A MONETARIST MODEL OF EXCHANGE RATE DETERMINATION

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Almost four years have passed since the major nations of the world decided to let their currencies float, jointly or individually. During this period foreign exchange rates have exhibited sharp movements, examples being the recent precipitous fall of the international value of the British pound, the Italian lira, and the Mexican peso as well as sharp gyrations in the U. S. dollar relative to the German deutschemark.

Among the explanations that have been advanced to account for these movements is the monetarist approach, which views national monetary policies as the primary factor directly or indirectly influencing exchange rates. As usually presented, the monetarist approach emphasizes that the exchange rate is determined by demands for and supplies of national currencies; that it is subject to the same influences as other asset prices (e.g., stock prices); that it is particularly sensitive to expectations about future exchange rates, expectations that are heavily conditioned by recent and current monetary policies; and finally that it reflects all available information about the two currencies and therefore alters in response to new information about changed circumstances. In accord with this view, monetarists argue that one reason for the observed volatility of exchange rates is that monetary policies of major nations have been variable and erratic. Policy changes, so the argument goes, have induced asset holders to alter their expectations of future exchange rates, thereby resulting in large movements in current exchange rates. A second factor allegedly contributing to exchange rate movements is lack of policy coordination among nations as manifested by divergent rates of monetary growth. Monetarists contend that this factor produces international differential inflation rates that are a primary source of exchange rate variability. It follows, therefore, that the way to achieve exchange rate stability is for countries to abandon monetary fine-tuning for policy rules calling for uniform constant rates of monetary growth per unit of trend output.

If the foregoing monetarist view sounds familiar, it is probably because it appears so frequently in the financial journals and the popular press. For example, Milton Friedman regularly espouses it in his *Newsweek* column, as do the editors of the *Wall Street Journal* and analysts writing in Citibank's *Monthly Economic Letter.* Rarely, however, do these commentators mention the analytical framework underlying their analysis, although that framework is a standard part of the monetarist approach.[1]

The purpose of this article is to present one version of this framework and to discuss its public policy implications. The framework is represented in the form of a simple two-country, seven-equation expository model of exchange rate determination.[2] This model has a long history dating back at least 175 years. A rudimentary version of it was first used by David Ricardo, John Wheatley, and other classical economists to explain the fall of the paper pound following Britain's suspension of convertibility of notes into bullion at a fixed price during the Napoleonic wars. Later it was employed by the Swedish economist Gustav Cassel to explain the fall of the German mark during World War I and afterward in the famous hyperinflation episode of the early 1920's. In fact, the model in one form or another has been at the center of monetarist policy discussion and analysis whenever flexible exchange rates have been in operation.[3] Applied to recent experience, the model is capable of explaining why exchange rates have been so volatile and why expectational influences have caused them to deviate from levels suggested by underlying rates of monetary and income growth alone.

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[1] This framework has been thoroughly developed in the scholarly, if not the popular, literature. See in particular the papers cited in the list of references at the end of this article. The present article draws heavily from these sources.

[2] The model presented here is adapted from similar models developed by Bilson [1, 2], Dornbusch [3], Frenkel [4], Fry [5], Magee [6], and Mussa [7].

[3] See Frenkel [4] and Myhrman [8], especially the latter, for a discussion of the role of the monetarist approach in earlier exchange rate debates.

Key Propositions Central to the model are six ingredients that should be acknowledged at the outset. These include (1) the quantity theory of money, (2) the purchasing power parity doctrine, (3) the interest rate parity concept, (4) the Fisher relationship (named for the economist who first formulated it) between nominal and real interest rates, (5) a monetarist expectations-formation hypothesis, and (6) the efficient markets hypothesis. The quantity theory states that the price level clears the market for money balances by bringing the real (price-deflated) value of the nominal money stock into equality with the real demand for it. The purchasing power parity doctrine states that the equilibrium exchange rate is such that a unit of a given currency commands the same quantity of goods and services abroad when converted into the other currency as it commands at home. This implies that the buying powers of the two currencies are the same when expressed in terms of a common unit at the equilibrium rate of exchange. Such purchasing power equalization eliminates profitable opportunities for commodity arbitrage, thereby insuring that existing stocks of national currencies will be willingly held and that the markets for real cash balances in both countries will clear simultaneously. Similar reasoning underlies the interest rate parity concept, which states that the real rate of return on capital assets tends to be everywhere the same and independent of the currency denomination of the asset. The Fisher relationship states that the nominal rate of interest equals the real rate of interest plus the expected rate of inflation. Taken together, the Fisher relationship and the real interest rate parity concept imply that international nominal interest rate differentials reflect differences in national inflationary prospects. The monetarist expectations-formation hypothesis states that the public forms expectations of the future rate of inflation on the basis of its perception of the likely future course of monetary policy. Finally, the efficient markets hypothesis states that the current market price of an asset (e.g., foreign exchange) reflects all available information and adjusts instantaneously to incorporate new information. Constituting the central analytical core of the monetarist view of exchange rate determination, the foregoing propositions are incorporated into the model presented below.

The Model and Its Components The model itself consists of seven equations containing the following variables. Let M be the nominal money stock (assumed to be exogenously determined by the central bank) and m and m^e be the current and expected

future rates of growth of that stock. Furthermore, let D be the real demand for money, i.e., the stock of real (price-deflated) cash balances that the public desires to hold, Y the exogenously determined level of real income, i and r the nominal and real rates of interest, respectively, and —a the interest elasticity of demand for money. Also let X be the exchange rate (defined as the domestic currency price of a unit of foreign currency), P be the price level, E be the expected future rate of inflation, and I be the set of information upon which those expectations are based. Asterisks are used to distinguish foreign-country variables from home-country variables, and the subscript w refers to the entire world economy.

The foregoing variables are linked together via the following relationships:

(1) $P = M/D$ and $P^* = M^*/D^*$

(2) $D = Yi^{-a}$ and $D^* = Y^*i^{*-a}$

(3) $P = XP^*$

(4) $i = r + E$ and $i^* = r^* + E^*$

(5) $r = r^* = r_w$

(6) $E = E(m^e)$ and $E^* = E^*(m^{e*})$

(7) $m^e = m^e(m, I)$ and $m^{e*} = m^{e*}(m^*, I^*)$

The first relationship, which can also be written as $M/P = D$, is the monetary equilibrium equation. It states that the price level in each country adjusts instantaneously to bring the real value of the nominal money stock into equality with the real demand for it thereby clearing the market for real cash balances. Note that the equation also implies that, given the real demand for money, the price level is determined by and varies equi-proportionally with the nominal money supply. This latter result, of course, is the essence of the quantity theory of money.

The second equation is the money demand function that expresses the public's demand for real cash balances as the product of two variables, namely real income and the nominal interest rate. The former variable is a proxy for the volume of real transactions effected with the aid of money and thus represents the transactions demand for money. By contrast, the interest rate variable measures the opportunity cost of holding money. The parameter —a, which appears as the exponent on the interest rate variable, is the interest elasticity of demand for money. This parameter measures the sensitivity or responsiveness of money demand to changes in the interest rate and is assumed to be a negative number indicating that desired real cash balances vary inversely with the cost of holding them. Note that the numerical magni-

tude of the interest elasticity coefficient is assumed to be the same in both countries. Note also that the income elasticity of demand for money, as represented by the exponential power to which the income variable is raised, is assumed to possess a numerical value of unity.

The third equation of the model is the purchasing power parity relationship showing how national price levels are linked together via the exchange rate. As indicated by the equation, prices in both countries are identical when converted into a common unit at the rate of exchange. This means that the exchange rate equalizes such (normalized) price levels and, by implication, the purchasing power of both moneys expressed in terms of a common currency unit. This condition of equalized purchasing power is of course necessary if the two national money stocks are to be willingly held and equilibrium is to prevail in both money markets simultaneously. If the purchasing powers were unequal, people would demand more of the high- and less of the low-purchasing power currency on the market for foreign exchange. The resulting excess demand for the former and the corresponding excess supply of the latter would cause the exchange rate between the two currencies to adjust until purchasing power was equalized and both money stocks were willingly held. Note also that the purchasing power parity equation can be rearranged to read $X = P/P^*$, thus corresponding to the monetarist interpretation of the exchange rate as the relative price of two currencies, i.e., as the ratio of the foreign currency's value in terms of goods to the domestic currency's value in terms of goods. Since the value of a unit of currency in terms of a composite market basket of commodities is the inverse of the general price level $1/P$, it follows that the relative price of the two moneys is simply the ratio of the national price levels as indicated by the equation.

The fourth and fifth equations explain the determination of the nominal and real rates of interest, respectively. Following Irving Fisher, the fourth equation defines the nominal interest rate as the sum of the real rate of interest and the expected future rate of inflation, the latter variable being the premium added to real yields to prevent their erosion by inflation. The fifth equation expresses the concept of interest rate parity according to which real yields on assets tend to be the same everywhere and independent of the currencies in which denominated. Since capital is mobile internationally, i.e., foreigners can purchase domestic securities and domestic citizens can purchase foreign securities, it follows that

real yield equalization is necessary if all asset stocks are to be willingly held. Accordingly, the equation states that real interest rates in both countries are the same and are equal to a given constant world rate. Taken together, equations 4 and 5 imply that international nominal interest rate differentials reflect differences in expected future national rates of inflation. For example, if the market expects the future rate of inflation to be 10 percent in the U. K. and 3 percent in the U. S., then the U. K. nominal interest rate will be 7 percentage points above the corresponding U. S. interest rate.

The sixth and seventh equations together explain how the public forms its expectations of the future rate of inflation. These inflationary expectations constitute the anticipated future rates of depreciation of money holdings. As such, they enter the foreign and domestic demand for money functions via the nominal interest rate variables and thereby play an important role in determining the exchange rate. Regarding the formation of price anticipations, equation 6 expresses the monetarist hypothesis that inflationary expectations are based on what the market believes the future rate of monetary growth will be. This of course means that the market must forecast the future rate of monetary growth in order to forecast the future rate of inflation. Equation 7 explains how money growth forecasts are formulated. The equation embodies the assumption that people formulate expectations rationally, using all available information in predicting future monetary growth, and perhaps revising their predictions as new information appears. Relevant information includes recent policy pronouncements, imminent political changes, data on past and current behavior of the monetary aggregates, past observations on the policymakers' responses to changes in the economy, and the like. In equation 7, the information input is represented by two variables, namely the current growth rate m of the monetary aggregates and all other information I. The model does not attempt to explain precisely how money growth forecasts are derived from this information. It simply assumes that the forecasts are somehow made, that they constitute the most accurate predictions possible given the state of the market's knowledge and the availability of information, and that they form the basis for future price anticipations. Note that the substitution of equation 7 into equation 6 yields the efficient market hypothesis that the price expectations underlying the exchange rate reflect all available information concerning it.

Linkages and Causation Taken together, the foregoing relationships constitute a simple seven-

equation system that embodies the monetarist view of exchange rate determination. The equations imply two unidirectional channels of influence—one direct, the other indirect—running from money to prices to the exchange rate. Regarding the former channel, the model implies that the actual stock of money affects prices and the exchange rate directly through the monetary equilibrium and purchasing power parity equations. As for the indirect channel, the model implies that the anticipated future growth rate of money influences prices and the exchange rate indirectly through the price expectations component of the nominal interest rate variable that enters the demand for money functions. More specifically, the model postulates the following causal chain:

1. Current and past monetary growth rates influence predictions of future monetary growth.

2. Predictions of future monetary growth determine the expected rate of inflation.

3. Given the real rate of interest, inflationary expectations determine the nominal rate of interest.

4. The latter variable, together with the given level of real income, determines the demand for money.

5. Given the demand for money, the nominal money stock determines the price level.

6. Finally, the two price levels, foreign and domestic, together determine the exchange rate.

Clearly, in the model presented above, the linkages run from money (actual and anticipated) to prices to the exchange rate. Moreover, all variables affecting the exchange rate do so through monetary channels, i.e., through the demand for or supply of money. In this sense, money demand and supply may be said to constitute the *proximate* determinants of the exchange rate. The *ultimate* determinants, however, are the variables that underlie and determine the monetary factors themselves, namely income, interest rates, price expectations, money stocks and their growth rates, and other exogenous information.

Determinants of the Exchange Rate To show the relationship between the exchange rate and its ultimate determinants, simply substitute equations 2-7 into equation 1 and solve for the exchange rate. The resulting "reduced form" expression is

$$(8) \quad X = [M/M^*][Y^*/Y][i/i^*]^a$$

or, since the nominal interest rate i is the sum of the real interest rate r and the expected rate of inflation E,

$$(8') \quad X = \left[\frac{M}{M^*}\right]\left[\frac{Y^*}{Y}\right]\left[\frac{r+E(m, I)}{r^*+E^*(m^*, I^*)}\right]^a$$

Equation 8 (or 8') collects the determinants of the exchange rate into three groups, namely relative money supplies, relative real incomes, and relative nominal interest rates comprised of a fixed real rate component and a variable price expectations component. Of these three groups, the first captures purely monetary influences on the exchange rate while the second and third capture real and expectational influences, respectively.

Regarding the first group of determinants, the equation implies that, all else being equal, the country with the faster monetary growth will find its currency depreciating on the foreign exchanges. As for the second group of determinants, the equation predicts that, everything else being equal, the country with the faster growth of real income and hence real demand for money will experience an appreciating exchange rate. The reason is straightforward. Given a constant nominal money stock, a real income-induced rise in the demand for it necessitates a fall in the price level to clear the market for money balances. Since the required price fall is greater in the high- than in the low-growth economy, and since the exchange rate by definition is the ratio of the two price levels, it follows that the high-growth country's currency will be appreciating on the foreign exchanges. Note that the monetarist conclusion that real income growth tends to appreciate (lower) the exchange rate contradicts the traditional trade balance view that income growth depreciates the exchange rate by inducing a rise in the home demand for imports.

Finally, as regards the third group of determinants, equation 8 (or 8') states that, everything else being equal, the country with the relatively worsening inflationary prospects will have a depreciating exchange rate. There are two explanations for this. First, people will desire to hold relatively less of the currency whose value is expected to fall the most. Therefore the relative asset demand for that currency will fall and the exchange rate will depreciate—assuming, of course, that no compensating changes occur in relative money supplies. Second, contracts will tend to be written in terms of the currency that is expected to depreciate the least, i.e., the stronger currency will be preferred to the weaker as an international unit of account, standard of value, and medium of exchange. The resulting fall in the relative transactions demand for the weaker currency will reduce its value on the foreign exchanges. In short, an anticipated depreciation of a currency will reduce both the asset and transactions demand for it thereby helping to bring about the very depreciation that is anticipated. Note, however, that such anticipations

are not independent of recent and current monetary policies (represented by the variables m and m* in equation 8') but are strongly conditioned by them. Within the context of the model, at least, a history of unrestrained monetary expansion will produce expectations of more of the same thereby contributing to the weakness of the currency on the foreign exchanges. Similarly, a history of monetary stability will help create the favorable expectations that contribute to a currency's strength.

The preceding discussion gives some indication of the importance that monetarists attach to the role of expectations in determining exchange rates. Corresponding to this emphasis on expectations, equation 8' specifies divergent inflationary prospects as the reason why exchange rates often deviate from levels suggested by relative money stocks and real incomes alone. According to the equation, the exchange rate will conform to the level suggested by the underlying fundamentals only when inflationary expectations are the same in both countries. In this special case, expected future rates of return on both currency holdings are identical and cancel out, and the exchange rate is determined solely by the fundamentals. In all other cases, however, differential expected inflation rates influence the exchange rate and cause it to diverge from the level predicted by the fundamentals, i.e., relative money stocks and real incomes.

Equation 8' would be of little interest to analysts and policymakers were it incapable of explaining another characteristic of recent floating rate experience, namely exchange rate volatility. Fortunately, however, the equation can account for such behavior and does so by identifying two main sources of exchange rate movements. The first is shifts in relative money supplies (M/M*) owing to monetary policies that are variable and divergent as between countries. For example, oscillatory movements in the exchange rate could be produced by two countries engaging in discretionary countercyclical monetary policy but always in opposite directions, A's money stock expanding when B's contracts, and vice versa.

The second source of exchange rate volatility identified by equation 8' is expectational shifts occasioned by the appearance of new information—e.g., announced changes in policy targets—about the future prospects for various currencies. The new information leads the market to revise its opinion about the future costs and returns from holding the different currencies. Reflecting these expectational shifts, exchange rates change until the existing stocks of the various currencies are again willingly held. Note that exchange rates are no different than stock prices in this respect. Just as the price of a firm's stock at

any moment reflects all available information about the future profitability of the firm, so also does an exchange rate embody all known information about the future values of two currencies. New information that alters the market's perception of these future values will result in sudden changes in exchange rates just as new information about future firm profitability causes sharp shifts in a stock's price. Both are special cases of the general rule that, given new information about changed circumstances, the market price of any asset—whether equity share or unit of foreign currency or whatever—must change until the outstanding stock of the asset is willingly held.

A third possible source of exchange rate instability is variations in the ratio of real incomes (Y*/Y). This factor, however, is deemphasized by monetarists who believe it to be dominated by shifts in relative money stocks and relative inflationary expectations.

Policy Implications of the Model This article has presented a monetarist model that specifies money stocks and inflationary expectations as key determinants of the exchange rate and that stresses the role of monetary policy in influencing these determinants. Specifically, the model postulates that money stocks are exogenously controlled by national central banks and that the public's expectations about the future purchasing power of various currencies are strongly shaped by current policy actions and announcements. Several implications follow from the model. It is well to remember, however, that these implications reflect the particular assumptions underlying the model and that some of these assumptions are disputable. This is especially true of the assumptions of purchasing power parity, real interest rate parity, and exogeneity of real income. While these conditions may hold in long-run equilibrium, empirical evidence suggests that they may not hold over any realistic short-run policy horizon nor over the transitional adjustment period following economic shocks. Recognition of this fact would probably modify any policy prescriptions based on the model. Subject to these caveats, the policy implications of the model are summarized below.

The first implication is that, given the rate of foreign monetary growth, the most effective means of halting and reversing a depreciation of the exchange rate is a preannounced permanent reduction in the rate of domestic monetary expansion. As new information, the announcement itself will of course have an immediate impact on the exchange rate through the price expectations channel. For this impact to be anything more than temporary, however,

the public must be convinced that the announced policy target is a reliable indicator of the future growth rate of the money stock. To convince the public of this, the authorities must bring the actual rate of monetary growth into conformity with the announced target rate since the public forms its expectations of future monetary growth at least partly on the basis of the observed current growth rate. Assuming this is done and the stable money growth rate target is thereafter permanently adhered to, the exchange rate will continue to be strengthened through the money stock and price anticipation channels.

A second policy implication is that exchange rate movements are going to occur when domestic monetary policies are divergent and inconsistent as between countries. This can be demonstrated by rewriting equation 8 as $X = (M/Y)(Y^*/M^*)(i/i^*)^a$. As written, this expression shows the relationship between the exchange rate, its underlying national money/output ratios, and of course the interest rate ratio. Dissimilar monetary policies (i.e., international differences in rates of monetary growth per unit of real output) cause the money/output ratios to diverge. When this happens relative inflationary expectations are also affected, thereby producing changes in the interest rate ratio. These changes augment and reinforce the impact of the divergent money/output ratios on the exchange rate. Because of these influences, the exchange rate is going to vary when monetary policies differ as between countries.

The exchange rate will be stable only if both countries agree to keep their money/output ratios constant or at least growing at the same rate. This in turn requires that both countries abandon divergent policies for a uniform rule tying the money growth rate to the growth rate of real income. Note in particular that within the context of the model it is impossible for a single country to stabilize the exchange rate by adhering to a monetary rule if the other country persists in monetary fine-tuning. In short, exchange rate stability is virtually impossible when countries pursue incompatible monetary policies.

A third policy implication, therefore, is that policy coordination or harmonization is the key to exchange rate stability. If two countries agree to adopt the same monetary expansion rule—e.g., a rule calling for a constant rate of domestic monetary growth fixed in relation to the trend growth rate of domestic output—then both will enjoy the same long-run stable domestic inflation rate, and the floating exchange rate between their currencies will be virtually as constant as an institutionally fixed rate. In this

case, policy coordination would allow the countries to enjoy the advantages of a fixed exchange rate while retaining some degree of national monetary autonomy.

The preceding discussion raises several questions. Why is exchange rate constancy so important? Is the type of exchange rate regime per se crucial to the attainment of that objective? Regarding the first question, it can be stated unequivocally that exchange rate constancy is a prerequisite for an efficiently operating international monetary system. This is because money, in its role as a social device for economizing on the use of scarce resources in the generation and transmission of economic information, is most effective when its value across countries is stable, certain, and predictable. These qualities of course are lacking when exchange rates fluctuate and money therefore functions poorly as a resource-economizer. In such situations, traders themselves must forecast shifts in the value of currencies, bear the risks of such shifts, or hire someone else to bear the risks. Either way, real resources—effort, time, knowledge—are diverted from productive pursuits into forecasting and risk-taking activities that would be totally unnecessary if exchange rates were constant. It follows that the international economic system is not going to be operating at peak efficiency as long as exchange rates continue to fluctuate. On efficiency grounds alone, therefore, exchange rate constancy is a desirable objective.

As for the question of whether a specific exchange rate regime—fixed or floating—is crucial to the attainment of that objective, the answer appears to be in the negative. The preceding analysis suggests that the key to achieving exchange rate constancy lies less in the way the foreign exchange market is organized than in finding a means of coordinating national monetary policies. As previously mentioned, policy coordination in the form of the adoption of uniform rules is required if exchange rates are going to be constant in a floating rate regime. Similarly, some sort of coordination is necessary in a fixed rate regime, otherwise countries might inflate their domestic money stocks at different rates forcing a breakdown of the system. To summarize, policy coordination, not the exchange rate regime, is the sine qua non for exchange rate stability.

Summary This article has presented a simple expository model of exchange rate determination that incorporates key elements of the monetarist approach. These elements lead to the conclusion that the exchange rate is determined by relative money stocks, relative real incomes, and relative inflationary expec-

tations, with the last variable being strongly conditioned by observed rates of monetary growth. The model is helpful in explaining exchange rate volatility and the tendency for some currencies to remain over- or under-valued for long periods. Finally, the model provides a useful framework for specifying the conditions necessary for the attainment of exchange rate stability.

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FORECASTS 1977

A PERSISTENT BUT GRADUAL EXPANSION

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The views and opinions set forth in this article are those of the various forecasters. No agreement or endorsement by this Bank is implied.

The economy will continue to expand in 1977, and "the pause" will pause, at least for the year. That, at least, is the general conclusion reached by leading business and academic economists who have published forecasts for the 1977 economy.

Each year the Federal Reserve Bank of Richmond compiles various forecasts of the economy's performance for the coming year. This year many of the forecasters based their forecasts on the following assumptions:

1. Higher oil prices;

2. Good harvests resulting in lower grain prices;

3. Continued availability of money for home financing;

4. An "accomodative" monetary policy.

Many also assumed that any fiscal stimulus that may be introduced by the Carter administration would not be felt in 1977. On the basis of these assumptions, the forecasters expect approximately a 5.0 percent rate of real growth for GNP. This slightly lower rate is expected to be accompanied by a 5.4 percent increase in prices and a 7.1 percent unemployment rate.

Last year the consensus prediction was remarkably close to the target for the year as a whole. The consensus was in error, however, on the path of the expansion during the course of the year. Last year's forecasters did not anticipate the so-called "pause" or "lull" in the economy's growth. This lull, which many observers believe began in June, persisted, some think, through October. There is some question about the dating of the pause, since different indicators suggest different dates. For example, the

unemployment rate, which reached a low of 7.3 percent in May and began to move up sharply until July and slowly thereafter, suggests that the economy could still be in the growth pause. The reliability of the unemployment rate as an economic indicator has been questioned, however, because of the extraordinarily large increase in the civilian labor force in 1976. Employment increased at a good pace until June, and after a pause, apparently resumed its long-term normal growth path in November. The index of industrial production increased until August, when it began a decline that lasted until October. In November, however, the index turned up again.

This year the forecasters expect steady, though moderate, expansion. Although the growth in 1977 is expected to be balanced with no sectors declining, the outlook appears to be brightest for residential construction, and especially for single-family dwellings, where conditions are expected to be much improved. Even for multi-family dwellings the seers expect considerable improvement.

This article attempts to convey the general tone and pattern of some 40 forecasts received by the Research Department of this Bank. Not all of these forecasts are comprehensive, and some incorporate estimates of future behavior of only a few key economic indicators. The consensus of the annual forecasts may differ from the consensus drawn from the quarterly forecasts, since different forecasters were applying their skills. Also, since there were varying assumptions in the individual forecasts regarding events in 1977, the general tone and pattern may not necessarily be based upon the more realistic assumptions but only those most prevalent.

This Bank also publishes the booklet *Business Forecasts 1977*, which is a compilation of representative business forecasts with names and details of the various estimates. No summary article can ever be as informative as the actual forecasts themselves. Serious readers are urged to look at the individual forecasts in more detail in *Business Forecasts 1977*.

1976 FORECASTS IN PERSPECTIVE

The consensus forecast for 1976 GNP, published in last year's January/February *Economic Review*, predicted an increase of 12 percent over 1975. The rates of increase forecast ranged from 9.0 percent to 13.4 percent. Using the revised 1975 GNP total of $1,516.3 billion, the consensus forecast for 1976 GNP would have been $1,698.3 billion and the range from $1,652.8 billion to $1,719.5 billion. Increasing prices were expected to account for 5.6 percent of the gain in GNP, so GNP measured in constant dollars, or real GNP, was expected to rise 6 percent.

Current estimates by the U. S. Department of Commerce indicate that GNP in 1976 actually increased 11.6 percent. Prices, however, increased at a somewhat slower rate than anticipated, so preliminary estimates put the increase in real GNP around 6 percent—quite close to the amount of increase predicted by the consensus of last year's forecasters.

The forecasters expected the unemployment rate to average 7.8 percent for the year. At present, preliminary estimates indicate an average of 7.7 percent.

As with the aggregate figure, the forecasters also predicted the components of GNP more accurately than in past years. Personal consumption spending was forecast to increase 11.0 percent, very close to the actual 10.8 percent rate of increase.

RESULTS FOR 1976 AND TYPICAL FORECAST FOR 1977

	Unit or Base	Preliminary 1976*	Forecast 1977**	Percentage Change 1975/1976	Percentage Change 1976/1977
Gross national product	$ billions	1692.4	1880.2	11.6	11.1
Personal consumption expenditures	$ billions	1078.6	1192.2	10.8	10.5
Durables	$ billions	156.3	175.4	18.7	12.2
Nondurables	$ billions	440.3	479.9	7.6	9.0
Services	$ billions	482.0	536.9	11.5	11.4
Gross private domestic investment	$ billions	241.2	281.5	31.3	16.7
Business fixed	$ billions	160.0	183.7	8.8	14.8
Residential structures	$ billions	67.8	82.5	32.4	21.7
Change in business inventories	$ billions	13.4	15.3	—	—
Government purchases	$ billions	365.8	399.8	7.9	9.3
Net exports	$ billions	6.9	6.7	—	—
Gross national product (1972 dollars)	$ billions	1265.0	1328.3	6.2	5.0
Plant and equipment expenditures	$ billions	121.2e	137.2	7.5	13.2
Corporate profits before taxes	$ billions	148.0e	167.2	29.3	13.0
Private housing starts	millions	1.6	1.8	34.5	16.9
Automobile sales (domestic)	millions	8.6	9.1	16.6	6.0
Rate of unemployment	percent	7.7	7.1	—	—
Industrial production index	1967=100	129.8	138.2	10.2	6.5
Wholesale price index	1967=100	182.9	192.2	4.6	5.1
Consumer price index	1967=100	170.5	180.6	5.8	5.9
Implicit price deflator	1972=100	133.8	141.0	5.1	5.4

*Data available as of January 24, 1977.

**Figures are constructed from the typical percentage change forecast for 1977.

eEstimated.

The components of consumption spending, however, were predicted less accurately. Consumer purchases of durable goods, estimated to increase 15 percent, actually rose 18.7 percent. In contrast to the underestimate of consumer durables, purchases of nondurables were overestimated, the actual rate of increase, 7.6 percent, being 3.1 percentage points below the forecast rate of increase. Consumption spending for services was forecast to increase only 10.1 percent, so its actual 11.5 percent increase combined with the underestimate of durable purchases acted to offset the overestimate of nondurable expenditures. As a result of these offsetting errors, the 11 percent expected increase in aggregate consumption turned out to be, quite fortuitously, close to the actual 10.8 percent figure.

The forecasters expected a large increase in gross private domestic investment from its depressed 1975 level, but not as large as the 31.3 percent rise that actually materialized. Their major error was in underestimating business inventory investment by $5.8 billion. By contrast, residential construction and business fixed investment spending were predicted fairly accurately. Residential construction, predicted to increase 33.3 percent, actually rose 32.4 percent; and business fixed investment, projected to rise 10.3 percent, actually rose 8.8 percent. When combined, those figures resulted in a predicted 28.4 percent increase in aggregate gross private domestic investment, and that prediction, as noted earlier, was well below the figure realized.

Net exports, which the forecasters always find difficult to estimate accurately, was underestimated by only $1.9 billion last year. By historical standards, that is a relatively small error. As for the last major component of GNP, namely government purchases of goods and services, the forecasts centered around a rate of increase of 8.7 percent. Actual government spending is now thought to have risen 7.9 percent.

All in all, the last year's forecasters did remarkably well in predicting average levels and rates of change on key economic variables for the year. They anticipated the recovery quite well, and their numbers for the year as a whole were closer to the mark than they have been in any previous year since this Bank has been gathering these data.

The consensus of the quarter-by-quarter forecasts for 1976 had current dollar GNP rising $41.8 billion in the first quarter, $46.7 billion in the second quarter, $46.0 billion in the third quarter, and $50.5 billion in the fourth. The realized quarterly increases were $48.0 billion, $39.0 billion, $34.6 billion, and $38.7 billion. For real GNP, the consensus forecast called for quarterly increases of $16.3 billion, $18.2

billion, $18.1 billion, and $19.7 billion. The realized numbers for the first three quarters, respectively, were $27.1 billion, $13.7 billion, and $12.2 billion, while the preliminary number for the fourth quarter is now placed at $9.3 billion.

The forecasters, then, exhibited considerably less prescience about the quarterly path of the economy than they did about average figures for the year as a whole. They expected relatively constant growth in 1976, with the largest increase in GNP coming in the fourth quarter. Instead, the economy experienced its largest growth in the first quarter, with the rate tapering off in the second, third, and fourth quarters. In defense of the forecasters, however, it should be noted that the large growth of GNP in the first quarter stemmed from hard-to-forecast inventory stimulus with real inventory investment increasing $15.9 billion. Likewise, much of the slowdowns in real GNP in the second and fourth quarters came from inventory adjustments. Excluding these unexpected and hard-to-predict inventory swings, the forecasters came much closer to anticipating actual developments.

The limits of forecasting prescience were equally apparent in the discrepancy between actual and predicted quarter-by-quarter behavior of the unemployment rate. The unemployment rate was expected to decline gradually throughout the bicentennial year, averaging 7.4 percent in the fourth quarter. Instead, the unemployment rate surprised almost everyone by dropping sharply in the first quarter—from 8.5 percent in the fourth quarter of 1975 to 7.6 percent; continuing its fall, as expected, to 7.4 percent in the second quarter; but rising sharply to 7.8 percent in the third quarter; and continuing that rise into the fourth, when it averaged close to 8 percent.

Thus, although those who forecast the quarter-by-quarter performance of the economy expected the unemployment rate to average 7.75 percent for the year (close to the actual 7.7 percent average rate), they thought that the end-of-the-year unemployment figures would be substantially better than they actually were.

Regarding profits and production, the forecasts for 1976 underestimated the recovery of both. Before-tax corporate profits were predicted to rise 22.5 percent; most observers now think they increased about 30 percent. The index of industrial production rose 10.2 percent against a predicted increase of 9.3 percent.

As with the implicit price deflator, the forecasters overestimated the rise in the consumer price index. Consumer prices were expected to rise 6.5 percent, but current figures indicate a rise of 5.8 percent.

1977 FORECASTS IN BRIEF

Gross National Product Forecasts for 1977 current dollar GNP center around $1,880.2 billion. This consensus forecast indicates an approximate 11.1 percent yearly gain, about the same as the 11.6 percent increase apparently registered in 1976. Prices are expected to increase only 5.4 percent. GNP measured in constant dollars, or real GNP, is projected to rise 5 percent in 1977, considerably less than the 6.2 percent increase registered in 1976. Estimates for increases in current dollar GNP range from 6.8 percent to 12 percent, but the great majority lie between 11.0 percent and 11.5 percent. The concensus of quarterly estimates indicates an expansion of an essentially constant rate throughout the year. It calls for increases of $45.3 billion in the first quarter of 1977, $50.9 billion in the second, $52.1 billion in the third, and $54.0 billion in the fourth.

Personal consumption expenditures are expected to total $1,192.2 billion for 1977, up 10.5 percent from 1976. The estimates for consumption spending range from an increase of 8.8 percent to an increase of 11.0 percent. Forecasters estimate that expenditures for durable goods will rise 12.2 percent for the year, while expenditures for nondurables and services are projected to advance 9.0 percent and 11.4 percent, respectively. The expansion in durable goods expenditures is expected to stem primarily from sales of appliances, furniture, and automobiles as a result of generally improving consumer confidence, a continued housing recovery, relatively strong demand for automobiles, and rising real disposable incomes.

Government purchases of goods and services are projected to total $399.8 billion. This estimate represents a 9.3 percent increase over 1976, somewhat larger than the 7.9 percent gain of the previous year. The 1977 forecasts for government purchases range from increases of 8.2 percent to 11.0 percent.

Gross private domestic investment is expected to rise by 16.7 percent in 1977, following a 31.3 percent increase in 1976. Inventory rebuilding is expected to continue at about the 1976 level, although without the large quarter-by-quarter fluctuations that characterized 1976. Residential construction, however, will be the leading sector if the projectors are correct. It is expected to increase by 21.7 percent in 1977. Business fixed investment spending will be another source of strength. That sector is expected to register a 14.8 percent gain. The array of forecasts this year, as is usually the case, diverge more from the consensus in the investment area than in any other. Expectations for residential construction increases

range from 13.6 percent to 27.5 percent. For business fixed investment, estimated increases range between 11.9 percent and 16.7 percent. Forecasts for investment in business inventories, for which the consensus was $15.3 billion, range from $14.0 billion to $21.0 billion.

Industrial Production The typical forecast for the Federal Reserve index of industrial production (1967 = 100) in 1977 is 138.2, an increase of 6.5 percent. This prediction calls for more moderate expansion than in 1976, when the index increased 10.2 percent. From a longer-term viewpoint, even if the projected increase for 1977 is realized, the index will still be only 6.5 percent above its 1973 level.

Housing The construction industry is expected to continue its recovery from the very low levels of 1974 and 1975. Activity in this sector, however, is still expected to be below the 1971-1973 pace. Private housing starts—which totaled over 2 million in 1971, 1972, and 1973: 1.3 million in 1974; 1.2 million in 1975; and 1.6 million in 1976—are expected to total 1.8 million units in 1977. According to preliminary estimates, however, housing starts closed 1976 at an average annual rate of 1.8 million in November and December, so the predicted number for 1977 represents no improvement over the year-end 1976 rate. Forecasters expect the recovery to be limited mainly to single-family dwellings. Home financing is expected to be available, and the inventory of unsold houses on hand has been reduced during 1976. High

TYPICAL* QUARTERLY FORECASTS FOR 1977

Quarter-by-Quarter Changes in Billions of Dollars Unless Otherwise Noted

	I	II	III	IV
Gross National Product	45.3	50.9	52.1	54.0
Personal Consumption Expenditures	27.0	31.2	31.0	30.1
Gross Private Domestic Investment	9.8	10.7	12.0	11.7
Net Exports†	4.5	4.0	3.2	3.0
Government Purchases	7.7	8.4	9.4	11.8
Gross National Product (1972 Dollars)	17.0	18.7	18.0	18.0
Implicit Price Deflator‡	5.2	5.6	5.6	6.4
Rate of Unemployment(%)†	7.7	7.4	7.2	6.9

*Median.
†Actual estimate.
‡Percentage changes at annual rates.

current prices for new homes, however, continue to limit sales, and some builders have not yet recovered from past difficulties.

Corporate Profits All the forecasters expect a better pretax profit figure than was realized last year. The most pessimistic forecaster expects a 9.6 percent profit increase; the most optimistic a 19.5 percent rise. The consensus forecast calls for an increase in pretax profits of about 13 percent, to $166.8 billion. This would follow a gain of approximately 29 percent in 1976. Hence, corporate profits are expected to continue their rebound from their generally poor performance in 1974 and 1975.

Unemployment Most forecasters are predicting a decline in the rate of unemployment during 1977. The typical forecast for the year's average is around 7.1 percent. This will be only 0.6 percentage points below the 1976 average, but considering that the unemployment rate at year-end 1976 stood around 8.0 percent, a 7.1 percent average for 1977 indicates the seers expect employment growth finally to outpace labor force expansion and reduce the unemployment rate.

Prices This year the forecast indicates that the rate of price increase will level out at about last year's rate. The implicit GNP deflator, which rose 10.0 percent in 1974; an estimated 9.3 percent in 1975; and an estimated 5.1 percent in 1976; is expected to increase only 5.4 percent in 1977. The consumer price index is expected to average 180.6, 5.9 percent higher than the 1976 average. The wholesale price index is expected to increase at a lower rate than the other indexes, 5.1 percent, but moderately faster than the 4.6 percent rate of advance registered in 1976. Current expectations are for a far better year, of course, than 1975, which had a

9.2 percent increase, and 1974, when wholesale prices rose 18.9 percent.

Net Exports The nation's trade position, measured on a National Income Accounts basis, was approximately $6.9 billion in surplus in 1976 and is expected to stay at approximately the same level in 1977. The forecasters expect imports to continue to increase as consumer spending picks up, but they also foresee an increase in exports, since they expect recovery abroad. The estimates for net exports varied between —$1.6 billion and +$10.0 billion.

Quarter-by-Quarter Forecasts Fifteen forecasters made quarter-by-quarter forecasts for 1977. As indicated by the accompanying table, the forecasters generally expect growth of $17-$19 billion (measured in 1972 dollars) per quarter throughout the year. Translated into percentages and annualized, the expected median growth rates are 5.4 percent, 5.9 percent, 5.6 percent, and 5.5 percent for the four quarters, respectively.

These rates are median forecasts, however, and there is considerable variation among the forecasters. The forecasts for increases in real GNP in the first quarter range from $12.5 billion to $19.5 billion; second quarter expectations range from increases of $14.8 billion to $21.5 billion; third quarter from $16.0 billion to $26.4 billion; and the fourth from $13.9 billion to $21.0 billion.

If the median forecasts are realized, the 6.9 percent unemployment rate for the fourth quarter will be a considerable improvement over the present unemployment rate. It is, however, above the announced policy target of the new administration. There was considerable difference of opinion among the forecasters about the fourth quarter unemployment rate, however, and the estimates ranged from 6.5 percent to 7.1 percent.

BUSINESS FORECASTS 1977

The Federal Reserve Bank of Richmond is pleased to announce the publication of *Business Forecasts 1977*, a compilation of representative business forecasts with names and details of estimates for the coming year. Publication is scheduled for February 16, 1977. Due to the energy crisis, however, there may be some delay. Requests for the booklet will be filled as soon as it becomes available. It may be obtained free of charge by writing to Bank and Public Relations, Federal Reserve Bank of Richmond, P. O. Box 27622, Richmond, Virginia 23261.

Cautiously Optimistic . . .

THE OUTLOOK FOR AGRICULTURE IN 1977

Sada L. Clarke

Leading economists of the U. S. Department of Agriculture presented their views of prospects for the nation's agriculture in 1977 at the National Agricultural Outlook Conference in mid-November. The following is a capsule review of the outlook as they see it.

Modest gains in gross farm income and a slight rise in farm production expenses leave prospects for realized net income in 1977 about the same as the relatively favorable level of 1976. Moreover, only modest increases in retail food prices are indicated. Expectations point to large supplies of crops and near-record livestock production. But strong domestic and foreign demand are expected to bolster farm prices and incomes despite the large supplies.

While the outlook for agriculture in 1977 currently appears favorable, major uncertainties exist which could have a significant impact on the general prosperity of the nation's farmers. These uncertainties include the expansion in domestic markets, upcoming farm legislation, growing stocks of food grains, the impact of the downswing in the cattle cycle on supplies and prices of meats, and the usual weather uncertainties here and abroad.

Farm Income and Production Expenses Farmers' net earnings in 1977 are expected to hold close to the average of recent years. Realized net income may range in the neighborhood of $23 to $25 billion if growing conditions are average and if there are no big surprises in world markets.

Earnings from farm marketings during the latter part of the year will probably be better than returns in the last half of 1976 and the early months of 1977. Should crop output be maintained at about the level of the last two years and if livestock numbers decline as anticipated, livestock producers will likely be in a stronger income position compared to last year and relative to crop farmers.

Supplies of crops—except for soybeans, cotton, and some fruits and vegetables—will continue large relative to demand during the current marketing year. Livestock output will also be large but will likely taper off and decline later in the year if cattle numbers fall and beef production is cut back as expected. Of course, crop prospects for 1977 are uncertain at this time. But unless there are unex-

pected weather developments during the growing and harvesting seasons, crop output should be large again. Some shifts in the acreage of major crops are likely. Moreover, there are no set-aside program restraints for the major crops, and large supplies of fertilizer and other inputs are available.

Farm price changes during the year will probably be mixed. But for calendar 1977, both crop and livestock prices may average about the same as in 1976. The indicated changes in farm marketings and prices point to further gains in gross farm income in 1977. Livestock producers are likely to benefit most from any increases that may be realized.

With lower prices for fertilizer and seed and relatively small increases for chemicals and feed, the rise in farm production expenses slowed to around 5 or 6 percent last year. The slower rise in the cost of farm inputs is expected to continue in 1977. Steady to slightly lower prices are indicated for fertilizer and chemical supplies, while outlays for purchased feed and livestock may change little. But with the expected increases in the costs of farm machinery, fuel, hired labor, and taxes, farm production expenses in 1977 will rise further, probably about as rapidly as in 1976.

Foreign Demand for Farm Products The agricultural trade outlook for fiscal 1977 points to another year of near-record exports. Expectations are that U. S. farm exports will total $22.8 billion, equaling last year's record. Export volume may be below the tonnage shipped last season, but the decline in volume is expected to be offset by higher prices for soybeans, oilseed products, and cotton.

With generally improved world grain production in 1976-77 and world grain carryover stocks expected to increase considerably—probably by about 20 percent—foreign demand for U. S. grain has slackened from last year's record level. U. S. grain exports during the current marketing year will probably be

at a high level, however, second only to the 83 million metric tons exported in 1975-76.

U. S. cotton is likely to be the star performer in fiscal 1977 as far as agricultural exports are concerned. With an export value of $1.6 billion, some 60 percent above last year, cotton exports are expected to show the largest percentage gain of all U. S. farm exports. Soybeans and oilseed products with an anticipated export value of $6.1 billion—up 30 percent over last fiscal year—will also be a major performer on U. S. export markets in 1976-77.

Japan will continue as the largest single-country market for U. S. farm exports, with exports in fiscal 1977 expected to reach an all-time 12-month high of $3.6 billion, up some 6 percent from the previous year. Because last summer's European drought caused severe crop damage, Western Europe will be the top regional export market for U. S. farm products this season, edging out Asia by some $200 million.

The continuing high level of U. S. agricultural exports in 1976-77 can be attributed to a number of factors. Prominent among these are:

• Supplies of grain, potatoes, and forage in Europe were sharply reduced by last summer's drought, thus many countries need to rebuild their small carryover stocks.

• Demand for livestock and poultry products is increasing in major industrialized countries, particularly the European Community and Japan, and hog and poultry numbers are expanding, encouraging the use of more grain and high-protein meals in livestock rations.

• Economic recovery is continuing in both the developed and developing nations, boosting the demand for food as well as the demand for feed for livestock production.

• Continuation of large exports of corn, wheat, and soybeans to the Soviet Union under the long-term Grain Supply Agreement between the U. S. and Russia.

Farm Financial Outlook A further rise in the value of farm assets, continued strong demand for farm loans, fairly stable interest rates, and adequate loan funds highlight the farm financial outlook for 1977 as seen by analysts of the Department of Agriculture.

On balance, the financial situation of the nation's farmers as they began the New Year looked favorable. Farmers' net income last year, despite some major exceptions, averaged about the same as in 1975, and no major change is forecast for 1977. The value of total farm assets as of January 1, 1977 reached $634 billion, an increase of $49 billion or 8 percent over a year earlier. Although last year's gain in asset values was below the rise of $65 billion in 1975, it far exceeded net farm income in 1976. A somewhat slower advance in farm asset values—in the neighborhood of about 7 percent—appears likely in 1977. Farmers, of course, frequently use increases in asset values to obtain additional financing.

Nationally, the value of farm real estate, a major component of farm assets, rose around 9 percent during the year ended February 1, 1977, significantly below the 14 percent increase during the previous year. Farmland values are expected to rise at a little slower rate—about 7 percent—during 1977. But as is always the case, the rates of increase across the country will vary substantially.

Farm debt outstanding totaled an estimated $102 billion at the beginning of 1977, some $11 billion or 12 percent above a year earlier. Both real estate and non-real-estate farm debt advanced more rapidly last year than in 1975. Despite the rise in debt, farmers' equities in their farm assets—asset values minus debt—continued to increase, climbing $38 billion during the year. A further gain in farmers' equities, at a slightly slower rate than in 1976, is forecast for 1977.

Demand for farm loans is expected to continue strong in 1977, with increases anticipated for most kinds of operating loans and for farm real estate loans. Farm machinery loans are also likely to increase, as are cattle feeding loans.

Farm lenders are expected to have ample loan funds to meet the enlarged loan demands. Interest rates, which eased a little in 1976, will likely hold near the late 1976 levels. Lenders generally believe that the risks of farm lending are increasing. Still, with steady gains in the value of farm assets providing additional security to offset the risks, many lenders continue to look upon good farm loans as desirable investments.

Food Price Increases Moderate Since consumers have felt the brunt of sharply rising food costs in recent years, they no doubt breathed a sigh of relief at the relative stability of average retail food prices in 1976 and will find the outlook for another year of only moderately rising food prices in 1977 good news indeed. With food supplies outpacing demand last year, the gain in food prices was held to around 3 percent in sharp contrast to the rapid advances during the three preceding years and the lowest annual rate of increase since 1971.

Domestic food supplies will be large again in 1977 and will tend to dampen the rise in retail food prices during the first half of the year. But at the same time, strong consumer demand and rising marketing costs will probably cause food prices to increase moderately. On balance, retail food prices may run from 2 to 4 percent above a year ago during the first half of the year. Small increases of from 2 to 3 percent are expected this winter, led mainly by rising prices for coffee and fresh vegetables and higher marketing costs and away-from-home eating. By spring, food prices may advance a little more rapidly—probably averaging 3 or 4 percent above last spring—if domestic demand increases and beef output declines as anticipated. Most food price increases this spring will reflect higher prices for meat, poultry, and fresh produce. Since Florida's fruit and winter vegetable crops suffered extensive freeze damage in January, supplies of citrus fruit and fresh vegetables have been sharply reduced and prices seem certain to increase more than was expected at the time of the Outlook Conference.

Commodity Review Highlights of the Department of Agriculture's forecasts for the principal money-making commodities produced by Fifth District farmers are summarized below.

Tobacco: Larger supplies of tobacco, both in the United States and overseas, highlight the outlook for 1977. Domestic cigarette consumption is expected to rise from last year's record high. But U. S. leaf exports will do well to hold near the high levels of recent years. Rising tobacco output overseas, the high prices of U. S. leaf, and slower growth in world cigarette output will hold down exports again even though the preference for light cigarettes containing flue-cured and burley tobaccos continues worldwide.

The basic flue-cured tobacco marketing quota for 1977 has been cut 12 percent on the heels of a 15 percent reduction last year. Both cuts were made in an attempt to keep supplies in line with demand. When the basic quota for flue-cured is adjusted for last year's marketings above and below quota, the effective quota for 1977 is 15 percent under last season's level. The basic quota for burley may be about the same as in 1976, however. Under the legal formula used to determine price supports for eligible tobaccos, the 1977 loan level will increase about 7 or 8 percent over 1976.

Cotton: The tight supplies and relatively strong demand that characterize the cotton outlook for the 1976-77 season are pushing cotton prices well above manmade fiber prices. Both domestic mill use and

exports are holding up rather well in view of current prices, however.

This season's beginning carryover was down sharply from a year ago, so supplies are only slightly above the 1975-76 level and the second smallest in 53 years despite the significantly larger 1976 crop. Meanwhile, mill consumption and exports combined are expected to show a moderate increase over last season's level. As a result, cotton stocks may be pulled down, probably to about 3.1 million bales by August 1, 1977, the smallest since 1952. A carryover of this size would equal approximately a four months' supply for expected mill use and exports.

Domestic mill consumption for the entire 1976-77 season may be down moderately from a year earlier. Demand for cotton by domestic mills has remained relatively strong during the marketing year thus far, but it is believed that later in the season when mills are confronted with the 1976 cotton crop—priced nearly one-third higher than the 1975 crop—they will increase the use of manmade fibers at the expense of cotton. Mill-delivered cotton prices are currently around 50 percent higher than manmade fiber staple. Moreover, record cotton textile imports will compete with U. S. mill consumption of cotton.

Export demand for U. S. cotton is expected to be strong, more than offsetting the moderate decline in mill use. Shipments may total about 4.6 million bales, about two-fifths above last season's 3.3 million. With modest recovery in foreign textile activity continuing and with limited competitive supplies abroad, the U. S. share of world cotton trade is likely to rise sharply, probably climbing to around one-fourth versus 18 percent last season.

Soybeans and Peanuts: Greatly reduced supplies, strong demand, higher prices, and a sharp drawdown in stocks dominate the outlook for soybeans. Reduced acreage and lower yields combined to produce an 18 percent smaller crop of soybeans in 1976. When the larger beginning carryover is added to the sharply lower production, soybean supplies for 1976-77 are down more than a tenth from last year's record level.

Soybean demand is expected to continue strong despite the smaller supplies and resultant higher prices. Total disappearance will probably drop some 5 percent below last season but will be about 160 million bushels above 1976 production. Both domestic crushings and exports will probably share in the decline. Carryover stocks September 1 will likely be down to minimum operating levels, or less than one month's requirement for crush and exports.

Soybean crushings this season are estimated to be

about 9 percent below the record 1975-76 crush. The smaller crush reflects prospective lower domestic requirements for soybean meal and oil as well as the increased availabilities of competitive fats, oils, and protein feeds.

Soybean exports are also expected to drop, but the decline is not likely to be as great as that projected for domestic use. Exports, like crushings, will be limited largely by the tight supply situation. With the U. S. guarantee to Japan of at least 110 million bushels of soybeans this season, and the contract with the Soviet Union for 55 million bushels of the 1976 crop, there will be fewer U. S. soybeans available for other markets. Any slack in U. S. soybean exports in 1976-77 will most likely be taken up by Brazil, which is continuing its rapid rise as a major producer-exporter of soybeans.

Soybean prices were relatively favorable to producers last fall, averaging $1.15 above a year ago. Prices for the season are expected to average higher than the early fall level and well above the $5 per bushel received last year. The price strength for soybeans in the second half could moderate, however, if Brazilian soybean plantings in November and December expand sharply and if there is a sizable increase in U. S. soybean acreage in 1977 as is expected.

Peanut supplies are down slightly from last year's record level as the result of both lower carryover stocks and a little smaller production. And the use of peanuts in edible products may rise some 4 percent to about 9.0 pounds per capita compared with 8.7 pounds last season. Even so, peanut supplies are well in excess of edible and farm requirements, and about one-fourth of the 1976 crop will be acquired by the Commodity Credit Corporation under the price support program. Peanut acreage allotments for 1977 have again been set at the minimum level permitted by law.

Dairy Products: Dairymen may well find that the situation they enjoyed in 1976 will be a hard act to follow. Milk production rose sharply following three years of virtually unchanged output, but sales of dairy products expanded dramatically and milk prices were strong, averaging about $1 per hundred pounds higher than in 1975. Market conditions have weakened, however, and the potential for surplus conditions in 1977 is large.

Milk production early in 1977 is expected to remain above year-earlier levels, although probably rising at a slower rate than in 1976. Strong gains in output per cow will likely continue, more than

offsetting a small decline in cow numbers. There is considerable uncertainty concerning the level of milk output later in the year, however. Whether production will continue to post strong gains or whether it will drop to year-earlier levels by the latter part of the year will depend not only on the prices of milk, but also on the prices of cull cows and feed and on developments in the general economy. Considering all factors involved, it now appears that total milk output in 1977 may rise by 1 or 2 percent.

With milk production increasing and commercial dairy stocks rebuilt and on the verge of being burdensome, supplies of milk are expected to be heavy and may well outstrip demand. Government purchases of dairy products are likely to be heavy early in the year. Under this set of circumstances, farm milk prices in 1977 could average below a year ago even if demand for dairy products stays strong.

Poultry and Eggs: Most egg producers had a good year in 1976. Broiler and turkey producers, however, lived up to their reputation as boom and bust industries, their profits early in the year turning into losses later. Moreover, prospects for egg producers, unlike broiler and turkey producers, look favorable for 1977.

Egg production during the first half of 1977 will likely average from 1 to 2 percent above a year ago as both layer numbers and the rate of lay rise slightly. The outlook for the second half also looks favorable for egg producers unless they overexpand. The level of output will depend on producers' profit margins in the first half and on prospects for 1977 feed grain and soybean crops. Expectations are that production will continue to expand and may average around 2 percent above a year earlier.

Relatively strong demand and smaller market supplies have resulted in higher than year-earlier egg prices since last winter. Prices are likely to remain comparatively strong through this winter and decline seasonally in the spring. Egg prices in the second half of 1977 are expected to average below a year earlier if production expands in the first half as anticipated.

Many broiler and turkey producers have been losing money since late last summer and are currently operating in the red. Furthermore, prospects for the first half of this year are not very favorable. Poultry prices are weak, and feed costs will likely be above a year ago. Poultry output continues to be relatively large, and there has been a sharp buildup in cold storage stocks of turkey meat. Both broilers and turkeys will continue to face increased competi-

tion from red meats. While beef supplies are expected to be moderately lower and prices higher, pork output will be sharply higher with much lower prices. Supplies of red meat, in fact, are likely to exert stronger downward price pressure on poultry meat through mid-1977 than in the first half of last year.

There are signs that the expansion in broiler and turkey output is winding down. But prices of both broilers and turkeys are expected to remain weak during the first half of the year. Movement of broiler and turkey meat into export channels rose substantially last year, and further increases are likely in 1977.

Meat Animals: The sharp upturn in livestock feeding that began in the closing months of 1975 has led to sharply larger supplies of livestock products. The gains have been rapid enough to weaken livestock prices in spite of the expanding domestic market. While some encouraging signs are beginning to appear for cattlemen, hog producers can look forward to another year of larger supplies.

Continued growth in pork production through 1977 is indicated by the actual and planned increases in the number of sows farrowing last summer and fall. Sharp gains in pork output at a rate about a fifth above a year ago are expected to continue through

mid-1977. Slower increases in production are likely in the second half.

Hog prices dropped sharply last fall, reflecting the big increase in pork output as well as the large supplies of chicken and beef. The lower hog prices continue to make hog feeding unprofitable even though grain prices softened during harvest.

A slowdown in beef production appears to be in the offing. Beef output continued to expand throughout 1976, but losses by cattle feeders during much of the year led to reduced placements of cattle on feed last summer. This development, along with the downphase of the cattle cycle, is expected to lead to less beef output in 1977 and strengthening cattle prices. Production will probably dip below year-earlier levels by early 1977. Higher cattle prices, along with moderating feeding costs, could lead to a more favorable beef-corn ratio early in the year.

The outlook for beef cattle has been clouded, however, by the sudden 10 percent jump in placements of cattle on feed during November. Should this apparent renewed interest in cattle feeding result in a larger supply of fed cattle by early spring than had been anticipated, then the expected firming in cattle prices may well not materialize. The upshot of such a development could be the postponement of the indicated rise in the price of beef to the consumer.