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The Quarterly Review *is published by the Research and Statistics Group of the Federal Reserve Bank of New York. Among the members of the staff who contributed to this issue are* JOHN WENNINGER *(on the responsiveness of interest rate spreads and deposit flows to changes in market rates, page 1);* LINDA A. BELL *(on wage rigidity in West Germany compared to the U.S. experience, page 11);* ROBERT T. McGEE *(on the cycle in property/casualty insurance, page 22); and* CHARLES STEINDEL *(on the effect of the repeal of* General Utilities *on the merger and acquisition market, page 31).*

Two quarterly reports on Treasury and Federal Reserve foreign exchange operations for the periods August through October and May through July begin on pages 36 and 43.

Responsiveness of Interest Rate Spreads and Deposit Flows to Changes in Market Rates

Changes in interest rates have long been recognized as an influence on the growth of transactions balances (M1). As market rates rise, depositors have typically reduced their money holdings because the interest income they forgo in holding money balances increases as market rates rise. When the Monetary Control Act of 1980 set a timetable for a gradual deregulation of interest rates on consumer deposits, it was widely recognized that the demand for transactions balances would probably respond differently to changes in market rates than it had in an environment where deposit rates were subject to officially imposed ceilings.[1] But it was not certain whether these balances would become more or less sensitive to changes in market rates because it would depend to a much larger degree on the rate-setting policies of the banks. It now appears, however, that banks have adjusted the rates on deregulated accounts (both on time deposits and transactions accounts) in such a way that the demand for transactions balances has been considerably more interest-sensitive than it was prior to 1980. If these banking practices continue, M1 is likely to speed up or slow down far more than it did in the past in response to decreases or increases in market rates. Deregulation has produced an environment in which changes in market rates have continued to affect the attractiveness of holding M1 balances relative to market instruments. In addition, changes in market rates now can affect the attractiveness of holding M1 balances relative to time deposits by causing spreads between the rates paid on time deposits and M1 balances to narrow or widen.

Since the third quarter of 1984 (when short-term rates peaked) these interest rate spreads have narrowed considerably (see Chart 1). At the same time, M1's growth rate accelerated from 5.4 percent in 1984 to over 11.5 percent in 1985 and the first half of 1986, and its velocity dropped from a 3 percent increase in 1984 to a negative 5.25 percent over the past year and a half. By comparison, during the 1960s and 1970s M1's growth averaged about 5 percent and velocity increased about 3 percent per year.

Because changes in these rate spreads seem to affect M1 and velocity growth so dramatically, a question arises about how these rate spreads adjust to changes in market rates in a deregulated (flexible-rate) environment. In other words, the responsiveness of M1 growth to changes in market interest rates now depends on how rate spreads (between market rates and the rate paid on M1 balances as well as between the rates on time deposits and M1 deposits) adjust to changes in market rates. The large changes in these rate spreads as interest rates fell in 1985 and the first half of 1986 demonstrated that banks do not adjust the rates on various types of deposits in step with market rates, leaving rate spreads (and hence the incentives to shift funds) unaffected as might have been expected in a deregulated structure.[2]

In a regulated environment, the spreads between the market rate and various consumer transaction and time deposit rates tended to move in step with market rate changes because the rates on bank deposits did not change as long as market rates were above the ceiling

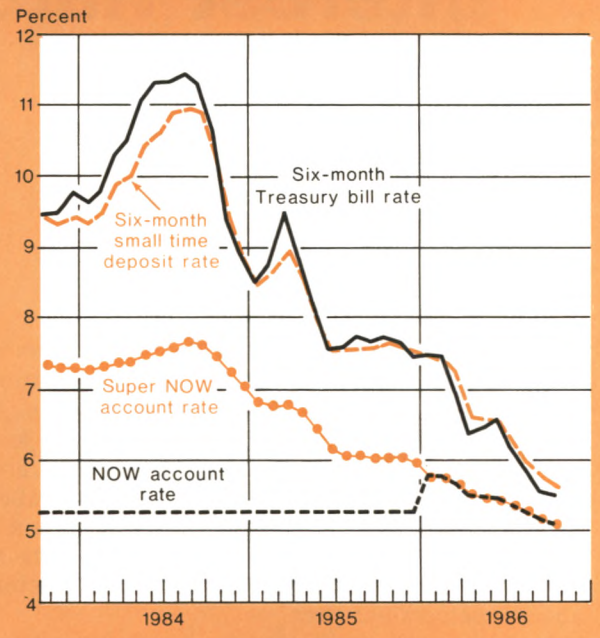
[1]For a detailed listing of the steps in the deregulation of consumer deposits, see R. Alton Gilbert, "Requiem for Regulation Q: What It Did and Why It Passed Away," *Review*, Federal Reserve Bank of St. Louis, February 1986, p. 31.

[2]For more on this aspect of deregulation, see R.G. Davis, "Monetary Targeting in a Zero Balance World," in *Interest Rate Deregulation and Monetary Policy*, Asilomar Conference, Federal Reserve Bank of San Francisco, November 1982.

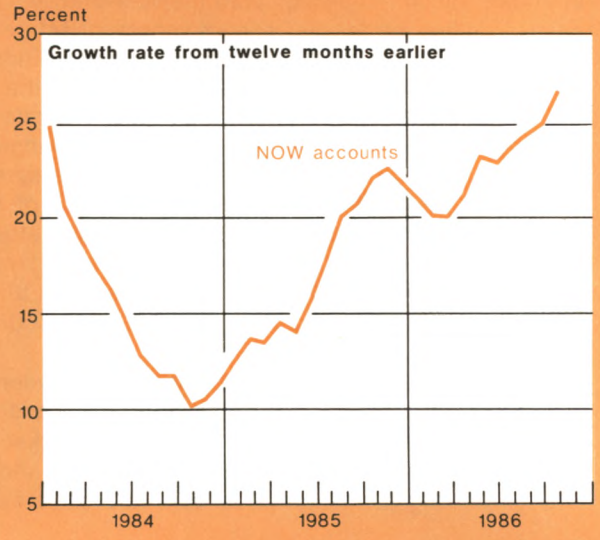
Chart 1

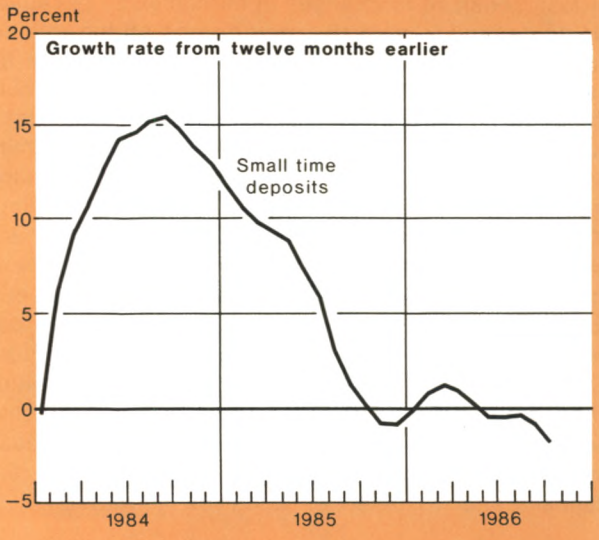
Selected Interest Rate Spreads and Deposit Flows

As market and time deposit rates fell, rate spreads relative to NOW accounts narrowed and M1 growth accelerated . . .



. . . reflecting the more rapid growth in NOW accounts, while small time deposits stopped growing.





Sources: Federal Reserve Board, Statistical Release H.6; Federal Reserve Bulletin.

specified by Regulation Q. Therefore, even though consumers did have incentives to shift funds between market instruments and bank deposits, they had little incentive to shift between time deposits and transactions accounts because these rate spreads tended to remain constant. As long as banks were paying the ceiling rates on deposits, the spreads between the rates on various types of deposits did not change even when market rates increased or decreased.

But now that banks can pay the rate the market dictates on consumer transactions and time deposits, it is important to study the effects that changes in market rates will have not only on (1) the spreads between market rates and the rates paid on bank deposits, but also on (2) the rate spreads between the different types of bank deposits (between time deposits and transactions deposits, for example). This second point is important, of course, because time deposits are part of the M2 definition of money while transactions balances are in M1. The dramatic slowdown in time deposits in 1985 and the first half of 1986, along with the concurrent acceleration in M1 growth as the spreads between the rates offered on time deposits and transactions deposits narrowed, suggest that substitution between M2 components could cause the demand for M1 to be more interest-sensitive in a deregulated environment (Chart 1).[3] Of course, when rate spreads change consumers can move funds not only between time deposits or market instruments and M1 balances, but also into and out of money market deposit accounts (MMDAs) and money market mutual funds (MMMFs). These components of M2 could be alternatives to holding M1 or time deposit balances as interest rate spreads change.

In the first section of this article, the responsiveness of various rate spreads to changes in market rates is reviewed on the basis of some econometric results. By and large, banks, with a lag, have fully adjusted the rate on time deposits to reflect changes in market rates. But they have made only a partial adjustment to their MMDA rates and have been very slow to adjust the rate on deregulated transactions balances (Super NOWs). Hence, even though rates on deposits have been deregulated, consumers still have had an interest rate incentive to reduce their liquidity when market rates rise and increase it when market rates fall.[4]

In the second section of this paper, we review the problems of estimating the responsiveness of deposit flows to changes in rate spreads. As a general note of caution, we have had too little time in a deregulated environment to make very precise estimates. But even with more time, the high correlations among the interest spreads that would affect the deposit flows will make estimates difficult. Nevertheless, we can anticipate the direction of response that some of the components of M2 will make to changes in market rates, based on the way interest rate spreads have responded to changes in market rates.

Responsiveness of interest rate spreads

Ten interest rate spreads are studied in this article:

(1) Six-month Treasury bill less six-month time deposit.
(2) Six-month Treasury bill less Super NOW.
(3) Six-month Treasury bill less MMDA.
(4) MMDA less Super NOW.
(5) Six-month time deposit less Super NOW.
(6) Six-month time deposit less MMDA.
(7) Six-month Treasury bill less MMMFs.
(8) Six-month time deposit less MMMFs.
(9) MMMFs less MMDAs.
(10) MMMFs less Super NOWs.[5]

The table in the box shows the results when the weekly changes in these ten rate spreads are regressed on current and lagged changes in the six-month Treasury bill rate. Based on these results, Charts 2 through 6 illustrate the response over time of the rate spreads to changes in market rates.

Chart 2 (bottom line) shows the response over time of the spread between the six-month bill rate and the six-month time deposit to changes in the six-month bill rate. In other words, we want to see what happens to the spread between the market rate and the time deposit rate when the market rate changes. The chart shows that initially the spread widens considerably, but after about ten to twelve weeks banks have adjusted the rate on time deposits to reflect completely the change in market rates.

At the other extreme, banks are very slow to adjust the Super NOW rate when market rates change.[6]

[3]For more detail, see J. Wenninger and L. Radecki, "The Monetary Aggregates in 1985," this *Review*, Winter 1985-86.

[4]Of course, now that the rates on consumer deposits are competitive with market instruments, the demand for bank deposits might be affected to a larger degree than in the past by changes in inflationary expectations or changes in the expected returns on other investments such as stocks.

[5]In theory, the spreads between the rates earned on longer term time deposits and these deposits could be important as well. To keep the number of rate spreads manageable, however, longer term rates on time deposits were not included. For an analysis of longer term deposit rates as well as short-term rates, see Paul O'Brien, "Deregulated Deposit Rate Behavior," Board of Governors of the Federal Reserve System, April 1986, unpublished.

[6]As of March 31, 1986, the distinction between conventional NOW accounts and Super NOWs was no longer meaningful. By that time, the minimum balance requirements for Super NOWs had been eliminated and the interest rate ceilings on savings deposits

The top line in Chart 2 shows that even after twelve weeks the Super NOW rate has changed by only about 25 percent of the change in market rates, and therefore changes in market rates have had long-lasting effects on the spread between market rates and the Super NOW rate. (This can also be seen from Chart 1.)

Between these two extremes is the responsiveness of the MMDA rate. The center line in Chart 2 shows that after a twelve-week period, the spread between market and MMDA rates has adjusted about 60 percent of the way to the change in market rates, as compared with 25 percent for Super NOWs and 100 percent for time deposits. Thus, along the liquidity spectrum from transactions accounts to time deposits, there have been increasingly fuller adjustments to changes in market interest rates.

Apparently, banks have not made rapid adjustments to the Super NOW rate, either due to lack of experience in pricing these accounts, or reluctance to make frequent changes to the terms offered on transactions accounts once they set a combination of fees, minimum balances, and an interest rate on Super NOWs. In other words, banks may have wanted to market Super NOWs not as flexible rate accounts, but as fixed-rate accounts on which the terms do not change frequently but consumers still earn a fair rate of return on average over the longer run.

On the other hand, banks have had considerably more experience with offering flexible rates on time deposits. Indeed, for several years the ceiling rates on six-month time deposits were linked directly to changes in the Treasury bill rate. Hence, banks were quicker to adjust time deposit rates to follow market rates after the ceilings rates on time deposits were eliminated. In addition, with time deposits banks are adjusting only the rate offered on maturing or new deposits; the rate on the nonmaturing stock remains unchanged. Hence, their cost of funds from this source adjusts gradually to changes in market rates even if they quickly match any change in market rates with a change in time deposit rates. In contrast, with Super NOWs any change in the rate offered by banks affects the entire stock of deposits since Super NOWs for all practical purposes do not have a maturity like time deposits do. Therefore, banks may feel that they have better control over the cost of funds from this source if they promote them as fixed-rate accounts or accounts on which the terms change only infrequently. In any case, it appears that M1 has retained a significant, if not a larger interest elasticity over the last few years as a result of the way banks have adjusted the rates on Super NOWs and time deposits.[7]

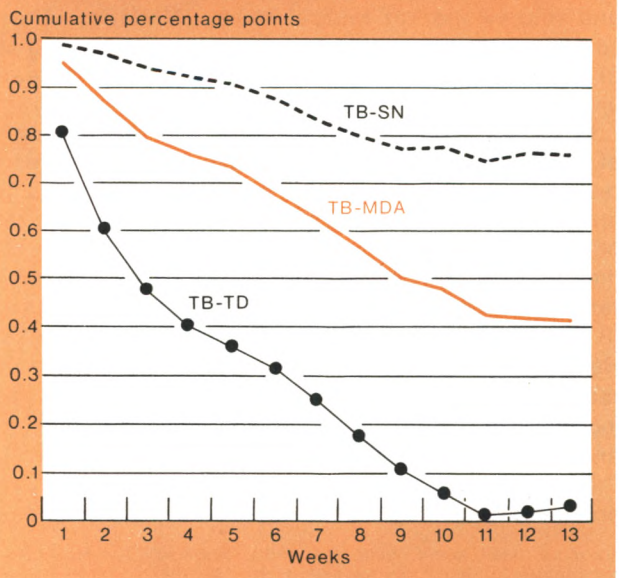
MMDAs, as a combination savings/checking instrument, probably involve a combination of the above considerations for banks. MMDAs were introduced as a means for banks to compete effectively with MMMFs. Hence, they were viewed from the start as a flexible-rate deposit, and banks may have been predisposed to

Footnote 6 continued
(including conventional NOWs) were no longer effective. For most of the three-year period studied in this article, however, the distinction between Super NOWs and conventional NOWs was important because banks could vary the rate on the former, while there was a ceiling rate on the latter. How banks varied the interest rate on Super NOWs during this period in response to changes in market rates is of interest because it gives some insights into how they are likely to administer all NOW accounts now that they are deregulated.

[7]This result may not hold in the very long run, of course. If market rates changed and then held steady for a very long period, banks would probably over time adjust the Super NOW rate to reflect this change fully, after allowing for the cost of required reserves. Over shorter periods of time in a less stable interest rate environment, however, it appears that significant changes in rate spreads can occur that strongly affect M1's growth. The overall responsiveness of deposit flows to changes in market rates depends, of course, not only on how rate spreads change but also on how responsive consumers are to a given change in these spreads. In this article, we are focusing primarily on how much rate spreads adjust to changes in market rates.

Chart 2

Responses of the Spreads Between the Treasury Bill Rate and the Time Deposit, MMDA, and Super NOW Rates to Changes in the Treasury Bill Rate*



*Cumulative responses of the spreads between the six-month bill rate (TB) and the six-month time deposit rate (TD), MMDA rate (MDA), and Super NOW rate (SN) to a change in the bill rate (percentage points).

Estimating the Response of Rate Spreads To Changes in Market Rates

To illustrate how various interest rate spreads have responded to changes in market rates, the change in each spread was regressed on the current and lagged changes in the six-month Treasury bill rate (see table). The sum of the coefficients, which represents the total response over thirteen weeks, is shown at the bottom of each column. For example, the total response of the spread between the six-month bill rate and the six-month time deposit rate to a change in the bill rate is zero. That is, when the bill rate increases by a given amount, so does the time deposit rate, leaving the spread after thirteen weeks unaffected (column 1). In contrast, the total response of the spread between the six-month bill rate and the Super NOW rate to a change in the bill rate is 0.77 (column 2). Thus, if the Treasury bill rate increases one percentage point, after thirteen weeks the spread between the Treasury bill rate and the Super NOW rate will be about three-quarters of a percentage point wider than it was before the change in the bill rate. In other words, the Super NOW rate only adjusts by about 25 percent (1-0.77) of the change in the market rate, leaving the spread about 0.75 percentage points wider. The remaining eight columns in the table show what happens to other rate spreads when the bill rate changes.*

*In the table, there are four basic equations (shown in columns 1, 2, 3 and 7) which determine how the rates on time deposits, Super NOWs, MMDAs and MMMFs adjust to changes in the market rate. The response of the six remaining spreads to changes in market rates can either be estimated, as was done here, or calculated from the results obtained from the four basic equations.

Response of Various Rate Spreads to Changes in Treasury Bill Rate*

	(1) Six-Month Bill Less Six-Month Time Dep.		(2) Six-Month Bill Less Super NOW		(3) Six-Month Bill Less MMDA		(4) MMDA Less Super NOW		(5) Six-Month Time Dep. Less Super NOW	
t	0.81	(41.0)	0.99	(58.0)	0.95	(45.8)	0.03	(2.4)	0.18	(9.4)
t-1	−0.20	(10.4)	−0.01	(0.9)	−0.08	(3.8)	0.06	(5.0)	0.19	(9.9)
t-2	−0.13	(6.3)	−0.03	(1.8)	−0.07	(3.5)	0.04	(3.2)	0.09	(4.8)
t-3	−0.07	(3.7)	−0.02	(1.1)	−0.04	(1.9)	0.02	(1.6)	0.06	(2.8)
t-4	−0.04	(2.1)	−0.01	(0.8)	−0.03	(1.3)	0.01	(0.9)	0.03	(0.9)
t-5	−0.05	(2.3)	−0.03	(1.6)	−0.05	(2.6)	0.03	(2.1)	0.02	(0.9)
t-6	−0.07	(3.3)	−0.05	(2.8)	−0.05	(2.4)	0.003	(0.2)	0.02	(0.9)
t-7	−0.08	(3.8)	−0.03	(1.8)	−0.06	(2.9)	0.03	(2.3)	0.04	(2.3)
t-8	−0.07	(3.5)	−0.03	(1.6)	−0.06	(3.1)	0.04	(2.8)	0.04	(2.1)
t-9	−0.05	(2.4)	−0.002	(0.1)	−0.02	(1.2)	0.03	(2.0)	0.05	(2.6)
t-10	−0.05	(2.4)	−0.03	(1.6)	−0.05	(2.6)	0.03	(2.1)	0.02	(1.0)
t-11	0.01	(0.6)	0.02	(1.0)	−0.006	(0.1)	0.02	(1.7)	0.005	(0.3)
t-12	0.01	(0.5)	0.001	(0.06)	−0.002	(0.3)	0.001	(0.1)	−0.01	(0.6)
Total	0.02		0.769		0.432		0.344		0.735	
R^2	0.94		0.96		0.94		0.43		0.70	
D.W.	1.48		1.80		1.67		1.83		1.30	

	(6) Six-Month Time Dep. Less MMDA		(7) Six-Month Bill Less MMMFs		(8) Six-Month Time Dep. Less MMMFs		(9) MMMFs Less MMDA		(10) MMMFs Less Super NOWs	
t	0.15	(7.7)	1.04	(36.0)	0.23	(7.2)	−0.08	(2.4)	−0.05	(1.6)
t-1	0.13	(6.5)	−0.26	(9.1)	−0.06	(1.8)	0.18	(5.3)	0.25	(7.3)
t-2	0.05	(2.6)	−0.13	(4.4)	−0.002	(0.07)	0.05	(1.5)	0.10	(2.8)
t-3	0.03	(1.7)	−0.13	(4.3)	−0.05	(1.6)	0.09	(2.5)	0.11	(3.1)
t-4	0.01	(0.7)	−0.12	(4.1)	−0.08	(2.4)	0.09	(2.7)	0.11	(3.1)
t-5	−0.01	(0.5)	−0.08	(2.7)	−0.03	(1.0)	0.02	(0.7)	0.05	(1.5)
t-6	0.001	(0.8)	−0.05	(1.8)	0.01	(0.4)	0.00	(0.0)	0.004	(0.1)
t-7	0.01	(0.8)	−0.04	(1.3)	0.04	(1.1)	−0.02	(0.7)	0.007	(0.2)
t-8	0.004	(0.2)	−0.07	(2.3)	0.0001	(0.004)	0.004	(0.1)	0.04	(1.2)
t-9	0.02	(1.2)	−0.03	(1.0)	0.02	(0.6)	0.004	(0.1)	0.03	(0.9)
t-10	−0.008	(0.4)	−0.06	(2.0)	−0.01	(0.4)	0.004	(0.1)	0.03	(0.9)
t-11	−0.02	(0.9)	−0.02	(0.7)	−0.03	(0.9)	0.01	(0.4)	0.04	(1.1)
t-12	−0.01	(0.6)	−0.02	(0.7)	−0.03	(0.9)	0.02	(0.5)	0.02	(0.5)
Total	0.366		0.03		0.008		0.452		0.741	
R^2	0.50		0.92		0.27		0.33		0.49	
D.W.	1.32		2.42		2.28		2.12		2.12	

*T-statistics in parenthesis.
Source: *Bank Rate Monitor.* Estimation period: weekly 10/12/83 to 7/23/86.

adjusting the rate on MMDAs when market rates changed more than the rates on Super NOWs. However, like Super NOWs, the rate on the entire stock of MMDAs changes when banks adjust the rate offered on MMDAs. Again banks might be slower to adjust the rates on MMDAs than on time deposits in an effort to avoid large fluctuations in the costs of funds from this source. On balance, it is not surprising that the rate on MMDAs has shown a response to changes in market rates that is between the responses of the time deposit and the Super NOW rates.

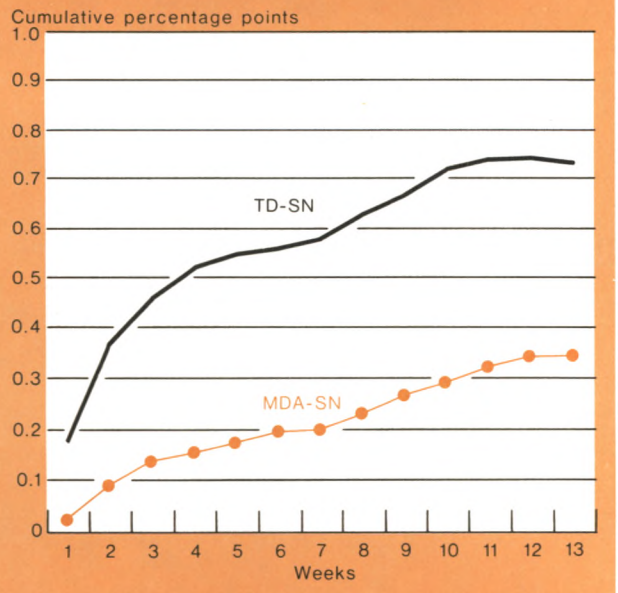
When market rates change, the rate spreads change not only between market rates and various bank liabilities but also between the types of bank liabilities. And changes in these spreads might induce shifts between components of M2, perhaps affecting the growth of M1 as a result.

Chart 3 (bottom line) illustrates the effect on the rate spread between MMDAs and Super NOWs when the market rate changes. Initially, banks are slow to adjust both of these rates to changes in market rates, but after a twelve-week period, the spread changes by about 33 percent of the change in market rates, creating an incentive for consumers to shift funds between MMDAs and Super NOWs. These shifts could have some effect on the growth of M1 but would leave M2 growth unchanged. We would expect the effect on M1 growth to be small because the rate spread does not appear responsive enough to changes in market rates to cause large substitutions between MMDAs and Super NOWs.

The top line in Chart 3 shows much more dramatic effects on the rate spread between time deposits and Super NOWs when the market rate changes. As in the previous case, there is little effect in the first week. But after twelve weeks, the rate spread between time deposits and Super NOWs has moved by 75 percent of the amount that the market rate changed. This reflects the tendency for the time deposit rate (with a lag of twelve weeks) to follow the market rate much more fully than the Super NOW rate does. As a result, substitutions between time deposits and Super NOWs are likely to have sizeable effects on M1 growth when market

Chart 3

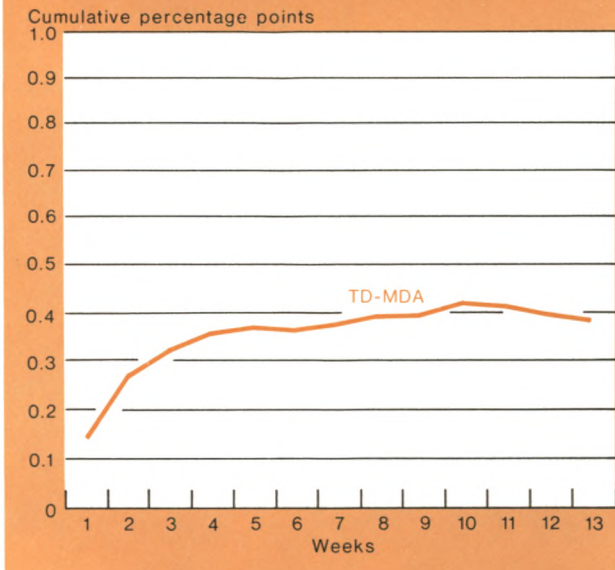
Responses of the Spreads Between the MMDA and Super NOW Rates and Between the Time Deposit and Super NOW Rates to Changes in the Treasury Bill Rate*



*Cumulative responses of the spreads between money market deposit rate (MDA) and the Super NOW rate (SN) and between the time deposit rate (TD) and Super NOW rate to a change in the bill rate (percentage points).

Chart 4

Response of the Spread Between the Time Deposit Rate and the MMDA Rate to Changes in the Treasury Bill Rate*



*Cumulative responses of the spread between the six-month time deposit rate (TD) and the money market deposit rate (MDA) to a change in the bill rate (percentage points).

rates change. As noted earlier, this would in a sense be a new source of M1 growth when market rates change and could well be contributing to M1's increased responsiveness to interest rate changes in recent years.

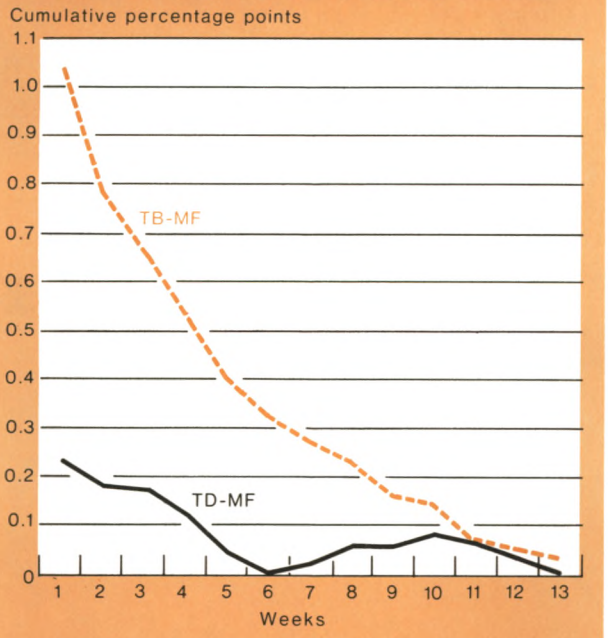
Moreover, changes in market rates might also prompt some shifting of funds from time deposits into more liquid MMDAs. This would not affect M1 or M2 but would affect the overall liquidity of the consumer sector. Chart 4 shows that the spread between the time deposit rate and the MMDA rate after twelve weeks changes by about 40 percent of the amount that the market rate has changed. Therefore, while consumers might also respond to lower rates on time deposits by increasing their holdings of MMDAs, their response is not likely to be very large because the impact on the rate spread when market rates change is quite small (about 50 percent of the size of the impact on the rate spread between time deposits and Super NOWs in Chart 3).

Finally, changes in market rates affect the rates earned not only on various types of bank deposits, but also on a very close substitute for bank deposits, MMMFs. Chart 5 shows that a change in market rates does not result in a permanent change in the rate spreads between market instruments and the MMMFs or between time deposits and the MMMFs.[8] However, more sizeable changes in rate spreads between MMMFs and MMDAs or Super NOWs have occurred when market rates change (Chart 6). Hence, changes in market rates could result in some funds flowing into or out of MMMFs and out of or into NOW accounts or MMDAs. Moreover, since fairly large spreads between the rates on MMMFs and MMDAs have occurred, it does not appear that the rates being offered by MMMFs are the primary factor determining how banks set the rate on MMDAs.

[8]This result should be expected from the basic way MMMFs operate. That is, as their market instruments mature and are gradually reinvested at the prevailing interest rate, the average rate of return on their overall portfolio gradually moves toward the market rate.

Chart 5

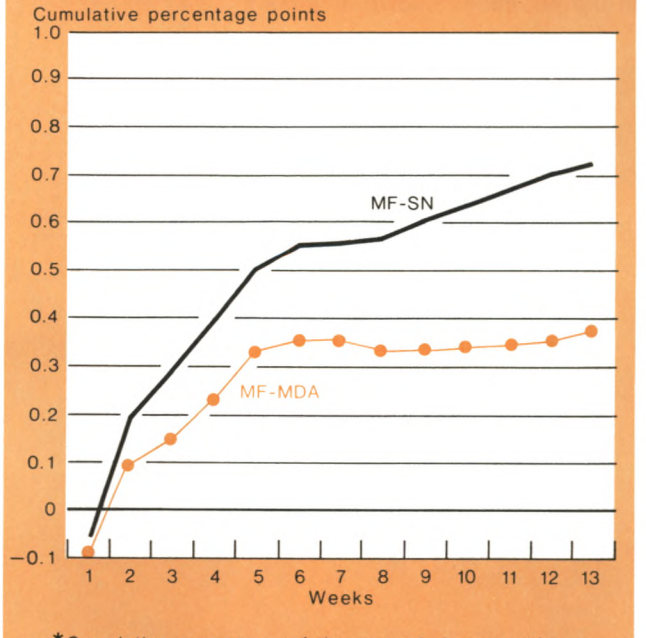
Responses of the Spreads Between the Treasury Bill Rate and MMMFs Rate and Between the Time Deposit Rate and MMMFs Rate to Changes in the Treasury Bill Rate*



*Cumulative responses of the spreads between the six-month bill rate (TB) and money market mutual funds rate (MF) and between the time deposit rate (TD) and MF to a change in the bill rate (percentage points)

Chart 6

Responses of the Spreads Between the MMMFs and MMDA Rates and Between the MMMFs and Super NOW Rates to Changes in the Treasury Bill Rate*



*Cumulative responses of the spreads between the money market mutual funds rate (MF) and the money market deposit rate (MDA) and between MF and the Super NOW rate (SN) to a change in the bill rate (percentage points).

Responsiveness of deposit flows

In terms of very broad trends, Chart 1 shows how deposit flows have responded to changes in interest rate spreads. However, this section will give some reasons why precise estimates of how strongly deposit flows will respond to changes in these spreads are not possible now. Since MMDAs and Super NOWs were introduced in 1983, we have data for only about three years in which all four flexible-rate instruments were available—too short a period to estimate money demand equations with monthly or quarterly statistics, particularly since the equation for each type of deposit (MMDAs, Super NOWs, MMMFs, and time deposits) would in theory include four interest spreads and seasonal dummies, as well as some other variables as explanatory variables. (Table 1 shows which of the ten rate spreads would appear in each of the demand equations as well as the expected signs on the coefficients.)

Even when more statistics become available, serious problems will arise in estimating the responsiveness of deposit flows to changes in the various rate spreads. These rate spreads, since they all respond to changes in market rates in a deregulated environment, tend to be correlated with one another, creating the problem of multicollinearity among the rate spreads used as explanatory variables. Table 2 shows the degree of correlation among the rate spreads that would be used in the equations shown in Table 1.

Table 1

Rate Spreads for Demand Equations*

Rate Spreads	Types of Deposits			
	SNOWs	MMDAs	MMMFs	Time Deposits
TD-TB				X(+)
TD-MDA		X(−)		X(+)
TD-MF			X(−)	X(+)
TD-SN	X(−)			X(+)
MDA-TB		X(+)		
MDA-MF		X(+)	X(−)	
MDA-SN	X(−)	X(+)		
MF-TB			X(+)	
MF-SN	X(−)		X(+)	
SN-TB	X(+)			

*The x's indicate which rate spreads should be included in the demand equation for each type of deposit. The + or − signs in parentheses indicate whether a widening in the spread would cause more rapid (+) or slower (−) growth in a given type of deposit.

Where:
TD = rate on six-month time deposit
TB = rate on six-month Treasury bill
MDA = rate on MMDA
MF = rate on MMMFs
SN = rate on Super NOWs

The most striking result from Table 2 is the high degree of correlation among the spreads that would be included in the demand equation for Super NOWs. Since the rates on the other three types of deposits adjust more fully and quickly to changes in market rates than the Super NOW rate, a high degree of correlation exists among the rate spreads that would logically be included in a demand equation for Super NOWs. Indeed, the correlation (multicollinearity) is so high and so extensive that it appears very unlikely that reliable estimates of the responsiveness of Super NOWs to changes in these spreads could be obtained.

Table 2

Correlation Between Rate Spreads*

Monthly Levels and (Changes)

			Time Deposits	
	TD-TB	TD-MDA	TD-MF	TD-SN
TD-TB	1.00 (1.00)			
TD-MDA	0.00 (0.02)	1.00 (1.00)		
TD-MF	0.25 (0.07)	0.02 (0.06)	1.00 (1.00)	
TD-SN	0.00 (0.00)	0.74 (0.85)	0.06 (0.01)	1.00 (1.00)
			Money Market Deposit Accounts	
	MDA-TB	MDA-TD	MDA-MF	MDA-SN
MDA-TB	1.00 (1.00)			
MDA-TD	0.53 (0.43)	1.00 (1.00)		
MDA-MF	0.30 (0.16)	0.87 (0.62)	1.00 (1.00)	
MDA-SN	0.19 (0.01)	0.45 (0.29)	0.48 (0.36)	1.00 (1.00)
			Money Market Mutual Funds	
	MF-TB	MF-TD	MF-SN	MF-MDA
MF-TB	1.00 (1.00)			
MF-TD	0.54 (0.39)	1.00 (1.00)		
MF-SN	0.06 (0.07)	0.15 (0.11)	1.00 (1.00)	
MF-MDA	0.10 (0.05)	0.24 (0.17)	0.78 (0.88)	1.00 (1.00)
				Super NOWs
	SN-TB	SN-TD	SN-MF	SN-MDA
SN-TB	1.00 (1.00)			
SN-TD	0.87 (0.54)	1.00 (1.00)		
SN-MF	0.80 (0.34)	0.98 (0.82)	1.00 (1.00)	
SN-MDA	0.78 (0.20)	0.91 (0.68)	0.90 (0.71)	1.00 (1.00)

*The R^2s that result when the interest rate speads that would appear in each of the demand equations are regressed on one another. Since four rate spreads would appear in each demand equation, there are six combinations of possible interest-rate-spread regressions for each type of deposit. The estimation period is from October 1983 to June 1986.

TD = six-month time deposit rate
TB = six-month Treasury bill rate
MDA = MMDA rate
MF = MMMF rate
SN = Super NOW rate

Source: *Bank Rate Monitor.*

The multicollinearity problem is somewhat less severe for the other three categories of deposits, but probably still serious enough to raise questions about whether reliable demand equations could be estimated. In particular, Table 2 shows that for the time deposit demand equation there would be strong correlation between the (TD-SN) and the (TD-MDA) spreads. For the MMDA demand equation, there would be a strong correlation between the (MDA-MF) and the (MDA-TD) spreads, and somewhat weaker correlations between the (MDA-TD) and the (MDA-TB) spreads, the (MDA-SN) and the (MDA-TD) spreads, and the (MDA-SN) and the (MDA-MF) spreads. And for the MMMFs demand equation, there would be a strong correlation between the (MF-MDA) and the (MF-SN) spreads and a somewhat weaker correlation between the (MF-TD) and the (MF-TB) spreads.[9]

This multicollinearity among the interest-rate-spread variables in all the equations is at least in part a by-product of a deregulated financial structure. When ceiling rates were fixed in a regulated structure, the spreads between the interest rates on deposits tended not to change when market rates changed. Now all these spreads can change as market rates change, and particularly in the case of Super NOWs, the outcome is an environment where it will be extremely difficult to estimate demand equations using rate spreads. Nevertheless, general trends (as shown in Chart 1) strongly suggest that these rate spreads are significantly affecting M1.

Though we cannot estimate precisely how much deposit flows will respond to changes in interest rate spreads, we can infer from the responses of interest spreads to changes in market rates the direction that deposit flows are likely to move:

(1) Time deposits should grow more rapidly as market rates increase. Since the rate on time deposits adjusts fully to the change in market rates, there should be no net loss of funds into market instruments. Likewise, there should be no net inflow or outflow of funds from MMMFs into time deposits because the rate on MMMFs over a twelve-week period also fully adjusts to changes in market rates. However, time deposits should grow more rapidly as market rates rise because of shifts of funds from MMDAs and Super NOWs into time deposits. The rates earned on MMDAs and Super NOWs do not fully adjust to changes in market rates, causing their spreads with time deposits to change as a result.

(2) Super NOWs should grow more slowly as market rates increase. Funds should flow from Super NOWs not only into market instruments but also into time deposits, MMMFs, and MMDAs because the rates on these three other deposits adjust more fully and rapidly to changes in market rates than the Super NOW rate.

(3) MMDAs will probably grow more slowly as market rates increase. MMDAs would lose funds to market instruments, time deposits, and MMMFs when market rates rise, but perhaps gain some funds from Super NOWs.

(4) MMMFs should grow more rapidly as market rates increase. In the longer run, MMMFs should not lose any funds to market instruments or time deposits (the rate on MMMFs fully adjusts to changes in market rates) and should gain some funds from MMDAs and Super NOWs, since the rates on these types of deposits do not fully adjust to changes in market rates.

Overall, as market rates increase, time deposits and MMMFs should grow more rapidly and NOW accounts and MMDAs should grow more slowly. Chart 7 shows that these patterns have generally held over the last three years. Time deposits showed their most rapid growth relative to trend at about the time interest rates peaked in 1984 and have slowed since then. In contrast, NOW accounts and MMDAs showed their weakest growth at about the time interest rates peaked and have accelerated as interest rates have fallen. By and large, MMMFs have displayed a pattern similar to time deposits, but the chart suggests that the main flows as market rates change are between time deposits and NOW accounts or MMDAs.

Conclusions

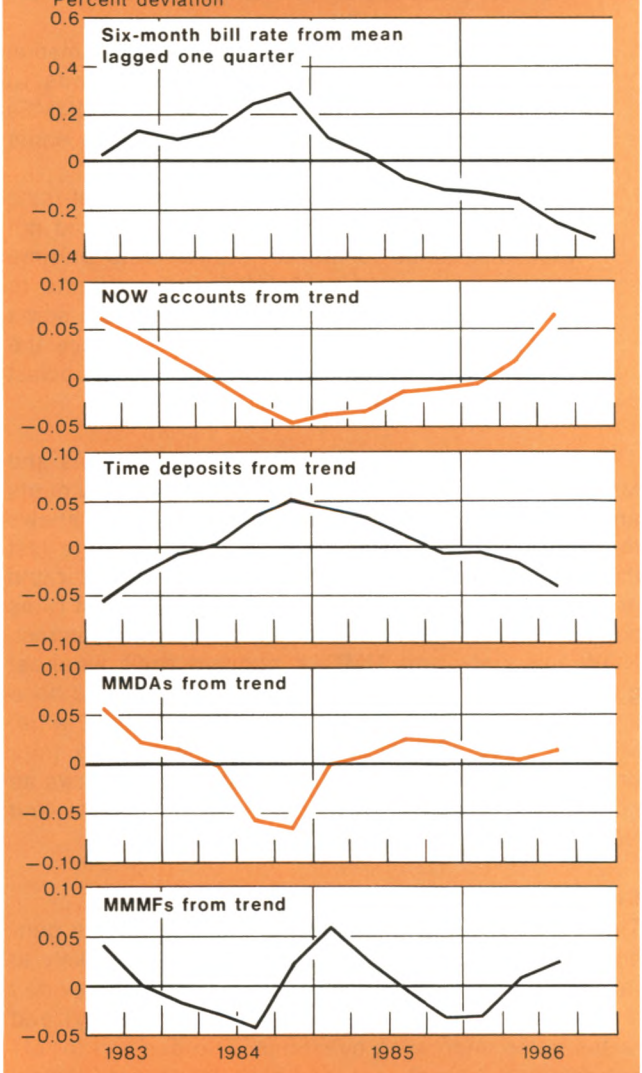
The experience of the last few years offers some general insights into how monetary aggregates are likely to respond to future changes in interest rates (provided that banks continue to behave in the same way) and raises some interesting questions. The demand for M1 has retained a significant, and probably larger, interest rate elasticity even though checking accounts for consumers have been deregulated. The traditional interest-

[9] In practice, some of the rate spreads could probably be eliminated in estimating demand equations. At the minimum, the opportunity costs with respect to market instruments and the other components of M2 should be included in each equation. Hence, for the MMDA and Super NOW equations, it probably would not be necessary to include both the spread with time deposits and MMMFs since both of these are components of M2 and fully adjust to changes in market rates with a similar pattern. That is, either rate spread could be used as a general proxy for the spreads that fully adjust to changes in market rates. In the case of Super NOWs, however, serious multicollinearity problems would still remain, whereas for MMDAs the problem would be considerably reduced. In some cases, taking the first differences of the spreads tends to reduce the degree of correlation somewhat, but in other cases it becomes greater.

rate channel is still open whereby movements in market rates cause changes in the desired level of transactions balances by affecting the spread between market rates and the rate paid on M1. In addition, the deregulated environment has provided a new channel through which changes in market rates can narrow or widen the spread between the time deposit rate, as well as the MMDA and MMMF rates, and the rate on transactions balances. Since many of these flows are within M2, M2's interest responsiveness has not been increased. Indeed, it probably has been considerably reduced compared to a regulated environment, because to an increasing degree the rates paid on its components respond at least partially (and time deposits and MMMFs fully) to changes in market rates.

Chart 7

Response of Deposit Flows to Movements in Interest Rates



While the experience of the last three years can provide some insights, interest rates have not moved over a sufficiently large range in both directions for there to be much confidence that the process by which these rate spreads are affected is well understood. Indeed, it is likely that banks have been learning how to price consumer deposits in a deregulated environment over these last few years, and that as they gain more experience they may behave in a different way. In the same way, consumers will become more familiar over time with deregulated deposits and could respond differently in the future. And both banks and consumers might not respond as strongly if rates were gradually increasing rather than falling by a large amount as they did over the past few years in response to the sharp fall in the rate of inflation. In other words, their response might not be symmetrical to rising and falling market rates, or to gradual rather than large changes in market rates. Moreover, we have no experience with how banks and consumers might behave in a situation where the yield curve for market instruments became inverted.

And even in a stable interest rate environment, banks may find it profitable to reprice these various accounts, thus affecting M1 as well. For example, if banks begin to believe that a large volume of the funds held in NOW accounts are relatively inactive savings balances that have been shifted into NOW accounts as interest rates fell, they may design combinations of accounts with transfer features that would induce consumers to hold these inactive savings balances in nontransactions accounts in order to avoid reserve requirements. Then M1 could appear unusually weak relative to GNP for a period of time, instead of appearing unusually strong as it has in recent years when savings balances were added to M1. Indeed, if banks should strongly encourage consumers to keep only frictional transactions balances in M1, M1's interest elasticity could begin to appear very low compared with the experience of the past few years. While we do understand a few features of this new environment, it continues to be important to monitor changes in the banking system that might affect the behavior of the monetary aggregates. There are many reasons to expect that the recent past might not be a good guide to the future.

John Wenninger

Wage Rigidity in West Germany: A Comparison With the U.S. Experience

Even though inflation seems to be well under control in West Germany, many policymakers and economists continue to be pessimistic about the ability of the economy to sustain a substantial domestic demand expansion. To a large extent, such pessimism is based on the view that the German economy is afflicted by severe labor market rigidities which leave virtually no scope for expansionary policies. Presumably the concern is that any demand expansion, even at today's record high unemployment levels, would simply rekindle inflation without significant gains in output and employment.[1]

This article provides some fresh evidence on labor market rigidities in West Germany, focusing on one of the most important aspects of these rigidities, namely the behavior of wages. Specifically, using both aggregate and disaggregate (industry level) data, this article examines the flexibility of wages in West Germany. Although other sources of rigidity may be potentially important, the relatively narrow approach of this article is appropriate, given that the behavior of wages is widely believed to be the driving force for most other labor market rigidities.[2]

Because it is difficult to gauge precisely what flexibility implies for wage responsiveness, we evaluate wage behavior in West Germany, and wherever possible contrast it with wage performance in the United States. We begin with the assumption, inspired by the literature in this area, that real wages in the United States through the 1970s and 1980s have been flexible and that the pattern of U.S. real wage response has aided output and employment expansion.[3]

The analysis in this article extends the work of previous studies in its consideration of industry wage behavior and in the distinct way it treats pre- and post-OPEC aggregate wage behavior. The key finding of our analysis is that wages in West Germany, at both the aggregate and industry level, have been flexible in recent years. As a consequence, the pace of real wage growth in West Germany has moderated, and unit labor costs have grown at about two-thirds the U.S. rate since 1980.

The industry patterns offer new and additional evidence of wage flexibility. Industry wages were highly responsive to industry-specific performance in West German manufacturing, particularly in the short run. Over the long run the data indicate greater flexibility in

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[1]Several arguments are believed to be relevant, the most common of which rests on the view that wages respond asymmetrically to conditions of excess demand and supply in the labor market. If wage structures are rigid, then wages are unresponsive to unemployment and unlikely to fall in the appropriate market-clearing way. If unemployment is classical (resulting from already too high wage levels) and wages are rigid, then a demand expansion could perversely result in higher wages (and prices) with little or no gain to output and employment. Wage flexibility prevents this scenario from occurring because unemployment exerts continued downward pressure on wages at the same time that the economy is expanding.

[2]This article does not evaluate, to any significant extent, more microeconomic aspects of labor market rigidities, such as minimum wage laws, unemployment insurance rules, labor mobility, and the costs of hiring and dismissing workers.

[3]There are many studies which characterize real wages in the U.S. as flexible. The most comprehensive study, and reference to other work in this area, may be found in M. Bruno and J. Sachs, *The Economics of Worldwide Stagflation* (Cambridge: Harvard University Press, 1985).

the United States, although to a degree not statistically distinguishable from West Germany. Taken as a whole, the data offer convincing evidence that industry wages were flexible in West Germany.

The next section of this article compares aggregate wage, productivity, and cost trends in the United States and West Germany, and evaluates the labor demand and supply pressures influencing equilibrium wages in each country. The following sections explore aggregate and industry wage flexibility in West Germany, drawing comparisons with the U.S. experience. A brief summary of the main findings and their implications for macroeconomic policy are presented in the final section.

The aggregate data: labor supply and demand in wage responsiveness

West German unemployment, unlike unemployment in the United States, has increased since 1982 (Table 1, top panel). Most analysts attribute this divergence to the behavior of aggregate wages and conclude that wages on average in West Germany have been more inflexible downward, preventing labor markets from clearing and resulting in relatively high unemployment.

Since we evaluate wage responsiveness in both the United States and West Germany, it is useful to compare labor market behavior in the two countries. The first question is whether there is anything in the trend of labor supply or demand growth that can explain differences in output and employment growth in West Germany, independent of wage flexibility.

Table 1

Unemployment Statistics

The Civilian Unemployment Rate
(annual averages)

	1965-85	1965-73	1974-79	1980-85	1986*
United States	6.2	4.5	6.8	8.1	7.0
West Germany	3.8	1.1	4.1	7.5	9.0

Share of Unemployed Prime Age Male Workers†
(calculated as a percentage of total unemployed)

	1965-85	1965-73	1974-79	1980-85	1986
United States	23.6	20.5	22.3	28.7	30.1‡
West Germany	26.6	22.3	27.6	30.7	32.2§

*Averages include the first ten months of 1986.
†Male workers aged 25-54.
‡Includes first ten months of 1986.
§1985 figure.

On the supply side, labor market demographic trends do not explain the pattern of West German unemployment. While an influx of female, part-time, youth, or foreign workers could conceivably lead to greater unemployment for any given level of aggregate demand, the evidence suggests that these changes have not been the leading cause of unemployment in West Germany.

Consider for example women in the labor force. While female labor force participation grew rapidly over the 1970s in the United States (increasing from 49 percent in 1970 to 65 percent in 1984), in West Germany over the same period it increased just one percentage point. With only 49 percent of women in the labor force, West Germany has one of the lowest female participation rates in the major European OECD countries.[4]

In the same way that the entry of women may affect the shape or position of the labor supply curve, changes in the mix of part-time and foreign workers may alter aggregate supply. This suggests that the employment data should be adjusted for these workers, to see if the employment record of either country is qualitatively altered. While this adjustment results in a stronger trend decline in West German employment, it has only modest effects on the pattern of employment growth in the United States (Chart 1). As a tool either for smoothing employment or for minimizing employer costs, West German firms have employed considerably more part-time workers than U.S. firms.[5] Excluding teenagers and older workers from the employment analysis, so that we consider the unemployment patterns of prime age male workers only, leads to the same conclusion—the core of the West German unemployed are permanent labor force members (Table 1, bottom panel).

The broad demographic data do not suggest major differences in aggregate labor supply behavior and therefore probably do not explain relatively higher unemployment in West Germany than in the United States. However, other supply-related factors are relevant. One obvious source of difference could be the unemployment insurance system. In West Germany, income replacement ratios from unemployment insurance are, on average, about two times greater, and the period of entitlement is about three times longer[6] than

[4]In the United Kingdom and France, for example, female participation rates in 1984 were 59 and 55 percent, respectively.

[5]Part-time workers typically are paid less than full-time workers and have fewer fringe benefit provisions. In addition, certain payroll tax exemptions are associated with part-time workers.

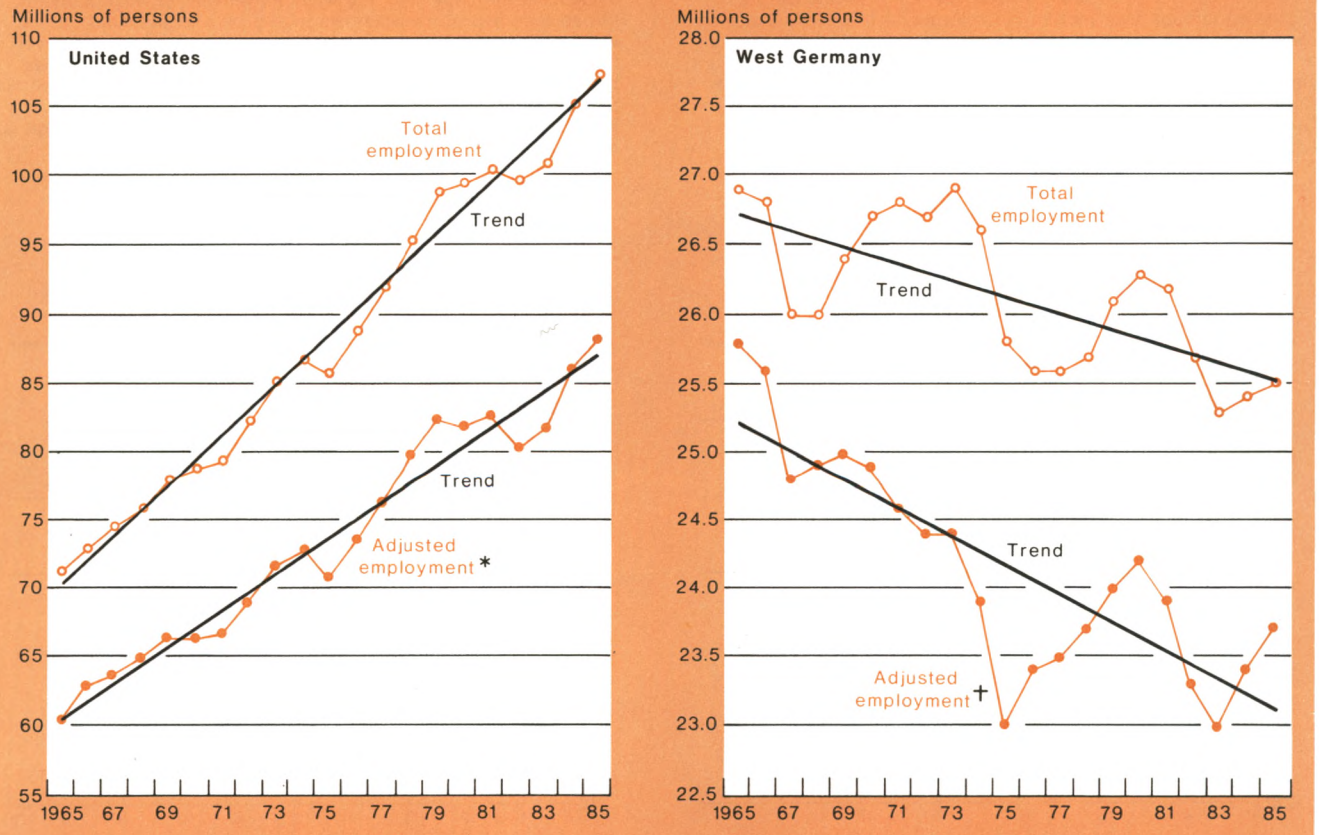
[6]The replacement ratio in West Germany for a single worker with average earnings is approximately 65 percent of previous earnings, and benefits last at this rate for three years. By contrast, the same worker in the United States receives an average first-year replacement ratio equal to 35 percent of his base earnings, and benefits are exhausted, on average in the United States, after 52 weeks.

in the United States. As a consequence, costs to the unemployed worker are lower in West Germany than in the United States, and the incentive to remain unemployed is therefore much greater. While the West German unemployment system might account for a higher overall level of unemployment at any point in time, it can not explain the trend through time. West German benefits have traditionally been generous, and the current law has been in effect, roughly without change, since 1969. Therefore, unless a significant change has occurred in the attitude of West German workers toward work, higher unemployment must reflect either lower expected benefits of seeking work or greater inability of the unemployed to find suitable jobs. Statistics on unemployment duration support the view that there is chronic excess supply in West German labor markets. While only 8.5 percent of West German workers were unemployed for one year or more in 1973, by 1985, 31 percent were unemployed for longer than one year. By contrast, only about 15 percent of unemployed workers in the United States were idle for longer than six months in 1985.

Finally the relationship between unemployment rates and job vacancies in West Germany (the so-called Beveridge Curve, Chart 2), suggests that the historically high recent rates of unemployment in West Germany are not supply-side induced. Shifts of this curve are associated with structural changes and structural unemployment and are taken to reflect a mismatch of jobs and worker skills; movements along the curve reflect

Chart 1

Employment Growth



* Data represent total employment (as measured by the Current Population Survey) minus part-time employment.

† Data represent total employment minus employment of foreign and short-term workers.

Sources: U.S. Department of Labor, Current Population Survey; Deutsche Bundesbank, Statistical Supplement to the Monthly Report, and staff estimates.

demand-induced changes. While the curve appears to have shifted in the United States, it is more stable in West Germany. However, the labor market situation in West Germany, as reflected by the position on the Beveridge Curve in the most recent years, has substantially worsened. In 1962, for example, there were more than two vacant jobs for every unemployed West German worker, but by 1985, for every two vacant jobs there were roughly 50 unemployed workers.[7]

Because supply-side developments do not explain why the employment situation is relatively worse in West Germany than in the United States, we next consider the degree to which wages, productivity, and costs may have adversely influenced West German labor demand.

Since the mid-1960s real wages in West Germany have grown at nearly four times the U.S. rate. More moderate nominal wage settlements in West Germany since 1980 have caused the pace of change in real wages to be more equal in the two countries (Table 2), although the latest available data indicate some change in early 1986. Despite the recent slowdown of real wage growth in West German manufacturing, rapid acceleration in the mid-1960s and early 1970s led to real wages that are now, on average, twice their 1965 level. By contrast, U.S. manufacturing workers now earn wages only about 20 percent higher than their 1965 level.[8]

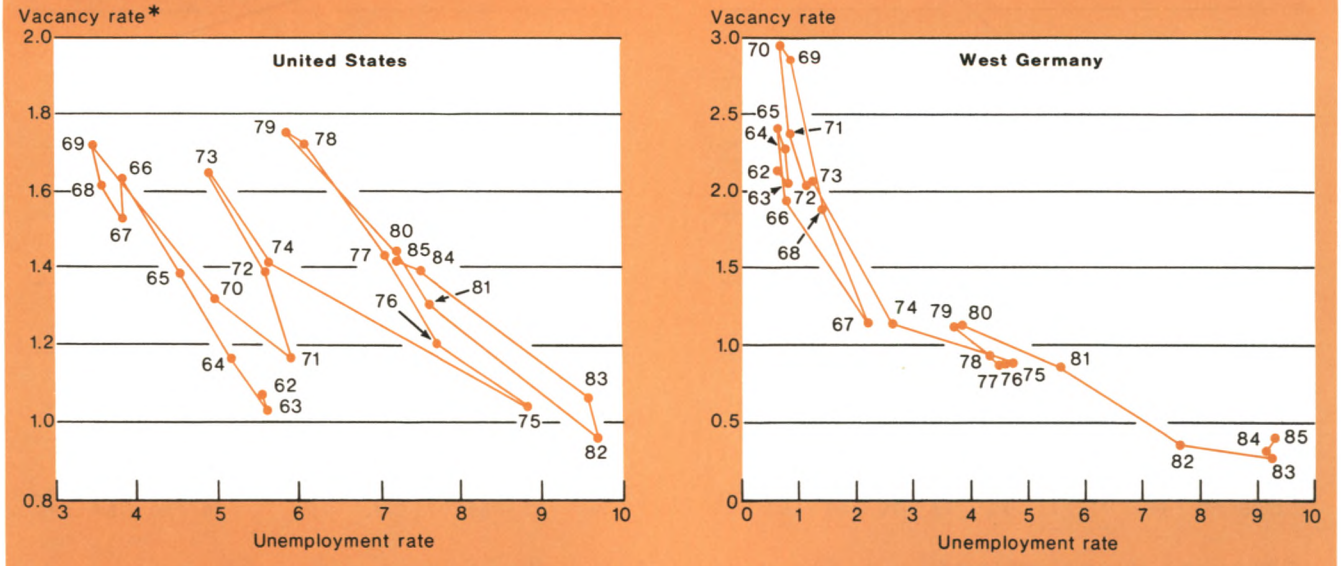
While the acceleration of wages through the 1970s suggests real wage levels that are both relatively and absolutely high in West Germany, focusing exclusively on the behavior of the wage series masks more important labor market trends. The growth of unit labor costs represents the excess of wage over productivity growth and probably is a better measure of the pressures on

[7]Vacancy data are unreliable and need to be interpreted with care. In the U.S., no vacancy series exists as a time series; we have used the Medoff technique of adjusting the help-wanted advertising data as a proxy for vacancy rates. In West Germany, vacancies are registered through the German central agency. It is likely that more vacant jobs will go unreported when unemployment is high, since available openings are filled immediately and with ease by employers. For a discussion of the stability of the U.S. Beveridge Curve, see J. Medoff, "U.S. Labor Markets: Imbalance, Wage Growth, and Productivity in the 1970s," *Brookings Papers on Economic Activity*, Vol. 1 (1973), pp. 87-128.

[8]Another potential source of difference between real wage patterns in the two countries results from the importance of minimum wages in influencing the pattern of real wage movement. In West Germany, the union-legislated minimum wage sets an effective floor on real wages at a relatively high level which is binding on the employer. In the United States, by contrast, the legislated minimum wage has been allowed to erode considerably in real terms and nearly all full-time workers in manufacturing currently receive wages well in excess of this level. As a consequence, the U.S. minimum wage is, in practice, not binding on the employer.

Chart 2

Beveridge Curve



*The vacancy rate was constructed by taking the average of the monthly help-wanted index figures for each year (1967=100) and dividing by the number of employees on non-agricultural payrolls.

Sources: The Conference Board; U.S. Department of Labor, Current Population Survey and Establishment Survey; Deutsche Bundesbank, Statistical Supplement to the Monthly Report, Series 4.

prices stemming from labor market conditions. From an employer's perspective, faster real wage growth does not matter nearly as much if it is offset by labor productivity advance. This appears to be the longer run trend supported by the growth pattern of unit labor costs in West Germany (Table 3). While wages accelerated rapidly in West Germany in the late 1960s and early 1970s, and unit labor costs grew somewhat faster than in the United States, by the mid-1970s more modest wage gains in West Germany had reversed the earlier trend. As a result, the cumulative growth of unit labor costs since 1965 has been slower in West Germany than in the United States.

Finally the evidence on wage growth in the nonmanufacturing sector is also inconsistent with wages being the key determinant of employment trends in West Germany. Although nonmanufacturing wage growth was somewhat faster in West Germany than in the United States until the late 1970s, it has been more modest in West Germany than in the United States since 1980 (Table 4). Moreover, the pace of nonmanufacturing relative to manufacturing wage growth has been consistently slower in West Germany (Table 4). Despite these trends, nonmanufacturing employment in West Germany has grown at a far weaker pace than in the United States.

In sum, the data do not reveal radically different changes in labor market conditions in the United States and West Germany since the 1970s. We next examine whether differences in wage flexibility may lie behind West Germany's poorer output performance and employment growth record.

The flexibility of aggregate wages

In this section, we apply some standard measures of wage flexibility to the U.S. and West German data to gauge wage responsiveness in each country. Despite the continuing debate about the relationship between wage flexibility and employment performance, most analysts assume that a more flexible wage system will allow faster and more complete adjustment to economic shocks and will therefore permit faster economic growth and greater levels of employment.

We consider first the simplest and most straightforward measure of wage flexibility. In a flexible real wage system, wages adjust freely to shifts in labor supply or demand, with the result that markets equilibrate quickly. This implies that during periods of labor market flux wages should be more variable in a flexible than in an inflexible system. Given this description, one test of wage flexibility is to calculate the variance of real wage growth around trend. A flexible system should produce high variation generally, with increasing variation during periods of unstable aggregate demand or supply behavior.

Two measures of real wages are used: (a) the real consumption wage, measured as the ratio of nominal wages to the personal consumption deflator and (b) the real product wage, measured as the ratio of nominal wages to the producer price index. These measures show that the variability of real consumption and product wage changes in manufacturing has been generally greater in West Germany than in the United States; the clearest difference between the two countries results from the relative long-run stability of real wage changes

Table 2

Wages in Manufacturing

Nominal Wage Growth in Manufacturing
(average annual rates of change in average hourly earnings)

	1965-85	1965-73	1974-79	1980-85	1986*
United States	6.5	5.5	8.7	5.9	2.1
West Germany	8.5	10.3	8.9	5.4	4.5

Real Wage Growth in Manufacturing†
(average annual rates of change)

	1965-85	1965-73	1974-79	1980-85	1986*
United States	0.7	1.2	0.6	0.1	0.2
West Germany	4.3	6.3	4.1	1.6	5.3

*For the U.S. the figure represents 1986-III/1985-III; for West Germany the figure represents 1986-II/1985-II.
†Real wage is calculated by deflating the average hourly earnings index in manufacturing by the implicit PCE deflator.

Table 3

Unit Labor Costs in Manufacturing

Growth in Unit Labor Costs
(average annual rates of change in unit labor costs in manufacturing)

	1965-85	1965-73	1974-79	1980-85	1986*
United States	4.7	3.5	8.2	3.2	0.1
West Germany	4.2	5.3	4.2	2.4	3.7

Cumulative Unit Labor Cost Growth
(1965 = 100)

	1972	1975	1979	1986
United States	129.5	164.7	210.0	261.0†
West Germany	136.0	175.1	189.3	224.4‡

*For the U.S. the figure represents 1986-III/1985-III; for West Germany the figure represents 1986-II/1985-II.
†Three-quarter average.
‡Two-quarter average.

Table 4

Wage Growth in Non-Manufacturing Industries

	Wage Growth				Relative Wage Levels*			
	1971-73	1974-79	1980-85	1985	1971-73	1974-79	1980-85	1985
United States†								
Wholesale trade	5.8	7.8	6.5	4.6	0.9	0.9	1.0	1.0
Retail trade	5.3	6.6	4.9	1.5	1.4	1.5	1.7	1.8
Banking	4.8	7.2	8.1	5.7	1.2	1.2	1.2	1.2
Insurance	5.0	6.5	6.6	3.6	0.8	0.9	0.9	0.9
West Germany‡								
Wholesale trade	10.8	7.4	4.2	3.2	1.3	1.3	1.3	1.3
Retail trade	10.5	7.2	3.5	2.7	1.4	1.4	1.5	1.5
Banking	10.4	7.2	4.7	4.5	1.1	1.2	1.2	1.2
Insurance	10.6	8.4	5.1	5.2	1.2	1.1	1.1	1.1

*Relative wages calculated by dividing the wage level in manufacturing by the wage level in each non-manufacturing industry.
†Wage and salary workers.
‡Data represent a weighted average of male and female earnings.

in the United States (Table 5). This is true generally, both before and after the OPEC oil shocks.

While the variability of wage changes in the United States and West Germany is relatively unaffected by the choice of deflator, the consumption and product wage measures offer independent information about the institutional behavior of wages. Product wages more accurately measure employer costs; high variability in this series may indicate greater flexibility on the part of employers in setting wages. The real wage series deflates nominal wage growth by the personal consumption deflator in each country and therefore reflects the purchasing power gains of nominal wage settlements. If, as many economic models suggest, workers desire a constant stream of real earnings over the course of their working lives,[9] then variation in this series may be a signal of weakness on the part of workers or unions in securing real wage gains. In any case, the substantial degree of variability in the pattern of West German wage growth is consistent with there being some flexibility in wage setting.

Variation in real wage growth does not necessarily imply that wages were flexible in any economically meaningful way. Evidence of wage responsiveness requires a systematic link between movements in wages and key economic variables. Real wage variability alone does not explain the source of wage movements and therefore cannot provide evidence of any such link. However, our efforts at evaluating the source of wage movements reveal a uniform increase in real wage flexibility in West German manufacturing in recent years.

To demonstrate this flexibility, we estimate equations linking growth rates of average hourly earnings in manufacturing to inflation and unemployment rates. Real wage flexibility is measured by comparing the responsiveness of wages to expected price inflation and the unemployment rate; in a flexible real wage structure, nominal wages react weakly and with a lag to expected price movements but strongly to movements in the unemployment rate. This measure combines the standard view that real wage flexibility results from inertia in the response of nominal wages to prices and the view that wages should be responsive to excess demand or supply in the labor market. In addition, combining the two flexibility criteria in a single equation yields a measure of the degree of accommodation necessary to keep the inflation rate constant.[10]

According to this flexibility measure, real wages have been increasingly responsive in West Germany in recent years (Box 1). The main reason is the lack of any strong response of wage growth to prices in West Germany over the recent period, most likely reflecting the deterioration of real wage growth. In general, the largest difference between the pattern of wage response in the

[9]Implicit contract models of the labor market are based on this assumption. While these models have been criticized on many grounds, including their failure to make an adequate distinction between real and nominal wages, most subsequent work has assumed that it is constancy in real earnings that workers seek in their bargaining demands.

[10]The standard framework for evalulating real wage responsiveness, based on the concept of nominal wage inertia, is discussed in J. Sachs, "Wages, Profits, and Macroeconomic Adjustment: A Comparative Study," *Brookings Papers on Economic Activity*, Vol. 2 (1979), pp. 269-319. An alternative approach, which stresses the role of unemployment, is discussed in D. Grubb, R. Jackman, and R. Layard, "Wage Rigidity and Unemployment in the OECD Countries," *European Economic Review*, Vol. 2 (1983), pp.11-40.

two countries is in the reaction of nominal wages to expected price movements, not in the overall responsiveness of real wage changes to the unemployment rate. In fact, the response of wages to unemployment in the two countries is similar.

Additional tests of aggregate wage flexibility, based on commonly used variants of the general specification reported here, broadly confirmed these results.[11] Our analysis shows that wages in West Germany, while more rigid than in the United States in the early 1970s, were quite flexible by the late 1970s. Previous studies may have failed to isolate this tendency because they did not distinguish the pattern of wages in West Germany in the most recent years.[12]

The flexibility of industry wages

There is no straightforward relationship between aggregate and industry wage flexibility. Aggregate wage flexibility does not necessarily imply that industry wages are free to vary; aggregate wages may be flexible at the same time that institutional restraints prevent industry wages from moving to equilibrate labor markets.

[11] Including both a productivity growth variable and a dummy variable to serve as a proxy for shifts in the structural Phillips Curve relation did not significantly affect the coefficient estimates on inflation and unemployment in either country. While the productivity term did figure significantly in the West German equations and did raise the explanatory power of the equation, it did not affect the size or significance of either the price expectations or the unemployment variable.

[12] More recent work has concluded that greater wage flexibility characterizes the West German economy today. See F. Klau and A. Mittelstädt, "Labour Market Flexibility," *OECD/ESD Working Papers*, No. 24 (July 1985).

Table 5

Variation* in Manufacturing Wage Growth

	Real Product Wages†		Real Consumption Wages‡	
	United States	West Germany	United States	West Germany
1965-85	2.8	3.5	1.2	3.4
1965-78	3.2	2.8	1.1	3.3
1979-85	2.1	2.4	0.8	1.7
1965-73	2.6	2.6	1.3	3.5
1974-85	3.0	2.6	1.0	2.5
Mean wage growth (1965-85). . .	0.9	4.6	0.7	4.3

*Calculated as the standard deviation in the arithmetic annual growth rate of average hourly earnings in manufacture.
†Deflated by producer price index.
‡Deflated by the personal consumption deflator in manufacture.

Box 1: Flexibility of Aggregate Wages

Data from 1966-I to 1985-IV were used to analyze wage flexibility in the United States and West Germany. The full period data were analyzed over subperiods chosen to capture the recent changes in nominal wage patterns. Alternative specifications were estimated over each subperiod; the results presented here were chosen for general fit. The equations are specified in four-quarter growth rates of both the dependent and independent variables. The dependent variable in all equations is the change in the natural log (ln) of average hourly earnings in manufacturing. The price expectations variable in all equations is estimated as a fitted lag on past price changes (see A.S. Englander and C. Los, *Federal Reserve Bank of New York Research Paper*, No. 8305, August 1983), and the unemployment rate is the rate for the economy as a whole. All equations have been corrected for fourth-order serial correlation. Standard errors appear in parentheses below the estimated coefficients.

Table A

Dependent Variable:
Change in AHE ($\ln AHE_t - \ln AHE_{t-4}$)

	United States			West Germany		
	(1)	(2)	(3)	(4)	(5)	(6)
	1966-85	1974-85	1979-85	1966-85	1974-85	1979-85
$\dot{p}_t^e$	.813	.949	.954	1.18	.761	.392
	(.158)	(.232)	(.031)	(.335)	(.193)	(.215)
$\ln U_t$	−.034	−.050	−.052	−.034	−.046	−.047
	(.011)	(.016)	(.005)	(.005)	(.006)	(.005)
Flexibility coefficient	23.91	18.98	18.35	34.71	16.54	8.34
R^2	.255	.387	.980	.351	.700	.760
SSE . . .	.003	.001	.0002	.017	.005	.003
DW	1.95	1.97	2.23	1.73	1.89	2.01

The wage flexibility coefficient listed in Table A above is calculated by taking the ratio of the long-run elasticity of wages with respect to past price inflation and the elasticity of wages with respect to the unemployment rate. This statistic may be interpreted for any given price change as the change in the ln of unemployment necessary to keep the nominal wage constant (i.e., to ensure a fall in the real wage). It is similar to the measure adopted in D. Coe, "Nominal Wages, the NAIRU and Wage Flexibility," *OECD Economic Studies*, No. 5 (Autumn 1986).

The economic shocks of the 1970s affected specific industries differently. The ones that relied to a large extent on oil as an input to production were made particularly vulnerable. In a well functioning competitive economy, the response of industry wages to short-term disturbances should reflect specific performance—in industries particularly affected by the OPEC oil shocks, wages should have fallen.

There are good reasons to suppose that the industrial wage structure of West Germany might be rigid. While collective bargaining is highly decentralized in the United States (with thousands of individual establishments setting wages), it is highly centralized in West Germany (with nearly all bargaining taking place at the industry and regional levels). While unions are a minority presence in the U.S. workplace (with less than 25 percent of U.S. workers covered by a union contract), they are a powerful majority presence in West Germany (where more than 90 percent of workers are employed in sectors covered by collective bargaining agreements).[13] The combination of these two facts implies, all else the same, that the structure of wages among industries is more likely to be rigid in West Germany than in the United States.

To test for wage rigidity among West German industries, we have assembled manufacturing data at the two-digit level for the United States and West Germany on wages, prices, productivity, and employment.[14] These data allow for a new analysis of wage flexibility within the economy that yields independent and more detailed information about the behavior of labor markets than can be learned from the aggregate data. To the extent that industry wages are flexible, structural labor market problems are more likely to be short-lived, since wages help to allocate labor appropriately among industries in the long run.

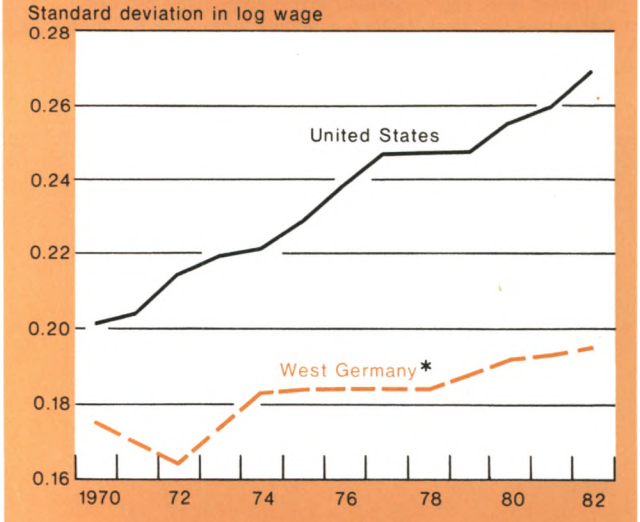
Industrial wage flexibility is defined as the responsiveness of industry wages to industry-specific performance. A rigid industrial wage structure has fixed relative wages, so that existing wage differences are preserved across industries through time. In the most rigid structure, wages among industries would respond equally to economy-wide productivity shocks but would show little or no response to industry-specific productivity movements. As a consequence, wages, on average, would grow equally among industries through time.

One obvious indicator of a country's industrial wage flexibility is the degree of dispersion, a statistical measure of the inequality of wages among industries, adjusted for the mean wage level. One way of deriving this measure is to calculate the standard deviation of the natural log of wages among industries in each year; a more flexible system should produce greater variation generally, with a trend of rising dispersion during periods of economic flux. Higher levels of wage dispersion imply greater industry wage flexibility because wages reflect the specific circumstances of each industry. By contrast, modest and constant levels of dispersion signal equality in wage response characteristic of an inflexible system.

Industrial wage dispersion has risen in the United States and West Germany since 1970 (Chart 3). While the rise is far more pronounced in both level and trend in the United States, the rise in West Germany stands out, particularly in light of its highly centralized system of collective bargaining. The trend in the West German

Chart 3

Wage Dispersion in Manufacturing



* Data for West Germany available in even-numbered years only.

Sources: U.S. Department of Commerce, National Income and Product Accounts; Deutsche Bundesbank.

[13] For the statistics on union coverage and membership, see the chapter on West German collective bargaining in OECD, *Collective Bargaining and Government Policies in Ten OECD Countries* (Paris, 1979). In West Germany there is a statistically large difference between the number of workers who are union members (which for years has been slightly greater than one-third of all workers) and those who are covered by union contracts. By contrast, the difference between union coverage and union membership is modest in the United States.

[14] Data for West Germany were kindly provided by the West German Bundesbank for 29 manufacturing industries over the period 1970-82. The U.S. data, except where otherwise noted, cover 22 manufacturing industries at the two-digit level and are from the National Income and Products Accounts Series. We focus on industry wage patterns over the period 1970-82 in this section because more recent data for West German industries are not available.

series is also unusual in comparison with other major European countries, where industry wage dispersion has either remained roughly stable or declined somewhat.[15]

While rising wage dispersion is consistent with wages being flexible, it does not indicate that wages are flexible in responding to economic events. Rising dispersion can occur due either to a mixing of industries within the wage ranking, or to an increase in the differential between wages paid to workers in high and low wage sectors. It may reflect institutional changes in union concentration or bargaining power within industries, or it may be economically motivated by structural changes in industry-specific productivity performance. Therefore, we measure the responsiveness of industry wages to evaluate the importance of economic factors in determining industry wage patterns.

Industry wage movements are important in labor markets because they send signals to workers about where and how to supply their labor. If workers have complete information about wages in other industries and can move freely among industries to higher paying jobs, then wages will be responsive to specific productivity developments in the short term but will respond only to economy-wide productivity shifts over longer periods. This pattern results because over the long run the mobility of workers should be sufficient to equalize inter-industry wage differences.

With this basic model of labor market behavior as a guide, we measure statistically the responsiveness of industry wages to specific performance using data on wages, productivity, and output prices at roughly the two-digit level for both U.S. and West German manufacturing industries. Equations linking annual changes in industrial wages to annual changes in industrial productivity and output prices show that wages in West Germany were very responsive to short-run shifts in industrial performance (Box 2). While the magnitude of this effect may appear larger in West Germany than in the United States (based on the productivity estimates), these differences are not statistically significant. In any case, the U.S. and West German regressions are not strictly comparable—the industry samples differ, and the periodicity of the data is not the same.[16] For each country, analysis reveals that short-run movements in industry wages were highly responsive to industry performance, suggesting that industry labor markets functioned efficiently in both West Germany and the United States in the short term.

If workers are not free to move across industries, then industry wages should be correlated with specific productivity and price movements over the long- as well as the short-run. For example, in a labor market with many barriers to switching jobs and obtaining training, labor mobility will be constrained. Thus in institutional settings where union rules govern the workplace, industry wage patterns may reflect both short- and long-term industry productivity trends.

A second test of industrial wage flexibilty confirms the view that industrial performance influences wages over longer periods of time (Box 2). Over the period 1970-82, we found that long-run industry wage movements were related to long-run industry productivity movements in both the United States and West Germany. To the extent that industrial productivity movements reflect inter-industry changes in the skill mix, sex mix, or occupational structure, the link between productivity and wages can be understood as a competitive labor market revaluation of the rewards to work. If instead productivity movements reflect long-run labor demand shifts or movements along the demand schedule, then the explanation must be either that worker mobility is imperfect across sectors or that wage patterns reflect at least some noncompetitive factors.

If worker mobility is limited across industries, then any shift in the industry labor demand curve must result in wage movement in the same direction—thus wage and employment growth should be positively associated among industries. In the United States, this does not seem to be the case, suggesting that the pattern of industry wage response is unlikely to be driven by long-run constraints to worker mobility. In West Germany, by contrast, industries with above average wage growth over the period 1970-82 exhibited above average employment growth. Although suggestive at best, these results imply that workers may, in fact, be inhibited from moving freely across industries in West Germany.[17]

While both disaggregate tests reveal that industry wages in West Germany were flexible over the 1970s

[15]See L. Bell and R. Freeman, "Does a Flexible Industry Wage Structure Increase Employment?: The U.S. Experience," *National Bureau of Economic Research Working Paper*, No. 1604 (April 1984). The analysis in this section for the U.S. replicates the Bell-Freeman tests and methodology.

[16]Because West German industry wage, productivity, and price data were available for even-numbered years only, we report two-year changes in wages and sectoral performance in Box 2. While statistical tests may be unreliable due to lack of comparability in data and specification across countries, standard tests reject the notion that wage response was different across countries, largely due to the relative imprecision of the West German estimates.

[17]To evaluate the relationship between wage and employment response, we correlated long-run changes among the 22 U.S. manufacturing industries over the period 1970-82, and performed the same analysis among the 29 West German industries. The correlation statistics in these tests were equal to −.09 for the United States and .24 for West Germany. More complete analysis of the implications of these tests for labor market performance can be found in L. Bell, "Essays in Labor Market Efficiency and Comparative Macroeconomic Performance," Ph.D dissertation, Harvard University (June 1986).

Box 2: Flexibility of Industry Wages

Industry-specific data for manufacturing industries from 1970-82 were used to analyze industrial wage flexibility in the United States and West Germany. The data were estimated linking both short-run changes in wages by industries (a panel study of 29 industries for West Germany and 22 U.S. industries) and long-run 13-year changes in wages among industries (a cross-sectional study of wage behavior). Annual data were used for the analysis in all cases. The dependent variable is the change in the natural log of the wage in the manufacturing industry, and the independent variables include industrial productivity and output price changes, which serve as proxies for industrial performance. The generally lower explanatory power of each test is standard to cross-sectional wage regression. Standard errors appear in parentheses below the estimated coefficients.

Short-run flexibility

Standard competitive theory requires that industry wages be responsive to short-run movements in industrial performance, as a means of allocating labor efficiently across sectors. To test for short-run industry wage flexibility, we link annual changes in industry wages to annual changes in industry value productivity (two-year changes for West Germany due to data limitations), which we decompose into industry productivity per worker and output prices. Our results (Table B) indicate a statistically significant degree of wage responsiveness in both West Germany and the United States.

Table B:

Dependent Variable:
Short-run change in wage by industry ($\ln w_{it} - \ln w_{it-1}$)

	United States		West Germany	
	(1)	(2)	(3)	(4)
$\Delta \ln (VA/L)_{it}$	.101		.238	
	(.017)		(.031)	
$\Delta \ln (Q/L)_{it}$		.039		.334
		(.019)		(.044)
$\Delta \ln P_{it}$		.191		.184
		(.021)		(.035)
R^2	.118	.235	.262	.299
N	252	252	174	174
Mean (Δ ln w)	.077	.077	.155	.155
S.D. (Δ ln w)	.021	.021	.049	.049

Long-run flexibility

Although the standard competitive model assumes that industrial wages will be linked only to aggregate performance in the long term, industrial performance may in fact influence industrial wages over longer periods of time. To test the extent to which industrial performance matters for industry wages over the long run, we link long-run changes in industry wages over the period 1970-82 to long-run changes in specific performance, measured in the same way as above. This test shows that value productivity movements by industry influenced industry wages in both countries. Decomposing these effects, we find that while industrial output prices influenced wages in the United States (column 2), they were insignificant in determining wage patterns in West Germany (column 4). In both countries, industry wage movements were positively associated with industry productivity movements.

Table C:

Dependent Variable:
Change in wage by industry ($\ln w_{i,1982} - \ln w_{i,1970}$)

	United States		West Germany	
	(1)	(2)	(3)	(4)
$\Delta \ln (VA/I)_i$	.384		.143	
	(.113)		(.078)	
$\Delta \ln (Q/L)_i$		.338		.206
		(.142)		(.081)
$\Delta \ln P_i$		.411		.083
		(.125)		(.080)
R^2	.378	.388	.110	.230
N	21	21	29	29
Mean (Δ ln wage)	.077	.077	.078	.078
S.D. (Δ ln wage)	.009	.009	.006	.006

Pooled analysis

The equations listed below test for the statistical equivalence of the industry wage-productivity link in the United States and West Germany by pooling data from the two countries. The equations are estimated using Weighted Least Squares (with the assigned weights equal to the standard errors from each of the individual regressions), and the relevant explanatory statistics have been recalculated to conform with the scaling procedure. We cannot reject, based on the pooled regression results below (data are from equations 2 and 4, Table C above), the hypothesis that the relationship between industry wages and industry-specific performance is statistically the same in the United States and West Germany over this period. The implication of this test is that industry wages were equally flexible in the two countries.

Pooled U.S.-W.G: (R^2 = .234)

(1a) $\Delta \ln (w_i) = \underset{(.075)}{.277}\ \Delta \ln (Q_i/L_i) + \underset{(.072)}{.209}\ \Delta \ln (P_i)$

Individual U.S.-W.G.: (R^2 = .322)

(1b) $\Delta \ln (w_i) = \underset{(.090)}{.206}\ \Delta \ln (Q_i/L_i)_{wg} + \underset{(.125)}{.338}\ \Delta \ln (Q_i/L_i)_{us}$

$$+ \underset{(.089)}{.083}\ \Delta \ln (P_i)_{wg} + \underset{(.110)}{.411}\ \Delta \ln (P_i)_{us}$$

The F-statistic for this test is 2.85.

and early 1980s, they do not explore the *relative* flexibility of the U.S. and West German industrial wage structures. To make this comparison, it is necessary to pool the data for West Gemany and the United States and estimate a single equation. In fact, the link between industry wage and value productivity movements was statistically indistinguishable in the two countries (Box 2). Even though industry output price movements had a stronger impact on wages in the United States, the combined impact of the industry performance variables in influencing wages was the same in the two countries.[18] Therefore, the response of industry wages to industry performance was, on average, just as strong in West Germany as in the United States. In sum, the industrial wage structures in both countries were flexible.[19]

[18]This test is not perfect. Missing variables may be of greater significance in determining wage behavior in one country than in another and therefore may bias the coefficient estimates and the statistical tests. For example, changes in the inter-industry mix of skill, sex, or age that are correlated with both industry wages and industry productivity will bias the point estimates on the industry performance variables. If the omission of these controls is more important in one country, then the pooled results will be biased as well.

[19]This section explores inter-industry wage patterns, but does not evaluate *intra*-industry wage flexibility. There is reason to believe that the pattern of wages within industries among establishments is far more rigid in West Germany than in the United States. While firms in the United States vary their wages according to size, with large firms paying 25 to 30% more than small ones, firms in West Germany are generally forced to pay the union scale wage, and there is no sizeable difference between what small and large firms pay their workers. For a comprehensive discussion of firm size effect, see *OECD Economic Outlook* (September 1985).

Conclusion

The key finding of our analysis is that wages, at both aggregate and industry levels, have been flexible in West Germany, at least since the late 1970s.

There appear to be strong similarities in both real and nominal aggregate wage flexibility in the United States and West Germany. While real wages responded equally to unemployment rates in both countries, nominal wages responded to prices differently. Although price inflation was an important influence on nominal wage growth in West Germany through the late 1970s, it has been relatively unimportant recently.

At the industry level, wages were flexible in the United States and West Germany as well. In the two countries, over both the short- and long-run, industry wage movements reflected changing industrial performance and showed some variation. Despite major differences in industrial structure and collective bargaining institutions in the United States and West Germany, the degree of wage responsiveness at the industry level was similar.

Since wages in the United States and West Germany have behaved similarly in recent years, wage rigidity seems unlikely to be the dominant cause of persistently high West German unemployment. Even more importantly, with reduced wage rigidity since the late 1970s the West German economy may be able to sustain a faster demand expansion over the next year or two without risking a resurgence of inflation.

Linda A. Bell

The Cycle in Property/Casualty Insurance

Property/casualty insurance companies hold about five percent of all financial assets in the United States. Currently they are recovering from one of their worst cyclical downturns in the post-World War II period. The industry is divided about evenly between personal and commercial lines of insurance. It is very competitive with fairly easy entry and exit and there are now more than 3000 companies operating in the United States. The vast majority of property/casualty coverage is written by a few hundred of these companies. But no single company supplied as much as five percent of the $85 billion of coverage written in the first half of 1986. Deviations from competition tend to be the result of regulation, particularly rate regulation, which is extensive in personal and workers' compensation lines. Commercial lines other than workers' compensation, and especially commercial reinsurance, are the focus of the current problems in the industry. Reform efforts are introducing rate regulation into these traditionally less regulated lines as well.

This article focuses on the underlying reasons for the profitability cycle in the property/casualty industry. Changes in interest rates are the primary force behind the recurrent swings in the industry's profitability. After describing the link between interest rate fluctuations and the insurance cycle, we look more closely at the most recent cycle. Its relative severity was primarily the result of the industry's response to the unprecedented swings in interest rates over the past ten years. Consequently, the return of interest rates and inflation to more normal historical levels should eventually ease the "crisis" in the industry.

The author would like to thank Paul Bennett for many helpful discussions while developing this article.

Interest rates and the insurance cycle

The cyclical behavior of the property/casualty insurance industry results from the extreme interest-sensitivity of the competitive price for insurance. The key to this sensitivity is the basic nature of the insurance product. Companies receive money (premiums) in exchange for promises to pay future claims. As interest rates rise, companies can lower premiums to meet the same future claims because the interest accumulated with premiums will be greater.

As a starting point for analyzing the insurance cycle, it is helpful to think of the insurance market as characterized by a fairly stable demand curve and a supply curve that shifts with interest rates. As rates rise, the supply curve shifts to the right, companies are willing to offer more insurance at the same price, and prices fall until enough new demand is induced and/or suppliers withdraw to clear the market.

This fundamental economic relationship between policy pricing and interest rates implies that insurance companies will raise prices when interest rates fall, and lower them when interest rates rise. The magnitude of these price changes will vary with the magnitude of interest rate changes. It is not a coincidence that the intense price competition of the late 1970s and early 1980s came at the same time as the unprecedented

increase in interest rates. Likewise, the enormous premium rate increases of recent years have coincided with the large declines in interest rates.[1]

The magnitude of these price changes also depends on how far competitive pressures push these firms beyond prudent underwriting practices when interest rates rise. Because the industry is quite competitive with easy entry and exit, it tends to overshoot the price level dictated by changes in interest rates.[2]

Inflation also has an impact on the relationship between the competitive price of insurance and interest rates. If costs of settling claims are expected to rise through time, a higher premium or investment return will be necessary to cover future costs. To the extent that rising interest rates reflect anticipated inflation, they should not affect insurance premiums. The insurance company must therefore incorporate expectations of future inflation, or more specifically future claims costs, into its pricing policy.

Uncertainty about the inflation outlook can amplify the cycle in premium pricing by widening the range of inflation expectations. Firms with lower than average expectations about future inflation will price policies more cheaply than those that expect higher rates of inflation. The lower price will draw an increasing market share to companies that anticipate low inflation, unless other firms match their prices. In either event, prices will tend toward the level dictated by a lower than average inflation outlook.[3] If the average level of inflation expectations is more near the mark, prices will end up too low and the extent of the ultimate industry shakeout will vary directly with the gap between actual inflation and the lower range of inflation expectations.

A corollary to the basic inverse relationship between interest rates and competitive premium pricing is greater volatility of premiums in longer tailed lines of insurance (*e.g.*, general liability) versus shorter tailed lines (*e.g.*, auto liability). Tail length refers to the amount of time between the premium payment and the expected claims payout. Other things equal, the longer the time between the premium payment and the expected claims payout, the bigger the effect of interest rate changes on the competitive price of insurance. This corollary helps explain why certain insurance lines are more cyclical than others. It also provides a theoretical basis for the greater cyclicality of reinsurance compared with primary insurance. Reinsurers typically have a longer tail length or emergence pattern in their claims payments than primary insurers.[4]

Combined ratios and the interest rate-insurance cycle

Property/casualty companies' profitability is divided into two broad categories—underwriting profits and investment income. Rising interest rates increase the investment income from each premium dollar. As discussed earlier, this higher investment income allows firms to charge a lower premium for the same level of coverage. Premium cutting due to rising interest rates erodes underwriting profits.

Underwriting profitability is judged by a measure called the combined ratio. This measure adds together the ratio of losses incurred over premiums earned and the ratio of commissions and other expenses incurred over premiums written and multiplies the result by 100.[5] It shows the cash outflow from underwriting operations relative to the cash inflow. When the combined ratio is greater than 100, it means underwriting expenses exceed revenues. Unless investment income makes up the difference, the firm will lose money.

A practice called "cashflow underwriting" relies on investment income to meet part of underwriting expenses and causes the combined ratio to exceed 100. Traditionally, this practice has been regarded as unsound. Investment income, in this view, is considered a buffer against unexpected underwriting losses, not a source of cashflow for anticipated claims costs. Property/casualty company aversion to cashflow underwriting was seriously

[1]Other factors besides interest rates affect insurance prices. The trends toward wider liability and higher settlements are obvious factors. Insurance prices declined despite these trends, when interest rates were at the high levels of the late 1970s and early 1980s. With interest rates lower now, the trend toward higher claims costs exacerbates the rise in competitive insurance prices. Policy measures to contain increases in the scope and size of insurance settlements could conceivably act as a partial offset to the interest rate pressure for higher premiums. Unfortunately, price data is not widely available. Constructing price data is difficult because there is no standardized unit of insurance. For example, deductibles can be increased and coverage limits lowered in lieu of raising the premium.

[2]See Paul L. Joskow, "Cartels, Competition and Regulation in the Property-Liability Insurance Industry," *The Bell Journal of Economics*, Vol. 4, No. 2 (Autumn 1973), for a discussion of competition in the property/casualty industry.

[3]This assumes that there is adequate capacity among firms expecting low inflation to absorb more market share. Firms with a low-inflation outlook and capacity to write more business will be among the most aggressive price cutters.

[4]Reinsurance is insurance for insurers. It allows them to cede parts of the risk they assume to other insurers. Emergence patterns show the time path of the *cumulative* claims associated with policies written at a particular time. For example, if 10 percent of the claims ultimately made on a set of policies are paid out each year over a ten-year period the emergence pattern would show 10 percent after one year, 20 percent after two years, and so on, reaching 100 percent at the end of the tenth year.

[5]Premiums written include earned premiums and an unearned premium reserve. The earned portion of premiums written is the property of the insurance company and is based on the expired portion of the policy period. For example, an annual premium of $400 paid in advance would initially be allocated to the unearned premium reserve. After six months, $200 or half the payment would remain in the unearned premium reserve.

undermined by the unusually high level of interest rates in the late 1970s and early 1980s.

The combined ratio is very cyclical and moves (with varying lags) according to interest rate movements. Cyclical peaks in the combined ratio are usually associated with interest rate peaks. As rates decline, the combined ratio tends to decline (Chart 1).[6]

Because premium income is weighted toward the present compared with investment income, the trade-off of current (premium) income for improved future (investment) income raises the combined ratio, as current expenses rise relative to current underwriting income. Furthermore, because gains in investment income occur with a lag, expenses also rise relative to total revenue. Thus, declining underwriting income is associated with declining total income (Chart 2).

Eventually, however, as investment income increases total income should improve. But if underwriting standards deteriorate in response to competitive price pressure, the improvement in investment income will be insufficient to service the increased claims associated with taking on greater underwriting risks. If the price cutting is excessive, total income will deteriorate despite the rise in investment income. Only when losses force more prudent underwriting and an industry shakeout occurs does the cycle reverse and income improve.

The significance of interest rate movements for underwriting performance has increased dramatically in the past 25 years. Until the protracted rise in interest rates that began in the late 1960s, interest rates had fluctuated around a sufficiently low level that investment income remained a much less important source of cashflow than it became in the 1970s. As the level of interest rates rose through each successive business cycle, the importance of interest income for cashflow increased threefold. In 1967, premium income was over eighteen times interest income. By 1985, this ratio had dropped to less than seven.

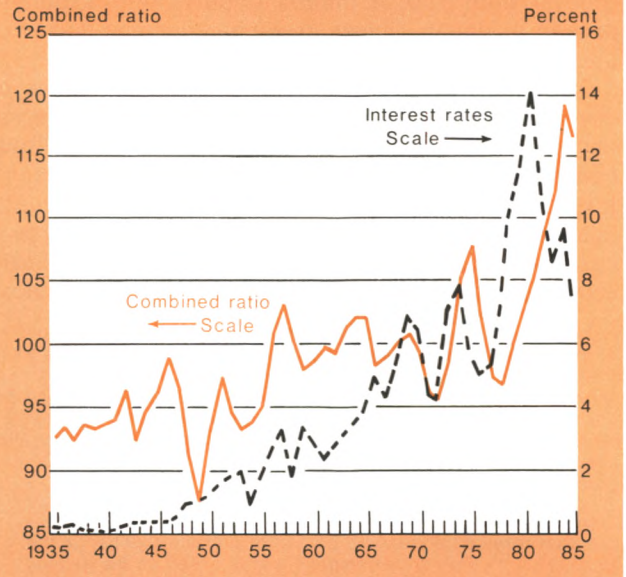
[6]The cycle beginning in 1976 is somewhat different because the combined ratio continued to go up even as interest rates began their descent in 1982. This may reflect the large increases in expensive, long-tailed liability settlements. These underwriting losses

Footnote 6 continued

emerge later on average, and therefore the combined ratio continues to deteriorate for a longer time. Special factors associated with the most recent cycle are discussed in more detail below.

Chart 1

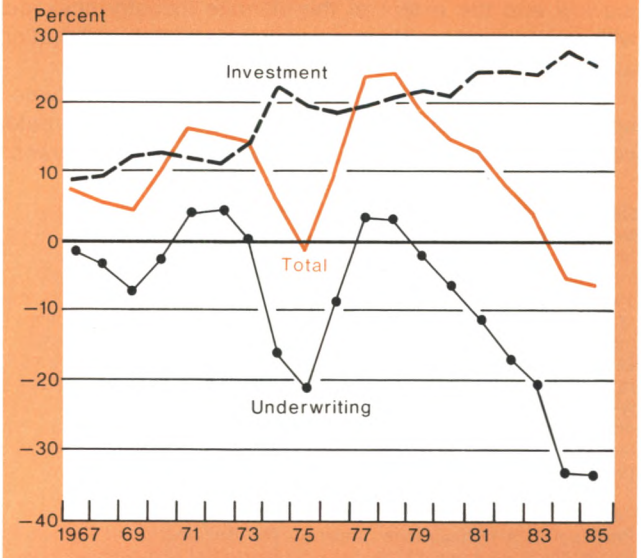
Three Month Treasury Bill Rates and Combined Ratios for Property/Casualty Insurers



Source: Best's Aggregates and Averages.

Chart 2

Property/Casualty Income as a Percent of Policyholders' Surplus*



*Policyholders' surplus is the net worth of an insurer as reported in its annual statement.

Source: Best's Aggregates and Averages.

If the disinflation-induced decline in interest rates over the past four years marks a return to more normal historical levels, premiums will rise simply because interest income will cover a much smaller part of the overall costs of insurance. If the current low-inflation scenario persists, the combined ratio for property/casualty companies could return to the lower average levels that prevailed prior to the 1970s. Also, if the sharp interest rate fluctuations of the late 1970s and early 1980s are replaced by the milder fluctuations of earlier years, the cyclicality of the industry could diminish.

Maturity structure of claims and the interest rate-insurance cycle

The effects of interest rate fluctuations on premiums should be greater in lines of insurance with longer intervals between the receipt of premiums and the payment of claims. Consequently, the combined ratio for long-duration lines of insurance should move more than the ratio for short-duration lines over the interest rate cycle, and the mix of insurance by lines will affect the timing and volatility of the property/casualty cycle.

The duration of the claims payout is illustrated by emergence patterns (Chart 3). For example, automobile liability insurance claims are generally settled sooner after the insured event than general liability or workers' compensation claims, which might not even be reported until years after the premiums are paid (*e.g.,* asbestosis claims). Within three years of occurrence, about 75 percent of automobile liability claims have been paid, while only about 25 to 40 percent of general liability and workers' compensation claims have been paid. Even after nine years, only about half of workers' compensation claims have been paid out.

Over the past 10 years, the combined ratio for general liability insurance has risen more than for automobile liability insurance when interest rates rose, and has fallen more when rates fell. Since general liability is the longer tailed line, this is consistent with the notion that lines with a slower emergence pattern will be more interest-sensitive.

Other factors can complicate this principle. For example, workers' compensation lines are long-tailed, but their combined ratio does not behave as the increased interest-sensitivity principle would suggest. Among the incentives that workers' compensation insurers offer to promote safety is the return of premium dollars to employers with a favorable loss record.

As a result, workers' compensation insurers pay a large part of all the dividends property/casualty insurers return to policyholders each year.[7] Since the combined ratio is based on premium income before distribution of dividends, underwriting performance in this line is often less favorable than the combined ratio would indicate. Furthermore, regulation is much more stringent in workers' compensation than in general liability insurance, perhaps restraining competitive excesses.[8] In this case, interest rate effects are outweighed by other factors.

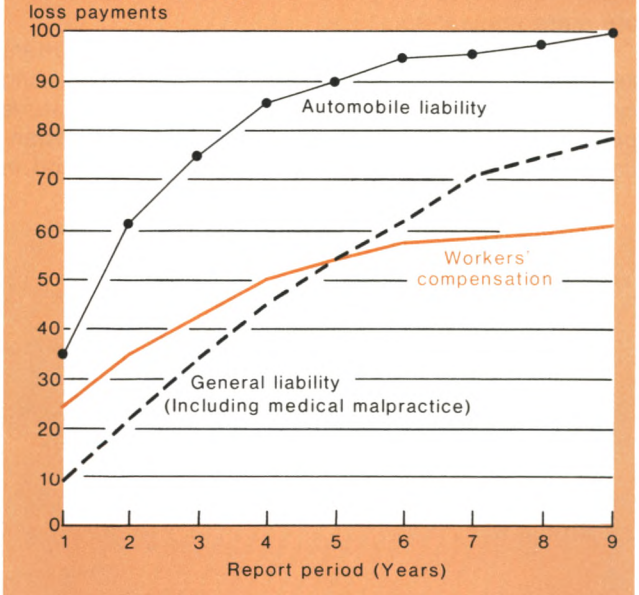
In past cycles the differences in performance between commercial and personal lines, primary insurers and reinsurers, and long-tailed and short-tailed lines within

[7]For more on special factors affecting various insurance lines, see *1985-86 Property Casualty Fact Book*, Insurance Information Institute.

[8]There are extensive laws at the state level providing performance standards for workers' compensation insurance. In recent years these laws have changed to meet standards recommended in 1972 by the National Commission on State Workmen's Compensation Laws.

Chart 3

Emergence Patterns by Line of Business



Explanatory notes:

1 Emergence is defined as the sum of two items: (1) claims outstanding at the end of each report period and (2) the cumulative payments that have been made up to the end of that report period.

2 The ratio of emergence to ultimate loss payments is expressed in percentage form and is plotted for each report period shown.

3 The usual range of points is 0 percent at inception to 100 percent (ultimate), a point which is reached after many years or report periods.

Source: 1980 Reinsurance Association of America Loss Development Study.

these categories were much less pronounced. But sharp differences arose with the unusually high and volatile level of interest rates during the past 10 years. For example, the performance of commercial lines deteriorated markedly in relation to personal lines over the past several years. Commercial insurance was very aggressively priced in the last cycle and has experienced some of the biggest rate increases in the past two years. Both the longer tailed nature of the business and rising costs of insurance settlements have contributed to this volatility.

Likewise, reinsurers' performance deteriorated much more than the overall performance of primary insurers in the last cycle. An important difference between reinsurers and primary insurers is the large amount of "excess-of-loss" coverage they retain. That is, reinsurers are more exposed to claims that exceed large deductibles or some limit that another insurer is responsible for. Thus reinsurance is longer tailed since the excess-of-loss component of losses is generally slower to develop. As a result, premiums in these lines are more interest-sensitive.

Beyond the cyclical issue there is also an important longer term issue. There has been a secular lengthening in loss emergence across lines. For example, the claims payout on many reinsurance lines has slowed substantially in recent years. Claims are coming later and in bigger amounts than actuarial calculations based on historical experience would indicate. As a result, loss reserves have generally been inadequate in recent years. Whether this is due to the changes in legal and social attitudes toward insurance or to other factors, it implies that the industry is more sensitive to interest rate fluctuations than in the past. To reduce this long-tailed exposure, insurers have begun to write more coverage on a claims-made basis.[9] Claims-made policies make the industry less sensitive to interest rate fluctuations.

Table 1

Stages of the P/C Insurance Business Cycle*

Insurers' View	Stage Number	Consumers' View
Upturn. Rising revenues, lower combined ratios, lower average risk.	1	Crisis. Scarcity, rapid price increases, unavailability of some lines.
Peak. Best underwriting results, highest overall profit.	2	Consolidation. Fixing of new price plateau, highest ratio of price to actual cost of providing protection.
Decline. Influx of new capital lured by high profits, price cutting, lower earnings.	3	Upturn. Easing of prices, greater availability, more willingness to tailor products to consumer demands.
Crisis. Massive underwriting losses, ruinous price competition, major risk of insolvencies.	4	Peak. Rampant price cutting, ample availability, full buyer's market.

*From *Insuring Our Future*, April 7, 1986, Report of the Governor's Advisory Commission on Liability Insurance, New York State.

Stages of the cycle

Table 1 shows how the interest rate sensitivity of premium pricing translates into the stages of the property/casualty insurance cycle. The upturn (stage 1), where the industry is now, is the recovery stage when prices move back into line with costs and availability of coverage is a problem, as bigger risks are dropped. For the consumer, this is the problem phase of the cycle. For the insurer, it is the improvement phase. It generally coincides with falling interest rates.

At the peak (stage 2), profitability for the insurer is highest, setting the stage for the decline (stage 3) as new capital comes in and price competition reverses the profit cycle. Higher interest rates, should they emerge, would provide further impetus for price cutting at this stage. In the crisis stage, price cutting gets out of control and companies begin to fail (stage 4). The most recent cycle began stage 1 from a trough in 1975, rose to a peak around 1978, and began a decline that continued into 1984. During the declining phase, prices in some commercial lines went down 50 percent or more. Personal lines were not as seriously affected. Some firms attempted to raise rates in the declining phase but lost market share as a result. By 1984, price increases and the recovery phase had begun. The big price increases have been in the lines where competition was most excessive in the crisis stage.

The rate of return on property/casualty companies' capital tracks this cycle quite closely. The peak in profitability around 1978 attracted many new firms into the industry, setting off the price wars (Chart 4).

What made the recent cycle different?

The cycle that began in 1976 was longer than usual and more pronounced. A traditional rule of thumb for the property/casualty cycle is three years up and three down. The most recent cycle was three years up and

[9]A claims-made policy covers only claims initiated during the policy period. Traditionally, coverage has been on an occurrence basis, so that an insurer covering the policy period 1987 would still be liable for claims filed in 1995 based on damages arising out of incidents occurring in 1987. Under a claims-made policy, any claims would have to be initiated by the end of 1987.

six down, bottoming in 1984. What made the downturn so long and sharp?

Five factors seem to account for the severity of the recent cycle and suggest that the recovery phase will also take longer than usual:

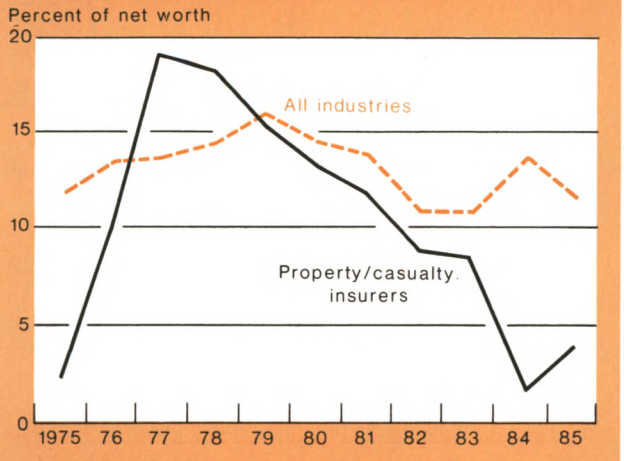
- the unusually large swings in interest rates over the last 10 years;
- the relatively worse cyclical performance in long-tailed commercial lines;
- the unexpectedly rapid growth in claims costs;
- the 1979 entry of captive insurers into third party business for tax reasons;[10] and
- the large inflow of foreign reinsurance capital.

The magnitude of interest rate changes alone would have guaranteed a longer and sharper cycle since 1975. Because the peak phase of the insurance cycle generally does not occur until interest rates have begun their cyclical upswing, the recovery phase of the current property/casualty cycle will probably be extended by the unusual behavior of interest rates in the present general business expansion. Normally interest rates would have begun to rise this far into an expansion. If rates are in a secular return to a more normal pattern, the insurance recovery phase may be extended as firms continue to raise premiums to offset falling investment income.

[10]Captive insurers are set up by firms to provide themselves with in-house insurance services.

Chart 4

Average Annual Rates of Return on Net Worth After Taxes



Source: 1985-86 Property/Casualty Fact Book, Insurance Information Institute.

The relatively greater severity of the last cycle in long-tailed commercial and reinsurance lines also works to prolong the recovery phase of this cycle. Claims associated with policies underwritten in the aggressive price-cutting phase of the last cycle (1978-83) will continue to haunt insurers well into the future. To some extent companies have prepared for this by holding large loss reserves. But the general consensus seems to be that the industry has insufficient reserves for the future claims arising from coverages written in the last cycle.[11]

Besides the usual cyclical fallout from poor underwriting, the unexpectedly rapid growth in claims costs in the long-tailed commercial and reinsurance lines has exacerbated the situation. A recent Rand Corporation study blames the rising costs of the personal injury system rather than the volume of cases for the explosion in insurance losses. According to this study, damage awards and insurance settlements in personal injury cases have increased on average twice as rapidly as inflation during the past five years.[12] The volume of lawsuits filed increased an average of only 3.9 percent a year during this period, according to the study. In essence, the high nominal interest rates of recent years were insufficient to protect insurers against rising claims costs. The unusually high level of inflation in the late 1970s and early 1980s meant that the real return on insurers' investments was much lower than the nominal return. The even greater rate of increase in claims costs made the problem that much more severe.

Many analysts also attribute the severity of the last cycle to the special role of captive insurers. In 1979, captives were forced to seek third party business to maintain their special tax status as insurers. Some claim these relatively inexperienced insurers pushed prices too low by aggressively bidding for outside business.

Finally, the U.S. has traditionally been a net importer of reinsurance from Western Europe, with about one-fourth of reinsurance coverage supplied from abroad. In the late 1970s high returns to capital in the property/casualty industry compared with other industries attracted an inflow of European capital that put additional competitive pressure on premiums and contributed to the severity of the cycle.

Capital adequacy and failure

The amount of policyholders' surplus (capital or net worth) in the property/casualty industry more than

[11]See *Insuring Our Future*, April 7, 1986, Report of the Governor's Advisory Commission on Liability Insurance. New York State. See also, "Second Thoughts About Loss Reserves," *Institutional Investor* (May 1986).

[12]See James S. Kakalik and Nicholas M. Pace, "Costs and Compensation Paid in Tort Litigation: Testimony Before the Joint Economic Committee of the U.S. Congress," Rand Corporation, Institute for Civil Justice (July 1986).

doubled as it rose from the cyclical low point of 1974. The standard regulatory measure of capital adequacy is the premium-to-surplus ratio.[13] A company with a low ratio is in a position to write additional business. Although it has increased somewhat as more leverage has been accepted over the years, the rule of thumb is a ratio of three- or four-to-one. Regulators may consider a company with a higher ratio to be overextended and not in a position to write new business. Of course, the significance of any particular premium-to-surplus ratio depends on other factors as well. For example, a company with ample loss reserves is in a better position to expand its business prudently than a company with inadequate reserves. Basically, the underreserved company has overstated its true capital.

Problems with the premium-to-surplus ratio as an indicator of capital adequacy arise because the volume of premiums is an imperfect measure of potential loss exposure. The same amount of premiums could reflect either a large amount of coverage at a low price or a small amount of coverage at a high price. Obviously, the latter situation is less risky than the former. In the current recovery phase of the cycle, with prices high and coverage hard to get, premiums have risen relative to the amount of coverage. A high premium-to-surplus ratio is less worrisome under these conditions.

While there is wide variation in the premium-to-surplus ratios of individual companies, the aggregate ratio for the industry declined through the last cycle until 1983. The recovery phase of the insurance cycle is marked by a capacity shortage while this ratio increases and companies are constrained from writing new business. This helps the recovery of prices.

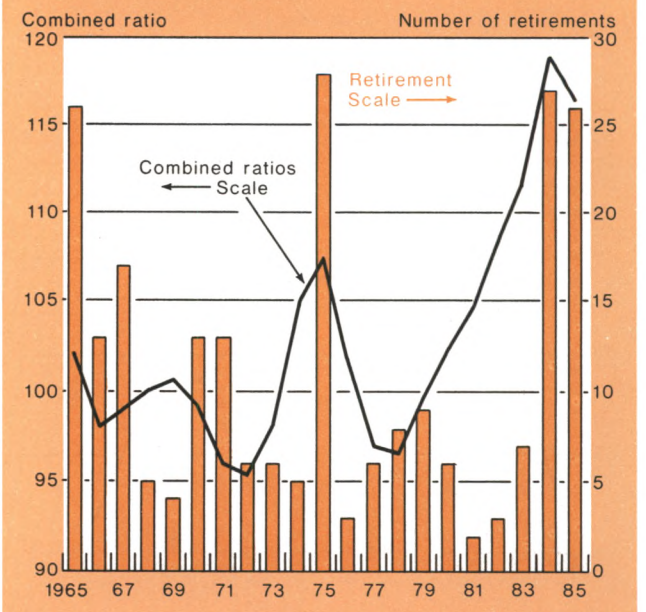
The premium-to-surplus ratio masks another important dimension of risk. Two companies may have the same premium-to-surplus ratio, yet one may have a much shorter average tail length on its policies than the other. Companies with longer tailed business will generally carry a larger proportion of loss reserves to assets than companies with shorter tailed business. Their capital is more leveraged as a result. To measure this aspect of capital adequacy, analysts use the ratio of loss reserves to surplus. This measure shows the size of expected losses in relation to capital or surplus. It has more than doubled over the past 20 years. The increase in the ratio of loss reserves to surplus is the primary factor behind the declining capital-to-asset ratio in the industry.

The reserve-to-surplus measure of capital adequacy is also imperfect. If a firm deliberately underreserves, it will appear to be in better shape than it actually is. But as a rough indicator this ratio is useful. Firms generally reserve within a sufficiently close margin of their actual needs to make large differences between firms' reserve-to-surplus ratios useful for comparison purposes.

There is wide dispersion in the ratios of loss reserves to surplus among property/casualty companies. A company with a high ratio has less margin for error in its loss reserve computation. For example, a firm with a two-to-one ratio, underreserved by 10 percent, would have 20 percent less capital than reported, while a firm with a five-to-one ratio, underreserved by 10 percent, would have 50 percent less capital than its accounts would show. Because there is a general consensus that firms are underreserved for the claims likely to result

Chart 5

Involuntary Retirement of Property/Casualty Insurers and Combined Ratios



Source: Best's Aggregates and Averages; Best's Management Reports.

[13] The idea behind the premium-to-surplus ratio as an indicator of capital adequacy is straightforward. The presumption is that the amount of risk that may be safely assumed by an insurance company should be related in some way to its net assets. Policyholders' surplus is the capital cushion firms have to pay policyholders' claims if premiums prove insufficient to cover future claims costs.

A few words about property/casualty accounting conventions may be useful at this point. A major liability on the books of property/casualty companies is loss reserves. Property/casualty loss reserves are fundamentally different from loss reserves at life insurance companies or other financial institutions like banks. Property/casualty loss reserves are set up *after* events causing losses have occurred. Life insurance and bank loss reserves are set up in anticipation of events causing losses.

from coverage written in recent years, firms with high ratios of loss reserves to surplus deserve special attention.

Failures or involuntary retirements in the property/casualty industry generally move with the combined ratio. This has been especially true in the high interest-rate environment of the past 12 years. The two most recent cyclical low points (1975 and 1984) coincide with peaks in the number of failures in the industry (Chart 5).

Outlook

The industry is currently enjoying a sellers' market. Surplus increased substantially over the past year, mainly as a result of equity issuance and capital gains from the stock and bond market rallies. Earnings also contributed to surplus as firms continued to increase premiums and stopped writing coverages in areas where legal uncertainties preclude sound actuarial evaluation of risks.

Availability of coverage problems are confined primarily to product liability, directors' and officers' liability, professional liability, and environmental damage coverage. In these lines coverage above certain amounts is now often written on a claims-made rather than an occurrence basis. This eliminates the longer tailed exposure by confining insurance company losses to claims made during the policy period.

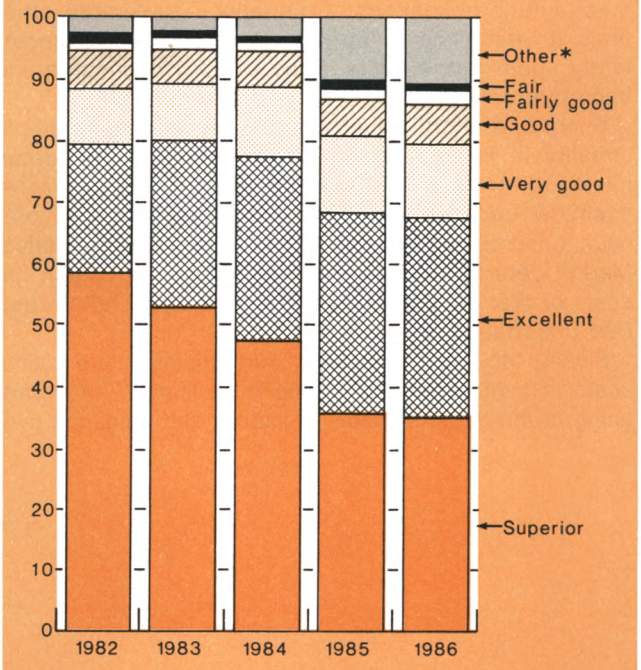
A look at the distribution of property/casualty company ratings also suggests that the worst of the industry's problems may be over (Chart 6). The steady deterioration from 1981 to 1985 stabilized in 1986, and the strong earnings reported this year suggest the 1987 distribution of ratings will show some improvement.

The most vulnerable area of the industry is reinsurance, where high claims awards have hit hardest. This less regulated area has also been the focus of fraud in the industry which, as in other financial industries, is an important cause of insolvencies. Unfortunately, these problems have created uncertainty about the quality of reinsurance on the books of many primary insurers. The adverse consequences of uncollectable reinsurance which erodes surplus and limits capacity to write new business should reinforce the effects of lower interest rates in prolonging the recovery phase of this cycle. Partly offsetting this, however, are the exceptional opportunities for new entrants and those firms that escaped the worst consequences of the last downturn.

The combination of unusually high and volatile interest rates with the other factors cited earlier—the relatively poor performance of long-tailed lines, the growth in claims costs, the role of captives, and the inflow of foreign reinsurance capital—seems to account for the severity of the recent recession in the industry. Consequently, the next downturn should be less severe if

Chart 6

Distribution of Best's Property/Casualty Ratings

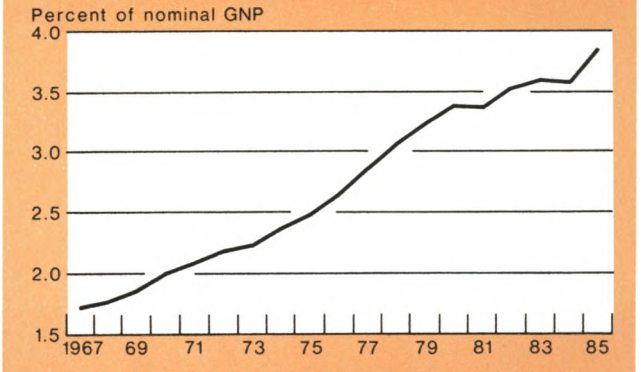


*This category includes but is not limited to companies with large reinsurance exposures.

Source: A.M. Best Company.

Chart 7

Loss and Loss Adjustment Expense Reserves for all U.S. Property/Casualty Insurers and Reinsurers



Source: Best's Aggregates and Averages.

three current trends continue. First, the return of inflation to low and less volatile levels should clarify the outlook for future claims costs. High and volatile inflation rates mask the real cost of future claims, making it more likely that some firms will price insurance inadequately to meet future obligations. Competition pressures other firms to make the same mistake. By reducing uncertainty about future costs, price stability eliminates one important source of volatility in the industry.

Second, and critically related to the inflation outlook, stability in interest rates around lower, more normal historical levels will reduce the pressure for excessive cashflow underwriting. The relationship between premiums and claims is less variable when rates are stable. Market determined prices are more likely to match the costs of providing coverage when the cloud of interest-rate uncertainty is lifted.

Finally, the legal uncertainty surrounding future claims costs is also a barrier to efficient pricing. The broadening of the legal concepts of liability and damages over the past 25 years is associated with an ever-growing share of national output devoted to insurance losses (Chart 7). More than 30 states have adopted elements of tort reform to stem this long-run increase in the real burden insurance costs place on the United States economy. These reforms incorporate recommendations from consumer groups and the insurance industry. Similar efforts are under way at the federal level. The unexpected claims costs associated with the broadening scope and size of insurance settlements contributed to the severity of the most recent down cycle. Successful reform efforts should mitigate the next down cycle.

Taken together, these trends, along with the shift of extraordinary risks to claims-made policies, should aid the industry as it continues to improve its financial condition.

Robert T. McGee

Tax Reform and the Merger and Acquisition Market: The Repeal of *General Utilities*

The 1986 Tax Reform Act repeals the so-called *General Utilities* doctrine—the principle that corporations liquidating their businesses are not subject to capital gains tax on the appreciation in the value of their assets.[1] This change, along with the new corporate tax rate structure, reduces the benefits and raises the costs of many mergers and acquisitions (M&A's), especially those involving firms with undervalued assets. The repeal of *General Utilities* takes effect after the end of 1986 (except for generous transition rules), and along with other tax changes, may help to explain the surge in M&A activity in the second half of 1986 (Chart 1).[2]

A liquidating corporation, using *General Utilities*, escapes the tax liability that comes with appreciated assets. This can be an important element of a liquidation, since the purchaser of the firm's assets will wish to acquire them with an increased (stepped-up) tax value (basis) in order to claim larger depreciation and depletion allowances. Ordinarily, a step-up implies that a corporation will incur a capital gains tax liability (the corporate capital gains tax rate, currently 28%, will rise to 34% in 1987).

General Utilities is relevant to the M&A market because, under Section 338 of the Internal Revenue Code, the purchaser of at least 80% of the stock of a corporation may treat the transaction, for tax purposes, as liquidation of the corporation and purchase of its assets.[3] By using *General Utilities* and Section 338, a corporation can obtain the advantages of a basis step-up without paying capital gains tax and without truly liquidating assets—a firm can stay in the same business with the same capital stock, managers, and workers. The tax saving arises solely from the change in ownership of a firm's stock. The prospect of such tax savings has been an important spur to the M&A market.

A step-up in the basis of an acquired firm's assets may not always be in a purchaser's interest, however. Even though an acquired firm escapes capital gains tax on the appreciation of its assets, it still has to pay tax on that part of the basis step-up that represents the "recapture" of past depreciation allowances. That is, because depreciation allowances are intended to capture the decline in an asset's value, sale of an asset for an amount greater than the depreciated book value implies that allowances taken in the past overstated the

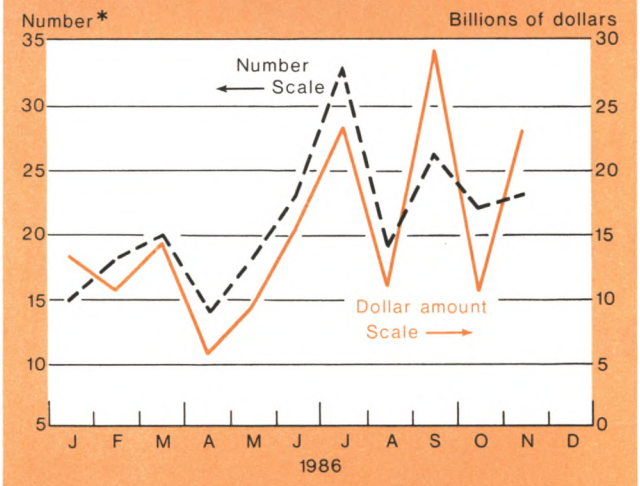
[1]The *General Utilities* doctrine derives its name from a 1935 Supreme Court case, *General Utilities and Operating Co. v. Helvering*. The Court's decision in the case was ultimately incorporated into the Internal Revenue Code. For an overall look at the pre-reform tax implications of mergers, see Joint Committee on Taxation, *Federal Income Tax Aspects of Mergers and Acquisitions* (JCS-6-85), March 29, 1985.

[2]Other elements of tax reform have affected M&A activity. The January 1, 1987 increase in the personal long-term capital gains tax rate—raising the maximum from 20% to 28%—created an important incentive to accelerate the completion of sales from 1987 to 1986. New rules on the transfer of net operating loss carryforwards and changes in the corporate minimum tax will make complex changes to the tax implications of many proposed mergers, favoring some and impeding others.

[3]The transaction must subject the selling shareholders to capital gains tax on the appreciated value of their stock. In general, a takeover involving the exchange of securities for stock is not taxable while a cash purchase is.

Chart 1

Large Stock Transactions



Includes publically-disclosed transactions completed or currently pending for stock or assets of U.S. nonfinancial corporations. Data through November 19, 1986.

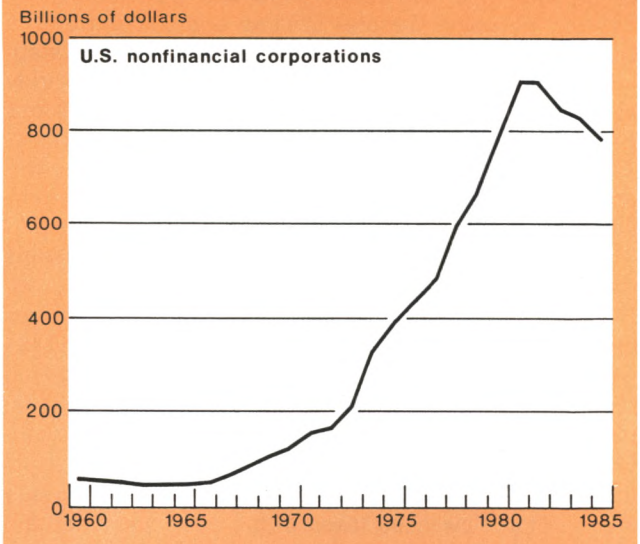
*Dollar amount greater than $250 million.

Source: Securities Data Company.

Chart 2

Fixed Reproducible Tangible Assets

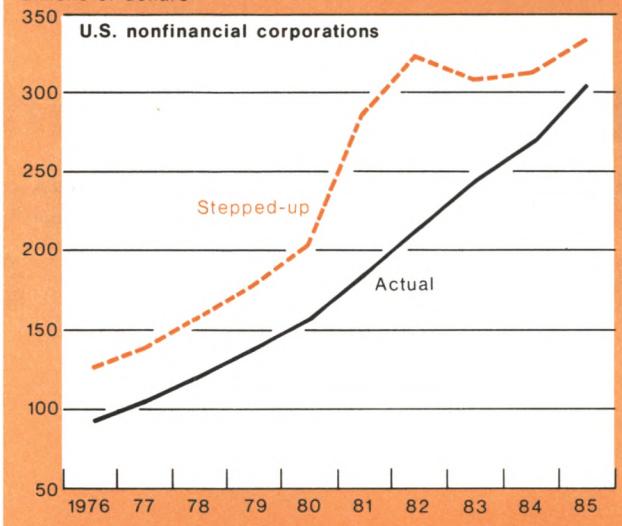
Current cost less historic cost



Source: Federal Reserve Board, Balance Sheets for the U.S. Economy 1946-1985, October 1986.

Chart 3

Actual Depreciation Compared to Depreciation on a Stepped-up Basis



Source: Federal Reserve Board, Flow-of-Funds; Federal Reserve Bank of New York staff estimates.

true decline in value. This recapture tax may offset the advantages of the basis step-up.[4]

Because detailed study of a corporation's assets is often necessary to calculate the costs and benefits of a basis step-up, purchasers are allowed one year to decide on carrying out a Section 338 liquidation. In the case of those buyouts involving a firm's management, the acquirers are likely to know the costs and benefits of a Section 338 liquidation well in advance of sale. Although the Treasury Department has no data on the overall use of Section 338, the device seems to be used often in the aftermath of leveraged buyouts.

But in general, Section 338 and *General Utilities* is more advantageous the greater the proportion of the acquired firm's overall purchase price that can be assigned to its depreciable and depletable assets, and the larger the basis step-up relative to the original cost of the assets. Many firms in the manufacturing and natural resource sectors fit this description. The inflation of the 1970s greatly increased the difference between the market value of tangible corporate assets and their tax basis, and in conjunction with the acceleration of depreciation schedules in 1981, allowed for dramatically increased depreciation allowances on existing assets.

[4]Investment tax credits and certain other deductions, along with depreciation, are also recaptured.

The wave of large-scale mergers and leveraged buyouts in the last few years, especially in manufacturing and mining, is partly due to the attraction of the tax-free basis step-up under Section 338 and *General Utilities*.

During the high-inflation era of the late 1970s and early 1980s, the potential size of basis step-ups surged. Chart 2 plots the difference between the value of nonfinancial corporate plant and equipment on a current (or reproduction) cost basis and on a depreciated historic cost basis. Current cost can be considered an approximation of market value and historic cost an approximation of the basis.[5] While these approximations are rough, the difference between the two provides an indication of the potential amount of step-up available on plant and equipment. The chart shows that the potential step-up did increase substantially in the 1970s, peaking at nearly $1 trillion in 1981. The discrepancy has been reduced somewhat in recent years as old, undervalued capital has been retired from service.

[5]The historic cost data used in Chart 2 are derived from expenditures on new capital and straight-line depreciation schedules. The tax basis of capital would be calculated from expenditures on new and used capital and actual depreciation schedules, which can be considerably different from hypothetical straight-line schedules. Thus, the historic cost data is likely a very rough approximation of the true basis.

Table 1

Effect of Merger (Before Tax Reform)

	Pre-merger	Post-merger*	
First year			
Cashflow from operations	$2,000,000	$2,000,000	
Depreciation	$ 500,000†	$3,850,000	
Interest	$ 0	$2,200,000	
Pre-tax profits	$1,500,000	($4,050,000)	
Taxes	$ 690,000	($1,863,000)	(on profits)
		+ $1,380,000	(on recaptured depreciation)
		=($ 483,000)	
After-tax cashflow‡	$1,130,000	$ 283,000	
Following years			
Cashflow from operations	$2,000,000	$2,000,000	
Depreciation	$ 500,000	$3,850,000	
Interest	$ 0	$2,200,000	
Pre-tax profits	$1,500,000	($4,050,000)	
Taxes	$ 690,000	($1,863,000)	
After-tax cashflow‡	$1,310,000	$1,663,000	
Present value of after-tax cashflows§	$5,518,197	$5,703,274	

*Purchase price $22 million, financed at 10%.
†Original purchase price $10,000,000; current basis $7,000,000.
‡Cashflow from operations less interest and taxes.
§Years 1 to 5, evaluated at a 6% rate.

A firm will wish to step up the basis of assets to obtain higher depreciation allowances. Chart 3 plots the actual depreciation allowances taken by nonfinancial corporations in the last decade and compares them to an estimate of the first year's allowance that could be obtained by stepping up the basis of plant and equipment to current cost, and depreciating under prevailing rules. The potential benefit of a step-up gradually increased during the late 1970s as inflation heated up. More importantly, the sharp reduction in taxable service lives introduced in 1981 dramatically increased the tax advantages of a stepped-up basis.[6] In conjunction with the post-1982 decline in interest rates, which reduced the cost of raising the funds used to finance takeovers, this opportunity to accelerate depreciation and avoid capital gains tax has probably facilitated many mergers.

An example can illustrate in more detail how the specific characteristics of the pre-reform tax law contributed to the feasibility of certain deals. The target corporation described in Table 1 purchased its assets for $10,000,000, and its current basis in these assets is $7,000,000. The company's pre-tax profit (cashflow from operations less interest and depreciation) is $1,500,000, and it pays taxes at the pre-reform 46% rate.[7]

The stock of the target is purchased by another corporation for $22,000,000. The acquirer borrows this money at 10%. The tax basis of the acquired firm's assets is stepped up from $7,000,000 to $22,000,000, and using post-1981 rules, the depreciation rate on these assets is increased from 5% to 17.5% (for simplicity, depreciation is assumed to be on a straight-line schedule).[8] Thus, the annual depreciation deduction rises from $500,000 to $3,850,000. The increase in

[6]The hypothetical depreciation line in Chart 2 is based on the first year's depreciation from accelerated schedules. The depreciation deductions in subsequent years tend to decline. In present value terms, the depreciation benefits enacted in 1981 were less substantial than the surge in the hypothetical line may suggest.

[7]For simplicity, the slight progressivity in the corporate tax schedule is ignored.

[8]A reasonable estimate, one used in the Federal Reserve Board's macroeconomic model, is that the useful life of equipment for tax purposes was reduced from an average of 10.5 years prior to 1981 to 4.6 years today, and structures from 40 years to 19 years. Thus, the example's assumption of a 12.5 percentage-point increase in the tax depreciation rate is a bit high, but not unrealistic. On a straight-line basis, the first-year depreciation rate on a capital stock equally divided between equipment and structures is now 14% as compared to 6% prior to 1981. Tax reform will increase the useful life of most structures to 30 years and slightly increase the lives of some categories of equipment. These changes will further reduce the attractiveness of stepping up the basis of assets following a merger.

depreciation, coupled with the interest expense of the borrowed money, results in a deduction against the acquirer's earnings of more than $4 million and a credit of nearly $2 million against its tax liability.

In the year following the merger, the target firm (which is technically selling its assets to the acquirer) will have to pay tax, at the ordinary corporate rate of 46%, on $3 million worth of recaptured depreciation.[9] This tax reduces the combined firm's tax credit in the first year after the merger to just under $500,000; the after-tax cashflow accruing to the combined firm from the financing of the takeover and the operation of the acquired firm will be $283,000. In the following years the after-tax cashflow will amount to $1.7 million—larger than the flow to the target firm before the merger, despite the rise in interest expense associated with financing the deal.

In present value terms, over a five-year horizon the after-tax cashflow these assets yield to the combined firm is greater than that to the target before the merger. (The 6% discount rate used is arbitrary, but is roughly the after-tax return earned by a high-income individual who can invest 10% pre-tax and pays federal, state, and local income tax). Thus, if equity markets price according to five-year expectations, the equity value of the combined firm will be greater than the sum of the equity values of the two firms before merger. This comes about even though no increase in the cashflow from operations of either firm has been assumed, and even though interest on the debt raised to finance the purchase exceeds the cashflow from the acquired firm's operations. After six years, when the depreciation allowances are assumed to expire, the merged firm will need to augment its cashflow, sell assets, or refinance

[9]The actual rules on depreciation recapture are more complex than those in the example. Furthermore, the example ignores the recapture of any investment tax credit taken on the purchase of these assets.

Table 2

Effect of New Tax Rates (*General Utilities* Doctrine Intact)

	Pre-merger	Post-merger	
First year			
Pre-tax profits	$1,500,000	($4,050,000)	
Taxes	$ 510,000	($1,377,000)	(on profits)
		+ $1,020,000	(on recaptured depreciation)
		=($ 357,000)	
After-tax cashflow*	$1,490,000	$ 157,000	
Following years			
Taxes	$ 510,000	($1,377,000)	
After-tax cashflow*	$1,490,000	$1,177,000	
Present value of after-tax cashflows†	$6,276,422	$3,995,688	

*Cashflow from operations less interest and taxes.
†Years 1 to 5, evaluated at a 6% rate.

Table 3

Effect of *General Utilities* Repeal

	No change in tax rates			New tax rates		
	Pre-merger	Post-merger		Pre-merger	Post-merger	
First year						
Pre-tax profits	$1,500,000	($4,050,000)		$1,500,000	($4,050,000)	
Taxes	$ 690,000	($1,863,000)	(on profits)	$ 510,000	($1,377,000)	(on profits)
		+ $1,380,000	(on recaptured depreciation)		+ $1,020,000	(on recaptured depreciation)
		+ $3,360,000	(on $12 million capital gain)		+ $4,080,000	(on $12 million capital gain)
		= $2,877,000			= $3,273,000	
After-tax cashflow*	$1,310,000	($3,007,000)		$1,490,000	($3,923,000)	
Following years						
Taxes	$ 690,000	($1,863,000)		$ 510,000	($1,377,000)	
After-tax cashflow*	$1,310,000	$1,663,000		$1,490,000	$1,177,000	
Present value of after-tax cashflows†	$5,518,187	$2,533,463		$6,276,422	$ 141,914	

*Cashflow from operations less interest and taxes.
†Years 1 to 5, evaluated at a 6% rate.

to cover the interest expense. In effect, the increase in depreciation expense gives the combined firm a long grace period to achieve operating economies.

Tax reform greatly reduces the incentives for this transaction to take place, both by changing the corporate tax rate structure and by repealing *General Utilities*. Table 2 shows the effect of reducing the corporate tax rate from 46% to 34%. The after-tax cashflow of the target firm rises (because its tax bill falls), while that of the merged firm falls (the after-tax value of the interest and depreciation deductions declines as the tax rate falls). The present value of the cashflow of the combined firm falls below the sum of the cashflows of the two firms separately.

Repeal of *General Utilities* sharply reduces the value of the combined firm (Table 3). The end of *General Utilities* means that capital gains tax is levied on the $12 million of the basis step-up that is not subject to recapture tax. The first year after-tax cashflow of the combined firm falls substantially, given the pre-reform corporate capital gains tax rate of 28%. Moreover, combining the new tax schedule (which, as mentioned above, includes a 34% rate on corporate capital gains) with the repeal of *General Utilities* produces a discounted cashflow for the combined firm only slightly larger than for the acquirer alone.

This example overemphasizes the impact of the *General Utilities* doctrine and its repeal—M&A activity is also motivated by non-tax factors and tax considerations other than depreciation. Nonetheless, elimination of *General Utilities* may harm investors who have taken positions based on the assumption that a corporation will be liquidated, since the end of *General Utilities* will raise the costs of liquidation. It is not clear how great the impact will be, and whether any investors will experience outright losses. On the other hand, tax reform could cause buyers to be more interested in the underlying earnings potential of merger candidates than in their tax attributes.[10]

[10]Repeal of *General Utilities*, along with the increase in the personal capital gains tax rate, may also mean that cash deals—which are usually necessary to use Section 338 but subject selling shareholders to capital gains tax—will become less common.

Charles Steindel

(This report was released to the Congress and to the press on December 8, 1986)

Treasury and Federal Reserve Foreign Exchange Operations

August-October 1986

After declining without interruption for nearly a year and a half, the dollar steadied during the period under review. Although the dollar continued to ease against most of the industrialized countries' currencies through August, it moved up subsequently to close the three-month period mixed on balance (Chart 1). From August to October, it appreciated against some currencies—6¼ percent against the Japanese yen, 5¾ percent against sterling, and 2½ percent against the Swiss franc. It declined, however, by about 1 percent against the German mark and other currencies of the European Monetary System (EMS). There were dollar purchases by foreign central banks, but no intervention by the U.S. authorities during the period.

As the period opened early in August, the dollar was declining. Market participants had come increasingly to question whether the major industrialized countries would be able to work together to redress their large external imbalances. The huge trade deficit of the United States and the enormous trade surpluses of Japan and Germany had shown little adjustment, notwithstanding the considerable movements in exchange rates between the dollar and both the Japanese yen and German mark. Moreover, there was growing disappointment that the sharp, $20-per-barrel drop in oil prices that occurred between November 1985 and July 1986 was failing to provide much of a boost to business activity in the oil importing industrialized countries. Doubts developed that our major trading partners were likely to expand domestic demand vigorously enough to provide a global environment within which the United States could markedly improve its balance of payments position. Market participants considered seriously the possibility that the U.S. authorities might welcome a continued decline in the dollar on the grounds that central banks abroad might then cut interest rates in their countries more quickly.

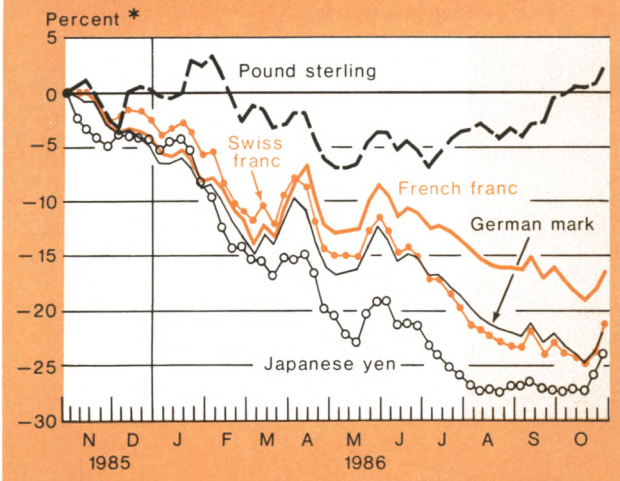
Under these circumstances, market participants expected the trend toward lower interest rates to continue, with the United States setting the pace and other industrial countries perhaps following later on. Although there were already a few signs that the U.S. economy was regaining some momentum from the slow first half of the year, market participants still were struck by the areas of weakness in U.S. economic performance. Output and investment remained sluggish, manufacturing employment continued to decline, and retail sales were generally stagnant. At the same time, prospects for price and wage stability appeared to be good for the short term, despite some concern about the longer term inflationary implications of recent rapid monetary growth.

In this environment, expectations resurfaced from time to time throughout the first few weeks of August that the Federal Reserve might again cut its discount rate, perhaps operating unilaterally as it had done in July (Chart 2). As a result, in August interest rates on deposits denominated in U.S. dollars fell, and their decline was sharper than the decline in interest rates in other currencies (Chart 3). The Federal Reserve did cut its discount rate by one-half of one percentage point,

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

Chart 1

During the period, the dollar paused in its long-term decline against other major currencies.



*Percentage change of weekly average rates for dollars from the average rate for the week ending November 1, 1985. Figures calculated from New York noon quotations.

to 5½ percent, effective August 21. The exchange market reaction was muted, partly because many market participants expected the authorities in Germany and Japan to provide some further stimulus to their economies—either with monetary or other measures—before the annual meetings of the International Monetary Fund (IMF) and World Bank at the end of September.

Economic statistics released in mid-August began to paint a contrasting picture between the German and Japanese economies. The German economy, which had contracted sharply early in the year, seemed to be staging a robust recovery; and official German projections of an acceleration in growth began to be given widespread credence in the financial markets. Japan, on the other hand, appeared to be having much more difficulty adjusting to the appreciation of its currency. Although both the mark and the yen had risen by about the same amount against the dollar since early 1985, on a trade-weighted basis the yen's appreciation had been much greater than the appreciation of the mark (Chart 4). Whereas German manufacturers lost little competitiveness in their markets in other EMS countries, Japanese export industries were hit hard. They lost competitiveness not only in the United States but also in important East Asian markets. With business statistics released in August showing continued stagnation in the

Chart 2

The Federal Reserve reduced its discount rate in August. At the end of October, the Bank of Japan announced a reduction in its lending rate.

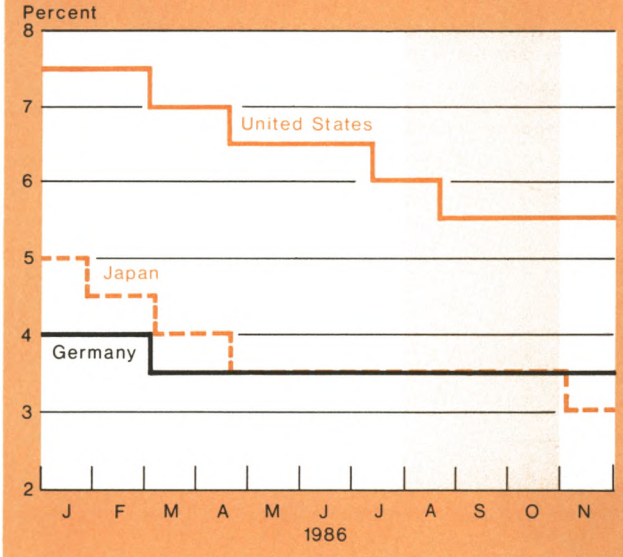
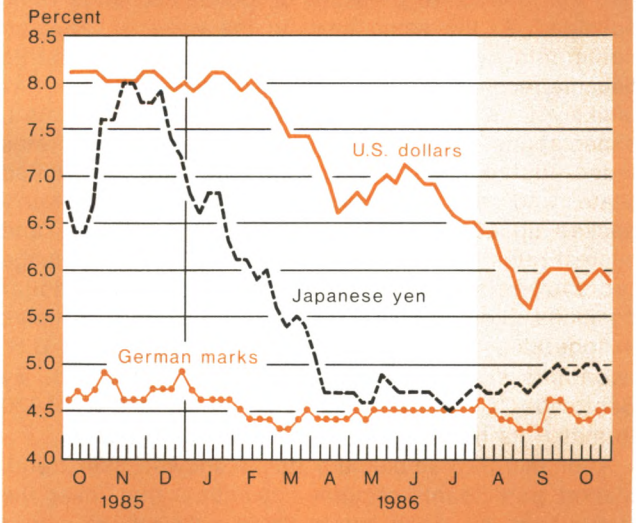


Chart 3

Short-term interest rates closely mirrored expectations of interest rate cuts.



Weekly average of interest rates on three-month Eurocurrency deposits.

Japanese manufacturing sector (Chart 5), market participants began to question whether the yen should appreciate much more.

In these circumstances, traders began to sense around mid-August that the dollar had more room to decline against the German mark and the other currencies of continental Europe than against the yen. When a large U.S. trade deficit for July was announced at the end of August, traders sold dollars aggressively against both marks and Swiss francs. The dollar continued to decline against the European currencies through the end of August, even though it stabilized against the yen.

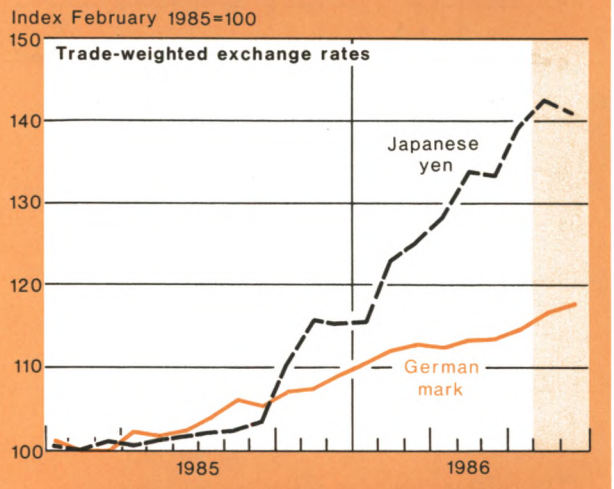
By mid-September, there was further evidence of improvement in the U.S. economic outlook. Gains in employment during August were more balanced, industrial activity was a little firmer, and retail sales were more buoyant. These developments, together with confirmation of strong growth for the German economy in the second quarter, seemed to suggest that an atmosphere supportive of renewed cooperation would surround the meetings of the Group of Five (G-5) and Group of Seven (G-7) industrial countries in Washington at the end of the month. With Japanese production for export declining, German domestic demand replacing exports as the major source of growth, and U.S. output appearing to grow at a more satisfactory pace, the process of adjustment appeared to be underway at long last.

In response to these developments, foreign exchange dealers concluded that the need for the U.S. authorities to seek further exchange rate adjustment had lessened, and the immediate pressure on dollar exchange rates subsided. At the same time, in the wake of repeated comments by German officials, market participants became reconciled to the view that the Bundesbank was unlikely to ease monetary policy soon. As a result, expectations of a further reduction of interest rates faded—not only in Germany, but also in the United States and other countries. U.S. interest rates actually backed up somewhat. As dollar exchange rates and interest rates both started to move up, foreign exchange professionals began to cover sizeable short dollar positions. Bidding for dollars became intense, at times exaggerated by rumors that unrealistically good U.S. economic statistics were about to be released. By September 12, the dollar was swept up to DM 2.1030 to match its high early in the three-month period.

After mid-September, the dollar showed little trend. Market participants remained skeptical that, over the longer term, the dollar had declined sufficiently to correct the U.S. balance of payments deficit. But over the shorter term, market participants perceived the dollar to be consolidating its position around mid-September rate levels.

Chart 4

In trade-weighted terms, the appreciation of the Japanese yen since September 1985 has been far greater than the appreciation of the German mark . . .

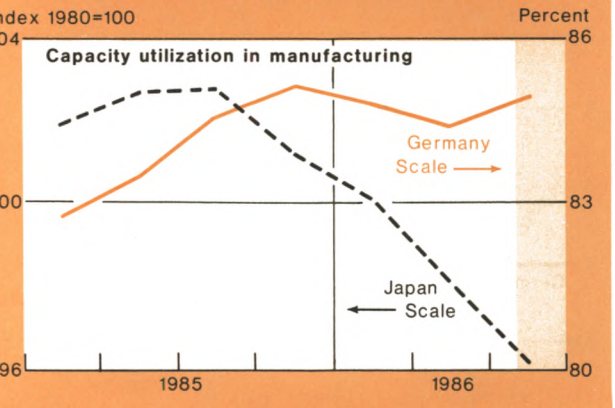


Trade-weighted value of the Japanese yen and the German mark vis-a-vis 17 other industrial countries derived from the International Monetary Fund's Multilateral Exchange Rate Model (MERM); indices rescaled to February 1985=100, the month of the lowest value during the recent period.

Source: International Financial Statistics.

Chart 5

. . . and the impact on the Japanese manufacturing industry was also greater.



Sources: Japan, Ministry of Industry and Trade; Germany, Ifo Economic Trends Survey.

They were sensitive to any evidence that U.S. and other monetary authorities would be willing to support such a stabilization of exchange rates. In this environment, they took note of statements such as the one by Chairman Volcker on September 24 that current exchange rate relationships place our industry in a far better competitive position than for some years. Accordingly, the dollar fluctuated without clear direction. But it was sometimes subject to abrupt movements, especially against the mark between a range of DM 2.00 and DM 2.08. These abrupt shifts came in response to statements, actions, or rumors of actions thought to reflect official attitudes toward exchange rates.

The view that the dollar was entering a period of greater stability was called into question several times between mid-September and mid-October. The first such occasion came in response to statements that brought official attitudes about exchange rates into question. Bundesbank President Poehl was reported to have said that the Bundesbank would not cut its interest rates but that Germany would accept a stronger mark as its contribution to international economic adjustment. Subsequently, Treasury Secretary Baker said that, although it was preferable not to rely on exchange rate adjustments alone to reduce trade imbalances, there would need to be further exchange rate changes in the absence of additional measures to promote higher growth abroad. In response, the dollar moved down decisively, declining on September 19 to DM 1.9845 and ¥ 151.77, its low for the period against the yen. But it soon recovered most of this decline after a European Community (EC) meeting of finance ministers and central bank governors at Gleneagles, Scotland, the following day. Market participants interpreted statements about that meeting as indicating that the EC countries had agreed to use exchange market intervention, if necessary, to protect the EMS from strains which they felt were associated with the decline in the dollar.

The next point of uncertainty occurred at the end of September. The weekend G-5 and G-7 meetings in Washington ended without a specific agreement, which some observers had been looking for, that Germany and Japan would cut interest rates in return for a U.S. commitment to stabilize the dollar. Market participants, sensing that no arrangement was in place to prevent a resumption of the dollar's decline, moved to reestablish short dollar positions. As a result, the dollar declined sharply against the continental European currencies throughout the first half of October, hitting its low against the German mark of DM 1.9690 on October 17.

Meanwhile, the dollar had continued to trade in a relatively narrow range against the Japanese yen. In early September, news of a meeting between Secretary of the Treasury Baker and Japan's Finance Minister Miyazawa generated some anticipation that an agreement on exchange rates might be forthcoming. Later in September, foreign investors, discouraged by the worsening business climate in Japan, began to sell holdings of shares on the Tokyo stock market. This outflow, combined with a growing pessimism about the likelihood of a reduction in the Bank of Japan's discount rate, contributed to a sharp drop in the Tokyo stock market in the middle of October. Japanese institutional investors, attempting to offset the resulting losses on their yen equity portfolios prior to the end-October reporting date, realized profits on their dollar-denominated assets by unwinding hedges that had been put in place when the dollar was much higher. These various factors generated a demand for dollars throughout most of October and reinforced sentiment that the dollar had reached a near-term bottom against the Japanese currency.

Late in October evidence was accumulating that the U.S. economy had strengthened significantly during the third quarter and that the U.S. trade position had at least begun to stabilize. A preliminary estimate showing that real GNP increased by 2.4 percent in the third quarter was followed by a report that U.S. durable goods orders had increased 4.9 percent in September. Moreover, preliminary trade statistics for September indicated a second month of decline in the U.S. trade deficit.

Table 1

Federal Reserve Reciprocal Currency Arrangements

In millions of dollars

Institution	Amount of Facility October 31, 1986
Austrian National Bank	250
National Bank of Belgium	1,000
Bank of Canada	2,000
National Bank of Denmark	250
Bank of England	3,000
Bank of France	2,000
German Federal Bank	6,000
Bank of Italy	3,000
Bank of Japan	5,000
Bank of Mexico	700
Netherlands Bank	500
Bank of Norway	250
Bank of Sweden	300
Swiss National Bank	4,000
Bank for International Settlements:	
Dollars against Swiss francs	600
Dollars against other authorized European currencies	1,250
Total	30,100

At the same time, market participants became increasingly impressed with European officials' apparent intention to buy dollars to resist depreciation of the U.S. currency and associated strains on the EMS. There were several reports of Bundesbank and other European central bank intervention to buy dollars during October. In addition, reported statements from German officials that any further decline of the dollar threatened economic growth in Europe contributed to the perception that there might also be a limit to the dollar's depreciation against the continental currencies. Accordingly, when the demand for dollars against the yen strengthened late in October, and the dollar began to firm against that currency, it also firmed somewhat against the European currencies.

As the period drew to a close, the dollar received a final boost of support from the announcement of a one-half percentage point cut in the Bank of Japan's discount rate and an economic policy accord between U.S. Treasury Secretary Baker and Japanese Finance Minister Miyazawa. The accord outlined fiscal policy initiatives, including tax reform plans in Japan, and underscored the U.S. commitment to reducing the budget deficit. The two countries judged the exchange rate realignment achieved between their currencies since September 1985 to be broadly consistent with present underlying economic fundamentals, and they reaffirmed a willingness to cooperate on exchange market issues. Notwithstanding statements by Treasury officials that U.S. intervention policy had not changed, some market participants interpreted the accord to be a pact for concerted intervention to support the dollar.

Thus the dollar continued to rise through end-October. This rise in dollar exchange rates was led by an increase against the yen but was accompanied by increases against other major currencies. The increase in the dollar at the end of the period left it higher on balance against some currencies and limited its decline against the German mark. On the trade-weighted basis of the Federal Reserve Board dollar exchange rate index, the dollar closed the period 1 3/8 percent higher than at the end of July.

The pound sterling was the only currency against which the dollar rose consistently during the period under review. Some of sterling's decline was seen in foreign exchange markets as reflecting the impact of weak oil prices on British export revenues and government income. But market participants were also concerned about the direction of the government's overall monetary and fiscal policies, as well as about pre-election political uncertainties. With the authorities deciding formally to abandon monetary targets as a

Table 2

Drawings and Repayments by Foreign Central Banks under Regular Reciprocal Currency Arrangements

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

Central Bank Drawing on the Federal Reserve System	Outstanding as of August 1, 1986	August	September	October	Outstanding as of October 31, 1986
Bank of Mexico	0	+210.2	−66.8	0	143.4

Data are on a value-date basis.

Table 3

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

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

Central Bank Drawing on the U.S. Treasury	Amount of Facility	Outstanding as of August 1, 1986	August	September	October	Outstanding as of October 31, 1986
Central Bank of Bolivia	100.0	*	*	0	0	0
Central Bank of Ecuador	75.0	75.0	−75.0	*	*	*
Bank of Mexico	273.0	*	+211.0	−67.0	0	144.0
Central Bank of Nigeria	37.0	*	*	*	+22.2	22.2

Data are on a value-date basis.

*No facility

policy tool, expectations strengthened that the government might adopt an exchange-rate guide for policy instead. As a result, discussion of sterling's joining the intervention arrangements of the EMS became even more widespread than before, both in the press and in financial markets. But no new policy initiatives along these lines emerged during the period under review. By the end of October, sterling had depreciated by almost 6 percent against the dollar and by even more against the continental European currencies.

During the period, the exchange rate mechanism of the EMS was at times subject to strain. The Irish pound was caught between the decline of sterling on the one hand and the rise of continental currencies on the other. With Irish exporters experiencing a loss of competitiveness in the United Kingdom, Ireland's primary export market, the Irish authorities devalued the Irish pound on August 2 by 8 percent against the bilateral central rates of the other EMS currencies.

Later on, as the German mark appreciated against the dollar, it also moved up against other currencies. By late August the mark reached the top of the narrow band, a position it held throughout the remainder of the period. At times during September and to a lesser extent during October, the narrow band was fully stretched to the 2¼ percent intervention limit as the mark benefitted more than the others from the dollar's decline. In response to these pressures, EC finance minister and central bank governors, at their Gleneagles meeting, agreed to try to stem the rise of the member currencies against the dollar, largely in an effort to preserve stability within the EMS. By late October, tensions within the EMS joint float had subsided substantially.

* * * *

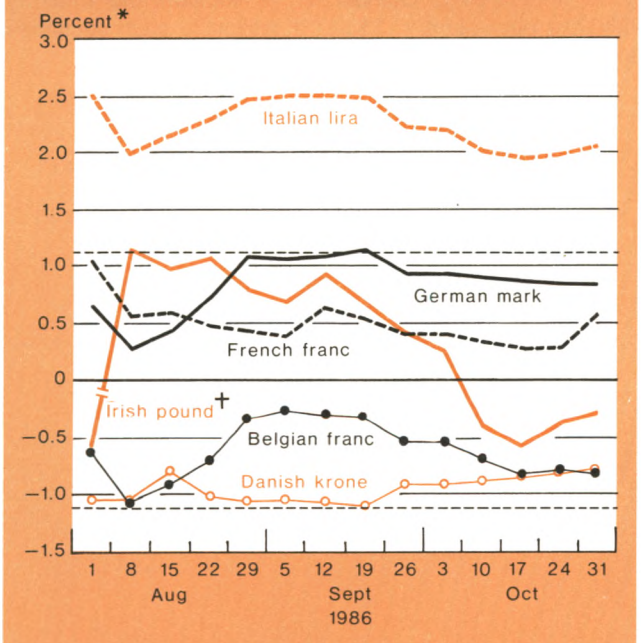
At the beginning of the three-month period, the only drawing outstanding on the credit arrangements of the U.S. Monetary Authorities was $75.0 million drawn on May 16, 1986 by the Central Bank of Ecuador against a $150.0 million U.S. Treasury Exchange Stabilization Fund (ESF) short-term swap facility. On August 14, the swap arrangement was terminated pursuant to the agreement.

In the period from July through October, the U.S. Monetary Authorities provided short-term bridging facilities to Bolivia, Nigeria, and Mexico:

Bolivia. The U.S. Treasury through the ESF on September 17 extended a $100.0 million financing facility to the Central Bank of Bolivia. There were no drawings made against this facility during the period under review.

Chart 6

In August, the German mark moved to the top of the narrow EMS band.



Weekly averages of 9 a.m. rates in New York for the weeks ending on dates shown.

* Percentage deviation of each currency from its ECU central rate. Dotted lines correspond to the System's 2¼ percent limit on movement from bilateral central exchange rates for all participating currencies except the Italian lira. The lira may fluctuate 6 percent from its central rates against other EMS currencies.

+ On August 2, the Irish pound was devalued by 8 percent against the bilateral central rates of the other EMS currencies.

Table 4

Net Profits (+) or 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
August 1, 1986—October 31, 1986	0	0
Valuation profits and losses on outstanding assets and liabilities as of October 31, 1986	+1,341.3	+1,290.1

Data are on a value-date basis.

Nigeria. The U.S. Treasury, through the ESF, agreed on October 24 to provide a $37.0 million short-term facility to the Central Bank of Nigeria as part of a $250.0 million multilateral facility organized under the leadership of the Bank of England. On October 31, a drawing of $22.2 million was made on the U.S. portion.

Mexico. On August 27, the U.S. Monetary Authorities agreed jointly to a multilateral arrangement in the amount of $1.1 billion with the Bank for International Settlements (acting for certain central banks) and the central banks of Argentina, Brazil, Colombia, and Uruguay to provide a near-term contingency support facility for Mexico's international reserves. Drawings on the facility were made available in light of agreement between Mexico and the IMF concerning a proposed stand-by arrangement, the expected receipt by Mexico of disbursements under loans from the International Bank for Reconstruction and Development (IBRD), and the agreement by Mexico to apply drawings from the IMF and disbursements from the IBRD to the balances on outstanding drawings on the facility. On August 29, $850.0 million was made available to Mexico. On this date Mexico drew $211.0 million from the Treasury through the ESF and $210.2 million from the Federal Reserve through its regular swap facility with the Bank of Mexico. On September 30, Mexico repaid $67.0 million to the ESF and $66.8 million to the Federal Reserve.

During this period the Federal Reserve and the ESF realized no profits or losses from exchange transactions. As of October 31, cumulative bookkeeping or valuation gains on outstanding foreign currency balances were $1,341.3 million for the Federal Reserve and $1,290.1 for the Treasury's ESF. These valuation gains represent the increase in the dollar value of outstanding currency assets valued at end-of-period exchange rates, compared with the rates prevailing at the time the foreign currencies were acquired.

The Federal Reserve and the ESF invest foreign currency balances acquired in the market as a result of their foreign operations in a variety of instruments that yield market-related rates of return and that have a high degree of quality and liquidity. Under the authority provided by the Monetary Control Act of 1980, the Federal Reserve invested $2,868.0 million equivalent of its foreign currency holdings in securities issued by foreign governments as of October 31. In addition, the Treasury held the equivalent of $3,980.1 million in such securities as of the end of October.

(This report was released to the Congress and to the press on September 4, 1986)

Treasury and Federal Reserve Foreign Exchange Operations

May-July 1986 Report

The dollar declined against most major currencies during the three months ended July. The dollar's downward movement proceeded against the background of sluggish U.S. economic growth, expectations of continued monetary easing in the United States, and doubts that large payments imbalances among the developed countries were being reduced. There was no intervention by the U.S. authorities during the period but there were sizable dollar purchases by some other central banks. The dollar's depreciation was temporarily interrupted in May only to resume in June and July. By the end of July, the dollar was at its low point of the period, having declined approximately 9 percent against the Japanese yen and Swiss franc, and nearly 5 percent against the German mark and other Continental European currencies.

Coming into the period, the dollar had already declined substantially from its highs of February 1985. Market participants had noted that officials in several foreign industrial countries were expressing concern over the adjustments that their own industries were beginning to experience. In the face of the appreciation of their currencies, foreign exporters increasingly complained of a squeeze on profits as they sought to maintain market shares. Indeed, a number of commentators questioned whether increases in domestic demand in Germany and Japan would be sufficient to offset the decline in export orders and sustain prospects for economic growth in these two countries.

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

Many in the exchange markets anticipated that the governments of the seven major industrial countries might use the occasion of the Economic Summit meeting in Tokyo during early May to outline measures to stabilize dollar exchange rates. The Tokyo Economic Declaration noted that there had been a significant shift in the pattern of exchange rates which better reflected fundamental economic conditions. It stated that the Group of Seven (G-7) countries had agreed to develop a process to review trends for a number of economic variables, including exchange rates, in order to achieve more effective policy coordination. But the declaration did not call for specific measures or concerted actions to prevent the dollar from declining further. Instead, there were reported remarks by some G-7 officials which seemed to imply that there was still room for further appreciation of nondollar currencies, especially the Japanese yen.

In reaction to the absence of an announcement of specific measures, the dollar resumed its decline after the Tokyo Summit. It depreciated most against the Japanese yen, trading as low as ¥159.99 on May 12, some 38½ percent below its peak of about a year before. Contributing to this decline in the dollar was the narrowing of favorable long-term interest differentials. In addition, the dollar was undermined by the persistent current account imbalances manifested by a large U.S. deficit and Japanese surplus. Market participants perceived that the U.S. Administration hoped that a high level of economic activity and rising imports abroad would set the stage for a sizable narrowing of the U.S. trade deficit, given that the dollar had already declined substantially during the past year. But the most recent data were seen by the market as showing little progress in redressing the trade imbalance. Strong protectionist

sentiments persisted in the U.S. manufacturing industry, even as the U.S. authorities sought to reduce restrictive trading practices abroad and resist pressures for protectionist measures at home. Market participants believed that so long as the imbalances were not diminishing, market pressures in favor of the yen would remain strong and that the authorities, at least in the United States, would accept further declines in dollar exchange rates.

In early May, the dollar's decline against the German mark was more muted than its decline against the yen. Political and economic uncertainties following the Chernobyl nuclear accident of late April weighed against the mark for a time. There were also heavy reflows of funds into the French franc and Italian lira following an April realignment of the European Monetary System (EMS) and, in the case of the franc, in response to the exchange market's favorable reaction to initial plans for privatization of French public-sector firms. Thus, the mark traded at the bottom of the EMS.

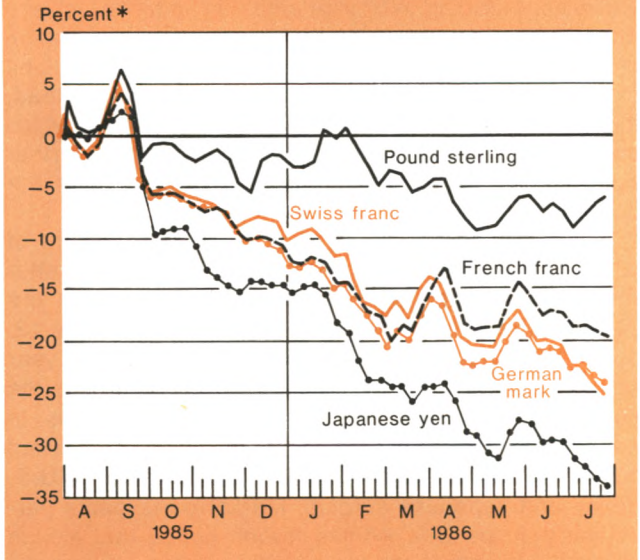
Before long, however, many in the market came to interpret official views as indicating that a period of consolidation was appropriate. Dealers anticipated that many of the governments abroad, facing local or national elections, would welcome a period of exchange market tranquility. Also, time was needed to evaluate the effects on economic activity and trade flows of the changes in exchange rates and declines in interest rates that had occurred during the preceding year.

After mid-May, perceptions about the relative strength of the U.S. economy temporarily brightened, expectations of further drops in U.S. interest rates faded, and the dollar appreciated more or less steadily for the rest of the month. Faster-than-expected growth in U.S. monetary aggregates appeared to lessen the scope for a near-term easing of U.S. monetary policy. Repeated denials of any need to ease monetary policy by officials of the Bundesbank and the Bank of Japan led dealers to believe that there was little chance of a coordinated cut in interest rates. For the first time in several months, dollar interest rates increased, with the rate on three-month Eurodollar deposits exceeding 7 percent. A strong upward revision in first quarter real GNP and other statistics on U.S. economic activity were interpreted favorably by the exchanges. By June 2, the dollar reached ¥177.05 and DM2.3445, levels which were the highs for the dollar during the period under review.

But the dollar began to edge down again in early June as new evidence suggested that the anticipated boost

Chart 1

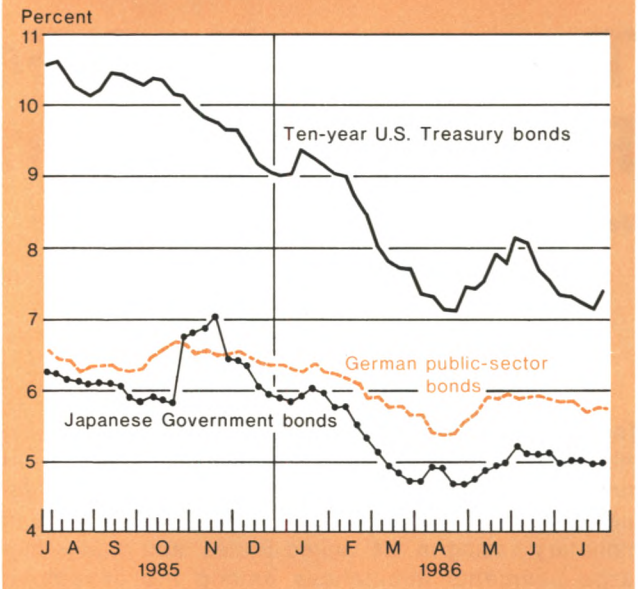
The dollar continued to decline against most major foreign currencies.



*Percentage change of weekly average rates for dollars from the average rate for the week ending August 2, 1985. Figures calculated from New York noon quotations.

Chart 2

Interest differentials favorable to the dollar initially widened but then resumed their declining trend.



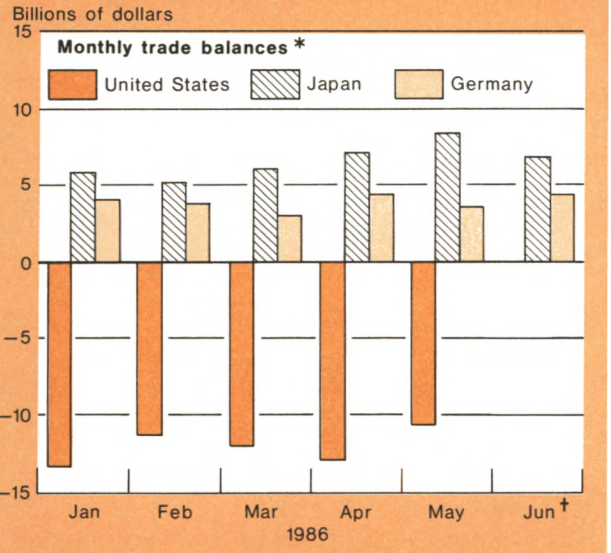
to U.S. exports and growth was not being sustained and expectations of another downward adjustment in U.S. interest rates were revived. After the statistics of late May, an increase in U.S. unemployment came as a disappointment and was the start of a series of figures pointing to only lackluster U.S. economic activity. Statements by Chairman Volcker were interpreted as running counter to the idea that the Federal Reserve needed to wait to cut its discount rate again until central banks in other countries eased monetary policy. Market participants started to consider the possibility that the U.S. authorities might welcome a renewed decline in the dollar on the grounds that central banks abroad might cut their interest rates more quickly in such an environment. In the meantime, there were concerns that some of the heavily indebted Latin American countries were considering imposing a debt service moratorium or limiting debt payment to a percentage of export earnings. Thus, for domestic and international reasons, market participants thought that a further easing of U.S. monetary policy might be imminent. With the possibility that such a U.S. move might not be matched elsewhere, the dollar came under downward pressure.

For several weeks in June, pressures to sell the dollar were well contained. Dealers perceived that authorities abroad were prepared to intervene to prevent a further decline in dollar rates for a while. In particular, there were numerous reports of dollar purchases by the Bank of Japan, and market participants seemed to believe that the Japanese central bank would strenuously attempt to limit the yen's rise before Japanese parliamentary elections on July 6. Dealers also thought that the Bundesbank might intervene if the mark threatened to rise too strongly.

In July, the dollar began to move down quickly, especially against the Japanese yen and the Swiss franc. Market participants doubted the Japanese authorities would be able to contain for long the yen's rise in the face of mounting trade surpluses. (Because of the substantial depreciation of the dollar since February 1985 and the decline in world oil prices, Japan's trade surplus continued to grow in dollar terms, even though Japanese exports in 1986 were actually lower in volume terms than in the previous year.) As a result, traders started to establish large long positions in yen and commercial leads and lags swung in favor of Japan. The Swiss franc also began to be viewed as a particularly attractive alternative to the dollar. It was not as

Chart 3

Attention in the foreign exchange market continued to focus on the persistent large trade imbalances of the United States, Germany, and Japan.

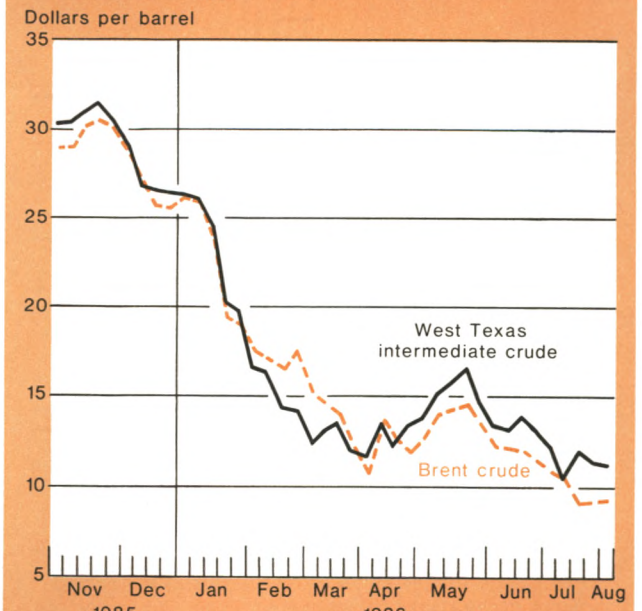


* Balance of payments basis for the United States. Census data for Japan and Germany.

† U.S. data for June on a balance of payments basis were unavailable at the time of publication.

Chart 4

Oil prices again moved lower.



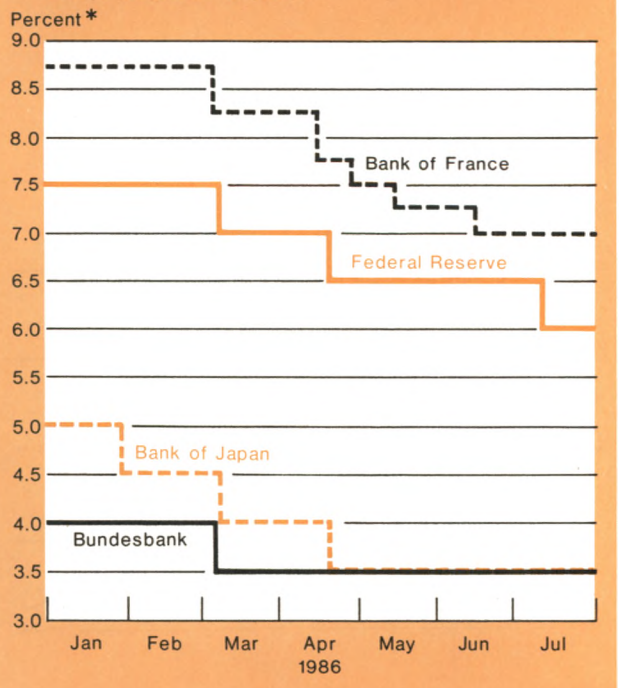
affected as the German mark by political uncertainties, and by June had developed an interest rate advantage over the mark. Moreover, market participants felt that the Swiss National Bank would maintain relatively tight monetary conditions whatever the international environment and was not likely to intervene in the exchanges to limit the appreciation of its currency.

The German mark, too, began to gain more strength as the dollar declined during July. After the Federal Reserve cut its discount rate a half of one percentage point, effective July 11, a number of German officials commented that a further decline in German interest rates would be inappropriate inasmuch as their domestic economy had picked up in the second quarter and the growth of central bank money remained above target. In addition, the German government indicated it would not depart from its earlier fiscal targets. The mark also strengthened against other European currencies around this time. Flows into France that had occurred after the April EMS realignment and had weighed on the mark began to subside as French residents reportedly took advantage of an easing of exchange controls. The mark also benefited from shifts in investor preference away from sterling-denominated assets, previously viewed as a principal alternative to dollar investments. As Britain's economic outlook dimmed with oil prices reaching new lows and the government of Prime Minister Thatcher facing considerable political criticism, investors and traders both shifted funds increasingly out of sterling and into marks. During July, the German mark moved from near the bottom to near the top of the EMS to emerge as the third strongest currency in that arrangement; it also gained 7½ percent against sterling.

In late July, the dollar's decline accelerated. There was press commentary to the effect that, for other industrialized countries, the boost to real income resulting from the oil price decline was not yet showing through; these countries were going to have to expand more quickly and import more vigorously for the United States to achieve a substantial balance of payments

Chart 5

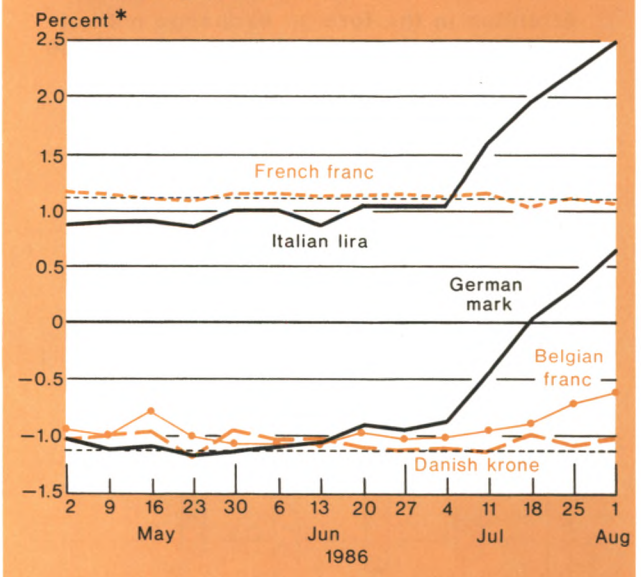
In July, the Federal Reserve lowered its discount rate but was not joined by some other central banks.



*Percentage change in the discount rates of the central banks of the United States, Germany, and Japan and the money market intervention rate of the Bank of France.

Chart 6

The German mark strengthened within the EMS joint float.



Weekly averages of 9 a.m. rates in New York for the weeks ending on dates shown.

*Percentage deviation of each currency from its ECU central rate. Dotted lines correspond to the System's 2¼ percent limit on movement from bilateral central exchange rates for all participating currencies except the Italian lira. The lira may fluctuate 6 percent from its central rates against other EMS currencies.

Table 1

Federal Reserve Reciprocal Currency Arrangements

In millions of dollars

Institution	Amount of facility July 31, 1986	Amount of facility July 31, 1985
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	300
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	30,100

adjustment. Yet a U.S. official's call for stronger growth abroad had elicited replies from German and Japanese officials indicating that stimulative policies would not be forthcoming in the near term. As for the United States, rapid growth in the U.S. monetary aggregates and a sustained decline in U.S. interest rates indicated that monetary policy was not a constraint on U.S. growth. But long-term U.S. interest rates had actually firmed as short-term rates eased during the last half of July. Under these circumstances, market observers wondered whether foreign demand for U.S. securities was being sustained sufficiently to finance the U.S. deficits and thereby avoid another sharp decline in dollar rates or a further rise in interest rates. Simultaneously, release of U.S. trade statistics suggesting the deficit had widened in June reinforced the view that the desired adjustments were slow in materializing. As market participants increasingly questioned whether the major industrialized countries would be able to work together to redress their large economic imbalances, the dollar declined to close the period at DM2.0890 and ¥153.65.

At the end of July, the dollar had declined 9 percent against the Japanese yen and Swiss franc, as well as almost 5 percent against the German mark and other EMS currencies. It had remained stable, however, against the Canadian dollar and had risen against the pound sterling. Therefore, on a trade-weighted basis against the currencies of the major industrial countries, as calculated by the Federal Reserve Board, the dollar closed the period 3 percent below its level of end-April.

On May 14, the U.S. Treasury, through the Exchange Stabilization Fund (ESF), agreed to provide short-term financing to the Central Bank of Ecuador totaling $150 million until Ecuador could finalize negotiations for a new financing facility from commercial banks and additional loans from international financial institutions. On May 16, the Central Bank of Ecuador made a drawing of $75 million.

The Federal Reserve and the ESF invest foreign currency balances acquired in the market as a result of their foreign exchange market operations in a variety of instruments that yield market-related rates of return and that have a high degree of quality and liquidity. Under the authority provided by the Monetary Control Act of 1980, as of July 31 the Federal Reserve had invested $2,941.2 million equivalent of its foreign currency holdings in securities issued by foreign governments. In addition, the Treasury held the equivalent of $4,083.6 million in such securities as of the end of July.

Table 2

Net Profits (+) or Losses (−) on U.S. Treasury and Federal Reserve Current Foreign Exchange Operations

In millions of dollars

Period	**Federal Reserve**	**U.S. Treasury** Exchange Stabilization Fund
May 1, 1986-July 31, 1986	0	0
Valuation profits and losses on outstanding assets and liabilities as of July 31, 1986*	+1,398.6	+1,470.4

Data are on a value-date basis.

*Valuation gains represent the increase in the dollar value of outstanding currency assets valued at end-of-period exchange rates, compared with the rates prevailing at the time the foreign currencies were acquired.

Table 3

Drawings under Special Swap Arrangements with the U.S. Treasury

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

Drawings on U.S. Treasury facilities for	Total facility	May 16, 1986	Outstanding July 31, 1986
Central Bank of Ecuador	150	+75	+75

Data are on value-date basis.

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