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Econometric Models: The Monetarist and Non-Monetarist Views Compared

Forecasts 1973

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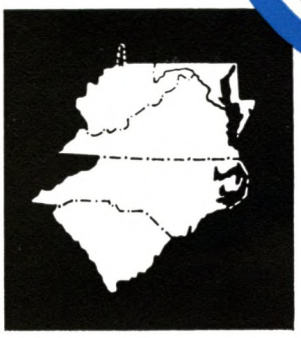

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ECONOMETRIC MODELS:

THE MONETARIST AND NON-MONETARIST VIEWS COMPARED

In recent years a growing number of Government agencies and private business firms have turned to large computer-solved econometric models as aids in forecasting future business conditions or in analyzing the effects of alternative economic policies. Econometric models are statistical representations of the structure, or workings, of the economy. They usually take the form of systems of equations, representing their model-builder's view of the economy's structure. Since economists differ in their views on the nature of the economy, different types of econometric models are to be expected. One major way in which econometric models differ is in the role they assign to financial variables in passing the influence of policy changes to the real sectors of the economy. Two major schools of thought may be identified. First, the Monetarist position generally argues that policy influences on economic activity are routed primarily through changes in the money supply; the importance of fiscal policy is generally downgraded. Second, the non-Monetarist, or neo-Keynesian, position argues that monetary policy influences economic activity primarily through changes in interest rates; the need for an appropriate mix of monetary and fiscal policy is emphasized.

This article compares the Monetarist and neo-Keynesian views by examining two representative econometric models. First, the general development and the nature of econometrics are summarized. A simple model illustrates the problems of constructing and specifying econometric models. Then, typical neo-Keynesian and Monetarist models are surveyed. Both the underlying theoretical position and the logical structure of these models are studied.

I. ECONOMETRICS

Econometrics is a unified collection of statistical techniques used to express economic relationships as single equations or as systems of simultaneous equations. This definition implies that the subject matter of econometrics is drawn from the two closely related fields of economics and statistics. Developments in both of these fields have converged to make possible the modern science of econometrics. In economics, the events of the 1930's redirected economic thinking toward problems of the economy-in-the-large, i.e., toward macroeconomics. Following the general framework established by John Maynard Keynes in the 1930's, macroeconomics developed rapidly, forming the basis for the large-scale econometric models in use today.

In statistics, the early work of Karl Pearson provided a method of estimating statistical relationships and laid the foundation for the science of econometrics. In the 1930's, Jan Tinbergen of the Netherlands and Ragnar Frisch of Norway began experimenting with models of their national economies. For this work they received the 1969 Nobel Prize in Economics. In the 1940's, T. Haavelmo and A. Wald restructured econometrics as a problem in statistical inference. This work was extended and consolidated by the Cowles Commission in the 1940's and 1950's. By the early 1950's, econometrics was generally recognized as a separate and distinct science.[1]

The first model of the U. S. economy was built by Lawrence R. Klein in the early 1940's. This was followed by the very successful Klein-Goldberger model in 1950 and by the Wharton forecasting model in 1960. Today the Wharton model has a substantial forecasting record and a clientele of over a hundred large corporations using its forecasts. A number of other models are similarly being used, including those of Chase Econometric Associates and Data Resources, Inc. Large structural models have also been produced by the Brookings Institution, the Department of Commerce, and the Board of Governors of the Federal Reserve System. The Federal Reserve model is one of the tools used for policy analysis and forecasting by a number of District Banks of the Federal Reserve System as well as by the Board itself. Recently, the Federal Reserve Bank of St. Louis has developed a small model conforming to the Monetarist view of the economy. A number of other models, for example the RCA forecasting

[1] For a summary of these developments and appropriate references, see Lawrence R. Klein, "Wither Econometrics," *Journal of the American Statistical Association*, 66 (June 1971), 415-21; and "Figuring the Future," *Wall Street Journal*, August 23, 1972, pp. 1, 6.

model, also follow the Monetarist approach. The Federal Reserve Board model and the St. Louis model will serve as the representative models analyzed in this article.[2]

Econometric Model-Building

Several types of variables appear in econometric models. Those variables that are explained within the context of the model are termed *endogenous* variables; those taken as given (determined outside the model) are said to be *exogenous*. Whether a variable is treated as exogenous or endogenous is determined by the model-builder himself in light of the analytical purpose of the model. For example, population would likely be treated as exogenous in a short-term model but endogenous in a long-term model of economic growth, since population trends interact with long swings in economic activity. Also, variables whose influence is felt in the current period, but observed in past periods, are known as *lagged,* or predetermined, variables. Finally, *instrument* variables, which derive their value from policy decisions, are usually treated as exogenous in econometric models.

A Simple Model

These concepts may be illustrated by examining a simple model of the economy.[3] This model is designed to determine measures of the broad components of national income: consumption, investment, and Government expenditures. It also determines the distribution of income between wage payments and nonwage, i.e., profit, payments. The first step in model-building is to hypothesize the relationships among the variables. There are generally two types of relationships to be defined. First, a number of *behavioral* equations set forth the model-builder's hypotheses concerning the determinants of the behavior of certain endogenous variables. Second, a number of variables are linked together by *identities,* which are simply economic or accounting definitions.

The following behavioral relationships may be hypothesized. Consumption is dependent upon, i.e., is a function of, income. Also, people have a tendency to maintain past consumption patterns. Symbolically, we could state: $C_t=f_1(Y_t,C_{t-1})$, where C_t represents consumption expenditures in the current time period, Y_t is national income, C_{t-1} is last period's consumption, representing habitual consumption patterns, and $f_1(\ )$ means "is a function of."

Investment may be explained, at first approximation, as a function of expected profits and the existing level of capital stock. Since measuring expectations is difficult, it can be further hypothesized that current period profits are a *proxy* for expected profits. Symbolically, $I_t=f_2(P_t,K_{t-1})$, where I_t is investment expenditures, P_t is profits (or nonwage income), and K_{t-1} is the nation's capital stock at the end of the previous period.

National income is distributed between wage and nonwage income. Wage income, W_t, may be explained as a function of the level of economic activity, measured by Y_t, and a measure of time, t, taken as a proxy for increasing productivity, price changes, and other changes that generally proceed at a fairly uniform rate over time. Symbolically, $W_t=f_3(Y_t,t)$. Nonwage income is then determined by subtracting wage payments from national income.

In addition to the three behavioral equations discussed above, the model is made complete by three identities. First, national income is simply the sum of consumption, investment, and Government expenditures. That is, $Y_t=C_t+I_t+G_t$. Second, nonwage income is national income less wage payments: $P_t=Y_t-W_t$. Finally, the capital stock at the end of the current period is identical to capital stock at the beginning of the period plus net investment expenditures during the current period. Symbolically, $K_t=K_{t-1}+I_t$. The model therefore consists of six equations, each of which explains a corresponding endogenous variable. Of the two remaining variables, time is exogenous, and Government expenditures are policy determined.

The second step in model-building consists of specifying the behavioral hypotheses in precise mathematical form. Any one of several alternative forms may be appropriate. For example, consumption may be linearly related to income, that is, changes in consumption may be proportional to changes in income. Alternatively, consumption may be related to the change in income, the logarithm of income, etc. For simplicity, all equations of this illustrative model are assumed to be linear. The complete model is presented in Exhibit 1.

Estimation Problems

An important step in building an econometric model is to specify numerically the coefficients of relationship among the variables in the behavioral equations. As presented in Exhibit 1, the equations of the model contain nine coefficients, the a's, b's, and

[2] Frank de Leeuw and Edward M. Gramlich, "The Channels of Monetary Policy: A Further Report on the Federal Reserve-MIT Model," *Journal of Finance,* 24 (May 1969), 265-90; and Leonall C. Andersen and Keith M. Carlson, "A Monetarist Model for Economic Stabilization," *Review,* Federal Reserve Bank of St. Louis, 52 (April 1970), 7-25.

[3] This model is similar to the small illustrative model presented in M. Liebenberg, A. Hirsch, and J. Popkin, "A Quarterly Econometric Model of the United States: A Progress Report," *Survey of Current Business,* 46 (May 1966), 13-16.

c's, that must be given numerical values if the model is to be mathematically operational. These coefficients are determined statistically by examining past data. There can conceivably be a large number of *estimating equations* relating, for example, consumption to income and past consumption. A statistical technique known as *regression analysis* selects the set of coefficients that minimizes the variation of observed consumption values from the corresponding values estimated by the equation. This "best fitting" equation is adopted for use in the model. Once these coefficients are specified, the model is complete in the sense that it can be solved mathematically.

Clearly, however, perfect estimates or predictions are not to be expected. First, these statistical equation systems produce solutions that are essentially averages; no such system can reproduce reality in full detail. Second, the model may be misspecified because errors in the data may provide incorrect estimates of the coefficients; or because the hypothesized structure may include incorrect variables, or exclude significant variables, or specify an incorrect mathematical form for an equation. For example, consumption may be more properly related to after-tax income than to total income. Also, it may be that credit conditions and other financial considerations, which are not included in the model, help to explain consumption. Finally, several sources of error relate to the statistical method of regression. For example, if several explanatory variables move through time in similar patterns, it is difficult to measure their separate influence on the dependent variable being explained. Also, the coefficients may be biased when the equations are part of a simultaneous system.[4] Much recent theoretical work in econometrics has been directed toward finding methods to minimize such errors.

Although these sources of error exist, econometric models have a number of clear advantages over alternative methods of analysis and prediction. Such models provide a logically consistent framework within which the interrelations of all variables in the model may be studied. Forecasts are provided that meet all accounting identities, as well as the requirements of the behavioral equations. Also, econometric models may be used to simulate the economy under alternative time paths for policy variables or different time paths for exogenous variables. Moreover, while the assumptions underlying traditional judgmental forecasts are often unstated, the assumptions built into an econometric forecast are necessarily explicit, taking the form of numerical

Exhibit 1

AN ILLUSTRATIVE MODEL

$$(1)\quad C_t = a_o + a_1 Y_t + a_2 C_{t-1}$$

$$(2)\quad I_t = b_o + b_1 P_t + b_2 K_{t-1}$$

$$(3)\quad W_t = c_o + c_1 Y_t + c_2 t$$

$$(4)\quad Y_t = C_t + I_t + G_t$$

$$(5)\quad P_t = Y_t - W_t$$

$$(6)\quad K_t = K_{t-1} + I_t$$

where C = consumption
Y = income
W = wage income
P = nonwage income
I = net investment
K = capital stock at end of period
G = government expenditures on goods and services
t = time

Source: Adapted from a similar model presented in M. Liebenberg, A. Hirsch, and J. Popkin, "A Quarterly Econometric Model of the United States: A Progress Report," Survey of Current Business, 46 (May 1966), 13-16.

estimates for the exogenous variables in the period being forecast. However, the primary advantage of econometric forecasting over judgmental methods is the potential for perfecting forecasting as econometric models improve in performance.[5]

The Logical Flow Chart

Large-scale econometric models may be extremely complex in structure. A clear understanding of their logical structure may be difficult to acquire from studying their equation systems. Perhaps a better approach is to study each model's flow chart. To illustrate this, Exhibit 2 charts the flow of economic interaction among the variables of the model presented in Exhibit 1. This flow chart may be used to maximum advantage by tracing the effects of a given

[4] *Ibid.*, p. 16.

[5] "Bad Year for Econometrics," *Business Week*, December 10, 1969, p. 40.

change step-by-step through the chart. In this simple case the equation system is given and can be compared directly with the flow chart. A rise in Government expenditures, for example, causes national income to rise. This is shown in equation 4, where G is a component of Y. Rising national income induces higher consumption (equation 1), increased profits (equation 5), and increased wages (equation 3). Consumption then feeds back into national income (equation 4) and, after a one period lag, induces further increased consumption. Rising profits induce increased investment expenditures (equation 2), resulting in a further rise in national income (equation 4). Increased investment is also reflected, at the end of the period, in a higher level of capital stock (equation 6). Changes in wages and profits are generally offsetting, as national income is distributed between these two components (equation 5). This procedure of tracing through the logical flow chart of a model provides a method for presenting and studying even the most complex econometric models in a manner that can be understood by nonmathematicians. This procedure will be followed below in studying the Monetarist and neo-Keynesian approaches to econometric model building.

II. THE NON-MONETARIST VIEW

Two fundamentally different views of the role of money in economic activity underlie current econometric models. The Monetarist view is formulated as an econometric model by the Federal Reserve Bank of St. Louis. The non-Monetarist view, based largely on a disaggregated Keynesian approach to monetary analysis, has given rise to several large-scale econometric models containing up to several hundred equations. The approach is illustrated in this article by the so-called FRB-MIT model.[6]

The Historical Setting

Prior to the Depression of the 1930's, conventional economic theory considered the economy basically stable over the long run and tending toward full employment. The main theme of theoretical analysis was toward long-run equilibrium relationships, with little attention devoted to the short-run process through which long-run equilibrium was attained. In this context, the quantity of money, together with the level of output, was viewed as determining the level of prices, but having little to do with long-run real productive growth. This *quantity theory* was was brought into serious question as a result of the Depression. The development of an alternative theory of money, interest, and output was initiated by the British economist John Maynard Keynes.

Neo-Keynesian Theory

The approach to macroeconomics developed by Keynes and those who refined his work is known as the income-expenditure approach. Its basic characteristics may be summarized briefly. First, the economy is viewed as consisting of a number of sectors, e.g., the consumption, investment, and government sectors. Demand in each sector is determined by factors peculiar to the sector. Then, all sectoral demands are added together to determine aggregate demand, measured by gross national product, GNP. This process is illustrated in Exhibit 1, where equations 1 and 2 determine consumption and investment demand; government demand is exogenous. Aggregate demand is added together in equation 4. With larger, more complex models, each of these major components of aggregate demand is disaggregated. Consumption may be divided into expenditures for durables, nondurables, and services; in some cases, automobile demand is explained separately. Investment may be broken down into expenditures for producers' equipment, producers' structures, residential construction, and inventory changes. Government spending may be classified as Federal or state and local, with Federal expenditures further subdivided as defense or nondefense. This disaggregation procedure can be carried to any practical degree of detail, limited, of course, by the availability of appropriate data.

A second characteristic of neo-Keynesian models is a built-in policy transmission mechanism that deemphasizes the role of money. For the most part, this mechanism involves the *indirect* linkage of money with aggregate demand *via* interest rates. In its simplest form, it may be stated symbolically as:

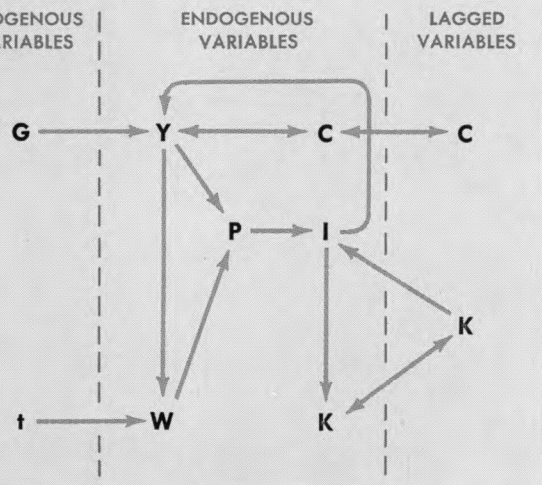
$$\text{OMO} \longrightarrow \text{R} \longrightarrow \text{M} \longrightarrow \text{i} \longrightarrow \text{I} \longrightarrow \text{GNP}.$$

An open market purchase of Government securities by the Federal Reserve, OMO, increases commercial bank reserves, R, and raises the banks' reserves-earning assets ratio. Banks operate to restore their desired ratios by extending new loans or by expanding bank credit in other ways. New loans create new demand deposits, thereby increasing the money supply, M. Given the public's liquidity preferences, a rising money supply causes the general level of interest rates, i, to decline. Given businessmen's "expected profits," expressed by Keynes as the *marginal efficiency of investment,* falling interest rates,

[6] See de Leeuw and Gramlich, *loc. cit.*, and Andersen and Carlson, *loc. cit.*

Exhibit 2

LOGICAL FLOW IN A SIMPLE MACROECONOMIC MODEL



i.e., reduced capital costs, induce expanded investment expenditures, I. Finally, increased investment spending causes successive rounds of new final demand spending, causing GNP to rise by a multiple of the initial change in investment.[7]

A number of refinements to this process have been made by later economists. For example, this transmission process involves Keynes's liquidity preference trade-off of money and financial assets. In more sophisticated versions, this trade-off is generalized to better approximate a real world of "numerous financial assets, hence numerous interest rates on . . . different securities. Different types of investment spending are most sensitive to particular interest rates, e.g., plant and equipment investment to the corporate bond rate, residential construction to the mortgage rate, and inventory investment to the bank-loan rate."[8] Policy-induced changes in bank reserves cause portfolio adjustments over a wide range of financial and real assets, eventually influencing the components of final demand spending.

In further refinement of the Keynesian theory, a number of writers now argue that changes in the money supply have direct wealth effects on consumption spending, in addition to the indirect wealth effects operating via interest rate changes, described above.

Two other characteristics of neo-Keynesian models are important as points of comparison with Monetarist models. First, the money supply, in the process described above, is an endogenous variable, whereas Monetarists consider it exogenous. Second, the basic Keynesian model treats the price level as independent of monetary forces. Large-scale neo-Keynesian econometric models, which generally encompass non-monetary theories of price level determination, are consistent with this treatment. These two points will be clarified at appropriate points in the discussion below.

The FRB-MIT Model

The generalized neo-Keynesian approach to model-building may be illustrated by the FRB-MIT model, which is a large-scale model of the U. S. economy constructed by the Board of Governors of the Federal Reserve System and the Economics Department of the Massachusetts Institute of Technology. Its stated purpose is to quantify the monetary policy process and its impact on the economy.[9] The model consists of 10 sectors, the most important of which are the financial, investment, and consumption/inventory sectors. The financial sector is displayed in Exhibit 3 and the real sector in Exhibit 4.

The Financial Sector The purpose of the financial sector is to establish the linkage between the instruments of monetary policy and the financial variables that are important in the real sector of the economy. Several types of variables appear in this sector. First, the instruments of monetary policy are nonborrowed reserves and the Federal Reserve discount rate. Nonborrowed reserves serve as a proxy for open market operations. Second, demands for short-term financial assets are explained. These assets include free reserves, demand deposits, currency, commercial loans, and time deposits held by banks, savings and loan associations, and mutual savings banks. Supply, i.e., rate setting, equations explain interest rates on Treasury bills, commercial loans, commercial paper, mortgages, industrial bonds, and state and local bonds. Other rate setting equations determine the stock market yield and rates on time deposits held by banks, savings and loan associations, and mutual savings banks. A term structure equation relates the corporate bond rate to the commercial paper rate.

The workings of the financial sector may be illustrated by tracing the effects of a Federal Reserve purchase of Government securities, represented in the model as an increase in nonborrowed reserves, RU. As shown in Exhibit 3, this purchase causes a rise

[7] William L. Silber, "Monetary Channels and the Relative Importance of Money Supply and Bank Portfolios," *Journal of Finance*, 24 (March 1969), 81-2.

[8] *Ibid.*, pp. 84-5.

[9] See de Leeuw and Gramlich, *op. cit.*, p. 266.

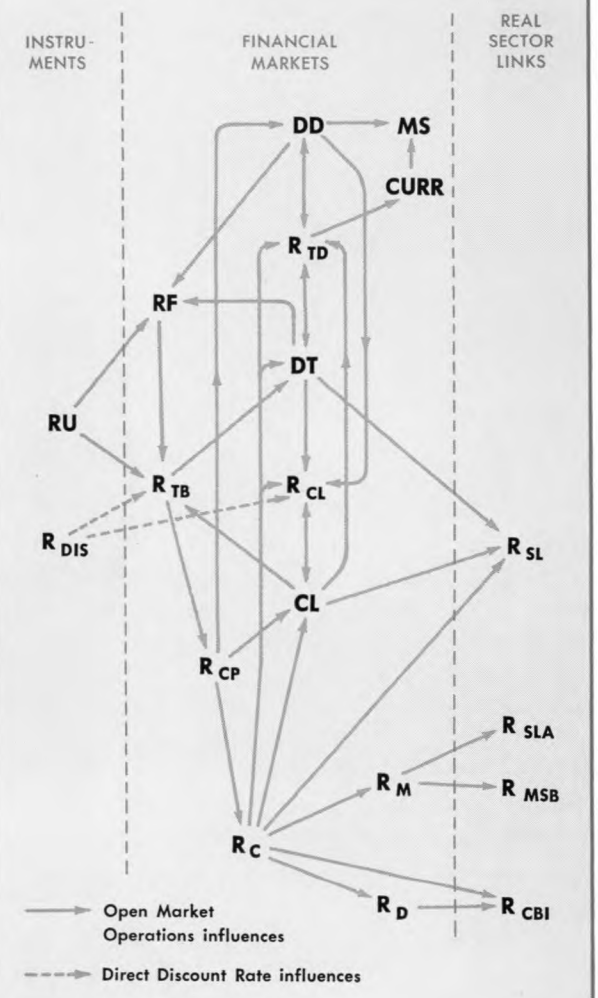
in free reserves, RF, and a rise in the price of Treasury bills, represented by a fall in the bill rate, RTB. Commercial banks are assumed to have, under given market conditions, a desired proportion of earning to non-earning assets (reserves). An increase in nonborrowed reserves lowers the proportion of earning assets in the banks' portfolios below the desired level. In attempting to restore this ratio, banks attempt to purchase similar fixed coupon short-term financial assets, increase their loan offerings, and increase their demands for commercial paper. The declining Treasury bill rate represents not only a decline in the yield on short-term Government securities but also a decline in short rates generally, for which RTB is a proxy. Other short rates, the commercial paper rate, RCP, and the rate on commercial loans, RCL, follow RTB downward. There follows a complex adjustment process serving to restore portfolio balance to the commercial banking market. This process is expressed primarily in the equations that determine the time deposit rate and the commercial loan rate.[10]

Part of the adjustment involves acquisition of longer-term financial assets, represented by a term-structure relationship linking the commercial paper rate and the corporate bond rate, RC. The corporate bond rate influences other long-term rates, the mortgage rate, RM, and the stock market yield, RD. These rates pass the monetary stimulus to the real sector by way of the industrial bond rate, RCBI; the state and local government bond rate, RSL; and the deposit rates of nonbank savings institutions, RSLA and RMSB.

The Financial-Real Sector Linkage Monetary effects spread through the economy by way of three separate channels: the cost of capital, the net worth of households, and the availability of credit to the household sector. Continuing the above illustration, the impact of lower interest rates may be traced in Exhibit 4. The cost-of-capital channel captures the effect of three long-term interest rates—the corporate bond rate, the mortgage rate, and the stock market yield—on investment expenditures for plant and equipment, expenditures for consumer durables, expenditures for single and multiple family housing, and state and local government construction spending.[11]

Exhibit 3

THE MONETARY POLICY PROCESS OF THE FRB-MIT MODEL



The net worth channel passes the effect of changing rates of return on bonds to the stock yield, to equity values in the net worth of households, and to consumption expenditures.

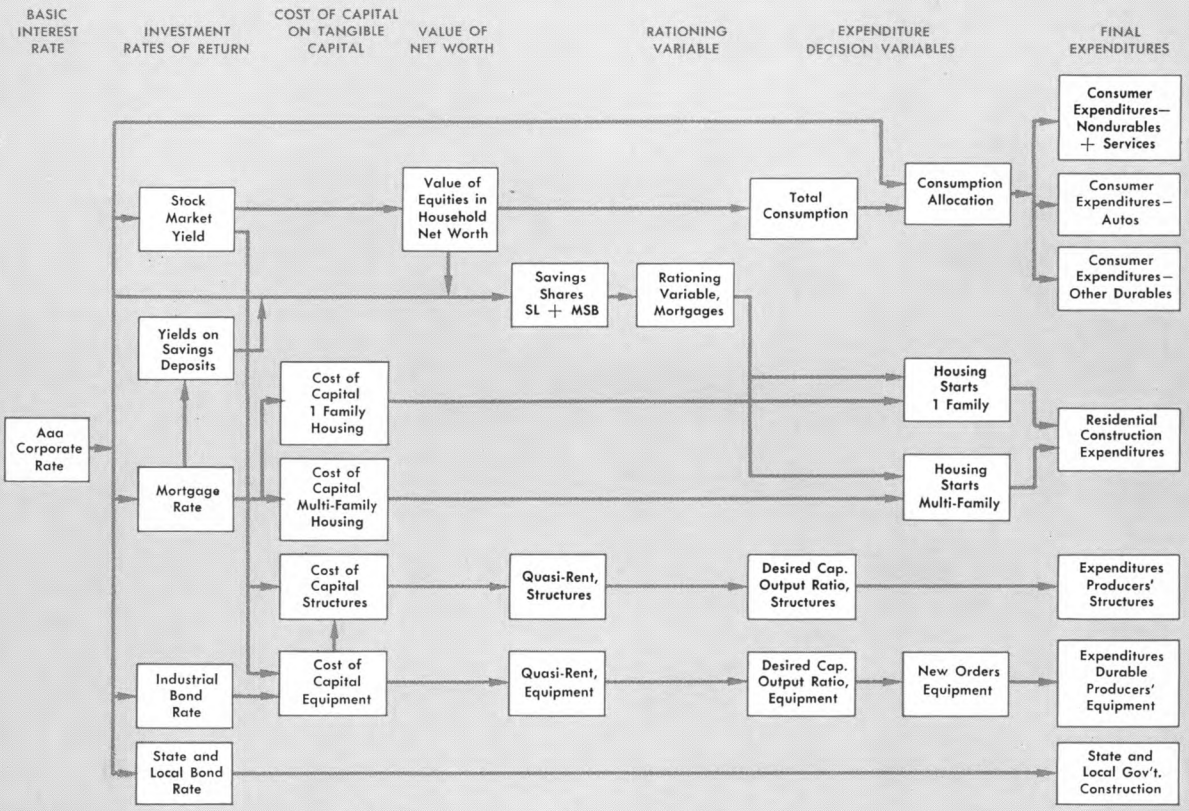
Finally, credit rationing, the third channel, is found to be important in the housing sector. Savings institutions experience large fluctuations in their deposit flows, because of the sluggishness of their lending and deposit rates. In addition, their port-

[10] This process is simplified in two ways for presentation in Exhibit 3. First, the portfolio balance terms are commercial loan-to-deposit ratios, which serve as measures of portfolio composition in determining each financial institution's desired deposit or loan rate. The actual market rate is a function of the discrepancy between the lagged actual rate and the desired rate. For simplicity, in Exhibit 3 each separate component of these ratios is shown rather than the full ratio. For example, rather than showing the ratio: $\frac{CL}{DD+DT}$, each component—commercial loans, CL; demand deposits, DD; and time deposits, DT—is shown separately. Second, in order to simplify the chart and to emphasize financial market interaction, no real sector feed-back variables appear. These variables, such as GNP or net worth, enter the several asset demand equations as transactions or scaling variables. For further discussion of these points, see de Leeuw and Gramlich, *op. cit.*, pp. 267-80.

[11] For a more detailed description of the cost-of-capital channel, see de Leeuw and Gramlich, *loc. cit.*

Exhibit 4

FIRST-ROUND EFFECTS OF MONETARY POLICY IN THE FRB-MIT MODEL



Source: de Leeuw and Gramlich, "The Channels of Monetary Policy," **Journal of Finance**, May 1969, p. 281.

folios usually include a high proportion of long-term, low turnover mortgages. In times of rising interest rates, these institutions are forced to restrict mortgage lending. This non-price rationing of credit influences the residential construction component of final demand.

The FRB-MIT model thus illustrates two basic characteristics of neo-Keynesian models: (1) a highly detailed sector-by-sector buildup of aggregate demand and (2) a detailed specification of the portfolio adjustment process that attaches a central role to interest rates as an indirect link between monetary policy and final demand.

As a point of comparison with Monetarist models, one further characteristic of the FRB-MIT model should be mentioned. Prices are determined in this model by real sector forces, that is, by a variable markup over wage costs.[12] Factors influencing the size of this markup include a productivity trend variable, which allows producers to maintain profit shares even though wages rise faster than prices. Demand shifts and non-labor cost-push forces are other factors involved in this essentially non-monetary theory of the price level.

III. THE MONETARIST VIEW

Although the quantity theory was in eclipse during the period of neo-Keynesian preeminence, a group of economists, led by Professor Milton Friedman at the University of Chicago, continued to develop the Monetarist approach, restructuring the theory and gathering supporting statistical evidence. With the problems of increasing inflation in the late 1960's and the questionable effectiveness of the 1968 tax surcharge in dampening inflationary pressures, the policy prescriptions and forecasts of neo-Keynesian economists became increasingly subject to question.[13]

[12] See de Leeuw and Gramlich, *op. cit.*, Appendix, pp. A15-16.

The Monetarist view gained increased respect among academic economists and policymakers.

Monetarist Theory

Modern Monetarists consider the economy basically stable, with most elements of instability the product of faulty monetary arrangements or improper policy. The reasoning behind this may be briefly summarized. First, there is a stable, but not precise, relationship between the growth rates of money and nominal, i.e., current dollar, national income or GNP. If money balances grow more rapidly in relation to income than people wish, they will attempt to spend the excess, causing prices to rise. On the other hand, if money grows too slowly in relation to income, people will try to build up their cash balances by reducing spending, which would result in a slowing of income growth and rising unemployment.[14] Changes in money and income do not occur simultaneously. On the average, a change in monetary growth will result in a change in real output growth six to nine months later, followed by changes in prices in another six to nine months, according to Friedman's estimates.[15]

Carrying this logic further, the Monetarists consider fiscal policy, when not accompanied by changes in the money supply, to be an unlikely source of economic change. For example, increased Government spending, if not accompanied by monetary expansion, will tend to "crowd out" some private spending and have minimal impact on aggregate demand.[16] Fiscal policy distributes income between the private and public sectors but has little impact on price level changes.[17] Thus, short-run variations in prices, output, and employment are thought to be dominated by movements in a policy-determined money supply.[18]

Long-run real economic growth, on the other hand, is thought to be independent of monetary change, being determined by basic growth factors such as expanding productive capacity, population growth, advancing technology, and natural resources. In the long run, monetary change affects only the price level. Accordingly, the basic objective of monetary policy is to "prevent money itself from being a major source of economic disturbance."[19] It follows that stabilization policy should seek a growth rate of money that closely approximates the long-term rate of growth of real productive capacity.

The Monetarist view of the role of interest rates in the policy transmission process may be summarized in the following way:

> . . . Monetary impulses are . . . transmitted by the play of interest rates over a vast array of assets. Variations in interest rates change relative prices of existing assets, relative to both yields and the supply prices of new production. Acceleration or deceleration of monetary impulses are thus converted by the variation of relative prices, or interest rates, into increased or reduced production, and subsequent revisions in supply prices of current output.[20]

Further, while interest rates serve to facilitate real and financial asset adjustments, "the impact of changes in money on any specific interest rate is both too brief and too weak to be either captured statistically or identified as a strategic variable in the transmission process."[21] Therefore, the Monetarists view the *money supply* as *the strategic variable,* affecting income directly. This view may be represented schematically as:

$$\text{OMO} \longrightarrow \text{M} \longrightarrow \text{SPENDING} \longrightarrow \text{GNP}.$$

A comparison of this description with the generalized neo-Keynesian portfolio adjustment process, as illustrated by the FRB-MIT model, focuses on two crucial points at issue: the range of assets involved in the adjustment process and the response patterns of interest rates and prices. Concerning the former, Friedman argues that the spectrum of assets and rates of return influenced by monetary action is extremely broad, including many implicit rates, which are not recorded.[22]

Friedman further argues that recorded rates do not reflect the real cost of capital but rather include anticipated rates of inflation. Moreover, monetary policy may be routed through as yet undiscovered channels. In short, the transmission process is too complicated to be captured by statistical models. The standard practice of using recorded interest rates both

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[13] There is some debate concerning the effectiveness of the 1968 tax surcharge. See, for example, Robert Eisner, "Fiscal and Monetary Policy Reconsidered," *American Economic Review,* 59 (December 1969), 897-905; and the subsequent comments and reply in *American Economic Review,* 61 (June 1971), 444-61. See also, Milton Friedman, "The Counter-Revolution in Monetary Theory," *Occasional Paper No. 33* (London: The Institute of Economic Affairs, 1970), pp. 19-20 and Arthur M. Okun, "The Personal Tax Surcharge and Consumer Demand, 1968-70," *Brookings Papers on Economic Activity* (January 1971), pp. 167-213.

[14] William N. Cox, III, "The Money Supply Controversy," *Monthly Review,* Federal Reserve Bank of Atlanta, 54 (June 1969), 73.

[15] Friedman, *op. cit.,* p. 22.

[16] Andersen and Carlson, *op. cit.,* p. 8.

[17] Friedman, *op. cit.,* p. 24.

[18] Ronald L. Teigen, "A Critical Look at Monetarist Economics," *Review,* Federal Reserve Bank of St. Louis, 54 (January 1972), 13.

[19] Milton Friedman, "The Role of Monetary Policy," *American Economic Review,* 58 (March 1968), 12.

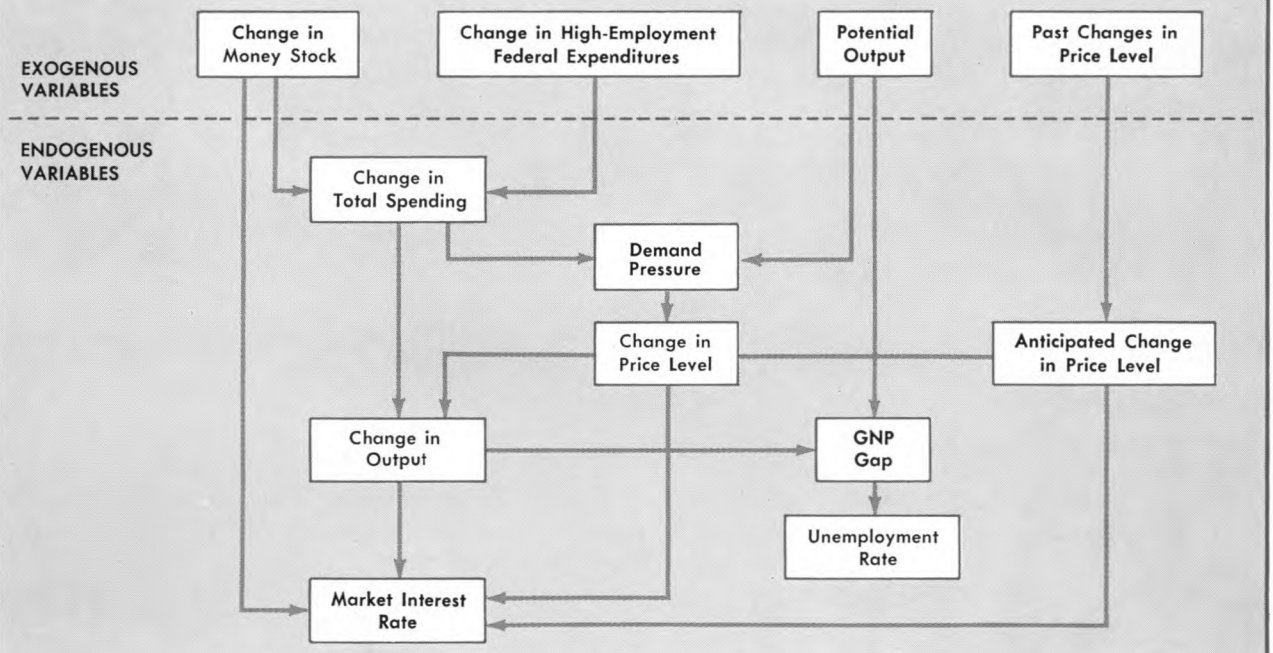
[20] Karl Brunner, "The Role of Money and Monetary Policy," *Review,* Federal Reserve Bank of St. Louis, 50 (July 1969), 18.

[21] W. E. Gibson and G. C. Kaufman, "The Relative Impact of Money and Income on Interest Rates: An Empirical Investigation," *Staff Economic Studies* (Washington, D. C. : Board of Governors of the Federal Reserve System, 1966), p. 3.

[22] Friedman, *Occasional Paper No. 33,* p. 25.

Exhibit 5

FLOW DIAGRAM OF THE ST. LOUIS MODEL



Source: Andersen and Carlson, "A Monetarist Model for Economic Stabilization," Review, Federal Reserve Bank of St. Louis, April 1970, p. 10.

underestimates the full impact of monetary actions and narrows the scope of the transmission process to only a relatively few channels. Therefore, Friedman concludes, even the most complex econometric model cannot adequately represent the monetary process.[23]

Monetarists also question the response patterns of interest rates and prices in neo-Keynesian models. They regard the fall in interest rates in response to monetary expansion as a temporary effect. In a longer view, monetary expansion, whether via interest rate effects or direct spending effects, causes rising income and expenditures. The Monetarists are careful to distinguish nominal from real changes. When the economy is operating below the full-employment level, changes in nominal money may significantly affect real economic variables—output and employment—rather than raising prices. As the economy approaches full employment, however, quantities become less responsive, and prices begin to rise. The real value of money balances grows more slowly, or declines, causing a reversal of the initial interest rate effect.[24] Thus, changes in interest rates may be only a result of the adjustment process, rather than a crucial link; and may be directly, rather than inversely, related to changes in money.

Prices, in this process, are a function of "demand pressure"—determined by how close to full employment the economy is operating. In addition, an accumulation of price changes over time tends to generate "price expectations," which serve as a separate influence in future price movements. Thus, the long-run insensitivity of real variables to changes in the money supply and the predominant short-run influence of money on real output and employment are consistent.

The St. Louis Model

The process described above has recently been incorporated into an econometric model by the Federal Reserve Bank of St. Louis.[25] The model makes no

[23] Yung C. Park, "Some Current Issues on the Transmission Process of Monetary Policy," *IMF Staff Papers*, 19 (March 1972), 24-6.

[24] For similar, but more detailed, expositions see Friedman, "The Role of Monetary Policy," *American Economic Review*, 58 (March 1968), 6; and David I. Fand, "A Monetarist Model of the Monetary Process," *Journal of Finance*, 25 (May 1970), 279-83.

[25] For a more detailed development, see Andersen and Carlson, *op. cit.*, pp. 8-11.

attempt to specify the structure of the economy; rather, it explains such broad measures as total spending, prices, and unemployment in terms of changes in money, Government expenditures, potential output, and price expectations.

The process by which monetary action predominates short-run changes in total spending can be seen by tracing through the flow chart, Exhibit 5. The responses in the actual model accumulate over a number of periods, but no lags except price changes appear in the chart. Total spending, measured by GNP, responds more strongly to money supply changes than to changes in the full-employment budget. The latter actually has a negative impact after three quarters, reflecting the Monetarist's "crowding out" hypothesis.

Potential output is determined by underlying factors such as growth of natural resources, technology, labor force, and productive capacity. Total spending and potential output together determine the amount of "demand pressure" existing in the economy in the short-run. Demand pressure, a measure of short-run market conditions, combines with long-run price expectations to determine the current change in the price level. Price expectations, measured by a five quarter weighted average of past price level changes, enter price determination as a separate influence.

The model thus determines changes in total spending and prices separately. Short-run changes in real output are then calculated as a residual by subtracting the price factor from changes in total spending.

Changes in output are subtracted from changes in potential output to determine the GNP gap, a measure of productive slack in the economy. The unemployment rate is directly related to current and past levels of the GNP gap. Changes in output combine with changes in the money supply, current and past changes in price levels, and price expectations to determine the level of interest rates. Market interest rates are a result of market interaction, not a crucial link in the transmission process as in the Keynesian view.

In sum, the St. Louis model is a direct formulation of the Monetarist view that monetary changes predominate short-run changes in the real economy, while in the long run money affects only nominal quantities. This model also reflects the contention that the full transmission mechanism cannot be captured by econometric models. The stable relationship found between money and total spending becomes the basis for a small, simple model that explains changes in broad economic aggregates in terms of changes in the money supply.

IV. SUMMARY

This article has presented a summary view of econometrics and has examined the econometric implications of two alternative theories of the monetary process. Both the neo-Keynesians and the Monetarists see a general portfolio balance mechanism at work in the economy, but agreement seems to stop there. Their divergent views concerning the importance of interest rates, the direction of effect of money on interest rates, the nature of price determination, and the feasibility of representing the adjustment process econometrically have been discussed above.

Although the two models presented here are representative of current thinking, some preliminary movement toward synthesis is evident. Recent analytical work has introduced prices into Keynesian models as endogenous variables.[26] Later unpublished versions of the FRB-MIT model are structured so that either the money supply or reserves may be used as a policy variable.[27] Recent unpublished Monetarist work specifies structural detail more than in the past.[28] The problem of implicit interest rates remains unresolved. The resolution of this problem and the thrust of current research point in the direction of larger, more detailed econometric models.

Joseph M. Crews

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[26] Arthur Benavie, "Prices and Wages in the Complete Keynesian Model," *Southern Economic Journal*, 38 (April 1972), 468-77; Teigen, *op. cit.*, p. 15 and footnote 27.

[27] "FRB-MIT-PENN Econometric Model," unpublished staff paper, Federal Reserve Board of Governors, July 13, 1971.

[28] Leonall C. Andersen, "Influence of Monetary and Financial Actions in a Financially Constrained Economy," unpublished paper, May 1971, p. 40.

Few Surprises in Store . . .

FORECASTS 1973

The forecasters this year expect the economy to move ahead at about the same rate as in 1972 but with gradually decelerating quarter-by-quarter growth. They also expect the rate of inflation to remain about the same as in 1972. The rate of unemployment, however, is expected to fall somewhat more than in 1972. In general, this year's crop of forecasters foresee few major surprises in store for us.

Last year's consensus forecast fell short of the GNP gain realized in 1972 and also underestimated the improvement in the inflation rate. But it overstated the amount of decline in the unemployment rate. This year's forecasts might have been influenced by these 1972 misses. In any case they, in general, call for good economic growth, moderate price increases, and a modest decline in the unemployment rate.

Many forecasters expect to see substantial increases in consumer expenditures, particularly for durable goods. The durable goods expenditures will be buoyed by large, in many cases unexpected, Federal tax refunds brought about by over-withholding during 1972. Significantly increased social security benefits are also expected to boost consumer outlays. The surge in consumption is expected to be especially heavy during the first and second quarters of the year. Many forecasters predict that automobile sales, in particular, will turn in an excellent performance in 1973. On the other hand, some believe that because of an expected slowing in residential construction, sales of household durables will increase at a slower rate than in 1972.

Business investment is expected to increase at about the same rate as in 1972, but most of the 1973 increase is expected in inventory accumulation and in expenditures for business plant. The predicted increases in plant expenditures are attributed to an expected availability of long-term funds at only modestly higher interest rates, combined with a stronger demand for increased plant capacity.

Business inventories are expected to be a leading source of growth in 1973 as businesses respond to increases in sales. Many forecasters were surprised that inventory investment increased by such a small amount in 1972 in the face of an 8.5 percent increase in consumption expenditures. Indications, now, seem to be that the inventory accumulation will proceed more rapidly in 1973.

Most of the forecasters included in the consensus, none of whom anticipated the President's Phase III program, thought that wage and price controls would continue at least until April. They expected Federal Government expenditures to increase only modestly, but state and local expenditures to rise more than last year's 10.1 percent because of revenue sharing.

The 1973 forecasts summarized here represent the best efforts of business and academic economists during the autumn and early winter of 1972 to predict the performance of the U. S. economy in 1973. This article attempts to convey the general tone and pattern of some 50 forecasts reviewed by the Research Department of this Bank. Not all of them are comprehensive forecasts, and some incorporate estimates of the future behavior of only a few key economic indicators. Several represent group rather than individual efforts.

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

1972 FORECASTS IN PERSPECTIVE

The consensus forecast for 1972 GNP published in last February's *Monthly Review* was $1,141.0 billion, a projected increase of 9 percent over 1971. The collection of forecasts ranged from a low of $1,135.0 billion to a high of $1,155.0 billion. After allowing for expected price rises, the growth of real GNP was predicted to account for slightly over two-thirds of the 9 percent rise. Latest estimates by the Department of Commerce indicate a 1972 GNP total of $1,152.1 billion, which is over $11 billion higher than the consensus forecast of the business and academic economists. Compared to 1971, when the seers overestimated the GNP by only $3 billion, the 1972 forecasting performance seems to leave something to be desired, at least so far as current dollar GNP is concerned.

In late 1971 and early 1972, forecasters were anticipating an increase in the implicit price deflator

RESULTS FOR 1972 AND TYPICAL FORECAST FOR 1973

	Unit or Base	Preliminary 1972	Forecast 1973*	Percentage Change 1971/1972	Percentage Change 1972/1973
Gross national product	$ billions	1,152.1	1,261.5	9.7	9.5
Personal consumption expenditures	$ billions	721.1	784.6	8.5	8.8
Durables	$ billions	116.3	127.5	12.4	9.6
Nondurables	$ billions	299.5	323.8	7.7	8.1
Services	$ billions	305.4	332.6	7.8	8.9
Gross private domestic investment	$ billions	180.2	201.5	18.6	11.8
Business fixed	$ billions	120.4	135.5	13.8	12.5
Residential structures	$ billions	53.9	54.0	26.5	0.1
Change in business inventories	$ billions	5.9	10.5	—	—
Government expenditures	$ billions	254.9	276.8	9.5	8.6
Net exports	$ billions	−4.1	−0.6	—	—
Gross national product (1958 dollars)	$ billions	789.7	837.1	6.5	6.0
Plant and equipment expenditures	$ billions	88.49	99.46	9.0	12.4
Corporate profits before taxes	$ billions	93.9	105.9	12.7	12.8
Private housing starts	millions	2.38	2.10	16.1	−11.7
Automobile sales	millions	10.76	11.01	6.2	2.3
Rate of unemployment	percent	5.6	5.0	—	—
Industrial production index	1967=100	114.1	122.1	6.8	7.0
Wholesale price index	1967=100	118.7	122.5	4.2	3.2
Consumer price index	1967=100	125.1	129.4	3.1	3.4
Implicit price deflator	1958=100	145.9	150.7	3.0	3.3

* Figures are constructed from the typical percentage change forecast for 1973.

for GNP of around 3.2 percent. Compared to their performance during the past two years, the forecasters came remarkably close to predicting the rate of increase in this price index, which actually rose 3.0 percent during the year. Thus, the consensus was for a rate of growth of real GNP of slightly under 6 percent for 1972. Real GNP in 1972 increased 6.5 percent, compared with the 1972 consensus forecast of slightly under 6 percent. The predictions for real GNP were closer to the mark than the predictions for current dollar GNP because of the offsetting errors in the predictions of current dollar GNP and prices. Apparently, the wage and price control program worked even better than our forecasters expected. Although the forecasters came close to predicting the actual amount of increase in the implicit deflator, it is of interest that their error was on the high side. In past years, forecasters exhibited a definite tendency to underestimate the rate of price increase.

The consensus of quarter-by-quarter forecasts for 1972 was for current dollar GNP to rise by approximately $26.5 billion during the first quarter, $25.4 billion in the second, $25.8 billion in the third, and $25.6 billion in the fourth. The realized increases come to $31.0 billion, $30.3 billion, $24.6 billion, and $31.8 billion for the four quarters, respectively. The quarterly predictions of the implicit GNP deflator were 3.4 percent, 3.0 percent, 3.3 percent, and 3.3 percent. For the four 1972 quarters, the implicit deflator rose at annual rates of 5.1 percent, 1.8 percent, 2.4 percent, and 2.7 percent during the year.

The consensus 1972 forecast projected personal consumption expenditures for the year at $717.8 billion. Current estimates place the figure at $721.1 billion. Gross private domestic investment was also underestimated and by a substantial $12.7 billion margin. That account was predicted to reach $167.5 billion, but it actually totaled $180.2 billion. The underestimate was characteristic of all three components of gross private domestic investment (inventories, business investment, and residential construction), but much of it was attributable to the greater-than-expected continuing upsurge in residential construction. A year ago, the consensus of forecasters had private housing starts totaling 2.07 million in

1972. The realized figure was 2.36 million, a new record.

With respect to the public sector of the economy, government purchases of goods and services were predicted relatively accurately. The consensus of forecasters projected outlays of $252.7 billion on a National Income Accounts basis. The figure amounted to $254.9 billion.

Summing the errors in predicting consumption expenditures, gross private domestic investment, and government purchases of goods and services, it seems that the forecasters were $18.2 billion too low. If the one remaining component of GNP, net exports of goods and services, had not been considerably overestimated, they would have been much further from the mark than the $11 billion mentioned earlier. Net exports, predicted to show a surplus of $3.0 billion, actually were $4.7 billion in deficit.

Although the forecasters underestimated the growth of real GNP, which is presumably a determinant of the unemployment rate, they expected the unemployment rate to fall somewhat more than it actually did. As a matter of fact, virtually every observer of the economic scene expected a greater recovery in unemployment than materialized. The unemployment rate, forecast to average 5.4 percent for 1972, actually averaged 5.6 percent.

In other areas, the 1972 forecasters underestimated, by a slight margin, the recovery of industrial production. The industrial production index rose 6.8 percent for the year, against a forecast of a 6.5 percent gain. The recovery in profits, however, was overestimated. Corporate profits before taxes were predicted to increase 15 percent but in fact rose only 12.7 percent. The Price Commission's profit margin ruling may have figured in the miss. The forecasters were on target with their prediction for a 3.12 percent increase in consumer prices.

1973 FORECASTS IN BRIEF

Gross National Product Forecasts for 1973 current dollar GNP center around $1,261.7 billion. This typical forecast represents an approximate 9.5 percent yearly gain, which is slightly less than the 9.7 percent increase registered in 1972. Price increases are expected to amount to 3.3 percent and thus to account for about a third of the rise in GNP this year. Estimates for GNP range from a low of $1,250.0 billion to a high of $1,269.7 billion. The typical quarterly estimates indicate that GNP should increase almost $30.0 billion in the first quarter 1973. Increases are expected to decline steadily thereafter and to dip to approximately $24.0 billion by the fourth quarter.

Personal consumption expenditures are expected to total $785.2 billion in 1973, up 8.8 percent from 1972. Forecasters estimate that expenditures for durable goods will increase at a faster rate than those for either nondurables or services.

Government purchases of goods and services are projected to total $276.6 billion. This estimate represents an 8.6 percent increase, somewhat less than the 9.4 percent gain of 1972. The largest share of this year's increase will occur among state and local governments, whose finances will benefit substantially from funds obtained through new revenue-sharing programs.

Gross private domestic investment is expected to rise about 11.8 percent to $201.1 billion. This estimated increase is considerably smaller than the substantial 18.4 percent gain registered for 1972. While business fixed investment is projected to show approximately the same rate of increase in 1973 as it did in 1972, expenditures for residential structures are expected to show only a slight gain this year. The forecasters were far from unanimous about estimates for the residential construction sector—projections ranged from an increase of 8.8 percent to a decline of 7.6 percent—but more than half projected within a range of +2.0 percent to —2.0 percent. All forecasters, however, did indicate declines from the record-high growth characterizing the construction industry in 1972. The consensus prediction, in fact, indicates an actual decline in real (constant dollar) residential construction spending from its 1972 level. Inventory investment is expected to increase around $4.9 billion for 1973.

Industrial Production The median forecast for the Federal Reserve index of industrial production (1967=100) is 122.1, which indicates an increase of 7.0 percent, only slightly greater than that of 1972. Anticipated gains are greatest in steel, automobile, and consumer household durables production.

Housing The construction industry is expected to experience some slowing from its record 1972 pace. The consensus forecast calls for a total of 2.10 million private housing starts, around 280,000 less than the 1972 total. Forecasters are impressed with the growing vacancy rates for apartments and seem to believe that pent-up housing demand has been largely accommodated by houses built in the 1970-72 housing boom. Residential construction expenditures are expected to total $54.0 billion for 1973, approximately the same as in 1972.

Corporate Profits The consensus forecast indicates that this year should be slightly more profitable

TYPICAL* QUARTERLY FORECAST FOR 1973

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

	I	II	III	IV
Gross National Product	29.9	26.2	24.5	23.9
Personal Consumption Expenditures	16.2	16.5	15.4	14.9
Gross Private Domestic Investment	5.7	4.9	5.1	4.0
Net Exports	−1.7	−1.3	−0.5	0.0
Government Purchases	7.0	4.8	5.8	6.2
Implicit Price Deflator†	4.1	3.2	3.5	3.7
Rate of Unemployment(%)	5.2	5.0	5.0	4.9

* Median.

† Percentage changes at annual rates.

for business than 1972, with pretax corporate profits expected to rise 12.8 percent to $105.9 billion. Predictions for growth in profits ranged from around 11.0 percent to 16.0 percent.

Unemployment Most forecasters are predicting a decline in the rate of unemployment in 1973. Many predict the rate will dip below the 5.0 percent mark by the end of the year. The median forecast for the year is around 5.0 percent, well below the 5.6 percent average for 1972. Since the unemployment rate averaged 5.2 percent in November and December, however, the expected fall in the unemployment rate is rather small.

Prices This year the consensus forecast indicates some increase in the rate of advance of prices. The implicit GNP deflator, which rose 3.0 percent in 1972, is expected to increase 3.3 percent. The consumer price index is also expected to increase more rapidly, 3.4 percent compared to 3.1 percent in 1972. The wholesale price index, on the other hand, is expected to rise at a slower rate than it did in 1972.

Net Exports The nation's trade position, which showed a deficit of over $4 billion in 1972 was of primary interest to forecasters this year. The seers were unanimous in projecting an improvement in net exports with estimates ranging from a deficit of $3.4 billion to a surplus of $2.0 billion. Most forecasters projected net exports around —$0.6 billion for 1973, a considerable improvement over this year's hefty deficit.

Quarter-by-Quarter Forecasts Twenty forecasters made quarter-by-quarter predictions for 1972. As indicated by the accompanying table, these forecasters generally foresee an increase in GNP for the first quarter of around $30.0 billion, with gradually declining quarterly gains over the rest of the year. To illustrate the diversity in their estimates of the expansion path for GNP, however, the lowest fourth quarter forecast called for an increase of $99.1 billion over the fourth quarter 1972 total. The highest predicted an increase of $121.8 billion. Prices, as measured by the implicit price deflator, are expected to increase to 4.1 percent in the first quarter, then slow to a rate of 3.2 percent in the second, then gradually rise again in the third and fourth. Net exports are anticipated to continue to improve until imports and exports balance in the fourth quarter. The unemployment rate, on the other hand, is expected by most to decline by 0.4 of a percentage point to 4.9 percent by the fourth quarter of 1973. The fourth quarter unemployment estimates ranged from 4.7 percent to 5.2 percent, so none of the seers is looking for a sharply declining unemployment rate during the year.

Summary Forecasters generally underestimated the prime economic indicators for 1972. Preliminary estimates for 1972 indicate that the typical forecast for GNP was some $11 billion lower than the actual amount. Overoptimism, on the other hand, was reflected in the areas of inventory accumulation, unemployment, profits, and especially in the U. S. trade position. The typical forecast for net exports was $3.0 billion; in actuality, net exports declined $4.1 billion. Projections for expenditures for nondurable goods and the percentage increase in the consumer price index, however, were right on target.

Forecasters seem to be in substantial agreement concerning the 1973 outlook and, as the consensus forecast indicates, are anticipating another year of favorable economic activity. According to most projections, the 1973 economy will be characterized by a declining unemployment rate, an improving trade position, and a healthy expansion that will gradually slow to more "normal" growth.

Some forecasters expressed concern over the possibility of excessive growth exemplified by overspending that could lead to a new burst of inflation. Most, however, believe that the challenge of promoting a continued expansion without a rekindling of inflationary fires will be met and that the result will be a healthy and stable economy for the new year.

William E. Cullison and Carla R. Gregory

FINANCIAL FORECASTS: 1973

For 1973, most economists are predicting another year of rapid economic growth and financial stability similar in most respects to 1972. Gross national product is again expected to increase by about 10 percent, with personal consumption expenditures and other GNP components growing accordingly. Unlike the latter 1960's when rapid economic growth was accompanied by sharp increases in prices and interest rates, 1972 was characterized by ready availability of credit and, by comparison with other recent years, relatively stable prices and interest rates. Although short-term interest rates advanced noticeably during the fourth quarter of 1972, they remained well below the levels recorded during the tight money periods of the latter 1960's. Thus, 1973 commences with interest rates at relatively moderate levels compared to recent years. Furthermore, most observers see little evidence to suggest that the U. S. economy will be incapable of generating sufficient funds to finance the growth projected for 1973.

Certain developments in 1972 are responsible for this sanguine view of the economic and financial scenes. As the pace of economic activity improved sharply during 1972, it became evident that the economy was experiencing an expansion of considerable breadth, orderliness, and sustainability. Nearly all sectors of the economy were sharing in the growth, and no serious bottlenecks seemed to be developing. Also, toward the end of the year, investor (and consumer) confidence was largely restored after many months of anxiety and indecision. The decisiveness of the presidential election, the apparent breakthrough in the Vietnam peace talks in October, and continually improving economic statistics contributed to investor confidence. For some time, investors in long-term markets have been particularly sensitive to the rate of inflation, which has an important impact on securities prices. Increases in the general price level have been quickly translated into interest rate increases in recent years, causing large price declines and capital losses on long-term security issues. Thus, a reduction in inflation and inflationary expectations, which occurred in 1972, makes for an improved climate of expectations, especially in bond markets.

The financial forecasts for 1973 presented in this article represent the efforts of several well known economists. Their forecasts have been aggregated into a consensus view as shown in Tables I and II.

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

Short-Term Financial Markets As the economy continues to expand, the demand for short-term funds is expected to grow rapidly. In the absence of a comparable growth in the supply of short-term funds, upward pressure on short-term interest rates similar to that experienced in the fourth quarter of 1972 will continue.

The supply of short-term funds hinges heavily on the reserve positions of commercial banks and the cash positions of nonbank businesses and state and local governments. During 1972, banks and nonbank corporations registered substantial improvement in their liquidity. At the same time the financial positions of state and local governments took a dramatic turn for the better. All this helped to keep interest rates relatively low during the first three quarters of the year.

In 1973 there will be three important short-term borrowers whose demands for funds are likely to increase over 1972—businesses, consumers, and the U. S. Treasury. The demand for funds by businesses is expected to show the sharpest increase. For most of 1972 several forces were at work to hold down the amount of short-term borrowing undertaken by the business community. In general, most firms were able to accommodate the increased demand for output without greatly enlarging their inventories of raw materials and finished goods. Inventory-to-sales ratios were much lower than most analysts expected. For several reasons many corporations, especially the large ones, enjoyed highly favorable liquidity positions and internal cash flows. Corporate treasurers had undertaken a massive program to rebuild liquidity during 1971 by replacing maturing short-term debt with freshly-issued long-term debt. Cash flow was unusually good during 1972 as aggregate corporate profits increased by 15 percent and the effects of the investment tax credit and accelerated depreciation allowances were felt. Also, the limitation on dividend payouts established under the wage and price controls helped corporations conserve cash.

Many of the factors limiting the need for borrowed funds in 1972 are likely to be altered during

1973. Continued growth in the demand for output will almost certainly force greater spending on inventories and other forms of short-term assets. Typically, such assets are financed with short-term debt. Profits are not expected to grow as rapidly in 1973, and some uncertainty has developed regarding the continuance of the investment tax credit and other tax benefits. Some analysts are even predicting a corporate tax increase sometime in 1973. All of this adds up to a growing need for short-term funds by businesses, as shown in Table I.

This demand will most likely be manifested in increased use of bank loans, sales of commercial paper, and business finance company borrowing. As banks experience greater loan demand, they will bid more aggressively for certificates of deposit and may sell off some temporary investments such as Treasury securities and short-term municipal securities. Many corporations will also be selling short-term securities acquired earlier when their liquidity positions were more favorable. Each of these actions tends to put upward pressure on short-term interest rates. Most analysts, however, as is evident from their predictions of short-term rates for 1973 shown in Table II, do not expect increased borrowing by businesses to result in an unusually sharp upward shift in short-term rates.

Consumers are also expected to increase their borrowings in 1973. As personal income continues to expand, consumers will enjoy a larger cash flow, which can be used to pay off increased installment borrowing. For some time in the recent business slowdown, consumers saved at historically high rates, presumably as a reaction to fears of unemployment and to continued inflation. Now that consumer confidence has improved, the saving rate has retreated somewhat, and consumers are spending more freely. For example, it appears that beginning with 1972 a good year for automobile sales will be at the 11 million unit level rather than at the 9-10 million level. In 1973 consumers are expected to purchase larger cars with more optional equipment, which should result in more installment borrowing. Also, the record numbers of new houses being built need to be furnished with assorted consumer durables. For these reasons consumers are expected to continue purchasing and borrowing at a very substantial rate in 1973. Their demands, while not exactly of a short-term nature, have an important impact on money market borrowings of finance companies and on efforts of commercial banks to raise funds through sales of CD's.

Table I

CONSENSUS FUNDS FORECASTS*

($ Billions)

	1972†	1973
Business Credit	19	22
Consumer Credit	15	17
U. S. Treasury Securities	15	20
Corporate Bonds	18	17
State and Local Debt	16	15
Residential Mortgages	53	53
Corporate Stock	12	11

* These numbers represent an estimation of the consensus forecasts of many well known economists.

† Estimated.

Treasury Borrowing Most observers feel that the Treasury will have to borrow a larger quantity of funds in 1973 than it did in 1972. Some of the most important factors affecting Treasury borrowing, however, remain clouded with uncertainty. In 1972 the Treasury's cash position was larger than expected on several occasions because of purchases of securities by foreign central banks, overwithholding of income taxes by individuals, and delays in expenditures.

Traditionally, the Treasury has conducted most of its financing activities in the second half of the year, with the first half characterized by debt repayment. This year, however, it is reasonably certain that the Treasury will be borrowing, perhaps substantial amounts, in the first half. Any large amount of contraseasonal borrowing by the Treasury this spring would tend to push up interest rates.

Although the Administration has vowed to limit Federal expenditures in the coming year, the high level of expenditures built into the Federal budget will produce a sizable deficit. Thus, new borrowing from the public will probably increase, as shown in Table I. Now that long-term interest rates are lower than they were in 1968-1970, the Treasury has been trying to lengthen the maturity of its outstanding debt by selling more long-term securities. Notwithstanding this effort, most of the financing is still carried out in the short-term markets because of the greater breadth and depth of these markets. Although it is difficult to be at all precise in forecasting the Treasury's need for funds in 1973, most factors point to an increase that will tend to put some upward pressure on short-term interest rates.

Long-Term Financial Markets Most observers see the balance between supply and demand in long-term markets as more favorable than in short-term markets. As a result they expect very little upward pressure on long-term interest rates. Several analysts, in fact, dare to hazard a prediction that long rates may decline slightly. These forecasters base

Table II

CONSENSUS INTEREST RATE FORECASTS*

	Year end 1972	Midyear 1973	Year end 1973
Certificates of Deposit†	5.50%	6.00%	6.60%
Treasury Bills†	5.10%	5.60%	6.20%
Commercial Paper†	5.50%	6.00%	6.60%
Prime Rate	6.00%	6.25%	6.50%
Aaa Corporate Bonds	7.10%	7.25%	7.35%
Bond Buyer Municipal Index	5.10%	5.20%	5.30%
Long-Term Treasuries	5.70%	6.00%	6.25%

* These numbers represent an estimation of the consensus forecasts of many well known economists.

† Three-month maturity.

their predictions not only on the flows of funds that develop in the economy, but also on the willingness of investors to commit funds to the long-term markets. Now that investor confidence has improved, long-term investors who earlier were driven by inflation fears into short-term markets are expected to move in greater numbers back into longer commitments.

The major purchasers of long-term debt, led by life insurance companies and pension funds, are expected to have substantial cash flows in 1973. Life insurance companies, in particular, have improved their liquidity positions since 1969-1970.

Also contributing to the behavior of long-term markets will be the smaller demands of most long-term borrowers in 1973. Although the short-term borrowing needs of business are expected to increase in 1973, their need for long-term funds may register a slight decline, as shown in Table I. In historical terms, however, corporations will be issuing new long-term debt at rather high rates. Only in the very early 1970's during the period of massive liquidity rebuilding, did corporations sell more debt securities than they probably will in 1973. Thus, corporations will be expanding plant and equipment during 1973 at a healthy rate, but they will not be financing an unusually large proportion of these expenditures externally.

State and local government financing needs are also expected to decline slightly in 1973 from 1972 rates. Funds acquired from the Federal Government under revenue sharing will augment the spending capacity of most municipalities and presumably reduce borrowing requirements. Nevertheless, like corporations, state and local governments will record one of their highest rates of borrowing ever in 1973. The supply of funds in the tax-exempt market may be cut back somewhat in 1973 as commercial banks channel more of their resources into loans than they did in 1972. On balance, however, no serious upward pressures on interest rates are expected to emerge in the tax-exempt market.

The demand for residential mortgage funds will probably be about the same in 1973 as in 1972. Housing starts are expected to decline somewhat in 1973, but because of the lag between the time building begins and permanent financing is obtained, mortgage demand is not expected to show a commensurate decline. The major sources of mortgage funds are the thrift institutions, which experienced record deposit inflows in 1972. This process may taper off somewhat in 1973, but the available supply of mortgage credit is generally viewed as adequate to satisfy demand without much upward pressure on interest rates.

Stock Market Most analysts appear to be cautiously bullish on the prospects for the stock market in 1973. The rapid rate of expansion in the economy should produce another year of improvement in corporate earnings, with much of the increase being attributable to increased productivity and output rather than to inflation. In terms of earnings prospects, many stocks are conservatively valued. For example, the price-earnings ratio for Standard and Poor's 500 Stocks is now much lower than in other recent bull market periods. The stocks of those industries whose performance is closely tied to cyclical movements in the economy should also begin to rise in value as economic expansion continues.

Market analysts expect institutional investors to continue to participate on a broad scale. Some analysts also see evidence that the small investor, who has been relatively inactive in the market in recent years, is returning to the marketplace in greater force. Most analysts believe that substantial improvement in economic conditions and the strong market performance in recent months should allay the fear of the stock market acquired by many individuals during the bear markets of 1969-1970. Also, many foreign investors who entered the market in 1972 are expected to continue to invest in stocks in 1973. The volume of new equity issues, shown in Table I, is expected to be relatively large in 1973. In the 1970's new issue volume has grown sharply compared to the 1960's.

Stock prices reflect expectations of future earnings performance, and indexes of their movement are widely regarded as leading economic indicators. Hence, as analysts suggest, the performance of the stock market in 1973 depends in part on expectations regarding the economy's performance in 1974.

Monetary Policy The course of monetary policy always plays an important role in shaping conditions in financial markets. Most investors now appear to believe that the chief problem facing the Federal Reserve System is that of preventing an overheating of the economy. Thus, many analysts are predicting that the Federal Reserve will attempt to moderate the recent relatively rapid rate of growth of the money supply in the months ahead. At one time, such thinking prompted talk of a credit crunch in 1973. Most analysts, however, feel that the current expansion is not excessive, that sufficient funds will be generated in the process of economic growth to finance the current expansion, and that the Federal Reserve will be careful to avoid the extremes of overheating or tight money. On balance, the consensus of forecasters is that the economy will continue to expand in 1973 and that there will be sufficient credit available to avoid any sharp upward movement of interest rates.

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FEDERAL RESERVE BOARD PUBLICATION

INDUSTRIAL PRODUCTION: 1971 EDITION

The publication, INDUSTRIAL PRODUCTION: 1971 EDITION, *is available for distribution by the Board of Governors of the Federal Reserve System. This book provides detailed descriptive material and statistical tables on the revision of the industrial production index, the results of which were summarized in the July 1971 issue of the* FEDERAL RESERVE BULLETIN. *Copies are available at a charge of $4.00 for single copies and $3.50 each for copies of ten or more sent in a single shipment. Please address all requests to Publications Services, Division of Administrative Services, Board of Governors of the Federal Reserve System, Washington, D. C. 20551.*

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