FORECASTS 1983

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The longest recession since World War II will have ended by the time you read this article, according to a group of economic forecasters. While record-breaking prosperity may not be right around the corner, the forecasters do expect moderate real economic growth in 1983 led by strong consumer spending and a rebound in residential construction. It should be noted, however, that forecasters also expected moderate real economic growth for 1982 at this time last year.

This article contains highlights of a recent survey of economic forecasts. First, the pattern of forecasts for 1983 is discussed, with details presented in Tables I and II. (Considerably more information is available in this Bank's "Business Forecasts 1983," which is a compilation of forecasts with names and details of the various estimates.) Next is a discussion of last year's predictions. An analysis of forecasts over the last twelve years concludes the article.

Table I

RESULTS FOR 1982 AND TYPICAL FORECAST FOR 1983

	Unit or Base	Preliminary 1982*	Forecast 1983**	Percentage Change: Preliminary 1982/1981	Percentage Change: Forecast 1983/1982
Gross national product	$ billions	3,057.5	3,293	4.1	7.7
Personal consumption expenditures	$ billions	1,972.0	2,136	7.0	8.3
Durables	$ billions	242.7	269	3.5	10.7
Nondurables	$ billions	762.7	808	3.8	6.0
Services	$ billions	966.6	1,061	10.6	9.8
Gross private domestic investment	$ billions	421.9	463	−10.5	9.6
Fixed investment:					
Nonresidential	$ billions	347.5	338	0.4	−2.6
Residential	$ billions	95.8	120	−8.7	25.8
Change in business inventories	$ billions	−21.4	6	—	—
Net exports	$ billions	16.5	−0.5	—	—
Government purchases	$ billions	647.1	695	8.4	7.4
Federal	$ billions	257.3	283	12.4	10.0
State and local	$ billions	389.8	413	5.9	6.0
Gross national product (1972 dollars)	$ billions	1,475.5	1,512	−1.8	2.5
Private housing starts	thousands	1,060.6	1,431	−2.2	34.9
Domestic automobile sales	$ millions	5.7	6.8	−8.1	19.4
Rate of unemployment	percent	9.7	10.1	—	—
Industrial production index	1967 = 100	138.6	141.9	−8.2	2.4
Consumer price index	1967 = 100	289.1	303.8	6.1	5.1
Producer price index	1967 = 100	280.6	293.5	4.0	4.6
GNP implicit price deflator	1972 = 100	207.2	217.8	6.0	5.1

* Data available as of January 1983.

** These data are constructed using preliminary 1982 data and the median annual percentage change forecast for each category, incorporating 31 forecasts.

Forecasts for 1983

Real GNP is projected to increase by 3.9 percent over the year (unless otherwise noted, growth-rates are from the fourth quarter of 1982 to the fourth quarter of 1983 as shown in Table II). That real growth would represent a considerable improvement over the last three years: real GNP declined 0.7 percent in 1980, grew only 0.7 percent in 1981 and fell 1.2 percent in 1982. Even if the predicted growth were to occur, however, at the end of 1983 the economy would still be well below its historical potential. For example, unemployment would be 9.7 percent of the labor force compared with 6.0 percent in late 1979. Likewise, housing starts, at 1.6 million units, would be well below the 2 million units started in 1978. And the industrial production index would still be 5 percent below its level in early 1979.

The household sector is expected to provide the strongest growth in spending in 1983. Consumer spending for durable goods is expected to rise by 14 percent, while private housing starts are expected to increase by 334,000 units. Business nonresidential fixed investment, however, is expected to show little real growth.

No dramatic change in the inflation picture is expected. The consumer price index, for example, is projected to grow by 5.3 percent in 1983, compared to 4.5 percent in 1982.

Table II

TYPICAL QUARTERLY CHANGES FORECAST FOR 1983

	Preliminary Result for 1982 (Fourth Quarter 1981 to Fourth Quarter 1982)[a]	Forecast 1983*				Change from Fourth Quarter 1982 to Fourth Quarter 1983[a, d]
		I	II	III	IV	
Gross national product	3.3	8.2	9.2	10.1	10.7	9.5
Personal consumption expenditures	8.0	8.4	8.8	8.8	9.4	8.9
Durables	9.6	13.6	14.6	15.3	12.3	13.9
Nondurables	4.3	6.2	7.5	6.1	6.2	6.5
Services	10.6	9.3	9.4	10.1	10.0	9.7
Gross private domestic investment	−15.1	16.6	17.8	19.3	18.8	18.1
Fixed investment:						
Nonresidential	−4.2	−4.4	3.3	8.6	10.0	4.2
Residential	4.5	43.9	31.6	33.9	28.8	34.4
Change in business inventories[b]	−21.4	−1.5	4.4	9.6	12.8	6.3
Net exports[b]	17.3	−5.5	−7.4	−9.0	−10.1	−8.0
Government purchases	7.9	5.8	5.9	7.4	8.4	6.9
Federal	6.4	6.2	4.8	8.6	14.0	8.3
State and local	6.1	5.4	6.0	6.7	5.2	5.8
Gross national product (1972 dollars)	−1.2	3.1	3.4	4.4	4.7	3.9
Corporate profits after taxes	—	3.7	17.2	19.9	22.8	15.7
Private housing starts	44.6	21.1	33.2	28.8	14.7	24.2
Domestic automobile sales	17.6	19.4	31.1	22.1	22.2	23.6
Rate of unemployment[c]	2.4	10.6	10.4	10.0	9.7	−1.0
Industrial production index	−7.7	5.4	7.6	8.2	7.6	7.2
Consumer price index	4.5	5.0	5.4	5.4	5.4	5.3
Producer price index	3.6	4.5	4.7	4.9	5.7	4.9
GNP implicit price deflator	4.6	5.5	5.1	5.3	5.6	5.4

* Percentage changes at annual rates unless otherwise noted. Median quarterly percentage change for each category, incorporating 20 forecasts. Due in port to the smaller sample size in this table, these data ore not strictly comparable to the median percentage changes forecast for the year 1983 in the preceding table.

[a] Percentage change, except cumulative change in the levels of inventories and exports, and change in the quarterly average unemployment rote.

[b] Billions of dollars at annual rates.

[c] Percent.

[d] Average computed from quarterly figures.

Last Year's Forecasting Performance

In many ways the 1983 forecast described above resembles the median forecast for 1982 described in "Forecasts 1982." Both projected a consumer-led recovery with moderate real GNP growth. The 1983 forecast for 3.9 percent growth in real GNP is not far from the 2.8 percent projected for 1982. Actually, real GNP in 1982 declined by 1.2 percent as the recession lingered much longer than anticipated.

Another point of similarity is that both the 1983 and the 1982 forecasts projected little change in the inflation rate. In 1983, the inflation rate (estimated by the producer price index) is predicted to rise by 1.3 percentage points, while last year it was predicted to rise by 0.5 percentage points. The rate actually declined in 1982 by 3.6 percentage points. As was noted in this article last year, forecasters typically underpredict changes in inflation rates. Most often, formal econometric models rely heavily on past inflation rates to predict future inflation (see, for example, Eckstein [1982] for an explanation of the reasoning behind such an approach). As a result, even when monetary policy changes as dramatically as it did in 1981 (when shift-adjusted Ml grew by 2.3 percent, down sharply from 6.6 percent growth in 1980) many forecasters will predict little change in near-term inflation rates.

The 1982 forecasts can also be compared with forecasts in recent years. As Table III indicates, the 1982 forecast errors were above average for real output growth, inflation, and the interest rate on Treasury bills. After such a difficult year to predict, one might wonder how much confidence should be placed in forecasts for 1983. To determine that, a more detailed analysis of past forecasts is presented below.

An Analysis of Past Forecasts

The purpose of this section is to study the record of median forecasts in an attempt to gauge the reliability of future forecasts.[1] In order to do that, simple statistical analysis is used. The price of that simplicity is the adoption of stringent assumptions.[2] If

[1] At this point it is useful to examine the comparability of the median with individual forecasts. Over the 1971-82 period there were three individual forecasters for whom this Bank published real GNP and inflation projections for each year. 'Their average errors were 1.5, 1.8, and 2.3 percent for inflation, versus 1.7 percent for the median forecast. For real GNP, their average errors were 1.2, 1.2, and 1.4 percent, versus 1.7 percent for the median. Thus while it is hard to draw firm conclusions based on three observations, it appears that the median forecast had about average accuracy in predicting inflation but below-average accuracy in predicting real GNP.

[2] It is assumed that when a forecast is prepared, the median forecast error for each year is an independent, normally distributed random variable with a zero mean and fixed variance that remains unchanged over time. In addition, it is assumed that the small sample sizes (twelve forecasts for GNP and inflation, and nine interest-rate forecasts) are large enough to provide useful information.

Table III

THE RECORD OF MEDIAN FORECASTS

	Real GNP (Percent Change)			Inflation Rate (GNP Deflator)			Treasury Bill Rate		
	Actual	Predicted	Error	Actual	Predicted	Error	Actual	Predicted	Error
1971	4.7	3.8	0.9	4.7	3.6	1.1			
1972	7.0	5.6	1.4	4.3	3.2	1.1			
1973	4.3	6.0	1.7	7.0	3.3	3.7			
1974	−2.7	1.2	3.9	10.1	5.5	4.6	7.3	6.0	1.3
1975	2.2	−0.6	2.8	7.7	7.1	0.6	5.7	7.1	1.4
1976	4.4	6.0	1.6	4.7	5.4	0.7	4.7	7.1	2.4
1977	5.8	5.0	0.8	6.1	5.7	0.4	6.1	5.8	0.3
1978	5.3	4.2	1.1	8.5	5.9	2.6	8.7	6.5	2.2
1979	1.7	1.5	0.2	8.1	7.1	1.0	11.8	8.1	3.7
1980	−0.3	−0.8	0.5	9.8	8.2	1.6	13.7	8.6	5.1
1981	0.9	2.4	1.5	8.9	9.1	0.2	11.8	10.8	1.0
1982 (preliminary)	−1.2	2.8	4.0	4.5	7.1	2.6	8.0	11.2	3.2
Average error			1.7			1.7			2.3

Note: Predictions ore from Business Forecasts, published annually by the Federal Reserve Bank of Richmond. The error is the absolute value of the difference between predicted and actual values. Real growth and inflation ore from the fourth quarter of the previous year to the fourth quarter of the stated year. The Treasury bill rote is the average value of three-month bills in the fourth quarter.

those assumptions are acceptable, then the following conclusions can be drawn.

First, the forecasts miss a large portion of the variation in future economic conditions. To see this, consider the regressions presented in Table IV of actual outcomes versus predictions for real GNP growth, the inflation rate and the Treasury bill rate. In each case the summary. statistic R^2 can be interpreted as the fraction of the variation in actual outcomes that is associated with variation in the forecast. For real GNP, a little more than half of the variation in actual growth was associated with the forecasts. But for inflation the corresponding value was less than one-third, and for the interest rate only one-fourth. That is, the median forecast failed to predict most of the variation in inflation and the interest rate. Thus over the sample period, the majority of the shocks to the economy that moved inflation and interest rates were not predicted. That result, in turn, raises doubts about the reliability of current and future forecasts.

A second conclusion is that forecasters often place an undue weight on recent conditions when predicting future inflation and interest rates. To see this, consider the R^2 statistics from regressions of forecasts for a given year on the previous year's actual outcome (also presented in Table IV). For both inflation and the interest rate it is clear that most of the variation of forecasts was associated with the previous year's experience. Predictions of real GNP, on the other hand, had a relatively small amount of forecast variation associated with recent outcomes.

Another way to illustrate forecast accuracy is to present confidence intervals for the 1983 forecasts based on the regressions mentioned above. If the assumptions given in footnote one are satisfied, then one can compute the distribution of future forecast errors and derive probabilities that forecasts will be within certain limits (often referred to as confidence intervals).[3] For each variable, a symmetric interval around the median forecast will be-presented so that the odds are three to one that the actual outcome is within that interval. (In other words, a 75 percent confidence interval is presented.) The width of that interval illustrates the precision of the forecast.

For real GNP growth, the 75 percent confidence interval is 1.1 to 6.7 percent. The inflation forecast has a confidence interval ranging from 3.0 to 7.8 percent. And the confidence interval for the interest rate is widest of all, 4.9 to 12.4 percent. It should be remembered that actual outcomes will be outside even such wide intervals about one-fourth of the time.

The foregoing analysis indicates that forecasts have been imperfect guides to the future. That is not to say that forecasts are useless. On the contrary, when an individual forecaster constructs a model of economic activity, predictions of numerous variables can be made consistent with each other, which is a valuable achievement. In addition, a nontrivial fraction of future movement can often be predicted, as the median real GNP forecast demonstrates. Nonetheless, considerable uncertainty remains and is illustrated in the wide confidence intervals described above. Whenever economic forecasts play a significant role in decision-making, that uncertainty is ignored at the, user's peril.

[3] See Kmenta [1971] for a discussion of forecast errors and confidence intervals.

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Table IV

REGRESSION SUMMARY

Independent Variable	Dependent Variable	R^2
Actual GNP growth	Predicted GNP Growth	.52
Actual inflation	Predicted inflation	.30
Actual Treasury bill rate	Predicted Treasury bill rate	.25
Predicted GNP growth	Actual GNP growth last year	.19
Predicted inflation	Actual inflation last year	.69
Predicted Treasury bill rate	Actual Treasury bill rate last year	.85

Another Difficult Year . . .

THE 1983 OUTLOOK FOR AGRICULTURE

Sada L. Clarke

The U.S. Department of Agriculture's analysis of this year's prospects for the nation's farm economy and the implications for retail food prices were presented at the 1983 Agricultural Outlook Conference late last November. The outlook as USDA's leading economists viewed it then is summarized below.

This year promises to be another difficult one for the nation's farmers. But consumers seem assured of larger supplies of food and continued moderation in food price increases.

While still highly uncertain, the outlook for agriculture in 1983 suggests continued low returns to farmers for the fourth consecutive year. Large worldwide crop supplies, together with a weak global economy, point to low crop prices and poor income prospects. Modest gains in livestock prices are indicated.

Weak domestic demand and sluggish export markets have been among the major factors behind the difficult economic conditions prevalent in the farm sector. The dramatic slowdown in the growth of global demand for farm products has coincided with the record U. S. and world crop harvests of the past two years, thus compounding the difficulties. While forecasts for 1983 indicate a modest upturn in general economic activity here at home, leading to some strengthening in domestic demand, they do not suggest any significant improvement in foreign demand. Since export markets have become an increasingly important outlet for U.S. farm products, the farm economy has become more sensitive to global crop and economic developments. Improvements in international conditions will thus have an important role to play in the recovery of the farm economy.

Agricultural production costs are moderating. Reduced inflation and lower interest rates should ease the pressure on farmers' expenses and borrowing costs in the year ahead. These same factors can also be expected to encourage demand.

Farm Income Outlook Not Encouraging

Last year marked the third successive year of low farm income and growing cash-flow difficulties in the farm sector. While significant reductions in inflation and interest rates, capital expenditures, and the use of inputs provided some relief in farmers' expenses in 1982, cash-flow problems persisted as cash receipts declined and production expenses continued to rise, albeit at a slower rate. Net farm income, net cash income, and personal disposable income all declined in the aggregate. These financial indicators varied among individual farms and geographic regions.

While still highly uncertain, prospects do not promise much improvement in these aggregate farm income indicators in 1983. Currently, it appears that total cash receipts from farm marketings will show only a slight rise over last year's level. While crop receipts may decline, livestock receipts could increase and be offsetting. On the brighter side, indications are that farm production expenses will continue to moderate, perhaps rising only 2 to 3 percent. Prospects that point to further progress against inflation and lower interest costs are, indeed, encouraging. Even so, these current indications provide little reason to believe that farmers' cash flow and net income in 1983 will show much improvement over 1982 levels.

The weather and the extent of economic. recovery will be major factors affecting the farm income situation in 1983. A sudden change in weather patterns that might affect worldwide crop output, for example, could alter the outlook materially.

Farm Financial Conditions and Outlook

With the cumulative effects of three years of low farm income, increasing cash-flow difficulties, and the continued rapid growth in the use of debt capital, many farmers are now facing severe financial problems. Many are heavily leveraged-that is, they have little or no equity in their land and equipment to support more debt. This situation suggests that

farmers' financial strategy in 1983 will be essentially conservative, with less reliance on debt financing.

Farm loan funds will apparently continue to be adequate in 1983, for there are no indications that agricultural lenders will have difficulty in obtaining loanable funds. Banks indicate, however, that only those farmers with adequate equity will qualify for credit. Given current farm commodity prices and interest rates, many farmers, especially those who are heavily in debt, will find it difficult to qualify for a loan on a cash-flow basis. Moreover, the pace of debt restructuring, loan extensions, and renewals to marginal farm borrowers will probably slow from that of the past two years. Should interest rates continue to fall, however, chances of refinancing to reduce the current burden of debt would be greatly improved for many farmers.

Delinquencies, farm liquidations, and bankruptcies are up, according to a midyear farm credit survey conducted by the American Bankers Association in 1982. Furthermore, the survey pointed out that a larger proportion of farmers are reaching practical lending limits and are therefore likely to have their financing discontinued in 1983. But the survey also revealed that more than 95 percent of banks' farm customers are managing their financial stress well enough to have their bank financing continued.

The financial health of the farm sector, as measured by balance sheet statistics, provides yet another picture of the difficulties faced by many farmers. The farm sector's wealth, or nominal equity, declined in 1982 for the second year in a row, primarily because of falling farmland values. With the drop in nominal farm equity, farmers' borrowing capacity declined further.

The nominal value of the farm sector's assets, including farm households, fell 2 percent in 1982, the first such decline since 1953. Total farm debt continued to rise, increasing around 6.6 percent during the year and causing farmers' equity to fall about 4 percent below a year earlier. The 1982 decline in nominal equity is the largest percentage decrease in farm-sector wealth since 1940, the year that balance sheet statistics were first collected. Equity per farm dropped some 3 percent from the 1981 level.

Because of the decrease in asset values and the increase in debt, the farm sector's debt-to-asset ratio -a measure of the sector's indebtedness-is estimated to have risen from 18.5 percent at the beginning of 1982 to a record 20.1 percent on January 1, 1983. Although the farm economy's debt-to-asset ratio is at a record level, it is still low compared with those of other industries.

Value of Farm Exports May Fall

U. S. agricultural exports in fiscal 1982 fell for the first time in thirteen years, and some further decline is anticipated in fiscal 1983. Export volume dipped some 2 percent last year, but value of exports plunged 11 percent because of sharply lower prices. While export volume may rise slightly this year, reaching about the same level as in 1980 and 1981, the value of farm exports could fall further to about $37.5 billion or some 4 percent. The value of U. S. agricultural imports is expected to total about $15.5 billion, roughly the same as last year, so the agricultural trade surplus will probably fall to around $22 billion, down some 17 percent from the record $26.6 billion in fiscal 1981.

Many of the problems that plagued U. S. farm exports last year are expected to remain in fiscal 1983. Large global crop supplies, especially in the United States; weak foreign demand; and low domestic farm prices will continue to hamper export growth. The likelihood of only a modest decline in the value of the U. S. dollar and a sluggish worldwide economic recovery will also limit foreign demand. Moreover, the financial problems of many developing countries and the worldwide tendency toward restrictive trade policies will continue to be major factors restricting U. S. farm exports. The European Community's trade policies have become a particular problem. By subsidizing their excess production into exports that compete with American farm 'products, the EC is seriously undercutting our farm export markets. The U. S. poultry industry, for example, had considerable success at building export markets during the seventies. U. S. poultry exporters today, however, are losing large chunks of the world's import business primarily because of export subsidies paid by other nations such as those of the European Community.[1]

Regional highlights of foreign trade prospects for 1983 reveal this picture: The value of farm exports to the developed countries is expected to be down, led by drops of around 10 percent in exports to the European Community and 13 to 15 percent in those to non-EC Western Europe. The value of shipments to the centrally planned economies may fall sharply, with declines of around 25 percent projected for both the USSR and China and some further slippage in exports to Eastern Europe. Modest expansion in purchases of U. S. farm exports by the developing

[1] Jim Gruff, "Subsidies Hurting U.S. Poultry Exports," **Foreign Agriculture,** Vol. XX, No. 12, USDA, Foreign Agricultural Service (Washington, December 1982), p. 10.

nations is anticipated, however. Among these countries, significant boosts in exports to Mexico and India are likely.

Most of the slight expansion anticipated in U. S. export volume in fiscal 1983 will probably be in shipments of feed grains and soybean cake and meal. Soybean exports may rise slightly to a record volume. Tobacco shipments are expected to hold near the 1981 and 1982 volumes. Somewhat smaller wheat and rice shipments are also indicated. Meanwhile, the volume of cotton exports is likely to fall about 15 percent, primarily because of smaller sales to China. While the volume of beef exports may rise about a tenth, poultry meat exports are likely to be down by roughly the same percentage.

Moderate Gains in Food Prices Likely

Retail food prices continued to moderate last year, rising about 4.5 percent for the smallest annual increase since 1976. Factors that helped slow the cost of food at retail were the large supplies of farm products, stagnant consumer incomes limiting food demand, and moderating food marketing costs that reflected the lower general inflation rate. A similar situation is expected to prevail in 1983, indicating that the moderating trend in food price increases will continue. The outlook now suggests an overall rise of from 3 to 6 percent in food prices in 1983. But within this range, the current assessment points to an increase of about 4 percent. Moderate gains in prices for both food at home and food consumed away from home are expected. Grocery store food prices-the at-home component-may average in the neighborhood of 3 to 6 percent over those last year. A somewhat larger increase, probably from 4 to 6 percent, is indicated for prices of food consumed in the away-from-home market.

Food marketing costs moderated significantly last year. With the general inflation rate likely to slow further in 1983, continued moderation in food marketing costs, probably on the order of 4 to 7 percent, can be expected. Biggest increase will likely come from higher energy prices, especially those for natural gas. Food industry labor costs, which account for nearly half of all food marketing costs, may slow again in 1983, rising from 5 to 7 percent versus a 7 percent advance last year. Transportation and packaging costs are also expected to show slight increases over last year.

The farm value of domestically produced foods sold in grocery stores, accounting for slightly more than one-third of the retail cost of the market basket, has increased slowly for the past three years. Expectations are that the farm value of foods will again show only a modest gain in 1983, perhaps on the order of 1 to 4 percent. These expectations largely reflect both weak domestic demand for food and weak export demand for farm products, with only slight improvement anticipated during 1983.

In general, abundant food supplies from crops and larger fruit supplies will tend to keep farm-level prices low and temper the rise in grocery store food prices. On the other hand, no expansion in livestock supplies is anticipated, thus retail meat prices will likely rise moderately. Retail pork prices could prove to be an exception, however, with indications pointing to a 4 to 7 percent increase over last year.

Commodity Outlook

Both farmers and farm lenders will likely find the outlook for the Fifth District's principal money-making commodities to be of special interest. The summaries below of the Department of Agriculture's forecasts for these products provide outlook highlights for each commodity or commodity group. Readers should note that export data in this section are on either a marketing- or calendar-year basis and therefore may vary considerably from the fiscal-year statistics used in the section on foreign trade.

Tobacco: Declining demand-both domestic and foreign-highlights the U. S. tobacco outlook for 1983. Last year's crop was 6 percent under the year-earlier level, largely because of reduced acreage. The outlook for 1983 points to a further cutback in production since effective quotas are lower for flue-cured and burley.

Despite the smaller 1982 crop, increased carryover means that total supplies for the 1982-83 marketing year are 3 percent larger than last season. The reduced crop now indicated for 1983, when added to prospective carryover, may mean a slight reduction in 1983-84 supplies, however.

Reductions in total tobacco use in 1982-83 are anticipated because of expected declines in both exports and domestic use. Exports of unmanufactured tobacco during 1982 probably did not equal the volume shipped in 1981. Moreover, exports in calendar 1983 are likely to decline from the 1982 level. Weaker demand, prospects for only a modest decline in the value of the U. S. dollar, and larger production overseas at prices attractive to foreign tobacco manufacturers will probably limit U. S. sales.

Reduced domestic use of U. S. tobacco is also indicated. Factors behind the expected decline include

weaker demand for cigarettes, continued reductions in tobacco used per cigarette, and continued use of imported flue-cured and burley in cigarettes.

U. S. imports of unmanufactured tobacco leaf and processed scrap have grown significantly in recent years and now comprise 31 percent of the tobacco used by U. S. manufacturers. While total imports in 1982 were somewhat below a year earlier, indications suggest that manufacturers in 1983 may increase the use of cheaper imported tobacco to hold down costs, despite greater domestic supplies.

Both total and per capita consumption of cigarettes are expected to decline in 1983, despite an increase in the smoking age population. Cigarette consumption per capita will be continuing a downward trend, as will the per capita consumption of cigars and smoking tobacco.

Soybeans and Peanuts: The outlook for soybeans in 1982-83 is dominated by large supplies and low prices. Both domestic use and exports are expected to rise this season, but the increase will likely fall far short of the expansion in supplies. Expectations point to a sizable buildup in stocks, with real soybean prices probably falling to their lowest level in many years. With prospects for weak economic growth in 1983 and further cutbacks in hog production-the major factor limiting domestic use-soybean producers will have to cut output to bring stocks and prices back to more normal levels. Even though soybean acreage will probably decline in 1983, supplies are expected to continue large relative to demand.

This season's record-large soybean supplies add up to 2.57 billion bushels, some 11 percent above a year earlier. Lower soybean prices are expected to stimulate usage, but only a moderate increase of about 3 percent is forecast. Domestic processors will probably crush about 6 percent more soybeans than in 1981-82, while exports could be up 1 percent above last season's record volume.

Last year's 14 percent smaller peanut crop combined with sharply larger beginning stocks to reduce total supplies for 1982-83 by only 5 percent. Domestic use of peanuts for food this season is expected to rise by 5 percent, but peanut crushings are likely to decline by some 18 percent. Last season, all major use categories were higher.

While peanut exports during the 1982-83 season may climb some 28 percent above a year ago, they will still be substantially below pre-1980 levels. Supplies of peanuts available for export will no doubt exceed demand, leading to lower farm prices this season.

Cotton: This season's U. S. cotton outlook is being shaped by rising supplies and falling demand. Last year's larger than expected crop and large carryin stocks have boosted supplies for 1982-83 to the highest level since 1967-68. At the same time, sluggish domestic and foreign demand have pushed prospects for total cotton use in 1982-83 down to 11.2 million bales, 0.7 million below 1982 production and the lowest since 1975. This season's ending stocks on August 1, 1983 are thus expected to rise to 7.5 million bales, a 16-year high.

Domestic mill use continues to reflect the weak economy and strong competition from imported textiles. The domestic outlook for the season, therefore, is not bright. Low and more stable cotton prices and higher retail sales of textile products during the first half of 1983 may strengthen mill use slightly. Cotton mill use for the 1982-83 season is forecast to reach 5.4 million bales, only 2 percent above 1981-82.

U. S. cotton exports this season are expected to drop to 5.8 million bales, 12 percent below a year ago and the lowest since 1977-78. The major cutback in cotton exports, as noted earlier, is expected to be in sales to China. China's import needs have been greatly reduced by an excellent harvest in 1982. As a result, some analysts believe that China may buy virtually no U. S. cotton this year. Sluggish use of cotton in other major Asian markets has also lowered export prospects.

Farm prices for cotton have been forced down toward the, loan rate. Since stocks are expected to increase, farm prices could continue near the loan rate for the 1982-83 season. The outlook for another increase in U. S. cotton carryover stocks suggests that a large adjustment in supplies will be necessary this year.

Poultry and Eggs: Poultry and egg producers can look forward to lower feed costs in 1983, with poultry and egg prices averaging near last year's levels. Expectations for a slow recovery in the general economy and the implied high unemployment suggest that prices will remain weak despite reduced supplies of red meats.

Broiler producers are likely to increase production slightly in 1983, probably by 1 to 3 percent. Lower feed costs and the expected declines in red meat supplies during the first half of the year should encourage the expansion in output. But the sluggish economy will probably continue to limit sales and

moderate the expansion. Broiler prices may average near 1982 levels. Price gains, however, are likely to be limited by consumers' tight budgets and their reluctance to pay higher prices when their incomes are growing very little.

Turkey supplies have been reduced over the past nine months to a less burdensome level. Furthermore, production costs in 1983 are expected to remain near those last year. Given this situation, it appears that turkey producers will increase production in 1983, expanding by about 6 percent during the first half of the year and by around 2 percent in the second half. Without large stocks of frozen turkey and reduced supplies of red meats, turkey prices in 1983 may be stronger.

Egg producers had unfavorable returns during most of 1980 and 1981 and for much of 1982. Because of these losses, producers will probably remain cautious about expanding egg output in 1983. They can be expected to continue to keep their old hens in the flock as long as they are producing to offset the reduction they have made in the number of replacement pullets. Egg output for the year may be about the same as in 1982, since low feed costs will help moderate production costs. The low number of replacement pullets may keep production in the first half slightly below the year-ago level. But if the general economy shows signs of recovery during the first half of 1983, and if interest rates decline enough to encourage purchases of additional pullets, egg producers can be expected to increase output in the second half.

Meat Animals: Because of financial pressures and economic uncertainty, many hog and cattle producers have been reluctant to expand their operations. Despite low grain prices, producers appear to have been more interested in reducing debts and improving their cash flow than in increasing their breeding herds.

On balance, commercial pork production in 1983 may be 3 percent under the 1982 level. Small hog inventories suggest a sharp cut in first-half pork output. The reduced hog production indicated for the first six months of the year, if realized, would be the lowest first-half output since 1978 and result in the smallest per capita consumption of pork since 1976. The low production will likely strengthen hog prices, but weak consumer purchasing power will probably limit the gains. While pork production may increase in the second half of the year, supplies will still be relatively tight and hog prices will likely average in the upper $50's per hundredweight. Some strengthening in hog prices could occur, however, if the increase in consumer purchasing power, now indicated to begin in the second half, is realized.

All indications suggest that the expansion in the current cattle cycle which began in 1979 has ended. While the expansion could resume in 1983, there is a greater possibility that cattle numbers will remain the same or perhaps show only a slight decline for the year. Because of the weak financial situation in the farm sector, beef cow herds in many areas are being culled closely or liquidated, especially on farms where cattle are a supplementary enterprise.

Lower feed and feeder cattle prices, plus higher fat cattle prices, encouraged cattle feeders to increase feedlot placements last fall. Placements are expected to remain near or somewhat above year-earlier levels through the winter but may fall slightly below 1982 for the remainder of the year. Fed cattle production can thus be expected to rise 1 or 2 percent this year and comprise a larger proportion of total beef production. Nonfed steer, heifer, and cow slaughter will likely decline, however, and could reduce total beef output slightly. Sharpest year-to-year decreases in beef production are expected to occur in the fall. Fed steer prices are likely to rise modestly through the winter, with prices of Choice fed steers at Omaha for the year probably averaging from $64 to $70 per hundredweight, compared with around $65 last year.

Dairy Products: The dairy situation for 1983 promises to be similar to that in 1982. Milk production will probably increase again since output per cow is likely to continue upward and the number of milk cows may average about the same as last year. Commercial use of manufactured and fluid dairy products is also likely to improve. But the gain in commercial use will probably not be large enough to offset the increase in production. So, the Department of Agriculture will continue to remove large amounts of dairy products from the market, keeping farm prices for milk and retail prices for dairy products near year-earlier levels.

Dairy farmers' effective returns per hundredweight received for milk in 1983 could average 6 percent or more below 1982 because of new legislation authorizing a 50-cent deduction from producer marketings beginning December 1 and a second 50-cent deduction starting April 1. This new program has been implemented in an effort to offset part of the costs of the dairy price support program. Dairy farmers' reactions to the effects of these deductions will play an important role in determining actual milk production in 1983.

THE RELATIONSHIP BETWEEN THE DISCOUNT RATE AND THE FEDERAL FUNDS RATE UNDER THE FEDERAL RESERVE'S POST-OCTOBER 6, 1979 OPERATING PROCEDURE*

Alfred Broaddus and Timothy Cook

Federal Reserve bank directors, who are responsible for establishing the discount rate at their respective banks, subject to the approval of the Board of Governors, naturally have a strong interest in the likely effect of discount rate changes on the Federal funds rate. Under the post-October 6, 1979, Federal Reserve operating procedure, changes in the discount rate have typically been followed by changes in the Federal funds rate in the same direction and of roughly the same magnitude, under usual conditions where the funds rate is above the discount rate. For example, an increase in the discount rate of one percentage point has typically been followed by about a one percentage point increase in the funds rate. This relationship between the two rates differs from their relationship in the period before October 6, 1979, when changes in the discount rate did not generally have a significant impact on the funds rate. The purpose of this article is to explain the basic difference between the procedures used in the two periods and to show how this difference has affected the relationship between the funds rate and the discount rate. More broadly, the article attempts to clarify the role of the discount rate in the overall conduct of monetary policy in the post-October 6 operating regime.

1. The Pre-October 6 Procedure

Before October 6, 1979, the Federal Reserve sought to achieve its money supply objectives by manipulating the Federal funds rate directly through open market operations. Under this procedure the Fed first chose a desired funds rate level believed to be consistent with the money supply objective. If the actual funds rate deviated from this level, the Fed bought or sold U. S. securities in the open market to move the funds rate back to the desired level. In doing so it necessarily increased or decreased the outstanding level of nonborrowed reserves-that is, the level of reserves held by banks other than those borrowed at the discount window-but the magnitude of these changes received little attention.

The key point to keep in mind about the pre-October 6 procedure is that under this procedure the Fed fixed the funds rate within very narrow limits in the short run. In this situation, sustained changes in the spread between the funds rate and the discount rate were possible following a change in the discount rate. To see this, assume that the funds rate was above the discount rate. When the Fed changed the discount rate, the change affected the spread between the funds rate and the discount rate, and the change in the spread, in turn, affected the proportion of its total reserve need the banking system borrowed at the discount window. (A reduction in the discount rate increased borrowing and vice-versa.) If nothing else had happened, this change in borrowing would have affected activity in the Federal funds market and therefore would have affected the funds rate. Under the old procedure, however, the Fed varied the supply of nonborrowed reserves to whatever extent was necessary to keep the funds rate at the desired level. In brief, under the old procedure, changes in the discount rate affected (1) the spread between the funds rate and the discount rate and (2) the allocation of total reserves between borrowed reserves and nonborrowed reserves. They did not significantly affect the funds rate.

The following example may help to clarify these points. Suppose that under the old procedure the Fed was fixing the funds rate at 12 percent and the discount rate was 10 percent. Suppose further that at this two percentage point spread, commer-

* This paper was prepared as part of a staff presentation to the Board of Directors of the Federal Reserve Bank of Richmond on September 9, 1982.

cial banks in the aggregate were borrowing $2 billion at the discount window. If the Fed then raised the discount rate to 11 percent, thereby reducing the spread from two percentage points to one point, the interest cost advantage of borrowing temporarily at the discount window instead of buying funds in the funds market would diminish. As a result, banks would reduce their borrowing at the window and increase their purchases of funds in the. Federal funds market. The increased purchases of Federal funds, in turn, would put upward pressure on the funds rate. In order to keep the funds rate at its desired level, the Fed would supply additional nonborrowed reserves through open market operations. The final result would be a reduction in the spread between the funds rate and the discount rate and a reduction in the proportion of the banking system's total reserve need supplied through the window, but no significant change in the funds rate.

2. The Post-October 6 Procedure

It is important to understand what the October 6 change did and did not involve. The change was ***not*** a move to a procedure in which the Fed controls the money supply by manipulating the supply of total reserves. The Fed cannot manipulate the supply of total reserves in the current statement week under present arrangements due to the present system of lagged reserve accounting. With lagged reserve accounting, total reserves in a given statement week -the bulk of which are required reserves-are essentially predetermined by the level of deposits two weeks earlier.

Because of lagged reserve accounting, the Fed still affects the money supply primarily through the Federal funds rate under the current procedure.[1] Nonetheless, the post-October 6 procedure differs significantly from the old one. Under the new procedure the Fed does not set specific short-run objectives for the funds rate. Instead, it sets a short-run target for nonborrowed reserves believed to be consistent with money supply objectives. Since the level of total reserves that the banking system must hold in a given statement week is essentially predetermined under lagged reserve accounting,[2] the selection of a target for nonborrowed reserves for a given statement week implies a particular level of borrowed reserves in that week. Because, as noted above, the demand for borrowed reserves depends on the spread between the funds rate and the discount rate, the implied level of borrowing in a particular statement week will be consistent with a particular, spread. Therefore, under the new procedure the choice of a nonborrowed reserve target strongly influences the spread between the funds rate and the discount rate in the current statement week.[3],[4] It follows that if the discount rate is changed, the funds rate must change by a roughly equal amount to re-establish the spread between the funds rate and the discount rate that is consistent with the borrowing level implied by the nonborrowed reserve target. If the implied level of borrowing changes significantly in subsequent weeks, both the spread and the funds rate will change. Alternatively, if the implied level of borrowing remains roughly the same, both the spread and the new level of the funds rate will be maintained.

Consider again the above example of a 12 percent funds rate and a 10 percent discount rate. Assume further that the level of borrowing implied by the nonborrowed reserves target is $2 billion. Suppose again that the Fed raises the discount rate to 11 percent. Initially, the increase in the discount rate would again reduce the spread between the funds rate and the discount rate from two percentage points to one point, which would again reduce the interest cost advantage of borrowing at the window relative to buying funds in the Federal funds market. Consequently, desired borrowing at the window would decline initially below the $2 billion level, and banks would attempt to meet their reserve needs by purchasing funds in the Federal funds market. With the supply of nonborrowed reserves fixed at the target level, however, the increased demand for Federal funds would put upward pressure on the funds rate. It seems reasonable to expect that the funds rate would have to rise to roughly 13 percent, which would re-establish the two-point spread that "had brought forth $2 billion of borrowing before the discount rate was changed.

[1] For a more complete description of the mechanism of monetary control under the new procedure, see Robert D. Laurent, "Lagged Reserve Accounting and the Fed's New Operating Procedure," Economic Perspectives, Federal Reserve Bank of Chicago (Midyear 1982), pp. 32-43.

[2] This statement assumes that the banking system's demand for excess reserves is small, which has generally been the case in recent years.

[3] The discussion in this section assumes there is a non-negligible level of borrowing, which normally implies that the funds rate will exceed the discount rate. Sections 3 and 4 of this paper discuss how the present procedure works where the funds rate is below the discount rate.

[4] Under this procedure, if the money supply departs from its path, and the nonborrowed reserve target is not changed; the implied level of borrowing, the spread, and the funds rate would all change in a way that would tend to bring money back to path over time.

To summarize, under the *pre* -October 6 procedure the Fed fixed the funds rate within narrow limits, and a change in the discount rate led to (1) a sustained change in the spread between the funds rate and the discount rate and (2) a change in the allocation of total reserves between borrowed reserves and nonborrowed reserves. Under the *post*-October 6 procedure, the Fed sets targets for nonborrowed reserves, and, a change in the discount rate causes the funds rate to change by about the same amount in the short run. Since the funds rate is the central channel through which the Fed affects the money supply under both procedures, it is obvious that the role of discount rate changes in the overall monetary control process differs significantly between the two procedures. Under the pre-October 6 procedure, a discount rate change did not affect the funds rate. Therefore, discount rate changes were of secondary importance in the monetary control process, although they may have had so-called "announcement" effects in the financial markets. Under the post-October 6 procedure, a change in the discount rate produces an approximately one-for-one change in the funds rate in the absence of a significant change in the level of borrowing implied by the nonborrowed reserve target. Therefore, discount rate changes play a more important role in the monetary control process in the present set-up. Further, these differences imply that the rationale for discount rate changes will differ between the two procedures. For example, if the funds rate was substantially above the discount rate in the pre-October 6 regime, one might recommend an increase in the discount rate to bring it into better alignment with the funds rate and other market rates. This rationale, however, would be much less applicable under the new procedure.

3. The Post-October 6 Procedure with Negligible Borrowing

The above description of the effect of discount rate changes on the Federal funds rate under the post-October 6 operating procedure is only valid in the more normal case where borrowed reserves are above a negligible level. On several occasions in the post-October 6 period, however, borrowing has dropped to negligible levels, and the funds rate has fallen below the discount rate. In this situation, discount rate changes should not affect the funds rate. (This statement and some of the following statements are subject to qualification as explained in the next section.) Suppose, for example, that the discount rate is 10 percent and the funds rate is 9 percent. In these circumstances, few if any banks would borrow at the window for adjustment purposes since the cost of doing so would exceed the cost of purchasing funds in the Federal funds market. A reduction in the discount rate to, say, 9½ percent would leave the discount rate above the funds rate and would not have a significant effect on either the demand for borrowed reserves or the level of purchases in the Federal funds market. Hence, any effect on the funds rate would be small, and the spread between the discount rate and the funds rate would narrow. More generally, when borrowing is negligible and the funds rate drops below the discount rate under the current procedure, the role of the discount rate is similar to its role under the old procedure.[5]

4. Tiering in the Federal Funds Market

There is, unfortunately, an additional complication that has to be mentioned in discussing the relationship between the discount rate and the Federal funds rate under the post-October 6 procedure. This complication was of practical importance in August 1982[6] when borrowing at the discount window was in the $300-$500 million range, even though the funds rate was below the discount rate. The relevant questions are: (1) why was there so much borrowing at the window when it appeared to be cheaper to buy funds in the Federal funds market than to borrow them at the window, and (2) what did this situation imply for the impact of discount rate changes on the funds rate ?

A plausible answer to the first question is that some degree of "tiering" existed in the Federal funds market at that time: that is, some banks could purchase funds only at a premium above the going rate. There is evidence, in fact, that some banks may have been paying premiums as high as 100 basis points in this period. In these circumstances, banks forced to pay a premium might have found it advantageous to borrow at the window even though the funds rate quoted in the market was below the discount rate. As an example, suppose the funds rate is 9½ percent and the discount rate is 10 percent but that there are several banks that can borrow only at a

[5] For empirical evidence on the differential effect on the funds rate of (1) discount rate increases when the funds rate is above the discount rate versus (2) discount rate decreases when the funds rate is below the discount rate, see Gordon H. Sellon, Jr. and Diane Seibert, "The Discount Rate: Experience Under Reserve Targeting," **Economic Review,** Federal Reserve Bank of Kansas City (September/October 1982).

[6] The period referred to here includes the statement weeks ending July 28 through August 25.

premium ranging from 0 to 100 basis points. In this situation banks that have to pay premiums exceeding 50 basis points will find the discount window more attractive than the funds market. In such a case borrowing of, say, $300 million might be consistent with a negative spread between the quoted funds rate and the discount rate.

In the presence of tiering and with borrowing above a negligible level, a reduction in the discount rate should cause the funds rate to decline even if it were already below the discount rate. The mechanism is the same as that outlined in the discussion in section 2 above. Returning to the example in the preceding paragraph, a reduction in the discount rate to 9½ percent would initially increase the demand for borrowed reserves at the window because all banks paying any premium in the Federal funds market would then find it less costly to borrow temporarily at the window. With the nonborrowed reserve target and therefore the supply of nonborrowed reserves unchanged, however, the funds rate would come under downward pressure.[7]

5. Summary of the Role of the Discount Rate in the Post-October 6 Regime

To summarize, when the Fed sets nonborrowed reserve targets, as it does under the post-October 6 procedure, changes in the discount rate will probably cause roughly equal changes in the Federal funds rate when the funds rate is above the discount rate. If borrowing drops to a negligible level, however, and the funds rate falls below the discount rate, discount rate changes will probably not affect the funds rate significantly. When the quoted funds rate is below the discount rate but there is a nonnegligible level of borrowing, such borrowing probably reflects tiering in the Federal funds market. In this situation the impact of a change in the discount rate on the funds rate should be similar to the case when the funds rate is above the discount rate.

While it is possible to delineate these three cases from an analytical standpoint, it is not always easy to do so in practice. In particular, it may be difficult at times to specify the point at which borrowing has reached a "negligible" level where all borrowing is of an interest-insensitive nature. For this reason it may be difficult to predict the effect of a discount rate change on the funds rate when borrowing is at a low level and the funds rate is below the discount rate.

[7] A second possible explanation for nonnegligible borrowing levels when the funds rate is below the discount is that the borrowing is not interest-sensitive adjustment borrowing, but borrowing of a longer term nature that is insensitive to the spread between the funds rate and the discount rate. Such borrowing might include, for example, borrowing by banks that have been denied access to the Federal funds market because they are perceived to be high credit risks. In principle, the target for nonborrowed reserves should include the full amount of interest-insensitive borrowing in each statement week. In practice, such borrowing, when it arises, is not always included immediately in the target. If all of the borrowed reserves in a particular statement week were interest-insensitive, a change in the discount rate would have no effect on the funds rate. This case is essentially equivalent to the situation discussed in the third section of this article where adjustment borrowing is negligible. If the borrowing in a given week were a mixture of interest-insensitive borrowing and interest-sensitive borrowing due to tiering, discount rate changes would affect the funds rate as discussed in the present section.