

# Federal Reserve Bank of New York

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# Shifts in Money Demand: Consumers versus Business

The year 1982 was particularly difficult for interpreting M-1 data. The growth of money (M-1) during 1982, whether viewed in terms of velocity (Chart 1) or in terms of the levels predicted using a conventional money demand equation (Chart 2), was much stronger than past experience would have suggested. Moreover, rapid M-1 growth has continued through the first half of 1983. Not only was the strength in M-1 surprising, but virtually all of the strength was in the money holdings of the consumer sector and concentrated in NOW account deposits. The business sector, in contrast, economized on cash balances.

These markedly different trends among the components of M-1 raise questions about whether the relationship between M-1 and the level of economic activity is changing. A higher percentage of total money holdings is in the consumer sector. Of these holdings a higher percentage is being held in interest-bearing deposits. Moreover, in recent years consumers have been offered additional liquid market-rate-yielding alternatives to transactions balances. This makes it very likely that the response of consumer money holdings to changes in interest rates is quite different from what it was before.

In many ways, 1982 was a year that points to several problems that are likely to be encountered in the future with M-1 as an intermediate target for monetary policy. And the data available thus far in 1983 point to the conclusion that these problems are persisting beyond 1982. Thus, it is important to learn as much as possible from monetary developments in 1982.

Of course, 1982 was not the first time there was a

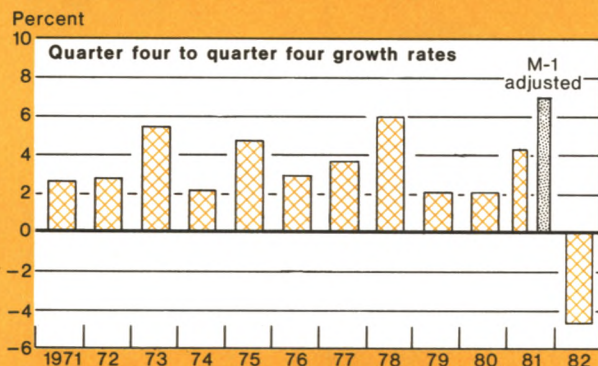
sizable disparity between the actual growth of M-1 and the growth predicted by a conventional money demand equation (Chart 2). For example, in 1974 and 1975, the money stock tended to grow at rates considerably less than would have been expected from past relationships with income and interest rates, *i.e.*, a negative prediction error. In contrast, from 1976 to 1980, the prediction error over each year tended to be rather small.<sup>1</sup> But in 1981 there appears to have been another substantial overprediction of money (perhaps even larger than in 1974 or 1975) and in 1982 a sizable underprediction. Not only is an underprediction of money surprising during a period of advancing technology in managing money balances, but in absolute terms the 1982 prediction error is one of the two largest out-of-sample errors for any year in the post-1973 simulation period! Thus, the stability of the public's demand for money has become an issue once again.

In this article, the consumer and business sectors are examined individually. Clearly, the money holdings of the two sectors were not responding to the same sets of forces in 1982 or, for that matter, in 1981.

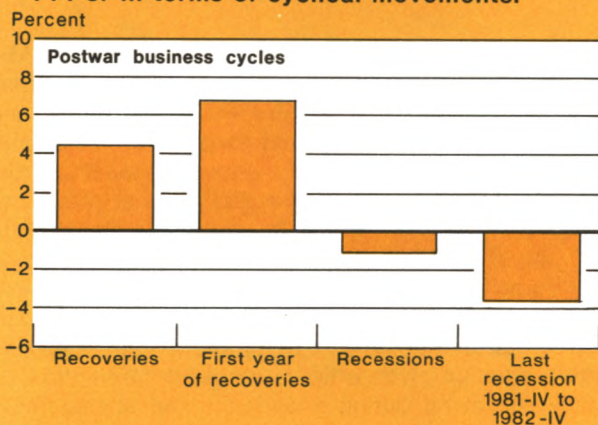
<sup>1</sup> In Chart 2, errors are plotted from a static simulation in which the actual values of the lagged money stock are used during the projection period rather than the values predicted by the equation. If the predicted values had been used and a "dynamic" simulation run had been taken, the overall pattern in the errors would have been roughly the same, although the downward shift in the mid-1970s would appear somewhat larger. Some deterioration in the equation's ability to track movements in money would have been expected as the simulation period is extended farther away from the sample period, but nonetheless the recent behavior of M-1 relative to the forecasts is quite striking compared with the 1976-80 period.

Chart 1

**In 1982 the velocity of M-1 was extremely weak, whether viewed relative to recent years . . .**



**. . . or in terms of cyclical movements.**



Consumers were permitted to hold interest-bearing checking accounts—NOW accounts—while firms were not. Businesses, however, it could be argued, continued to emphasize cash management, particularly in 1981 when interest rates were very high. Thus, it should be more revealing to examine separately the checkable deposit holdings of these two sectors during the past few years, rather than to look just at economy-wide velocity or money demand results for the M-1 measure of money.

In the next section of this article, velocity trends for the consumer and business sectors are examined for a general idea of their contributions to the large decline in aggregate velocity in 1982. The section following that explores the problem in terms of separate checkable-deposit-demand equations for the two sectors, while in the third section some of the possible

reasons for the steep decline in velocity in the consumer sector are explored in more detail. In the conclusion, some of the policy implications are spelled out.

By and large, the analysis suggests that rapid growth of NOW account balances held by the consumer sector was the primary reason for the decline in velocity during 1982.

- New NOW accounts continued to be opened in 1982 and hence, as was the case in 1981, M-1 was inflated somewhat as savings and demand deposits were combined into NOW accounts.
- The responsiveness of M-1 to changes in market rates appears to be increasing in part because NOW accounts earn a 5¼ percent rate of interest and in part because several highly liquid alternatives to M-1 deposits that bear market yields have become widely used in recent years by the consumer sector. After allowing for the opening of new accounts in 1982, even a very conservative market rate response by the consumer sector would explain the increase in deposits.

This conclusion, of course, has important implications for policy in the future because money market deposit accounts (MMDAs) could add further to the market interest rate response of the consumer sector's money holdings. This will be offset, at least in part by the Super NOW account—a component of M-1 that bears a market-related rate. Nevertheless, all these developments mean that it will be difficult to interpret M-1 for some time, and alternative approaches will be required in implementing policy.

#### Velocity trends in the consumer and business sectors

Prior to 1979, velocity—GNP/checkable deposits—in both the consumer and business sectors was increasing (Chart 3) and the sectoral velocities tended to move in a parallel manner. (Box 1 gives more detail on the sectoral decomposition of demand deposits and total checkable deposits.) Since that time, however, it has not been widely noted that the velocity of checkable deposits—demand deposits plus NOW deposits—in the consumer sector has been *declining*, while in the nonfinancial business sector velocity has continued to increase. In fact, velocity in the business sector increased so rapidly in the past few years that the volume of demand deposits held by businesses at the end of 1982 was virtually equal to what it was four years earlier. This occurred even though nominal GNP rose 36 percent over that period. In contrast, the consumer sector increased its holdings of checkable deposits by 81 percent during that time.

What this means is that the predictability or stability in the trend of aggregate velocity in 1979, 1980, and especially 1981 was the result of a coincidence. The divergent movements in the consumer- and business-sector velocities just happened more or less to offset each other in those three years. Consequently, aggregate velocity appeared to be roughly in line with its trend over the previous ten years. The year 1981 was particularly fortuitous in that velocity in the business sector increased by 15 percent, while simultaneously velocity in the consumer sector decreased by 13 percent. But it is difficult to imagine that offsetting movements such as these would continue indefinitely. And, in 1982, velocity growth in the business sector returned to its long-run trend, while velocity growth in the consumer sector remained as weak as it had been in 1981. These developments thereby produced the remarkable drop in aggregate velocity observed in 1982.

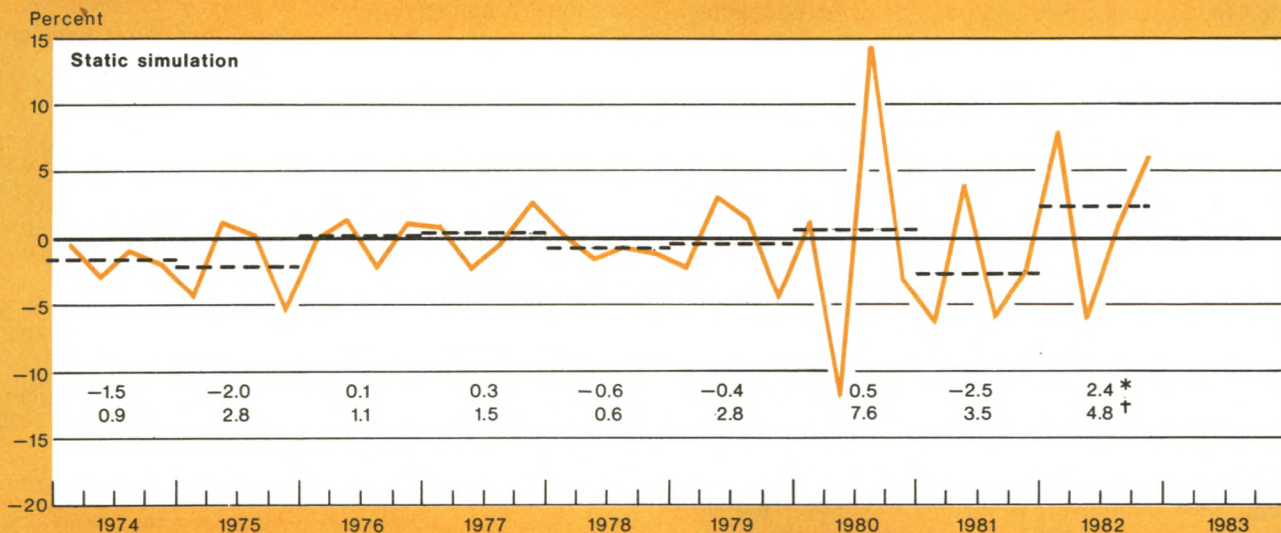
As a result of the large increase in checkable deposit holdings by the consumer sector over the past

few years, compared with no increase by the business sector, consumers held at the end of 1982 about 48 percent of total checkable deposits and the business sector 38 percent. As recently as 1976, the breakdown was 38 percent for the consumer sector and 52 percent for the business sector, a swing of 10 to 14 percentage points in relative checkable deposit holdings. (Other sectors currently hold about 14 percent of total checkable deposits.) Because of this shift in the composition of total checkable deposits, changes in the trend of aggregate velocity and in its behavior over the business cycle could occur, particularly since consumers can also earn interest on certain types of checkable deposits. Moreover, for the same reasons, estimates of economywide money demand equations could suffer from considerable aggregation bias. And, finally, the changing sectoral composition of M-1 points to potential problems for the implementation of monetary policy based on M-1 as the intermediate target.

Chart 2

### Errors from Conventional Money Demand Equation

Quarterly growth rates and annual averages



Estimation period is 1959-II through 1973-IV

$$M = 0.61 + 0.69M(-1) - 0.016CP - 0.024RCBP + 0.16Y$$

(1.81) (6.74) (3.61) (1.79) (4.38)

$\bar{R}^2 = 0.98$

M=ln (M-1/GNP deflator)

CP=ln (commercial paper rate)

RCBP=ln (commercial bank passbook rate)

Y=ln (real GNP)

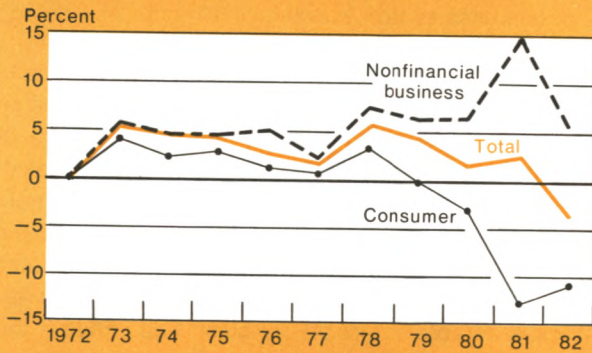
\* Row of figures indicates annual average errors for indicated years.

† Row of figures indicates average quarterly absolute deviation for indicated years.

Chart 3

**Velocity Growth of Checkable Deposits**

Fourth quarter to fourth quarter



Source: Federal Reserve Bulletin.

**Checkable-deposit-demand equations for the consumer and business sectors**

Tracking velocity trends is one of two approaches frequently used to analyze the growth of money or checkable deposits. In this statistical section of the article, separate checkable-deposit-demand equations for the consumer and business sectors are employed. The regression equations indicate that for the consumer sector the demand for checkable deposits remained stable through 1980 but shifted sharply upward in 1981 and again in 1982. By the end of 1982, the consumer sector was holding about \$33 billion more of checkable deposits than past experience would have suggested. In contrast, the equation for the business sector points to a relatively stable demand in that sector in the 1981 and 1982 period, although business money holdings were overpredicted to a moderate degree, about \$7 billion.

For the consumer sector, however, a variable that serves as a proxy for the number of NOW accounts opened stabilizes the coefficient estimates of the equation when the sample period is extended through 1981. Moreover, when this modified equation is simulated through 1982, the prediction error is reduced to \$8 billion. The remaining error appears to have been associated with the decline in interest rates, and that aspect as well as others are explored in the section on 1982 growth of checkable deposits and the decline in market interest rates.

In estimating the regression equations for the two sectors, three difficulties immediately arise. First, the quarterly Demand Deposit Ownership Survey (DDOS), from which the breakdown for consumer and business

demand deposit holdings is obtained, begins in 1971, thereby limiting the sample period over which any such equation might be estimated. Second, it is difficult to incorporate the effects of technological change and financial innovation on money demand in the two sectors.<sup>2</sup> And, third, the widespread use of NOW accounts by consumers is not the only important change in financial services affecting the checkable deposit holdings of consumers. Most notably, over the past few years there has been a considerable change in the instruments used by consumers for liquid savings and, therefore, also in the closest alternatives to holding checkable deposits. Consumers have moved largely from conventional savings and small time deposits earning low, fixed rates of interest to money market certificates (MMCs), money market mutual funds (MMMFs) and most lately MMDAs, all earning market rates of interest and in some cases offering limited transactions features.

Recognizing that these difficulties limit the confidence that can be placed in the results, a checkable-deposit-demand equation was estimated first for the consumer sector over the 1971-II to 1978-IV period, and then reestimated with the sample period extended one year at a time through 1982-IV. The results are reported below.<sup>3</sup> Since the DDOS is not seasonally adjusted, seasonal dummy variables were also included in the regressions, but the coefficient estimates are not reported.<sup>4</sup>

- (1) 1971-II to 1978-IV:  

$$TCD = -6.60 + 0.98Y - 0.23PBR - 0.09D1$$

(13.7)
(13.3)
(2.8)
(7.0)

 $\bar{R}^2 = 0.88$   
 $\rho = 0.31$
- (2) 1971-II to 1979-IV:  

$$TCD = -6.90 + 1.03Y - 0.25PBR - 0.10D1$$

(15.4)
(14.8)
(2.8)
(6.8)

 $\bar{R}^2 = 0.90$   
 $\rho = 0.24$
- (3) 1971-II to 1980-IV:  

$$TCD = -6.87 + 1.03Y - 0.25PBR - 0.10D1$$

(15.4)
(14.2)
(2.6)
(6.5)

 $\bar{R}^2 = 0.90$   
 $\rho = 0.27$
- (4) 1971-II to 1981-IV:  

$$TCD = -0.53 + 0.29Y - 0.59PBR - 0.12D1$$

(0.1)
(0.6)
(1.7)
(1.6)

 $\bar{R}^2 = 0.15$   
 $\rho = 0.99$

<sup>2</sup> A dummy variable is included in each equation to account for the shift in the demand for checkable deposits since 1974.

<sup>3</sup> To allow for lagged effects in the demand for checkable deposits, the independent variables are two-quarter moving averages. The equations were estimated with an adjustment for first-order autocorrelation.

<sup>4</sup> While the use of dummy variables is a simple way to allow for seasonal variation, it is unlikely that alternative methods would have affected the results substantially. For example, when the money demand equation used to simulate the 1974-82 period as shown in Chart 2 is estimated with not seasonally adjusted M-1 data and seasonal dummies rather than with seasonally adjusted M-1, the coefficient estimates as well as the predicted values of M-1 are much the same.

(5) 1971-II to 1982-IV:  

$$\text{TCD} = -0.94 + 0.16Y - 0.70\text{PBR} - 0.14\text{D1} \quad \bar{R}^2 = 0.19$$

$$(0.2) \quad (0.3) \quad (2.0) \quad (1.9) \quad \rho = 0.99$$

where: TCD = ln (total real checkable deposit holdings of the consumer sector, obtained by using the implicit price index for personal consumption expenditures).

Y = ln (real consumption expenditures).

PBR = ln (passbook rate).

D1 = a dummy variable that increases from zero to one over the 1974 to 1976 period.

A comparison of equations (1), (2), and (3) indicates that the demand for checkable deposits remained stable in the consumer sector through 1980—the coefficient estimates are virtually the same, and the explanatory power of the equation remained high and quite constant. But adding to the sample just the four observations for 1981 causes the explanatory power of the equation to fall sharply, the  $\bar{R}^2$  drops from 0.90 to 0.15. This implies that the increase in NOW account holdings during that year could *not* have represented just a substitution of demand deposits for NOW account deposits, leaving the demand for total money balances unchanged. Indeed, when equation (3) is simulated out of sample for the 1981-82 period, the underestimate—amount by which the actual value exceeds the predicted—by the fourth quarter of 1982 reaches \$33 billion. About \$13 billion or 40 percent of the total error for the period occurs in the first quarter of 1981, when NOW accounts were introduced nationwide, and about another \$11 billion in the fourth quarter of 1982 (Table 1), right after short-term interest rates had declined sharply.

The second large increase in the cumulative prediction error suggests that this equation does not capture the market interest rate response of consumer checkable deposit holdings, since a large part of these holdings is in the form of NOW account deposits and consumers have and use more market-yielding alternatives to checkable deposit holdings than in the past, *i.e.*, MMMFs and MMCs. Regardless of the exact nature of the additional \$33 billion of money holdings by the consumer sector, this figure represents about 43 percent of the total increase in NOW account volume over the 1981-82 period (and 54 percent of the increase in checkable deposits held by the consumer sector). It shows that the introduction of NOW accounts nationwide has changed dramatically the desired quantity of checkable deposits the consumer sector holds.

What about the business sector? The velocity charts shown earlier pointed out that this sector, in contrast to the consumer sector, has been holding lower balances

than would be expected from past relationships. The demand for checkable deposits in the business sector, as can be seen from the regression results reported below, appears to have remained relatively stable through 1982, although there has been a fairly large increase in absolute value in the income and interest rate coefficients, as well as the intercept, when the sample period includes the past two years.

(6) 1971-II to 1978-IV:  

$$\text{DD} = -1.92 + 0.94Y - 0.04\text{CP} - 0.44\text{D2} \quad \bar{R}^2 = 0.91$$

$$(0.9) \quad (3.2) \quad (1.3) \quad (4.2) \quad \rho = 0.76$$

(7) 1971-II to 1979-IV:  

$$\text{DD} = -1.59 + 0.89Y - 0.05\text{CP} - 0.43\text{D2} \quad \bar{R}^2 = 0.89$$

$$(0.8) \quad (3.2) \quad (1.8) \quad (4.8) \quad \rho = 0.64$$

(8) 1971-II to 1980-IV:  

$$\text{DD} = -1.60 + 0.89Y - 0.05\text{CP} - 0.43\text{D2} \quad \bar{R}^2 = 0.90$$

$$(1.0) \quad (4.0) \quad (2.4) \quad (6.6) \quad \rho = 0.62$$

(9) 1971-II to 1981-IV:  

$$\text{DD} = -3.51 + 1.17Y - 0.08\text{CP} - 0.52\text{D2} \quad \bar{R}^2 = 0.90$$

$$(1.8) \quad (4.3) \quad (3.4) \quad (7.4) \quad \rho = 0.73$$

(10) 1971-II to 1982-IV:  

$$\text{DD} = -4.18 + 1.27Y - 0.08\text{CP} - 0.57\text{D2} \quad \bar{R}^2 = 0.92$$

$$(2.3) \quad (5.0) \quad (3.3) \quad (9.9) \quad \rho = 0.77$$

where: DD = ln (real demand deposit holdings of the business sector obtained by using the GNP implicit price index).

Y = ln (real GNP).

CP = ln (three-month commercial paper rate).

D2 = a dummy variable that increases gradually from zero to one over the 1974-82 period.

If equation (8), estimated through 1980, is simulated for the next two years, it *overpredicts* demand deposit holdings of the business sector by about \$7 billion by the fourth quarter of 1982 (Table 2). This is in sharp contrast to the \$33 billion *underprediction* for the consumer sector's holdings of total checkable deposits.<sup>5</sup>

The cumulative error for the business sector at the end of 1981 was about \$7 billion but grew no larger during 1982. This pattern in the prediction error agrees with what was noted earlier in the discussion of Chart 3: the business sector's velocity-increasing cash management practices did not offset the velocity-reducing buildup in consumer NOW accounts to so large a degree in 1982 as in 1981, and thus the large decline in overall velocity in 1982 resulted.

With the growth of M-1 in 1982 concentrated in the consumer sector's holdings of other checkable deposits, the question arises as to what extent the rapid growth of M-1 could be attributed to consumers con-

<sup>5</sup> A further indication that aggregate money demand equations could suffer considerable aggregation bias comes from the opposite signs of the errors for these two sectors.

### Box 1: Demand Deposit Ownership Survey

The results of the Demand Deposit Ownership Survey (DDOS) are published in the Federal Reserve *Bulletin*. Four times each year, the Federal Reserve System conducts a survey of 232 banks concerning the demand deposit holdings of individuals, partnerships, and corporations. From the survey's findings, estimates are made of demand deposit holdings of five ownership categories: financial business, nonfinancial business, consumer, foreign, and other. The estimates are on a daily average basis for the last month of each quarter. To calculate the total checkable deposits of the consumer sector, other checkable deposits—consisting primarily of NOW account deposits—for the last month of each quarter are added to the consumer sector's demand deposits as shown in this survey.

The Board of Governors' staff tested the validity of the DDOS data indirectly and found it to be "reasonably reliable". This test was part of the study by Helen T. Farr, Richard D. Porter, and Eleanor M. Pruitt, "Demand Deposit Ownership Survey", in *Improving the Monetary Aggregates* (Staff Papers, Board of Governors of the Federal Reserve System, 1978). For additional information on the DDOS, see the Federal Reserve *Bulletin* (June 1971).

tinuing to shift funds from outside M-1 into NOW accounts as they *opened* additional NOW accounts. An estimate of the number of accounts opened nationwide can be derived from a survey on average balances in NOW accounts (Box 2). Incorporating this information in the regression equation can then give an estimate of how much the opening of NOW accounts has been adding to the total checkable deposit holdings of the consumer sector. The results from estimating the demand equation with a number-of-NOW-accounts variable (N) included are shown in equation (11).<sup>6</sup>

$$(3) \text{ 1971-II to 1980-IV:} \\ \text{TCD} = -6.87 + 1.03Y - 0.25\text{PBR} - 0.10\text{D1} \quad \bar{R}^2 = 0.90 \\ (15.4) \quad (14.2) \quad (2.6) \quad (6.5) \quad \rho = 0.27$$

$$(11) \text{ 1971-II to 1981-IV (with number-of-accounts variable):} \\ \text{TCD} = -6.86 + 1.03Y - 0.25\text{PBR} - 0.095\text{D1} + 0.014\text{N} \\ (15.8) \quad (14.5) \quad (2.7) \quad (6.6) \quad (12.0) \\ \bar{R}^2 = 0.96 \\ \rho = 0.23$$

$$(4) \text{ 1971-II to 1981-IV (without number-of-accounts variable):} \\ \text{TCD} = -0.53 + 0.29Y - 0.59\text{PBR} - 0.12\text{D1} \quad \bar{R}^2 = 0.15 \\ (0.1) \quad (0.6) \quad (1.7) \quad (1.6) \quad \rho = 0.99$$

<sup>6</sup> Prior to the introduction of nationwide NOWs in January 1981, the value of this variable is zero. It is not intended to control for the gradual development of NOW accounts in a few states prior to 1981 but for the introduction of NOWs nationwide in 1981.

Comparing equations (3) and (11), it can be seen that with the number-of-accounts variable included in the regression the estimated coefficients remained very stable when the sample period was extended through 1981. In contrast, with the number-of-accounts variable omitted the estimated coefficients not only change drastically but also become insignificant (equation 4). This result for 1981 raises the question whether a very significant portion of the M-1 growth during 1982 was due to consumers combining savings and transactions balances when opening a NOW account. (The transfer of savings into NOW accounts is probably partly to meet the higher minimum balance requirements on NOW accounts than on demand deposit accounts.) When equation (11) is simulated through 1982-IV, it underpredicts consumer money holdings by \$7.6 billion, whereas if it is simulated keeping the number-of-accounts variable constant at the 1981-IV level, the prediction error is \$15.8 billion. This implies that approximately \$8 billion represents funds flowing into checkable deposits from outside M-1 because of the opening of new accounts (Box 2). That leaves an additional \$7½ billion of consumer checkable deposit holdings to be explained by other factors. All of this remaining prediction error is concentrated in the fourth quarter of 1982, following the large decline in short-term interest rates in the third quarter. The timing suggests a sizable response on the part of consumers, especially those that hold NOW accounts, to the decline in market interest rates. This possibility is explored in more detail in the next section.

### 1982 growth of checkable deposits and the decline in market rates

With the econometric results of the previous section in mind, the article now explores in more detail whether the strength in the consumer sector's holdings of checkable deposits can be explained by the decline in market interest rates. A basic problem, however, in attempting to attribute the observed strength to the decline in market rates in 1982 is that this strength could just as well have been the consequence of an increased precautionary demand for money. The severe recession of 1981-82 certainly created a sense of financial insecurity, or at least caution, on the part of households. Consequently, to some unknown extent, consumers enlarged their overall holdings of liquid precautionary balances. Small time deposits and MMMF shares grew very rapidly—6.0 percent and 31.6 percent—and, after exhibiting a general decline for the past few years, even passbook savings accounts showed a significant increase. (These were measured from December 1981 to November 1982 before the introduction of the MMDA.) Along with these increases,



some of the growth of NOW accounts, since they earn nearly the same rate of interest as passbook accounts, must have represented additions to precautionary, rather than transactions, balances. This makes it difficult to estimate how much of the bulge in M-1 was due to the decline in market rates.<sup>7</sup>

Even though it is not possible to disentangle the effects of an increased precautionary demand for money during 1982 from the decline in interest rates, the question remains whether a reasonable interest rate elasticity can be used to explain the buildup in consumer checkable deposit holdings. The differential between the explicit rates paid on checkable deposits (0 percent for demand deposits, 5¼ percent for NOW and ATS accounts) and the rates paid on the savings vehicles most popular among consumers during 1982—MMCs and MMMFs—narrowed considerably.<sup>8</sup> During 1981-IV consumers were able to earn about 12.5 percent on highly liquid savings but during 1982-IV only about 8.5 percent. This means that the opportunity cost of holding demand deposits fell by about one third, and the opportunity cost of holding NOW and ATS deposits fell by over one half, from about 7.25 percent (12.5 percent minus 5¼ percent) to about 3.25 percent (8.5 percent minus 5¼ percent).

According to the conventional theory of the demand for money, an increase in consumer checkable deposit holdings would be expected as the opportunity cost of holding checkable deposits falls. The magnitude of the increase depends on the value of the elasticity of demand with respect to opportunity cost. Thus, to get a rough idea of how great an increase could have

<sup>7</sup>A further problem in attributing all the strength in M-1 to the consumer sector stems from the consideration that the demand deposit holdings of financial businesses at commercial banks increased \$7 billion or 25 percent during 1982 after holding fairly steady for a number of years. Financial businesses include thrift institutions, securities dealers, insurance companies, finance companies, and investment companies. The rise in the deposit holdings of this category, however, is very difficult to interpret in terms of M-1. Some of the deposit holdings of the thrift institutions are netted out of M-1 when the demand deposit component is consolidated across institutions. Hence, part of this \$7 billion increase shown in the DDOS might not show up at all in M-1. Furthermore, it is hard to believe that government securities dealers and some of the other financial businesses would increase their demand deposit holdings very much while nonfinancial businesses are not increasing their holdings because these financial businesses are among the most sophisticated of cash managers. It could be argued, of course, that some increase in the deposit holdings of these firms might be expected as a result of the increased volume of trading in the stock market in the second half of 1982. But, again, while that might increase consumers' or some nonfinancial businesses' demand for checkable deposits for the purpose of making financial transactions, it is still hard to understand why the deposit holdings of the sophisticated dealers and brokers would increase very much.

<sup>8</sup>The rate on MMCs is the discount rate on 26-week Treasury bills, set at auction, plus 25 to 50 basis points; the rate on MMMFs is roughly the market rate on one-month certificates of deposit (CDs) less the charges imposed, usually around 50 basis points.

Table 1

**Prediction Errors from a Simulation of Equation (3)**

In billions of dollars

Period	Actual	Predicted	Error
1981: I .....	144.8	131.6	13.2
II .....	149.9	138.3	11.6
III .....	153.8	142.4	11.4
IV .....	165.0	145.9	19.1
1982: I .....	168.4	146.3	22.1
II .....	170.9	150.7	20.2
III .....	176.6	154.3	22.3
IV .....	192.1	159.1	33.0

Table 2

**Comparison of Errors for Consumer and Business Sectors**

In billions of dollars

Period	Consumer	Business	Total
1981: I .....	13.2	-6.3	6.9
II .....	11.6	-5.0	6.6
III .....	11.4	-3.7	7.7
IV .....	19.1	-7.4	11.7
1982: I .....	22.1	-7.1	15.0
II .....	20.2	-4.8	15.4
III .....	22.3	-6.6	15.7
IV .....	33.0	-6.8	26.2

Table 3

**Predicted Increases in Consumer Checkable Deposits during 1982**

In billions of dollars

Interest rate elasticity	Scale variable*	Demand deposits	Other checkable deposits†	Total checkable deposits	
0.05 .....	C	8.5	9.5	18.0	
0.10 .....	C	10.4	13.1	23.5	
0.15 .....	C	12.3	16.9	29.2	
0.05 .....	DI	6.8	8.0	14.8	
0.10 .....	DI	8.5	11.5	20.0	
0.15 .....	DI	10.5	15.2	25.7	
			<b>Actual increases</b>		
			1.5	25.6	27.1

\*C=consumption expenditures, DI=disposable income.

†Primarily NOW accounts.

been expected as a result of the fall in short-term rates during 1982, an estimate of the opportunity-cost elasticity's value in the consumer demand for checkable deposits is needed. But, because consumers have made extensive use of liquid, market-yielding savings instruments for only a brief time, an estimate from regression analysis of this elasticity in the current environment could not be made directly. However, some estimates are available for the period before 1973, when passbook savings accounts and consumer time deposits, while subject to interest rate ceilings, were nonetheless the principal liquid savings vehicles. The estimates are usually in the range of 0.15 to 0.40, and the estimate obtained in the previous econometric section of this article was around 0.25. Nevertheless, a few preliminary calculations suggested that it would not even be necessary to assume a value as large as that to explain the bulge in consumer money holdings, and the assumed values used here for sake of illustration vary from 0.05 to 0.15, a fairly conservative range.

In this setting, to illustrate the possible effect of the

sharp drop in short-term interest rates on the consumer demand for checkable deposits, six sets of predicted increases in the levels of demand deposits and other checkable deposits were calculated and are presented in Table 3. These sets of predicted increases differ depending on (1) the proxy for transactions employed (consumption expenditures or disposable income to which unitary elasticity in the demand function was applied, consistent with the findings in the econometric section) and (2) the assumed elasticity (0.05, 0.10, or 0.15) applied to the opportunity cost of holding a demand or NOW account deposit.

For example, in the top line of Table 3, an \$8.5 billion increase in demand deposits was predicted for 1982 from the \$86.6 billion level of December 1981. Part of this increase was due to a 7.7 percent rise over the year in consumption expenditures, to which unitary elasticity of demand was applied. The rest of the \$8.5 billion increase was due to a fall in the opportunity cost of holding a demand deposit, from 12.5 percent to 8.5 percent per year, to which in this case an elas-

### Box 2: Opening of NOW Accounts during 1982

Survey results from a limited sample show that the average balance in NOW (negotiable order of withdrawal) and ATS (automatic transfer service) accounts increased about 9 percent from November 1981 to November 1982, from \$5,079 to \$5,520. If it is assumed that these average balance figures are representative for the nation as a whole, then it is possible to construct estimates of the number of NOW and ATS accounts in existence by dividing the volume of deposits in these accounts by the average balances held in them. The estimates show that the number of accounts, after growing very rapidly in 1981 when NOW accounts were introduced nationwide, increased another 22 percent in 1982. Thus, in explaining the 33 percent increase in the dollar volume of NOW and ATS accounts from November 1981 to November 1982, the increase in the number of accounts was about 2½ times more important than the increase in the size of the average balance. The importance of additional NOW accounts still being opened in 1982 is that the M-1 data would have been inflated during that year, just as they were in 1981 but to a lesser degree.

Roughly speaking, a little over 70 percent or \$18 billion of the \$25 billion increase in NOW account balances appears to be due to the growth of the number of accounts. Of that \$18 billion, the results from the econometric section suggest that \$8 billion or 44 percent came from outside M-1, leaving about \$10 billion or 56 percent coming

### Estimates on NOW and ATS Accounts

Period	Total volume (billions of dollars)	Average balance (dollars)	Number of accounts (millions)
November 1981 . . . .	75.2	5,079	14.81
February 1982 . . . . .	83.4	5,156	16.18
May 1982 . . . . .	87.4	5,154	16.96
August 1982 . . . . .	91.8	5,206	17.63
November 1982 . . . .	100.1	5,520	18.13
November 1982 over November 1981 (per- centage increase) . .	33.1	8.7	22.4

Source: Board of Governors of Federal Reserve System.

from demand deposits. The 44 percent coming from outside M-1 seems high in light of previous experience with NOW accounts and probably should be viewed more as an upper limit.\*

\*For more detail on the earlier experience with NOW accounts, see Joanna H. Frodin and Richard Startz, "The NOW Account Experiment and the Demand for Money", *Journal of Banking and Finance* (1982), pages 179-93. For 1981, the Board of Governors' staff estimated that about 25 percent of the growth of NOW accounts came from outside M-1.

tivity value of 0.05 was applied. Similarly, other checkable deposits—primarily NOW accounts—were predicted to increase \$9.5 billion from the level of \$78.4 billion as the result of the rise in consumption and the fall in the opportunity cost of holding these deposits from 7.25 percent to 3.25 percent per year. (In each case, the same elasticity values were applied to other checkable deposits as to demand deposits.) The predicted increases in demand deposits and other checkable deposits together imply an increase in total checkable deposits of \$18.0 billion. The five other sets of predicted increases shown in the table were obtained in the same manner.

By interpolating, it can be seen that the observed increase in *total* checkable deposits is consistent with that predicted when it is assumed that the opportunity-cost elasticity value is about 0.13 and consumption expenditures measure transactions, or when it is assumed that the value of the opportunity-cost elasticity is about 0.16 and disposable income measures transactions.<sup>9</sup> While reasonable elasticities will explain the increase in *total* checkable deposits held by the consumer sector, the predicted increase in demand deposits is considerably too high, and the predicted increase in other checkable deposits is far too low. If it is in fact correct to apply the same elasticity to both NOWs and demand deposits, then these figures, too, suggest that funds were switched from demand deposits into NOWs as new accounts were opened during 1982.

These calculations, however, do not incorporate the estimate, reported in the previous section, of about \$8 billion of funds deposited into the new NOW accounts that came from outside M-1. Using the \$8 billion estimate to adjust downward the increase in total checkable deposits leaves an increase of around \$19 billion to be explained by changes in the level of interest rates and the volume of transactions. By interpolating between the calculations shown in the table, an increase of \$19 billion is consistent with an assumed opportunity-cost elasticity of about 0.06 if consumption expenditures are used to measure transactions or an assumed opportunity-cost elasticity of about 0.09 if disposable income measures transactions. As would be expected, these elasticities are somewhat smaller than those found consistent with the unadjusted increase in *total* checkable deposits. Looking

next at the two components of total checkable deposits on an adjusted basis: (1) if the estimated transfer of funds from demand deposits to new NOW accounts (\$10 billion) is subtracted from NOWs and added back into demand deposits and (2) if the \$8 billion flow from outside M-1 into new NOW accounts is subtracted from NOW accounts, then the adjusted increases in demand deposits and other checkable deposits are, respectively, \$11½ billion and \$7½ billion.<sup>10</sup> These adjusted figures are still somewhat different from the predicted increases of about \$8 billion for demand deposits and about \$10.5 billion for other checkable deposits but are reasonably close. So, whether or not explicit account is taken of the effect of additional NOW accounts being opened in 1982, even a rather small market rate response on the part of the consumer sector would explain the increase in that sector's total checkable deposit holdings. However, to explain the increases in the components, adjustments for shifts of funds into new NOW accounts are necessary.

As noted in the econometric section, to assign much of the growth of M-1 during 1982 to a fall in short-term rates implies that the new instruments (MMMFs and NOWs) have made the consumer-sector holdings of transactions balances much more responsive to market rate changes than in the past. If this argument is in fact valid, then part of the reason why an aggregate money demand equation—estimated with data prior to 1979—underpredicts M-1 growth in 1982 is because the estimated market interest rate elasticity was the combined response of the business and consumer sectors covering a period when consumers did not use extensively either NOW accounts or market-yielding alternatives to M-1 (Chart 2). The continued opening of new accounts added to this tendency for the equation to underpredict.

### Conclusions and implications for policy

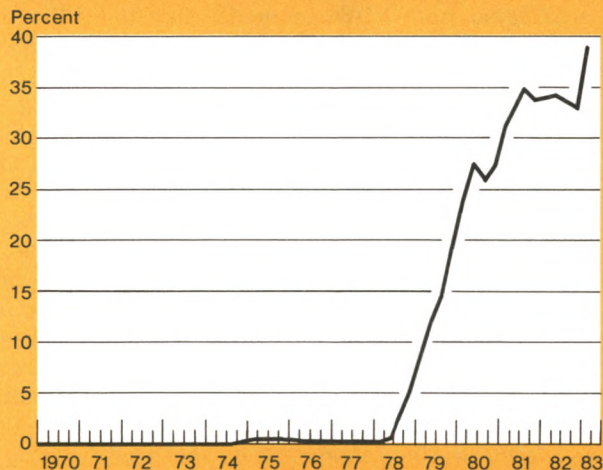
In summary, what appears to be behind the large decline in the velocity of M-1 during 1982? First, whether looking at the question from the perspective of sectoral velocity or sectoral checkable-deposit-demand equations, the buildup in money balances that caused the reduction of M-1's velocity was in the consumer sector and concentrated in consumer NOW account holdings. But, because NOW accounts have been used extensively for just a little more than two years, not

<sup>9</sup> Compared with the elasticities estimated in earlier studies using the passbook rate (0.15 to 0.40), these figures appear rather small. However, with respect to market rates, the consumer sector did not appear to be very responsive until the introduction of liquid market-yielding instruments such as MMMFs. As a result, consumers have become more responsive to changes in market rates than in the past, but this "responsiveness" is not yet so large as earlier estimates made with respect to changes in the passbook rate.

<sup>10</sup> As shown in Box 2, the increase in the number of accounts explains a little over 70 percent, or about \$18 billion of the \$25 billion increase in NOW account deposits in 1982. If, as estimated in the econometric section, \$8 billion came from outside M-1, then about \$10 billion was transferred from demand deposit accounts, and the volume of demand deposits would need to be adjusted by that amount.

Chart 4

**Noninstitutional MMMFs, Six-month MMCs, and MMDAs as a Percentage of M-2**



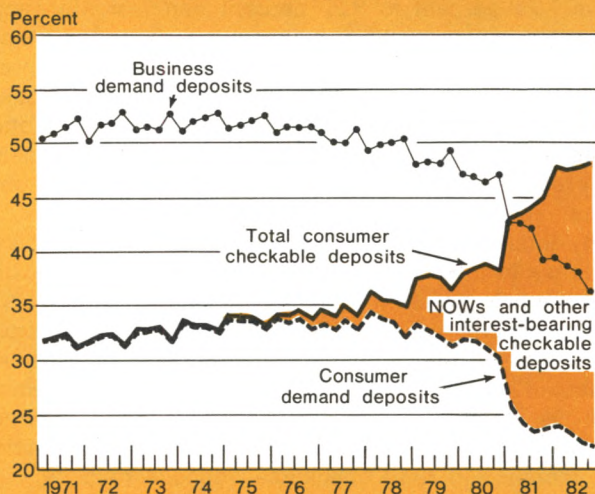
enough time has passed as yet to establish the degree to which consumers view them as a savings instrument. Furthermore, for similar reasons, it is not possible to determine what the demand elasticities of consumer money holdings are, not only relative to the rate paid on conventional time and savings accounts, but also with respect to the rates on market-yielding instruments (MMDAs and MMMFs) which have been growing very rapidly as a percentage of consumers' liquid assets (Chart 4). Nevertheless, after allowance is made for the consideration that consumers continued to open NOW accounts during 1982, much of the increase in consumer money holdings can be explained by using what would be considered, even by very conservative standards, reasonable market interest rate elasticities for total money holdings demanded by the consumer sector. (These elasticities are considerably less than those estimated in earlier studies for regulated time and savings accounts.) Hence, one explanation for the rapid M-1 growth in 1982 is that these relatively new unregulated savings instruments are, at least for the time being, increasing the market interest rate sensitivity of M-1 in the sense that consumers can more easily substitute in and out of M-1 as market rates change.

But that explanation does not rule the others out. It is thus difficult to anticipate what the relationship between M-1 and the economy will be. The severity of the recession may have temporarily increased con-

Chart 5

**Changing Composition of Checkable Deposits**

Sectors as percentage of total



sumers' demand for liquid precautionary balances. This leaves open the possibility of a sudden reversal at some later date, causing velocity to rise sharply. It also increases the uncertainty about the degree to which M-1's response to movements in interest rates has changed over the last few years. Moreover, even if consumers' demand for money holdings has become more sensitive to market rates over time, that is not the same as saying that any past elasticity estimates are good guides to the future. It appears that MMDAs, like MMMFs could increase even further the sensitivity of consumer money demand to interest rates, particularly since they are covered by FDIC insurance.

On the other hand, the new Super NOW account, because it is a component of M-1 that does not have any limitations on the rate of interest that can be paid, will tend to offset some of the added market interest rate response for the consumer sector caused in recent years by the MMMFs and MMCs and just recently by the MMDAs. Super NOWs could also result in some further combining of savings and transactions balances. This would be done to meet minimum balance requirements and for the sake of having all liquid balances conveniently in one place. The key point is that not only is the composition of M-1 changing, that is, becoming more and more consumer oriented, but even the characteristics of the money holdings within the consumer sector are changing—shifting from noninterest-bearing to interest-bearing forms (Chart 5).

At the same time, new liquid alternatives for holding narrow money are being offered to consumers. Thus, M-1, in general, and the money holdings of the consumer sector, in particular, are likely to deviate from past relationships for some time.

This, of course, raises serious questions for monetary policy. How much weight should M-1 have in the

policy process when its sectoral composition as well as its responsiveness to movements in market interest rates are changing? Should alternative approaches to policy be tried because of the uncertainty of M-1's interpretation? These are questions that the experience of 1982 and early 1983 suggests will need to be explored in considerable depth.

Lawrence J. Radecki and John Wenninger

# Credit Cycles and the Pricing of the Prime Rate

The prime rate—so named because it was the rate banks offered business borrowers with the best credit—long has been regarded as a key indicator of borrowing costs. But in recent years the significance of the prime rate has diminished. To begin with, large volumes of below-prime loans have been made. For instance, surveys show that during the second half of 1982, a period of falling interest rates, over three quarters of the new short-term business loans were made at rates below prime. Also, there have been times when the prime appeared to be unusually high relative to other interest rates. For example, during August 1982, the prime fell much more slowly than most money market rates and the spread between the prime and three-month certificate of deposit (CD) rates widened to almost 4 percentage points.

In this article, we present evidence that the prime has been set differently since the mid-1970s. During the early 1970s the prime rate lagged a month or two behind both upward and downward changes of other money market rates. During the late 1970s and early 1980s, however, the prime rate movements lagged more when rates were declining. Some people view this situation as reflecting a noncompetitive prime. But there are few cogent economic explanations of how the U.S. banking market with thousands of institutions could be generally noncompetitive.

We suggest that the reason for the prime's asymmetrical adjustment is that the "competitiveness" of the prime rate now varies with the state of loan demand. When loan demand is weak, individual banks have less interest-sensitive loan demand and tend to keep the prime high relative to market rates. During

such times, banks use pricing schemes other than the prime to attract or to retain those customers who are most sensitive to interest rates. In the future, if the trend to nonprime pricing options continues, the prime may move even less with market rates.

## The prime rate in recent years

Until the late 1970s, the prime rate was considered the measure of the cost of bank credit. Many commercial and industrial loans were tied to the prime, and it was often viewed by the public as an indicator of the overall level and movement of interest rates. Since then, many people have argued that the prime is no longer an indicative rate. What has happened?

During the late 1970s and 1980s, the prime rate deviated more from other money market rates than in the early 1970s (Chart 1). Reflecting this new development, the correlation of the prime with most other interest rates fell after the late 1970s (Table 1).<sup>1</sup> One explanation for this declining correspondence is the increased volatility in interest rates. Since the prime rate changes less frequently than market rates, the prime would diverge more from other rates when the financial markets are more volatile. However, casual observation indicates that the spread between the prime and the commercial paper rates was much higher in the late 1970s than in

<sup>1</sup> Brian C. Gendreau, "When Is the Prime Rate Second Choice?", *Business Review* (Federal Reserve Bank of Philadelphia, May/June 1983), argued that the prime rate has been adjusting faster in recent years than in the early 1970s. However, our results suggest that the faster speed of adjustment was accompanied by an overall decline in the correlation between the prime and other money market rates.

the earlier period. If the increased fluctuation in interest rates was the only reason for the decreased correlation between the prime and other money market rates, the spread would be equally likely to decrease as to increase, and the observed widening of the prime-commercial paper rate spread should not occur. Thus, volatility in interest rates cannot explain entirely the increased deviations between the prime and other money market rates.

### The asymmetric adjustment of the prime rate

One peculiarity associated with this declining correspondence between the prime and other money market rates is the asymmetric adjustment of the prime rate over an interest rate cycle. Since the mid-1970s, the prime has tended to lag market rates more when they were falling than when they were rising.

A typical adjustment path for the prime rate over a hypothetical interest rate cycle can be derived from statistical analysis of the period 1976-82 (Table 2). During the upswing of an interest rate cycle, the prime rate is adjusted upward rather quickly (Chart 2). For example, if the three-month CD rate increases by 1 percent, the prime is raised by 62 basis points in the first month so that the spread narrows temporarily by 38 basis points (Chart 3). By the second month, the

prime rate is realigned completely. When the CD rate declines, however, the prime rate lags behind substantially. Even after three months, the spread is still 16 basis points higher than its normal level.<sup>2</sup>

One explanation of the widening spread between the prime and other money market rates when rates are declining relates to the "maturity" of the prime relative to the maturity of other money market instruments. The prime rate can be changed by banks anytime and has no obvious maturity. In fact, the prime can be regarded as a "daily" rate while the CD rate used in Charts 2 and 3 is clearly a rate on a ninety-day instrument. If daily market rates are expected to decline over the next ninety days, then a ninety-day rate, which embodies expectations of these lower daily rates, will tend to be below the current daily rate. Or, turning this around, the prime rate which is a "daily" rate should tend to be high relative to the CD rate when rates are falling. Extending this argument to periods when rates are rising rather than falling, we would expect the prime rate to be low relative to the CD rate. In other words, the spread should narrow when rates are rising.

<sup>2</sup> Statistical tests show that the asymmetry in the adjustment path is statistically significant at the 1 percent level.

Table 1

### Coefficients of Correlation with the Prime Rate

Rate	July 23, 1975- October 3, 1979	October 10, 1979- July 28, 1982	July 23, 1975- July 28, 1982
<b>Weekly data on:</b>			
Federal funds rate .....	0.98	0.89	0.98
30-day Treasury bill rate .....	0.98	0.84	0.96
30-day commercial paper rate* .....	0.98	0.88	0.94
90-day certificate of deposit rate .....	0.98	0.86	0.98
90-day Treasury bill rate .....	0.99	0.83	0.97
20-year Treasury bond rate .....	0.92	0.55	0.92
	January 1972- September 1979	October 1979- July 1982	January 1972- July 1982
<b>Monthly data on:</b>			
Federal funds rate .....	0.92	0.91	0.97
30-day Treasury bill rate .....	0.72	0.87	0.92
30-day commercial paper rate .....	0.94	0.90	0.97
90-day certificate of deposit rate .....	0.94	0.88	0.97
90-day Treasury bill rate .....	0.93	0.85	0.97
20-year Treasury bond rate .....	0.74	0.57	0.92

\* Weekly data for the commercial paper rate begin on April 12, 1978.

Table 2

**Dependent Variable: Prime-RCD/(1-RR)**

Variable	Equation (1) January 1971- December 1975	Equation (2) January 1976- December 1982	Equation (3) January 1976- December 1982
Constant ...	0.32	0.88*	1.13*
X .....	-0.52*	-0.40*	-0.38*
X (-1) ....	-0.27*	-0.07	—
X (-2) ....	-0.26*	0.05	—
Y .....	-0.79*	-0.60*	-0.65*
Y (-1) ....	-0.24*	-0.19*	-0.23*
Y (-2) ....	-0.11	-0.16*	-0.16*
RR .....	-0.14*	-0.10*	-0.13*
RISK .....	0.58†	0.53*	0.42*
$\bar{R}^2$ .....	0.83	0.94	0.93
DW .....	1.13	2.12	2.14
$\rho$ .....	0.85	0.61	0.57

\* Statistically significant at 1 percent level.

† Statistically significant at 10 percent level.

RCD = Three-month secondary market certificate of deposit rates.

X =  $\Delta RCD$  when  $\Delta RCD > 0$ ; 0 otherwise.Y =  $\Delta RCD$  when  $\Delta RCD < 0$ ; 0 otherwise.

RR = Required reserve ratio on certificates of deposit (including marginal reserve requirement).

RISK = Difference between rates on BAA and AAA corporate bonds.

To test whether the peculiar adjustment path of the prime rate observed in Charts 2 and 3 is due to the particular maturity of the prime, we also estimated the movement of the prime rate relative to a daily rate, the Federal funds rate. The estimation results show the persistence of the asymmetry. The prime is adjusted relatively fast when the funds rate is rising. When the funds rate is falling, however, the prime tends to lag behind.<sup>3</sup> Therefore, the difference in rate maturities cannot explain entirely the unusual behavior of the prime rate.

Thus far, we have shown that during recent years the prime rate has been adjusting asymmetrically over an interest rate cycle. Did the prime rate exhibit the same behavior in earlier years?

Applying the same kind of statistical analysis, we found that the prime rate moved much more sym-

metrically across the credit cycle during the early 1970s than in the late 1970s and 1980s. During the earlier period, the prime rate seemed to fall just as fast as it rose.<sup>4</sup>

**Causes of the prime's unusual behavior**

In past years, many authors have investigated the prime rate and its determination.<sup>5</sup> Two competing hypotheses have emerged on the setting of the prime rate. They are the competitive and noncompetitive approaches.

The competitive approach asserts that the costs of searching and switching banks are not high enough to give banks much leeway for noncompetitive pricing. Rather, fluctuations in the spread between bank lending rates and their cost of funds merely reflect changes in the characteristics of the loans or the services provided by the bank. In contrast, the noncompetitive approach views search and information costs as important factors in the pricing of bank loans. By this argument, banks can price their loans noncompetitively to some extent.

There are several problems, however, in treating the prime as a rate which can diverge greatly from other market rates for extended periods because of noncompetitive behavior. First, it does not seem plausible that there can be an equilibrium in which borrowers pay noncompetitive prices in a nation where there are 15,000 commercial banks. While the markets in which these banks compete are segmented to some degree, it is hard to believe that the barriers to entry in other banks' local markets are sufficiently high to inhibit competitive behavior, at least in urban areas. And, for many borrowers, there are adequate incentives to compare rates among banks and to respond to persistent interest rate differentials. The second prob-

<sup>4</sup> The asymmetry is not statistically significant at the 5 percent level.

<sup>5</sup> For example: Paul Boltz and Tim Campbell, "Innovations in Bank Loan Contracting: Recent Evidence" (Board of Governors of the Federal Reserve System, Staff Economics Study No. 104), 1979; William Dunkelberg and Jonathan Scott, "Credit Conditions for Small Business", mimeographed (National Federation of Independent Business), 1982; Gerald C. Fisher, *The Prime: Myth and Reality* (1982); Gendreau (1983); Michael Goldberg, "The Pricing of the Prime Rate", *Journal of Banking and Finance* (June 1981), pages 277-96; Christopher James, "An Analysis of Bank Loan Rate Indexation", *Journal of Finance* (June 1982), pages 809-25; Jeffrey D. Hanna, Bruce Brittain, and Tran Q. Hung, "Libor vs. Prime: The Internationalization of the U.S. Loan Market", *American Banker* (June 5, 1981); John P. Judd, "Competition Between the Commercial Paper Market and Commercial Banks", *Economic Review* (Federal Reserve Bank of San Francisco, Winter 1979); John W. Lanza, "Criticism of the Prime Rate", *The Journal of Commercial Bank Lending* (February 1973); Randall C. Merris, "The Prime Rate", *Business Conditions* (Federal Reserve Bank of Chicago, April 1975); Howard J. Poduska, "The Prime Rate and Other Pricing Considerations in Past, Present, and Future", *The Journal of Commercial Bank Lending* (October 1978).

<sup>3</sup> This asymmetric adjustment is also statistically significant at the 1 percent level. Statistical results are available upon request.



lem in positing a noncompetitive prime is the lack of strong empirical evidence. Most of those who argue for an oligopolistic banking industry provide suggestive rather than conclusive evidence.<sup>6</sup>

### Cyclical monopolistic competition and the prime

While it seems unlikely that the banking system consistently behaves noncompetitively, there may be forces which generate noncompetitive opportunities occasionally. We hypothesize that the elasticity of demand for loans from any particular bank varies with economic conditions and can account for periods of a relatively noncompetitive prime. There are times when most businesses know market conditions and are in contact with several banks. At other times, this will not be true. With a significant portion of outstanding loans still linked to the prime, by maintaining a higher prime a bank can make greater profits on the loans that remain with it. It must weigh these extra profits on the loans it maintains against the loss of customers.<sup>7</sup>

When is the elasticity of loan demand low and when is it high? Among small businesses, the most interest-sensitive participants in the credit markets would tend to be borrowers who are applying for new loans or are seeking to establish a credit relationship with a new lender. They already have gathered the materials to prove their creditworthiness and as a matter of course (or precaution) are in touch with several lenders. In this case, other things being equal, the bank which offers the best deal wins their trade. Comparison shopping across banks requires time and resources, however. If a small firm is not already in the market for new loans, it may be reluctant to make the effort to search out the cheapest loan rate.

Large firms, in contrast, generally have relationships with several banks in addition to having access to the commercial paper market. In fact, a 1981 survey reported that more than 75 percent of large companies (Fortune's top 500) deal extensively with five or more banks.<sup>8</sup> Since large companies typically have staffs to keep constant track of credit market conditions, the cost of the search for them may be no more than a phone call in either phase of the business cycle.

Should one lender's rate move grossly out of line, the several banking relationships maintained by large firms would allow them to begin shading their borrowings fairly rapidly toward other banks or the commercial paper market.

Another reason why a small firm may face difficulty in developing a new banking relationship during downturns is that banks have a problem in identifying the source of its borrowing needs: Is the firm seeking a new credit relation to expand and/or to avoid the perceived high spread charged by its previous lender, as it claims, or has it been cut off by its old banker because the firm may not survive? The firm's old banker may be willing to provide credit because, in the course of their relationship, he has acquired information on the fundamental health of the firm. To the extent that such information is difficult to provide to a new prospective lender who is unacquainted with the firm, the firm will be tied to its old credit relationship. Banks may be able to take advantage of these hurdles to entering the loan market which certain borrowers face during downturns. During upswings, however, these hurdles would be much less significant and banks would be forced to charge competitive rates.

Large firms do not face such problems to the same degree. With several established banking relationships and constant monitoring of their creditworthiness by

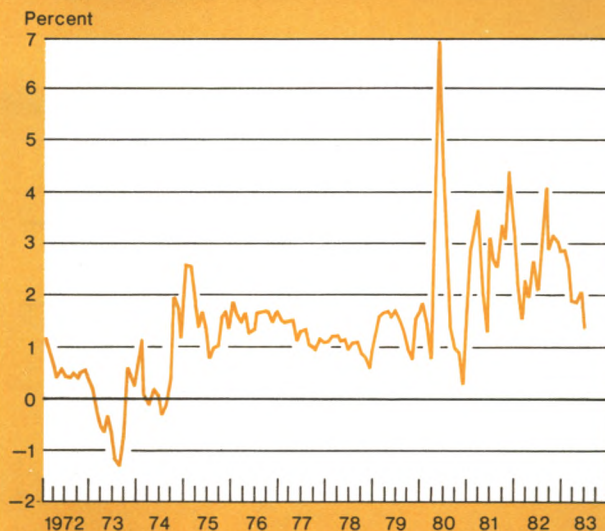
<sup>6</sup> For example, Goldberg (1981) argued the current month's prime rate is affected by previous months' CD rates. He suggested that this is a sign of average cost pricing rather than marginal cost pricing, which indicates oligopolistic behavior. However, his results may reflect merely the difference in maturities between the three-month CD and the prime rates. Thus, Goldberg's results did not provide conclusive evidence about the competitiveness of the banking industry.

<sup>7</sup> Judd (1979) also argued that tying floating rate loans to the prime might have reduced the incentives for banks to compete by lowering spreads.

<sup>8</sup> Greenwich Research Associates, "Large Corporate Banking 1981", mimeographed, 1981.

Chart 1

### Spread between Prime and Commercial Paper Rates\*



\*Thirty-day dealer-placed commercial paper rate.

rating agencies and market analysts, both current and potential lenders can draw distinctions between cyclical and secular weakness in the firm's balance sheets. Overall, then, information and search costs would differ for large borrowers and small borrowers over a credit cycle.

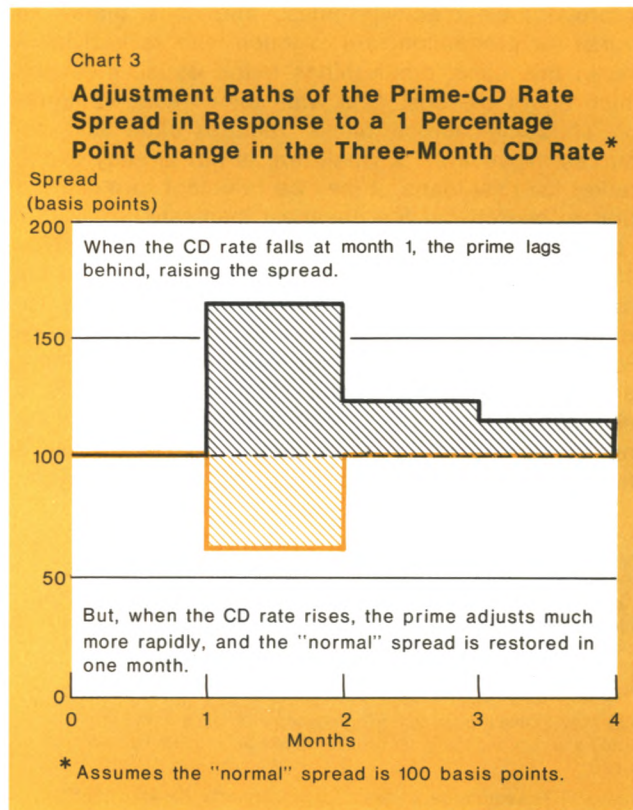
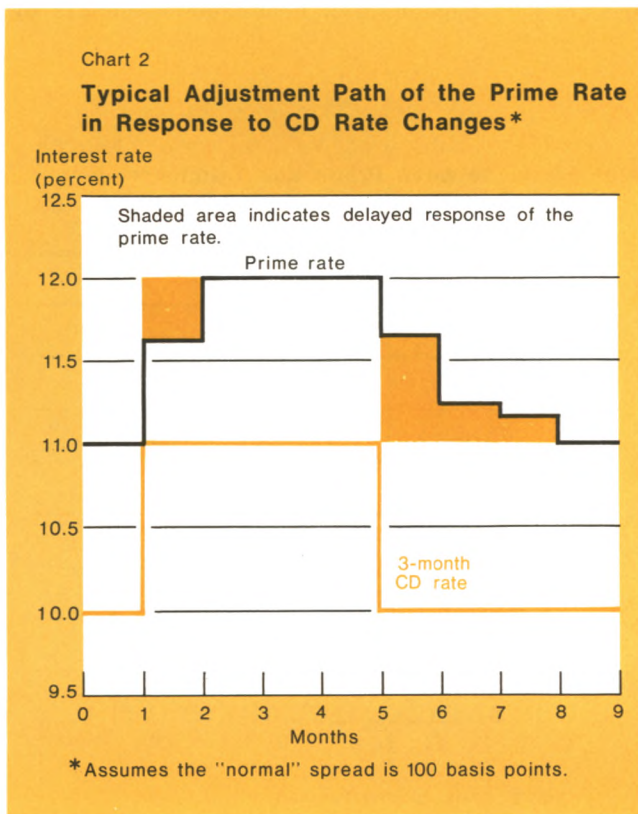
Because of the relative immobility of small borrowers during downturns, individual banks may face different elasticities of loan demand at different points in the credit cycle. The elasticity of loan demand from each individual bank is likely to be highest when total demand for new loans is strongest. This generally happens later in an expansion, a time when interest rates are generally rising, too. At such times the lost revenue from discouraged new borrowers and disgruntled old borrowers outweighs any additional revenue from keeping a wide spread. Therefore, a bank would find it in its best interests to charge a competitive spread. At times when loan demand is weak, however, larger total profits can be earned by keeping a high prime and perhaps foregoing the few interest-sensitive customers. In addition, banks can limit the loss of customers by lending at below-prime rates to particularly interest rate-conscious borrowers when the prime rate is high relative to market rates. Interest-sensitive bor-

rowers can thus be charged market rates at any point in the business cycle.

We, therefore, characterize the pricing of the prime as being subject to cyclical noncompetitiveness. We suspect that it is competitive during periods of stable or increasing market rates but may be somewhat non-competitive when rates are falling.

This argument is supported by statistical evidence. Recall that we found that the prime rate comes down more slowly relative to market rates than it rises, indicating that banks charge higher spreads on prime-based loans during downswings. However, our theory also suggests that borrowers in the market for new loans would be better able to obtain loan rates closely tied to market rates, in contrast to those merely maintaining outstanding loans tied to the prime. Indeed, we find that the interest rates charged on new commercial and industrial loans do not show the same asymmetry with respect to market rates.<sup>9</sup> Although the rates on new loans tend to lag behind the CD rate and move down a bit slower than they move up, the difference in the speed of adjustment is very small and not statis-

<sup>9</sup> Statistical results are available upon request.



tically significant. Of course, these data come from a sample of borrowers who may not be typical of the average loan seeker.<sup>10</sup> Nonetheless, the results suggest that those firms actively in the loan market may be able to obtain market-related rates at any point in the credit cycle, despite the increase in the prime-CD spread during downturns.

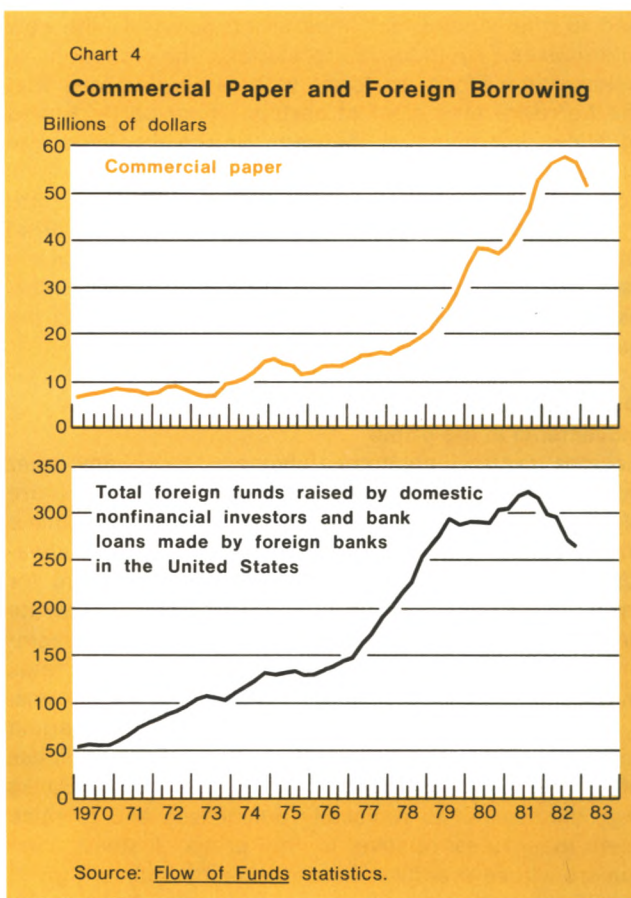
Evidence on below-prime loans is also consistent with the view that such pricing schemes enable banks to retain interest-sensitive customers during periods of a high prime-CD rate spread. If below-prime loans are completely unrelated to the pricing of the prime, then they should be neither more nor less prevalent when the prime-CD spread changes. Statistical analysis, however, indicates that below-prime lending is much more common when rates are falling and the spread is wide, suggesting that some customers move from prime-based to below-prime loans when the prime is out of line with market rates.<sup>11</sup>

### Why did the behavior of the prime rate change?

While these arguments may explain why the prime adjusts asymmetrically during the credit cycle, they do not explain why the pricing of the prime changed in the last decade. Earlier, we showed that during the early 1970s there was little or no asymmetry in the prime rate *vis-à-vis* market rates across the business cycle. By the late 1970s, however, there was a pronounced asymmetry. Can these results be related to the bank lending practices described above?

Perhaps the most striking change in the banking system in the mid-1970s was the development of alternatives to domestic bank lending. The commercial paper market grew rapidly, while U.S. domestic residents also began to have better access to foreign sources of funds (Chart 4). By most accounts, the development of these markets have made the U.S. banking system on the whole more competitive now than in the past. These pro-competitive developments may have had a somewhat paradoxical effect on the prime rate, however.

In the early 1970s, most floating rate loans were also prime-based loans. Both the interest-sensitive and relatively immobile borrowers were tied to the prime, for the most part without other pricing options. If an individual bank kept its prime too high, then the interest-sensitive customers would leave for an-



other bank or for the commercial paper market, which was beginning a period of rapid expansion. Consequently, banks had to set their prime rate in line with other market rates. Since the loan rates for both rate-sensitive and rate-insensitive borrowers were generally based on the prime, price discrimination between the two classes of borrowers over a credit cycle was more difficult.<sup>12</sup>

In the mid-1970s, new pricing options became more common, as many borrowers began to have easier access to the commercial paper and Euro-lending markets and were no longer restricted to the prime. Commercial banks desiring to retain such customers

<sup>10</sup> The data are from the Survey on Terms of Bank Lending conducted quarterly by the Federal Reserve System. The surveys include business loans extended during the first full week of the middle of the month of each quarter. The sample consists of both large and small commercial banks.

<sup>11</sup> Statistical results are available upon request.

<sup>12</sup> Banks and their customers could negotiate different spreads on their loans at different points in the credit cycle. However, such customer by customer negotiation is an inefficient method for price discrimination between broad classes of borrowers. Similarly, the two-tier prime under the Committee on Interest and Dividends (CID) was monitored closely by the CID, and banks were not able to use this as a vehicle to take advantage of the difference in interest sensitivity between the two classes of borrowers.

had to offer pricing schemes as attractive as the new alternatives. By this interpretation, the function of below-prime loans (or loans with pricing options that the borrower may elect at certain times) partly served to allow discrimination between borrowers. Less mobile borrowers remain tied to the prime when rates come down and spreads increase, while the more mobile borrowers shift to rates closely tied to market rates. Thus, the change in the behavior of the prime rate can be attributed to the declining average interest sensitivity of the prime-based borrowers since the early 1970s.<sup>13</sup>

#### **Other possible explanations for asymmetric movements in the prime**

Besides cyclical noncompetitiveness, there are other possible reasons for the prime to move down more slowly than up. One of them is a change in the relative risk premium attached to nonfinancial business *vis-à-vis* banks over a business cycle. In a recession, for instance, interest rates tend to fall and corporate financial positions tend to deteriorate. Thus, the seemingly high prime during periods of falling interest rates may reflect the higher default risk of business loans.

In addition, the asymmetric movement of the prime rate may be caused by a shift in the creditworthiness of prime-based borrowers during downturns. Banks may choose not to reclassify businesses and to raise their loan rates relative to the prime. Instead, customers whose creditworthiness remains high are given below-prime loans, while the prime is kept high relative to market rates. Those businesses that remain tied to the prime are then companies that require a higher risk premium.

Also, the movement of the prime-CD rate spread may be affected by government policies. Under the Committee on Interest and Dividends (CID), banks offered a lower prime to small businesses from April 1973 to May 1974. And, in 1980, the credit restraint program placed limits on loan growth which may have contributed to the unusually high prime rate during that period.

To take account of these factors, we included several additional variables in our statistical analysis. The spread between the rates on BAA- and AAA-rated corporate bonds was used to measure the higher default risk of business lending. Additional impact from the

shift in the creditworthiness of prime-based borrowers was incorporated in our analysis by adding the business failure rate. Moreover, separate dummy variables for the periods of the CID and the credit restraint program were included in our equations. None of these variables, however, with the exception of the BAA-AAA bond rate spread and the business failure rate, had any significant effect on our estimates. Most importantly, inclusion of these variables did not reduce the asymmetry in the movement of the prime.<sup>14</sup>

Besides testing our hypothesis of cyclical noncompetitiveness against alternative explanations, we also conducted out-of-sample simulations to measure the forecasting accuracy of our equation over the past year. The simulation results indicate that our statistical estimates track quite well the behavior of the prime-CD rate spread from July 1982 to June 1983, accounting for 1.3 percentage points of the 1.4 percentage points narrowing in the spread.<sup>15</sup> In the most recent month, when the prime has been unchanged while market rates were rising, our equation predicted about half the actual narrowing in the spread.

#### **Summary**

There has been a major change in the behavior of the prime rate. Since the mid-1970s, the prime rate has moved asymmetrically over an interest rate cycle.

One explanation for this change is the development of new forms of borrowing by large corporations. Since the mid-1970s, many interest-sensitive borrowers were given pricing options other than the prime. Those borrowers who remain tied to the prime may be less responsive to their loan rates, unless they are in the market for new loans. This may give banks occasional opportunities to increase the spread.

Despite the temporary noncompetitive behavior of bank lending, in the long run we would expect bank loan rates increasingly to resemble other money market rates. For one thing, borrowers may demand more pricing alternatives, which will safeguard them against overpaying at times of falling interest rates. Paradoxically, however, the fewer borrowers remaining tied to the prime would be the least mobile, and the slowness in the prime following other rates down may become even more pronounced than it is now.

<sup>14</sup> Statistical results are available upon request.

<sup>15</sup> The mean error and root mean square error for the out-of-sample period of July 1982 to June 1983 was -0.01 and 0.33 percent, respectively, compared with the in-sample root mean square error of 0.23 percent for the period January 1976 to June 1982.

<sup>13</sup> The contribution of the commercial paper market in attracting interest-sensitive borrowers away from banks was also stressed by Judd (1979).

Marcelle Arak, A. Steven Englander, and  
Eric M. P. Tang

# Recovery without Accelerating Inflation?

On both the wage and price side, inflation over the past year was at its lowest level since 1967. The Employment Cost Index increased only 6.4 percent in 1982, down from 9.8 percent in 1981 (Chart 1). And consumer prices rose by only 3.9 percent in 1982, down from 8.9 percent in the previous year. Moreover, consumer prices have increased at only a 3 percent annual rate thus far this year.

The dramatic price and wage slowdowns undoubtedly reflect the recession at least to some degree, and many analysts expect some reacceleration of prices in late 1983 and 1984 as the economy recovers. The Blue Chip consensus, for example, foresees 1984 consumer price inflation at about 5 percent. But an examination of the 1961-82 period suggests that there may be more ground for optimism:

- Both casual observation and more rigorous statistical analysis imply that the paths of real economic growth and unemployment rates projected by most analysts are unlikely to generate an inflationary resurgence in the near term, 1983 or 1984.
- The immediate outlook in oil and crop markets is for continued weakness and price moderation, although a major crop failure or oil shock could rapidly push up inflation.

While the high level of unemployment is likely to sustain slow growth of wages and prices in the near term, the medium- to long-term outlook (1985-88) is less

certain. Nevertheless, economic relationships, found to hold true in the past, suggest that wages in the mid-1980s might not accelerate until the unemployment rate falls below 6 percent. This would represent a more favorable scenario than we have had recently when unemployment rates of 7 percent or so seem to have been associated with a speedup in inflation.

## Near-term inflation prospects

Many forecasters expect the recovery to be accompanied by a rise in inflation in 1984. For example, growth of the GNP deflator, the broadest measure of price inflation, is expected by many observers to accelerate in 1984 by about 0.4-0.6 percentage point (Table 1). Assumptions underlying these forecasts generally include somewhat stronger commodities prices and profit margins, a gradual tightening in labor markets, and a declining dollar. Such forecasts may be overly pessimistic about the resurgence in inflation, however.

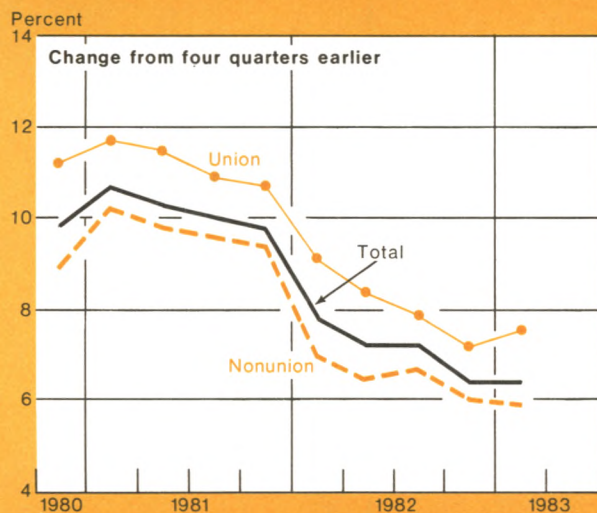
In the first few years of other recoveries inflation has generally stayed flat or fallen (Table 2). Moreover, as of this spring, most forecasters predicted a slower than normal recovery for the next year or so. For example, the Office of Management and Budget (OMB) projected 4.3 percent growth of GNP and the Blue Chip consensus projected 4.6 percent for the first two years of the expansion.<sup>1</sup> Yet, GNP growth averaged 5 percent per year in the first two years of every postwar re-

<sup>1</sup> Sources: OMB, April Update of the 1984 Budget; Blue Chip, *Economic Indicators* (May 1983).

Chart 1

**Private Nonfarm Compensation**

Employment cost index



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

covery, except for the short recovery from the 1980 recession, and the inflation rate generally declined. Thus, casual observation of history suggests the possibility that disinflation will continue during the next few years.

Recent wage bargains also bode well for the near term. In 1982, collective bargaining settlements contained wage adjustments that were quite modest as compared with recent years. As shown on Chart 2, the average first-year increase of 3.8 percent was well under half the increase in 1980 and 1981, and just about equal to half the increase approved the last time the two parties settled.<sup>2</sup> Of course, part of this drop was in distressed industries, as 43 percent of workers received no increase. But the average for the remaining workers is still well below the previous year. Further, the wage agreements are not simply front loaded, with low increases in the first year only. The average increase over the life of the contract is 3.6 percent annually, excluding cost-of-living adjustments (COLAs). COLAs could add 2 percent or less in 1984, provided 1983 Consumer Price Index (CPI) growth remains in the

<sup>2</sup> The statistics cited in this paragraph are published by the U.S. Department of Labor, *Major Collective Bargaining Settlements in Private Industry, 1982* (January 1983).

forecasted 3-4 percent range.<sup>3</sup> Thus, with a mean duration of thirty-one months, the 1982 agreements and similar ones negotiated in early 1983 appear to have locked in moderate wage growth for these industries for 1983 and 1984. Moreover, if these settlements reflect the wage trends emerging in the nonunionized sector, the next two years may bring a continuation of wage disinflation.

More rigorous statistical analysis also supports the view that wage growth will continue to fall or moderate over the next eighteen months even as the recovery progresses. In common with many earlier analyses, our research suggests that the critical determinants of wage inflation over the past twenty years have been (1) the level of the unemployment rate and (2) inflation expectations. This relationship of wage growth, inflation expectations, and the unemployment rate, which is summarized by the model described in Box 1, has been extremely stable and reliable over the past twenty years.<sup>4</sup> Moreover, the relationship explains a large proportion of what to many has been the surprisingly rapid slowdown of wage inflation. The 4 percentage point decline in hourly compensation from 1980 to 1982 represents the sharpest slowdown over a two-year period since the 1940s. And when our estimated relationship, which is based on the 1961-79 period, is applied to the 1980-82 period, it suggests a 4.3 percentage point reduction of the growth of hourly compensation, very close to the actual 4 percentage point drop.

Such results obviously do not guarantee that past relationships will remain reliable, but they provide at least some analytical basis for formulating a forecast of the near-term outlook for wages. One way of assessing that outlook is to insert the Blue Chip consensus forecast of unemployment and price inflation into our equation and then to calculate a forecast for compensation growth. A projection done in this way shows *continued moderation* in wage growth in 1983 and 1984 (Table 3). The growth of compensation per man-hour would be 4-5 percent in each year. Despite the expansion, high unemployment rates—about 9 percent in 1984—will continue to exert downward pressure on wage growth.

This forecasting approach provides only a rough estimate of future compensation growth since it ignores the interdependence of wages and prices. In a more complete model, the slower wage growth would

<sup>3</sup> According to the Bureau of Labor Statistics, about 60 percent of the workers are covered by COLAs that reimburse workers for approximately 70 percent of CPI growth.

<sup>4</sup> For a more detailed discussion see Englander and Los, "The Stability of the Phillips Curve and Its Implications for the 1980s" (Federal Reserve Bank of New York Research Paper No. 8303), February 1983.

contribute to lower price growth. (Note that the Blue Chip consensus forecast has consumer price growth accelerating from 3.2 percent in 1983 to 5.1 percent in 1984.) Then, since inflation expectations in our model are measured by lagged price increases, compensation growth could be even slower than the 4.2 percent projection that uses the Blue Chip price inflation assumptions.

One risk is that supply shocks may occur and quickly rekindle expectations of rising inflation despite the weakness in labor markets. Although employee compensation is the major cost faced by firms, many economists believe that wages were not the primary cause of the inflationary upswings of the mid- and late 1970s. Instead, run-ups in the prices of food and oil contributed the initial spark to the speedup of inflation, and wages responded only with a lag. Again, in the 1980s there is some risk that sudden run-ups in energy or food prices or a steep depreciation of the dollar (which would raise import prices) could cause workers to press for higher wages.

However, there is currently little basis for projecting such shocks over the next eighteen months. The supply-demand balances in food and energy suggest that food and oil price increases will be moderate in the short run (Table 4). For example, the CPI for food is expected to rise by 3-4 percent in 1983 and possibly a bit more in 1984. It now appears that it would take a major crop failure, either here or abroad, to change that outlook by much. Imported oil prices are expected to remain flat over the remainder of 1983 and grow only slightly in 1984.

The international value of the dollar—another key factor in inflation—has continued to remain strong despite many forecasters' predictions of a decline. It now appears that, if a depreciation of the dollar does occur over the next eighteen months, it will not be large enough to affect significantly the wage and price out-

look. Data Resources Incorporated (DRI), for example, sees the dollar falling by about 8 percent over 1983 and 1984. Such a decline in the dollar, on a trade-weighted basis, would probably contribute less than 0.5 percentage point to inflation in 1983 and perhaps 0.8 percentage point in 1984.<sup>5</sup> Since most of the Blue Chip forecasts already have assumed some decline in the dollar, it would take a very large drop to affect the compensation growth projection in Table 3.

**Will a declining unemployment rate result in a speedup in wage growth?**

The difference between compensation growth in 1984 of 5 to 6 percent that is projected by some other economic forecasters and our projection of about 4 percent is not large in absolute terms, given the variability of the inflation rate over the last decade. But whether or not compensation growth begins to speed up so soon after the start of a recovery, as reflected in the alternative forecasts, can have important implications for longer term inflation prospects. It is unlikely that the rate of compensation growth would increase in 1984 and then not change after that, unless real growth of the economy slowed down significantly. If compensation growth were to accelerate in 1984, it would in all likelihood be followed by continued escalation, assuming real economic growth through 1984 and into 1985 were to continue at a 4-5 percent pace. Also, in the past, even after it was clear that inflation had speeded up, forecasters have generally underestimated the size of the subsequent acceleration. If the predicted 1984 acceleration occurs, then forecasts of generally modest in-

<sup>5</sup> For a more detailed discussion of the effects of a dollar devaluation on consumer prices, see Joel L. Prakken, "The Exchange Rate and Domestic Inflation", this *Quarterly Review* (Summer 1979), pages 49-55.

Table 1

**Alternative Inflation Forecasts**

Four-quarter change in GNP deflator; in percent

Year	Chase Econometrics	Congressional Budget Office	Data Resources Incorporated	Office of Management and Budget	Blue Chip consensus
1983 .....	5.0	4.7	4.6	4.5	4.9
1984 .....	5.5	4.7	5.2	5.0	5.3

Sources: Chase Econometrics, *U.S. Macroeconomic Forecast and Analysis* (May 1983). Congressional Budget Office, *Five-Year Economic Assumptions* (January 1983). Data Resources Incorporated, *Review of the U.S. Economy* (March 1983). Office of Management and Budget, April Update of 1984 Budget. Blue Chip, *Economic Indicators* (May 1983).

Table 2

### Does Inflation Accelerate in Early Stages of Recovery?

In percent

Trough of recession	Real GNP growth	Change in inflation rate*
<b>First four quarters of recovery†</b>		
1954-II .....	7.4	0.5
1958-II .....	8.4	0.9
1961-I .....	7.0	1.3
1970-IV .....	4.7	-0.3
1975-I .....	6.7	-5.1
1980-III .....	3.2	-0.1
<b>Second four quarters of recovery‡</b>		
1954-II .....	2.6	1.1
1958-II .....	1.7	-1.2
1961-I .....	3.3	-0.3
1970-IV .....	7.0	-0.4
1975-I .....	4.4	-0.8

\*Implicit GNP deflator.

†Growth rate in the four quarters after the trough minus growth rate in the four quarters before the trough.

‡Growth rate in the second four quarters of recovery minus growth rate in the first four quarters of recovery.

creases over the rest of the decade may be similarly low. Thus, it is reasonable to raise the issue of whether "slow" or "modest" acceleration in inflation might quickly turn into rapidly rising wages and prices.

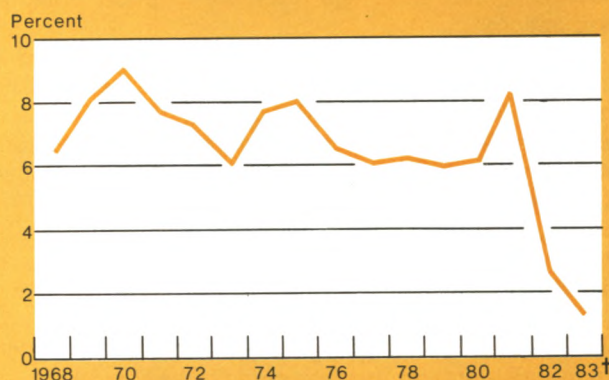
Some analysts, looking at simple relationships between wage growth and the unemployment rate, argue that an acceleration in wage increases within the next eighteen months is inevitable if the unemployment rate declines. They argue that the decline in the unemployment rate will result in tighter labor markets that will lead to more rapid wage growth. Our analysis suggests that this point of view is incomplete.

A lower unemployment rate will mean a higher rate of wage growth only if everything else is held constant. Statistical analysis of past data suggests that the trade-off at any given point in time  $t$ , looks something like the line AB, shown in Chart 3. Notice, if the unemployment rate at  $t$  were lower than the one associated with point W, the rate of wage growth would be higher. When moving between time periods, however, everything else other than the unemployment rate does not remain constant. A critical factor that can change between time periods is in-

Chart 2

### Mean Wage-Rate Adjustment over Life of Contract in Major Collective Bargaining Settlements\*

Annual rate



\* Excluding cost-of-living adjustments (COLAs).

† First three months.

### Summary of Collective Bargaining Agreements

In percent

	1982	1981	1980	Last time 1982 parties bargained
Basic wage increases				
Average first-year wage increase (excluding COLAs) .....	3.8‡	9.8	8.3	7.9
Average annual increase over life of contract (excluding COLAs) .....	3.6	7.9	6.5	6.3

‡ 1982: 43 percent of workers received no increase; average increase for remainder was 7 percent; 25 percent of workers received increases greater than 8 percent.

Source: U.S. Department of Labor, Bureau of Labor Statistics.

flation expectations. Statistical analysis also suggests that, if inflation expectations decline, the trade-off line for the period  $t + 1$  will shift down to A'B' in Chart 3.

The movement between point W and point X in Chart 3 is intended to illustrate our estimate of the growth of compensation that is consistent with the Blue Chip projection for the recovery. Moderating inflation expectations, as measured by lagged inflation, can cause the unemployment-wage growth trade-off line to shift downward. (The 1982 and 1983 de-



clines in the inflation rate would be responsible for this.) This shift is enough to compensate for the effect of a decline in the unemployment rate, so that between periods  $t$  and  $t + 1$  the shift between point  $W$  and point  $X$  results in the same rate of wage growth. But a more rapid decline in the unemployment rate could more than offset the effect of lower inflation expectations. The shift would be between point  $W$  and point  $Y$ , with the rate of wage growth increasing in period  $t + 1$  compared with period  $t$ . A less rapid decline in the unemployment rate would lead to a reduction of wage growth.

Thus, while a decline in the unemployment rate clearly contributes an upward thrust to the rate of wage growth, it is possible for this to be offset by

the downward momentum of declining inflation expectations. Under the Blue Chip forecasts for prices and for the unemployment rate, the unemployment rate decline and the expectations effect exactly cancel each other out in 1984, so that wage growth is the same as in 1983.

Recently, many economic forecasts for 1983 and 1984 have been revised upward and projections of the unemployment rate revised downward from the 9.3 percent rate for 1984 used in our calculation. However, it is also possible that the inflation projection for 1984 implicit in the Blue Chip forecast is too high. Our research suggests that as long as the unemployment rate remains high—above 7 percent in 1984 and above 6 percent in 1985 and beyond—the expectations effect

### Box 1: Estimating the Inflation-Unemployment Trade-off

To measure the trade-off between unemployment and inflation, we use the expectations-augmented Phillips curve (EAP) in combination with a simple price equation. The EAP curve relates the rate of change in compensation per man-hour (CCOMP) to: (1) the unemployment rate of prime age males (25-54 years) (URM25), as a measure of labor market tightness;\* (2) a weighted average of past inflation rates as a measure of expected price inflation (CPCE); (3) upward changes in the prime age male unemployment rate (DURM25) to capture the cost of certain fringe and severance benefits received by laid off workers; (4) the increase in employer social security contributions (ECSS), a component of hourly compensation;† (5) the increase in the civilian labor force (CLHC) since the rapid influx of workers shifts the distribution of workers toward less-experienced and less-skilled (and therefore, presumably, to lower paid) workers; and (6) the share of unemployment benefits paid to workers unemployed more than twenty-six weeks (SURB27).‡

\*The prime age (24-54 years) male unemployment rate as a measure of "slack" in the labor market was suggested by Phillip Cagan. See Phillip Cagan, "The Reduction of Inflation by Slack Demand", in W. Fellner, (ed.), *Contemporary Economic Problems 1978* (Washington, D.C., 1978), pages 13-45.

†The changes in employer social security contributions are expressed as a percentage of compensation per hour. From this, we subtract the increased contributions which occur as the overall level of wages grows. The remainder represents the effect of social security tax contributions in causing compensation growth to change.

‡Extension of unemployment benefits may reduce the incentive to search aggressively for new jobs, raising the unemployment rate while damping the disinflationary effects of higher unemployment.

A dummy variable,  $D1$  accounts for the restraining effect of the price freeze in 1971-IV and the rebound after the relaxing of the controls in 1972-I.

The equation estimated by ordinary least squares (standard errors presented in parenthesis) is:

$$\begin{aligned} \text{CCOMP} = & 0.92 \cdot \text{CPCE} - 0.89 \cdot \text{URM25} + 0.60 \cdot \text{DURM25} \\ & (0.09) \quad (0.21) \quad (0.86) \\ & + 1.06 \cdot \text{ECSS} - 0.45 \cdot \text{CLHC} \\ & (0.24) \quad (0.13) \\ & + 4.15 \cdot \text{SURB27} - 4.59 \cdot \text{D1} + 6.23 \\ & (2.30) \quad (1.13) \quad (0.76) \end{aligned}$$

Period: 1961-I to 1979-IV

$$\begin{aligned} \bar{R}^2 &= 0.75 \\ \text{SEE} &= 1.30 \\ F(7,68) &= 33.0 \\ \text{DW} &= 2.16 \end{aligned}$$

We applied a series of recently developed econometric robustness tests to this EAP equation. The tests strongly suggest that this EAP curve is subject neither to permanent nor transitory stochastic shifts nor to permanent deterministic shifts. Additional evidence of its stability is provided by the excellent out-of-sample forecasting ability of this EAP curve in the 1980s.§

§For more details, see A. Steven Englander and Cornelis A. Los, "The Stability of the Phillips Curve and Its Implications for the 1980s" (Federal Reserve Bank of New York Research Paper No. 8303), February 1983.

shown in Chart 3 will continue to exert a significant downward thrust to wage growth. Whether this would be sufficient to offset the effect of a more rapid decline in the unemployment rate depends on how fast the rate falls. We estimate that it is likely that wage growth will hold steady or slow down further as long as the unemployment rate declines by 1.5 percentage points or less over the next six quarters from its second-quarter level of 10.1 percent. This is still a somewhat steeper unemployment rate decline than is projected in many of the recently revised forecasts for the economy.

### Wage inflation over the long term

While falling unemployment during the next eighteen months may not lead to rising inflation, for how long can economic growth proceed before wage inflation does begin to speed up? In recent years, it appears that the unemployment rate could not fall below 7 percent without an upsurge of inflation. And, indeed, this was the experience in 1978. Currently, many observers feel that the "natural" rate—the unemployment rate consistent with no speedup in inflation—will remain high through the 1980s.<sup>6</sup> For example, in a talk given in November 1982, Martin Feldstein, the Chairman of the Council of Economic Advisers, suggested that the natural rate of unemployment will remain at 6-7 percent or above and not drop significantly over the balance of the decade unless programs such as job retraining induce major structural changes in the economy.

Estimates of the natural rate should be examined carefully. The higher they are, the more severe are the constraints on the economy's ability to expand without worsening inflation. However, the natural rate is not directly observable; it must be inferred from estimates of wage and price relationships. As such, it depends on all the factors which underlie the inflation-unemployment rate trade-off. All the issues have by no means been settled, but both theoretical work and statistical analysis suggest that productivity growth, demographics, and employer payroll taxes are linked to the trade-off. In general, more rapid productivity growth lowers the unemployment rate associated with nonaccelerating wages. Conversely, more rapid labor force growth and employer tax increases tend to raise the natural rate of unemployment. (The interactions of these factors are discussed in greater depth in Box 2.)

Analysis of the behavior of wages and prices suggests that the natural rate moved from about 4.5 percent in the early 1960s to over 7 percent in the mid- and late 1970s (Table 5). The key factor in the rise in the

<sup>6</sup> The technical appendix to this article discusses the calculation of the natural rate.

Table 3  
**Projected Compensation Growth, 1983-84**  
In percent

	Underlying assumptions*		Projected compensation growth
	Civilian unemployment rate†	Consumer price growth	
1983 . . . . .	10.2	3.2	4.2
1984 . . . . .	9.3	5.1	4.2

\*Blue Chip, *Economic Indicators* (May 1983).

†Average for year obtained by adding 0.2 to the unemployment rate of all workers including military.

Table 4  
**Food and Energy Price Increases Built into Current Forecasts**  
In percent

Forecast source	Projected price growth from 1983-I to 1984-IV (compounded, annual rate)	
	Food at home (CPI)	Oil†
DRI . . . . .	4.2*	-7.6
Chase . . . . .	5.8	-0.7
OMB . . . . .	—	-3.6
CBO . . . . .	4.9	2.9

\*Food and beverages.

†Crude oil—composite refiner acquisition cost.

Sources: Same as Table 1.

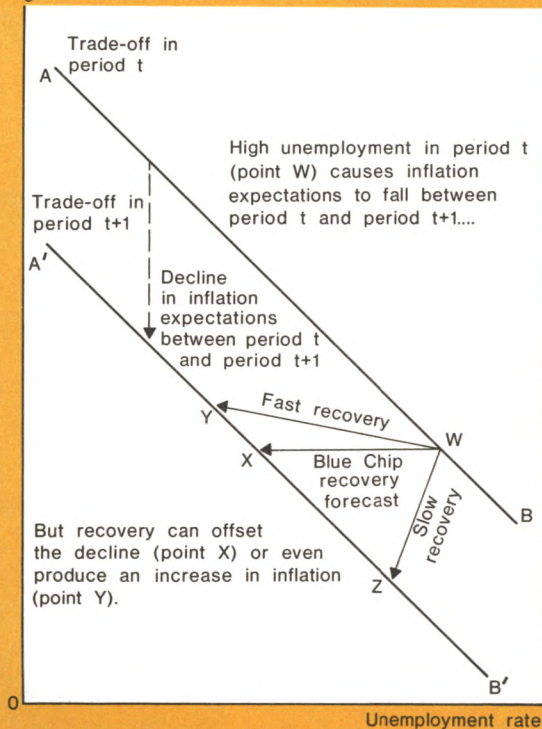
Table 5  
**The Natural Rate of Unemployment, 1961-82**  
In percent

	1961-67	1968-73	1974-82
<b>The increase in the natural rate of unemployment</b>			
Natural rate of unemployment . . . . .	4.4	6.2	7.2
<b>appears to have been caused primarily by the decline in productivity</b>			
Productivity growth . . . . .	3.3	1.8	0.8
<b>and a rapid upsurge in the labor force</b>			
Civilian labor force growth . . . . .	1.6	2.5	2.3

Chart 3

### The Inflation-Unemployment Trade-off during Recovery

Wage growth



natural rate appears to be the dramatic slowdown in productivity growth over this period, although rapid labor force growth, particularly in 1968-73, also contributed.

By projecting future trends in the major determinants of the natural rate—productivity, demographics, social security tax increases—we can estimate how low the unemployment rate can fall in the 1980s without an inflationary resurgence. Our benchmark assumptions come from the Administration's April 1983 scenario. They forecast trend productivity growth of about 1.7 percent over 1983-88 and civilian labor force growth of 1.6 percent.<sup>7</sup> On the basis of these assumptions, we estimate that the natural rate could fall close to 6 percent in the mid- to late 1980s, giving the economy

<sup>7</sup> The Administration scenario contains no social security tax projection. We assume that employer social security contributions will rise with inflation and according to legislated rate increases. At most, these increases may contribute 0.2 percentage point to the natural rate.

some breathing room for expansion without worsening inflationary pressures.

Of course, the actual path of inflation will depend on the pace at which the unemployment rate is lowered. But, under the Administration's long-term growth scenario, the unemployment rate would fall by 0.8 percentage point per year and would not dip below 6 percent until 1988. In the absence of exogenous price shocks, such a gradual recovery should not cause compensation to accelerate until the end of the period. In short, wages would not appear to be a major factor propelling inflation over the next five years under the projections of productivity, labor force, and unemployment made by the Administration.

Long-range economic assumptions that accompany the budget are often overly optimistic. If that is the case for the Administration's April assumptions, then a 6 percent estimate for the natural rate is too low. But it is not obvious that overoptimism characterizes the Administration's recent productivity assumptions. Much research has been devoted to analysis of the causes of reduced productivity growth in the mid-1970s. The important factors appear to be a slowdown in the rate of growth of capital per worker, changes in the age-sex composition of the labor force, and the impact of higher energy costs. While the contributions of these factors are not known with certainty, several studies have concluded that some combination of these factors accounts for over half the decline in productivity growth.<sup>8</sup>

The future outlook for capital formation has been much improved by the Economic Recovery Tax Act, although some economists believe that part of this is countered by the prospects for large Federal budget deficits. The teenagers and women who entered the labor force in the late 1960s and 1970s will continue to acquire experience over the next several years and can be expected to contribute more to total output than in the past. And most energy forecasters do not foresee another sharp run-up in oil prices, similar to the 1973 and 1979 experiences, during the remainder of the decade. It is for these reasons that those economists who have made long-range projections expect productivity growth to average about 1.8 percent annually over the next several years, about the same as the Administration.<sup>9</sup> Their projections

<sup>8</sup> J. R. Norsworthy, Michael J. Harper, and Kent Kunze, "The Slowdown in Productivity Growth: Analysis of Some Contributing Factors", in *Brookings Papers on Economic Activity* (1979:2); Edward F. Denison, *Accounting for Slower Economic Growth* (Brookings Institution, 1979); Edward A. Hudson and Dale W. Jorgenson, "Energy Prices and the U.S. Economy, 1972-1976", *DRI Review of the U.S. Economy* (September 1978).

<sup>9</sup> DRI, *U.S. Long-Term Review* (Spring 1983), *Morgan Guaranty Survey* (April 1983), *Chemical Bank U.S. Economic Outlook* (May 10, 1983).

## Box 2: Determinants of the Natural Rate of Unemployment

The natural rate of unemployment is the unemployment rate consistent with no acceleration or deceleration of prices. This box examines some of the underlying determinants of the natural rate.

### Productivity

In the past, many researchers tried to find a direct link from productivity to wages. In most cases the efforts were unsuccessful or unconvincing.\* However, there is an indirect link from productivity to wages via unit labor costs. In the long run, price growth is mainly determined by the growth of unit labor costs, the difference between wage growth and productivity growth. Short-run cyclical factors, price shocks, and exchange rate fluctuations can alter this relationship for short periods of time, but they generally even out over longer intervals. To the extent that wage growth exceeds productivity growth, unit labor costs rise and feed into price inflation. Actual price inflation affects expected price inflation which, in turn, affects wage growth. Thus, faster productivity growth indirectly affects compensation growth by lowering the price inflation which corresponds to any given rate of wage inflation.

The effect of productivity is very powerful by our estimates. The decline in productivity growth from 3.3 percent in 1961-67 to 0.8 percent in 1974-82 raised the natural rate by about 2.5 percentage points according to our calculations. But this may overstate the effects somewhat, since part of the productivity decline undoubtedly results from cyclical factors in the 1974-82 period. Nevertheless, few analysts place trend productivity growth in the 1970s much above 1.1 percent, which implies a 2 percentage point increase in the

\*Most researchers agree that trend productivity growth rather than current productivity growth should affect wages. However, few of the trend productivity measures have produced statistically significant results.

natural rate of unemployment due to the productivity slowdown.

### Demographics

Labor force growth affects the inflation-unemployment trade-off in complex ways. Rapid labor force growth tends to improve the measured trade-off because new workers are generally younger, inexperienced, and thus lower paid. This shifts the distribution of workers toward those at the bottom of the age and earnings scale, causing a slowdown in wage growth and a decline in the natural rate of unemployment. However, labor force growth also has offsetting indirect effects. If new entrants are less productive because of inexperience, more rapid labor force growth will tend to raise the natural rate by slowing productivity growth. Of course, if workers' wages are directly proportional to their productivity, then the two effects should exactly even out. However, our results, while tentative, suggest that on net more labor force growth tends to raise the natural rate of unemployment.

One reason that rapid labor force growth may raise the natural rate is that new workers and old workers may not be perfect substitutes. When labor force growth takes off rapidly, there may be a limit to the economy's ability to absorb the new workers, and some of them may have to queue temporarily as unemployed, worsening the trade-off. Or, new entrants to the labor force may take more time in their search for employment, again tending to raise the unemployment rate.

Most analyses suggest that the labor force growth rate will fall off in the 1980s, although a portion of the recent slowdown probably stems from the recession. Nevertheless, over the next few years the labor force will become more experienced and the economy may be better able to absorb a slower stream of new entrants than in the 1970s.

for labor force growth are also similar to those of the Administration. Moreover, in recent months, the productivity gains have surpassed any normal cyclical upturn. Were this to continue, the prospects would be for a natural rate of unemployment under 6 percent.

Of course, the reliability of all forecasts tends to diminish the further out they are drawn. The likelihood of unforeseen shocks increases as economic projections are extended further into the future. Nevertheless, it is important to realize that, in the absence of such shocks, there may be considerably more room for noninflationary economic expansion than is commonly assumed by many analysts. It is possible that

the pattern of growth and inflation in the mid-1980s may be closer to the 1960s model than the 1970s.

### Summary

Based on the evidence of the past twenty years and forecasts of real growth and unemployment for the next five, the outlook for nonaccelerating wages and prices is probably better now than at any time over the past decade. In the short run, the unemployment rate will probably be high enough to keep wage inflation decreasing or flat. Over the medium to long term, two factors should prevent a significant upturn in inflation. First, if the recovery is gradual as ex-

## Box 2: Determinants of the Natural Rate of Unemployment (continued)

### Government policies

Government programs can affect the unemployment-inflation trade-off either directly or indirectly. Direct effects come from employer payroll taxes, social security being most important, although unemployment insurance contributions also may have some effect. Our results indicate that employer social security tax increases enter one for one into compensation—that is, workers do not seem to mitigate their wage demands as a result of employer payroll tax increases. In the past, such increases have had a small effect, raising the natural rate by 0.1-0.2 percentage points. The rate increases currently scheduled for 1983-88 are somewhat larger than in recent years but should nevertheless contribute only about 0.15 percentage points to the natural rate.

Another program which may affect the unemployment-inflation trade-off is the extension of unemployment insurance benefits. Evidence from our statistical analysis and other sources suggests that the extension of benefits may offset a portion of the effect of higher unemployment on wage growth.<sup>†</sup> In part, this simply may reflect the requirement that workers remain in the labor force to collect unemployment benefits. Extension also may reduce somewhat the incentives to search for work early during unemployment spells, raising the average duration of unemployment and thus the unemployment rate.

Other policies may have less direct effects, perhaps working through some of the factors discussed earlier. Easier immigration policies would tend to increase labor force growth, probably among relatively inexperienced and less productive workers, raising the natural rate. But investment incentives introduced in recent

<sup>†</sup>For example, see S. T. Marston, "The Impact of Unemployment Insurance on Job Search", *Brookings Papers on Economic Activity* (1975-1).

years may push in the opposite direction as the recovery picks up steam and capital per worker increases.

Protectionist policies while attractive in the short term may worsen the inflation-unemployment trade-off. By shielding weak industries, discouraging innovation, and diverting investment toward less competitive sectors, long-run productivity may suffer. More directly, domestic prices may shift upward if cheaper foreign products are blocked from the market. Potentially offsetting some of these effects are efficiency gains from running plants at nearer to full capacity. Nevertheless, over the long term, the losses from the protectionist policies are likely to outweigh the benefits.

More generally, the effects of foreign competition may differ in the short run from the long run. A rapid upsurge of imports, particularly if concentrated in specific industries, may increase structural unemployment in these sectors without significantly damping wage agreements in the economy overall. This would temporarily raise the unemployment rate which corresponds to any path of wage growth. The inflation effect may be muted, however, because the imported goods are likely to be cheaper than their domestic counterparts.

In contrast, the longer term effect of foreign competition may be to improve the inflation-unemployment trade-off. As workers move from the industries affected by foreign competition to other sectors, they should exert a downward effect on wage settlements in these sectors. As such, the net effect of competition may be to lower wage growth at any level of unemployment. Moreover, to the extent that the competition grows gradually rather than in a burst, the initial stage of increased structural unemployment may be avoided and the benefits from a more productive allocation of resources will be observed sooner.

pected, the unemployment rate will remain high relative to its natural rate even several years into the recovery. Second, it may take a lower unemployment rate than in the 1970s to generate inflationary wage increases because of renewed growth of labor productivity. If

we avoid major exogenous price shocks in food and raw materials markets and get improvements in productivity growth, the economy may finally pull itself out of the stagflation in which it has been mired for the last decade.

A. Steven Englander and Cornelis A. Los

### Technical Appendix: Computation of the Natural Rate of Unemployment

The short-term behavior of compensation growth is described by the expectations augmented Phillips curve:\*

$$(1) \quad w_t = p_t^e - bu_t + cx_t$$

where  $w_t$  is the rate of change in compensation per man-hour and  $p_t^e$  is the expected average rate of price inflation,  $u_t$  is the unemployment rate, and  $x_t$  captures all additional economic influences on compensation growth. A second equation allows inflation expectations to be determined by a simple adaptive expectations scheme:

$$(2) \quad p_t^e = p_{t-1}^e + \lambda(p_{t-1} - p_{t-1}^e).$$

The current expected average rate of price inflation is equal to the expected average rate of price inflation in the previous period adjusted by a fraction of the difference between this rate and the actual rate in the previous period. Price inflation is determined by unit labor costs:

$$(3) \quad p_t = w_t - q_t$$

where  $p_t$  is the rate of change of prices and  $q_t$  is trend productivity growth. Applying the definition of the natural rate of unemployment, being that rate of unemployment at which price inflation remains constant, the natural rate can be found as a function of productivity and other real economic factors. When expected inflation equals actual inflation, we have from equation (2):

$$(4) \quad p_t^e = p_{t-1}^e = p_t.$$

Substituting equation (4) into equation (3) and then into equation (1) results in an expression for the natural rate of unemployment:

$$(5) \quad u_t = (cx_t - q_t)/b.$$

In our estimated equation the crucial trade-off coefficient  $b$  has a value equal to 0.89. Notice that the natural rate of unemployment is not a constant but is negatively related to productivity  $q_t$  and positively related to the economic variables represented by  $x_t$  which tended to raise wage growth in equation (1).

\*This is, in very simplified form, the estimated equation of Box 1.

# Federal Deficits and Private Credit Demands

## Economic Impact Analysis

One of the few areas of agreement among public officials and economists alike is the belief that the United States is facing deficits of unprecedented size—in absolute terms and relative to the economy—over the next several years. There are, of course, some technical estimating differences among professionals, but these are minuscule compared with wide differences in the outlook for the deficit that existed a year ago. The important questions now are what are the chances that the projected deficits will be reduced and, if they are not cut, what are the implications of large deficits for monetary policy and ultimately for the economy in general.

The analysis that follows is in three parts. First, after a brief introductory discussion to put the magnitude of the future deficits into a historical and international perspective, the factors that have led to the dramatic shift in the outlook in the last few years are reviewed. Next, the question of whether it is likely that the economy can “grow out of the deficits” is explored. At the end of these two parts, it will be clear that the budget deficit is not likely to be reduced very easily or very rapidly. This conclusion is the motivating factor behind the final section which discusses the implications of large deficits for monetary policy and the economy.

The views expressed in this article are those of the author, James R. Capra, formerly Manager of the Domestic Research Department, and do not necessarily reflect those of the Federal Reserve Bank of New York. The author would like to thank William Cohen for his help on net interest estimates and Carl Palash for his work on estimates of saving.

### Uncharted fiscal territory

As shown on Chart 1, the United States is moving into uncharted fiscal territory. The deficit will equal 6½ percent of gross national product in 1983, and by 1985—three years into a recovery—it could still be about 6 percent of GNP. Usually the deficit peaks shortly after the end of a recession and then drops by a significant amount. But that is not likely to be the case in 1983 through 1985, under reasonable assumptions about how the economy will perform.

While Chart 1 compares the projected deficits to previous experience, Table 1 puts them into an international perspective. As a percentage of GNP, projected general government deficits for the United States (the combined deficit or surplus of the Federal and state and local sectors) are well in excess of the 1970-80 average for Japan, Germany, the United Kingdom, and France. More important, the projections of the general government deficit as a percentage of net saving, 50 to 60 percent for the United States in 1984 and 1985, is about double the highest figure for Japan during the decade—31 percent in 1978—and is above the highest figure for any of the four countries, except the United Kingdom, during their 1975 recession.

### What is driving the widening gap?

A few years ago, in the late 1970s, even the most pessimistic of fiscal policy economists were not projecting deficits of 6 percent of GNP, especially not well into a recovery. What happened? Some argue that the tax cut is responsible for the problem. Others

contend it is the defense buildup or uncontrolled non-defense spending. Still others say the recession put the economy on a growth path so far below potential that it will never fully recover. They argue that lower real output and incomes, combined with disinflation, have permanently eroded the revenue base, that is, nominal incomes. It is important to explore the question of what has caused the deficit to grow, if only to emphasize that the problem is one that is not likely to go away without some hard and difficult decisions being made.

As shown on Chart 2, by 1985, revenues are projected to be 18.7 percent of GNP and outlays 24.6 percent, for a deficit of 5.9 percent of GNP. Using 1980 as a reference point, a year when the deficit was 2.3 percent of GNP, revenues are projected to decline and outlays increase. The swing is 1.4 percentage points for revenues and 2.2 percentage points for outlays (Table 2). The defense increase (1.7 percentage points) and higher government interest payments (1.4 percentage points) more than account for the spending increases. Nondefense outlays are pro-

jected to decline as a percentage of GNP, although, as will be shown later, there are both ups and downs within this category.

### Revenues

The 1.4 percentage point decline in Federal revenues as a percentage of GNP is made up of reductions of the corporate and individual income tax burden, offset partially by the rise in social security taxes enacted in the 1977 and 1983 Social Security Act Amendments (Table 3A). The second part of the table partitions the change in revenues, compared with 1980, into recession-related changes and legislative changes. The message of the table is that, although the recent recession is a factor in the decline in revenues as a percentage of GNP, it is far less important than the legislative changes—in particular the Economic Recovery Tax Act (ERTA).

A different way of looking at the revenue projection is to ask if the decline was deliberate. This can be done by comparing current projections of revenues

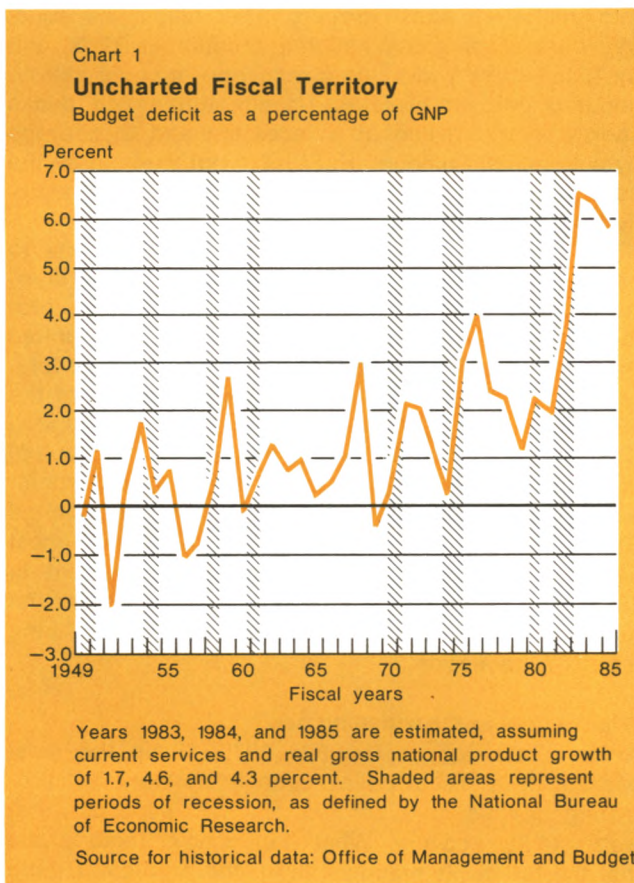


Table 1

### General Government Deficits, 1970-80

Country	Average	Highest*
<b>As a percentage of GDP or GNP</b>		
Japan .....	-2.17	-5.5 (1979)
Germany .....	-1.85	-5.7 (1975)
United Kingdom .....	-2.37	-4.9 (1976)
France .....	-0.17	-2.2 (1975)
United States† .....	-0.88	-4.2 (1975)
Projection for the United States:	1983 = -5.4	
	1984 = -4.7	
	1985 = -4.7	
<b>As a percentage of net private savings</b>		
Japan .....	-11.3‡	-31.0 (1978)
Germany .....	-19.6	-55.9 (1975)
United Kingdom .....	-30.2	-70.0 (1975)
France .....	-1.8	-20.2 (1975)
United States† .....	-14.8	-52.4 (1975)
Projection for the United States:	1983 = -70-80	
	1984 = -50-60	
	1985 = -50-60	

\* Figures in parenthesis indicate year of highest deficit for decade.

† Includes state and local governments.

‡ Average for 1975-80 was 24.8 percent.

Source: Organization for Economic Cooperation and Development (June 1983).



Table 2

**How the Budget Changes after 1980**

As a percentage of GNP

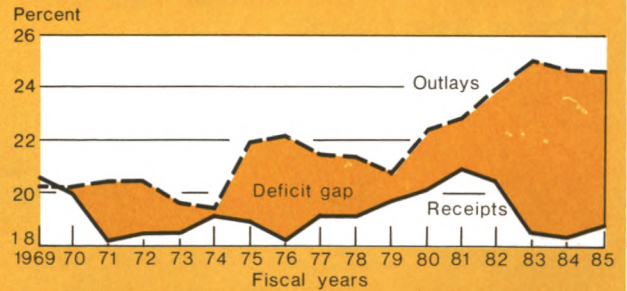
Budget items	1980	1985*	Change (percentage points)
Deficit .....	-2.3	-5.9	-3.6
Revenues .....	20.1	18.7	-1.4
Outlays .....	22.4	24.6	+2.2
Defense .....	4.8	6.5	+1.7
Interest .....	2.0	3.4	+1.4
Nondefense .....	15.6	14.7	-0.9

\*Current policy (current services) estimates.

Chart 2

**Growing Gap in Share of GNP**

Federal receipts vs. outlays



Projections for 1983, 1984, and 1985 are Federal Reserve Bank of New York estimates.

Source for historical data: Office of Management and Budget.

Table 3

**(A) Composition of Decline in Federal Revenues**

As a percentage of GNP

Revenue source	1980	1985	Change
Individual income .....	9.5	8.4	-1.0
Corporate income .....	2.5	1.6	-0.9
Social insurance .....	6.1	6.9	+0.8
Other .....	2.0	1.7	-0.3
Total .....	20.1	18.7	-1.4

**(B) Factors Contributing to Change in Federal Revenues**

As a percentage of GNP, 1985 compared with 1980

Revenue source	Total change	Recession related	Social security tax increase	ERTA/TEFRA*	Wind-fall profit
Individual income .....	-1.0	-0.2†	—	-0.8	—
Corporate income .....	-0.9	-0.4‡	—	-0.5	—
Social insurance .....	+0.8	—	+0.8	—	—
Other .....	-0.3	-0.2§	—	-0.2	+0.1
Total change .....	-1.4	-0.8	+0.8	-1.6	+0.1

\*Economic Recovery Tax Act and Tax Equity and Fiscal Responsibility Act.

†The 1980 unemployment rate was 7.3 percent and real GNP was 4.0 percent below potential. For 1985, the unemployment rate is assumed to average 8.9 percent and real GNP is projected to be 8.0 percent below potential. If the gap had remained the same, individual income taxes as a share of GNP would have risen because of the progressive tax structure.

‡Profits before taxes (pre-accelerated cost recovery basis) as a share of GNP are projected to be 7.8 percent in 1985, compared with 9.5 percent in 1980. If the profits share had remained at 9.5 percent, corporate taxes as a percentage of GNP would have been larger.

§This change reflects the effect of lower interest rates (assumed to be related to the 1982 recession) on Federal Reserve earnings and the effect of lower oil prices on windfall profit taxes.

Table 4

### How Individual-Corporate Income Taxes for 1985 Compare with What was Anticipated When ERTA was Passed?

As a percentage of GNP

Changes	Individual	Corporate
ERTA estimate .....	8.3	1.7
Changes:		
Economic changes .....	-0.6*	-0.6†
‡Revenue loss (revised estimate)	+0.4	—
TEFRA .....	+0.3	+0.5
Subtotal .....	+0.1	-0.1
Current estimate .....	8.4	1.6

\* -0.2 because of lower real GNP; -0.4 because of lower inflation.

† The corporate profits share of GNP (pre-accelerated cost recovery basis) was assumed to be 9.0 percent at the time ERTA was passed, compared with a current estimate of 7.8 percent.

‡ The Treasury and Joint Committee on Taxation revised their estimates of the revenue effects of the tax cuts subsequent to enactment.

Table 5

### Where in the Budget will the GNP Share Decline?

Outlays as a percentage of GNP

Budget items	1980 Actual	1985 Baseline projection	1980-85 change
National defense .....	4.8	6.5*	+1.7
Benefit payments:			
Means tested .....	2.2	2.1	-0.1
†Nonmeans tested ...	8.8	9.6	+0.8
Grants to state and local governments‡ .....	2.3	1.5	-0.8
Other Federal operations and subsidies .....	2.3	1.5	-0.8
Net interest .....	2.0	3.4	+1.4
Total .....	22.4	24.6	+2.2

\* Assumes 5 percent real growth in 1984-85 budget authority and pay raises of 4 percent in January of each year.

† Such as social security and medicare benefit payments.

‡ Excludes grants for benefit payments for individuals.

with what public officials were told was going to happen to 1985 individual and corporate income tax revenues when ERTA was passed. Recently, some have argued that the deficit increase is larger than anticipated two years ago because inflation is now forecast to be so much lower than projected then, in the summer of 1981, and because the real economy in 1985 is expected to be a lot farther below potential than anticipated in the Administration's economic scenario that was used at the time.<sup>1</sup>

Those who take this position tend to overestimate the effect of the change in economic assumptions on revenues as a share of GNP. Changing economic assumptions can drastically affect estimates of revenues in billions of dollars, but the effect on the share of GNP is much smaller in a proportional sense. A weaker economy and lower inflation mean that both GNP and revenues are lower. Whatever effect there is on the revenue share of GNP is primarily the result of the progressive or graduated character of individual income tax rates. This causes individual income tax revenues to fall by a somewhat greater percentage than the fall in income. But the effect on the total

revenue share of GNP is not very large, in part because individual taxes will represent less than 50 percent of total revenues by 1985 and in part because starting in 1985 the effect of inflation on the revenue share of GNP is muted by the start of tax indexing. Also ignored by those who suggest that revenues will fall by more than anticipated is the fact that the Tax Equity and Fiscal Responsibility Act (TEFRA) effectively took back some of the ERTA tax cuts, a political development not anticipated in 1981. When the effects of the economic and legislative changes since the summer of 1981 are tabulated, as in Table 4, the results for individual and corporate income taxes are that the estimated share of GNP in 1985 is virtually unchanged from what was intended when ERTA was passed. Individual income taxes for 1985, as a percentage of GNP, are up  $\frac{1}{10}$  percentage point (8.4 percent compared with 8.3 percent) from what was planned and corporate income taxes are down  $\frac{1}{10}$  (1.6 percent compared with 1.7 percent).

The conclusion to be drawn from this discussion of the revenue side of the growing deficit is that the decline in revenues as a percentage of GNP is primarily because of the 1981 tax cuts. The recession is a much less important factor. And the projected decline, especially in individual and corporate income taxes, is about what was intended.

<sup>1</sup> See the House Budget Committee Recommendations for the First Concurrent Resolution (March 1983), page 72, for a discussion of the disinflation point.

## Outlays

It is clear that in an arithmetic sense defense and government interest payments more than account for the projected increase in outlays from 22.4 percent of GNP in 1980 to 24.6 percent by 1985. Nondefense spending as a percentage of GNP is projected to decline. But this calculation masks the fact, shown in Table 5, that the GNP share for nonmeans-tested benefit payments such as social security and medicare increases significantly. At the same time, grants to state and local governments and other Federal operations (primarily Federal civilian agency pay) decline.

The size of the defense buildup is a familiar topic. A relevant point that has not been made, though, is that much of this buildup is already locked in. Thus, although the estimates in Table 5 assume that real growth of budget authority will be held to 5 percent in 1984 and 1985, defense outlays as a percentage of GNP will still rise significantly by 1985. Defense expenditures will rise even more if the cuts assumed in the First Concurrent Resolution are not implemented and budget authority growth in real terms is not held to 5 percent. For example, if authority increases by as much as suggested by the President, projected outlays in 1985 as a percentage of GNP would be 0.4 to 0.5 percentage points higher than shown in Table 5.

Nonmeans-tested benefit payments are dominated by social security cash payments—Old Age, Survivors, and Disability Insurance—and medicare, which make up almost three fourths of the category (Table 6). The problem of future growth of entitlement and benefit payments really boils down to these two programs. They account for more than all the 1980-85 growth. The other programs decline slightly, on balance, as a percentage of GNP. An important point to note is that medicare, as a percentage of GNP, is projected to grow faster than social security cash payments. Its share of GNP is projected to rise from 1.2 percent in 1980 to 2.0 percent in 1985. The figures in Table 6 imply that, if spending for nonmeans-tested programs is to be brought under control, social security cash payments (which were just recently addressed in the Social Security Amendments of 1983) and medicare would probably have to absorb a significant part of the cutback.

How do the projections for 1985 compare with the Administration's original budget plans of March 1981? In March 1981, the Administration was seeking to reduce outlays to 19.2 percent of GNP by 1985. The baseline projection is now 24.6 percent (a difference of 5.4 percentage points). The largest increases in the projection since 1981 are due to rises in nonmeans-tested benefit payments, rises in net interest, and the failure to achieve an undistributed cut of over \$40 billion (equivalent to 1 percent of GNP) that the Ad-

ministration never ultimately proposed but which was included in the March 1981 budget totals.

One reason why the projection has changed is that, on balance, the budget cuts were smaller than the President included in his plan—by 0.5 percentage points as a percentage of GNP or 1.5 percentage points if the Congressional reductions to the President's defense plan are not included. Most of the change was the \$40 billion undistributed cut. Excluding that cut, the Congress actually passed nondefense budget reductions about equal to what was proposed in March 1981 although the distribution of the cuts was somewhat different (Table 7). If defense is included, the cuts exceeded the President's proposal.

Automatic stabilizers, that is, higher than anticipated unemployment benefits resulting from a higher than projected unemployment rate, and higher interest payments, resulting from higher rates and greater than anticipated debt outstanding, are responsible for 1.9 of the 5.4 percentage point change in the projection of 1985 outlays as a percentage of GNP. But the largest element in the change is the fact that there is not necessarily a full and automatic response of outlays to a lower than anticipated nominal GNP. Lower inflation results in lower outlays for some, but not all, programs. But even this occurs with an appreciable lag. Lower real economic growth has no effect on outlays aside from the automatic stabilizers just mentioned. Thus, when nominal GNP falls, the denominator of the spending-GNP ratio falls much more rapidly than the numerator.

Table 6

### What is the Composition of 1980-85 Growth of Nonmeans-Tested Benefit Payments?

As a percentage of GNP

Benefit payments	1980	1985 baseline projection	Change
Social security:			
*Cash payments .....	4.6	5.1	+0.5
Medicare .....	1.2	2.0	+0.8
Civil service/military retirement .....	1.0	1.1	+0.1
Unemployment compensation .....	0.7	0.6	-0.1
Veterans benefits .....	0.8	0.5	-0.3
Other .....	0.5	0.3	-0.2
Total .....	8.8	9.6	+0.8

\*Old-Age, Survivors, and Disability Insurance.

The last column in the table is an attempt to account for the unresponsiveness of outlays to lower nominal GNP. It shows that, even if all the President's proposals had been enacted intact, lower nominal GNP, unaccompanied by lower nominal outlays, would have raised the GNP share for outlays by 3.0 percentage points. To keep the outlay target at 19.2 percent of GNP, the President would have had to propose successively deeper cuts in nominal outlays as the projections for real growth and inflation were lowered.

For outlays, then, the projected growth as a percentage of GNP since 1980 is comprised of defense, net interest, and nonmeans-tested benefit payments.

Grants and other operations have been reduced significantly, while the GNP share for means-tested benefits is projected to be virtually unchanged. The projection for outlays as a share of GNP in 1985 has increased significantly since the President submitted his March 1981 plan. This is primarily because proposals were not made nor was Congressional action initiated that would lower nominal outlays by an amount proportional to the loss in projected GNP. In an indirect sense, recession and disinflation had more of an effect on the President's 1981 plan to cut the outlay share of GNP than it did on his path for revenues.

Table 7

### What Happened to the Administration's Original Spending Plan for 1985?

Outlays in 1985 as a percentage of GNP

Budget items	March 1981 estimate	1985 baseline projection	Change
National defense .....	6.5	6.5	—
Benefit payments:			
Nonmeans tested .....	8.3	9.6	+1.3
Means tested .....	1.7	2.1	+0.4
Grants .....	1.0	1.5	+0.5
Other operations and subsidies .....	1.2	1.5	+0.3
Net interest .....	1.5	3.4	+1.9
Undistributed cut .....	-1.0	—	+1.0
<b>Total .....</b>	<b>19.2</b>	<b>24.6</b>	<b>+5.4</b>

### Reasons for Change from 1981 Plan

Outlays in 1985 as a percentage of GNP

Budget items	Total change	Congressional action/inaction	Automatic stabilizers*	Interest payments: more debt	higher rates	Lower GNP inflexible outlays†
National defense .....	—	-1.0	—	—	—	+1.0
Benefit payments:						
Nonmeans tested .....	+1.3	-0.2	+0.2	—	—	+1.3
Means tested .....	+0.4	+0.1	—	—	—	+0.3
Grants .....	+0.5	+0.3	—	—	—	+0.2
Other operations and subsidies .....	+0.3	+0.1	—	—	—	+0.2
Net interest .....	+1.9	—	—	+1.3	+0.4	+0.2
Undistributed cut .....	+1.0	+1.2	—	—	—	-0.2
<b>Total .....</b>	<b>+5.4</b>	<b>+0.5</b>	<b>+0.2</b>	<b>+1.3</b>	<b>+0.4</b>	<b>+3.0</b>

\*Higher than anticipated unemployment benefits resulting from a higher than projected unemployment rate.

†Measures effect of lower GNP on outlays as a percentage of GNP if 1985 outlays, in nominal terms, were to equal the March 1981 target.

### Will the economy grow out of the projected deficits

Recently, the suggestion has been made that the economy will grow out of the projected deficits. The reasoning is that higher incomes, resulting from more economic growth, will boost tax revenues sufficiently to wipe out a significant part of the deficits. To examine this proposition more carefully, three alternatives were chosen to the basic economic scenario used for the calculations in the previous section. Also, the projections were extended through 1988.

### Real GNP

Most forecasters have recently revised their projections for 1984 in response to a faster than expected expansion in production and employment in the second quarter of 1983. But the important question for the long-run prospects for the deficit is what growth to project for the extended period 1984-88.

The baseline economic scenario used here assumes real GNP growth (year-over-year basis) of 4.6 percent in fiscal 1984, 4.3 percent in 1985, and 3.8 percent in each year 1986-88. Over the five-year period, 1984-88, cumulative real GNP growth under these assumptions would be 22.0 percent.

In the postwar era, there have in fact been selected five-year periods over which more growth was achieved. For example, in the five-year period ended with 1966, real GNP grew by 30.2 percent. In the five-year period just after the war, ended with 1952, real GNP grew by 27.7 percent. The momentum of growth during these periods, together with the simple arithmetic of including at least two of the years from these peak growth spurts in the calculation of moving averages for five-year periods, meant that the periods ended in 1963, 1965, 1967, 1968, 1969, and 1953, 1954, and 1955 also showed growth above the 22 percent assumed in the baseline economic assumptions (Table 8). But, if the years affected by the two postwar growth spurts are disregarded, the next highest five-year period is the one ended in 1980—the recovery from the 1974 recession. Five-year growth was only 19.7 percent, lower than assumed for 1984-88. In fact, there was not one five-year period ended in the 1970s when cumulative growth was as high as 20 percent.

In economics, historical precedent is not proof. Yet it does temper our judgment of what is likely. Clearly, a growth spurt comparable to 1962-66 is possible, but it does not appear likely. The Administration, in its January budget document, lists several reasons why such rapid growth probably will not occur. For one thing they suggest that since capacity utilization is now much lower than it was at the start of the earlier period, a comparable surge in fixed investment will probably not happen—especially at current levels

Table 8

### Cumulative Real GNP Growth over Five-Year Periods

Year designates final year of period; in percent

Year	Cumulative five-year growth
1952	27.7
1953	27.3
1954	25.2
1955	22.9
1956	15.9
1957	13.8
1958	9.2
1959	17.2
1960	12.1
1961	12.7
1962	17.0
1963	22.3
1964	21.4
1965	26.1
1966	30.2
1967	26.4
1968	27.1
1969	24.1
1970	16.8
1971	14.0
1972	17.3
1973	18.5
1974	14.6
1975	13.5
1976	15.7
1977	15.5
1978	14.7
1979	18.7
1980	19.7
1981	15.7
1982	7.8

of real interest rates. They also mention that financial difficulties faced by many lesser developed countries will be a drag on future U.S. exports.

More fundamentally, over extended periods of time it is best to think about the growth of real GNP as the sum of the growth of employment and labor productivity. In the five-year period ended with 1966, real GNP growth averaged 5.4 percent per year. Civilian employment grew by 2.0 percent per year (2.6 percent in the nonagricultural sector) and productivity by 3.3 percent. In the five-year period ending in 1988, real GNP—according to the baseline economic assumptions—would grow by about 4.1 percent per year, with civilian employment growing by 2.5 percent annually and productivity by 1.7 percent. (Average weekly hours are assumed to continue their long-run secular decline, falling 0.2 percentage points.)

The big difference between economic performance in the early sixties and the projection for the mid-

Table 9

**Alternative Economic Assumptions**

Fiscal year over fiscal year growth rates; in percent

Fiscal year	(Baseline)		Path A (1962-66)*		Path B (1948-52)*		Path C (1976-80)*	
	Real GNP	GNP deflator	Real GNP	GNP deflator	Real GNP	GNP deflator	Real GNP	GNP deflator
1984 .....	4.6	4.0	6.0	5.5	6.0	5.5	4.5	3.9
1985 .....	4.3	4.0	6.0	6.5	5.7	6.5	3.4	3.9
1986 .....	3.8	4.0	5.5	7.5	5.0	7.0	3.4	3.8
1987 .....	3.8	4.0	5.0	7.5	4.5	7.0	3.4	3.8
1988 .....	3.8	4.0	4.6	7.5	3.9	7.0	3.4	3.7

\* Real GNP growth was made, on average, the same as in the period identified. Inflation that is consistent with that growth was then estimated. Inflation was not made the same as in the period identified, since labor force, productivity, and energy price outlooks are now much different.

eighties is productivity. As low as the projection for productivity is, it still is significantly better than the performance of the past five years. In 1982, the *level* of output per man-hour in the nonfarm business sector averaged exactly what it did in 1977—no growth in five years. While it is unlikely that the experience of the last five years will be repeated, neither is it probable that an explosion in productivity will occur and then be sustained for five years. The factors contributing to the slowdown in productivity growth are not likely to change dramatically overnight.<sup>2</sup> It is true that in the first quarter of 1983, productivity did grow at a 4.8 percent annual rate. But a one- or two-quarter jump in productivity at the start of a recovery, before workers are rehired, is normal. In fact, 4.8 percent is well below the average of 7.9 percent for the first quarter of postwar recoveries. Thus, it does not appear reasonable to use the first-quarter numbers to argue that the long-range productivity assumptions are too low.

The growth of 2.5 percent annually in employment under the baseline economic assumptions would be sufficient to reduce the unemployment rate to 6 percent by the end of the period, assuming labor force growth of about 1.7 percent per year. In the 1962-66 period, the labor force grew by 1.5 percent per year, while employment was growing by 2.0 percent. Thus employment growth in the 1984-88 period under the baseline

assumptions is assumed to be even faster, relative to labor force growth, than in 1962-66.

A repeat of the 1962-66 growth spurt, while technically possible, is not likely, although estimates of the effects of such a recovery on the deficit will be presented. But, first, it is necessary to state the inflation rates that are assumed to go with alternative rates of real GNP growth.

*Inflation*

The baseline economic assumptions project inflation, as measured by the GNP deflator, to average about 4 percent annually. The projections assume an absence of food or oil price shocks—about the only assumption that can be made—but it is clear that these could change the outlook considerably. From a more fundamental economic standpoint, the character of the recovery that is projected implies that not until 1988 would the economy approach “potential”—the level of GNP above which most economists believe that inflation will accelerate. Thus, under the baseline real GNP forecast, inflation would remain moderate throughout the period.<sup>3</sup>

If the economy were to grow at the 1962-66 pace, accelerating inflation would probably reassert itself more quickly. By 1986, real GNP would be in excess

<sup>2</sup> J. R. Norsworthy, Michael J. Harper, and Kent Kunze, “The Slowdown in Productivity Growth, Analysis of Some Contributing Factors” in *Brookings Papers on Economic Activity* (1979:2); Edward F. Denison, *Accounting for Slower Economic Growth* (Brookings Institution, 1979); Edward A. Hudson and Dale W. Jorgenson, “Energy Prices and the U.S. Economy, 1972-1976”, *DRI Review* (September 1978).

<sup>3</sup> For this analysis, potential GNP is defined as the level of real GNP when the unemployment rate is 6 percent. The question of whether inflation is likely to accelerate under a growth path similar to the baseline scenario used here is explored in some detail in the article by Steven Englander and Cornelis Los elsewhere in this *Quarterly Review*. Their conclusion is that an acceleration is not likely until the unemployment rate falls below 6 percent unless exogenous food or energy price shocks occur.

of potential GNP. The resulting faster inflation would improve the deficit outlook. Revenues, which tend to respond fully and immediately to higher inflation, would increase by more than outlays, which respond only partially to more inflation and with a lag. An acceleration of inflation would reduce the likelihood of sustaining rapid real growth, so that in a sense a high growth-high inflation scenario might not be feasible. Nevertheless, for illustrative purposes, the next section includes estimates of current services deficits under two such economic scenarios. Also included are estimates of current services deficits if the economy were to recover at the 1976-80 pace, with real growth averaging 3.6 percent annually over the next five years.

*Budget deficits under alternative economic paths*

Three alternatives to the baseline economic scenario were selected for use in calculating projected budget deficits. The three paths—A, B, and C—correspond to average annual growth of 5.4 percent, equivalent to the experience of 1962-66, 5.0 percent (1948-52), and 3.6 percent (1976-80). In all the paths, growth is assumed to be more rapid at first and to decline gradually. For example, under path A, real GNP growth is 6.0 percent in both fiscal years 1984 and 1985 (Table 9).

For inflation, a gradually widening discrepancy between the inflation rate in the baseline projection and the alternative paths is assumed. The process might not be that gradual if inflation expectations were to anticipate rapidly accelerating price increases.

Interest rates tend to be sensitive to the current and anticipated inflation rate. For the calculations of interest on the public debt, it was assumed that the gap between the inflation rates in the baseline and the rates in the alternative paths would be fully transmitted to interest rates. Thus, the rates on new Treasury financing would be 3.5 percentage points higher in 1988 under path A than under the baseline.

The baseline deficit projection grows from about \$220 billion in fiscal year 1984 to \$300 billion by 1988 (Table 10). There is no question that more rapid GNP growth, like the record growth in 1962-66, would alter the outlook. But the improvement is not so great or so rapid as might be expected. Specifically, under path A, the current services deficit would decline to about \$180 billion by 1985 and to \$150 billion by 1988. The estimates contain four separate effects of the economy on the budget:

- Higher revenues because of higher real GNP and higher prices (\$215 billion in 1988).
- Lower outlays for unemployment compensation, food stamps, and welfare (\$10 billion in 1988).

Table 10

**Alternative Deficit Projections**

By fiscal year; in billions of dollars

Fiscal year	Baseline	Under path A (1962-66) growth rate	Under path B (1948-52) growth rate	Under path C (1976-80) growth rate
1984	-222	-200	-200	-222
1985	-225	-180	-180	-235
1986	-243	-165	-175	-260
1987	-276	-165	-175	-300
1988	-300	-150	-185	-330

- Higher outlays for indexed entitlements because of higher inflation (\$60 billion in 1988).
- Lower interest outlays because of lower debt outstanding as a result of deficits being smaller than in the baseline (\$45 billion in 1988).
- Higher interest outlays because of higher interest rates on Treasury debt as a result of higher inflation (\$60 billion in 1988).<sup>4</sup>

It is important to note that, if by some chance the rate of inflation were not to accelerate even though real GNP were growing at a record pace, the deficits would be *larger* than under path A. There would be no effect on indexed entitlements or on the interest rates for Treasury debt, but revenues would not grow as much because nominal income would be lower than under path A. The 1988 deficit would be about \$185 billion under this hypothetical rapid growth-low inflation scenario, compared with \$150 billion under path A.

Under path B, the 1948-52 growth scenario, the deficit would hover around \$180 billion throughout the period. Finally, under path C, a recovery similar to that of the 1976-80 period, the deficit would be even larger than in the baseline—about \$330 billion in 1988. The year-by-year estimates for all three paths are summarized in Table 10.

As a percentage of GNP, deficits under the three paths contrast more sharply with the baseline figures. For example, the 1988 deficit of \$300 billion for the baseline would be 6.3 percent of GNP. The \$150 billion deficit under the record growth of path A would be 2.6

<sup>4</sup> This includes about \$50 billion from higher rates and \$10 billion because financing the higher rates caused more debt to be created.

percent of GNP—substantially more modest, but still well above the postwar average of 0.9 percent and the average of 1.6 percent between 1965 and 1980. (If faster real growth were for some reason not accompanied by more rapid inflation, the deficit would be 3.2 percent of GNP in 1988.) Under path B, the 1988 deficit would be 3.1 percent of GNP. The path C deficit, which reflects slower economic growth and lower inflation, would be 7.1 percent of GNP in 1988.

Overall, analysis of budget trends reveals that explicit policy actions like the tax cut, institutional constraints like the failure of nominal outlays automatically to respond very much or very quickly to disinflation, and public support for social security, medicare, and a stronger defense appear to imply that large deficits could be a part of the economic landscape for the foreseeable future. More rapid GNP growth could improve the outlook somewhat, but even with record growth over the 1984-88 period the deficit would still be about \$150 billion by 1988 and the GNP share would be large by historical standards. If substantial deficits are likely under almost all circumstances, barring a major switch in public policy, what are the implications for monetary policy and the economy?

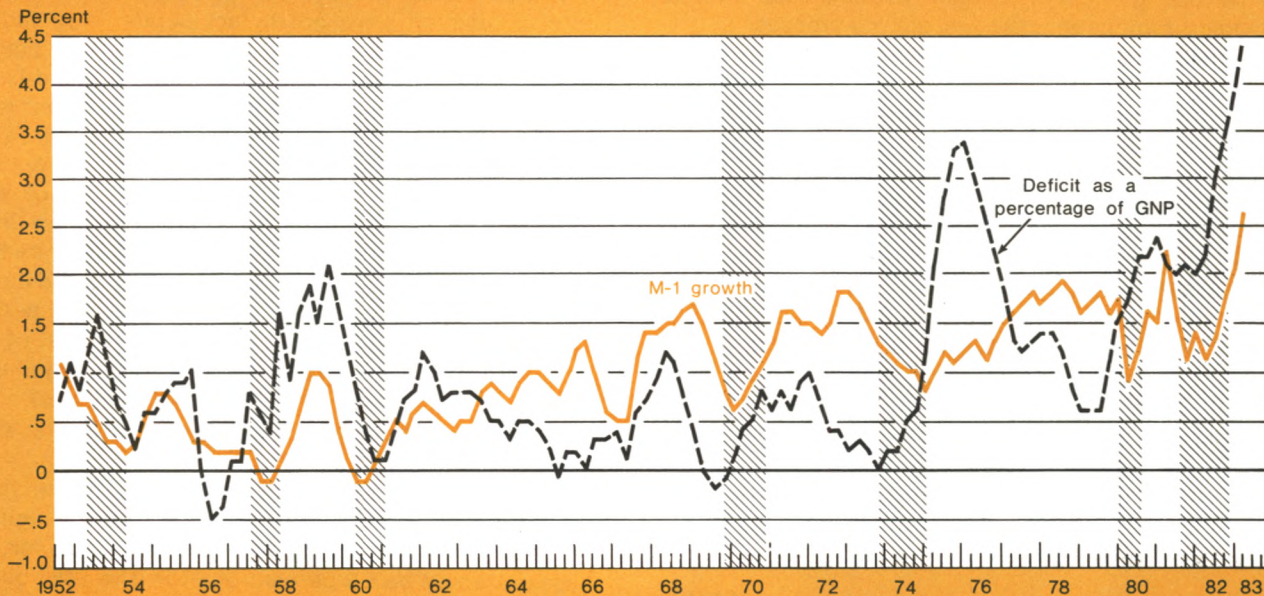
### Implications for monetary policy

On the surface, it is not entirely clear what the large deficit projections for the future mean for monetary policy. In the United States, there is no precedent for deficits that do not drop significantly (at least as a percentage of GNP) within six to twelve months after the end of a recession. In addition, even if the current deficit outlook were not unique, the historical relationship between deficits and monetary policy—at least as measured by M-1 growth—is ambiguous. The econometric results on this subject are as contradictory as any in the literature with the possible exception of the work on the relationship between social security and saving behavior. Chart 3 exemplifies this. Between the mid-1950s and 1974, money growth and deficits appear to track quite well, but between 1974 and 1980 there appears to be little relationship—possibly because the Federal Reserve was paying more attention to targeting the money stock or possibly because financial innovation was distorting the meaning of M-1 growth rates.

Money is not the only important economic variable that does not show a strong historical correspondence or correlation with deficits. The Secretary of the Treasury recently reiterated what many academicians re-

Chart 3

### The Deficit as a Percentage of GNP and M-1 Growth \*



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

Series are normalized by dividing by the mean of each series.



ported throughout the 1970s—namely, that deficits have historically not been high at the same time interest rates and inflation rates were high. But this lack of historical or statistical correspondence by no means proves there is no relationship between deficits and these other variables. It may mean that the deficits were not big enough to make a difference, or that other policies or economic events were working to offset the effects. To evaluate the potential effects of the large projected deficits on the economy, simple correlation analysis is insufficient. Some model or view of how the economy works is an essential first step. Next is a forecast of the outlook for the economy, together with some assumption about how public policy (especially monetary policy) will respond or choose not to respond to the deficits.

### The near term

Ironically, one of the factors contributing to what many thought would be the slow pace of the current recovery is the relative weakness of the fiscal stimulus. This does not mean that the level of deficit is small. The important thing to focus on, from the standpoint of fiscal stimulus, is the change or swing in the deficit. As shown in Table 11, the increment to the deficit in 1983 (as a percentage of GNP) is less than one half of that in the first year of the 1975-76 recovery.<sup>5</sup>

A useful way of summarizing fiscal-monetary policy interactions is the graphical framework of IS-LM curves. The position of the IS curve, which is the locus of combinations of interest rates and output that correspond to equilibrium in the markets for goods and services (output market), is determined by, among other things, government expenditures and taxes. The position of the LM curve, which is the locus of interest rate-output combinations consistent with equilibrium in the money market, is determined by, among other things, monetary policy.

With the fiscal policy-induced shift in the IS curve in late 1982 and 1983 being relatively small, because the fiscal year 1983 deficit as a percentage of GNP grew by only 1.7 percentage points, the movement in the IS curve was rather modest—as shown in the first drawing in Chart 4. Thus, the only other short-run change that would induce an increase in output was an LM curve shift.<sup>6</sup> Between late summer and mid-December 1982, reserve pressures were eased

Table 11

### Fiscal Policy Comparison, 1974-76 vs. 1982-84\*

As a percentage of GNP

Budget item	1974	1975	1976	1982	1983	1984
Revenues .....	20.4	18.8	19.5	20.1	18.5	18.3
Expenditures .....	21.2	23.4	22.6	24.9	25.0	24.7
Deficit .....	-0.8	-4.6	-3.2	-4.8	-6.5	-6.4

### Change in deficit as a percentage of GNP

#### First recovery year

1974-75 .....	Increase of 3.8 percentage points
1982-83 .....	Increase of 1.7 percentage points

#### Second recovery year

1975-76 .....	Decrease of 1.4 percentage points
1983-84 .....	Decrease of 0.1 percentage points

\* Estimates are for year before the start of recovery, first recovery year, and second recovery year. Thus, the figures for 1974 represent deficits and GNP for 1974-II through 1975-I. Figures for 1982 represent 1982-I through 1982-IV.

and the discount rate was cut seven separate times, falling from 12 percent in early July to 8.5 percent on December 15. Short-term rates fell and long-term rates followed them. Yields on thirty-year Treasury bonds fell from 13.92 in late June to 10.54 in December. The LM curve shifted down, as graphically shown in the second drawing in Chart 4.

Up to this point in the analysis, deficits would appear to be relatively unimportant to the recovery. In fact, it could be argued that cutting the 1983 or 1984 deficit might reduce demand (shift the IS curve down) and, without an offsetting monetary policy change (LM curve shift), such a move toward fiscal restraint would slow the recovery.

However, there is at least one way in which deficits may in fact endanger the recovery by maintaining high nominal and real intermediate- and long-term interest rates even in the face of a monetary policy designed to facilitate recovery through moderate levels of short-term rates. For many purposes the interest rates of fundamental importance to spending decisions are intermediate- and long-term rates. Open market operations and discount rate cuts, however, directly affect only short-term rates. There is no guarantee that long-term rates will follow. They usually do, but not always. In December, for example, after the most recent discount rate cut, long-term rates did not follow and, in fact, backed up a bit. There are numerous explanations for this. A commonly held view is that the market had already anticipated the discount rate cut and

<sup>5</sup> This is not to say that over a more extended period the budget will not be more stimulative than in the past. It will be, as exemplified by the second recovery year comparison in Table 11.

<sup>6</sup> The LM curve on Chart 4 is drawn as a nearly horizontal line. This would appear to be appropriate for short periods of time. Over the long term, the curve is more nearly vertical.

Chart 4

**Near-term IS-LM Equilibrium**

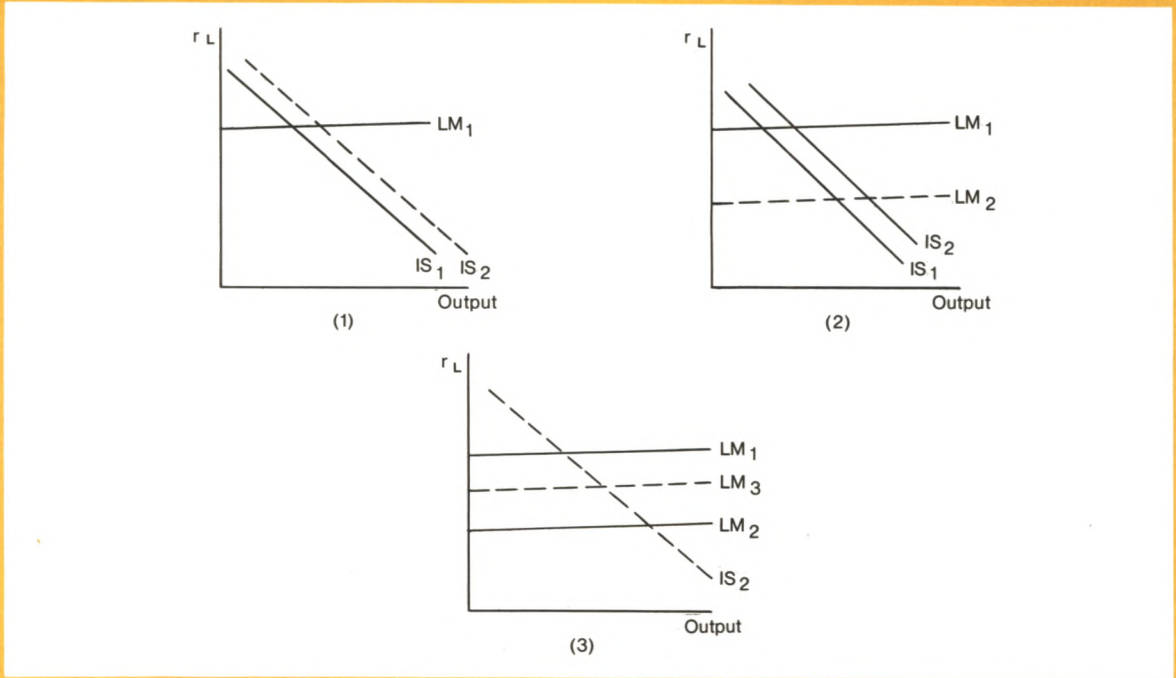
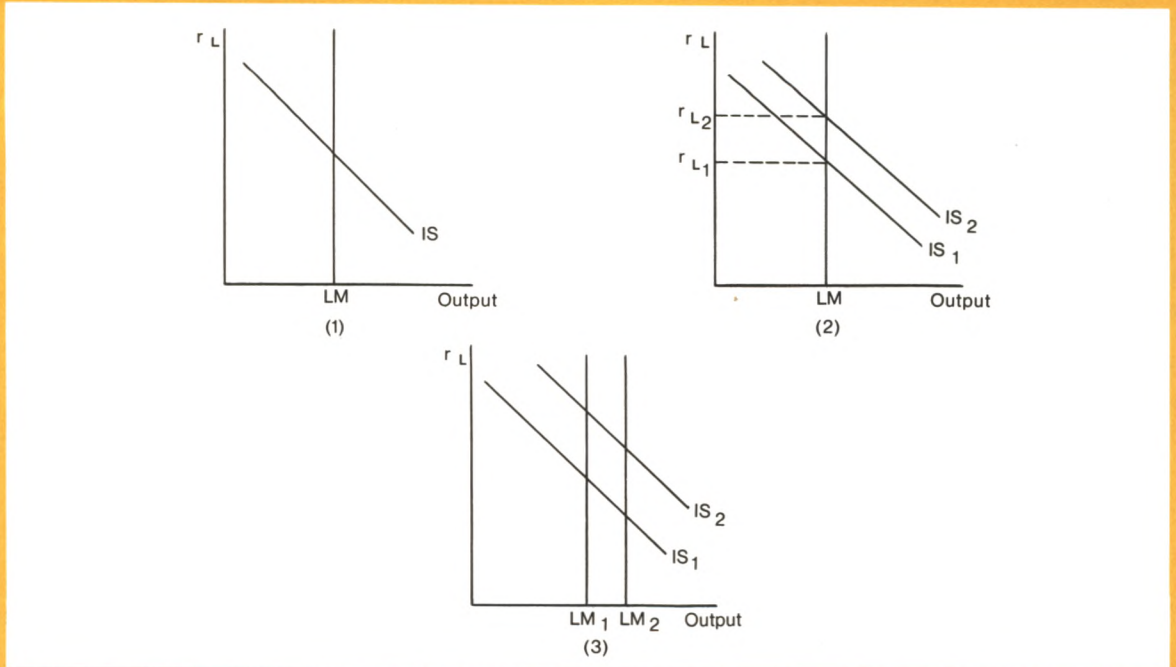


Chart 5

**Long-term IS-LM Equilibrium**



did not expect any additional ones for a while, and so the cut was already built into rates. But, looking beyond this reasoning, some explanation is required for the expectation that additional discount rate cuts were not forthcoming. One hypothesis is that money growth was expected to accelerate. Another hypothesis is that the market or the Federal Reserve or both may have believed that for a time a limit had been reached as to what monetary policy could do to stimulate the economy. A reasonable case could have been made that further monetary accommodation, while further lowering short-term rates for a time, at best would have had no effect on long-term rates and at worst could have caused them to increase, shifting the LM curve up, as shown in the third drawing on Chart 4.

Deficits are one of the reasons, although not necessarily the only reason, for what may be constraints on the ability of monetary policy to reduce intermediate- and long-term rates. The explanations given for continued high real and nominal intermediate- and long-term rates include the following:

- Projections of *future* deficits are holding up *real* rates as investors believe that ultimately, after recovery is under way, fiscal and monetary policies will clash.
- Future deficits undermine the market's confidence in monetary policy's ability to remain on its anti-inflationary course over the long run. Thus, they affect the inflation premium, based on *expected* inflation, that is built into long-term rates.
- Finally, the uncertainty premium in rates is probably increased because of expected high deficits, since the high level of rates—adjusted for current inflation—increases the risk of financial failure.

In short, what is argued is that from the standpoint of long-term investors large deficits in the midst of a prolonged economic recovery mean one of two things. Either a noninflationary monetary policy will lead to a confrontation between public and private credit demands that will drive up real interest rates or the Federal Reserve will ultimately accommodate, inflate the money stock, and the economy along with it. Thus nominal rates will rise.

Are there any facts to back up these hypotheses or does the unprecedented size of projected deficits mean we cannot use past experience and conventional analysis at all? In the first three years of recovery from the 1974-75 recession, the recession most like our recent

one in depth and duration, public borrowing (that is, Federal and state and local government borrowing) was 46.2 percent (1975), 30.8 percent (1976), and 21.6 percent (1977) of the net funds raised in the credit and equity markets by domestic nonfinancial sectors and by foreigners who borrowed and issued equity in the United States. The private percentage was the mirror image of these figures—53.8 percent, 69.2 percent, and 78.4 percent. One signal of possible future credit market pressures induced by a clash between monetary policy and deficits would be if government borrowing, as a percentage of total credit, were not to decline during recovery as in the past. For example, Federal Reserve policies could restrict the growth of total credit. And, since the Federal Government will never be crowded out of the market, the private sector would have to adjust. The market mechanism for this would be higher interest rates.

In early 1983, when the Federal Reserve set its target range for growth of the monetary aggregates, it also estimated an associated range for the growth of the level of domestic nonfinancial credit. A range of 8½ percent to 11½ percent growth for 1983 was estimated to be consistent with the targets for monetary growth. Even though the M-1 target was recently revised, the associated range for domestic nonfinancial credit was left unchanged. In addition, Chairman Volcker suggested that the range would in all likelihood be lowered by ½ percentage point, to an 8 to 11 percent band, for 1984. Under a noninflationary monetary policy and in the absence of major future institutional shifts in the financial sector, it is reasonable to extrapolate the 8 to 11 percent band into 1985. (Some might even argue that the band should be lowered.) The elements of funds raised in the financial markets that are not part of this credit aggregate—corporate equity issues and foreign debt and equity issues—have been included in a projection of total funds raised in 1983-85 (Table 12). (The funds raised through these vehicles are projected to grow by a significant amount in 1983, reflecting the surge in stock issues in early 1983, and then to decline somewhat in 1984 and 1985.)

The view of many in the credit markets that problems lie ahead if the deficits turn out as projected appears to be justified (Table 12). Funds available for the private sector—business, households, and foreigners—would be only about 40 percent or less of the total in each year, 1983-85, if total funds raised were held to the low end of the range. This would imply credit market pressures in each year, since private credit and equity comprised much higher fractions of the total—53.8 percent, 69.2 percent, 78.4 percent—in the 1975-77 recovery years. Even under the more expansionary policy, where domestic nonfinancial credit was to grow

at 11½ percent in 1983 and 11 percent in both 1984 and 1985, funds available for the private sector would be about 55 percent of total funds raised in the credit and equity markets in 1983-85. In this case, the restrictions on credit growth implied by the monetary targets would not appear to be a problem in 1983—which probably has been the case so far this year—but would become an increasingly serious problem in 1984 and 1985.

The estimates in Table 12 should not be viewed as a flow-of-funds forecast but simply a first-order calculation to determine whether on the surface the large future deficits appear consistent with growth of private credit that might be expected in a recovery. If this initial calculation were closer to prior experience, that is, if

the government share were calculated to be 20 to 30 percent of the total, for example, instead of 40 to 60 percent, it might be argued that second-order effects would make it possible for the government deficit to be financed with only minor repercussions for interest rates.

One of these second-order effects is net foreign investment. Clearly, both the government and the private sector could draw on foreign capital flows. In 1977, for example, foreigners purchased \$31.5 billion of U.S. Government securities, equal to about 55 percent of new issues. Over the 1983-85 period, slightly higher interest rates might induce future foreign purchases of securities, but it is hard to see this being enough to finance a large percentage of a

Table 12

### Funds Raised in the Credit and Equity Markets

By calendar year

Calendar year	Total funds raised in credit markets* (billions of dollars)	Federal financing		State and municipal financing		Nonfinancial business		Households		Foreign	
		Billions of dollars	% of total funds raised	Billions of dollars	% of total funds raised	Billions of dollars	% of total funds raised	Billions of dollars	% of total funds raised	Billions of dollars	% of total funds raised
1973	201.7	8.3	4.1	13.2	6.5	96.4	47.8	77.7	38.5	6.1	3.0
1974	193.9	11.8	6.1	15.5	8.0	98.0	50.5	53.9	27.8	14.8	7.6
1975	214.4	85.4	39.8	13.7	6.4	51.6	24.1	52.1	24.3	11.5	5.4
1976	273.5	69.0	25.2	15.2	5.6	80.2	29.3	89.5	32.7	19.6	7.2
1977	334.3	56.8	17.0	15.4	4.6	110.9	33.2	137.3	41.1	13.9	4.2
1978	401.7	53.7	13.4	19.1	4.8	126.3	31.5	169.3	42.1	33.2	8.3
1979	402.0	37.4	9.3	20.2	5.0	146.9	36.5	176.5	43.9	21.0	5.2
1980	397.1	79.2	19.9	27.3	6.9	143.9	36.2	117.5	29.6	29.3	7.4
1981	406.9	87.4	21.5	22.3	5.5	149.5	36.7	120.4	29.6	27.3	6.7
1982	440.7	161.3	36.6	45.8	10.4	128.5	29.2	88.5	20.1	16.6	3.8

### Projection

Calendar year	Total funds raised†		Public-sector borrowing		Public percentage of total		Private percentage of total (residual)‡	
	8-8½ % scenario (billions of dollars)	11-11½ % scenario (billions of dollars)	Federal (billions of dollars)	State-local (billions of dollars)	8-8½ % scenario (percent)	11-11½ % scenario (percent)	8-8½ % scenario (percent)	11-11½ % scenario (percent)
1983	447	589	214	45	57.9	44.0	42.1	56.0
1984	447	616	237	43	62.6	45.4	37.1	54.6
1985	471	673	243	46	61.3	42.9	38.7	57.1

\* Includes nonfinancial foreign borrowing and new equity issues.

† Assumes 8½-11½ percent range for 1983 and 8-11 percent range for 1984 and 1985.

‡ Business, households, and foreign.

\$225 billion deficit unless interest rates and the dollar rise appreciably.

Another second-order effect is that, with somewhat higher interest rates, the personal saving rate might increase. That would mean credit could grow more rapidly not because the economy was expanding faster (as would be the case with a constant saving rate) but because of a rise in the desire to save on the part of individuals. The statistical evidence on the relationship between interest rates and the personal saving rate is not very convincing, however.

Foreign capital flows and a change in personal saving rates are just two of the second-order effects that could reduce the upward pressure that large deficits exert on interest rates. There may be others. But, even under complete flow-of-funds forecasts, second-order effects are insufficient to counter the unprecedented size of the projected deficits.<sup>7</sup> Thus, returning to the initial hypothesis, it does appear reasonable to conclude that the prospects of large Federal deficits has served as a constraint on the ability of monetary policy to reduce intermediate- and long-term interest rates by actions that result in lower short-term rates.

One attempt to quantify the effect of the deficits on current interest rates has concluded that, because the financial markets foresee an endless stream of \$200 billion budget deficits, corporate bond yields are 160 basis points higher than they would be if the expectation were for a series of \$100 billion deficits. The econometric equation, formulated by Allen Sinai, shows that over the last few years, the outlook for deficits has become an important variable in the determination of long-term interest rates.<sup>8</sup> The precise estimate made by Sinai may be subject to some question, since large deficits are only a recent phenomenon and there is more uncertainty attached to an estimate obtained with just a few data points. But the magnitude of the estimated effect lends support to those who argue that large projected deficits are keeping long-term rates higher than they would otherwise be, limiting the ability of monetary policy to induce recovery, and ultimately slowing down the recovery.

<sup>7</sup> Cary Leahey and Allen Sinai, "Funds Raised in U.S. Financial Markets: An Econometric Study", Data Resources Incorporated, *Review of the U.S. Economy* (May 1983).

<sup>8</sup> Allen Sinai, "Deficits, Capital Markets, and the Economy", Testimony for the House Subcommittee on Telecommunications, Consumer Protection, and Finance (April 14, 1983). This research differs from previous econometric work where the effect of deficits on rates appears at best to be ambiguous. Sinai used forward or projected deficits in his equation rather than previous or lagged deficits.

Table 13

### Saving as a Percentage of GNP

By calendar year

Item	1961 to 1970	1971 to 1980	1985 projection
<b>Gross private saving</b> .....	<b>16.4</b>	<b>16.9</b>	<b>17.5</b>
Personal .....	4.7	4.9	4.0
Business .....	11.7	12.0	13.5
<b>Total use of saving</b> .....	<b>16.4</b>	<b>16.9</b>	<b>17.5</b>
Less:			
Financing the Federal deficit ..	0.5	1.9	5.9
Other* .....	0.5	-0.9	-2.6
Equals:			
Amount available for gross private investments .....	15.4	15.9	14.2
Addendum:			
Capital consumption allowance	8.4	9.9	11.0
<b>Amount available for net new private investments</b> .....	<b>7.0</b>	<b>6.0</b>	<b>3.2</b>

\* Includes net foreign investment and state and local deficits.

### The long term

The long-term and near-term effects of deficits are related. The analysis just completed has suggested that the expectation of future interest rate pressures may be keeping current long-term rates high. But there is another sense in which some argue that deficits are a long-term problem.

For the longer term, a reasonable case can be made for the proposition that the growth of the money stock is the critical variable in the determination of the level of *nominal* GNP. In other words, the LM curve, when the analysis is done in nominal terms, is nearly vertical (Chart 5 on page 40). Once a money growth-nominal GNP path is determined, it can be argued that fiscal policy will affect the mix of GNP—both in terms of its real-inflation composition and its relative shares of consumption, investment, government purchases, and exports.

An expansive long-run fiscal policy, given the current composition of the budget, appears to mean a GNP more heavily weighted toward consumption and defense expenditures than toward investment in plant and equipment. By 1985—three years into a recovery—the deficit under current policies would be about 6 percent of GNP. Under what may be generous assumptions for personal and business saving, this would mean that net saving available for new private investment—as a

share of GNP—would be about one half the average of the 1960s and 1970s (Table 13).

No one knows for sure the precise magnitude of the effect of capital formation on productivity growth. One analysis estimates that in the period 1948-73, when output per man-hour grew by an average of 2.9 percent per year, productivity growth stemming from capital formation was about 0.75 percent per year. In the subsequent period, 1973-78, when productivity growth slowed to 1.2 percent per year, the contribution of capital formation was only 0.21 percent, contributing a considerable amount to the productivity slowdown.<sup>9</sup> Somewhat different estimates of the effect of capital formation have been made by other scholars, using different measures of capital, labor, and output. But the results all show that capital formation does have an important positive effect on productivity growth.

One of the significant implications of large deficits and weak capital formation is that the real-inflation mix of GNP in the long term (under a given set of monetary targets) may be more heavily weighted toward inflation. Thus, the long-term problem with large deficits, aside from the anticipated interest rate pressures, is that the deficits may ultimately have an unfavorable effect on the composition of GNP.

#### **Conclusion**

The analysis presented here has attempted to delineate the forces that have contributed to the rise in the

Federal budget deficits projected for the 1980s and to put the effects of large projected deficits into a broader economic perspective. The tax cut is clearly one reason for the increase in deficit, but, even if it were not for that, decisions to increase the real resources for defense and the relentless growth of medicare and social security would have caused the expenditure-revenue gap to widen. More rapid economic growth and faster inflation could narrow the projected gap somewhat, but even under record GNP growth for 1984-88 the projection is for deficits well in excess of those experienced on average during the postwar period.

It is reasonable to conclude that, from the short-run perspective, anticipation of large Federal deficits has reduced the effectiveness of monetary policy. Certainly, Federal Reserve actions can lead to lower or higher short-term interest rates. But analysis of projected deficits and private demands on the credit markets clearly lends support to market fears of either a monetary-fiscal policy clash in 1984 or 1985 or an inflationary monetary policy if such a clash is avoided. And there is evidence that these fears would be an important factor that could prevent long-term rates from falling very much even if the Federal Reserve were to take actions to reduce short-term interest rates.

From the long-term perspective, while monetary policy can have an important effect on the level of nominal GNP, it can do much less to affect the composition. Under reasonable assumptions about the future growth of GNP, projected deficits of \$200-250 billion in 1984-85 would result in saving available for capital formation that would be very much below the experience of the 1960s and 1970s, with negative consequences for long-run productivity growth.

James R. Capra

<sup>9</sup> Norsworthy, Harper, and Kunze, *op. cit.*

# Treasury and Federal Reserve Foreign Exchange Operations

During the February-April period under review, the decline in global economic activity appeared to have ended, but questions remained about the breadth and scope of recovery and the prospects for a resumption in growth of world trade. Demand for oil remained weak and oil prices softened to the point of challenging the ability of OPEC (Organization of Petroleum Exporting Countries) to set production quotas and price differentials and thereby effectively to limit price declines. Meanwhile, persistent concern about the divergence of economic performances within Europe generated a major speculative attack against the exchange rate relationships within the European Monetary System (EMS). This speculation prompted the heaviest central bank intervention in support of the EMS rate structure in the four-year history of the EMS before the rates were realigned on March 21.

As the exchange markets reacted to the cross-currents of these developments, the dollar generally held steady against most currencies. On balance, between end-January and end-April the dollar was little changed against the German mark and narrowly mixed *vis-à-vis* other currencies. Although trading below its highs of late 1982 against the major foreign currencies, the dollar remained well above its lows reached immediately preceding the reporting period, in January 1983. This firm performance was contrary to the

forecasts of the many experts and market observers who were anticipating a significant further easing of the dollar through early 1983.

The dollar's firmer than expected tone first emerged in response to definite signs that recession in the United States was giving way to a significant recovery. However, for a period after mid-February, those initial signs of a strong industrial upturn were superseded by later indications that the expansion was likely to be more moderately paced, confined largely to increased activity in a few sectors of the economy and to a turnaround in inventory investment. Thus, some skepticism reappeared that the recovery would prove durable in the face of continued high real interest rates.

Nevertheless, the economic outlook remained more promising for the United States than for most other industrialized countries. Moreover, shortly after the President's State of the Union and budget messages, the Administration's economic advisers were suggesting that the projections for real output growth for 1983, then estimated at 1.4 percent, should be revised strongly upward. By comparison, European officials forecast little or no growth of Continental economies, and Japan's forecast growth rate of 3.4 percent for fiscal 1983-84 looked modest as compared with that country's presumed potential.

The dollar was sustained in the market as a number of concerns subsided that had weighed against the currency during the late fall and early winter. In particular, the fear that economic recovery would necessarily be accompanied by a rekindling of inflation tended to dissipate as prospects for substantial gains

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

in productivity improved. Market observers also became less concerned about cost pressures from basic materials, as expectations grew of a substantial reduction of world oil prices. The U.S. trade account turned out to be in smaller deficit during the first quarter than had generally been expected, and the deficit even narrowed somewhat from that recorded in the last three months of 1982. This result reflected a sharp drop in the oil import bill, which was expected to be largely temporary and was associated with reduced demand in response to the relatively warm

winter and liquidation of inventories in anticipation of lower prices later. Market forecasts of a very large U.S. current account deficit for the year as a whole were not significantly revised. Nevertheless, the temporary respite from monthly releases of large deficit figures seemed to defuse what had been an important negative factor for the dollar previously, so that considerations of relative trade and current account performances received little attention in the exchange markets during this period.

The exchange markets were also influenced at times

Table 1

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

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

Bank drawing on Federal Reserve System	Outstanding January 1, 1982	1982 I	1982 II	1982 III	1982 IV	1983 I	1983 April	Outstanding April 30, 1983
Bank of Mexico .....	-0-	-0-	{+800.0 -600.0}	{+1,400.0 -900.0}	-217.4	-482.6	-0-	-0-
* Bank for International Settlements (against German marks) .....	-0-	-0-	-0-	-0-	{+124.0 -124.0}	-0-	-0-	-0-

Data are on a value-date basis.

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

Table 2

**Drawings and Repayments by the Bank of Mexico under Special Swap Arrangements**

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

Drawings on	Outstanding January 1, 1982	1982 I	1982 II	1982 III	1982 IV	1983 I	1983 April	Outstanding April 30, 1983
U.S. Treasury special temporary facility for \$1,000 million .....	*	*	*	{+ 825.0 - 825.0}	*	*	*	*
Drawings on special combined credit facility:								
Federal Reserve special facility for \$325 million .....	*	*	*	{+ 89.8 - 43.8}	+211.2	+ 67.8	-0-	325.0
U.S. Treasury special facility for \$600 million .....	*	*	*	{+ 166.8 - 81.3}	+392.2	+122.3	-0-	600.0
Total .....	*	*	*	{+1,081.6 - 950.0}	+603.5	+190.0	-0-	925.0

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

\*Not applicable.



by shifting assessments of the prospects for dollar interest rates. During February the improving scenario for inflation, together with the prospect for only a moderate recovery, gave a lift to U.S. credit markets, and long-term interest rates began to turn down. In this environment, market operators considered the possibility that the Federal Reserve would not resist a decline in short-term interest rates and might lower its discount rate, both to lend support to the recovery at home and to help foster an international economic climate in which heavily indebted countries

might be better able to meet the objectives of their stabilization programs. In fact, short-term rates held steady through April, and the Federal Reserve kept its discount rate at the 8½ percent level established in December. But long-term rates did continue to ease, moving down in two stages—first during February and again in April. It appears that, as long-term rates eased, substantial amounts of funds were moved into the United States by investors hoping to realize further capital gains. At the same time, real interest rates remained relatively high, and foreign investment was

Table 3

**Drawings and Repayments by the Central Bank of Brazil under Special Swap Arrangements with the U.S. Treasury**

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

Drawings on U.S. Treasury special facilities for	Outstanding January 1, 1982	1982 I	1982 II	1982 III	1982 IV	1983 I	1983 April	Outstanding April 30, 1983
\$500 million .....	*	*	*	*	{ + 500.0 - 500.0	*	*	*
\$280 million .....	*	*	*	*	+ 280.0	- 280.0	*	*
\$450 million .....	*	*	*	*	+ 450.0	- 450.0	*	*
\$250 million .....	*	*	*	*	{ + 250.0 - 104.2	- 145.8	*	*
\$200 million .....	*	*	*	*	*	{ + 200.0 - 200.0	*	*
\$200 million .....	*	*	*	*	*	{ + 200.0 - 200.0	*	*
Total .....	*	*	*	*	{ +1,480.0 - 604.2	{ + 400.0 - 1,275.8	*	*

Data are on a value-date basis.

\* Not applicable.

Table 4

**U.S. Treasury Securities, Foreign Currency Denominated**

In millions of dollars equivalent at Treasury book value; issues (+) or redemptions (—)

Issues	Amount of commitments January 1, 1982	1982 I	1982 II	1982 III	1982 IV	1983 I	1983 April	Amount of commitments April 30, 1983
<b>Public series:</b>								
Germany .....	3,622.3	-0-	-451.0	-1,231.9	-664.1	-0-	-0-	1,275.2
Switzerland .....	458.5	-0-	-0-	-0-	-0-	-458.5	-0-	-0-
Total .....	4,080.8	-0-	-451.0	-1,231.9	-664.1	-458.5	-0-	1,275.2

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

Table 5

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

In millions of dollars

Period	United States Treasury		
	Federal Reserve	Exchange Stabilization Fund	General account
February 1 through April 30, 1983 .....	-0-	-0-	-0-
Valuation profits and losses on outstanding assets and liabilities as of April 30, 1983 .....	-578.1	-951.3	+360.9

Data are on a value-date basis.

attracted also by the bullish U.S. stock market, continuing safe-haven considerations, and the apparently better growth prospects in the United States than abroad.

In addition, the dollar frequently became caught up in developments primarily involving European currencies, particularly the events surrounding the realignment on March 21 of parities in the EMS. From early February, sentiment became increasingly favorable toward the German mark, which strengthened against other European currencies as well as the dollar, as market participants speculated first about the outcome of coming national elections in Germany and then about the likelihood that a long-anticipated realignment of EMS parities would take place shortly thereafter. Speculative buying of German marks and Dutch guilders, both considered virtually certain to be revalued in any restructuring of the EMS, intensified while the weaker currencies in the European joint float, including particularly the French and Belgian francs, came on offer. The French franc, after having been maintained around the middle of the EMS band for some weeks, was allowed to drop to its mandatory lower intervention point after March 6 and, subsequently, Euro-French franc interest rates soared to unprecedented levels. The Belgian authorities, also faced with intensifying pressures, imposed stringent new foreign exchange controls. With speculation against these two currencies becoming prohibitively expensive, positioning in favor of the stronger EMS currencies increasingly took the form of sales of non-EMS currencies, including the dollar. At the

same time, official intervention to defend the EMS parities, while primarily conducted in European currencies, also involved substantial sales of dollars by the central banks whose currencies were weak within the system. EMS-related sales by both private and official parties thus contributed to a tendency of the dollar to decline moderately during the first three weeks of March, particularly against the German mark. The reversal of these flows after the March 21 realignment similarly contributed to the dollar's subsequent recovery.

By April, as the new quarter opened and many of the reflows into dollars associated with the recent EMS realignment were completed, exchange market activity settled down to a subdued pace, and the dollar traded in a relatively narrow range. Some uncertainty was generated by the persistent divergence between the dollar's apparent firmness and the still widely held view that the medium-term trend of the dollar would be downward because of the outlook for interest rates and current accounts. Adding to the uncertainty were concerns that trade protectionist pressures might be deepening in response to two years of declining world growth. In this context, talk spread among market participants that the major industrial countries might be preparing a coordinated intervention effort—now that the intervention study commissioned at last year's summit meeting had been completed and on speculation that exchange rates would be a major point of discussion at the Williamsburg summit. By late April, however, expectations of substantial changes in official intervention policy faded, and on April 29 the intervention study was released by the summit ministers, accompanied by a statement on intervention and related matters. But, in the cautious atmosphere that had prevailed during much of April, market professionals were prepared to sell dollars, thereby stemming any marked upward movement of the dollar, while commercial participants often were substantial buyers when the dollar eased. As a result, the dollar market was well balanced. There was a marked change in the dollar only against the pound sterling which, in an environment of stabilizing oil prices, recovered nearly 7 percent from an earlier decline.

By the close of the period the dollar traded at DM2.4615 in terms of the German mark and ¥237.80 against the yen, some ½ percent and 1 percent respectively below the levels of three months earlier. Against the pound sterling, the dollar ended the period down nearly 3 percent as compared with three months earlier, while it increased by 2 percent against the Swiss franc. In terms of a trade-weighted average, the dollar rose by about 1 percent to close the period

only slightly below the historically high levels it had reached in November 1982. The U.S. authorities did not intervene in the exchange markets during the period under review.

In other operations during the three-month period, the U.S. monetary authorities continued to provide credits to Mexico and Brazil. At the same time, both countries made repayments on earlier bridging credits provided by the U.S. monetary authorities as they drew on other financing arrangements.

As discussed in the previous report, both the Federal Reserve and the U.S. Treasury's Exchange Stabilization Fund had provided credits to Mexico during 1982-83. Funding was provided through the Bank of Mexico's regular swap facility of \$700 million with the Federal Reserve, and also through special swap facilities in cooperation with other central banks through the Bank for International Settlements (BIS). In February, Mexico drew the remaining portion of the special facility, receiving \$44.25 million from the Treasury and \$25.75 million from the Federal Reserve. As of April 30, drawings of \$325 million and \$600 million were outstanding from the Federal Reserve and the Treasury, respectively, representing the entire \$925 million available under the U.S. portion of the multilateral swap facility. On February 28, the Bank of Mexico fully repaid the remaining \$373 million outstanding on its swap line under the Federal Reserve's regular reciprocal currency arrangement, which had been drawn last August before other arrangements had been put in place. Thus, on balance, during this three-month period, Mexico reduced its net outstanding borrowing from the Federal Reserve and the Treasury under these facilities by \$303.0 million.

The Central Bank of Brazil repaid on February 1 \$280 million of the \$730 million outstanding on facilities made available to it earlier by the Treasury. The remaining \$450 million facility was repaid on March 3. On February 28, the Treasury agreed to provide Brazil with two additional swap facilities of \$200 million each in anticipation of Brazil's drawings under the compensatory financing facility and extended Fund facility of the International Monetary Fund. These swaps

were drawn on February 28 and March 3 and were repaid by March 11. Thus, at that point Brazil had repaid in full all Treasury swaps made available to it since October 1982.

In April, the Bank for International Settlements, acting with the support of the U.S. Treasury and the monetary authorities in other countries, agreed to participate in an international financial support package for Yugoslavia. The Treasury, through the Exchange Stabilization Fund, as part of the liquidity-support arrangement for the BIS provided by the participating monetary authorities agreed to be substituted for the BIS for \$75 million in the unlikely event of delayed repayment by Yugoslavia.

In the period from February through April, the Federal Reserve and the Treasury realized no profits or losses from exchange transactions. As of April 30, cumulative bookkeeping or valuation losses on outstanding foreign currency balances were \$578.1 million for the Federal Reserve and \$951.3 million for the Treasury Exchange Stabilization Fund, while the Treasury general account showed valuation gains of \$360.9 million related to outstanding issues of securities denominated in foreign currencies. These valuation gains and losses represent the decrease in the dollar value of outstanding currency assets and liabilities 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 Treasury have invested foreign currency balances they had acquired in the market as a result of their foreign exchange operations in a variety of investments that yield market-related rates of return and have a high degree of quality and liquidity. Under the authority provided by the Monetary Control Act of 1980, the Federal Reserve had invested some of its own foreign currency resources and those held under warehousing agreements with the Treasury in securities issued by foreign governments. As of April 30, the Federal Reserve's holdings of such securities were equivalent to \$1,509 million. In addition, the Treasury directly held the equivalent of \$2,589 million in these securities as of end-April.

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