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This Quarterly Review is published by the Research and Statistics Function of the Federal Reserve Bank of New York. Among the members of the function who contributed to this issue are CHARLES M. SIVESIND *(on mortgage-backed securities: the revolution in real estate finance, page 1);* PETER FOUSEK *(on monetary restraint, interest rates, and inflation, page 11);* PATRICK J. CORCORAN *(on inflation, taxes, and the composition of business investment, page 13);* PAUL BENNETT *(on perspectives on the slowdown of American productivity growth, page 25);* MARK A. WILLIS *(chart analysis on inflation in New York, page 32); and* M. A. AKHTAR *(on the economic prospects for industrial countries abroad, page 37).*

A semiannual report of Treasury and Federal Reserve foreign exchange operations for the period February through July 1979 begins on page 47.

Mortgage-Backed Securities: The Revolution in Real Estate Finance

The rapid development of a variety of mortgage-backed securities has led to a radical transformation in real estate finance in recent years. By integrating the mortgage market into the traditional capital markets, these securities have broadened the financial base for home mortgages. During 1978, the $40 billion of mortgage-backed securities issued in this national market financed nearly one quarter of all home loan originations.

There are two major types of mortgage-backed securities: *bonds* with scheduled principal repayments that are secured by mortgage collateral and *pass-throughs* which provide ownership interest in the monthly payments from a pool of mortgages. Until recently, the market has been dominated by the bonds issued by the Federal National Mortgage Association (FNMA or "Fannie Mae") and the pass-through securities guaranteed by the Government National Mortgage Association (GNMA or "Ginnie Mae"), both backed by Government-insured mortgages. However, a variety of mortgage-backed securities are now financing conventional mortgage lending as well. Building on the success of pass-through securities issued by the Federal Home Loan Mortgage Corporation (FHLMC or "Freddie Mac"), pass-throughs backed by conventional loans are now being issued publicly by banks, savings and loan associations, and mortgage companies. Mortgage-related bonds are being used to finance mortgage loan portfolios of thrift institutions and various government-sponsored housing programs.

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Mortgage-backed securities allow firms dealing in real estate finance either to specialize in originating and servicing mortgage loans (seller/servicing) or to focus on providing the long-term capital investment funds to finance lending activities (investment). Traditionally, commercial banks, savings and loan associations, and mutual savings banks performed both of these functions. Mortgage companies, on the other hand, mainly originated and serviced mortgage loans which they packaged for sale to such permanent investors as insurance companies and pension funds.

The widespread acceptance of mortgage-backed securities has encouraged a broad variety of institutional investors to invest in the mortgage market, once dominated by individuals and thrift institutions. This new market for mortgage-backed securities has reduced geographic and institutional barriers to mortgage lending by distant investors. By attracting a variety of new types of investors to the mortgage market and by integrating the mortgage market into the broader, more highly developed capital markets, mortgage-backed securities promise to stabilize the supply of funds to the housing sector of the economy—once an early casualty in any period of credit stringency.

The changing home mortgage market

The unique financing requirements brought about by widespread homeownership have caused a continuing evolution in mortgage lending practices. But until recently the housing sector has been plagued by an insecure financial base. The real estate collapse of the 1930's led to a reorganization of mortgage lending practices, sparked by the creation of the mortgage

guarantee program of the Federal Housing Administration (FHA) in 1934 and later by the Veterans Administration (VA) mortgage insurance program in 1944. The programs encouraged underwriting of mortgages with standardized terms, relatively low downpayments, and long maturities on properties meeting high-quality standards. Since low-risk FHA-VA loans could be sold to investors across the country, the programs facilitated the early development of an integrated, national mortgage market at little direct cost to the Government.

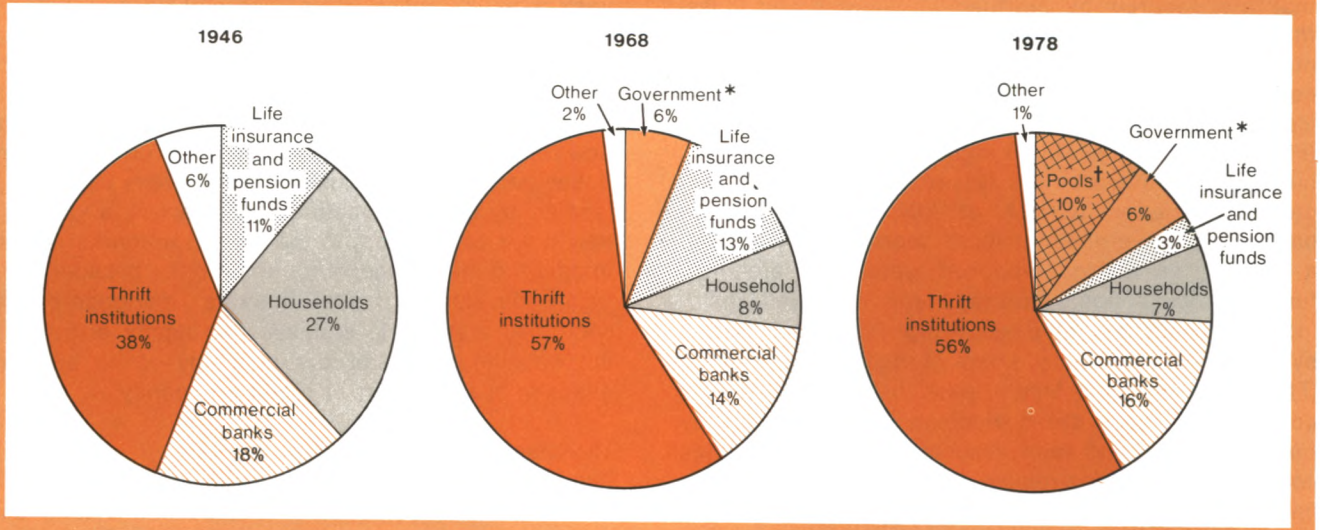
By encouraging the widespread adoption of the long-term, fully amortized, fixed-payment mortgage as the standard lending agreement, the FHA-VA programs also contributed to an increased role for institutional investors in home loans. The long-term nature of the contract lowered monthly payments, making homeownership affordable for a larger segment of the population, while monthly amortization of principal resulted in a gradual buildup of each homeowner's equity, reducing default risk. For investors, however, this type of contract presented several difficulties. The long maturity made evaluation of the future collateral value of the property particularly difficult, required the loans to be serviced over a long period, and emphasized the need for escrow of taxes and insurance. Liberal prepayment clauses, which were desired by borrowers to facilitate future real estate sales, created uncertainty of investment maturity. In addition, amortization resulted in relatively small but continuous principal repayments, complicating reinvestment options. These factors made mortgage investment attractive primarily to savings institutions and life insurance companies with larger portfolios than most individual investors.

The growth of institutional dominance in the mortgage market continued from the postwar housing boom into the mid-1960's. In 1946, households held over one quarter of the outstanding home mortgage debt (Chart 1). Commercial banks held about one fifth of the total, while thrift institutions and insurance companies held nearly half.

During the next twenty years, savings and loan associations provided most of the conventional financing in the rapidly growing sections of the country while households' relative mortgage holdings shrank. Over this period, strong housing demand made mortgage yields attractive, relative to the returns available to institutional investors on many other long-term investments. Banks and thrift institutions, closely tied to their local markets, saw little need for FHA-VA insurance and tended to concentrate on conventional home loans.

Chart 1

Holders of Home Mortgages



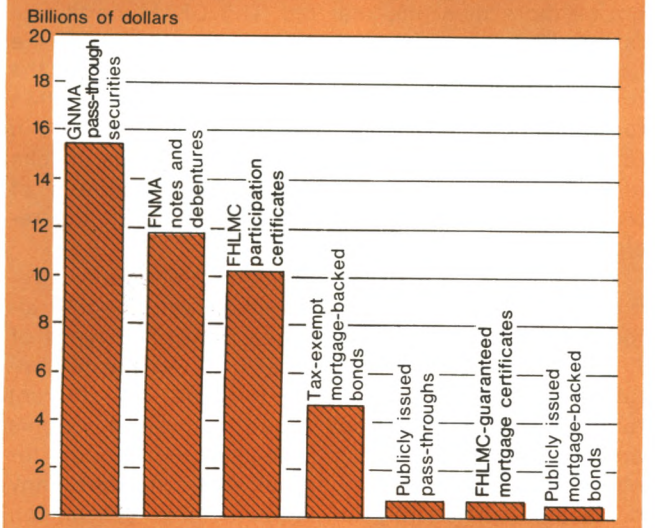
*Federal, state, and local, including directly held mortgages and holdings of sponsored credit agencies.

†Pass-through securities backed by these pools are ultimately held by a variety of investor groups, including those listed here, but are carried on the books separately from direct mortgage holdings.

Source: Board of Governors of the Federal Reserve System, Flow of Funds.

Chart 2

Mortgage-Backed Securities Issued in 1978



Life insurance companies, on the other hand, saw these Government-insured loans as a new type of high-yield, low-risk, long-term investment. Mainly to meet the needs of insurance companies for seller/servicing of FHA-VA loans in local communities, many mortgage companies were created during the postwar housing boom. These mortgage companies originated loans, nearly at cost, and sold them to final investors, continuing to earn servicing income over the life of the loan. Home mortgage investments of thrift institutions and insurance companies reached nearly three quarters of the outstanding total by the mid-1960's.

The activities of mortgage companies began to change in the mid-1960's, when general increases in interest rates (in the face of FHA-VA ceilings which were held below market levels) encouraged life insurance companies to shift their lending focus away from one- to four-family houses toward multifamily dwellings and commercial buildings. Mortgage companies responded by becoming more active in multifamily and commercial lending, but they also were forced to seek new investors for home loans. At first the slack in the home loan market was taken up by the various Federally sponsored credit agencies (mainly FNMA) whose holdings of mortgages on one- to four-family dwellings increased from $2.5 billion in 1965 to $15.5 billion in 1970. Most of the loans sold to these agencies were originated and serviced by mortgage companies and consisted mainly of FHA-VA mortgages.

The search by mortgage companies for new investors took a new turn in the late 1960's with the creation of the first publicly traded pass-through securities backed by pools of mortgages. These new securities—mostly GNMA pass-throughs (see below)—in effect allowed mortgage companies to sell mortgages to investors who were located in other sections of the country and to institutions which had not invested in real estate loans in the past. By 1978, 15 percent of all newly originated home loans was placed in pass-through pools. These pools contained 10 percent of total home mortgage debt by the year-end. Meanwhile, as home mortgage rates declined relative to corporate bond yields, insurance companies and pension funds all but stopped buying home mortgages directly, although they continued to invest in pass-through securities and mortgage-backed bonds.

The invention of mortgage-backed securities

The Government-related agencies—FNMA, GNMA, and FHLMC—may be credited with the development and widespread adoption of mortgage-backed securities as a means of financing home loans. Each agency fulfills a variety of roles, servicing one or more sectors of the mortgage market.[1] Some agencies subsidize certain types of housing. Some provide securities guarantees. Others purchase mortgages from originators and either package these loans into participation pools for resale to final investors or hold them in portfolio, financing the acquisitions by issuing notes and bonds. Some deal mainly in conventional loans, while others specialize in FHA-VA loans, which typically are made in connection with lower priced or older homes.

The FNMA was organized as a Government agency in 1938 to purchase Government-guaranteed mortgages. After its reorganization as a privately owned corporation in 1968, it began in 1971 to buy conventional mortgages. FNMA programs have been popular with mortgage bankers, who originate most of the loans it purchases, but it also buys from other approved FHA-VA lenders. In 1978, it purchased over $12 billion in mortgages, about half of which were conventional loans. At the end of 1978 it held mortgages with an unpaid principal balance of over $43 billion, one quarter of which were conventional loans. To finance its portfolio, FNMA issues short-term discount notes and intermediate-term debentures, effectively transforming mortgages into securities with a fixed maturity and a

[1] The twelve Federal Home Loan Banks (FHLBs), while not usually treated as credit agencies, issue debt and lend the proceeds primarily to savings and loan associations on mortgage collateral. FHLB advances, which totaled $30 billion at the end of 1978, effectively increase the liquidity of mortgages held in savings and loan association portfolios but do not directly contribute to the marketability of mortgages.

single principal repayment at the end.[2] Its short-term debt rose by $2.5 billion in 1978, and it issued debentures totaling $9.3 billion (Chart 2). FNMA purchases facilitate the separation of the seller/servicing and investment aspects of real estate finance, allowing local real estate markets to attract funds indirectly from distant geographic regions and from investors who do not wish to originate, service, or hold mortgage loans.

When FNMA was rechartered as a private corporation in 1968, programs requiring Government subsidies or other direct Federal support were assumed by GNMA, a newly organized Government corporation within the Department of Housing and Urban Development. There are now two major GNMA programs. One is the purchase of mortgages to support housing for low-income families for which private financing is not readily available. These special assistance programs provide mortgage funds at below market rates of interest. In its "tandem plan" operations, GNMA issues commitments to purchase certain types of loans with interest rates below prevailing market levels and simultaneously sells these mortgages to FNMA or to private investors at prices resulting in market yields, absorbing as subsidy the difference between the prices paid and received.

The second major GNMA activity is its mortgage-backed securities program, which has revolutionized the secondary mortgage market. Under GNMA sponsorship beginning in 1970, the Government guarantees the timely payment of principal and interest on securities issued by private mortgage institutions and backed by pools of Government-insured or -guaranteed mortgages. These pass-through securities are designed to appeal to pension funds and other institutional investors not wishing to originate and service mortgage loans themselves. Pass-throughs are considered eligible real estate investments by most agencies that regulate commercial banks and thrift institutions, and for purposes of determining the tax status of thrift institutions. The securities provide a safe, easily marketable investment with an attractive long-term yield and a high cash flow each month resulting from interest and principal repayment.

GNMA pass-through securities provide for monthly instalments of interest on the unpaid balance at the securities' stated certificate rate plus payment of scheduled principal amortization, whether or not collected by the servicer, together with any prepayment or other recoveries of principal. All mortgages placed in a pool must be issued at the same interest rate and cannot be more than one-year old. The GNMA certificate rate is 50 basis points below the contract rate of the underlying mortgages, 44 basis points going to the originator for servicing and 6 basis points to GNMA for providing its guarantee. Pass-throughs are issued in registered form with coupons. The issuer mails checks for interest and principal repayments to holders of record as of the end of each month to reach the recipient by the fifteenth.

Mortgage pools backing GNMA securities most frequently contain FHA-VA single-family mortgages, although pools may also be formed from other types of FHA-insured or VA- and Farmers Home Administration-guaranteed mortgages, subject to somewhat different terms than those described above. Single-family pools are formed in $1 million minimum amounts (pools for other mortgage types may be half that size), but many pools are substantially larger, containing $25 million or more in mortgages. Pass-through securities are issued in $25,000 minimum denominations with $5,000 increments, although in the national market a round-lot transaction is $1 million.

GNMA pass-through securities are issued by mortgage bankers (who account for three fourths of the annual total) as well as by thrift institutions and commercial banks that originate FHA-VA mortgages. Instead of selling the mortgages outright or financing them through deposits or other debt, the issuer forms a pool, sells pass-through securities, and continues to earn servicing income on the loans. Newly issued securities are marketed for immediate or forward delivery either directly by the issuer or, more typically, a securities dealer. There is a sizable annual volume of trading in seasoned issues, a direct result of the large volume of outstanding securities and their widespread distribution among all types of investors. In addition, there is an active futures market for the securities on the major commodities exchanges.

Until recently, GNMA pass-throughs have dominated the mortgage-backed securities market. There are over 800 active issuers of GNMA pass-throughs and over 33,000 pools. New issues in 1978 totaled $15 billion, financing over half of all new FHA-VA home loans and raising the outstanding unpaid principal balance of GNMA pass-throughs to $52 billion. In the first nine months of 1979, GNMA issues totaled over $16 billion.

FNMA and GNMA securities backed mainly by Government-guaranteed mortgages have dominated the mortgage-backed securities market during the past decade. Now, over 90 percent of all newly originated FHA-VA mortgages on single-family homes is placed

[2] In the past, FNMA issued a few bonds explicitly collateralized by designated mortgages—the forerunner of mortgage-backed bonds now being used by savings and loan associations—but most of its debentures are not explicitly collateralized. All FNMA debt is treated as mortgage backed in this discussion. FNMA currently is considering the feasibility of marketing pass-through securities for conventional mortgages.

in pass-throughs or sold to FNMA, but FHA-VA fixed-payment mortgages represent a declining fraction of total home loans. In May 1979, GNMA began to guarantee pass-through securities backed by graduated payment mortgages[3] insured by FHA, a potential fast-growth area for GNMA securities. However, the key to continued rapid growth of mortgage-backed securities lies in the conventional loan market and the housing bonds of state and local governments.

Mortgage-backed securities have been used only recently to finance conventional loans, which account for four fifths of all home mortgages. The FHLMC, created by the Congress in 1970 and wholly owned by the Federal Home Loan Banks (FHLBs), has as its primary goal the development of a national secondary market in conventional mortgages. As a general rule, the FHLMC purchases conventional mortgage loans from savings and loans associations (four fifths of its total purchases), mutual savings banks, commercial banks, and mortgage banks. At first the FHLMC purchased mainly participations and whole loans for its own portfolio, financing the acquisitions by borrowing from the Treasury and the FHLBs and by issuing its own mortgage-backed bonds. In 1974, however, the focus of its operations was shifted toward the sale of mortgage participation certificates (PCs) and guaranteed mortgage certificates (GMCs).

In many respects, PCs are similar to GNMA pass-through securities, although they are not backed by the full faith and credit of either the United States Government or the FHLBs. These certificates represent ownership interest in pools of conventional mortgages purchased by the FHLMC, which guarantees the monthly pass-through of interest, scheduled amortization of principal, and ultimate repayment of principal. Like GNMA pass-throughs, PCs are considered direct mortgage investments for most tax and regulatory purposes. PCs are marketed directly by the FHLMC and through a group of securities dealers who also maintain a secondary market in seasoned issues. The originator retains the obligation to service the loans for a fee of ⅜ percent and the spread between the price paid and received by the FHLMC, usually 30 to 50 basis points, provides a return to cover FHLMC insurance and administration costs.

PCs differ from GNMA pass-throughs in several respects because they are issued by the FHLMC rather than by individual mortgage lenders throughout the country. The mortgage pool underlying a typical PC comprises about 5,000 mortgage loans with a total value of about $100 million to $300 million. A given pool may contain mortgages issued at several rates, allowing PCs to contain loans issued in different sections of the country. Although the minimum PC denomination is $100,000, $5 million denominations are particularly popular since the unpaid principal balance will remain comfortably above the $1 million round-lot trading size for many years. In 1978, $5.6 billion in PCs was issued, bringing the outstanding unpaid balance to $10.2 billion at the year-end.

In 1974 the FHLMC created a new type of instrument, the GMC, to provide a mortgage investment instrument with much of the convenience of a bond. Like a GNMA pass-through, a GMC represents ownership interest in a pool of mortgages, but the interest on a GMC is paid semiannually and principal repayments are made annually, like some sinking fund bonds. The FHLMC guarantees timely payment on interest, full payment of principal, and promises to repurchase any principal that remains unretired after fifteen years. At irregular intervals, GMCs backed by mortgage pools totaling $200 million-$300 million are issued in minimum denominations of $100,000. In 1978 new issues totaled $700 million, bringing the outstanding unpaid balance to about $1.9 billion by the year-end.

New types of mortgage-backed securities

The success of mortgage-backed securities guaranteed by the Federally related credit agencies has encouraged private mortgage orginators to issue both mortgage-backed bonds and pass-through securities without Government involvement. Since 1975, thrift institutions have issued mortgage-backed bonds patterned after bonds issued by various Government-related credit agencies. The securities are similar in most respects to other corporate bonds. They are general obligations of the issuer with a stated maturity and fixed semi-annual interest payments. The bonds are collateralized by pools of mortgages, with a covenant obligating the issuer to maintain a stated level of collateral even when discounted to market value and adjusted for amortization and prepayments. Collateral maintenance levels are normally so high (usually 150 percent or more) that mortgage-backed bonds receive highest ratings.

Mortgage-backed bonds allow thrift institutions to borrow against their mortgage assets to obtain funds for new loans during periods of slow deposit growth, instead of borrowing from commercial banks or the FHLBs. These bonds are particularly attractive when the cost of alternative financing is above the bond rate, provided mortgage yields are higher than bond yields. Moreover, since the thrift institutions do not sell the mortgages outright, they may pledge old, relatively low-yielding loans as collateral without showing capital

[3] Graduated payment mortgages are a new and rapidly growing type of instrument having a lower monthly payment in the first few years than standard fixed-payment home loans.

losses on their books. Most mortgage-backed bonds are issued with original maturities of five to ten years, roughly comparable to the expected average maturity of new mortgages. On the whole, these bonds allow thrift institutions to match more closely their asset and liability maturities and to broaden their funding base. Mortgage-backed bonds issued publicly in 1978 totaled $465 million, bringing the amount outstanding to $1.7 billion. In 1979, bonds totaling $1.0 billion were issued publicly in the first nine months.

Mortgage-related bonds have also become a prominent feature in the tax-exempt sector of the capital markets. State governments have supported single-family housing through general obligation bonds for a number of years (usually associated with veterans' benefit programs) and since 1970 through revenue bonds issued by housing finance agencies.[4] Housing-related revenue bonds were first issued by municipalities in 1978. These three types of bonds, designed to appeal to individuals and institutions who purchase other types of tax-exempt municipal securities, are used mainly to finance loans for low- and middle-income housing at below-market rates. New issues supporting single-family housing totaled $4.7 billion in 1978 and $6.5 billion in the first nine months of 1979.

The use of tax-exempt securities to finance mortgage lending has sparked considerable public debate. Proponents assert that the tax-exempt mortgage bond programs benefit the home buyer, the locality, and the housing industry by making homeownership affordable to more people. As a result, local neighborhoods are stabilized and, with demand pushing house prices higher, the tax base of the locality is enhanced. Critics charge that the use of tax-exempt bonds to finance housing increases borrowing costs to state and local governments for other purposes and reduces Treasury tax revenues and that mortgage funds generated in some programs are not channeled to those most in need of government subsidies. In response to these objections, Congressional legislation, H.R. 3712 and related bills, was introduced in April 1979 to restrict the use of tax-exempt revenue bonds to finance homeownership. The uncertainty about the outcome of this pending legislation has raised questions about the tax status of forthcoming issues.

In a promising application of mortgage-backed securities to the conventional loan market, banks, savings and loan associations, and subsidiaries of private mortgage insurance companies have placed a number of publicly issued pass-through securities (PIPs)[5] without any form of Government guarantee. PIPs provide a means for market pricing and public distribution of mortgage loans, substituting for private placement of whole loans and participations, or sale to a Government-related agency. The issuer forms a mortgage pool or trust, obtains private mortgage and hazard insurance and secures a rating, and sells the securities through an underwriting group—often to customers who regularly buy corporate bonds.

The first PIP was sold by Bank of America in September 1977, followed quickly by an offering of the First Federal Savings and Loan Association of Chicago in October. Securities totaling $728 million were sold in 1978 by four issuers and an additional $445 million was publicly placed in the first nine months of 1979. In a major extension of this market, "conduit" companies recently have begun to issue pass-through securities backed by conventional mortgages and serviced by thirty to forty lenders. This allows smaller originators access to the market, creating pools with broad geographic diversity.

PIPs offer several advantages over other loan sale alternatives. Public distribution provides a broader and deeper investment base than private placements, allowing large amounts of loans to be sold quickly at relatively attractive rates. In addition, details of the offering can be tailored to match the needs of the issuer rather than those of the Government-related credit agencies. For example, some agencies currently place limits on the maximum size of individual home loans that may be pooled as well as limit the amount of commitments accepted from any one seller. The agencies purchase loans in quantities determined by their own investment goals and require sellers to contract for delivery well in advance. Finally, many issuers feel they can provide insurance and administration at lower cost than the spread retained by the FHLMC when it issues PCs.

Forward commitments

PCs and GNMA securities are sold mainly for forward delivery and settlement. These forward commitment procedures present a variety of new portfolio management options to investors more familiar with the immediate delivery conventions of the bond and equity markets. The necessity for a forward market arises from the special problems of originating home loans and packaging them for sale to final investors. Mortgage companies, thrift institutions, and other mortgage originators make commitments to lend funds in the future to builders

[4] Although six states formed housing finance agencies before 1970, only the New York housing finance agency issued bonds prior to that date. Such agencies are now found in forty states.

[5] A number of issuers have coined names for their securities—Connie Mac (Ticor), Pennie Mae (PMI), Maggie Mae (MGIC).

and developers and to home buyers, although the borrowers are not obligated to take down the loans. Since home loans have long maturities and are often large relative to the borrowers' net worth, the time-consuming process of checking collateral and creditworthiness is particularly important.

It may take three to six months to accumulate a bundle of completed mortgage loans and process the necessary paperwork before selling the loans to a final investor. During this time, a mortgage originator bears the risk of capital loss if interest rates rise. For highly levered mortgage companies, even a small rate increase could be disastrous, making a purchase commitment from a future buyer desirable in many cases. "Firm" commitments require the loan seller to deliver mortgages at the commitment price; under a "standby" commitment, delivery is optional at the seller's discretion. Standby commitments are usually associated with more distant delivery horizons (often twelve months) and are accompanied by a nonrefundable fee of about 1 percent. To meet the demand for purchase commitments, particularly for twelve-month horizons or during tight money periods, standby commitments are often issued by banks and thrift institutions that may not desire delivery of the underlying mortgages but are willing to bear some price risk in return for the commitment fee. This can be done by fixing the strike price—the price at which delivery is made—at such a low level that the delivery option will not be exercised unless rates increase sharply.

In 1968 FNMA instituted a program for market determination of strike prices on its firm and standby forward commitments. FNMA now holds biweekly auctions in which lenders specify the rate at which they will offer various dollar amounts of mortgages. The volume of accepted offers is based on FNMA's cost of funds and the general tone of the mortgage market. Commitments are issued to successful bidders offering mortgages to FNMA at the highest yields (lowest strike prices). Since October 1971 four-month firm commitments have been auctioned biweekly, and since October 1972 twelve-month convertible standby commitments have been available as well. At the loan seller's option, these standby commitments may be converted to firm four-month commitments at the average price established in the most recent auction. These auction-market commitment procedures have not been imitated by other government or private loan purchasers, but an active over-the-counter forward market for pass-through securities serves much the same purpose.

This over-the-counter forward market—often called the "cash" market to differentiate it from the GNMA futures market on the commodities exchanges—is most active for GNMA securities, but similar procedures are followed in all pass-through markets. Dealers issue firm commitments to purchase or sell securities with stated certificate rates for delivery one to six months or more in the future.[6] The bid-asked spread is normally ⅛ percent for recently issued securities and somewhat higher for seasoned issues. Dealers may hedge their commitments with each other, with final investors, or in the futures market.

Some dealers also offer standby commitments that are essentially "put" options traded over the counter.[7] A potential seller of GNMA securities obtains a standby purchase commitment from the dealer for a negotiated fee, about 1 percent for the popular twelve-month contract. The strike price is usually negotiated at a spread below the firm forward commitment price. The dealer may offset such a commitment by obtaining a standby commitment from a potential buyer, passing along most or all of the commitment fee.

Futures contracts—similar in many ways to firm GNMA forward commitments—may be arranged on the Chicago Board of Trade (CBT) and the Amex Commodities Exchange (ACE). At each exchange, contracts are available for delivery at three-month intervals going forward about two and one-half years. Delivery is guaranteed by the exchange, reducing the risk of delivery failures, and investors are required to post margin in the form of cash, securities, or a letter of credit. Contracts are evaluated at current market prices—marked to market—each day, and a maintenance margin is required to cover accumulated losses.

The contracts are issued in terms of a standard 8 percent GNMA certificate rate, but pass-throughs bearing other rates are deliverable according to an established price adjustment schedule. Because this schedule does not preserve equality of true yield to maturity for securities with different certificate rates, market participants generally find it advantageous to deliver a security with the highest allowable certificate rate. Under the new CBT contract and the ACE contract, only securities selling at or below par are deliverable, so that the "8 percent future", in fact, trades as if

[6] These forward interest rates must be adjusted to get an unbiased estimate of future mortgage rates. As in any forward market for a durable commodity, forward prices tend to be lower than the cash prices expected to prevail on the delivery date when the cost of carry—anticipated capital gains plus any accrued interest less short-term interest rates and storage costs—is positive. With the usual upward-sloping yield curve and an unchanged interest rate forecast, forward commitment prices would normally be below prices quoted for immediate delivery.

[7] Although there is still some confusion on this point, the Commodity Futures Trading Commission is not expected to treat GNMA forwards as leverage instruments falling under its regulation. However, most regulations of financial institutions treat forward commitments as "puts" that may be questioned by examiners.

it were a contract for a GNMA issued at the current certificate rate.[8]

Because GNMA securities are Government backed, the forward market is exempt from most SEC (Securities and Exchange Commission) regulations. Unfortunately, it also has been associated with several well-publicized financial failures, leading to moves toward a restructuring of market practices.[9] Some dealers now request initial margin and mark outstanding contracts to market, requiring maintenance margins to cover accumulated losses.[10] Dealers also attempt to monitor the credit risk of customers, but a dealer generally has no means to determine a customer's total market exposure on a timely basis.

The risks inherent in issuing forward commitments for the purchase of pass-through securities (or taking the long side of a forward or futures contract) have caused regulators to question whether such activities are consistent with the fiduciary responsibilities of banks and thrift institutions. Firms may issue firm commitments with the hope of selling them prior to delivery at a speculative profit and may issue standby contracts for the fee income. Since delayed delivery contracts are an integral part of mortgage lending, the goal of regulation is to prevent abuses, while allowing financial intermediaries to perform this necessary role. To prevent portfolio managers from accumulating larger losses than can be accommodated at the time of settlement, most regulators and market participants support rules requiring all over-the-counter forward contracts to be marked to market and obligating buyers and sellers to post maintenance margins in the form of cash, securities, or letters of credit to cover any accumulated losses.[11] This would reduce the potential for the failure of one firm to create a chain reaction in the market but does little to insure that forward positions taken by individual investors are authorized by top management and are appropriate to the investment goals of the firm. Most market participants agree that, since little cash changes hands immediately, relative to the price exposure that is assumed in entering into a forward contract, operations of financial firms in either the forward or futures markets should be supervised at the highest management level.

Outlook

The mortgage-backed securities market is coming of age. Up to this point, the market has been dominated by bonds issued by FNMA and by GNMA pass-through securities—both backed by FHA-VA loans. However, the relative importance of most types of Government-insured mortgages in the housing market is declining. Future growth of the pass-through market depends on the popularity of pass-through securities sold by the FHLMC and publicly issued by banks, savings and loan associations, and mortgage companies that are financing conventional mortgage loans. A second type of instrument, the mortgage-backed bond, is being used by thrift institutions to gain access to the capital markets, and tax-exempt bonds are being sold by state and local governments to support housing.

Mortgage-backed securities have important implications for economic efficiency and policy. By reducing geographic and institutional barriers to the movement of funds, the market facilitates a more efficient distribution of available financing to areas where housing demand is strongest. By allowing home buyers to compete for funds on favorable terms with corporate and governmental borrowers, the market contributes to general economic efficiency. Both of these effects increase the ability of the capital markets to generate mortgage funds by reducing the dependence of housing finance on interest-sensitive deposit flows. Thus, mortgage-backed securities help moderate the traditional "boom and bust" cycles in the housing sector by spreading the burden of high interest rates more evenly across all sectors of the economy.

[8] Under the original CBT contract there was no "par cap", so that market participants tended to deliver securities with the highest available certificate rates.

[9] The three most widely publicized problems in GNMA trading have centered on forward commitment speculation resulting in delivery failures: The Winters Government Securities case involved questionable sales practices by a dealer. The University of Houston case resulted from overzealous investment plans of an investment officer. Most recently, the Reliance case involved massive failures by a mortgage banker to meet purchase commitments.

[10] The Justice Department has said that mandatory margin requirements proposed by the Mortgage-Backed Securities Dealers Association could constitute restraint of trade. Various forms of Government- and self-regulation are pending. These issues are discussed at length in *Analysis and Report on Alternative Approaches to Regulating the Trading of GNMA Securities* (November 7, 1978), prepared for GNMA by R. Shriver Associates.

[11] There is some feeling that contracts made by an approved mortgage issuer to sell any loans generated within the normal "production cycle" could be exempt from mark-to-market rules without undue risk of speculative abuse.

Charles M. Sivesind

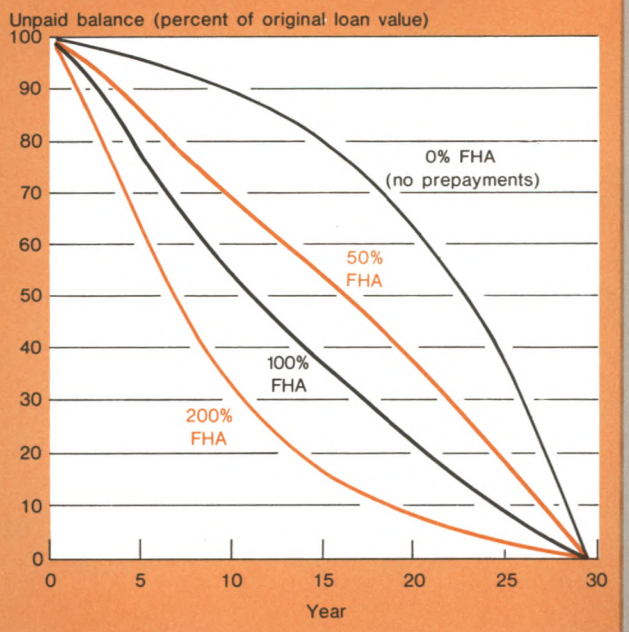
Appendix: Estimating Pass-Through Yields and Maturities

The likelihood that many mortgages placed in a pass-through pool will be prepaid sometime before maturity creates uncertainty about the yield and average maturity of such an investment. Yields commonly quoted for pass-through securities are computed assuming there will be no prepayments until the twelfth year, at which time the entire remaining principal balance will be paid off. Monthly payments are assumed to be reinvested at the average yield, compounded monthly, until the end of the twelve-year horizon. This yield calculation probably does not give the best estimate of the rate of return, and a security's average maturity may differ significantly from twelve years.

To obtain a better estimate of the true yield of a pass-through security, a more realistic prepayment assumption must be employed. But, since pass-through securities are a relatively recent innovation, there is little direct prepayment evidence available. One strategy is to use the prepayment history of Federal Housing Administration (FHA) loans as a bench mark against which other mortgage pools may be measured.

Chart 3

Unpaid Balance at Different Paydown Rates
10 Percent GNMA Certificate Rate



Although few pools are likely to pay down precisely at the historical FHA rate, one plausible assumption is that the pattern of prepayments will be the same but will come in proportionately faster or slower. A "100 percent FHA" pool pays down at the historical FHA rate; a "200 percent FHA" pool pays down twice as fast (percentage of remaining balance that is prepaid each month, not dollar amount); a "0 percent FHA" pool has no prepayments (Chart 3).

Existing GNMA pools show a wide variation in prepayment experience. For example, 8 percent GNMA pass-throughs issued on December 1, 1970 had unpaid principal balances after eight and one-half years ranging from 70 to 29 percent of the original investment, corresponding to FHA paydown rates ranging from 50 to 200 percent. As the various types of pass-through securities have time to establish prepayment track records, it should be possible to determine more precisely which geographic, demographic, and financial factors affect the prepayment profile. Until such factors are analyzed more fully, buyers of newly issued pass-throughs will be unable to compute expected yields and average maturities with much precision. Similarly, the prepayment rate over the early years of the life of a pool need not give a good estimate of the subsequent prepayment rate.

Some prepayment assumption must be employed to produce a yield estimate well suited for comparison with returns on other types of instruments. If pass-through yields are to be compared with bonds, an adjustment must also be made for semiannual compounding. For example, a 9½ percent GNMA security priced at 96 has a quoted yield of 10.04 percent with the twelve-year paydown calculation. On a "true yield" basis, this security would yield 10.08 percent with a 100 percent FHA paydown or 10.21 percent with a 200 percent paydown. For securities such as this one, selling at prices close to par because they have certificate rates close to current market yields, the assumed prepayment rate does not have a large effect on yield. For securities selling at a deep discount (or premium), however, the prepayment assumption is a critical determinant of yield because the cash flow is assumed to be reinvested at the average yield rather than the certificate rate. As a result, an investor buying a deep discount GNMA pass-through would be willing to pay a premium price for a security backed by a "fast pay" pool expected to prepay at, say, a 400 percent FHA rate.

Because the cash flow from a pass-through security is concentrated in the early years, comparing pass-through yields with returns available in the bond market is not a straightforward exercise. The average

maturity of a pass-through security—the proportion of the loan repaid each month times the number of months since the loan was originated—is sensitive to the prepayment assumption. A 9½ percent GNMA pool with no prepayments has an average life of 21.6 years. The average life under a standard twelve-year prepayment assumption is about 11.2 years, two years shorter than the 13.1-year average with a 100 percent FHA paydown. For a 200 percent FHA paydown, the average life drops to 8.9 years. These calculations suggest that most pass-through yields are roughly comparable to returns available on intermediate-term bonds.*

However, since pass-throughs return both principal and interest throughout their lives, reinvestment options must be considered carefully in light of interest rate expectations. When short-term interest rates are higher than the certificate rates on pass-throughs, fast pay pools appear attractive but, if short-term rates are expected to fall, investors would value such pools less highly. Rather than comparing pass-through yields with returns on bonds of similar average maturity, analysts can provide more useful information for investment decisions by comparing pass-through yields with returns on strips of bonds of various maturities weighted to produce a similar expected cash flow. This information may then be combined with estimates of possible reinvestment options, to decide whether the cash flow and yield characteristics of a particular pass-through are superior to the alternative presented by a given bond or combination of bonds.

*The calculation of average maturity and yield was recently discussed by Dexter Senft in "The 'True Yield' of a Pass-Through Security", *The Mortgage Banker* (September 1979).

Monetary Restraint, Interest Rates, and Inflation*

The recent run-up of short-term interest rates has revived old controversies on the role of interest rates in controlling inflation. Two questions, in particular, are being debated with growing frequency: one, do increases in interest rates help reduce inflation, or do they only make inflation worse; and, two, can the Federal Reserve achieve a tighter monetary policy and fight inflation without such high interest rates by a more direct means of limiting bank credit expansion, such as increasing reserve requirements.

To many people the pro-inflationary effect of higher interest rates seems much more obvious than the anti-inflationary effect. For any business firm that must refinance its indebtedness, or raise new debt capital, an increase in interest rates inevitably means that its cost of doing business goes up. And rising business costs lead to rising prices. The same is true for governments—higher interest rates mean higher government outlays—and that of itself can be inflationary. And for individuals who borrow money, higher interest rates raise the cost of living directly.

As against all this, it must be remembered that interest rates are not just another cost of doing business, they are the price of money and credit. That means that higher interest rates are the inevitable price to be paid in the first instance when the growth of money and credit is reduced from excessive, inflationary rates. Excessive money growth in the vernacular is too much money chasing too few goods. Once monetary restraint succeeds in reducing inflation, interest rates can come down again.

The general cost-raising, the inflationary, effect of higher interest rates is relatively small. For nonfinancial corporations as a whole, interest payments come to about 3 percent of total costs. Thus, for example, if interest rates were raised by one fifth, let's say from 10 to 12 percent on average, and all debt had to be refinanced at the higher rate, *total* business costs would go up by 0.6 percent. Of course, in real life not all borrowing would be refinanced at the higher rate right away, so that the price-raising effect would be substantially smaller (the volume of long-term corporate debt is much larger than short-term debt). Estimates for the period since 1975 show that business costs have been raised by less than 1 percent, cumulative, over this period as a result of higher interest rates. Over the same period the cost of living has gone up by 38 percent.

In contrast, in evaluating the anti-inflationary effect of a jump in interest rates, it is the higher cost of *new* projects that becomes relevant. The increase in the cost of financing new projects reduces their profitability, and this tends to tip the balance in favor of postponing them. If that happens, total demands in the economy are reduced.

More broadly, the case that increases in interest rates are anti-inflationary rests on the proposition that whatever the immediate source of inflation—budget deficits, wage increases larger than increases in productivity, excessively high expectations by people in general, a jump in oil prices—inflation is a monetary

* Based on a talk by Peter Fousek, Senior Vice President and Director of Research, given on September 20, 1979.

phenomenon. One does not have to be a monetarist to believe that. Our financial history and that of other countries shows that there is an inevitable relationship between money and inflation. Too much money either starts inflations or continues them.

When the central bank begins restricting the growth of money by supplying less money than the public wants at existing interest rates, then interest rates go up over the near term. This happens whichever way the central bank controls the money supply. The Federal Reserve's instruments for controlling the money supply are open market operations and changes in reserve requirements. Both affect the money supply by changing the volume of reserves available to commercial banks to expand bank credit. Open market operations do this directly—net sales of Government securities reduce the volume of bank reserves. Increases in reserve requirements do this indirectly—by requiring the banks to hold a larger volume of reserves for a given amount of deposits. In either case, as the banking system has less reserves available to support the expansion of loans and deposits demanded by the economy at current interest rates, interest rates increase.

Even complete direct controls over the volume and terms of all financial transactions—the freezing of interest rates and allocations of credit by the authorities—would not do the trick of holding down interest rates: black markets would spring up for borrowers willing to pay higher interest rates to get the funds they could not obtain at the official rates.

One way a central bank in an inflationary situation could try to prevent interest rates from rising would be to provide more and more reserves to the banking system to satisfy the demand for money and credit at unchanging interest rates. The money supply would explode and inflation would get worse. With inflation accelerating, the attempt by the central bank to hold interest rates down would not succeed for very long. As inflation gets worse, interest rates inevitably go up.

As inflation rates increase, borrowers are willing to pay more for obtaining credit. If you expect inflation to be 10 percent over the next few years, borrowing at 10 percent seems costless. At the same time, lenders increase the minimum rates at which they are willing to lend. And, as borrowers and lenders expect inflation to get worse, interest rates quite naturally escalate. A climate of high inflationary expectations affects not only the financial markets but markets for goods and services too. Sellers increase their prices and buyers try to increase their purchases and are willing to pay higher prices.

Since expectations play such an important role in keeping inflation going and making it worse, breaking inflationary expectations is an essential part in the fight against inflation. The Federal Reserve obviously cannot beat inflation through its efforts alone, nor can it break inflationary expectations by itself. But Federal Reserve actions can influence, and have influenced, inflationary expectations in a major way. In periods when the Federal Reserve was perceived as being too weak in its resolve against inflation, inflationary expectations have accelerated. When Federal Reserve actions paralleled its anti-inflationary pronouncements, inflationary expectations have moderated.

In conclusion and to summarize, temporary increases in interest rates—at least short-term rates—are an inevitable consequence of restricting the growth of money and credit, whichever instruments of monetary restraint the Federal Reserve uses. The short-term rises in interest rates do have some cost effects leading to higher prices, but they are relatively small. And, in the longer run, attempts to avoid short-run increases in interest rates by pumping out excessive supplies of money and credit succeed only in accelerating inflation—and in the process raising all interest rates. Monetary restraint works through the slowdown in money and bank credit growth as the Federal Reserve reduces the availability of bank reserves. It also works through the direct effect of higher rates on borrowers' willingness and ability to borrow and on lenders' willingness and ability to lend. And, finally, it works through the general dampening and eventually breaking of inflationary expectations.†

† For an outline of the Federal Reserve System's October 6 measures to help curb inflation, see article on current financial developments on page 43.

Inflation, Taxes, and the Composition of Business Investment

The composition of business fixed investment has shifted dramatically toward less durable assets over the past two decades. The investment share for short-lived equipment outlays has raced ahead, while the spending share of long-lived structures has plummeted (Chart 1). This shortened investment horizon has important repercussions for the nation's capital stock, impairing its productivity and reducing its growth as an increasing share of outlays is devoted to replacement. Among the roots of this changing distribution of capital spending are a system of business taxes and an inflationary environment that have discriminated against long-lived investment.

Tax policy and investment: channels of influence

Corporations purchase a new capital asset in anticipation of certain net earnings from the sale of the asset's output after deducting expected labor and materials costs, taxes, and wear and tear on the asset. Obviously, the expected profitability of a capital asset is greater the larger is the anticipated earnings stream and the lower the cost of purchasing the asset. The ratio of expected earnings to the replacement cost of corporate assets, or *rate of return* on assets, therefore, is a summary measure of the expected profitability of acquiring a new capital asset. Unfortunately, there are no data on the rate of return on new assets. The average rate of return estimated for this article includes the earnings of both old and new assets.[1] Information on the tax advantages of old and new investments is then combined with the average rate of return to estimate the rate of return on new assets.

The behavior of the average rate of return on corporate assets tended to parallel the movement of business activity in the twenty years following World War II (top panel, Chart 2). For the most part the rate of return rose during recovery periods and fell to relatively low values during each of the recessions. This pattern came to an abrupt halt in 1965, when the expansion pushed the rate of return to a postwar high. For the next ten years the rate of return fell continuously, reaching its lowest value in 1975, well below the earlier trough levels. An important part of this decline is due to the role of inflation in raising the effective corporate tax rate on capital income. Of course, the 1974-75 recession also depressed the rate of return. However, by 1978 the rate of capacity utilization in manufacturing had risen above the level for 1957-63 while the rate of return had hardly recovered.

Business decisions to invest are, of course, not based solely upon the rate of return on corporate assets. Rather the return is compared with the cost of raising capital in debt and equity markets, which is here called the *cost of capital.* The more the rate of return on corporate assets exceeds the cost of financing investments, the greater is the incentive for business to expand facilities.

The cost of capital rose sharply in the late forties and reached its highest values during the years 1949-53 (second panel, Chart 2). In part, these high values reflected the strong worldwide demand by business and consumers for capital. Businesses sought to bolster stocks of plant and equipment which had been ne-

[1] The measurement of the average rate of return and the cost of capital is discussed in Appendix I. These variables are refined versions of earlier measures discussed in Patrick J. Corcoran, "Inflation, Taxes, and Corporate Investment Incentives", this *Quarterly Review* (Autumn 1977), pages 1-10.

glected or destroyed during World War II. At the same time, households attempted to rebuild stocks of consumer goods which were far below levels commensurate with postwar income and wealth. As stocks of business capital and household durable goods were brought into balance, demand pressures subsided and the cost of capital gradually declined.

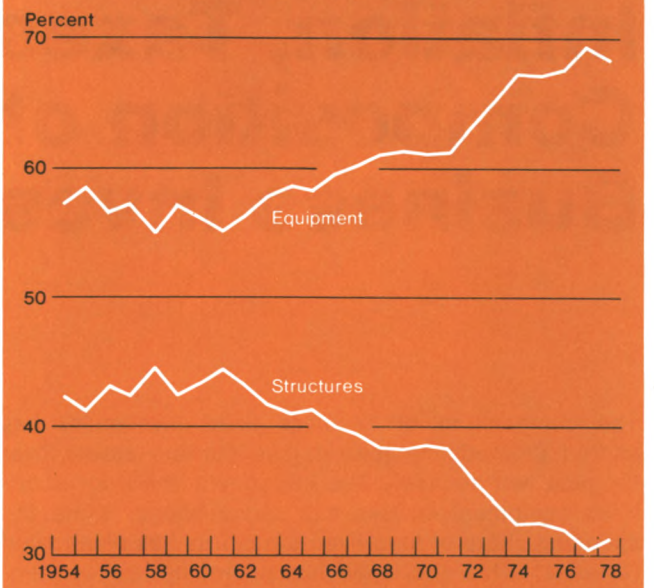
The cost of capital then exhibited a generally flat pattern in the sixties and seventies. Its relative peaks and troughs were influenced by many factors, including monetary policy. Following the peak in 1970, the cost of capital fell to very low levels in 1971-73. While the run-up of the cost of capital in 1974 was just over 1 percentage point, the 1974 peak was comparable to previous ones in the 1960's and 1970's. In 1978, the cost of capital equaled its value in 1974.

In order to measure incentives to invest, the cost of capital must be compared with the rate of return on new investments. The expected return on new assets can be above the average return on old assets for a number of reasons.[2] Under the tax laws, old and new assets are treated differently. Many statutory changes in the tax laws have applied only to new assets. This was true of the accelerated depreciation provisions introduced in 1954 and the investment tax credit initiated in 1962. Moreover, those tax write-offs that remain on old assets have been eroded away by inflation. The relative abundance of tax benefits on new assets elevates the rate of return available for new investments above the average rate of return measure.[3]

Empirical measures of these tax benefits are based upon a new study of tax policy. Estimates of tax service lives and tax credit rates were computed for several different classes of investment.[4] These data measure the tax advantages of new investments and also make it possible to remove the tax benefits of old capital from the average rate of return.[5] This study uses these tax variables, together with the rate of return net of the tax benefits on old capital investments, to measure incentives to invest and to explain shifts in business investment toward less durable asset categories.

Chart 1

As a share of total business investment, equipment spending has surged while structures spending has plummeted.



Source: United States Department of Commerce.

The investment classes for which the tax variables were computed fall under the broad headings of equipment and structures. The equipment categories are (1) transportation equipment, (2) office, computing, and accounting machinery, and (3) production machinery. Transportation equipment, the shortest lived component, consists largely of autos and trucks but also includes ships, railroad equipment, aircraft, and tractors. The second category includes business outlays on furniture and fixtures as well as office and computing equipment. Production machinery, the most durable equipment category, includes all remaining equipment outlays. The broad structures heading includes categories for industrial, commercial, public utilities, and other.[6]

[2] In theory, differential tax benefits on old and new assets might be "capitalized" in the prices of the assets in a manner that would equalize the rate of return on old and new assets. However, prices of used capital goods are generally unavailable. As a consequence, existing capital-stock estimates value old capital goods using new capital goods prices. Since older capital goods provide smaller tax advantages than new ones, the procedure implicitly overvalues the capital stock and depresses the average rate of return.

[3] In addition to the effects of taxes, the rate of return on new and old investments can differ for other reasons. For example, changes in technology or in relative prices can render old capital goods economically obsolete or inefficient.

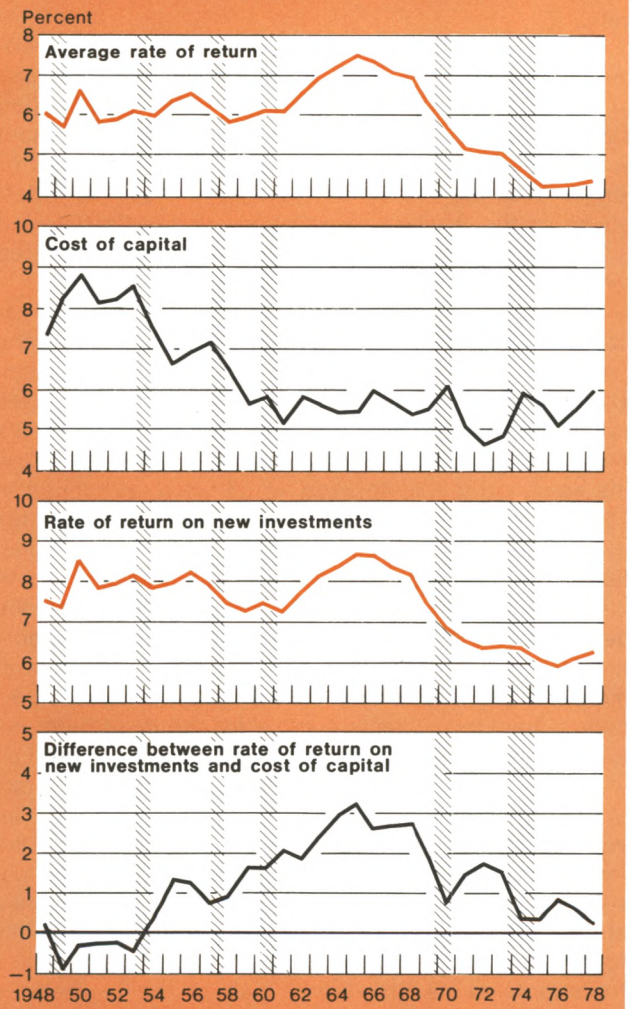
[4] These estimates are the results of unpublished work by P.J. Corcoran and L. Sahling.

[5] The theoretical approach employed here owes much to John H. Ciccolo, "Tobin's q and Tax Incentives", paper to be presented at the Southern Economic Association meeting, November 1979.

[6] Structures outlays by religious, educational, and hospital institutions were not examined.

Chart 2

Determinants of Investment Spending



Shaded areas represent periods of recession, as defined by the National Bureau of Economic Research.

Present value of tax-depreciation streams

The present value of the tax deductions available on a new investment is a way of adding up the worth of these deductions over time. Since today's value of one dollar of income several years in the future is smaller than the worth of one dollar to be paid immediately, an important element of present value is the extent to which future income should be "discounted" relative to current income. In addition, the statutory provisions governing allowable tax service lives, the choice of the depreciation method, and the corporate tax rate are all important in determining the shape and level of tax deductions, and hence their present value.

What discount rate should be used in capitalizing the tax write-offs on new capital outlays? Financial theory suggests that the appropriate rate depends upon the properties of the income stream generated by business tax depreciation. This income stream is dollar denominated, similar to the interest payments accruing to a corporate bond. Moreover, just as with a corporate fixed-income security, there is a chance that the maximum nominal tax benefit will not be realized. In the case of a bond, this event corresponds to default. In the case of tax write-offs, it occurs when the firm's revenues are so low that it is unable to utilize fully all its depreciation deductions.

The risk that a firm is unable to utilize tax write-offs fully is greater than the default risk on its fixed-income securities. The difference between these risks, however, has been reduced by a well-developed leasing market for capital goods. The leasing market helps to minimize the possibility that a firm may be unable to use tax write-offs fully. By leasing capital goods rather than purchasing them outright, a firm can effectively exchange tax-depreciation deductions for lower lease payments.

The income streams from tax write-offs and corporate bonds are thus similar in risk properties and their dollar-denominated character. In this article, the Aaa corporate bond rate is used as the discount rate in capitalizing tax-depreciation streams. The present value of the tax write-offs per dollar of new investment has been declining since the early fifties (top panel, Chart 3). The reason for this has been the rise in interest rates which mirrors the ratcheting-up of inflation. The secular rise in the bond rate from about 3 percent in 1954 to close to 9 percent in 1975 has exerted a sharp downward influence on the present value of business tax write-offs. Moreover, the depressing impact on the present value for assets with longer service lives is greater than those with shorter lives (bottom panel, Chart 3). This is because the longer the waiting period for a tax write-off, the more the write-off is "discounted" under the present value calculations.

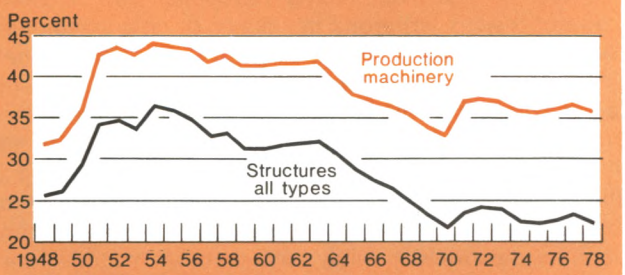
In addition to the effects of inflation on the value of depreciation, statutory tax changes have affected the present value series. Since the midfifties, these factors have generally acted to slow the decline of present values and sometimes to dampen increases in the spread between the present value of write-offs for production machinery and structures. The introduction of accelerated methods of depreciation beginning in 1954 helped stem the downward drift in present values by allowing businesses to switch to faster methods of

writing off their capital outlays. Switching from straight-line to accelerated methods also tends to be more favorable to structures than to production machinery or other equipment assets with shorter tax service lives. However, in practice, accelerated methods have actually been used more extensively for equipment-type assets than structures. In 1970, 82 percent of equipment was being depreciated using accelerated methods; the figure for structures was only about 60 percent. The more limited switching to accelerated methods for structures tends to offset the larger relative advantage which accrues to structures from a given amount of switching. Thus, the net impact of accelerated depreciation on the composition of investment was rather small.

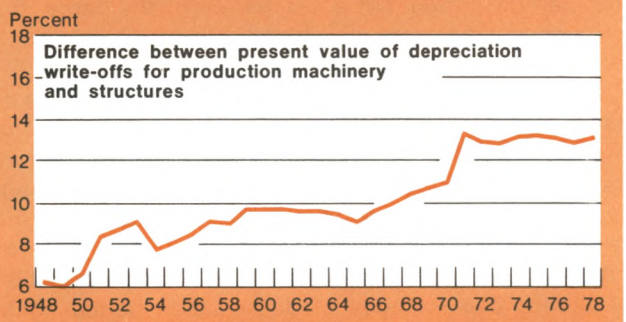
In addition to the adoption of accelerated depreciation methods, changes in the corporate tax rate have also exerted an influence on the present value of write-offs for different investments. In the years 1950-52 the corporate tax rate rose dramatically, raising both the present value of tax-depreciation streams and the difference between such values for long-lived and short-lived assets (bottom panel, Chart 3). In 1964 and 1965 the rate of taxation for large corporations was lowered, reducing the values for both long- and short-lived assets.

Chart 3

Rising interest rates have reduced the present value of tax-depreciation write-offs more for structures than equipment . . .



. . . encouraging less durable investments.



The net influence of higher interest rates and various statutory tax changes between 1954 and 1970 was to reduce the present value of tax-depreciation streams for all categories. The decline in the present value of tax write-offs was larger, the more durable or longer lived the investment category. Thus, the differences in the present value of tax write-offs between less durable and more durable categories exhibited increases between 1954 and 1970.

The value of tax depreciation for production machinery jumped sharply in 1971 at the onset of the Treasury's asset depreciation range (ADR) system. The ADR system provides a range of tax service lives for investments eligible for the investment tax credit. The range is generally 20 percent above and below the so-called guideline lives which were introduced in 1962. In addition to permitting the use of shorter tax lives, the ADR system also involves some additional features which allow faster write-offs of depreciation outlays than were previously possible. To obtain the benefits of ADR, a taxpaying firm must formally "elect" the ADR system and fulfill reporting and other requirements. According to a Treasury study, about 60 percent of new investments eligible for the investment tax credit is made by firms electing ADR.[7]

The value of tax write-offs for structures also rose in 1971 in response to ADR (top panel, Chart 3). Investments covered under ADR and eligible for the investment tax credit include not only equipment assets but also structures (see next section). Since structures investments have more limited eligibility for the tax credit, the present value of tax depreciation for structures rises by about half of the increase in the depreciation value of production machinery. While the present value of the tax write-offs increases for all asset categories, the gain is greatest for production machinery.

The rise in the present value of depreciation charges for transportation equipment is about the same size as the structures increases. The possibilities for higher present values under ADR are limited for the short-lived transportation equipment, because in 1970 it already had the highest present values among the investment categories. In addition, the option to shorten tax lives further tended not to be exercised because

[7] See Thomas Vasquez, "The Effects of the Asset Depreciation Range System on Depreciation Practices" (Office of Tax Analysis, Department of the Treasury, May 1974).

the investment tax credit gives only partial credit for tax lives at the short end of the spectrum (see next section). To a limited degree, these factors also dampened the 1971 increase in the present value for office, accounting, and computing machinery.

The investment tax credit

The investment tax credit has encouraged the use of less durable or shorter lived capital goods, primarily because equipment assets have generally received higher tax credits.[8] As initially introduced in 1962, the credit was available for outlays on most types of "tangible personal property" and certain limited types of "real property" which were used directly in manufacturing, production, or transportation. In a very rough sense, "tangible personal property" applies to equipment outlays and "real property" refers to structures outlays.[9]

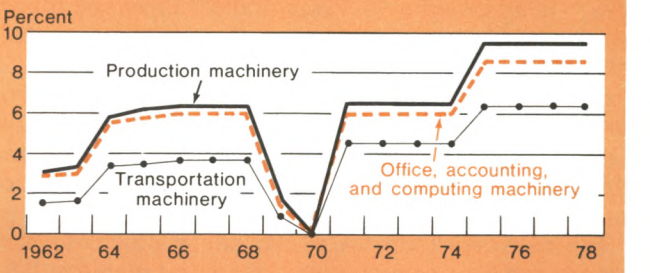
In addition to excluding certain types of capital expenditures, the full benefits of the tax credit were limited to assets with a tax service life of at least eight years. Assets with a tax life of six to eight years obtained a two-thirds credit; those with a life of four to six years, one-third credit; and those with a life less than four years, no credit. It is primarily these different levels of partial credit that explain the differences in the tax credit rates for the various equipment categories (top panel, Chart 4).

In 1962 the rate of credit on fully eligible investments was set at 7 percent but any credit taken had to be deducted from the depreciation base of the asset. The latter provision, known as the Long Amendment, was repealed in 1964. As a result, there was a sharp jump in tax credit rates. In April 1969 the tax credit was suspended. The credit was reinstated in 1971, and the rate was raised from 7 to 10 percent in 1975. Although the 1975 increase was intended initially as a temporary measure, it subsequently became permanent. When the credit was reinstated in 1971, the ranges for full and partial credit were all reduced by one year relative to those pertaining in the 1962-69 period. The full benefits of the tax credit now apply to eligible investments with a tax service life of seven years (formerly eight years). Two-thirds credit was available to assets with tax service lives in the five- to seven-year range (previously six to eight years); investments with a life of three to five years received one-third credit. As a result, the average tax credit rate for transportation equipment was higher in the seventies than in 1968 and 1967.

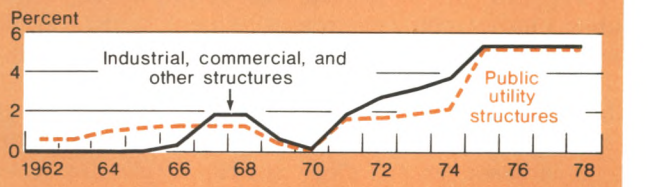
Chart 4

Effective Tax Credit Rates

The tax credit has favored investments in most equipment . . .



. . . relative to durable structures investments.



It is a common notion that the tax credit has been largely unavailable to investment in structures. However, a look at the data for recent years shows this assumption to be in error. In 1974, for example, the cost of new investments eligible for the investment tax credit is estimated to be about $120.9 billion (Table 1). By comparison, equipment outlays amounted to about $96.2 billion. Suppose every dollar of investment in equipment is eligible for the tax credit.[10] Then the

[8] In principle, shorter lived investment can also be encouraged by an increase in the level of a credit which is uniform across asset categories. This kind of effect is not very important, however. See Appendix II.

[9] The inadequacy of this correspondence as a guide in calculating effective tax credit rates is discussed below.

[10] In fact, this is not the case since some equipment outlays are charged to current expense and hence are not eligible for the tax credit. Little information is available on the amount of this current expensing, however. Assuming that all nonresidential equipment outlays were eligible for the tax credit causes the estimates of eligible structures investments and the tax credit rates calculated for the structures categories to be underestimated. For example, if 5 percent of equipment outlays were current expensed, estimated eligible structures outlays would rise to $29.7 billion from $24.7 billion (Table 1). This would raise the estimated tax credit rates for the structures categories to 6.2 percent for public utility structures and 6.3 percent for other categories of structures outlays from 5.2 percent and 5.3 percent, respectively. On the other hand, there is also a small amount of residential investment that qualifies for the credit so that the estimated tax credit rates for structures (Chart 4) are probably not so conservative as the comparison suggests.

excess of eligible total outlays over equipment expenditures would represent outlays on new structures which were eligible for the investment tax credit. Eligible structures spending thus amounted to $24.7 billion in 1974 and represented about half of total structures investment.

The ratio of eligible outlays to total structures outlays may be called a "coverage ratio". Coverage ratios can be computed in a number of different years for total structures investment and for structures investment by public utilities. They also may be computed for investment in structures by other than public utilities in a residual fashion. To obtain the effective tax credit rate (bottom panel, Chart 4), the coverage ratio is multiplied by the statutory tax credit rate.

The coverage ratio for public utility structures has been rising over time and is currently estimated at 0.5, meaning half of public utilities' structures investment is eligible for the tax credit. The big jump in 1975 in the effective rate of utilities was due to a rise in the public utility credit rate from 4 percent in 1974 to 10 percent in 1975. For structures outlays outside public utilities, the coverage ratio was very small until 1967 when it rose to about 0.25. It currently stands at about 0.5, the same level as the public utilities category. The rapid increase in the other structures effective rate between 1971 and 1975 reflected the doubling of the coverage ratio and the jump in the statutory credit rate from 7 to 10 percent in 1975.

Rate of return on new investments

The effective tax credit rates and present values of tax-depreciation streams are used to calculate the rate of return on new investments. In order to assess the incentives to invest in new capital goods, the remaining tax advantages from old capital must be removed from the average rate of return. Then the tax benefits arising from new capital outlays are added in. The result is the rate of return on new investments (third panel, Chart 2).[11]

In the two decades after World War II, the rate of return on new investments hovered around 8 percent. It stayed below this mark during the years 1958-61 and was driven above it during the boom years of the mid-sixties. In the late sixties and seventies the rate of return on new investments plunged downward. By 1978 it stood nearly 2 percentage points below the average level recorded for the years 1948-68.

The difference between the rate of return on new investments and the cost of capital is a measure of the incentives to invest in new plant and equipment (bottom panel, Chart 2). Incentives to invest were growing prior to 1965 as the cost of capital was falling in the fifties and the rate of return on new investments surged in the early 1960's. Since the midsixties, incentives to invest have been shrinking and have mirrored the decline in the rate of return on new investments. An important reason for these declining incentives has been the increase in the effective tax rate on capital income brought about by inflation.

In order to measure incentives to invest for the various asset categories, the spread between the new rate of return and the cost of capital can be separated into three elements.[12] The first two elements are the benefits from the depreciation and the tax credit for each asset category. The third element is the spread between the average rate of return excluding tax benefits from old capital and the cost of capital. The latter

Table 1

Comparison of Investments Eligible for Tax Credit with Total Equipment Outlays, 1974

Item		Billions of dollars
(1)	New investments eligible for tax credit	120.9
(2)	Total equipment investment	96.2
(3)	Eligible structures investment: (1) minus (2)	24.7
(4)	Total structures investment*	49.3
		Percent
(5)	Percentage of structures investment eligible for tax credit: [(3)/(4)]×100	50.1

* Excludes investments by religious, educational, hospital, and institutional organizations.

Source: Department of Commerce and unpublished work by P.J. Corcoran and L. Sahling.

[11] The present value of the remaining write-offs on old capital is calculated in the same way as the present value streams for new assets. The per dollar present value of these tax write-offs must be converted into an *income* adjustment to be added to or subtracted from the average rate of return. The income per dollar of investment stemming from the depreciation write-offs is obtained by multiplying the present value of such write-offs by the cost of capital.

[12] The "rate of return on new investments" (denoted r^N) is equal to the average rate of return (denoted r) minus the permanent income stemming from the write-offs on old investments (cTo) plus that stemming from the investment tax credit (cITC) and write-offs on new investments (cDEPR). Symbolically,

$$r^N = r - cTo + cITC + cDEPR$$

where c represents the cost of capital. The symbol To is the per dollar present value of remaining tax depreciation on old assets, DEPR the present value of the tax write-offs on new investment, and ITC the effective tax credit rate. Thus the spread between r^N and the cost of capital c is:

$$\text{spread} = r^N - c$$
$$= [r - cTo - c] + cITC + cDEPR$$

The first term above is the difference between the net rate of return (r−cTo) and the cost of capital.

Table 2

Changes in Investment Shares, 1961-78*

Selected categories; in percent

Investment categories	Higher interest rates and tax depreciation		Investment tax credit		Asset depreciation range	1964-65 tax cut	Total share changes
	Reduction in present value of depreciation†	Change in shares	Effective rate 1974-78	Change in shares	Change in shares	Change in shares	
Transportation	−3.45	+1.32	6.4	−0.34	−0.07	−0.18	0.73
Office	−4.59	+0.13	8.6	+0.23	0.04	−0.10	0.30
Production	−5.22	+0.64	9.5	+1.88	0.24	−0.31	2.45
Commercial structures	−8.03	−1.14	5.3	−0.06	0.05	−0.04	−1.19
Other structures	−8.03	−0.52	5.3	−0.28	−0.02	0.07	−0.75
Public utility structures	−8.03	−0.02	5.2	−0.60	0.00	0.24	−0.38
Industrial structures	−8.03	−1.27	5.3	+0.06	0.05	0.10	−1.06

* Column totals for share changes do not necessarily add to zero because structures investment by religious, educational, and hospital institutions is excluded.

The dependent variable in each investment equation is gross investment outlays in 1972 dollars (I) divided by the stock of capital (K). The shifts in the estimated equations can be denoted $\Delta I/_K$. To translate these shifts into percentage changes in gross outlays, the shifts must be divided by representative values of the ratio $I/_K$. Thus, $\Delta I/_K \div I/_K = \Delta I/_I$. The $I/_K$ ratios were set equal to 4 percent (a steady growth rate) plus the depreciation rate appropriate for each category of investment. The base years used for calculating changes in composition were 1965 for higher interest rates, 1961 for the tax credit, 1970 for ADR, and 1963 for the tax cut.

† Present value reductions are expressed as a percentage of gross investment outlays.

element can be measured for nonfinancial corporate assets only in the aggregate. These three elements form the basis for statistical equations that explain the composition of business investment and quantify the role of tax policy (Appendix II). The influences examined are tax depreciation and interest rates, the investment tax credit, ADR, and the 1964-65 corporate income tax cut.

Higher interest rates and tax depreciation

The impact of higher interest rates on the composition of investment is important. In the calculation shown (Table 2), higher interest rates operate through reducing the present value of tax depreciation on new investments. The present value of tax write-offs in 1978 is calculated using the 1965 and 1978 interest rate levels. The reduction in the present value of the tax depreciation attributed to the rise in interest rates is larger for longer lived assets, and this shifts the composition of investment toward shorter lived capital goods. The equipment categories grow, while the structures categories decline. The increase in the share of equipment is slightly more than 2 percentage points over the period studied.

The investment tax credit

The effective tax credit rates for 1974-78 differ for each kind of capital good (Table 2). Those assets such as production machinery and office and computing equipment with the highest effective tax credit rates post larger increases in outlays and rising shares in total investment. Further, investment in shorter lived equipment is more responsive to a given change in the tax credit than the structures investments, and this enhances the shares of the equipment categories by a modest amount.[13] The rise in the share of equipment is a bit less than 2 percentage points.

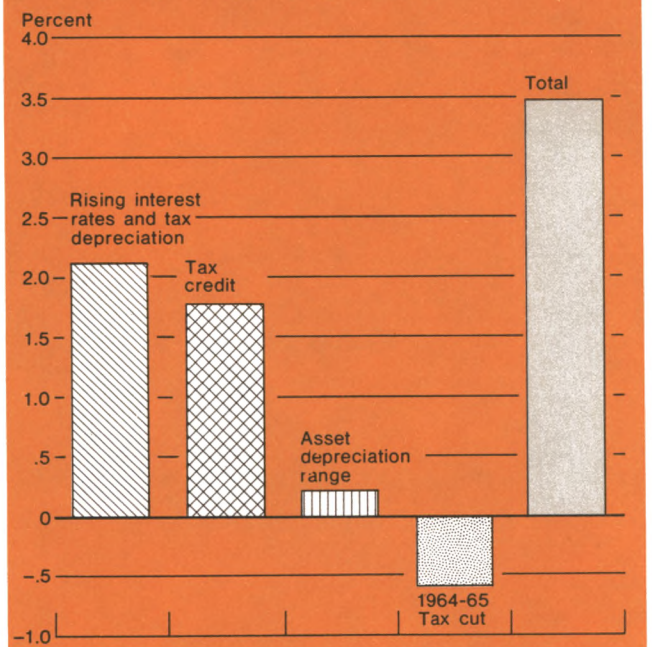
ADR system and the 1964-65 tax cut

The impacts of the asset depreciation range system and the 1964-65 tax cut on the composition of business investment are small and work in opposite directions. The ADR system has its strongest stimulative impact on production and office machinery. For short-lived

[13] This can be seen by looking at the estimated tax credit coefficients (Appendix II). These coefficients are generally consistent with the view, expressed in footnote 8, that increases in the average tax credit rate shorten the durability of capital.

Chart 5

Effect of Inflation and Taxes on the Share of Equipment Investment in Total Capital Spending, 1961-78



transportation equipment, the impact is smaller because of limitations on the investment tax credit for short-lived equipment. For structures, the impact is also smaller since only about one half of structures investment falls under ADR. Thus, the main impact of ADR is to enhance the share of production machinery and to reduce the share of transportation equipment (Table 2). The share of total equipment outlays edged up by about 0.2 percentage point.

The 1964-65 corporate tax cut from 52 percent to 48 percent is the only measure examined that increases the durability of capital. Since the present value of tax write-offs is larger for short-lived investments, a cut in the tax rate reduces tax benefits most for short-lived investments. This induces a mild substitution toward longer lived structures (Table 2). The share of equipment falls by about 0.6 percentage point.

Conclusions and summary

In recent years, the crosscurrents of accelerating inflation and business taxation have reduced the durability of the nation's capital stock. With the run-up in inflation, the value of tax write-offs for long-lived capital investments in structures has fallen much more sharply than that for short-lived equipment. Accordingly, businesses have attempted to improve profitability by altering the mix of their investments away from long-lived structures and toward shorter lived equipment. The switching from structures to equipment has gained additional momentum from the wider availability of the investment tax credit to equipment. Only about half of new structures outlays are eligible for the credit.

Taxes and inflation have not been the only factors responsible for raising the share of equipment outlays. The "computer revolution" has raised the share of office and computing machinery, while the rise in outlays related to pollution abatement has been concentrated in production machinery. Nevertheless, accelerating inflation operating through rising interest rates has caused an estimated 2 percent of total business investment to be switched from structures to equipment. The tax credit has brought about an additional 2 percent reallocation of total business investment in favor of equipment spending (Chart 5). Altogether, the upsurge in inflation over the past decade and tax policy changes increase the share of equipment outlays in total investment by 3.5 percentage points. This increase amounts to one quarter of the 14 percentage point run-up in the equipment share between 1961 and 1978 (Chart 1). The change in investment composition cushions the impact of inflation and taxes on business profits. However, the cost to the nation is lessened productivity growth and reduced business output.

The influence of inflation and the business tax structure in reducing the durability of business capital and output is only one facet of a larger problem. Inflation operating through the tax system has eroded incentives to invest and has thus reduced the level of capital spending. One way of resolving these problems is to modify the tax system to eliminate some of its burdensome effects on business investment. More fundamentally, these difficulties can be overcome through strong policy actions that reduce the rate of inflation.

Patrick J. Corcoran

Appendix I: Measurement of the Rate of Return and the Cost of Capital

The rate of return is measured as the ratio of long-run expected earnings to the replacement cost of nonfinancial corporate assets.[1] These earnings—denoted total capital income (TCI)—include income accruing to both debt holders and equity holders. The income to debt holders is equal to the net interest payments[2] of nonfinancial corporations (NI) less the reduction in the real value of debt holders' securities arising from the expected increase in the general price level. Thus

$$TCI = P + NI - \pi D$$

where D is the market value of debt holders' securities, π is the expected increase in the general price level,[3] and P represents the income to equity holders. The loss to debt holders arising from expected inflation represents a corresponding gain to equity holders. In other words, shareholders' income P already includes an amount $+\pi D$, so that total capital income is unchanged.

Most measures of income to equity holders look at actual corporate profits rather than a more appropriate long-run expected income concept. As a result, they tend to be overly volatile in response to transitory developments. While no solution to this problem is completely satisfactory, an attractive approach is to use the idea that corporate dividend payouts are tied to a longer run concept of sustainable shareholder income. Comparing the actual annual values of shareholder income[4] and dividends shows that, on average, dividends are about half of shareholder income. In turn, this suggests that sustainable shareholder income, P, could be measured as:

$$P = 2\,DIV \text{ and}$$
$$TCI = 2\,DIV + NI - \pi D$$

where DIV denotes corporate dividend payouts.

The cost of capital (c) is defined as the ratio of long-run total capital income to the market value of firms' debt (D) and equity (S) securities.

Thus,

$$c = \frac{TCI}{V} = \frac{2DIV + NI - \pi D}{S + D}$$
$$= 2\left(\frac{S}{S+D}\right)\left(\frac{DIV}{S}\right) + \frac{D}{S+D}\left(\frac{NI}{D} - \pi\right)$$

The terms DIV/S and $(NI/D - \pi)$ represent, respectively, the dividend-price ratio and the inflation adjusted return on nonfinancial corporate debt. Thus, the weight on the dividend-price ratio is $2\,S/(S+D)$ and that on the inflation adjusted return on debt is $D/(S+D)$. The market value on nonfinancial corporate debt and equity claims is calculated following a procedure used by the Council of Economic Advisers.[5]

[1] The replacement cost of corporate assets includes Commerce Department estimates of the stock of plant and equipment and inventories plus some short-term financial assets. For the measurement and setup of these balance-sheet variables, see *Annual Report of the Council of Economic Advisers* (January 1977), Table 1, page 29.

[2] Net interest payments of nonfinancial corporations is equal to "monetary interest paid" less "monetary interest received". See Table 8.2 in "The National Income and Product Accounts of the United States, 1929-74, Statistical Tables"; a supplement to the *Survey of Current Business* (1977).

[3] The expected inflation rate is measured as a five-year average rate computed on the consumer price index; *i.e.*,

$$\pi(t) = \exp\ \{\, 1/5\, \ln [CPI(t)/CPI(t-5)] \,\} - 1.0$$

[4] The annual values of shareholder income were measured as corporate profits after corporate taxes plus the capital consumption adjustment plus the inventory valuation adjustment plus the purchasing power loss for holding demand deposits and currency plus the inflation-induced reduction in the value of corporate fixed-income liabilities. When viewed against this inflation-adjusted shareholder income series, the dividends paid by nonfinancial corporations in the seventies appear to be in line with historical experience.

[5] The market value of debt securities, D, is computed by the formula

$$D = NI\ \left\{\, 1 - (1/(1+r))^{5} \,\right\} / r + F\ \left\{\, \left(\frac{1}{1+r}\right)^{5} \,\right\}$$

where NI is given by footnote 2, r is the Baa rate on corporate bonds (divided by 100), and the face value of the securities F is measured by the following variables from the Flow of Funds Accounts for nonfinancial corporations:

F = Credit market instruments
−(liquid assets − demand deposits
−currency + consumer credit)

The market value of equity is computed by the formula

$S = DIV/d$ where

d is the dividend-price ratio for the Standard & Poor's 500 industrial stocks.

Appendix II: The Estimated Equations, A Technical Note

For each asset category, an equation is estimated that relates the ratio of gross investment to the stock of capital to (a) the difference between the average rate of return excluding old tax benefits and the cost of capital, (b) the product of the investment tax credit rate and the cost of capital, and (c) the product of the present value of the tax write-offs on a dollar of new investment and the cost of capital. More formally, and following the notation of footnote 12, we may write

$$\frac{I}{K} = \alpha[r - cTo - c] + \beta[cITC] + \gamma[cDEPR] + \epsilon$$

In this equation I and K are measured in 1972 constant dollars. Capital stocks were computed by cumulating real investment flows and employing economic depreciation rates derived from the 1976 capital stock study published by the Department of Commerce. The calculation of r and c is discussed in Appendix I and that of the other variables in the text and Appendix III. In the equation, the term ϵ denotes an "error term" which may be correlated with its own past value.

In principle, the two tax variables should have equal weight in computing incentives to invest ($\beta = \gamma$). The regressions were estimated in constrained ($\beta = \gamma$) and unconstrained versions. The constrained versions are reported below. As a technical matter, the equations were estimated in level form using generalized least squares. In level form the basic equation may be rewritten:

$$I = \alpha[r - cTo - c]K + \beta[cITC]K + \gamma[cDEPR]K + \epsilon K$$

where the variance-covariance matrix of the errors ϵK is given by

$$V = \begin{bmatrix} K(1)^2 & \rho K(1)\,K(2) & \cdots & \rho^{T-1}K(1)\,K(T) \\ \rho K(1)\,K(2) & K(2)^2 & & \\ \vdots & \vdots & & \vdots \\ & & K(T-1)^2 & \rho K(T-1)\,K(T) \\ \rho^{T-1}K(1)\,K(T) & \cdots & \rho K(T-1)\,K(T) & K(T)^2 \end{bmatrix}$$

where ρ represents the autocorrelation coefficient for the errors ϵ. K(1) corresponds to the beginning of year capital stock for 1950. In the equation estimates reported below, the aggregative variables r, c, and T_o were lagged one year whereas the variables specific to the asset categories, ITC and DEPR, correspond to the current year.

Investment categories	α	$\beta=\gamma$	ρ	δ	DW	K_{1950}
Transportation equipment	4.24 (4.13)	8.00 (8.31)	0.75	.156	2.08	63.1
Office, accounting, and computing	3.82 (5.91)	9.00 (18.61)	0.5	.151	1.84	11.6
Production machinery	2.68 (6.81)	7.61 (26.88)	0.3	.132	1.88	99.6
Industrial structures	3.08 (5.48)	6.68 (8.64)	0.75	.068	1.63	39.5
Commercial structures	2.01 (4.23)	5.05 (6.96)	0.8	.051	1.69	54.4
Public utility structures	0.95 (2.66)	3.21 (5.20)	0.85	.056	1.55	112.1
Other structures	1.21 (3.52)	5.63 (14.43)	0.6	.080	1.93	51.0

Numbers in parentheses beneath α, β, γ coefficients are t statistics. The standard errors are conditional on the indicated ρ and δ (economic depreciation rate) values. The D.W. (Durbin Watson) statistic is calculated on the estimated ϵ residuals. K_{1950} is the beginning-of-year capital stock for 1950 measured in billions of 1972 dollars. All equations were estimated for the years 1950-77.

Appendix III

Tax service lives

The tax service lives were derived using sources [2] and [3] as a starting point. Initially, mean tax service life estimates for the 1950's were developed from [2] for the four broad categories transportation equipment, office, computing, and accounting machinery, production machinery, and structures. Important adjustments were made to take account of some sampling and other statistical problems in [2].

In the next step, tax service lives corresponding to the 1962 guideline lives were calculated. An important vehicle in this computation was commodity flow matrices for 1963 and 1967 which allocated capital goods purchases for twenty-two components of national income and product accounts (NIPA) equipment to about seventy industries.* Following a detailed coding procedure, industries were assigned the mean tax service lives indicated by the 1962 guideline procedure [1]. For asset categories falling within the production machinery sector, weighted average guideline lives were computed. An average guideline life was also computed for the aggregate production machinery category. For transportation equipment, office and computing machinery, and structures, a similar procedure was employed. The main difference was that industry weights were not so important here because these investments were governed primarily by asset guidelines—not industry guidelines.

The computed 1962 guideline tax lives for the broad categories provided a basis for comparison with the estimated lives for the 1950's. It was found that the latter lives were 10 to 15 percent below guideline levels depending on the category. An exception was structures where the mean tax life for the 1950's was even further below the guideline level.

The 1950's mean tax service life for production machinery was compared with an estimate in Vasquez [3] for the year 1970. The two estimates were essentially identical. The tax service life estimates in the post-1971 period also come primarily from Vasquez [3].

Investment tax credit rates

The effective tax credit rates shown in Chart 4 are the product of coverage ratios and a tax rate. The coverage ratio represents the fraction of investment outlays in a particular asset category eligible for the tax credit. In the annual *Statistics of Income* Treasury publications (United States Business Tax Returns and United States Corporation Tax Returns), the cost of property eligible for the investment tax credit is available at various levels of aggregation. The eligible investments were allocated across the asset categories for which investment equations were to be estimated.

By comparing different data sources, it was possible to allocate a portion of the cost of eligible property for public utilities to the asset category "public utility structures". This was done separately for (a) electric and gas utilities and (b) telephone and telegraph. For each sector, three sources of data were utilized: (1) cost of eligible property, (2) total investment outlays as reported in the plant and equipment survey published by the Department of Commerce, and (3) structures investment as reported in NIPA.

It was assumed that equipment outlays were all eligible so that the difference between (2) and (1) represented NIPA structures outlays that were *not eligible*. Thus, eligible structures outlays were taken to equal (3) minus (2) plus (1).

In years where the aggregate estimate of the cost of eligible property minus NIPA equipment outlays exceeded eligible public utility structures investment, the remaining eligible property was allocated uniformly over the other structures categories. When this was not the case, the coverage ratio for equipment categories was diminished accordingly. It was neither possible nor suitable to make comparisons for all years, and missing years were interpolated. The last suitable year was 1974. The 1974 values of the coverage ratio were simply extrapolated forward through 1978. The coverage ratios used are based on unpublished work by P. J. Corcoran and L. Sahling.

As noted above, the coverage ratio for an asset category must be multiplied by the rate of tax credit appropriate for that category to obtain the series displayed in Chart 4. The rate of tax credit used was taken to be equal to the statutory "full credit" rate times a proportionality factor which depends upon the mean tax service life applicable to the asset category. For the years 1962-70, the factor of proportionality was taken to be as follows:

Factor of proportionality as a function of mean tax service life

Tax life (years)	2.5	5.0	7.0	9.0	11.0
Factor	0	⅓	⅔	⅚	1

Appendix III (continued)

When the mean tax service life fell between any two of the points shown above, the corresponding factor was interpolated. When the tax credit was first introduced in 1962, full credit was reserved for assets in accounts whose tax service life was at least eight years. However, this does not mean that an observed mean tax service life of eight years for a particular category ought to correspond to a factor of unity. This is because, for a mean life of eight years, there is a distribution of service lives across firms above and below eight years.

Since 1971, the factors shown in the table above correspond to a tax life which is one-year smaller than those shown in the table. For example, the factor of unity would correspond to a tax service life of at least 10.0 years, a factor of 2/3 would correspond to a life of 6.0 years, etc.

Finally, the product of the coverage ratio and the proportionality factor is multiplied by the full credit statutory rate. For the year 1969, the statutory rate is taken to be ¼ of 7 percent. The temporary suspension of the tax credit in the last quarter of 1966 and the first quarter of 1967 is ignored.

Present value of tax-depreciation streams

It is assumed that corporations set up composite or multiple-asset accounts for each of the twenty-two NIPA equipment categories and for each of the four broad structures categories considered. These tax accounts are closed at the end of the tax year. They are meant to correspond to so-called closed-end or year's acquisition accounts. This type of account is mandatory under ADR (asset depreciation range). The alternative type of open-end account is one which is continued from one year to the next and which contains investments from many different years. The mean remaining tax life of the account is then adjusted to reflect the mix of old and new assets in the account. The open-end account is difficult to model easily since the mean remaining tax life for the account depends on the history of past investments. In 1965, the Treasury outlawed open-end accounts for the straight-line and sum-of-year's-digits depreciation formulas.

The vast majority of investments are depreciated in multiple asset accounts. The recognition that firms' reported mean tax service lives refer to multiple asset accounts has important implications for the type of present-value formulas used. These implications are developed for straight-line depreciation and for double-declining-balance depreciation.

Tax benefits on old capital

It was assumed that the remaining tax-depreciation stream on old assets could be calculated by using the formulas which correspond to the year the assets were originally purchased. NIPA equipment was taken as an aggregate, and the pre-1971 mean tax service life was taken to be 10.1 years. The post-1971 life was 9.0 years. The mean tax service life for structures was 25.9 years.

* These unpublished data were made available as a result of the *BLS Capital Stock Study*. The basic sources and methodology of the study are described in Bureau of Labor Statistics Bulletin 2034 (October 1979).

References:

[1] United States Treasury Department, Internal Revenue Service, "Revenue Procedure 62-21, Depreciation Guidelines and Rules, Parts I and II, Publication No. 456, Revised August 1964".

[2] United States Treasury Department, Internal Revenue Service, "Statistics of Income—1959: Supplementary Depreciation Data from Corporate Income Tax Returns, with Special Appendix-Depreciation Methods and Amortization Data, 1954, through 1961" (mimeograph, June 1965).

[3] Vasquez, Thomas, "The Effects of the Asset Depreciation Range System on Depreciation Practices" (Office of Tax Analysis, Department of the Treasury, May 1974).

American Productivity Growth: Perspectives on the Slowdown

Productivity growth in the United States has slowed dramatically in the past decade. Since the late 1960's productivity in the private economy has risen only about half as rapidly as it did during the two decades following World War II. Slower productivity growth means a slower growth of real incomes and at the same time contributes to inflation. Why has productivity fared so badly? This article examines American productivity growth in historical perspective and evaluates some of the explanations for the slowdown. In part, the slowdown reflects the end of a period when many workers were leaving relatively low-productivity farm jobs. Even in the nonfarm sector, however, there has been a marked productivity slowdown. This nonfarm slowdown, it is found, reflects to a surprising extent productivity problems in a few nonmanufacturing industries. In the manufacturing sector, however, there has been little change in the pace of productivity advance.

A brief historical perspective

Productivity, defined as output per employee hour, has increased tremendously in the private economy during the twentieth century (Chart 1). Workers today are four and one-half times as productive as they were seventy years ago. Basically this increase has reflected technological advance, the accumulation of capital, and an increasingly skilled work force. Productivity growth was particularly rapid and steady after World War II; the average rate of growth was 3.2 percent per year during 1948-67, compared with 1.9 percent during 1909-48. Starting in the late 1960's, however, productivity began to grow at a slower pace, increasing at an annual average of only 1.7 percent during the 1967-78 interval. Thus output per employee hour in recent years has fallen farther and farther below what it would have been had the rapid 1948-67 productivity trend continued (Chart 1).

The ill effects of this slowdown in productivity growth during the past decade have been twofold. First, the growth of real incomes has been slowed. Second, inflation has been aggravated. If money wages continue to rise at past rates while productivity growth falls behind, then unit labor costs will increase more rapidly. Some of this rise in cost will be passed along to the consumer in the form of higher prices.

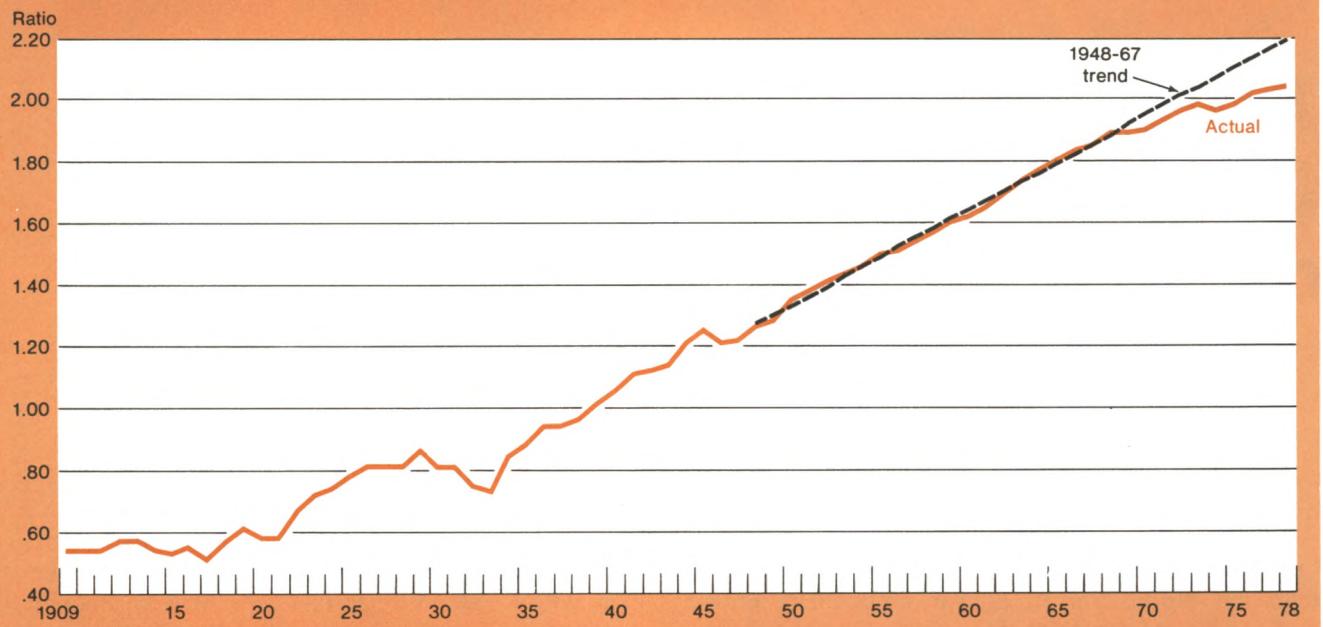
The shrinking farm sector. Because productivity historically has been considerably lower on farms, the shift of workers from farming to the nonfarm economy contributed greatly to productivity growth. From 1909 to 1937, the level of productivity on farms was much lower than in the nonfarm economy and was growing very slowly. During this period the relative size of the farm sector declined only very gradually, from 29 percent of private-economy employment to 26 percent. Between 1937 and 1967, however, the relative size of the farm sector fell to only 6 percent of private employment. At the same time, farm productivity grew very rapidly. Since 1967, the shift from farming has moderated considerably, with farming accounting for 4 percent of private employment today; the growth of farm productivity has also slowed.[1]

In part, therefore, the current productivity slowdown reflects the fact that the movement of a substantial

[1] Other industrialized nations have also experienced major shifts away from farming, but in many (Japan, Germany, France, and Italy, for example) low-productivity agriculture still takes a significantly larger fraction of total employment than in the United States. Shifts from farming, therefore, may remain an important source of productivity growth in those economies.

Chart 1

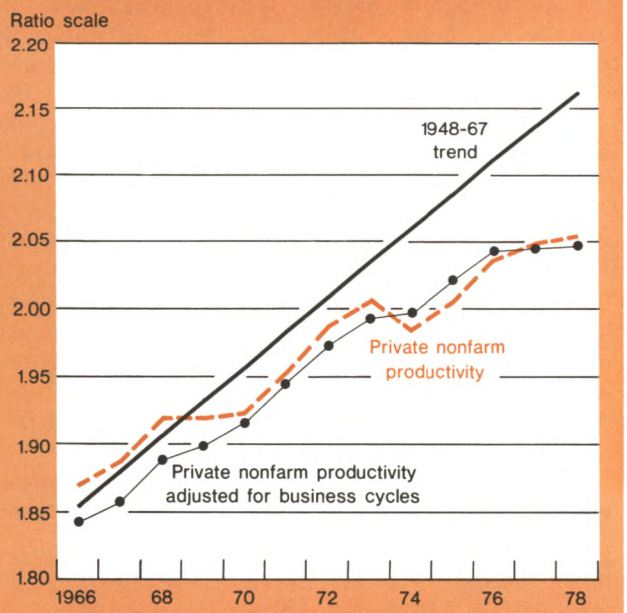
Output per Employee Hour, United States Private Economy



Source: United States Department of Labor, Bureau of Labor Statistics.

Chart 2

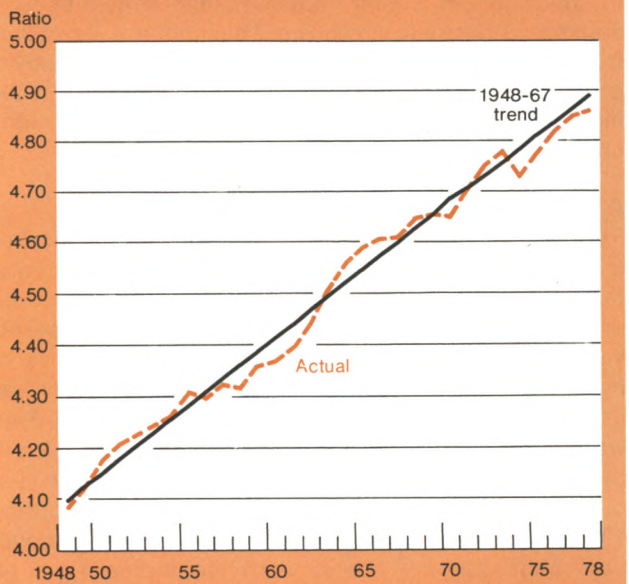
The Recent Nonfarm Productivity Slowdown



Source: United States Department of Labor, Bureau of Labor Statistics.

Chart 3

United States Manufacturing Output per Employee Hour



Source: United States Department of Labor, Bureau of Labor Statistics.

fraction of the work force from the lower productivity farm sector to the higher productivity nonfarm economy was virtually completed by the late 1960's. The end of this shift from farms would have made total private productivity growth slow even if there had been no change in the rate of productivity growth within the nonfarm economy, where most private employment is today. In fact, private nonfarm productivity growth has also slowed. But this nonfarm slowdown has been somewhat less dramatic than that in the total private economy, where productivity had previously been boosted by the shift from farms. During 1948-67, when total private productivity rose at a 3.2 percent annual rate, private nonfarm productivity grew at a 2.7 percent pace. Since 1967, however, the total and the nonfarm private productivity growth rates have been about equal, since the farm sector has become such a small part of the total.

Productivity and fluctuations in business activity. Productivity is sensitive to cyclical changes in economic activity. The growth of output per employee hour has generally been faster in economic expansions and slower in contractions. Productivity dropped sharply in 1929-33 during the Great Depression and in the 1945 recession, but during 1948-67 the relative mildness and shortness of recessions kept annual productivity on an upward trend, although some quarters showed declines. The recession in 1974-75 was severe enough to create a sharp year-to-year drop in output per employee hour, the first such drop since 1945.

The main reason why changes in business activity affect productivity is that, given hiring and training costs, many firms are reluctant to lay off workers when sales drop if they believe the decline is temporary. But these workers are not fully utilized, although they remain on the payroll. This is especially true of most administrative and supervisory employees, whose widespread dismissal would normally occur only during a permanent cutback in the size of the firm. Another factor slowing productivity growth during an economic contraction is the postponement of capital investment projects, along with the technological advances they embody.

The economic contraction during the mid-1970's cannot explain the current productivity slowdown, however. This becomes apparent when private nonfarm productivity is compared with a private nonfarm productivity measure which has been adjusted to eliminate the effects of fluctuations in business activity (Chart 2).[2] In the adjusted measure, the productivity drop associated with the 1974-75 recession has been removed. By 1978, however, adjusted productivity was above the unadjusted measure, and both had fallen far short of the 1948-67 private nonfarm trend.

An industry profile of the adjusted nonfarm slowdown

The lag in nonfarm private productivity growth has been largely concentrated in a few industries. During the late 1960's and early 1970's, productivity growth began to slow, especially in mining and in construction. Since the slow growth in these areas was partly offset by unusually strong performances in other industries, however, the productivity slowdown for the whole private nonfarm economy remained relatively moderate during 1967-73. After 1973, however, the slowdowns in construction and mining persisted while productivity growth, adjusted for business cycles, also began to lag in some new areas, most notably public utilities. Moreover, productivity growth in other industries was no longer particularly strong and did not offset the few "problem" areas after 1973. Thus, the overall slowdown suddenly became much more pronounced in 1973-78. For 1967-78 as a whole, however, only in certain industries has productivity growth fallen significantly below its earlier trend (Table 1).

An individual industry's contribution to the overall slowdown basically depends on the size of the industry and how much its productivity has slowed. The larger an industry's share of employment, the more important are fluctuations in its output per employee hour for the overall nonfarm average. But even a moderate-sized industry can have a substantial role if its productivity falls off sharply.[3]

Three fourths of the adjusted nonfarm slowdown during 1967-78 is accounted for by the poor showing of three industries—construction, mining, and retail trade (Table 1). Construction alone accounts for nearly half of the overall slowdown. While construction represents only about 7 percent of nonfarm private employment, output per employee hour there actually dropped 2.4 percent per year for the 1967-78 period. Mining provides less than 2 percent of private nonfarm employment, but it also has had an actual productivity decline in recent years. In retail trade, productivity has continued to rise but at a slower pace. Its large contribution to the overall slowdown reflects its large share of employee hours, about 18 percent.

In contrast to the roles played by these few nonman-

[2] Business-cycle effects were removed from nonfarm private productivity using a regression equation which included changes in adult male unemployment rates and various time trend terms.

[3] Each industry's contribution to the total slowdown is calculated as the product of its own slowdown times its share of total employee hours. Summing these contributions gives the total slowdown as a weighted average of the industry slowdowns (with each industry's weight equaling its share of total employee hours).

Table 1

The Industry Profile of the Productivity Slowdown

In percent

Industries	Trend growth rates of output per employee hour adjusted for business cycles* 1948-67	1967-78	Changes in rates of growth 1967-78 minus 1948-67	Contributions to the change in nonfarm productivity growth, 1967-78 minus 1948-67
Mining	4.1	−1.1	−5.2	−.07
Construction	2.7	−2.4	−5.1	−.33
Manufacturing	2.6	2.6	0.0	00
Transportation	2.8	2.6	−0.2	−.01
Communications	5.4	5.9	0.5	.01
Public utilities	5.9	2.2	−3.7	−.04
Wholesale trade	3.0	2.7	−0.3	−.02
Retail trade	2.4	1.8	−0.6	−.11
Finance, insurance, real estate	2.1	0.9	−1.1	−.06
Services	1.6	1.4	−0.2	−.04
Total nonfarm private	2.5	1.8	−0.7	−.68
Total nonfarm private, adjusted for interindustry shifts in employment	2.4	1.8		

* Estimated trend coefficients are from industry regression equations in which changes in industry unemployment rates were controlled.

ufacturing industries is the lack of any contribution by manufacturing to the overall slowdown. Manufacturing productivity is particularly vulnerable to business conditions, and its growth has been characterized by wide cyclical swings around a steady upward trend (Chart 3). With or without adjustment for business cycles, however, no noticeable shortfall of manufacturing productivity from its 1948-67 trend has developed.

Has a shift in the distribution of employment among industries contributed to the slowdown within the private nonfarm economy? For example, a large shift of workers into the lower productivity services sector could help slow aggregate productivity growth above and beyond any productivity slowdowns in individual industries. To see if this has been the case, aggregate nonfarm private productivity growth was adjusted to eliminate the effects of interindustry employment shifts (Table 1).[4] There is, however, little difference between these estimates and those that are not adjusted for interindustry shifts. It is true that employment in services has grown more rapidly in the past decade. But there have been offsetting shifts into such areas as communications and finance, where the level of productivity is above average.

Explanations for the slowdown

Lagging capital investment. How much output workers can produce depends in part on their machinery and equipment and on the characteristics of their plant or office. It is usually true that more fixed capital raises productivity. Furthermore, technological advances are often embodied in new equipment. The rate of productivity growth of an industry, therefore, depends in part on the rate of accumulation of capital per employee hour.

A slow growth rate of capital per employee hour may have been partly responsible for the productivity problems in construction and in mining (Table 2). Capital per employee hour in these two industries scarcely grew at all during 1967-73, which coincides with the start of their productivity slowdowns.[5] In mining, this lag in investment relative to employment

[4] A slowdown in productivity growth can be approximately divided into three parts: the effect of individual industry slowdowns, holding employment shares constant; the effect of faster shifts of employment into low-productivity industries; and the effect of employment shifts into industries where productivity growth is slow. To eliminate all the effects of shifts of employment among industries, constant 1967-78 average employee-hour share weights were used to recalculate 1948-67 total nonfarm productivity growth as a weighted average of the industry growth rates.

[5] Capital stock data by industry are not yet available beyond 1974 from the Bureau of Labor Statistics.

growth may in part reflect increases in Federal health and safety regulations, which are frequently cited as an important source of mining productivity problems.[6] Increases in the number of employees directly involved in worker health and safety protection could account for slower growth of both output per employee hour and capital per employee hour.

For the nonfarm private economy as a whole, capital investment has clearly slowed relative to employment growth in the past decade. During 1948-67 capital per employee hour grew at a 2.3 percent annual rate, but the pace during 1967-78 was only 1.7 percent annually.[7] This slowdown has been especially pronounced most recently; in 1978 capital per employee hour fell 1.3 percent. Moreover, other developments may have reduced the ability of the capital stock to enhance productivity. Of the total business outlays for new plant and equipment since 1973, roughly 5 percent went for pollution control equipment.[8] The sharp rise in energy prices also may have reduced the usefulness of some of the capital stock. In short, the lagging growth of productive capital per employee hour has very likely been one important factor contributing to the productivity slowdown.

Energy problems. Shortages and higher prices of energy may have reduced output per employee hour in the United States in several ways. One is by precipitating or deepening the 1974-75 recession, but this business-cycle effect would have only been temporary.

Another, longer lasting way in which energy problems may have affected productivity is by shifting demand away from products that require a particularly large amount of high-priced energy to make and toward other products. The costs of adjusting to such a change may show up in the form of lower productivity growth. A prime example is the shift in demand away from electrical power as a result of oil price hikes. The rise in electricity prices has caused the growth of demand for the output of utilities to slow markedly since 1973, leading to the underutilization of power-generating capacity.[9] There has been a somewhat slower growth of employment in utilities since 1973, but this adjustment of the work force to the lower demand for output has not been complete. Thus, the growth of output per employee hour in utilities has slowed markedly.

Higher energy prices may also have reduced productivity growth by inducing firms to substitute more labor-intensive production methods for energy-intensive techniques. If the same output can be produced using more labor and less energy or energy-consuming capital equipment, some firms may find it cost effective to make this shift when energy prices rise. For example, one possible interpretation of the recent lag in the growth of capital per employee hour is that firms have resisted investing in equipment requiring costly energy to operate. A shift toward more labor-intensive production methods reduces the average output per employee hour.

Pollution abatement and control costs. It is frequently suggested that government environmental regulations have played a role in retarding recent productivity growth. For example, discouraging the use of coal has helped keep utilities more reliant on expensive oil, thereby increasing the price of electrical power. The lack of demand for coal, in turn, has not helped productivity in mining. The sharp 1973-77 fall in mining productivity coincides with a fall in bituminous coal mine utilization from 88.1 percent down to 80.7 percent of capacity.

Another way in which environmental regulations may

Table 2

Growth of Net Capital Stock per Employee Hour

Annual growth rates; in percent

Industries	1948-67	1967-73
Mining	6.2	0.6
Construction	5.5	0.0
Manufacturing	2.5	2.9
Transportation	2.1	1.2
Communications	5.3	3.6
Public utilities	3.7	5.1
Wholesale and retail	5.5	3.6
Finance, insurance, real estate	1.7	4.8
Services	3.8	3.2

Source: Industry capital stock and employment estimates are from the Bureau of Labor Statistics.

[6] See Edward F. Denison, "Effects of Selected Changes in the Institutional and Human Environment upon Output per Unit of Input", *Survey of Current Business* (January 1978).

[7] Nonfarm business capital stock figures are presented in J.R. Norsworthy and Michael J. Harper, "The Role of Capital Formation in the Recent Productivity Slowdown", Bureau of Labor Statistics Working Paper 87, Office of Productivity and Technology (January 1979).

[8] See G. L. Rutledge, F. J. Dreiling, and B. C. Dunlap, "Capital Expenditures by Business for Pollution Abatement, 1973-77 and Planned 1978", *Survey of Current Business* (June 1978).

[9] Capacity utilization in fossil fuel power generation, the largest utility, fell to 81.6 percent in 1974 from 90.0 percent the year before. Rather than recovering with the rest of the economy, it continued to fall to 73.9 percent in 1978.

have reduced productivity growth is by causing business to spend on equipment related to these regulations rather than on productivity-enhancing capital. Edward Denison concluded in a recent study that during 1967-78 government-mandated pollution abatement efforts resulted in a total cumulative reduction in productivity of 1.2 percent, most of which occurred in the more recent years.[10] Denison's calculations are based on the observation that business expenditures for pollution control have increased dramatically and that the "output" which these antipollution operations yield (*i.e.,* a cleaner environment) is not included in the standard measures of national income. If these business outlays had instead gone to set up or expand operations which produce output included in the national income, then measured output per employee hour would be higher today. In effect, Denison assumes that expenditures for pollution control crowd out other productive business spending dollar for dollar.

The validity of Denison's assumption of dollar-for-dollar crowding out is questionable, however. Many of the pollution-control costs are associated with capital equipment used for pollution abatement. During 1974-75 these costs were increasing very rapidly, yet the use of other, output-producing capital equipment was far below capacity, particularly in manufacturing and utilities where antipollution outlays were especially great. Taken at face value, Denison's estimates account for only a modest fraction of the total productivity slowdown, but they probably overstate the effect.

Environmental regulations may also affect productivity by reducing the profitability of certain types of capital investments. If an operation would require heavy pollution-control outlays to remain in compliance with the law, the return on the revenue-producing part of the operation must be sufficient to justify these added costs. Environmental regulations, therefore, may have retarded somewhat the growth of capital per employee hour in recent years.

Changing work force composition. The recent labor force entry of many young people of the baby boom generation and the increasing participation of women have led many observers to argue that the influx of relatively inexperienced or unskilled workers has retarded productivity growth (Table 3). The proportion of adult males in the work force was already declining in the early 1960's, but the pace of this shift accelerated in 1967-78. At first, the shift mostly reflected a rising proportion of young workers. During 1973-78, however, adult women substantially increased their fraction of employment, while the share of teenagers leveled off. The demographic changes in the work force have been generally widespread throughout the economy, although the shifts toward younger workers have been slightly more pronounced in mining, construction, and retail trade, areas in which much of the productivity slowdown has been concentrated.

Table 3

Average Annual Change in Employment Shares in the United States Economy

Changes in percentage shares

Group	1948-67	1967-73	1973-78
Males, 20 years of age and over	—.42	—.46	—.51
Females, 20 years of age and over	.38	.31	.53
Teenagers	.04	.15	—.02
Total	.00	.00	.00

Source: Bureau of Labor Statistics.

These changes may have affected productivity growth in several ways. One is simply by reducing the average quality of employee hours; the new workers lack the experience and skills acquired on the job to make them fully productive. This also diverts some of the time and effort of both old and new workers to the task of training the newcomers. Such training represents an important "investment", which, even though it is not included in current measures of output, should boost productivity in the future. Finally, it is largely because of the entry of the baby boom generation and the increasing participation of women that the labor force has grown more rapidly in recent years, rising an average of 2.4 percent annually during 1967-78 compared with its 1.3 percent annual rate of increase during 1948-67. Such a large increase in the availability of workers, even after taking quality changes into account, may have reduced employers' needs to invest in new labor-saving (*i.e.,* productivity-enhancing) plant and equipment to meet demands for output.

The construction productivity decline

The currently popular hypotheses cited above do not seem to explain adequately the 2 percent average annual *drop* in construction productivity since 1967. This represents a reversal from its *positive* growth in excess of 2 percent per year during 1948-67. This dramatic turnabout in construction accounts for a large part of the aggregate productivity slowdown

[10] Edward F. Denison, "Pollution Abatement Programs: Estimates of Their Effect upon Output per Unit of Input, 1975-78", *Survey of Current Business* (August 1979).

during the last decade. Construction employment and the use of construction materials have continued to grow at roughly their earlier rates of increase. It is particularly puzzling, therefore, that, despite this continued growth of labor and materials, construction industry output has actually fallen slightly during 1967-78 after rising at over 4 percent annually during 1948-67.

It is true that the rate of capital formation was especially slow, and the average age of the work force in construction dropped during 1967-73. But, even though the growth of the capital stock slowed, it at least kept pace with the increase in employment during 1967-73. These developments may help explain why the growth of construction productivity has slowed, but they do not seem to account for why it has declined so dramatically.

One possibility is that bad data have overstated the extent of the construction productivity reversal, but it remains unclear how important a factor this has been. A recent Commerce Department study concluded that, while the construction productivity data are far from perfect, it is still not apparent why any of the procedures used to construct the data would have generated a spurious sudden change from positive productivity growth to productivity decline.[11] On the other hand, separate survey evidence is collected by the Labor Department on the manpower requirements for various types of construction, and these surveys consistently have shown that the employee hours required for given amounts of construction have diminished in the past decade. This seems to contradict the usual data showing that construction productivity has actually declined, although other, technical differences in the two sources of data may help account for their different findings.[12]

Conclusion

The slowdown in United States productivity growth during the past decade defies simple explanation. A number of interrelated developments have probably affected productivity growth. Capital investment has lagged significantly relative to the growth of employment. Other factors, such as the completion of the farm-to-nonfarm shift, energy problems, government regulatory practices, and changes in the work force may have affected productivity growth directly or through their effects on capital investment. Even taken as a group, however, these developments do not seem to provide a sufficient explanation for the whole slowdown. The sharp reversal in construction productivity, for example, has been a major factor depressing the overall average rate of productivity growth since the late 1960's. Yet why this turnabout in construction has occurred, or indeed to what extent it merely reflects bad data, is still largely a mystery. It is also somewhat puzzling that productivity growth has held up so well in the manufacturing sector. Why have the factors retarding productivity growth elsewhere in the economy not affected manufacturing similarly? Or, if they have, what offsetting positive developments have kept manufacturing productivity growth on course?

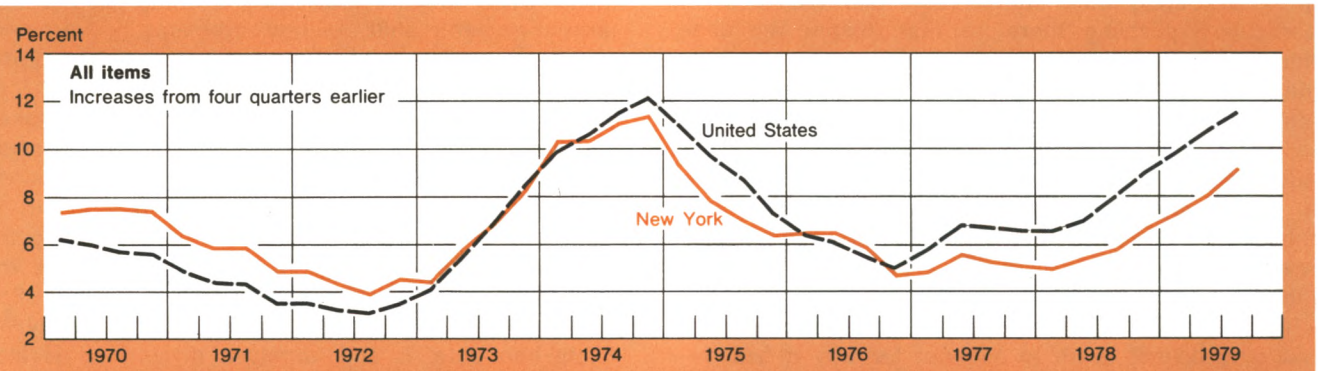
Although our understanding of the productivity slowdown is still far from complete, it is safe to assume that the basic ingredients needed to improve future productivity have not changed. An increasingly skilled work force is, of course, one key item for advancing productivity, and the aging of today's relatively young, inexperienced workers should provide a more capable labor force in coming years. Important challenges remain, however, especially the need to insure an adequate growth of innovative, productive capital investment. One barrier to investment that should be overcome is the decreased profitability of capital resulting from the interaction of the tax system with high inflation. As discussed elsewhere in this issue, the shift in the composition of investment toward shorter lived assets is also in part a product of taxes and inflation and, to the extent this is so, this shift may have further retarded productivity. It is also essential that government regulatory practices be made reasonably efficient, although this in itself will not eliminate some of the basic economic trade-offs involved in protecting the environment or the health and safety of workers. Improving our productivity growth may prove difficult, but it is of fundamental importance for achieving a rising real standard of living, along with reasonable price stability.

Paul Bennett

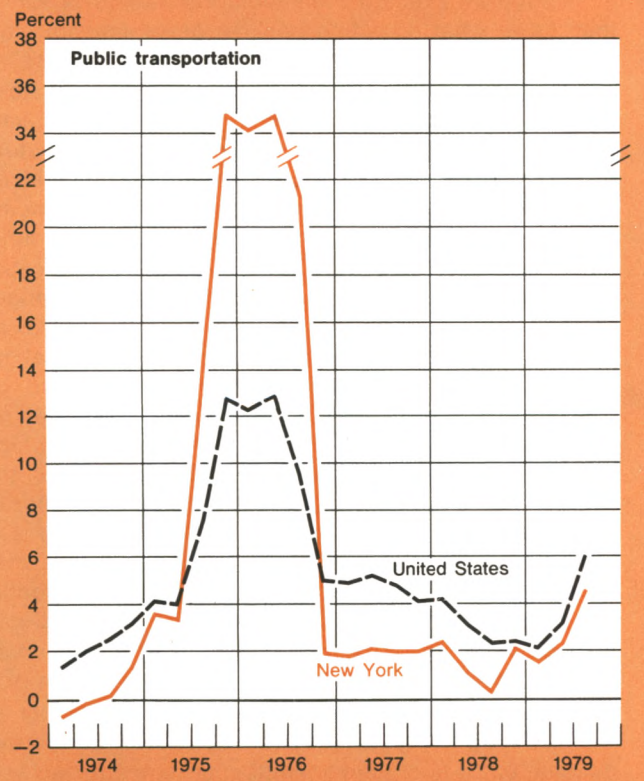
[11] H. Kemble Stokes, Jr., "An Examination of the Productivity Decline in the Construction Industry", Office of the Chief Economist, United States Department of Commerce (March 1979).

[12] The Labor Department surveys of manpower requirements do not cover all categories of construction activity, and the output concept used in them includes the costs of materials and supplies, which have been increasing relatively rapidly.

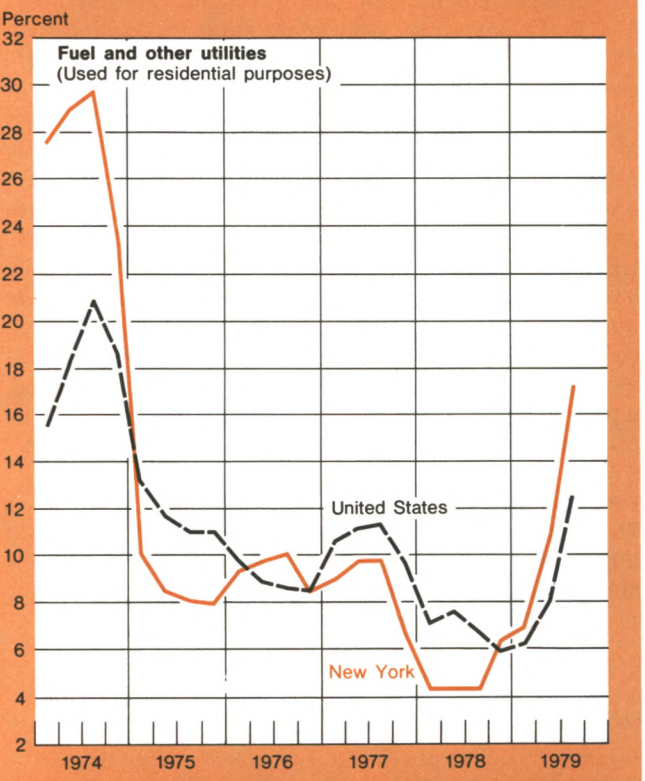
INFLATION IN NEW YORK



Since 1974, inflationary pressures have been less severe in New York than in the nation as a whole...



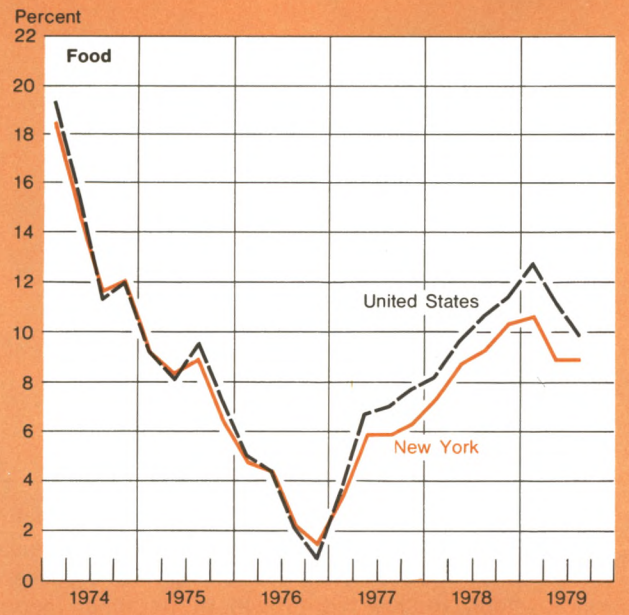
...except during a brief period following the 1975 hike in mass transit fares.

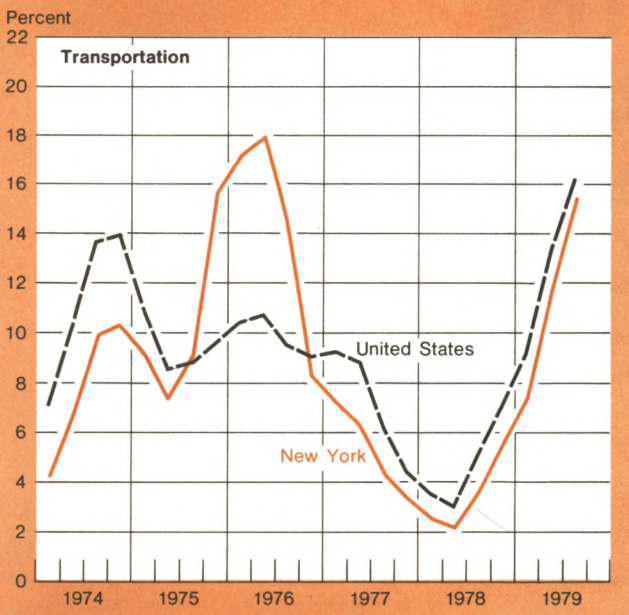


Presently, New York is, once again, being particularly hard hit by a sharp jump in oil prices.

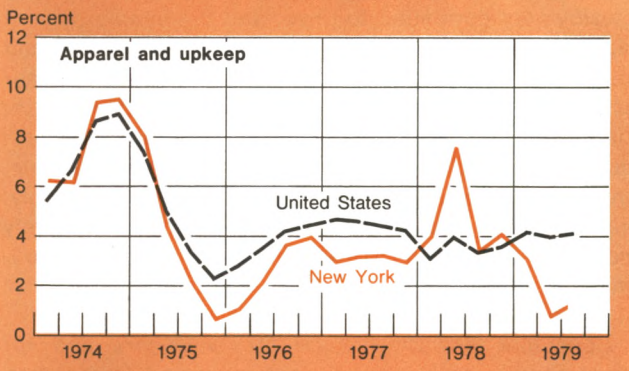
Data compare changes from four quarters earlier in the consumer price index for the United States with those for the New York-Northeastern New Jersey metropolitan area. Last plottings in 1979 are July-August averages.

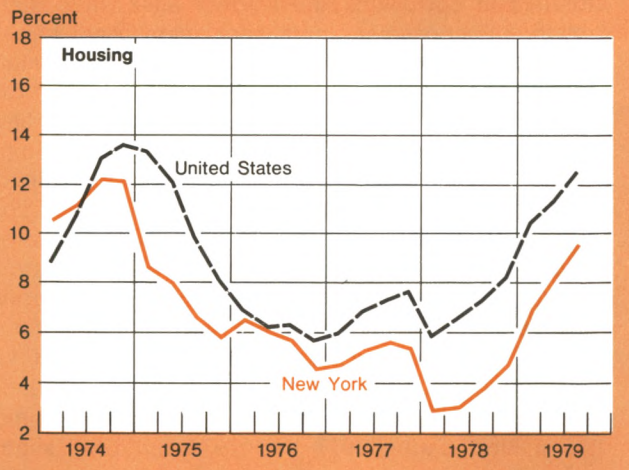
Source: United States Department of Labor, Bureau of Labor Statistics.

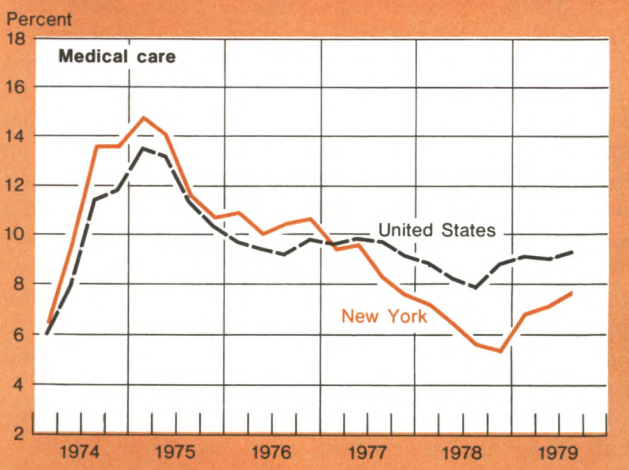




However, the broader components of the consumer price index continue to increase less rapidly in New York than in the nation as a whole.







Prepared by Mark A. Willis

The business situation
Current developments

Business activity picked up during the summer as the economy began to absorb the shock of the sharp increases in imported oil prices and recouped some losses inflicted by work stoppages during the spring. Employment continued to grow, and the unemployment rate ended the summer within the range that had prevailed for the past year. Spending for consumer goods, capital goods, and housing was sustained better than many had expected. Exports of goods and services continued to grow rapidly. At the same time, upward pressures on prices persisted unrelentingly. Nevertheless, wages continued to show relatively moderate rates of increase—especially wages of nonunion workers—considerably slower than overall rates of price inflation.

Consumer spending—both for new cars and for other goods—rose strongly in August and September. While the disappearance of long lines at gasoline stations that had developed in some areas encouraged retail buying, shoppers in metropolitan areas such as New York apparently continued to favor centrally located stores accessible via public transportation in preference to suburban outlets. Consumers responded to price discounts and rebates offered by domestic automobile manufacturers seeking to clear out heavy inventories of the larger 1979 models. Sales of domestic-type passenger cars rose during August and September about 11 percent above the sales rate of the three preceding months, although they remained 6 percent below the year-earlier rate.

While consumer spending has held up much better than many had anticipated, some weakening of consumer demand appears to be in prospect. A number of considerations point in this direction. Domestic auto sales may diminish with the end of special incentives and rebates. Sales of durable household goods are likely to taper off as completions of new homes decline. Consumer purchases in general are bound to weaken if slower growth of jobs, or outright decreases in employment, reduce the growth of personal income. In real terms, disposable personal income has already fallen substantially this year, largely as a consequence of the acceleration of inflation. Consumer confidence has declined to a low ebb, according to a number of surveys, and increasing economic uncertainties may well depress sentiment further.

Purchases of durable goods, which are often financed by credit, are particularly vulnerable to adverse changes in consumer fortunes and attitudes. Record high debt burdens of consumers, in the face of heightening economic uncertainties and tightening credit conditions, may well instill more cautious attitudes in borrowers and lenders alike. Indeed, the growth of consumer instalment debt has already slowed somewhat in recent months, although it remains rapid by past standards. The personal savings rate, which has been very low in recent quarters, is likely to rise as households seek to increase their holdings of liquid assets as well as to liquidate debts in the face of growing uncertainty. In short, the signs point to a retrenchment by consumers in coming quarters.

Residential construction continued relatively strong during the summer in spite of tightened credit conditions and rising construction costs. Single-family housing starts leveled off on a plateau of about 1.25 million units (annual rate) during the six months ended August. This was down from an average of almost 1.45 million during 1977 and 1978 but only slightly below the peak of the last housing boom in 1972. Construction of multifamily dwellings—spurred by Federal subsidy programs as well as historically low rental vacancy rates—continued close to the 1977-78

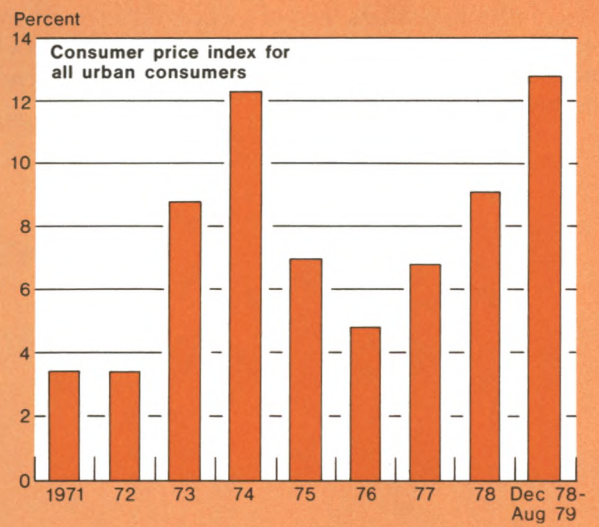
rate, but well below the hectic pace of 1972-73 when considerable overbuilding occurred.

Various innovations in the credit markets have helped to sustain a high level of residential construction this year. Money market certificates yielding interest rates tied to Treasury bill rates, which were authorized beginning in June 1978, have helped thrift institutions to maintain deposit flows better than in earlier periods of high interest rates. Innovations in the secondary market for mortgage-backed securities also have facilitated the flow of credit to the housing market (see the article beginning on page 1). While such innovations should help the housing market to avoid the extreme volatility of the past, tightening credit conditions are likely to dampen housing activity somewhat in coming quarters.

Business investment in productive facilities also has been sustained at a high rate. The Commerce Department's latest survey of business spending plans for plant and equipment, taken in late July and August, indicated a slight increase in capital investment plans during 1979 as compared with those shown in the survey taken three months earlier. The latest survey pointed to a 13.2 percent growth of spending on plant and equipment this year, about the same as last year's increase. Because of the step-up in inflation, however, a somewhat smaller increase in the physical volume of investment is indicated than last year's 5.6 percent. It is not unusual for capital spending to continue relatively strong as other components of aggregate demand begin to weaken. If the expected slowing of consumer spending occurs, however, a slowing of capital investment is to be expected as well. Indeed, data on spending commitments—both construction contracts for commercial and industrial structures and new orders for nondefense capital equipment—have been declining on balance in real terms over the past several months.

The growth of business inventories has been gradually speeding up since the middle of last year. In July, the book value of manufacturing and trade inventories surged 1.9 percent, the sharpest rise since September 1974. A significant part of that accumulation was in the automotive sector, where inventories were pared considerably in August, as production schedules were curtailed sharply and sales were stepped up. Overall, business inventories rose moderately in August by 0.8 percent. Outside the automotive sector, inventories in most lines of business appear to be reasonably balanced with the current rate of sales. Nevertheless,

Price inflation has worsened markedly this year . . .



Annual data are expressed as the change from December of the preceding year to December of the year shown. Data for 1979 are expressed at a seasonally adjusted annual rate.

. . . but nonunion wage increases have slowed somewhat.

Data represent employment cost index of private nonfarm straight-time hourly earnings, expressed as the change from four quarters earlier.

Source: United States Department of Labor, Bureau of Labor Statistics.

if consumer spending weakens, the same level of stocks might appear excessive. Moreover, the run-up in interest rates, by imposing higher carrying costs, produces incentives for cutting stocks. Thus, some inventory correction within the next several months would not be surprising.

Price developments continue to be distressing. The consumer price index for all urban households rose at an average rate of about 1 percent each month through the first eight months of the year. The resultant annual rate of increase of more than 12 percent slightly exceeded the previous postwar peak inflation rate in 1974 (left-hand panel of chart). The most drastic price increases were for energy. Reflecting the sharp increases in imported oil prices, consumer fuel and power prices rose more than 5 percent per month from January through August. The consumer price index continued to rise rapidly during the summer in spite of a virtual halt to increases in retail food prices from June through August. The respite from rising food prices may be about over, in view of the sharp increases in producers' prices of foods in August and September. Excluding both food and energy, consumer prices rose more than 0.8 percent monthly during the first eight months of 1979.

Notwithstanding the virulence of price inflation, the overall growth of wages does not appear to have accelerated. Average hourly earnings of production and nonsupervisory workers in the private nonfarm sector (adjusted to eliminate the effects of shifts of employment between industries and of overtime in manufacturing) rose 7.9 percent during the twelve months ended September 1979, which was slightly less than the increase during the preceding twelve months. The absence of wage acceleration may reflect the impact of the voluntary wage and price restraint program inaugurated by the President in October 1978. As may be seen in the right-hand panel of the chart, through the third quarter of last year wages in the union and nonunion sectors were behaving in their usual cyclical fashion. As labor market conditions gradually tightened during 1977 and 1978, the growth of nonunion wages began to approach that of union wages and, by the middle of 1978, slightly exceeded union wage growth according to the employment cost index compiled by the Bureau of Labor Statistics. Then, beginning in the final quarter of 1978, the growth of nonunion wages slowed while that of union wages accelerated. It thus appears that the wage restraint program has been more successful in nonunionized sectors than in the unionized sectors of the economy.

It would be understandable for those workers whose purchasing power has been seriously eroded by inflation to attempt to catch up with higher prices. However, it is impossible for Americans as a whole to recoup losses caused by the massive transfer of income to the oil-producing countries. If price stability is to be restored, it is imperative that external shocks, such as the imported oil price increases, not become built into the wage structure. In any case, real wages cannot increase over an extended period in the absence of improvement in the productivity of labor. As discussed in the article that begins on page 25, the growth of productivity in the United States has been slowing since 1967. Output per hour of work in the private business sector as a whole actually declined over the four quarters ended in mid-1979. Apart from restraint on the growth of money and credit, improving productivity is perhaps the most urgent imperative in the battle against inflation.

Economic prospects for industrial countries abroad

Domestic demand in most foreign industrial countries expanded at a fairly rapid pace during the last several quarters. Earlier this year, there were strong indications that this pattern of growth would be sustained for some time, even without further stimulative economic policies by national authorities. Private spending was strengthening in both the consumer and the business sectors. Yet the expansion of demand, particularly in the second half of 1978, had not brought an immediate upsurge in domestic inflation rates, which had slowed substantially over the previous year or so. At the same time, all larger foreign industrial countries, except Canada, registered current account surpluses for 1978. Thus, for many industrial economies, there was little or no evidence of significant external or internal strains that could impede continued growth.

The implications of that outlook were broadly favorable from an international perspective. With a slowdown in United States economic activity, the improved growth performance elsewhere would have been a step toward restoring a growth pattern more typical of the 1960's and early 1970's. One desirable consequence would have been to reinforce a trend toward adjustment of United States and foreign countries' balance-of-payments positions—a smaller deficit here and smaller surpluses in several important countries abroad.

However, the combination of threatened oil supply disruptions, a series of abrupt increases in oil prices, and several other unfavorable factors have cast doubt on this optimistic scenario for the major industrial economies abroad. The question is how much of an adverse impact on growth and prices might there be and how soon might it be felt. To shed light on that question, this article begins by reviewing the main features of the foreign growth experience during the current cyclical expansion. It analyzes the factors that seemed to justify a relatively optimistic outlook earlier this year. It then assesses the implications of new developments for growth prospects over the next year or so.

The main conclusion is that the relatively mild cost-price pressures and comfortable wage-productivity-profit relationships that prevailed abroad at the beginning of 1979—especially in Germany and Japan—would promote continued improvement in economic activity through the end of this year. But the likelihood of a marked reduction in growth rates during 1980 has definitely increased now that the full extent of the oil shock has become apparent and other cost pressures are intensifying.

Growth experience since 1975

During the current expansion, until early this year major foreign economies grew at a substantially slower pace than the United States economy. That performance stands in sharp contrast to the previous cyclical expansion of 1971-73, when the reverse was true. Cumulative United States real GNP (gross national product) growth, measured from the trough in the first quarter of 1975 to end-1978, was almost 4 percentage points above weighted average real growth for the six largest foreign industrial economies (Chart 1). Even more striking, on a fourth-quarter to fourth-quarter basis, the United States growth rate was consistently above the average foreign growth rate in each of the four years. Comparing the United States with Europe, the output gap was considerably larger.

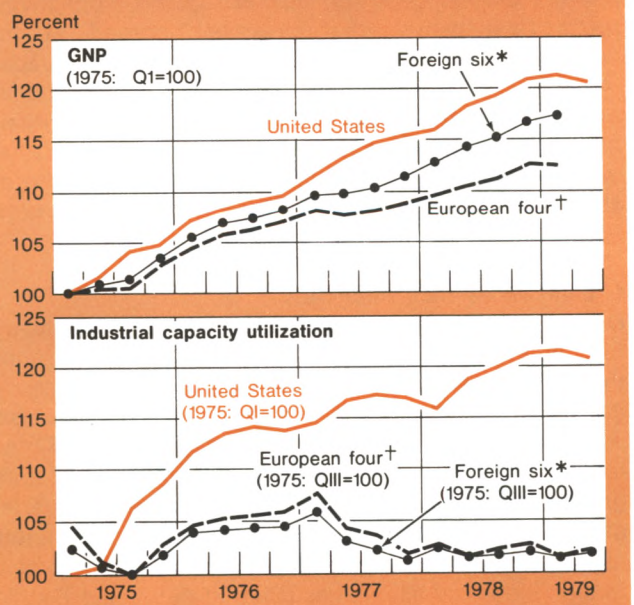
The divergence in output performance was especially marked in the industrial sector. For instance, in the four quarters to end-1977, average industrial growth was near zero abroad, whereas United States

industrial output expanded almost 6 percent. And, even as foreign industrial growth picked up to nearly 6 percent last year, the United States expansion of about 7½ percent remained higher.

The differential performance was reflected in utilization rates in manufacturing and in employment. During 1975-78, industrial capacity utilization rose very rapidly in the United States while elsewhere, after showing an initial rebound, utilization rates slid back to near 1975 trough levels. Even after a modest improvement in capacity utilization rates abroad during 1978, on average, those rates were still substantially below the United States rate at end-1978 (Chart 1). Throughout 1975-78, unemployment levels remained persistently high in all foreign countries and employment actually declined in a number of them. By contrast, during that period, United States employment rose by more than 11 million and the unemployment rate declined by about 3 percentage points to under 6 percent.

Chart 1

GNP Growth and Industrial Capacity Utilization



*Foreign six include Germany, Japan, Canada, United Kingdom, France, and Italy.

†European four include Germany, United Kingdom, France, and Italy.

Sources: GNP: various national data publications. Industrial capacity utilization: Wharton School estimates and Federal Reserve Bank of New York staff updates for foreign countries; for the United States, index of the Board of Governors of the Federal Reserve System.

The persistently slow pace of foreign growth relative to the United States in the present expansion led to growing differences in demand pressures and consequently to divergent cost-price patterns. By end-1977, the divergence in cost-price patterns and in relative inflation rates had become firmly established (Chart 2), as differences in demand pressures widened and economic policies in most foreign countries tended to become more restrictive. Moreover, the exchange rate movements widened the divergent trends of inflation. A sharp depreciation of the dollar led to considerable upward pressures on costs and prices in the United States. In several foreign countries, by contrast, appreciating exchange rates helped offset domestic cost-price pressures in 1977-78.

The contrast is particularly pronounced with respect to Germany and Japan, where cost-price pressures have been substantially lower than in the United States. Cumulative increases in GNP deflators, manufacturing unit labor costs, and wholesale prices—measured from the first-quarter 1975 trough to the fourth quarter of 1978—are 10 to 23 percentage points smaller than for the United States (Chart 3). Moreover, compared with the 1971-73 cyclical expansion, cumulative increases for Germany and Japan are much smaller and indicate only a modest buildup of cost-price pressures. Most notably, at end-1978, average manufacturing unit labor costs were only 2½ percentage points above the 1975 trough level for Germany and Japan. This suggested that both countries could absorb further increases in costs, at least for a while, without serious consequences for inflation. In that relative sense, their cost-price patterns could be called "durable". That is, they would carry a relatively low risk of deteriorating into a domestic cost-price spiral.

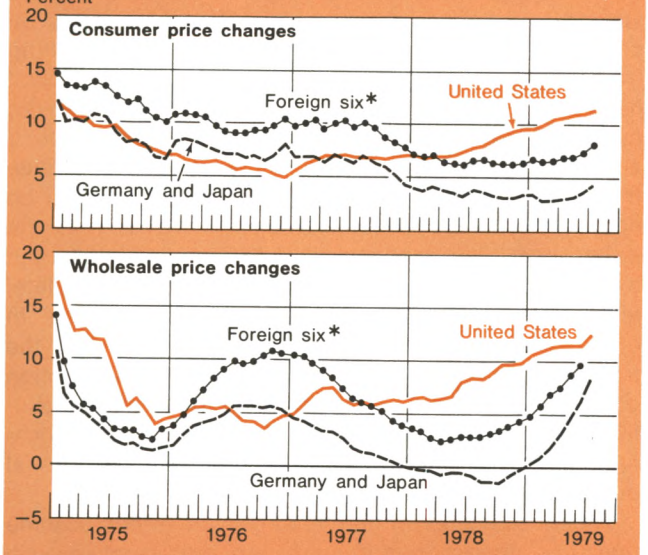
In part, the modest cost-price pressures reflected the relationship between increases in real wages and productivity growth. Unlike the United States, productivity growth was substantially higher than the average increase in real wage rates for Germany and Japan (Chart 4). By helping maintain mild cost pressures, this allowed for development of comfortable profit margins.

The durable cost-price patterns and comfortable wage-profit-productivity relationships had set the stage for a period of strong growth abroad centered on Germany and Japan and sustained by private domestic demand. Thus, toward the end of 1978, the situation characterized by fast growth in the United States and slow growth abroad appeared to be changing. Domestic demand—domestic components of GNP—was expanding much faster in Germany, Japan, and several other countries than in the United States. With higher profits and rising capacity utilization, business invest-

Chart 2

Consumer and Wholesale Price Inflation

Percentage change from 12 months earlier

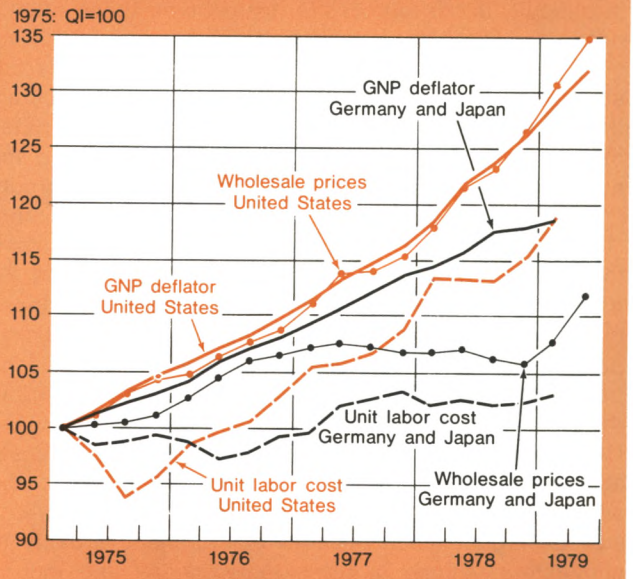


*Foreign six include Germany, Japan, Canada, United Kingdom, France, and Italy.

Sources: Various national data publications.

Chart 3

GNP Deflators, Wholesale Prices, and Unit Labor Costs in Manufacturing



Sources: Various national data publications and the International Monetary Fund.

ment was beginning to grow rapidly, making a strong contribution to aggregate demand. A part of the rise in investment activity was attributable to the acceleration in public expenditures during the second half of 1978, as the authorities implemented expansionary policies. The pickup in private investment and increased public expenditures led to a higher absorption of excess savings in the private sector of Germany and Japan, thus helping correct a persistent imbalance between domestic savings and investment. That imbalance had been important in explaining the large current account surpluses recorded by those countries.

After allowing for the effects of bad weather and strikes in some countries, the underlying pattern of domestic demand abroad remained strong in the first half of this year. In most countries, industrial output growth was essentially similar to that in the second half of 1978. Private consumption demand continued to be buoyant in virtually all foreign countries. And, in Japan and Germany, private investment in machinery and equipment made a particularly strong contribution to growth.

However, several new developments now threaten the foreign expansion. The most important, of course, is the new oil shock that is leading to large consumer and wholesale price increases and may be affecting consumer and business confidence. Uncertainties about the price of oil and its supply remain. Other major negative influences on foreign growth prospects include commodity price increases other than oil, potential labor cost pressures, and the slowdown in United States economic activity. Moreover, as external factors began to push up domestic inflation rates above acceptable levels, several countries started to take restrictive policy actions. Those actions could have substantial adverse impact on real growth next year.

Impact of the oil shock

By the end of 1979, the average price for OPEC (Organization of Petroleum Exporting Countries) oil is projected to rise 55-60 percent over the end-1978 level.[1] Comparing average 1979 oil prices with average

[1] The average weighted price is based on price and quantity weights for OPEC producers. For the United States, the weighted price will be 4-6 percentage points higher, on a year-end basis, because the imported oil contains a larger than average share of more expensive high-quality crude, whose price has been rising more sharply.

1978 prices, this is equivalent to a year-on-year increase of 35-40 percent. An oil price rise of this size entails serious consequences for prices and real growth in industrial countries, including the United States.[2] It is difficult, if not impossible, to estimate those effects precisely. There are substantial problems in calculating not only the magnitudes of various consequences but also their timing. Notwithstanding those difficulties, this section attempts to provide some rough estimates of the overall effects on prices, real growth, and the current account for the industrial countries as a group.

At present, industrial countries' oil imports from OPEC account for somewhat less than half of their total energy requirements and are running around 2.3 percent of their total domestic demand. Given these magnitudes and assuming full adjustment of energy prices in general to foreign oil prices, the 1978-79 oil price hikes may contribute 2.0-2.5 percentage points to the domestic demand deflator (somewhat less to the GNP deflator) in the course of one year. The estimate abstracts from any immediate wage response to the oil price changes. The longer term effect on prices may be higher since the new environment is likely to stimulate revisions in price expectations and induce increases in money wages. These changes, in turn, could lead to wage-price interactions that ratchet inflation higher.

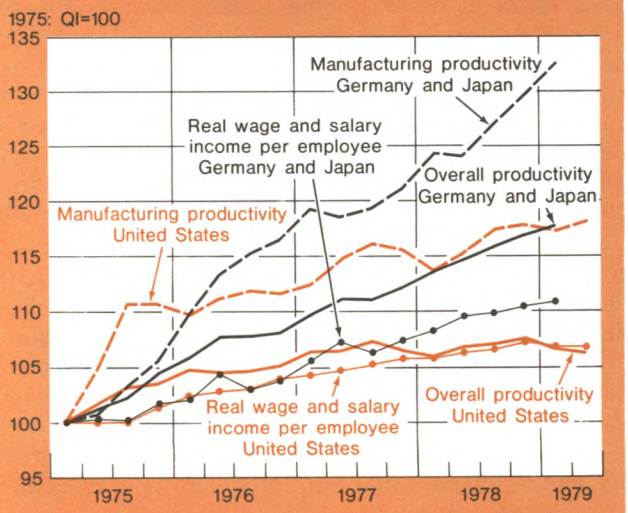
To the extent the oil price rise increases the total domestic demand deflator without corresponding increases in nominal income, it must directly reduce real income. Moreover, since OPEC will spend only a portion of the increased revenues, real domestic spending and hence GNP in industrial countries indirectly would be depressed. The direct and the indirect effects of the OPEC price rise may add up to a real income loss of 1.2-1.5 percent in the course of one year.[3] The calculation assumes that (1) OPEC spends somewhat less than half of 1979 additional revenue of roughly $55 billion in industrial countries and (2) there is no substantial change in government budgets or overall economic policy postures. With the average oil price level at end-1979 sustained throughout 1980, the depressing effect on real income over a period of perhaps two years would be greater as OPEC revenues rise by another $25 billion. The effects for any individual country are likely to differ according to the size of the income "multiplier" and the degree of dependence on imported oil. But, with the exception of Canada and the United Kingdom, the real income effect for each of the major countries should be roughly similar to the average for the group.

For various reasons, this range of estimates may be viewed as being on the low side. Negative effects on consumption and investment expenditures resulting from changes in consumer and business confidence have not been taken into account explicitly. Moreover, during 1979-80 the oil-exporting countries may spend substantially less than half of their additional revenue in industrial countries—the proportion assumed to be spent in the above calculations. There is also the strong possibility that the oil shock will reduce output by making some existing production capacity obsolete, although it will provide incentives for investment in energy-saving equipment. Over a longer period, the transmission of higher oil import prices to production costs and additional OPEC spending in industrial countries may lead to partially offsetting price and volume effects on exports and output. But these additional output and income effects are likely to be small.

These estimates of the real growth effect assume that the energy requirement for additional growth will be met. Given the current evidence on the relationship between energy and growth, the energy requirement for increases in output may be relatively

Chart 4

Productivity and Real Wage and Salary Income per Employee



Sources: Various national data publications.

[2] The International Monetary Fund classification of industrial countries is used: Austria, Belgium ,Canada, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the United States.

[3] The calculation is based on a one-year income "multiplier" of about 1.7 for industrial countries as a group.

modest.[4] It could possibly be met by a rundown of inventories or by cuts in wasteful oil consumption. However, the ability of industrial countries to conserve energy in the short run is limited. Therefore, the growth consequences of even a modest shortfall in energy supplies could be significant.

Implied in the preceding discussion are substantial adverse current account effects for industrial countries. Well over three fourths of the 1979-80 additional OPEC oil revenue will be reflected in industrial countries' oil import bill. Somewhat less than half of that increase would be offset by higher exports to OPEC and from higher export prices. Moreover, slower growth would by itself tend to reduce import expansion. On balance, the adverse impact on current account for the group of industrial countries might amount to $22-23 billion in 1979 and another $10-11 billion in 1980.

In sum, this year's oil price increase is estimated to add about $80 billion at an annual rate to OPEC revenue by 1980. That would compare with about $75 billion for the 1973-74 oil shock. As a percentage of domestic demand in industrial countries, the increase in oil costs will amount to about 1.3 percent of the 1979-80 average, compared with about 2 percent for 1973-74.

Other cost pressures

There are other actual and potential pressures on costs and prices which may have serious consequences for growth abroad. Commodity prices other than oil have risen sharply since the beginning of this year. The overall dollar-based commodity price index of the *Economist* rose at an annual rate of nearly 30 percent between end-December and end-September. The raw materials component (especially metals) of the index rose very sharply in the first quarter, but the food component was relatively stable over that period. In the last two quarters, however, both food and raw materials prices have advanced considerably. Although a general slowdown in economic activity may lead to downward pressures on commodity prices during the next several quarters, commodity price increases to date have the potential to increase production costs and eventually to become imbedded in consumer prices.

Most foreign industrial countries are also likely to face some upward pressures on prices from labor costs and other factors:

- In Canada, wage increases in the first half of 1979 have been large due to catch-up movements following the sharp decline of real wages during 1978 and the recent dismantling of wage controls.
- In the United Kingdom, after the final phase of the incomes policy, average earnings have been rising at a rate of 13-14 percent per annum. Moreover, the value-added tax increase of 7 percent announced in the new budget is estimated to have added close to 4 percentage points to consumer price inflation this year.
- In France and Italy, significant increases in total unit labor costs are expected as persistently high inflation is rapidly transmitted to wages, in part because of formal indexation arrangements.
- For Japan, some rise in total unit costs may be forthcoming as a result of higher utility charges, special bonus payments to workers associated with higher profits, and the depreciation of the yen early this year.
- In Germany, labor costs are not expected to be an important factor behind a rise in the inflation rate in 1979, but some analysts have questioned whether that would continue to be the case in 1980. Moreover, a 1 percent increase in the value-added tax, effective July 1, and sharply rising construction prices will add momentum to cost increases from oil and other commodity prices.

Finally, there is a substantial risk that over time cost pressures will be passed through to product prices. Monetary growth continues to be high in virtually all industrial countries at a time when domestic demand is strong.

Policy dilemmas abroad

In these circumstances, foreign industrial countries—particularly Germany and Japan—face a difficult policy dilemma. The problem is that, at the present pace of economic expansion, rising inflation rates could begin to accelerate rapidly. On the other hand, if inflation control is overemphasized at this time, it would stifle growth unduly. The latter course of action could stop, or at least markedly retard, progress toward restoring a more balanced long-term pattern of economic performance among the industrial countries abroad and the United States. In view of the relatively comfortable cost-price conditions, both Germany and Japan could

[4] Recent studies indicate an energy elasticity—the ratio of percentage changes in total energy requirements to percentage changes in GNP—in the range of 0.7-0.8. With nearly half of the energy requirements in industrial countries being met by imported oil, a 3 percent annual real GNP growth rate implies about 0.5 million barrels per day increase in oil import volume.

be in a position to accept some further moderate increases in inflation without sacrificing their growth objectives. But cost-price pressures are beginning to build up and a long delay in reacting to these pressures could lead to another period of high inflation rates. Thus, the timing of any major changes in policy actions would be the most crucial element in determining the balance between growth and inflation over the next two or three years.

So far, foreign industrial countries have shown little inclination to offset the deflationary effects of the oil price rise, unlike the response of several countries to the 1973-74 oil shock. On the contrary, many countries have adopted more restrictive economic policies in the last six months. Official interest rates have risen considerably in most countries, including Germany and Japan. Several countries have also taken various direct monetary policy measures to restrict liquidity and to reduce monetary growth. On the fiscal policy side, the United Kingdom has adopted a substantially deflationary stance in the budget proposal for 1979-80. Elsewhere, attempts to reduce public-sector expenditures and/or deficits remain an important objective.

In view of the severity of the actual and potential cost pressures, inflation control may be given increasingly greater priority in most foreign industrial countries. The prospects for restrictive policies are reinforced by the fact that the oil price rise is generating substantial adverse effects on current accounts. For some countries, external objectives are thus likely to be a more important constraint on policies during the next several quarters than in the last year or so.

Conclusion

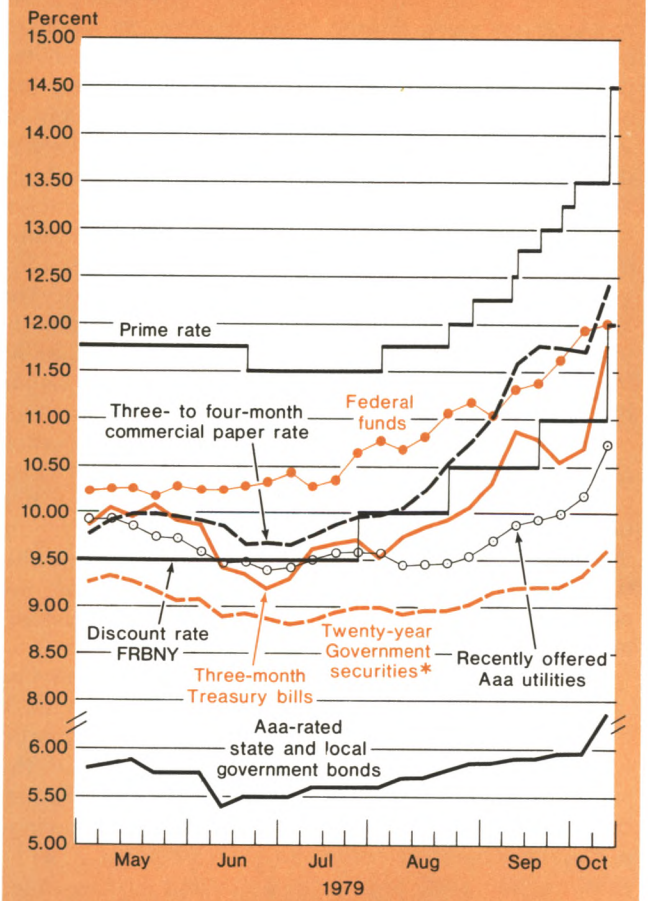
Foreign growth prospects for this year remain good, although for the closing months of the year they seem less optimistic than they did only a few months ago. For 1980, however, the growth outlook is guarded. There is a risk that most larger foreign countries will experience very little real growth. At this stage, probably the best that can be hoped for next year is a moderate slowdown, with major foreign countries as a group experiencing growth of around 2.5 percent. Such a scenario is suggested by the underlying strength of recent data on GNP and business investment, and movements of the leading indicators—such as the ratio of prices to unit labor costs, corporate profits, and real monetary aggregates. This view is also supported by the fact that the relatively stable pattern of private consumption demand and planned public investment programs in several countries will continue to provide at least a small contribution to real GNP growth through early 1980. Nevertheless, the achievement of even this moderate growth might be associated with continued high inflation.

M. A. Akhtar

The financial markets Current developments

Chart 1

Interest Rates Rose Sharply in the Third Quarter Following Declines in June



*This yield is adjusted to twenty-year maturities and excludes bonds with special estate tax privileges.

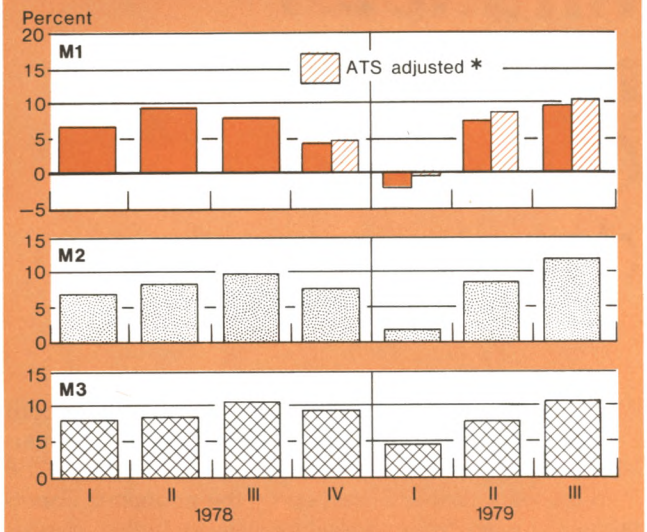
Sources: Federal Reserve Bank of New York, Board of Governors of the Federal Reserve System, and Moody's Investors Service, Inc.

With interest rates rising to record or near-record levels in the summer and early fall, the financial markets became increasingly cautious and uneasy. The markets were further unsettled by the economic uncertainties arising from several factors including continued high rates of inflation, rapid growth of the monetary aggregates, and bouts of severe weakness of the dollar in foreign exchange markets. On October 6 the Federal Reserve announced a series of policy actions aimed at gaining better control over the growth of money and bank credit, curbing speculative forces in foreign exchange and commodity markets, and thereby serving to dampen inflationary forces. These actions, all approved in unanimous votes, included: (1) a full percentage-point increase in the discount rate, (2) a marginal reserve requirement of 8 percent on certain managed liabilities of member banks, United States agencies and branches of foreign banks, and Edge Act corporations, and (3) a change in the method used to conduct monetary policy to support the goal of containing the growth of the monetary aggregates over the remainder of 1979 within the ranges previously established by the Federal Reserve. This action involves placing greater emphasis in day-to-day operations on the supply of reserves and less emphasis on confining short-run movements in the Federal funds rate.

Throughout the third quarter, heavy demand for short-term credit by businesses put strong upward pressure on interest rates. While the markets had rallied in June, when it appeared for a brief period of time that a peak in yields might be imminent because of emerging signs of an economic slowdown, short-term rates rose sharply during the third quarter and into early October. The movement toward greater restraint was spurred by increases in the Federal funds rate as the Federal Open Market Committee

Chart 2

Growth of the Monetary Aggregates Accelerated During the Third Quarter



* The growth rates are percentage changes from the previous quarter expressed at annual rates. The M1 growth rates are shown with and without an estimated adjustment for the impact of automatic transfers (ATS) between savings deposits and demand deposits introduced on November 1, 1978.

Source: Board of Governors of the Federal Reserve System.

(FOMC) acted to contain the very rapid growth of the monetary aggregates. The discount rate was raised three times during the third quarter, each time by ½ percentage point. In early October, as part of the broad plan aimed at gaining better control over the monetary and credit aggregates and slowing the rate of inflation, the discount rate was increased an additional percentage point. In turn, each of these increases brought the discount rate to a new record level, reaching 12 percent by October 8 and far surpassing the pre-1978 record of 8 percent set in 1974.

Other short-term rates generally paralleled the course of the Federal funds rate and the discount rate, and by mid-September the three-month Treasury bill rate had risen to just over 10.75 percent, an increase in excess of 150 basis points from the end of June (Chart 1). Near the end of the third quarter the financial markets rallied briefly when investors construed the four to three vote by the Board of Governors, approving an increase in the discount rate to 11 percent, as signaling that a peak in short-term rates was near. However, when the Federal Reserve announced its series of anti-inflationary policy actions on October 6, yields rose very sharply in an unsettled market as investors retreated to the sidelines.

In contrast to the short-term markets, the longer term sectors experienced only modest yield increases in the first six weeks of the third quarter, after participating in the June rally. Although inflation continued to be the primary focus of attention in the long-term markets, the weaker than expected performance of gross national product (GNP) in the second quarter helped to improve market sentiment. Expectations concerning inflation also improved during this period because of Paul Volcker's nomination as Chairman of the Board of Governors of the Federal Reserve System, and during the first half of the third quarter the long-term markets were also buoyed by the more restrictive monetary policy signaled by the increases in the discount rate and the Federal funds rate. However, by late August sentiment shifted as concern mounted that monetary policy might not ease for some time to come despite the evidence of weakening economic activity. The increase in the prime rate to a record 12¼ percent during the last week of August, along with a statement by Chairman Volcker that short-term interest rates are not likely to decline as long as the inflation rate continues high, added impetus to this change in sentiment in the long-term markets. As a result, investor interest in long-term issues declined, putting upward pressure on long-term yields during late August and early September. The same factors affecting the long-term markets contributed to a weakening in Treasury bill futures beginning in mid-August. Yields on the near-term contracts began the upward adjustment, and the rates on the late-1980 contracts followed one week later, as market participants reassessed the prospects of a more restrictive monetary policy through 1980 and into 1981 than had been anticipated only a few weeks earlier. And both the long-term securities market and the Treasury bill futures market reacted strongly to the Federal Reserve's policy moves on October 6 with prices initially moving sharply downward.

The prospects for any immediate easing in monetary policy were further dimmed by continued strength in the monetary aggregates during the third quarter (Chart 2). In part, the more rapid growth of M_1 in the second and third quarters as compared with the first quarter is due to a slower rate of expansion of savings accounts subject to automatic transfer service (ATS). After reducing M_1 growth an estimated 2 percentage points in the first quarter of 1979, the impact from ATS declined to about 1 percentage point in the second quarter and to about ½ percentage point in the third quarter. Uncertainty concerning the future legal status of ATS has undoubtedly led to reduced

promotion of this service by commercial banks following a ruling in April by a United States Court of Appeals that ATS and certain other payment services are illegal under current laws and would be prohibited as of January 1, 1980 in the absence of Congressional action. However, even after allowing for the reduced impact from ATS, M_1 growth accelerated markedly in both the second and third quarters of 1979.

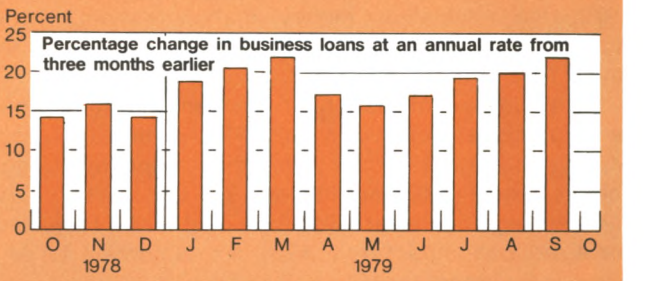
Reflecting not only the additional strength in M_1 but also very rapid expansion of time and savings deposits other than large negotiable CDs (certificates of deposit), M_2 growth accelerated to an annual rate of 12 percent in the third quarter from 8.6 percent in the second quarter. Savings deposits at commercial banks expanded at an annual rate of 5.5 percent in the third quarter, after declining $9.5 billion from October 1978 to May 1979. In contrast, sales of six-month money market certificates at commercial banks slowed in the three-month period from June to August to an average monthly gain of $5.2 billion, compared with an average of $6.8 billion per month in the March to May period.

Sales of six-month certificates at thrift institutions tapered off more sharply than at commercial banks during June, July, and August. These six-month certificates have added to the ability of thrift institutions to continue making mortgages even as market rates exceed the ceiling rates on other categories of time and savings deposits. The housing market has been further supported by the growing secondary mortgage market which now supplies one out of every four dollars of mortgage lending. A further development in the market for mortgage-backed securities was introduced during the third quarter when three firms announced plans to sell pass-through securities backed by a pool of mortgages serviced by a variety of mortgage lenders. This will provide a more diversified instrument for investors, since other publicly issued pass-through securities contain the assets of only one mortgage lender. And, for the lender, this new instrument means that smaller lenders can participate, since the entire mortgage pool need not be originated by a single institution. A more detailed analysis of this innovation and the mortgage-backed securities market in general is presented in an article beginning on page 1.

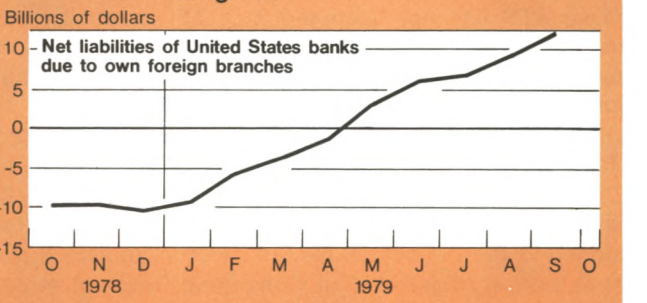
As was the case with commercial banks, total time deposits at thrift institutions accelerated in the third quarter—despite the slowing in the sales of six-month certificates—because of strength in other categories of time and savings deposits. Moreover, the strength in the monetary aggregates occurred even while the assets of money market mutual funds were expanding at a very rapid pace. These funds serve as close substitutes for savings deposits and, to a lesser extent, demand deposits. It is also possible that the rapid growth

Chart 3

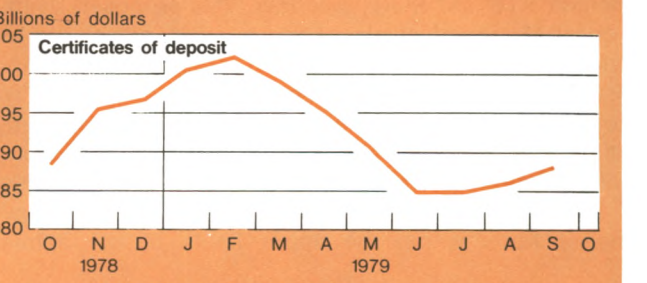
The demand for bank loans by business remained very strong into the third quarter . . .



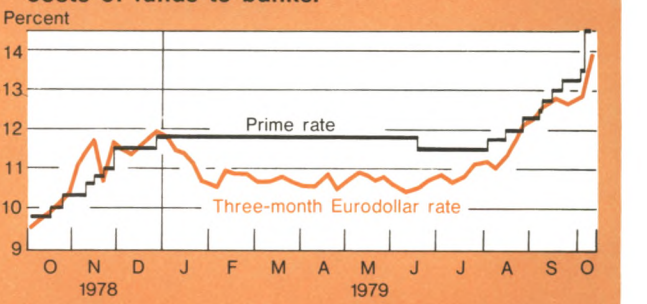
. . . as banks stepped up borrowings from their foreign branches to finance business lending . . .



. . . and returned to the CD market as well . . .



. . . while the prime lending rate rose to record levels, reflecting the higher costs of funds to banks.



Source: Board of Governors of the Federal Reserve System.

of these money market funds has contributed to the slower sales of six-month certificates, with some investors placing the proceeds of maturing six-month certificates into money market funds to gain increased liquidity as well as market yields. As of September 1979, the assets of money market mutual funds amounted to about $35 billion, or 9.2 percent of M_1 and 3.7 percent of M_2.

In the context of the longer run trends in the monetary aggregates relative to the FOMC's annual targets, M_1, M_2, and M_3 all remain within their respective target ranges. The FOMC targets for 1978-QIV to 1979-QIV for these aggregates are 3 to 6 percent for M_1 (adjusted for a reduced impact from ATS), 5 to 8 percent for M_2, and 6 to 9 percent for M_3.

The target for M_1 has been adjusted from a range of 1½ to 4½ percent to a range of 3 to 6 percent because ATS has not been reducing M_1 growth by the amount originally incorporated in setting the target. It had been estimated at the beginning of the year that nationwide ATS along with NOW (negotiable order of withdrawal) accounts in New York State would reduce M_1 growth 3 percentage points from 1978-QIV to 1979-QIV. Thus far, however, the impact appears to have amounted to only about half that amount. In response to the difficulties encountered in analyzing the monetary aggregates in our changing financial structure, an alternative definition of M_1 has been proposed by the staff of the Board of Governors, which would include ATS and NOW accounts. This proposed definition of M_1 would eliminate the need to adjust the M_1 targets in the future because of differences between the estimated and realized impacts from ATS and NOW accounts. The new M_1 measure is expected to be ready fairly soon, possibly as early as February 1980 along with redefinitions of the broader monetary aggregates.

While the monetary aggregates have been growing at rates within the upper limits of the annual ranges set by the FOMC, bank credit (loans and investments plus loans sold to affiliates) has expanded thus far in 1979 at an estimated annual rate of 13 percent, a rate well above the 7.5 to 10.5 percent range. Much of the strength in bank credit stemmed from heavy demand for short-term business loans, as corporations financed increased levels of inventories. The demand for business loans has strengthened somewhat more at the weekly reporting banks in New York City than for those outside New York City. In the first quarter of 1979, the New York banks posted virtually no gain in business loans, while business lending continued strong outside New York. In the second and third quarters, however, the New York banks accounted for about 40 percent of the $16.4 billion increase in business lending by all weekly reporting banks.

A large volume of corporate financing needs is being met in the commercial paper market as well. Business loans have expanded at about a 22 percent rate from June to September, while business loans plus short-term commercial paper increased at an annual rate of 24 percent for the same period. Banks continue to finance these loans largely through nondeposit sources of funds, primarily borrowings from foreign branches, although in the third quarter banks also increased slightly the outstanding levels of CDs and large other time deposits of $100,000 or more after several months of running off these liabilities (Chart 3). To slow the growth of bank credit financed by CDs, Eurodollar borrowings, repurchase agreements (RPs), and Federal funds purchased from nonmember institutions, the Federal Reserve announced on October 6 an 8 percent marginal reserve requirement on the total amount of these liabilities outstanding in excess of the total level outstanding on average for the fourteen-day period ended September 26 or $100 million, whichever is larger.

February-July 1979 Semiannual Report
(This report was released to the Congress and to the press on September 5, 1979)

Treasury and Federal Reserve Foreign Exchange Operations

By early 1979, progress was clearly under way in resolving the disparities in economic performance among industrial countries that had been of concern to policymakers and exchange market participants alike for several years. The United States economy was beginning to cool down under policies of restraint, while the economies of several other industrial countries were picking up steam under policies of stimulus. These shifts in relative demand conditions, coming on top of the long-awaited adjustments in trade volumes as a result of previous exchange rate changes, were reducing the serious trade and current account imbalances of recent years. The sharp drop in Japan's trade surplus and the further narrowing of the United States trade deficit were especially encouraging. Nevertheless, those processes were far from complete, and inflation in the United States remained uncomfortably high.

In the early months of 1979, the exchange markets were responding favorably to the November 1 measures by the United States and foreign authorities to correct what had become an excessive decline of dollar rates. The follow-through on those measures included heavy intervention in the exchange market by the United States authorities in coordination with the central banks of Germany, Switzerland, and Japan, the maintenance of a firm monetary policy by the Federal Reserve, and the sale of foreign currency notes by the United States Treasury in the German and Swiss capital markets. These actions helped restore a sense of two-way risk in the market and, with interest rate differentials strongly favoring the United States, funds began to flow back into dollars. This reflux took the form of unwinding previously adverse leads and lags, covering of speculative positions, and the reversal of portfolio shifts out of the dollar which had built up last year.

While progress was being made on past problems, market participants and policymakers had to contend with new shocks to the international economy. A shortfall in world oil supplies emerged abruptly in early 1979, following the political upheavals in Iran which temporarily cut off crude oil exports from that country. The ensuing scramble for spot crude pushed spot market prices to astronomical highs and prompted individual OPEC (Organization of Petroleum Exporting Countries) members to jack up their posted prices. These events favored the dollar in two ways. The bidding-up of the spot oil price had the direct effect of generating additional demand for dollars in the exchange market to pay for the oil. In addition, markets for individual currencies were influenced by traders' assessments of the relative impact of the oil-supply and price strains on different countries. Currencies of countries which were most heavily dependent on oil imports for their energy needs, such as Japan and several continental European countries, came under

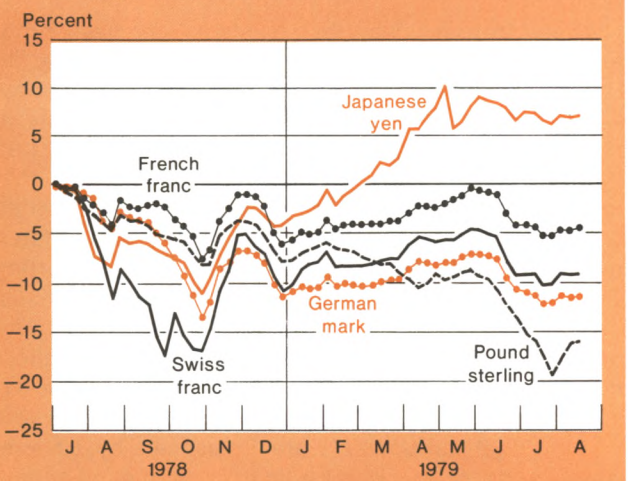
A report by Scott E. Pardee. Mr. Pardee is Senior Vice President in the Foreign Department of the Federal Reserve Bank of New York and Manager of Foreign Operations for the System Open Market Account. During the period under review, Alan R. Holmes, Executive Vice President of the Federal Reserve Bank of New York, was Manager of the System Open Market Account and Mr. Pardee was Deputy Manager for Foreign Operations. Mr. Holmes has since been named Senior Policy Adviser to the Bank and Special Market Adviser to the System Open Market Committee.

Table 1
Federal Reserve Reciprocal Currency Arrangements
In millions of dollars

Institution	Amount of facility July 31, 1979
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
German Federal Bank	6,000
Bank of Italy	3,000
Bank of Japan	5,000
Bank of Mexico	360*
Netherlands Bank	500
Bank of Norway	250
Bank of Sweden	300
Swiss National Bank	4,000
Bank for International Settlements:	
Swiss francs-dollars	600
Other authorized European currencies-dollars	1,250
Total	$29,760

*Increased to $700 million effective August 17, 1979.

Chart 1
The Dollar Against Selected Foreign Currencies



Percentage change of weekly average of bid rates for dollars from the average rate for the week of July 3-7, 1978. Figures calculated from New York noon quotations.

selling pressure. By contrast, the currencies of countries with near self-sufficiency in oil, such as the United Kingdom and Canada, came into demand. The United States was viewed as better able than most others to cope with short-term oil supply problems, and so long as the scramble for oil persisted the dollar was also in demand.

The surge in world oil prices aggravated inflation pressures generally, coming at a time when a number of important international commodity prices were also advancing. The economies of Japan and continental Western Europe were no longer shielded from these price increases as they had been earlier when their currencies were appreciating against the dollar. Consequently, wholesale and consumer prices jumped sharply abroad. Since inflation also accelerated in the United States, this raised concern over the possibility of a renewed worldwide price spiral such as occurred in the early 1970's. For their part, foreign central banks moved to tighten monetary conditions to avoid further exacerbation of inflationary pressures as a result of domestic credit demand or international influences, and short- and long-term interest rates advanced fairly sharply in most countries. In addition, to avoid the inflationary effects of a depreciation, the authorities intervened forcefully in the exchange markets whenever their currencies came on offer.

In an effort to attain greater stability of exchange rates within the European Community (EC), the member countries launched the European Monetary System (EMS), which included new intervention arrangements and a partial pooling of reserves. As some strains developed among the EMS currencies, the arrangements provided the context in which several countries stepped up their intervention or tightened monetary policy when their currencies came under selling pressure. The United Kingdom authorities had decided not to join the intervention arrangements of the EMS for the time being and, when sterling came into heavy demand in the spring, they allowed the rate to rise rather than create substantial new domestic liquidity through intervention.

With the dollar in generalized demand through much of the spring, the United States authorities had acquired sufficient currencies to repay by end-April all their previous foreign currency indebtedness to other central banks. Subsequently, considerable progress was made in rebuilding balances drawn out of the resources acquired under the various parts of the November 1 program. Most of the currencies purchased during the period came out of direct transactions with correspondents, but the Trading Desk also bought currencies in the market on occasion when the bidding for dollars was particularly strong.

In sum, by mid-June the United States authorities purchased a total of $8,123.5 million of currencies and repaid $6,126.1 million of outstanding debt while holding the rest in balances. In addition, $1,351.5 million equivalent of marks was acquired by a further medium-term issue in the German capital market. Aside from some $656 million of foreign currency sales during brief periods of market nervousness through February, the Desk did not intervene as a seller of foreign exchange until mid-June.

By late spring, however, the balance of market sentiment began to swing against the dollar. Traders saw that the reflux of last year's outflows was coming to an end, leaving the dollar vulnerable on the downside. Moreover, the United States trade deficit was widening again somewhat and, in view of the prospective sharp increase in our oil import bill, private forecasts were being revised to show larger deficits than earlier predicted. Indeed, just when the bidding for dollars by other major countries to pay for spot oil began to slacken, the United States was encountering serious gasoline shortages and an uncertain outlook for heating oil supplies. These developments, plus the continuing debate over energy policy generally in this country, led many market participants to question whether the United States was better able to cope with oil price and supply problems after all. In addition, interest rate trends internationally had become a matter of concern. Even though inflation had accelerated in the United States and the Federal Reserve had firmed interest rates somewhat further in April, widespread talk of recession led market participants to expect that interest rates might not be raised in line with those abroad and might even decline somewhat.

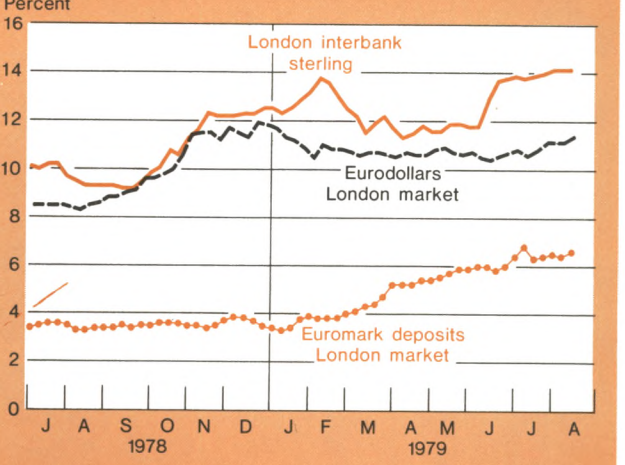
By mid-June, following further interest rate hikes in several major foreign countries, these various concerns came to a head. The dollar suddenly came on offer in the exchanges, and many market participants hastened to shift out of dollars on the expectation of an even greater decline. In these highly unstable market conditions, the United States authorities intervened forcefully to check the decline, particularly on days surrounding the OPEC meeting and the Tokyo summit in late June. The United States intervention operations were mainly in marks, but also in Swiss francs. The German and Swiss central banks intervened in their own markets.

The outcome of the OPEC meeting, which resulted in an agreement that set the average OPEC price some 60 percent over last year's levels, gave rise to expectations of a strong policy response by the United States and other countries, and the communiqué from the Tokyo summit reinforced those expectations. But the tide of market sentiment was running so strongly

Chart 2

Selected Interest Rates

Three-month maturities*



*Weekly averages of daily rates.

against the dollar that political and economic events in the United States over the next few weeks were interpreted bearishly. The dollar came under repeated bouts of selling pressure, especially following the President's energy speech on July 15 and over subsequent days during which the President made several changes in the cabinet. The United States authorities intervened vigorously in German marks to head off a possible generalized decline of the dollar which might exacerbate inflationary pressures in the United States. These operations, conducted both in New York and in the overnight markets in the Far East, were coordinated with those of the Bundesbank in Frankfurt and helped blunt the immediate pressures on the dollar. In addition, on July 20, the Federal Reserve raised the discount rate by ½ percent to a record 10 percent and moved to firm money market rates as well. Once the new appointments were made, with G. William Miller moving to the Treasury as Secretary and Paul A. Volcker becoming Chairman of the Federal Reserve Board, the market quieted down and dollar rates firmed somewhat at the end of July.

From end-January to end-July, the United States dollar declined a net 2¼ percent against the continental Western European currencies, 2½ percent against the Canadian dollar, and 13 percent against the pound sterling. It rose by a net 7½ percent against the Japanese yen.

Intervention sales of foreign currencies by the United

Table 2

Federal Reserve System Drawings and Repayments under Reciprocal Currency Arrangements

In millions of dollars equivalent; drawings (+) or repayments (−)

Transactions with	System swap commitments, January 1, 1979	1979 I	1979 II	1979 July	System swap commitments, July 31, 1979
German Federal Bank	4,434.2	+ 334.2 −1,762.8*	+ 790.8 −3,020.8*	+1,377.1 − 114.6	2,053.3
Bank of Japan	106.5	− 106.5	-0-	-0-	-0-
Swiss National Bank	786.3	+ 74.1 − 860.5	+ 36.2	+ 31.7 − 36.2	31.7
Total	5,327.0	+ 408.4 −2,729.8*	+ 826.9 −3,020.8*	+1,408.8 − 150.7	2,085.1

Because of rounding, figures do not add to totals. Data are on a value-date basis.

* Repayments include revaluation adjustments from swap renewals, which totaled $15.2 million for drawings on the German Federal Bank renewed during the first and second quarters.

Table 3

Federal Reserve System Repayments under Special Swap Arrangement with the Swiss National Bank

In millions of dollars equivalent

System swap commitments, January 1, 1979	1979 I	1979 II	1979 July	System swap commitments, July 31, 1979
157.3	−156.5	−0.9	-0-	-0-

Because of rounding, figures do not add to total.

Data are on a value-date basis.

Table 5

United States Treasury Drawings and Repayments under Swap Arrangement with the German Federal Bank

In millions of dollars equivalent; drawings (+) or repayments (−)

Amount of commitments, January 1, 1979	1979 I	1979 II	1979 July	Amount of commitments, July 31, 1979
889.4	−878.2*	-0-	-0-	-0-

Because of rounding, figures do not add to totals. Data are on a value-date basis.

* Repayments include revaluation adjustments from swap renewals, which amounted to $11.3 million for drawings on the German Federal Bank renewed during the first quarter.

Table 4

Drawings and Repayments by Foreign Central Banks and the Bank for International Settlements under Reciprocal Currency Arrangements

In millions of dollars; drawings (+) or repayments (−)

Bank drawing on Federal Reserve System	Outstanding January 1, 1979	1979 I	1979 II	1979 July	Outstanding July 31, 1979
Bank for International Settlements* (against German marks)	-0-	-0-	+31.0 −31.0	-0-	-0-

Data are on a value-date basis.

* BIS drawings and repayments of dollars against European currencies other than Swiss francs to meet temporary cash requirements.

States authorities in June and July totaled $5,414.4 million equivalent. The bulk of this was in marks, of which $2,758.9 million was sold by the Treasury out of balances and $2,537.6 million was by the Federal Reserve out of balances and through drawings on the swap line with the Bundesbank. Drawings of marks by the Federal Reserve during June and July amounted to $2,167.9 million, of which $2,053.3 million was outstanding on July 31. In addition, the System sold $117.9 million of Swiss francs in June and July, and at the end of July $31.7 million of swap drawings on the Swiss National Bank was still outstanding from that series of operations. From mid-June through end-July, the United States authorities purchased $670.6 million equivalent of marks and Swiss francs, mainly from correspondents.

During the first half of 1979 both the Federal Reserve and the Treasury realized net profits on liquidations of current swap debt and sales of currencies out of balances held by the System, the Exchange Stabilization Fund (ESF), and the Treasury General Account. The figures appear in Table 7. During July the System realized a small net loss on its operations, but the ESF and General Account earned profits. The valuation profits and losses for all three accounts reflect revaluation of System and Treasury assets and liabilities as of July 31. Losses on final liquidation of pre-August 1971 Swiss franc debts are shown in Table 8.

German mark

For some time the German authorities had sought to generate a more rapid rate of domestic growth without undercutting the clear progress they had made in slowing inflation in recent years. Much of the stimulus had come from fiscal policy, with a substantial increase in the budget deficit by the public sector. Although Germany's growth rate had advanced in 1978 to 3.4 percent, the solidity of the expansion was still in question late in the year when huge amounts of hot money flowed into the mark from the dollar and from other EC currencies. The rise in the mark rate in the exchange market, particularly against the dollar, had threatened to impede real growth as German businessmen became apprehensive of their ability to compete in their own or in foreign markets. At the same time, intervention by the Bundesbank and foreign authorities to counter the mark's rise was swelling liquidity in Germany, thereby threatening to unleash serious inflationary pressures from the monetary side. The German authorities joined with those of the United States, Switzerland, and Japan in the coordinated effort starting last November 1 to correct what had been an excessive decline of the dollar and to avoid the recurrence of such a decline. The resolve of the authorities had been put to a severe test in November and December, and intervention—particularly by the United States authorities—had been very heavy. But pressures eased off on the dollar in early 1979. Already in January a reflux of funds had begun and the United States authorities were able to begin acquiring marks from correspondents and in the market to reduce their swap debt to the Bundesbank. At end-January the Federal Reserve's swap debt in marks amounted to $4,168.2 million equivalent, and the United States Treasury's swap debt in marks was $613.0 million equivalent. Moreover, with the exchange markets in better balance, the Bundesbank moved cautiously to absorb the excess liquidity generated by the late-1978 intervention.

The fragility of this balance was underscored when the dollar came under a brief bout of selling pressure in early February, as the market responded nervously to political developments in Iran. The spot mark was quickly bid up from around DM 1.86 to DM 1.83 to the dollar, but heavy intervention again helped contain the immediate pressures. In New York, the Desk sold $507.1 million equivalent of marks over three trading days through February 8. Of this total, $317.3 million equivalent was from United States Treasury balances and $189.8 million equivalent was for the Federal Reserve, of which $145.5 million was drawn under the swap line with the Bundesbank and the rest was from balances. Later in February, the mark came into brief demand on two trading days, and the Desk sold another $21.7 million equivalent of marks from System balances and $6.2 million equivalent from Treasury balances. Meanwhile, as a further follow-up to the November 1 program, the United States Treasury announced that it would issue a second mark-denominated note, equivalent to $1,351.5 million in the German capital market, with the payment date on March 1. Following these actions, the exchange market came into better balance again, and the process of unwinding resumed.

As the exchanges became more settled, market participants attempted to assess the implications for monetary policy and interest rates of the changing conditions in Germany's domestic economy. A harsh winter and a metal workers' strike had temporarily depressed production, but most analysts expected fairly strong growth to continue through 1979. At the same time, however, with the exchange rate no longer appreciating and thereby not shielding the domestic economy from rising international oil and raw material prices, Germany was hit by the same burst of inflation as other industrial countries. With the mark on offer in the exchanges, the Bundesbank took advantage of the opportunity to intensify its efforts to

absorb liquidity, signal its intention that funds would no longer be as readily available, and otherwise bring down the growth of central bank money to its target range of 6-9 percent. In the market, concerns that interest rates would rise sharply in Germany prompted investors to shift funds from marks into higher yielding assets in dollars, sterling, and currencies linked to the mark in the EMS.

These outflows occurred at a time when the dollar was in demand in the exchanges for other reasons. It was benefiting from evidence of a slowdown in the United States economy, news of a sharp improvement in the United States trade deficit in February, and some expectation of a moderation of inflationary pressures. Moreover, because of its role as a transaction currency, the dollar was being increasingly well bid as the scramble for oil and other dollar-based commodities intensified. As a result, the selling of marks at times put considerable pressure on the mark rate. By early April the mark dropped to trade as low as DM 1.9050. In addition, the mark was on offer against other European currencies.

As the mark came on offer, the Bundesbank sold increasingly large amounts of dollars to maintain orderly trading conditions and to absorb some of the excess liquidity in the domestic money market. For their part, the United States authorities continued to take advantage of the opportunity to cover outstanding swap commitments and to replenish foreign currency resources, largely on the basis of direct transactions with official correspondents. But, as pressure against the mark intensified in early April, the Trading Desk also intervened by buying marks in the market to maintain orderly trading conditions. Before long these combined operations had drained so much liquidity in Germany as to exert strains on the banks' reserve positions. Accordingly, the German monetary authorities acted to provide liquidity in a short-term and easily reversible manner so as not to signal any change in their efforts to resist inflationary pressures. In particular, they raised banks' rediscount quotas with the central bank by DM 5 billion on April 1, and subsequently engaged in foreign exchange swaps with commercial banks, mostly for three-month maturities. But, in response to continuing expansion in bank lending, the Bundesbank also acted to raise the cost of credit, increasing both its discount and Lombard rates by 1 percentage point to 4 percent and 5 percent, respectively.

By the spring months, it was becoming clear that the adjustment of Germany's external position was under way, as the trade and current account surpluses were sharply reduced from last year's levels. Imports were being boosted both by a sharp rebound in domestic demand and by the higher prices of oil and other international commodities. Uncertainties over energy continued to weigh on the mark. Since Germany is almost wholly dependent on imported oil for its petroleum needs, the further escalation of oil prices threatened to inflate even more the oil import bill. Moreover, the nuclear accident in the United States raised concern that Germany's efforts to shift toward greater reliance on nuclear power might be undercut and that large contracts to export nuclear plants might be delayed or canceled.

By contrast, the United States was seen as being better able to cope with oil price and supply problems than most other countries. Thus, the offering of marks was increasingly being reinforced by commercial selling and adverse reactions to each news report that suggested yet another price hike for oil. In addition, through April and early May, the exchange markets were reacting favorably to the further firming of interest rates by the Federal Reserve in response to the rapid rise in the monetary aggregates and to evidence of a further narrowing of the United States trade deficit.

Selling pressure on the mark continued and pushed the mark to a low of DM 1.9220 at one point late in May, some 3½ percent below early-February levels. In the four and one-half months to mid-June, the Bundesbank was a substantial seller of dollars. The United States authorities also purchased a total of $5,963.2 million equivalent of marks. These purchases permitted the System and the Treasury to liquidate, respectively, their remaining $4,355.2 million equivalent and $613.3 million equivalent of swap debt to the Bundesbank by end-April. In addition, they provided the United States Treasury the opportunity to make substantial progress in restoring its resources under the November 1 package in order that they might be available to finance future operations.

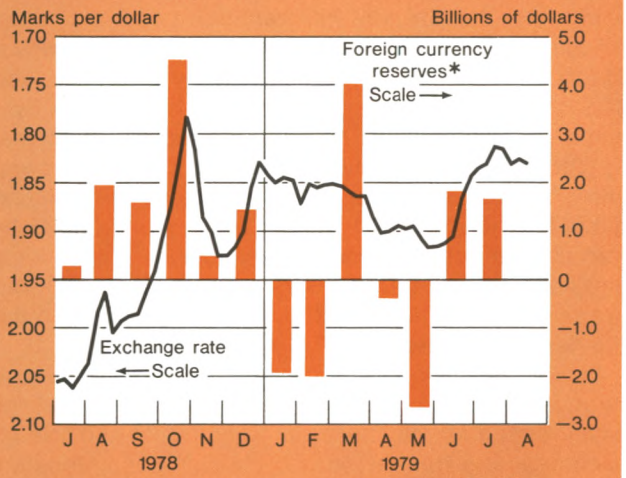
By early June, however, the balance of market forces was beginning to shift. After nearly six months, the process of unwinding commercial leads and lags and other types of foreign exchange positions was virtually completed. The scramble for oil was tapering down, as many of the important importers abroad had by now made alternative arrangements to secure their supplies. Meanwhile, the political scrap over energy policy in the United States cast doubts in the market over this country's ability to deal effectively with the oil supply and price situation. Moreover, interest rate differentials were narrowing. United States rates had leveled off since April or eased somewhat, and talk of a possible recession gave rise to expectations that United States interest rates might begin to decline significantly.

In Germany by that time most of the earlier strains

Chart 3

Germany

Movements in exchange rate and official foreign currency reserves



Exchange rates shown in this and the following charts are weekly averages of noon bid rates for dollars in New York. Foreign currency reserves shown in this and the following charts are drawn from IMF data published in International Financial Statistics.

*German foreign exchange data include adjustments for gold deposited with the European Monetary System and for foreign exchange swaps.

that had generated such large capital outflows had disappeared, but interest rates were some 1-2 percentage points higher than before. And the market was concerned that, to prevent rising oil and other commodity prices from further exacerbating inflation in Germany, the authorities in that country would tighten monetary policy sharply. Indeed, German banks were facing seasonal liquidity pressures during June in any case. The Bundesbank raised the Lombard rate a further ½ percentage point and tempered these immediate pressures by offering a new repurchase agreement type of facility for the banks, based on interest rates close to those prevailing in the market. As money market rates in Germany rose, the German mark advanced to the upper intervention point against other currencies in the EMS. Already the participating central banks had sold a sizable amount of marks, and some had increased their own official lending rates. The market was therefore uncertain about the implications for the relatively new intervention arrangements in the EC should monetary policy be tightened further in Germany. At the same time, many market participants felt there was little downside risk for the mark in view of continuing sales of dollars by the Bundesbank and purchases of marks by the United States authorities.

Under these circumstances, the mark immediately became the focus of heavy demand when the dollar suddenly came on offer on June 15. In one day it jumped 1 percent through DM 1.90, even as the Trading Desk stepped in to contain the rise. By comparison with the relatively limited rate fluctuations of previous months, market participants were impressed by the magnitude of the mark's rise, and the bidding for marks quickly cumulated even in the face of stiff resistance by the authorities who continued to intervene in sizable volume. Moreover, as the late-June OPEC meeting approached, the feeling in the market strengthened that the German authorities might welcome an appreciation of the mark to cushion the inflationary impact of rising oil prices. Also, news of a worsening in both the United States trade deficit for April and our consumer price index for May had heightened concerns in the market about the performance of the United States economy.

In these market conditions, the Trading Desk at the Federal Reserve Bank of New York intervened almost daily for the rest of the month, operating not only in New York but in the overnight markets in the Far East during the week of the OPEC meeting and Tokyo summit, June 25-29. In all, the Desk sold $2,429.9 million equivalent of marks by the month end, of which $842.1 million equivalent was financed by new drawings by the System on its swap line with the Bundesbank and the rest was drawn out of System and Treasury balances. On several days, the Bundesbank also intervened forcefully. By the month end the spot rate had advanced above DM 1.84.

Early in July, the results of the OPEC pricing meeting and the Tokyo summit set up expectations in the market that there would be strong official reactions to the higher than expected new oil price increases. In fact, participants at the Tokyo summit committed themselves to limit oil imports. The market responded nervously to the postponement of President Carter's energy speech. Meanwhile the Bundesbank, following up on the rise in domestic interest rates in Germany, raised its discount and Lombard rates on July 12 to 5 percent and 6 percent, respectively. This action had been anticipated, but it nonetheless reinforced concerns in the market over the further narrowing interest differentials between Germany and the United States.

Even before the President had completed his energy address on Sunday evening, July 15, the mark advanced sharply in the overnight markets in Singapore and Hong Kong, and the Desk intervened vigorously in

those markets through banks in the United States with offices in those countries. Subsequently, the announcement that the entire United States cabinet and senior White House staff had offered their resignations to President Carter distressed the market. The dollar came under a renewed burst of selling pressure and the Desk stiffened its resistance. On July 20, the Federal Reserve raised its discount rate ½ percentage point to 10 percent and short-term money market rates were moved up as well.

The mark nevertheless remained in heavy demand, as commercial and professional market participants undertook a hard reassessment of the dollar's prospects. Over subsequent days, United States corporate interests that had previously been hesitant to turn their positions began to unwind their forward mark sales and to cover future mark needs in the spot market. In this unsettled environment, reports that central banks were diversifying out of dollar-denominated assets spread throughout the market. In response to these pressures, the United States authorities provided heavy and sustained support in both the United States and Far Eastern markets, and the Bundesbank also bought dollars in Frankfurt. This intervention blunted the immediate selling pressures, and the mark rate, which briefly reached DM 1.80, dropped back on some covering of short dollar positions. Moreover, the appointment of G. William Miller as Secretary of the Treasury and Paul A. Volcker to replace him as Chairman of the Federal Reserve helped reassure the market that lower inflation and a stable dollar would continue to be of the highest priority for economic policy in the United States. In addition, in late July statistics were released showing a widening in the German current account deficit and a narrowing in the United States trade deficit during June. The mark eased back to DM 1.8335 on July 31. At this level the mark was up a net 2 percent over the six-month period.

In July the Desk's intervention sales of marks amounted to $2,866.6 million equivalent, of which $1,225.6 million was out of Treasury balances and $1,641.0 million was for the Federal Reserve. The System's operations were mainly financed by additional $1,325.8 million equivalent of drawings on the swap line with the Bundesbank, with the remainder coming out of balances. Toward the end of the month the Desk was able to acquire some marks from correspondents and liquidated some $114.6 million equivalent of swap drawings. At the month end, System swap debt with the Bundesbank totaled $2,053.3 million equivalent.

During the period, German reserves were influenced by a revaluation of some of Germany's gold holdings when, during March, 20 percent of all gold and foreign exchange was transferred into the European Monetary Fund against the receipt of claims denominated in the European Currency Unit (ECU). Germany's reserves were also affected when the Bundesbank executed foreign exchange swaps during April and May to provide temporary liquidity to the domestic market. Excluding the impact of these transactions, Germany's foreign exchange reserves declined $6.6 billion from end-January through May, reflecting almost equally the Bundesbank's intervention in dollars and in EMS currencies. By contrast, foreign exchange reserves rose by $5.0 billion during June -July.

Table 6

United States Treasury Securities, Foreign Currency Denominated

In millions of dollars equivalent; issues (+) or redemptions (−)

Issues	Outstanding January 1, 1979	1979 I	1979 II	1979 July	Outstanding July 31, 1979
Government series:					
Swiss National Bank	600.4	− 597.2	−3.2	-0-	-0-
Public series:					
Switzerland	-0-	+1,203.0	-0-	-0-	1,203.0
Germany	1,595.2	+1,351.5	-0-	-0-	2,946.7
Total	2,195.6	− 597.2 +2,554.5	−3.2	-0-	4,149.7

Data are on a value-date basis.

Swiss franc

Coming into 1979, the persistent rise in the Swiss franc was finally blunted. Concerned that excessive appreciation might drive the economy into recession, the Swiss National Bank had intervened massively in the exchanges and had accepted the huge injection of liquidity that resulted from the heavy intervention. As part of the November 1 dollar-support package, the Federal Reserve also sold large amounts of Swiss francs in its efforts to correct an excessive decline in the dollar, and the United States Treasury had arranged a $1,203.0 million equivalent placement of Treasury notes in the Swiss capital market. The market had been impressed by these initiatives and by the priority the Swiss government was giving to stabilizing the franc. As a result, the franc had started coming on offer in January, enabling the Federal Reserve to reduce its outstanding swap debt incurred last year with the Swiss National Bank to $446.7 million equivalent by the time the period began.

In early February the franc was again bid up when the dollar came briefly on offer following the cancellation of large military contracts with Iran. The rate jumped 3¼ percent above its SF 1.70 opening, prompting the Swiss National Bank and the United States authorities to intervene. The System sold $45.8 million equivalent of francs financed by drawings of $40.4 million on the swap line with the Swiss National Bank and from balances, while the Treasury sold $24.8 million equivalent of francs out of the proceeds of its recent borrowing. These operations quickly brought the market into better balance and reaffirmed to the market the authorities' determination to contain any further rise in the Swiss franc. Thus, the franc settled back to SF 1.67 by midmonth while trading around SF .9000 against the German mark.

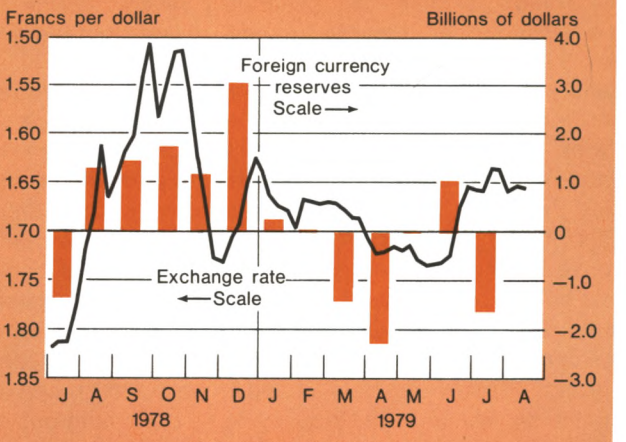
Meanwhile, the turnaround in the Swiss franc was generating fears that the sharp rise in oil and other international commodity prices would be transmitted more rapidly to the Swiss economy. Also, an improved business outlook had set in as new orders recovered somewhat from the depressed condition of earlier months. Against this background, market participants, looking for parallels between developments in Germany and Switzerland, were sensitive to the possibility that the Swiss authorities would tighten liquidity, just as the Bundesbank had done, should the recovery in activity threaten domestic price stability. But, in fact, the Swiss expansion was not nearly so well established as that in Germany, and the Swiss authorities repeatedly reaffirmed that economic policy was still focused on the need to stabilize exchange relationships. By early March the relatively comfortable conditions in Switzerland's money and capital markets were in clear contrast to the tightening taking place in Germany. As a result, Switzerland emerged as one of the most favorable markets for placing new loans. Indeed, borrowers from Asia, Europe, and North America flocked to Zurich to take advantage of the attractively low interest rates for as long as they might last. Thus, the buildup of a heavy calendar of new foreign issues weighed on the Swiss franc for some time. As the near-term outlook for the franc faded, nonresidents also shifted some of their funds out of francs into higher yielding assets in other currencies, and the leads and lags built up last year continued to be unwound.

These various developments kept the franc on offer against both the dollar and the mark during most of the spring months. Between mid-February and early May, the franc declined 3 percent to SF 1.7228 against the dollar and had slipped to trade around SF .9060 against the German mark. As the franc eased, the Swiss authorities became more concerned that a sharp decline in the franc would magnify the effect of rising oil prices and otherwise exacerbate inflationary pressures. The Swiss National Bank, therefore, came into the market to support the franc and to absorb domestic liquidity by selling large amounts of dollars in the market while also continuing with its dollar sales under its capital export conversion program. For its part the Federal Reserve bought francs in the market and directly from the Swiss National Bank to repay the remaining $487.1 million equivalent of market-related

Chart 4

Switzerland

Movements in exchange rate and official foreign currency reserves



See exchange rate footnote on Chart 3.

Table 7

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

In millions of dollars

Period	Federal Reserve	United States Treasury: Exchange Stabilization Fund	United States Treasury: General Account
First quarter 1979	+ 0.7	+ 5.7	+17.3
Second quarter 1979	+30.8	+ 4.6	+21.7
July 1979	− 0.2	+ 22.5	+20.7
Valuation profits and losses on outstanding assets and liabilities as of July 31, 1979	+ 5.6	−209.1	−62.0

Data are on a value-date basis.

Table 8

Net Profits (+) and Losses (−) on United States Treasury and Federal Reserve Liquidations of Foreign Currency Debts Outstanding as of August 15, 1971

In millions of dollars

Period	Federal Reserve	Exchange Stabilization Fund
First quarter 1979	−139.1	−531.0
Second quarter 1979	− 0.7	− 2.8
July 1979	-0-	-0-

Data are on a value-date basis.

swap debt incurred with that bank last year and during February. The Treasury also purchased francs to restore its Swiss franc balances. In addition, the United States authorities accelerated the program for orderly payment of the pre-August 1971 Swiss franc debt, so that the System and the Treasury were able to repay $139.3 million equivalent of special swap debt and $531.2 million equivalent of Treasury securities, respectively. Consequently, by early April the United States had no outstanding obligations to the Swiss National Bank for the first time since August 1970. Once the debt was repaid the Federal Reserve acquired modest balances in Swiss francs.

During May the unwinding of commercial leads and lags and the heavy volume of capital outflows gradually tapered off. But the heavy intervention to moderate the franc's decline had generated severe strains in the Swiss money market. To some extent, the authorities had offset these strains by lending francs against dollars through foreign exchange swaps with maturities of up to six months. By this time, they had also allowed Swiss interest rates to rise to contain monetary growth and to reduce inflationary pressures. In addition, during May the Swiss National Bank liberalized its exchange controls by removing requirements that nonresidents convert franc borrowings with the Swiss central bank, that commercial banks balance foreign currency claims and liabilities at the end of each day, and that nonbank residents receive official approval for placing loans abroad. These regulatory changes were well received in the market and contributed to a bottoming-out of the franc around end-May.

As a result of the relaxation of the exchange controls and some narrowing in interest differentials between the United States and Switzerland, the Swiss franc was poised for a recovery at the time the dollar started its decline in mid-June. Bidding for francs put the rate under strong upward pressure. Leading the rise in foreign currencies against the dollar, the franc soared almost 4½ percent to as high as SF 1.6475 on June 22. To avoid an excessive appreciation of the franc, the Swiss National Bank reacted by intervening massively both in Zurich and through the agency of the Trading Desk in New York. In addition, during June the Federal Reserve sold $86.2 million equivalent of francs, with $36.2 million equivalent drawn on the swap line with the Swiss National Bank and the remainder financed from balances.

This forceful and concerted operation by the Swiss and United States authorities impressed the market, and the franc eased back to SF 1.6565 around the month end. Thereafter, the franc moved up again with the other European currencies in response first to the postponement and then to the disappointment in the market over President Carter's energy speech and the subsequent resignation of the United States cabinet. But the franc did not lead this rise, and its advance was contained with only modest intervention by the Swiss authorities and by the System, which sold $37.1 million equivalent of francs in the market financed by swap line drawings. Once the President had completed the reorganization of his economic team, the franc fell back more rapidly than the mark. The Swiss National Bank sold dollars in the market, and the Federal Reserve was able to buy directly from the Swiss National Bank a sufficient amount of the

proceeds of this intervention to repay $36.2 million equivalent of swap debt with the Swiss National Bank. At the month end, System swap debt with the Swiss National Bank was $31.7 million equivalent. By the close of the six-month period under review, the franc had eased back to SF 1.6610 for a net gain of 2¼ percent on balance. Meanwhile, during the first four months of this period, Switzerland's foreign exchange reserves declined $3.6 billion. In June and July, foreign exchange reserves declined a further $500 million, as the effect of money market operations more than offset spot foreign exchange market intervention, for a net $4.1 billion decline over the six-month period.

Japanese yen

By early 1979 the Japanese economy had entered a period of strong recovery, spurred first by public investment, then by private investment and personal consumption. Progress was being made in reducing Japan's massive trade and current account surpluses, as export growth had slackened for several months while imports expanded briskly in response to rising domestic demand, to last year's sharp appreciation of the yen, and to government programs to encourage imports. The yen had fallen back more sharply than most other major currencies after the announcement of the November 1 measures and concerted intervention by United States and Japanese authorities and was trading at ¥202 on February 1. Even so, economic policy under the new Ohira government continued to focus on the need to cut the current account surplus further. The government's budget for the fiscal year beginning April 1979 contained another substantial increase in spending to maintain real growth at 6.3 percent even if production for foreign markets slowed further. On this basis, the government forecast an impressive 50 percent fallback in the current account surplus to $7.5 billion for the fiscal year. Meanwhile, monetary policy remained accommodative, so as to provide support to the economic recovery and to an outflow of capital that would offset the continuing current account surplus. But expansion of bank credit had become a matter of concern.

As a follow-up to the November 1 actions, the United States authorities remained prepared to intervene in yen. And so, when the dollar came under selling pressure on two occasions through early February, the Desk sold $50.4 million equivalent of yen in the New York market, of which $33.8 million equivalent was from Federal Reserve balances and $16.6 million equivalent from Treasury balances. But for the most part the yen was under selling pressure over the late winter and early spring. The United States authorities thus took advantage of the opportunity to acquire yen to add to balances of the System and the Treasury.

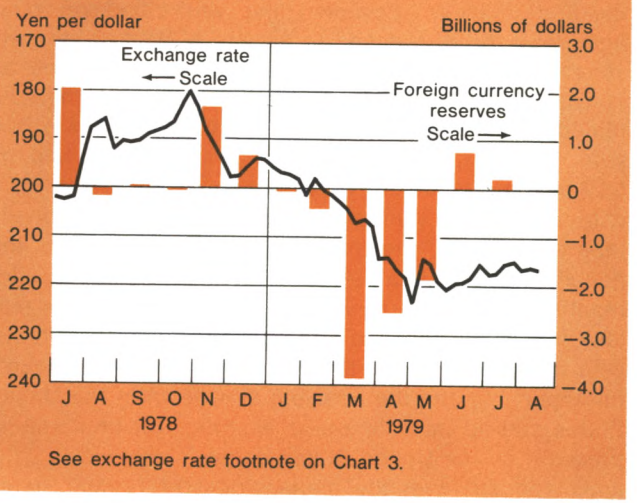
Much of the flow out of yen continued to reflect the reversal of commercial leads and lags which had built up in 1978, when the yen had been appreciating rapidly. In addition, with interest rates in Japan well below those in the United States and Eurodollar markets, capital moved out of yen once the spot rate began to decline. Japanese residents shifted funds abroad and nonresidents ran down their free-yen deposits in Japan. Moreover, a number of foreign borrowers took advantage of both favorable rates and ample liquidity in the Tokyo market to issue bonds and to place syndicated loans denominated in yen. The continued conversion of the proceeds of sizable issues over a short period of time also weighed on the exchange market.

In addition, the decline in the rate reflected a deterioration in market sentiment toward the yen during the early spring. Now that the sharp rise in the spot rate had been broken, the adjustment in Japan's trade position was no longer masked in the monthly figures by a continuous improvement in the terms of trade. At the same time, the oil shortage triggered by the protracted shutdown of Iranian production was highlighted, even more in Japan than elsewhere, when multinational oil companies phased out shipments to their nonaffiliates, thereby sharply reducing deliveries of crude oil to Japan's refineries. Fears over the availability of supplies as well as concern over rapidly rising international prices led to an increase in imports of oil and other commodities. This was reflected in a

Chart 5

Japan

Movements in exchange rate and official foreign currency reserves



See exchange rate footnote on Chart 3.

scramble for dollars in the exchange market, which added to the pressure against the yen. While other major currencies were weakening only slightly against the dollar, the spot yen dropped a full 4½ percent below early-February levels to ¥211.60 by early April.

With the yen on offer and declining almost daily, the Japanese authorities acted to moderate the selling pressures, in part, through the continued liberalization of exchange controls on capital inflows. Limitations on nonresident purchases of yen bonds were progressively eliminated, a marginal reserve requirement on increases in nonresident free-yen accounts was phased out, and the period for converting the proceeds of nonresident issues of yen-denominated bonds was extended. Moreover, the Bank of Japan intervened massively in the exchange market as a seller of dollars, thereby absorbing yen. As the pressures continued to build, the authorities became concerned that the decline in the yen would undercut the progress already achieved in reducing the large trade and current account surpluses of recent years. At the same time, the sharp depreciation of the yen magnified the effect of rapidly rising commodity prices, thereby aggravating domestic inflationary pressures. With these concerns in mind, on April 17 the Bank of Japan raised its discount rate by ¾ percentage point to 4¼ percent. Selling pressure on the yen nevertheless continued into early May at which point the rate had fallen to ¥225.25, some 11½ percent below the early-February level and fully 27¾ percent below its peak just before the November 1 program.

By May, expressions of concern by senior Japanese and United States officials that the yen may have reached excessively low levels sparked a sudden scramble for yen. In a surge of profit taking and short covering, the spot rate shot up over 6 percent to ¥211.50 toward midmonth. Once these immediate demands passed, however, the yen came on offer again and the rate eased to around ¥218-220 by early June. The Japanese authorities did not intervene as heavily as before in the market but, reflecting the sustained heavy intervention over the early months of the year, Japan's foreign exchange reserves declined by $8.7 billion from January through May.

In early June, selling pressure on the yen gradually tapered off, but the yen did not participate in the generalized rise against the dollar that set in at midmonth. The market remained cautious about the outlook for Japanese trade and current account positions, with the further rise in the oil prices adding to Japan's oil-import bill and the possible slowdown in the United States cutting into Japanese exports. Not until selling pressure on the United States dollar intensified in July, amid concern over the management of United States energy policy and of economic policy more generally, did the yen begin to advance. By that time, the pickup of inflationary pressures in Japan and rapid growth of the money supply prompted the Bank of Japan to raise its discount rate by 1 percentage point to 5¼ percent. The market responded favorably to this action, and the yen edged higher to close around ¥217. At this level, the yen showed a net 7½ percent decline over the six-month period under review. Japan's foreign exchange reserves posted little further change in June and July, closing the period at $21.0 billion, compared with $28.8 billion at end-January.

Sterling

Coming into 1979, sterling was firm in the exchange markets. Underpinning the pound were the relatively high yields available on British gilt-edged securities and other sterling instruments. Also, the United Kingdom government had indicated that, even though it would not initially join the exchange intervention arrangement in the EMS, it would seek to keep sterling relatively stable *vis-à-vis* the currencies of its major trading partners. The comfortable level of foreign exchange reserves, which were at $15.6 billion at the end of January, gave credibility in the market to this pledge. Moreover, Britain's near self-sufficiency in oil was seen as insulating the United Kingdom economy from the disruption in Iranian oil supplies and its balance of payments from the effects of skyrocketing oil prices. Thus, the pound traded comfortably around the $2.00 level in early February and, on the effective trade-weighted basis used by the United Kingdom authorities, it remained around 63 percent of its Smithsonian parity.

Meanwhile, Britain's economic performance was falling short of market expectations. The recovery of the domestic economy had run out of steam, inflationary pressures were accelerating, and the current account was showing little improvement despite the increasing contribution of North Sea oil to the balance of payments. Looking ahead, a larger than expected public-sector borrowing requirement, labor union demands for large pay increases to make up for four years of wage restraint, and spiraling commodity prices all aggravated the outlook for inflation. Interest rates continued to move up in London's financial markets, and on February 8 the Bank of England raised its minimum lending rate from 12½ percent to 14 percent.

During February a massive reflow of German marks, Swiss francs, and Japanese yen was getting under way. Much of this reflux was into dollars. But with so much money on the move at a time when interest rates in the United Kingdom were higher than in other major countries, including the United States, there was a tendency for some of these funds to gravitate

into sterling. In addition, sterling was buoyed by Britain's near self-sufficiency in oil. In response to the continuing inflow of funds, the Bank of England cut its minimum lending rate by 1 percentage point to 13 percent on March 1. The sterling rate was allowed to rise gradually, and it advanced to nearly $2.06 by late March. The Bank of England moderated the rise in the rate by intervening fairly heavily, and this intervention was reflected in the $1.3 billion increase in United Kingdom foreign exchange reserves in February and March.

On March 28 the Labour government lost a no confidence vote in Parliament, thereby opening the way for a general election in early May. Coming into the campaign, the two major parties offered clearly different approaches for bolstering the British economy. The Labour Party pointed to its record in gaining trade union acceptance of wage restraint and its plans to use North Sea oil earnings to strengthen British industry. The Conservative Party put emphasis on restoring incentives for long-term recovery by stimulating the private sector, reducing the government's role in the economy, and lowering inflation by setting firm limits on the growth of the money supply. Public opinion polls, showing the Conservative Party to be heavily favored, were viewed by many market participants as a bullish factor for sterling. Consequently, the injection of election uncertainties at first gave little pause to the bidding for sterling.

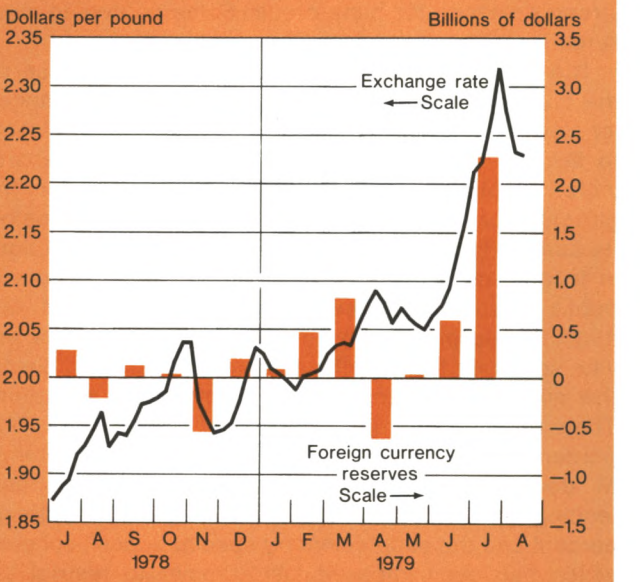
The persistent inflows of funds into sterling raised a serious policy dilemma for the United Kingdom authorities. Exchange market intervention to keep spot sterling from rising sharply risked generating a substantial burst in the monetary aggregates beyond the targeted levels. Cuts in interest rates aimed at reducing the attractiveness of sterling investments could instead spark additional demand from investors on expectations of capital gains and undermine efforts to rein in monetary expansion. Complicating matters further was the lack of reliable data on current economic developments in the United Kingdom as a result of a civil servants' strike affecting data collection and of a series of strikes elsewhere in the economy which were having imponderable effects on overall employment and production levels. On April 5 the Bank of England once again cut its minimum lending rate by 1 percentage point to 12 percent. At the same time concern that continued heavy intervention to restrain the rise in sterling was generating excessive growth of the money supply, the United Kingdom authorities decided to scale back the magnitude of their intervention.

The initial response in the market to these steps was a further rush into sterling. By mid-April, the spot rate had been bid up above $2.10 against the dollar and to

Chart 6

United Kingdom

Movements in exchange rate and official foreign currency reserves



See exchange rate footnote on Chart 3.

nearly 68 percent in effective terms. The demand for sterling then ran out of steam and the rate eased back as traders sensed that interest rates would not be allowed to fall further in the United Kingdom, particularly following evidence that domestic inflation was accelerating. Moreover, the market turned cautious ahead of the general election, as the public opinion polls indicated a narrowing of the margin in favor of the Conservatives. Spot sterling fluctuated rather widely over the last weeks before the election. The immediate reaction to the May 3 election results, a clear majority for a new Conservative government, led by Prime Minister Margaret Thatcher, was some further bidding for pounds and the spot rate advanced to as high as $2.0843. Although the Bank of England remained prepared to intervene to counter excessively disorderly conditions in the market, it continued to allow sterling to move rather widely in response to market forces. Sterling soon settled back somewhat as the market assessed the propects for the Conservative Party program, which was to be laid out in some detail in a budget message on June 12.

By this time, available evidence suggested that output had fallen during the first quarter and that both the

trade and current accounts had been in uncomfortably large deficit. Wage increases had been much higher than anticipated which, together with the upsurge of raw material and oil prices, contributed to the acceleration of inflation. The pace of monetary expansion had quickened substantially, largely because of strong demands for bank credit. Some tightening measures were therefore expected.

The market was nonetheless caught by surprise by the boldness of the initiatives announced by Chancellor Howe in the budget address, which adhered closely to the principles set forth in the campaign. The projected public-sector borrowing requirement for the current fiscal year was to be cut nearly £1 billion below its current level to £8¼ billion. Substantial reductions in income taxes were to be financed by large cuts in public spending, Increases in the value-added tax, and the sale of some government holdings to the private sector. In the meantime, to keep inflation in check, the authorities imposed stricter monetary restraints. They reduced the money growth target to a 7-11 percent range. To bring the actual growth of sterling M_3 down into the middle of this range, the minimum lending rate was raised 2 percentage points to 14 percent and the supplementary special deposit scheme, which had been imposed last summer to restrict the growth of commercial bank interest-bearing eligible liabilities, was extended for a further three-month period. With the intention of allowing United Kingdom residents much freer use of sterling resources, certain capital controls were also liberalized. These changes included freer availability of official exchange for outward direct investment, abolition of the requirement that two thirds of overseas profits be repatriated, the end to controls on dividends, and the relaxation of controls on travel and emigration allowances.

The exchange market's response was exceedingly bullish, with the pound coming into heavy commercial and professional demand from financial centers the world over. The jump in interest rates had particularly marked effects, as foreign investors joined in the scramble to buy government securities and several issues of government tap stocks were sold out quickly. Rumors of a large new oil find in the North Sea reinforced favorable market sentiment toward sterling at a time when the world oil price and policies were under active debate within OPEC and among the major industrial countries. With the increased volume of funds coming into sterling, the British authorities continued to intervene to avoid excessively disorderly markets but allowed the exchange rate to take the brunt of the demand pressures. As a result, the pound shot up to $2.21 by early July, some 6 percent above early-May levels. Sterling rose against other major currencies as well, advancing to 70.8 percent in effective terms.

The relatively high level of United Kingdom interest rates, the security of British oil supplies, and the depth and diversity of the United Kingdom money market all benefited sterling when the dollar came on offer during July. In response to the uncertainties surrounding United States energy policy and the outlook for economic policy generally in the United States, funds from multinational corporations, OPEC members, and market professionals continued to flow heavily into London. The perception that the Bank of England, reluctant to compromise its control of the money supply, would restrain its intervention in the exchanges also propelled sterling higher. In these circumstances, the authorities accelerated their policy of relaxing exchange controls by lifting totally all restrictions on overseas direct investment and easing those on outward portfolio investment. But these measures had little immediate impact, and the pound rocketed up to a four-year high of $2.3324 on July 26. By that time, British manufacturers were expressing open alarm over a possible loss of competitive positions which could result with sterling at such a high level. Once the immediate concern over United States economic policy eased in late July, the flow into sterling suddenly dried up. Spot sterling dropped away as sharply as it had risen, receding to $2.2480 by the month end. Nevertheless, compared with six months before, sterling had risen on balance by 13 percent against the dollar and by 14¾ percentage points to 72.7 percent on the trade-weighted index.

During the period the government took advantage of sterling's strength in the exchanges to repay previously incurred external debt while also extending the maturities of remaining external public debt. These repayments included the prepayment of $1 billion to the International Monetary Fund (IMF), liquidating Britain's remaining credit tranche drawings with the Fund as well as the repayment of a large portion of public-sector debt which was coming up for early maturity. Even so, reserves rose another $2.3 billion above end-March levels to $19.2 billion at end-July, reflecting the accumulation of dollar intervention by the Bank of England.

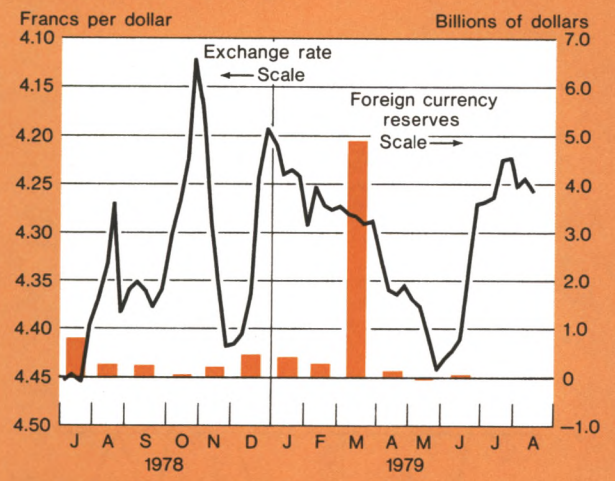
European Monetary System

On March 13 the EMS was formally inaugurated. Aimed at achieving greater exchange rate stability in Europe, the new system supplanted the EC snake, which had been in existence since 1972 but had by this time lost more than half its membership. Within the EMS the new joint floating arrangement included the currencies still remaining in the EC snake, together with the

Chart 7

France

Movements in exchange rate and official foreign currency reserves

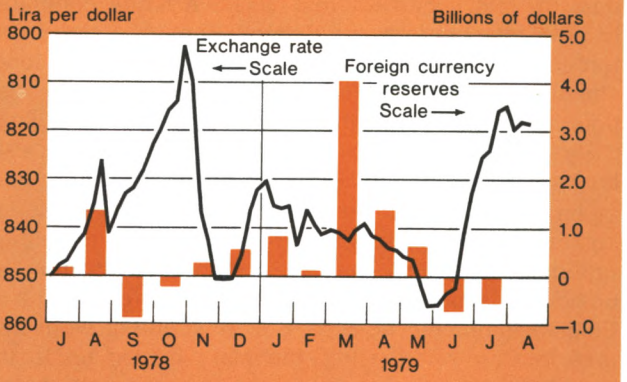


See exchange rate footnote on Chart 3.

Chart 8

Italy

Movements in exchange rate and official foreign currency reserves



See exchange rate footnote on Chart 3.

French franc, the Italian lira, and the Irish pound. As in the EC snake, the member nations agreed to maintain their currencies in a 2¼ percent band against each other, except for Italy which was allowed a wider 6 percent margin for the lira. The United Kingdom decided not to bring the pound sterling into the exchange rate arrangement at this stage, though participating in other aspects of the EMS.

The launching of the EMS was the culmination of nearly a year's intensive efforts by officials of the nine participating nations. The new system was designed to promote monetary stability by appropriate and timely policy measures and by a strengthening of existing financing arrangements, including the creation of ECUs (European Currency Units) against central bank deposits of gold and dollars. In addition, the participating governments agreed to limit fluctuations in their currencies against the ECU, a weighted basket of all currencies. A nation whose currency deviates beyond an agreed limit from the ECU is expected either to intervene, to apply domestic monetary measures, to adjust other economic policies, or to explain to the other members why none of these actions would be sufficient or adequate to bring its currency back into line.

Initially, the exchange market had been skeptical about the practicality of a joint floating arrangement, given the persistently wide disparities in the inflation and trade performances of the respective economies. Expectations of a realignment prior to or just after the EMS got under way had generated large movements of funds between member currencies. But, once the monetary authorities of the EC snake countries let it be known that the bilateral central rates then in force between the "snake" currencies would be maintained in the new system, tensions eased and most speculative positions were unwound before the EMS was finally launched.

In this context, interest differentials increasingly dominated exchange rate movements within the EMS as elsewhere. Funds flowed heavily out of the German marks, where interest rates were low, into assets of other currencies where interest rates were much higher. Among the beneficiaries of these flows was the French franc, which settled into the middle of the new band. It was also helped from an improved external position and favorable market reaction to the sustained commitment of the French government to fight inflation and to increase the competitiveness of French industry. The Italian lira also was well bid, moving quickly to its 6 percent upper limit, as higher interest rates, restrictions on domestic credit expansion, and the market's awareness of the sizable foreign exchange reserves the Bank of Italy had amassed over the previous two years encouraged Italian companies to satisfy their financing needs through external borrowings. The lira was buoyed, too, by Italy's current account position, which remained in sizable surplus even after a rebound in economic activity over the

winter and early spring. In addition, the Danish krone, as well as the Irish pound, which remained tied to sterling, moved to the top of the 2¼ percent band as capital inflows were attracted by the exceptionally high interest rates in Denmark and the United Kingdom. In fact, when interest-sensitive funds continued to pour into sterling, the Central Bank of Ireland was forced on March 30 to suspend its currency's long-standing link with sterling in order to keep the Irish pound from bursting through the top of the joint float.

By contrast, the commercial Belgian franc, after having already reached its lower intervention limit against the Danish krone during April, weakened against the mark. In part, this reflected the deterioration in Belgium's current account deficit from an upsurge in imports associated with the expansion in Belgian economic activity. But in addition, with German interest rates rising, the mark moved up to the top of the 2¼ percent band in the second half of May. Once the mark hit its upper intervention limit against the Belgian franc, rumors circulated of a possible realignment within the joint float. As a result, the Netherlands guilder moved down close to the Belgian franc amid signs of a widening in the Netherlands trade deficit. At the same time, the Danish krone dropped to the bottom of the band as earlier capital inflows dried up and were even reversed.

As German interest rates rose higher, pressures within the EMS intensified. However, in this first test of the durability of the new arrangement, the participating central banks provided strong support for their currencies through sales of dollars and marks both at the intervention limits against the mark and within the margins. Moreover, the authorities were quick to raise domestic interest rates to maintain interest differentials against the mark. In mid-June, when the mark started to rise against the dollar, other EMS currencies had difficulty keeping pace. But once the mark's advance was checked, pressures within the joint float were alleviated. As a result, the weaker EMS currencies moved above their lower intervention points, and tensions eased within the EMS during July.

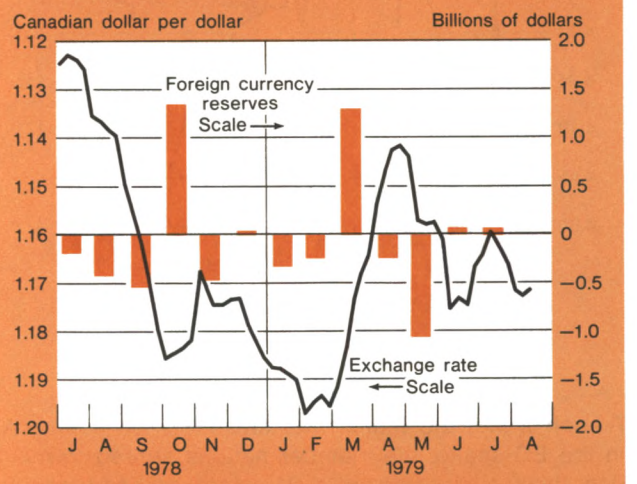
Canadian dollar

By early 1979, Canada's current account remained in substantial deficit despite the sharp depreciation of the Canadian dollar over the previous two years. The growth of export earnings was insufficient to offset rising imports and the increasing burden of Canada's interest payments on external debt. Long-term capital inflows from abroad were not large enough to close the payments gap left by the current account deficit. Moreover, the persistent decline in the Canadian dollar was complicating the task of winding down inflation, since the foreign sector had become a principal source of upward pressure on Canadian prices and costs. Therefore, the Canadian authorities had intensified their efforts to check the decline of the exchange rate. The Bank of Canada had intervened substantially at

Chart 9

Canada

Movements in exchange rate and official foreign currency reserves

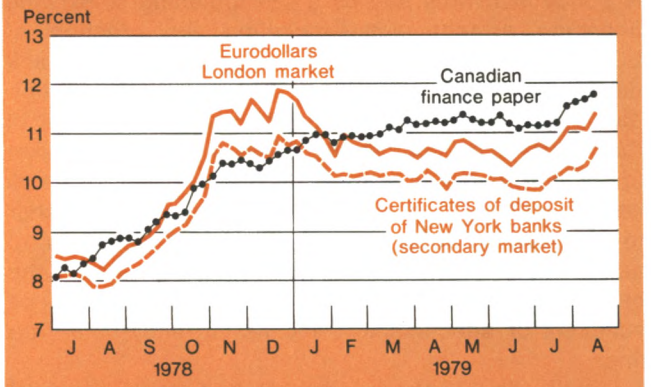


See exchange rate footnote on Chart 3.

Chart 10

Interest Rates in the United States, Canada, and the Eurodollar Market

Three-month maturities*



*Weekly averages of daily rates.

times. It had also increased its discount rate in several stages to 11¼ percent by early January and acted to firm up yields in the bond market, thereby maintaining favorable interest rate differentials *vis-à-vis* the United States. To replenish Canada's reserves and to supplement long-term capital inflows, the government had previously borrowed large sums in the United States and German capital markets and had drawn $2.7 billion under two revolving standby credit facilities with foreign commercial banks. In addition, early this year the government raised about $500 million and $900 million equivalent in the Japanese and Swiss capital markets, respectively.

Exchange market pessimism toward the Canadian dollar was deeply entrenched, however, following the extended slide of the exchange rate, and this mood was reinforced by uncertainties ahead of the national election to be held in 1979. The Canadian currency therefore remained on offer in the early weeks of the year and reached Can.$1.2019, a 46-year low, on February 1. Against the United States dollar, this represented a cumulative decline of 20½ percent since November 1976 and an even greater fall against currencies of many of its other trading partners.

In early February, the Canadian dollar began to rally, partly in response to the worldwide scramble for oil and other commodities. Canada with its rich supplies of natural gas, oil, and other minerals was considered less vulnerable than other industrial countries to energy shortages. Moreover, in March, Canada's role as an energy producer was highlighted when the National Energy Board determined that Canada's natural gas reserves were sufficient to warrant an increase in exports. Once it was clear that the spot exchange rate had bottomed out, the adverse leads and lags and short trading positions that had been built up began to be unwound, and favorable short-term interest rates also helped draw liquid funds into Canadian dollars. The higher yields on government bonds also attracted investment funds from abroad, including substantial amounts from Europe, Japan, and OPEC countries. By late April, the Canadian dollar had been bid up to as high as Can.$1.1401, some 5 percent above early-February lows. During the advance the Bank of Canada bought substantial amounts of United States dollars on days in which the Canadian dollar was in demand, in accordance with the Canadian authorities' approach of intervening to moderate exchange rate movements in either direction.

Meanwhile, Canada's external position had failed to improve. Export growth turned sluggish, and the possibility of a slowdown in the United States worsened prospects for the near term, while imports continued to grow by more than expected. With respect to capital flows, the expansion of the domestic economy was generating sufficient liquidity in the corporate sector to provide for the financing of new investment out of internal sources rather than depending so heavily on foreign borrowing. At the same time, there were prospective outflows in connection with takeovers by Canadian companies of United States-owned operations. Moreover, in assessing the prospects for the Canadian dollar, many market participants viewed the sizable intervention purchases of United States dollars as an indication that the Canadian authorities were resisting an appreciation of the rate to maintain the competitiveness of Canadian exports and to build up reserves.

These uncertainties reinforced existing bearish sentiment in the exchange market, and the Canadian dollar came increasingly on offer. Also, with the approach of the May 22 general election, market participants became concerned over the possibility that a weak minority government might emerge, which many thought would be unable to deal effectively with Canada's economic problems. The spot rate fell back to as low as Can.$1.1626 in mid-May, with the Bank of Canada intervening to moderate the decline.

The election provided a near majority to the Progressive Conservative Party under Joseph Clark and helped clear the air somewhat. But the release of recent trade figures confirmed Canada's disappointing trade performance. Also, the $1.1 billion decline in Canada's foreign exchange reserves during May suggested that there had been more support for the Canadian dollar than the market had realized. The Canadian dollar dropped off to Can.$1.1780, almost 3½ percent below the mid-April high.

As attention again shifted to world energy problems ahead of the late-June OPEC meeting and Tokyo summit, market sentiment toward the Canadian dollar improved somewhat and reports of several large natural gas discoveries in Canada prompted some bidding-up of the Canadian dollar. Therefore the exchange market came into better balance over the rest of June and through July. Following the further advance of interest rates in the United States and in European centers, the Bank of Canada raised its discount rate by ½ percentage point to 11¾ percent on July 23. At the end of July the Canadian dollar was trading at Can.$1.1700, up a net 2½ percent against the United States dollar over the six-month period. After the large reserve swings earlier in the period, there was little change in June and July. At the close of the period Canada's reserves totaled $2.1 billion, down a net $60 million from the level of January 31, after official borrowings of $1.4 billion and repayments of $2.2 billion under the standby facilities with commercial banks.

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