

DISTRICT ENJOYS STRONG INCOME GROWTH

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An examination of recently revised personal income data shows that in the ten-year period from 1966 to 1976, growth in economic activity in the Fifth District outpaced that of the national economy. Over that decade, personal income in Fifth District states grew significantly faster than it did in the nation as a whole, both on a total and a per capita basis. In addition, figures on personal income by source show significant changes in the relative importance of particular industries in District states and in the nation.

Personal Income Data Personal income for a particular state may be looked at in two ways: (1) as the total personal income received by residents of the state, or (2) as the personal income produced by industries located in the state. Since many people live in one state and work in another, these two figures are not necessarily equal for any given state. Thus, in deriving personal income by place of residence, the Department of Commerce begins with total labor and proprietors' income generated by indus-

tries located in the state. This figure is adjusted by deducting personal contributions for social insurance by place of work and also by making an adjustment for residence of workers.¹ These adjustments produce net labor and proprietors' income by place of residence. To this is added dividends, interest, rent, and transfer payments received by residents of a state to obtain personal income by place of residence.

Personal income by place of residence is the figure most commonly used in discussions of state income and it is the one that will be used here in reviewing the growth in total and per capita income in the Fifth District. On the other hand, data on labor and proprietors' income by industry provide important information on the industrial structure of a state

¹ This adjustment for residence is particularly important in the Fifth District because so many workers in the District of Columbia reside in Maryland and Virginia. As a result, the District of Columbia had a negative residence adjustment in 1976 equal to more than 57 percent of total labor and proprietors' income. On the other hand, Maryland derived 15 percent of its personal income from outside the state and Virginia about 9 percent.

Table 1

PERSONAL INCOME

United States and Fifth District States, 1966, 1971, and 1976

(millions of dollars)

	1966	1971	1976	Percent Change		
				1966-71	1971-76	1966-76
District of Columbia	2,839	3,862	5,662	36.0	46.6	99.4
Maryland	11,652	17,999	28,514	54.5	58.4	144.7
Virginia	11,814	18,867	31,908	59.7	69.1	170.1
West Virginia	3,929	5,773	9,941	46.9	72.2	153.0
North Carolina	11,344	17,724	29,821	56.2	68.3	162.9
South Carolina	5,347	8,369	14,662	56.5	75.2	174.2
Fifth District	46,925	72,594	120,508	54.7	66.0	156.8
United States	579,161	851,952	1,373,511	47.1	61.2	137.2

Source: U. S. Department of Commerce, Bureau of Economic Analysis.

or region as well as changes in that structure over time. This type of information will be used to portray the industrial structures of Fifth District states and to spotlight changes in those structures over the past decade.

Growth in Personal Income The personal income of Americans has grown quite rapidly in recent years. In nominal terms, total personal income in the United States more than doubled between 1966 and 1976, for an average annual increase of almost 14 percent (Table I). Moreover, the rate of growth in the second half of that period was almost a third higher than in the first five years.² And over this ten-year period, every state in the Fifth Federal Reserve District enjoyed a significantly higher growth in personal income than the nation as a whole. Only the District of Columbia, because of its peculiar industrial structure and geographical limitations, had a smaller increase than the national rate. Among District states, South Carolina and Virginia recorded the fastest growth in total personal income while Maryland and West Virginia were at the lower end of the scale.

As Table I shows, however, in most District states growth in personal income did not proceed at a uniform pace over the ten-year period. Most District states, as well as the nation as a whole, achieved a much higher rate of growth in the 1971-76 period than in the immediately preceding five years. Maryland was the only District state to show very little pickup in the second half over the first half of that period and, excluding the District of Columbia, was the only District state with a growth rate in the second half that was below the national rate.³

Both South Carolina and Virginia enjoyed strong growth in income throughout the decade, with these two states ranking one-two among District states in terms of growth over the entire period. Virginia achieved the highest growth rate among District states in the 1966-71 period, with South Carolina second; South Carolina was first in the 1971-76 period, with Virginia third.

² These comments refer to nominal income, of course, and the faster growth rate in the latter period is largely a reflection of the higher rate of inflation experienced since 1970. Real per capita disposable income (that is, total nominal income adjusted for taxes, inflation, and the growth in population) increased at a faster pace in the second half of the 1960's than it did in the first half of the 1970's.

³ At the same time it should be noted that, excluding the District of Columbia, Maryland has the highest per capita income of any District state and is the only District state whose per capita income exceeds the national figure.

Table II

PER CAPITA PERSONAL INCOME

United States and Fifth District States,
1966 and 1976

	1966		1976		% Change 1966-1976
	Per Capita Income	Percent of U. S.	Per Capita Income	Percent of U. S.	
District of Columbia	3,589	121.1	8,067	126.1	124.8
Maryland	3,153	106.4	6,880	107.5	118.2
Virginia	2,651	89.5	6,341	99.1	139.2
West Virginia	2,213	74.7	5,460	85.3	146.7
North Carolina	2,317	78.2	5,453	85.2	135.3
South Carolina	2,122	71.6	5,147	80.4	142.6
Fifth District	2,674	90.2	6,225	97.3	132.8
United States	2,963	100.0	6,399	100.0	116.0

Source: U. S. Department of Commerce, Bureau of Economic Analysis.

West Virginia had the most dramatic turnaround in growth of any District state. In the 1966-71 period, West Virginia recorded the smallest growth in income of any state in the District and was the only District state with a growth rate below the national average; in 1971-76 West Virginia's growth was second among District states only to South Carolina's, and was significantly higher than either the District or the national rate. This dramatic improvement is undoubtedly attributable to the revolutionary changes in the world energy picture and the resulting recovery in West Virginia's coal industry.

Per Capita Personal Income From 1966 to 1976, per capita personal income in the Fifth District rose almost 133 percent (Table II). This compares with an increase of 116 percent for the entire nation. Every District state and the District of Columbia recorded a larger percentage increase over this period than the national gain. Maryland, which has the highest per capita income among District states (excluding the District of Columbia), realized the smallest percentage increase. West Virginia, with the second lowest per capita income in 1966, enjoyed the largest percentage gain, mainly because of a very strong surge in the final five years of the period. South Carolina, with the lowest per capita income among District states, had the second highest growth rate, while Virginia was third. Per capita income

Table III

TOTAL LABOR AND PROPRIETORS' INCOME BY PLACE OF WORK

United States and Fifth District States, 1966 and 1976

	United States		Fifth District		District of Columbia		Maryland	
	Percent of Total		Percent of Total		Percent of Total		Percent of Total	
	1966	1976	1966	1976	1966	1976	1966	1976
Total Labor and Proprietors' Income	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Farm	3.5	2.4	2.9	2.1	—	—	1.1	1.1
Agricultural services, forestry, fisheries, and other	0.3	0.4	0.3	0.3	0.5	0.7	0.3	0.3
Mining	1.1	1.5	1.4	2.0	0.0	0.0	0.2	0.1
Construction	6.3	5.7	6.3	5.8	4.0	2.9	7.2	6.8
Manufacturing	29.7	25.9	25.1	22.6	4.0	2.9	23.3	16.6
Transportation and public utilities	7.1	7.5	6.4	6.6	6.3	6.2	6.6	6.5
Wholesale and retail trade	16.9	17.2	15.0	15.0	12.0	7.1	16.4	17.7
Finance, insurance, and real estate	5.2	5.3	4.2	4.1	4.6	4.4	4.6	4.8
Services	14.3	16.4	13.6	15.2	20.0	21.2	15.0	18.7
Government	15.6	17.8	24.8	26.2	48.7	54.4	25.1	27.3

	North Carolina		South Carolina		Virginia		West Virginia	
	Percent of Total		Percent of Total		Percent of Total		Percent of Total	
	1966	1976	1966	1976	1966	1976	1966	1976
Total Labor and Proprietors' Income	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Farm	6.6	5.3	4.5	2.3	2.1	1.2	0.7	0.2
Agricultural services, forestry, fisheries, and other	0.3	0.3	0.4	0.3	0.3	0.2	0.1	0.1
Mining	0.2	0.2	0.2	0.2	1.1	1.9	12.6	17.8
Construction	6.1	5.3	6.6	6.3	7.0	6.4	6.1	6.4
Manufacturing	33.3	32.4	35.2	33.7	21.5	19.6	29.9	24.4
Transportation and public utilities	5.7	6.3	4.4	5.5	7.0	7.0	9.5	8.2
Wholesale and retail trade	16.0	16.1	13.8	14.6	15.0	15.4	14.1	14.4
Finance, insurance, and real estate	4.0	4.0	3.6	3.8	4.4	4.2	2.9	2.9
Services	11.8	12.9	11.0	11.7	13.2	15.1	11.2	11.8
Government	16.1	17.3	20.2	21.6	28.4	29.0	12.8	13.9

Source: U. S. Department of Commerce, Bureau of Economic Analysis.

growth in North Carolina exceeded the District figure, while the increase in the District of Columbia fell somewhat short of it.

As a result of these above average growth rates, the level of per capita income in every District state and in the District of Columbia improved relative to the national level (Table II). For the District as a whole, income per capita rose from about 90 percent of the national figure in 1966 to about 97 percent in 1976. The District of Columbia, whose per capita income of \$8,067 in 1976 was second only to Alaska among the nation's states, improved its relative posi-

tion from 121 percent to 126 percent of the national level. Maryland, with the smallest percentage increase among District states, improved only slightly relative to the national level. Virginia, with the third highest per capita income in the District, enjoyed strong growth throughout the period. As a result, the level of income per person rose from almost 90 percent of the national figure in 1966 to 99 percent in 1976. West Virginia, North Carolina, and South Carolina all enjoyed better than average growth in per capita income and all made significant gains toward reaching the national average.

Sources of Personal Income Data on labor and proprietors' income by industry provide valuable information as to the relative importance of particular industries in our economy and, if looked at over a period of years, they may spotlight changes in the industrial structure of the economy. It comes as no great surprise, of course, that the industrial structures of Fifth District states, with the exception of the District of Columbia, are not greatly different from the structure of the national economy. But there are differences between them, just as there are differences among the individual states of the District, and these structural differences help to explain such things as differential rates of growth, more or less susceptibility to business cycles, and so on.

The major structural difference between the District and the national economies lies in the difference in relative importance of government and manufacturing (Table III). Government is, of course, a much more important generator of income in the Fifth District than it is nationally. It was the most important source of personal income in the Fifth District in 1976, accounting for 26.2 percent of total labor and proprietors' income. This compares with 17.8 percent for the nation as a whole. Part of this difference is accounted for by the location of Washington, D. C. in the Fifth District, but there are also a number of large military installations and other government facilities in the District that generate a considerable amount of income. Manufacturing, on the other hand, accounts for a much larger part of labor and proprietors' income nationally than it does in the District. In 1976 it generated 25.9 percent of total labor and proprietors' income in the United States, by far the most important single source, as compared with 22.6 percent of such income in the Fifth District.

While government and manufacturing account for the major structural differences between the nation and the District, there are other differences as well. Wholesale and retail trade and the service industries, each of which contributes about one-sixth of labor and proprietors' income in the United States, are both more important nationally than in the District. Finance, insurance, and real estate is a much less important source of income than the other industries mentioned, but it is significantly more important nationally than in the District.

Changes in Sources of Income As mentioned earlier, changes in the relative importance of particular industries as generators of personal income

provide useful information as to the changing structure of the economy. They are by no means a perfect indicator of structural changes, however, because increases in labor income may result simply from a larger number of workers, drawing higher wages, but producing the same amount of output. Nevertheless, changes in these data over a period of years do provide a fairly accurate picture of structural changes in the economy.

Data for the ten-year period 1966-76 show a continuation of trends that have been in progress for a number of years. Generally a reflection of the evolution toward what might be called a post-industrial (i.e., service oriented) society, they will undoubtedly continue to affect the structure of the economy for many years to come. The general picture one gets from these data is of an economy increasingly oriented toward wholesale and retail trade and the service industries, and in which government is an increasingly important source of personal income. On the other hand, manufacturing and farming are becoming less important as creators of income. During the period under review, construction also declined in relative importance but construction is a highly cyclical industry, and in 1976 it had not fully recovered from the severe downturn of 1974-75.

Changes in sources of income in the individual states comprising the Fifth District were generally in line with changes in the national economy. There were differences, however, and these may help to explain the faster growth in personal income in District states than in the nation. That is to say, differences in the growth of personal income for Fifth District states as compared with the national growth may be explained, at least in part, by two factors. First, in most District states the rapidly growing sectors are relatively more important than they are in the national economy. Second, growth rates of specific components of the state's personal income differed from the national growth rate. In several District states the second factor appeared to be more important than the first.

Maryland is perhaps a case in point. Government, one of the "growth" sectors, is the most important source of labor and proprietors' income in that state, accounting for more than a quarter of the total. Manufacturing, a relatively slower growth sector, was second most important in 1966, the source of more than 23 percent of the total. Between 1966 and 1976, however, government-produced income increased in Maryland at almost the identical rate as in the nation, and at a significantly lower rate than in other District

Table IV

TOTAL LABOR AND PROPRIETORS' INCOME BY PLACE OF WORK

United States and Fifth District States, 1966 and 1976

(millions of dollars)

	United States			Fifth District		
	1966	1976	% Change	1966	1976	% Change
Total Labor and Proprietors' Income	472,866	1,046,513	121.3	39,422	95,192	141.5
Farm	16,606	24,977	50.4	1,144	2,031	77.5
Agricultural services, forestry, fisheries, and other	1,587	3,840	142.0	130	292	124.6
Mining	5,099	15,256	199.2	552	1,902	244.6
Construction	29,770	60,147	102.2	2,502	5,559	122.2
Manufacturing	140,243	271,138	93.3	9,890	21,484	117.2
Transportation and public utilities	33,512	78,203	133.4	2,531	6,253	147.1
Wholesale and retail trade	79,789	179,693	125.2	5,915	14,315	142.0
Finance, insurance, and real estate	24,576	55,712	126.7	1,637	3,946	141.1
Services	67,765	171,741	153.4	5,359	14,505	170.7
Government	73,919	185,806	151.4	9,760	24,903	155.2

	North Carolina			South Carolina		
	1966	1976	% Change	1966	1976	% Change
Total Labor and Proprietors' Income	9,599	23,666	146.5	4,533	11,461	152.8
Farm	629	1,259	100.2	205	259	26.3
Agricultural services, forestry, fisheries, and other	29	62	113.8	18	37	105.6
Mining	18	54	200.0	9	20	122.2
Construction	582	1,243	113.6	300	720	140.0
Manufacturing	3,195	7,663	139.8	1,597	3,868	142.2
Transportation and public utilities	545	1,485	172.5	201	629	212.9
Wholesale and retail trade	1,535	3,802	147.7	624	1,670	167.6
Finance, insurance, and real estate	383	956	149.6	162	438	170.4
Services	1,133	3,044	168.7	500	1,341	168.2
Government	1,549	4,098	164.6	917	2,478	170.2

* Less than \$500,000.

Source: U. S. Department of Commerce, Bureau of Economic Analysis.

states (Table IV). At the same time, income from manufacturing in Maryland increased only 64.4 percent over that decade, as compared with an increase of 93.3 percent nationally. For the entire District, manufacturing income rose 117.2 percent, and figures for the other states ranged from 91.9 percent for West Virginia to 142.2 percent in South Carolina. Income from the trade and service industries grew significantly faster in Maryland than in the nation.

Thus, the smaller growth in the relative position of income from government, and the more rapid decline in the relative importance of manufacturing income was only partially offset by the robust ex-

pansion in trade- and service-produced income, so that the increase in total personal income in Maryland was the smallest among District states. It was still significantly above the national figure, however.

The pattern in North Carolina also differs from the national pattern and the patterns in other District states. Manufacturing is by far the most important source of personal income in North Carolina, accounting for almost a third of labor and proprietors' income. But income from manufacturing in North Carolina grew almost 140 percent from 1966 to 1976, compared with 93.3 percent growth for the nation. At the same time, income from trade and service

District of Columbia			Maryland		
1966	1976	% Change	1966	1976	% Change
4,405	9,465	114.9	8,557	19,807	131.5
—	—	—	97	222	128.9
22	66	200.0	28	62	121.4
*	3	—	21	29	38.1
174	279	60.3	612	1,354	121.2
174	278	59.8	1,998	3,284	64.4
278	590	112.2	562	1,293	130.1
529	676	27.8	1,404	3,511	150.1
204	416	103.9	396	943	138.1
879	2,011	128.8	1,287	3,707	188.0
2,144	5,146	140.0	2,152	5,402	151.0

Virginia			West Virginia		
1966	1976	% Change	1966	1976	% Change
9,097	23,188	154.9	3,231	7,605	135.4
189	276	46.0	24	15	-37.5
29	56	93.1	4	9	125.0
97	442	355.7	407	1,354	232.7
638	1,480	132.0	196	483	146.4
1,960	4,537	131.5	966	1,854	91.9
639	1,632	155.4	306	624	103.9
1,367	3,563	160.6	456	1,093	139.7
397	971	144.6	95	222	133.7
1,198	3,507	192.7	362	895	147.2
2,584	6,723	160.2	414	1,056	155.1

industries also grew significantly faster than in the nation. Government-produced income in North Carolina also outpaced the nation, but government is less important as a source of income in North Carolina than it is in Maryland, Virginia, and South Carolina.

South Carolina enjoyed the highest rate of growth of personal income among District states, recording an increase of 174.2 percent as compared with 156.8 percent for the District and 137.2 percent for the nation. This robust expansion is reflected in the growth rates of the various categories of income, with most of them exceeding the comparable national

rates. Nevertheless, there were changes in the relative importance of particular industries. Manufacturing, for example, fell from 35.2 percent to 33.7 percent of total labor and proprietors' income, but at the same time income from this source rose 142.2 percent over the ten-year period. Trade and service industries are relatively less important as a source of income than they are nationally, but income from these industries rose substantially faster in South Carolina than nationwide.

Virginia had the second highest growth rate of personal income for District states and this may be one instance where the industrial structure was favorable to growth. Government is by far the most important source of income in Virginia, accounting for almost 30 percent of labor and proprietors' income in recent years, and income from this source grew much more rapidly in Virginia than in the nation. Other high growth sectors, the trade and service industries, also enjoyed considerably faster expansion in Virginia than across the nation. At the same time, income from the slow-growth manufacturing sector surged 131.5 percent in Virginia, as compared with 93.3 percent nationwide. Construction, mining, and the finance industries all recorded above average growth.

The behavior of personal income in West Virginia over the past decade reflects the differences between the economic structure of that state and the structures of other District states as well as that of the nation. Although manufacturing accounted for almost a quarter of total labor and proprietors' income in West Virginia, mining was in second place in 1976, accounting for 17.8 percent of the total. Wholesale and retail trade was the third most important source, and government fourth. Services, with only 11.8 percent of the total, was far below the comparable figure for the District and for the United States.

The strong surge in income from mining in the last five years dominates the economic picture of West Virginia. From 1966 to 1971, personal income in West Virginia recorded a gain of 46.9 percent, the lowest among District states. Mining declined in relative importance as a source of income, showing a gain of only 30 percent over the five-year period. Manufacturing fell in relative importance from 29.9 percent to 25.9 percent of labor and proprietors' income and showed a five-year gain of only 21.6 percent (compared with 39.7 percent for the District and 27.1 percent nationally). The largest gains during this period were in construction and government. But the change in the worldwide energy

supply situation in the early 1970's brought dramatic changes in the West Virginia economy. The loss of population that had characterized the 1960's was reversed and personal income jumped 72.2 percent from 1971 to 1976. This growth was second among District states during that period only to South Carolina. And there is no doubt that the large growth in personal income came from the coal mines. Income from mining grew 156.0 percent over this five-year period and by 1976 mining accounted for 17.8 percent of labor and proprietors' income, up from 11.7 percent in 1971. There were some spillover effects, with the service and trade industries showing above average increases in income. Income from government grew at a faster pace than in the preceding five years, and considerably above both the District and the national rate.

It is not very meaningful to compare the District of Columbia with the states in the District or with

the national economy because growth in personal income in the District of Columbia is largely determined by the government sector. In 1976, government was the source of 54.4 percent of total labor and proprietors' income, a figure that had grown from 48.7 percent in 1966. The service sector was second with 21.2 percent of the total, while wholesale and retail trade produced 7.1 percent of the total. In sharp contrast to developments throughout the Fifth District and the nation, trade has declined sharply in relative importance in the District of Columbia. In the ten-year period ending in 1976, income produced in the trade industries grew only 27.8 percent. This compares with 142.0 percent for the Fifth District and 125.2 percent for the nation. The decline in the relative importance of trade in the District of Columbia can be attributed to the rapid development of shopping centers in the Maryland and Virginia suburbs of the Washington area.

THE FARM INCOME AND DEBT SITUATION IN PERSPECTIVE

Sada L. Clarke

The winter of 1977-78 may well be remembered as the winter of farmers' discontent. Many of the nation's farmers, faced with rising production costs, low prices, depressed incomes, and heavy indebtedness, banded together to seek better prices for their products. With many producers in financial difficulty, a wave of rural unrest swept across the country. Farmers' sign-draped tractor and truck caravans parading through Washington and other major cities to protest low farm prices, their threatened "strike," their battle cry of 100 percent of parity prices—all in an attempt to increase their incomes—were evidences of farmers' angry mood.

History records that farm prices have never been supported at 100 percent of parity. While it is doubtful that all farmers know just what full parity really means, they apparently are not alone. Few people probably understand parity or realize what full parity would actually cost.

Today's farmers may, or may not, understand parity.¹ But what they do understand is that farm prices slumped in 1977 on the heels of progressively low prices since 1974, while the costs of farm inputs kept rising. Moreover, it is quite clear to them that they've netted less money almost every year since the record level in 1973. Meanwhile, farmers have continued to increase their debts, which limits their ability to repay loans. They know, too, that it takes a lot more corn, wheat, and/or soybeans to buy items for farm production and family living, or to pay off a \$1,000 debt, than it did a few years ago.

Grain Producers Hit Hardest Of course, the buying ability of all farm products has not declined equally, nor have all costs risen equally. Farmers

¹ The parity price of a farm commodity is the price (calculated by a complex formula) that will give a unit of that commodity the same purchasing power, in terms of goods and services bought by farmers, as that farm product had in a selected base period (1910-14), during which the price relationships were considered to have been reasonably well balanced. To illustrate: Whenever a commodity, such as corn, is selling at parity, a farmer can sell a bushel and buy, say, as much food as he could with a bushel of corn during the period 1910-14. When the price is below parity, the farmer can buy less; when it is above, he can buy more.

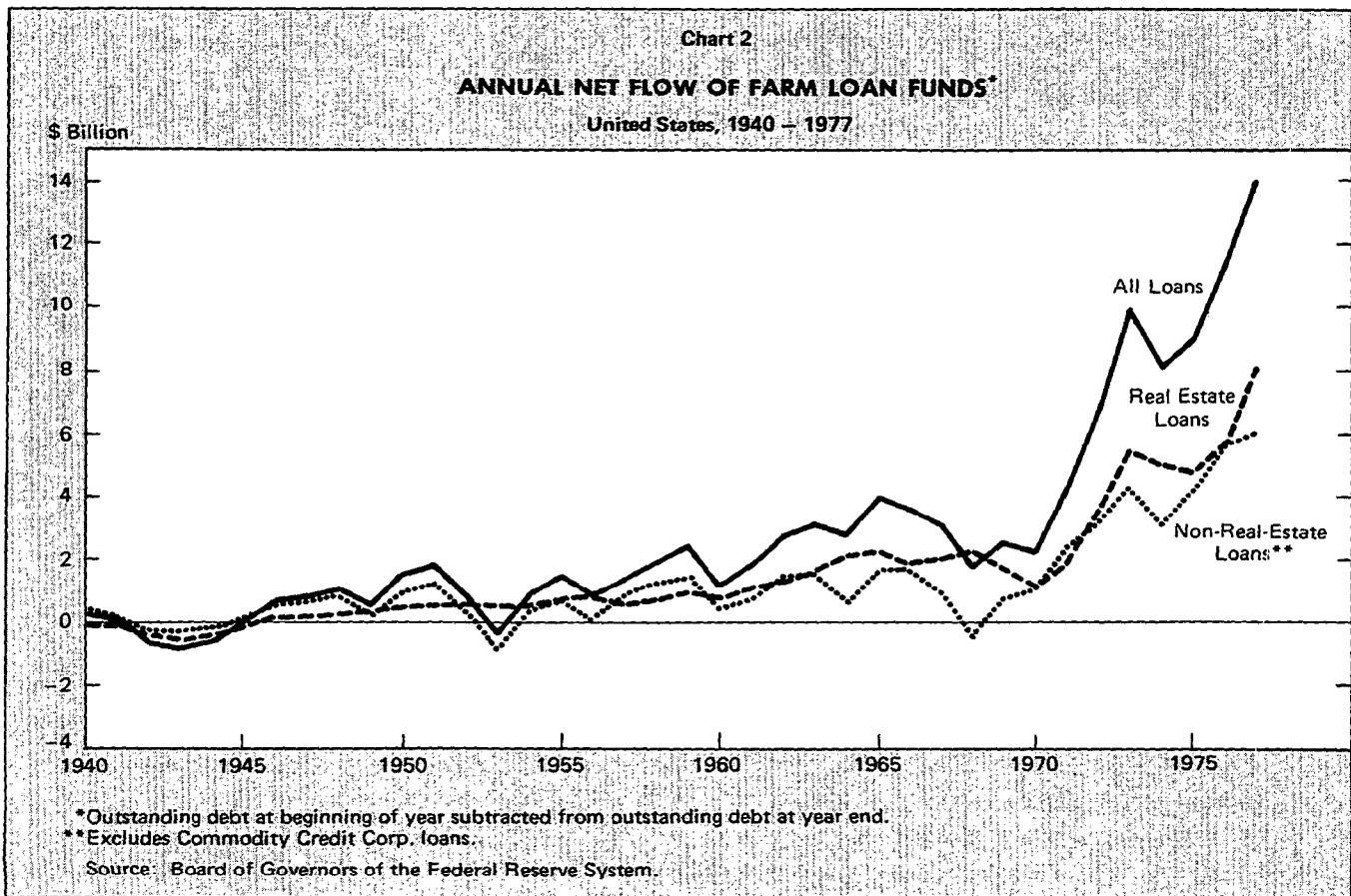
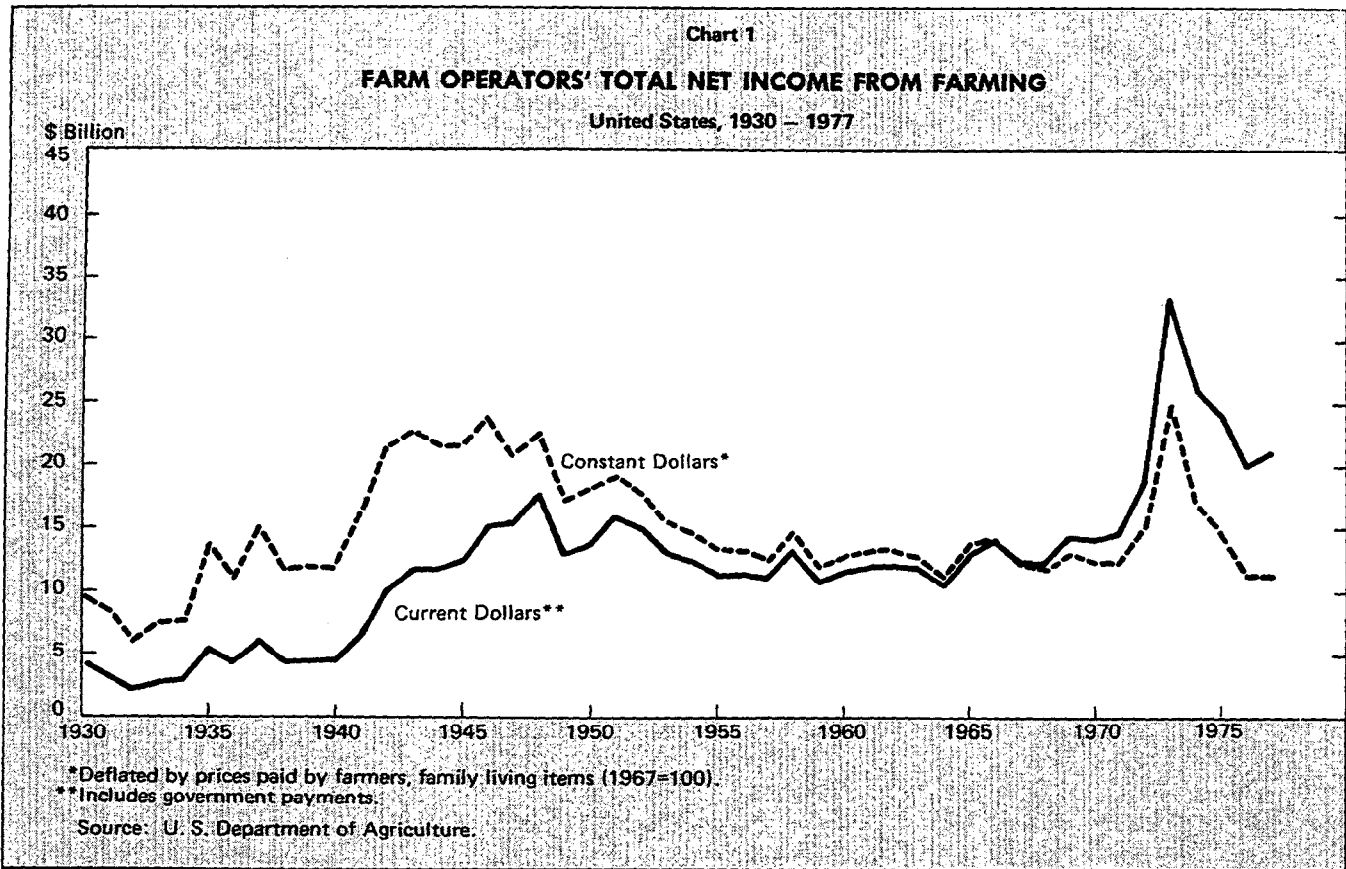
hurt most are the grain producers, followed by cattlemen who are now finally beginning to recover from a 3- to 4-year slump in cattle prices. Nor are all farmers in debt. Well over one-third of the nation's farmers were estimated to be debt free at the beginning of 1977. Evidence indicates that operators of large farms were much more heavily indebted than were the small farm operators.

More Refinancing Because of the poor cash-flow position of many farmers brought on by the slump in farm prices, many farm borrowers had loan repayment difficulties last year and many had to request loan renewals or extensions. Moreover, many operators found it necessary to convert their short- and intermediate-term loans into loans secured by farmland. This restructuring of debt not only enables farmers to spread out their payments and takes the pressure off their cash flow but also provides lenders with more security.

No Farm Credit Crunch While farmers' demand for credit continued strong in 1977, supplies of loanable funds from traditional lenders were generally adequate to meet the demand. Furthermore, the SBA and FmHA provided additional loan fund assistance to farmers in disaster areas. Generally, bankers' regular farm customers did not find it difficult to get needed credit. Most lenders, it seems, have been willing to assist borrowers who have run into repayment problems. Overall, lenders say that only a few borrowers—about 5 percent—have become unsatisfactory credit risks.

District Versus Nation This picture of the national farm financial and credit situation mirrors conditions in the District pretty well. The one exception would seem to be the likelihood that the proportion of District farmers with cash-flow problems may be a shade larger than in the nation as a whole.

The Situation in Perspective To put current farm financial conditions in perspective, it is helpful to study the key financial relationships shown in the



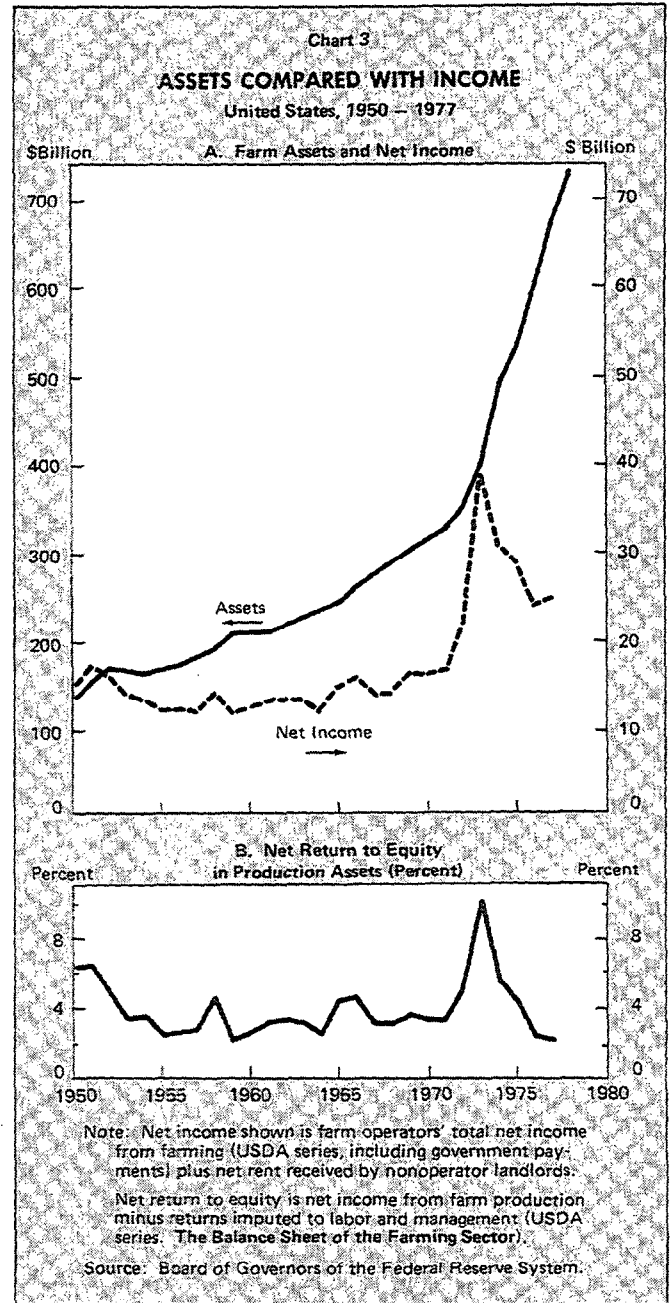
accompanying charts.² This longer term perspective showing the changing fortunes of farming reveals that the current situation is both highly unusual and potentially troublesome.

Chart 1 The sharp gains in total net income of farm operators that occurred during the concluding years of the World War II-Korean War boom were followed by a cost-price squeeze on net income during the remainder of the 1950's. Net income shifted to a slow uptrend in the 1960's. Farm prices and income in the early 1970's were driven up significantly by a combination of circumstances—shortfalls in world grain production, the drawdown in stocks of the major grain-exporting countries, the massive grain sale to Russia, the disappearance of anchovies off the Peruvian coast, and other causes. The peak in farm operators' total net farm income came in 1973, and farm prices peaked in 1974. But better world crops, especially in the last two years, have reversed the situation. By 1977, total net farm income had dropped 36 percent from its 1973 level. Moreover, its purchasing power in constant (1967) dollars had fallen 55 percent and, with the exception of 1976, was at its lowest level since 1964. On a per farm basis, operators' total net income from farming in constant dollars was about \$4,190—down from around \$8,800 in 1973 and, except for 1976, the lowest since 1968.

Chart 2 Although outstanding farm debt has been trending upward since the mid-1940's, farm debt (excluding CCC loans) increased by a record \$14 billion or 14 percent in 1977, following a gain of \$11 billion or 12 percent in 1976. Both real estate and non-real-estate debt contributed to the rise. Historically, net increases in farm debt of the magnitude of 14 percent in a single year tend to occur in boom years for farm income and investment, such as 1950-51 and 1973, rather than in years like 1977 when farm income was relatively depressed and had few prospects for significant near-term improvement.

Chart 3 The value of farm assets rose gradually through the 1950's and 1960's and then literally shot upward in the early 1970's, exceeding \$700 billion by January 1, 1978. Rapidly accelerating farm real estate values were the chief cause, for

² The analyses accompanying Charts 3-6 rely heavily on a report by Emanuel Melichar, Division of Research and Statistics, Board of Governors of the Federal Reserve System. See Emanuel Melichar, "Agricultural Finance Commentary," Board of Governors of the Federal Reserve System, Washington, November 1977, pp. 1-15. (Mimeographed.)



farmland accounts for from two-thirds to three-fourths of the value of all farm assets. By raising the value of assets and thus also the equity of farm proprietors, the advance in farmland prices in the 1950's helped to push the annual return from production down to around 3 percent of equity as shown in Panel B. Continued increases in land prices during the 1960's and early 1970's kept the return at roughly this same level. Favorable farm income triggered a land price explosion in 1972-73, and returns to farm proprietors' equity in production assets moved up to some 10 percent. Since 1973, however, farmland prices have continued to rise in the face of declining net income. Returns

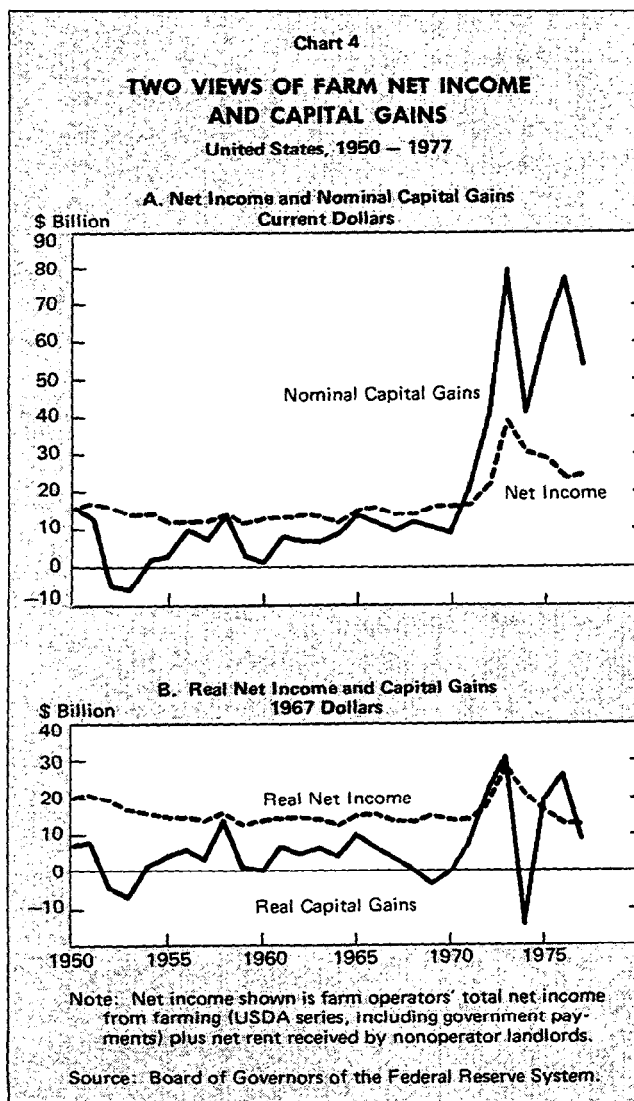
through 1974 and 1975, on the average, continued high enough to support the gains in land prices. But by 1977, the combination of depressed income and high prices of farmland reduced returns to equity to around 2 percent—only one-fifth the record rate in 1973. With farm income settling near the floor provided by government programs, a key support for further land price gains is now missing.

Chart 4 Favorable farm income, as pointed out earlier, triggered the recent explosion in land prices. By the late 1960's, however, land market participants and analysts had noted the steady capital gains that appeared to be providing a significant supplement to net farm income and were discussing the concept of "total returns" to farm investment. However, those who add capital gains to income to calculate a "total return" to the farming sector should also note that only the amount by which the price appreciation

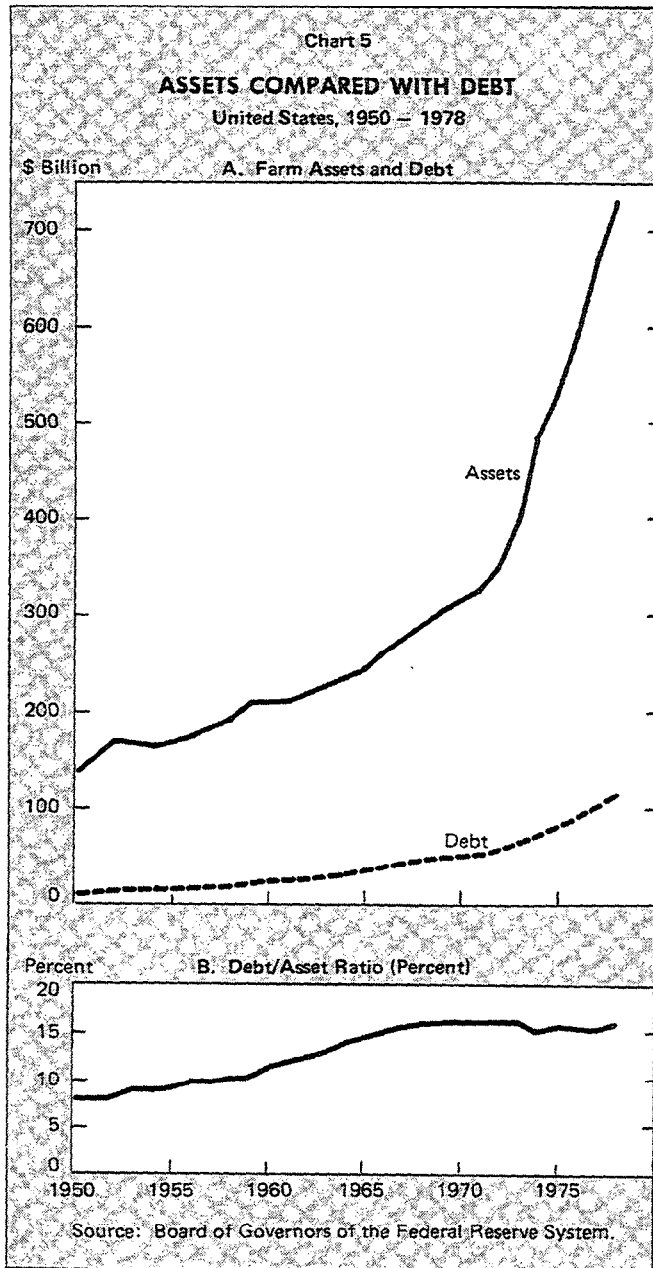
of farm assets exceeds general price inflation represents a gain in real terms to owners of farm assets. Comparison of real net income and real capital gains in Panel B reveals that, in real terms, capital gains over the last five years average slightly less than income, rather than eclipsing income as one might suppose after viewing nominal gains only. Also, in constant dollars the recent levels of income and capital gains are revealed as somewhat more modest relative to past levels. Real income, in fact, has dropped below its pre-1972 level. Also note that real capital gains disappeared in 1968-70, demonstrating that if farm income is relatively depressed, farm assets may not continue to appreciate faster than the rate of inflation.

Chart 5 With farm income relatively depressed and with the continuation of real capital gains in some doubt, should there be cause for concern about further large increases in farm debt such as that which occurred last year? Many analysts examine this question in terms of relationships shown in Chart 5. These analyses reflect the optimism derived from (1) the recent large absolute increase in equity and (2) the low overall debt-to-asset ratio. They note, for example, that the farming sector's debt-to-asset ratio is just under 16 percent and conclude that the sector can greatly increase its borrowings. The financial cushion implied by this sort of an analysis, however, is in part an illusion. For instance: High equity in farm real estate is no guarantee of sufficient cash flows necessary to meet consumption needs and to repay debt.³ The debt-to-asset ratio was not reduced significantly during the recent years of farm prosperity, and thus the farming sector has entered a period of financial strain with the ratio near its post-World War II high. More importantly, the average return on farm production assets is now about 3 percent, while the interest charge on new farm loans averages around 8.5 percent. Given this relationship, further borrowing by the farming sector would tend to reduce its net income. In other words, increased borrowing cannot be sustained for long in the absence of income adequate to service the additional debt.

Chart 6 A look at debt financing of capital formation provides another approach in evaluating the relative usefulness and safety of ongoing increases in farm debt. The inherent productivity of increased



³ David Lins, "Credit and Finance Outlook" (Speech presented at the 1978 Food and Agricultural Outlook Conference, Washington, November 16, 1977), p. 8.

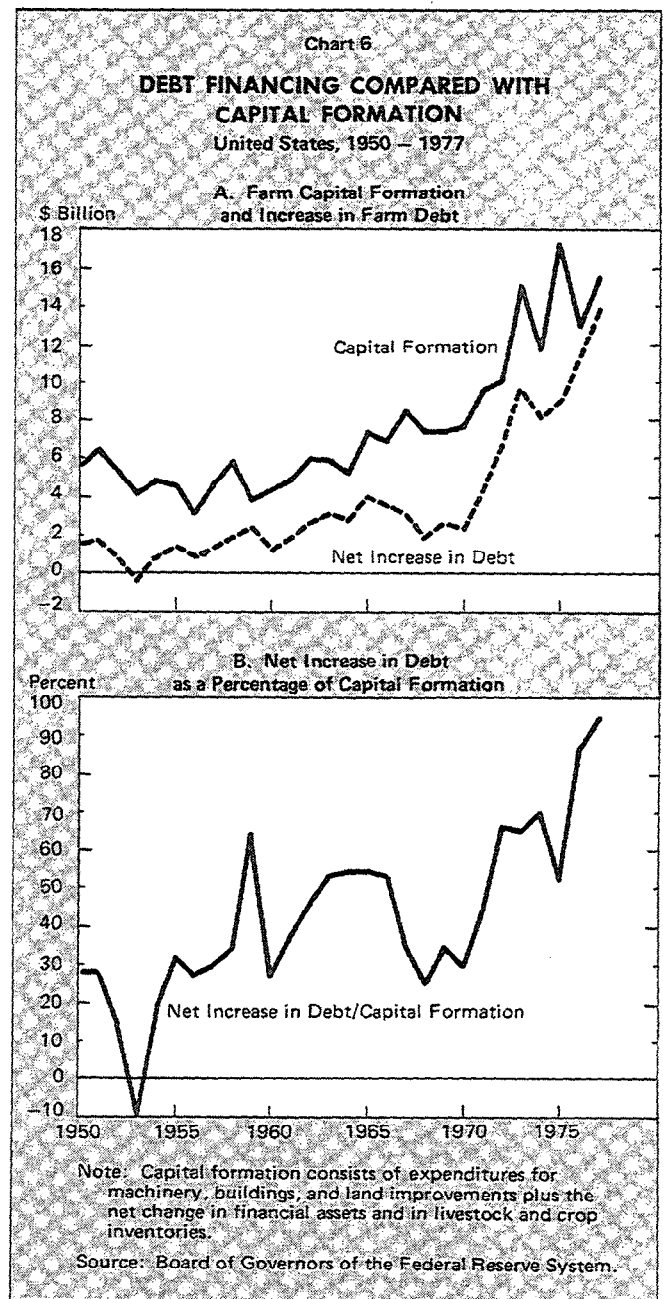


debt financing, for example, can be assessed in part by examining whether it is financing increased capital formation or simply replacing internal financing of this capital flow. Panel A shows that increases in debt have recently been rising faster than capital formation. By 1976-77, debt financing had replaced internal financing to a highly unusual degree. Debt financing, as indicated in Panel B, in fact, averaged 86 percent of farm capital formation in 1976 and 95 percent in 1977. In this century, a comparably high ratio of debt financing to farm capital formation has previously occurred only once—during the ill-fated speculative boom of World War I. In this latter period, according to Tostlebe, debt financing as a

percentage of farm capital formation averaged 76 percent.⁴

Chart 7 Farmers have relied increasingly on the use of borrowed funds in recent years. Because the importance of debt capital has risen substantially, the growth in farm debt outstanding has been spectacular. The rapid increases in outstanding farm debt, in fact, are far outside the previous bounds of their

⁴ Alvin S. Tostlebe, *Capital in Agriculture: Its Formation and Financing since 1870*, A Study by the National Bureau of Economic Research (Princeton, N. J.: Princeton University Press, 1957), p. 136.



relationship to total net farm income and to total net cash income from farm and nonfarm sources. (See Panel A.)

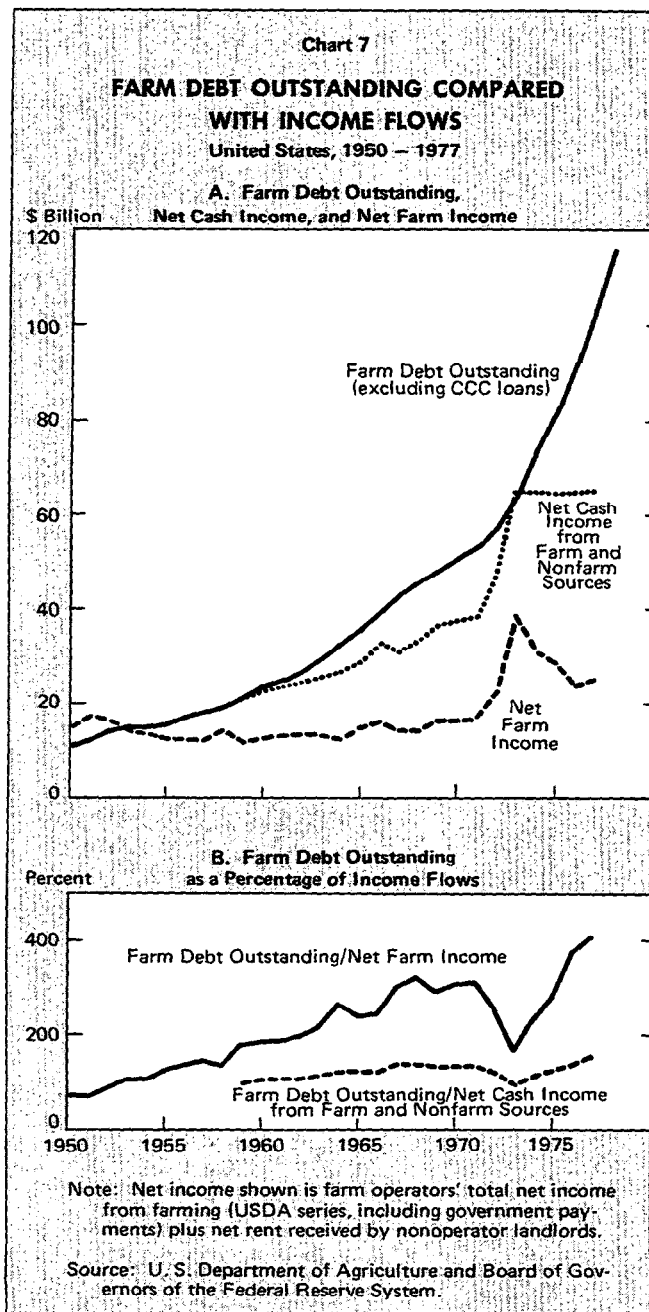
There is growing concern, therefore, as to whether the income of farm operators can support this debt load. Ratios of farm debt outstanding to total net farm income, or to total net cash income from farm and nonfarm sources, allow one to measure the relative burden of debt against income. (See Panel B.) Both ratios indicate that the relative burden of debt has risen significantly since 1973. Farm debt (excluding CCC loans) in 1977, for example, was 4.07 times as large as total net farm income and 1.56

times as great as total net cash income from farm and nonfarm sources. Such increases indicate that farmers are incurring debt commitments at an accelerated rate relative to their income flows from which debt must be serviced. Moreover, they make it clear that the farmer whose income comes solely from farming generally has a much higher relative burden of debt than the farm operator whose income derives from both farm and off-farm sources. His capacity to repay debt and his credit rating with lenders is thus often poorer than those of the farm operator who also has income from an off-farm job.

Summary Some potential for future financial problems appears to be indicated by these aggregate farm finance trends. To what extent problems materialize remains to be seen, however. The key uncertainty is whether the level of farm income in the post-boom period will prove sufficient to maintain the past appreciation of farm assets and to support further increases in farm debt. At current income levels, the financial ratios examined here are not very encouraging.

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THE CAUSE OF THE DOLLAR DEPRECIATION

Robert L. Hetzel and Thomas A. Lawler

An index of the value of the dollar against the currencies of other major industrialized countries fell from an average value of 89.7 in 1976 to a value of 84.0 in January 1978.¹ The depreciation of the dollar is often attributed to a surplus of dollars on the foreign exchange market caused by an excess of imports over exports for the United States as measured either by the trade balance or the current account balance.² (See Chart 1.) These payments imbalances are, in turn, attributed to two particular factors—the demand for oil imports and the faster economic recovery in the United States than abroad. These factors have caused the demand for United States imports to increase faster than its exports. This article presents evidence suggesting that the depreciation of the dollar, rather than being primarily a real phenomenon as just suggested, is primarily a monetary phenomenon. Before this evidence is examined, however, several popular views concerning the current account deficit and the depreciation of the dollar are discussed critically.

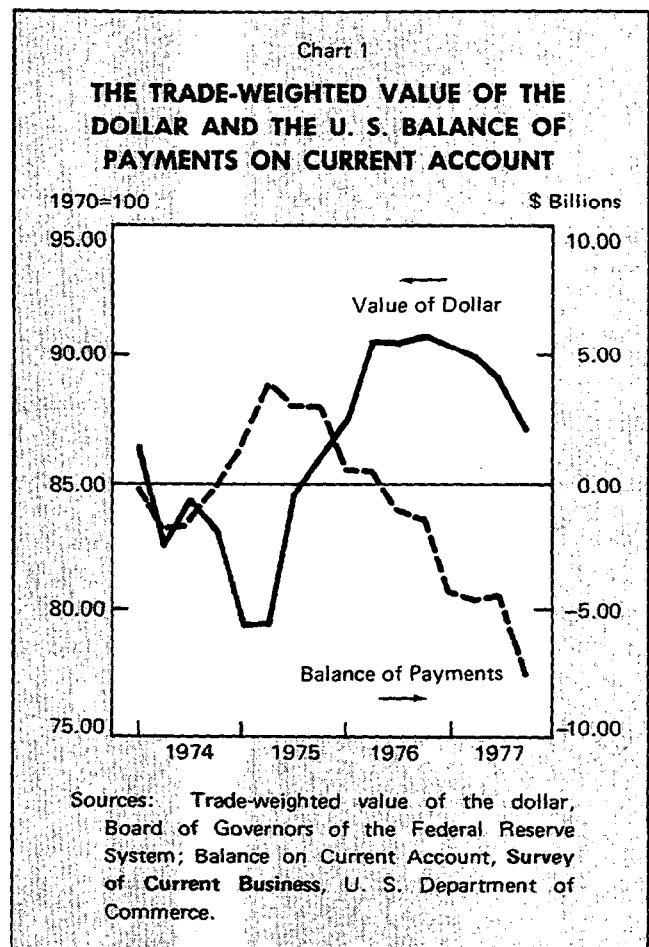
The Current Account and the Exchange Rate
Imports produce a supply of dollars and exports produce a demand for dollars on the foreign exchange market. It seems reasonable, therefore, to associate a current account deficit (an excess of imports over exports) with an excess supply of dollars on the foreign exchange market and consequently with a fall in the value of the dollar. A current account deficit need not, however, imply the existence of an excess supply of dollars on the foreign exchange market. The net supply of dollars coming onto the foreign exchange market because of a current account deficit can be offset by a net demand for dollars if foreigners desire to invest more in the United States than residents of the United States desire to invest abroad.

¹ The index referred to is the Federal Reserve Index of Currency Values. In this index, changes in the value of the U. S. dollar since May 1970 in terms of the currencies of 10 countries are weighted by each foreign country's 1972 worldwide exports plus imports relative to the 1972 worldwide exports plus imports of all 10 foreign countries. The countries are Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, and the United Kingdom.

² The former measure is the difference between merchandise exports and imports. The latter measure is the more inclusive and includes net military transactions, net investment income, net travel and transportation, net other services, and net unilateral transfers.

Direct foreign corporate investment in 1977 by United States residents exceeded by \$3.5 billion similar investment by foreigners in the United States. This amount, however, was undoubtedly outweighed by the investment by the oil-producing states of the Persian Gulf in dollar-denominated assets. The current oil revenues of these countries exceed the value of their merchandise imports and the surplus is invested mainly in dollar-denominated assets.

The net supply of dollars generated by a current account deficit may also be matched by a demand for dollars by foreign central banks motivated by a desire to maintain existing exchange rates. The current account deficit for the United States in 1977 was \$20.2 billion. The dollar holdings of foreign central banks, however, increased by \$37.4 billion in 1977. (In 1976 their dollar holdings increased by \$18 bil-



lion.)³ A comparison of the respective magnitudes of the current account deficit and the demand for dollars by foreign investors and foreign central banks renders implausible the simple statement that the current account deficit of the United States produced an excess supply of dollars on the foreign exchange market that, in turn, caused the dollar to depreciate.

The Foreign Exchange Market and the Exchange Rate It also appears reasonable that a depreciation in the value of a country's currency indicates that there is an excess supply of its currency on the foreign exchange market. Exchange rates may change, however, without excess supplies or demands ever appearing on the foreign exchange market. If the rate of growth of the money supply in the United States produces a seven percent rate of inflation here, and the rate of growth of the money supply in Germany produces a three percent rate of inflation there, then the dollar must depreciate by four percent each year in order to keep constant the real terms of trade between the United States and Germany. For example, if one unit of a United States commodity costs one dollar, one unit of a German commodity costs two marks, and one dollar exchanges for two marks, the rate of exchange between the commodities is one for one. If the dollar price of the United States commodity rises, the mark price of the dollar must fall proportionally in order to preserve the original rate of exchange between the commodities. It is important to note that changes in exchange rates occurring in order to compensate for differing rates of inflation across countries can take place without any balance of payments disequilibria or without any excess demands or supplies on foreign exchange markets. All that is necessary is that the inflation be anticipated.

Exchange Rate Changes and Invalid Association

Simple association between a present current account deficit (surplus) and a depreciation (appreciation) of the dollar does not necessarily imply that the payments imbalance is causing the change in the value of the dollar. Consider a country with balanced international accounts. Market participants come to believe that the price level will rise more rapidly than previously anticipated for one of its trading partners than for the home country, and as a result they begin to trade the home country's currency at an appreciated value. The home country's central bank uses domestic currency to buy foreign

currency in order to resist the appreciation. The overall balance of payments is an accounting identity that must equal zero; total imports must equal total exports. If the home country imports foreign currency as a consequence of the purchases of foreign exchange by the central bank, it must be a net exporter of securities, goods, and services.

The central bank may buy the foreign currency at the old rate. This intervention in the foreign exchange market increases the domestic money supply. The increase in the domestic money supply, if not offset, will raise the domestic price level and validate the old exchange rate. Market participants may, however, believe that the central bank will be unwilling to place its exchange rate objective above its domestic price level objective. They may conclude then that the central bank is only temporarily keeping the value of the home currency below its longer-run value and will willingly supply the central bank with foreign currency in return for the home country's currency. The acquired home currency will be held in liquid securities in anticipation of a windfall gain to be derived from the eventual appreciation of the home currency.

Alternatively, the market may anticipate that the efforts of the central bank to control the value of its currency will be useless and the exchange rate may move immediately to the level that the market views as the equilibrium level. There will be no advantage to placing the home currency received from the intervention of the central bank in the foreign exchange market into liquid securities because the exchange rate is viewed as having appreciated to its equilibrium value. The acquired home currency will be used to purchase not only securities, but also the goods and services of the home country. In this case, home country imports of foreign currency resulting from intervention by its central bank produce a surplus in its current account accompanied by an appreciation of its currency. The foreign country necessarily experiences a deficit in its current account accompanied by a depreciation of its currency.

This example suggests the following possibility. The recent depreciation of the dollar resulted from a belief by market participants that monetary phenomena would lower the equilibrium value of the dollar. Fruitless attempts by foreign central banks to resist the appreciation of their currencies put their currencies into the hands of United States residents who used them to purchase foreign goods and services. The depreciation of the dollar is in this sense a cause of the present United States current account deficit, not a consequence of the deficit. The fact that the

³ The figures are from the U. S. Department of Commerce.

dollar holdings of foreign central banks increased by \$37.4 billion in 1977 means this view must be considered seriously.

Expectations and Exchange Rates Investors can, other things equal, increase the rate of return on their portfolios by moving into a currency before it appreciates and by moving out of it after the appreciation has occurred and, of course, by reversing the process in the case of a depreciation. They will try to anticipate changes in exchange rates and alter their portfolios accordingly. If a widespread change in anticipations occurs, the resulting portfolio adjustments will cause the exchange rate to move independently of excess supplies or demands in the foreign exchange market. This idea and the assertion that forces exist that motivate the market to form its anticipations in such a way that the exchange rate is moved in the direction of its longer-run equilibrium value are discussed in the following section. The reader with an interest in economic theory should read this section. Others may skip to the section entitled "Examination of the Data."

Theoretical Section The basic ideas of this section are introduced initially by analogy in a discussion of the market for long-term bonds. At a given point in time, there is a given stock of bonds outstanding (stock supply) and a given demand for these bonds (stock demand) that depends on their price. At a given price, the difference between the stock demand for bonds and the stock supply of bonds is called the stock excess demand for bonds, and this difference is defined as of a given point in time. There is also a new issue market for bonds. Over an interval of time, the difference between new issues and maturations of old issues give the net flow of stocks (flow supply) for investors to absorb into their portfolios. Over the same interval investors will want to change their bond holdings by an amount (flow demand) that depends on the price of bonds. At a given price, the difference between the flow demand and flow supply is called the flow excess demand for bonds, and this difference is defined over an interval of time.

Assume that at time t_1 market participants come to anticipate that at time t_2 the rate of inflation will increase by some discrete amount. Holders of long-term bonds will now demand an inflation premium to compensate for the expected decrease in the future purchasing power of the dollars with which coupons are redeemed and principal is paid. Issuers of bonds will be willing to pay this premium because they will need to surrender fewer real resources in order to

obtain dollars in the future. The price of bonds drops immediately. If the price had remained at its old level, there would be a stock excess supply of bonds. No one will buy the old bonds at the old price when new ones can be obtained for less. The price of bonds changed without a flow excess supply ever having developed, that is, without bond houses first having to accumulate undesired inventories at the old price.

The exchange rate, similarly with the price of bonds, must equilibrate two kinds of markets, those characterized by stock excess demands and those characterized by flow excess demands. The first kind of market includes the market for the stock of assets denominated in domestic currency and the market for the stock of assets denominated in foreign currency. Such assets include cash balances, securities of all maturities, stocks and real estate. The second kind of market is the market for foreign exchange, that is, the supply and demand for dollars arising over time as a consequence of international transactions.

It will be argued in this section that the dollar may depreciate as a consequence of a change in the expectations of asset holders. This depreciation is necessary in order to maintain equilibrium in the markets characterized by stock excess demands. A depreciation of the dollar is not necessarily a sign of an excess supply of dollars on the foreign exchange market. Consequently the depreciation cannot necessarily be halted by measures conceived of solely as "mopping up" excess supplies of dollars on the foreign exchange market, for example, by central bank intervention.

The rate of return to holding assets denominated in a foreign unit of account, calculated using the domestic unit of account, is affected by changes in the exchange rate. If one believes that foreign currency will appreciate, he will, other things equal, want to hold more assets denominated in the foreign currency and less in the domestic currency. Everyone cannot do so, however, because at a particular point in time the stocks of domestically-denominated and foreign-denominated assets are fixed and exactly these amounts must be held. Given the level of the exchange rate expected to prevail in the future, the current exchange rate will have to adjust in order that the difference between the current and future rate is such that asset holders are willing to hold these fixed stocks. The current exchange rate must be such that there is no advantage anticipated from shifting between foreign- and domestically-denominated assets.

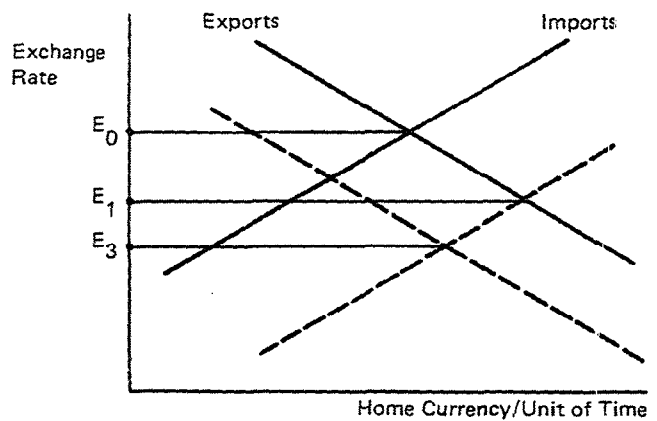
The anticipated value of the future exchange rate determines the current rate. Given this anticipated value, the level of the current rate must be such that asset holders are willing to hold the given stocks of foreign- and domestically-denominated assets. Expectations do not, however, constitute a bootstraps theory of exchange rate determination. The current exchange rate must equilibrate over time the flow demands and supplies in the foreign exchange market. If it fails to do so, the asset holders of the country with the payments surplus will accumulate an excess stock of liquid foreign-denominated assets. When they try to dispose of these assets, the foreign currency will depreciate and inflict capital losses on these asset holders. Asset holders will be unwilling to accumulate the assets that buffer short-lived discrepancies in exports and imports unless they believe the current exchange rate over time will produce overall payments balance. The determinants of the exchange rate anticipated by market participants to prevail in the future must, as a consequence, be those factors, real and monetary, that determine the future value of the exchange rate necessary to achieve over time flow equilibrium in the foreign exchange market.

The following example is provided in order to illustrate how the exchange rate is determined as a consequence of the need to maintain equilibrium in the market for the stock of assets and in the market for the flow of foreign exchange. Assume that in the home country the recent rate of growth of the money supply has been above its trend value, but that, because of past experience, the public expects an offsetting period during which the rate of growth of the money supply will be below trend. Something then occurs that causes the public to believe that the higher rate of growth of the money supply will continue indefinitely. The public then revises upward by a discrete amount the domestic price level anticipated to prevail in the future. Alternatively, the public at some point comes to realize that a natural resource important in that country's exports and in its domestic consumption will be depleted at some future time. For expositional simplicity, these assumptions are summarized by saying that at time t_1 the public comes to anticipate the occurrence of a phenomenon at time t_2 that will cause the exchange rate that equilibrates the flow demand and supply of foreign exchange to fall by some discrete amount.

Figure 1 depicts the demand schedule for home currency arising from the home country's exports of goods and securities and the supply schedule of home currency arising from its imports of foreign goods and securities. A fall in the foreign exchange value

Figure 1

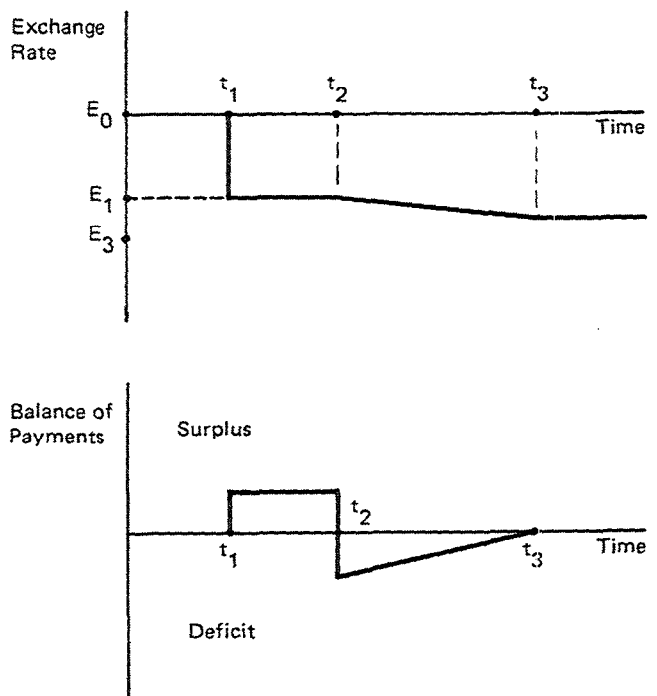
EXPORT AND IMPORT DEMAND SCHEDULES



of the home currency makes exports less expensive abroad and increases the demand for home currency. It makes imports more expensive and, it is assumed, causes less home currency to be offered on the foreign exchange market. The schedules do not include the flow of liquid assets that buffer short-lived discrepancies between the flow of exports and imports. At time t_1 these schedules are represented by the solid lines. At time t_2 they shift to the position indicated by the dashed lines. Figure 2 shows the behavior over time of the exchange rate and the balance of

Figure 2

EXCHANGE RATE AND BALANCE OF PAYMENTS



payments apart from international flows of liquid assets. Initially, the behavior of the exchange rate over time is described, then the rationale behind this behavior is provided.

At time t_1 the public comes to anticipate the occurrence of a phenomenon at time t_2 that will cause the exchange rate that equilibrates the flow demand and supply of foreign exchange to fall. At the old exchange rate E_0 , there is now an excess stock supply of domestically-denominated assets and an excess stock demand for foreign-denominated assets because asset holders anticipate a windfall gain from holding assets denominated in the foreign currency. The exchange rate must fall immediately (E_1). The foreign exchange market is characterized at t_1 by the solid lines shown in Figure 1 and the home country's balance of payments moves into a position of surplus. The surplus will be financed by an accumulation by residents of the home country of liquid assets denominated in the foreign currency. At time t_2 the export and import demand schedules shift to the position shown by the dashed lines in Figure 1 as anticipated. At the exchange rate existing at t_2 (E_1), the home country develops a balance of payments deficit. The exchange rate then depreciates over time until it reaches its long-run equilibrium value. As shown in Figure 2, the deficit is eliminated by this further depreciation, but it persists long enough in order to offset the previous surplus. The initial accumulation of foreign-denominated liquid assets is matched by a corresponding reduction.

What keeps the exchange rate on the path shown in Figure 2? Between time t_1 and t_2 , the home country experiences a trade surplus and between time t_2 and the time when the final rate of exchange is attained, a trade deficit. The home country first accumulates foreign-denominated securities and then reduces them as a result of the deficit. This accumulation represents no risk of capital loss from changes in exchange rates because the foreign-denominated assets will subsequently be used to pay for foreign goods. If, however, the initial depreciation is too small, eventually it will become evident that the exchange rate will fall further than anticipated. Domestic holders of foreign assets could have increased the rate of return on their portfolios by holding more foreign-denominated assets. Their attempt to do so will drive the exchange rate down. If, on the other hand, the initial depreciation is too large, over time it will become evident that when the exchange rate reaches its long-run equilibrium value, asset holders will still be left with foreign-denominated assets. The

deficit following the surplus in the balance of payments is smaller than anticipated. Domestic holders of foreign assets will experience a capital loss because the exchange rate will appreciate when they unload their foreign-denominated assets. Their attempt to decrease their holdings of foreign-denominated assets will drive the exchange rate up. Between time t_2 and t_3 , the exchange rate is prevented from falling immediately to its long-run level because home residents are unloading foreign-denominated securities, but it must fall. Otherwise, a discrete appreciation of the foreign currency would occur in the future. This possibility increases the demand for foreign-denominated assets and forces the exchange rate downward.

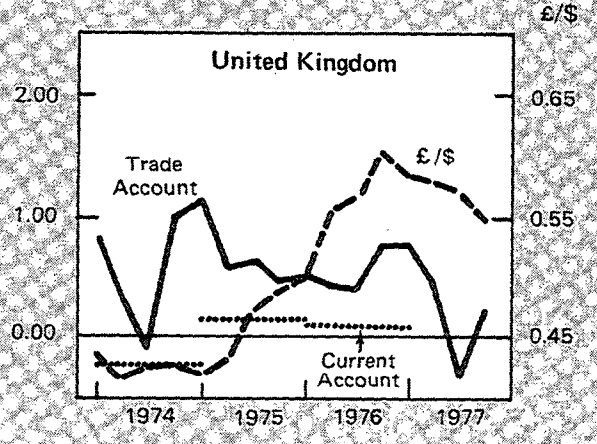
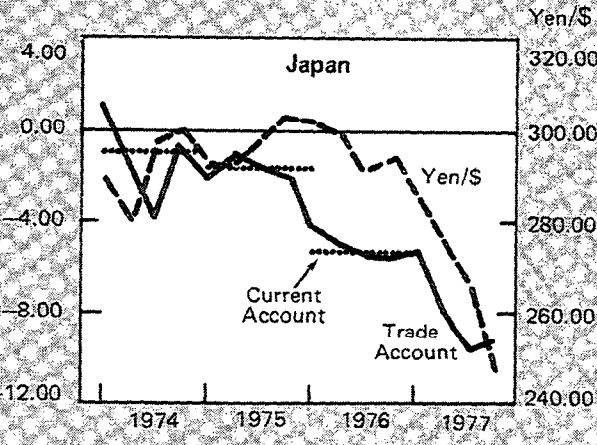
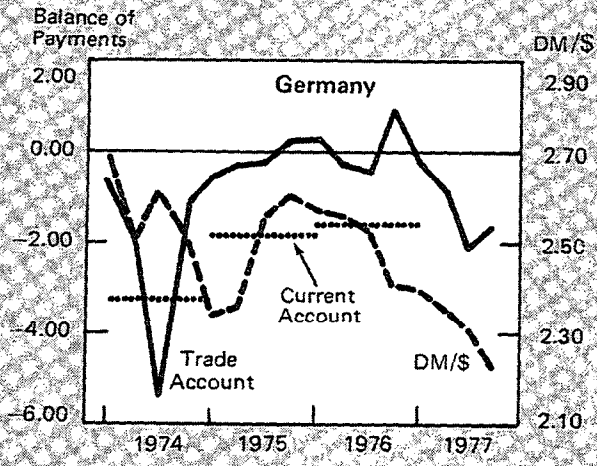
If the event anticipated to occur at t_2 does not occur, the domestic currency will appreciate above its former level while domestic residents run down the foreign-denominated assets accumulated because of the surplus, and then it will return to its old level. Holders of foreign-denominated assets incur a loss. If the event at t_2 causes a greater deficit at the existing exchange rate than anticipated, the domestic currency will depreciate further. Holders of foreign-denominated assets forego gains that could have been earned by holding even more of these assets.

The anticipated future exchange rate is a major determinant of the current exchange rate, but the former will be the rate that the market anticipates will equate over time the flow demands and supplies for foreign exchange arising out of international transactions. In general, if the exchange rate is set at a lower (higher) level, the payments surplus (deficit) will have to be financed by accumulations (reductions) of foreign-denominated assets. These portfolio shifts lower the rate of return earned by holders of these assets when the exchange rate moves to its equilibrium value. (The exchange rate must at some point move to its equilibrium value because individuals cannot accumulate or reduce assets to offset a payments imbalance indefinitely.) The self-interest of market participants motivates them to form expectations of the exchange rate that will assure over time equilibrium in the foreign exchange market. Note finally, once more, that expectations can cause changes in exchange rates even without imbalances in the foreign exchange market.

Examination of the Data It has been the depreciation of the dollar against the German mark, the Japanese yen, and the British pound that has aroused the most concern. Evidence is presented in this

Chart 2

BILATERAL BALANCE OF PAYMENTS ON TRADE AND CURRENT ACCOUNT AND THE BILATERAL EXCHANGE RATE



Note: Trade figures are in billions of dollars at annual rates.
Sources: Balance of payment figures, Survey of Current Business; Exchange rates, Federal Reserve Bulletin.

section concerning the value of the dollar measured in marks, yen, and pounds. The first question examined is whether the balance of payments on current account has been a major determinant of exchange rate movements.

Current Account Imbalance The solid line in Chart 2 shows for each of the three countries the ratio at which its currency exchanges for one dollar, so that declines represent a depreciation of the dollar. The broken lines measure the bilateral balance of payments of the United States with each country measured on a trade account basis (quarterly observations) and on a current account basis (annual observations).⁴ The United States has consistently had a bilateral current account deficit with Japan and Germany since 1974; yet, from 1974 I to 1976 IV for Japan and from 1974 II to 1976 III for Germany, the dollar failed to depreciate against the currency of either country. It may be objected of course that countries need only to balance their international payments across all their trading partners, not bilaterally with each, in order to maintain equilibrium in the foreign exchange market.

Chart 1 plots the balance on current account for the United States and an index of the weighted-average exchange value of the dollar against the currencies of other major industrialized countries. In only slightly more than half the quarters shown is either a surplus associated with a significant appreciation of the dollar, a deficit associated with a significant depreciation of the dollar, or approximate balance in the current account associated with no change in the value of the dollar. It has been argued, however, that even if these associations were present uniformly it is not necessarily valid to assume that the then-existing trade imbalance was causing the change in the exchange rate because central banks were trying to offset the change by intervention in the foreign exchange market.

Differential Movements in Real Income It is possible to test the belief that differential rates of growth in real income between the United States and Germany, Japan, and the United Kingdom have produced a depreciation of the dollar by causing the demand for imports into the United States to increase

⁴ The bilateral trade surplus or deficit figures refer to the value of exports of U. S. merchandise plus reexports of foreign merchandise, minus imports of that country's merchandise into the U. S. customs area.

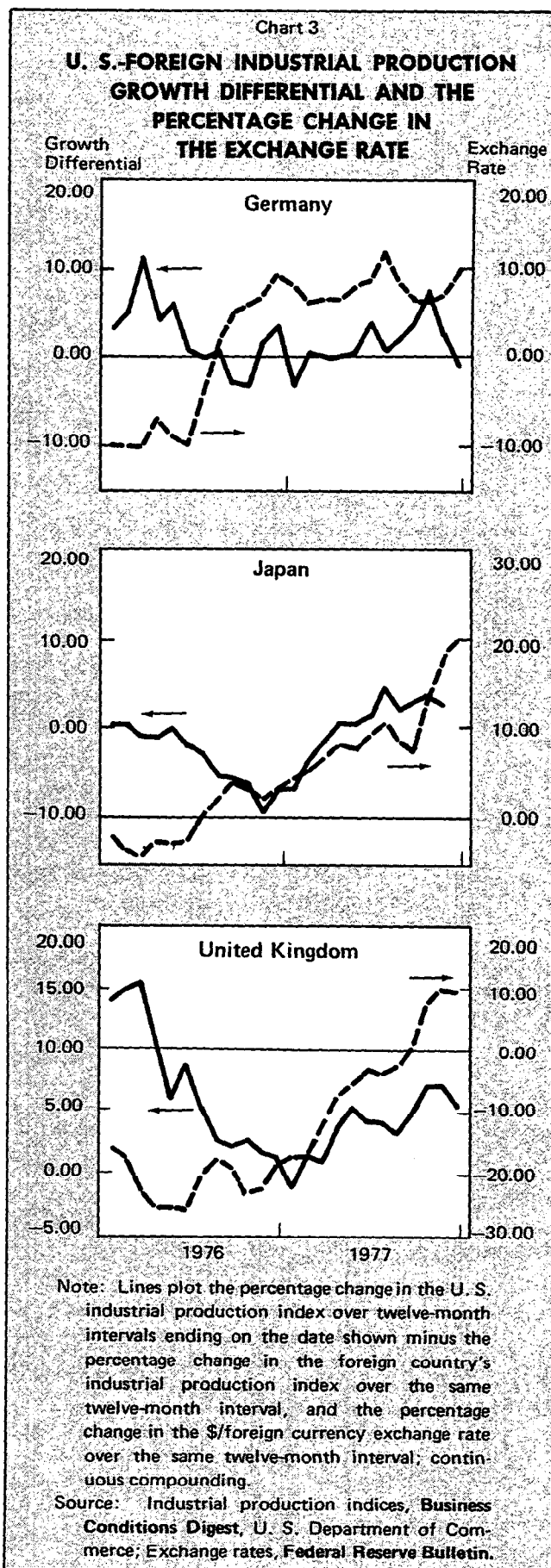
faster than the demand for exports from the United States.⁵

A test of this belief is also a test of the more particular belief that oil imports are a cause of the depreciation of the dollar.⁶ The argument is that the United States is recovering from the trough of the recession faster than other countries. This fact is causing its oil imports to rise faster than other countries' oil imports. If the OPEC countries were willing to invest the receipts from their exports to the United States in United States securities or to import exclusively from the United States, then the dollar need not depreciate against any currency. OPEC countries, however, are using part of the receipts to buy goods from other countries. In order to achieve overall balance in international payments, the United States will, therefore, have to run surpluses in its trade account with other non-OPEC countries. Its currency will have to depreciate vis-a-vis these other currencies in order to generate such surpluses.

Charts 3 and 4 present evidence bearing on the hypothesis that higher rates of growth in real income in the United States than abroad have caused the dollar to depreciate. In Chart 3, the solid line is the percentage change in industrial production in the United States over the twelve-month interval ending in the month shown on the horizontal-axis minus the percentage change in industrial production in the foreign country over the same interval. The dashed line measures the depreciation (positive height) or appreciation (negative height) of the dollar over the same twelve-month interval. The hypothesis requires that these lines rise and fall sympathetically. This behavior is not as a general rule visible in the graphs. It fails to hold for any of the countries for the twelve-month intervals ending in 1976. In 1977, economic activity increased more strongly in the United States than in Germany, Japan, and the United Kingdom.

⁵ It should be noted that the assumed relationship must refer to behavior over a business cycle, not secular behavior. If a country is growing faster secularly than its trading partners, so will its demand for money. For given rates of growth in the nominal money supply, the faster growing country will experience relatively slower growth in its domestic price level. This effect works to increase the foreign-exchange value of the country's currency.

⁶ Oil imports in themselves do not explain a depreciation of the dollar, however. The rise in the price of oil increased the cost to all countries of importing oil. Because the United States is relatively self-sufficient in the production of energy relative to Germany and Japan, the increase in the cost of importing oil cannot explain a depreciation of the dollar against the mark and the yen. Furthermore, the OPEC surpluses are invested mainly in dollar-denominated assets. This fact would indicate an appreciation of the dollar.



For Germany, there was little corresponding increase in the rate at which the mark was appreciating. For Japan, the yen did begin to appreciate at an accelerated pace. For the United Kingdom, the pound depreciated less rapidly and then appreciated against the dollar. In these two cases, however, the upward movement in the line representing percentage changes in the exchange rate preceded the upward movement in the line representing differences in economic activity.

Chart 4 extends the period of observation and employs the more general measure of real income—real gross national product. Observations represent percentage changes over four-quarter intervals ending in the third quarter of the year indicated.⁷ The horizontal distance represents the percentage change of real gross national product in the United States minus the percentage change of real gross national product in the foreign country.⁸ The vertical distance measures the depreciation (positive height) or appreciation (negative height) of the dollar. The hypothesis requires that these points fall along an upward sloping line. When the 1974 observation is ignored in the case of Japan and the United Kingdom, lines passing through the observations would be upward sloping. Ignoring 1974 may be justifiable because the effects of the oil embargo, the rise in the price of oil, and uncertainty over national policies toward energy unquestionably introduced large movements into exchange rates unrelated to differences in real income growth across countries. Chart 4 offers some evidence to support the hypothesis that the foreign exchange value of the dollar is determined by differential rates of growth of real income, but Chart 3 indicates that the evidence is not strong.

Differential Rates of Inflation Chart 5 is useful for deciding whether movements in the foreign exchange value of the dollar are explainable by reference to divergent behavior in the rate of inflation in the United States and abroad. It is constructed in the same way as Chart 3 except that the solid line represents percentage changes in the consumer price index in the United States over twelve-month intervals minus percentage changes in the consumer price index in the foreign country over the same twelve-month intervals. The dashed line, as before, is the percentage change in the exchange rate over twelve-

⁷ Only third quarter 1977 data were available for all countries at the time this article was written.

⁸ For the United Kingdom, the horizontal distance of each point is the percentage changes of real gross national product in the U. S. minus the percentage changes of real gross domestic product in the U. K.

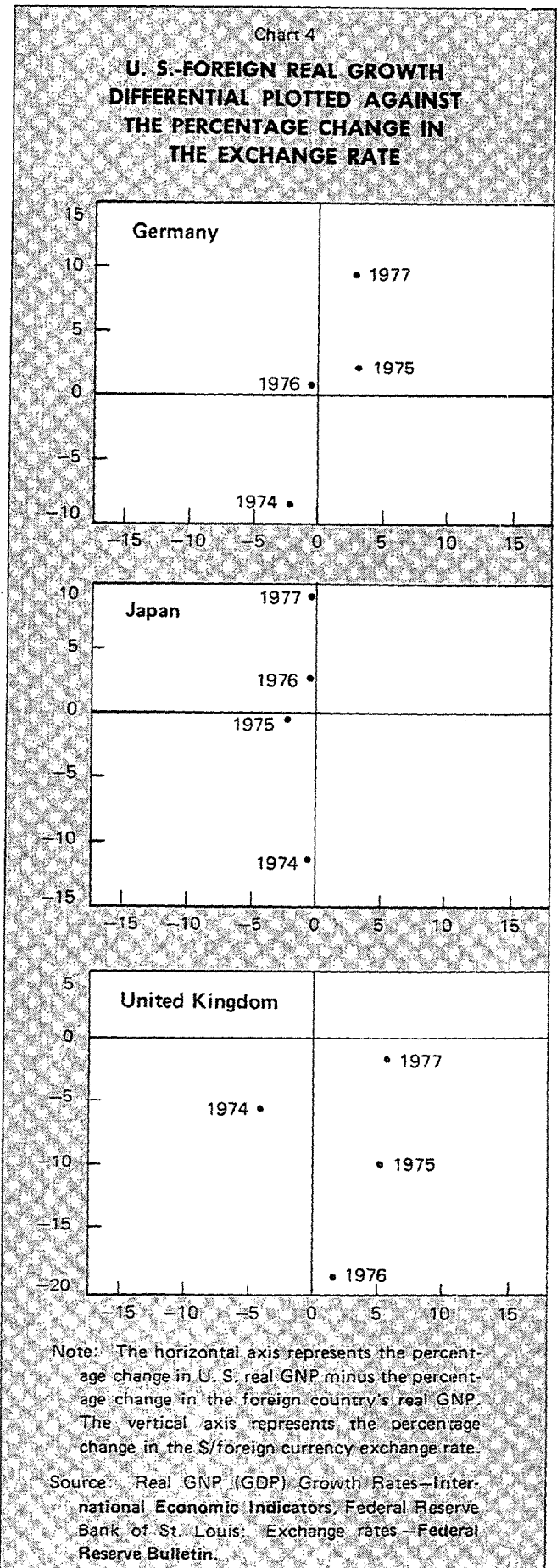
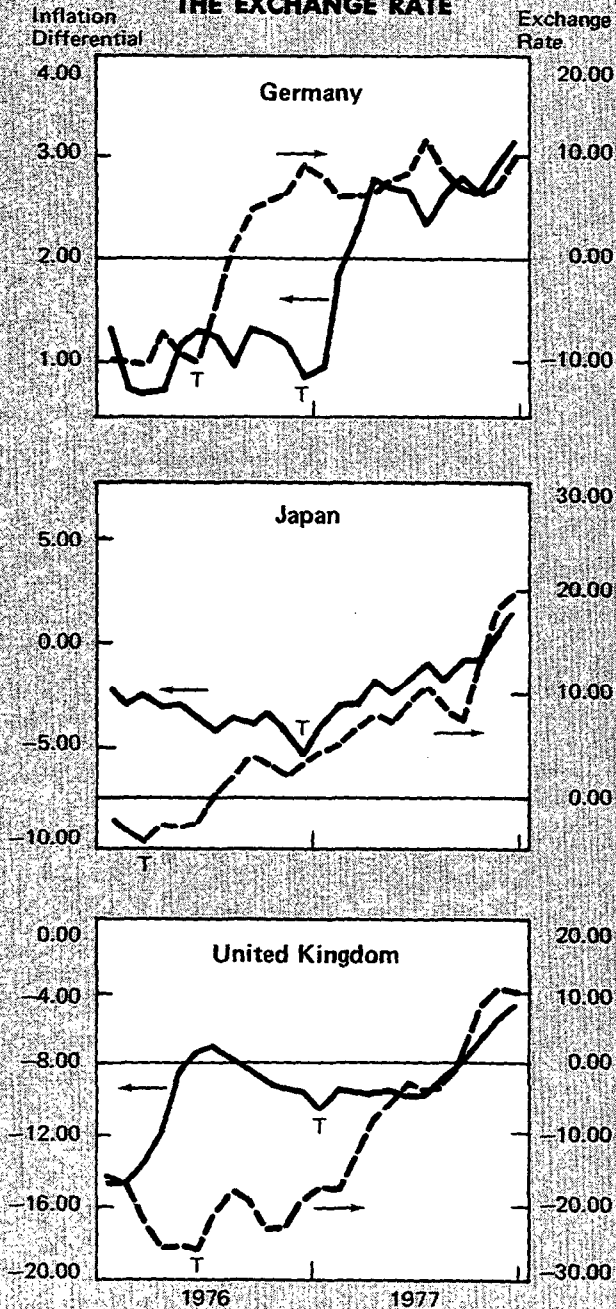


Chart 5

U. S.-FOREIGN INFLATION DIFFERENTIAL AND THE PERCENTAGE CHANGE IN THE EXCHANGE RATE



Note: Lines plot the percentage change in the U. S. consumer price index over twelve-month intervals ending on the date shown minus the percentage change in the foreign country's consumer price index over the same twelve-month interval; and the percentage change in the \$/foreign currency exchange rate over the same twelve-month interval; continuous compounding.

Source: Consumer price indices, *Business Conditions Digest*; Exchange rates, *Federal Reserve Bulletin*.

month intervals. The two lines do not exhibit similar contemporaneous movements. It is, however, possible that exchange rate movements reflected anticipations of future differential rates of inflation. If the line plotting percentage changes over twelve-month intervals in the exchange rate is a predictor of differential rates of inflation over future twelve-month intervals, its predictive power may be tested by moving it rightward and comparing it with the line plotting differential rates of inflation. A rightward movement of the line representing the exchange rate does increase the similarity in movement between the two lines. In particular, the troughs of the lines can be made to coincide by this rightward movement. Given the difficulty of predicting future rates of inflation, it is, however, probably unreasonable to expect that movements in exchange rates should predict any better than is indicated by Chart 5.

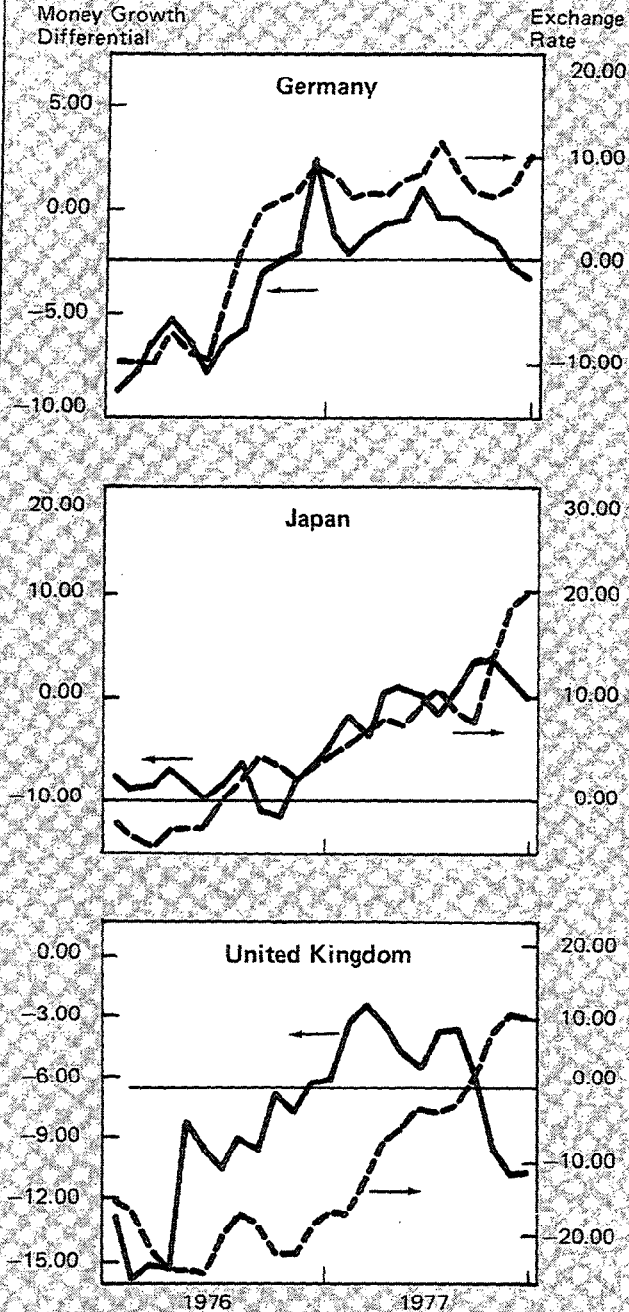
The rate of growth of the money supply offers information about future rates of inflation. Chart 6 is useful in examining whether differential rates of growth in the money supply between the United States and foreign countries are a determinant of movements in the foreign exchange value of the dollar. It is constructed in the same way as Charts 3 and 5 except that the solid line represents percentage changes in the money supply in the United States over twelve-month intervals minus percentage changes in the money supply in the foreign country over the same twelve-month intervals.⁹ The dashed line, as before, is the percentage change in the exchange rate over twelve-month intervals.

Shifts in United States-German and United States-Japanese money growth rate differentials lead to changes in the percentage changes of the foreign exchange value of the dollar as predicted. The exception is the end of 1977. During this time, Germany and Japan were using their currencies to buy dollars in an effort to resist the appreciation of their currencies. This intervention has the effect of raising the rate of growth of the money supply in Germany and Japan relative to the United States, causing a downturn of the solid line in Chart 6. An explanation for the failure of the mark and the yen to appreciate less rapidly or to depreciate against the dollar as a result of this downturn is that market participants believe that the upsurge in the rates of growth of the money supply in Germany and Japan will be reversed

⁹ The money supply used for all countries is M_1 , or currency plus demand deposits. U. S. money growth rates are based on monthly averages of daily M_1 figures, German and Japanese money growth rates are calculated using end-of-month figures, and U. K. money growth rates are based on M_1 figures for the third Wednesday of each month.

Chart 6

U. S.-FOREIGN MONEY GROWTH DIFFERENTIAL AND THE PERCENTAGE CHANGE IN THE EXCHANGE RATE



Note: Lines plot the percentage change in the U. S. money supply (M_1) over twelve-month intervals ending on the date shown minus the percentage change in the foreign country's money supply (M_1) over the same twelve month interval, and the percentage change in the \$/foreign currency exchange rate over the same twelve-month interval; continuous compounding.

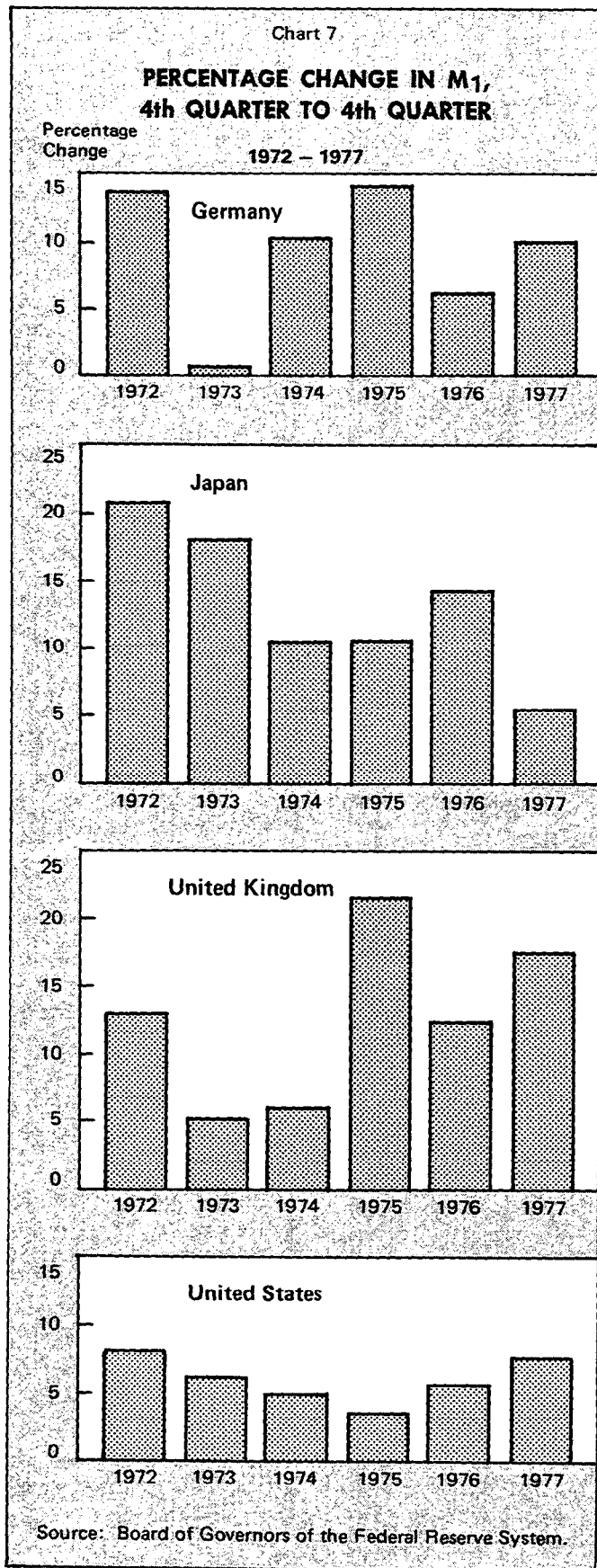
Source: Board of Governors of the Federal Reserve System.

shortly. The increase in the rate of growth of their money supplies would, if not reversed, frustrate the desire of the German and Japanese central banks to maintain low rates of inflation. If a movement in the line representing differential rates of money growth is expected to be reversed shortly after it occurs, it will have no effect on the exchange rate. Such a movement will not affect differential rates of inflation. Furthermore, if the exchange rate were to follow any such predictable pattern, speculative activity would soon eliminate the pattern.

For the United Kingdom, the slowdown in the rate of growth of its money supply relative to the rate of growth in the United States money supply that lasted until early 1977 is reflected by a slowdown in the rate at which the pound was depreciating against the dollar. Over most of 1977, however, the rate of growth of the money supply in the United Kingdom rose in relation to the rate of growth of the money supply in the United States while the pound continued to depreciate more slowly and finally appreciated vis-a-vis the dollar. The explanation for the similar discrepancy in the cases of Germany and Japan may also apply here. Also, in the United Kingdom, the rate of growth of the money supply is closely related to the size of the government deficit. The opening of the North Sea oil wells may have been expected to reduce or eliminate this deficit and to slow the rate of growth of the money supply in the United Kingdom. The current behavior of the dollar-pound exchange rate may be dominated by expectations of slower future growth rates in the British money supply.

The evidence presented in Charts 3 through 6 suggests that both real and monetary phenomena have influenced the value of the dollar in the last three years. A comparison of Charts 3 and 6 suggests that monetary phenomena have been relatively more important than real phenomena in determining the value of the dollar.

Expectations Because of a lack of a direct measure of expectations, it is difficult to say whether the expectations market participants form about the exchange rate necessary to equilibrate the market for foreign exchange over future intervals of time explain the depreciation of the dollar. Chart 7 plots the rate of change of the money supply from the fourth quarter of the preceding year to the fourth quarter of the year shown. These annual growth rates decrease and then increase for the United States. For the United Kingdom, they exhibit an upward trend, although as mentioned above, there are reasons that may be causing asset holders to anticipate a fall in



this series in the future. The series for Germany appears trendless. The series for Japan exhibits a downward trend. Only for Japan does a comparison of these series across countries strongly support the hypothesis that the dollar has depreciated because asset holders expect monetary policy to be more inflationary in the future in the United States than abroad. Asset holders are undoubtedly concerned more about future than past rates of growth of the money supply, however, and historical growth rates of the money supply probably offer less information on this question than a complex of nonquantifiable domestic considerations.

Concluding Comments There is evidence to support the view that the depreciation of the dollar is primarily a monetary phenomenon. Acceptance of this view has several implications. First, the depreciation of the dollar is not necessarily a self-limiting process. Although a discrete change in the expectations of asset holders may cause a large one-time depreciation of the dollar, a continual depreciation of smaller magnitude can continue indefinitely, if necessary, in order to compensate for a faster rate of inflation domestically than abroad. Second, the depreciation of the dollar cannot be dealt with using policy tools designed to deal with real phenomena, that is, phenomena pertaining to particular markets in the real sector of the economy. For example, a tariff or quota on imports might strengthen the dollar temporarily by reducing the demand for imports, but the effect would only be temporary. Furthermore, intervention by foreign central banks in the foreign exchange market that puts foreign currencies into the hands of United States citizens will, if these currencies are used to purchase foreign goods, produce a current account deficit for the United States.

A depreciation of the dollar need not indicate a current flow excess supply of dollars in the foreign exchange market. It may rather be a result of anticipations by the market that at the old exchange rate a flow excess supply of dollars would develop in the future. Many of the current proposals for ending the depreciation of the dollar concentrate entirely on the presumed current flow excess supply of dollars in the foreign exchange market.

For example, one proposal is for the United States Treasury to float a mark-denominated bond and to use the proceeds to buy dollars. Deposits of German banks decrease when the bonds are purchased, but increase to their original level when the Treasury uses the marks it has obtained to purchase dollars. The purchase of marks with dollars decreases the

deposits of United States banks. The operations of the Federal Reserve necessary to preserve its Federal funds rate target will, however, bring these deposits back to their original level. If the Treasury uses the dollars it obtains in this operation in order to retire debt, asset holders end up with fewer dollar-denominated securities and more mark-denominated securities. They may be willing simply to accept this alteration in the relative shares of their portfolios denominated in marks versus dollars in order to profit from an anticipated appreciation of the mark. The operation has no effect on the equilibrium value of the exchange rate.

Intervention in the foreign exchange market in

itself need have no effect on the value of the dollar. It is necessary for this intervention to change the expectations of asset holders about the foreign-exchange value of the dollar that will equilibrate the market for foreign exchange not only over the current time interval, but also over future time intervals. For example, what will be of concern to market participants will be how intervention affects the long-run behavior of the money supply domestically and abroad. Intervention in the market for foreign exchange in order to affect the exchange value of the dollar cannot be viewed in isolation, but must be viewed as an integral part of a more comprehensive set of policies.

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