

FEDERAL RESERVE BANK OF ST. LOUIS



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Review

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Economic Activity Weakens

GROWTH in total spending, which moderated in the last half of 1966, slowed further in the early part of this year. The weakness in total demand has centered in the private sector of the economy, while Government expenditures, especially for defense, have tended to bolster total demand.

With a smaller rate of expansion in demand for goods and services, the demand for credit has also lessened. As a result interest rates have declined, and other credit terms have been relaxed. With lower interest rates on market instruments, banks and other financial institutions have been able to attract a larger portion of the community's savings to improve their liquidity and to grant more loans.

Government stabilization actions have been mixed. Fiscal policies have been expansionary in the last year and are expected to continue to be stimulative in the next few months. Monetary developments, which were tight last summer and early fall, may have been less restrictive since November. The nation's money stock increased from last November to February after declining in the previous six months.

Interest Rates, Monetary Policy, and Reintermediation

Interest rates declined after reaching a peak last September; at first the decline was moderate, but from November to late January rates fell abruptly.

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In February most rates rose, offsetting a part of the previous decline, but in early March rates again drifted lower.

The three-month Treasury bill yield fell from about 5.50 per cent in mid-September to 4.50 per cent in early February and was 4.40 per cent in early March. The 4- to 6-month commercial paper rate decreased from 6.00 per cent in October to 5.38 per cent in early February and remained at that level through early March. Yields on long-term market instruments also declined substantially. From mid-September to early February the market rate on highest grade corporate bonds decreased from 5.50 per cent to 5.00 per cent, but in early March corporate Aaa bonds were yielding 5.10 per cent.

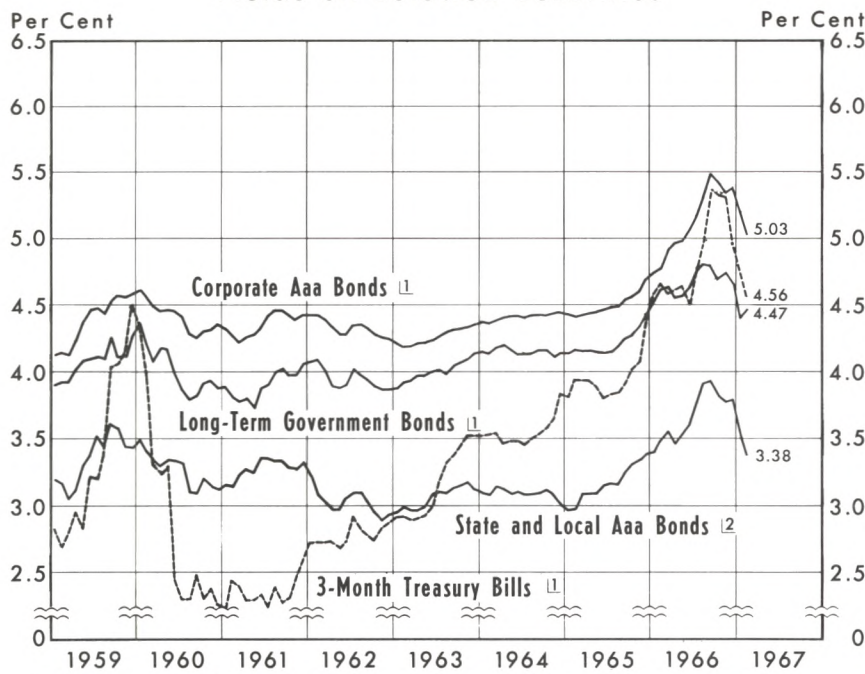
Lower interest rates since last fall have been in large measure a response to slackened credit demands. One reflection of weakened credit demand was the decline in the prime rate, the interest rate charged by banks for loans to their most credit-worthy customers. From August 16 to about January 30 the prime rate was 6 per cent, after rising from 5 per cent in early December 1965. Beginning in late January of this year most money market banks revised the prime rate downward to 5½ per cent.

The lower market rates relative to the legal maximum of 5½ per cent on large CD's (those of \$100,000 and over) at commercial banks have made these deposits more attractive to investors and have contributed to the marked revival of this market. From late December to early March the outstanding volume of CD's at major commercial banks more than recovered the \$3 billion decline suffered from late August to mid-December.

Savings and consumer-type time deposits of commercial banks have continued to rise rapidly. From December to February time deposits other than large CD's at major banks increased by about \$2 billion or at an annual rate of 15 per cent. In the year ending last December these deposits rose 7 per cent.

The renewed growth of total time deposits has tended to ease the reserve position of commercial banks and to improve bank liquidity positions. These

Yields on Selected Securities



1 Monthly averages of daily figures.

2 Monthly averages of Thursday figures.

Sources: Board of Governors of the Federal Reserve System and Moody's Investors Service

Latest data plotted: February

inflows of funds coupled with slackened credit demands have allowed banks to become more active in seeking uses for their funds.

Savings and loan associations and mutual savings banks, along with commercial banks, have been benefitting from the relative decline of market interest rates. From October to December 1966 outstanding savings and loan shares increased at an annual rate of 12 per cent compared with a 1.7 per cent rate from January to October. Mutual savings banks have shown a similar pattern of deposit growth for these periods. From 1961 to 1965 savings accounts at these institutions increased rapidly: savings and loan association shares increased at an average annual rate of 12 per cent, while deposits at mutual savings banks increased at an 8 per cent rate.

Large inflows of savings during the past few months have allowed nonbank depository institutions to improve their liquidity and to be more competitive in granting loans in markets in which their lending is specialized. Mortgage markets in particular have felt benefits which will probably have an expansionary effect on new residential construction.

Most monetary indicators have recently been less restrictive than they were last summer and fall. From November to February total member bank reserves rose at about a 13 per cent annual rate compared with

a decline at a 2.6 per cent rate in the previous six months, after adjustments for reserve requirement changes. Most of the reserves have been used to support the renewed bank intermediation. Reserves available for private demand deposits have risen at a 2 per cent rate since November and have changed little since mid-December. Bank reserves are influenced by Federal Reserve action and are important because they set an upper limit on bank deposits (the major part of the money stock).

From November to February total commercial bank credit (loans and investments) increased at an annual rate of 10 per cent compared with a 3.7 per cent rate from May to November. The composition of the growth in bank credit has changed since November as compared with the earlier period. Loans increased at an annual rate of 7 per cent from November to February after rising at

an 8 per cent rate from May to November. Bank holdings of U.S. Government securities increased at a 14 per cent annual rate during the period from November to February compared with a decrease at a 10 per cent rate from May to November. After a period when banks were drawing down secondary reserves in an attempt to meet a vigorous loan demand, they have more recently been building up liquidity positions.

The nation's money supply (demand deposits and currency) rose from November to February. This apparent recent growth may in some measure be the result of peculiarities of the February figures. From May to November money declined. In the year ending in May, the money supply increased 6 per cent after going up at about a 3 per cent average annual rate from June 1960 to May 1965. Demand deposits rose moderately from November to February, while currency outside banks increased rapidly. The lack of monetary growth last summer and fall probably had a restrictive impact upon economic expansion. When individuals and businesses have less money than they desire to hold, current expenditures are reduced relative to receipts in order to build up cash balances.

On February 28 the Board of Governors of the Federal Reserve System announced a reduction (from 4 per cent to 3 per cent) on reserve requirements

against savings deposits and the first \$5 million of other time deposits at member banks. (Each member bank is still required to hold reserves of 6 per cent against its time deposits in excess of \$5 million.) The requirement on those time deposits affected was scheduled to become 3½ per cent on March 2 and 3 per cent on March 16. An initial effect of the change was to free an estimated \$850 million of reserves, permitting further expansion in deposits.

Fiscal Conditions

The Federal Government, according to conventional measures, is providing a substantial stimulus to the economy in the first half of 1967.¹ The national income accounts budget is scheduled to move from a \$2.6 billion deficit (i.e., expenditures greater than receipts) in the last half of calendar 1966 to about a \$5 billion deficit rate in the first half of 1967. This budget adjusted for cyclical movements in economic activity (the so-called high-employment budget) is the most expansionary budget in more than a decade. By comparison it averaged about an \$8 billion surplus from 1961 to 1965.

Sales, Inventories, and Production

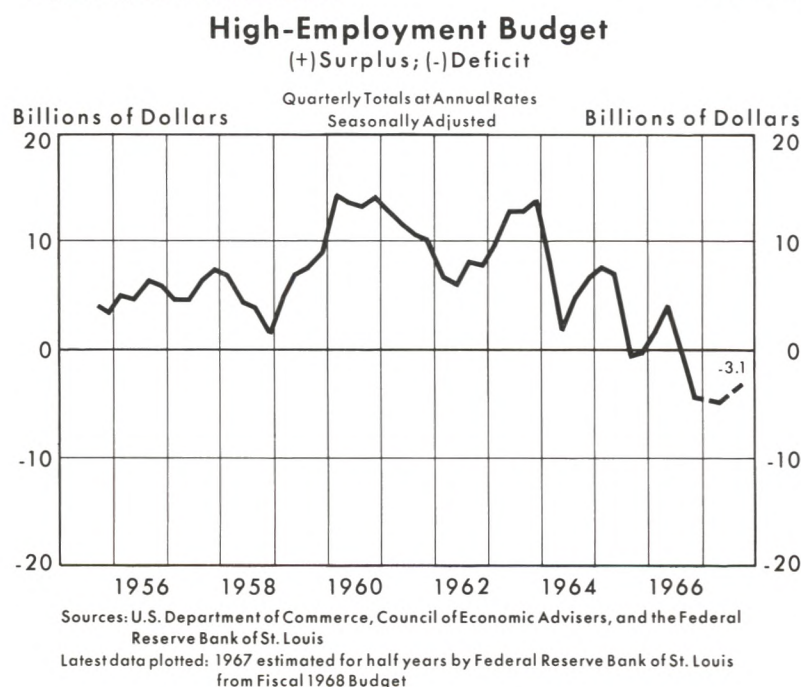
Total spending (GNP in current dollars) increased at an annual rate of 7 per cent in the last three quar-

ters of 1966 compared with a 10 per cent rate in the previous five quarters. Although a 7 per cent rate is large relative to growth of productive capacity, weaknesses in key areas of private demand developed in the last half of 1966 which have continued into the early part of this year. These weaknesses have stemmed from a reduced rate of spending by the private sector, while Federal Government expenditures have continued to increase.

Retail sales declined at an annual rate of 4.5 per cent from September to January after rising at a 5 per cent rate in the preceding 10 months. The recent decline consisted primarily of a reduction in sales of automobiles and other durable goods. The smaller spending on appliances and autos may be partially a reaction to the decline in new house purchases as well as a reflection of the rapid pace of auto purchases in the past several years. Consumers may also be attempting to build up their liquidity by spending a smaller share of their incomes. Such cutbacks usually occur in durable goods since existing stocks continue to be usable.

Although business spending has remained large, there are indications that it also has been one aspect of the weakness in aggregate demand. The large business outlays in late 1966 were accounted for in considerable part by an acceleration of inventory accumulation. Business inventory holdings increased at a \$16.4 billion annual rate in the last quarter of 1966 compared with accumulation at a \$10.4 billion annual rate in the first three quarters of 1966 and \$9.1 billion in 1965.

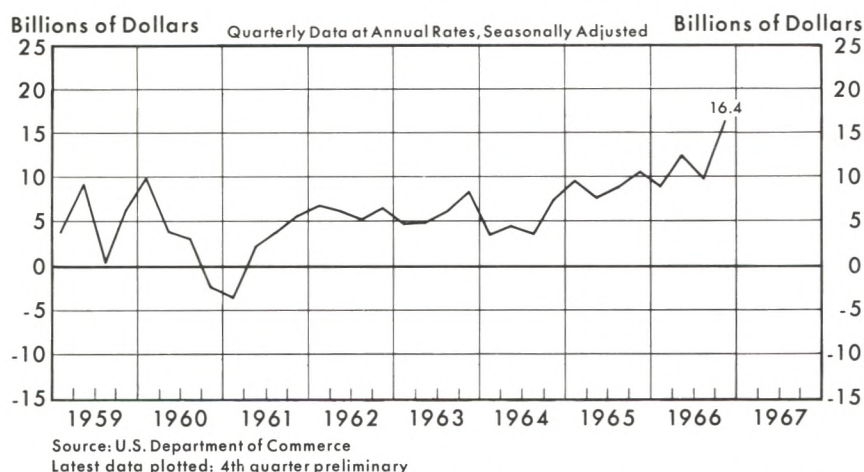
¹ *Annual Report of the Council of Economic Advisers*, January 1967. For an evaluation of planned fiscal policy see, "The Federal Budget and Economic Stabilization," in the February 1967 issue of this *Review*. Also, see *Federal Budget Trends*, a quarterly release of this Bank.



The high rate of inventory accumulation is unsustainable, which suggests that a substantial amount of this accumulation has been involuntary. If this is the case, firms experiencing large inventory accumulation may attempt to bring them into line by reducing the rate of output and purchase of production goods. Such adjustments tend to reduce sales, income, and employment.

During the initial periods of cyclical up-swings in business activity, inventories are usually drawn down relative to sales as sales increase at a more rapid pace than production. Inventories frequently reach undesirably low levels relative to sales during the early phases of a business expansion. Consequently, businesses attempt to build up their inventory stock so as to regain a desired relation to sales, but, with sales also rising, the inventory-sales ratio

Changes in Business Inventories



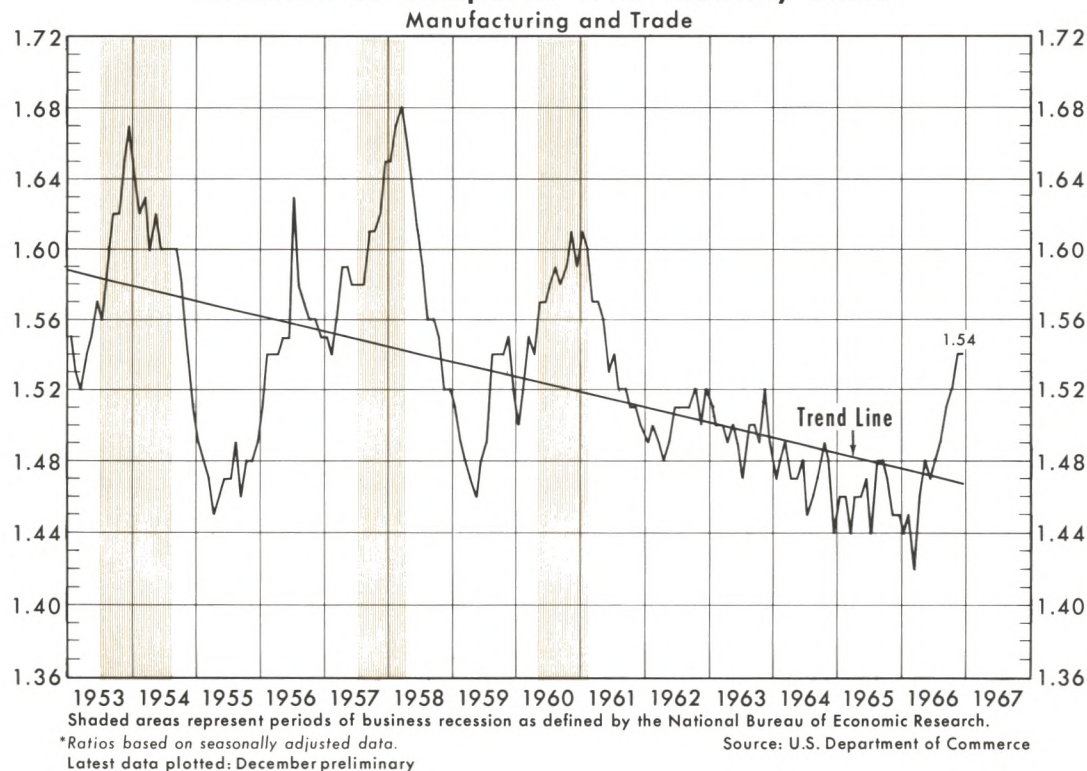
usually remains low during most of the expansionary phase of the cycle. Attempts to build inventories tend to maintain or accelerate income and employment.

In the latter phases of an upswing, when growth in sales slows, inventories usually rise markedly relative to sales. Businesses then attempt to reduce the rate of inventory accumulation by limiting their purchases. These actions, in turn, tend to lower consumer and business incomes, which tend to "feed back," causing a further weakening in sales. Consequently, an attempt to trim inventories to achieve a desired inventory-sales ratio is partially self-defeating.

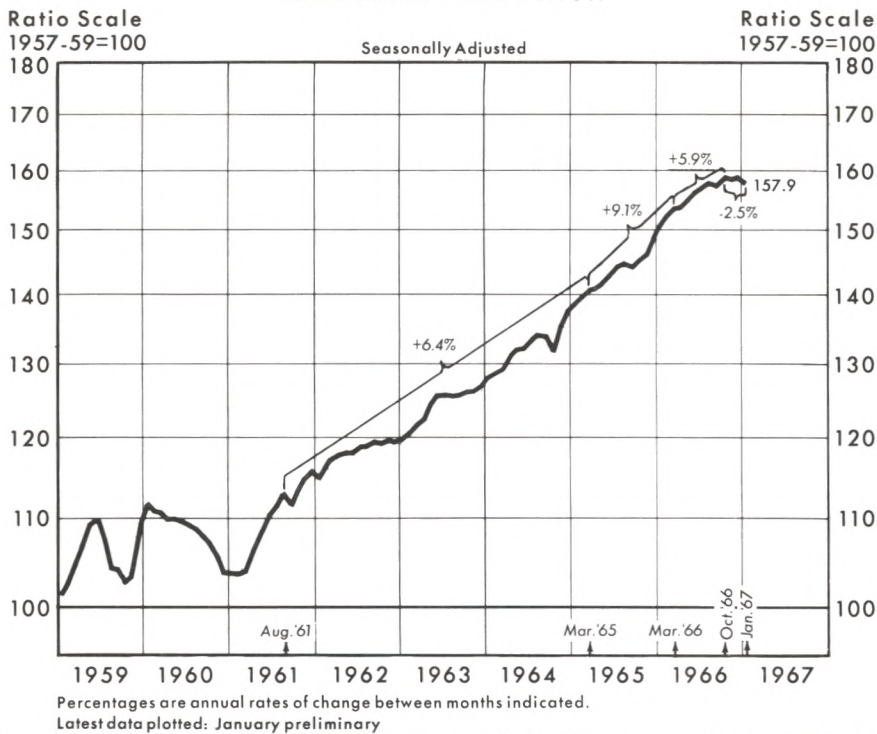
From 1961 to mid-1966 the inventory-sales ratio declined steadily from 1.54 to 1.48, with the only interruption occurring in 1962. This ratio increased in late 1966 to 1.54. Such a marked rise may be a signal that businesses will begin to add to inventories less rapidly. The effect of undesired inventory levels is already taking place according to some indicators. Unfilled orders for durable goods have declined slightly since September after rising steadily in the previous year. Recently, there have been production cutbacks in automobiles and some appliance industries because of a slowdown in sales and rising inventories of dealers.

Growth in production has recently been at a decidedly slower rate than during most recent years. Industrial production declined at a 2.5 per cent annual rate from October to January compared with a 5 per cent rate of increase from June to October and a 9 per cent gain in the previous year. The current slowdown may reflect in part adjustments associated with the reallocation of resources from civilian to military goods production during a period of near full employment. It may also reflect a weakening of consumer and business demand which may now be

Inventories Compared With Monthly Sales*



Industrial Production



feeding on itself. For example, the 1966 decline in new residential construction has been reflected in output declines of the lumber industry and in little change in the rate of furniture and fixtures production. The decline in iron and steel production since August may be associated with the decline in new construction as well as the smaller automobile sales.

Employment, in contrast with most other measures of economic activity, has continued to expand rapidly. From August to January total employment increased at a 3.7 per cent annual rate compared with a rise of 2.7 per cent during the year ending last August. Payroll employment has also continued to rise substantially. From August to January payroll employment increased at a 4.4 per cent annual rate compared with 5.2 per cent in the previous 12 months. These rates of growth may be compared with growth of population of labor force age at a rate of about 1.5 per cent a year.

Unemployment has remained at slightly below 4 per cent of the labor force. The average workweek in manufacturing declined from 41.5 hours last September to 40.9 hours in January.

Prices

The smaller expansion in total demand has reduced the demand-pull pressures on prices, but cost-push forces may be rising. The strong demand for labor and for goods during 1966 has not been fully reflected in wages (and some other prices) since many contracts have not come up for renegotiation. Mark-ups in these prices, in turn, increase costs of production and place cost-push pressures on other prices.

Consumer prices increased at about a 1 per cent annual rate from October to January compared with 3.7 per cent during the preceding 12 months. Most of the gain since October has been in the cost of services; the prices of commodities have changed little on balance, with declines in food being nearly matched by mark-ups in other nondurable goods.

Wholesale prices have declined since last summer in contrast to the continued rise in consumer prices. From August to January wholesale prices decreased at an annual rate of 1.3 per cent compared with an increase of 3.8 per cent in the preceding year. Farm products and processed foods have contributed most to this recent decline. Prices of these commodities declined abruptly last fall, partially offsetting the 8 per cent rise during the 12 months ending last September. Industrial prices have continued to work up, increasing since September at a 1.7 per cent annual rate compared with a 2.4 per cent increase in the previous year.



Economic Theory and Forecasting

Occasionally this Review publishes articles of a more technical nature.

These articles result from basic research efforts of staff economists.

Introduction

THE ECONOMIC FORECASTS for 1967 have been duly recorded and only await the passage of time to see how accurate they were. This article does not attempt to add an additional forecast to those already made. Rather, it specifies some of the common underlying assumptions or theories which major groups of forecasters accept and which they implicitly or explicitly take into account in constructing a forecast.

It is hoped that this review of forecasting assumptions will help clarify some of the differences which separate those who forecast a substantial decline in the growth of gross national product (GNP) in 1967, with a resulting increase in unemployment, from those who project a high rate of growth in GNP and a continued tight labor market.

There is widespread interest in economic forecasting. It is of concern to the private citizen because of the information it may provide regarding his future income and employment. It is of interest to business firms which desire to plan their investment and production programs appropriately. It is of interest to the Government because its policy actions can affect the level of economic activity. Policymakers have some idea of a socially desirable level of economic activity. An accurate forecast tells what the actual level of economic activity is most likely to be. When actual and desired levels differ, appropriate application of monetary, fiscal, or other public policy may serve to move the actual closer to the desired value.

Empirical Forecasts

Methods of economic forecasting may be divided into two major classes. One class uses primarily an empirical approach, while the other class combines economic theory with empirical evidence. The best-known empirical approach to forecasting is the "leading indicators" technique. This was originally developed by the National Bureau of Economic Research (NBER) during the 1920's, and since 1961 data for applying this technique have been published monthly

by the Department of Commerce in *Business Cycle Developments*. This technique consists of examining a wide range of economic data from previous business cycles to discover those time series which typically show peaks and troughs before peaks and troughs are observed in general business conditions.

The leading indicators approach is widely reported and discussed in the financial press. In the December 1966 issue of *Business Cycle Developments* (which presented the best information then available, when most forecasts of 1967 were being completed), the leading indicators were giving conflicting evidence about the future. A sampling of leading indicators published in the December issue is presented in the accompanying table. Some indicators showed continued expansion, others had turned down, and many were indeterminate. For example, in the last half of 1966 new orders received by durable goods industries and plant and equipment contracts and orders tended to increase at about the same rate as during the whole of the 1961-66 expansion period. By comparison, private nonfarm housing starts and stock market prices, two other leading indicators, showed well-publicized decreases. (Since December the stock market has shown renewed strength.) Also, many of the "coincident indicators," those which generally move simultaneously with peaks and troughs in business cycles, registered advances. Given this conflicting evidence plus uncertainties regarding Government spending for Vietnam, it is not surprising that there was a considerable degree of uncertainty in the projections of many forecasters.¹

To evaluate the mass of largely conflicting evidence available to forecasters, some judgment about what are important and what are secondary causes of changes in the economy are needed. It is in this context that the second class of forecasting tools (the

¹ Some attempts have been made to apply an objective statistical test to see if a mixture of leading and coincident indicators point to continued expansion or contraction. For example, see Leonall C. Andersen, "A Method of Using Diffusion Indexes to Indicate the Direction of National Economic Activity," 1966 *Proceedings of the Business and Economic Statistics Section*, American Statistical Association (Washington, D. C.), pp. 424-434.

LEADING INDICATORS
OF BUSINESS CYCLE DEVELOPMENTS
(As of December 1966)

Clearly Showing Expansion	Clearly Showing Downturn	Indeterminate
1. New orders, durable goods industries.	1. Private nonfarm housing starts.	1. Employment data.
2. Plant and equipment contracts and orders.	2. Net business formation.	2. New capital appropriations, manufacturing.
3. Manufacturing and trade inventories, change in book value.	3. Stock prices, 500 common stocks.	3. Liabilities of business failures.
4. Purchased materials, per cent establishments reporting higher inventories.	4. Industrial materials prices.	4. Corporate profits after taxes.
5. Buying policy, production materials, per cent reporting commitments 60 days or longer.		5. Price per unit labor costs, manufacturing.
		6. Change in unfilled orders, durable goods industries.
		7. Profits per dollar of sales, manufacturing.

Note: This is a representative sampling from a larger list of leading indicators.

Source: U.S. Department of Commerce, Bureau of the Census, *Business Cycle Developments*, December 1966.

combination of economic theory and empirical evidence) plays an important role.²

Economic Theory and Forecasting

A theory which attempts to explain the determinants of national income should also provide some insights into the future level of national income. This is especially true if changes in the determinants of income as postulated by the theory generally occur prior to actual changes in income. For example, if one knows for some previous time period ($t-1$) the value of the determinants of income, one is in a strong position to predict the value of income in the subsequent time period (t). But even if there is no time lag between the theoretical determinants of income and their effect on income, theory may, nevertheless, help in forecasting. The determinants of income may be easier to predict, or certainly more subject to direct influence by the monetary or fiscal authorities, than the aggregate level of income.

Since economics is far from an exact science, more than one theory about the operation of the economy may be consistent with the available statistical evidence. Theories of national income determination representing the two major schools of thought which presently influence professional economic thinking in the United States are considered here in a highly simplified form. One is the quantity theory of money

and the other is the income-expenditure theory. The quantity theory of money dominated economic thinking until the middle of the 1930's when John Maynard Lord Keynes' income-expenditure theory came into prominence. The quantity theory has recently re-emerged under the intellectual leadership of such economists as Professor Milton Friedman of the University of Chicago and Professor Karl Brunner of Ohio State University. However, the income-expenditure theory is still dominant in professional economic thinking.

Because of the important role these two theories play in influencing the thinking of present-day economists and economic policymakers, it is useful to (1) review briefly the rationale of each theory; (2) consider the experience of each theory in explaining developments in national income during the present business cycle (1960 to 1966); (3) indicate how each theory might forecast national income for 1967, and (4) consider the possibility of a mix of these two theories.

The Theoretical Frameworks³

The proponents of the quantity theory of money consider that the desire to hold a given stock of money is predictably related to income, wealth, interest rates, and possibly some other strategic economic variables.

²Economic theory plays a larger role than facilitating forecasting—it also helps explain the underlying structural relations in the economy. The application of theory, mathematical reasoning, and statistical technique to establish the actual value of these structural relations is called econometrics. Forecasting is only one application of the results of this type of research.

³The following is an extremely simple statement of what are in fact highly complex explanations of the determination of national income. The interested reader is referred to any standard text on national income analysis for a more complete discussion, e.g., Gardner Ackley, *Macroeconomic Theory* (New York: The Macmillan Company, 1961), and Joseph P. McKenna, *Aggregate Economic Analysis* (New York: Henry Holt and Company, Inc., 1955).

Based on the value of these variables, all spending units are considered to desire a certain amount of money to hold. This theory also postulates that discretionary actions by the Federal Reserve can alter the actual stock of money relative to the desired stock, thereby setting into action a course of events which leads to a change in income and interest rates. When the actual stock of money differs from the desired stock, a response is induced on the part of the public to re-establish the desired relation. This attempt to shift between money and other financial assets or commodities affects interest rates and aggregate demand and through these the level of prices and real output.

The income-expenditure theory divides expenditures into two groups—those which are induced or are dependent on current income and those which are autonomous or are independent of current income. Most consumption spending is considered to depend upon income and is therefore the major induced expenditure. Autonomous expenditures (as defined in this article) are investments of business firms, government expenditures, the net export surplus, and some minor items.⁴ Although autonomous spending is independent of current income, it is, of course, dependent on something. Government spending depends upon the policy decisions of the President, Congress, and their advisers; business investment depends upon such factors as expectations of future sales, changes in technology, and interest rates; exports depend upon income and prices in the rest of the world and the exchange rate. By definition, the sum of induced and autonomous expenditures is equal to the total value of all goods and services produced in the economy, i.e., GNP. Thus, autonomous spending is one component of GNP, but the level of GNP does not directly determine the amount of autonomous spending.

The proponents of the income-expenditure theory postulate that consumption expenditures are very closely tied to the level of income and thus cannot generally act as a substantial initial cause of short-term changes in income.⁵ Consequently, changes in autonomous expenditures are considered the major

cause of changes in income. This is not only because autonomous spending is a component of income, but also (and more importantly) because autonomous spending actually induces changes in consumption. The Government, through its control of expenditures, affects the level of autonomous spending, thereby influencing consumption and GNP.

The formal structure of each theoretical model is presented in the following highly simplified equations:

Quantity Theory of Money

$$1. \Delta Y_t = e + v (\Delta M)_{t-n}$$

Income-Expenditure Theory

$$2. \Delta Y_t = a + b (\Delta A)_{t-m}$$

Y = GNP

M = Money⁶

A = Autonomous spending

t = time unit which is one-quarter of a year

$t-n$, $t-m$ = different possible time lags between (M) and (Y) and between (A) and (Y)

Δ = change between quarters

The symbols, e , v , a , b , represent specific statistically determined values relating (M) to (Y) and (A) to (Y). The quantity theory of money (equation 1) says that short-term movements in GNP (ΔY) are largely determined by changes in the stock of money (ΔM). The income-expenditure theory (equation 2) says that changes in autonomous spending (ΔA) determine short-term movements in GNP (ΔY).⁷

(Continued from col. 1)

because of scare buying. (2) There may be a change in tastes of the public or temporary saturation of the market which could decrease consumption of some product although income is unchanged. The first factor has been sufficiently unpredictable that it would be unprofitable to incorporate it into a general theory explaining consumption. The second factor may be of major importance in analyzing a particular commodity market (like autos), but it has not been a major factor in causing changes in overall consumption.

⁶ Several definitions of money are used in economic literature. The standard definition of money, which is used here, is currency held outside of commercial banks plus demand deposits adjusted (referred to as $M1$). Some economists consider this definition too narrow because it excludes other important sources of household and business liquidity. A broader definition which is sometimes used is $M1$ plus time deposits in commercial banks (referred to as $M2$).

⁷ Those economists who consider that both theories jointly explain how GNP is determined might say that monetary variables (through the interest rate) will affect autonomous spending, while autonomous variables (through demand for bank credit, etc.) will affect the money supply. According to this view, independent changes in either money or autonomous variables, or both, determine the level of GNP.

⁴ There is considerable controversy among economists about which components of income are induced and which are autonomous. See Appendix, page 14, for some discussion of this and other issues.

⁵ The income-expenditure theory considers certain exceptions in the dependence of consumption on income. (1) A sharp change in the public's expectations about future prices or availability, such as took place in the early months of the Korean War, can temporarily increase the consumption-income relation

The obvious policy difference between the two theories is that the first emphasizes the role of money and central bank monetary policy in determining GNP, while the second emphasizes the role of autonomous expenditures and Government fiscal policy in determining GNP. In the event that movements in money and autonomous expenditures are in different directions, very different conclusions as to the future course of GNP would be forecast by proponents of each of the theories.

A case in point is the recent economic experience in this country. From the second to the fourth quarter of 1966 the economy experienced a period of tight money but a continuing stimulative fiscal policy. The proponents of the quantity theory might reasonably forecast for 1967 a marked decline in the growth of GNP and real output. On the other hand, proponents of the income-expenditure theory would most likely expect continued growth in GNP at a relatively rapid rate.

Experience During the Present Cycle

One way to examine these theories is to compare movements in GNP with each of the theoretically postulated determinants of GNP, i.e., money and autonomous spending, to see how closely each has moved with GNP. Because there are strong upward trends in money, GNP, consumption, and autonomous spending, turning points in the data may not easily be observed. To remove most of the trend and therefore to concentrate on the cyclical elements in income, its components, and money, quarterly changes in each series are used.⁸

In Chart 1 quarterly changes in money and GNP are plotted from 1958 (4th quarter) to 1966 (4th quarter). In Chart 2 quarterly changes in autonomous spending

⁸The generally accepted convention in computing changes for any time period (t) is to consider the difference between (t-1) and (t). However, there is no necessary reason for this. The change at (t) could also be measured as the difference between (t) and (t+1). The value of the change at (t) used here is the average of these two measures of change. The practical advantage of this approach is that it reduces much of the random statistical "noise" (movement) which results from the use of first differences computations.

(A), consumption (C), and GNP (Y) are plotted for the same time period. The relationship between (ΔM) and (ΔY) or (ΔA) and (ΔY) can be estimated statistically to get a quantitative measure of the value of the relation and its statistical significance. Using the same data as plotted in Charts 1 and 2, the following estimates were computed:

The Quantity Theory

$$1a. \Delta Y_t = 5.61 + 3.94 (\Delta M)_{t-3} \quad r^2 = .553 \\ (.69)$$

The Income-Expenditure Theory

$$2a. \Delta Y_t = 4.94 + 1.08(\Delta A)_{t-1} \quad r^2 = .400 \\ (.24)$$

The quantity theory result indicates that in each quarter GNP (Y) will increase \$5.6 billion (at annual rates) plus \$3.9 billion for every \$1.0 billion increase in the stock of money (M) three quarters previously.⁹ The number in brackets (.69) is a measure of the degree of error in this estimate. As it is only about one-sixth the value of the coefficient (3.94), one can be reasonably confident that the relationship is statistically significant. The coefficient of determination (r^2) indicates that 55 per cent of the variance in (ΔY)_t could be explained by changes in (ΔM)_{t-3}.¹⁰

⁹The three-quarter lag in the quantity theory and the one-quarter lag in the income-expenditure theory are based on best statistical fit.

¹⁰Using the broader definition of money (M2), the relation between (M) and (Y) is even closer. Changes in ($\Delta M2$)_{t-3} explain 67 per cent of the variance in (ΔY).

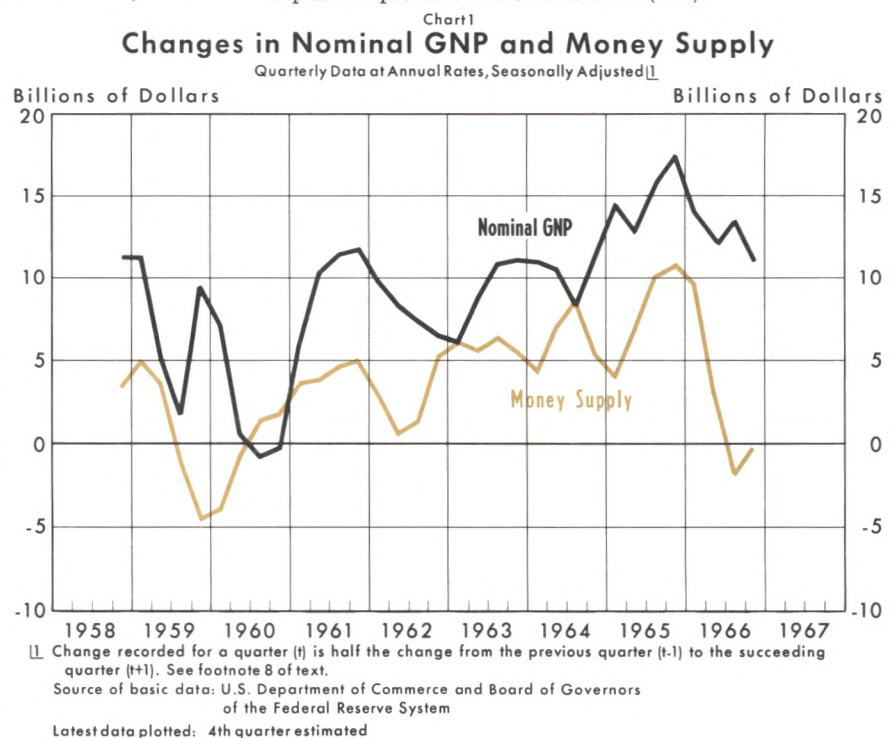
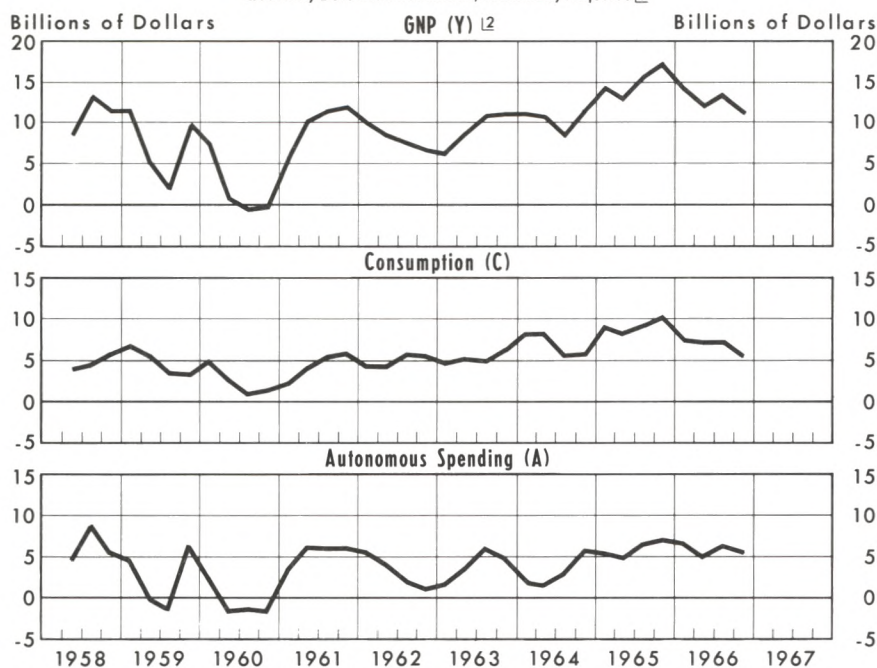


Chart 2
Changes in GNP, Consumption, and Autonomous Spending

Quarterly Data at Annual Rates, Seasonally Adjusted¹



¹ Change recorded for a quarter (t) is half the change from the previous quarter (t-1) to the succeeding quarter (t+1). See footnote 8 of text.

² $Y = C + A$

Source of basic data: U.S. Department of Commerce
Latest data plotted: 4th quarter estimated

The income-expenditure theory result indicates that in each quarter GNP increases \$4.9 billion plus \$1.1 billion for every \$1.0 billion increase in autonomous spending (A) in the previous quarter. This coefficient is also statistically significant and 40 per cent of the change in $(\Delta Y)_t$ can be explained by changes in $(\Delta A)_{t-1}$.

In Charts 1 and 2 turning points can be observed in each series.¹¹ In Chart 1 the upper turning points in the money time series generally occur in the same quarter as the upper turning points in the income series. On the other hand, the lower turning points in money lead the lower turning points in income by two to three quarters. One possible implication of this is that GNP responds promptly to a decline in a monetary variable but responds sluggishly to an increase. Even quite small movements in GNP appear to be associated with small movements in money. The moderate deceleration in money in the middle of 1962 is related to the moderate deceleration in GNP in late 1962 and early 1963. On the other hand, larger

movements in GNP are associated with large movements in money. For example, the sharp deceleration in money in late 1959 and early 1960 compared with a sharp deceleration in GNP in mid- and late 1960.

Changes in autonomous expenditures (A) are related to changes in GNP (Y) and consumption (C) in Chart 2.¹² In this case there is also a similarity between the movements in the time series, with (A) slightly leading (C). The major deceleration in autonomous spending from the second quarter of 1960 to the fourth quarter of 1960 compares with the deceleration in consumption spending from the third quarter of 1960 to the first quarter of 1961. The acceleration in autonomous spending beginning in the first quarter of 1961 compares with the acceleration in consumption and GNP from the second quarter of 1961. Complementary movements

between these two series are observed for other time periods. There is, however, one case where a deceleration in autonomous spending (from the third quarter of 1962 to the first quarter of 1963) was not associated with any significant deceleration in the growth of consumption spending.

1967 GNP Forecasts

To forecast national income for 1967 on the basis of the two theoretical frameworks requires a projection of the course of money and autonomous spending during 1967. The best statistical fit observed between money and GNP over the last eight years was with changes in money three quarters before the changes in GNP. Thus, on the basis of currently available information the quantity theory would indicate that, given the decline in the stock of money through the fourth quarter of 1966, it is highly probable there will be a substantial slowdown in the growth of GNP at least until the third quarter of 1967. Given the stock

¹¹ The turning points or peaks and troughs in the first difference series are not the same as business cycle turning points as determined by the National Bureau of Economic Research. NBER business cycle turning points are determined from a number of factors, but they are influenced heavily by the level of income. One would expect the NBER turning points to occur after turning points described here because a deceleration in income generally occurs before a decline in income.

¹² We cannot compare statistically the relationship between autonomous spending (A) and GNP (Y) in the same time period because (A) is a component of (Y). Variations in autonomous spending would lead to variations in income not because of the causal link postulated in the theory but because of a statistical artifact. To avoid this problem, (A) can either be related to the other component of income which, in this case, is consumption spending (C), or (A) can be related to (Y) with a time lag. The second possibility is considered here and the first is considered in the Appendix.

of money through 1966, continuation of the average relationship between money and GNP which has existed over the past eight years would imply a growth in nominal GNP of about \$22 billion (at an annual rate) from the fourth quarter 1966 to the third quarter 1967. This is about one-half the rate of growth for the same period in 1966. To estimate GNP for all of 1967 requires a prediction of changes in the stock of money during the first quarter of 1967. Money declined about \$1 billion in the last half of 1966. It has shown little change thus far this year from the average of the fourth quarter of 1966. If this unchanged state continues during the rest of the first quarter of 1967, then GNP would increase about \$28 billion or 3.7 per cent from the fourth quarter of 1966 to the fourth quarter of 1967, or from \$759 billion to \$787 billion. This is much smaller than the \$55 billion or 7.8 per cent increase from the fourth quarter of 1965 to the fourth quarter of 1966.

Given the way in which the quantity theory has been stated here, there is no way of knowing how the increase in GNP in 1967 will be distributed between price increases and real increases. However, there seems to be wide agreement that even with a decline in the growth of GNP the inflationary momentum developed in 1966 will carry over into 1967 in the form of cost-push, with average prices increasing about 2.5 per cent. The growth in real output consistent with this calculation would be between 1.0 and 1.5 per cent from the fourth quarter of 1966 to the fourth quarter of 1967, down substantially from the 4.1 per cent growth for the same period in 1966. This forecast of 1967 growth in real GNP is below the growth in capacity, which is generally estimated at about 4 per cent. This implies some increase in unemployment in 1967. Milton Friedman, a major exponent of the quantity theory approach, has predicted (*Newsweek*, October 17, 1966 and January 9, 1967) that the U.S. economy would suffer a recession in 1967 on the basis of the decline in the money supply in the last half of 1966.

Forecasting 1967 GNP on the basis of the income-expenditure theory requires a projection of autonomous spending through most of 1967. This is because the best statistical relation between changes in autonomous spending (ΔA) and GNP (ΔY) is with a one-quarter time lag. To predict the course of GNP during 1967 with only a one-quarter forecasting horizon requires estimates of (ΔA) through the third quarter of 1967. Autonomous spending consists mainly of business investment and Government spending. This is why many forecasters emphasize the need to estimate these variables before any projection of GNP can be attempted. If these estimates are unreliable, the re-

sulting forecast of GNP will also be poor. But this does not imply that the theory underlying the forecast is necessarily wrong.

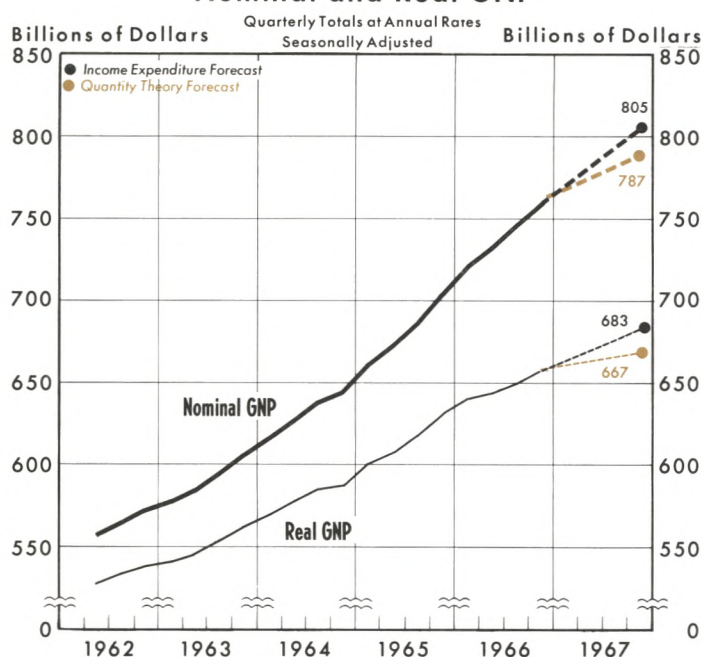
According to the Department of Commerce-SEC Survey of Business Intentions released in December 1966, investment in 1967 will be 7 per cent above the 1966 level. The increase from the fourth quarter of 1966 to the fourth quarter of 1967 will be smaller (perhaps a 4 per cent increase). On the other hand, Government spending, especially because of the Vietnam War, is estimated in the budget to be about 13 per cent or \$16 billion higher in the fourth quarter of 1967 than in the fourth quarter of 1966. The export surplus should also be larger. On the assumption of no significant increase in tax rates,¹³ the sum of all of this autonomous spending should grow at a healthy, though somewhat reduced, rate in 1967 as compared with 1966. This would imply a fourth quarter to fourth quarter increase in GNP of \$45 to \$50 billion, about 6.5 per cent. Making the same assumption about prices as in the discussion of the quantity theory, this forecast would imply growth in real output of approximately 4 per cent. This is the same as the rate of growth in capacity. Consequently, the labor market will continue to remain tight, with the unemployment rate at 4 per cent or below. Professor Lawrence Kline of the University of Pennsylvania, a leading exponent of the income-expenditure school, has constructed an econometric model of the U.S. economy. The output of this model as reported in the December 3, 1966 issue of *Business Week* is a \$48 billion or 6.3 per cent increase in nominal GNP from the fourth quarter of 1966 to the fourth quarter of 1967. A Michigan University econometric model, also based on the income-expenditure theory (the published results of which are only available on a calendar year basis), gives similar results.

These alternative forecasts can be presented graphically. In Chart 3 they are represented as projected movements in the level of real and nominal GNP. The preliminary value of nominal GNP for the fourth quarter of 1966 is \$759 billion. The quantity theory would forecast GNP to grow to the level of \$787 billion by the fourth quarter of 1967. The income-expenditure theory would forecast growth to a level of about \$805 billion. Similar projections are shown for real GNP in 1958 prices. In Chart 4 the alternative forecasts are presented as projections of per cent

¹³In the January 10, 1967 State of the Union Message the President proposed a 6 per cent surtax on personal and corporate income effective July 1, 1967. Even if adopted as proposed, the effect on GNP estimates for 1967 as a whole would probably be small.

Chart 3

Nominal and Real GNP



changes in real and nominal GNP. As these forecasts are on a fourth quarter-to-fourth quarter basis, the projection into 1967 must be viewed as an average value during the year rather than as a specific estimate of growth in the fourth quarter of 1967.

The year 1967 will provide an interesting testing ground for the predictability of the quantity theory as against the income-expenditure theory. These two views of the determination of GNP have been consistent with each other during the present business cycle. Each has predicted about the same movement in GNP. However, with the recent decline in the stock of money, the quantity theory predicts a substantial decline in the growth of GNP and the emergence of some unemployment. The income-expenditure theory, on the other hand, predicts only a moderate lessening in inflationary pressures, with real output growing at roughly the same rate as capacity. Depending upon the actual course of events in 1967, one theoretical view or the other will be given substantial empirical support.

The Middle Ground

The two theories discussed above represent extreme statements about the determinants of GNP. One says that GNP is determined in the short run only by financial factors (money). The other states that GNP is determined only by autonomous real factors. These strongly divergent views reflect a real division of opinion in the economics profession as to the fundamental forces which determine short-term move-

ments in GNP.

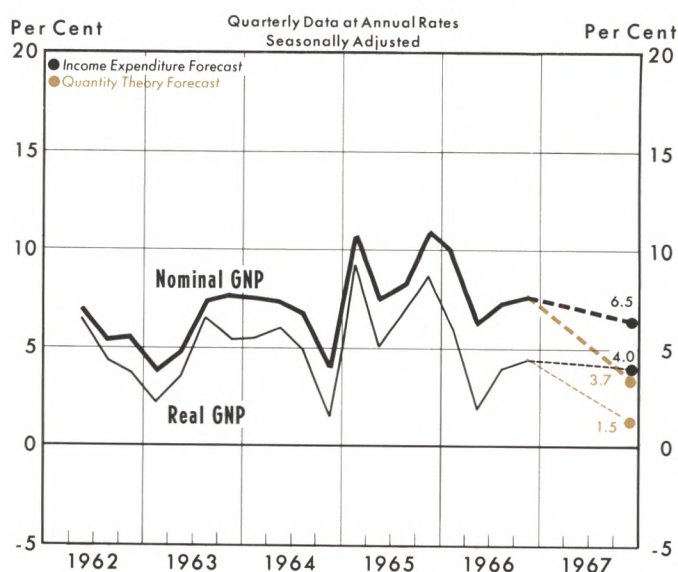
It should be kept in mind, however, that there is also a trend towards synthesizing these two theoretical views. A large middle group of professional economic opinion holds that both financial and autonomous real factors play a role in jointly determining GNP. When changes in money (ΔM) and autonomous spending (ΔA) are simultaneously used in an equation to determine quarterly changes in GNP (ΔY), the results are as follows:

$$3. \Delta Y_t = 4.00 + 2.52 (\Delta M)_{t-3} + .670 (\Delta A)_{t-1} \\ (.80) \quad (.241) \quad r^2 = .658$$

According to equation 3, quarterly changes in GNP (ΔY)_t will equal \$4.0 billion (at an annual rate) plus \$2.5 billion for every \$1.0 billion increase in money three quarters previously plus \$0.7 billion for every increase of \$1.0 billion in autonomous spending one quarter previously. The values of the coefficient for (ΔM) and (ΔA) are both significant in a statistical sense and the equation explains 66 per cent of the variance in (ΔY)_t. It should be noted that equation 3 explains a greater per cent of the variance in GNP (ΔY) than either the quantity theory or the income-expenditure theory separately. Proponents of the synthesis view might argue that this is because it reflects the real-world situation more accurately.¹⁴

Chart 4

Changes in Nominal and Real GNP



¹⁴ An alternative explanation is that (ΔM)_{t-3} determines (ΔA)_{t-1} and (ΔY)_t. Therefore, including (ΔA)_{t-1} as one of the determinants of (ΔY)_t is an indirect way of counting (ΔM)_{t-3} twice. This possibility is supported by the results of another statistical test. The partial correlation coefficient between (ΔM)_{t-3} and (ΔY)_t holding (ΔA)_{t-1} constant is 0.769. The partial correlation coefficient between (ΔA)_{t-1} and (ΔY)_t holding (ΔM)_{t-3} constant is 0.486. Thus, the independent contribution of (ΔA)_{t-1} to (ΔY)_t is relatively small.

This synthesis would not view either monetary or fiscal policy as the dominant tool of Government action to the exclusion of the other. Rather, it would consider that there is a possible mix of monetary and fiscal policies which can simultaneously achieve desired levels of income.

The most likely reason for the existence of the divergent theories described above is that one theoretical approach or the other may do a superior job of explaining short-term movements in GNP depending upon factors which are not explicitly considered in either theory. For example, during the 1930's business expectations of the future were so badly impaired by the depression experience that even large changes in financial variables like money, bank

credit availability, and interest rates would not be sufficient to induce new investment and consumption. In this case, the income-expenditure theory would seem to provide a superior explanation of short-term movements in GNP. On the other hand, at other periods when business expectations of the future are buoyant, as the last five years, the major restriction on new investment and consumption is the availability of money and credit, which would make the quantity theory a superior explanation. At still other times, business expectations may be between these two extremes, in which case a mix or synthesis of the two theories may provide the best explanation of short-term movements of GNP.

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APPENDIX

The method of testing the respective theories of income determination used here is similar to one originally devised by Milton Friedman and David Meiselman in an article published in 1963 as "Research Study Two: The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States, 1897-1958" in *Stabilization Policies*, one of a series of research studies prepared for the Commission on Money and Credit. The purpose of that study was to test empirically the stability of the fundamental behavioral assumptions underlying each theory. To do this, they selected definitions of GNP (Y), autonomous spending (A), consumption (C), and money (M) which seemed to them most appropriate to that task. Since publication of that study there has been much controversy within the economics profession¹ regarding the appropriateness of using a single-equation model to test competing theories and also regarding the appropriate definitions of major variables. The purpose of this article is not to test these theories but only to consider their use as forecasting tools. We have used the definitions of (Y), (A), (C), and (M) which are most widely recognized by the general public although they differ in important respects from the definitions used by Friedman and Meiselman.

¹ See *American Economic Review*, September 1965, "The Relative Stability of Monetary Velocity and the Investment Multiplier," by Albert Ando and Franco Modigliani; "Test of the Relative Importance of Autonomous Expenditures and Money," by Michael DePrano and Thomas Mayer; "Reply to Ando and Modigliani and to DePrano and Mayer," by Milton Friedman and David Meiselman. Also see *Review of Economics and Statistics*, November 1964, "Keynes and The Quantity Theory: a Comment on the Friedman-Meiselman CMC Paper," by Donald D. Hester, and "Reply to Donald Hester," by Friedman and Meiselman.

Each theory is presented as a single-equation model, while the true structure of the economy, and thus the structure of any model which attempts to explain the economy, is considerably more complicated. However, the use of a single-equation model of each theory may be justified for several reasons. (1) At the theoretical level these single-equation models can be thought of as representing reduced forms of a more complex structural model of the economy. The intermediate links between the fundamental causal factors (money or autonomous spending) and GNP are netted out. (2) The causal differences between each theory as presented here are sufficiently large (one emphasizing financial factors and the other real factors) that as a first approximation a very crude single-equation model may distinguish between them. (3) As a practical matter, an economic model used just for forecasting future income can be simpler than a model designed to explain the structure and interrelationships of the economy.

The measure of aggregate economic activity used here as a forecasting target is GNP. The use of gross national product rather than net national product, national income, or disposable income can be criticized for a variety of theoretical and statistical reasons. The major justification for using GNP is that it is the most publicly recognized aggregate measure of economic activity. It is also the most widely forecast value of aggregate economic behavior, and results obtained here can be compared with other forecasts. If this article were designed to test the theoretical and empirical "correctness" of these two theories (which, it should be noted, is not the case), then some measure other than GNP might have been superior.

There has been relatively little controversy among professional economists about the procedures for testing the significance of the quantity theory, with the possible exception of discussion of the appropriate definition of money (see footnotes 6 and 10 in the text). However, with respect to the income-expenditure theory, a major problem is the method of specifying what is autonomous spending and what is induced spending. It is difficult, if not impossible, to distinguish statistically which components of income are induced and which components are autonomous. Some elements in personal consumption, like durable goods, are only weakly related to current income. On the other hand, some part of business investment is induced by changes in current income. In this article all consumption is considered induced and all investment is considered autonomous.

A related problem is the treatment of imports and taxes in the analysis. Although neither of these items appears explicitly, both are included implicitly and their inclusion complicates the distinction between autonomous and induced spending.

The value of GNP in the national income accounts does not include taxes directly. Imports, however, are netted against exports. That is, GNP is defined as

$$1. Y = C + Ig + G + (X - Im)$$

$Y = \text{GNP}$

$C = \text{Consumption}$

$Ig = \text{Gross business investment}$

$G = \text{Government spending}$

$X = \text{Exports}$

$Im = \text{Imports}$

It is necessary to define induced and autonomous spending in such a way that their sum will equal GNP (Y). Considering these problems, induced spending (I) and autonomous spending (A) have been defined as follows:

$$2. I = C$$

$$3. A = Ig + G + (X - Im)^2$$

This problem of adjusting the values of (I) and (A) to make them consistent with (Y) will arise no matter what definition of income is used. Because this adjusting process is rather arbitrary, reasonable men could disagree with the specific adjustments used. The rationale for the adjustments made here are given in the two following paragraphs.

Imports are already included in the recorded value of consumption, investment, and government spending. Thus, the major behavioral role of imports broken down according to its induced and autonomous components is already included in other values. The value of (I) is not biased by excluding imports. However, by netting all imports against (A) we are introducing some element of induced spending which makes this measure of (A) less accurate than would be ideal, although its quantitative importance is not likely to be large.

²Some very minor additional items which are part of GNP are included in A .

To the extent that rates are unchanged, taxes are dependent upon changes in income, and their effect is thereby reflected in consumption (C). However, changes in tax rates are an important discretionary tool of fiscal policy. Therefore some measure of their effect on consumption (C) should be included in autonomous spending (A). As a practical matter, there is no simple, clear-cut way to separate these two components of taxes. To the extent that important changes in tax structure take place, the measure of (A) is weakened, at least in the time periods during, and just after, the change in the tax structure. There was an important change in the tax structure in 1964 which makes the observed relation between (A) and (Y) or (C) weaker than was really the case. However, no major change in the tax structure is likely for 1967 so the use of (A) in forecasting 1967 will not be seriously impaired.

Another important issue with respect to the income-expenditure theory has to do with the fact that (A) is not only the theoretical determinant of (Y) but also an accounting component of (Y). That is:

$$4. Y = I + A \quad [\text{Accounting definition}]$$

Or

$$4a. \Delta Y = \Delta I + \Delta A$$

And

$$5. \Delta Y = a + b(\Delta A) \quad [\text{Theoretical assumption}]$$

Any statistical test of the theoretical relation between (ΔA) and (ΔY) would give a much closer link between the two variables than would actually be the case, because in an accounting sense (ΔA) is included in (ΔY). This problem has been handled by relating (ΔA) to (ΔY) with a one-quarter time lag which breaks the link with the accounting definition. An alternative and perhaps conceptually superior method would be to compare (ΔA) only with those components of (ΔY) which are not included in (ΔA). Because ($\Delta Y - \Delta A = \Delta I$) this would mean comparing (ΔA) with (ΔI). If

$$6. \Delta I = c + d(\Delta Y) \quad [\text{Because induced spending (I) depends upon current income (Y).}]$$

Then

$$\Delta I = c + d(\Delta I) + d(\Delta A) \quad [\text{Because (Y) can be written as (I + A).}]$$

$$\Delta I(1 - d) = c + d(\Delta A) \quad [\text{Collecting all (I) terms on the left-hand side.}]$$

$$7. \Delta I = \frac{c}{1-d} + \frac{d}{1-d}(\Delta A) \quad [\text{Dividing both sides by (1-d).}]$$

Thus, (ΔI) depends upon (ΔA).

When this relation is tested statistically, the results are as follows:

$$7a. \Delta I = 3.42 + .550 (\Delta A)_{t-1} \quad r^2 = .372 \quad (.133)$$

These results are statistically significant and almost as good as equation 2a in the text which relates (A) to (Y).

It is interesting to note that when changes in money are compared with changes in induced spending only, the results are actually superior to money related to GNP.

$$8. \Delta I_t = 3.61 + 2.13 (\Delta M)_{t-3} \quad r^2 = .591$$

(.35)

Friedman and Meiselman observed this superior relation in their study and attributed it to the fact that money should be related to permanent (rather than observed) income and that consumption or induced spending is superior to (Y) as a proxy for permanent income.

