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This Quarterly Review *is published by the Research and Statistics Group of the Federal Reserve Bank of New York. Remarks of* E. GERALD CORRIGAN, *President of the Bank, on legislative priorities begin on page 1. Among the staff members who contributed to articles in this issue are* ROBERT N. McCAULEY *and* STEVEN A. ZIMMER *(on explaining international differences in the cost of capital, page 7);* RAMA SETH *(on distributional issues in privatization, page 29);* LINDA A. BELL *(on union concessions in the 1980s, page 44); and* RICHARD CANTOR *(on interest rates, household cash flow, and consumer expenditures, page 59).*

A quarterly report on Treasury and Federal Reserve foreign exchange operations for the period February through April 1989 starts on page 68.

Legislative Priorities

Mr. Chairman and Members of the Committee: I am pleased to have this opportunity to appear before you this morning. The issues raised in your letter of invitation are of great importance now and well into the future. Not surprisingly, they are also exceedingly complex and do not lend themselves to a simple synopsis in the form of an opening statement. Therefore, I would propose to confine my prepared statement to an overview of the key priorities facing the Committee as I see them. However, I have appended to this statement several earlier public statements of mine—together with some statistical materials—that relate to the subject matter at hand, and I would ask that they be included in the record.

At the risk of an obvious oversimplification, I believe the issues before the Committee in seeking to shape its agenda can be viewed in the context of four central priorities, and my statement will proceed accordingly. In speaking to these issues, Mr. Chairman, I want to convey a sense of urgency, which is rooted in my conviction that failure to come to grips with these matters in a prompt and progressive fashion entails unacceptably high risks of major difficulties at some later date. I also want to be clear that the views I will express today are my own and should not be attributed to the Federal Reserve Board or the Federal Reserve more generally. Let me now turn to the four priorities.

The *first* and most important is that we, as a nation, must get on with the very pressing task of narrowing and eliminating the very large and persistent macroeconomic imbalances that, in my view, constitute a major threat to our economic and financial well-being over time. By macroeconomic imbalances I mean, of course, the sizable and inexorably interrelated gaps between what we import and what we export, between what we consume and what we produce, and between what we save and what we invest.

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Most would accept at face value the importance of eliminating these imbalances over time, but some might ask why it is so important in the specific context of the well-being of our financial markets and institutions, including their international competitiveness. As I see it, there is a very direct connection between these macroeconomic imbalances and the issues immediately before the Committee.

I say that for the following reasons: First, there is no question in my mind that the current imbalances in the U.S. and the global economy contribute importantly to the volatility we see in financial markets. This volatility can be the source of dangerous elements of risk—including systemic risk—to financial institutions and

Statement by E. Gerald Corrigan, President of the Federal Reserve Bank of New York, before the United States Senate Committee on Banking, Housing, and Urban Affairs on Thursday, July 13, 1989. The attachments referred to in this statement are not reprinted here.

markets. Second, as long as the budget deficit is so very large relative to domestic savings, we are, in effect, hostage to the willingness of foreigners to plug our savings gap at interest rates and exchange rates that are otherwise compatible with satisfactory overall economic and financial performance. Right now that process is proceeding in a relatively easy and painless fashion, but it has not always been that way. More to the point, there is absolutely no guarantee that it will stay that way in the future. Third, the high private savings rates and large current account surpluses in a number of other countries are a major factor contributing to the increased importance and enhanced competitive position of their financial markets and their financial institutions.

There is no question in my mind that the current imbalances in the U.S. and global economy contribute importantly to the volatility we see in financial markets.

Finally, I am convinced that a major factor in explaining the high cost of capital in the United States relative to Japan and Germany is to be found in patterns of macroeconomic performance here in the United States. Needless to say, those differences in the relative cost of capital have very important implications for the well-being and competitiveness of U.S. business enterprises, financial and nonfinancial alike.

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Let me elaborate briefly on this latter point. There is a widespread perception that the cost of capital in this country is higher than it is in Japan and Germany and that these differences are importantly related to tax rate and/or tax structure considerations. Based on work we have been doing at the Federal Reserve Bank of New York, it appears that the cost of capital in the United States is indeed high, but tax considerations are not the principal explanation. More specifically, the pronounced difference in the cost of capital seems to be importantly rooted in (1) differences in private savings rates and (2) higher risk premiums in the United States due to (a) greater volatility in macroeconomic performance and (b) higher and more volatile rates of inflation. This is not to say that other factors — including tax considerations — do not matter in explaining differences in the cost of capital. But it does suggest that the emphasis that is often placed on tax policy as the major or dominant factor in explaining these differences is misplaced. As always, at the end of the day it is the economic fundamentals that really matter.

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My *second* priority relates more directly to matters within the purview of this Committee. That second priority is the compelling need to proceed with the prompt, progressive, and comprehensive overhaul of the basic structure of our banking and financial system. The Committee is familiar with my views on this subject as set forth in my January 1987 essay on *Financial Market Structure: A Longer View*. Earlier this year, in addresses before the New York State Bankers Association and the Institute of International Bankers, I attempted to take stock of the progress that has been made in moving toward a more coherent, a more competitive, and a more stable banking and financial system over the past two or so years. My conclusion, unfortunately, was that on balance we had not made much progress, and from an international perspective we probably had lost ground.

The main thrust of my own thinking on this subject has not changed materially since my 1987 appearances before this Committee. For example, I still believe that the guiding principles and broad approach to reform outlined in my 1987 essay remain essentially valid today. Similarly, I remain of the view that structural reform of the banking and financial system must be accompanied with adaptations and enhancements of the supervisory process — a subject I will turn to shortly. Finally, I remain convinced that sound public policy demands that we strongly resist structural arrangements — whether they materialize by design or by accident — that would permit banking institutions having access to the public safety net to be owned and controlled by commercial concerns. If anything, recent developments — including experience with segments of

the thrift industry — have reinforced my belief in that regard. The reasons why I have such strong views on this subject are outlined in an excerpt from my June 1987 statement before this Committee, which is also appended to this statement.

While the broad thrust of my thinking about structural reform of the financial system has not changed, my sense of urgency about the task has grown. The reasons for this are rooted in market developments here and abroad, which in turn have important implications for (1) the competitive position of U.S. firms and U.S. markets and (2) the manner in which we and others seek to formulate effective supervisory and prudential policies. Looking around the globe, it is quite clear — especially in wholesale banking and financial markets — that the interrelated forces of technology and financial innovation are rendering segmented financial systems, such as we have in the United States, increasingly obsolete. Indeed, in virtually all other major industrialized countries the clear trend is toward more integrated financial institutions, with elements of commercial banking, securities activities, investment banking and, to a limited but growing extent, insurance activities coming under common ownership and control. The only major exceptions to this trend are in the United States and Japan, but even in Japan serious consideration is now being given to the substantial liberalization of Article 65 — the Japanese version of Glass-Steagall.

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As all of this occurs, not only do we run the very troubling risk of losing competitiveness — including the loss of jobs, income, and tax revenues in our major financial centers such as New York, Chicago, and San Francisco — but we also run the risk of fostering unnecessary and potentially dangerous political tensions concerning the rights and privileges of institutions to operate freely in foreign markets. For example, while I am clearly encouraged by the recent steps taken in Brussels to respond constructively to expressed concerns about the reciprocity provisions in the European Community banking directive, I am certain that difficult problems lie ahead in this area so long as the basic structure of our system is so different from most others.

This is not to suggest that we — or any other nation — should compromise basic national goals and priorities in the name of a "cookie cutter" approach to financial structure dictated by international considerations. That would be neither desirable nor appropriate. On the other hand, it would be equally undesirable and inappropriate to ignore developments in the global marketplace that have a direct impact on the prospective well-being of our financial markets and institutions. We can and must adapt our system in ways that are broadly sensitive to market developments while still consistent with our own national priorities, traditions, and culture.

My *third* priority relates to efforts to further modify supervisory approaches and the so-called safety net more generally to the needs of the day and beyond. At the heart of this issue is, of course, the very delicate balance between the dictates of a competitive, efficient, and market-driven financial system on the one hand and the preservation of a safe, sound, and stable system on the other.

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In approaching this task, we must keep in mind an important practical constraint: namely, it is impossible to conceive of an effective and durable approach to the restructuring of supervisory responsibilities among the various agencies unless and until we have come to grips with reform of the basic structure of the financial system itself. While the specific task of reshaping the structural approach to banking and financial supervision must, therefore, go onto the back burner, we do need a vision of what is important as we fashion policies in the interim and as we seek to adapt our attitudes to the needs of that broader and longer term goal. Several things strike me as important in this regard. They are:

- First, in my judgment we should operate on the assumption that systemic risk considerations are even more important than they once were, if only by virtue of the volume, speed, and complexity of

financial transactions and the related far-reaching operational, liquidity, and credit interdependencies between financial markets and institutions nationally and internationally. The fact that monetary policy now works mainly through interest rate and exchange rate channels — as distinct from de facto credit-rationing devices — only reinforces my belief in this regard.

We should operate on the assumption that systemic risk considerations are even more important that they once were, if only by virtue of the volume, speed, and complexity of financial transactions and the related far-reaching operational, liquidity, and credit interdependencies between financial markets and institutions nationally and internationally.

- Second, very strong capital positions for individual institutions — especially major institutions — are an absolute must. To put it bluntly, there is no banking system, no supervisory system, nor any safety net that can compensate for weakly capitalized financial institutions except at major costs to society at large. Stated differently, we simply cannot tolerate a system in which the incentives work to maximize profits and socialize losses.

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- Third, the Federal Reserve, as the nation's central bank, must remain a prominent part of the supervisory process. I raise that subject today because every now and then I hear the suggestion that the Federal Reserve should confine itself to monetary policy and leave the supervisory business to others. I also raise the subject gingerly because I know full well that there are those who will react to my statement by suggesting that it is motivated by turf or institutional self-interest considerations. For those who are inclined to that view I suspect there is nothing I can say that will change their minds. What I can say, however, is that from my perspective the relationships and the linkages between monetary policy and financial stability are profoundly important and ultimately inseparable. Moreover, if the Congress and the public at large expect that the Federal Reserve will continue to play a constructive role in helping to cope with financial problems when they arise, the Fed must continue to retain the tools, including on-site examination authority, necessary to do that job well.

Our system of official oversight must be predicated on the principle of consolidated supervision, including supervisory oversight of holding companies.

- Fourth, our system of official oversight must be predicated on the principle of consolidated supervision, including supervisory oversight of holding companies. This is a well-established principle on a global basis as it pertains to banking institutions. However, here in the United States and to a degree elsewhere, that principle is not followed for securities firms and investment banks. Moreover, there are those who would view firewalls as a substitute for consolidated official oversight. I simply do not share that view. Therefore, I believe we must — for both competitive and prudential reasons — clarify our thinking on the subject of firewalls and corporate separateness.

  As the Committee knows, I have always taken the view that firewalls can serve a useful and necessary purpose. They help protect against unfair competitive practices; they help guard against conflicts of interest; they help protect the integrity of the deposit insurance system and the safety net more generally, and they help to facilitate a system of functional supervision. Having said that, I have also consistently maintained that in practice, when the temperature goes up, the firewalls tend to melt. I have further maintained that insofar as the marketplace is concerned, in times of stress, firewalls become something of a fiction. Never was that more clear than at the time of the October 1987 market break. In that setting, when questions arose in the marketplace both here and abroad about the creditworthiness of individual firms, those questions pertained to the company as a whole, with almost total disregard for the niceties of corporate structure.

  If that is a reasonable description of the realities of the marketplace, then it seems to me to follow that we must be prepared to think about two possibilities that lie well outside the bounds of conventional thinking in this country. One possibility is that we try to recondition attitudes in the mar-

ketplace to accept a legalistic view of absolute corporate separateness. That, however, strikes me as wholly impractical, especially since it would have to be achieved on a global basis to be effective. Indeed, leaving aside completely the question whether CEOs and boards of directors are prepared to accept this view of the world, I know for a fact that authorities in many other countries simply do not look at things in this manner.

The other possibility is that maybe—just maybe—we have to begin thinking in terms of something that leans in the direction of the so-called universal bank model. Having said that, let me hasten to add that I'm not stating a conclusion. But I would be less than candid if I did not acknowledge that I now give this possibility more serious thought than I once did.

The other possibility is that maybe—just maybe—we have to begin thinking in terms of something that leans in the direction of the so-called universal bank model.

That brings me to another controversial subject. Namely, of all the public policy considerations relating to the operation of the banking and financial system, the greatest concern is that of systemic disruption or failure. Having said that, let me now say quite directly something I have hinted at in the past. That is, the potential systemic damage growing out of the sudden and uncontrolled failure of a large, globally active nonbank financial firm can be just as great, if not greater, than the damage that can arise from the demise of a large, globally active banking firm. Indeed, this can be true even for some smaller firms. However problematic that view may be, it is, in my judgment, the reality. In turn, it is one of the reasons why I believe that the principle of consolidated supervision—which, among other things, fosters centralized systems of risk control and management—is so important. More generally, the systemic risk phenomenon also needs to be taken into consideration in the context of the national debate on financial structure.

In closing, Mr. Chairman, I have a *fourth* priority I want to comment on very briefly with a view toward getting the subject on the table rather than offering any hard suggestions. That fourth priority is that we do all we can to move more fully and more forcefully in the direction of greater coordination and harmonization of supervisory and prudential policies both domestically and internationally.

This call for greater harmonization obviously applies to the basics of financial structure as well as to central elements of prudential policies such as capital standards. But it applies in other areas as well. For example, I place great importance on what I call the "plumbing" of the financial system—the day-to-day, hour-by-hour, and minute-by-minute workings of payment, clearance, and settlement systems. While it is not fundamentally a legislative matter, seeking to extend efforts aimed at coordination and harmonization to encompass operational policies and practices that relate to key elements of the "plumbing" of the system strikes me as an important objective in its own right. Over the past several years—perhaps especially in the post-stock-market-break interval—we have seen major gains in this regard. And still other initiatives in both the public and private sector are under way.

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Much is at stake, not only for our financial institutions and markets but for our national well-being more generally. The longer we fail to forge a coherent approach to these problems, the greater the danger that we will find ourselves scrambling for ad hoc solutions in a less hospitable environment than we face today.

However, in all of this, we are trying to hit a very rapidly moving target in a setting in which the risks of competition in laxity and regulatory arbitrage, nationally and internationally, are very real. To cite an illustration, if we take a fairly straightforward activity such as foreign exchange trading in New York and London, there are at least five different regimes of capital and prudential standards that apply to that single activity depending on whether the firm in question is a bank, a

merchant bank, an investment bank, a branch of one of the above, or a subsidiary of one of the above. Of course, if we put into the equation foreign exchange derivative products such as exchange traded futures and options as well as over the counter options, the matrix of regulatory regimes is probably increased by a *factor* of five.

That little example, Mr. Chairman, is reflective of the complex and technologically integrated financial world in which we live. And it is also reflective of why I come before you with the sense of urgency I hope I have conveyed. Much is at stake, not only for our financial institutions and markets but for our national well-being more generally. The longer we fail to forge a coherent approach to these problems, the greater the danger that we will find ourselves scrambling for ad hoc solutions in a less hospitable environment than we face today.

Explaining International Differences in the Cost of Capital

The chronic weakness of the U.S. trade position has raised concerns about what factors may lie behind this country's reduced competitiveness. One factor often cited in this regard is consistently lagging investment relative to other countries (Chart 1). Many elements can affect investment efforts. Certainly, the expected growth of markets for output is important, as is the pace at which technological change can be embodied in capital equipment. But differences in the cost of capital between nations are often viewed as contributing significantly to divergent investment performance.

This article estimates the cost of capital for corporations in the United States, Japan, Germany, and Britain in the period 1977-88 and finds that the United States and Britain labor under a decided disadvantage in relation to the other two economies. The second half of this article examines potential explanations for this finding.[1] We reject income tax structures as an important determinant of the cost of capital gap. Rather, we contend that higher household savings in Japan and Germany and more successful policies for maintaining stable growth in Japan and stable prices in Germany have opened up the gap. In addition, we stress the importance of international differences in the relation of banks to industry and in the policy response to corporate distress. Industrial organization and policy enable firms in Japan and Germany to cheapen their capital through greater use of debt at lower risk premia.

Forces now at work to close the gap between the United States and United Kingdom, on the one hand, and Japan and Germany, on the other, may well prove slow acting and weak. There are signs that U.S. corporations, and perhaps also British corporations, are consciously leveraging up, spurred on by the cost advantages enjoyed by more leveraged international competitors. But leveraging may not be very effective in narrowing the gap. U.S. public policy toward financial distress puts the official sector at arm's length from corporate debtors and their creditors and tends to resist government bailouts or approved cartelization in troubled sectors. This policy of nonintervention, which touches values transcending the cost of capital, increases the degree of economic competition but raises the level of risk as well. That risk limits the extent to which U.S. and British corporations can cheapen their cost of capital through leverage.

Trends in the underlying determinants of the cost of capital suggest only limited prospects for improvement of the U.S. relative cost disadvantage without policy changes. Demographics will favor some rise in household savings in the United States; households abroad are likely to continue to gain more access to credit and

[1] Earlier, less systematic inquiries into the causes of the gap include Albert Ando and Alan J. Auerbach, "The Cost of Capital in the U.S. and Japan: A Comparison," *Journal of the Japanese and International Economies,* vol. 2 (1988), pp. 134-58; Albert Ando and Alan Auerbach, "The Corporate Cost of Capital in Japan and the United States: A Comparison," in John B. Shoven, ed., *Government Policy Towards Industry in the United States and Japan* (Cambridge: Cambridge University Press, 1988), chap. 2, pp. 21-49; George N. Hatsopoulis and Stephen H. Brooks, "The Gap in the Cost of Capital: Causes, Effects, and Remedies," in R. Landau and Dale Jorgensen, eds., *Technology and Economic Policy* (Cambridge: Ballinger, 1986), chap. 12, pp. 221-80. See our "Explaining International Differences in the Cost of Capital: the United States and United Kingdom versus Japan and Germany," Federal Reserve Bank of New York Research Paper no. 8913, for a more technical version of this article and more complete references.

thereby to lower their savings rate. Forces are operating to loosen the ties between Japanese and German corporations and their banks and to render government assistance to distressed sectors in Japan more difficult. These prospects alone, however, do not suggest a substantial closing of the cost of capital gap. More fundamentally, a monetary policy yielding stable prices and a fiscal policy consolidation offer the most potent means for the United States to redress its cost of capital disadvantage.

Measuring the cost of capital

The cost of capital is the minimum before-tax real rate of return that an investment project must generate in order to pay its financing costs after tax liabilities. The cost of capital will be determined by the required payments to a firm's debt and equity holders, which we call the cost of funds, as well as by the economic depreciation of the investment, the tax treatment of that depreciation, the taxation of corporate earnings, and any fiscal incentives for investment.

Professional usage, as well as ordinary language, often equates the cost of funds with the cost of capital. Beyond the difference in terminology, however, lie two important economic distinctions. First, while a higher corporate income tax rate lowers the after-tax cost of funds by increasing deductions for interest payments, businessmen do not clamor for higher tax rates. Their behavior is understandable in light of the effect of higher taxes on the cost of capital: for a given cost of funds, a higher corporate income tax rate raises the cost of capital, since it increases the pre-tax rate of return that a project must generate. The net effect of an increase in the corporate tax rate is usually a rise in the cost of capital.

Second, while the cost of funds that a borrower faces is the same for all projects, the cost of capital is subject to influences that vary with the type of investment in different ways across countries. The most important influences are the tax treatment of depreciation and investment tax credits.

Judging whether corporations in one economy enjoy an advantage over their counterparts in financing a given project, therefore, requires more than analysis of financial market prices. One must demonstrate that any international disparity in the cost of funds survives differences in general corporate tax rates, investment tax rates, and depreciation allowed by national tax systems, taking account of the interaction of these factors with inflation.

The cost of debt and equity

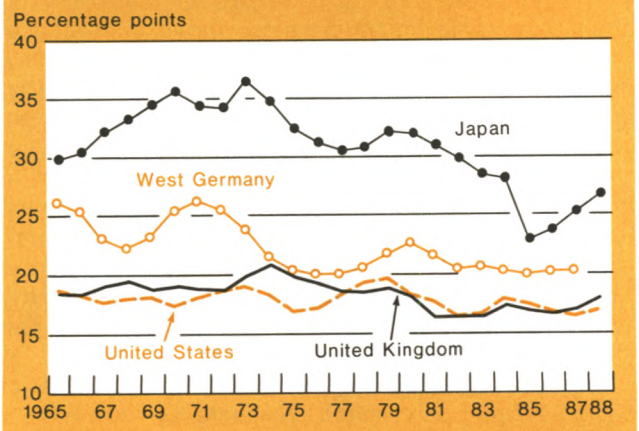
Investment can be financed by two basic kinds of claims on the stream of returns from the investment project: debt or equity. The cost of funds is defined as a weighted average of a firm's debt and equity costs. We measure first the cost of debt, then the cost of equity, and then combine the two according to the shares of debt and equity in the capital structure of the representative firm. Our measurements aim to capture the cost to the aggregate of nonfinancial firms in the four economies.

The cost of debt

The cost of debt is defined as the real after-tax rate of interest faced by nonfinancial corporate borrowers. Estimating this measure begins with the nominal rate of interest paid by firms in each country on their mix of debt.[2] For reasons discussed below, this rate is then adjusted to account for the effects on borrowing costs across countries of different levels of liquid assets held by corporations. Inflation, measured by the GNP deflator, is subtracted from the nominal interest rate to give a more comparable measure of real rates of interest. Finally, the allowable deductions from corporate income taxes for nominal interest payments in all four countries are netted to put these real rates on an after-

Chart 1

Gross Fixed Capital Formation as a Share of GDP



Source: Organization for Economic Cooperation and Development.

[2]We assume that corporations finance themselves in their home currencies. Both survey results and anecdotal evidence strongly suggest that domestic firms borrow in foreign currency either to finance investment by subsidiaries abroad or to swap the proceeds into domestic currency. In the former case, the borrowing does not affect the cost of funds for domestic investment. In the latter case, the swap market is typically efficiently arbitraged so the all-in borrowing cost is the same in the domestic currency.

tax basis (Chart 2).

Corporate indebtedness comprises liabilities to banks, to bondholders, and to other creditors such as insurance companies and pension funds. Data from corporate balance sheets indicate that bank and bond debt typically amounts to 80 percent of total debt in each of the four countries considered. Owing to data limitations, miscellaneous debt has to be treated as an appropriately weighted mixture of bank and bond debt. Shares of bond debt and bank debt are then used to weight the interest rates payable on each in order to construct the nominal average cost of debt.

Bond yields are easy to observe, while the true cost of bank debt is more difficult. Bond rates are taken to be the yield on new issues of medium-term bonds of AA-rated corporate issuers. Measuring the cost of bank borrowing is not straightforward because a bank loan often represents just one item in a package of services that a corporation obtains from a bank.

Adjustment must be made for the differing propensities of corporations across nations to hold liquid balances. Liquid balances yielding less than market rates may be required by banks, especially in the presence of regulation of bank loan rates, to raise the effective cost of bank loans (see Appendix, equation 1).

Finally, accounting for differences in inflation and taxes permits a comparison of real after-tax effective rates of interest in the four countries (see Appendix, equation 2). Just as increased international capital flows in the 1980s have not equalized real interest rates,[3] so too they have not eliminated differences in real corporate borrowing costs (Chart 2). While the distortions of inflation are evident in the first half of the period, in the second half, real after-tax debt costs are similar for the United States (1.85 percent), Japan (1.82 percent), and Britain (1.82 percent). Low real rates after tax for German firms (-0.05 percent) reflect their heavy reliance on bank loans that have carried consistently low real rates of interest in this decade.

Differences in the pre-tax real cost of debt narrow when costs are put on a post-tax basis. Higher inflation economies improve their relative position because the entire nominal interest payment is deductible, even the portion that simply compensates lenders for the erosion of principal owing to inflation.

The cost of equity

Measuring the cost of equity poses far greater difficulty than measuring the cost of debt. The preferred conceptual measure of the cost of equity is the sustainable post-tax profit rate. To give empirical content to that concept requires a basic choice between two competing approaches. One method measures the pre-tax holding period return, both capital gains and dividends, as a proportion of market value. This ratio recommends itself because it captures the return realizable by shareholders. In the long run this method accurately measures the cost of equity, but in the short run it can mislead owing to its volatility. Worse yet, when market pricing shifts to incorporate a new discount rate for future cash flows, realized gains send the wrong signal. As the real long-term interest rate falls, for example, a corresponding decline in the required rate of return on equity is expected. For the ongoing return to equity to decline, stock prices must first rise to a new, higher level. The realized-gain measure, however, shows a short-term rise in the cost of equity. For such reasons, this study takes a second approach, accepting the market valuation of corporate earnings as the basic measure of the cost of equity. Adjustments are then necessary to produce comparable costs of equity because of international differences in inflation, depreciation rules, inventory behavior, ownership patterns, and accounting conventions.

Estimation of the cost of equity starts with the inverse of the value multiple that the equity market assigns to a given stream of earnings, the price-earnings ratio. Various potential adjustments can then be made to earnings to produce a true cost of equity.[4] Some adjustments apply to all countries — adjustments for the effects of inflation on depreciation allowances, on inventory profits, and on nominal interest payments and for the differential prospects of corporate earnings growth. Other adjustments are country-specific — in Japan, a novel adjustment for the underreporting of earnings on shares held by other corporations; and in Japan and Germany, adjustments stemming from additions to reserves for employees' retirement payments. Although each adjustment deserves examination, we do not deem it necessary or appropriate to implement every one.

(1) Depreciation: Earnings must be adjusted downward to reflect inflation's erosion of the historical values used for depreciation and upward to reflect acceleration of tax depreciation schedules. Economic earnings are overstated in an inflationary environment because historical costs used in tax and accounting allowances fall short of replacement values for plant and equipment. Partly in response to this distortion, tax laws at times speed up permitted depreciation rates beyond

[3]See Bruce Kasman and Charles Pigott, "Interest Rate Divergence among the Major Industrial Nations," this *Quarterly Review*, Autumn 1988, pp. 28-44.

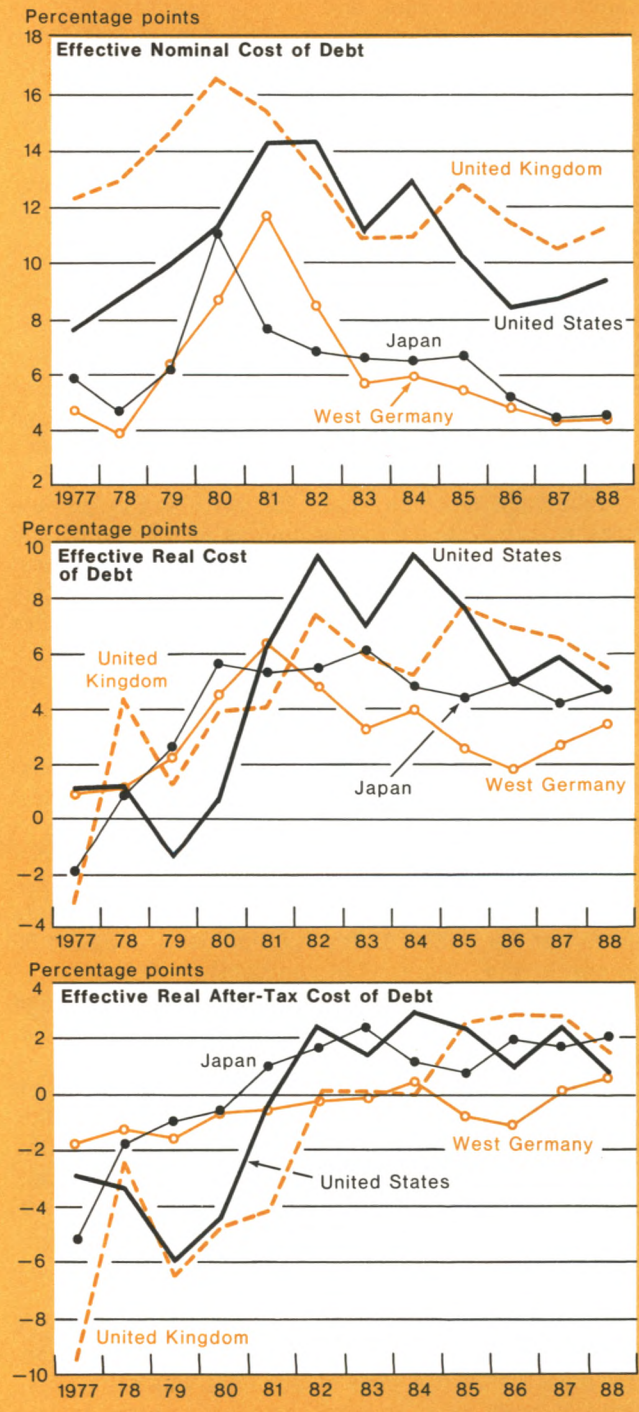
[4]Most of these adjustments are discussed in Ando and Auerbach, "Cost of Capital" and "Corporate Cost of Capital"; and Hatsopoulis and Brooks, "The Gap." Paul H. Aron, "Japanese Price Earnings Multiples," Daiwa Securities America, 1981-87 reports, provides background on the interlocked shareholding pattern of Japan.

Chart 2

The cost of debt is defined as the real after-tax interest rate faced by corporate borrowers. This measure is built up by starting with a weighted average of rates on bank and bond debt adjusted for differing propensities of firms to hold liquid assets, . . .

. . . then subtracting the actual inflation rate to produce a standard real rate of interest measure, . . .

. . . and, finally, correcting for allowable tax deductions on corporate interest payments to place costs on a real after-tax basis.



Note: Chart 2 incorporates data from the following sources -- Federal Reserve Board, U.K. Central Statistical Office, Deutsche Bundesbank, Bank of Japan, Japan Ministry of Finance, International Monetary Fund, Organization for Economic Cooperation and Development, Yamaichi Research Institute, Price Waterhouse, Statistical Office of the European Communities.

economic rates. Earnings for all countries must be adjusted, but the procedures vary across the four countries, as outlined in the Appendix.

Only for Germany, where the tax code does not permit accelerated depreciation, does the adjustment consistently reduce earnings and the cost of equity (Table 1). The 1981 tax act lifted U.S. tax depreciation above economic depreciation from 1983 on. British companies experienced the opposite shift when they lost the ability to deduct much investment as an expense in the early 1980s. Accelerated depreciation in Japan has more than offset the effect of inflation in the latter half of the 1980s.

(2) Inventory profits: This adjustment reduces earnings to remove purely inflationary gains on goods in inventory. If a corporation uses first-in, first-out (FIFO) accounting, the real cost of goods sold will be understated by the extent of inflation over the inventory holding period. If the corporation uses last-in, first-out (LIFO) accounting, the real cost of goods sold will be understated when the firm reduces its inventory, with the size of the understatement dependent on the extent of the inventory rundown and on the age distribution of the inventory. The appropriate inventory cost adjustment is straightforward for U.S. and U.K. corporations but more problematic in Japan and Germany (see Appendix).

Table 1

Summary of Adjustments to Cost of Equity
(Percentage Points Addition)

		1977-88	1977-82	1983-88
Depreciation	United States	0.70	−1.04	2.44
	Japan	−0.28	−0.94	0.38
	Germany	−2.42	−3.16	−1.68
	United Kingdom	−0.33	1.19	−1.85
Inventory	United States	−1.33	−2.21	−0.45
	Japan	−0.69	−1.22	−0.16
	Germany	−0.58	−0.87	−0.30
	United Kingdom	−2.67	−4.24	−1.10
Net nominal liabilities/ inflation	United States	1.20	1.50	0.89
	Japan	2.27	4.02	0.51
	Germany	2.64	3.91	1.37
	United Kingdom	2.63	4.00	1.27
Growth	United States	2.3	2.3	2.3
	Japan	3.0	3.2	2.7
	Germany	1.8	1.9	1.7
	United Kingdom	1.4	1.2	1.7
Crossholding	Japan	1.17	1.19	1.14
Total	United States	2.86	0.54	5.18
	Japan	5.43	6.28	4.57
	Germany	1.43	1.77	1.08
	United Kingdom	1.06	2.09	0.02
Total without growth	United States	0.57	−1.74	2.88
	Japan	2.47	3.06	1.87
	Germany	−0.37	−0.11	−0.62
	United Kingdom	−0.37	0.94	−1.68

(3) Inflation's effect on nominal interest payments: The overstatement of borrowing costs in an inflationary environment has a counterpart in the understatement of earnings. With no inflation, only real interest payments are subtracted from cash flow to arrive at earnings; with inflation, nominal interest costs represent not only the real interest rate but also a payment that compensates for inflation. In effect, this extra payment is a capital loss, not a current cost, and should not be accounted as a reduction in the firm's earnings.

For example, consider a firm with $100 million of floating-rate debt and $100 million of book equity financing nondepreciating fixed capital in an environment of 10 percent inflation and 12 percent nominal interest rates. Over a year, the firm contracts no net debt and reports no earnings. By usual accounting, its debt and equity remain unchanged; its capital structure remains half debt and half equity. It is true that in the previous year's prices, its debt has actually declined by 10 percent. But the debtholder is compensated by the inflation premium in the nominal interest rate. Most of the nominal interest payments serve as a realized capital loss, a liability equivalent of the inventory profits discussed in the preceding section, and should be removed from the income statement.

(4) Differential growth rates: Differing growth prospects for the corporate sectors of the four economies under consideration suggest another adjustment of the cost of equity measure. Theoretically, the cost of equity should be equal to the current profit rate, after appropriate adjustments, plus the rate of growth of profits. Making an allowance for different perceived growth prospects across nations is the analog of ascribing a fast-growing company's high price-earnings to rapid anticipated earnings growth rather than a low cost of equity. Ignoring the growth of profits tends to bias upward the cost of equity for low-growth countries relative to that of high-growth countries.

While the effect of expected differences in profit growth on cost of capital comparisons must be kept in mind, making precise quantitative adjustments is problematic. Japan, for example, is generally thought to have a higher potential growth rate than the other three countries, but the difference has narrowed in the last 10 years.[5] Whether the gap will continue to narrow or remain stable is necessarily difficult to say. Our approach to this problem is to recompute the cost of

[5]Bruce Kasman, "Japan's Growth Performance over the Last Decade," this *Quarterly Review*, Summer 1987, pp. 45-53.

equity, adding to our current profit rate measures of the potential growth of the corporate sectors of the four economies as estimated by researchers at the International Monetary Fund.[6] Building expected growth rates into the cost of equity lifts the U.S. average from just below to just above the U.K. average; Japan's advantage is preserved but narrowed by one percentage point (Charts 3 and 4). Because this adjustment is rough and does not significantly affect the ranking of the countries, we retain the original cost of equity measure without the growth rate adjustment.

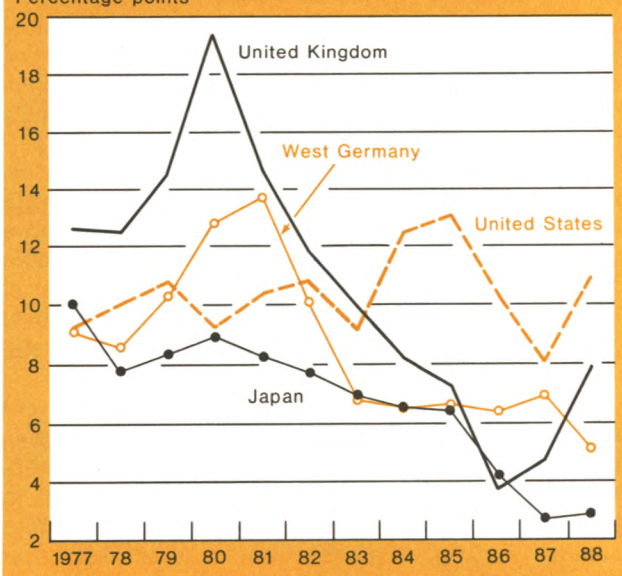
(5) Crossholding of Japanese shares: This adjustment, made solely to the Japanese costs of equity, accounts for the understatement of corporate earnings stemming from extensive ownership by affiliated firms of each other's shares. The need for this adjustment arises because a Japanese firm that holds less than a 20 percent share of a second corporation does not include the retained earnings of the latter corporation in its own reported earnings. At the same time, the crossheld shares are not excluded from the value of the outstanding shares of the second company. As a consequence, the outstanding value of shares overcounts the net value held outside the corporate sector when compared to reported earnings. Since listed firms own a large and rising portion of all shares, crossholding results in a serious understatement of profits in Japan.

(6) Employee retirement payments: A final matter that merits discussion is how to treat reserves for employees' retirements. Some analysts have adjusted Japanese corporate earnings upward by treating these reserves as retained earnings. We consider this inappropriate and have made no such adjustment.

Japanese firms accumulate internal reserves against their promise to make a lump-sum payment of three or four years' wages to retiring workers. German firms accumulate reserves to pay retirement annuities, as do U.S. firms, but carry the funds as an on-balance-sheet liability and can use the funds for general corporate purposes, as in Japan. An important difference in fiduciary responsibility emerges: General Motors' pension management subsidiary by law cannot invest all its funds in its parent, but Daimler Benz may use employees' savings to finance plant and equipment or

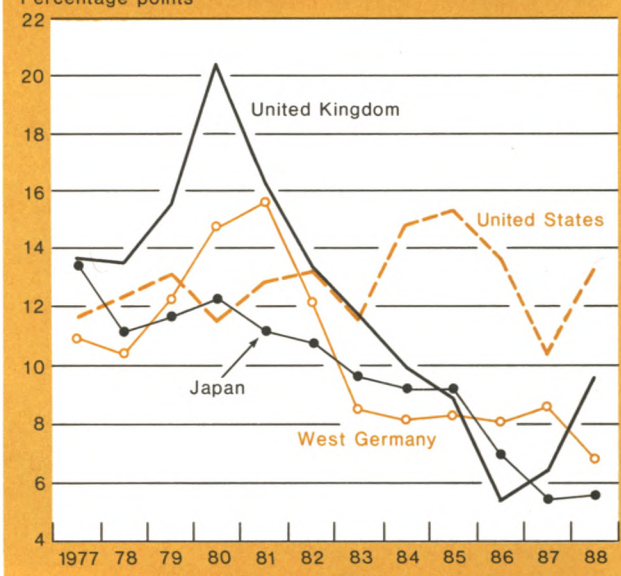
[6]Charles Adams, Paul R. Fenton, and Flemming Larsen, "Potential Output in Major Industrial Countries," in *Staff Studies for the World Economic Outlook*, August 1987, p. 24.

Chart 3
Cost of Equity



Sources: Federal Reserve Bank of New York staff estimates and data from Morgan Stanley Capital International.

Chart 4
Cost of Equity Including Profit Growth Rates



Sources: Federal Reserve Bank of New York staff estimates and data from Morgan Stanley Capital International and International Monetary Fund.

acquisition of shares in suppliers or new businesses.

For our purposes, however, it is irrelevant whether contributions are made to a retirement reserve that appears on the balance sheet, as in Japan and Germany, or to a "firewalled" pension fund set apart from the company, as in the United States or United Kingdom. While these differences may have significant implications for corporate control and market constraints on management, they do not drive a wedge between true profits and reported profits.

Retirement funds affect the proper statement of profits only insofar as their value does not grow in line with the corporate obligation. To the extent that contributions to a retirement fund exceed the increase in the present value of retirement obligations, reported profits understate true profits. To the extent that contributions to a retirement fund fall short of the increase in the present value of retirement obligations, reported profits overstate true profits.

Taking all these adjustments into account, we obtain the measures of the cost of equity in the four countries shown in Chart 3. Japanese corporations have generally enjoyed lower equity costs than the other three countries, and U.S. firms have generally faced the steepest equity costs. The effect of bull stock markets in the 1980s is evident in the generally declining trend of equity costs.

A comparison of debt and equity costs shows that debt is generally cheaper than equity. Only for Japan in the last couple of years are the two costs close, that is, within 1 percent.

Cost of funds

The costs of debt and equity combine to produce a cost of funds. Weighting the two presents conceptual and measurement problems. This article adopts a weighting based on the market value of equity and the book value of debt. By this measure, German and Japanese corporations are more leveraged than U.S. and U.K. firms, and U.S. firms are leveraging up while Japanese firms are deleveraging at a more rapid pace (Chart 5).

The costs of debt and equity, weighted by book debt and market equity, yield an after-tax cost of funds (Chart 6). Japan and Germany claim the advantage of cheaper corporate funding. Japan's advantage derives from debt and equity that are both relatively cheap while Germany's advantage resides in cheap debt.

The argument for this choice of weighting scheme is grounded in both managerial practice and theoretical considerations. U.S. corporations actually use such a measure, and corporate funding in the four countries largely tracks it. While the measure is a simplification built on directly observable data, its deviation from the theoretically correct measure is limited.

Changing capital structure

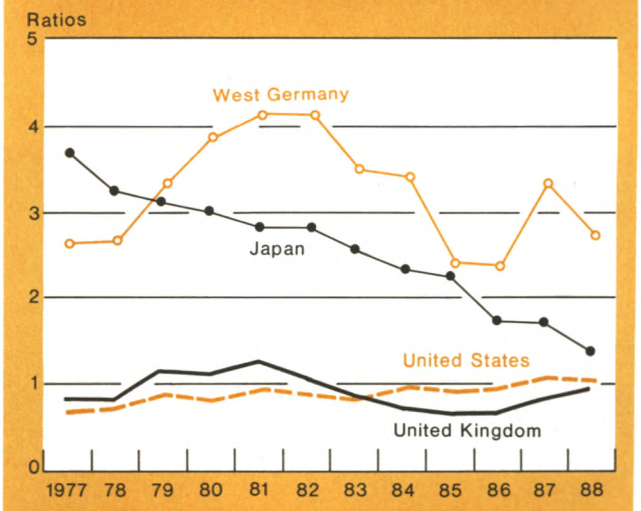
A problem arises in using observed capital structure to weight debt and equity costs if corporations are making their investment decisions on the basis of a planned change in the mix of debt and equity. Indeed, survey evidence on large firms' assessment of capital costs points to the importance of target capital structure.[7] If this structure differs from current capital structure, new financing patterns must be used to make the transition. Examination of the flow of actual financing can indicate the relation of target to actual structures. If the flow of financing for marginal assets matches the existing capital structure, then target leverage may be taken as equal to actual leverage in the aggregate. If the flow of financing does not match the stock, then further consideration of the appropriate weights for debt and equity is in order.

Changes in the relation of book debt to market equity arise from various sources. One source, the market

[7]Lawrence J. Gitman and Vincent A. Mercurio, "Cost of Capital Techniques Used by Major U.S. Firms: Survey and Analysis of Fortune's 1000," *Financial Management*, vol. 11 (Winter 1982), p. 23. For a comparison across countries, see James E. Hodder, "Evaluation of Manufacturing Investments: A Comparison of U.S. and Japanese Practices," *Financial Management*, vol. 15 (Spring 1986), pp. 17-24.

Chart 5

Debt/Market Equity Ratios



Sources: Bank of Japan, Federal Reserve Board, U.K. Central Statistical Office, Organization for Economic Cooperation and Development, Japan Management and Coordination Agency, Tokyo Stock Exchange.

price of equity, is largely outside the control of management, while three others are under its more immediate direction: net debt issuance, net equity issuance, and payment of dividends or, equivalently, retention of earnings. We consider a measure of the flow of financing decisions based on the three sources of change under management's control and then compare it to the ratio of book debt to market equity in the preceding period.

Management adds to real debt by net nominal debt issuance in excess of the rate of inflation. Many discussions of the sources of corporate financing fail to take explicit account of inflation in this manner, with the result that they overstate reliance on debt in cases of higher inflation. Management adds to equity through net equity issuance and through retained earnings, which may be thought of as sustainable profits less dividends paid out.

Managed leveraging

We call the change in leverage over time produced by real net borrowing, retained earnings, and net equity issuance, "managed leveraging."[8] This flow of financing is displayed as an index in Chart 7: a rising index indicates that debt is rising faster than equity; a falling index shows that equity is growing faster than debt. The partial convergence of leverage across countries that showed up in measures based on the outstanding values of debt and equity (Chart 5) emerges in the financing flows indicator as well. This can be seen by comparing debt-equity ratios in 1988 with those for the base year.

U.S. firms have been actively leveraging up since 1983; British firms geared up in 1984 and again in 1988, while German firms are actively deleveraging. By contrast, Japanese firms do not appear to be managing a change in their leverage in the most recent years,

$$[8]\ \Delta DE_t = \prod_{i=0}^{t} \left\{ \left[\frac{1 + N_{D_i}}{1 + \pi_i} \right] \cdot \left[\frac{(1 + N_{E_i}) * (1 + ev_i)}{(1 + dv_i)} \right]^{-1} \right\},$$

where

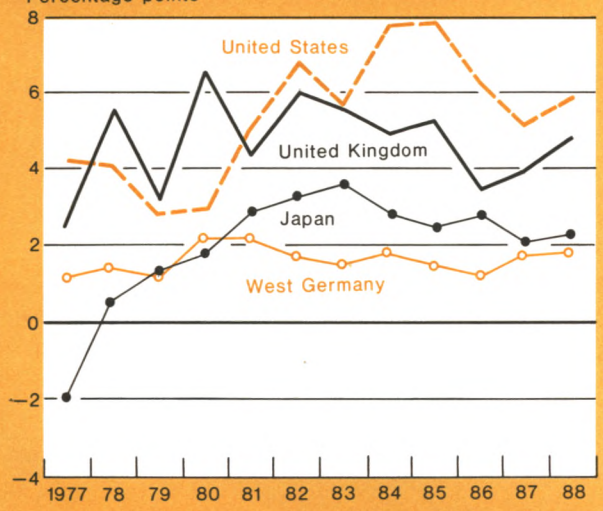
ΔDE_t = index of intentional change in debt/equity ratio
dv_t = dividend rate at time t

Footnote 8 *(continued)*

N_{E_t} = net equity issuance / market value of equity
N_{D_t} = net debt issuance / book value of debt
ev_t = adjusted profit rate
π_t = inflation rate for period t.

Chart 6

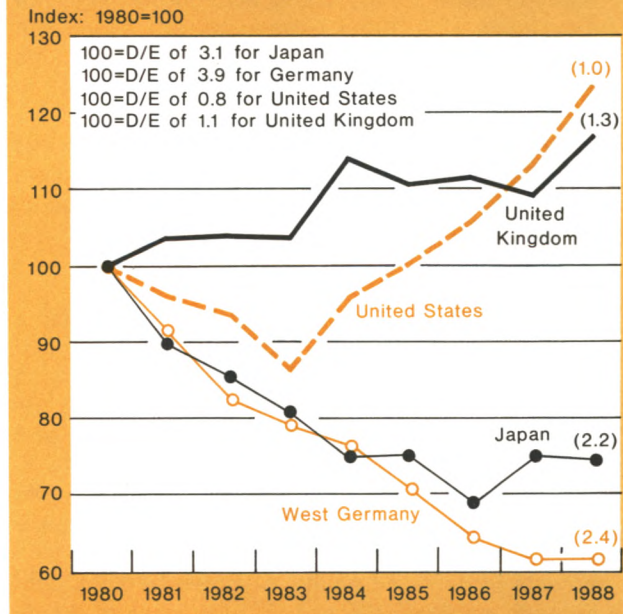
Real After-Tax Cost of Funds



Source: Federal Reserve Bank of New York staff estimates.

Chart 7

Managed Leveraging



Sources: Federal Reserve Bank of New York staff estimates and data from Tokyo Stock Exchange, Japan Ministry of Finance, Yamaichi Research Institute, Federal Reserve Board, Statistical Office of the European Communities, International Stock Exchange, Morgan Stanley Capital International.

Notes: Numbers in parentheses are 1988 D/E ratios implied by 1980 base and managed leveraging over the 1980-88 period. The 1988 data for Germany and the United Kingdom are Federal Reserve Bank of New York staff estimates.

suggesting little aggregate difference between target and actual capital structure. We conjecture that German firms, under no pressure to disgorge equity through dividends and unable to repurchase shares, are letting the flow of retirement reserves replace debt.

The problem of a target capital structure that differs from actual structure remains for U.S. firms and, to a lesser extent, U.K. firms. Even if U.S. managers are relying heavily on debt to fund their marginal assets, however, their cost of funds does not in general reduce to the cost of debt. If an investment project is long-lived in relation to the transition period needed to reach the target capital structure, the target debt-equity ratio offers appropriate weights. Only if the project were to be exhausted during the transition period would the cost of debt alone be the appropriate cost of funds. In general, the weight of debt in the cost of funds is directly related to the portion (in present value terms) of a project's life falling in the transition period.[9]

It is fair to presume that the transition period is short in relation to the life of the average investment project in U.S. corporate finance. Recapitalization through leveraged buy-outs, special dividends, and stock repurchases can take mere months and could hardly average more than two years. The average investment project, by contrast, stretches over seven years. Any error introduced by using actual debt in the weighting rather than target debt is limited since there is a strong presumption that a firm cannot plan to fund exclusively with debt.

The cost of capital

The cost of funds does not measure investment costs but rather represents an intermediate step in figuring the cost of capital. The cost of funds does not account for all effects of inflation and taxation on corporate profits and neglects differences in depreciation schedules and investment tax incentives. No statement about relative costs of capital can safely be based on the relative cost of funds.

The appropriate hurdle for an investment project to clear is the cost of capital, the real pre-tax rate of return that covers both the company's after-tax cost of funds and its tax obligations. The cost of capital is satisfied when revenues cover (1) the cost of equity as weighted by equity's share in the capital structure, (2) the effective cost of debt as weighted by the debt share, and (3) income taxes, taking into account the tax value of any investment tax credit and depreciation allowance and discounting by the after-tax cost of funds (see Appendix).

The country rankings for the required rate of return on an investment in plant or equipment generally match the country rankings for the cost of funds (Table 2). This finding should be understood as the result of two forces working in opposite directions. Higher inflation raises the U.S. and U.K. corporate cost of capital by eroding the present value of depreciation allowances and generating spurious earnings on inventory, developments which both act to raise the tax on economic profits. But higher inflation in the United States and Britain is offset by tax rates that are lower than those in Japan and Germany.

The difference that inflation and investment tax policy make can be seen over time. Observe that the U.S. cost of funds rises over the sample period, while the cost of capital for a 20-year machine falls. High inflation in the early part of the period not only increased the interest tax deductions, as reflected in the cost of funds, but also eroded depreciation and imposed the "inventory tax," as reflected only in the cost of capital. In addition, accelerated depreciation for machinery over most of the latter half of the sample period lowered the hurdle rate for machinery.

That the British cost of capital for 20-year machinery and 40-year buildings tracks the cost of funds is partly coincidental. Sharp depreciation schedules in the first half of the period offset the tendency of inflation to raise the cost of capital.

The cost of capital captures differences in the relative cost of projects. The low cost of funds offers Japanese and German firms a greater advantage in long-term projects. U.S. firms actually had the lowest cost of capital for a three-year expensed project in 1984-86. The shorter the project life, the less important are funding costs, so the low U.S. tax rate dominated. The German and Japanese cost of capital advantage emerges and widens as the project life extends from 3 years to 20 years to 40 years to infinity, the life-span of investment in land.

The required rates of return for a research and development (R&D) project illustrate how a relatively high cost of funds erects a high hurdle for investments with delayed payoff and how a tax credit can lower the

[9] The appropriate weight of debt is given by the following:

$$d_t = (\gamma_t * d\tau_t) + \{(1 - \gamma_t) * dss_t\},$$

where

$d\tau_t$ = debt as share of total financing flows during transition period

dss_t = debt as share of total firm value in steady state

$$\gamma_t = \frac{\sum_{i=0}^{m} \left[\prod_{k=t}^{t+i} (1 + R_k)^{-1} \right]}{\sum_{j=0}^{n} \left[\prod_{h=t}^{t+j} (1 + R_h)^{-1} \right]} \quad \text{if } m \leq n$$

$\gamma_t = 1$ if $m > n$

where m = length of transition period

n = length of life of investment project

R_t = discount rate for period t.

hurdle. The archetypal R&D project analyzed here bears fruit after 10 years and its yield falls off geometrically thereafter. The contrast between U.S. and Japanese required rates shows how delayed revenues magnify cost of funds differences. The contrast is equally stark for U.K. and German required returns. Cutting across these funding advantages, the tax credits of 20 percent to 25 percent for R&D enjoyed by U.S. and Japanese firms over these years lower their hurdle rates as compared to U.K. and German firms, respectively. In the absence of the credits, the U.S. cost of capital for such projects would approximate the British cost, while the cost of capital for such projects in Japan would be closer to that in Germany. It should be noted that these calculations do not capture the uncertainty attending the periodic renewal of the U.S. R&D credit or the availability of various R&D credits from the provincial governments in Germany.

Explanations of the cost of capital gap

Possible explanations of the gap in the cost of capital fall into four broad categories: (1) corporate and personal income tax structures; (2) factors affecting personal savings efforts, especially the rates of return required by households and the rationing of credit; (3) macroeconomic stability; and (4) capital structure permitted by relations among corporations, banks, and governments. We reject the first explanation and accept the others with varying confidence.

Differences in personal and corporate income taxation

In a world with imperfect capital mobility we would expect a higher tax wedge between borrowers and savers to result in a higher cost of capital. The reason is that a higher tax wedge requires a higher before-tax return in order to hit an after-tax target return for the investor. A comparison of international tax rates, however, suggests that different overall income tax wedges do not explain differences in the cost of capital.

Table 3 shows the portion of a pre-tax dollar of corporate earnings that reaches a top-bracket taxpayer

Table 2

Cost of Capital for Various Projects

Equipment and machinery with physical life of 20 years												
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
United States	11.2	11.7	11.2	11.5	13.5	11.5	10.6	11.3	11.1	9.1	10.2	11.2
Japan	5.9	6.9	7.6	8.8	8.8	8.5	8.8	8.4	8.3	7.8	7.0	7.2
Germany	7.7	7.3	7.5	8.6	8.8	7.8	7.0	7.2	7.1	6.9	7.0	7.0
United Kingdom	8.8	10.8	9.8	12.7	10.3	10.7	10.8	9.3	9.4	7.8	8.2	9.2
Factory with physical life of 40 years												
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
United States	10.0	10.4	8.9	9.3	10.1	12.4	10.8	12.8	12.6	9.3	9.0	10.2
Japan	2.8	4.2	5.1	6.2	6.8	6.6	7.0	6.3	6.1	5.8	4.8	5.0
Germany	5.5	5.5	5.6	7.0	7.4	6.3	5.4	5.7	5.5	5.2	5.4	5.4
United Kingdom	6.7	9.9	7.8	12.2	7.7	8.7	8.8	7.6	8.3	6.1	6.6	7.9
Research and development project with 10 year payoff lag												
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
United States	12.5	12.9	11.9	12.4	8.3	18.4	15.2	20.3	20.2	16.8	18.2	20.3
Japan	3.9	5.7	6.5	7.3	8.0	8.3	8.7	7.7	9.2	9.4	8.4	8.7
Germany	13.4	13.8	13.3	15.6	15.7	14.7	13.9	14.6	13.9	13.2	14.4	14.8
United Kingdom	18.2	28.4	21.1	33.4	24.2	29.5	29.2	24.4	25.4	18.9	20.6	23.7
Expensed item with physical life of 3 years												
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
United States	39.5	40.6	42.4	43.3	38.5	40.5	39.3	39.6	39.1	36.7	39.4	40.4
Japan	35.0	35.1	35.4	36.4	36.1	36.0	36.0	35.7	35.6	35.3	34.8	34.9
Germany	34.7	34.7	34.7	35.4	35.6	35.1	34.7	34.8	34.8	34.6	34.7	34.8
United Kingdom	39.4	40.6	41.4	42.5	40.5	40.0	39.6	38.4	37.7	36.1	37.0	37.4
Land												
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
United States	10.5	11.1	8.6	9.6	12.6	15.3	12.5	16.1	15.8	10.4	9.3	10.6
Japan	−5.6	1.3	3.2	4.4	7.0	7.8	8.4	6.6	6.0	6.5	4.8	5.4
Germany	3.1	3.7	3.0	5.5	5.6	4.6	3.7	4.6	3.8	3.0	4.3	4.7
United Kingdom	6.8	14.2	9.6	17.8	11.7	14.6	12.5	9.7	9.2	5.4	6.2	7.7

Source: FRBNY staff estimates.

with a claim on the firm. The bottom of the table repeats that exercise for untaxed claimants. The tax systems of Britain and Germany are neutral with regard to top-bracket taxpayers: in both countries, after all local and national corporate and personal income taxes have been paid, the investor ultimately pockets about 40 cents of corporate net operating income, whether his claim takes the form of debt or equity. Note that the U.S. tax system is unique in strongly favoring debt issuance to both top-bracket and zero-bracket claimants.

Overall, U.S. and U.K. income tax wedges are no wider than those in Japan and Germany. The portion of financial assets in tax-exempt institutional portfolios is not so much higher in Japan and Germany than in the United States and Britain as to invalidate the comparison across countries for a given tax bracket. Thus tax differences alone do not offer a good explanation for the cost of capital gap. This is not to say that tax structures are without effect or that, say, elimination of the double taxation of dividends would not improve the cost of capital in the United States. Rather, other factors have worked to offset the U.S. advantage.

Since tax wedges in West Germany and Japan are no larger than those in the United States and the United Kingdom, it must be the case that the higher cost of American and British funds makes for higher returns to savers in those countries. We examine three reasons why rates of return required by households may vary.

Household thrift

The readiest explanation for the finding that households in Japan and Germany receive a lower rate of return on their savings is that they are thriftier. Certainly the observation that Japanese and German families save more of their disposable incomes (Chart 8) for lower returns provides first blush evidence of greater thrift than shown by American and British families. In other words, Japanese and German households appear to place relatively greater value on consumption tomorrow as compared to consumption today. What is more, U.S. fiscal deficits in the 1980s have reinforced the effect on national savings of U.S. households' impatience.

Some observers have argued that conventionally measured household savings rates overstate international differences because they treat spending on consumer durables as consumption rather than as savings.[10] In particular, Japanese households spend

[10] Michael J. Boskin and John M. Roberts, "A Closer Look at Saving Rates in the United States and Japan," in John B. Shoven, ed., *Government Policy Towards Industry in the United States and Japan* (Cambridge: Cambridge University Press, 1988), chap. 5, pp. 121-43.

Table 3

Effects of Income Tax Policy

Portion of Pre-Tax Corporate Dollar Reaching Top-Bracket Taxpayer through

	Interest	Dividends	Capital Gains
United States	0.65	0.403	0.403
Japan	0.332	0.187	0.4674
West Germany	0.44	0.44	0.41†
United Kingdom	0.40	0.455	0.455

Portion of Pre-Tax Corporate Dollar Reaching Zero-Bracket Taxpayer through

	Interest	Dividends	Capital Gains
United States	1.0	0.62	0.62
Japan	1.0	0.5634	0.4674
West Germany	1.0	1.0	0.41†
United Kingdom	1.0	0.65	0.65

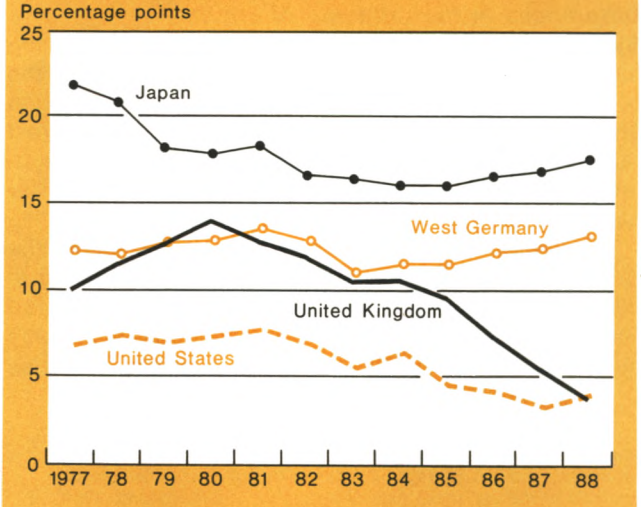
Sources: Price Waterhouse, Organization for Economic Cooperation and Development.

Memo: Claims of tax-exempt institutions as percentage of total financial claims —
United States: 23 percent
Japan: 25 percent
Germany: 27 percent to 50 percent‡
United Kingdom: 44 percent

†Reflects long-term (over 6 months) capital gains tax.
‡Tax status of some reserve funds unclear.

Chart 8

Household Savings as a Share of Disposable Income



Source: Organization for Economic Cooperation and Development.

less on consumer durables than do U.S. households. The difference in purchases of consumer durables, however, is not sufficient to close the savings gap, which amounts to 12 percent of GNP. U.S. households' gross purchases of durables exceed those of their Japanese counterparts by 4 percent of gross national product and their net purchases are higher by only 1 percent of net national product. Furthermore, whether household incomes are spent on long- or short-lived consumption goods makes little difference to the supply of funds by households to business.

Other observers contend that the timing of wage and salary payments in Japan, with about a sixth of yearly pay taking the form of bonuses, accounts for apparently greater Japanese thrift. A study that argues in favor of this view suggests, however, that it cannot be the whole story. In particular, about 3 percent of the 20 percent of disposable income saved by Japanese families is ascribed to the greater propensity to save out of bonuses.[11]

The inference of greater thrift requires that households in the four countries face essentially the same opportunities and, in particular, that households must enjoy equal access to credit. Otherwise, the unavailability of credit compels consumers to save simply to buy an automobile or a house obtainable on credit elsewhere. In addition, the riskiness of fixed income and equity investments must be identical, or the higher rate of return in one economy may simply compensate households for greater risk. The two explanations considered below address differences in credit rationing and macroeconomic risk.

Differences in the rationing of credit

Systematic differences in credit availability across the four economies could help explain differences in the cost of capital. A report by the President's Commission on Industrial Competitiveness juxtaposed "low interest rates on business debt" in Japan with "a two-tier, regulated rate structure in which interest rates are far higher on consumer loans than on business loans."[12]

One measure of the access of families to credit, the ratio of consumer debt to household disposable income, suggests greater availability in the United States and, more recently, Great Britain and also some convergence of household borrowing across countries in the last 10 years (Chart 9).[13] This measure is hardly perfect, since one would expect it to vary with demographics, attitudes toward debt, and household financial wealth relative to household income, a ratio which remains highest in the United States. Still, these debt-to-income ratios point to the conclusion that the Japanese and German financial systems formerly did not pump much credit to consumers but now circulate credit more evenly, though American and British consumers may still enjoy a stronger flow.

Differences in tax and other policies underlie the place of household credit in the overall financial system. Consider official policies toward housing. U.S. housing finance claims advantage from a separate industry that historically enjoyed favorable administered deposit rates and that continues to enjoy government-sponsored funding and federal and federally sponsored guarantees of home loans. Mortgage

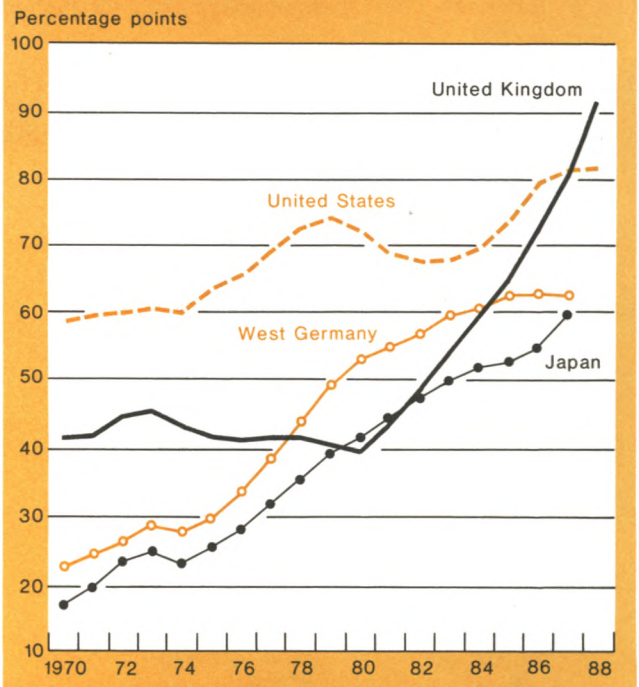
[11]Tsuneo Ishikawa and Kazui Ueda, "The Bonus Payment System and Japanese Personal Savings," in Masahiko Aoki, ed., *The Economic Analysis of the Japanese Firm* (Amsterdam: North-Holland, 1984), chap. 5, pp. 133-92.

[12]President's Commission on Industrial Competitiveness, *Global Competition: The New Reality*, vol. 2 (Washington: Government Printing Office, 1985), p. 114.

[13]Dorothy B. Christelow, "Converging Household Debt Ratios of Four Industrial Countries," this *Quarterly Review*, Winter 1987-88, pp. 35-47.

Chart 9

Household Debt as a Share of Disposable Income



Sources: U.S. Department of Commerce; Federal Reserve Board; U.K. Central Statistical Office; Government of Japan, Economic Planning Agency; Deutsche Bundesbank.

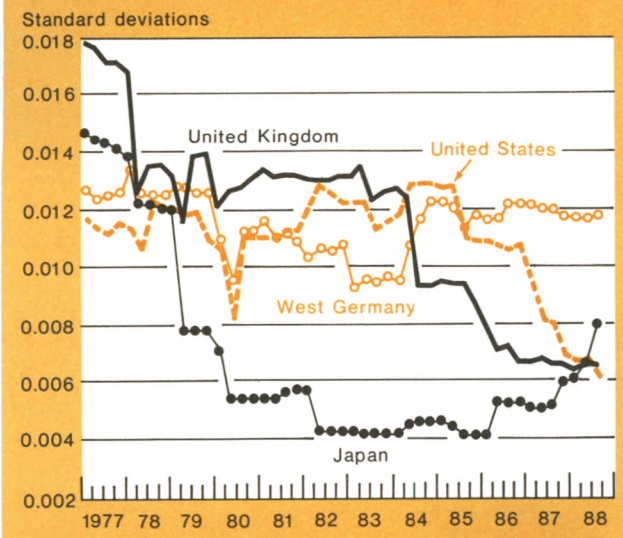
interest retains full tax deductibility although tax reform in 1986 equalized the treatment of consumer installment debt in the four countries. In Britain, mortgage credit exploded in the 1980s after quantitative constraints on the growth of bank balance sheets were abandoned and specialized mortgage lenders were afforded the opportunity to borrow funds wholesale. Germany shifted its fiscal support of housing in the last 10 years from permitting tax-deductible savings in mutual associations devoted to mortgage finance to allowing deduction of house depreciation in the first eight years of ownership. Official support in Japan is not so liberal—deductibility of mortgage payments is restricted to the first three years—but a government agency offers direct credit for families of moderate income.

Macroeconomic stability

Savers in Japan and Germany may accept lower real rates of return because lower risk attaches to these returns. When corporate earnings are steady, equity investors assign a higher value to the earnings stream and the required return is lower. In the case of debt, when the overall level of prices is stable and predictable, savers do not demand compensation for the risk of losing their principal to inflation.

Chart 10

Real GNP Volatility



Sources: U.K. Central Statistical Office, U.S. Department of Commerce, International Monetary Fund.

Note: Data are moving five-year standard deviations of Gross National Product percentage changes.

Consider the volatility of real GNP as a measure of fundamental earnings risk. Real GNP offers quarterly data of reasonably consistent quality for the four countries. Real GNP volatility is measured as the standard deviation of the logarithm of 4-quarter growth rates over a rolling 20-quarter period (Chart 10). The volatility of corporate profits is not an appropriate measure because profits will tend to be more volatile in more highly leveraged economies, even when the underlying degree of macroeconomic risk is the same.

The steadiness of Japan's GNP growth is consistent with its relatively low equity costs. Note also that the rise in volatility of Germany's real growth in the latter half of the 1980s is consistent with the rise in Germany's equity costs relative to those of the other countries.[14]

An important source of the variability of real rates of return on debt is inflation. To compare price volatility across the four countries, consider a rolling, 36-month standard deviation of the log of the price level (Chart 11). We track the volatility of the level rather than its rate of change because a consistently high inflation rate is taken to pose greater risks to savers than a consistently low rate.

Comparison of the measures shows that Germany has enjoyed lower price volatility than the other countries studied. Low price volatility leaves German savers willing to accept low real rates of return on debt, just as Japan's low volatility of real GNP is associated with savers' assigning high prices to earnings streams. Japan also shows a lower price level volatility than the United States or the United Kingdom over the period examined, an observation consistent with the country's generally lower debt costs.

Viewed from the other side of the creditor-debtor nexus, low and stable inflation limits the risk of paying high real interest rates when an acceleration of inflation induces the monetary authorities to tighten. U.S. corporations and, to a lesser extent, U.K. corporations regularly issue long-term, fixed-interest debt in order to lock in fixed payments to shield their earnings from a sudden rise in higher real interest rates on short-term debt. This insurance carries a cost, however, since long-term, fixed-rate debt exacts over long periods a premium relative to the cost of short-term, floating-rate debt.

[14]Real cash flow volatility, measured as the standard deviation of annual changes in real cash flow, is an alternative measure. Real cash flow consists of after-tax corporate profits plus depreciation charges and interest payments converted into constant purchasing power by the GNP deflator. The ranking of the volatility of real cash flow growth in 1974-86 lines up with the ranking of the cost of equity, with the possible exception of Britain: 0.017 for Japan, 0.018 for Britain, 0.061 for the United States, 0.073 for Germany.

By relying heavily on floating-rate debt from banks, Japanese and German companies avoid paying this premium.[15] To see that their funding habitat is associated with lower risks, consider the real interest volatility of prime corporate borrowing rates in the four countries (Chart 12). Corporations in Japan and Germany expose themselves to less risk in funding themselves at the short end of the yield curve owing to the more stable real rates associated with stable prices.

What accounts for the differences in macroeconomic stability that affect the terms on which households make debt and equity available to businesses? One important influence is macroeconomic policy, which conventionally takes as its goals a stable price level and a smooth GNP expansion at the potential growth rate of the economy. It seems fair, for example, to associate Germany's relatively stable price level with a steadfast anti-inflationary monetary policy. But differences in performance reflect factors other than policy. Japan's accomplishment of steady growth has been ascribed to the suppleness that its industrial organization imparts to the economy in responding to shocks.[16]

Relations among corporations, banks and governments

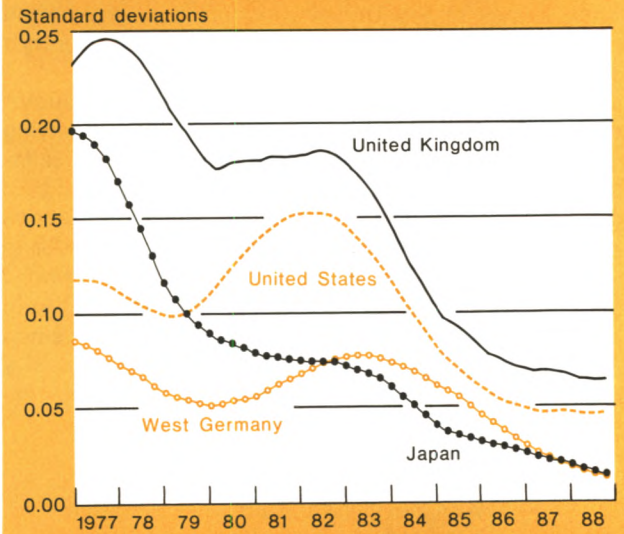
Close relations between corporations and banks in Japan and Germany and official efforts in these countries to reduce the private costs of corporate distress permit corporations to finance themselves in ways that cheapen the cost of funds. In particular, greater integration of industry and banking has permitted higher leveraging in Japan and Germany without raising bankruptcy rates much above those in the United States and Britain. The stronger ties between corporate borrowers and their banks also reduce the liquidity risk that a firm runs by borrowing so much at short term. Backstopping private creditors' management of difficulties is the Japanese and German governments' predictable willingness to spread the adjustment costs

[15] Debt to banks and short-term debt as a share of total debt are estimated from national sources at 93 percent for Japanese firms, 88 percent for German firms, 77 percent for British firms, and 28 percent for U.S. firms over the 1977-88 period.

[16] "The difference between Japan and other industrial economies in the effectiveness of macroeconomic policy may be attributable to a large extent to the institutional aspects of the industrial structure." Iwao Nakatani, "The Economic Role of Financial Corporate Grouping," in Masahiko Aoki, ed., *The Economic Analysis of the Japanese Firm* (Amsterdam: North-Holland, 1984), chap. 6, p. 246.

Chart 11

Price Level Volatility

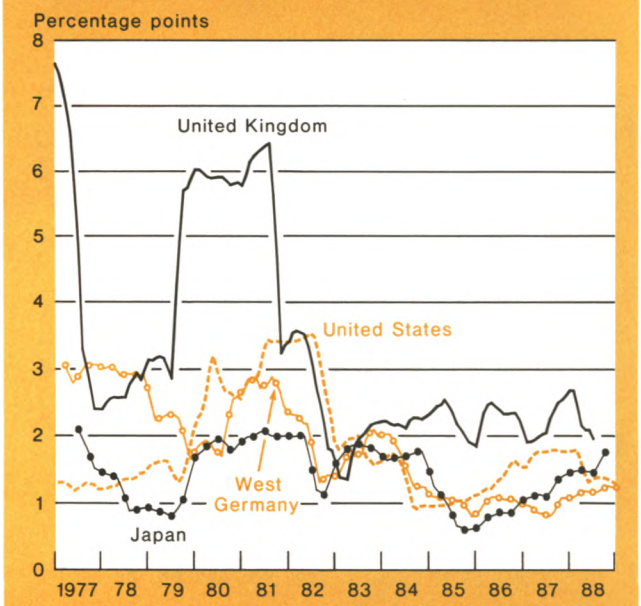


Source: International Monetary Fund.

Note: Data are moving five-year standard deviations of Consumer Price Index logarithms.

Chart 12

Volatility of Real Interest Rates for Domestic Corporate Prime Rates



Sources: Federal Reserve Board, Bank of England, Bank of Japan, Deutsche Bundesbank, International Monetary Fund, U.K. Central Statistical Office.

beyond the immediately involved workers, managements, creditors, and shareholders to business customers, consumers, and taxpayers.

Relations between corporations and banks: Japan

A system of stable shareholdings binds most major Japanese corporations, their subsidiaries, suppliers, and sales corporations with one or two lead banks and affiliated mutual life insurers. Financial institutions, mostly banks and insurance companies, own a major and rising share of equities traded on the Tokyo Stock Exchange. Financial institutions appear to be even more important among shareholders of large Japanese companies: of 78 large firms studied 10 years ago, 61 were more than 75 percent owned by financial institutions.[17] The large firms in turn have set up or bought into smaller companies upstream and downstream — some in the same line of business, others in marketing, and still others in diverse fields such as real estate.[18]

Differences in the performance of Japanese firms within and without a *keiretsu,* the enterprise group as just defined, support the hypothesis that the "group functions as a social contrivance for reducing aggregate risk costs for relatively risk-averse member firms, with financial institutions acting as insurers."[19] Operating profit and growth rates tend to be somewhat lower for firms within a *keiretsu,* but the variation of these rates is smaller. Both the dividend payout rate of affiliated firms and the variance of the interest rate on debt are lower, while their workers are better paid.[20]

The risk-sharing arrangement costs the corporation money and flexibility in good times but offers support in bad times. Corporations must maintain a high and stable outstanding debt to their respective main banks.[21] The short-term loans are governed by conditions that "give Japanese banks rights to take assets, seize collateral or offset holdings to counter possible losses in event of threatened insolvency even though there is no literal default."[22] When corporations are "heavy borrowers," their "bank has considerable influence and, in some cases, veto power over capital spending plans. In the extreme, a firm in financial difficulties may suddenly find several of its top executives replaced by bank personnel."[23]

When a corporate borrower faces difficulty, the main bank not only coordinates efforts by affiliates to increase purchases, to stretch receivables, or to accept transfers of lifetime workers, but also renders more than its share of financial assistance. This behavior has led more than one U.S. observer to describe the main bank's lending as subordinated.[24] A comparison of the work-out of troubled companies AEG-Telefunken, Mazda, British Leyland, and Chrysler shows how Mazda benefited from its relation with its bank. Because of the steady information flow between the company and the bank, the bank's rapid installation of new management, and the easy transfer of people and resources among bank affiliates, Mazda experienced less shrinkage than the other companies and was spared the direct government intervention, in the form of guarantees or loans, that figured in the other three cases.[25]

Financing and risk-sharing within the group of affiliated firms permits higher leveraging, especially for rapidly growing firms.[26] Nakatani finds that the affiliated firms' ratio of own equity to total assets is 5 to 9 per-

[17]Tadanori Nishiyama, "The Structure of Managerial Control: Who Owns and Controls Japanese Businesses?" *Japanese Economic Studies,* vol. 11 (Fall 1982), pp. 37-77.

[18]Hiroshi Okumura, "Interfirm Relations in an Enterprise Group: The Case of Mitsubishi," *Japanese Economic Studies,* vol. 10 (Summer 1982), pp. 53-82.

[19]Aoki, "Aspects," p. 25. Aoki suggests that companies select themselves into *keiretsu* membership according to risk aversion, but it is possible that expectations of strong profits result in nonmembership.

[20]Nakatani, "Economic Role," pp. 227-64. Nakatani confirmed an earlier finding that affiliation does not raise profitability. See Richard E. Caves and Masu Uekusa, *Industrial Organization in Japan* (Washington: Brookings Institution, 1976), chap. 4, pp. 59-87.

[21]One observer has argued that Japanese banks forced their corporate customers to rely on bank debt beyond the fraction warranted by the interests of individual shareholders. See Masahiko Aoki, "Shareholders' Non-Unanimity on Investment Financing: Banks vs. Individual Investors," in Masahiko Aoki, ed., *The Economic Analysis of the Japanese Firm* (Amsterdam: North-Holland, 1984), chap. 6, pp. 193-224.

[22]Andreas R. Prindl, *Japanese Finance* (Chichester: John Wiley & Sons, 1981), p. 60.

[23]James E. Hodder and Adrian E. Tschoegl, "Some Aspects of Japanese Corporate Finance," *Journal of Financial and Quantitative Analysis,* vol. 20 (1985), p. 186.

[24]Henry C. Wallich and M. I. Wallich, "Banking and Finance," in Hugh Patrick and Henry Rosovsky, eds., *Asia's New Giant* (Washington, D.C.: Brookings Institution, 1976), p. 273; W. Carl Kester, "Capital and Ownership Structure: A Comparison of United States and Japanese Manufacturing Corporations," *Financial Management,* vol. 15 (Spring 1986), p. 7.

[25]Sumitomo knew of Mazda's problems in part from the automobile firm's dealers. Robert B. Reich, "Bailout: A Comparative Study in Law and Industrial Structure," *Yale Journal on Regulation,* vol. 2 (1985), pp. 163-224. See also Richard Pascale and Thomas P. Rohlen, "The Mazda Turnaround," *Journal of Japanese Studies,* vol. 9 (Summer 1983), pp. 219-63.

[26]Nakatani, "Economic Role," pp. 240-42. Takeo Hoshi, Anil Kashyap and David Scharfstein, "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Panel Data," September 1988, processed, p. 30, report a median debt-equity ratio for affiliated firms of 1.09 and for independent firms, 0.76.

cent lower than that of independent firms.[27] He interprets this finding: "since the risk of bankruptcy for a given debt-equity ratio is smaller for *G* [group] firms than *I* [independent] firms, the optimal debt-equity ratio...will be accordingly higher."

Relations between banks and corporations: West Germany

Close relations between banks and industry have a longer history in Germany than in Japan. The government initiated Japan's industrial development, and banks and industry conglomerated only after the government divested itself of most industry in 1880. The catch-up industrialization of Germany was directed in the first instance by banks that combined illiquid development or *credit-mobilier* banking with commercial banking in what became known as the universal bank.[28] Despite their long standing, the bank-industry ties in Germany appear weaker, less serviceable, and certainly more controversial than those in Japan.

Ownership stakes, reinforced by holding of proxies for almost all shares held in trust accounts, give rise to strong German bank representation in corporate governance. Thus while banks own less than 10 percent of market equity directly, their proxy voting rights give them control over nearly 60 percent of market equity value. The Gessler Commission in 1974-75 found that of the 66 large companies (excluding banks) surveyed, 51 had more than one banker on the board, and among the 74 large companies surveyed (including banks), 32 bankers served as board chairmen. Proxy holding and membership on boards were both concentrated among the top handful of banks.[29]

Greater bank control, as measured by bank representation on supervisory boards, proportion of voting rights controlled by banks, and bank loans as a share of total corporate borrowing, makes for a more profitable German company, according to one study.[30] Still, the author recognized the difficulty of attributing this finding to the alternative explanations of improved creditor monitoring or anticompetitive price-setting facilitated by networks of bank representation. The German Cartel Office's proposal to bar a bank's representatives from sitting on the supervisory boards of competing firms takes the second interpretation seriously.

The controversy that bank power has stirred in Germany may limit banks' effectiveness in monitoring firms. This issue arose over 10 years ago when a government-appointed commission measured the role of banks in corporate governance. Last June the Economics Minister, a member of the junior party in the coalition government, proposed a 15 percent limit on banks' stakes in industrial firms and a reduction in the number of supervisory board members from any one bank. The ongoing dispute over bank control can impede the flow of information among management, labor, and bank representatives on the supervisory board and can slow management changes.[31]

Bank/firm relations, credit spreads, and leverage

Close bank/firm links in Japan and Germany spread risks and reduce incentives for shareholders' agents to exploit creditors, so that leveraging can cheapen capital. In addition, the willingness of banks to lower distress costs by extending fresh credit to firms approaching bankruptcy probably averts a portion of the bankruptcies that would otherwise occur. Finally, even when bankruptcies do occur, the greater concentration of lenders works to minimize the deadweight losses. These institutional differences make it easier to live with relatively high interest costs in relation to cash flow (Chart 13).

The hypothesis that banking relations work differently across the four countries derives support from a comparison of corporate bankruptcy rates. The higher proportion of cash flow devoted to interest payments in Japan and Germany would suggest to a U.S. banker a higher rate of corporate bankruptcy in these countries than in the United States. But frequencies of bankruptcies—1.6 percent for U.S. firms and 1.3 percent for U.K. firms as against 1.1 percent for Japanese firms

[27] A lively debate over whether Japanese firms are more leveraged than U.S. firms continues. Michel and Shaked compare 130 U.S. and 130 Japanese firms, 10 firms in 13 industries each, over 1977-81. The authors find that Japanese firms on average are more leveraged on a book equity basis but not on a market equity basis, although the Japanese average includes more highly leveraged firms. Allen Michel and Israel Saked, "Japanese Leverage: Myth or Reality?" *Financial Analysts Journal*, July-August 1985, pp. 61-66. Aoki knocks the debt-to-asset ratio from 0.82 to 0.62 for 1981 by taking account of the inflation of land prices and reserves for specific purposes and for employees' retirement pay; he notes that an adjustment should be made for shares carried at historic values. Aoki, "Aspects," pp. 16-23. Two economists at the Bank of Japan reduce the leverage of firms listed on the First Section of the Tokyo Stock Exchange to about one by revaluing depreciable assets and land; they note, however, that they did not net out any capital gains tax that might be payable on realization. Iwao Kuroda and Yoshiharu Oritani, "A Reexamination of the Unique Features of Japan's Corporate Financial Structure: A Comparison of Corporate Balance Sheets in Japan and the United States," *Japanese Economic Studies*, vol. 8 (Summer 1980), pp. 82-117.

[28] Alexander Gerschenkron, *Economic Backwardness in Historical Perspective* (Cambridge: Harvard University Press, 1962), pp. 5-30.

[29] Graham Bannock, "Banks and Industrial Management," in Economists Advisory Group, Ltd, ed., *The British and German Banking System: A Comparative Study*, chap. 5, pp. 201-34.

[30] John Cable, "Capital Market Information and Industrial Performance: The Role of West German Banks," *Economic Journal*, vol. 95 (March 1985), pp. 118-32.

[31] Reich, "Bailout," pp. 204-208.

and an estimated 0.7 percent for German firms in 1977-87 — do not bear out this expectation.[32]

The proportion of corporate debts involved in bankruptcy, rather than bankrupt companies as a share of all companies, offers stronger evidence of the bearing of financial structure on the incidence of costly corporate distress. The measure controls for size of bankruptcy and the overall number of small firms. Although corporate leverage is higher in Japan than in the United States, the percentages of corporate debt in bankruptcy in the two countries from 1977 to 1987 (Chart 14) are statistically indistinguishable.[33] The U.S. financial system is paying the price of leveraging up in rising bankruptcies while Japan is enjoying declining bankruptcies as leverage falls. Moreover, bankruptcy responds more strongly to changed leverage in the United States than in Japan. A 10 percent rise in U.S. leverage was associated with a 29 percent rise in the fraction of corporate debt in bankruptcy in 1977-87; over the same period a 10 percent decline in Japanese leverage was associated with a 7 to 10 percent drop in bankruptcy. Thus, the U.S. rate of corporate distress not only matches Japan's at a lower level of leverage but also appears to rise much faster in response to higher leverage.

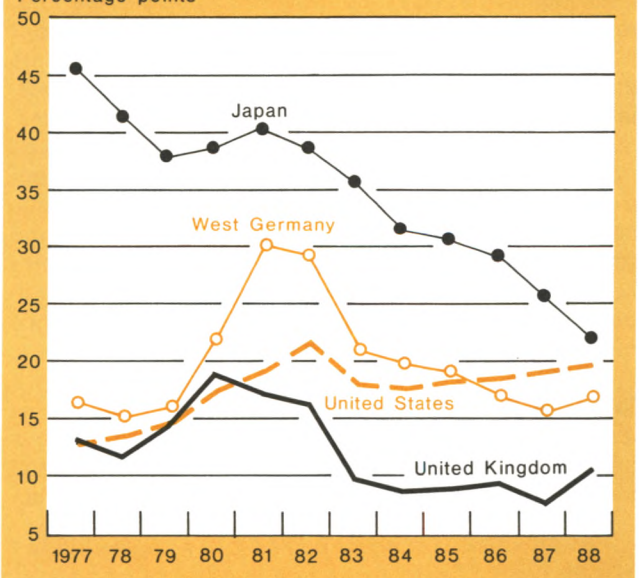
Given the different relation of bankruptcy risk to cash flow coverage of interest, U.S. firms' ability to cheapen their cost of funds through leverage is limited. Crossing the credit spectrum from prime corporations through the middle market to highly leveraged firms, U.S. and U.K. banks increase credit spreads substantially, while Japanese and German banks, lending against assets

[32]Edward I. Altman, "The Success of Business Failure Prediction Models: An International Survey," Salomon Brothers Center for the Study of Financial Institutions, Occasional Papers in Business and Finance, no. 5 (1982), p. 7. Altman's estimates have been updated with information from U.S. Department of Commerce, *Statistical Abstract of the U.S.*, Tables 836 and 846; Statistiches Bundesant, *Statistiches Jahrbuch der Bundesrepublik Deutschland*, Table 7.17; Central Statistics Office, *Annual Abstract of Statistics*, Table 17.28; and Japan Bureau of Statistics, *Japan Statistical Yearbook*, Tables 11.1 and 11.8.

[33]The 0.62 percent average for Japan is insignificantly different from the 0.57 average for the United States, with a t statistic of −0.53.

Chart 13

Gross Interest Payments as a Share of Cash Flow



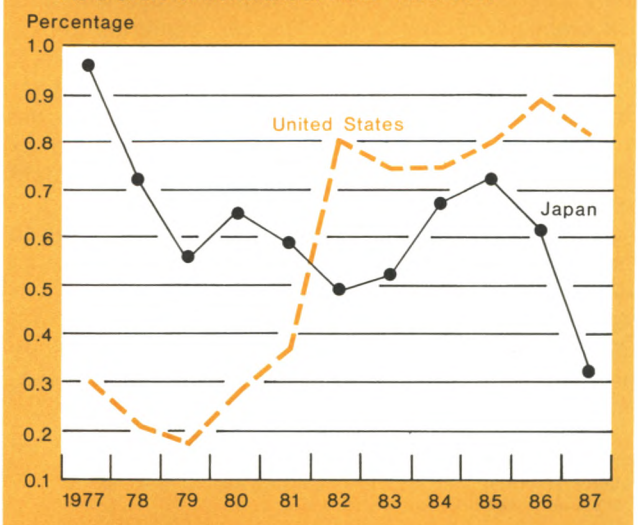
Sources: U.S. Department of Commerce, Bank of Japan, Organization for Economic Cooperation and Development, U.K. Central Statistical Office.

Note: 1988 figures for Japan and West Germany are based on Federal Reserve Bank of New York staff estimates.

Chart 14

Debt of Bankrupt Nonfinancial Firms

As a Share of Nonfinancial Firms' Total Debt



Sources: Japan Bureau of Statistics, Dun and Bradstreet, Federal Reserve Board, Standard and Poor's Corporation.

Note: Federal Reserve Bank of New York staff estimate for 1987 Japanese total debt figure.

and monitoring and controlling behavior better, do not.

A rough calculation suggests how doubling U.S. corporate leverage would close the cost of funds gap only marginally. A corporation leveraging up from a debt-equity ratio of 1:1 to 2:1 on a book basis falls from a BBB rating to a B rating, and interest payments rise from 18 percent of pre-tax cash flow to 36 percent.[34] Holding debt costs fixed, the leveraging would lower the overall cost of funds by 100 basis points, given a six percentage point difference in the cost of equity and debt and the shift of one-sixth of financing from equity to debt. But in 1989 B-rated bonds generally yielded over 150 basis points more than BBB-rated bonds.[35] Two-thirds of the capital structure is more expensive by this margin; so before taxes the 100 basis points are reclaimed by the higher credit spread. Because the spread is deductible, however, the net cheapening of the cost of capital is about 40 basis points, or only 40 percent of the value of leveraging up with no change in credit spreads.[36]

The exercise could be repeated for a corporation gearing up from AAA (book debt-equity ratio of 1:4) to A (1:2), with less lost in the 60 to 80 basis point widening of the credit spread. The conclusion to be drawn is that without tight links between creditors and corporations, the returns to gearing up are limited and they become more so as leverage rises.

Government policy toward corporate distress

Policy toward distressed industries in Japan and Germany also reconciles relatively high leverage with little risk premium in debt costs. The two countries deploy quite different policies to achieve much the same effect of socializing adjustment costs to relieve immediate creditors and employees of the full burden. Since the policies are broadly predictable, if not specified ex ante, risk premia do not have to be added to debt costs.

Japanese officials often waive antitrust structures to manage across-the-board cuts in capacity in distressed industries that allow adjustment costs to be paid out of higher prices. Mikuni provides a useful contrast between the "musical chairs" method of capacity reduction analyzed a century ago by the English economist Marshall, by which the least efficient producer goes out of business, and the "egalitarian method" of proportional cuts as practiced in Japan, usually under the direction of a ministry, particularly the Ministry of International Trade and Industry.[37]

Japanese officials use other methods as well, and exit by smaller firms plays an important role in more competitive industries.[38] In aluminum smelting, 57 percent of 1977 capacity was targeted for removal, and firms were subsidized in proportion to their capacity cutbacks out of the proceeds of a tariff on imported aluminum. The subsidy of 6.6 percent of book value of the scrapped or mothballed capacity covered interest costs and amounted to over a quarter of the losses reported by the aluminum companies between 1976 and 1983. In the more competitively structured industry of shipbuilding, an industry association was granted an antitrust exemption and received a loan from the governmental Japan Development Bank and commercial banks in order to buy up and to scrap 12 percent of capacity. Official loans to business to enter new lines or to repay loans collateralized by factories in order to scrap them and to sell off land are sometimes extended. Through such means the taxpayer joins the consumer in sharing the costs of shrinkage.

German officials rely much more on subsidies to declining industries, and even to some "sunrise" industries such as aircraft and aerospace, although the European Community oversees concerted capacity shedding in the steel industry.[39] Of course, the U.S. government shelters some industries that are under pressure by establishing voluntary export restraints and has provided federal rescues in the cases of Lockheed and Chrysler. Still, it is fair to say that such intervention remains quite controversial in principle and practice in the United States, where public policy generally seeks to promote competition and economic mobility. Under such a policy stance, however, and from the standpoint of a creditor, any potential government assistance would appear much more uncertain in the United States than in Japan or Germany and thus much less likely to be reflected ex ante in risk spreads.

Forces at work for change

Long-term structural forces are working in directions that narrow the cost of capital gap, but at slow and uneven rates, so that their effect will probably be lim-

[34]Robert C. Nelson, "Key Industrial Financial Ratios," *Standard & Poor's Credit Week* (September 5, 1988).

[35]The spread averaged 205 basis points in the first half of 1989 and ranged between 122 and 264 basis points, according to *Standard & Poor's Credit Week*.

[36]Compare Carliss Y. Baldwin, "The Capital Factor: Competing for Capital in Global Environment," in Michael Porter, ed., *Competing in Global Industries* (Boston: Harvard University Press, 1986), p. 199.

[37]Akio Mikuni, "Mikuni on Banking," Mikuni and Company, Occasional Paper no. 2, December 1987.

[38]See Merton J. Peck, Richard C. Levin, and Akira Goto, "Picking Losers: Public Policy Toward Declining Industries in Japan," in John B. Shoven, ed., *Government Policy Towards Industry in the United States and Japan* (Cambridge: Cambridge University Press, 1988), chap. 8, pp. 195-239.

[39]Organization for Economic Cooperation and Development, *OECD Economics Surveys, 1986/1987: Germany* (Paris: OECD, 1987), p. 56.

ited for some time.

- Demographic trends in the United States on the one hand, and Japan and Germany, on the other, may favor some closing of the household savings gap. Projections of population shares in the productive and retired years suggest some scope for the improvement of the U.S. savings rate and, to a lesser extent, U.K. savings rate relative to that of Germany over the next decade or so and to that of Japan over the longer term.[40]
- Availability of, and popular attitudes toward, consumer credit in the four countries appear to be converging and may well continue to do so.
- Ongoing restructuring of the U.S. and U.K. financial markets points to some integration of banking, securities, and insurance activities, but not to a tightening of the links between finance and industry. Government intervention on behalf of declining or sunrise industries may have increased, but it remains limited and hardly represents a reversal of U.S. policy. In this context, the corporate leveraging evident in U.S. financial markets, which some observers interpret as an attempt to cheapen capital in response to competitive challenges in the goods market, is likely to ratchet up borrowing costs and to improve the U.S. position only marginally.
- In Japan and Germany, the close relation between banks and industry, one prop for relatively high leveraging, may prove unable to carry as much weight as in the past. Another prop, the government's policies toward sectoral adjustment, may become less reliable as foreign manufactures increase their penetration of the Japanese domestic market.

Several forces are working to drive a wedge between banks and corporations in Japan and Germany. Slower growth of the Japanese economy in this decade and the growing access of larger Japanese corporations to bond finance and, through equity warrants, to equity finance in the Euromarket are freeing them from reliance on their traditional banks to finance growth. Indeed, some large firms are competing with banks as they turn corporate treasuries into profit centers. The equity crossholdings between Japanese banks and their borrowers may diminish, according to some observers, as Japanese banks attempt to meet the new international capital standards.[41] Japanese banks are looking to raise sums of equity through issuance of shares, convertible bonds, and equity warrants in Tokyo and London; their traditional shareholders may well wind up with a relatively diminished stake. At the same time, Japanese banks may prove less willing to buy the low-yielding and, by the new rules, risky shares of clients or would-be clients. Increasing foreign penetration of the Japanese market for manufactured goods renders the egalitarian method of capacity reduction in troubled industrial sectors more difficult.[42]

German corporations for their part are turning more to their employees for funding, given firms' immediate access to rapidly growing company pension reserves. Further, steps toward financial integration in the European Community may well resolve the long-simmering controversy in Germany over the permitted level of equity participation by banks in corporations and lead to limits on banks' involvement.

In the short run, though, these changes serve only to increase the options open to Japanese and German corporations, which give evidence of improving their competitive position by taking advantage of the new funding opportunities. Only the change in bank capital regulation poses short-term constraints that might create a situation less favorable to the corporations. In the long run, more subtle complications may arise: for instance, the seniority of the claims of German workers over bank creditors might at some point force German banks to reconsider their lending terms.

The policy challenge

Despite the longer run forces working toward some convergence in household saving behavior and consumer indebtedness, a considerable gap in the cost of capital between the United States and Great Britain, on the one hand, and Japan and Germany, on the other, is likely to remain open. The prospects advise against waiting and hoping for demographic and consumer borrowing trends to improve the U.S. position. The analysis above suggests a role for policy.

First, a monetary policy that takes price stability as its object is critical to U.S. competitiveness. Steadier prices will over time reduce the inflation premium in corporate borrowing costs. In addition, a lower volatility of nominal and real interest rates, typically associated with steadier prices, may allow U.S. corporations to finance themselves more at the short term and thereby

[40]Peter S. Heller, "Aging, Savings, and Pensions in the Group of Seven Countries: 1980-2025," International Monetary Fund Working Paper no. WP/89/13, January 31, 1989, pp. 1-35.

[41]Masaaki Kurokawa, Chairman, Nomura Securities International, speech to conference on "The American Corporation and the Institutional Investor: Are there Lessons from Abroad?" Center for Law and Economic Studies, Columbia University School of Law, May 23, 1988, pp. 8-9.

[42]Akio Mikuni, "Mikuni," pp. 8-9.

to avoid paying the risk premium built into longer term yields. In any case, the social benefit from stable prices extends well beyond the welfare costs of the inflation tax, summarized by the increased transactions costs incurred in more active management of cash holdings.

Second, fiscal actions could help close the cost of capital disparity. Even though income tax structures do not themselves account for international differences in capital costs, eliminating the double taxation of dividends in the United States could only work in the direction of improvement. But a lower level of government dissaving is also important. Fiscal consolidation that reduces the government's call on private savings without relying on taxes that discourage savings or investment would also help to narrow the gap.

Robert N. McCauley
Steven A. Zimmer

Appendix

This appendix details the calculation of the cost of capital. We follow the same sequence of topics as in the text of the article: the cost of debt, the cost of equity, the cost of funds and the cost of capital.

Cost of debt

We make the following adjustment for liquid balances:

$$(1)\quad ie_t = \left\{\frac{(i_t * Db_t) - (il_t * l_t)}{Db_t - l_t}\right\} * \alpha_t + \{ib_t * (1 - \alpha_t)\},$$

where

ie_t = effective nominal interest rate
i_t = bank lending rate
il_t = interest rate on liquid assets
ib_t = yield on new intermediate term bonds
Db_t = book value of bank debt
α_t = share of bank debt $= \dfrac{Db_t - l_t}{Db_t - l_t + B_t}$
B_t = book value of outstanding bonds

$$l_t = \overline{lb}_t * \left[1 - \left\{\left[\frac{\overline{lb}_t}{\overline{B}_t + \overline{Db}_t}\right] * \left[\frac{\overline{lb}_t}{B_t + Db_t}\right]^{-1}\right\}\right]$$

lb_t = cash and short-term time deposits

(bar over variable signifies four-country average).

The real cost of debt is calculated by taking the firms' nominal interest costs, factoring out inflation, and subtracting the tax deduction for interest payments:

$$(2)\quad r_t = \frac{1 + ie_t}{1 + \pi_t} - 1 - (ie_t * tc_t),$$

where

r_t = real after-tax rate of interest
π_t = inflation rate for period t (from GNP deflator)
tc_t = corporate tax rate at time t.

Cost of equity

We adjust depreciation allowances as follows:

$$(3)\quad ed_t = ce_t - \left\{(ce_t - e_t) * \left[\sum_{k=1}^{n} \frac{EDP_t^k}{TDP_t^k}\right]\right\},$$

where

ed_t = earnings/price ratio, adjusted for understatement of depreciation expenses
ce_t = cash earnings/price ratio
e_t = earnings/price ratio
n = number of types of investment projects

$$EDP_t^k = \sum_{i=0}^{t} \left[I_i^k * \Theta_k * (1 - \Theta_k)^{t-i}\right]$$

I_t^k = period t real investment in project type k
Θ_k = economic depreciation rate for project type k

$$TDP_t^k = \sum_{i=0}^{t} \left[I_i^k * \delta_{it}^k * \left[\prod_{j=i}^{t} (1 + \pi_j)^{-1}\right]\right]$$

δi_t = period t depreciation allowance for project type k initiated in period i.

EDP_t^k represents true or economic depreciation while TDP_t^k represents balance sheet depreciation. Equation 3 is used to calculate the depreciation adjustment for the United Kingdom. We use estimates by King and Fullerton† of economic depreciation rates. The depreciation adjustment for the United Kingdom is positive for the first

†Mervyn A. King and Don Fullerton, eds., *The Taxation of Income from Capital* (Chicago and London: University of Chicago Press, 1984).

Appendix *(continued)*

half of the sample period because of very rapid depreciation allowances on all U.K. investment projects.

Since West German tax depreciation schedules tend to be close to economic depreciation rates, we adjust German depreciation figures for inflation only, using a variation of equation 3:

$$(4)\ ed_t = ce_t - \left\{ (ce_t - e_t) * \left[\sum_{i=t-k}^{t-1} w^{t-i} * \left(\prod_{j=i}^{t-1} 1 + \pi_j \right) \right] \right\},$$

where

$$w < 1, \quad \sum_{i=t-k}^{t-1} w^{t-i} = 1.$$

We also use this equation for the inflation portion of the Japanese depreciation adjustment. We use estimates made by Paul Aron‡ for the understatement of Japanese earnings due to accelerated depreciation over the period.

The U.S. Department of Commerce estimates the discrepancy between balance sheet and economic depreciation;§ we use their estimates to adjust depreciation for U.S. corporations.

We use inventory cost adjustments for U.S. and U.K. corporations made by the Department of Commerce and the Central Statistical Office, respectively. The following adjustment to earnings is made for Japanese and German corporations:

$$(5)\ eid_t = ed_t - \left[\frac{INV_t * s_t * \pi_t}{PR_t} \right],$$

where

eid_t = earnings/price ratio, adjusted for understatement of depreciation and inventory expenses
INV_t = dollar value of inventory at time t
s_t = share of inventory under FIFO accounting
PR_t = dollar value of after-tax, depreciation-adjusted profits in time t.

Since the distribution of accounting techniques across firms by size of inventories is not available for Japan and Germany, aggregate accounting estimates based on secondary references and discussion with market practitioners are used. In Japan, "the most popular methods for inventories are the three (weighted-, moving- and straight-) average methods; the actual cost methods follow. About 80 percent of corporations are covered by these methods. There are few corporations that choose LIFO, and the FIFO method is chosen by only about 10 percent of corporations."‖ Since these average methods may be considered hybrids of LIFO and FIFO, the share of inventories in Japan accounted for under FIFO is taken to be 0.6 for 1977 through 1981, and 0.5 for 1982 through 1988, with the decline reflecting the decreasing use of FIFO. German firms are said to use LIFO almost exclusively. The share of inventory under FIFO accounting is taken to be 0.2, to allow for LIFO firms that are reducing inventories and for firms that use FIFO.

We make an adjustment to earnings to take account of inflation's effect on the value of nominal assets and liabilities of the firm:

$$(6)\ ev_t = eid_t + \left\{ \left[\frac{\pi_t}{1 + \pi_t} \right] * \left[\frac{D_{N_{t-1}}}{E_t} \right] \right\},$$

where

ev_t = profit rate including debt erosion effects
D_{N_t} = nominal value of financial liabilities less nominal value of financial assets
E_t = market value of equity at time t.

This adjustment raises the cost of equity across the four countries by similar magnitudes. The reason is that the two economies with higher net debt relative to earnings, Germany and Japan, also have better inflation records.

We make the following adjustment to account for the crossholding of shares by Japanese firms:

$$(7)\ PRc_t = \frac{PR_t}{\left[1 - \{ Cr_t * (1 - x_t) \} \right] + g_t},$$

where

PRc_t = after-tax Japanese corporate profits with crossholding adjustment
Cr_t = crossholding rate

‡Paul H. Aron, "Japanese Price Earnings Multiples," Daiwa Securities America, 1981-87 reports.

§U.S. Department of Commerce, *Survey of Current Business*, Table 1.14, December 1978-December 1988.

‖John B. Shoven and Toshiaki Tachibanaki, "The Taxation of Income from Capital in Japan," in John B. Shoven, ed., *Government Policy Towards Industry in the United States and Japan* (Cambridge: Cambridge University Press, 1988), chap. 3, p. 67.

Appendix *(continued)*

x_t = share of crossheld stocks held in blocks comprising more than 20 percent of firm value

g_t = rate of realization of stock gains.

We have data on Cr_t, but not x_t or g_t. On the basis of size and structure of the Japanese industrial groups, we estimate x_t to be 0.30. The turnover rate on stock ownership by Japanese corporations is under 5 percent; however, the sale of holdings by companies with weak earnings typically yields gains that are large relative to their carrying value. To reflect this, we assign a weight of 0.15 to g_t.

Cost of funds

The weighting for the cost of funds uses the market value of equity and the book value of debt:

$$(8)\quad cf_t = (d_t * r_t) + \{ (1 - d_t) * ev_t \},$$

where

cf_t = cost of funds at time t

$$d_t = \frac{Db_t + B_t - l_t}{E_t + Db_t + B_t - l_t}.$$

Cost of capital

The cost of capital, p, satisfies the following equation for a given investment project:

$$(9)\quad \sum_{t=0}^{\infty} \Bigg[\Big\{ \Big[\rho_t * [1 - tc_t * (1 + inv_t)] * \prod_{i=0}^{t} (1+\pi_i) \Big] - \Big[[ev_t * \prod_{i=0}^{t} (1 + \pi_i)] * (1 - d_t) \Big] - [ie_t * d_t * (1 - tc_t)] + z_t + \{ [1 - (z_t * \varnothing_t)] * \delta_t * tc_t \} \Big\} * \Big[\prod_{i=0}^{t} (1 + cf_i) * (1 + \pi_i) \Big]^{-1} \Bigg] = 0,$$

where

ρt = ρ when $t \leq$ length of project life

ρt = 0 when $t >$ length of project life

$$inv_t = \left[\frac{INV_t * s_t * \pi_t}{PR_t} \right], \text{ from (5)}$$

δ_t = depreciation allowed for tax purposes

z_t = investment tax credit at time t

$\varnothing_t$ = share of investment tax credit used in reducing depreciation basis.

As explained earlier, profits will be overstated because the costs of inventory items are understated. The accounting profit earned on the marginal product of investment will be overstated, resulting in additional taxes on the output. To take account of this excess taxation, we introduce the variable "inv_t," which measures the expected excess rate of taxation. This "inventory tax" works to raise the cost of capital much more than the standard corporate income tax does, since it does not enter into the tax deductions for interest payments and depreciation.

As expected, the inventory tax raises the cost of capital more for the United States and the United Kingdom than for Germany and Japan. The average sample period effect for the tax is to raise the corporate income tax rate on profits by about seven percentage points for U.S. and U.K. corporations and about two percentage points for German and Japanese firms.

Distributional Issues in Privatization

Privatization, the sale of government-owned enterprises in whole or in part to private sector participants, has been an increasingly important feature of the world economy in recent years. Although privatization has not played a prominent role in the United States, it has become commonplace in other countries, both developed and developing.

Governments have various motives for privatization. Sales of relatively illiquid assets to the private sector may be viewed as a less inflationary method of financing a current deficit than further issues of government paper. Governments may foresee large potential operating efficiencies arising from a reorganization of public sector enterprises but believe that such changes are politically feasible only under a change in ownership. Or political leaders may support privatization as part of a larger plan to shrink the size of government.

In addition to these reasons for undertaking privatization, governments may have certain distributional goals regarding equity ownership that they can pursue through privatization policy. These include promoting wider share ownership, retaining some measure of government control, and limiting the degree of foreign ownership. This article examines why governments have set distributional goals, how privatization policy has been designed to achieve them, and whether these policy initiatives have succeeded.

The goal of wider share ownership in privatizations

Privatizations have aimed at wider share ownership in many countries, most notably in the United Kingdom and France but also in countries such as Chile and Turkey. Although the goal itself is clear, the reasons for pursuing it are more complicated. A variety of economic, political, and ideological considerations may lead countries to seek wider share ownership. These considerations must be taken into account in any effort to evaluate the success of privatization in achieving its distributional goals.

Motives underlying the goal of wider share ownership

Economic motives for broadening share ownership may include reducing stock price volatility, achieving portfolio diversification, and reducing the risk transferred to the equity market. Broadening share ownership might lessen stock price volatility by limiting the role of institutional investors. It is widely believed that institutional investors contribute to stock price volatility through their compensation arrangements, their tax-exempt status, and their reliance on similar trading strategies. Professional portfolio managers typically have a short-term horizon for investment returns since their compensation is a function of relatively short-term profits. Thus institutions may be more likely than individuals to sell shares when, for example, a firm suffers a temporary fall in its equity price owing to a cash-flow problem but experiences no change in long-run profitability. In addition, individuals pay taxes on capital gains whereas institutions such as pension funds are tax-exempt. Because individual investors share both their capital gains and losses with the government, they have less incentive to cash in on their gains when the market is rising or to consolidate their losses when the market is falling. Finally, reactive selling by institutions that follow portfolio insurance strategies or, as in the

case of mutual funds, sell stock in reaction to redemptions[1] could also promote stock price volatility. Since large buy or sell orders are created without primary regard to fundamentals, movements in stock prices are accentuated by the trading strategies of the institutions.

Governments may also pursue wider share ownership to help diversify investors' portfolios. Promoting dispersion in share ownership may be a means to educate investors and thereby influence their perception of the trade-off between risks and returns. A clearer understanding of this trade-off may encourage investors to deepen their share ownership by holding a larger proportion of shares in their portfolios.

Moreover, a broader distribution of shares reduces the risk transferred to the equity market by privatization. The risks of public enterprises are borne by all taxpayers in the economy; when such enterprises are privatized, the risks devolve upon a smaller group of investors in the equity market.[2] Broadening the ownership of privatized issues reduces the amount of risk borne by *individual* investors in the equity market.

Ideology may also induce governments to pursue distributional goals. A leadership influenced by the doctrines of classical liberalism might support the spreading of share ownership as a means of placing decision making in the hands of individuals. Similarly, in countries where popular capitalism is a force, the extension of share ownership to workers might be welcomed as a step toward removing the owner-worker distinction.

Finally, political purposes may be served by a share distribution policy. Government leaders who adopt such a policy may be able to commit their countries to a free enterprise system and minimize the chance of a future reversal in privatization efforts. Once shares of privatized firms are widely held, subsequent regimes may find it too costly to renationalize.

The primary reasons for promoting wider share ownership differ across countries. In the United Kingdom wider share ownership has been sought as a means to spread ownership of wealth, to give people a direct stake in the success of British industry, and to remove distinctions between owners and workers.[3] It has been argued that widespread ownership of shares was sought in France to make renationalization more difficult,[4] and in Chile to prevent concentration of monopoly power in the hands of a few investors.[5] Though wider share ownership is a priority in the Turkish privatization program, the ultimate reasons for seeking wider share ownership have not been spelt out in statements issued by the government.[6]

Measures of success in achieving the goal

Whether privatizations have achieved the goal of wider share ownership depends on the measure of success used. Alternative measures are the increase in the number of total shareholders, the number of employee shareholders, or the percentage of shares held by individuals as opposed to institutions.

The reason for seeking wider share ownership will determine the appropriate measure of success. If the intent is to spread the ownership of wealth (to decentralize decision making), or to disperse shares so that costs of renationalization become prohibitive, then increasing the number of shareholders is important. If the removal of the owner-worker distinction is desired, increasing the number of employee shareholders is important. If a reduction in stock price volatility is sought, then increasing the percentage of equity held directly by individuals is important.

Impact of privatization on the number of shareholders

If one of the goals of privatizations is to increase the number of shareholders, it has been achieved quite remarkably (Table 1). Between 1978 and 1988, the number of shareholders in English, French, and Japanese markets increased by an *estimated* 55 percent, or 11 million persons, because of issues of newly privatized companies. These issues probably increased the number of shareholders by 300 percent in England and France. In Turkey, most buyers of Teletas, the telecommunications firm privatized last year, were first-time shareholders, though exact figures are not yet available.

Impact of privatizations on the number of employee shareholders

Both British and French privatizations have encouraged share ownership by the employees of privatized firms. Preferential treatment of employee applications in

[1] *Report of the Presidential Task Force on Market Mechanisms*, January 1988.

[2] Eli M. Remolona, "Risk, Capital Markets, and the Large Public Enterprise," Federal Reserve Bank of New York, Research Paper no. 8912, July 1989.

[3] H. M. Treasury, "Privatization in the United Kingdom," Background Briefing, London, 1986.

[4] Charles Vuylsteke, "Methods and Implementation," vol. 1 of *Techniques of Privatization of State-Owned Enterprises*, World Bank Technical Papers, no. 88, 1988.

[5] H. Nankani, "Selected Country Case Studies," vol. 2 of *Techniques of Privatization of State-Owned Enterprises*, World Bank Technical Papers, no. 89, 1988, pp. 28-30.

[6] *Turkish Finance*, September 1988, p. 134.

Britain has led nearly half a million employees to become shareholders in privatized issues.[7] As a result, 90 percent of employees in privatized firms now hold equity in them.

Governments have used share allocations and special incentives to promote employee shareholdings in privatizations (Table 2). First, shares of up to 15 percent of the issue, as in the privatization of Jaguar, have been earmarked for employees. Second, free shares have been offered, ranging in value from 33 pound sterling per employee in the case of British Gas to 83 pound sterling in the case of British Airways (Table 3).[8] Finally, purchases of shares by employees have been matched by employers, ranging from 2 for 1 on purchases up to 111 shares in the case of British Gas to 1 for 1 on purchases up to 600 shares in the case of British Aerospace.

[7] *Treasury-Stock Exchange Survey,* 1988.

[8] Shares are valued at first-day trading prices.

Table 1

Increase in Number of Shareholders after Privatizations

(In Millions)

Privatized Issues	Number of New Shareholders after Issue	Percentage Increase in Number of Shareholders
Japan: NTT	1.4 (0.7)	9 (4)
England:	6.8	315
British Telecom	1.6	80
British Aerospace, Britoil, and Cable and Wireless	0.9	25
Trustee Savings Bank	2.0	44
British Gas	1.8	28
British Airways, British Airport Authority, Rolls Royce, and British Petroleum IV	0.5	6
France: all privatizations between 1978 and mid-1987	5.6 (4.5)	295

Sources: *Share Ownership—1988,* NOP Market Research, March 1988; *Fact Book,* Tokyo Stock Exchange, 1987 and 1988; Vivian Beattie, "The Divorce of Ownership from Understanding," *The Accountants Magazine,* April 1987; Michel Develle, "Privatization in France: The Status and Outlook," *The World of Banking,* September-October 1988.

Note: Numbers in parentheses are estimates of increase in shareholders directly attributable to privatizations.

Table 2

Incentives for Shareownership by Employees in British and French Privatizations

Date	Issuer	Incentives
October 31, 1979	British Petroleum II	Employees were given preferential treatment on applications of up to 137 shares.
February 15, 1981	British Aerospace I	Each employee received 33 free shares, and the government matched purchases 1 for 1 up to 600 shares.
October 25, 1981	Cable and Wireless I	Employees received preferential treatment for 5 percent of the issue, and 285,883 shares were given free to the employee stock ownership plan.
February 15, 1982	Amersham International	Employees received 35 free shares, and the government matched purchases 1 for 1 up to 350 shares.
November 15, 1982	Britoil I	Employees received 60 sterling worth of shares and preferential treatment on subscriptions of up to 11,500 shares.
February 15, 1983	Associated British Port I	Each employee received 53 free shares, and the government matched purchases up to 225 shares. The portion of the offering that went to employees was 2.5 percent.
September 15, 1983	British Petroleum III	Preferential treatment was given to employees on applications of up to 250 shares.
September 15, 1983	Cable and Wireless II	Preferential treatment was given to employees on applications of up to 1,000 shares.
June 21, 1984	Enterprise Oil	Preferential treatment was given to employees on applications of up to 13,500 shares.
July 15, 1984	Jaguar Plc	Fifteen percent of the issue was earmarked for employee subscription.
November 15, 1984	British Telecom	Employees received 54 free shares, and the government matched purchases 2 for 1 up to 77 shares.
May 10, 1985	British Aerospace II	Preferential treatment was given to employees on applications of up to 10,000 shares. Existing shareholders were given 1 for 4 rights.

Table 2

Incentives for Shareownership by Employees in British and French Privatizations
(continued)

Date	Issuer	Incentives
August 1, 1985	Britoil II	Employees received preferential treatment on applications of up to 10,000 shares.
December 2, 1985	Cable and Wireless III	Preferential treatment was given to employees on applications of up to 5,000 shares. Existing shareholders were given 1 for 8 rights.
November 26, 1986	Cie de Saint-Gobain	Ten percent of Saint-Gobain's capital was reserved for employees.
December 8, 1986	British Gas	Employees received 52 free shares, and the government matched purchases 2 for 1 up to 111 shares.
April 24, 1987	Credit Commercial Francais	Ten percent was reserved for employees.
July 15, 1987	British Airport Authority	Employees received 41 free shares, and the government matched purchases 2 for 1 up to 111 shares.
January 27, 1987	British Airways	Employees received 76 free shares, and the government matched purchases 2 for 1 up to 120 shares.
June 26, 1987	Television Francaise 1	Ten percent was reserved for employees.

Sources: Price Waterhouse, *Privatization: The Facts* (Libra Press, 1987); *International Financing Review,* London.

Impact of privatization on the distribution of share ownership

Although privatization has succeeded in raising the number of individual and employee shareholders, there is no evidence that it has increased the percentage of equity held directly by individuals. For privatizations to change the structure of share ownership in the economy, the government would have to influence asset preferences of various investor groups, alter the relative prices of various instruments, or create a new instrument that had risk-return properties differing from those of existing equities.

The distribution of share ownership in most countries has been and continues to be skewed in favor of the large domestic investor (Table 4). In most countries for which we have data or estimates of share ownership, individual investors hold no more than 30 percent of all shares. In countries where institutional investors — trusts and insurance companies — are not yet well developed, as in Taiwan or Turkey, a large percentage of issued shares are held by government, banks, or industrial groups.

In all countries for which we have data, privatizations have failed to reverse the trend toward falling share ownership by individuals. Individual investors have reduced their ownership of shares in general at the same time that they have participated in privatizations (Table 5). In Italy, individual shareholdings have

Table 3

Estimated Value of Free and Matched Shares Offered to Employees Who Bought Privatized Issues in the United Kingdom
(In Pound Sterling)

	Free	Matched	Total
British Aerospace I	57	1026	1083
Amersham International	66	658	724
Britoil I	60	—	60
Associated British Port I	73	311	384
British Telecom	50	72	122
British Gas	33	69	102
British Airport Authority	60	163	223
British Airways	83	131	214

Source: Price Waterhouse, *Privatization: The Facts* (Libra Press, 1987).

Note: Figures are estimated using first-day trading prices and assuming that each employee received the maximum amount of matched shares.

Table 4

Share Ownership by Type of Investor

	Institutional		Individual		Foreign	
	1981-83	1987-88	1981-83	1987-88	1981-83	1987-88
England	69	75	28	20	3	5
Japan	66	75	26	20	8	5
Taiwan	47	48	46	43	7	9
Turkey, Israel, Egypt†	80	80	20	20	0	0
Greece†	90	80	10	18	0	2

Sources: *Share Ownership — 1988,* NOP Market Research, March 1988; "The Stock Exchange Survey of Share Ownership," London Stock Exchange, 1981; *Fact Book,* Tokyo Stock Exchange, 1987 and 1988; *1988 SEC Statistics,* Securities and Exchange Commission, Ministry of Finance, Republic of China.

†No data available; order of magnitude estimates by country officials.

remained relatively constant at 13 to 14 percent, while in England and Japan, institutional investors have increased their share ownership at the expense of individuals. In England, the individual investor's percentage holding of ordinary shares fell from 38 percent in 1975 to 22 percent in 1987. Share ownership by the individual investor in Japan fell from 26 percent in 1983 to 20 percent in 1987. In the case of Nippon Telephone and Telegraph (NTT), the only issue for which we have details on share ownership, 54 percent of privatized shares, that is, those not in the hands of the government or municipal agencies, were held by individual shareholders at the end of fiscal 1987 (Table 6). It follows that the share of holdings by individuals of issues other than privatized shares fell to less than 20 percent by the end of fiscal 1987.

Table 5

Share Ownership in Italy, England, and Japan by Different Categories of Investors

(As a Percent of All Shares)

Italy		**1984**	**1985**	**1986**	**1987**
Institutions		80	81	82	80
Households		12	13	14	14
Foreigners		8	6	4	6
England	**1963**	**1969**	**1975**	**1981**	**1988**
Institutions	39	45	56	68	60
Individuals	54	47	38	28	22
Foreigners	7	7	6	4	18
Japan	**1983**	**1984**	**1985**	**1986**	**1987**
Institutions	66	67	70	71	75
Individuals	26	24	23	22	20
Foreigners	8	9	7	7	5

Sources: Banca D'Italia; *Fact Book*, Tokyo Stock Exchange, 1987 and 1988; *Share Ownership—1988*, NOP Market Research, March 1988; "The Stock Exchange Survey of Share Ownership," London Stock Exchange, 1981; London Stock Exchange estimates for 1987.

Conflicts between distribution, efficiency, and revenue goals

There is usually a trade-off between various goals in any privatization. In particular, the effort to achieve a wider distribution of shares often leads to reduced efficiency in the stock market and a loss in revenue obtained from the privatization.

Incentive schemes to encourage wider share ownership might be self-defeating. Wider share ownership may improve the functioning of the equity market to the extent that it puts a higher proportion of stocks in the hands of investors more oriented towards fundamentals. If wider share ownership is achieved through artificial schemes, however, it may reduce market liquidity. Incentives to lock in the initial investor have been offered to discourage investors from using discounted privatized issues for short-term capital gains (Table 7). Such "loyalty bonuses," offered in Britain and France, encourage the investor to hold shares bought at the time of issue for 18 months to 3 years.

The bonuses have had some success in achieving investor loyalty (Table 8), but it is not clear that the outcome would have been significantly different in the absence of these bonuses. The success rate, measured by taking ultimate shareholders as a percent of initial purchasers, is positively correlated with the estimated value of bonuses per loyal investor ($r = 0.6$). However, at the 10 percent level of significance, the mean success rate is not significantly higher for the issues that had loyalty bonuses.[9]

[9]The t-statistic of 0.61 for the difference in mean success rates between issues that did and did not have loyalty bonuses is not significant at the 10 percent level.

Table 6

Shareownership of NTT

(As of March 31, 1988)

	Government and Municipal Agencies	Financial Institutions	Securities Firms	Other Business Corporations	Foreigners	Individual and Other Corporations	Total
Number of shareholders	3	856	166	21,912	0	1,186,875	1,209,812
Number of shares held	12,095,028†	873,234	154,032	595,804	0	1,881,902	15,600,000
Percentage	78	6	1	4	0	12	100

Source: Tokyo Stock Exchange.

†The Ministry of Finance holds 12,095,022 of these shares.

Investor sophistication may also be sacrificed if share ownership in privatized issues is promoted without adequate emphasis given to risks involved. The Teletas issue in Turkey, for example, received wide promotion through televised advertisements that projected security for investors. Instead of improving investor understanding of the trade-off between risk and return, such promotions may lead investors to believe that the value of their investments is de facto guaranteed by the government.

Table 7

Incentives to Lock in the Initial Investor in British and French Privatizations

Date	Issuer	Incentives
November 15, 1982	Britoil I	Those who applied for more than 2,000 shares and held them for three years received as a bonus 1 share for every 10 held.
November 15, 1984	British Telecom	Shareholders who kept their shares for three years received either telephone bill vouchers of 210 sterling or 1 share for every 10 up to a maximum bonus of 400 shares.
November 26, 1986	Cie de Saint-Gobain	French citizens who held their shares for 18 months received 1 additional share for every 10 owned up to a maximum of 50.
December 8, 1986	British Gas	Investors who hold shares for three years are to be awarded a bonus of 1 share for every 10 owned up to 500 shares, or a 250 sterling gas bill voucher.
July 15, 1987	British Airport Authority	Investors who hold shares for three years are to be awarded a bonus of 1 share for every 10 owned up to a maximum of 200 shares.
January 27, 1987	British Airways	Investors who hold shares for three years will get a 1 for 10 bonus up to 400 shares.

Sources: Price Waterhouse, *Privatization: The Facts* (Libra Press, 1987); *International Financing Review,* London.

Note: In Portugal's privatization of Unicer, a brewing company, Unicer staff and small shareholders could buy up to 200 shares each (on condition that the shares not be sold for two years) at special prices of Es 2,400 ($14.70) and Es 2,400 ($15.40), respectively. The basic price of the 3.18 million shares of Unicer was Es 2,500 ($16).

Conflicts may also develop between distribution and revenue goals. In taking steps to attract more investors, governments sometimes realize lower revenues. They underprice fixed-price privatized issues by offering the privatized issue at a significant discount from the price expected in the after-market.[10] Higher underpricing may have been successful in achieving greater investor participation in privatized issues (Tables 9 and 10). Underpricing of British privatizations was positively correlated with both new shareholders ($r = 0.6$) and with applicants that received shares ($r = 0.72$), taken as a percent of value of shares issued. Moreover, controlling for the number of shares issued, size of issue, and the price per share, regression results suggest that on average a one percentage point underpricing "buys" 19,000 initial purchasers.[11]

As a result of underpricing, however, revenue was forgone (Table 11). Had there been no underpricing, fixed-price offerings of privatized issues on average would have generated 51 percent, or 4.8 billion pound sterling, more revenue in Britain (28 percent, or 4.6 billion pound sterling, if British Petroleum [BP] is included) and 16 percent, or 7.4 billion francs, more revenue in France. Had British issues been underpriced at 3 percent, the average discount in British fixed-price initial public offerings (IPOs) between 1983 and 1985, the revenue gain would have been 46 percent, or 4.4 billion pound sterling (20 percent, or 4 billion pound sterling, if BP is included). Had French issues been underpriced similarly to French IPOs at 4.8 percent for tender offers,[12] they would have yielded 10 percent, or 4.6 billion francs, more government revenue.

Relationship between goals of privatization and techniques used to privatize

Choice between public offerings and private sales

A private sale may be the preferred technique when a specific investor profile is desired. Firms with experi-

[10]Defined as the percentage difference of the issue price from the market price on the first trading day, both partly paid prices where applicable. The underpricing of privatized issues is adjusted for the change in the market index between the issue date and the first day of trading.

[11]The regression run was:

$$NA = \underset{(-0.7)}{-171.8} + \underset{(2.9)}{19.1\,U} - \underset{(-2.2)}{2.5\,NS} - \underset{(-1.0)}{126.2\,P} + \underset{(3.0)}{2.6\,S}$$

$$R^2 = 0.91,$$

where NA = number of successful applicants in thousands, NS = number of shares issued in millions, U = underpricing in percentage points, P = price per share in pence, S = size of the issue in millions of pound sterling.

[12]We use the underpricing in French tender offers for reference since IPOs on the official listing in France are almost exclusively tender offers.

ence in the same line of production are sometimes favored, even though the comparative advantage from this experience or from potential economies of scale should be reflected in the bid. The preference for mergers within the same industry is even more surprising because most governments are in favor of promoting competition through privatizations.

Governments have tended to prefer a horizontal merger, especially when the holding in question is felt to be of national importance and in need of rapid restructuring. Israel's Master Privatization Plan proposes that 12 of the 23 companies that it recommends for privatization be privately sold. The only private companies identified as potential investors are those with operations in areas related to the companies to be privatized. In Turkey the next privatization is expected

Table 8

Success of Incentive Schemes

Issuer	Successful Applicants (In Thousands)	Number of Shareholders as of October 1987 (In Thousands)	Success Rate† (Percent)	Estimated Value of Maximum Loyalty Bonuses per Shareholder (In Pounds Sterling)
Issues with loyalty bonuses				
British Airport Authority	2,188	1,500	69	490
British Airways	1,100	404	37	500
British Gas	4,407	3,000	68	675
British Telecom	2,300	1,418	62	520
Britoil‡	485	179	37	430
Issues without loyalty bonuses				
Amersham International	65	6	9	0
Associated British Ports	54	10	18	0
British Aerospace	415	103	25	0
Cable and Wireless	280	175	62	0
Enterprise Oil	14	11	80	0
Jaguar	125	35	28	0
Rolls-Royce	2,000	1,250	63	0

Sources: *Quality Markets Quarterly,* London Stock Exchange, Spring and Summer 1988; Price Waterhouse, *Privatization: The Facts* (Libra Press, 1987); Cento Veljanovski, ed., *Privatization and Competition: A Market Prospectus,* Institute of Economic Affairs, 1989.

†Defined as ultimate shareholders (as of October 1987) as a percent of applicants who initially received shares.

‡Using the bonus scheme and the first-day trading price of Britoil I, while the figures for total applicants and current holders are of Britoil I and II. Value of bonus is the minimum for those investors that qualified for the bonus.

Table 9

New Shareholders in British Privatizations and Average Adjusted Discount

Issuers	Value of Shares Issued (In Millions of Pound Sterling)	New Shareholders as a Percentage of Value of Shares Issued	Average Adjusted Discount (Unweighted)
British Telecom	3,916	0.041	44.00
British Aerospace (I, II), Britoil (II), Cable and Wireless (I, II)	1,649	0.055	11.79
Trustee Savings Bank	1,360	0.147	41.18†
British Gas	5,434	0.033	19.90
British Airways, British Airport Authority, Rolls-Royce, and British Petroleum IV	10,688	0.005	98.94

Sources: Vivian Beattie, "The Divorce of Ownership from Understanding," *The Accountants Magazine,* April 1987; Price Waterhouse, *Privatization: The Facts* (Libra Press, 1987).

Note: New shareholders here are individuals who never held any shares before the respective privatizations.

†Unadjusted for change in the market index.

Table 10

Successful Applicants in British Privatizations

	Issuer	Number of Applicants (In Thousands)	Value of New Shares (In Millions of Pound Sterling)	Number of New Shares (In Millions)	Applicants per Million Pound Sterling of Shares Issued	Applicants per Million New Shares
Fixed price	Amersham International	65	71	50	915	1300
	Associated British Port I	46	22	20	2068	2321
	Associated British Port II	8	52	19	154	412
	British Airport Authority	2188	1225	500	1786	4375
	British Aerospace I	155	150	100	1033	1550
	British Aerospace II	260	551	147	472	1770
	British Airways	1100	900	720	1222	1527
	Bristish Gas	4407	5434	4026	811	1095
	British Telecom	2300	3916	3012	587	764
	Britoil II	450	449	243	1002	1855
	Cable and Wireless I	26	224	133	116	195
	Cable and Wireless III	219	933	159	234	1376
	Jaguar	125	294	178	425	703
	Rolls-Royce	2000	1363	802	1467	2495
	Trustee Savings Bank	3000	1360	136	2206	22059
Tender offer	Britoil I	35	549	255	64	137
	Cable and Wireless II	35	275	100	128	351
	Enterprise Oil	14	392	212	35	65

Source: *Share Ownership — 1988*, NOP Market Research, March 1988.

Note: Successful applicants are individuals who applied for and received shares.

Table 11

Percentage Gain in Revenue from Privatized Issues with No Underpricing

	United Kingdom	France
Fixed price		
Increase in revenue with no discount	28	16
(UK) Excluding British Petroleum IV	51	
(France) Excluding Compagnie de Financiere de Suez		10
Increase in revenue with standard IPO discount	20	10
(UK) Excluding British Petroleum IV	46	
(France) Excluding Compagnie de Financiere de Suez		5
Memo: Standard IPO discount (percent)	3	5
Tender offer		
Increase in revenue with no discount	19	36
Increase in revenue with standard IPO discount	22	29
Memo: Standard IPO discount (percent)	−2.2	5
All privatizations		
Increase in revenue with no discount	27	16
(UK) Excluding British Petroleum IV	43	
(France) Excluding Compagnie de Financiere de Suez		11
Increase in revenue with standard IPO discount		
(UK) Excluding British Petroleum IV	27	10
(France) Excluding Compagnie de Financiere de Suez	40	5

Sources: Price Waterhouse, *Privatization: The Facts* (Libra Press, 1987); Tim Jenkinson and Colin Mayer, "New Issues and Privatizations," 1987, mimeographed; Bertrand C. Jacquillat, "French Auctions of Common Stock: Methods and Techniques of New Issues, 1966-86," *Going Public: An International Overview*, Euromobiliare Occasional Paper no. 2, 1986.

Note: Average underpricing used is unweighted and adjusted for change in the general market index between offering and first day of trading. Average underpricing in the United Kingdom is computed exclusive of Trustee Savings Bank.

to be that of the state-owned enterprise in the petrochemicals sector — Petkim. The controlling interest, or "locomotive share," in Petkim is expected to be privately placed with investors owning operations in the petrochemicals industry. The Egyptian government's leasing arrangements for its hotels are all with companies in the hotel industry.

The available information on private sales in privatized firms suggests that integration is found in both developed and developing countries (Table 12). In a sample of 10 developed and developing countries, 70 percent of all the private sales for which we have information were to investors in the same industry.

Nevertheless, integration in developing countries appears to be less common than in developed countries. Only 60 percent of all private sales in developing countries were to investors in the same industry, as opposed to 74 percent in the case of developed countries.

While a public offering is the obvious choice if a larger investor base is desired, this goal is sometimes more effectively achieved by combining a private sale with a public offering. Individual investors may lack full information and thus be wary of companies reported to be suffering. But if the government has confidence in such a company, it can turn around the company and then sell it publicly. Alternatively, it can convince a well-known investor of its belief. In lieu of full information, a private sale of a block of shares to an experienced investor can provide a signal to the individual investor that the company will become profitable. Though we do not have specific knowledge of cases where private sales were used for signaling purposes in privatizations, we do know that 7 of 10 private sales in France were in combination with a public offering.

Table 12

Evidence of Integration in Privatized Firms

	Total Number of Private Sales	Total Number of Investors Known	Investors Known to Be in Same Industry as Privatized Firm	As a Percent of Firms with Known Investors
Private sales†				
Developed countries	76	31	23	74.2
LDCs	43	15	9	60.0
Total	119	46	32	69.6

Source: Rebecca Candoy-Sekse, "Inventory of Country Experience and Reference," vol. 3 of *Techniques of Privatization of State-Owned Enterprises*, World Bank Technical Papers, no. 90, 1988.

Note: Developed countries are United Kingdom, Canada, Italy, and France. LDC countries are Argentina, Chile, Honduras, Jamaica, Mexico, and Brazil.

†Includes private sales, sales of assets, and combinations of public offerings and private sales.

Choice between a fixed-price offering and a tender[13]

The more important the goal of wider share ownership, the more likely the fixed-price method will be chosen over a tender in a public offering. The reason usually cited for this preference is that an individual investor can more easily participate in a fixed-price than in a tender offer.[14] Asymmetric information costs between individual and institutional investors must underlie this argument. Informational asymmetries can exist when there is uncertainty about the future earnings of a firm whose shares are being offered for the first time. If a tender offer is chosen in such cases, the institutional investor is likely to be better informed than an individual because of the fixed cost element in information costs. If a fixed-price offering is chosen, however, the price itself would provide information to the uninformed investor.[15]

In Britain, the goal of wider share ownership became prominent just prior to the British Telecom (BT) offer. Fixed-price offers as a percent of all privatized issues increased from the pre-BT 55 percent to 89 percent once BT was launched and thereafter.[16] In France, where wider share ownership has also been a goal, all but 1 of the 10 privatized issues since 1986 have been issued by a fixed-price offering. This pattern is unusual since French IPOs were almost exclusively issued through tender offers. In Turkey, a fixed-price offering was chosen for the Teletas privatization, which also had wider share ownership as one of its goals.

Use of price and quantity schemes to achieve distributional goals

Pricing under public offerings

Underpricing has been used to achieve a wider share ownership in privatizations. Fixed-price offerings of pri-

[13]In a fixed-price offer, the price is set by underwriters before the offering. In a tender offer, investors specify both price and quantity in their bids.

[14]See for example, Richard Hemming and Ali M. Mansoor, "Privatization and Public Enterprises," International Monetary Fund, Occasional Paper no. 56, January 1988.

[15]Eli M. Remolona, "How to Privatize: Implications of Size and Uncertainty," Federal Reserve Bank of New York, 1988, unpublished.

[16]The number of initial purchasers of fixed-price issues, as a percent of shares issued, was lower for the issues launched before the BT offer than for BT and the issues thereafter. The t-statistic for the mean difference, 1.84, is significant at the 5 percent level.

vatized shares have been underpriced more than IPOs, on average, both in the United Kingdom and in France (Table 13). Moreover, the difference in underpricing is statistically significant, at least for the United Kingdom. In addition, free leveraging has often been provided by allowing the investor to pay for shares of privatized issues in installments. The BT shares, for example, were partly paid shares: payment of the 130 pence price occurred in three installments of 50, 40, and 40 pence, spread over a period of 18 months. The free loan of 80 pence per share constituted, in effect, additional underpricing.

Table 13

Average Market-adjusted Underpricing in Privatized Issues Compared with That in IPOs for the United Kingdom and France

(Percent)

	Average Adjusted Underpricing	Value-weighted Average Adjusted Underpricing
United Kingdom		
Privatized issues†		
Fixed price	19*	17**
(Excluding British Petroleum IV)	(20)	(31)
Tender	6	11
IPOs		
Fixed price	3*	5**
Tender	17	11
France		
Privatized issues		
Fixed price	17	12
(Excluding Compagnie de Financiere de Suez)	17	8
Tender‡	26	26
IPOs		
Fixed price	NA	NA
Tender	NA	5

Sources: Price Waterhouse, *Privatization: The Facts* (Libra Press, 1987); "Financial Times Stock Exchange 100," *Financial Times*; Tim Jenkinson and Colin Mayer, "New Issues and Privatizations," 1987, mimeographed; Bertrand C. Jacquillat, "French Auctions of Common Stock: Methods and Techniques of New Issues, 1966-86," *Going Public: An International Overview,* Euromobiliare Occasional Paper no. 2, 1986.

†Secondary issues are not excluded. If they were, average underpricing of privatized issues would increase, since secondary issues generally have lower discounts. Category does not include Trustee Savings Bank.

‡Only issue is Banque de Batiment and Travaux.

*The test statistic for the difference in underpricing between privatized issues and IPOs was 6.7 (7.6 excluding BP IV) and significant at the 1 percent level.

**The test statistic for the difference in value-weighted underpricing between privatized issues and IPOs was 4.5 (10.6 excluding BP IV) and significant at the 1 percent level.

To examine why underpricing was higher for privatized issues than for IPOs, regressions were run using data for the United Kingdom. Cross-sectional differences in discounts in all U.K. fixed-price IPOs and privatized issues were examined. The data included 14 fixed-price offerings of privatized issues between 1977 and 1987 and 74 IPOs between 1983 and 1985. The issue discount[17] was regressed on the size of the issue, the volatility of monthly returns of the general market index over a six-month period prior to the issue, and a dummy variable, which took the value one for all privatized issues only. The coefficient on the dummy variable, significant at the 5 percent level, suggested that privatized issues in the United Kingdom were on average underpriced 160 percent more than IPOs (see regression 3 in Table 14). Effects specific to any given year were controlled for by taking, instead of issue size on the right hand side, deviations of issue size from the mean sample size during the year of the issue. The evidence for higher underpricing of privatized issues was then stronger, as the coefficient on the dummy variable was significant at the 2 percent level (see regression 4). Furthermore, the results were essentially unchanged when the volatility used in the regressions was computed over a 3-month period or a 12-month period instead of the 6-month volatility reported in Table 14.

There was no evidence that discounts were related to the size of the offering in IPOs and privatizations taken together or separately. At least one previous study found a significant negative relationship between underpricing and the size of IPOs.[18] In none of the regressions, however, was the size coefficient significant even at the 10 percent level. A dummy variable for large issues instead of one for privatizations was weakly significant (see regressions 5 and 6). But this dummy was highly collinear with the dummy for privatizations and could thus give us no more information.

There is little reason to believe that greater underpricing of privatized issues is due to greater investor uncertainty concerning the companies to be privatized. On the contrary, investors are probably better acquainted with public sector enterprises than with

[17]Underpricing of IPOs was not adjusted for change in the market index since issue dates were not easily available. However, adjusting for market changes typically reduced the underpricing of the privatizations in our sample. Without such adjustment, the difference in average underpricing between privatizations and IPOs might well have been greater.

[18]Dennis E. Logue, "On the Pricing of Unseasoned Equity Issues: 1965-1969," *Journal of Financial and Quantitative Analysis,* January 1973.

other companies going public for the first time. Furthermore, the government is better able to inform the investor than is an average IPO candidate, perhaps because of economies of scale in advertising.

We are led to conclude that the greater underpricing of privatized issues has probably been deliberate and may have been used to achieve a distributional goal. Another piece of evidence, though weak, is that privatized issues in the United Kingdom were more severely underpriced starting with the BT issue, when wider share ownership became a prominent goal. The average unweighted discount of privatized issues after (and including) the BT issue of 25 percent was significantly greater than the average discount of 14 percent of issues before BT.[19]

Rationing with oversubscription

The overwhelming popularity of privatized issues led to their being largely oversubscribed, partly as a result of underpricing (see Table 15). In the United Kingdom, the oversubscription of privatized issues, applications as a multiple of shares issued, was positively correlated with their underpricing ($r = 0.33$).

The rationing rules for oversubscribed issues in public offerings of privatized issues tend to favor domestic individual share ownership. When not distributing shares simply on a pro rata basis, governments faced with oversubscription have reduced the allocation to institutional and to foreign investors. They have done this either by putting a cap on the number of shares available to any one investor or by invoking a clawback clause specified in the offer (Table 16). A clawback clause reduces part of an offer originally allocated to a certain investor group.

In none of the issues for which we have information did the government increase the allocation to the institutional investor at the expense of the individual. Indeed to the contrary, in the case of British Airways, the government stipulated that the institutional portion of the offer could be reduced by 20 percent in the event of oversubscription by the public.

In IPOs, underwriters have generally preferred filling larger applications first, whereas in privatized issues, governments have put a cap on orders when the issues have been oversubscribed. In the case of Societe

[19]The t-statistic for the difference in pre- and post-BT means, 1.56, was significant at the 10 percent level. The post-BT mean discount was computed exclusive of the BP issue in October 1987 since, as a result of the October crash, this issue was overpriced ex post. When the BP issue was included, the t-statistic of 1.03 for the difference in means, 22 percent post-BT versus 14 percent pre-BT, was not significant.

Table 14

Regressions of Underpricing in British Privatizations

Independent Variables:	C	S_i	S_P	S	V	D	$S-\bar{S}_Y$	D_1	D_2
1.	19.88	0.03			−127.17				
	(2.4)	(0.6)			(−2.2)				
2.	19.97		−0.01		−7.40				
	(2.5)		(−1.3)		(−0.2)				
3.	14.82			−0.01	−84.54	16.39			
	(2.2)			(−0.2)	(−1.9)	(2.2)			
4.					7.0	16.33	−0.01		
					(0.4)	(2.4)	(−1.6)		
5.	5.65			−0.004	−11.85			24.29	
	(0.4)			(−0.8)	(−0.3)			(1.3)	
6.	6.07			−0.001	−25.62				11.41
	(1.0)			(−0.4)	(−0.6)				(1.7)

Notes: Underpricing is defined as the percentage difference of the issue price from the market price on the first day of trading. Both prices are partly paid where applicable and adjusted for change in the general market index. The variables are as follows:

C = constant
S = size of issue in pounds sterling
$\bar{S}y$ = average size of issue in year Y (1977 / Y / 1987)
V = volatility of monthly returns over a six-month period of the general market index
D = dummy = 1 if privatization; = 0 if IPO
D_1 = 1 if 1000 / S / 4000; 0 if 0 / S / 1000
D_2 = 1 if 100 / S / 4000; 0 if 0 / S / 100.

The subscripts "i" and "P" denote IPOs and privatization, respectively. The numbers in parentheses are t-statistics. Data include 74 IPOs and 14 privatized issues.

Generale Alsace, which was 43 times oversubscribed, orders were filled to a maximum of six shares per person, a practice that promoted wider share ownership.

Rationing schemes have also favored domestic investors. It is the international placement that has been subject to clawbacks. Only in the case of British Airways was a part of the domestic placement subject to a clawback, and this part was the institutional investors' portion.

Restrictions on private control

Governments often retain control in privatized industries either by holding shares that grant them special rights or by retaining majority control. The usual reason for retaining control is that the firm is considered strategic to national interests.

Holding a special share is a common way for the government to divorce ownership from control in a privatized enterprise. The control retained has varied across countries and across firms but generally allows the government to approve or veto certain actions specified in the company charter. These actions include liquidation, takeovers, issuance of other special shares, and limitation on control by any particular investor group.

Table 15

Degree of Oversubscription and Underpricing in British Privatization

Issuer	Over-subscription	Adjusted Discount (Percent)
Fixed price		
Amersham International	24.0	26.7
British Aerospace I	3.5	11.5
British Aerospace II	5.4	16.0
British Airways	32.0	36.1
British Gas	4.0	19.9
British Telecom	3.0	44.0
Britoil II	10.0	17.5
Cable and Wireless I	5.6	8.1
Cable and Wireless III	2.0	3.7
Jaguar	8.3	−1.3
Rolls-Royce	9.4	39.4
Trustee Savings Bank	8.0	41.2
Tender offer		
Associated British Port I	34.0	19.7
Associated British Port II	NA	4.1
British Airport Authority	7.0†	34.9
Britoil I	0.3	−20.5
Cable and Wireless II	0.7	−2.8
Enterprise Oil	0.4	5.1

Sources: Price Waterhouse, *Privatization: The Facts* (Libra Press, 1987); "Financial Times Stock Exchange 100," *Financial Times.*

†Average of fixed price and tender offer.

In Britain the Golden Share, like the "blocking minority" in Germany, grants the government special rights when it is a minority shareholder. In the case of British Telecom, it allowed the government to be present at meetings as an observer without voting privileges. It also required written consent from the special shareholder for the amendment or removal of articles in the charter relating to the limitation of shareholders, certain appointments, and the issuance of other spe-

Table 16

Schemes to Ration Shares in British and French Privatizations

Date	Issuer	Rationing Schemes
January 27, 1987	British Airways	A 20 percent clawback on the institutional and international portions was activated because the U.K. public offering was more than three times oversubscribed.
December 8, 1986	British Gas (Canadian tranche)	Allotments to institutions (40 percent) and foreign investors (20 percent) were to be reduced if applications from individual investors reached twice their allotment (40 percent), so that individuals could be allocated up to 64 percent of the total issue.
December 2, 1985	Cable and Wireless III	Clawback provided for but not triggered.
May 8, 1987	Compagnie Generale d'Electricite	International placement was subject to a 15 percent clawback, which was activated because of heavy domestic demand.
April 24, 1987	Credit Commercial Francais	A 15 percent clawback on the international tranches was activated.
January 16, 1987	Paribas	International placement was reduced 10 percent by a clawback. French investors applying for fewer than 11 shares were guaranteed a fill, but demand was so great that allocation was limited to 4 shares apiece.
March 7, 1987	Societe Generale Alsace	Orders were cut back to a maximum of 6 shares per person.

Sources: Price Waterhouse, *Privatization: The Facts* (Libra Press, 1987); *International Financing Review,* London.

cial shares. A Golden Share was also retained when Sealink was privately placed with a foreign company. Since the shares of Sealink are to be publicly offered within a few years, the Golden Share provides the same safeguards that it would in the case of a public offering.

The French Privatization Law[20] provides for the use of "specific shares." By holding these shares, the government can limit, for five years, any share acquisition in excess of 10 percent of the capital of the privatized enterprise, since such acquisitions require government approval. The government has held shares only selectively — in the case of Elf Acquitaine (petroleum), Havas (media), Bull (electronics), and Matra (armaments and other products) — generally on grounds of national interest.

The Master Privatization Plan in Israel recommends the use of a Golden Share in some of the proposed privatizations, again on grounds of national interest. In the proposed privatization of El Al Airlines by means of a public offering, the plan recommends that the government retain voting control in specified circumstances, primarily to prevent an unwanted takeover attempt. In the case of Israel Chemicals, to be sold privately, the use of a Golden Share is recommended to ensure adequate employment in the Negev region and effective use of Israel's national resources.

Governments retaining majority control in privatized enterprises need not retain special shares. In the British and French privatizations in which shares were not fully divested, the governments held on to shares of up to 51 percent and 67 percent, respectively (Table 17). In Portugal's first privatization, in April of this year, the government retained majority holding of the brewing company Unicer by offering only 49 percent of Unicer's capital to the public. The privatization of traditional utilities in Spain, the "public service" companies, has been undertaken solely to raise capital, not to transfer control to the private sector. Consequently, the Instituto Nacional de Industria (INI), the government holding company in charge of the traditional utilities, has retained and expects to continue its majority ownership in all privatizations.

Restrictions on foreign investment

Many countries have regulations limiting foreign portfolio investment and the degree of foreign ownership of domestic enterprises. Some regulations stipulate that foreigners obtain special approvals, usually for investment in excess of a certain specified minimum; others impose quantitative limits on foreign capital inflows (general or specific to certain enterprises), restrict the group of foreign investors, or prevent foreign participation altogether.[21]

Finally, some countries have, in addition to general regulations on foreign investment, rules specific to privatized industries. In France, access to foreign investors for newly privatized companies is restricted to 20 percent, but this figure can be lowered in the case of some companies. In Japan, foreigners were not allowed to participate in the NTT offerings, and in Portugal, foreign investors could not hold more than 10 percent of the privatized capital of Unicer. In Brazil, foreigners can invest in privatized issues as long as voting control is not transferred. In Pakistan, Pakistani expatriates are the only foreign investors allowed to participate in state-owned enterprises being privatized.

Regulations restricting investment in privatized issues by foreigners are generally justified on grounds of national interest, although there are some exceptions. Possible exceptions include the privatizations of Rolls Royce and Jaguar, in which the sale of common stock to foreigners was restricted to 15 percent.

Foreign investors may have a limited demand for shares of privatized firms. British privatizations have met with less than expected demand from at least one group of foreign investors, the Americans (Table 18). The number of American depositary receipts (ADRs) of

[20] Law no. 86-912 of August 6, 1987, articles 9 and 10.

[21] See International Monetary Fund, "Foreign Private Investment in Developing Countries," Occasional Paper no. 33, January 1985; and Vuylsteke, "Techniques of Privatization."

Table 17

Shares Retained by the Government in British and French Privatizations

Issuer	Date	Percentage Held by Government
England		
British Petroleum I	June 15, 1977	51
British Petroleum II	October 31, 1979	46
British Petroleum III	September 15, 1983	32
British Aerospace Plc. I	February 15, 1981	48
Cable and Wireless I	October 25, 1981	50
Britoil I	November 15, 1982	49
Associated British Ports I	February 15, 1983	48
British Telecom	November 15, 1984	50
British Airport Authority	July 15, 1987	0
France		
Locamic	January 27, 1987	61
Societe Generale Alsace	March 7, 1987	57
Compagnie Generale d'Electricite	May 8, 1987	21
Compagnie Generale d'Electricite	May 8, 1987	5

the shares of privatized British companies has frequently fallen after the initial listing. In the case of Jaguar and British Telecom, the number of ADRs fell during 1988. In the case of British Petroleum, the number of ADRs frequently fell (and rose) over the course of the eight years from the listing of the first tranche. Moreover, the number of ADRs fell in 1983, despite the issue of a new tranche that year.

Conclusion

Privatizations have increased the number of shareholders and employee shareholders without reversing the downward trend in direct equity holding by individuals. Between 1978 and 1988, shareholders in English, French, and Japanese markets increased by an estimated 55 percent, or 11 million persons, because of issues of newly privatized companies. As a result of preferential treatment of employee applications in British privatizations, 90 percent of employees of privatized firms now hold equity in them. Individual investors, however, reduced their share ownership by up to six percentage points between 1981 and 1988.

However successful the effort to achieve the distributional goal, the cost has been a reduction in market liquidity and in government revenue. Loyalty bonuses, offered in Britain and France to encourage investors to hold shares for up to three years, appear to have been sufficient though not necessary to achieve investor loyalty. But using bonuses to achieve loyalty has meant lower liquidity of the privatized issue in the secondary

Table 18

Flowbacks in American Depositary Receipts of British Privatized Issues

Issue	Date	Shares Represented by ADRs as a Percentage of Number of Privatized Shares	Number of ADRs (In Millions)	Percentage Change in Number of ADRs Each Year, 1980-88
British Airways	1987†	6	4.45	NA
	1988	7	5.15	16
British Petroleum	(1979†)			
	1980	2	9.02	NA
	1981	2	8.37	−7
	1982	2	7.52	−10
	1983†	1	5.49	−27
	1984	1	6.15	12
	1985	2	8.10	32
	1986	5	21.31	163
	1987†	6	22.14	4
	1988	5	22.81	3
British Telecom	1984†	0	1.17	NA
	1985	1	1.63	39
	1986	1	4.33	166
	1987	2	4.79	11
	1988	1	4.01	−16
Jaguar	(1984†)			
	1985	NA	NA	
	1986	NA	NA	
	1987	33	57.93	NA
	1988	25	45.19	−22
Aggregate	1980	31	9.02	NA
	1981	29	1.00	−7
	1982	26	7.52	−10
	1983†	14	5.49	−27
	1984†	5	7.32	33
	1985	6	9.73	33
	1986	15	25.64	164
	1987†	45	89.31	248
	1988	39	77.16	−14

Sources: Figures obtained from Citibank, Bank of New York, Chemical Bank, J.P. Morgan, Irving Trust, and B.P. Finance International; Price Waterhouse, *Privatization: The Facts* (Libra Press, 1987).

Note: Flowback information does not include British Gas because data were unavailable.

†Shares in privatized companies were floated during the year.

market. In addition, although each percentage point in underpricing of privatized issues "bought," on average, 19,000 initial purchasers of privatized issues, the underpricing resulted in lost revenue in Britain of up to 51 percent, or 4.8 billion pound sterling, and in France up to 16 percent, or 7.4 billion francs.

Distributional goals have influenced the choice of technique in privatizations. When a specific investor profile was desired, a private sale was preferred. Most private sales were made to investors in the industry of the privatized firm, in both developed and developing countries. When wider share ownership was a prominent goal, the fixed-price method was preferred over a tender offer.

Both price and quantity schemes have been used to achieve distributional goals. Privatized issues have been more severely underpriced than IPOs; the estimates presented here showed that the average underpricing of privatized issues, adjusted for change in the market index, was up to 21 percent more than in IPOs. This difference did not appear to stem from the relatively larger size of the privatized issue or from the difference in the timing of the two types of issues. Nor was there evidence of greater uncertainty surrounding a privatized issue. It follows that privatized issues may have been deliberately underpriced to attract more investors.

Rationing schemes have preferred the small over the large investor and the domestic over the foreign investor. Restrictions on private share holdings and the use of special voting privileges have limited private control in some privatizations. Limits on foreign ownership of shares have restricted the pool of foreign savings that privatizations have attracted, although as flowbacks in ADRs indicate, the demand for privatized shares by foreigners may itself be limited.

Rama Seth

Union Concessions in the 1980s

Collective bargaining in the United States in the 1980s has been concession prone, with union givebacks occurring across diverse industries and eroding traditional compensation premiums in the unionized sector. Although the majority of concessions in the early 1980s occurred in the troubled sectors, by the mid-1980s the statistical link between concessions and economic performance was less clear. The most striking illustration of this point is that after six years of economic expansion and rapid jobs creation, a dominant share of 1988 labor contracts either lowered wages, weakened benefits, or altered standard methods of pay to workers in cost-reducing ways. An implication of the persistence of concessionary activity is that standard macroeconomic models, which link wages to aggregate variables like unemployment and prices, cannot fully characterize the wage determination process in the 1980s, at least in the union sector.

This article explores in detail the role of aggregate economic and industry-specific factors in explaining wage developments and concessions in the union sector. Using contract-level data on union settlements, it describes the content of major collective bargaining settlements over the period 1975-88, documenting the upward trend in concessionary activity. The article's key conclusion is that concessionary contracts in the mid-1980s exceeded "normal" levels—that is, the levels predicted by standard economic criteria alone. Specifically, although industry concessions were influenced by aggregate factors such as the rate of unemployment and the behavior of prices and by industry factors such as employment growth, these factors are not able to account fully for the rising trend in concessions described in this article. A possible interpretation of these results is that the continuation of union concessions into the late stages of the economy's expansion reflects a weakening of union influence in the face of longer term changes in the bargaining environment.[1]

The facts about union concessions

The contract data used in this analysis are compiled from Bureau of Labor Statistics contract reports, published monthly in *Current Wage Developments*. This source lists all major collective bargaining settlements covered by the Labor Department[2] and includes data on bargaining pairs (establishment and union), industry, region, dates of contract negotiation and settlement, number of workers covered, and settlement terms (including information about wages, cost-of-living adjustments [COLAs], benefits, and work rules). In total, the data set compiles information from 5,443 contracts negotiated in 1,241 establishments between 1975 and May of 1988 in private industry excluding construction. The collective bargaining data set is also merged with financial data from Standard and Poor's Compustat database and with earnings data from the Bureau of Labor Statistics in order to analyze the spe-

[1]This article draws on an earlier paper written jointly with Elizabeth Hall and Daniel Hayes. See "The Incidence of Union Concessions in the 1980s: What, Where, and Why?" Federal Reserve Bank of New York, Research Paper no. 8819, August 1988.

[2]To be included in the Labor Department data base, a contract must have initially involved greater than 1,000 workers. Future fluctuations in employment may, however, drive total worker coverage to below 1,000 workers.

cific characteristics of concessionary and nonconcessionary firms. A detailed account of the data is contained in the Appendix.

A contract is defined to be "concessionary" (except where otherwise stated) if any of the following outcomes occur — a nominal wage reduction or zero wage increase in any year of the contract; a reduction in the generosity of the COLA provision, including diversions, deferrals, and unfavorable adjustments to COLA ceilings or floors; a net reduction in the benefit package offered to workers;[3] a stated relaxation of existing union work rules, including worker per machine requirements and restrictions on outside contracting, as well as stated reduction in job classification or union progressions; the adoption of a "two-tier" wage structure; and the payment of a "lump-sum" or profit-sharing bonus in lieu of the more standard wage increase.[4] Because concessions may vary in the severity of their impact, the concessions group is separated in subsequent statistical analysis into "hard" concessions — settlements directly involving a reduction in compensation such as wages, benefits, or COLA provisions — and "soft" concessions — settlements involving institutional contracting changes such as lump-sum payment plans, two-tier plans, and work rule changes.

Industry concession trends

The concessions in the early 1980s were largely a response to slack demand brought on by a general recession. It was in troubled industries such as rubber, transportation equipment, and utilities that concessionary activity was most prominent. By the middle of the decade, however, despite economic recovery, concessions were more widespread across industry.

Table 1 lists for each industry in the years 1975-88 the share of workers in contracts involving concessions. In all but the most troubled sectors of the economy, concessionary bargaining outcomes were relatively infrequent before 1983. By 1985 concessionary settlements had spread from a few troubled industries to virtually all industries. In 1987, the last full year of data, more than two-thirds of workers in major agreements in manufacturing and one-half of workers in agreements in nonmanufacturing were involved in a union concession. The 1988 figures, complete through May, show that concessions remained important in 1988 contracts and continued to be widespread in incidence across industry.

A similar spreading in concessionary outcomes occurred across unions through the 1980s. For example, while concessions in the early 1980s were largely confined to the big rank and file settlements like the 1981 United Auto Workers contract and the 1982 Steelworkers pact, by 1987, the 10 unions with the largest membership were involved in concessionary settlements in a majority of contracts, with the exception of the Service Workers and the Carpenters and Joiners (Table 2).

Hard concessions

Contract terms that unambiguously reduce the nominal compensation of workers are a greater hardship to workers, at least initially, than contracts that specify innovative payment schedules. Clearly, the most direct and painful form of reducing labor costs is cutting wages, and with increasing frequency throughout the 1980s, workers have agreed to terms that have frozen or reduced their nominal wages and thereby reduced their real wages (Table 3).[5] Although the cost of such nominal wage cuts in terms of forgone real income has dropped substantially over the decade, the share of workers experiencing nominal wage cuts has grown. In 1982, 45 percent of all manufacturing workers and 36 percent of all nonmanufacturing workers who negotiated contracts agreed to terms that reduced their real wages by at least 6 percent in the first year of the agreement. By comparison, nearly 70 percent of workers in the manufacturing sector in 1986 agreed to terms that reduced first-year wages, although the expected loss associated with these settlements was closer to 2 percent.[6]

[3]A subjective evaluation of the terms of the benefit package is made for all contracts to assess whether the overall value of benefits to workers has increased or decreased in the contract as stated. In the majority of cases, this decision was clear-cut. In instances in which the mix of benefits changed in such a way as to leave the overall value of the package ambiguous, the contract was interpreted as a "mixed change in benefits" and was not coded as a concessionary contract.

[4]This definition of concession is derived loosely from the concept and motivation in Daniel Mitchell, "Recent Union Contract Concessions," *Brookings Papers on Economic Activity,* 1982:1; and "Union Wage Determination: Policy Implications and "Outlook," *Brookings Papers on Economic Activity,* 1978:4, by the same author.

[5]Likewise, the same calculations could be carried out for contracts in which second- or third-year wages were frozen or reduced. The share of contracts in which first-year wages were reduced or frozen and *either* second- *or* third-year wages were reduced or frozen peaked at 75 percent in manufacturing in 1987 and 37 percent in nonmanufacturing industries in 1982; the current first-half 1988 figures for manufacturing and nonmanufacturing are 16 percent and 20 percent, respectively. The share of contracts in which first year wages were reduced or frozen and *both* second- *and* third-year wages were reduced or frozen peaked at 36 percent in manufacturing in 1982 and 34 percent in nonmanufacturing in 1982; the current first-half 1988 figures for manufacturing and nonmanufacturing are 11 percent and 18 percent, respectively.

[6]It has been suggested that in previous periods in which workers negotiated contracts involving the freezing or reduction of wages, inflationary expectations were lagging and workers did not correctly anticipate real wage losses as a consequence of their contract. Of course, this logic cannot easily be applied to the low inflationary environment of the mid-1980s. In fact, to the extent that expectations were lagging, we should expect to see workers absorbing real wage

Table 1

Union-Covered Workers Affected by Concessions

(As a Percentage of All Workers Negotiating Contracts in Year, 1975-88)

Industry	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988†
Manufacturing	6.1	4.5	25.7	50.7	52.2	79.3	84.4	76.0	86.4	91.4
Food and kindred products	8.0	2.5	5.2	65.2	49.9	39.2	78.8	58.0	42.0	87.3
Tobacco	0	0	nc‡	0	58.4	nc	0	100.0	nc	nc
Textile mill products	25.5	0	nc	0	62.2	15.5	42.7	50.0	0	nc
Apparel	0	0	0	0.3	51.3	0	96.7	40.0	7.3	nc
Lumber	nc	0	0	0	94.9	0	100.0	96.4	0	100.0
Furniture	0	0	0	10.6	61.9	nc	39.8	52.6	0	nc
Paper	0	0	7.7	0	21.9	23.3	65.7	89.7	85.8	100.0
Printing	17.9	0	20.4	53.8	50.1	10.9	0	0	43.4	100.0
Chemicals	0	0	21.4	16.7	28.0	28.1	69.1	56.8	42.3	0
Petroleum and coal	0	nc	nc	14.2	0	0	0	100.0	100.0	100.0
Rubber	0	46.5	100.0	91.1	nc	0	7.1	100.0	68.4	100.0
Leather	37.0	0	0	0	0	33.2	100.0	100.0	100.0	nc
Stone, clay, and glass	9.1	0	66.3	83.4	39.8	100.0	100.0	39.3	0	0
Primary metals	0	7.9	13.2	77.8	100.0	85.3	94.3	100.0	100.0	70.2
Fabricated metals	0	9.6	15.6	20.7	71.7	92.7	32.7	84.2	100.0	nc
Nonelectric machinery	7.3	3.4	15.8	66.6	93.0	57.0	85.5	90.8	100.0	nc
Electric equipment	0	17.3	48.0	9.2	23.3	69.5	93.3	51.3	72.3	0
Transportation equipment	15.3	100.0§	41.8	92.7	39.3	97.4	95.3	45.2	100.0	100.0
Instruments	nc	10.2	0	9.1	45.7	40.0	0	87.6	nc	100.0
Miscellaneous manufacture	0	0	0	0	68.4	0	74.6	68.0	0	100.0
Nonmanufacturing	5.2	2.0	13.3	49.7	43.2	51.2	60.6	75.9	60.6	47.7
Transportation and utilities	4.4	3.9	20.2	66.0	39.3	43.5	80.4	80.7	76.2	72.4
Wholesale and retail trade	7.5	0.4	6.7	15.5	58.2	76.8	54.5	71.6	75.7	64.1
Finance, insurance, real estate	0	0	31.1	20.1	0	47.5	9.8	8.5	45.4	100.0
Services	0.4	0	0	6.3	33.6	42.0	29.4	68.3	24.6	0
All	5.6	3.3	15.4	50.2	47.8	60.5	71.2	75.9	73.5	47.7

†Data through May.
‡nc: no contract negotiated in year.
§1979 negotiated agreements.

Table 2

Prevalence of Concessionary Settlements by Union

(Workers Accepting Concessionary Settlements as a Share of Workers Negotiating in Year, 1975-88)

Union	Membership†	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988‡
AFSCME	997,000	0	0	0	0	nc	22.1	22.5	46.9	nc	nc
UFCW	989,000	nc§	0	6.4	27.9	60.2	79.3	46.3	82.0	76.9	72.6
UAW	974,000	6.2	12.3	75.1	96.8	53.8	98.9	96.6	90.9	99.7	100.0
IBEW	791,000	0	0	14.5	15.2	4.3	12.8	39.5	31.8	53.9	60.1
Service employees	688,000	12.8	0	0	12.0	5.8	40.8	26.5	34.8	32.6	17.6
Carpenters and joiners	609,000	0	0	0	0	83.1	0	77.0	52.6	0	nc
Steelworkers	572,000	0	4.8	27.3	81.4	70.9	48.7	90.7	95.6	98.1	nc
CWA	524,000	0	0	0	48.5	37.3	31.6	27.0	88.5	47.2	nc
Machinists	520,000	7.1	16.7	4.0	44.9	68.8	82.8	78.8	41.9	72.3	0
AFT	470,000	nc	nc	nc	nc	nc	0	33.6	nc	nc	nc

Note: Union abbreviations are as follows: AFSCME — Association of Federal, State, County and Municipal Employees; UFCW — United Food and Commercial Workers; UAW — United Automobile Workers; IBEW — International Brotherhood of Electrical Workers; CWA — Communications Workers of America; AFT — American Federation of Teachers.

†Membership figures 1985.

‡Data through May.

§nc: no contract negotiated in year.

The differential between compensation in union and nonunion establishments was large in the 1970s and exceeded the differential in wages alone. The reason is that fringe benefits have traditionally been larger in union contracts. To some extent, this differential was eroded in the 1980s. Table 4 shows the extent to which benefit and COLA provisions were reduced or eliminated in union contracts over this period. Largely as a consequence of low inflation in the mid-1980s, a growing share of contracts involved the deferral or elimination of previously established COLA provisions. Both COLA and benefit reductions appear to have peaked in their incidence in contracts by the mid-1980s.[7]

Footnote 6 *(continued)*
gains as a consequence of lower than expected inflation. See Daniel Mitchell, "Shifting Norms in Wage Determination," *Brookings Papers on Economic Activity*, 1985:2.

[7]Because the contract data used in this analysis contain crude information about the type of change in the COLA provision and not the actual change in the value of the COLA, COLAs are treated as

Soft concessions

Collective bargaining agreements in the 1980s increasingly involved the use of new and innovative pay plans for workers, such as two-tier contracts and lump-sum and bonus payment plans. These methods of paying workers, in addition to reducing costs to the employer, have implications for the flexibility of wages within the union workplace and for the distribution of earnings within the firm.

Two-tiered contracts — contracts in which newly hired workers are paid at a lower rate than existing workers — have been strongly opposed by unions because they disrupt established union payscales and violate the principle of pay uniformity across workers. Two-tier arrangements may specify a "permanent" tier — with newly hired workers paid at permanently lower wages

Footnote 7 *(continued)*
benefits whose terms have been eroded or improved. Eliminations, deferrals, reductions, or changes in terms of COLAs are all treated symmetrically as a reduction in benefits.

Table 3

Workers Affected by First-Year Wage Reduction

(As a Percentage of All Workers Negotiating Contracts in Year, 1975-88)

Industry	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988†
Manufacturing	0.9	0.2	2.6	44.8	40.1	14.8	67.0	67.2	20.5	19.6
Food and kindred products	0	0	5.2	63.0	41.0	25.3	47.1	49.0	18.3	0
Tobacco	0	0	nc‡	0	0	nc	0	0	nc	nc
Textile mill products	25.5	0	nc	0	62.2	15.5	42.7	50.0	0	nc
Apparel	0	0	0	0	51.3	0	96.7	40.0	7.3	nc
Lumber	nc	0	0	0	94.9	0	61.4	96.4	0	0
Furniture	0	0	0	10.6	61.9	nc	39.8	0	0	nc
Paper	0	0	7.7	0	7.3	23.3	31.9	85.0	76.6	100.0
Printing	0	0	20.4	9.0	50.1	10.9	0	0	11.7	100.0
Chemicals	0	0	0	16.7	5.0	28.1	37.7	30.6	18.0	0
Petroleum and coal	0	nc	nc	0	0	0	0	94.0	0	0
Rubber	0	0	100.0	91.1	nc	0	4.8	0	0	100.0
Leather	0	0	0	0	0	33.2	100.0	100.0	0	nc
Stone, clay, and glass	0	0	0	83.4	30.7	0	0	31.2	0	0
Primary metals	0	1.8	0	72.9	93.8	85.3	94.3	97.5	100.0	0
Fabricated metals	0	0	10.3	1.9	13.3	60.4	32.7	64.1	33.8	nc
Nonelectric machinery	7.3	0	0	60.8	77.6	11.4	18.9	88.7	82.5	nc
Electric equipment	0	0	0	7.0	6.3	7.4	87.3	34.9	72.3	0
Transportation equipment	0.8	0§	0	81.1	33.2	11.5	39.0	37.2	13.9	37.5
Instruments	nc	0	0	0	45.7	40.0	0	87.6	nc	0
Miscellaneous manufacture	0	0	0	0	68.4	0	0	68.0	0	0
Nonmanufacturing	0.7	0	6.5	35.9	12.9	14.1	17.2	13.6	24.4	31.3
Transportation and utilities	1.2	0	13.3	50.5	12.3	11.6	8.9	2.9	13.3	63.3
Wholesale and retail trade	0.4	0	1.1	3.9	21.4	33.1	47.5	45.3	50.2	17.4
Finance, insurance, real estate	0	0	0	0	0	11.9	0	0	8.3	0
Services	0	0	0	1.3	1.0	3.0	6.8	27.3	11.8	0
All	0.8	0.1	4.7	40.6	25.9	13.7	39.3	30.7	22.5	17.7
Consumer Price Index (percent change)	9.1	13.5	10.4	6.2	3.2	4.4	3.6	1.9	3.7	4.1

†Data through May.
‡nc: no contract negotiated in year.
§1979 negotiated agreements.

through their full tenure — or a "temporary" tier — with an arranged schedule for the catch-up of wages through time. Both permanent and temporary two-tier systems reduce the effective wage bill by lowering the average wage paid to workers at the firm. Although these plans have been most publicized in the transportation sector, two-tier contracts can be found in diverse industries ranging from services to electrical equipment to lumber (Table 5). Two-tier plans are less prevalent in more recent settlements since they have been viewed increasingly as unsuccessful by both management and labor.[8] In addition, the impact of such plans has been minimized because they are increasingly of the temporary type. While a majority of plans in 1983 and 1984 specified a permanent arrangement (51 percent and 64 percent, respectively), by 1988 the vast majority were temporary (with only 20 percent specifying the creation of a permanently lower tier in two-tier arrangements in 1987 and 1988).

Lump-sum and bonus payments are considered concessionary because they have typically been substitutes for standard pay increases, and as such, have been generally opposed by unions in collective bargaining. Concessions of this kind are of interest because unlike wage/compensation reduction they show no evidence of being on the decline in union settlements (Table 6).[9] Indeed, data for the last three years show that in nearly all industries, contracts specifying lump-sum arrangements are in place. These pay systems reduce costs because base wages may remain at existing levels and because lump-sums do not enter into the calculation of worker overtime, fringe benefits, or pensions. In addition, lump-sum contracts

[8]Unions have opposed the adoption of the two-tier plan because it disregards the tradition of pay uniformity in collective bargaining agreements. Although management initially sought two-tier agreements as a mechanism for lowering average labor costs, such plans have increasingly been abandoned owing to the perception that they may harm industrial harmony and productivity.

[9]It has been suggested that lump-sum payments may be easier to pass on to workers. The reasoning is that workers take a short-sighted view, welcoming a lump-sum payment as a "bonus check" and disregarding the long-term reduction in average compensation that may have occurred.

Table 4

Workers Affected by Nonwage Benefit and COLA Provision Reductions

(As a Percentage of All Workers Negotiating Contracts in Year, 1975-88)

Industry	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988†
Manufacturing	1.7	3.2	21.2	37.6	18.6	64.8	43.6	43.5	10.3	16.8
Food and kindred products	4.4	2.5	5.2	11.2	15.1	2.7	46.1	3.3	4.2	0
Tobacco	0	0	nc‡	0	0	nc	0	100.0	nc	nc
Textile mill products	0	0	nc	0	0	0	0	0	0	nc
Apparel	0	0	0	0	0	0	62.0	0	0	nc
Lumber	nc	0	0	0	0	0	59.6	94.4	0	0
Furniture	0	0	0	10.6	0	nc	0	0	0	nc
Paper	0	0	0	0	14.6	7.0	0	13.2	0	0
Printing	17.9	0	1.5	9.0	0	0	0	0	0	36.8
Chemicals	0	0	21.4	0	11.9	28.1	29.3	14.2	24.3	0
Petroleum and coal	0	nc	nc	0	0	0	0	0	0	0
Rubber	0	46.5	100.0	17.9	nc	0	7.1	0	15.8	100.0
Leather	0	0	0	0	0	8.2	0	0	0	nc
Stone, clay, and glass	0	0	0	30.7	9.2	44.4	100.0	4.5	0	0
Primary metals	6.7	2.1	0	77.8	88.3	74.6	82.7	91.8	96.6	70.2
Fabricated metals	0	9.6	5.3	18.8	57.2	9.8	23.2	34.2	66.2	nc
Nonelectric machinery	0	0	0	63.7	9.6	14.2	57.0	56.8	73.8	nc
Electric equipment	0	7.3	48.0	3.8	19.2	69.5	12.6	23.1	21.3	0
Transportation equipment	1.9	15.0§	41.8	82.9	11.6	86.5	59.5	11.1	4.1	12.5
Instruments	nc	10.2	0	0	0	40.0	0	87.6	nc	0
Miscellaneous manufacture	0	0	0	0	68.4	0	17.5	68.0	0	100.0
Nonmanufacturing	1.6	1.9	3.5	43.8	27.1	14.2	26.7	35.0	20.8	7.5
Transportation and utilities	0	3.9	5.4	58.7	27.0	4.5	39.8	49.1	41.7	0
Wholesale and retail trade	3.8	0	3.2	11.6	31.3	10.8	15.5	10.4	12.0	24.0
Finance, insurance, real estate	0	0	0	20.1	0	33.3	9.8	0	5.9	100.0
Services	0	0	0	5.0	23.5	26.6	11.4	5.8	8.3	0
All	1.7	2.6	8.2	40.5	23.5	35.2	34.2	37.6	15.6	8.3

†Data through May.
‡nc: no contract negotiated in year.
§1979 negotiated agreements.

reduce regular pay increases to workers. Since 1984, lump-sum contracts paid increments to workers that were 61 percent of those received by workers in contracts without lump-sum provisions. The calculations for 1988 contracts (through May) show that while lump-sum agreements started from a higher base wage (with hourly wages of $12.99 in lump-sum agreements as opposed to $9.97 in non-lump-sum pacts), they averaged just 62 percent of the base wage increases of non-lump-sum agreements.[10]

In addition, lump-sums may be important innovations in contracting because they may ultimately affect the flexibility of wages and the distribution of earnings within the firm. Because lump-sums do not alter base wages, they are more easily eliminated in subsequent contracts and may be more readily denied in adverse circumstances. In agreements with lump-sum provisions, the implication is that labor costs will be more sensitive to the business cycle. The reason is that some lump-sum provisions may contain an implicit profit-sharing component enhancing the flexibility of the compensation plan.[11]

Bonus plans, such as profit-sharing or employee stock ownership plans (ESOPs), differ from lump-sum payments and are related explicitly to the performance of the firm. Whereas standard profit-sharing plans link workers' bonus payments to profits at the firm (with the size of these payments often varying to reflect wage

[10]The differences in the increments to base wages in lump-sum and non-lump-sum contracts varied from year to year. More detailed calculations of differences, which include total compensation calculations, can be found in Chris Erickson and Andrea Inchino, "Lumpsum Bonuses in Union Contracts: Semantic Change or Step Toward a New Wage Determination System?" Massachusetts Institute of Technology, April 1989, mimeographed.

[11]A great deal may be learned from comparing U.S. lump-sum plans with bonus payments in Japan. Japanese bonus plans are more widespread in use and far greater in magnitude than lump-sum plans in the United States. However, as in the Japanese system, U.S. lump-sum plans may contain a hidden profit-sharing component, where the scale of payments is set according to expectations of current and future profits. On the Japanese plans, see Richard Freeman and Martin Weitzman, "Bonuses and Employment in Japan," National Bureau of Economic Research, Working Paper no. 1878, April 1986.

Table 5

Workers Affected by Two-Tiered Contracts

(As a Percentage of All Workers Negotiating Contracts in Year, 1975-88)

Industry	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988†
Manufacturing	0.5	0.4	3.2	30.4	9.6	6.0	26.3	10.1	5.0	2.8
Food and kindred products	1.3	0	5.2	2.8	7.3	11.3	28.1	19.3	5.9	0
Tobacco	0	0	nc‡	0	0	nc	0	0	nc	nc
Textile mill products	0	0	nc	0	0	0	0	0	0	nc
Apparel	0	0	0	0	0	0	0	0	0	nc
Lumber	nc	0	0	0	0	0	38.6	76.5	0	0
Furniture	0	0	0	0	0	nc	0	0	0	nc
Paper	0	0	0	0	0	0	0	0	0	0
Printing	0	0	0	0	0	0	0	0	0	0
Chemicals	0	0	0	0	11.9	28.1	44.0	0	0	0
Petroleum and coal	0	nc	nc	0	0	0	0	0	0	0
Rubber	0	0	0	8.5	nc	0	0	0	0	0
Leather	0	0	0	0	0	8.2	0	0	0	nc
Stone, clay, and glass	0	0	66.3	0	0	55.6	0	4.5	0	0
Primary metals	0	3.7	0	0	7.8	13.0	5.3	1.6	12.7	0
Fabricated metals	0	0	0	0	17.3	0	0	5.4	42.7	nc
Nonelectric machinery	7.3	0	0	0	11.7	0	0	3.0	0	nc
Electric equipment	0	0	0	0	1.4	0	64.4	0	0	0
Transportation equipment	0	95.5§	0	78.5	23.5	5.9	62.3	6.0	4.9	25.0
Instruments	nc	0	0	0	0	40.0	0	0	nc	0
Miscellaneous manufacture	0	0	0	0	0	0	31.7	0	0	0
Nonmanufacturing	0	0	1.1	32.2	7.2	24.8	39.0	24.6	17.3	21.7
Transportation and utilities	0	0	0	46.4	7.5	10.8	67.8	29.2	47.9	38.4
Wholesale and retail trade	0	0	3.5	0	6.2	46.1	3.8	20.1	1.3	22.8
Finance, insurance, real estate	0	0	0	0	0	2.2	0	8.5	0	0
Services	0	0	0	0	9.1	31.3	15.7	12.4	1.0	0
All	0.3	0.2	1.6	31.2	8.4	15.3	33.3	20.0	11.1	8.7

†Data through May.
‡nc: no contract negotiated in year.
§1979 negotiated agreements.

differences among workers), ESOPs grant stock ownership shares to individual employees. Both these plans act as a hedge against economic risk since labor costs are necessarily reduced when profits are down. As Table 7 shows, bonus payments linked to profits are less common than lump-sum payments. In all but the most organized sectors of the economy, profit sharing has been rare. In an adversarial bargaining environment, where profits may be hidden or misreported, profit sharing is viewed with suspicion by both workers and management. A strong and centralized union may have speedier and more complete access to company files than other unions and may therefore be better able to provide information to workers about company profits; indeed, profit sharing has been more common in such industries as automobiles and primary metals, which have a record of aggressive centralized collective bargaining.

In sum, although concessions remain dominant in many industries in the U.S. economy, the form of these concessions has changed. While hard concessions such as wage reduction, COLA revision, and benefit cuts are less common in the most recent negotiated agreements, more institutionally innovative soft concessions such as lump-sum payments are important in current contracts. In light of differences in trend, some distinction between the two forms of worker concessions may be warranted.

Concessionary outcomes and economic performance

The fact that union concessions continued to occur with reasonable frequency through the middle and later part of the 1980s brings into question the degree to which aggregate economic variables such as real growth, prices, and unemployment can fully explain compensation settlement patterns. Even if allowance is made for lags in the effect of the economy on bargaining outcomes — lags due to long-term contracts, backward-looking expectations, or the role of relative wages — the frequency of concessionary settlements since 1983 suggests that more than cyclical factors

Table 6

Workers Affected by Lump-Sum Payments

(As a Percentage of All Workers Negotiating Contracts in Year, 1975-88)

Industry	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988†
Manufacturing	1.4	0.1	16.6	1.7	5.9	69.5	56.5	34.1	75.4	67.1
Food and kindred products	2.3	0	5.2	9.8	3.3	3.4	17.2	26.5	29.0	87.3
Tobacco	0	0	nc‡	0	0	nc	0	84.0	nc	nc
Textile mill products	0	0	nc	0	0	0	0	0	0	nc
Apparel	0	0	0	0	0	0	55.7	40.0	0	nc
Lumber	nc	0	0	0	0	0	40.4	19.8	0	100.0
Furniture	0	0	0	0	0	nc	19.7	0	0	nc
Paper	0	0	6.9	0	0	18.6	65.7	80.8	65.3	100.0
Printing	0	0	0	0	0	0	0	0	0	63.2
Chemicals	0	0	0	0	0	28.1	0	30.6	18.0	0
Petroleum and coal	0	nc	nc	0	0	0	0	9.0	0	100.0
Rubber	0	0	0	0	nc	0	0	100.0	52.6	0
Leather	37.0	0	0	0	0	0	0	0	100.0	nc
Stone, clay, and glass	0	0	0	0	0	0	0	16.6	0	0
Primary metals	0	1.0	0	0	0	0	0	32.8	20.4	0
Fabricated metals	0	0	0	0	0	58.0	32.7	26.6	59.8	nc
Nonelectric machinery	0	0	0	0	6.1	0	28.5	40.9	78.6	nc
Electric equipment	0	0	0	4.1	0	66.7	90.3	46.0	40.4	0
Transportation equipment	4.1	15.0§	38.6	1.1	19.5	94.1	91.2	37.8	94.6	100.0
Instruments	nc	0	0	0	0	0	0	87.6	nc	0
Miscellaneous manufacture	0	0	0	0	0	0	0	68.0	0	0
Nonmanufacturing	1.4	0	1.8	0	0.7	15.1	22.7	57.7	49.8	25.8
Transportation and utilities	1.3	0	0	0	0.6	24.3	25.2	64.6	61.8	38.4
Wholesale and retail trade	1.8	0	0	0	1.2	17.7	33.9	53.5	65.6	41.3
Finance, insurance, real estate	0	0	31.1	0	0	9.3	9.8	0	37.3	0
Services	0	0	0	0	0	1.6	7.7	40.3	17.0	0
All	1.4	0.1	5.9	0.9	3.0	37.7	37.8	50.2	62.6	31.7

†Data through May.
‡nc: no contract negotiated in year.
§1979 negotiated agreements.

may underlie their pattern.

To evaluate this point, consider first the behavior of aggregate wage equations estimated for the private nonfarm business sector and for the union and nonunion sectors from the mid-1970s to 1989 (Table 8). The first thing to note is that such models (estimated for wages and salaries) continue to predict aggregate wage patterns fairly precisely through the 1980s, with coefficients of reasonable magnitude and quarterly prediction errors that indicate, on average, a close fit. But in the most recent period, while the aggregate and nonunion wage equations have overpredicted wage growth to a modest degree, the deterioration in the union equation has been more pronounced. Moreover, the possible spillover of weak wage growth from the union sector to the nonunion sector may account for some of the relatively good performance of the nonunion wage equations (columns 2 and 8). While lagged union wage growth matters for nonunion wage growth, nonunion wage patterns do not influence union wage patterns and are therefore omitted from the union regressions. Two points are worth stressing from this exercise: (1) prediction errors from wage equations are somewhat larger since 1986, and (2) union equations have a growing tendency to overpredict the actual level of wage growth relative to nonunion equations.

Explanations have been offered and tested for the somewhat weaker performance of these equations since the mid-1980s.[12] Chief among them are "structural" theories, suggesting that either factor or product market changes have influenced the fit of such equations. Many analysts have argued for the inclusion of labor force growth, trend productivity growth, a unionization variable, and import penetration variables in the aggregate equation to capture the types of structural changes that may have taken place. In general, the

[12]For example, David Neumark, "Declining Union Strength and Wage Inflation in the 1980s," Board of Governors of the Federal Reserve System, Working Paper no. 96, April 1989; Robert Gordon, "U.S. Inflation, Labor's Share, and the Natural Rate of Unemployment," National Bureau of Economic Research, Working Paper no. 2585, September 1988; and Mitchell, "Shifting Norms in Wage Determination."

Table 7

Workers Affected by Profit Sharing†

(As a Percentage of All Workers Negotiating Contracts in Year, 1975-88)

Industry	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988†
Manufacturing	0	0.7	16.7	36.5	11.5	61.4	12.1	17.1	58.0	12.2
Food and kindred products	0	0	0	0	5.7	0	9.2	0	0	60.0
Tobacco	0	0	nc‡	0	58.4	nc	0	0	nc	nc
Textile mill products	0	0	nc	0	0	0	0	0	0	nc
Apparel	0	0	0	0	0	0	0	0	0	nc
Lumber	nc	0	0	0	0	0	0	17.9	0	100.0
Furniture	0	0	0	0	0	nc	0	0	0	nc
Paper	0	0	6.9	0	0	0	0	0	0	0
Printing	0	0	8.9	0	0	0	0	0	11.7	0
Chemicals	0	0	21.4	0	6.9	0	12.6	12.0	0	0
Petroleum and coal	0	nc	nc	0	0	0	0	0	0	0
Rubber	0	0	0	20.0	nc	0	0	0	0	0
Leather	0	0	0	0	0	0	0	0	0	nc
Stone, clay, and glass	0	0	0	0	0	0	0	0	0	0
Primary metals	0	1.0	0	59.1	18.7	0	34.3	65.3	79.6	0
Fabricated metals	0	0	0	0	7.5	33.2	9.5	0	0	nc
Nonelectric machinery	0	1.5	15.8	47.0	68.3	31.3	51.1	3.0	52.4	nc
Electric equipment	0	10.1	0	0	0	59.3	1.0	0	0	0
Transportation equipment	97.0§	0	37.9	87.6	2.9	84.4	47.8	0	75.9	0
Instruments	nc	0	0	0	0	0	0	0	nc	0
Miscellaneous manufacture	0	0	0	0	0	0	0	0	0	0
Nonmanufacturing	0	0	0	0.4	7.9	2.2	1.8	2.6	2.1	0
Transportation and utilities	0	0	0	0.6	15.8	5.5	2.2	3.9	0	0
Wholesale and retail trade	0	0	0	0	0	0	2.9	0	5.8	0
Finance, insurance, real estate	0	0	0	0	0	0	0	0	2.3	0
Services	0	0	0	0	0	0	0	0	0	0
All	0	0.4	4.8	19.5	9.4	27.6	6.4	7.2	30.1	4.1

†Data through May.
‡nc: no contract negotiated in year.
§1979 negotiated agreements.

inclusion of variables intended to control for these factors does not change qualitatively the relative trend towards somewhat weaker prediction since the mid-1980s.

Collective bargaining and microeconomic factors

There are many reasons to suspect that firm and industry factors figured more heavily in collective bargaining in the 1980s.[13] Through the 1980s, union goals such as employment security became increasingly important in certain firms and industries, implying that the aggregate union wage equations of Table 8 may be misspecified. Similarly, demographic factors such as the influx of younger workers and a greater share of female workers potentially changed the profile of the "average" union worker and therefore the bargaining demands of the representative union. In addition, recent evidence suggests that union "pattern bargaining" (linking various settlements within an industry, for example) has eroded somewhat in the 1980s. A notable example is the dissolution of the formal Steelworkers' bargaining coalition in 1986.

The standard bargaining model relies on joint maximization by the firm and the union in the bargaining agreement. In the most common model the firm minimizes the cost of producing a quantity of output given both labor and nonlabor inputs, while the union is set in charge of maximizing the utility of its workers. In maximizing the welfare of its workers, the representative union would presumably include wages, the level of employment, *and* employment security in its objective function. Assuming that the union sets the wage and

[13] While earlier researchers stressed the role of institutional and firm-specific factors in influencing the outcomes of collective bargaining, there has been little empirical work on compensation determination at the firm level, presumably because firm-specific data are so difficult to obtain. For a discussion of firm-specific factors influential in wage determination, see John T. Dunlop, *Wage Determination Under Trade Unions* (New York: A.M. Kelley, 1944).

Table 8

Aggregate and Union/Nonunion Wage Equations

Dependent Variable: Growth in Wages and Salaries: 1976-I to 1989-I†

Independent Variables:	Private Nonfarm Business Sector			Union Sector			Nonunion Sector		
	(1)††	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PCE_t‡	.84	.67	.82	1.22	1.27	1.18	.69	.40	.67
	(.06)	(.09)	(0.06)	(.15)	(.15)	(.15)	(.09)	(.13)	(.09)
UR 25_t§	−.36	−.35	−.36	−.29		−.44	−.37	−.35	−.37
	(.10)	(.10)	(0.11)	(.26)		(.29)	(.16)	(.15)	(.18)
Union UR_t‖					−.21				
					(0.24)				
Change in LF_t#			.07			−.29			.08
			(.13)			(.34)			(.20)
Change in Union $(-1)_t$*		.14						.23	
		(.05)						(.08)	
UE Ben††			1.97			4.68			1.50
			(1.23)			(3.27)			(1.97)
R^2	.82	.85	.84	.58	.58	.60	.58	.64	.58
N	53	53	53	53	53	53	53	53	53
DW	2.17	2.24	2.36	2.51	2.49	2.59	2.38	2.32	2.46
Average Quarterly Prediction Errors									
1980-I to 1989-I	−.14	−.11	−.04	−.27	−.32	−.07	−.09	−.03	−.00
1986-I to 1989-I	−.45	−.36	−.25	−.66	−.66	−.33	−.43	−.27	−.27

†Compounded quarterly growth in the Employment Cost Index for wages and salaries, for relevant categories as indicated.
‡Twelve-quarter polynominal distributed lag of inflation in the personal consumption expenditures deflator.
§Prime age male unemployment rate.
‖Unemployment rate for major sector weighted by sectoral unionization coverage rates in each year.
#Compounded quarterly growth in civilian noninstitutional labor force.
*One period lag of union wage and salary growth.
††Share of unemployment benefits paid by federal government received by those unemployed for greater than 26 weeks.

allows the firm to choose the level of employment, the condition for equilibrium is satisfied where the marginal rate of substitution of wages for employment in the union's utility function equals the slope of the firm's labor demand function — a solution which in this example implies that both the equilibrium level of wages and the equilibrium level of employment will depend on the employment security variable.[14] The point is that any observed deterioration in the employment-wage tradeoff may reflect an improvement in employment security, and for this reason, bargaining outcomes will not be independent of this (unobserved) factor. Because many such factors may affect bargaining outcomes, and because these factors are more likely to be correlated with firm- and industry-specific variables than with aggregate variables, the firm and industry detail of the data is used in the following sections to assess the causes of collective bargaining outcomes in the 1980s.

Firm characteristics

Union concessions should occur in the troubled firms, where the fear of shutdown threatens the jobs of the most senior workers, who then agree to a concession.[15] In this setting, concessions occur to save jobs, and thereby involve a change in union preferences from higher wages to higher employment rather than any fundamental change in the opportunities available to the union in bargaining for its workers.

The union voting model summarized above has testable implications for firm performance. Specifically, concessionary firms should be firms that are "worse off" based on a set of standard criteria for judging performance. If concessionary firms can be differentiated from nonconcessionary firms on the basis of their financial performance, then it is plausible that concessions occurred in reaction to the risk of job loss associated with the plant closings.[16]

To test whether this is in fact the case, Table 9 reports the mean values of alternate financial variables for concessionary and nonconcessionary firms by year, using a limited data set that matches collective bargaining firms to their financial data. (See Appendix for details of matching.) Rows 1-7 of Table 9 indicate the level of assets, net income, retained earnings, sales, capital, and employment for the average concessionary and nonconcessionary firm, and thereby provide information about the size of the average firm in each year. Generally, concessions appear to have occurred in firms that were somewhat smaller than average in the early 1980s and in firms that were somewhat larger than average in the later 1980s.

Rows 8-12 of Table 9 provide some information about profitability and labor costs for the representative concessionary and nonconcessionary firms. While labor costs (row 8) appear roughly similar for concessionary and nonconcessionary firms, profits as proxied by net income scaled for assets (row 9) are significantly lower for concessionary firms in every year. Similarly, the sales growth performance of concessionary firms is somewhat weaker than that of nonconcessionary firms in most years (line 10). Finally, employment growth tended to be lower in concessionary firms as well (row 11). Arguing somewhat in an opposite direction is the behavior of stock prices, which have in the majority of cases risen faster for concessionary firms in the year of a concession than for nonconcessionary firms (line 12). Given the poor profitability performance of concessionary firms, however, the positive correlation of concessions and stock values may arise because concessions reduce future cost pressures and therefore lessen the probability of bankruptcy or shutdown.

Taken together, these data are consistent with the view that concessions tended to occur in firms that were relatively weak on average, although the difference in the financial performance of the two types of firms is, on average, not clear in all years.

[14] As in the standard model, the firm minimizes the cost of producing a quantity of output X, given K_n nonlabor inputs priced r_n and labor input L priced w:

(1) $C = C(w,r_1 \ldots r_n,X)$ or $C(w,r,X)$

with the cost-minimizing level of employment l* given by:

(2) $L^*(w,r,X) = \partial C(w,r,X)/\partial w = C_w$.

The union, in this example, places value not only on wages and the level of employment, but also on employment security, S, which is at least partially exogenous to the union:

(3) $U = g(w,L,S)$.

If we assume that the union sets the wage and allows the firm to choose employment according to equation 2, the first order condition is:

(4) $MRS_{L,w} = \partial C_w(w,r,X)/\partial w$,

yielding the standard result that the marginal rate of substitution in the union's objective function is equal to the slope of the firm's demand function. The reduced form equations for wages and employment, as derived from equations 2 and 3, will be given by:

(5) $w = f(S,r,X)$;

(6) $L = f(S,r,X)$.

From equations 5 and 6 it is clear that both wages and employment will depend on the employment security variable S; moreover, it is apparent that the signs of $\partial w/\partial S$ and $\partial L/\partial S$ will be opposite (an increase in Y will change the position of the union's objective function without changing the condition for cost minimization, so that an increase in wages must be accompanied by a fall in employment).

[15] See Richard Freeman and James Medoff, *What Do Unions Do?* (New York: Basic Books, 1984).

[16] While activity of this sort at the firm level would presumably be correlated with aggregate unemployment trends, the aggregate rate omits specific firm and industry deviations from average unemployment rates.

Industry characteristics

The effect of macroeconomic and industry-specific influences on the propensity for concessionary activity can be evaluated statistically by aggregating across firms and linking the share of concessions in each industry to several industry-specific and aggregate variables. Formally we have:

(6) $C_{it} = f(X_t, Y_{it}, T)$, where

C_{it} is the share of workers negotiating a contract with a concession in industry i in year t, X_t is a set of macroeconomic variables varying through time and included to capture the influence of the business cycle on concessionary probabilities, Y_{it} is a set of industry-specific variables varying through time and intended to capture the effect of industry characteristics, and T is a linear time trend.

In this exercise, the bargaining data set is merged with aggregate price and unemployment data; with industry data on employment, prices, and output from the National Income and Product Accounts; and for manufacturing industries, with import shares from the Department of Commerce.

To the extent that concessionary outcomes are predicted by economic events as captured by the independent right hand side variables, the time trend should be insignificant in an equation with the economic variables included.[17] Alternatively, if at least a portion of the upward drift in the level of concessions by industry is unrelated to industry-specific or aggregate influences, then the time trend may matter for concessions by industry even after the economic variables are included. The share of concessions by industry that are not explained by economic factors and are related to trend can be termed "structural" factors. Structural factors that might explain an erosion in union organizing and bargaining strength and that are at least partially independent of economic developments include: increased efforts at, and greater success of, employer resistance to union organizing; a shift in the interpretation of existing labor laws that is unfavorable to unions; changes in the public perception of unions and changes in the role of government in the bargaining process; and deregulation and changes in market structure that have increased both foreign and domestic nonunion competition.[18]

[17]Of course this is only true if union and nonunion firms are sufficiently similar within industry on average.

[18]For a discussion of employer efforts against union organizing, see Richard Freeman, "Contraction and Expansion: The Divergence of Private Sector and Public Sector Unionism in the United States," *Journal of Economic Perspectives*, vol. 2, no. 2 (Spring 1988). For information about labor law effects, see Paul Weiller, "Promises to Keep: Securing Workers' Rights to Self-Organization Under the NLRA," *Harvard Law Review*, vol. 96, no. 8 (June 1983), and "String and New Balance: Freedom of Contract and the Prospects for Union Representation," *Harvard Law Review*, vol. 98 (December 1984). A discussion of public perception and the role of government can be found in Freeman and Medoff, *What Do Unions Do?* A discussion of trade factors and deregulation can be found in Henry Farber, "The Decline of Unionization in the United States: What Can Be Learned From Recent Experience?" National Bureau of Economic Research, Working Paper no. 2267, May 1987.

Table 9

Mean Characteristics of Concessionary and Noncessionary Firms

	1983		1984		1985		1986		1987	
	No Con†	Con†	No Con	Con	No Con	Con	No Con	Con	No Con	Con
Financial Variables‡										
1. Current assets	1003.90	1097.17	1384.39	1052.97	763.61	2273.76	1245.37	1449.82	549.37	1482.71
2. Total assets	6459.44	2829.55	5926.63	2955.32	2863.36	5468.43	4750.87	5746.23	2938.26	4249.77
3. Net income (NI)	212.71	26.10	340.28	154.62	131.08	321.09	261.53	142.21	168.00	54.15
4. Retained earnings (RE)	1155.25	776.81	1981.81	890.44	611.76	1806.78	942.52	1420.37	672.13	607.65
5. Sales	4188.04	2882.79	7313.06	4788.00	3498.97	7112.00	5424.59	4906.08	2388.13	6641.35
6. Working capital	211.18	360.43	342.38	327.42	337.80	661.55	510.69	406.18	254.44	359.27
7. Employment§	40.73	28.72	27.32	42.46	26.23	68.62	26.74	31.67	15.57	48.49
8. Labor cost/employment§	32.31	37.23	35.54	32.39	36.77	36.44	38.37	38.34	38.03	39.37
9. NI/total assets	0.056	−0.007	0.058	0.055	0.035	0.026	0.049	0.008	0.056	0.006
10. Percent change in sales‖	10.03	−3.25	10.25	9.58	4.65	4.04	2.98	5.94	9.74	8.35
11. Percent change in employment	0.81	−4.88	−1.17	1.78	1.70	−5.32	−0.71	−0.71	3.61	−6.69
12. Percent change in stock price	6.28	23.13	−6.64	−8.76	15.62	22.21	1.18	−6.65	−26.03	−8.00
Number of observations	65	56	50	33	31	46	27	84	18	38

†"Con" indicates that the firm experienced concessions. "No con" indicates that no concessions were granted to workers in the firm in the given year.
‡Data are in millions, unless otherwise indicated.
§Data are in thousands.
‖Percent changes are percent change from previous period.

The model is estimated in Table 10. Because of the nature of the dependent variable in equation 6, the model is estimated using a nonlinear procedure under which only non-negative observations of the dependent variable are possible.[19] The dependent variable in all equations is the share of concessionary contracts by industry. Included as explanatory variables are the last period's inflation rate, the expected inflation rate,[20] the prime age male unemployment rate, and changes in the natural log (ln) of industry output shares, employment, and prices. Industry import penetration ratios are included as well in the "manufacturing only" regressions in columns 5, 8, and 11.[21] In order to capture what appears to be an upward trend in concessionary activity through the late 1980s and to evaluate the sig-

[19]The dependent variable is truncated at zero, and only positive observations of the dependent variable are possible. A standard linear regression model is not appropriate in this case, and the model is estimated as a tobit via maximum likelihood techniques.

[20]The expected inflation rate is calculated as the annual averages of a 12-quarter lag of inflation in personal consumption expenditure

Footnote 20 *(continued)*
prices, with geometrically declining weights on past inflation.

[21]Industry import penetration ratios were not available for nonmanufacturing industries according to the required breakdown. The model estimated without these variables for both manufacturing and nonmanufacturing industries yielded qualitatively similar conclusions as to the significance of the post-1984 time trend.

Table 10

Industry Concessions

Dependent Variable: Share of Contracts in Industry with Concessions in Year t

Independent Variables	All Concessions					Hard Concessions†			Soft Concessions†		
	(1)	(2)	(3)	(4)	(5)‡	(6)	(7)	(8)‡	(9)	(10)	(11)‡
Percent change in PCE_t	−.068		−.088		−.088	−.081		−.083	−.083		−0.085
	(.019)		(.017)		(.021)	(.018)		(.026)	(.019)		(.022)
PCE_t^e		−.065		−.089			−.084			−.078	
		(.020)		(.194)			(.020)			(.020)	
ln $(ur25)_t$	.192	.416	.119	.381	0.128	.173	.409	.214	−.186	.079	−.264
	(.179)	(.145)	(.165)	(.135)	(.198)	(.174)	(.142)	(.213)	(.168)	(.140)	(.203)
Change in ln Q $Share_{it}$	.386	.373	.331	.347	0.502	.300	.332	.281	.061	.025	.371
	(.497)	(.503)	(.468)	(.475)	(0.541)	(.480)	(.486)	(.563)	(.451)	(.461)	(.526)
Change in ln FTE_{it}	−1.052	−1.070	−1.440	−1.615	−1.627	−1.760	−1.963	−1.640	−.912	−.978	−1.467
	(.759)	(.778)	(.757)	(.790)	(.869)	(.773)	(.808)	(.900)	(.782)	(.822)	(.912)
Change in ln P_{it}	−.639	−.636	−.577	−.660	0.637	.270	−.379	.156	1.104	1.069	1.335
	(.497)	(.507)	(.545)	(.561)	(.616)	(.561)	(.576)	(.646)	(.583)	(.546)	(.668)
Change in ln PEN_{it}					−5.702			−8.180			−.902
					(15.943)			(16.465)			(14.302)
IND DUM			X	X	X	X	X	X	X	X	X
TREND 84	.072	.058	.073	.058	0.076	.060	.047	.065	.077	.069	.074
	(.029)	(.030)	(.026)	(.030)	(0.031)	(.027)	(.031)	(0.032)	(.025)	(.030)	(.030)
Number of Observations	207	207	207	207	180	207	207	180	207	207	180
Log likelihood	−102.85	−104.10	−69.57	−71.00	−72.96	−70.55	−71.38	−74.01	−48.56	−51.28	−50.55
Percent of positive§	69	69	69	69	66	66	66	62	49	49	45

†Hard concessions involve direct compensation reduction — nominal wage freezes and reduction, benefit reduction, or an unfavorable alteration to the terms of a COLA provision. Soft concessions involve institutional innovations such as two-tiered contracts, lump-sum provisions, profit-sharing or ESOP plans, or work rule changes favorable to management.
‡Manufacturing industries only.
§Observations for which there was a concession in industry.

nificance of this pattern, the model includes a post-1984 time trend measuring the structural component of concessionary activity by industry. This break is chosen for the time trend in order to capture the upward drift in concessions by industry noted in Tables 1-7 that is independent of the influence of the business cycle on bargaining outcomes.[22] Because the data summarized in Tables 1-7 show a different time pattern of behavior in hard and soft concessions, and because the two types of concession differ in severity, the data were estimated separately for the two types, using the definitions developed above.

Row 1 shows that inflation reduced the likelihood of industry concessions over this period.[23] Row 2 controls for expectations of inflation by including a long lag on past inflation; it yields similar results. Row 3 of the table shows that concessions in general were sensitive to aggregate labor market conditions as reflected in the behavior of the unemployment rate, but that innovative soft concessions did not respond to labor market tightness as measured in this way.

Rows 4-8 of the table summarize the impact of industry-specific factors on concessionary probabilities by industry. Row 4 shows that changes in industry output share (scaled for total industry output) did not affect industry concessionary probabilities. Changes in industry employment were strongly negatively associated with industry concessions involving direct compensation reduction (hard concessions), but were only weakly associated with industry concessions involving innovative changes in compensation packages (soft concessions). In general, in industries with lower than average employment growth, the incidence of concessions was higher. The change in the industry prices did not matter for concessions in general (row 6) but was positively associated with soft concessions. Finally, industry import penetration did not affect the incidence of concessions in manufacturing industries. Industry dummy variables are included to control for omitted industry-specific factors.

The key finding of this analysis is that even after the aggregate and industry variables most likely to influence bargaining outcomes by industry are included, the post-1984 time trend in row 10 is strongly significant in nearly all cases. Both compensation and noncompensation concessions by industry appear to have a secular component that is unrelated to the types of economic factors that have been modeled. An approximation to the impact of the trend variable in explaining the rise in industry concessions from 1979 to 1987 can be obtained by multiplying the coefficient value on the time trend by the mean value of trend in 1979 and 1987 respectively, taking the difference, and then dividing it by the change in the mean of the dependent variable over the same years.[24] These calculations produce estimates for the contribution of the trend variable in the range of 40 to 50 percent for all concessions, and about 30 to 40 percent for soft concessions.[25]

In sum, the data present a strong argument that economic factors do not fully explain the incidence of union concessions at the industry level in the 1980s. The evidence from the aggregate union wage equations and industry-specific bargaining equations indicates that structural factors may have influenced compensation outcomes over the late 1980s. Specifically, the analysis offered above suggests that one-third to one-half of post-recession industry concessions were unrelated to industry and aggregate influences. Instead these concessions appear to reflect longer term changes in the bargaining environment faced by unions and unionized firms.

Conclusion

In summarizing the major collective bargaining settlements in the 1980s, this article charts the pattern of union concessions over this period. Union concessions have been spread across diverse industries in both manufacturing and nonmanufacturing. Through the 1980s concessionary bargaining has increasingly involved the use of innovative contracting, with the adoption of lump-sum provisions, bonus plans, and two-tier contracts. Although in recent years fewer union settlements have involved wage and benefit reductions than in the mid-1980s, the incidence of soft concessions such as lump-sum payment plans has remained strong among agreements to date. Diverse patterns in hard and soft concessions do not appear to be due to differences in the effect of specific industry or aggregate variables on concessionary probabilities.

[22] Alternative specifications of the time trend were chosen with qualitatively similiar conclusions. The post-1984 linear trend was chosen based on overall fit.

[23] Because concessions are defined as *nominal* reductions in this article, inflation unambiguously increases the *real* cost of any giveback to the worker. That concession probabilities decrease as inflation increases presumably indicates that workers fight harder to preserve current compensation levels when inflation threatens to erode compensation even further.

[24] The formal decomposition accounts for the correlation of the right hand side variables with the Mill's correction of the tobit procedure. Because this factor can be quite large, the approximation to this procedure using the mean values of the trend and dependent variables in the earlier and later periods may produce misleading estimates of total contribution.

[25] The means of the dependent variable in 1979 and 1987 are, respectively: .0375, .5386 for all concessions; .0177, .4361 for hard concessions; and .0225, .3431 for soft concessions.

Standard aggregate wage equations overpredict union wage growth in the 1980s. These results are consistent with the industry-specific results, which indicate that concessions, when aggregated within industry, cannot be explained by economic factors alone. Although aggregate price inflation and unemployment influenced bargaining outcomes in expected ways and although industry performance — captured by import penetration, price movement, output share growth, and employment growth — had significant effects on bargaining outcomes in certain cases, the preponderance of evidence suggests that economic factors by themselves do not fully explain the upward trend in union concessions in industries in the 1980s. On the basis of this evidence, it is likely that at least a portion of concessionary activity in each industry was due to an erosion of union bargaining strength largely independent of economic factors.

Linda A. Bell

Appendix

The contract data used in this article were drawn from Bureau of Labor Statistics contract reports that appeared in *Current Wage Development* from 1975 to 1988. The database compiles information on all major collective bargaining settlements. It provides data on the firm and union negotiating the contract, and it specifies the industry, region, and settlement dates. In addition, information on wages, COLAs, benefits, work rules, and specific compensation plans is given for each contract. The full data set covers 5,443 private industry contracts negotiated in 1,241 establishments but excludes agreements in the construction industry. Each bargaining pair (union and firm) is followed from the date of the initial contract through subsequent contract settlements, thereby forming a panel data set by establishment through time.

The typical firm-union pair appears in the data set for four contracting periods, with each period averaging 36 months. Thirteen percent of the contracts in the sample are national agreements. The agreements are distributed regionally as follows: 26 percent Northeast, 24 percent Northcentral, 15 percent Southeast, and 17 percent West. Transportation and public utilities have a relatively heavy representation in the sample, making up 18 percent of all agreements; 57 percent of the agreements in the sample are in manufacturing industries, 15 percent in wholesale and retail trade, and 9 percent in services. The contract data is weighted according to the bargaining year cycle, whereby 1977, 1980, 1983, and 1986 are the heaviest years of data.

To analyze financial characteristics of concessionary and nonconcessionary firms and thereby explore the determinants of concessionary contracts, the basic contract data are merged by establishment to the company code listings in Standard and Poor's Compustat data, which provide financial information for publicly traded companies. This matching reduces the number of establishments in the merged data set to 304. Although employing the firm level data from Compustat significantly reduces the establishment sample, it preserves the general characteristics of the full bargaining data set according to location, length of contract, and payment terms. By industry, the subsampled Compustat/collective bargaining data set is more heavily weighted to manufacturing industries, which account for 68 percent of the subsampled data set.

Each of the establishments in the collective bargaining sample was assigned a four-digit standard industrial classification code using Compustat codings and firm-industry matchings.† The establishment-industry matched pair was then assigned an initial level of average hourly earnings corresponding to the level of earnings in the four-digit industry in 1974. A time series of earnings for each establishment was generated by applying the actual settlement terms, as stated in the contract language, to the base 1974 level earnings.‡ This matching restricted the analysis to manufacturing firms.§

In sum, the data are composed of three related samples, each used for different purposes in this article. First, the full collective bargaining data set contains the complete information from the contract data and is used for evaluating concessions by type in Tables 1-7 and for the statistical analysis of concessions by industry in Table 10. Second, the Compustat/collective bargaining data set contains a subsample of the collective bargaining data set according to the availability of company matchings in Compustat and is used for the analysis of means in Table 9. Third, the wage/collective bargaining data set is a manufacturing subsample of the collective

†Firm-union-industry matching provided by Hirtle (1987) was used for this purpose. Additional assignments were made by referring to pairings in IRS Compustat data.

‡The COLA information available in the contract data set specifies a COLA deferral, reduction, or change in terms, without precise information on the magnitude of these changes.

§Problems in matching certain establishments in this manner further limited the size of the final collective bargaining data set in several of the tests on firm-level effects.

Appendix *(continued)*

bargaining data according to the availability of earnings data and is used to generate information about average wages across concessionary and nonconcessionary firms. This data set is used in this article to define average wages in lump-sum and non-lump-sum agreements, as stated on page 49 of the text.

For the regression analysis found in Table 10, the bargaining data set was merged by two-digit industry with aggregate price and unemployment data; with industry data on employment, prices, and output from the National Income and Product Accounts; and import shares from the Department of Commerce.

Interest Rates, Household Cash Flow, and Consumer Expenditures

The recent expansion of adjustable-rate lending has made consumer debt payments more sensitive to changes in interest rates than before. At the same time, however, the growth in money market mutual funds and the deregulation of small time deposit rates have made household interest receipts more responsive to interest rate movements. In a period when interest rates are changing significantly, these developments prompt concern about the role played by household cash flows in the transmission of monetary policy.[1]

This article develops a methodology for estimating the effect of rising interest rates on household cash flow and the resulting impact on consumption. Cash flow is shown to be proportionately more responsive to movements in interest rates at present than it was in the late 1960s, although slightly less responsive than in the late 1970s. Sensitivity has risen over the whole period because households increased their stocks of floating-rate and rapidly repricing assets more than their debts with these characteristics; in the last decade, however, this sensitivity has diminished somewhat as floating-rate debt has grown more rapidly than floating-rate assets.

The household cash flow effect on aggregate consumption depends not only on the magnitude of the change in net interest receipts, but also on the impact of the associated redistribution of income from debtors to creditors. Microeconomic data presented in this article suggest that households that make debt service payments have spending propensities similar to those of interest income recipients. The effect of rising interest rates on net cash flow and subsequently on consumption is probably positive, although perhaps somewhat less important quantitatively than a decade ago.

Rising interest rates do tend to reduce household expenditures through effects on the cost of borrowing, the reward for savings, and household wealth. This article, however, focuses more narrowly on the household cash flow effect. The analysis concludes with an exercise that projects the impact on cash flow and consumption of a 300 basis point rise in interest rates.[2] The calculations suggest that such an increase would raise household after-tax cash flow by about $15 billion and raise consumption by about $10 billion over a 12-month period.[3]

The direct effects of higher interest rates on consumption

A rise in interest rates has a theoretically ambiguous

[1]Valuable discussion of some of these issues may be found in John L. Goodman, Charles A. Luckett, and David W. Wilcox, "Interest Rates and Household Cash Flow," Federal Reserve Board, December 1988, mimeographed. See also Stephen S. Roach, "The Interest Rate Connection," *Economic Perspectives*, Morgan Stanley, February 1989; Jason Benderly and Edward McKelvey, "Consumer Debt: Buried Alive?" Goldman Sachs, February 1989; and Roger H. Fulton and R. Scott Brown, "Will Variable-Rate Mortgages Doom the Economic Boom?" A. Gary Shilling and Company, March 1989.

[2]Short-term interest rates rose by about 300 basis points between March 1988 and March 1989, but short-term rates have fallen about 100 basis points since then.

[3]The estimates presented here are based on a partial equilibrium analysis in which household spending patterns, national income and prices, and debt and asset compositions are assumed constant. It is also assumed that associated changes in the interest incomes of the business sector, the government, or financial intermediaries do not affect consumption.

effect on consumption. On the one hand, consumers may delay expenditures, substituting future consumption for present consumption, in response to higher returns to saving and increased costs of borrowing. On the other hand, the aggregate household sector is a net lender and receives more interest income on its assets as interest rates rise. Since higher interest receipts make possible increased consumption over time, consumers may choose to increase current as well as future expenditures.[4]

The cash flow effect of changing interest rates is the real world counterpart to the income effect described in microeconomic theory. Net cash flow rises (falls) with interest rates if households hold more (less) floating-rate or rapidly repricing assets than debts. The aggregate effect on consumption also depends on the propensities to consume of those households that receive interest income relative to those that make debt payments.

The substitution and income effects are not the only channels by which interest rates affect aggregate consumption in the real economy. First, a rise in interest rates may be accompanied by a reduction in credit availability, causing liquidity-constrained households to reduce their expenditures more than the simple intertemporal substitution effect would suggest. Second, most household assets, such as corporate equity, corporate and government bonds, home equity, and human capital, provide income payments that are largely independent of market interest rates. When long-term interest rates rise, present value calculations discounting future dividends, coupon payments, housing services, and wages cause the market value of these assets to fall. For consumers who intend to borrow against future income or to finance expenditures by stock, bond, or home sales, an increase in long-term rates not only reduces their wealth but also reduces their ability to spend. In response to such capital losses, consumers may increase their savings to restore their desired stocks of wealth.

This article, however, abstracts from wealth, credit-rationing, and substitution effects, focusing instead on the income effects of changing interest rates. The approach is not so restrictive in its empirical application as it first appears. The recent rise in short-term interest rates was not accompanied by a significant rise in long-term rates or a reduction in credit availability.[5] Moreover, some evidence suggests that the negative substitution effect on nondurables and services consumption, though compelling in theory, may not be quantitatively important.[6] The apparently limited amount of credit rationing and household wealth reduction accompanying the current rise in interest rates raises the possibility that the household cash-flow channel is relatively more important today than in previous episodes of monetary tightening.

The historical relationship between interest rates and net monetary interest

The basic data on interest paid and received by the household sector is recorded in the Commerce Department's National Income and Product Accounts. A breakdown of the data for the years 1987 and 1988 appears in Table 1. In 1988, households received directly $343 billion in monetary interest; they paid out $272 billion, of which about two-thirds went to mortgage interest payments.[7]

The National Income Accounts' definition of personal income includes, in addition to monetary interest,

[4]The associated changes in noninterest income, exchange rates, and relative prices of course indirectly affect consumption as well.

[5]Recent surveys of senior bank loan officers do not indicate a significant reduction in their "willingness to lend" to consumers.

[6]A rise in interest rates may, nonetheless, reduce expenditures on durable goods because their relative desirability as savings vehicles declines. The intertemporal elasticity of consumption for nondurables and services is estimated to be approximately zero in Robert E. Hall, "Intertemporal Substitution in Consumption," *Journal of Political Economy*, vol. 96, no. 2 (1988), pp. 339-57; and in John Y. Campbell and N. Gregory Mankiw, "Consumption, Income, and Interest Rates: Reinterpreting the Time Series Evidence," Princeton University, April 1989.

[7]As defined in this article, the household sector includes nonprofit institutions and foundations. Goodman, Luckett, and Wilcox, in "Interest Rates and Household Cash Flow," estimate that these entities account for perhaps 10 to 15 percent of assets and 5 to 10 percent of the debts of the household sector. Noncapital expenditures by nonprofit institutions are included in the National Income Accounts' definition of private consumption and may be sensitive to variations in their cash flows.

Table 1

Interest Paid and Received by Households

(In Billions of Dollars)

	1987	1988
Monetary interest received	313	343
Monetary interest paid	253	272
Nonmortgage interest	92	99
Mortgage interest	161	173
Net monetary interest	60	71
Memo items:		
Imputed interest received†	214	233
Disposable income	3210	3464

Sources: Federal Reserve Bank of New York staff estimates and data from U.S. Commerce Department.

†Imputed interest income consists of interest earned by life insurance companies and pension funds and the undistributed interest income of other financial intermediaries, mainly banks.

imputed interest income, that is, the undistributed interest income earned by pension funds, insurance companies, and other financial intermediaries. This totaled $233 billion in 1988. Since these funds are generally not available to be spent directly, the rest of the article assumes that households do not alter their consumption in response to changes in the level of imputed interest. This assumption imparts a bias toward finding that rising interest rates exert a negative effect on household spending because some consumers can borrow more or will save less as imputed income rises.

A historical perspective is provided by Chart 1, which displays interest paid and received over time as fractions of disposable income. Imputed interest is given by the gap between the lines representing total interest received and monetary interest received. Imputed interest has been growing in relative importance in the 1980s.

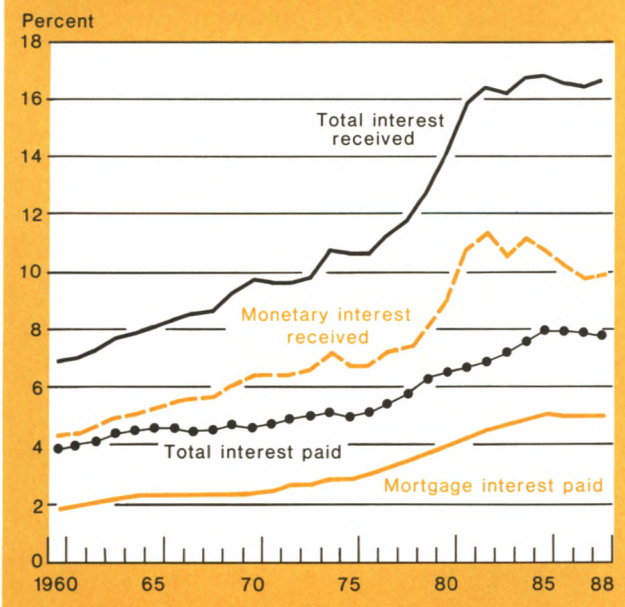
The difference between total interest paid and mortgage interest is interest paid on consumer installment credit and other consumer debt. While mortgage interest payments have been rising, nonmortgage interest payments have remained a fairly constant percentage of income. The gap between monetary interest received and total interest paid is net monetary interest. Household net interest has always been positive, but its relative share of income has been falling in the last few years. The most volatile series on this chart is monetary interest received, which increased dramatically during the run-up in interest rates in 1979 and 1980 and fell with the level of interest rates in the early 1980s.

Chart 2 compares changes in net monetary interest with a two-year moving average of changes in the three-month Treasury bill rate and shows a generally positive correlation. When interest rates have been rising, net monetary interest has risen with a lag of one or two years. In 1979, 1980, and 1981, interest rates rose about 200 basis points each year, and net monetary interest rose by 1 or 2 percent of disposable income each year.

Chart 1

Household Interest Paid and Received

As Percentages of Disposable Income



Source: Department of Commerce.

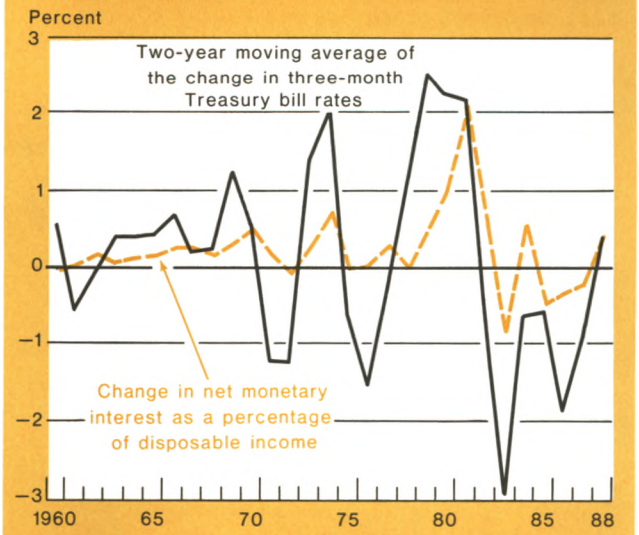
Note: Total interest received is the sum of monetary and imputed interest. Total interest paid is the sum of mortgage and consumer credit interest.

The composition of household assets and debts and the sensitivity of net monetary interest to changes in market rates

We can draw few inferences about the current sensitivity of household cash flow to market interest rates from historical data. Over the last decade, consumer

Chart 2

Changes in Net Monetary Interest and Treasury Bill Rates



Sources: Department of Commerce and Federal Reserve Board.

deposit rates have been deregulated, the available menu of money market savings instruments has expanded, and variable-rate lending has grown dramatically.[8]

Table 2 details the composition of interest-bearing assets of the household sector 20 years ago, 10 years ago, and today. Although the total financial assets of the household sector are today about 12 trillion dollars, only about a third of these assets provide interest income directly to households. The rest of the household sector's financial assets consists of corporate equity, noncorporate equity, IRA and Keogh Plan deposits, pension fund reserves, and insurance company reserves.

Interest-earning assets differ substantially in the responsiveness of their returns to market rates. The yields earned on NOW account deposits ($282 billion) and passbook savings balances ($420 billion) adjust only modestly to changes in market rates. But the yields on money market deposit account balances ($489 billion) are likely to reflect about half of a sustained increase in the Treasury bill rate within a year.[9]

Of the small time deposits ($991 billion), more than half have maturities of one year or less, and about half of the longer maturities are likely to roll over within a year.[10] Three-fourths of small time deposits, therefore, will reprice at market rates within a year. The money market mutual funds ($302 billion) and large time deposits ($109 billion) are, of course, extremely responsive to short-term money market rates.

Information about the average maturities of the household sector's holdings of other financial instruments is less precise. Of the negotiable Treasury securities ($466 billion), perhaps 45 percent reprice in response to short-term interest rates and 5 percent reprice in response to long-term rates after a year.[11] Although little is known about the maturity structure of the household sector's holdings of other credit market instruments ($824 billion), a conservative estimate is that 10 percent respond to short-term rates and 10 percent respond to long-term rates within a year.[12]

Table 3 displays the composition of consumer debt for the same three dates cited in Table 2. Almost half of consumer debt arises from fixed-rate mortgages ($1410 billion); perhaps 10 percent of these mortgages are

[8]The historical relationship between changes in interest rates and net monetary interest is statistically dominated by the interest volatility of the late 1970s and early 1980s. Over this same period, the characteristics and composition of household assets were rapidly changing. Current inferences based on data from this period may be highly inaccurate.

[9]The ways in which banks adjust consumer deposit rates under deregulation are explored by John Wenninger in "Responsiveness of Interest Rate Spreads and Deposit Flows to Changes in Market Rates," this *Quarterly Review*, Autumn 1986, pp. 1-10.

[10]These estimates were obtained from the Board of Governors of the Federal Reserve System, Monthly Survey of Selected Deposits and Other Accounts, December 28, 1988 and January 25, 1989, H.6 Statistical Release.

[11]Of the total marketable interest-bearing public debt securities outstanding at the end of 1988, about one-third mature in less than 1 year, one-third mature in 1 to 5 years, and the rest have an average maturity of about 10 years (Table B-85, *Economic Report of the President*, 1989).

[12]The classification "other credit market instruments" consists of mortgages, corporate and foreign bonds, tax-exempt obligations, open-market paper, savings bonds, and agency issues.

Table 2

Interest-bearing Assets of the Household Sector

(Seasonally Adjusted)

	December 1968		December 1978		December 1988	
	Billions of Dollars	Percentage of Total	Billions of Dollars	Percentage of Total	Billions of Dollars	Percentage of Total
NOW accounts	0.0	0.0	8.5	0.6	282.3	7.3
Passbook savings	266.3	45.8	474.3	31.9	419.3	10.8
Money market deposit accounts	0.0	0.0	0.0	0.0	488.7	12.6
Small time accounts†	99.6	17.1	512.5	34.5	990.7	25.5
Money market mutual funds	0.0	0.0	9.4	0.6	301.5	7.8
Large time accounts	8.4	1.4	64.2	4.3	108.5	2.8
Treasury bills, notes, and bonds	39.1	6.7	79.2	5.3	466.4	12.0
Other credit market instruments‡	167.9	28.9	347.2	23.3	823.8	21.2
Total	581.3	100.0	1486.2	100.0	3881.2	100.0

Sources: Flow of Funds data from the Federal Reserve Board; Federal Reserve Bank of New York estimates.

†Excludes IRA and Keogh Plan deposits totaling $0.4 billion, $11.6 billion, and $216.5 billion in 1968, 1978, and 1988, respectively.

‡Includes U.S. savings bonds, agency securities, tax-exempt obligations, mortgages, corporate bonds, foreign bonds, and open-market paper.

repriced in response to a change in long-term interest rates after about a year. Adjustable-rate mortgages ($585 billion), however, respond almost fully to short-term interest rate changes within a year.[13] The interest rate charged on home equity lines of credit ($75 billion) adjusts rapidly, often within a month, to market rates.[14]

Of the nonmortgage consumer debt ($746 billion), about 15 percent is at a variable interest rate, tied either to the Treasury bill rate or the prime rate. Most of the remaining debt is of relatively short maturity. Banks report an average liquidation period of about three years for auto loans, two years for personal loans, and four years for other loans.[15] Although interest rates on revolving credit balances could in principle vary closely with market rates, in practice they are not responsive.

Table 4 compares the amount of household debts and assets, weighted by the extent of variable-rate adjustment or frequency of market-rate repricing within a year. The excess of such interest-sensitivity-adjusted assets over debts has grown from $74 billion in 1968 to $410 billion in 1978 to $768 billion in 1988; expressed as a percentage of disposable income, the excess has risen from 12 percent in 1968 to 25 percent in 1978, and fallen to 21 percent in 1988. Table 4 provides evidence for this article's main conclusion: the effect of a change in interest rates on household cash flow is positive. Expressed as a percentage of disposable income, the effect is much stronger than it was in 1968 and somewhat less strong than it was in 1978.

Since long-term interest rates have been basically flat and short-term rates rose about 300 basis points between March 1988 and March 1989, the data in Table 4 imply that over 12 months this degree of monetary tightening would increase net monetary interest by $24.1 billion.[16] This sort of calculation abstracts from any shifts in asset and debt composition that are caused by rising interest rates. In the previous run-up in interest rates in the late 1970s, funds were shifted out of passbook savings accounts into money market mutual funds and time accounts with unregulated interest rates. No analogous rapid portfolio shift to reduce debt service burdens is possible, however. The working assumption, that the composition of debts and assets does not change as rates rise, imparts a bias toward

[13]The amount of adjustable-rate mortgages outstanding is inferred from a model developed by Lynn Paquette and maintained at the Federal Reserve Bank of New York. The model tracks the historical issuance and estimated prepayments of fixed-rate and adjustable-rate mortgages. For further detail, see Lynn Paquette, "Estimating Household Debt Service Payments," this *Quarterly Review,* Summer 1986, pp. 12-23.

[14]The $75 billion estimate of debt outstanding on home equity lines of credit is from Glenn B. Canner, Charles Luckett, and Thomas A. Durkin, "Home Equity Lending," *Federal Reserve Bulletin,* May 1989, pp. 333-44. These authors estimate that traditional home equity loans, that is, second mortgages, total $135 billion to $190 billion; 16 percent of these loans have adjustable rates.

[15]Average liquidation periods are less than average maturities for loans because of prepayments. The characteristics of consumer installment debt outstanding in December 1987 can be found in American Bankers Association, *Installment Credit Report 1988.*

[16]This number is obtained by multiplying 0.03 times the difference shown in Table 4 between assets and debts that reprice in response to changes in short rates.

Table 3

Debts of the Household Sector

(Seasonally Adjusted)

	December 1968		December 1978		December 1988	
	Billions of Dollars	Percentage of Total	Billions of Dollars	Percentage of Total	Billions of Dollars	Percentage of Total
Consumer installment credit†	90.1	23.9	262.0	25.2	666.2	23.7
Revolving credit	2.0	0.5	45.2	4.3	185.8	6.6
Auto loans	34.4	9.1	98.7	9.5	289.8	10.3
Other installment credit‡	53.7	14.2	118.1	11.4	190.6	6.8
Other consumer credit§	29.3	7.7	50.3	4.8	80.0	2.8
Mortgage debt	257.7	68.3	727.7	70.0	2070.3	73.5
Home equity lines of credit	0.0	0.0	0.0	0.0	75.0	2.7
Adjustable-rate mortgages	0.0	0.0	0.0	0.0	585.0	20.8
Fixed-rate mortgages	257.7	68.3	727.7	70.0	1410.3	50.1
Total household debt	377.1	100.0	1040.0	100.0	2816.5	100.0

Sources: Federal Reserve Board, Statistical Release G.19 and Flow of Funds data; Federal Reserve Bank of New York estimates.

†Data were collected in May 1989 and are subject to subsequent revisions.

‡Includes personal loans and mobile home loans.

§Includes single-payment loans, charge account balances, service credit, and installment credit of nonprofit institutions.

Table 4

The Amount of Variable-Rate or Annually Repriced Interest-earning Assets and Debts

(In Billions of Dollars)

	December 1968	December 1978	December 1988
Total interest-bearing assets	581.3	1486.2	3881.2
Assets responding to market rates after one year	136.3	567.0	1795.4
Responding to short-term rates†	117.5	528.3	1689.7
Responding to long-term rates‡	18.8	38.7	105.7
Total interest-bearing debt	377.1	1040.0	2816.5
Debt responding to market rates after one year	62.1	156.9	1027.6
Responding to short-term rates§	36.3	84.1	886.6
Responding to long-term rates‖	25.8	72.8	141.0
Net assets responding to market rates after one year	74.2	410.1	767.8
Memo: Disposable income	628.7	1637.3	3599.5
Net assets responding to market rates after one year as a percentage of disposable income	11.8 percent	25.0 percent	21.3 percent

†These assets consist of the weighted sum (weights given parenthetically) of savings and NOW accounts (0.0), MMDAs (0.5), small time accounts (0.75), MMMFs and large time accounts (1.0), federal securities (0.45), and other securities (0.1).

‡These assets consist of the weighted sum of federal securities (0.05) and other securities (0.1).

§This debt consists of the weighted sum of revolving credit, fixed-rate auto loans, and other consumer installment credit (.33); other consumer debt (0.25); and variable rate consumer installment credit, home equity lines of credit, and adjustable rate mortgage loans (1.0). Fifteen percent of auto loans and other consumer installment credit had variable rates in 1988; none had variable rates in 1968 and 1978.

‖This debt consists of 10 percent of fixed-rate mortgage debt.

finding a negative effect of higher interest rates on cash flow.[17]

Distributional considerations

If the individuals who received interest income were the same as those who made debt payments, then the cash flow effect of a rise in interest rates would undoubtedly be stimulative to consumption. More generally, if the propensity of creditors to consume were as great as that of debtors, then again the cash flow effect would be stimulative.

The individuals who benefit from higher interest receipts are, however, different from those who make higher interest payments. Rising adjustable-rate mortgage payments undoubtedly require significant consumption cutbacks for many borrowers. The vast majority of adjustable-rate mortgage holders do not have nearly enough adjustable-rate assets to offset their rising mortgage payments directly.[18] The crucial issue, however, is whether the recipients of interest incomes have significantly lower propensities to spend than those who make interest payments that are sensitive to market rates.

Table 5

Disposable Income and Consumer Expenditures in 1985 by Income Quintile

Income Quintile	Mean Disposable Income (Dollars)	Mean Expenditures (Dollars)	Expenditures' Share of Disposable Income (Percent)
Lowest 20 percent	3,462	11,006	318
Second 20 percent	10,338	14,131	137
Third 20 percent	18,041	19,183	113
Fourth 20 percent	28,178	25,932	92
Highest 20 percent	54,215	42,374	78
Mean	22,887	22,217	97

Source: Data from U.S. Bureau of Labor Statistics, reported in *Statistical Abstract of the United States 1988*, Table no. 688.

Aggregate consumption would be more sensitive to interest paid than interest received if interest-earning assets were concentrated among high-income households with low propensities to spend. Table 5 shows that the top income quintile's average propensity to

[17]Households probably still shift funds to high-yield accounts out of low-interest liquid deposit accounts. For example, since yields on money market deposit accounts adjust to market rates relatively slowly, the balances in these accounts have recently been falling while money market funds have been growing.

[18]Goodman, Luckett, and Wilcox, "Interest Rates and Household Cash Flow," report that 80 percent of adjustable-rate mortgage holders have mortgage debts that are at least four times their holdings of floating-rate or rapidly repricing assets.

consume is, in fact, lower than the overall average.[19] Since nonlabor income is more concentrated than labor income, the propensity to consume out of interest income may be less than that out of labor income.

Most debt, however, is owed by households with fairly high incomes. Two-thirds of all consumer installment debt and three-fourths of all home mortgages are held by the top two income quintiles of the population.[20] Moreover, some debtors, such as borrowers with home equity lines of credit, are clearly not liquidity constrained and are not forced to reduce consumption in response to higher interest payments. Surveys show that these borrowers have large unused balances on their lines of credit.[21] Those that make large debt service payments do not appear to have higher than average propensities to consume.

There is also little evidence that the recipients of interest income have low propensities to consume. In order to preserve their capital and guarantee a sizable interest cash flow, many households maintain large balances in money market deposit accounts, money market mutual funds, and small time accounts rather than invest in corporate equity. Holdings of these interest-earning assets are spread much more evenly across income classes than are holdings of corporate equity, and they are likely to be held by people with fairly high propensities to consume, such as the elderly.

Almost all interest received by households is taxable.[22] Table 6 shows that the tax returns of those with moderate incomes, say, those reporting under $40,000 of adjustable gross income, earn over half of all interest income. The argument that only the rich receive interest while the poor pay it out is therefore unfounded.

Table 7 shows that those over the age of 65 hold about 47 percent of all interest-earning assets at financial institutions and about 42 percent of all open market interest-earning financial instruments. Table 8 shows that the elderly consume a higher percentage of their incomes than the rest of the population. Although there is no reliable estimate of the marginal propensity to consume of the elderly (particularly those who receive large amounts of interest income), some economists have found empirical evidence that the elderly do have higher than average marginal propensities to consume.[23]

[19]Some households are placed in the highest income quintile because they have experienced temporary windfalls, and they are likely to save much of this increased income. The variation in average expenditure shares in Table 5, therefore, overstates differences in marginal propensities to consume across income classes defined in terms of permanent income.

[20]See Goodman, Luckett, and Wilson, "Interest Rates and Household Cash Flow," p. 9.

[21]In their discussion of a survey conducted in the second half of 1988, Canner, Luckett, and Durkin, "Home Equity Lending," report that the median home equity line of credit debtor owes $10,000 and that the median available line of credit is $31,250.

[22]The flow of funds data collected by the Federal Reserve Board suggest that about $270 billion, or less than 7 percent, of all interest-earning assets of households were tax exempt in December 1988. Most of these securities have fixed interest rates and long maturities and are hence unimportant when estimating the sensitivity of interest income to changes in short-term interest rates.

[23]See, for example, papers by Michael Hurd, "Savings of the Elderly and Desired Bequests," *American Economic Review*, vol. 77, no. 3.

Table 6

Distribution of Tax Returns and Interest Income in 1985

Adjusted Gross Income (Dollars)	Share of Total Tax Returns (Percent)	Share of Reported Interest Income (Percent)
9,999 and less	19.2	8.6
10,000–19,999	29.5	19.5
20,000–29,999	19.6	14.9
30,000–39,999	13.9	12.3
40,000–49,999	8.1	9.8
50,000–99,999	8.3	19.3
100,000 and above	1.5	15.6
Total	100.0	100.0

Source: Data from U.S. Internal Revenue Service, reported in *Statistical Abstract of the United States 1988*, Table no. 492.

Table 7

Distribution of Ownership of Interest-earning Assets in 1984

Age of Head of Household	Share of Total Households (Percent)	Share of Assets at Financial Institutions† (Percent)	Share of Open Market Instruments‡ (Percent)
Under 35	29.6	6.8	4.2
35-44	20.0	10.4	13.3
45-54	14.5	12.8	11.0
55-64	14.9	22.5	28.4
65-74	12.3	26.6	25.8
75 and over	8.6	20.9	16.9
Total	100.0	100.0	100.0

Source: Data from U.S. Bureau of Census, reported in *Statistical Abstract of the United States 1988*, Table no. 728.

†Includes passbook accounts, money market deposit accounts, certificates of deposit, and interest-earning checking accounts.

‡Includes money market funds, U.S. government securities, municipal and corporate bonds, and other interest-bearing assets.

Implications of recent interest rate changes for household after-tax cash flow and consumption expenditures

The direct impact of a sustained 300 basis point increase in short-term interest rates on interest paid and received can be inferred from Table 4. After 12 months, interest received would be $50.7 billion greater and interest paid would be $26.6 billion greater than if interest rates were unchanged.

If one assumes that the representative interest income recipient faces a 30 percent combined state and federal marginal tax rate,[24] then the increase in interest rates would cause a $35.4 increase in after-tax income over the next 12 months. The interest paid on ordinary mortgages and home equity loans is fully deductible, but only a small portion of the interest paid on nonmortgage debt is deductible (20 percent in 1989 and zero thereafter) and some households do not itemize their returns. When mortgage interest is treated as fully deductible and nonmortgage interest is treated as not deductible at all, a 30 percent marginal tax rate implies an increase in after-tax interest paid of $20.7 billion owing to the increase in rates. After-tax net interest would therefore rise $14.7 billion over the next year because of a 300 basis point increase in interest rates.

Table 9 shows the effects of these changes in after-tax income paid and received under alternative assumptions about relative propensities to consume. Standard macroeconomic models suggest a marginal propensity to consume out of wage income of about 0.7.[25] Applying this fraction to both interest paid and received implies a $10.3 billion increase in consumption over the next 12 months from a sustained 300 basis point rise in short-term rates. Since total consumption spending is now about $3.4 trillion a year, the household cash flow effect would therefore be an increase in consumption of one-third of 1 percent.

Alternative cases shown in Table 9 reveal the sensitivity of the results to different parameter values. If we retain the assumption that the propensity to consume out of interest income is fairly high — say, 0.7 — but assume that all those who must pay more interest are

Footnote 23 *(continued)*
(June 1987), pp. 298-312; and David W. Wilcox, "Social Security Benefits, Consumption Expenditures, and the Life Cycle Hypothesis," *Journal of Political Economy*, vol. 97, no. 2 (April 1989), pp. 288-304.

[24] As Table 6 shows, about half of all household interest income in 1985 was received by households reporting less than $40,000 in adjustable gross income. Marginal federal tax rates are either 15 percent, 28 percent, or 33 percent depending on adjustable gross income and filing status. Marginal state tax rates range from zero to about 9 percent, but interest earned on Treasury securities is exempt from state taxes. Securities exempt from federal taxes are ignored since the amount held by households is relatively small (see footnote 22).

[25] Model estimates of the propensity to consume out of interest income are usually lower, but these estimates are based on definitions of interest income that include imputations bound to be consumed in small proportion. Since this article considers only monetary interest paid, the appropriate spending propensity could be quite high.

Table 8

Disposable Income and Consumer Expenditures in 1985 by Head of Household

Age	Mean Disposable Income (Dollars)	Mean Expenditures (Dollars)	Expenditures' Share of Disposable Income (Percent)
Less than 25	11,088	12,964	117
25 to 34	23,025	21,977	95
35 to 44	29,643	28,063	95
45 to 54	30,354	29,146	96
55 to 64	24,649	23,390	95
65 to 74	17,170	17,000	99
75 and over	11,553	12,347	107
Mean	22,887	22,217	97

Source: Data from U.S. Bureau of Labor Statistics, reported in *Statistical Abstract of the United States 1988*, Table no. 688.

Table 9

Twelve-Month Change in Income and Consumption Due to a 300 Basis Point Rise in Interest Rates

(In Billions of Dollars)

Changes in Income			
Change in Interest Received	Change in Interest Paid	Change in Interest Received after Taxes	Change in Interest Paid after Taxes
50.7	26.6	35.4	20.7

Changes in Aggregate Consumption		
	Debtors' Marginal Propensity to Consume Equals 0.7	Debtors' Marginal Propensity to Consume Equals 1.0
Creditors' Marginal Propensity to Consume Equals 0.7	10.3	4.1
Creditors' Marginal Propensity to Consume Equals 0.2	−7.4	−13.6

Sources: Table 4 and adjustments described in the text.

liquidity constrained so that every dollar of increased interest paid comes out of consumption, the higher interest rates would still cause consumption to rise by about $4.1 billion. If, however, we assume a very low propensity to consume out of interest income (0.2) and a high propensity to cut back in response to increased interest payments (0.7), we find that interest rates have a negative cash flow effect on consumption totaling −$7.4 billion. The more extreme assumption that all debtors are liquidity constrained and their marginal propensity to consume is 1.0 implies a consumption decline of −$13.6 billion, about two-fifths of 1 percent of total consumption.

Conclusion

The excess of household assets over household debts that have floating rates or that reprice rapidly in response to market rates increased from 11 percent to 25 percent of disposable income between 1968 and 1978. Over the past decade, floating-rate debt has increased more rapidly than similar assets, and the excess is now 21 percent. Household cash flow, therefore, continues to rise with interest rates, though somewhat less than 10 years ago. The estimates reported in this article suggest that a 300 basis point rise in interest rates would, if sustained, raise after-tax cash flow by about $15 billion over the next 12 months.

There is little reason to expect the marginal propensity to consume out of interest received to be significantly lower than the propensity to consume out of interest paid. The typical debtor household has fairly high income. Interest-earning assets, moreover, are spread more evenly across income classes than other forms of wealth and are particularly concentrated among elderly households that may have higher than average propensities to spend.

Ignoring any wealth, substitution, or credit-rationing effects of the recent monetary tightening, if the rise in short-term interest rates of roughly 300 basis points between March 1988 and March 1989 had continued, the household cash flow effect would likely have increased aggregate consumption by about a third of 1 percent over a 12-month period. The effect could have been a reduction, to be sure, but such a result would hold only in the unlikely event that the propensity to consume of interest payers greatly exceeded that of interest recipients. These results were derived under the assumptions that households do not alter the composition of their assets in response to higher interest rates and that consumers do not increase their spending as imputed interest income rises. More realistic assumptions would likely imply that rising interest rates have a larger positive cash flow effect on household consumption.

Richard Cantor

Treasury and Federal Reserve Foreign Exchange Operations

February-April 1989

The dollar traded with a firm undertone during most of the three months ending in April, buoyed by persistent investment and commercial demand for the currency. At times, upward pressure intensified and, in keeping with Group of Seven (G-7) undertakings to foster exchange rate stability, the U.S. monetary authorities intervened to resist the dollar's rise. On occasion, the upward pressure subsided and the dollar eased back somewhat. Overall, dollar exchange rates remained more stable than in recent quarterly periods, although throughout the period the currency continued to edge back toward the highs reached in the fall of 1988. On balance, the dollar rose ¼ percent against the German mark and Canadian dollar, 2¼ percent against the Japanese yen, 4 percent against the British pound, and 5 percent against the Swiss franc (Chart 1). The dollar ended the three-month period 1 percent higher on a trade-weighted basis as measured by the staff of the Federal Reserve Board of Governors.

A variety of factors contributed to the investment demand for dollars and dollar assets during this period. The currency's stronger performance in 1988 and early 1989 relative to preceding years prompted investors to feel more confident about increasing the share of dollar assets in their overall portfolios and reducing the hedged proportion of their dollar assets. By such actions, they could benefit more from the relatively wide short-term interest rate differentials favoring the dollar and avoid the increased costs of maintaining hedges.

Meanwhile, as positive sentiment toward the dollar mounted, commercial market participants also began to alter their trading strategies. Those, such as Japanese exporters, who at times in the past had been heavy forward sellers of dollar receivables scaled back their selling in advance of payment. Similarly, those who had dollars to buy in the future began to buy more dollars during the period lest the U.S. currency rise further. With the dollar consistently well bid in the market, interbank and speculative position-takers became more willing to take on long-dollar positions.

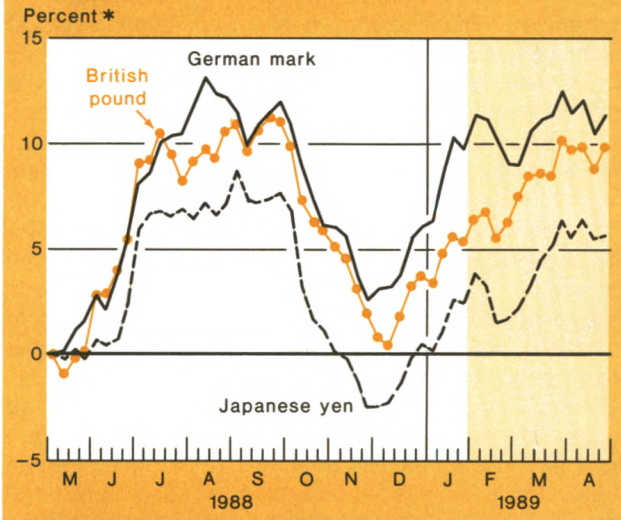
Underpinning the more positive sentiment toward the dollar were two key factors: interest rate differentials and political developments. Interest differentials continued to favor the dollar, providing a strong incentive for investors to purchase dollar assets so long as they presumed the dollar would remain stable or rise. During the three months ending in April, short-term interest rate differentials against the yen increased from what were already considered high levels, while against the mark they remained sizable but in about the same range as earlier (Chart 2).

At times during the period, political developments abroad also weighed against several major foreign currencies. In Japan, investigations of an insider trading scandal brought the government of Prime Minister Takeshita under increasing pressure and raised concerns about its viability. In Germany, electoral setbacks to the governing coalition's leading party and other centrist parties gave rise to market uncertainty at a time when there was already considerable confusion in

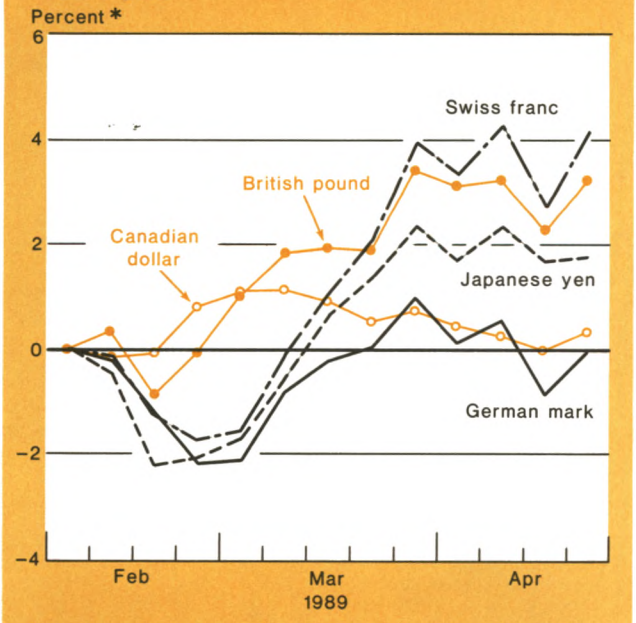
A report presented by Sam Y. Cross, Executive Vice President in charge of the Foreign Group at the Federal Reserve Bank of New York and Manager of Foreign Operations for the System Open Market Account. Daniel Brotman was primarily responsible for preparation of the report.

Chart 1

The dollar traded within a relatively narrow range during the three months ending in April 1989, after recovering from its autumn lows late in the previous period.



Still, the dollar moved higher on balance against a number of currencies, with upward pressure especially noticeable in March and late April.



* The top chart shows the percentage change of weekly average rates for the dollar from May 2, 1988. The bottom chart shows the percentage change of weekly average rates from February 1, 1989. All figures are calculated from New York noon quotations.

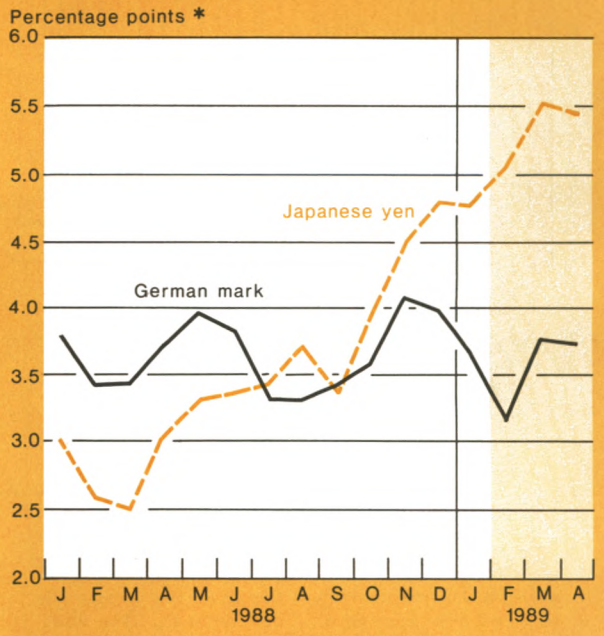
the market surrounding the imposition and subsequent removal of a withholding tax on interest income.

Under these circumstances, market participants appeared increasingly willing to overlook, at least for the time being, developments cited last year as giving rise to concerns about the dollar. Trade data released by the United States and other countries during the period suggested that the pace of adjustment of world trade and current account balances might be slowing (Chart 3). Similarly, market observers at times expressed disappointment over the absence of plans for substantial, long-term reduction of the U.S. budget deficit.

During the period, the degree of upward pressure on the dollar varied in response to shifting market views regarding inflationary pressures and the appropriate tightness of monetary policy in the United States and abroad. Changing market assessments of official commitments to exchange rate stability at times also

Chart 2

Short-term interest rate differentials favoring the dollar over the yen continued to widen, while those against the mark remained in their recently observed range.



* The chart shows monthly average differentials at the three-month maturity between Eurodollar deposit rates and Euromarket deposit rates for marks and yen.

affected market demand for the U.S. currency. Upward pressure was most pronounced at the opening of the period in February, during March, and toward the end of April. Upward pressure abated and the dollar settled back somewhat in mid-February and mid-April.

After a strong opening, the dollar settles back in mid-February

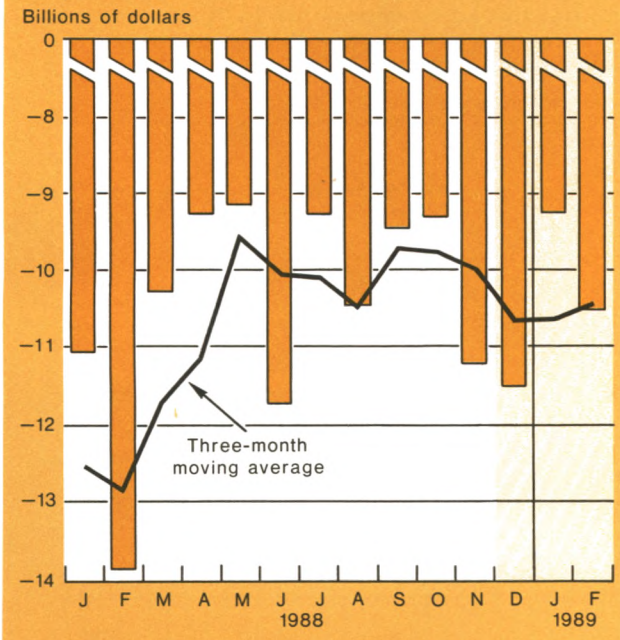
When the three-month period opened in February, market sentiment toward the dollar was distinctly bullish. Market participants, mindful of Chairman Greenspan's earlier indications in Congressional testimony of the Federal Reserve's strong anti-inflationary stance, interpreted evidence of robust U.S. economic growth as a portent of higher dollar interest rates. In particular, the early February report of an unexpectedly large rise in U.S. employment in January reinforced expectations that a buoyant economy would lead to further tightening of U.S. monetary policy. As the dollar firmed above its January highs, the U.S. monetary authorities sold a total of $350 million against marks during the period from February 2 through February 6 in the only intervention operations during the month.

Thereafter, sentiment toward the dollar took on a more cautious tone. This change in sentiment appeared, in part, to reflect concern about central bank intervention. The currency was approaching levels at which central banks had acted forcefully to counter its rise in 1988. Believing the central banks would seek to limit the dollar's rise at these levels again, market participants appeared less aggressive about bidding for dollars in the exchange market. Also, after President Bush's budget address before the Congress on February 9, market participants began to adopt a more realistic view regarding the difficulties the Administration and the Congress would face in negotiating a long-term plan to reduce the U.S. fiscal deficit. After rising in early February to DM 1.8880 and ¥ 130.67, the dollar began to edge lower, and upward pressure abated.

By mid-February, inflation and monetary policy had become the most immediate market concerns. A variety of economic statistics released at that time seemed to indicate a surprising upturn in inflation in several industrialized countries, including the United States and Germany (Chart 4), as well as a worrisome persistence of high inflation in the United Kingdom. There was also considerable uncertainty about the

Chart 3

Data released during the period suggested a slowing in the U.S. trade adjustment process.



The chart shows monthly and three-month moving average U.S. merchandise trade balances, seasonally adjusted and reported on a census basis. The trade figures for December, January, and February were released on February 17, March 15, and April 14, respectively.

Table 1

Federal Reserve Reciprocal Currency Arrangements

In Millions of Dollars

Institution	Amount of Facility April 28, 1989
Austrian National Bank	250
National Bank of Belgium	1,000
Bank of Canada	2,000
National Bank of Denmark	250
Bank of England	3,000
Bank of France	2,000
Deutsche Bundesbank	6,000
Bank of Italy	3,000
Bank of Japan	5,000
Bank of Mexico	700
Netherlands Bank	500
Bank of Norway	250
Bank of Sweden	300
Swiss National Bank	4,000
Bank for International Settlements	
Dollars against Swiss francs	600
Dollars against other authorized European currencies	1,250
Total	30,100

extent to which tax changes in several foreign countries might give rise to inflationary wage demands in the coming months. Against this background, market participants began to wonder whether efforts to subdue inflation worldwide might prove more difficult, and require higher interest rates, than had previously been assumed. The management of monetary policy by central banks in various countries tended to come under greater market scrutiny.

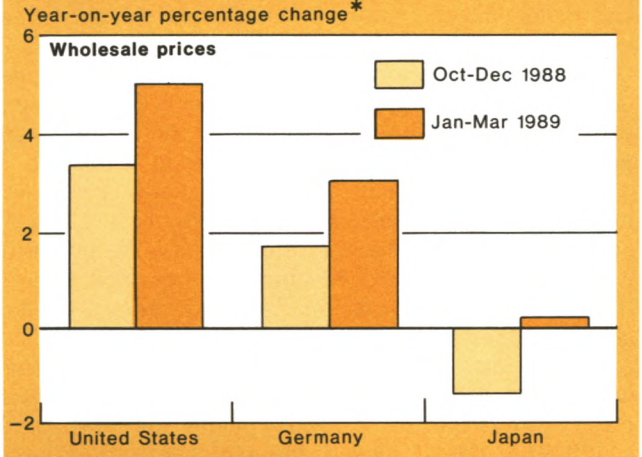
As for the United States, some market observers questioned whether the successive modest tightening moves by the Federal Reserve over the past year would be sufficient to prevent an acceleration of inflation. At the same time, market participants expressed concern that the potential economic, financial, and political implications of further policy tightening might deter the U.S. central bank from acting as forcefully as needed.

In contrast, market analysts at that time appeared more certain that signs of accelerating inflation in Germany would lead to a quick tightening of the German central bank's policy stance. This market view showed through in a significant increase in German money market rates as German banks aggressively bid for funds in anticipation of a near-term increase in the Bundesbank's official interest rates.

In this environment, dollar exchange rates eased from their earlier levels. By February 20, the dollar had declined to its period low against the yen of ¥ 125.25. Against the mark, the dollar continued to edge lower for another week, reaching its period low of DM 1.8095 on February 27. Even at these levels, however, the dollar remained well above where it had opened the year.

Chart 4

Data released during the period indicated an upturn in price pressures in several industrialized countries, focusing the market's attention on inflation and monetary policy.



*The chart shows the change in wholesale prices for the three-month period relative to the same three months in the previous year. The figures for January-March were released during the period under review.

The dollar resumes its advance in March

In late February, market assessments of the relative tightness of monetary policy in the United States and abroad underwent an abrupt shift.

Questions regarding the U.S. central bank's counter-inflationary stance were put to rest, and U.S. short-term market interest rates began to edge higher, when the Federal Reserve unexpectedly drained liquidity from the banking system on February 23 and the following day increased its discount rate by one-half percentage point.

Table 2

Drawings and Repayments by Foreign Central Banks under Special Swap Arrangements with the U.S. Treasury

In Millions of Dollars; Drawings (+) or Repayments (−)

Central Bank Drawing on the U.S. Treasury	Amount of Facility	Outstanding as of January 31, 1989	February	March	April	Outstanding as of April 30, 1989
Central Bank of the Argentine Republic	265.0	0.8	−0.8	*	*	*
Central Bank of Venezuela	450.0	0	0	+450.0	−450.0	0

Data are on a value-date basis.
*Facility expired on February 28, 1989.

Shortly thereafter, the Bundesbank appeared to send a signal through its public statements and money market operations that it saw no need at that time to tighten its policy stance. Market participants also noted the constraints on Bundesbank monetary policy stemming from currency relationships within the European Monetary System (EMS). With the German mark approaching the upper limit of its bilateral parity with another EMS currency, the Danish krone, further German tightening was viewed as unlikely, and short-term mark interest rates began to decline. Elsewhere, market participants interpreted actions by both the Bank of Japan and the Bank of England as indicating that these monetary authorities were also reluctant to see further increases in short-term interest rates.

Observers concluded that the Federal Reserve's discount rate increase was unlikely to lead to an immediate tightening of policy elsewhere. With U.S. economic statistics released during the month continuing to suggest generally strong economic performance, market participants expected that the recent widening of interest rate differentials favoring the dollar would be maintained. The report that U.S. producer prices had increased by a full percentage point in February in particular fueled expectations that dollar interest rates would remain firm.

Under these circumstances, upward pressure on the dollar reemerged, and by mid-March the dollar had more than fully recouped its February decline. As the dollar moved up against most major currencies, the U.S. monetary authorities resumed selling dollars against marks on March 8, generally operating in coordination with other central banks.

At the same time that sentiment toward the U.S. currency was becoming more positive, sentiment toward other currencies, most notably the Swiss franc and Japanese yen, was worsening. In Switzerland, reports surfaced of heavy selling of the Swiss franc as that currency broke out of the range in which it had traded for several years against the German mark. As the Swiss currency declined, upward pressure on the dollar increased, and the dollar rose against not only the franc but other continental currencies as well.

In Japan, the political atmosphere in March became increasingly tense and uncertain as allegations spread of insider trading and influence-peddling by prominent individuals in business and politics. Reports that foreign investors were looking to liquidate some of their Japanese bond and equity holdings added to the selling pressure on the Japanese yen. Indeed, whereas until mid-month the dollar was advancing most strongly against the mark among the major currencies, by the end of the month upward pressure had shifted to the dollar/yen exchange rate. Thus, at the end of March, U.S. intervention operations were expanded to include dollar sales against yen. In all, the U.S. monetary authorities sold $1,419 million against marks and $100 million against yen between March 8 and March 30.

By the end of March, the dollar's renewed rise led market participants to question the firmness of official commitments to exchange rate stability. As an early April meeting of the G-7 Finance Ministers and Central Bank Governors approached, some observers speculated that the G-7 might tolerate a further rise in dollar exchange rates as a consequence of the need to deal with inflation. In this atmosphere, the dollar reached its period highs of DM 1.9025 against the mark and ¥ 133.50 against the yen at the end of March. At these levels, the dollar was trading about 5 percent and 6½ percent, respectively, above its late-February lows against these two currencies.

Table 3

Net Profits (+) or Losses (−) on United States Treasury and Federal Reserve Foreign Exchange Operations

In Millions of Dollars

February 1, 1989 to April 30, 1989	Federal Reserve	United States Treasury Exchange Stabilization Fund
Realized	0	0
Valuation profits and losses on outstanding assets and liabilities as of April 30, 1989	+941.9	+734.5

Data are on a value-date basis.

Upward pressure on the dollar dissipates in April

Around the time of the April 2 G-7 meeting in Washington, however, market participants began to revise their assessment of official attitudes toward the dollar. A communiqué issued after the meeting stated that "a rise of the dollar which undermined adjustment efforts, or an excessive decline, would be counterproductive." Market participants interpreted this asymmetrical statement as a sign that the authorities remained committed to resisting the dollar's rise but were prepared to see some decline in the dollar. U.S. intervention sales of dollars against yen during the previous week and market reports of similar operations by the Bank of Japan following the G-7 meeting served to highlight this commitment. So, too, did operations on April 10 and 11 when the U.S. monetary authorities were quick to reenter the market, selling a total of $170 million against

marks, as soon as the dollar began to recover from its initial decline after the G-7 meeting.

Around the same time, accumulating, though still ambiguous, evidence that the pace of U.S. economic growth might be easing added to a more cautious sentiment surrounding the dollar. In particular, a number of economic reports on April 14 suggested that earlier fears of a sharp rise in U.S. inflation might have been premature and that capacity pressures in the economy might have peaked (Chart 5).

Meanwhile, market expectations of a possible tightening of monetary policy abroad began to resurface. The announcement on April 13 that the Swiss National Bank would increase its discount and Lombard rates drew market attention once again to the possibility that interest rates abroad might need to be raised. Around the same time, pressures within the EMS eased, and the Bundesbank was thus seen as having more scope to tighten its credit stance if it so chose. In Japan, rumors that the Bank of Japan was making preparations to raise its discount rate also became more widespread. Moreover, reports that the newly appointed German Finance Minister would seek to repeal the recently imposed withholding tax on interest earnings from domestic securities lent some support to the mark against both the dollar and the yen.

When the Bundesbank in fact announced a one-half percentage point increase in its discount and Lombard rates on April 20, and several other continental European central banks joined in by increasing their own official rates, the dollar initially eased further. The dollar moved as low as DM 1.8410 against the mark and ¥ 130.90 against the yen, to trade 3¼ percent and 2 percent, respectively, below its March highs.

The dollar closes the period on a strong note

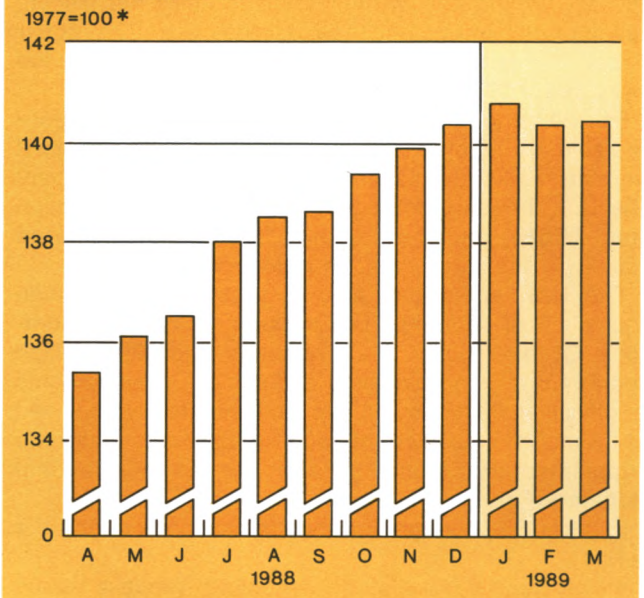
The dollar then quickly began to rebound. Market participants, noting that the Bundesbank's tightening move had had only a limited impact on market interest rates in Germany, reportedly began to take profits on long-mark positions established earlier in the month. By the following day, the dollar was already above the levels at which it had been trading before the German interest rate announcement.

At the same time, expectations diminished that other countries would soon follow the Bundesbank's move. Market expectations of higher interest rates in Japan lessened following a Japanese price report which suggested that the inflationary effect of Japan's new consumption tax might prove less than initially feared. Similarly, in Switzerland, comments by a senior central bank official countered the view that the Swiss central bank would further tighten its credit stance.

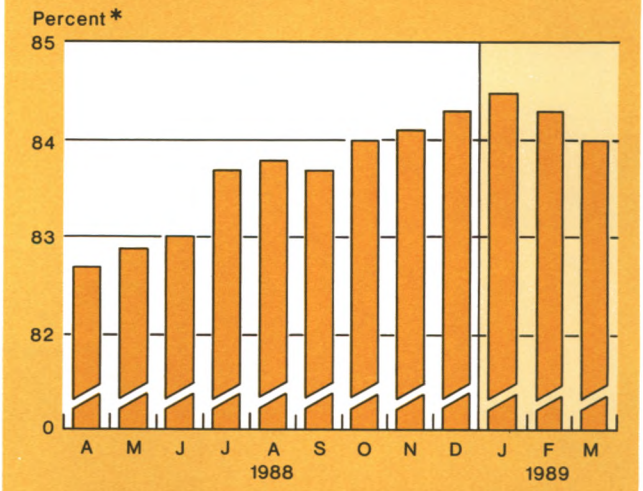
In these circumstances, sentiment toward the dollar

Chart 5

As the period progressed, data indicating a stabilization of U.S. industrial production . . .



and an easing of capacity constraints . . .



suggested to many market participants that the pace of U.S. economic growth may have moderated sufficiently to relieve upward pressure on U.S. interest rates.

* The top chart shows monthly seasonally adjusted index levels of U.S. industrial production. The bottom chart shows monthly seasonally adjusted capacity utilization rates in U.S. industry. The figures for January-March were released during the period under review.

again became bullish, and investment-related purchases of dollars reportedly began to accelerate. With the dollar approaching the levels of its period highs of late March, the U.S. monetary authorities intervened on the last trading day of the period to sell $100 million, half against marks and half against yen. The dollar closed the quarterly period at DM 1.8810 against the mark and ¥133.02 against the yen.

For the period as a whole, the U.S. monetary authorities sold a total of $2,139 million, $1,989 million against German marks and $150 million against Japanese yen. The U.S. Treasury, through the Exchange Stabilization Fund (ESF), and the Federal Reserve participated equally in these intervention operations.

The U.S. authorities also acquired $228.2 million equivalent of Japanese yen through nonmarket operations. Of this amount, the authorities sold $99.1 million and $84.8 million equivalent of Special Drawing Rights to official institutions for yen and separately received $44.3 million equivalent of yen in repayments under the Supplementary Financing Facility of the International Monetary Fund.

In other ESF foreign currency transactions during the period:

- The Central Bank of the Argentine Republic repaid the remaining $0.8 million of its swap arrangement with the ESF on February 28. The $265 million facility with the ESF, part of a $500 million short-term financing package arranged in October 1988, expired on February 28.
- The U.S. Treasury, through the ESF, agreed to establish a facility to provide up to $450 million in short-term financing to Venezuela on March 13. On March 15, Venezuela drew the entire amount in the facility, and on April 3, repaid the Treasury in full.

As of end April, cumulative bookkeeping or valuation gains on outstanding foreign currency balances were $941.9 million for the Federal Reserve and $734.5 million for the ESF. These valuation gains represent the increase in the dollar value of outstanding currency assets valued at end-of-period exchange rates, compared with the rates prevailing at the time the foreign currencies were acquired.

The Federal Reserve and the ESF regularly invest their foreign currency balances in a variety of instruments that yield market-related rates of return and that have a high degree of quality and liquidity. A portion of the balances is invested in securities issued by foreign governments. As of end April, holdings of such securities by the Federal Reserve amounted to $1,503.3 million equivalent, and holdings by the Treasury amounted to the equivalent of $1,985.0 million.

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