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The 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 RONA B. STEIN (on New York City's economy in 1980, page 1); DANIEL E. CHALL (on the economic costs of subway deterioration, page 8); DEBORAH JAMROZ (on highlights of the recent national income and product account revisions, page 18); DONALD COX (on the decline in personal saving, page 25); DAVID ROBERTS (on the LDC debt burden, page 33); DOROTHY B. CRISTELOW (on financial innovation and monetary indicators in Japan, page 42).

A semiannual report of Treasury and Federal Reserve foreign exchange operations for the period August 1980 through January 1981 begins on page 54.

New York City's Economy in 1980

New York City's economy seemed to function better than the national economy during the recession of 1980. Between January and July, private employment expanded in New York even as it fell in the rest of the country, and the city's unemployment rate did not increase sharply, as it did elsewhere. This represented a major change from the devastating effect on the city's economy of the past two national recessions. In addition to the better employment picture during the 1980 recession, retail sales were strong in the city relative to the rest of the country, tourism thrived, commercial construction activity was brisk, and the local inflation rate was more moderate than nationwide. These factors have been taken by some people as evidence of a broader turnaround in New York City's economic situation.

A closer review of the data for 1980, however, indicates that such an optimistic conclusion about New York City's longer term prospects is unwarranted. In fact, the only job category for which the city's employment record was better than the nation's was construction. Moreover, while the city's unemployment rate was comparatively steady, it remained well above the national average. In addition, the proportion of working-age residents in jobs or actually seeking jobs was still far below the national average because of limited employment opportunities. Also, the pronounced slowing in wage increases relative to the rest of the country that was evident during the fiscal crisis of 1976-78 has not continued. In the last two years, wage costs in the city have accelerated and may now be going up about as fast as in the nation both in manufacturing industries and in other sectors.

Thus, a reading of just the aggregate data conceals great disparities in the city economy, with some notable improvements in selected sectors but no clear turnaround toward economic revival. In large part, the city's economic condition is still fragile.

Disparities in the private economy

For 1980 as a whole, private employment increased at about the same rate in New York City as it did in the rest of the nation—about $\frac{3}{4}$ percent. But all the city's job growth was concentrated in three sectors: finance, services other than financial, and construction. Together, these three sectors account for about half of the city's private employment, compared with less than 40 percent nationwide. Total employment growth in these areas was not robust, just large enough to offset slightly the reductions occurring elsewhere in the city's economy (Table 1).

In absolute terms, the greatest job growth was in the finance, insurance, and real estate sector and in services. Bolstered by higher activity on the stock exchanges and expanded operations of foreign banks in New York, financial sector employment grew by 3.8 percent in 1980, the same rate as in the rest of the country. This marked a significant change from the years prior to 1978 when total employment had been declining annually (Table 2).

Services, the largest local employment sector, grew almost as fast in New York City as it did nationwide. Within this sector are such diverse industries as hotels, business services (for example, advertising, management consulting, and computer and data processing), nonprofit organizations, medical services, and

Table 1

1980 Private Payroll Employment

Level in thousands

Sector	United States		New York City	
	1980 level	Percentage change from 1979	1980 level	Percentage change from 1979
Manufacturing	20,361	-3.4	499	-3.8
Durable	12,215	-4.4	106	-4.6
Nondurable	8,146	-1.7	392	-3.6
Construction	4,469	-0.1	75	5.4
Transportation, communications, and public utilities	5,156	0.3	257	-0.6
Wholesale and retail trade	20,573	1.5	615	-1.0
Finance, insurance, and real estate	5,162	3.8	446	3.8
Services	17,741	3.9	889	3.6
Private*	74,487	0.7	2,782	0.8

* Includes mining not shown elsewhere.

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

Table 2

Private Payroll Employment in New York City

Percentage changes

Sector	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Manufacturing	-7.2	-8.3	-3.8	-3.4	-7.8	-10.8	0.8	-0.5	-1.2	-2.1	-3.8
Durable	-7.3	-10.9	-3.5	-2.2	-6.1	-17.1	0.6	-1.1	-0.9	-2.9	-4.6
Nondurable	-7.2	-7.5	-3.8	-3.8	-8.2	-8.9	0.8	-0.3	-1.3	-2.3	-3.6
Construction	5.7	0.8	-6.7	2.3	-5.3	-21.4	-16.5	-4.2	1.3	7.9	5.4
Transportation, communications, and public utilities ...	-0.2	-7.5	-0.4	-1.4	-3.6	-4.7	-2.2	-2.1	0.5	-0.3	-0.6
Wholesale and retail trade ..	-1.8	-4.3	-1.3	-1.4	-3.0	-4.6	-0.8	-1.4	-0.1	0.1	-0.1
Finance, insurance, and real estate	-1.3	-1.8	-1.0	-2.5	-2.2	-1.2	-0.9	-0.5	0.9	2.8	3.8
Services	0.8	-1.8	1.0	1.2	-0.6	-1.7	-0.2	2.6	4.6	4.9	3.6
Private*	-2.1	-4.4	-1.3	-1.2	-3.4	-5.2	-0.9	-0.3	1.3	1.6	0.8

* Includes mining not shown elsewhere.

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

private education. The two segments that grew the fastest were business services and hotels.

Construction was the one sector in which the city did markedly better than the rest of the country. Whereas construction employment declined 0.1 percent nationwide in 1980, it increased 5.4 percent in the city. Of course, construction jobs still account for a smaller proportion of total employment in New York than in

the rest of the country. The fairly rapid growth of local construction jobs reflects a commercial building and real estate recovery in Manhattan, which has been in progress for a few years. As office space has become scarce, midtown Manhattan rental rates have shot up—more than 60 percent for the year ended 1980. In a recent survey of eighteen major metropolitan areas, the estimated office vacancy rate was down to 3.8 per-

cent in New York City in the autumn of 1980, well below the overall average of 6 percent.¹ This relative scarcity and the rising rents have stimulated new construction. At present, New York City has roughly 9 million square feet of new office space under construction, amounting to about 6 percent of existing space. The only other city with more construction under way is Houston.

Construction employment also has been stimulated by the city's thriving hotel industry. Strong tourist activity has kept local vacancy rates for hotel and motel rooms low, and this has encouraged both new building and renovation. Three new hotels have opened in 1980, and three more are scheduled to open in 1981.

In contrast to the strength in commercial and hotel

construction, residential construction remains weak, just as elsewhere in the nation. In fact, new residential construction declined in each of the five boroughs of New York City during 1980. The lion's share of new building, however, continued to be garnered by Manhattan (Box 1).

In half of New York City's private economy, employment decreased. Trade employment edged down despite a sustained expansion of retail sales, which rose 16.4 percent in New York City during 1980, compared with 6.9 percent nationwide. Job losses were most severe, however, in manufacturing. Employment in New York City's manufacturing sector contracted more than in the rest of the country, and at an even faster rate than in the last three years (Table 2). Just about every one of the large manufacturing industries in the city was harder hit than its national counterpart. In the city's durable goods industries, this sharper decline

¹ The Office Network, Inc., *National Office Market Report* (Fall 1980).

Box 1: Disparity between the Boroughs

The borough of Manhattan overwhelmingly dominates New York City's economic recovery by almost all measures. Nearly 60 percent of the residential building permits issued in 1980 were concentrated in Manhattan although the borough is home to only one fifth of the city's population. Office construction continues to be virtually dormant outside this borough, with only one major office building under way in the other four boroughs. (That one office building is being constructed in Queens.) The bulk of tourist activity, a key factor behind the booming restaurant and record-setting theater attendance, is centered in Manhattan;

so is most of the employment growth. Indeed, between 1977 and 1979, 93 percent of the city's private employment growth was in Manhattan. This same pattern of job growth prevailed in the first half of 1980, the latest data available (table).

In 1979, personal income, on a per-capita basis, ranged from a high of \$13,589 in Manhattan to a low of \$7,179 in the Bronx, despite per-capita income growth which has been slightly faster in the Bronx than any other borough since 1977. Growth of total income, however, continues to be the slowest in the Bronx.

Private Insured Employment in New York City

By borough; in thousands

Employment	New York City	Bronx	Brooklyn	Manhattan	Queens	Staten Island
1977	2,631.8	163.6	369.4	1,691.8	368.5	38.5
1979	2,716.8	160.6	366.2	1,771.2	377.4	41.4
Percentage change	3.2	-1.8	-0.9	4.7	2.4	7.5
1979, 1st half	2,694.3	159.8	364.4	1,754.8	374.7	40.6
1980, 1st half	2,731.3	159.3	364.1	1,791.4	373.2	43.3
Percentage change	1.3	-0.3	-0.8	2.1	-0.4	6.7

Data are for private sector workers covered by unemployment insurance.

Source: New York State Department of Labor.

Box 2: Labor Force Participation in New York City

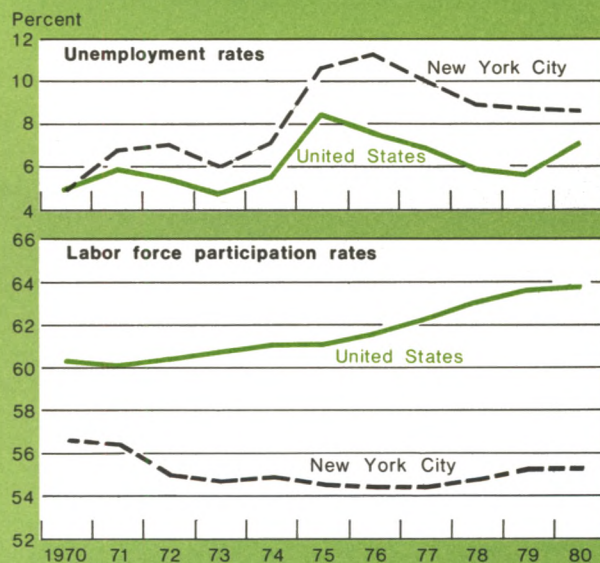
The limited nature of the city's economic revival is mirrored in the labor markets. Although the unemployment rate in 1980 was basically unchanged in New York City while rising sharply in the rest of the country, joblessness continued to be much higher in the city (chart). The stability of the city's jobless rate was largely the result of a reduction of the size of the city's labor force and not because its job market was substantially stronger than the nation's. Indeed, if the city's labor force had grown in 1980 at the same rate as the nation's, all other things being the same, the city's unemployment rate would have risen to 10.9 percent instead of remaining unchanged at 8.6 percent.

Actually, the city's civilian labor force has been declining for several years now. This decline is partly the result of the city's shrinking population. According to the 1980 census, the city's population has fallen by about 10 percent since 1970.

The size of the labor force also depends on what fraction of the population is at work or actively looking for work—the labor force participation rate, as measured by the ratio of the civilian labor force to the civilian noninstitutional population aged 16 years or more. It is not widely appreciated how much lower participation rates are in New York City, compared with the rest of the country. The difference is striking. In 1980, however, in both the city and the nation, labor force participation was virtually unchanged from a year earlier at 55.3 and 63.8 percent, respectively (chart).

Labor force participation in New York City decreased in the first part of the 1970s. In contrast,

Unemployment Rates and Labor Force Participation Rates



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

participation rose steadily in the nation. Since bottoming out in 1977, however, the city's labor force participation rate has edged up, but it is still less than it was in 1970.

No doubt many different factors are contributing to this widening disparity between the labor force participation rates in the city and the nation.

Box 2: Labor Force Participation in New York City (continued)

It is well known from past empirical studies that the availability of jobs is a key determinant of labor force participation among workers who are not the principal breadwinners of their families. In all likelihood, then, the paucity of job opportunities in New York City is primarily responsible for the low labor force participation rate among city residents. In addition, the underground economy may be relatively larger and thus siphon off a greater share of workers in New York City than it does elsewhere, but there are no hard data to substantiate this hypothesis.

The rates of unemployment and labor force participation for a given group of people can be

combined to form the employment-population ratio, defined as the ratio of employment to the civilian noninstitutional population. Whereas the unemployment rate measures what proportion of the labor force is seeking work, the employment-population ratio indicates what proportion of all the people who could work actually do. For both adult men and women, this ratio remained lower in New York City than nationwide in 1979, the latest data available (table). It is among teenagers, however, that the largest discrepancy is observed. The employment-population ratio for teenagers is less than half as large in New York City as it is in the rest of the country.

Employment-Population Ratio*

In percentages

Group	1975	1976	1977	1978	1979
Men, 20 years and over					
New York City	68.1	67.3	67.2	67.9	68.5
United States	72.9	73.2	73.7	74.6	74.7
Women, 20 years and over					
New York City	38.2	37.9	39.2	41.4	41.6
United States	42.3	43.5	44.7	46.5	47.7
Teenagers, 16-19 years					
New York City	23.5	21.9	22.3	23.9	23.1
United States	42.3	43.3	45.2	47.6	47.9

* For New York City, this represents the ratio of employment to *civilian* noninstitutional population. For the nation, this represents the ratio of employment to *total* noninstitutional population. Since there is a very small military population in New York City, the difference is minor.

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

occurred even though New York does not have many jobs in the automotive industry, which suffered the greatest losses nationwide. On top of that, employment in nondurable goods industries, which represents close to 80 percent of local manufacturing jobs, fell more than twice as fast as the national rate. The apparel industry, which employs nearly four out of ten nondurables manufacturing workers in New York City, was especially weak. Employment fell by more than 4 percent. Nationwide, apparel industry jobs decreased by only 1 percent. The printing and publishing industries, which account for one fourth of local nondurables jobs, were relatively strong in comparison with the rest of the city's manufacturing sector, growing by close to 1 percent. But, nationwide, these jobs increased by almost 3 percent.

In addition to the city's decline as a production center, its dominance as an industrial headquarters center continues to diminish. Although its headquarters concentration still far exceeds that of any other city in the country according to the traditional yardstick of headquarters concentration—the number of *Fortune's* 500 industrial companies located in New York—this measure can be misleading. Indeed, the number of these firms in the city rose from 78 in 1979 to 81 in 1980.

This increase, however, did not result from any new firms moving in but from the inclusion in the 1980 list of three firms already located in the city. Moreover, there have been several departures of large companies, which are not counted in this grouping, as well as substantial retrenchments in corporate staffs of other firms. In fact, employment in administrative offices of manufacturing firms in the city fell by 3,500 during 1980 to 50,900.

Other indicators of economic performance also have not looked particularly positive in 1980. Joblessness, for example, has remained high and labor force participation low (Box 2).

Overall, then, the New York City economy is still in a transitional phase, moving out of manufacturing and into service industries—continuing the pattern of job change which has prevailed during most of the postwar period. This greater than national service industry orientation does have some beneficial effects during recessions, or at least it did prior to 1969, and seems to have had some during the 1980 recession.

Competitive forces

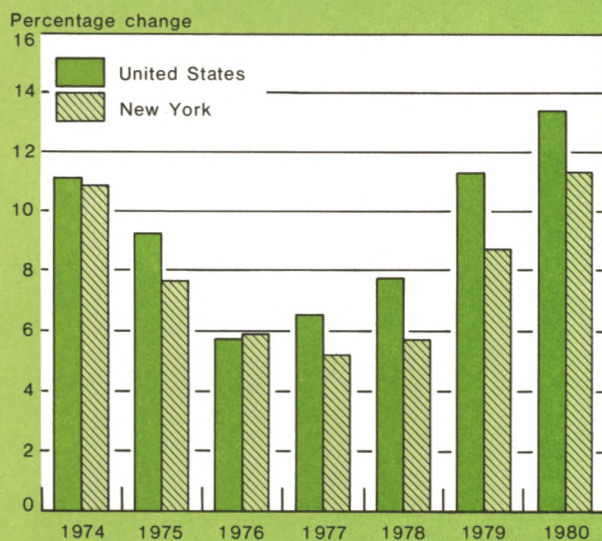
New York City's economic performance in 1980 suggests that certain facets of the local economy are continuing to undermine the city's attractiveness as a business location. At the same time, however, there has been noticeable improvement in certain other facets—enough to support at least limited growth of the city's economy and to preclude a repetition of the massive job losses that occurred in the 1970s.

One area of improvement has been in the easing of local price pressures. In recent years, the consumer price index for the New York-Northeastern New Jersey area has been rising at a slower rate than in the nation or than in many other metropolitan areas (Chart 1). Since 1974, when this crossover in the rates of inflation first occurred, the local consumer price index has increased by 53 percent compared with 67 percent nationwide.² During 1980, the index rose 11.3 percent locally, while rising 13.5 percent nationally. Nevertheless, the cost of living remains comparatively high in New York City, especially when total Federal, state, and local taxes are included in calculating household budget costs (they are not counted in the consumer price index).

A reduction of strike activity in New York City relative to the nation also contributes favorably to the city's business environment. Workdays lost due to strikes in New York City decreased from 6.3 percent of the

Chart 1

The Consumer Price Index for the United States and the New York-Northeastern New Jersey Area



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

² The higher than national inflation rate in 1976 is mainly attributable to the transit fare hike which had been in effect for only a small part of 1975.

nationwide total in the 1960-69 period to 3.9 percent in the decade of the 1970s. In the earlier period, the city accounted for an average of 7 percent of the nation's labor stoppages and about 7 percent of the workers involved. In the 1970-79 period, approximately 3 percent of the nation's work stoppages and 4 percent of the workers involved were in New York City. While a great improvement, this is still above the city's share of the nation's labor force, which declined from about 4.0 percent in 1970, the earliest data available, to 2.8 percent in 1980.

In addition, the city's business environment has benefited from reductions of the state and local tax burden. In the late 1970s, New York City and New York State began to decrease the number of taxes along with the rates at which remaining ones were levied. The expiration of state surcharges on general business corporations and on banks, the phaseout of the state unincorporated business tax, the lowering of the city commercial rent tax, and the 3½-year freeze on the city real estate tax rate at its 1978 level (a decrease from 1977) are important examples. At the same time, various tax-incentive programs aimed at promoting industrial and commercial development were adopted. Moreover, state personal income tax rates have been gradually lowered. These cuts amounted to more than \$1 billion in reduced tax payments for the 1980 calendar year.

It would be wrong, however, to minimize the remaining impediments to a decisive economic turnaround for New York City.

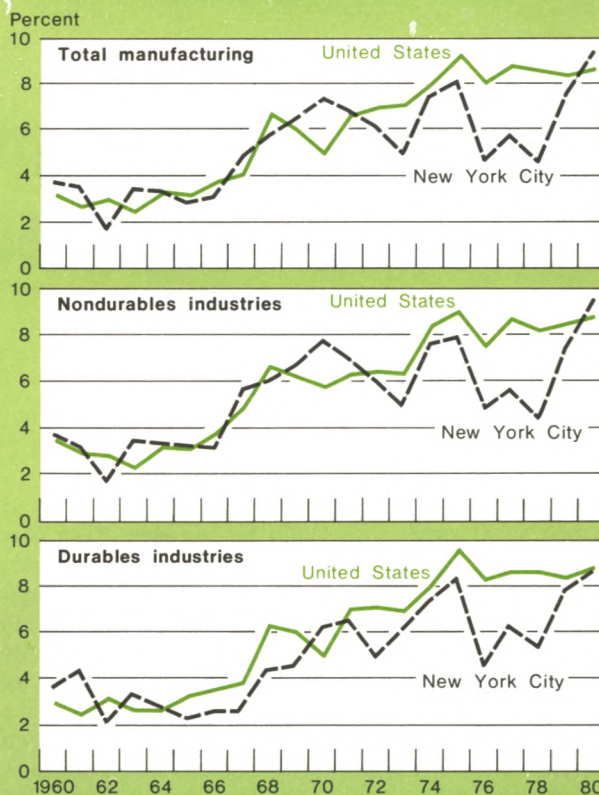
First, one of the most promising developments for the city's economic situation had been the comparatively slow growth of labor costs. Over the last two years, though, average hourly wages have accelerated once more (Chart 2). This raises questions about the potential impact on New York's competitive position, particularly since the level of wages continues to be higher in New York for many of the occupational categories surveyed by the Bureau of Labor Statistics.

Second, the price of energy remained relatively high in New York City. The cost of a typical month's electricity for a single-family house was more than double the national average and more than triple the Pacific Coast average. As for office energy costs, a recent survey found that, in New York City, they were almost double the costs in Houston, Atlanta, or Dallas. In industry, electricity prices were also about double the United States city average in 1980. Between 1975 and 1980, however, industrial energy prices grew faster nationwide than in the city.

Finally, the continued deterioration of New York

Chart 2

Changes in Average Hourly Earnings in Manufacturing



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

City's infrastructure, reflecting years of delayed maintenance and lack of new capital investment, greatly weakens the city's long-term economic potential. This decay increasingly reduces its attractiveness as a place to live and to work and raises concern about where resources will come from to finance remedial investments that are needed with increasing urgency.

In sum, while New York City withstood the 1980 recession reasonably well, it clearly has not fully overcome all its economic problems. The city's longer term growth prospects are clouded by the remaining vestiges of a high-cost environment that has contributed to its economic decline for many years. Complacency based on misplaced optimism would be a serious mistake at this critical point.

Rona B. Stein

The Economic Costs of Subway Deterioration

The quality of service provided by the New York City subway system has declined sharply over the past year. Riders have faced longer travel times, longer and more frequent delays, and more crowding during their daily journeys to work. These and other elements of deteriorating service impose costs that are just as real as increases in taxes or in prices. Over time, firms and their employees will seek to avoid these costs in a variety of ways. If the burden is sufficiently large, people and companies may react by moving out of the city.

This article presents estimates of the size of economic costs caused by increased subway delays. The conclusion is that the aggregate cost imposed on New York residents and firms is huge. The cost of only a five-minute increase in the average length of each ride to work may easily reach \$166 million annually. Moreover, unpredictability of travel time imposes further costs. If, at random, one morning and one evening trip each week are delayed by twenty-five minutes, the time loss is the same as in the first case, but the dollar costs may be twice as large. For the typical subway rider, this may be as burdensome as a doubling of city income tax rates. Thus, time losses need not be extremely large before significant responses can be expected. In sum, even though it will take substantial infusions of capital and operating expenditures to get the system running properly, the costs of postponing improvements may be even more enormous.

Measuring the costs of lost time

The many statistics generated by the New York City Transit Authority allow no straightfor

determining the amount of time subway riders have lost as a result of subway delays (Box 1). Nevertheless, it is possible to appreciate the magnitude of the costs by considering two representative cases. The first assumes that the length of each ride increases by five minutes; this provides a bench mark for measuring the costs of extra time on the subway. The second case assumes that two twenty-five minute delays occur at random each week, one in the morning and one in the afternoon rush hour; this allows the cost of increased uncertainty to be measured, since the time lost each week is the same as for the daily five-minute delay. If more precise information on time actually lost should become available, estimates of the costs to firms and their employees could be adjusted proportionately.

Even though five minutes per trip may not seem like very much, the immensity of the costs becomes apparent when the time losses are aggregated to a city-wide annual total. For the one million city residents who take the subway to work, the aggregate time loss each week is over 800,000 hours, or 41 million hours per year.¹

¹ Average weekday ridership was more than 3.3 million in 1980, and there were roughly 1.8 million trips per weekend, bringing the total number of trips provided by the subway system to nearly a billion for the year. The cost estimates in this article, though, focus on the estimated one million city residents who use the subway to travel to work. This figure comes from the Census report that there were 1.2 million such subway travelers in 1970 and from the estimate by Tri-State Regional Planning Commission and the Regional Plan Association that there was a 15 percent drop in subway travel to the district by 1980.

Box 1: Statistics Generated by the New York City Transit Authority

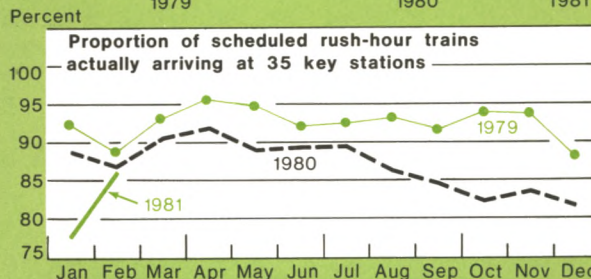
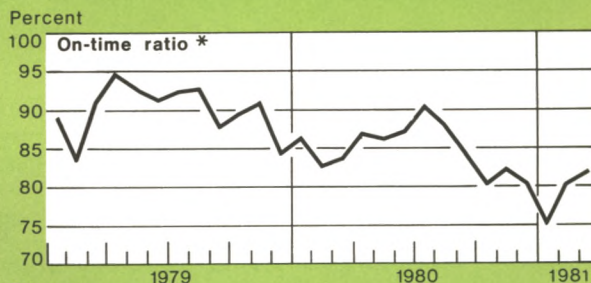
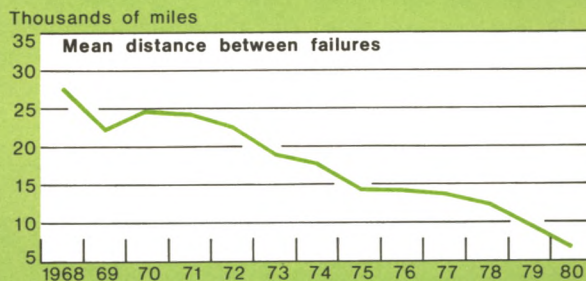
The Transit Authority does not directly measure its success in getting people to work on time. Rather, it monitors adherence to schedules, counts incidents and conditions which disrupt service, and checks the status of the fleet. Disruptions affect travel times in complex ways, and there is no straightforward method of determining the impact on subway riders. However, the system-oriented statistics do document the decline.

For example, failure statistics indicate that the train breakdowns per mile of service were 30 percent higher in 1980 than in the previous year and 75 percent higher than in 1968 (chart). Even if one could estimate with confidence that half of the breakdowns took place during rush hour and that each train carried 1,000 passengers, the resulting estimate of the impact on riders would still ignore the effects on the following trains.

A more direct measure of lateness is given by the on-time ratio (chart). A train is considered on time unless it completes a trip more than four minutes behind schedule. From September 1980 through March 1981 the rush-hour on-time ratio averaged about 80 percent, down from the 88 percent level in mid-1980. This reflects a 70 percent increase in lateness. However, trains canceled at the terminal due to breakdowns or equipment shortages are not included in the fractions, and trains abandoned in mid-trip are considered *on time*. Moreover, trains can run behind schedule within the business district and still be considered on time by making up lost time after most passengers have left the train. Multiplying the number of passengers by the lateness ratio (i.e., 1 minus the on-time ratio) would thus provide only an incomplete count of lateness of unspecified lengths.

Cancellations and abandonments are not counted separately for rush hour by the Transit Authority. However, a related measure, rush-hour key-point performance, may be helpful by recording the difference between scheduled and actual arrivals at thirty-five major transfer points (chart). This statistic reveals that no-shows increased from 12 percent to 18 percent of the rush-hour schedule in recent months. This reflects a substantial increase in travel time for many subway riders. The minimum possible delay caused passengers by an abandonment is equal to the "headway" (the interval between trains, averaging two to five minutes during rush hour). If passengers cannot fit on the next train, the delay is much longer. These complications make it difficult to judge the impact on subway riders, either in number or in length of time.

Finally, no single statistic can capture the effects of local trains which switch to express tracks, or the delays that are magnified as connections are missed,



*Trains either arriving at the terminal within four minutes of schedule or taken out of service in mid-trip as a percentage of train trips actually started.

Source: New York City Transit Authority.

or the trains that are slowed as that last passenger fights the closing doors. The subway trip is a complex process, and many things can go wrong. Since the system-oriented statistics cannot capture the myriad of determinants of subway travel times, a sophisticated estimate of time losses must be as open to question as the naive assumption that the average subway rider faces an extra twenty-five minutes per week in morning travel time. Although the latter course has been taken, the dollar estimates can easily incorporate any new information.

Initial costs of subway delays

The immediate impact of a sudden increase in travel time is that many subway riders are late for work. For a while after the delays materialize, firms and their employees may continue to view the increased crowding and longer travel times as isolated episodes which have plagued the subway system from time to time. As a result, workers may be slow to adjust their times

of departure for work, and the lateness may persist for some time.

The reductions of output which result from this are substantial. Twenty-five minutes of lateness for each of one million subway riders amounts to an aggregate cost of over 400,000 person-hours each week. Multiplying this time loss by the average wage (taken to be \$8.00 per hour) yields an estimate of the value of the

Box 2: Measuring the Value of Lost Personal Time

Although economists have long realized that travel time is an important cost affecting many consumer decisions, no simple rule of thumb has emerged for assigning a dollar value to the personal activities foregone while traveling to work. For many years, economists multiplied the wage rate by the number of hours traveled in order to value the time; however, Lowdon Wingo* showed that this method is inappropriate when workers cannot freely choose the number of hours worked each day. A second complication was introduced by Gary Becker,† who specified a model which allowed the journey to work to be unpleasant *per se*. To determine the burden felt by an increase in subway delays, then, it is necessary to determine (1) the value of the personal and family activities foregone because of travel time and (2) the value of the unpleasantness which must be endured.

A number of economists have tried empirically to ascertain the value people place on travel time by observing the time-money tradeoffs involved with travel-mode or auto-route choices. However, the information gained is to a large extent anecdotal. Automobile trips cannot be compared with subway trips; even

mass transit systems vary greatly from city to city. As a result, the studies do not provide a consensus on the value of time. However, many estimates lay between 25 and 50 percent of the wage. While none of these studies are very recent, and none involve New York subways, they do provide a basis for valuing the time spent traveling by subway.

The estimates presented in this article make the conservative assumption that people value their personal time at 25 percent of the wage, the lower end of the range (table). This applies to the time people spend at their work place before working time. On the other hand, subway travel is unpleasant, and subway riders would be willing to pay a premium to avoid the unpleasantness. For that reason, the time spent on the subway is assumed to impose a cost equal to 50 percent of the wage. The "unpleasantness premium", then, is 25 percent of the wage. It is reasonable to add such a premium, since there are many express-bus riders who willingly pay significantly higher fares in order to buy improved amenities (including a seat).

It would be inappropriate to use the estimates of the value of time presented here for interpersonal comparisons, since the true values may not be constant across income class or by any other demographic stratification. The only assumptions used in this research with respect to income distribution are that the dollar value of time losses are higher for high-income persons and that high-income persons are more likely to respond strongly to an increase in costs.

* Lowdon Wingo, Jr., *Transportation and Urban Land* (Washington: Resources for the Future, Inc., 1961), pages 52-62.

† Gary S. Becker, "A Theory of the Allocation of Time", *Economic Journal* (September 1965), pages 493-517.

Values of Time by Location and Foregone Activity

As a percentage of the wage rate

Location	Foregone activity	Value of foregone activity	Unpleasantness premium	Total cost
Subway	Work	100	25	125
Subway	Personal	25	25	50
Work place	Personal	25	—	25

Annual Direct Costs of Subway Delays

In millions of dollars

Cost	Across-the-board 5-minute delays			25-minute random delays: one morning, one afternoon per week		
	AM	PM	Total	AM	PM	Total
Leave normal time for work; arrive late						
Borne by firms	166	0	166	166	0	166
Borne by employees	42	83	125	42	83	125
Total	208	83	291	208	83	291
Leave early for work; arrive on time						
Borne by firms	0	0	0	0	0	0
Borne by employees	83	83	166	250	83	333
Total	83	83	166	250	83	333

lost output equal to \$3.3 million per week, manifesting an annual rate of \$166 million (table).² Initially, the major portion of these costs may be borne by firms, since strict lateness policies may have been unnecessary before the subway deterioration. These costs are one third as large as the city corporation income tax.³

In addition to these costs, firms may suffer further output reductions which can be particularly burdensome if the delays are of random duration and frequency. Even firms which dock the pay of latecomers bear substantial costs as a result of the increase in subway delays. Valuing lost output at the wage rate does not account for short-run disruptions such as idle machine time or teams that are understaffed. The absence of even a single employee may be costly to firms working on rigid schedules, especially if the disruptions occur at random. For instance, the lateness of a secretary may reduce the productivity of one or more executives. Moreover, an employee arriving late for work after spending extra time in a crowded, motionless subway car is likely to be less productive on the

job. None of these costs borne by firms are included in the estimates reported above, so that docking the wage of latecomers does not insulate firms from the costs of the subway decline. The result is that all firms have incentives to eliminate lateness, even if sanctions stricter than docking are required.

Costs faced by employees

As employees are induced to leave earlier for work, they are forced to forego personal time which otherwise would be spent with their families, doing work around the house, or enjoying leisure activities. Putting a monetary value on this cut in living standards is difficult. Economists have investigated this problem and have come up with rather diverse estimates of the value people place on foregone personal time. However, 25 percent of the hourly wage seems to be consistent with many estimates (Box 2). This means they would be prepared to pay up to that amount to hold on to an hour of personal time. Moreover, since the journey to work is inherently unpleasant, the cost of extra subway time is greater. The premium for this unpleasantness is assumed to be equal to 25 percent of the wage, indicating that subway passengers would be willing to pay that much more to avoid spending more time traveling. Altogether, the costs of extra time on the subway are assumed to be equal to 50 percent of the wage.

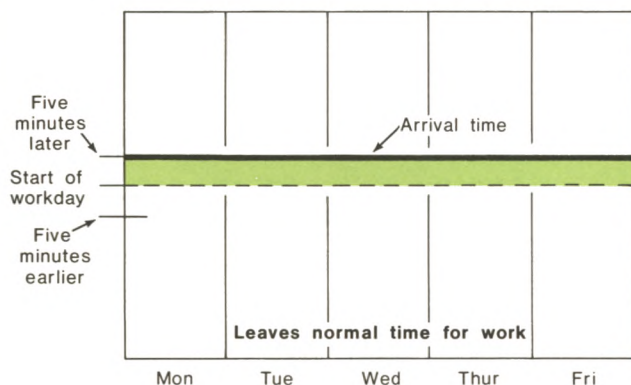
The amount of personal time which workers must give up to avoid lateness depends on the uncertainty of transit performance. If the twenty-five minutes of morning delays were distributed uniformly and predictably each week, any lateness could be avoided by leaving for work five minutes early every day (Figure 1). This

² In 1978, the average payroll per employee (excluding those workers who were self-employed or in the public sector) was \$14,356, according to data in *County Business Patterns*. Dividing by 2,080 hours and inflating by 20 percent to cover the increase in wages between 1978 and 1980 yields \$8.28. In 1970, the average family income of workers who traveled by subway was 96 percent of that of all employees. Assuming that the same relationships held in 1980, the average hourly earnings of subway riders would then have amounted to \$7.95. Alternatively, average weekly earnings for covered employment in 1979 were \$303.17 in New York City. Dividing by forty hours and inflating to 1980 by 10 percent yields \$8.34. The 4 percent subway correction yields \$8.00.

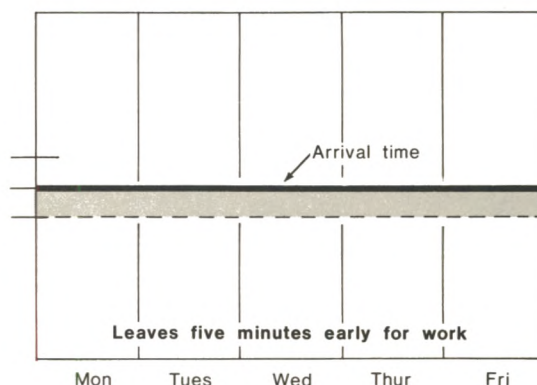
³ The annual city corporation tax revenue is \$502 million, compared with an annualized cost of delays of \$166 million. Of course, not all the burden of subway deterioration is borne by corporations.

Figure 1

Time Losses Caused by a Five-Minute Increase Per Day in Morning Commuting Time



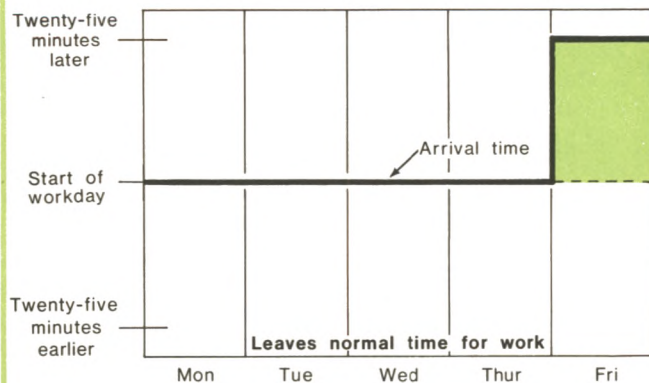
Location	Foregone activity	Time lost	Value
Subway	Work	25 minutes	\$3.33
Subway	Personal	—	—
Work place	Personal	—	—
Total		25 minutes	\$3.33



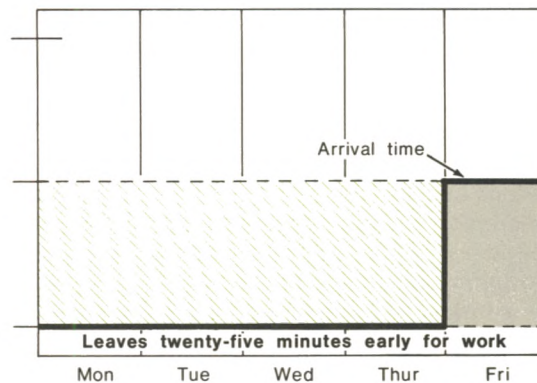
Location	Foregone activity	Time lost	Value
Subway	Work	—	—
Subway	Personal	25 minutes	\$1.67
Work place	Personal	—	—
Total		25 minutes	\$1.67

Figure 2

Time Losses Caused by a Single Random Twenty-Five Minute Increase Per Week in Morning Commuting Time



Location	Foregone activity	Time lost	Value
Subway	Work	25 minutes	\$3.33
Subway	Personal	—	—
Work place	Personal	—	—
Total		25 minutes	\$3.33



Location	Foregone activity	Time lost	Value
Subway	Work	—	—
Subway	Personal	25 minutes	\$1.67
Work place	Personal	100 minutes	\$3.33
Total		125 minutes	\$5.00

loss of twenty-five minutes per week, valued at 50 percent of the average wage, is a cost which is equivalent to \$1.67 per week, or \$83.00 per year. The aggregate cost of the morning delays in the predictable five-minute delay case, then, is \$83 million.

Alternatively, if there were only one random twenty-five-minute morning delay per week, and firms were able to eliminate lateness, then workers would have to leave twenty-five minutes early for work every day (Figure 2). In this case, subway riders lose 125 minutes of their own time each week, of which only twenty-five minutes are spent on the subways. The other 100 minutes are spent at or near the work place on the four days out of five that there is no delay. Valuing the subway time at 50 percent of the wage and the rest at 25 percent of the wage, the total weekly cost to the typical city resident who travels to work by subway is \$5.00 per week, or \$250 per year. The aggregate cost to the one million riders, then, is \$250 million.⁴

These estimates of the costs imposed by morning delays tell only part of the story. In addition, subway riders lose twenty-five minutes each week of personal time in the afternoon due to the delays. This amounts to over twenty hours per year and to over 20 million hours for the entire city. This extra time on the subway is valued at 50 percent of the wage and represents an aggregate cost of \$83 million, bringing the estimate of total costs to \$333 million. This is almost 40 percent of the size of city income tax revenues and is borne only by subway riders, who comprise 40 percent of city employment.⁵

Another aspect of subway deterioration is the increase in the unpleasantness of the journey to work. As more trains lose lights, as crowding increases in cars and on platforms, and as subway service becomes more unreliable, each minute spent on the subway becomes a greater burden than before. This would be reflected in an increase in the "unpleasantness premium" above the currently assumed 25 percent of the wage. This increase applies to the entire trip, not just the extra time and may be a significant addition to the estimates presented above.

⁴ Here the assumptions interact in a critical way. Subway riders must give up five minutes of personal time to save one minute of lateness, but the five minutes are valued at 25 percent of the wage. In this case, leaving earlier actually increases the cost to employees (thereby making necessary sanctions more severe than docking), but this result depends on the specific assumptions. In general, docking is a sufficient incentive for employees to get to work on time if the proportion of trips delayed exceeds the value of personal time expressed as a fraction of the wage.

⁵ The taxable income (and, by implication, the tax rate) of the typical subway rider is lower than that of the average city taxpayer. Further, city taxes are deductible against Federal tax liability, while commuting costs are not. Thus, the subway delays may impose costs substantially greater than a doubling of city tax rates for many riders.

Economic responses

It is clear, then, that travel times need not increase by very much for substantial costs to be imposed. The responses of firms and residents depend on the costs actually being faced, as well as the extent of the delays expected in the future. When subway riders perceive the higher travel costs as permanent or increasing, they inevitably will reevaluate many of the critical choices which affect their standard of living. For example, automobile travel may begin to be more attractive, home locations nearer employment centers may become more desirable, and the benefits of moving to another city may appear more compelling. The extent to which residents make these changes depends on the costs of switching to automobile use or of relocating, compared with the magnitude of the costs of subway delays. If the latter are large enough, it would not be surprising to observe all these responses.

The least expensive change may be to switch to off-peak travel. Although this may not be an option for many people due to rigid family or business schedules, some employees who can alter the length and timing of the workday can cut travel costs considerably. Subway cars and platforms are less crowded off peak, so that in addition to the improved amenities people do not have to let trains pass for lack of space. Further, travel times may be shorter as crowding-related delays are reduced. The lower frequency of service has offsetting effects, since the average waiting time is longer, but trains are less likely to be delayed by trouble further down the line.

The evidence does show some shift to earlier travel. The number of people entering the subways between 7 and 8 a.m. increased by 4.8 percent between March and October 1980, while subway use fell during each of the next two hours by 2.1 percent and 9.5 percent, respectively. This indicates a general tendency to leave earlier.

Another possible short-run response to the increased subway costs is to switch to automobile use. It is expensive to own and operate a car in New York, and it is inconceivable that many people would buy cars for the sole purpose of abandoning the subways. However, if automobile use increases by even a small amount, the congestion costs may be significant. During 1980, when subway use fell by about 2 percent, automobile traffic into Manhattan rose by 3 percent. Since many facilities were already operating at capacity, speeds declined dramatically. For example, the average speed on Fifth Avenue fell by 19 percent in 1980 to 5.8 miles per hour. Further, parking facilities are limited in Manhattan, and it is unlikely that many more parked cars could be accommodated. Even so, if more subway riders switch, higher

congestion and time costs will be imposed on existing drivers and bus riders. This means that many of the more affluent residents, who in the past were able to escape the costs of subway deterioration by paying the higher outlays for automobile travel, will begin to share the burden of the decline.

Long-term responses

It is unlikely that the actions described so far could succeed in avoiding the bulk of the costs imposed by subway delays. Thus, city residents and firms can be expected to take a variety of stronger measures to avoid the increased costs. To some extent, these actions merely shift costs from one group to another. However, firms and residents may leave the area, perhaps leading to a reduction of the size of the city.

The effects of subway decline on the labor market, for example, may be substantial. Workers who have some choice might prefer to work for firms which are located near their homes. Similarly, firms which depend on tight schedules might prefer that their employees live near the work place. Advertisements in the *New York Times* specifying Manhattan residence as a requirement for employment have already begun to appear.

Where job changes are not possible, employees will attempt to restore their standard of living by increasing their wage demands. Since employees with high-level skills are relatively scarce, mobile, and in demand everywhere, they may decide to relocate to other cities if a significantly higher standard of living is available. Thus, firms in New York City must meet these wage demands if they want to keep skilled employees. At the same time, however, low-wage earners may not receive comparable wage hikes, since their lesser mobility lowers their bargaining position. Thus, the net benefits of working are likely to remain lower than before the subway decline.

Firms would not be equally affected by the increased wage demands. As most service-oriented industries and high-technology firms depend on high-skilled labor, it is especially important to retain these employees. Firms must therefore pay wages sufficient to provide the standard of living available elsewhere, the size of the required increase being proportional to the extent of subway delays.

In many industries, therefore, the increase in the cost of labor could put New York firms at a competitive disadvantage with respect to the rest of the country. The result might be that some firms and corporate headquarters would leave the city. Residents who did not receive their wage demands, and those

whose employers moved away, also might relocate to another region. As mentioned, residents with scarce job skills have greater means and opportunities to move than lower income persons, and their departure tends to make the city worse off for those who cannot.⁴ The loss of economic activity and of higher income residents lowers the tax base, bringing about a need for tax increases and/or service cutbacks.

Subway maintenance has been one of the prime candidates for budget cutbacks. Such reductions, however, have not been limited to times of financial difficulty; maintenance has been curtailed in varying extents for many years to limit fare and tax increases. Deferred maintenance is an appealing tactic since there may be no immediate reduction of service.

The analysis presented here has shown, though, that this appealing tactic gives rise to substantial long-run costs. Indeed, the governments of New York State and New York City have adopted a policy of encouraging business activity in the region. If the subway deterioration is allowed to continue, these efforts stand to be seriously undermined.

Summary

This study has shown that:

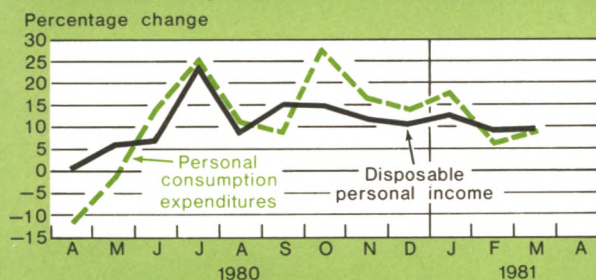
- Subway deterioration can impose huge costs to individuals in the form of lost time and to firms in the form of reduced productivity.
- The cost of only a five-minute increase in the average morning and afternoon ride may easily reach \$166 million per year.
- Unpredictability of service imposes further costs. If delays are randomly distributed but still average five minutes per trip, the costs may be twice as large.
- Firms and their employees face other costs not included in these estimates.
- Individuals and businesses will try to avoid these costs in a variety of ways. If many people and firms relocate outside the region, New York's economic position will suffer.

⁴ A less drastic response would be to move closer to the employment centers. Since high-income persons value time savings more highly than the lower income persons, they will provide the highest bids for housing in and near Manhattan. A result would be an increase in conversion of properties to high-income residential use, displacing many current residents.

Daniel E. Chali

Chart 1

After increasing more rapidly than income, consumption spending has begun to grow at a slower pace . . .



. . . and the savings rate has stopped declining.



Source: United States Department of Commerce, Bureau of Economic Analysis.

Chart 2

Durable Consumption Expenditures as a Percentage of Total Consumption



Source: United States Department of Commerce, Bureau of Economic Analysis.

The business situation

Current developments

The economy displayed considerable vigor in early 1981, with gross national product (GNP) growing by 6½ percent in real terms in the first quarter. Consumer spending remained generally strong, particularly relative to disposable income—as it has been throughout the recovery. Generous rebates on the part of automobile manufacturers helped bolster demand; in fact, car sales plummeted in late March as these programs were phased out. Also contributing to the sharp rise in real GNP was a surge in business investment in the first quarter, breaking out of a sluggish pattern during the second half of 1980. Despite this strong growth of the economy overall, the unemployment rate was little changed over the quarter. In addition, there were mixed signals about the degree of inflationary pressures in the economy.

Historically, the early part of business recoveries has been characterized by strong growth of consumer spending and housing-related outlays, while business investment has tended to remain sluggish in the face of low capacity utilization. As recovery proceeds, investment spending tends to gather strength, while higher interest rates and reduced credit availability slow the momentum of consumer outlays. By and large the current expansion is following this basic pattern, but the transitions from one stage to the next seem to be taking place much faster than normal.

Consumption spending was a major factor in the first quarter's strong growth. After rising very rapidly in the latter part of 1980, consumption maintained its momentum in January, although growth slowed over the next two months. The surge in household spending over the past three quarters has brought the personal savings rate to an abnormally low level (Chart 1).

Among the factors affecting consumer spending may

be expectations of prospective tax cuts. A portion of the recent strength in consumption may be attributable to spending in anticipation of the Administration's proposed cuts. Consumers may have already taken account of them in calculating their longer term (permanent) income. As a result, they may generally have been spending more out of current income than they otherwise would. Moreover, consumers may have increased their demand for the services provided by durable goods in response to the higher permanent income levels, requiring a large initial outlay to acquire those goods. Thus, anticipatory spending could also explain part of the strong rebound in purchases of consumer durables as a percentage of total consumption (Chart 2).

There are other ways of looking at the recent data, however. For one thing, although the anticipation of tax cuts may have been a factor in generating increased consumer spending, the subsequent postponements of the tax reductions may cause consumers to reappraise their estimated permanent income levels. Apart from this, the recovery in durable goods spending from its extremely low level of the second quarter of 1980 could represent no more than a one-time replenishment of depleted stocks. Therefore, the recent fall in the savings rate may be more of a temporary phenomenon, not simply a result of any tax cut expectations. On this reasoning, consumption would decline to more normal levels with respect to current disposable income as savings rates recover.

Questions about the resiliency of consumer expenditures naturally arise in analyzing the impact of the automobile rebate program that began in February. From an annual rate of 6.9 million units in January, sales of domestically produced cars climbed to 7.3 million and 7.7 million in February and March, respectively. The end of the rebate programs in late March brought with it a reversal of this surge, as car sales dropped to 5.7 million units during the first twenty days of April (Chart 3). This mirrored the sharp declines in sales that occurred following similar rebate programs in 1975 and 1980, since many car buyers undoubtedly pushed up their planned purchases to take advantage of the cash inducement. Moreover, the recently announced price increases by major auto manufacturers could exacerbate the expected decline in sales. All in all, uncertainty regarding savings patterns and regarding the overall timing of consumer durable purchases, including cars, clouds the outlook for the expansion of demand over the next few quarters.

Housing, an important sector in its own right and a key determinant of consumer purchases of household durable goods, has decidedly weakened over recent months. From last September to January, housing

Chart 3

Domestic Automobile Sales

Millions of units



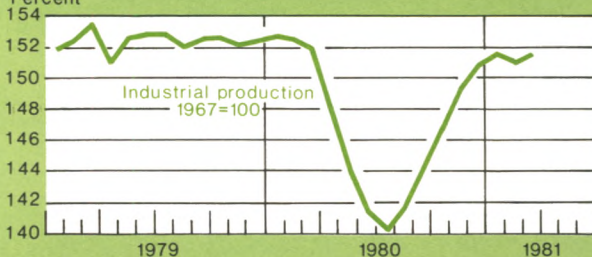
Shaded area represents the rebate program (February to mid-March for most popular models).

Source: Board of Governors of the Federal Reserve System.

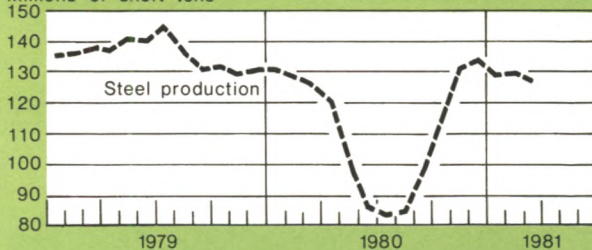
Chart 4

The recovery in production has stalled.

Percent



Millions of short tons



Sources: Board of Governors of the Federal Reserve System and the American Iron and Steel Institute.

starts remained on a plateau in the 1.5 million to 1.7 million units range, as gains in multifamily starts largely offset the declines in the single-family category. In February, however, starts plummeted to 1.2 million, its lowest level since June 1980, as both single-family and multifamily units decreased, and there was only a slight recovery in March.

Many questions arise regarding the housing outlook. First, to what extent will the Administration's plans to reduce Federal housing subsidies decrease starts of rental units. A second issue concerns the response of home buyers to a persistence of high mortgage interest rates. So long as home prices were rising and were expected to continue to do so, home buyers seemed to be prepared to accept steep mortgage rates. But recent declines in home prices may be altering these expectations and making potential home buyers more cautious, even though by themselves these price declines make houses more affordable. Moreover, the increase in rates precludes some families from meeting the higher income requirements for mortgage payments, which may counteract the increased affordability of homes.

Although housing has weakened, real business fixed investment has shown remarkable strength. It rose by 12.5 percent in the first quarter, following an increase of 3.9 percent in the fourth quarter of 1980. The recovery in business investment is occurring more rapidly than is usual so soon after a recession. One factor may be firms' expectations of a tax cut in the form of liberalized depreciation allowances. Also, while capacity utilization is relatively low by historical standards, this measure may not be a good indicator of the need to invest in plant and equipment. Much of the existing stock of capital was acquired during an era of significantly lower energy prices, implying that the available capital stock is energy inefficient. Thus, under the new environment of higher energy prices, there exists a stimulus for spending to replace capital, rather than just for expanding productive capacity.

Moreover, the growth of defense spending is a factor in the strength of capital spending, as firms gear up to expand production of these items. Since increased Government spending for military purposes is widely expected to continue, this impetus for business investment is likely to be sustained.

Reflecting the strength in private-sector demand in the early winter, industrial production continued its upward momentum in January, but then fell back in February, and recovered only to its January level in March. The performance of the steel industry is particularly instructive. After posting very strong gains

earlier in the recovery, steel production flattened out during the first quarter. A major part of this slowdown is attributable to a weak prospective pattern for domestic auto sales in the absence of rebates or other special incentives. While steel demand has been supported by the surge in oil and gas drilling activity, the prospect of slower growth of outlays for housing-related consumer durables may also have exerted a dampening influence (Chart 4).

Notwithstanding the recent strength of output growth, the unemployment rate has hovered around the relatively high 7.3-7.4 percent range since December, as an increase in the labor force largely offset the 1.1 million rise in the number employed. Hours worked in February declined following six successive months of growth and rose only marginally in March.

The economy's recovery in recent quarters has also not brought about a similar resurgence in the demand for petroleum products. In fact, the ratio of petroleum consumption to real GNP has continued its secular decline, mainly as a result of additional conservation induced by the accelerated decontrol of oil prices.

The close to double-digit rates of increase in the consumer and producer price indexes were in large part due to the Administration's decision to decontrol oil prices immediately, as prices of finished energy goods climbed at an annual rate of 73.6 percent in March. The effects of these energy price increases will be felt over the longer term. As they filter through the stages of production, they will be manifested in higher materials costs and eventually in higher prices for final goods and services. Moreover, as already mentioned regarding investment, energy price increases reduce the efficiency of older, energy-intensive capital equipment. This reduces the amount of slack available in the economy, adding to inflationary pressures at any level of output. While the rate of increase in the implicit GNP deflator declined to 7.8 percent in the first quarter from 10.7 percent in last year's final quarter, this partly reflects a switching-away from higher priced items, such as gasoline. An alternative indicator of the economy's inflationary pressures is the fixed-weight deflator, which rose almost 10 percent, about the same as in the fourth quarter of 1980.

On the other hand, there are some indications of an abatement of inflation. Prices of nonfood finished goods excluding energy increased at an annual rate of 8.4 percent in the past half year, after rising 9.6 percent in the previous six months. And unit labor costs increased only 7.5 percent at an annual rate in the first quarter following a 10.1 percent jump in the last quarter of 1980.

Highlights of the recent national income and product account revisions

All the national income and product accounts back to 1968 were revised in late 1980 as part of a comprehensive revision of the accounts—the first such revision since 1976. The revisions are sizable. However, only a few components of gross national product (GNP) and national income are affected significantly.

Overview of the revisions

The revisions show that real GNP grew at a 3.2 percent average annual rate during 1968-79, 0.3 percentage point faster than reported earlier.¹ Only a few components of GNP and national income were adjusted up significantly. Both investment in producers' durable equipment and net exports were raised sharply, particularly in recent years. Because a large part of the upward revision in GNP resulted from changes in international transactions, GNP was raised by more than gross domestic product. For 1968-79, the revised data show that real gross domestic product grew at a 3.1 percent average annual rate, only 0.17 percentage point faster than reported earlier. On the income side of the accounts, corporate profits and personal saving also were raised substantially. Inflation, as measured by the GNP implicit price deflator, averaged 6.2 percent during 1968-79 or 0.2 percentage point lower than had been thought.

Neither the timing nor the length of postwar business cycles was affected by the recent revisions. The new data for the 1970s show that the recessions were somewhat less severe and the expansions somewhat stronger than reported earlier.

The higher level of domestic output in recent years

indicates that worker productivity, or output per hour worked, has been greater than reported earlier. For the entire private business sector, the upward revisions of productivity growth are modest, averaging only 0.2 percentage point annually for 1972-79.² The upward revisions are concentrated in the manufacturing sector.

Business fixed investment

Prior to the latest revision, producers' durable equipment expenditures were calculated using both durables manufacturers' shipments data and the Commerce Department's plant and equipment expenditures survey. In recent years, estimates derived from the survey had been considerably lower than estimates based on shipments data. Because the higher estimates of equipment outlays are more consistent with newly available economic census data, only manufacturers' shipments data are being used in calculating producers' durable equipment spending beginning with 1973 estimates. Largely reflecting this change, real outlays for capital equipment were revised significantly, especially in recent years. In constant-dollar terms, the revisions raised equipment spending by 14 percent (\$14 billion) in 1979.

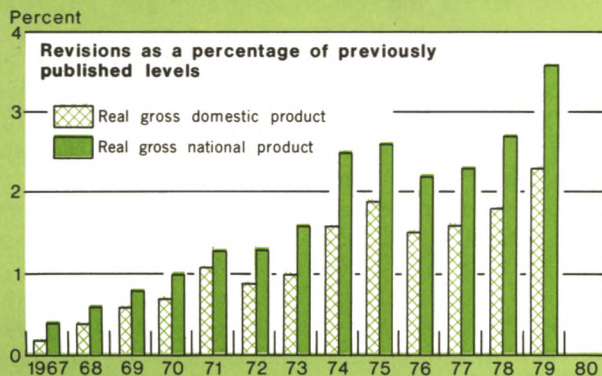
The new data show an even more pronounced shift of business fixed investment toward equipment. Moreover, the revised estimates indicate that outlays for high technology goods, such as computers and communications equipment, were much higher than had been thought, while spending for motor vehicles was lower.

Business outlays for structures also were affected by the revision. Hotel and motel construction, previ-

¹ For a technical discussion of the recent revisions, see "The National Income and Product Accounts of the United States: An Introduction to the Revised Estimates for 1929-80", *Survey of Current Business* (December 1980).

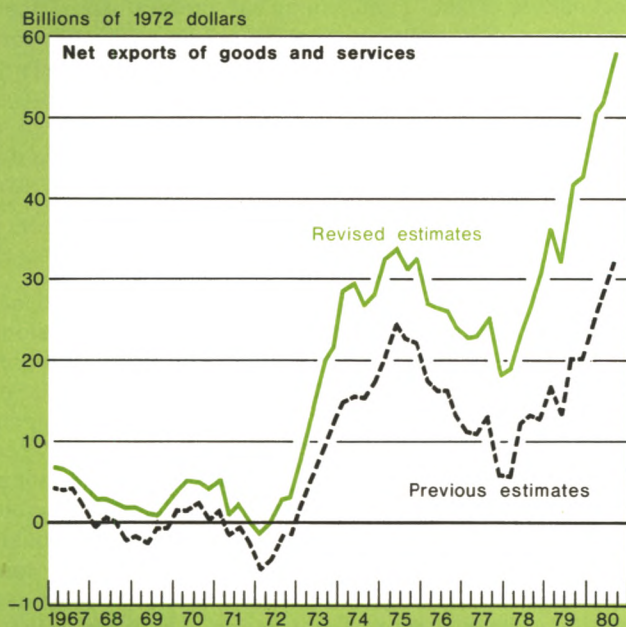
² Revised measures of productivity reflect new seasonal and other adjustment factors in addition to new and revised source data.

The revisions are larger for recent years.



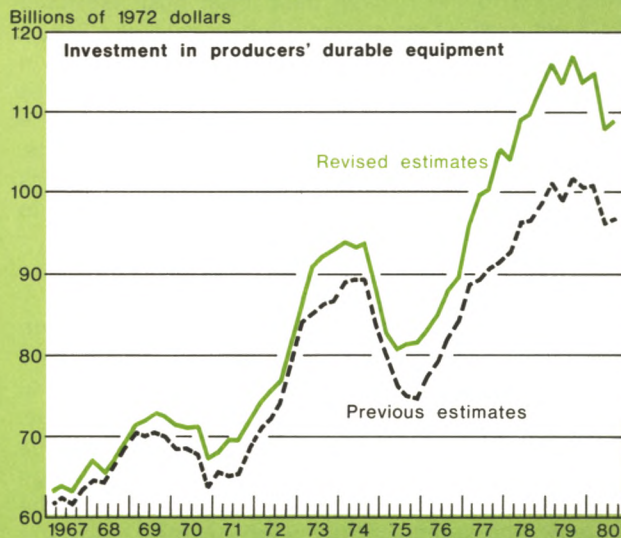
Because there was a large revision of income earned abroad by Americans, the revisions to gross national product (GNP) exceed the revisions to gross domestic product, which measures only production within United States borders.

Net exports were revised significantly.



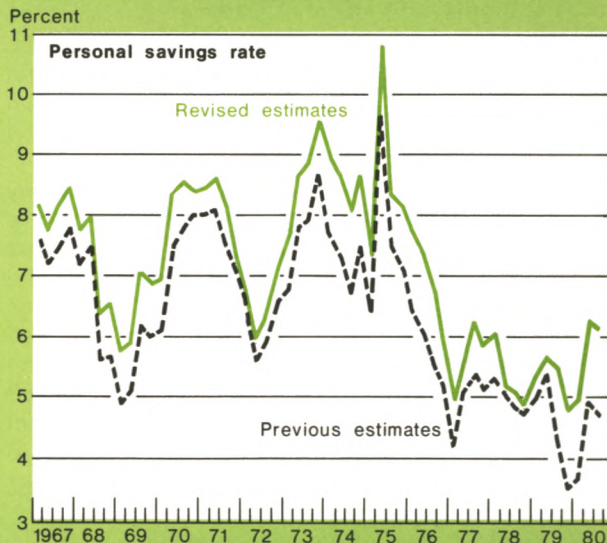
This reflects primarily the inclusion of reinvested earnings and new procedures to adjust for price changes.

Spending for new capital equipment was revised substantially.



As a result, business fixed investment grew faster and amounted to a larger share of GNP than had been reported earlier.

The rate of personal saving has been higher than previously thought.



In part, the higher savings rate reflects a shift in interest receipts from businesses to households, which raised personal income.

Source: United States Department of Commerce, Bureau of Economic Analysis.

ously classified as nonfarm residential structures, now is reported as nonresidential buildings.

According to the revised data, total business fixed investment grew at an average annual rate of 4.8 percent during 1972-79, 0.7 percentage point faster than reported earlier. But the rate of growth of business fixed investment in the 1970s is still less than in the preceding decade. Due to the relatively large revisions, the average share of real GNP devoted to business fixed investment was raised 0.4 percentage point to 10.4 percent for 1972-79.

Net exports

Net exports of goods and services were revised up substantially. For 1979, real net exports were raised about \$20 billion. The major sources of this revision are:

Reinvested earnings of incorporated foreign affiliates. A major conceptual change was made in the accounts by including reinvested earnings of incorporated foreign affiliates of United States and foreign investors. In the past, only repatriated earnings were included in exports and imports of services. These reinvested earnings now are treated as part of gross product originating in the rest of the world. Therefore, this change affected GNP but left gross domestic product unchanged. On the income side of the accounts, these reinvested earnings are included in corporate profits originating in the rest of the world. As such, they are part of total corporate profits and national income. Because the inflow typically has exceeded the outflow of earnings, the addition of reinvested earnings raised net exports and GNP. In 1979, that revision amounted to \$9.4 billion in real terms, or nearly 20 percent of the total revision in real GNP.

Export and import deflators. A modification in the way in which nominal flows of imports and exports are adjusted for price changes also raised constant-dollar GNP. In the past, the inflow of factor income was deflated by an implicit price deflator for imports of goods and selected services, and the outflow by a similar deflator for exports. Current-dollar values of both inflows and outflows now are divided by the implicit price deflator for United States net domestic product to obtain constant-dollar estimates. This change in deflation procedure raised real net exports by \$8.7 billion in 1979.

Other. Revised data for net exports also reflect a new procedure for estimating the value of gold. Previously, changes in inventories of gold held for nonindustrial use were omitted from GNP. Under the new treatment, imports of gold include inventory investment in gold for nonindustrial use. Exports now are set at zero

because historically United States gold production has not been sufficient to satisfy industrial needs.

Net exports and rest-of-world corporate profits also were affected by the exclusion of capital gains and losses of unincorporated foreign affiliates and a new treatment of undistributed profits. In the second quarter of 1980, capital gains and losses of unincorporated foreign affiliates were excluded from the accounts. This change now extends back to 1978. In the accounts, rest-of-world corporate profits now are more comparable with domestic profits, from which capital gains and losses have always been excluded.³

In the previous estimates, earnings of unincorporated foreign affiliates of United States investors—nearly all of which accrue to corporations—less the earnings of United States affiliates of foreign investors had been classified as undistributed rest-of-world profits. These earnings now are treated as dividends. While neither approach is totally accurate, a recent survey suggests that most earnings are repatriated, so that the new approach is more appropriate.

National defense purchases

While revisions to Federal Government purchases generally are relatively small, the reliability of the data and estimates of the composition of outlays have been improved. For example, real defense purchases from 1972 are now available for the first time. Constant-dollar estimates are based on prices paid by the Department of Defense, which were developed from a recent study. According to the newly available data, real defense outlays fell over 11 percent in 1973-76 and then rose about 3.5 percent during 1977-79.

Income and saving

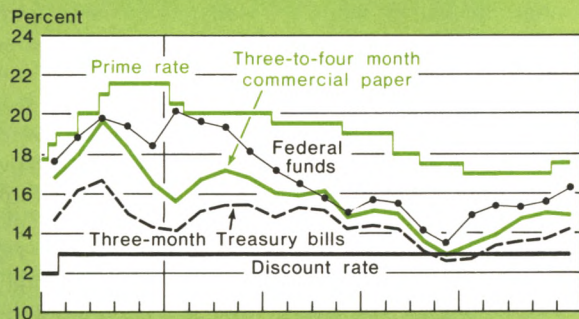
A shift in interest receipts from businesses to households contributed importantly to upward revisions in personal income. Between 1968 and 1979, total personal income was raised \$9.9 billion on average. For the same period, personal tax and nontax payments were little changed and personal outlays were revised up only \$1.8 billion on average. As a result, personal saving, computed as a residual, and the savings rate have been higher in recent years than previously thought. During 1968-79, the personal savings rate averaged 7.1 percent, up from 6.4 percent as published earlier. Movements in the savings rate were largely unaffected by the revisions.

³ Inventory valuation and capital consumption adjustments, which are made to profits earned domestically, are not made to rest-of-world profits because data for these adjustments are not available.

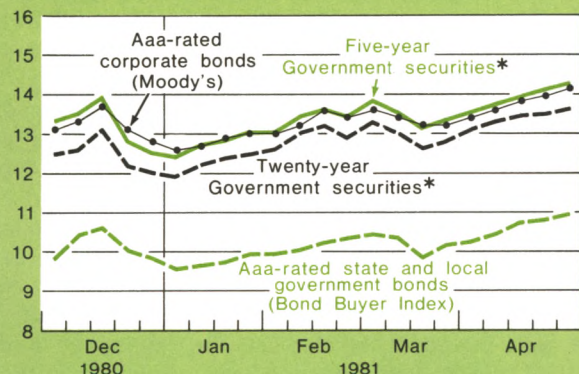
Deborah Jamroz

Chart 1

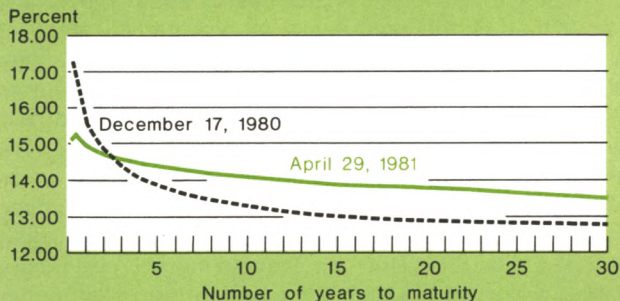
Interest rates showed considerable volatility during the winter and early spring, with short-term rates declining during the first three months of the year, and then rising sharply in April . . .



. . . while long-term rates moved steadily upward . . .



. . . causing a flattening of the yield curve by late April.



*These yields are adjusted to five-year and twenty-year maturities and exclude bonds with special estate tax privileges.

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

The financial markets

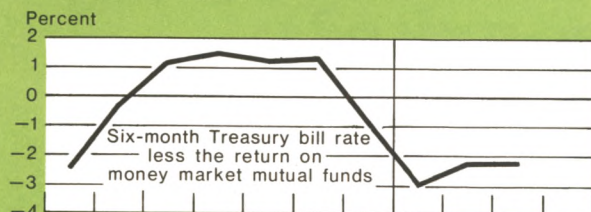
Current developments

The financial markets during the winter and early spring were unsettled by uncertainty over the near-term outlook for the economy and the longer run implications of the new Administration's economic policies. Short-term rates declined from mid-December to late March, reflecting an easing of short-term credit demand as well as market reaction to slower money growth, but then moved sharply upward during April as the market became concerned that monetary policy would tighten. Although short-term rates dropped during the first three months of the year, the market remained nervous about the outlook for inflation, and long-term yields edged back up to their mid-December highs (Chart 1).

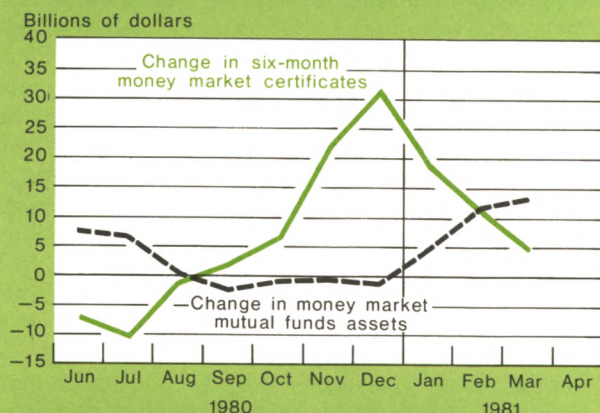
During the first quarter, short-term rates changed direction several times in response to often conflicting signals on the strength of the economy and the growth of the monetary aggregates. In late December and early January, the money market rallied on expectations that an economic slowdown was imminent and short-term rates fell sharply. However, as subsequent reports on the economy showed surprising strength in business activity and continuing inflationary pressures, rates began to edge up again in mid-January. The Treasury's heavy financing schedule and the Administration's proposal for large tax cuts also weighed on market sentiment. Then, in March, the economic statistics began to point to a slowdown in economic activity and rates declined once again. Also, despite the problems of interpretation resulting from the nationwide introduction of negotiable order of withdrawal (NOW) accounts on December 31, it appeared that the growth of the narrow monetary aggregates was below the Federal Open Market Committee's (FOMC) annual targets. This contributed to market sentiment that short-term rates would fall further. But, in early April, short-term rates increased sharply

Chart 2

As short-term rates fell, the spread between the money market rates and the return on money market funds became negative after November . . .



. . . leading to a sharp increase in the assets of money market mutual funds and a slowing in the growth of six-month certificates.



Sources: Federal Reserve Bank of New York, Board of Governors of the Federal Reserve System, and Donoghue's *Money Fund Report* of Holliston, Massachusetts.

as the market reacted to news that, even though the Federal funds rate had fallen below 15 percent, the Federal Reserve had not lowered its broad range for the Federal funds rate at the February FOMC telephone conference. Rather, in the February directive, the FOMC instructed the Manager for Domestic Operations to notify the Chairman if, over a period of time, fluctuations in the Federal funds rate within a range of 15 to 20 percent were likely to be inconsistent with the monetary and related reserve paths. Late in April, further impetus was added to the increase in short-term rates as the market became concerned that monetary policy would tighten in response to the more rapid growth of the money stock.

The decline in short-term rates during most of the

first quarter occurred during a period of moderating short-term business credit demand. After increasing at an annual rate of 21.5 percent between September and December, business loans plus short-term commercial paper slowed to a 12.2 percent gain during the first three months of 1981. Moreover, with the prime rate lagging the decline in short-term rates, the growth of business borrowing slowed dramatically between December and March, while the issuance of new commercial paper increased. Corporations also turned abroad for a larger share of their credit needs in the first quarter, as the prime rate also lagged the decline in the London interbank offer rate. Between December and March, borrowing by American businesses from the overseas branches of United States banks rose by \$2.8 billion, compared with a decline of nearly \$1.0 billion during the last three months of 1980. By late April, however, even though business loan demand remained moderate, banks increased their prime lending rates for the first time since December in response to tighter money market conditions.

The easing in the money market during much of the first quarter reduced a little the pressures on the earnings of thrift institutions. As short-term rates fell in the first quarter, the additional cost of rolling over maturing six-month money market certificates eased. In December, as six-month certificates matured and were rolled over, banks and thrift institutions paid 7.6 percentage points more for the funds than they had paid six months earlier, but by March this additional rollover cost had eased to 2.5 percentage points. At the same time, however, declining short-term rates made it more difficult for the thrift institutions to attract additional deposits because as rates fell the returns on money market mutual funds declined less rapidly than yields on money market certificates. (Calculations of returns on money market funds are based on average yields of portfolios with average maturities of about thirty days rather than on the most recent money market rates.) As a result, the flow of funds into money market certificates at thrift institutions and commercial banks slowed dramatically from \$30.4 billion in December to \$4.9 billion in March, while the movement of funds into money market funds accelerated to \$13.2 billion by March as compared with a small outflow in December. In contrast, when short-term rates were rising rapidly last autumn, the yields on money market certificates were considerably above the average return on money market funds, and a growing volume of funds flowed into money market certificates between September and December, while assets of the money market funds declined by \$2.4 billion (Chart 2).

While short-term borrowers were able to obtain new funds at generally lower costs as the first quarter pro-

gressed, long-term borrowers had to pay substantially higher rates. After a brief rally in late December, long-term yields approached their mid-December highs in mid-February and again in early March, as market participants remained skeptical that the Administration's economic program would lower inflation. Subsequently, the market atmosphere improved for a brief period, and long-term rates declined sharply; but late in March the market reversed itself once again and by late April yields on Aaa-rated corporate bonds had reached a peak of 14.14 percent, up sharply from the early-January low of 12.63 percent.

The cautious attitude of investors about the outlook for inflation made it difficult at times to bring new long-term bonds to market and prompted some borrowers to find new ways to raise needed funds. When long-term yields rose rapidly during the last half of 1980, many corporations became reluctant to incur such high long-term borrowing costs. They postponed new bond offerings and increased their short-term borrowings instead. But with rallies in the bond market in the late December-early January period and again in early March, corporations were able to bring \$10.5 billion of new bonds to the market during the first quarter, compared with \$7.9 billion in the last quarter of 1980. Corporations however, remained sensitive to long-term rate movements. During the first quarter, they postponed new offerings when rates rose sharply and seemed to rush new issues to market when yields fell. Furthermore, as a result of investor reluctance to purchase long-term debt in the inflationary environment, corporations sought to reduce the risk and increase the marketabil-

ity of new offerings by shortening the maturity and offering special features, such as deep discount bonds and put options.

The unsettled conditions in the bond market resulting from the uncertainty about the prospects for inflation occurred even as the narrow monetary aggregates weakened considerably during the first three months of the year. Interpretation of short-run movements in the narrow monetary aggregates, however, was even more troublesome than usual because of the nationwide introduction of NOW accounts on December 31. Since other checkable deposits such as NOW accounts are included in M-1B but not in M-1A, any shift out of demand deposits into NOW accounts reduces M-1A but leaves M-1B unaffected. At the same time, any movement of funds from sources other than demand deposits into NOW accounts increases M-1B. NOW accounts increased by \$24.8 billion during the first quarter, and surveys of commercial banks and thrift institutions indicate that roughly 75 percent of the inflows into these accounts have come from demand deposits and 25 percent from other sources, primarily savings accounts (Chart 3). This means that the growth of M-1A is understated and M-1B overstated relative to what would have occurred in the absence of NOW accounts. Since the initial shift of funds into NOW accounts has been very large, the first-quarter impact on M-1A and M-1B was substantial. Thus, the reported statistics show that M-1A and M-1B changed at widely different rates during the first quarter as a result of the growth of NOW accounts. On an "adjusted" basis, however, the level of M-1B appears

1980 and 1981 Ranges for the Monetary Aggregates

Seasonally adjusted annual rates, in percent

Aggregates	Fourth quarter to fourth quarter			Over preceding quarter
	1980 annual target ranges	1980 actual growth rates	1981 annual target ranges	First quarter 1981
M-1A	3.5-6.0	5.0 (6.3)*	3.0-5.5†	—
M-1B	4.0-6.5	7.3 (6.7)*	3.5-6.0†	1.1†
M-2	6.0-9.0	9.8	6.0-9.0	8.4
M-3	6.5-9.5	9.9	6.5-9.5	11.9
Bank credit	6.0-9.0	7.9	6.0-9.0	12.7

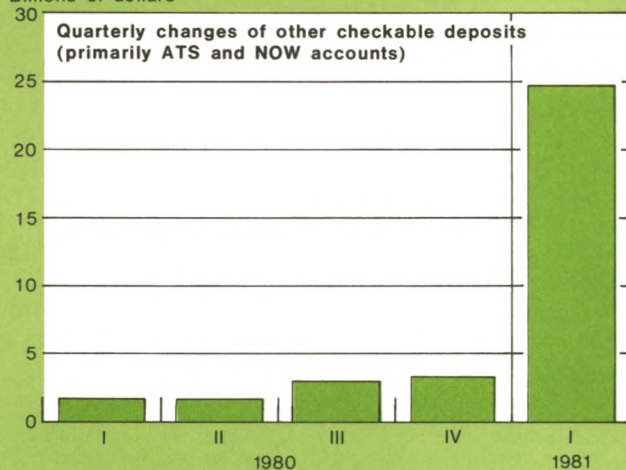
* Adjusted for the more rapid than expected growth of automatic transfer service (ATS) accounts in 1980. The adjusted growth rates are based on the assumption that two thirds of the more rapid than expected growth of ATS accounts during 1980 resulted from shifts of funds out of demand deposits and one third from shifts out of savings accounts.

† After adjusting for the effects of nationwide NOW accounts. See Chart 3 for details on how "adjusted" figures for the first quarter 1981 were calculated.

Chart 3

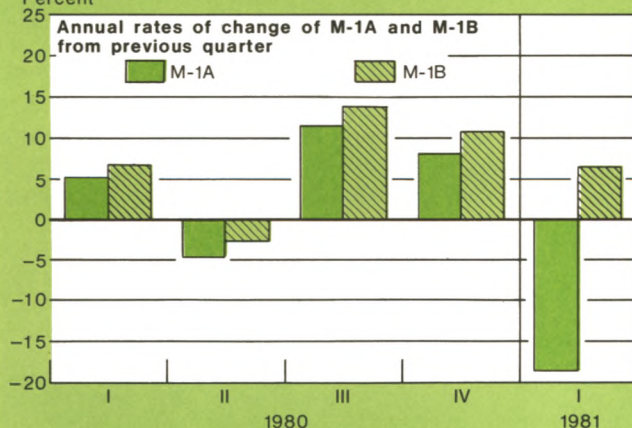
As a result of the introduction of nationwide NOW accounts on December 31, 1980 . . .

Billions of dollars



. . . M-1A and M-1B changed at widely different rates during the first quarter of 1981 . . .

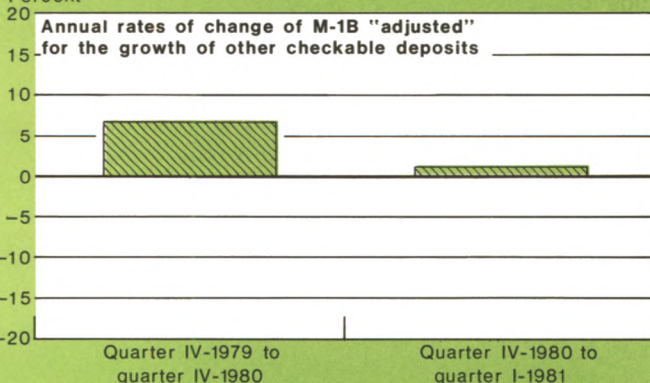
Percent



Interpreting the growth of the narrow monetary aggregates during the first quarter relative to the FOMC's annual ranges is complicated by the rapid growth of NOW accounts. While it is difficult to make precise adjustments for the effects of NOW accounts, the Board of Governors of the Federal Reserve System has now released an estimate of M-1B growth for the first quarter of 1981 adjusted for the effects of NOW accounts. Surveys and other information suggest that about 22.5 percent of the increase in NOW accounts in January and 27.5 percent in February and March (after allowing for growth of NOW accounts in existence before December 31, 1980) came from sources other than demand deposits, primarily savings deposits, thereby raising the M-1B growth rates relative to what they would have been if nationwide NOWs had not been permitted. Hence, to arrive at an adjusted M-1B series, the above percentages were applied to the change in other checkable deposits in excess of trend. The resulting cumulative amounts were seasonally adjusted using the seasonal factor for commercial bank savings deposits and subtracted from the level of M-1B.

. . . but on an "adjusted" basis M-1B appears to have increased slightly in the first quarter.

Percent



to be largely unchanged from the last quarter of 1980. The broad monetary aggregates, which were not affected by the movements of funds into NOW accounts, showed stronger growth.

In February, the Federal Reserve presented its semiannual report to the Congress pursuant to the Humphrey-Hawkins Act and announced the 1981 targets for the monetary aggregates (table). The 1981 targets for M-1A and M-1B are $\frac{1}{2}$ percentage point less than those in effect for 1980, whereas the ranges for the broader aggregates are the same as those set

for 1980, but with upper limits below the 1980 actual growth rates. (On a quarterly average basis, M-1B on an "adjusted" basis appears to have been well below the lower bound of its range during the first quarter, while M-2 growth was within its annual range and M-3 about 2 percentage points above its upper limit.) In the report to the Congress, Chairman Volcker stressed once again the Federal Reserve's commitment to the goal of reducing long-term inflationary pressures through a policy of gradually slowing the growth of money.

The Decline in Personal Saving

The low rate of personal saving in the United States has received much attention in recent years. Though the savings data have been revised upward, current levels of the personal savings ratio in recent years are disappointing relative to past performance.¹ The personal savings rate fell sharply after the 1973-75 recession and has remained far below its postwar average. In fact, the United States savings rate ranks among the lowest of all industrialized countries (Chart 1). The savings decline has prompted a variety of explanations and has raised a number of questions. Has the rapid influx of younger and possibly less thrifty workers into the labor force caused a reduction of national saving? Might a growing underground economy distort the savings statistics? Though a full accounting of the savings slump is difficult to construct, one development—the rapid inflation of recent years—appears to be a primary cause. Faced with a rapidly rising price level, households have apparently been discouraged from accumulating financial assets.

The weakness in personal saving implies that less funds are available for business investment and accordingly most discussions focus solely on this narrow measure of the financing available for total capital formation. Household saving takes other forms, however, such as expenditures on education and investments in consumer durables. Moreover, households are not the only source of saving for the economy. The corporate sector, for example, saves in the form of retained earnings and allocates funds for research and development.

More inclusive measures of saving, while not available on a year-to-year basis, help keep the role of households' accumulation of financial assets in perspective. In the area of education, for example, the United States appears to outperform most of its major trading partners. On the other hand, some sources of economic growth, such as research and development, have tended to weaken during the 1970s. The current financial savings slump, therefore, is not the only dimension of the United States savings problem.

Sources of saving in the United States

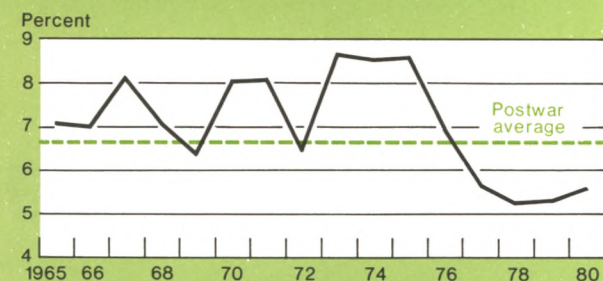
Personal saving is calculated by deducting consumer outlays from aftertax income. In 1980, households saved 5.6 percent of their aftertax income, generating saving of over \$100 billion. Most of this saving took two forms—net financial investment and net purchases of housing. Financial investment includes additions to personal cash holdings, demand and time deposits, stocks and bonds, and saving in pension funds. Net financial investment is calculated by subtracting increases in household liabilities—such as home mortgages and consumer credit—from financial investment. Net housing investment includes purchases of new homes and improvements on existing homes minus the value of wear and tear on existing homes. Housing investments are counted as saving because a house yields a stream of services over a long period of time.

Housing, of course, is not the only long-lasting good purchased by households. Many other products such as autos, appliances, and furniture last for several years. In fact, purchases of consumer durables are treated as saving in the flow-of-funds accounts con-

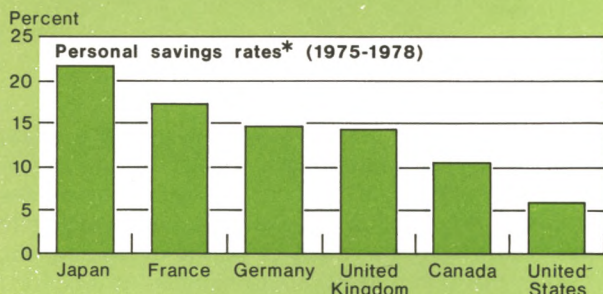
¹ See Deborah Jamroz, "Highlights of the Recent National Income and Product Account Revisions", this *Quarterly Review*, pages 18-20.

Chart 1

The United States personal savings rate has fallen dramatically in recent years . . .



. . . and ranks among the lowest of all industrial countries.



*Due to discrepancies in data collection, international savings rates are not exactly comparable.

Sources: United States Department of Commerce, *Survey of Current Business*; International Trade Administration.

structured by the Board of Governors of the Federal Reserve System. In 1980, net purchases of consumer durables—expenditures less estimated wear and tear—totaled \$33.8 billion, about 1.9 percent of aftertax income. If we add these purchases to the national income estimate of personal saving, the fraction of after-tax income that Americans saved in 1980 rises from 5.6 percent to 7.5 percent.

Net purchases of consumer durables and net investments in housing became important components of total household saving early in the 1976 recovery (Chart 2; table).² The net accumulation of consumer durables increased from 1976 to 1978, and net housing investment rose during the same period. Meanwhile, financial saving fell sharply from 1975 to 1978. Despite

² For a detailed analysis of the composition of household saving and consumer balance sheets, see Carol Corrado and Charles Steindel, "Perspectives on Personal Saving", *Federal Reserve Bulletin* (August 1980), pages 613-25.

the weakening demand for consumer durables and housing which culminated in their sharp decline in the spring of 1980, the acquisition of these tangible assets has become a primary method of household saving in recent years (Chart 2).

In addition to households, businesses also save (Chart 3). Firms in the United States have a strong incentive to retain aftertax earnings rather than pay dividends. Dividends paid to stockholders are taxed as ordinary income, whereas retained earnings are taxed only if they lead to realized capital gains.³ Earnings not paid out as dividends can be used to finance the investment projects of a firm. Last year, corporations saved some \$59 billion, or about half of their aftertax operating profits.

The public sector can add to or decrease national saving as well. The government saves in the following way. If tax receipts exceed total expenditures, the public sector generates a surplus. In a sense, the government generates involuntary saving through this surplus. On the other hand, if government tax receipts do not cover expenditures, the government is a borrower, or net dissaver, causing total national saving to decline. Due to the large deficits of the Federal Government, the public sector has been a net borrower in recent years, although in 1979 the \$27 billion surplus of state and local governments offset the Federal Government's deficit of \$15 billion.

The acquisition of "knowledge capital"

Many important dimensions of savings behavior tend to be overlooked in the official statistics.⁴ In 1978, for example, almost \$150 billion was spent on education. Schooling is a primary means of raising an individual's earning potential. The costs of acquiring knowledge and skills can be viewed as saving and investment,

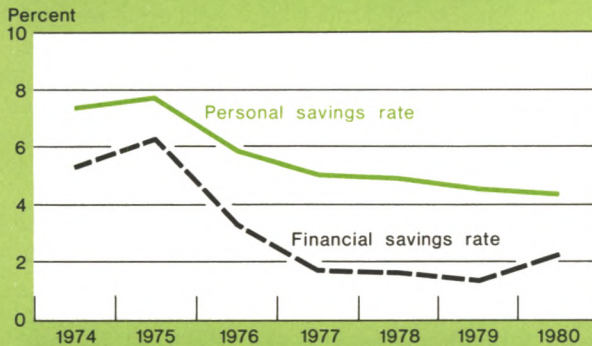
³ Retained earnings lead to capital gains because corporate saving causes the value of the business to appreciate. Even when capital gains occur, they are not taxed until the assets are sold. Accrued gains, or "paper profits", are not taxed. The shareholders' expected gain, therefore, is taxed at a much lower rate than ordinary income. Business saving is probably a good substitute for personal saving. Feldstein calculated that, if firms took a dollar of retained earnings (corporate saving) and added it to dividends, total private saving (in both the household and corporate sectors) would decline by only about 25 cents. The reason for the smaller net decline is that the one dollar switch from retained earnings to dividend payments is likely to prompt an increase in personal saving of 75 cents. Households appear to anticipate the lower capital gains associated with the reduction of retained earnings, so that they save more to achieve their targeted stock of wealth. In other words, individuals see through the "corporate veil" and adjust their personal saving. See Martin Feldstein, "Tax Incentives, Corporate Saving, and Capital Accumulation in the United States", *Journal of Public Economics* (April 1973), page 170.

⁴ For a full exposition of intangible types of saving, see John Kendrick, *The Formation and Stocks of Total Capital* (New York: National Bureau of Economic Research, 1976), especially chapters 1 and 2.

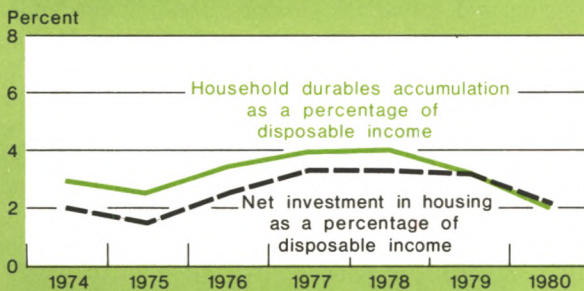
Chart 2

Household Saving as a Fraction of Disposable Income

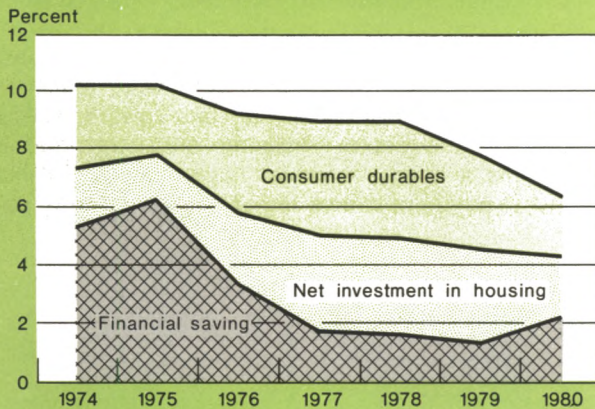
The recent falloff in the personal savings rate stemmed largely from a decline in financial saving . . .



. . . while the rate of saving in the forms of net investment in housing and durables has held fairly steady . . .



. . . so that the contribution of financial saving to the total saving of households has been sharply diminished.



Sources: United States Department of Commerce; Board of Governors of the Federal Reserve System.

even though they are considered consumption expenses in the national income accounts. An individual's tuition expenses, for example, are like saving because they entail the current sacrifice of other goods and services in exchange for greater future earnings. Moreover, tuition expenses represent only a fraction of the cost of education. Students have fewer opportunities to earn income while they are in school, and these foregone earnings are a hidden cost of education. Further, individuals who are being trained on the job often receive a lower wage than they might earn elsewhere. This wage deduction is an indirect payment for the benefits of training and should be regarded as a form of saving.

Firms, as well as individuals, invest in knowledge capital. This saving takes the form of research and development expenditures. These expenditures do not appear in measures of national output, because they are treated as an input in the production of goods and services rather than as a final product. Still, these expenditures conform to the basic concept of saving. Current expenditures for the advancement of scientific knowledge yield new and better products and processes later on. Outlays for research and development are fairly large; \$61 billion was spent on them in 1980.

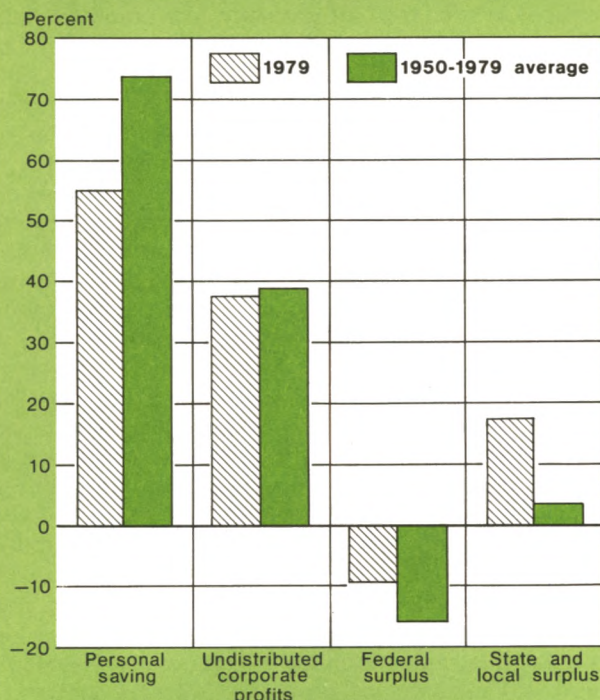
Still another type of saving which is not included in official estimates is moving expenses. In seeking to improve their earnings prospects, workers are continually moving from one location or job to another. Costs are incurred in the present (e.g., transportation expenses, foregone earnings) to obtain a job which is expected to be better suited to the individual's skills. This type of behavior is characteristic of a vibrant and dynamic society, yet it is ignored in conventional measures of saving.

Not only are Americans highly mobile, they are health conscious as well. Medical expenditures totaled \$131 billion in 1978. A large part of these expenditures was probably undertaken in the spirit of investment spending. Preventive health care expenses are like saving in that they result in higher productivity and therefore a higher standard of living in the years to come.

Two striking conclusions arise from adding these types of saving to total national saving. First, the aspects of saving that are not commonly measured in conventional accounting procedures are a critical part of total capital formation. Resources saved in the form of education and training expenditures, for example, represent about half of this expanded measure of total net saving (Chart 4). Secondly, these hard-to-measure aspects of saving have grown significantly as a fraction of total capital formation. In 1948, education and training accounted for less than a third of total net saving, compared with 52 percent in 1969. Research

Chart 3

Sources of National Saving as a Percentage of Net National Saving



Source: United States Department of Commerce, Bureau of Economic Analysis.

and development expenditures are estimated to have grown from 2.5 percent of total net saving in 1948 to 6.8 percent in 1969.

A measure of the resources devoted to the acquisition of knowledge is not available for more recent years. There is some evidence, however, that, while investment in knowledge capital has continued to grow in the past decade, its rate of advance has slowed. Beginning in the late 1960s, the proportion of research and development spending to gross national product (GNP) leveled off and then fell. The rapid expansion of college enrollments and educational expenditures that occurred in the 1960s did not continue into the 1970s, and the fraction of high school graduates going on to higher education declined. The push for research in the sciences, which had been precipitated by Sputnik, also began to slow down. Despite the apparent deceleration in the growth of knowledge capital, these intangible types of saving remain an integral part of total saving.

In addition, the growth of educational attainment of

the labor force in the United States appears to be proceeding at a faster pace than that of most other industrialized nations. The average annual rate of increase in the quality of the United States labor force from 1960 to 1973 was 0.8 percent, compared with 0.6 percent for Japan and 0.1 percent for Germany.⁵

The savings slowdown

Though the United States has registered respectable gains in the skills and training of its labor force, its financial saving has lagged behind that of most other industrialized nations. Further, the recent declines in household saving have been sharp. Personal saving began to slide in 1976, when the savings rate fell from its 1975 average of 8.6 percent to 6.9 percent.⁶ The savings rate continued to drop until 1978, falling to 5.2 percent—significantly lower than the postwar average of 6.6 percent.

The decline in personal saving can be traced to a steep drop-off in the financial saving of households. In 1975 the financial savings rate alone stood at 6.6 percent, but by 1978 this rate had dwindled to 1.4 percent (table). In contrast, saving in the forms of housing and consumer durables actually strengthened during the early stages of the last recovery. Moreover, increases in public saving offset part of the decline in household financial saving (Chart 3). The public sector, for example, went from a slight deficit in 1978 to a surplus in 1979. Except for the buildup of precautionary saving that occurred during the 1980 recession, household financial saving was weak during the past few years. What are the sources of the slowdown in this component of household saving?

Saving and inflation

Inflationary pressures have intensified since the 1973-75 recession. The rate of increase in the consumer price index accelerated from about 5 percent in 1976 to 14 percent in the first half of 1980. Rapid increases in the price level have apparently caused families to turn away from financial saving and toward the purchases of real assets—housing and other durable goods—as a hedge against inflation. Unlike financial assets, this type of wealth is not eroded by rapid price

⁵ The average annual percentage increases in labor force quality for some other industrialized nations are the following: United Kingdom, 0.6 percent, France, 0.5 percent, and Canada, 0.5 percent. These data are taken from Laurits R. Christensen, Diane Cummings, and Dale Jorgenson, "Economic Growth 1947-73: An International Comparison", *New Developments in Productivity Measurement and Analysis*, John Kendrick and Beatrice Vaccara, eds. (Chicago: University of Chicago Press, 1980), pages 639-41.

⁶ Saving was stronger than average in 1975 partially because of a tax cut in the second quarter, the bulk of which was probably saved.

Household Saving as a Share of Disposable Income

In percent, 1952-80

Year	Personal savings rate*	Financial savings rate*	Net investment in consumer durables*	Total household savings rate†
1952-59	6.9	2.2	2.9	9.8
1960-69	6.6	3.8	3.3	9.8
1970-74	7.9	5.5	3.6	11.5
1975	8.6	6.6	2.4	11.0
1976	6.9	4.2	3.3	10.3
1977	5.6	2.1	3.8	9.5
1978	5.2	1.4	3.8	9.1
1979	5.3	1.9	3.2	8.5
1980	5.6	3.6	1.9	7.5

* Expressed as a percentage of disposable income.

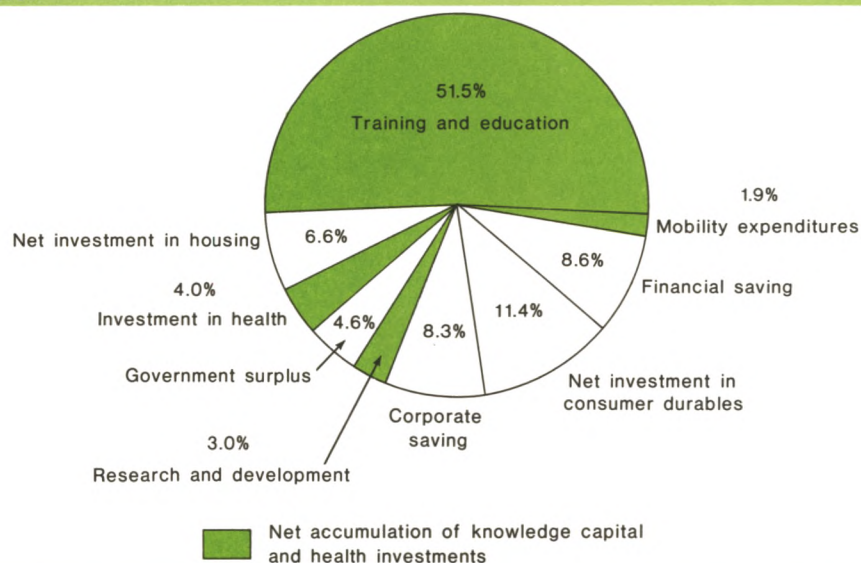
† Personal saving and net investment in consumer durables expressed as a percentage of disposable income.

Sources: United States Department of Commerce, Bureau of Economic Analysis; Board of Governors of the Federal Reserve System.

Chart 4

The Role of "Knowledge Capital" in a Broader Measure of National Saving

Based on data for 1969



Sources: United States Department of Commerce, Bureau of Economic Analysis; John Kendrick, *The Formation and Stocks of Total Capital* (New York: National Bureau of Economic Research, 1976).

increases.⁷ Further, an increase in all types of consumer spending—not just spending for durables—could be stimulated by inflation. When savers receive interest payments in dollars with eroded purchasing power, the return from saving is diminished. For this reason, a fall in the inflation-adjusted rate of return might encourage consumption and discourage saving. The tendency for inflation to discourage saving is reinforced by the progressive tax system. Inflation induces “bracket creep”—that is, individuals find themselves pushed into higher tax brackets even if their purchasing power has not risen. Bracket creep causes the aftertax reward for saving to fall even further because a greater proportion of the interest payments becomes subject to taxation.

A fall in financial saving due to a flare-up in inflation marks a significant departure from past behavior. In the 1960s and early 1970s, outbursts of inflation were often unexpected, prompting households to protect the purchasing power of their assets by saving more. Because of the steady upward ratcheting of prices since the early 1970s, households began to manage their assets more effectively.⁸ Realizing that fixed-interest payments on financial instruments failed to yield an adequate return after allowing for inflation, consumers accumulated durable goods instead of financial assets. Much of the decline in financial saving which began in 1976 was offset by a step-up in tangible forms of saving (Chart 2).

The housing boom

The attractiveness of housing as a hedge against inflation helped fuel the explosion in home prices that occurred in the late 1970s. In 1972, the average price of a single-family home was \$31,000. In just seven years, the price had doubled. Just as a bull market in common stocks causes capital gains to accrue to stockholders, this dramatic increase in home prices resulted in capital gains for real estate owners. For many families, the buildup of equity in their homes is likely to be a primary source of saving. Because of capital gains on housing, the typical homeowner has been made

wealthier and may want to consume more and save less out of current income as a result. A particularly rapid rise in housing-related wealth coincided with the beginning of the personal savings slide.⁹ Indeed, some analysts maintain that these capital gains in housing may be partly responsible for lower levels of national saving.

The relationship between housing gains and saving, however, is more complicated than it might appear at first glance.¹⁰ McNees (1980) has argued that increases in housing equity may not affect the savings behavior of all individuals in the same way. An older homeowner who plans to sell his house to help finance retirement may begin to save less if his house appreciates at an unexpectedly rapid rate. Similarly, if an older household wants to leave something of value to heirs, an unexpectedly large increase in housing prices may fulfill the bequest objective, leaving the household free to spend out of other assets that had been earmarked for the bequest.

On the other hand, the effects of housing gains on saving are less clear-cut for individuals who are not planning to stop being homeowners. Increases in housing wealth could have little effect on spending and saving in many cases. To convert these gains into cash, funds must be borrowed against the house or the house must be sold. When the homeowner refinances or sells the house in exchange for a similar dwelling, part of the capital gain is needed each year to meet higher mortgage payments. If the house is likely to be occupied for a long time, virtually all the gains will be used up in this way, leaving very little to be spent on other goods and services. Also, the expectation of rapidly rising housing prices probably stimulates net investment (saving) in the form of housing expenditures, and this is also an offset to the other aspects of housing gains that depress saving.

All in all, these different ways of looking at savings decisions in light of housing gains point to the difficulty in trying to assess precisely the impact on saving. Nonetheless, because of the enormous stock of residential housing—about \$1 trillion or almost half of GNP in 1979—the relationship between housing gains and saving could be very important. Moreover, unlike capital gains on corporate stock, which tend to be

⁷ Institutional regulations have begun, however, to adapt to the current inflationary environment. The gradual elimination of Regulation Q, for example, will help protect the financial wealth of small savers from depreciating in the face of rapid price level increases.

⁸ Early studies found that a 1 percentage point increase in the rate of inflation caused personal saving to increase by 1.8 percent in the short run. See T. Juster and P. Wachtel, “A Note on Inflation and the Saving Rate”, *Brookings Papers on Economic Activity* (1972,3), pages 765-78. However, estimates using more recent data suggest that the positive relationship between inflation and saving has broken down. See Claudia Campbell and Jean Lovati, “Inflation and Personal Saving: An Update”, *The Federal Reserve Bank of St. Louis Review* (August 1979), pages 3-9. The breakdown in the inflation-savings relationship indicates a turning point in consumer behavior.

⁹ Consumer wealth held in the form of housing increased \$73.7 billion in 1976, the year in which personal saving began to decline. Housing wealth had risen by only \$32.7 billion in the previous year.

¹⁰ For a more extensive discussion of the relationship between housing prices and consumer behavior, see Stephen McNees, “The 1979 Consumer Spending Sector: New Era or Last Gasp”, *New England Economic Review* (June 1980), and David Sieders and Charles Luckett, “Household Borrowing in the Recovery”, *Federal Reserve Bulletin* (March 1978), pages 153-60.

concentrated in upper income groups, housing gains are distributed among a broader segment of the population. Certain households, particularly young families, would probably like to consume more but are prohibited from doing so because of the reluctance of intermediaries to offer large unsecured loans. Borrowing against housing equity to support current consumption may be an attractive alternative to other sources of funds. Some empirical studies have suggested that the appreciation of housing values reduces saving, but the estimated relationships were not so strong as to warrant a great deal of confidence.

Demographic influences on saving

During the last decade, there was an important change in the demographic composition of the United States. Persons born during the post-World War II baby boom entered the adult population in increasing numbers, causing the average age of the labor force to decline rapidly. Younger families tend to borrow heavily in order to set up new households and tend to accumulate less financial wealth. Moreover, the ranks of primary savers have been shrinking relative to other groups. Almost 54 percent of all households was headed by persons aged 35 to 64 in 1970. By 1980 this figure fell to about 48 percent.

Could the rapid influx of young people into the labor force have something to do with the recent weakness in the personal savings rate? Despite the dramatic change in the composition of the population, the answer is probably not. First, these changes usually affect economic conditions very slowly, and the drop in the savings rate since the mid-1970s has been precipitous. In addition, there is evidence that demographic influences on total saving may be slight. Recent studies suggest that a relative scarcity of families in their savings years could have two roughly offsetting effects.¹¹ First, a decline in the proportion of primary savers depresses overall saving. At the same time, however, a smaller proportion of these families causes their incomes to rise relative to the rest of the population. When older, more experienced workers are in short supply, their salaries tend to increase. Even though there are fewer primary savers, these individuals save more because their incomes are higher. As a result of these offsetting effects, the net impact of demographic changes on aggregate saving is estimated to be negligible.

This finding does not imply that demographic

changes will have no impact on business capital formation. Lieberman and Wachtel (1980) found that, although total saving is fairly unresponsive to demographic changes, its composition may change. Younger families tend to save through purchases of tangible assets like housing and consumer durables; older families tend to accumulate financial assets. Financial saving in 1985, for example, is predicted to be only about half the level implied by the age and income distribution which prevailed in 1963. Since financial saving represents the source of funds necessary to finance business investment, demographic changes could have an influence on capital formation over the long run. Still, the impact of demographic changes on year-to-year movements in financial saving is likely to be minor.

Unreported income and measured saving

Indirect evidence suggests that the total income generated from unreported and illegal activity is rising.¹² An expanding underground economy could cause official savings rates to decline because of the way in which income and consumption are measured. The bulk of wages and salaries reported in national income estimates comes from the Department of Labor wage surveys. On the other hand, consumption is mainly measured by data on physical shipments. If a growing number of persons receive unreported income but continue to purchase goods in the conventional marketplace, measured consumption rises more than measured disposable income. Consumers will appear to be spending more out of their incomes because some of their income is unreported. As a result, the measured savings rate declines and consumers appear to be less thrifty than they really are.

Most people have received some cash income at one time or another: informal payments for repair services, tips, and the like. Such payments are often not reported for tax purposes. With bracket creep increasing the incentives for tax evasion, this type of activity is probably becoming more widespread. The amount of currency in circulation—the principal means of payment for unreported activity—provides some indirect evidence about the size of the underground economy. Growth of the use of currency has far outstripped that of checking accounts in the past few decades. Adjusting for inflation, total currency holdings have grown by 2 percent per year since 1960, while inflation-adjusted checking account deposits

¹¹ See Charles Lieberman and Paul Wachtel, "Age Structure and Personal Saving Behavior", *Social Security Versus Private Saving*, George M. Von Furstenberg, ed. (Cambridge, Mass.: Ballinger Publishing Co., 1980).

¹² A detailed discussion of the underground economy is found in Norman Bowsher, "The Demand for Currency: Is the Underground Economy Undermining Monetary Policy?", *Federal Reserve Bank of St. Louis Review* (January 1980), pages 11-17.

have remained unchanged.¹³ While by some indirect measures the underground economy appears to have grown, the possible effects on the savings figures are nearly impossible to reckon. For one thing, certain types of economic activity could disappear from both income and consumption data. Consider, for example, a lawyer who prepares his dentist's will in exchange for some new bridgework. In addition, assessments of the size of the underground economy vary widely. The Internal Revenue Service estimates that the amount of unreported income (excluding illegal activity) was between 4 and 5 percent of GNP in 1976. However, *ad hoc* estimates of the total size of the underground economy, based on currency usage, range from 10 to 22 percent of GNP. The growth of unreported activity is even more difficult to measure. Still there may be

¹³ Much of the historical movement in the currency-to-deposit ratio can be explained by changes in important determinants of currency and deposit holdings: income, prices, interest rates, and personal consumption expenditures. Since 1974 the currency-to-deposit ratio has increased more sharply, but this development coincides with a number of financial innovations which would be expected to cause weakness in demand deposit growth. In particular, negotiable order of withdrawal (NOW) accounts, electronic funds transfer systems, and money market mutual funds have been substituted for demand deposits. In addition, cash management techniques of business have become increasingly effective in recent years. In light of these developments, any measurement of underground activity based on movements in currency-to-deposit ratios must be interpreted with extreme caution.

reason to believe that measurement problems stemming from the underground economy are responsible for some of the decline in measured saving.

Summary

Household financial saving has declined markedly in recent years. Despite the buildup of precautionary saving which occurred in the second quarter of 1980, the personal savings rate remains well below its postwar average. Many possible explanations for the slowdown exist. Though a detailed account can only become available through the benefit of hindsight, the growth of inflationary pressures is certainly responsible for much of the savings slump. However, to focus solely on household saving as a determinant of the nation's future production capacity would be a mistake. The role of this saving in the formation of the nation's total capital stock is only part of the overall picture and should be kept in perspective. The bulk of the nation's wealth is held in the form of human resources—the skills, training, and technical expertise of its work force. Additions to the nation's total stock of wealth take place, not only in the financial markets, but in classrooms and research facilities as well. As long as technical progress continues, the acquisition of knowledge capital will play a fundamental role in national capital formation.

Donald Cox

The LDC Debt Burden

Less developed countries (LDCs) accumulated substantial amounts of external debt over the past decade, and this indebtedness has expanded considerably in the wake of the 1979-80 oil price increases. Concern has been raised over how great a burden on developing countries external debt represents. This article examines the trends in debt burden over the 1970s. It begins with a discussion of the problem of defining and measuring the burdens associated with external debt. Next, it traces the recent history of debt burden and contrasts the experience of countries that borrow most heavily from private banks with the poorest countries that, by and large, do not. Finally, it assesses the prospects of debt burden given the likelihood that, for some time, interest rates will remain high and exports will be difficult to increase, and therefore most LDCs will have to borrow to finance large current account deficits.

A number of conclusions emerge. To begin with, there are useful distinctions to be made when considering debt burden. These are the economic burden of transferring domestic resources to foreigners to pay for debt servicing over the longer run, and the financial burden of generating sufficient foreign exchange to carry debt on an on-going basis. An excessive burden in either form could result in a liquidity crisis with sharp effects on imports and consumption.

Most developing countries did not incur a heavy economic burden during the 1970s when real borrowing costs, adjusted for inflation, were very low. External borrowing generally has been used productively, so that the economic burden should remain manageable even if real borrowing costs rise significantly.

The financial burden posed more difficult problems for many countries. Low-income countries, especially, became vulnerable to shocks as import prices and debt servicing payments grew faster than their exports and international reserves. A few of the higher income LDCs accounted for a large part of the increase in external debt. For these major borrowers, an increasing proportion of external debt came from private banks, usually at interest rates subject to regular adjustment. Compared with official source debt, the higher interest rates and shorter maturities of these loans led to a greater financial burden of acquiring sufficient foreign exchange to service external debt. Recent rises in nominal interest rates have added to this burden. Through expanding and diversifying exports, a number of countries have managed to sustain a larger flow of foreign exchange, and thus minimized their financial burden.

Defining external debt burden

The distinction between economic and financial forms of debt burden focuses on different aspects of the overall burden. An economic burden results from the reduction of goods available for domestic use when interest and amortization payments are made. Financial burden refers to the need to acquire and maintain sufficient foreign exchange to make debt service payments. If foreign exchange earnings and reserves are inadequate, a liquidity crisis can develop, forcing sharp reductions of imports, output, and consumption, even though the longer run economic burden may be low. The problem in assessing either form of debt burden is to determine the various returns to, and costs of, foreign borrowing.

The economic burden

The economic burden of external debt is simply the giving up of real resources as interest and amortization payments are made. This burden should remain manageable as long as the addition to output made possible by a loan exceeds the claim on resources as debt service payments are made. Determining whether this is the case is not a straightforward process.

Some people might argue that the rapid increase in borrowing by developing countries is an indirect indicator that benefits have generally exceeded costs. In this view, borrowing countries and lending institutions had sufficient information to calculate the benefits and costs of borrowing and decided that, on balance, these loans provided a net economic contribution. This line of

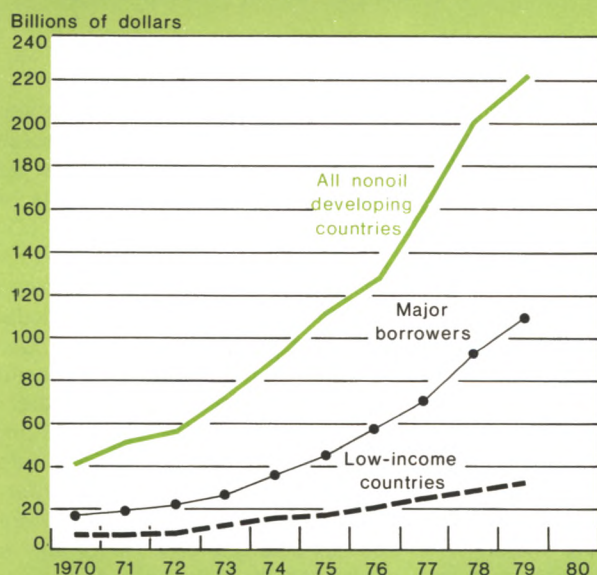
argument is not fully convincing for several reasons. Fundamental uncertainty about future interest rates, prices, and other economic variables makes a precise comparison of future benefits and costs impossible. Exceptionally low real interest rates may have misled borrowers and lenders about the long-run cost of borrowing. Concern with maintaining or increasing imports and consumption in the short term may be so great that a possible need to reduce future consumption in order to service debts is not given much consideration.

So long as borrowers receive more in new loans than they must pay out for debt servicing, the economic burden may not seem pressing. During a period when the inflow of resources made available by the new loans more than equals the outflow to meet interest and amortization payments, the borrower receives an increase in total available resources. If the borrower believes that this positive net inflow will continue indefinitely, it may not concern itself with the ultimate costs of external borrowing. This can be a dangerous approach. Unless external borrowing is making a net contribution, that is, unless its economic benefits exceed its costs, external debt will tend to rise much faster than gross domestic product (GDP).¹ Borrowing to pay for interest and amortization on the debt will also accelerate. At some point, realizing that borrowing is being used for consumption rather than investment, lenders will search for less risky borrowers. New loans will dry up, and the borrower will be faced with a painful cut in consumption.

Returns to borrowing. There are problems in estimating the economic returns to external borrowing. In simple theoretical models, the return to additional borrowing equals the general productivity of new investment in the economy, that is, the opportunity to increase output by undertaking investments. But the contribution of external borrowing to output can differ from that of domestic investment. Foreign loans may lead to the use of more efficient capital, relieve import bottlenecks, or otherwise contribute more to productivity than domestic investment. On the other hand, part of the additional resources made available by external borrowing may

Chart 1

Developing Country External Debt



In this article, data on external debt refers to long-term public and publicly guaranteed debt only.

Nonoil developing countries are defined here to exclude members of the Organization of Petroleum Exporting Countries, countries in southern Europe, China, and South Africa. Of the nonoil developing countries, major borrowers include Argentina, Brazil, Chile, Colombia, Mexico, Peru, the Philippines, South Korea, Taiwan, and Thailand; low-income countries include thirty-eight countries with per-capita incomes of less than \$300 in 1977, as defined in the International Monetary Fund's *World Economic Outlook* (1980).

Sources: *World Tables* (World Bank, 1980); *World Economic Outlook* (IMF, 1980).

¹ GDP is the total value of a country's output produced within its physical borders. For most developing countries, GDP is greater than gross national product (GNP) which subtracts net dividend, interest, or other factor payments abroad. So long as investment is more productive in the borrowing country than the lending country, economic theory predicts that debt inflows will occur. Whether debt will rise faster than GDP, and by how much, depends on several factors, such as the stock of debt outstanding and the savings rate. For further discussion, see R. Solomon, "A Perspective on the Debt of Developing Countries", *Brookings Papers on Economic Activity* (1977:2), and C.M. Loser, "External Debt Management and Balance of Payments Policies", *Staff Papers* (International Monetary Fund, 1977:1).

be consumed rather than invested, thus reducing the contribution of the loan to economic growth. In any case, there are few reliable empirical studies of the productivity of investments in developing countries. It is necessary to rely on less direct measures of the return to borrowing.

The most widely available general indicator of the return to external borrowing is the growth rate of GDP. A high rate of return on investments is not the only source of rapid economic growth. Improvements in organization, technological progress, increased arable land, and a larger labor force all contribute to growth. But investment plays an important part in the growth process. Countries with high growth rates usually devote a large proportion of their total expenditures to investment. These countries offer opportunities for productive investments, whether financed from domestic or foreign sources. Thus, the GDP growth rate can be taken as a broad indicator of the return to foreign borrowing.

The ratio of external debt to GDP provides additional information on the return to borrowing. As financing becomes available, the most promising investments are usually undertaken first. If inflows occur very rapidly, or the level of debt becomes high, the productivity of additional borrowing may be expected to fall. A high and increasing debt/GDP ratio may indicate that borrowing has been used to finance consumption rather than increase investment. However, the ratio could also increase if capital is highly productive in the borrowing country so that it is able to attract a rapid inflow of loans. Therefore, the debt/GDP ratio must be used with care but, in conjunction with other information, it is helpful for the comparison of economic burdens, either between countries or over time.²

Costs of borrowing. Two major factors require attention when considering the cost of external borrowing. First, real borrowing costs depend on both nominal interest rates and inflation. Second, real borrowing costs are subject to significant fluctuations over time, complicating the problem of determining the economic burden.

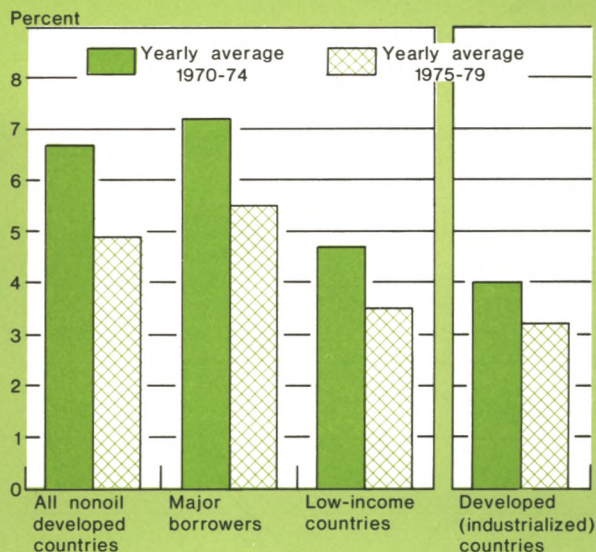
Inflation has important effects on borrowing costs. From the borrower's perspective, the real cost of borrowing may be estimated by the difference between nominal interest rates and changes in export prices.³

² Denominating GDP in foreign currency can be misleading if the exchange rate is overvalued or undervalued. Thus, debt/GDP estimates for individual countries must be used with caution.

³ Use of a more complex deflator, such as value-added in exports weighted by import price changes, would not materially affect the argument. Problems with choosing the appropriate price deflator for external debt are discussed in M. Long and F. Veneroso, "The Real Value of International Financial Assets: An Application to Non-oil LDC Debt" (Boston: Boston University, Department of Economics, Discussion Paper Number 22, August 1978).

Chart 2

Real Growth Rate of Gross Domestic Product



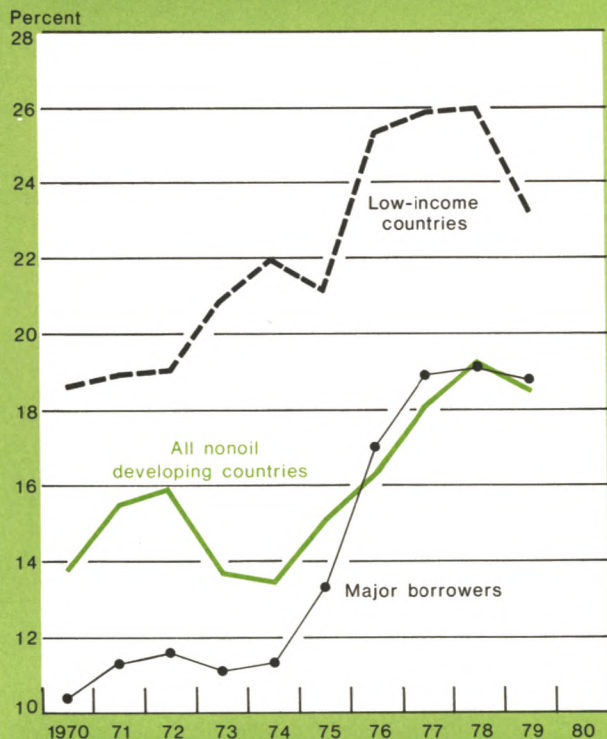
Sources: World Economic Outlook (IMF, 1980);
National Accounts Statistics (United Nations, 1979).

If export prices increase, the real resources required to pay for debt servicing decline. When nominal interest rates go up, the nominal cost of borrowing increases. Real borrowing costs depend on the balance between these factors. During periods when export prices increase rapidly, the real cost of borrowing can fall substantially. Conversely, rising nominal rates, along with stagnating export prices, can cause real borrowing costs to climb. Over time, nominal interest rates tend to adjust to reflect trends in inflation rates, plus compensation for the risk of lending and the real cost of capital. But this adjustment does not happen immediately. Moreover, export prices in the borrowing country will not necessarily move in step with general inflationary trends and other factors that affect nominal interest rates.

The economic burden depends on movements in interest rates and export prices extending well into the future. Most developing country Eurocredits in 1980, for example, had maturities of seven to ten years. Maturing debt is often rolled over, so that the relevant time frame is even longer. On the proportion of total debt from private lenders, interest rates usually are adjusted at least twice a year, in line with other interest rate movements. For this form of debt, nom-

Chart 3

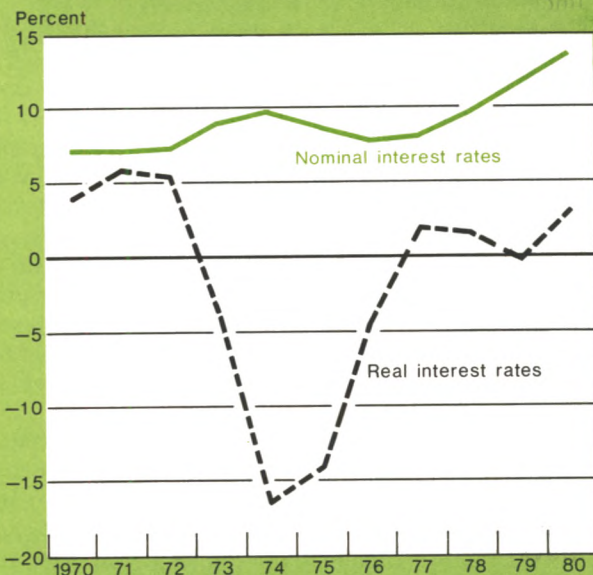
Ratio of External Debt to Gross Domestic Product of Developing Countries



Sources: World Tables (World Bank, 1980); World Economic Outlook (IMF, 1980); International Financial Statistics (IMF, various issues).

Chart 4

Nominal and Real Interest Rates Faced by Developing Countries



The nominal rate is the average interest on new loan commitments by private lenders. Real interest is the nominal interest rate minus the three-year average change in export prices.

Sources: World Debt Tables (World Bank, 1980); International Financial Statistics (IMF, various issues). Author's estimates for 1980 figures.

inal interest rates even on existing debt may be expected to fluctuate widely over time. Export prices, particularly for primary commodities, often fluctuate greatly. These considerations make prediction of the economic burden difficult. One implication is that risks of adverse changes in the economic burden can be reduced by diversifying exports as much as possible.

The financial burden

The financial aspects of debt burden can be critical. The financial burden of external debt results from the need to acquire sufficient foreign exchange to pay for debt servicing. Financial burden increases whenever debt servicing increases, even though the economic burden may not change. A fall in sources of foreign exchange, whether from export earnings or inflows of new loans, will also increase the financial burden. Growing debt service payments may increase an econo-

my's vulnerability to hikes in import prices or declines in export earnings. Over the longer run, an inability to generate sufficient foreign exchange through export growth to cover debt servicing can lead to an increasing financial burden. If financing problems result in a liquidity crisis, the economic effects can be sharp, including a squeeze on imports, reduced or even negative economic growth, and other painful adjustments.

Inflation increases the financial burden of the large proportion of private debt on which interest rates are adjusted periodically in line with movements in other interest rates. Inflation lowers the real value of the principal of a loan but, to compensate, interest rates go up. Thus, during an inflationary period, nominal interest rates include both the real cost of borrowing and, in effect, a principal payment equal to the fall in the real value of the loan. Debt service payments now include, not only the previously scheduled amorti-

zation payments, but also payments for the declining real value of the principal. The result is an acceleration in debt servicing and a greater need to acquire foreign exchange to service the debt. Although the real value of the debt is the same and thus the economic burden is unchanged, the financial burden rises.

Financial burden is particularly complicated to measure. This is primarily because financial burden refers to any number of possible events rather than to a certain outcome. However, it is possible to distinguish factors affecting the short-run vulnerability to financing problems from the longer run need to generate sufficient foreign exchange through exports.

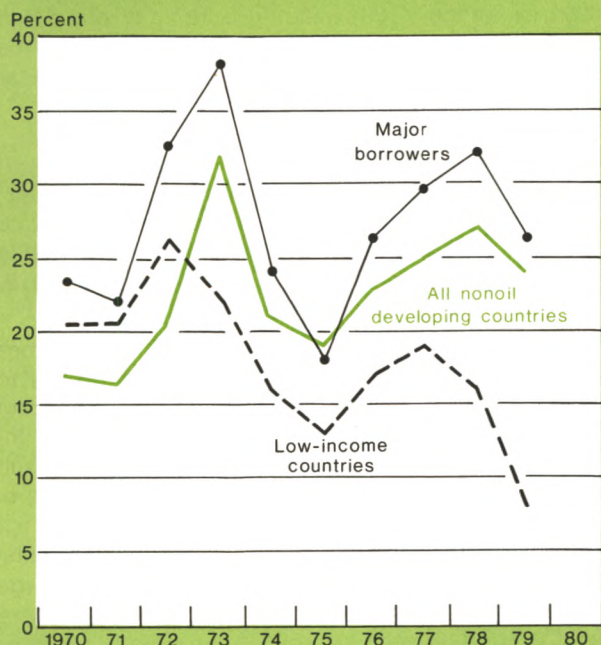
Short-run vulnerability. In an accounting sense, total foreign currency expenditures for debt servicing, imports, or other outflows less total inflows from exports, transfer payments, borrowing, or other sources must be balanced by a change in international reserves. To some

extent, inflows and outflows can be managed, through devaluations or import controls, for example. However, the first line of defense against a high financial burden or possible liquidity crisis is to maintain sufficient international reserves. These reserves can finance adverse swings in import costs or export revenues while longer term adjustment policies are being put in place.

There is no exact formula for an "optimal" level of reserves. As both the volume and prices of international trade increase, the desired level of reserves goes up. Probably the most common measure of the ability to withstand short-run trade fluctuations is the ratio of international reserves to imports of goods and services (including interest on debt). Taken by itself, this ratio provides only a very rough indication of the economy's short-run vulnerability to adverse events. Financial vulnerability is also influenced by such factors as the stability of export receipts, the compressi-

Chart 5

Ratio of International Reserves to Imports of Developing Countries

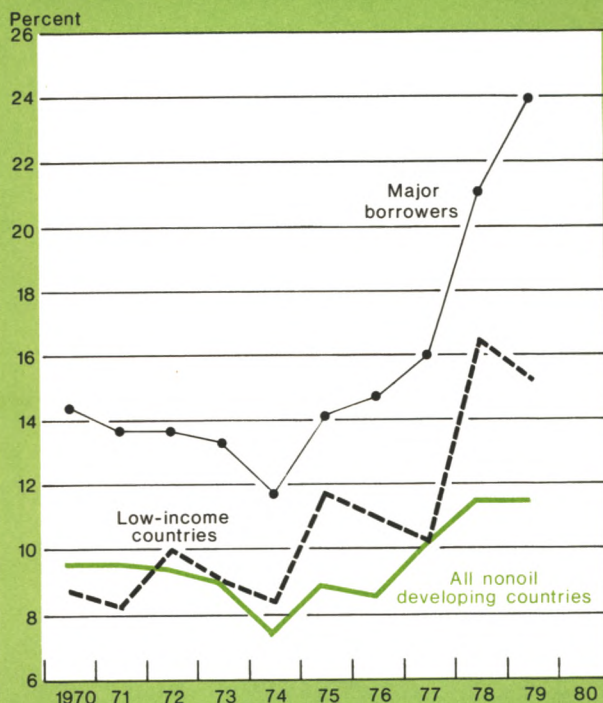


International reserves excluding gold. (For low-income countries, gold is included, valued at 35 special drawing rights per ounce.) Imports of goods and services.

Sources: International Financial Statistics (IMF, various issues); World Economic Outlook (IMF, 1980).

Chart 6

Ratio of Debt Service to Exports of Developing Countries



Exports include goods and services. Debt service on public and guaranteed debt.

Sources: World Tables (World Bank, 1980); International Financial Statistics (IMF, various issues).

bility of imports, and the country's capacity to borrow rather than use reserves. No convenient measures of these other factors are available. However, they can have a considerable effect on the financial burden.

Longer run financial vulnerability. In addition to the danger of excessive financial burden arising from short-run fluctuations, a long-run imbalance between inflows and outflows can occur. As external debt increases, interest and amortization payments also rise. Unless exports grow in proportion, the share of exports devoted to debt servicing will continually increase. The economy may come to depend on additional borrowing to fill the gap between exports and debt service payments plus imports. If new loans are used to cover interest and amortization payments on outstanding debt, they do not contribute to increased investment and growth. Lenders may become reluctant to extend loans for what they consider to be nonproductive uses. Even if lending continues at the same rate, debt servicing can tend to absorb an increasing fraction of export receipts, leaving less for imports. If export revenues

fall or import prices rise, a liquidity crisis could occur very quickly.

The ratio of debt service to exports provides a rough measure of an economy's financial burden in this longer run sense. If this ratio is high, a large proportion of export earnings must be devoted to debt servicing, so that expanding imports, or even maintaining real imports as prices rise, may increasingly depend on uninterrupted flows of new loans. The debt service/exports ratio gives some indication of the significance of service payments due each year, but requires extremely tenuous projections if it is to reflect possible bunching of amortization payments in future years. As with other financial burden indicators, there is no exact formula for determining when this ratio is dangerously high. Rather, it is useful to help identify trends in financial burden across countries or over time.

Debt burden trends

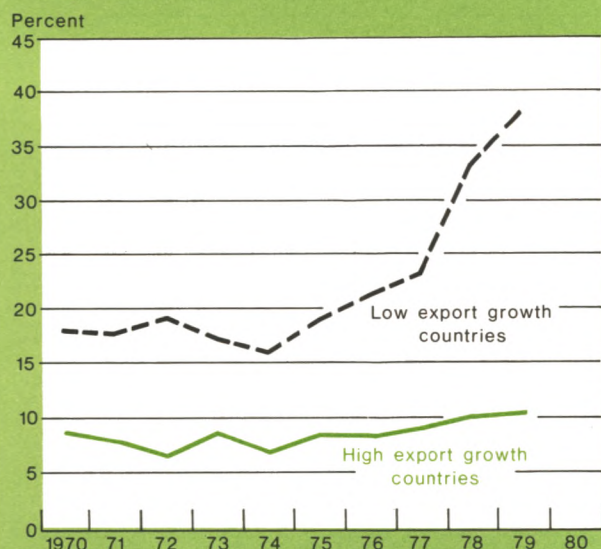
The previous section clarified the distinctions in the types of debt burden. Economic burden results from the transfer of domestic resources to foreigners to pay for external debt servicing. Financial burden arises from the need to acquire sufficient foreign exchange to cover both debt service payments and imports. If foreign exchange is unavailable, a liquidity crisis can occur leading to sharp effects on the economy. This section traces the trends since 1970 in various measures of these aspects of debt burden.

Economic burden comparisons

The external debt of the nonoil developing countries⁴ accumulated rapidly even before the first oil price shock, but this growth accelerated thereafter. Public external debt⁵ reached \$220 billion by the end of 1979, a fivefold increase since 1970 (Chart 1). Most of the increase occurred after 1973. A major proportion of this increase was obtained from private sources, primarily banks, and was concentrated in a few relatively high-income LDCs with good prospects. By 1979, ten of these major borrowers⁶ accounted for 70 percent of

Chart 7

Ratio of Debt Service to Exports of Major Borrowers



Exports include goods and services. High export growth countries are Chile, Colombia, South Korea, Taiwan, and Thailand. Low export growth countries are Argentina, Brazil, Mexico, Peru, and the Philippines.

Sources: *World Tables* (World Bank, 1980); *International Financial Statistics* (IMF, various issues).

⁴ Nonoil developing countries are defined here to exclude members of the Organization of Petroleum Exporting Countries, countries in southern Europe, China, and South Africa.

⁵ Public debt includes long-term debt guaranteed by the public sector of the borrowing country as reported through the World Bank's Debtor Reporting System. No comprehensive data on nonguaranteed debt or short-term debt are available. Given the size of current account deficits that were financed, these forms of debt probably increased in roughly the same proportion as public debt for major groups of LDCs, but omission of short-term and private debt would distort the relative debt position of individual countries.

⁶ Argentina, Brazil, Chile, Colombia, Mexico, Peru, the Philippines, South Korea, Taiwan, and Thailand.

the private source debt. At the other extreme, the poorest thirty-eight countries accounted for only 10 percent of total debt, and an even smaller fraction of debt from private lenders. Although these low-income countries⁷ had a slightly slower growth rate of debt, their public debt still quadrupled during the 1970s.

The economic returns to the rising debt appear to have been good. Investment rates have been high and rising in most developing countries and real growth of GDP has remained significantly above growth of the industrialized world. In the first half of the decade, growth averaged over 6 percent in developing countries, compared with less than 4 percent in the industrial countries (Chart 2). Along with most of the world, the developing countries experienced slower growth after the 1973 oil price hike. Still, developing countries managed to grow almost 5 percent on average, while growth fell to slightly more than 3 percent in the industrial countries. Since 1974, external debt has risen faster than GDP (Chart 3). The debt/GDP ratio tended to level off toward the end of the decade, but large current account deficits in 1980 probably led to another rise. Still the debt/GDP ratio remained moderate for most countries.

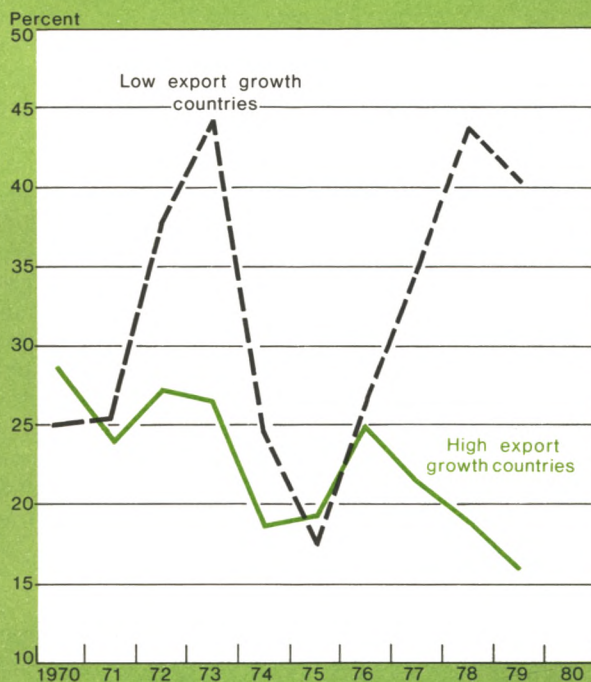
Countries that borrowed most heavily from private sources appear to have had the greatest returns to external borrowing. Economic growth in these major borrowing countries exceeded the developing country average by almost 1 percent each year. Comparison with the industrial countries is more striking. From 1970 to 1974, growth averaged over 7 percent among the major borrowers, 3 percent more than the industrial country average. In the second half of the decade, growth of the major borrowers slowed to 5½ percent but remained over 2 percent above the industrial country average. Also, the major borrowers began the period with relatively little debt relative to their GDP. Thus, despite heavy borrowing, their debt/GDP ratio was about equal to the developing country average at the end of the decade.

Economic returns were lower for the poorest countries. Throughout the 1970s these countries had less investment and lower growth than other developing countries. Their GDP did grow somewhat faster than in the industrial countries, indicating a potential for productive uses of borrowing. However, debt grew more rapidly than output. By 1979, external debt equaled almost one fourth of GDP, substantially above the average for all developing countries.

⁷ As classified by the International Monetary Fund in the *World Economic Outlook* (1980). Per-capita income in these thirty-eight countries averaged less than \$300 in 1977.

Chart 8

Ratio of International Reserves to Imports of Major Borrowers



International reserves excluding gold. Imports of goods and services.

Source: *International Financial Statistics* (IMF, various issues).

Inflation and borrowing costs. The cost of external borrowing is the other side of the economic burden. Chart 4 presents some evidence on borrowing costs. On new loan commitments from private sources,⁸ nominal interest rates increased somewhat over the period, as higher inflation rates led to higher interest rates in most financial markets. This upward trend was not marked before 1979, but rates have risen sharply in the last two years.

Borrowing costs were subject to considerable variation. Movements in real interest rates, measured as the difference between nominal rates and changes in LDC exports prices, complicated the problems of predicting borrowing costs. Until 1972, real interest rates averaged 5 percent (about equal to the average in the

⁸ Interest rates on official lending are generally below rates for private lending.

1960s). In 1973-74, however, many commodities prices boomed. The average price of LDC exports nearly doubled. As a result, real interest rates fell to negative levels. By 1975, real interest rates were increasing, but remained close to zero through 1979 as the rise in nominal interest lagged world inflation. Recent higher nominal rates and slow growth of export prices have increased real interest rates once again. For countries that depend on a small number of exports, the movements were almost certainly even sharper. Given the long period for which most external debt has been contracted, this volatility made prediction of the real cost of borrowing very difficult.

On average, the real interest rate was a negative 2 percent over the last decade. This outcome was largely fortuitous, reflecting both the commodities boom and the slow adjustment of nominal interest rates to higher world inflation. This low interest rate meant that borrowing costs were very low during most of this period. In economic terms, the return to borrowing far outweighed the costs so that increased borrowing was a profitable strategy to support economic growth. In this sense, the economic burden of developing countries has been very low.

Changes in financial burden

The financial vulnerability of developing countries showed pronounced movements over the decade. This was apparent in the ratio of international reserves to imports (Chart 5). This ratio serves as a rough indicator of an economy's susceptibility to short-run adverse developments. As reserves grew rapidly during the commodities prices boom, the average ratio for all developing countries rose in the early part of the decade, reaching a peak of 32 percent in 1973. By 1975, after the first oil price shock and declines in commodities prices, the ratio fell by over one third to 19 percent. From 1976 to 1978 reserves were rebuilt, but the second oil shock in 1979 was accompanied by another fall in reserves relative to imports.

To some degree, these movements were a normal part of the adjustment process by which reserves are used to cover short-term fluctuations in import prices and export earnings. Developing countries as a group ended the decade with a stronger relative reserve position than at the beginning. A trend deterioration in this ratio for low-income countries, however, was more troublesome. These countries began the decade with a reserves/imports ratio equal to the developing country average. By the end of the decade the ratio fell by over two thirds. The 1979 ratio of 8 percent covered less than one month's imports of goods and services. Clearly, many of these countries have become more vulnerable to financial problems.

Longer run financial burden measures tended to rise over the decade. This tendency, as shown by the debt service/exports ratio presented in Chart 6, was relatively slight for all developing countries taken together. Again, the low-income countries experienced a larger increase than most countries. Most of the borrowing by low-income countries was from official sources at relatively low interest rates and long maturities. Still, exports grew less rapidly than debt service payments, so that by 1979 the debt service/exports ratio for low-income countries was more than 30 percent above the ratio for all nonoil developing countries.

Differences among major borrowers. The ten major borrowing countries showed diverse behavior on both the short-term and longer term indicators of financial burden. The ratio of debt service to exports fell until 1974, then began a distinct rise. By 1979, the debt service/exports ratio had doubled to 24 percent from its 1974 low. But this average for all major borrowers obscured important differences within the group. Over the decade, some major borrowers concentrated on the rapid expansion of exports as a base for economic growth. Others emphasized growth of domestic markets and import substitution while exports grew less rapidly. These alternatives produced very different results in terms of the financial burden of their external debt.

In Charts 7 and 8 the major borrowers are divided into high export growth and low export growth countries.⁹ It would be hazardous to draw strong conclusions from this evidence, particularly since some members of the low export group began to increase exports rapidly toward the end of the decade. Yet the groupings offer an interesting contrast. The high exporters showed only a slight upward trend in debt service/exports, from 8 percent in 1970 to about 11 percent by 1979. The low exporters began the decade with a relatively high ratio of 18 percent. The commodities boom years permitted a slight fall during the mid-1970s, but by 1979 the ratio had climbed to over 30 percent. To some degree, low export countries compensated for this higher financial burden by maintaining greater reserves (Chart 8). However, the sharp decline in the reserves/imports ratio between 1973 and 1975 illustrates the speed with which these reserves can be depleted. By the end of the 1970s, the major borrowers with lower export growth generally faced a greater financial burden than those countries which were able to expand exports more rapidly.

⁹ Export growth in 1970-79 averaged 23 percent for the high group (Chile, Colombia, South Korea, Taiwan, and Thailand) and 15 percent for the low group (Argentina, Brazil, Mexico, Peru, and the Philippines).

Prospects for the debt burden

For most developing countries the long-run economic returns to external borrowing appear favorable. The available evidence suggests that these countries have the ability to use external borrowing, along with domestic saving and investment, improved organization, and other inputs, to add to their economic growth. Countries which have been major borrowers from private sources have had especially high rates of economic growth. They should be able to continue to use external borrowing productively. The poorest countries are in a more difficult situation, given their slower growth rates in recent years. For these low-income countries, credit from official sources, on terms more generous than they can obtain on private markets, performs an important function.

Rapidly increasing export prices and lagging adjustments of interest rates to higher inflation contributed to very low borrowing costs during much of the 1970s. Even when costs return to more positive real levels, the economic burden does not appear in danger of becoming excessive. Most LDCs have been able to use external borrowing for productive purposes, so that returns probably exceed costs by a substantial margin.

The question is whether higher levels of external indebtedness will lead to an unmanageable financial burden. Over the near future, most countries should be able to withstand adverse shocks. In the late 1970s most countries were able to rebuild their reserves relative to imports. Recent economic developments have reduced this reserve cushion, particularly for countries heavily dependent on oil imports. But, assuming that no further severe shocks occur in the immediate future, these reserves should be adequate.

Again, the low-income countries are in a much less favorable position. Their vulnerability to excessive financial burden increased markedly over the last decade. By 1979 their reserves were very low, and they have declined since. A number of these countries are faced with severe financial strains even if no further external shocks are imposed.

For the higher income developing countries, the prospects for financial burden are a source of more concern over the longer run than the near term. An increasing proportion of their external debt is obtained from private sources. This debt is usually subject to regular adjustments in interest rates. Higher nominal interest rates have added to the financial burden of servicing this debt. In some countries, debt servicing has grown more rapidly than exports. This implies an increased vulnerability by these countries to prolonged weakness in exports, further sharp increases in import prices, reduction of the volume of new loans, or other adverse developments. This possibility of an excessive financial burden can occur despite the underlying strengths in their economies.

In recent years, many countries have moved to expand and diversify their exports. This policy tends to reduce debt burden in two ways. First, a broad export base should lessen fluctuations in average export prices, making real borrowing costs and the economic burden more predictable. Second, greater exports lower the financial burden by reducing the country's vulnerability to temporary disruptions in loan inflows and other adversities. This relationship underlines, for both developing and developed countries, the importance of open markets for international trade and strong, stable growth of the industrialized economies.

David Roberts

Financial Innovation and Monetary Indicators in Japan

The financial system of Japan has undergone substantial innovation over the past dozen years or so. A once rigid and unchanging structure of interest rates has become more flexible. Markets for bonds and short-term paper open to nonbank investors—almost nonexistent until late in the 1960s—are now active. A number of new financial instruments emerged during the 1970s. Given present trends, further changes can be expected.

Two important developments have motivated innovation. First, much higher inflation rates and greater variation in inflation rates, compared with the 1960s, has made a relatively fixed interest rate structure less workable than it was then. And, second, there has been a need to accommodate important changes in financial flows among the main domestic sectors and the world outside. In the domestic sector, government has become a larger borrower than business while business borrowing has declined and its liquidity has increased. In its external relations, Japan has emerged as a major international creditor and the yen has become more important as an international currency. Some innovations have originated in the private sector to meet new borrower or lender needs. Others have been fostered by the authorities as they faced new problems in domestic and external monetary management. Nearly

all have been subject to some official controls or guidance.

The increasing diversity of financial flows also led the Bank of Japan to abandon bank credit to the private sector as its main monetary indicator and to substitute the broader monetary aggregate, M-2—more recently M-2 plus certificates of deposit (CDs). Since 1978 the Bank has regularly forecast the growth of that aggregate one quarter ahead. But it has felt free to revise its forecasts in the light of unexpected developments. It has not adopted a money growth target, since it believes that the variability and unpredictability of the money-income relationship (*i.e.*, money velocity) have made this approach to policymaking unworkable. In Japan as elsewhere, financial innovation has been an important source of uncertainty and change in money velocity.

The first section of this article describes the institutional setting of the late 1960s and the changes in financial flows and in the economic environment since then that have spurred innovation in financial instruments held by individuals and corporations.¹ The second section deals with the gradual development of the innovations themselves and their effects on personal and corporate financial portfolios. The final section shows how those innovations have complicated the use of monetary aggregates as policy indicators and contributed to Japan's reluctance to establish targets for those aggregates.

This is the second in a series of articles on financial innovation abroad. The first, "Financial Innovation in Canada", appeared in this *Quarterly Review* (Autumn 1980), pages 1-8.

A number of persons have contributed to the development of this article. The writer would especially like to thank M. Akbar Akhtar, Hugh Patrick, Jeffrey Shafer, and John Wenninger.

¹ Innovations in interbank financial markets, also of considerable importance, are not dealt with in this article.

Forces for change

At the end of the 1960s, financial investment patterns in Japan more closely resembled those of continental Europe, where deposit-taking institutions attracted the major portion of personal and business funds, than those of the United States, where securities markets closely rivaled deposit institutions as avenues for investment.² Deposits averaged about two thirds of all business and personal financial holdings of currency, deposits, and securities in Japan in 1965-69, compared with about one third in the United States. While the Japanese stock market was very active, bond trading was negligible. (Stock exchanges were closed to most bond trading from 1962 to 1966 for lack of volume.) And there was virtually no market for short-term credit instruments open to nonbank investors.

As in many other countries, most interest rates were subject to official control. But Japan was exceptional among industrial countries in the rigidity of interest rates on bank deposits, bank loans, and new bond issues. For most of the 1960s, those rates remained unchanged despite numerous changes in the official discount rate up and down within a 5.5 to 7.3 percent range and much wider fluctuations in interbank call money rates.³ From 1961 to 1970, the one-year bank deposit rate remained at 5.5 percent, slightly lower than the 5.8 percent consumer price inflation averaged during that period. In four of those years, real deposit rates (roughly calculated as the difference between the deposit rate and the inflation rate) were in the negative 1.1 to 2.3 percent range. The rigidity of most interest rates was made possible by comprehensive controls over bank credit, bond issues, and foreign exchange transactions as well as the absence of organized trading in outstanding bonds during much of the 1960s.

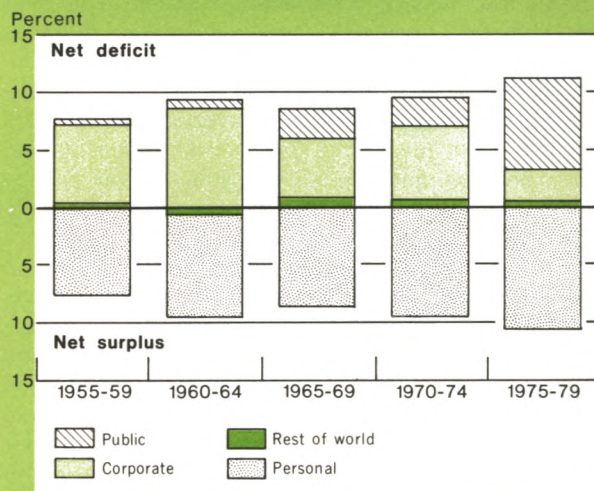
Monetary control was very close during the decade. The primary monetary target was bank credit to the private domestic sector, and an important policy instrument was the imposition of ceilings ("window guid-

² Descriptions of the Japanese financial structure as it existed at the end of the 1960s may be found in Bank of Japan, Economic Research Department, *Money and Banking in Japan*, L.S. Presnell, ed. (New York: St. Martin's Press, 1972); Hugh T. Patrick, "Finance, Capital Markets and Economic Growth in Japan", *Financial Developments and Economic Growth*, Arnold Sametz, ed. (New York University Press, 1972); and *Banking System in Japan* (Japan: Federation of Bankers' Association of Japan, third edition, 1970). For a description of financial institutions in the early 1970s, see Henry C. Wallich and Mabel I. Wallich, "Banking and Finance", *Asia's New Giant*, Hugh Patrick, and Henry Rošovský, eds. (Brookings Institution, 1976).

³ While banks managed to adjust effective loan rates somewhat by altering compensating deposit requirements, and sometimes paid above-ceiling deposit rates, interest rate controls were by and large effective. See Hugh T. Patrick, "Japan's Interest Rates and the 'Grey' Financial Market", *Pacific Affairs* (Fall and Winter, 1965-66).

Chart 1

Financial Deficits and Surpluses of Major Economic Sectors in Japan in Relation to Gross National Product



Source: Bank of Japan, Flow of Funds.

ance") on that credit aggregate for each bank. The effectiveness of credit ceilings was strengthened by discount rate changes, discount quotas, changes in reserve requirements, and securities transactions with banks—all undertaken to influence the availability and cost of liquid assets to the banking system.⁴

Until well into the 1960s, the main beneficiaries of the low and inflexible interest rate structure were the corporations; which regularly absorbed net flows amounting to 7 to 9 percent of gross national product (GNP). Until late in the decade, public-sector borrowing was very modest since the central government held to a balanced budget policy. All borrowing was financed by large personal saving plus a small amount of carefully controlled borrowing from abroad (Chart 1).

But, from the late 1960s onward, the pattern of financial flows underwent a significant transformation, reflecting the changing role of the external, government, and business sectors in Japan's economy. Those trends created a need for new financial instruments

⁴ An excellent description of monetary control techniques in the 1960s is contained in *Monetary Policy in Japan* (Organization for Economic Cooperation and Development, Monetary Studies Series, December 1972). An account of changing official policies on interest rate flexibility in the 1960s and 1970s is given in *Steps Toward Flexible Interest Rates in Japan* (Bank of Japan, Economic Research Department, Special Paper No. 72, December 1977).

and more flexible interest rates, thus setting in motion a process of financial innovation.

In the external sector, sustained current account surpluses appeared in the latter half of the 1960s for the first time in the postwar period, rising from about 0.8 percent of GNP in the late 1960s to well over 2 percent in 1971 and 1972. The two oil price increases of the 1970s plunged the Japanese accounts into temporary deficits, but the 1974 drop was followed by a strong return to surplus, and recovery from the 1979 deficit is now in full swing. Japan's new international creditor position and the severe year-to-year swings in the external balance led the government to adopt a compensatory capital flow policy—alternately encouraging inflows and outflows of Japanese and foreign capital—as a means of limiting changes in reserves and fluctuations in the external value of the yen. Capital flow policy was partly implemented by relaxing and tightening a battery of exchange controls. But it also required the availability of financial instruments to accommodate foreign borrowing and lending and greater flexibility in Japanese interest rates to provide incentives to the desired capital flows.

In the domestic area, the central government's abandonment of a balanced budget policy in 1965 was followed by a rise in public-sector borrowing to an average of about 2½ percent of GNP in the second half of the 1960s and the first half of the 1970s. Much of the borrowing financed needed infrastructure such as roads, rail, and port facilities. Increasingly, however, fiscal policy took on a contracyclical role, providing a stimulus to supplement the effects of rising exports in the recovery phase of the cycle. With the oil price hikes of 1973-74 and subsequent world recession, the need for stimulus increased, both for domestic reasons and in response to international pressures for the United States, Germany, and Japan to lead world recovery. As a result, the public-sector deficit rose to nearly 8 percent of GNP in the latter half of the decade. The need to finance the rising government deficit underlined the desirability of an active market in government securities, a closer relationship between new issue rates and market yields on outstanding bonds, and a wider variety of debt maturities than existed in the 1960s.

The slower growth prospects of the 1970s also contributed to a downward trend in corporate investment and borrowing (the latter falling to less than 3 percent of GNP in the late 1970s) and an upward trend in corporate saving and liquidity. The corporations' holdings of liquid assets and their lessened dependence on borrowing from banks reduced the effectiveness of window guidance as the key monetary control instrument. Faced with this new problem, the authorities

concluded that more use should be made of interest rates as a means of influencing business investment decisions.

While important shifts in intersectoral financial flows generated pressures for a more flexible interest rate structure, the acceleration of inflation and its increasing variability during the 1970s served to reinforce those pressures. From 1961 through 1970 the average yearly rate of consumer price inflation was 5.8 percent and its variability around that average, as measured by the coefficient of variation,⁵ was 23 percent. But from 1971 through 1980, the average inflation rate was 9.1 percent and the coefficient of variation was 67 percent. Thus, the burden imposed on lenders implicit in a low and inflexible interest rate structure was far greater in the 1970s than it had been in the 1960s and the pressure to innovate that much greater.

The need for more flexible interest rates was recognized early, in a 1967 report by the Ministry of Finance Committee on Financial System Research. The committee did not propose eliminating official controls over interest rates. However, it did advocate loosening controls over new bond issue rates and over loan and deposit rates to allow greater responsiveness to market forces. These specific recommendations were implemented within the next few years, thus breathing new life into old instruments. More broadly, the report reflected the change in official attitudes toward interest rate flexibility, thereby setting the stage for further innovations.

Innovations and changes in financial portfolios

Innovations in financial instruments

Innovations in financial instruments developed gradually but fairly continuously during the 1970s. In most areas the government exercised strict control over the pace of change. Innovations took three major forms.

- Deposits at banks and post offices and bond issues with newly flexible interest rates.
- New forms of consumer banking.
- New financial instruments free of interest rate controls but usually subject to stringent volume controls.

Bond issues and bank and postal deposits with flexible interest rates developed early. From 1968, interest rates on new issues of government and industrial

⁵ Denoting the average four-quarter inflation rate as P , the number of quarters as N , and the difference between the inflation rate in any given quarter and the average inflation rate as d , the coefficient of variation is $(\sum d^2/N)^{0.5}/P$.

bonds and on bank debentures⁶ were adjusted at intervals in response to changes in the official discount rate. In 1970, Bank of Japan guidelines for interest rates on bank deposits were substituted for the maximum interest rates previously set by the Ministry of Finance. While the new guidelines were initially as unresponsive to market rates as the old ceilings, they acquired new flexibility beginning in 1972. Since then, interest rates on new bond issues and bank deposits have moved up and down with each change in the official discount rate, but often with a lag and by lesser amounts. Rates on deposits at post offices are aligned with bank deposit rates, although postal deposits offer slightly more favorable interest-compounding features.⁷

During the high-inflation years, 1973-75, when consumer price inflation rose as high as 25 percent and averaged 16 percent, real interest rates on one-year bank deposits averaged a negative 8.5 percent. From 1976 through 1980, more moderate inflation rates and more flexible deposit rates reduced the average negative real interest rate on these deposits to about 0.6 percent. This was not very different from the real deposit rates of the 1960s.

A second group of innovations—new developments in consumer finance and related economizing in the use of low-interest demand deposits—was partly initiated by foreigners. While the foreigners' traditional commercial banking activities were severely restricted by official regulations, companies specializing in consumer credit, credit cards, factoring, and leasing were able to enter those unregulated fields. Beginning in the 1960s, they formed joint ventures with their Japanese counterparts, the Japanese contributing ready access to yen financing and foreigners (mostly Americans) contributing their extensive experience.⁸

In 1972, the Japanese banks adapted what they had learned to their regular commercial banking, introducing the "sogo account" for personal use. The sogo account customer maintains a time deposit and an

"ordinary" deposit paying a lower rate of interest than the time deposit.⁹ Payments for purchases made by credit card or prearranged automatic payments (e.g., utility charges) are automatically debited to the customer's ordinary account. Overdrafts in this account are permitted up to 90 percent of the amount in the customer's time deposit, which serves as collateral for the overdraft. The interest charge is only ¼ percentage point higher than the rate received on time deposits. Statistics on sogo accounts are not available, but the Federation of Bankers' Associations states that these accounts are now widely used.¹⁰ The development of sogo accounts tends to blur the distinction between demand deposits and savings deposits in personal money holdings, since they permit time deposits bearing relatively high interest rates to be used to finance current spending at the very modest cost of ¼ percent. Somewhat similar features may be observed in recent innovations by United States banks, for example, ATS accounts (savings accounts subject to automatic transfer) and "loophole" CDs.

A third form of innovation—new financial instruments bearing market rates of interest—was allowed to develop gradually throughout the period. The first new instrument to appear was the bond repurchase agreement (gensaki). Trading in public-sector and industrial bonds and in bank debentures had become more active in the late 1960s, helped by the reopening of the stock exchanges to those securities and by the introduction of some flexibility into new issue rates. The need of securities houses to finance their growing bond portfolios and the desire of corporations to maximize the return on their growing liquid balances were joined, as securities houses sold bonds to corporations under repurchase agreements ranging from a few days to one year. Later, a second type of gensaki transaction developed, with the securities houses acting as brokers for transactions between financial institutions and nonfinancial business firms. However, securities companies have remained the largest gensaki borrowers and business firms the largest lenders.¹¹

The market gathered momentum in the early 1970s

⁶ The power to issue debentures is mainly confined to the long-term credit banks which, in view of the long-term maturities on most of their loans, are permitted to issue debentures up to twenty times capital and surplus. The Bank of Tokyo, a specialized foreign exchange bank with few domestic branches, is permitted to issue debentures up to five times capital.

⁷ The proceeds of postal deposits are turned over to the Trust Fund Bureau of the Ministry of Finance, which invests them largely in government securities and loans to the central government, local governments, and government-related organizations.

⁸ Those developments are described briefly in T.F.M. Adams and Iwao Hoshii, *A Financial History of the New Japan* (Tokyo and Palo Alto: Kodansha International Ltd., 1972).

⁹ "Ordinary" accounts resemble passbook savings accounts in the United States. However, since personal checking accounts are rare and ordinary accounts are drawn on for payments purposes, they are classified as demand deposits in Japan.

¹⁰ *Banking System in Japan* (Federation of Bankers' Associations of Japan, 1979).

¹¹ For a description of the gensaki market, see Mark Borsuk, "How the Gensaki Market Works", *Euromoney* (May 1978), and "Japan's Bond Repurchase (Gensaki) Market", *Mitsubishi Trust Report* (July 1979).

but continued free of any official control over either interest rates or volume until 1974 (a year in which *gensaki* yields touched 17.3 percent, some 12 percentage points higher than three-month bank deposit rates, the largest discrepancy ever registered). During that year, the Ministry of Finance introduced several rules for self-regulation. The rules were followed in 1976 by official Ministry guidelines covering the varieties of bonds that might be traded, the maturities of the repurchase agreements, and the institutions allowed to participate in the market. In 1978 the Ministry also imposed limits for each participating securities house (on its position as broker and its position for its own account), and the Bank of Japan set limits on each participating bank's position. Those restrictions have been eased gradually since then, while interest rates have remained free of all but occasional informal restraint.

Other early innovations in financial instruments resulted from capital flow policies geared to offsetting large swings in the current account balance of payments. Aside from opening doors to Japanese residents' investments in foreign financial markets, capital flow policies also led to the development of two new financial instruments in Japanese markets: "samurai" bonds and foreign currency deposits at banks in Japan.

The samurai bond—a yen bond issued by a foreign borrower in Japan—was first permitted in 1970. Access to the market is carefully regulated, with an eye to balance-of-payments requirements and domestic bond market conditions, and is confined mainly to official borrowers. The bonds have served to increase the volume and variety of assets available to the Japanese investor, although many have been purchased by foreigners. In 1978, samurai bonds also made a minor contribution to interest rate flexibility when several issues were priced closer to the market for outstanding securities than new domestic issues were at that time.

Japanese residents were first permitted to make foreign currency deposits at Japanese banks in 1972, as authorities sought means of relieving upward pressure on the yen. These deposits were exempted from interest rate controls in 1974. But, when the yen came under substantial downward pressure in 1974, a ceiling on resident foreign currency deposits was imposed, causing them to level off until 1976, when this form of exchange control was partially liberalized. Until recently, however, such deposits acquired by conversion of yen into foreign currency (rather than by deposit of foreign currency proceeds of exports or other external transactions) were limited to ¥3 million equivalent (about \$15,000). With the coming into force of a more liberal foreign exchange law late in 1980, this restriction was removed. As funds moved strongly into foreign

currency deposits, the Bank of Japan monitored developments closely. It also raised reserve requirements on those deposits, bringing them closer to but not level with reserve requirements on yen deposits.

Late in the decade, other yen instruments issued by domestic borrowers appeared. Shorter term government bonds were introduced in 1977 and 1978. Until then, the government had confined its debt issues to seven- and ten-year maturities—aside from very low-yield Treasury bills sold mainly to the Bank of Japan and other official holders. Rather than selling bonds at auction as in the United States, the government allocated them to banks and other financial institutions at interest rates that were often lower than yields on outstanding issues.¹² The rising size of government borrowing requirements and rising interest rates increased the banks' resistance to this practice, since it threatened their earnings and created large capital losses. In partial response, the government offered a somewhat shorter maturing five-year bond in 1977. In 1978 it went further, offering two- and three-year bonds at auction rather than by allocation. Thus far, however, short-term bond issues have been small and auctions infrequent. At the end of 1980, bonds with original maturities of two to four years amounted to about 7 percent of all government bonds outstanding.

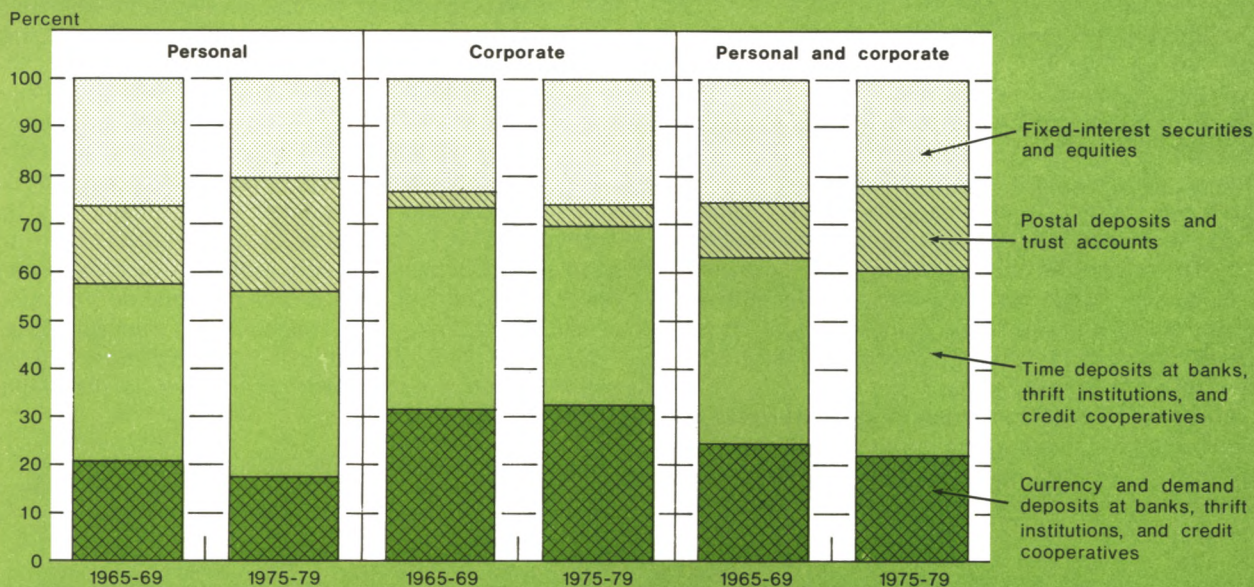
Despite the authorities' preference for longer term bond issues, the maturity of outstanding government debt is likely to decline over the next few years as the large volume of bonds issued in the latter half of the 1970s approaches maturity. Thus, the volume of short-term securities available to business and personal investors will be greatly increased. Indeed, by the mid-1980s, as much as one fifth of all government bonds outstanding could be within two years of maturity.

Large-denomination bank CDs were permitted only recently, in May 1979, after a long campaign on the part of the banks. In authorizing their issuance, the Bank of Japan specified that maturities be limited to the three- to six-month maturity range and that CDs be negotiable only with the permission of the original issuers. The Bank of Japan also strictly controlled volume, originally setting ceilings at 25 percent of each bank's capital. Since then, issue limits have been adjusted upward several times as the more active banks approached their upper limits. By April 1980, the ceiling

¹² Following an agreement made in the 1960s, an underwriting group of banks and securities companies is committed to absorb each new issue of government bonds. The share that each bank must take is set by the authorities. Banks are not permitted to resell new issues for some specified period of time. This holding period has gradually been reduced, however, and is currently only 100 days.

Chart 2

Distribution of Selected Personal and Corporate Financial Assets in Japan



The monetary aggregates defined:

M-1 = Currency and demand deposits at banks and thrift institutions.

M-2 = M-1 plus time deposits at banks and thrift institutions.

M-3 = M-2 plus postal deposits, trust accounts, and deposits at cooperatives.

Source: Bank of Japan; Flow of Funds.

was 50 percent of each bank's capital. In recent months, a repurchase market in CDs, which in effect allows shorter maturity transactions in CDs, has started to develop. CD interest rates are allowed to move freely, and thus arbitrage keeps gensaki (repurchase agreement) rates, CD rates, and rates in the interbank call money market fairly closely aligned.¹³

The latest market instrument to appear—the government bond mutual fund introduced in 1980—is keyed to the needs of the personal sector. Fund shares are issued by the securities houses, which in turn invest mainly in short-term and other government bonds and in call money. These funds might ultimately become as popular as money market funds in the United States. But, for the present, their volume is small and carefully controlled by the Ministry of Finance.

Innovation-related changes in the composition of financial portfolios (Chart 2).

The innovations described in the preceding section have led to important changes in personal and corporate financial portfolios during the 1970s. For individuals, the more flexible interest rates offered on deposits, trust accounts, and new issues of bank debentures, as well as more active trading in debentures, apparently encouraged a massive shift in the composition of their portfolios with more going to those assets and less to equities. Dividend payments are very low in Japan, and most of the return on capital is reflected in the price of equities. However, stock prices have been volatile, creating risks that discouraged small holders. Thus, the newly flexible interest rates on deposits, trust accounts, and debentures seem to have proved appealing. Most of the deposit gain was in term deposits at post offices, with only a modest share going to bank deposits. This was apparently because post offices were more easily accessible than banks for small depositors and offered slightly more favorable interest-compounding features.

¹³ Remaining restrictions in each of those markets has allowed un-arbitrated gaps between the three rates to appear from time to time. For a discussion, see *General Features of Recent Interest Rate Changes* (Bank of Japan, Economic Research Department, Special Paper No. 91, December 1980).

However, banks did attract added personal investment in trust accounts (in effect long-term deposits) and debentures (issued mainly by specialized long-term credit banks).

In a separate development, the introduction of *sogo* accounts led to a decline in the importance of both currency and demand deposits relative to time deposits in personal financial assets. This was because *sogo* accounts permit individuals to use relatively high-interest deposits as a means of payment.

In corporate portfolios, the importance of equities increased somewhat. At the same time, the development of the repurchase agreement and the growing supply of bonds eligible for repurchase agreement attracted a growing share of their liquid balances. Both developments served to reduce the importance of corporations' time deposits at banks.

The portfolio adjustments just described have in turn affected the relative importance of the main monetary aggregates in total financial assets. Chart 2 compares the importance of these aggregates in personal

and corporate portfolios in the second half of the 1970s with the situation a decade earlier. The importance of M-1—currency and demand deposits—was reduced by the tendency of individuals to economize in their holdings of those two assets and to increase their time deposits once *sogo* accounts became available. The importance of M-2—M-1 plus time deposits at banks—also declined slightly, largely in response to the growing corporate preference for fixed-interest securities whose liquidity was greatly enhanced by the introduction of repurchase agreements. And, finally, the importance of M-3—M-2 plus postal deposits, trust accounts, and deposits at cooperatives—increased as a result of adjustments in personal financial portfolios out of equities and into postal deposits and trust accounts.¹⁴

More detailed information on Japan's monetary aggregates and a comparison with those in the United States is given in the box.

¹⁴ The differing treatment of deposits at credit cooperatives in flow-of-funds statistics (used in Chart 2) as compared with statistics for the monetary aggregates does not materially affect the analysis.

Definitions of Monetary Aggregates* in Japan and the United States

Japan	United States
M-1 . . . Currency, checkable demand deposits, and noncheckable interest-bearing demand deposits (used for payments purposes) at banks and thrift institutions.	M-1A . . . Currency and checkable demand deposits at commercial banks.
M-1' . . . M-1 plus corporations' domestic and foreign currency time deposits at banks and thrift institutions.	M-1B . . . M-1A plus ATS (automatic transfer service) and NOW (negotiable order of withdrawal) accounts at banks and thrift institutions, credit union share draft accounts, and demand deposits at mutual savings banks.
M-2 . . . M-1' plus other domestic and foreign currency time deposits at banks and thrift institutions.	M-2 . . . M-1B plus savings and small-denomination time deposits at all depository institutions, overnight repurchase agreements at commercial banks, overnight Eurodollars held by United States residents at Caribbean branches of member banks, and money market mutual fund shares.
M-2 + CDs at banks and thrift institutions.	
M-3 . . . M-2 plus deposits with postal system, deposits with credit cooperatives, and trust accounts—in effect long-term deposits—at banks.	M-3 . . . M-2 plus large-denomination time deposits at all depository institutions and term repurchase agreements at commercial banks and savings and loan associations.
	L . . . M-3 plus other liquid assets such as term Eurodollars held by United States residents, bankers' acceptances, commercial paper, Treasury bills, other liquid Treasury securities, and United States savings bonds.

* Holdings of residents and nonresidents (except central governments, official monetary institutions, and banks).

Chart 3

Income Velocity of M-2* in the United States and Japan



*Gross national product/M-2.

Innovation and the usefulness of the monetary aggregates as indicators and targets

The changes in financial flows of the 1970s that motivated innovation in financial instruments also led to a change in monetary policy indicators. In the 1960s, when private corporations were the predominant borrowers, bank credit to the private sector had proved a useful indicator of the thrust and effectiveness of monetary policy. But in the 1970s, as public-sector borrowing came to overshadow private borrowing and as external transactions gained in importance, some broader policy indicator was clearly needed. While total bank credit might have served the purpose, most industrial countries at the time were adopting monetary rather than credit aggregates as indicators and targets. This may have influenced the Japanese decision to adopt M-2 as its main policy indicator.

An important reason for the choice of M-2—rather than the narrower and more homogeneous M-1 or the broader and more comprehensive M-3—as the main indicator was that M-2 came closest to being the balance-sheet counterpart of bank credit to both the private and government sectors and of the position of the monetary authorities and the banks relative to the

outside world.¹⁵ (In line with this reasoning, M-2 plus CDs replaced M-2 as the primary indicator when banks were first permitted to issue CDs.) The authorities' choice of the monetary aggregate that corresponds most closely to bank credit may well have been related to their ability to influence bank credit through credit ceilings, allocation of new government securities issues to banks, and through regulation of the banks' net foreign position.

Since 1978, the Bank of Japan has published at the beginning of each quarter its forecast for the growth rate of the indicator aggregate in that quarter, expressed as a percentage change over the same quarter a year earlier. (The indicator forecast was M-2 through the second quarter of 1979 and M-2 plus CDs thereafter.) The forecasts have been given in round numbers with qualifiers such as "about" or "a little less than". Their purpose has been to call public attention to

¹⁵ *Role of the Money Supply in the Japanese Economy* (Bank of Japan, Economic Research Department, Special Paper No. 60, October 1975); *Rising Trend Line of the Marshallian k* (Bank of Japan, Economic Research Department, Special Paper No. 74, February 1978). The Bank of Japan's views cited throughout this section are drawn in good part from these two papers.

monetary developments and to give some indication of the general thrust of monetary policy. Thus far, the objective has been a gradual deceleration of money growth to reduce inflation without inhibiting real GNP growth. Through the second quarter of 1980, successive forecasts spelled out a gradual decline in money growth from 12 percent to 10 percent. And, after a small unwelcome overshoot late in 1978, actual money growth followed rather closely the forecast pattern. But, for the third quarter of 1980, when M-2 plus CDs was forecast to be about 10 percent higher than four quarters earlier, implying a seasonally adjusted annual rate of growth for that quarter alone of a little over 10 percent, actual money growth dropped precipitately. In fact, the indicator rose to a level only 8.4 percent higher than four quarters earlier and growth in the single quarter being forecast dropped to 4.9 percent.

Partly in an effort to halt further overrapid deceleration in the growth of money, the official discount rate was reduced three times—in August and November 1980 and March 1981 for a total of 2.75 percentage points—to 6.25 percent. At the same time, forecasts were progressively adjusted downward, to 8 percent for the four quarters ended in the fourth quarter of 1980 and 7 percent for the period ended in the first quarter of this year, to take account of trends clearly in evidence.

Despite their introduction of quarterly forecasts, the authorities have avoided any suggestion of monetary targets, especially the targets for four quarters ahead common in other industrial countries. The Bank has given two related reasons for the way it uses monetary aggregates. First, it is unsure of its ability to control money growth closely enough to make targeting successful. And, second, it doubts its ability to forecast accurately the relationship between money growth and ultimate objectives, such as real GNP growth and inflation. Its own studies have suggested that the transmission mechanism running from changes in money to changes in ultimate policy targets, such as output and prices, is highly variable over time because it is subject to numerous independent influences—notably government expenditures, foreign demand, exchange rates, and autonomous expenditures for plant, equipment, and inventory. Further, its studies of the demand for M-2 have also shown considerable variability in the relationship between income and the demand for money balances.¹⁶ The variability of both the transmission mechanism and the money demand relationships is reflected in Chart 3, which plots the income velocity of money, $GNP/M-2$ and compares it

with the income velocity of the somewhat broader based M-2 in the United States.¹⁷

Much of the variability and uncertainty regarding the relationship between income and demand for money is related to financial innovation. In the 1970s, the increased availability of financial instruments bearing market rates of interest—which sometimes varied widely from rates available on bank deposits—made money demand much more sensitive to market interest rates than in the 1960s. This interest sensitivity of money demand in the 1970s is illustrated by the equations given in the appendix. Further, the fact that innovations are continuing to occur means that the money demand relationships that developed in the 1970s cannot be counted on as a guide to the 1980s.

Some of the problems that would have faced the authorities in 1979 and 1980, had they wished to set money growth targets for the twelve-month period immediately ahead, may serve to illustrate the difficulties. First, the introduction of CDs in May 1979 and the adoption of M-2 plus CDs as the primary monetary indicator changed the character of the indicator, presenting the authorities with a variable to be forecast for which there was no track record. The prediction of CDs themselves was eased somewhat by the fairly tight limits on the amount that could be issued. But it was difficult to predict whether the funds invested in CDs would come out of bank deposits and thus out of existing M-2 or out of other assets held in Japan or abroad. The analysis of actual developments in 1979 and 1980, given in the appendix, suggests that CD purchases were financed in good part by drawing down bank deposits already included in M-2. But this could not have been forecast with any degree of certainty in early 1979.

A second problem associated with targeting in 1979 and 1980 would have been how to allow for the effect on the interest sensitivity of money demand of the

¹⁶ The Bank of Japan's studies of the transmission mechanism and the demand for money revealed even more variability and uncertainty on both counts for M-1, at least since the mid-1960s.

¹⁷ The velocity-of-money ratio relates to a single period of time and reflects the effects of two processes, both of which may entail lags: (1) the transmission mechanism running from money to income and (2) the adjustment of money holdings to the level desired at any given income. This ratio is often used in investigations of factors other than income that influence the demand for money. In its money demand studies, Japan has used the reciprocal of velocity (M/GNP , known as the Marshallian k). Unless GNP is also introduced as an independent variable in the regression, the use of GNP/M or M/GNP in such investigations requires the assumption that the income elasticity of demand for money is unitary.

The widely differing trends in the Japanese and United States velocities are related to differences in savings rates. In the second half of the 1970s, personal saving averaged over 20 percent of personal disposable income in Japan but only about 6 percent in the United States. It will be remembered that in Japan the ratio of M-2 (plus CDs) to financial assets has declined even though its importance relative to GNP has increased.

growing supply of market instruments that competed with money. The Bank of Japan's own money demand studies had found that during most of the 1970s money demand was primarily responsive to long-term market interest rates, such as those on bonds and bank debentures. However, the simulation experiments given in the appendix indicate that reliance on past sensitivity to long-term interest rates would have resulted in seriously overpredicting actual money demand as it developed in 1979 and 1980. Historic responses to short-term interest rates, though somewhat weaker in the past, would have provided a far better, though imperfect, basis for forecasting. Indeed, in commenting on the shortfall in the growth of M-2 plus CDs relative to the official quarterly forecast for the third quarter of 1980, the Bank of Japan attributed the discrepancy to the strong attraction of high-interest market instruments. Many such instruments have relatively short maturities.

Since the pace of innovation has quickened in the past year or so, similar forecasting problems can be expected in the future. This would, in turn, complicate monetary targeting should such a policy be adopted.

Conclusions

Financial innovation in Japan has come in response to the changing needs of a maturing economy and its increasing role in international capital markets and to higher and increasingly variable inflation rates since 1970. The authorities themselves have encouraged interest rate flexibility and the development of new financial instruments to influence business investments and international capital flows indirectly through interest rates, as direct controls (credit ceilings and exchange controls) have become less workable. But they have also applied restrictions effectively limiting the pace of financial change.

The main forms of innovation have been the introduction of flexibility into interest rates on bank and postal deposits and on new issue rates for bonds, the advent of *sogo* accounts incorporating bank overdraft facilities that blurred the line between personal demand and time deposits, and the successive introduction of new short-term instruments bearing market rates of interest.

The effects of innovations on the monetary indicator, M-2 plus CDs, and on the authorities' ability to predict its response to policy actions and other de-

velopments have varied greatly. Some innovations have had only minor effects on the demand for M-2 plus CDs, although they have altered the composition of assets included in that aggregate and also those outside it. (One example is the increasing importance of time deposits relative to demand deposits and currency—all within M-2 plus CDs—in response to consumer finance developments.) But the gradual development of nondeposit instruments bearing market interest rates has clearly increased the interest sensitivity of money demand to market interest rates, especially short-term rates, during the past few years.

The interest sensitivity of money demand could well change again in the 1980s. The inevitable growth of the supply of near-maturity government securities and the possible relaxation of limits on the growth of repurchase agreements and government bond funds would tend to make money demand more negatively sensitive to short-term interest rate changes. But continued freedom to make foreign currency deposits in Japanese banks and further development of bank CDs would work in the opposite direction since both instruments are included in the indicator aggregate. And some as yet unforeseen innovations and developments could tip the balance either way.

The problems just cited are very similar to those experienced in a number of other industrial countries, including the United States. In Japan, they have contributed to official reluctance to become committed to yearly targets for any monetary aggregate. In a recent article¹⁸ reviewing Japan's monetary policy in the 1970s, Haruo Mayekawa, Governor of the Bank of Japan, affirmed the Bank's commitment to controlling the money supply as one means of achieving price stability. But he also stated that: "The Bank has not yet started to set a specific numerical target for monetary growth, partly because empirical studies so far carried out have not found a demand for money function stable enough to justify normative monetary targetry, and partly also because experience with the control over the money supply has not yet demonstrated the sufficiently high degree of precision required for the adoption of such a strategy."

¹⁸ Haruo Mayekawa, "Monetary Policy in Japan. A Review of its Conduct during the Past Ten Years", *Kredit und Kapital* (Fourth Quarter 1979).

Dorothy B. Christelow

Appendix: Estimating and Predicting the Demand for Money in Japan, an Illustrative Exercise

The new interest sensitivity of money demand that developed during the 1970s is illustrated in the money demand equations, based on quarterly observations for 1970-78 given in the table on page 53. The variable to be determined is the demand for real money. One equation uses a long-term market rate as a measure of the opportunity cost of holding money, an own-deposit rate, and real income. The other substitutes a short-term market rate for the long-term rate. The real money variable to be determined, lagged one quarter, also enters the right-hand side of the equation, signifying the lagged adjustment response of money holders to the other independent variables.¹

Analysts attempting to forecast the growth of M-2 on the basis of historical money demand relationships face at least three problems. These are: (1) the difficulty of accurately forecasting income, interest rates, and any other variable thought to affect the demand for money, (2) the estimating errors implicit in any money demand equation even when underlying relationships are stable, and (3) the possibility that the money demand relationship itself may be changing in response to innovations.

"Predictions" of money demand in 1979 and 1980 derived from two money demand equations, also given in the table, serve to illustrate some of these problems. Since the predictions make use of actual income and interest rates in 1979 and 1980, a device not available to those forecasting the future, most of the first problem is eliminated. However, the predictions also make use of the lagged value of the dependent variable, a forecast generated by the equation and thus subject to forecasting error. With respect to the second problem, the standard errors of estimate of the two equations (given in the final column at the top section of the table) proved to be 1.6 and 1.8 percentage points.

Various facets of the third problem—whether or not the money demand relationship is being altered by innovation—can be illustrated by considering the prediction errors of the two equations (lower section of the table). First, with the adoption as primary monetary indicator of M-2 plus CDs, a variable for which no previous experience existed, it was necessary to predict whether the funds invested in the CDs would come out of bank deposits and thus out of existing M-2 or out of other assets held in Japan or abroad. If the first alternative were entirely correct, one could use a 1970-78 M-2 demand equation to forecast demand for M-2 plus CDs. But, if the second assumption were en-

tirely correct, one might use the 1970-78 equation to forecast M-2 alone, then add some reasonable fraction of the maximum volume of CDs permitted to arrive at a forecast of M-2 plus CDs.² Since equations I and II gave a better prediction of M-2 plus CDs than they did for M-2 alone, it is likely that investment in CDs was, in fact, financed by drawing down other bank deposits included in M-2. Other assets such as repurchase agreements, being subject to official volume controls, apparently remained in short supply relative to the demand for them, and thus were little affected by the appearance of a new financial instrument.

A second aspect of the innovation-related forecasting problem is the choice of the correct interest rate for denoting the yield on alternative assets. In choosing between an equation featuring a long-term market interest rate and one featuring a short-term rate, the authorities might well have chosen the first. In the equations given here, the significance of the coefficients of all variables (as measured by their t-statistics) was somewhat higher and the standard error of the equation was somewhat lower, using a long-term interest rate as a measure of opportunity cost.

In fact, the second equation, featuring a short-term market interest rate, yielded a far better prediction of money demand in 1979 and 1980. Based on equation II, four of the seven quarterly prediction errors were smaller than the standard error of estimate as compared with only one prediction for equation I.³

The greater predictive success of the equation incorporating a short-term market interest rate probably reflects the growing availability of more liquid instruments to Japanese corporations. As far as domestic short-term securities are concerned, those held by persons and corporations amounted to only a negligible percentage of M-2 in the early 1970s but to around 3 percent by early 1980. Japan's flow-of-funds statistics, the source of information on residents' holdings of domestic securities, contains no information on their holdings of the obligations of foreigners, either the samurai bonds held in Japan or foreign-currency-denominated assets held abroad. By 1980, those holdings might well have amounted to 1 to 2 percent of M-2 plus CDs.

¹ For more elaborate and detailed money demand studies, see Bank of Japan, Economic Research Department, Special Paper No. 60 (October 1975) and Special Paper No. 74 (February 1978).

² Since some banks moved more aggressively into CD issues than others, CDs outstanding were unlikely to be at the maxima permissible for all banks.

³ An equation for 1970-78 using both interest rates, long term and short term, was also tried. The short-term rate proved insignificant and the prediction errors nearly as large as for the equation using long-term rates alone. This reinforces the impression that the relative importance of long-term and short-term alternative assets was different in 1979 and 1980 than earlier in the 1970s.

Appendix (continued)

The Demand for Real Money (M), 1970-78*

Equation	Constant	YR	RL	RS	RD	M ₋₁	\bar{R}^2	SEE
Short-term coefficients								
I	-2.38 † (-2.90)	0.47 † (4.15)	-0.22 † (-5.41)		0.04 (1.00)	0.60 † (7.82)	0.98	0.016
II	-2.25 (-1.96)	0.44 † (2.92)		-0.10 † (-3.15)	0.02 (0.32)	0.60 † (5.66)	0.97	0.018
Long-term elasticities								
I		1.19	-0.55		0.11			
II		1.10		-0.26	0.05			

Prediction Errors for 1979 and 1980‡

Percentage deviation of actual from predicted value

Year and quarter	Using equation I to predict:		Using equation II to predict:	
	M-2	M-2 + CDs	M-2	M-2 + CDs
1979: First quarter	-1.6	-1.7	-1.5	-1.6
Second quarter	-0.6	-0.8	0.4	0.2
Third quarter	3.0	2.5	2.1	1.5
Fourth quarter	4.3	3.6	2.8	2.1
1980: First quarter	9.2	8.5	5.7	4.9
Second quarter	11.7	10.6	4.2	3.2
Third quarter	13.1	12.1	2.4	1.3

Key to variables (all are in natural logarithms):

M = Real M-2 (M-2/wholesale price index).

YR = Real GNP (gross national product).

RL = Market yield on Nippon Telephone and Telegraph bonds (quarterly average of end-of-month data).

RS = Call money rate (considered as a proxy for yield on repurchase agreements, for which data are not available prior to 1977); average of daily rates.

RD = Six-month deposit rates, quarterly average of end-period rates.

M₋₁ = Dependent variable lagged one quarter.

Figures in parentheses are t-values.

* The equations are corrected for first order autocorrelation using the Cochrane-Orcutt method. The Durbin-Watson statistic, although a biased indicator of remaining autocorrelation in an equation with a lagged dependent variable when the Cochrane-Orcutt correction is used, was 2.13 for equation I and 2.00 for equation II.

† Denotes significance at the 99 percent level.

‡ Predictions use the dynamic method whereby M₋₁ is generated by the forecasting equation.

Treasury and Federal Reserve Foreign Exchange Operations

During the six-month period under review, the United States dollar came into heavy demand in the exchange markets and advanced sharply against many major currencies.

The dollar's underlying strength reflected the relatively favorable current account position of the United States. Our current account had swung from substantial deficit in the first half of 1980 to surplus in the second half of the year. By contrast, many other major industrial countries continued to record massive current account deficits, swollen by the increase in their oil-import bills following the run-up of international oil prices in 1979-80.

In addition, the dollar proved increasingly attractive as an investment medium. As the United States economy snapped back from the sharp recession of early 1980, the demand for money and credit in the United States also rebounded strongly. With the Federal Reserve continuing to adhere to its approach—adopted in October 1979—of placing primary emphasis on bank reserves rather than on interest rates to control the growth of the money and credit aggregates, interest rates in the United States were bid up once again to new peak levels. Meanwhile, the economies of most other major

countries were showing slower growth than before or even moving into recession, with marked increases in unemployment. This generated strong pressures on the authorities to ease up on policies, including monetary policies, even as inflation rates and, in most cases, current account deficits still showed little sign of improving. The authorities were reluctant to have their interest rates rise in pace with those in the United States. Consequently, as interest differentials opened up in favor of the dollar, increasing volumes of funds moved into dollar-denominated assets.

Through late 1980, the selling pressures were mainly on Western European currencies, in particular the German mark. In Europe, current account deficits continued to be large and interest rates, while high relative to inflation rates, were generally below those in the United States. The pound sterling was an exception; the United Kingdom moved into a strong current account position and maintained high interest rates which proved attractive to investment flows. The Japanese yen also advanced sharply, on a substantial improvement in Japan's current account position and on heavy demands for yen-denominated assets.

In early 1981 the dollar's advance became more generalized, even though United States interest rates had edged off from their peaks. The release of the United States hostages by Iran lifted one element of uncertainty for the dollar, while the unfreezing of a part of Iran's assets took place without disrupting the exchanges. Moreover, the market reacted positively to

A report by Scott E. Pardee. Mr. Pardee is Senior Vice President in charge of the Foreign Exchange Function of the Federal Reserve Bank of New York and Manager of Foreign Operations for the System Open Market Account.

the sense of determination shown by the Reagan administration to deal with inflation and to revitalize the United States economy. By late January, market sentiment became extremely bullish toward the dollar. At the same time, market participants were inclined to interpret developments affecting other major currencies in a pessimistic light. In this atmosphere markets became increasingly one way, with the dollar rising virtually every day.

By the end of January, the dollar had risen by 19 percent against the German mark and by 16 to 20 percent against other currencies within the European Monetary System (EMS) joint float over the six-month period. Sterling, which had risen by 5½ percent, had dropped back for a net 1½ percent gain on balance. The yen also eased back from its highs but still rose 10 percent for the six-month period. The Canadian dollar, which had dropped to a forty-year low in December, was steadier after the year-end on signs of an improvement in Canada's external position and on the sharp rise in interest rates which had occurred in December.

In foreign currency operations, the United States authorities were active throughout the period, mainly as buyers of currencies. As the dollar firmed against the German mark in August, the Federal Reserve and

the Treasury began to acquire, in the market and through correspondents, the currencies needed by the System to repay swap debt and by the Treasury to cover its short position under its medium-term mark obligations. These operations continued in substantial volume through the fall. By end-October, the System had repaid in full the remaining \$879.7 million equivalent of swap debt to the Bundesbank and \$166.3 million of swap drawings on the Bank of France outstanding as of July 31, 1980. By early December the Treasury had acquired sufficient marks to cover its medium-term notes in that currency. Thereafter, with the dollar still in strong demand, the United States authorities continued on balance to acquire currencies. Operations were conducted on days in which the exchange rates were particularly volatile, and on some occasions the Trading Desk placed simultaneous bid and asked prices to settle the market. Nevertheless, with the one-way movement into dollars which developed, by late January the United States authorities were again purchasing marks virtually every day.

To summarize, over the six months, the United States authorities operated in German marks, French francs, Swiss francs, and Japanese yen. In marks, the Federal Reserve and Treasury purchased a total of \$7,569.5 million equivalent in the market and from cor-

Table 1
Federal Reserve Reciprocal Currency Arrangements
In millions of dollars

Institution	Amount of facility January 1, 1980	Increase effective May 23, 1980	Amount of facility January 31, 1981
Austrian National Bank	250		250
National Bank of Belgium	1,000		1,000
Bank of Canada	2,000		2,000
National Bank of Denmark	250		250
Bank of England	3,000		3,000
Bank of France	2,000		2,000
German Federal Bank	6,000		6,000
Bank of Italy	3,000		3,000
Bank of Japan	5,000		5,000
Bank of Mexico	700		700
Netherlands Bank	500		500
Bank of Norway	250		250
Bank of Sweden	300	200	500
Swiss National Bank	4,000		4,000
Bank for International Settlements:			
Swiss francs-dollars	600		600
Other authorized European currencies-dollars	1,250		1,250
Total	30,100	200	30,300

respondents and sold \$368.2 million in the market. In French francs, the Federal Reserve purchased \$158.6 million in the market and from correspondents to repay the swap debt. In Swiss francs, the Federal Reserve and the Treasury bought \$192.2 million equivalent, which was added to balances. In yen, the Federal Reserve sold \$50.0 million equivalent as part of a coordinated intervention operation early in January. Finally, in January the central bank of Sweden drew \$200 million under its swap line with the Federal Reserve. United States foreign currency reserves stood at \$10.7 billion at the end of January, up from \$5.4 billion at the end of July.

During the six-month period, August-January, the Federal Reserve realized profits of \$18.6 million on its foreign exchange operations. The United States Treasury's Exchange Stabilization Fund realized losses of \$3.7 million on its operations in the market. Also, the Treasury's general account incurred losses of \$170.2 million, reflecting annual renewals at current market rates of the agreement to warehouse with the Federal Reserve mark and Swiss franc proceeds of Treasury securities denominated in these currencies. These losses will be recovered by the Treasury's general account when it reacquires these currencies for the redemption of the securities. As of the end of the period, with the dollar having risen sharply, the Federal Reserve showed valuation losses of \$150.6 million on its foreign exchange assets while the Exchange Stabilization Fund showed valuation losses of \$826.3 million on its foreign exchange assets. The Treasury's general account showed valuation profits of \$781.1 million related to the outstanding issues of securities denominated in foreign currencies of \$6,436.6 million equivalent.

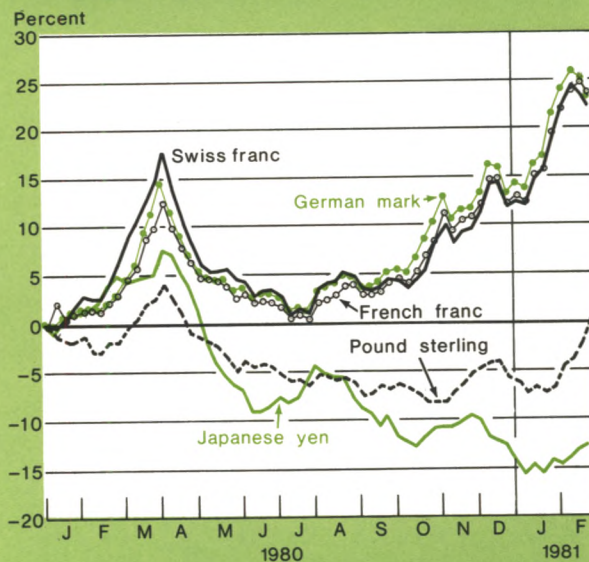
During the period under review, the United States authorities changed certain provisions of swap agreements with foreign central banks. Since July 1973 the exchange risk on drawings by the Federal Reserve or the United States Treasury had been shared evenly with the foreign central bank on which the drawing was being made. This risk-sharing procedure did not apply to drawings by other central banks. In addition, since the inception of the swap agreements in 1962, the interest rates paid on any drawings, either by the Federal Reserve or the Treasury or by the foreign central banks, were based on the current rates for United States Treasury bills. Under procedures beginning this year, the Federal Reserve and the United States Treasury, like their counterparties in the swap arrangements, will take the full exchange risk on their swap drawings. They will also pay a rate of interest based on the creditor country's Treasury bill rate or the nearest equivalent market rate.

German mark

By mid-1980 the German authorities were confronted with an emerging policy dilemma. Economic activity was contracting as recessionary trends abroad led to a sharp slowdown in export growth at the same time that domestic demand faltered. Unemployment was rising. Inflation, after peaking at 6 percent, began to recede and the growth of central bank money had slowed to the lower end of the 5-8 percent annual target range. These developments had permitted the Bundesbank to begin cautiously to ease money market conditions by providing some liquidity on a temporary basis over the summer months. But the central bank resisted domestic pressures to reduce official interest rates out of concern that a relaxation of the overall restrictive stance of monetary policy before inflationary expectations were firmly laid to rest would undercut the progress already under way in bringing inflation under control. Moreover, the current account deficit, running in excess of DM 25 billion at an annual rate, was in deeper deficit than earlier projected. German interest rates, though high by domestic standards, remained low relative to interest rates elsewhere. As a result, the goal of financing the current account deficit

Chart 1

The Dollar Against Selected Foreign Currencies

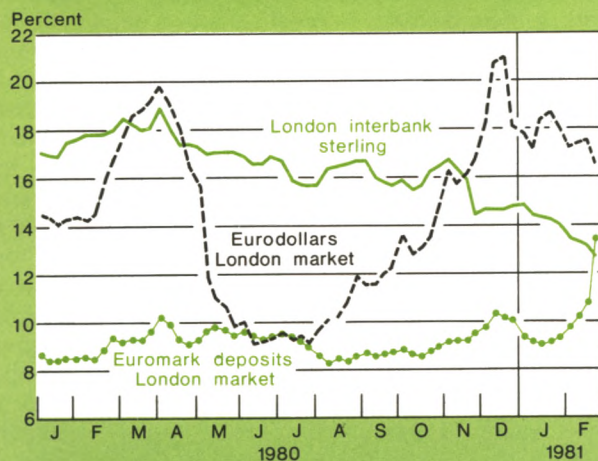


Percentage change of weekly average bid rates for dollars from the average rate for the week of January 2-4, 1980. Figures calculated from New York noon quotations.

Chart 2

Selected Interest Rates

Three-month maturities*



*Weekly averages of daily rates.

with a combination of private and public inflows of capital, and thereby avoiding a drain on Germany's foreign exchange reserves, had met with only limited success. Despite substantial foreign official placements with the Bundesbank and revaluation adjustments to its gold and foreign currency holdings with the European Monetary Fund, Germany's gross foreign exchange reserves declined \$1.6 billion in the first seven months of 1980 to stand at \$45.7 billion at end-July.*

In the exchanges, the German mark had moved up from its lows of last April in the wake of declining United States interest rates. On occasion during August the mark still came into bursts of demand amid concerns about the outlook for inflation in the United States. As in preceding months, the authorities in the United States acted to settle these pressures. The Federal Reserve and United States Treasury together sold \$69.6 million equivalent of marks during the month. But the mark's rebound had lost momentum as a renewed upturn in United States interest rates began to provide support for the dollar. Also, tensions in Poland were generating uncertainties about Germany's strategic and economic exposure to developments in

Eastern Europe. Consequently, the mark was from time to time vulnerable to renewed capital outflows and, on days when the spot rate weakened, the Federal Reserve and the United States Treasury were able to acquire \$481.1 million equivalent of marks and \$312.8 million equivalent of marks, respectively, in the market and from correspondents. These marks were used to rebuild balances and to reduce the Federal Reserve's swap debt with the Bundesbank from \$879.7 million at end-July to \$437.9 million by end-August.

The stalling of the mark's recovery during August contributed to the perception in the market that a deepening conflict between domestic and external objectives had left the German authorities with little room to maneuver. Following up on their actions of the summer, the Bundesbank acted to nudge money market rates lower while aiming to keep an overall, tight grip on liquidity. On September 1 the authorities cut minimum reserve requirements by 10 percent on domestic and foreign liabilities. To reduce the cost of funds to the banks further, the authorities acted on September 19 to lower the Lombard rate from 9½ to 9 percent, while also supplying additional mark liquidity via repurchase agreements against government securities and via foreign exchange swaps of marks against dollars. In fact, however, German money market rates did not ease much since the commercial banks, expecting a further drop in official lending rates, bid aggressively for funds in the market rather than approach the central bank for longer term loans. Around the time of the International Monetary Fund (IMF)-World Bank meetings in late September-early October, expectations of a more meaningful relaxation of policy became widespread amid spirited public discussion of the need for a cut in the discount rate.

Meanwhile, in contrast to the pattern of declining production and rising unemployment in Germany, economic activity in the United States was picking up. In the face of renewed demands for money and credit, the Federal Reserve had acted to constrain the growth of bank reserves in order to control the growth of the monetary aggregates. Market interest rates climbed sharply, and on September 26 the Federal Reserve raised the discount rate 1 percentage point to 11 percent. Strong demand for money and credit persisted, putting additional upward pressure on United States money market rates. With interest differentials adverse to the mark thus widening and with market participants looking for still larger differentials in the weeks ahead, capital began to flow heavily out of mark-denominated assets. As a result, the mark, already weighed down by the large current account deficit, came under increasing selling pressure in the foreign exchange market. The Trading Desk continued to buy marks

* Foreign exchange reserves for Germany and other members of the EMS, including the United Kingdom, incorporate adjustments for gold and foreign exchange swaps against European currency units (ECUs) done with the European Monetary Fund. Foreign exchange reserve numbers used in the report are drawn from International Monetary Fund data published in *International Financial Statistics*.

in response to the emergence of one-way pressures, acquiring \$395.9 million equivalent of marks on behalf of the Federal Reserve and \$283.6 million equivalent of marks, including \$36.9 million on a forward basis, on behalf of the United States Treasury through October 15. These purchases in the market and from correspondents enabled the Federal Reserve to liquidate in full its remaining swap debt with the Bundesbank and the Treasury to continue covering its outstanding mark-denominated medium-term notes.

At its Council meeting on October 20 the Bundesbank provided the banks with additional rediscount quotas at preferential rates and otherwise acted to increase bank liquidity but decided not to lower official interest rates. Demands that greater priority be given to restoring economic growth nevertheless continued. Indeed, a report of the five leading German economic research institutes recommended that the Bundesbank expand the growth of the money supply,

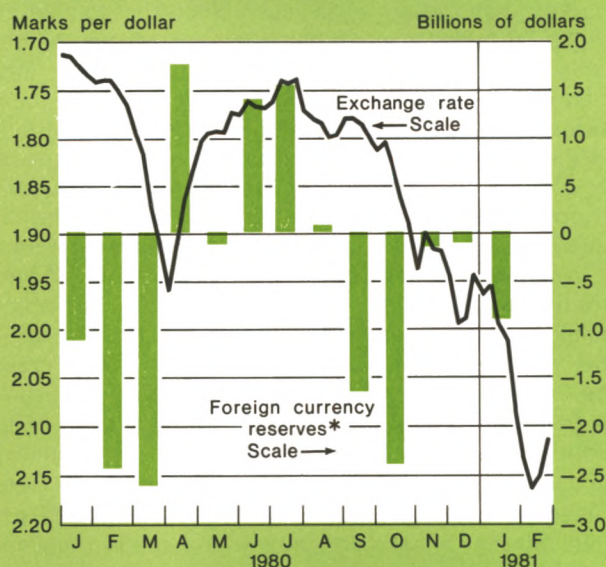
reduce official lending rates, and accept a temporary depreciation of the mark if necessary to prevent the downturn of the economy from deepening further. In the foreign exchange market, sentiment toward the mark turned bearish. Interest-sensitive capital flowed even more heavily from Germany amid portfolio shifts into the dollar, sterling, and higher yielding EMS currencies. Meanwhile, official and commercial borrowers with financing needs in other currencies borrowed marks and converted the proceeds in the exchanges. The pressure of these outflows triggered a fall in bond prices, prompting the Bundesbank to support the capital market through open market operations, while also pushing the mark to the floor of the joint float *vis-à-vis* the French franc and occasionally also *vis-à-vis* the Netherlands guilder. As speculative selling pressures mounted, reports of a temporary withdrawal of the mark from the joint float or of a widening in intervention limits began circulating through the market. But high-ranking German officials denied that such measures were under consideration and reaffirmed their commitment to maintain the mark's strength and thereby its attractiveness to foreign investors. The Bundesbank, which had gradually increased its intervention sales of dollars, was by late October operating heavily in French francs and on a smaller scale in Dutch guilders to preserve exchange rate limits within the EMS. Even so, by early November the mark had declined 10 percent from levels prevailing around mid-September to a low of DM 1.96 against the dollar.

To support the mark further, the Bundesbank allowed the heavy intervention within the EMS to tighten the German money market. Moreover, the French authorities adopted measures on November 7 to ease their money market interest rates and to discourage capital inflows. These actions alleviated the pressures on the mark. As concerns over realignment of EMS parities began to fade, the immediate focus of market attention shifted to interest rate developments among the industrial countries. In this respect, traders were unsure about the dollar's prospects if United States interest rates should suddenly drop off once the near-term run-up in rates topped out. Consequently, when signs that the growth of the United States monetary aggregates had begun to decelerate set off expectations that United States interest rates might decline, the dollar came suddenly on offer. As funds flowed out of dollars back into mark-denominated assets, the spot rate soared about 4 percent against the dollar to a high of DM 1.8860 in less than two trading days between November 7-10. In response, the United States authorities intervened as a seller of marks, while the Bundesbank also purchased dollars in Frankfurt.

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.

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, 1980	1980 I	1980 II	1980 III	1980 IV	1981 January	System swap commitments January 31, 1981
Bank of France	-0-	-0-	+ 100.2	{ + 60.6 — 54.6	—110.5	-0-	-0-
German Federal Bank	3,150.4	{ + 316.0 — 3,489.2	{ + 996.1 — 132.4	{ + 265.7 — 876.2	—260.3	-0-	-0-
Swiss National Bank	-0-	{ + 22.7 — 22.7	-0-	{ + 11.2 — 11.2	-0-	-0-	-0-
Total	3,150.4	{ + 338.7 — 3,511.9	{ + 1,096.2 — 132.4	{ + 337.5 — 942.1	—370.8	-0-	-0-

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

Data on repayments of swap commitments with the Bank of France and the German Federal Bank include revaluation adjustments of \$34.3 million for swap renewals during 1980.

Table 3

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, 1980	1980 I	1980 II	1980 III	1980 IV	1981 January	Outstanding January 31, 1981
Bank of Sweden	-0-	-0-	-0-	-0-	-0-	+200.0	200.0
* Bank for International Settlements (against German marks)	-0-	{ + 192.0 — 97.0	{ + 50.0 — 145.0	-0-	-0-	-0-	-0-
Total	-0-	{ + 192.0 — 97.0	{ + 50.0 — 145.0	-0-	-0-	+200.0	200.0

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.

Table 4

United States Treasury Securities, Foreign Currency Denominated

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

Issues	Amount of commitments January 1, 1980	1980 I	1980 II	1980 III	1980 IV	1981 January	Amount of commitments January 31, 1981
Public series:							
Germany	4,065.7	+1,168.0	-0-	-0-	-0-	-0-	5,233.6
Switzerland	1,203.0	-0-	-0-	-0-	-0-	-0-	1,203.0
Total	5,268.6	+1,168.0	-0-	-0-	-0-	-0-	6,436.6

Data are on a value-date basis.

Because of rounding, figures may not add to totals.

But, contrary to expectations, United States interest rates continued their advance in the weeks that followed. With the economy expanding, the growth of the monetary aggregates resumed and United States interest rates began to advance once again. The Federal Reserve followed by raising the discount rate successively by 1 percentage point each on November 17 and December 5 to 13 percent and introduced a surcharge on frequent use of the discount window by large borrowers. Short-term domestic and Eurodollar rates climbed sharply higher through mid-December, reaching new peaks of 22 percent and opening up interest differentials adverse to the mark of as much as 12½ percentage points.

Once again private capital flowed out of Germany as investors locked in high dollar interest yields at the expense of mark-denominated assets and as foreign governments, corporations, and individuals continued to borrow marks to take advantage of relatively low interest costs and prospective further declines of the spot rate in the exchanges. Such outflows were of major concern to the German authorities. They added to huge funding needs imposed by the current account deficit as well as by the continuing deficit on long-term private direct investment. Increased foreign borrowings by German public authorities, mainly from Organization of Petroleum Exporting Countries (OPEC) members, were not proving sufficient to prevent the mark from weakening further or to stem the erosion of Germany's foreign exchange reserves. Accordingly, the Bundesbank acted to curtail further capital outflows and in December negotiated a "gentleman's agreement" with large commercial banks which temporarily stopped new mark-denominated loans to foreigners. Nevertheless, selling pressure on the mark pushed the spot rate to as low as DM 2.0325 in European trading on December 12 despite substantial purchases of marks by the Trading Desk both in New York and through the agency of the Bundesbank in Frankfurt. In the weeks between mid-October and mid-December, the United States authorities intervened forcefully at times to counter one-way pressures on the mark. The Federal Reserve acquired \$1,472.8 million equivalent of marks in the market and from correspondents, adding these to balances. For its part the United States Treasury bought \$3,101.7 million equivalent, including \$196 million on a forward basis, enabling it to cover entirely its mark-denominated securities. On occasions when the markets were particularly volatile, the authorities also intervened to sell \$170.3 million equivalent of marks, financed out of balances.

After mid-December as United States interest rates slipped back from their highs, the mark began to recover. Even so, a sustained surge of buying did not

materialize. There was some evidence by this time that the decline in United States interest rates would be more gradual than had been originally thought. In particular, the United States economy, though generally expected to weaken in the first half of 1981, appeared fairly robust despite the depressed state of the auto and housing sectors. Moreover, further declines in German industrial production and rising unemployment were taken to suggest that the German authorities would follow by lowering their interest rates. But, in view of the considerable uncertainties surrounding the movement in interest differentials, few traders were willing to take on new positions, particularly ahead of the year-end.

Coming into the new year, market participants tried to assess the outlook for economic and financial developments for 1981. Traders were impressed by the large swing in the United States current account from deficit in the first half of 1980 to surplus in the second half of the year. Indeed, the importance of the increasingly favorable United States current account position for the dollar-mark relationship was underscored at the onset of trading in January when the mark, after initially rising to as high as DM 1.9280 on January 6, dropped back amid a stream of commercially based orders for dollars. By contrast, the outlook for Germany's current account worsened. Most forecasters were looking for nearly as large a deficit this year as the DM 28 billion shortfall recorded in 1980, despite projections of continued stagnation and even recession in the German economy. The prospect of a sizable and prolonged deficit partly reflected the adverse impact on Germany's terms of trade of the sharp depreciation of the mark and of higher oil prices. But underlying the tenaciousness of the deficit were structural problems as well, such as the challenge to manufactured exports by overseas competitors and Germany's continued heavy dependence on foreign energy resources.

Within Germany the on-going policy debate intensified amid heightened disagreement over the appropriate adjustment to the change in Germany's external situation. In the exchange market, sentiment toward the mark turned exceedingly bearish during January as market participants focused on the ambivalence of German policy. While holding to a firm monetary stance in the face of internal pressures to stimulate the economy, the central bank had nonetheless withheld from overt steps toward tightening, and market participants began to question the resolve of the authorities to support the mark. Moreover, the determined tone of the Reagan administration in seeking to strengthen the United States posture both at home and abroad contrasted sharply with the sense of policy frustration

in Germany, adding to the market's pessimism toward the mark.

In these circumstances, the selling of marks gathered force as concerns about a sharp drop in United States interest rates evaporated and as the Iranian hostage crisis and the unfreezing of blocked Iranian dollar assets were resolved without major incident, thereby removing uncertainties about the dollar. Downward pressures on the mark were also aggravated by the possibility of a Soviet military intervention in Poland, in view of Germany's strategic exposure and its extensive trade and investment relationships with Eastern Europe. By late January the mark was dropping more rapidly in the exchanges against the dollar than other EMS currencies and was again at the floor of the EMS *vis-à-vis* the French franc. In response, the Bundesbank intervened in dollars and, together with the Bank of France, in francs to preserve the EMS intervention limits. For their part, the United States authorities also acquired substantial amounts of marks. Even so, the mark plummeted 10 percent from its early-January highs to DM 2.1300 by January 31, for a net 19 percent decline over the six months under review.

In view of the continuing volatility of the exchanges after mid-December, the United States authorities intervened frequently both to settle the market and toward end-January to counter the strong one-way pressures building up in favor of the dollar. From mid-December, purchases of marks by the Federal Reserve and the United States Treasury amounted to \$719.0 million equivalent and \$802.6 million equivalent, respectively. Over that time, intervention sales by the United States authorities amounted to \$128.4 million equivalent.

In summary, during the six-month period the Federal Reserve purchased \$2,106.9 million equivalent of marks in the market and \$961.8 million equivalent of marks from correspondents, while intervening to sell \$215.9 million equivalent. At the same time, the United States Treasury acquired \$3,865.2 million equivalent in the market and another \$635.8 million equivalent from correspondents and sold \$152.4 million equivalent of marks. Meanwhile, reflecting sizable intervention purchases of marks within the EMS and the repayment of swap debt by the Federal Reserve, Germany's foreign exchange reserves declined \$3.3 billion over the six-month period to stand at \$42.4 billion on January 31, 1981.

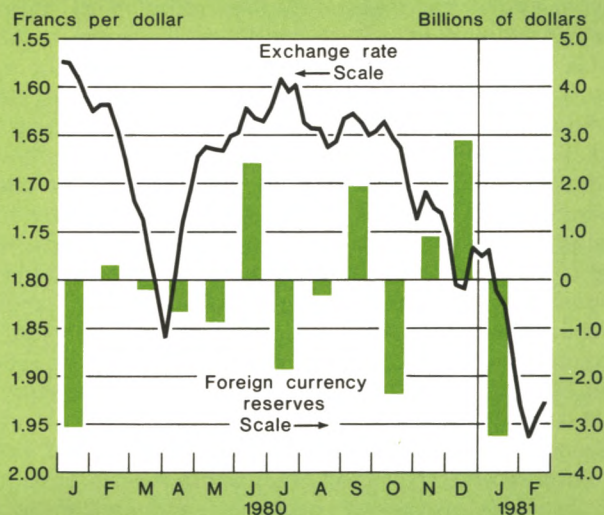
Swiss franc

The economy in Switzerland, in contrast to that in Germany, remained strong through the early summer of last year. Bolstered by consumer and investment demand, the Swiss gross national product was expanding

Chart 4

Switzerland

Movements in exchange rate and official foreign currency reserves



See exchange rate footnote on Chart 3.

at a 3 percent annual rate while employment advanced to its highest level in five years. But international developments were impinging on this otherwise favorable economic performance. Even though the Swiss inflation rate was still the lowest in the industrialized world, domestic prices were being pulled up sharply by rising oil prices and the higher prices of other imported goods.

The deterioration in the terms of trade, recessions in foreign markets, and the strength of the domestic economy had opened up a trade gap of around \$6 billion, about twice the 1979 deficit and sufficiently large to push the current account into deficit for the first time in fifteen years. Moreover, since the larger industrialized countries were relying heavily on restrictive monetary policies to combat high inflation, interest rates abroad had risen, reaching historic highs in a number of countries and moving interest differentials sharply against Switzerland in early 1980. These differentials, especially against the United States, were widening again by early August.

The relatively low nominal interest rates in Switzerland left the franc vulnerable to downward pressures which, if they intensified, threatened to increase inflationary pressures within Switzerland. In response, the Swiss authorities had begun to dismantle exchange controls limiting capital inflows, actions which helped

the franc rebound strongly against the dollar in the late spring-early summer. But, in late July, when the dollar began to recover, the franc fell back from its highs to trade around SF 1.65 in early August. Later in the month as United States interest rates continued to advance, the franc eased further, slipping at times against the mark as well as the dollar. In response, the Swiss authorities hastened to complete the abolition of all remaining restrictions against capital inflows. In addition, regulations governing borrowings in Swiss francs were changed to make it easier for central banks and monetary authorities to invest in private Swiss franc placements. During this period the United States authorities supplemented their operations in marks by operating in Swiss francs as well. By end-August, they had bought \$20 million equivalent of francs in the market and \$15.2 million equivalent from correspondents, of which \$22.6 million was for the Federal Reserve and \$12.6 million was for the Treasury.

Meanwhile, since the Swiss National Bank had intervened only occasionally to buy dollars in 1980, the authorities were relying on other operations to provide the liquidity banks needed on a short- and medium-term basis to maintain reserve requirements. These operations included arranging foreign exchange swaps for short- and medium-term maturities and placing government deposits with commercial banks. Even so, the Swiss monetary base, which is used as a target by the authorities, was falling just below the desired 4 percent per annum growth rate. In part, this reflected reduced holdings of bank notes following the removal of exchange controls. But, with recessions spreading across other European countries, especially Germany, the sluggishness of monetary growth suggested that the Swiss economy might also be slowing down. The markets came to expect a decline in interest rates. Nevertheless, the authorities remained determined to combat inflation, which at 4 percent per annum remained historically high for Switzerland. Therefore, the Swiss National Bank provided liquidity at now relatively unfavorable interest rates, thereby signaling to the market its refusal to accommodate lower interest rates.

By mid-October, the steep rise in United States interest rates opened up a large gap between United States and Swiss rates. Funds flowed heavily out of the franc into the dollar and the rate fell sharply with other Continental currencies, dropping some 5½ percent to SF 1.7425 in early November before leveling off with the mark around midmonth. Nevertheless, during this same period the somewhat tighter money market conditions had helped stabilize the franc *vis-à-vis* the mark. With the franc benefiting from the return of funds that had been invested earlier in the year in Germany, the franc did not fall as fast as the mark

and the Swiss National Bank did not have to intervene in the exchange market. Between early September and mid-November the Federal Reserve bought an additional \$5 million equivalent of francs in the market and \$102.2 million equivalent from correspondents. For its part the Exchange Stabilization Fund bought \$29.8 million equivalent from correspondents.

In December, United States interest rates rose even higher and the differential between United States and Swiss interest rates widened to more than 14 percent. Investment portfolio managers reacted swiftly by moving large amounts of funds out of the franc into higher yielding dollar assets. Moreover, seeing little possibility of a near-term recovery in the franc, many corporate entities, governments, and official agencies borrowed francs domestically or in the Euro-Swiss franc market where in many cases borrowers simply exercised options to allow them to switch loan currency denominations on rollover dates. As a result, the franc fell even more sharply against the dollar, while also relinquishing some of its gains against the mark. By mid-December, it dropped another 5½ percent to SF 1.8365 before recovering to SF 1.7800 at the month end in response to the decline in United States interest rates and a sharp year-end rise in Swiss interest rates.

Coming into 1981, participants remained wary over the outlook for the franc. Its steep decline against the dollar was seen as undercutting the fight against inflation in Switzerland. At the same time, the Swiss economy was expanding more slowly in the face of deepening recessions in Germany and elsewhere in Europe. In many financial centers around the world the concern over Germany's economic outlook tended to include Switzerland, and as a result many investors viewed the Swiss franc as a less attractive medium for investment funds. Against this background, once it became clear in early January that United States interest rates were not giving up much ground, the franc came heavily on offer with the other Continental currencies, plummeting 8 percent against the dollar over the month. This further steep decline in the rate prompted the Swiss National Bank to sell modest amounts of dollars in the exchange market. Also, on January 29 the Federal Reserve and the Treasury each purchased \$10 million equivalent of francs in the market to supplement intervention in marks. The franc closed on January 30 at a three-year low of SF 1.9270, to end the six-month period 16¼ percent lower against the dollar. Also, the franc eased back from its highs against the mark, having received much less intervention support. It therefore closed the six-month period little changed on balance against the mark.

Over the period, Federal Reserve market and correspondent purchases of francs totaled \$30 million equivalent.

Table 5

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

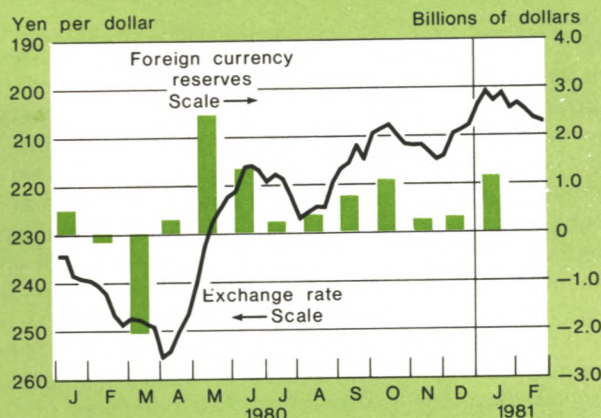
In millions of dollars

Period	Federal Reserve	United States Treasury	
		Exchange Stabilization Fund	General account
First quarter 1980	+ 14.1	-0-	+ 64.9
Second quarter 1980	+ 7.7	+ 42.0	-0-
Third quarter 1980	- 1.1	+ 3.9	+ 6.3
Fourth quarter 1980	+ 6.2	- 3.1	- 25.9
January 1981	+ 6.2	- 0.7	-144.3
Valuation profits and losses on outstanding assets and liabilities as of January 31, 1981 ..	-150.6	-826.3	+781.1

Data are on a value-date basis.

Chart 5

Japan

Movements in exchange rate and official
foreign currency reserves

See exchange rate footnote on Chart 3.

alent and \$109.8 million equivalent, respectively. Treasury Exchange Stabilization Fund acquisitions of francs totaled \$15 million equivalent and \$37.4 million equivalent, respectively.

During the six-month period, Switzerland's foreign currency reserves fluctuated from month to month in response to foreign exchange swap operations undertaken for domestic monetary purposes. On balance, the reserves declined \$200 million to \$12.1 billion as of January 31.

Japanese yen

By the third quarter of 1980, Japan was experiencing a dramatic turnaround in its balance of payments. This shift occurred initially in the capital account, where heavy inflows first into the banking sector and later into stocks and bonds had provided more than adequate financing for a current account deficit still running at a \$20 billion annual rate through the first half of the year. By midsummer, however, the current account was itself moving out of deficit at an unexpectedly rapid pace. A major reason for this improvement was a large reduction of the volume of oil imports, reflecting energy conservation efforts and major investments in energy-saving production processes by Japanese companies. In addition, following the adoption of more restrictive fiscal and monetary policies to stabilize the Japanese yen last March, private consumption flattened out and inventories were cut back

sharply. This reduction of domestic demand also contributed to lower import volume, while at the same time it encouraged Japanese companies to expand their overseas sales. As a result, the Japanese yen advanced from its early-April lows to ¥ 227.28 by the opening of the period, while Japan's foreign exchange reserves rose to \$18.8 billion.

This sharp recovery in the yen, together with the improved balance-of-payments performance, touched off a debate within Japan on whether or not to lower domestic interest rates. Earlier in the summer, the Bank of Japan had resisted pressures for easing monetary policy in view of the continued strength of inflationary pressures and the size of the current account deficit. But, by mid-August, evidence emerged of the substantial improvement in the current account and of a lowering in the inflation rate. Moreover, economic growth was slowing down both at home and abroad. As a result, on August 20, the Bank of Japan lowered its discount rate by $\frac{3}{4}$ percentage point to $8\frac{1}{4}$ percent. In addition, on September 5, the government announced a modest fiscal stimulus, featuring a restoration of some programs cut earlier in the year.

In the exchange market, this slight relaxation in fiscal and monetary policy had little impact on the performance of the yen. The market had become increasingly aware that, despite its heavy dependence on oil imports, Japan—by comparison with most other industrialized countries—was achieving a rapid adjust-

ment to higher world oil prices. The yen was remarkably resilient in the face of a prospective short-fall in oil production resulting from the outbreak of hostilities between Iran and Iraq. This resiliency impressed the market and the yen continued to be buoyed by capital inflows, including funds from OPEC countries to purchase stocks of Japanese companies as well as government and corporate bonds. These inflows, together with the virtual elimination of the current account deficit by early autumn, propelled the yen 7¼ percent above early-August levels to ¥ 210.65 by September 19 and a further 2 percent to ¥ 206.20 on October 14. At this level the yen was at its highest in nearly two years before easing back against a strengthening dollar to ¥ 211.05 at the month end. Meanwhile, with the yen in heavy demand in late September-early October, the Bank of Japan intervened in the exchange market to moderate its rise. These operations contributed to a \$2.2 billion increase in foreign exchange reserves to \$21.0 billion as of October 31.

In early November the strength of the yen, further evidence of moderating inflation, and a moderation of monetary growth provided the Bank of Japan with an opportunity to cut its discount rate another 1 percentage point to 7¼ percent. In addition, the authorities lowered reserve requirement ratios for bank deposits. This move was largely anticipated in the exchange market, and the yen continued to fluctuate around ¥ 212. Around the month end, however, the Japanese yen dropped to as low as ¥ 216.75 on expectations of higher interest rates in the United States coinciding with the implementation of a new exchange control law on December 1, liberalizing the movement of funds in and out of the country. But, effective the same day, the Ministry of Finance announced increases in the quotas available to Japanese and foreign banks for swapping dollar borrowing into yen, thereby providing more scope for capital inflows. The market soon came into better balance, and the yen recovered to fluctuate around ¥ 210 through midmonth.

In late December, exchange market sentiment became more favorable for the yen. Continued strength of export and investment demand was expected to give the economy a boost in Japan that contrasted with the spreading slowdown in most other industrialized countries. With United States interest rates also drifting lower at the time, market participants came to expect another wave of investment flows into Japan. As the market turned more bullish toward the yen, commercial leads and lags moved in its favor, pushing the rate up to as high as ¥ 198.00 on January 5. This abrupt rise prompted the Bank of Japan to intervene in the exchanges. At that time, the dollar was coming gener-

ally on offer and, as part of a joint effort with the Bank of Japan to prevent the disorderly conditions in the yen market from spilling over into the other currency markets, the Federal Reserve sold \$50 million equivalent of yen in New York, financed out of System balances. This intervention helped bring the market into balance and, as concern over a possible sharp drop in United States interest rates faded, the yen rate settled back to around ¥ 202.50 by midmonth. Thereafter, the yen traded quietly, declining somewhat against the dollar but rising against the continental European currencies. Market sentiment remained generally positive for the yen, which closed on January 30 at ¥ 206.10, up some 9½ percent over the six-month period. Meanwhile, the Bank of Japan's interventions during the last three months of the period contributed to a \$1.7 billion rise in foreign exchange reserves to \$22.7 billion as of January 31, for an overall rise of \$3.9 billion higher for the six-month period.

Sterling

Coming into the period under review, sterling had been buoyant relative to other European currencies. Britain's rising production of oil from the North Sea left its economy well protected against possible cutoffs in oil supplies and further increases in energy prices. A deepening recession at home was so dampening import demand as to help push the current account from deficit into substantial surplus. The British authorities remained determined to curb the entrenched inflationary pressures in the domestic economy. Toward that end, the Bank of England kept short-term British interest rates close to the recent record levels as long as the demand for credit appeared to remain strong. As a result, British interest rates stayed high by international standards and, in a world dominated by fears over the vulnerability of national economies to rising oil prices, sterling remained an attractive investment medium, especially in view of the depth, diversity, and breadth of the London money and capital markets.

As a result, the pound had led the advance of the European currencies against the dollar during the spring and summer to trade by early August at \$2.34 against the dollar and around 74.5 on a trade-weighted basis as a percentage of Smithsonian parities. Moreover, Britain's reserve position had become so strong that the government had announced during July its decision to prepay during 1980 an official Eurodollar borrowing of \$1.5 billion due to mature during 1985-88. Even after some of these repayments, Britain's official foreign currency holdings at the end of July were close to an all-time high at \$20.4 billion.

Sterling's strength in the exchange market, while acting to slow domestic price increases, was creat-

ing a dilemma for British policymakers, since the pound's steep and persistent rise against nearly all other currencies posed an ever-increasing threat to the competitiveness of British goods. As the pound advanced, British industrialists complained bitterly over narrowing profit margins and declining product market shares. As Britain's company sector came under increasing liquidity strains, unemployment rose to over 2 million, stocks were run down, and investment was cut back. The corporate bond market remained inactive, and bank borrowing was the major source of finance. The continued high level of borrowing by the private sector, as well as the large public-sector borrowing requirement, kept monetary growth well above target despite substantial sales of government stock. Thus, market participants eagerly awaited any evidence that might point to a deceleration in monetary growth sufficient to permit the authorities to lower interest rates or, alternatively, any development that might prompt the authorities once more to engage in heavy exchange market intervention to moderate the pound's rise.

Instead, money market conditions in London remained tight almost continuously from August to October. Statistics on the growth of the monetary and credit aggregates gave the market little hope that the time had come for the Bank of England to reduce its official minimum lending rate. As a result, sterling continued to be well bid during the late summer and fall. During August, both the exchange market and the money market were further influenced by efforts of the major oil companies to acquire sterling to make sizable

petroleum revenue tax payments. In late September the pound was bid up further in reaction to the outbreak of hostilities between Iraq and Iran, rekindling concerns over the global availability of oil supplies. By mid-October, release of figures revealing a further gain in Britain's trade surplus underscored the magnitude of the favorable shift in the country's balance-of-payments position. Thus, sterling was ratcheted up against the dollar 3 percent in the two and a half months to mid-October to \$2.4108, even as most other European currencies were fluctuating rather narrowly, albeit somewhat lower, against the dollar.

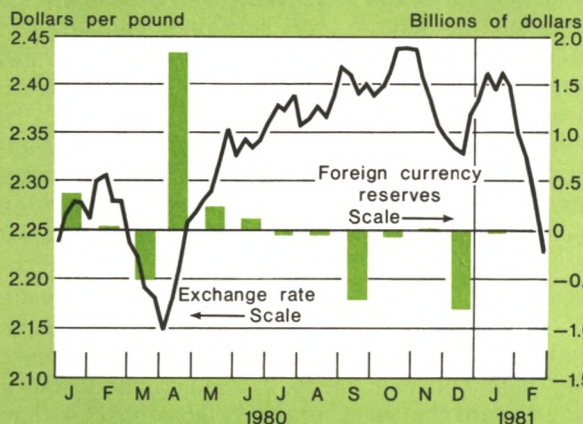
Later that month, when a renewed rise in United States interest rates started to draw funds out of many continental European currencies, the still relatively high yields available in London shielded the pound from these pressures. Indeed, with sizable amounts of OPEC and other investment funds on the move, some funds went into sterling and this influx helped push the exchange rate up even higher. By late October the pound was advancing against virtually all currencies, hitting a six-year high of \$2.4565 against the dollar. Against the continental EMS currencies, the pound rose 10 percent above early-August levels to four-year highs in early November. The Bank of England continued to intervene only to smooth out wide movements in the rate. Net official dollar purchases in the exchange market were more than offset by other operations, so that the United Kingdom's currency reserves declined somewhat over the three months.

Meanwhile, however, credit demand, although still strong, was on the verge of slackening for several reasons. The government deficit, although running ahead of forecast levels, was expected to decline as a result of planned expenditure reductions, the approach of the tax payment season, an anticipated rebate from the European Community (EC), and sales of government-owned companies. Also, as the recession became more protracted and industry cut its employment rolls while also pruning financial commitments, the demand for bank credit was expected to taper off. In the exchange market, expectations therefore hardened that the authorities would announce a reduction of interest rates when a new Parliamentary session opened in mid-November. A sharp sell-off suddenly developed, and the pound fell 4¾ percent from its highs to \$2.3385 on November 24. On that day the Bank of England's minimum lending rate was reduced by 2 percentage points to 14 percent. Chancellor Howe also announced a series of measures designed to lower the public-sector borrowing requirement, including a proposal for a supplementary tax on oil production at a rate of 20 percent of gross revenues and an increase in employee national insurance contributions

Chart 6

United Kingdom

Movements in exchange rate and official foreign currency reserves



See exchange rate footnote on Chart 3.

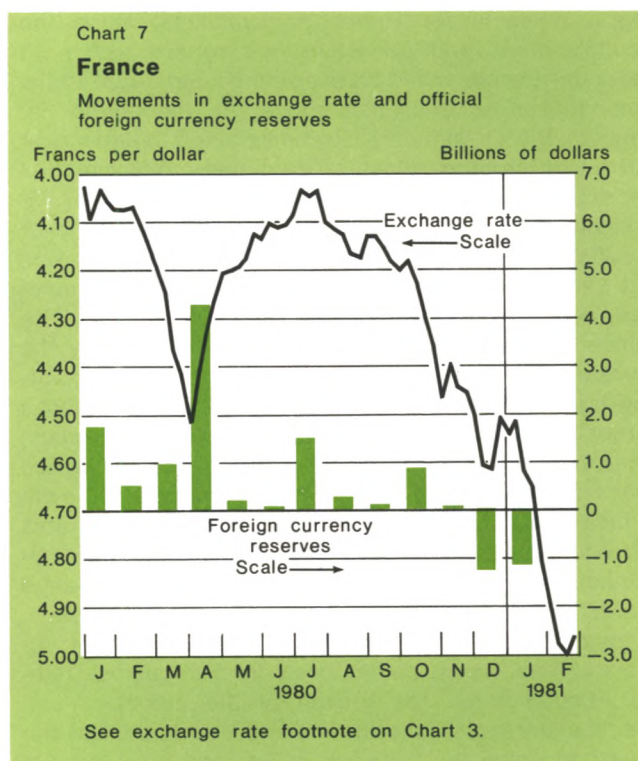
(effective from April 1981). On balance, this package was well received in the exchange market and the pound steadied to trade around \$2.34 through mid-December.

Coming into the new year, sterling was again buoyant in the exchange market. Underpinned by a further widening in the current account surplus, a rebate from the EC, and occasional large investment orders, the pound was bid up to as high as \$2.4320 on January 21. Nevertheless, with United States interest rates unexpectedly firm and with the dollar strong in the exchanges, the pace of capital flows into the pound began to slow. As a result, a diversification of investment portfolios by British residents into other currencies that had proceeded ever since abolition of exchange controls a year before now began to show through. Around the month end, sterling dropped back from its highs to close at \$2.3630 on January 30. The pound was, however, still up 1½ percent on balance against the dollar and nearly 21 percent higher against the mark since end-July. On a trade-weighted effective basis, the rate rose 7 percentage points to 81.2 percent of its Smithsonian parity over the six-month period.

Meanwhile, the Bank of England continued to intervene on both sides of the market to smooth fluctuations in the pound. These operations had little impact on external reserves, which were affected more by repayments of foreign currency debts and periodic revaluations of Britain's holdings in the European Monetary Fund. As a result of these considerations, the United Kingdom's foreign currency reserves declined \$1.7 billion over the six-month period to \$18.7 billion as of January 31.

French franc

For France the recent sharp oil price increase served to aggravate domestic inflationary pressures, lower real incomes, and impose a sharp reversal in the country's current account position, thereby eroding the benefits of years of stabilization policies. By mid-1980, the rate of consumer price inflation had jumped up to 13½ percent. The current account surplus of preceding years had given way to a deficit that was to amount to \$7 billion for the full year. Moreover, the economy had lost its upward momentum in the face of weakening consumer and investment demand and, with little opportunity to absorb a growing labor force, the rate of unemployment rose to over 6 percent. In response, the French government had already begun to provide limited fiscal stimulus to the economy and followed up with some further modest measures when it announced its 1981 budget early in September. In particular, certain social benefits were increased, more low-interest loans were made available to export firms and to fi-



nance housing, and some tax relief was provided to encourage new investment. But the French authorities, remaining committed to the combined goal of curbing inflation and maintaining the strength of the French franc, resisted pressure to ease the Bank of France's restrictive monetary policy as the economy weakened. Indeed, tight limits on banks' credit ceilings were maintained. The growth of money, which had run near the top of the target for M-2 of 11 percent at times during the summer, was back well within the targeted range by early fall. In addition, short-term rates had resumed a gradual rise after the summer, so that interest rates for most maturities were yielding a positive return even after taking account of inflation.

In the exchange market, the French franc was trading firmly as the six-month period under review opened. It was benefiting then, as it had through much of the year, partly from the relatively high French interest rates that attracted investment flows into franc-denominated assets and partly from the domestic credit ceilings that provided an incentive to French banks and corporations to borrow in foreign currencies to meet local financing needs. In addition, the market's attitude toward the franc remained more positive than for other European currencies. The current account deficit, while a source of concern, was considerably

smaller than that for Germany, its principal trading partner. France's traditionally good relations with Middle Eastern countries were generally thought in the market to help cushion France from any shortfall of oil supplies that might result from either the Iranian crisis or the outbreak of hostilities between Iran and Iraq. Moreover, some investors looking to diversify their holdings were attracted by the opportunities afforded in either the domestic or Eurofranc markets. Thus, capital inflows were more than sufficient to finance France's current account deficit. The French franc had recovered from its spring lows to trade around FF 4.15 early in August. Bank of France intervention within the context of the EMS had contributed to a rise in France's foreign currency reserves to \$25.3 billion by end-July. Also, in view of the franc's relative strength, the Federal Reserve had included the French currency in its intervention operations earlier in the year, leaving a net \$166.3 million of indebtedness outstanding under the System's swap line with the Bank of France as of that same date.

Against this background, with the currency markets reasonably well balanced during August-September, the franc fluctuated narrowly against the dollar while remaining comfortably near the top of the EMS 2¼ percent band. Although the Bank of France continued to buy modest amounts of EMS currencies, there was little further increase in French official foreign exchange reserves. Later on, however, the French franc became caught up in the tug-of-war between a generally rising dollar and a declining German mark. As the dollar strengthened after mid-October, the French franc started a decline which was to proceed almost without interruption to FF 4.4750 against the dollar by early November. Meanwhile, the Federal Reserve took advantage of the opportunity to begin to buy French francs both from correspondents and in the market and covered all its outstanding swap debt by end-October.

Within the EMS, by contrast, upward pressure on the French franc intensified after mid-October. The Bank of France had just, in effect, reaffirmed its commitment to a restrictive monetary policy stance at a time when the authorities of other European countries were becoming increasingly concerned about slower economic growth and the prospect of recession. The French central bank announced that its growth target for M-2 for 1981 would be reduced to 10 percent and intervened in the Paris money market to maintain interest rates at a fairly high level. With the German mark coming under increasing selling pressure, the still relatively high level of interest rates in France attracted funds from abroad and kept the French franc from declining as rapidly as the mark against the dollar. The

relationship between these two currencies within the EMS, therefore, became increasingly strained. On a number of occasions in late October and early November, the franc was at its upper intervention limit against the mark. The central banks of both countries were obliged to intervene in the market to buy large amounts of marks against francs. At times the Bank of France supplemented these operations by buying small amounts of dollars as well. Despite these purchases, which were partially reflected in an \$874 million increase in official foreign currency holdings for the month of October, the franc had risen to a high of FF 2.3002 against the mark by October 31.

On November 7, the Bank of France announced a number of measures to relieve the upward pressure on the franc within the EMS. The money market intervention point was reduced ¾ percentage point to 10½ percent, and a 5 percent reserve requirement was imposed on nonresident deposits to discourage interest-sensitive short-term capital inflows from abroad. But, to offset the effects of the recent intervention activity on domestic liquidity, the Bank of France also increased reserve requirements on commercial bank sight and time deposits. After these measures, the pressures in the EMS substantially subsided. The franc eased from its limit against the German mark, although at times during November-December the Bank of France bought modest amounts of marks while also acquiring Belgian francs when that currency was low within the EMS. For a time the EMS also steadied against the dollar. When, however, the EMS as a group declined, the French franc dropped further against the dollar, easing as much as 4 percent below early-November levels before recovering some in advance of the year-end.

During January, as prospects of a resolution to the Iranian hostage issue improved, the market for French francs began to react to the possibility that any move to unfreeze Iranian assets would set off new and possibly massive flows of funds. Those United States banks with liabilities *vis-à-vis* Iran were presumed to have to bid for funds in the Eurodollar market to meet these liabilities and, as Eurodollar rates were bid up, the European currencies generally weakened against the dollar. At the same time, market participants anticipated that Iran, once its assets were unfrozen, might try to switch a substantial amount of its funds into French francs. As a result, the franc declined less against the dollar than the other EMS currencies as the dollar continued to advance around midmonth. Although in fact no such flow of funds materialized, the relatively high interest rates in France continued to attract funds from abroad. By the end of January, the franc was again firmly against the upper EMS band

even as it eased to FF 4.9000 against the dollar. The Bank of France was once more intervening with other central banks to support the German mark and Belgian franc. France's official foreign currency reserves increased further to stand at \$26.5 billion by end-January, up \$1.2 billion over the six-month period. Over the six months under review, the French franc, frequently caught between the rising dollar and the weakening German mark, moved down by 18½ percent on balance against the dollar and up ½ percent on balance against the mark.

Italian lira

By mid-1980, the sharp increase in energy prices of the past two years, together with a rapid deterioration in Italy's nonoil trade position, had swung Italy's current account sharply into deficit, reversing the sizable surplus position of 1979. The Italian domestic economy continued to expand strongly into 1980, even at a time when a slackening of other economies was being reflected in a slowing of foreign demand for Italian products. Moreover, inflation in Italy remained relatively high, proceeding at a pace of more than 20 percent on a year-over-year basis. Since spring, fiscal policy had been at the center of an intense domestic debate that focused on the need to control inflation, to reduce the government debt, and to spur export growth. But, with no fiscal measures yet in place, the burden of fighting inflation fell entirely on monetary policy which remained restrictive.

In this context, the Italian lira had come under increasing pressure. In the exchanges, as the growing current account deficit weighed increasingly on the lira, the spot rate had not risen as the dollar declined and, consequently, had fallen from the top to the bottom of the EMS. At home, exporters had pressed strongly for devaluation to restore their competitive position. Government officials publicly denied that devaluation was a viable alternative in Italy where prices and wages are highly indexed. Even so, commercial leads and lags moved sharply against the lira, and Italian residents sought increasingly to repay their foreign currency borrowings, thereby adding to pressure on the lira and keeping the devaluation rumors alive. By early summer the Bank of Italy had intervened heavily in the exchanges to steady the lira within the EMS band.

Early in July the government implemented a package of austerity measures aimed at controlling inflation, supporting the lira in the exchanges, spurring exports, and cutting the public-sector borrowing requirement as a share of gross domestic product. The measures, which became effective immediately but required Parliamentary ratification within sixty days, included

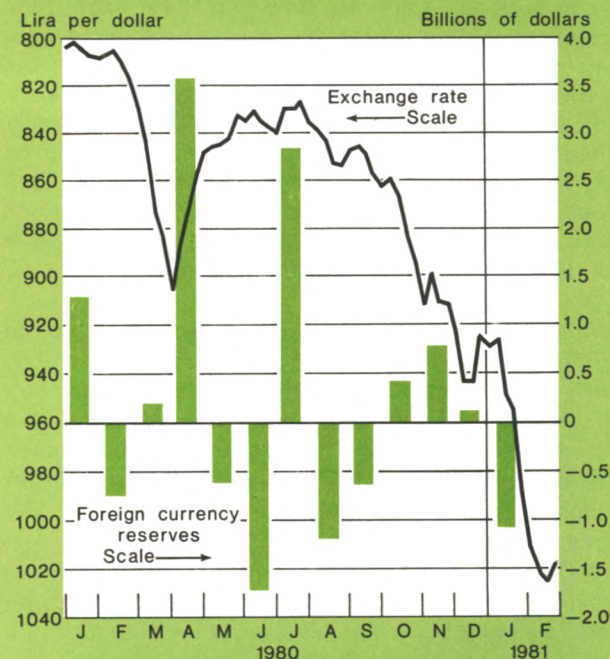
consolidation of value-added tax brackets, higher taxes on spirits, gasoline, and stamps, and a special tax on wages to be used in support of weak industries. At the same time, the Bank of Italy further tightened restrictions on domestic credit expansion. The exchange markets responded favorably to these measures, rumors of lira devaluation subsided, and the lira firmed temporarily in the exchanges. As capital began to flow back into Italy and the normal tourist-related inflows began to gather pace, the Bank of Italy was able to rebuild its foreign currency reserves to \$22.0 billion by end-July. Meanwhile, the lira stabilized within the EMS band about 2½ percent below the top and participated with other currencies' rise against the United States dollar. By early August it was trading above its lows as LIT 838.80.

But downward pressures on the lira developed again by mid-August. Although by this time the domestic economy had itself begun to slow, Italy's current account continued to deteriorate and there was little evidence of improvement on the inflation front. Market

Chart 8

Italy

Movements in exchange rate and official foreign currency reserves



See exchange rate footnote on Chart 3.

participants continued to question how long the lira could be held within its EMS band in view of the much lower inflation rates in most other EMS countries. Also, the time for ratifying the July package of economic measures was running out. In fact, when the coalition government of Sig. Cossiga lost a Parliamentary vote of confidence and resigned over the weekend of September 27-28, the July government austerity measures were allowed to lapse.

At this juncture, the Bank of Italy stepped in to stem any buildup of speculative pressure against the lira. It immediately raised the discount rate $1\frac{1}{2}$ percentage points to $16\frac{1}{2}$ percent, required exporters to finance 50 percent of their short-term credit needs in foreign currency borrowings, and tightened regulations dealing with leading and lagging of payments and receipts. The Bank of Italy also intervened forcefully in the exchange markets. Meanwhile, a new government under Sig. Forlani was soon formed. New fiscal measures were put into place to control the budget and slow the growth of personal consumption. Though similar to those contained in the July policy package, the new measures provided for additional acceleration of personal income tax payments and expanded support for ailing industries. These actions combined to reassure the exchange markets, and by mid-October the lira stabilized around LIT 865 and at a level of about $3\frac{1}{2}$ percent below the top of the EMS band.

Over the next two months, the lira traded comfortably within the EMS, while declining against the United States dollar no more rapidly than the other currencies involved in the joint float arrangement. Interest rates in Italy remained higher than those abroad; and, though the climbing of United States rates narrowed some of the differentials favorable to the lira, the Italian currency was shielded more than most currencies from the growing flows of funds into United States dollar assets. Indeed, interest rate considerations, as well as restrictions on domestic credit demand, still encouraged inflows of short-term capital, and commercial leads and lags turned in favor of the lira. Moreover, the Italian oil companies that normally enter the exchange markets to acquire foreign currency balances in early December for regular import payments instead borrowed heavily in the Eurocurrency markets on the hope that the dollar would be cheaper in the future. With the lira thus holding steady within the EMS, the Bank of Italy took advantage of opportunities to acquire foreign currencies through mid-December and relaxed somewhat the October regulation relating to short-term export financing abroad.

Meanwhile, Italy's current account gap had widened to bring the deficit for 1980 as a whole to about \$10 billion—a figure that was much larger than anticipated

only a few months earlier and overshadowed news of a modest improvement in the trade account late in the year. Industrial production was beginning to show signs of a possible recovery, even before much progress had been achieved in improving price or trade performance. Public expenditures and borrowing turned higher late in the year, and monetary growth accelerated, clouding the outlook for a near-term reduction of inflationary pressures all the more. The Bank of Italy continued its strong anti-inflationary stance, and Italian interest rates remained high. Furthermore, just as the period closed, the Bank of Italy sought to strengthen its grip on credit expansion by extending the application of its ceilings to all bank loans in lire and, for the first time, to most loans in foreign currencies, leaving only export loans exempt from the ceilings.

Nevertheless, funds had begun to flow out of Italy in late December, as export financings were repaid and those Italian oil companies that had previously borrowed abroad to finance their import deliveries took advantage of a brief softening of dollar rates to repay these loans. The pressures against the lira continued through January, prompting the Bank of Italy to intervene at times quite heavily to maintain the lira's position within the EMS band. As the entire joint float declined sharply against the dollar through January, the lira fell to record lows, closing the six-month period at LIT 1,004.50 or down a net $19\frac{3}{4}$ percent. At the same time, Italian reserves stood at \$20.5 billion, down \$1.5 billion for the period.

European Monetary System

Last spring and early summer, the currencies linked together in the joint float arrangement within the EMS rebounded against the dollar, largely in response to the sharp decline in United States interest rates while interest rates in EMS member countries generally remained firm. This advance halted in July, and EMS currencies generally eased somewhat against the dollar in August and in early September as United States interest rates began to turn upward while interest rates in several EMS countries declined slightly.

For the most part, these broad movements took place without much strain on the EMS joint float mechanism itself. Member countries faced the common problem of having to adjust to the sharp run-up of oil prices of 1979 and early 1980, which had generated unusually large current account deficits for all of them and had aggravated domestic inflationary pressures. The authorities were seeking to develop a coordinated policy response in the monetary and fiscal areas as well as on energy questions. Monetary policy, in particular, had been tightened to combat inflation at

home and to attract funds which could help finance the current account deficits, or at least to stem an outflow of interest-sensitive funds that would complicate the effort. In general, interest rates were higher in countries with high rates of inflation, so that interest differentials roughly compensated for inflation differentials. By late summer it was clear that industrial production had dropped back from early in the year and, with unemployment rates rising, pressures were building up for an easing of earlier restrictive policies. But the central banks resisted pressures to ease, in view of the continuing high rates of inflation and the need to finance the current account deficits, with the result that any movement in the direction of ease was modest, if at all.

Within the band of currencies, the Dutch guilder was firm on the Netherlands' relatively favorable external position and on the high interest rates prevailing in the Amsterdam money market. The guilder, after having traded in the upper half of the EMS band during the first seven months of the year, moved toward the top of the band in August and remained there over the rest of the year. The guilder's relative strength enabled the Dutch authorities to move cautiously to reduce interest rates, with four cuts in official rates totaling 2 percentage points between June and October. The French franc was also strong within the EMS, alternating at the top with the guilder, as France attracted capital inflows in excess of its current account deficit. In Ireland, foreign borrowings by the public sector were being used to finance the current account deficit. Conversions in the market of the proceeds of these borrowings and some favorable leads and lags in sterling payments kept the Irish pound near the top of the band. At the same time, Denmark was financing its current account deficit by borrowing abroad, enabling the Danish krone to fluctuate around the middle of the joint float. The Italian lira, which is allowed a wider trading band than the other currencies in the arrangement, also moved widely but without need for intervention at the outer limits.

The Belgian franc traded near the bottom of the 2¼ percent band. Belgium's problems were viewed as particularly serious by the market, with a large current account deficit, a large fiscal deficit, and a stagnating economy. To finance the current account and fiscal deficits, the Belgian government borrowed heavily in international markets. Political wrangling hampered the taking of effective adjustment measures, and the Belgian franc remained under selling pressure, with the result that the National Bank was obliged to maintain interest rates high enough to avoid funds moving out of the franc and to give support from time to time to keep the franc within the 2¼ percent EMS band.

The German mark was also near the bottom of the band. Germany had the largest current account deficit to finance among the EMS members. Although Germany's inflation performance continued to be as good or better than the others, German interest rates were well below those in other EMS member countries. Moreover, Germany had no official restrictions on capital outflows and still refrained from removing all controls on inflows. The result was that funds could readily move out of Germany into other EMS currencies, and official and private entities within other EMS countries could readily use marks in international borrowings.

By October, strains began to build up within the EMS. In part these came from outside, as heavy flows of funds moved into the United States dollar, the pound sterling, and the Japanese yen—currencies in which interest rates remained very high or, as in the United States case, were rising. But the interest rate disparities within the EMS and the relative freedom of funds to move also played a role. With the exchange markets turning generally bearish over the outlook for the German mark, funds moved out of the mark and into other EMS currencies. To the extent that these funds gravitated to the currencies at the top of the EMS band—the French franc and Dutch guilder—the EMS intervention mechanisms were soon triggered.

Intervention mounted quickly and talk began circulating of a possible widening in the intervention limits or of a temporary withdrawal of the mark from the joint float arrangement. Such approaches were openly rejected by the authorities of the respective EMS member countries. In early November, the French took measures to ease money market conditions, making explicit their intention to reduce the selling pressures on the German mark. Meanwhile, the Bundesbank was allowing the heavy intervention within the EMS to tighten its own money market. The market sensed the resolve of the authorities to maintain existing parities and the tension gradually eased. Even so, the EMS joint float continued to decline against the major currencies outside the group, including the dollar, the pound sterling, the Japanese yen, and to a small degree the Swiss franc. Apart from a rise in the Danish krone, reflecting a lower than expected 1980 current account deficit for Denmark and a downward movement in the Irish pound from its temporarily high position in the band, the configuration of currencies hardly changed within the EMS.

The currencies in the group at first recovered slightly against the dollar when United States interest rates were receding from their mid-December highs. But it soon became apparent that United States interest rates would not drop off as sharply as some market participants had originally believed. Moreover, the market

remained concerned about the prospects for EMS member countries in reversing their current account deficits and dealing with domestic policy dilemmas. As market sentiment toward the dollar became increasingly bullish, the dollar came into demand against the currencies in the EMS band. As before, the brunt of the immediate selling pressures fell on the German mark, and that currency touched its lower intervention limit. The Belgian franc also came under selling pressure, and both the mark and the franc required official support within the EMS.

Canadian dollar

In the summer of 1980, the Canadian dollar was underpinned by a favorable shift in Canada's trade and current account position, by a reversal of the previous adverse interest rate differentials *vis-à-vis* the United States, and by Canada's status as a major oil and gas producer. The improvement in the trade account stemmed from a slowdown in the domestic economy, the ability of Canadian exporters to take advantage of the sharp depreciation of the Canadian dollar of previous years, and the market's perception of sustained efforts to curb cost and price pressures at home through monetary policy. As a result, exports to markets like Europe, where activity had not yet slackened so sharply as in North America, continued to increase. With the trade account heading to a surplus of \$7 billion for the year, the current account deficit was narrowing to a size that could comfortably be financed by private capital inflows. The reemergence of favorable interest differentials reflected the sharper drop of interest rates in the United States than in Canada. Restoration of the traditionally favorable interest rate gap for Canada had once again provided an incentive for investors to shift funds into higher yielding Canadian dollar assets, while also prompting Canadian borrowers to tap United States and other foreign capital markets and to convert the proceeds in the exchanges. Canada's potential for increasing energy production in the future for both domestic and export use was underscored early in the year with reports of new oil discoveries. At a time of rapidly rising world energy prices and uncertainty over the adequacy of aggregate oil supplies, this factor added to the attractiveness of the Canadian dollar as an investment medium. In this environment, the Canadian dollar had been bid up to its high for the year of Can.\$1.1406 in early July and by the month end Canada's foreign currency reserves stood at \$1.9 billion after repayment in May and June of \$600 million borrowed early in the year under the revolving standby credit facility with Canadian banks.

During August and September the Canadian dollar

was beginning to lose some of its buoyancy. In part, this reflected a narrowing of the positive interest differential as Canadian interest rates continued to ease for a while even after interest rates in the United States resumed an upward trend. The exchange market had also become concerned about the continued debate over domestic energy pricing and development policy, which had important implications for the distribution of income as well as the outlook for containing inflationary pressures at home. The western provinces had called for a larger share of oil revenues to be returned to provincial governments and for a more rapid increase in domestic energy prices to world market levels. When these calls were resisted at the federal level, the market became concerned that a fundamental constitutional conflict might emerge over the relationship between the federal and provincial governments. Thus, the Canadian dollar settled back to trade around Can.\$1.1575 during much of August and September. It came on offer in early September around the time of a meeting between Prime Minister Trudeau and the provincial premiers and then again later in the month when no visible progress was made on the constitutional issue. By October 2, the rate declined to Can.\$1.1734 with the Bank of Canada continuing to operate on both sides of the market to smooth short-run rate fluctuations.

The Canadian dollar firmed briefly after early October as a number of developments, including the outbreak of hostilities between Iran and Iraq, reinforced the market's positive views about Canada's basic strength in its natural resources. Late in the month, however, the Canadian dollar was again coming under some selling pressure as the market anticipated and then reacted to measures contained in the October 28 federal budget. The budget called for cuts in the federal deficit and included a national energy policy which, in turn, provided for specific measures to increase domestic wellhead oil prices, impose a refinery levy to pay for oil import subsidies, and increase Canadian ownership of oil and gas production with an increase in the share of the national oil company. These measures were seen in the market as discouraging foreign investment and as possibly complicating constitutional issues. Indeed, a number of provinces objected to the proposed oil-pricing arrangements and Alberta announced its intention to cut its oil production by 15 percent. These developments contributed to a substantial sell-off of Canadian dollars in the exchange market and the rate declined to Can.\$1.1899 on November 6. By mid-November the market came back into balance with the spot rate fluctuating around Can.\$1.1860.

Meanwhile, the Canadian economy, spurred by strengthening retail sales and industrial production,

had picked up in the third quarter and posted its first gain in real output for the year. At the same time, the inflation rate began to accelerate as increases in food and energy prices and higher labor costs worked their way through the economy. The money supply moved toward the upper end of its target range, and the Bank of Canada, operating within a system of establishing its official bank rate in accordance with the weekly Treasury bill tender rate, entered the money market to push up short-term interest rates. The discount rate then climbed to nearly 14 percent in mid-November, compared with about 10½ percent in mid-August. But an even more rapid interest rate surge was under way in the United States—one which the Canadian authorities were initially reluctant to match.

As a result, interest rates in Canada increasingly fell behind those in the United States, and the adverse differentials that first had emerged at the end of August had widened sharply by November-December. Several announced bond issues planned by Canadian entities for the New York market were postponed in response to the rise in interest rates here, cutting off a potential source of demand for Canadian dollars in the exchanges. Also, dealers and corporate treasurers became increasingly unsure about the willingness of the authorities to foster interest rate increases to match those in the United States. The Canadian dollar therefore came heavily on offer, plunging through the Can.\$1.20 bench mark by December 11 to a low of

Can.\$1.2122 on December 16, 4½ percent below early-August levels.

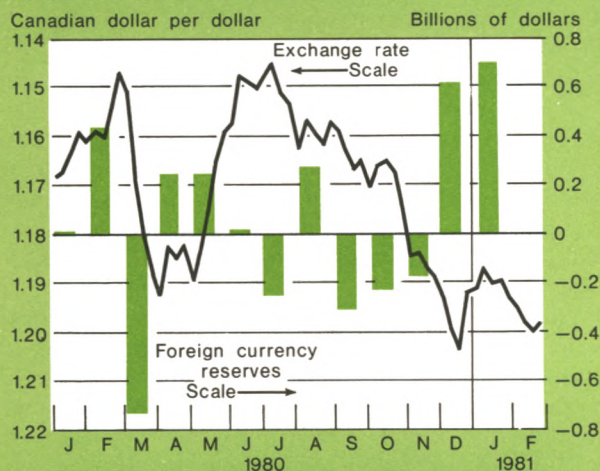
At the same time, the Bank of Canada continued to act forcefully in the money market, raising the official discount rate to 17.4 percent by December 19 as well as selling sizable amounts of dollars in the exchange market on a number of occasions. These actions were reinforced by Governor Bouey's speech to provincial ministers of finance restating the commitment of the Bank of Canada to firm anti-inflation policy and a stable currency in the exchanges. As a result, the Canadian dollar steadied and began to recover, helped by an easing in United States interest rates. Dealers moved to cover their short positions, and corporations which had held off buying Canadian dollars in expectation of further rate declines entered the market to cover their needs. The rate thus rebounded to Can.\$1.1885 by December 30.

A more positive tone prevailed in the market early in the new year, as market participants took note of the continuing improvement in Canada's trade position. Also, some easing of United States interest rates early in January led to a narrowing of interest differentials *vis-à-vis* United States dollar assets, while wide favorable differentials for Canada remained against several major Continental currencies. As a result, the Canadian dollar generally kept pace with the rising United States dollar until late in the period, thereby strengthening considerably against the Continental

Chart 9

Canada

Movements in exchange rate and official foreign currency reserves

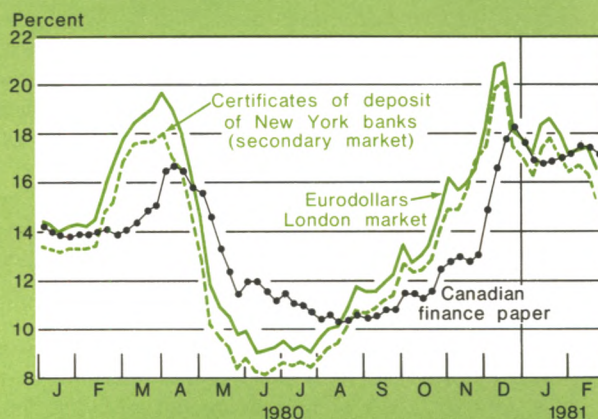


See exchange rate footnote on Chart 3.

Chart 10

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

Three-month maturities*



* Weekly averages of daily rates.

currencies. Although announcement of decontrol of domestic oil prices in the United States by President Reagan on January 27 refocused market attention on the still unresolved Canadian energy policy controversy and sapped the Canadian dollar of some of its strength, the spot rate was trading some 1½ percent above its December lows at Can.\$1.1948 by the close of the six-month period. At this level, it had reduced its net decline against the United States dollar since July to some 3 percent. Against the European currencies, the Canadian dollar had gained on balance some 15 percent.

As the Canadian dollar had firmed in the first weeks of January, the Bank of Canada purchased sizable amounts of United States dollars. Also, after drawing \$900 million in December on standby credit facilities with Canadian and foreign banks, the Bank of Canada repaid in January the \$600 million drawing on Canadian banks, leaving the \$300 million drawing on foreign banks still outstanding. As a result, Canada's foreign exchange reserves stood at \$1.4 billion at the end of the period, down \$558 million net over the six months.

Swedish krona

Last year, the Swedish authorities were confronted with several economic problems at once. The current account deficit deepened, to nearly \$5 billion, as the latest rise in world oil prices added to Sweden's oil-import bill and as export growth slackened. The inflation rate accelerated to nearly 14 percent for the year as a whole. A surge in state and local spending contributed to a continuing increase in the government budget deficit to about \$10 billion, or over 10 percent of gross national product (GNP). Efforts to deal with these and other issues, such as the long-festering debate over nuclear policy, were hampered by the fact that Sweden was governed by a coalition of parties with only a slender majority in Parliament. Consequently, as major adjustment policies were being hampered out, the Sveriges Riksbank had little choice but to tighten monetary policy, both to absorb the excess liquidity generated by the fiscal deficit and to avoid outflows of interest-sensitive funds.

Meanwhile, the Riksbank intervened as necessary to keep the krona within a reasonable range against the index of a trade-weighted basket of currencies, and the government continued to arrange borrowings in the international capital markets to cover the current account deficit and to avoid an excessive drain on reserves. On the possibility that some bridge financing might occasionally be needed as longer term loan packages were assembled, the Riksbank moved to reinforce its short-term credit lines. In this context, in May the Riksbank and the Federal Reserve agreed to

increase the swap arrangement by \$200 million to \$500 million for one year, with the understanding that drawings could be made, if needed, in connection with bridge-financing operations.

Through the spring and early summer, the exchange market for the Swedish krona was rather well balanced, and takedowns on the government's international borrowings ran well ahead of the Riksbank's intervention sales of dollars. By August, however, as the government prepared a new package of measures, rumors of a possible devaluation generated heavy selling pressure on the krona, largely in the form of adverse commercial leads and lags. The krona declined ½ percent during the month, to as low as SK 4.2005 against the dollar, but remained around 100.8 in terms of the official index. For their part, the authorities firmly rejected devaluation on the grounds that it would exacerbate domestic inflationary pressures and do little to solve Sweden's structural problems. The Riksbank stepped up its exchange market intervention, and the government increased the pace of its external borrowings to replenish reserves.

Early in September the government convened an extraordinary session of Parliament and gained approval of a package of fiscal measures, which included a sizable hike in the value-added tax and an increase in taxes on energy consumption. The government followed up by announcing cuts in planned expenditures to reduce the budget deficit. These actions were seen in the markets as positive first steps, and the krona improved somewhat over October and November. As some commercial leads and lags ran off, the krona gained ½ percentage point, in terms of its official index, to 100.3, while declining some 5 percent against a strengthening United States dollar to SK 4.36. At the end of November, Sweden's foreign currency reserves remained little changed from the levels of last summer.

Nevertheless, concerns over the outlook for Sweden's fiscal and current account deficits continued to weigh on the exchange market, and the krona's relative strengthening proved short-lived. Devaluation talk revived toward the year-end, and commercial leads and lags turned against the krona once more. On January 12 the government announced its proposed budget for the next fiscal year, beginning in July 1981. The deficit was again projected to be large, but the message lacked significant new measures to close the gap. The exchange market atmosphere deteriorated further, leading to strong selling pressure on the krona. The Riksbank was obliged to intervene in size to avoid a sharp deterioration of the krona against the official index. On January 20, the Riksbank followed up by announcing a series of forceful measures, hiking its discount rate by 2 percentage points to 12 percent

and its penalty lending rate by fully 4 percent to 17 percent, raising long-term rates by about 1 percentage point, doubling the bank's cash reserve requirements from 2 to 4 percent, and imposing a ceiling on commercial banks' lending.

These actions led to a tightening of money market conditions and to a sharp rise in interest rates, but market participants continued to focus on the need for clear new measures on the fiscal side. Consequently, the krona remained under heavy selling pressure. The Riksbank's sizable intervention continued, and the government accelerated its pace of negotiating new borrowings, including a \$1 billion loan in the Euromarkets. Even so, the intervention had become so heavy that reserves were being drawn down. Consequently, in late January the Riksbank drew \$200 million under the swap agreement with the Federal Reserve to be used as bridge financing until new loans could be completed. Against the dollar, the krona declined a fur-

ther 5¼ percent from November levels to SK 4.5900, while against the official index it slipped to as low as 101 before recovering to 100.3 on the last trading day of the month. On balance, Sweden's reserves declined by \$500 million in December-January to \$2.5 billion as of January 31.

After the turn of the month, however, the immediate selling pressures on the krona lifted. On February 2, employers and trade unions reached an agreement on a wage package which scheduled much more modest percentage increases than in recent years and incorporated cost-of-living provisions that would make devaluation even more improbable. On February 3, the government announced a far-reaching package of fiscal measures, designed to scale back the size and cost of government and to stimulate private initiative. These developments were well received in the exchange market, and funds began to flow back into the krona, enabling the authorities to replenish external reserves.

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