monthly review

FEDERAL RESERVE BANK OF KANSAS CITY

Money and Stock Prices

By Robert D. Auerbach

It is frequently argued that movements in aggregate indices of common stock prices can be predicted from prior changes in the money supply. This belief has been supported by a number of statistical studies which appeared during the 1960's and early 1970's. These studies purported to show that changes in the quantity of money have an important and explicit influence on movements in equity prices. Recently, however, doubts have arisen regarding the accuracy of this simplistic linkage between money and stock prices. Underlying these doubts are concerns about certain analytical underpinnings of the linkage as well as the statistical methodologies used to support the linkage.

This article further explores the relationship between money and stock prices. The first part of the article briefly reviews and comments on some of the earlier studies that have dealt with this relationship. The second part offers additional empirical evidence on the relationship in an attempt to correct some of the deficiencies of earlier studies. In general, the results presented here indicate that, while money is related to stock prices, the relationship is much weaker than claimed in some earlier studies. Also, changes in stock prices are found to be statistically related to both current and future changes in the money supply but not to past changes in money. Thus, the common belief that stock prices can be simply predicted by prior changes in the money supply would appear to be unfounded.

A REVIEW OF EARLIER STUDIES

One of the first studies to draw popular attention to the simple relation between money and stock prices was conducted by Beryl Sprinkel in 1964.' In his book, **Money and Stock Prices,** Sprinkel used the simple quantity theory of money to explain equity asset pricing. Changes in the money supply, he held, would influence the public's desire to substitute money balances for other financial assets, including stocks. This substitution process, in turn, would generate pressures leading to changes in the prices of stocks.

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[1] Beryl W. Sprinkel, *Money* and *Stock Prices* (Homewood, Ill.: Richard Irwin, Inc., 1964).

To examine this relation, Sprinkel compared the level of an index of stock prices with a moving average of rates of change in the narrowly defined money supply (M1).[2] He then compared selected turning points in each of these two series with turning points in the business cycle. By visual examination of the data, he observed that changes in both money and stock prices led business cycle turning points. He also observed that changes in money had a longer lead time over business cycle turning points than over stock price changes. Hence, money supply changes appeared to lead stock price changes. From these observations, Sprinkel asserted:

> . . . the average lead of changes in monetary growth prior to the business cycle peak is about 19 months compared to a 4-month average lead of stock prices. Changes in monetary growth lead cyclical upturns by an average period of about 7 months, whereas stock price upturns occur about 5 months prior to business upturns on average. Therefore, changes in monetary growth lead changes in stock prices by an average of about 15 months prior to a bear market and by about 2 months prior to bull markets.[3]

There are three fundamental problems with Sprinkel's technique for relating money to stock prices and the business cycle. First, there is the problem of determining which movements in the time series data on money and stock prices are significant turning points. Visual inspection of the data, as Sprinkel has done, is less exact than other statistical techniques. The second problem concerns the determination of whether it is money or stock prices that change first. It is not clear, as evidence presented later shows, that money supply changes always precede related stock price changes. The third problem pertains to Sprinkel's use of averages, which raises the following question: Are the average time lags he finds between the change in one variable and the change in the second variable stable time lags? In other words, over repeated episodes will these lags tend to approach the same average time period? As a matter of arithmetic, it is always possible to compute an average time lag between turning points in two series that do not have synchronous turning points. However, it is not the existence of such a lag but rather the stability of the lag which supports the view that the two series are related. In view of these problems, subsequent researchers have sought to employ better statistical techniques to examine the relation between money and stock prices.

A more rigorous statistical examination of money and stock prices was made by Michael Keran in 1971.[4] He began his analysis by using the standard formulation for theoretically explaining stock prices. This formulation holds that the price of a share of common stock is equal to the present discounted value of the earnings the stock is expected to produce in the future. The standard formulation is represented by the following equation:

$$(1) \qquad SP_t = \sum_{i=1}^{\infty} \frac{E_i}{(1+r)^i},$$

where SP_t is the price of a stock at the beginning of period (t), E is expected future corporate earnings, and r is the rate of interest used to discount expected earnings. According to the formula, a rise in earnings serves to

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[2] M1 includes demand deposits adjusted plus currency in the hands of the public.

[3] Sprinkel, *Money and Stock Prices,* p. 119. Also, his "Monetary Growth as a Cyclical Indicator," *The Journal of Finance.* September 1956, pp. 333-46, presents similar methodology.

[4] Michael Keran, "Expectations, Money, and the Stock Market," Federal Reserve Bank of St. Louis *Review.* January 1971.

increase stock prices and a rise in the interest rate decreases prices.

In Keran's model, proxy variables were used as substitutes for expected earnings (E) and the interest rate (r). For expected earnings, he substituted current and past values of corporate earnings. For the interest rate, he substituted the determinants of the corporate bond rate, which he held to be current and past rates of growth of real income ($\dot{y}$), the price level ($\dot{P}$), and the real money supply (m). The level of stock prices, therefore, was expressed as a function of these variables in the following manner:

(2) $\qquad SP = f (E, y, P, m).$

Given this equation, Keran postulated that increases in real income and the price level serve to increase interest rates which, in turn, act to decrease stock prices. Also, an increase in the real money supply lowers interest rates which acts to increase stock prices. In brief, the level of stock prices was expected to be positively related to the level of corporate earnings and the rate of change in money and negatively related to the rate of change in real income and the rate of change of prices.

Using regression analysis, Keran estimated the values of his stock price equation employing quarterly data for the time period 1957-70.[5] His

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[5] The estimated equation is:

$$SP_t = -30.68 + \sum_{i=0}^{19} 4.80\ E^o_{t-i} + \sum_{i=0}^{2} 1.31\ \dot{m}_{t-i}$$
$$(9.84) \qquad (20.00) \qquad\qquad (4.14)$$

$$- \sum_{i=0}^{7} 5.37\ \dot{y}_{t-i} - \sum_{i=0}^{16} 11.96\ \dot{P}_{t-i}$$
$$(5.67) \qquad\qquad (7.93)$$

$$R^2 = .98 \qquad\qquad D\text{-}W = 1.71.$$

R^2 is the per cent of variation in the dependent variable which is explained by variations in the independent variables. The "t" statistics, enclosed by parentheses, are for the sum of the coefficients of each variable and are significant at the 95 per cent level of confidence. D-W is the Durbin-Watson statistic.

equation explained a remarkable 98 per cent of the variation in the Standard and Poor's composite stock price index. Keran also found: "A 1 per cent acceleration in real money will lead to a 1.31 per cent increase in the stock price index." He described this direct effect of money on stock prices as significant but relatively small. However, he also claimed that money has an important influence on the other variables explaining stock prices, i.e., real output, prices, and earnings. "Through this process," he concluded, "changes in money are the dominant factor, both direct and indirect, influencing stock prices."

In another study, also appearing in 1971, Kenneth Homa and Dwight Jaffee focused more explicitly on the direct relationship of money and stock prices.[6] In the context of the standard valuation formula of equation (1), they theorized that money should serve as a proxy for both explanatory variables, expected earnings and the interest rate. That is, the money supply should be positively related to corporate earnings and negatively related to the interest rate. Consequently, the level of stock prices, they felt, should be positively related to the money supply as shown in the following functional equation:

(3) $\qquad\qquad SP = f (M).$

To test this relationship, Homa and Jaffee estimated an equation that related the level of stock prices to the level of the money supply (M) and the rate of growth of the money supply ($\dot{M}$).[7] They used Standard and Poor's composite index as a measure of stock prices,

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[6] Kenneth E. Homa and Dwight M. Jaffee, "The Supply of Money and Common Stock Prices," *The Journal of Finance*, December 1971.

[7] Their estimated equation is:

$$SP = -26.77 + 0.61\ M_t + 3.14\ \dot{M}_t + 1.46\ \dot{M}_{t-1} + 0.87 u_{t-1}$$
$$(1.11)\ \ (4.13) \quad\ (3.16) \quad\ (1.46)$$

$$R^2 = .968 \qquad\qquad D\text{-}W = 1.82$$

M1 as a measure of money, and employed quarterly data for the period 1954-69. Homa and Jaffee were able to explain as much as 96 per cent of the variation in stock prices by using the nominal money supply as the only explanatory variable.

The surprisingly high degree of explanatory power obtained in the tests by both Keran and Homa and Jaffee are suspect, however, due to their statistical methodologies. Both of these studies suffer from a common problem in the statistical analysis of variables. This problem arises when an attempt is made to quantify the relationship between variables that are marked in their time series behavior by a common long-run trend and by common movements during business cycles. Adequate procedures must be employed to carefully take account of these common trends and cycles in the variables; otherwise, statistical tests may tend to support a close relationship between the variables even though they are basically unrelated.

To illustrate this point, the following test was conducted. An artificial series having no economic significance was constructed by adding a series of random numbers to a simple trend variable. This artificial series was then used in a regression test to explain the quarterly levels of stock prices (again measured by the Standard and Poor's index) from 1959 through 1974. The results showed that this single artificial variable was able to explain 86 per cent of the change in stock prices.[8] The finding that such an artificial variable can explain nearly as much of the variation in stock prices as obtained in the previous studies underscores the possibility of producing results

that are statistical illusions when trends in the data are ignored.[9]

A further problem with the studies by Keran, Homa and Jaffee, as well as by Sprinkel, is that they only tested one-way causation with money predicting future changes in stock prices. They did not consider that changes in stock prices may lead changes in money. This latter sequence is embodied in a widely accepted view regarding the determination of stock prices known as the "efficient market hypothesis."[10] According to this hypothesis, the stock market is said to be efficient in that stock prices are determined by market participants on the basis of all available information. The stock market also is said to be efficient in that the adjustment of stock prices to new information is so rapid that it can be treated as being almost instantaneous. Taken together, these conditions mean that if the public "expected" a change in the money supply to occur that would ultimately affect price levels, corporate profits, etc., the public would immediately buy and sell stocks at prices that take account of these expected effects. That is, expected changes in money would immediately be discounted into the prices of stocks. Consequently, if subsequent changes in money were to occur as

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[8] With the artificial series denoted by X, and the trend variable at an annual rate of 2.5 per cent, the estimated equation is:

$$SP = -49647\ 3 + 0\ 11\ X$$
$$(18.74) \qquad R^2 = 86.$$

[9] Further criticism of Keran's work is made by Merton H. Miller, "Discussion." *Pupers and Proceedings of the 13th Annual Meeting of the Americun Finance Association. The Journal of Finance,* May 1972, pp. 294-98; and James E. Pesando, "The Supply of Money and Common Stock Prices: Further Observations on the Econometric Evidence," *The Journal of Finance,* June 1974, pp. 904-21. Pesando finds that Keran's model predicts an unabated persistent decline in stock prices from 1970:3 to 1972:2 while stock prices actually rose in the second half of 1970. leveled off in 1971, and advanced in 1972.

[10] For a review of the efficient market hypothesis literature, see Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work." in *Puprrs und Proceedings of the 28th Annual Meeting of rhe American Finance Association, Thr Journal of the American Finance Association.* May 1970, pp. 383-416; and Charles D. Kuehner. "Efficient Markets and Random Walk." *Financial Analysts Handbook,* ed.. Suniner *N.* Levine (Homewood, Ill.: Dow Jones-Irwin. Inc.. 1975). pp. 1226-95.

expected, stock prices would change before and not after observed changes in money.

Another aspect of the efficient market hypothesis involves an "unexpected" change in the money supply. In this case, the hypothesis holds, when the public observes an unexpected monetary change they would immediately discount this information into stock prices. Hence, an unexpected money supply change would produce a synchronous relationship, or at most a very short lag, between money supply changes and stock prices.[11] The efficient market hypothesis; therefore, by combining expected and unexpected changes in money, holds that stock prices should tend to be related to current and future changes in money and not to past money changes.

A recent study by Richard Cooper examined the issue of leads and lags between money and stock prices.[12] Using the framework of equation (3) cited previously, which relates stock prices directly to the money supply, Cooper estimated the following equation:

$$(4) \qquad SP_t = \sum_{i=-6}^{12} a_i \dot{M}_{t-i,}$$

where SP is the percentage change in stock prices adjusted for dividend yields and M is the percentage change in money. He referred to the stock price variable as the "stock yield" since it combines the percentage change in the price of a stock with its dividend yield. Stock yields, Cooper claimed, were a better measure of returns on stocks than just the percentage change in stock prices. In brief, Cooper related the stock yield to the current percentage change

in money, to past percentage changes in money for up to 12 months, and to future percentage changes in money for up to 6 months. Using regression analysis, he estimated the relation using monthly data for the period 1947-70. Chart 1 depicts the monthly stock yields used by Cooper for the 1947-70 period.

Cooper's regression tests showed a weak relationship between stock yields and rates of change of the money supply. His estimated equation using current, past, and future percentage changes in money (M1) explained only about 7 per cent of the monthly variation in stock yields." Moreover, the money supply variable in the current period was found to be not statistically significant in explaining stock yields. This result tended to contradict the efficient market hypothesis which liolds that a synchronous adjustment of stock yields should occur if the market is efficient. Cooper also found only one of the lagged money supply variables and only two of the future money variables to be statistically significant in explaining stock yields. On the basis of these inconclusive results, Cooper concluded it was difficult to assess the significant lead and lag relationships from regression analysis.[14]

11 Transactions and decisionmaking costs may produce lags between monetary changes and stock prices.

12 Richard V. L. Cooper, "Efficient Capital Markets and the Quantity Theory of Money." *The Journal of Finance.* June 1974, pp. 887-908.

13 Cooper also tested his equation using quarterly and annual data. While the explanatory power of these tests rose somewhat relative to the use of monthly data, all of his tests were probably seriously flawed by the existence of trends in the data and nonrandom residuals. If the dependent variable, SP_t, in equation (4) above is not related to any of its prior values, which is almost the case, then it can be shown that the regression residuals may be nonrandom. Thus, a test for the randomness of the residuals must be conducted but no such test was made by Cooper.

14 Cooper then proceeded to use the more sophisticated spectral analysis technique to examine the relation of money and stock prices in the frequency domain. These results showed that stock returns led money changes but did not lag money changes. On this basis, he felt his results offered support for the concept of market efficiency. Cooper's evaluation of his spectral results, however, is somewhat doubtful due to his own admitted difficulty in interpreting the lead-lag relationships. (See Cooper, p. 898.)

Chart 1
STOCK YIELDS
Monthly, 1947-70
(Standard and Poor's Common Stock Indexes)
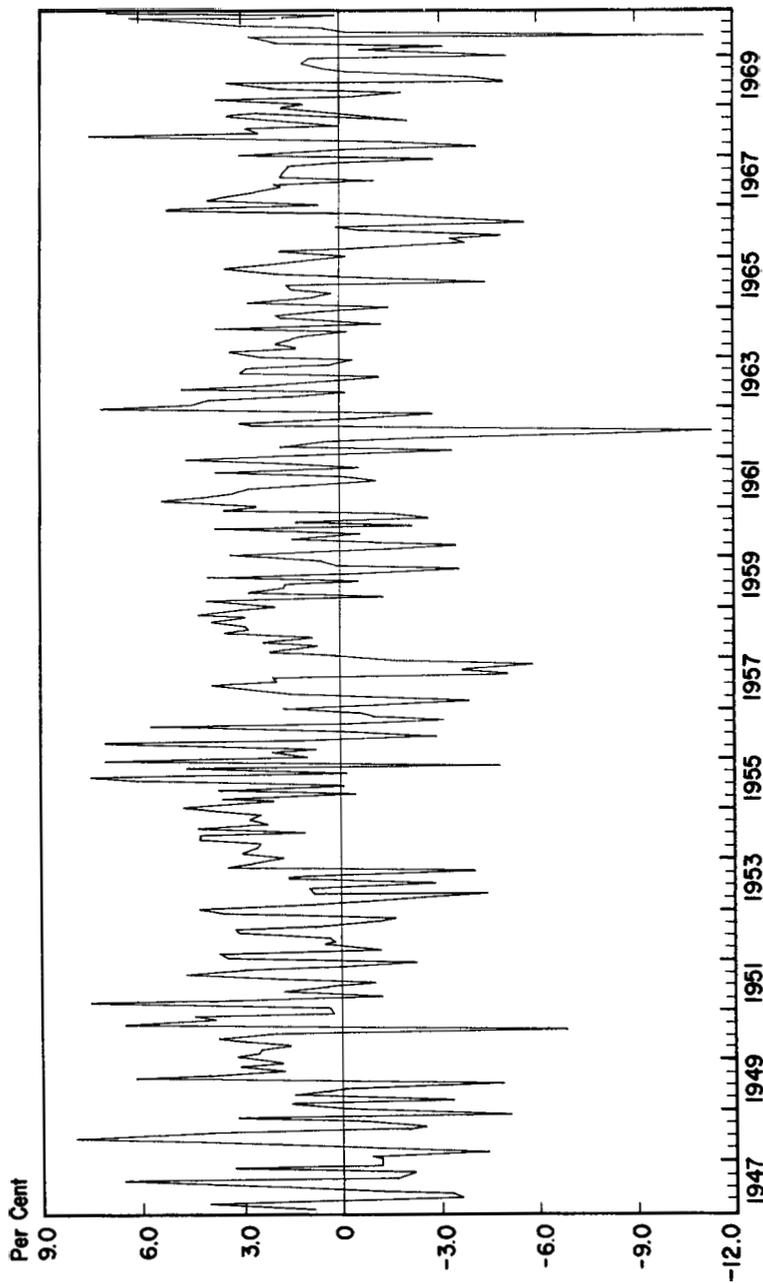
FURTHER TESTS

Results of additional tests on the relation between money and stock prices are presented in this section. As in Cooper's study, the tests explicitly examine the lead-lag relation between money and stock prices. The variables used in the tests are also the same as those used by Cooper, the stock yield and the rate of change in the money supply. M1 is used as a measure of money and stock yields are defined as the percentage change in stock prices adjusted for dividend yields.

Two modifications, however, were made in the approach used by Cooper. First, the data for the variables were examined for evidence of trends and cycles. The examination revealed that both variables contained trend and cycle elements which may have tended to bias the results obtained by Cooper. Thus, the trend and cycle components of each variable were removed.[15] Secondly, to examine the degree of association between the money supply and the stock yield, simple cross correlation tests were performed rather than regression analysis.[16] The correlation coefficient, which is a measure of the degree to which two variables are related, can vary from $+1$ to -1. For example, if two variables display little or no association the coefficient would approach zero; if there is perfect positive association the coefficient would be $+1$; and with perfect negative association it would be -1;

Using simple correlation analysis, therefore, the cross correlation was computed between the

Table 1 SIMPLE CROSS CORRELATIONS	
PERIOD	CURRENT STOCK YIELD WITH PERCENTAGE CHANGE IN M1
Synchronous	.18*
1 month prior	−.03
2 months prior	.07
3 through 60 months prior	None significantly different from zero
PERIOD	CURRENT PERCENTAGE CHANGE IN M1 WITH STOCK YIELD
Synchronous	.18*
1 month prior	.12*
2 months prior	.20*
3 through 60 months prior	None significantly different from zero
"Significantly different from zero.	

current stock yield and the current money variable. Next, cross correlations were calculated between the current stock yield and the money variable in each of 60 prior monthly periods. Finally, to test whether stock yields lead money, the variables were reversed and cross correlations were computed between the current money variable and the stock yield in each of 60 prior monthly periods. These tests were conducted using monthly data for the period 1947-70.

As shown in Table 1, the cross correlations between the current stock yield and 60 prior values of the money variable were not statistically significant.[17] Only the synchronous

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[15] For a description of the autoregressive technique used to remove the trends and cycles, see Robert D. Auerbach and Jack L. Rutner. "Time and Frequency Domain Tests of Some U.S.-Canadian Relationships Under an Autoregressive Filter," Applied *Economics* (forthcoming). If the levels of stock prices used in the previously cited studies were transformed to first differences of its logarithmic values in an attempt to eliminate its trend, the variable would be in exactly the same form as the stock yield used by Cooper and very similar to the stock variable used in these additional tests except for the dividend adjustment.

[16] The use of simple cross correlations bypasses the statistical problems mentioned in footnote 12.

[17] A chi square statistic due to G. E. Box and David Pierce, "Distribution of Residual Autocorrelations in Autoregressive-Integrated Moving Average Time Series," **Journal of the American Statistical Association,** December 1970. p. 1510, was used to test for significance in groups. The correlations in the righthand column. .18, .12, and .20, taken as a group of three or as a group of two with the synchronous cross correlation deleted, were significant at the 99.5 per cent level. All other lagged coefficients taken in groups of three for successive cumulative tests were not significantly different from zero at the 95 per cent level of confidence.

cross correlation was statistically significant at a value of .18. When the variables were reversed to test whether stock yields lead money, the synchronous cross correlation was equal to .18, as expected. Cross correlations between the current money variable and stock yields in each of the previous 2 months also were found to be statistically significant. Specifically, stock yields 1 and 2 months in the past had significant cross correlations with the current percentage change in money of .12 and .20, respectively. Taken together, the current stock yield and the two prior stock yields serve to "explain" about 8.7 per cent of the variation in the current percentage change in money.[18]

The results of these further tests support the following conclusions:

1. Rates of change of the money supply are not related to future stock yields.

2. Stock yields are related to synchronous and future rates of change in the money supply.

3. The relation between stock yields and synchronous and future rates of change in the money supply is weak, with stock yields associated with only about 9 per cent of the variation in the money supply.

Theoretically, these findings are consistent with the efficient market hypothesis and the belief that the public is knowledgeable about a relationship between money and other variables—such as the price level—as Cooper suggested. The public tends to anticipate some money supply changes and discounts this information into stock prices 1 or 2 months before the money supply changes. Unanticipated money supply changes are discounted into stock prices in the same month as the monetary change occurs.

One reservation for this explanation of the results concerns the public's ability to forecast the monetary variable in advance. Since trends and periodicities have been removed from the money series, the public would be required to predict deviations from the trend and past periodicities. Prior values of the money supply series would provide no useful information for this forecast. It is questionable, however, that the public has the ability to predict more than a very minor component of these monetary changes. Thus, other explanations might underlie these results.

An alternative explanation is that the relationship between prior and synchronous stock yield changes and current rates of change in money is the result of actions taken by the central bank. Suppose, first, that stock yields, or some variable related to stock yields, is used by the central bank as an indicator of business cycle fluctuations. Suppose further that the central bank acts to partially accommodate movements in the cycle. Then, during an economic expansion, for example, the central bank would attempt to accommodate increased business activity by providing for an increase in the money supply. Under these conditions, stock yields would increase slightly earlier and synchronously with monetary expansion, and one would observe the findings reported in these tests.[19]

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[18] **Squaring and adding these cross correlations produce a statistic equal to .0868, which in concept is roughly equivalent to a multiple correlation coefficient in regression analysis. Since the percentage change of M1 has been prewhitened, the values of this series in different periods are approximately independent so that the simple cross correlations are similar to partial correlations. The differences in degrees of freedom for each simple cross correlation and the possibility of slight violations of the white noise hypothesis for the variables make this relationship approximate.**

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[19] **If the public also uses stock yields or a related variable to signal business cycle fluctuations in the same way as the central bank, the public would be able to forecast monetary changes and this explanation would not differ from the first explanation.**

CONCLUSION

Other studies which have reported a strong relation between money and stock prices with money supply changes related to future stock prices appear to be incorrect. These studies have probably measured the effects of common trends and cycles in each variable rather than a causal relationship between the variables. In addition, these tests may also include relationships between stock prices and future monetary changes which have been mistakenly identified as a relation between money and future stock price changes. Theoretically, these studies appear to have incorrectly assumed that the public was slow in discounting information about monetary changes into stock prices so that monetary changes precede related stock price changes. The evidence here indicates that the public rapidly discounts any useful information about monetary changes into stock prices so that past monetary changes no longer contain information about present or future stock prices.

The Federal Subsidy Picture: A Blurred Image

By Sheldon W. Stahl

If there is a negative overtone or stigma surrounding the word "subsidy" for many people today, it is interesting to reflect that such a negative attachment has not always been the case. In fact, the concept of the subsidy is almost as old as our nation itself. When the First Congress convened in 1789, its initial action was to devise a system for administering oaths of office. However, the next item of business was the enactment of a tariff law to protect and promote the new nation's agricultural and industrial development. Included in the legislation was a special subsidy feature designed to encourage the growth of an American merchant fleet. All goods imported into the United States in American vessels were to have their customs duties reduced by 10 per cent, and a tonnage tax favorable to American shipping interests was also made part of the law.

From this early beginning, the Government has used the subsidy time and again, not only to influence the pace and direction of economic development, but for diverse other purposes, including the promotion of science and the arts, and to mitigate the normal workings of market demand and supply forces when deemed desirable. Not only have their purposes varied over time, but subsidies have taken a number of different forms. For example, from 1827 to 1866, private interests were granted well over 6 million acres of public lands to stimulate the building of canals and the improvement of rivers. In addition, these same interests received right-of-way grants and public funds by means of direct Governmental contributions, stock subscriptions, and loans. Between 1850 and 1871, the railroads were granted more than 180 million acres of Federal and state lands to spur their development. Significant sums of public monies have been used to subsidize the building of ships on American ways as well as the crews that manned them. Although complaints about the U.S. Postal Service are legion, it is, nonetheless, worth noting that the first mail subsidy was paid by the Government in 1845—more than 130 years ago—and the tradition still remains in force. Indeed, the Committee on Agriculture of the U.S. House of

Representatives observed more than 20 years ago:

> While originally the subsidy mechanism was employed to expand transportation, to encourage foreign trade, and to foster domestic industrial development, more recently subsidy and subsidylike programs have multiplied to such an extent that their impact is felt by virtually all elements in the Nation's economic structure.[1]

The accuracy of the Committee's observation will be of interest in the analysis which follows. What is abundantly clear at the outset, however, is that there appears to be a growing public interest in Federal spending, of which outlays on subsidies are an integral part.

One of the more frequently recurring themes on the contemporary political scene is the size and scope of the Federal Government and its effects upon the private lives of individuals or in their roles as business or professional persons. In general, many allege that the Government is too big and that its spending has contributed mightily to the problem of inflation in this country. The relative merits of such charges continue to be argued at length with considerable vigor. If the discussants have not yet been successful in convincing each other of the rectitude of their position, at least the debate has generated one valuable consequence: The subject of Government spending is no longer confined to economists and/or those with an abiding interest in the field of fiscal finance. Rather, the topic is now one which is more generally discussed by the public at large. And, as a corollary, that same public is subjecting the spending process to closer scrutiny than ever before.

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[1] **U.S. Congress, House, Committee on Agriculture, "Government Subsidy Historical Review," 86th Congress, 2nd Sess., Committee Print, June 3, 1954, revised May 10, 1960. p. 1.**

The basic reason for the growing wave of public interest in Federal spending would appear to be reasonably straightforward. The sheer volume of spending and its apparent inexorability makes it exceedingly difficult to ignore. For example, during World War II, Federal outlays rose dramatically, increasing from less than $14 billion for the fiscal year 1941 to a peak level for that period of just under $93 billion in the 1945 fiscal year. The end of World War II brought a reversal of the growth in Federal outlays. For the fiscal years 1947 and 1948, spending fell to a range of approximately $30-$35 billion, and sizable budgetary surpluses were achieved. However, these developments were short-lived, and the period since then has been marked by continuous increases in Federal outlays. Not only have these expenditures grown almost uninterruptedly in absolute amounts--outlays for fiscal year 1977 will likely exceed $400 billion — but, as Table 1 shows, total expenditures for the various Federal sectors have claimed an increasing share of the nation's gross national product (GNP).

In the face of these developments in overall Federal spending, a closer look at the subsidy picture might appear somewhat misplaced in terms of priorities. For example, during the 3 decades shown in Table 1, outlays for subsidies represented well under 1 per cent of GNP, and accounted for the same share of GNP-O.3 per cent—in fiscal year 1977 as in fiscal year 1947. Indeed, in the last decade, the share of GNP accounted for by outlays on Federal subsidies has fallen by more than one-half. Table 2 shows those areas which receive subsidy payments. In addition, it examines those outlays annually on a fiscal year basis since 1966 and provides the data in dollar amounts rather than as a share of GNP. Yet, even when the deficits of certain business-type operations of the Federal Government such as those shown in Table 2 are added to the outlays on subsidies, the resultant totals still appear quite

Table 1
FEDERAL SECTOR EXPENDITURES
AS A PER CENT OF GNP

	Fiscal Year			
Description	1947 Actual	1957 Actual	1967 Actual	1977 Estimate
Defense purchases	4.3	9 8	8 7	5 1
Nondefense purchases	1 7	1 3	2.5	2 5
Domestic transfer payments	3.7	3.3	4 8	8.9
Foreign transfer payments	.8	4	.3	2
Grants-in-aid to state and local governments	7	9	1 9	3 2
Net interest paid	1.8	1 2	1 2	1 7
Subsidies less current surplus of Government enterprises	3	6	7	3
Total expenditures	133	175	200	220

SOURCE: **Special Analyses, Budget of the United, States Government, Fiscal Year 1977** (Washington: **U.S.** Government Printing Office, 1976), Table **A-3,** p. 12.
NOTE: Individual items may not add to totals due to rounding.

small relative to overall Federal expenditures. Thus, one might question whether those concerned with the size and scope of Federal spending might more profitably apply themselves to looking at some other, quantitatively more significant, aspect of Government spending. Is the earlier characterization of the subsidy picture by the Committee on Agriculture inaccurate, or do the data shown in Tables 1 and 2 tend to obscure the picture? In this regard, the matter of defining a subsidy is of paramount importance.

ON DEFINING A SUBSIDY

The Office of Management and Budget (OMB), which developed the data in Tables **1** and **2,** defines subsidy as "a monetary grant to a unit engaged in commercial activities." Thus, the rather modest scale of subsidy costs shown results from a narrow view of just what constitutes a subsidy. In this particular instance, nonmonetary benefits to recipients not engaged in commercial activities would not appear as subsidies for budget purposes. Such a definition is too confining given the wide

range of Government activities which benefit varying groups in our society and which can and do take forms other than monetary grants.

A single, unequivocal definition of the term "subsidy" would improve objective analysis and promote reasoned debate. Unfortunately, most attempts to establish such an analytical frame of reference founder because, like beauty, subsidy is often in the eye of the beholder. Thus, proponents of some program designed to aid a particular industry, enterprise, or group in society tend to invoke such terms as "incentives," "assistance," or "in the national interest" to describe their aims. The term "subsidy" is notable largely by its absence in most legislative proposals. It should not be surprising, therefore, to note that opponents of a particular program often invoke the word subsidy to brand the program as wasteful or of dubious benefit to the taxpayer. In short, the pursuit of reason all too often is subordinated to appeals to emotion where subsidies are concerned. Therefore, the staff of the Joint Economic Committee of the **U.S.** Congress (JEC) is to be applauded for their efforts in attempting to develop an analytically clear and operationally useful definition as a first and necessary step in the assessment of Federal subsidy programs. Their work, entitled "The Economics of Federal Subsidy Programs," was published in January **1972,** and a number of the observations which follow have been drawn from it.

Viewed from an analytical rather than an emotional perspective, a number of major characteristics of subsidies can be identified. Few would disagree that a subsidy involves a transfer of income either between Government and the private sector or between groups within the private sector. Furthermore, the transfer imposes costs upon the donor. The form of income transfer may involve money or some monetary equivalent. In either case, the increase in income by the recipient enhances his or her ability to satisfy economic demands

Table 2
SUBSIDIES LESS CURRENT SURPLUS OF GOVERNMENT ENTERPRISES
(In Billions of Dollars)

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
	Actual										Estimates	
Subsidies												
Commodity Credit Corporation	2 0	3 1	2 6	3 0	3 1	3 6	3.0	4 0	2.4	6	3	.4
Maritime . . .	.3	3	3	3	3	4	.4	4	4	.5	6	7
Housing (HUD)	2	3	3	4	5	8	1 3	1 7	1.9	2 1	2 4	3 0
Railroad.	–	—	–	–	–		.1	1	1	.5	.7	5
Small Business Administration .	–	–	–	—	–	–	—	7	•	–	–	—
Other (mainly Agriculture)	5	6	6	5	4	.4	.4	4	.3	5	3	.2
Subtotal . .	3 1	4 2	3 7	4 2	4 4	5 2	5 2.	7 3	5 2	4 2	4 3	4 8
Enterprise surpluses (−Ior deficits												
Commodity Credit Corporation	1 6	7	3	5	6	6	6	1 3	1 5	3	4	3
Postal Service . .	8	1 0	9	9	1 3	2 0	1 4	1 3	2.0	2.1	2 4	1.7
Tennessee Valley Authority	– 1	–.1	– 1	– 1	– 2	– 2	– 2	– 2	–.3	– 4	– 3	–.4
Federal Housing Administration	– 2	– 2	– 2	– 2	– 2	– 3	– 3	– 3	– 1	– 1	•	– 1
Federal Deposit Insurance Corporation	– 1	– 1	–.I	– 1	– 1	– 1	– 2	– 1	– 1	–.2	– 2	–.2
Federal Savings and Loan Insurance Corporation	– 1	– 1	– 1	– 1	– 1	– 1	– 1	–.I	– 2	– 2	– 2	–.2
All Other† . .	– 2	– 3	– 3	– 3	– 2	– 3	•	– 1	– 2	– 1	– 2	– 2
Subtotal. .	1 7	1 0	4	4	1 1	1 7	1 2	1 8	2 7	1 5	1.9	9
Total subsidies less current surplus	4.8	5 2	4 1	4 6	5 4	6 8	6 4	9 1	7 9	5.7	6 2	5 6

'Less than $50 million.
†Includes impact of retroactive pay raises.
NOTE: Excludes the transition quarter.
SOURCE: Special Analyses, Budget of the United States Government, Fiscal Year 1977 (Washington: **U.S.** Government Printing Office, 1976), Table **A-7,** p. **21.**
NOTE: Individual items may not add to totals due to rounding.

or desires. A second characteristic of subsidy is that, insofar as a transfer of income occurs, it is a one-way transfer. This aspect of a subsidy undoubtedly has caused many people to view subsidy programs simply as giveaways, a view undoubtedly reinforced by another characteristic of subsidies. Subsidies are restricted in nature and accrue to a special group—a subgroup of the private sector—rather than to the public at large. This feature, in part, distinguishes them from the provision of free public services or public goods. For by its nature, a public good such as national defense cannot be provided solely to some special group in society; when it is provided to any one member of society, it is provided to all.

It was noted earlier that the subsidy device has been used to mitigate the normal workings of market demand and supply forces when it was deemed desirable. In other words, a subsidy is intended to directly influence the pattern of production and consumption in the private economy in a manner the Government may wish. More specifically, a subsidy involves a Government action that serves to modify, but not eliminate or take the place of, private market activities or prices. Thus, a fourth characteristic of a subsidy is that it seeks to

change some particular private market behavior without doing away with the market. By use of the subsidy, price-cost relationships in the market are changed, and as a consequence, market participants have incentives to behave differently. It is important to remember, however, that despite the fact that the subsidy may take the form of a one-way grant from the Government, it is the private marketplace utilizing the pricing mechanism which carries out the economic activity associated with the subsidy. This role of the private market serves further to contrast subsidy programs with free public services or public goods. For as noted by the JEC:

> **. . .** Usually, then, a free government service is an economic activity that takes the place of the private market, represents government ends rather than means, and operates through the rule-making of a bureaucracy rather than the price system—all characteristics that tend not to be associated with subsidies **. . . .**[2]

This market-modifying aspect of subsidies is associated with a fifth and related subsidy characteristic. The notion that subsidies generate incentives to alter particular market behavior suggests that wherever a subsidy is tied to a particular market, the recipients of the subsidy must give some *quid* pro quo. The subsidy requires an alteration in market performance--either increased or decreased output or sales, or, increased or decreased use of a particular good or service or productive factor. Without such alteration, the subsidy does not apply even though the person may be a part of the market to which the subsidy is tied. For example, farmers who chose to limit their acreage would be the beneficiaries of crop

support payments, while those who did not do so would not share in the program benefits. It is this expectation of performance in return for the subsidy that serves to distinguish subsidies from welfare payments. A welfare payment, such as to an indigent, is not conditional upon some increase or decrease in a particular market activity. Instead, payment is given solely to raise the level of income of people with certain characteristics such as **being** out of work, infirm, or below some specified income level.

This criterion of performance which distinguishes subsidy from welfare is of crucial importance in evaluating the extent to which a particular program is succeeding. Indeed, it is this expectation of a modification or alteration in some specific private sector performance which both the Government and the taxpaying public expect in return for the transfer of income through the subsidy. If there is no *quid* pro *quo* forthcoming from the recipient, such an income transfer should be more properly labeled welfare. This is not to imply that one category of public outlays is better than another, but rather that confusion between the two is often the fault of applying inappropriate standards for evaluation. The public has a right to expect performance in return for a subsidy; that is its justification, the benefit in return for the cost. In the absence of such performance, the subsidy program should be reevaluated to determine if the objects of the subsidy should instead be more appropriately objects of a welfare program.

From the preceding discussion, it should be clear that there is a wide variety of ways by which the Government can effect income transfers. It should be equally clear that not all such transfers should be regarded as subsidies, and that any meaningful definition of the term should encompass those characteristics which have some reasonable degree of economic merit. By these standards, the definition used by the **OMB** and cited earlier is far too

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[2] U. S. Congress, *The Economics of Federal Subsidy Programs,* **92nd Congress, 1st Sess.. Joint Committee Print. January** 11, **1972, p. 14.**

restrictive. Given the preceding analysis dealing with the matter of definition, the proposal of the JEC appears to represent a far better alternative:

> . . . a subsidy is defined as the provision of Federal economic assistance, at the expense of others in the economy, to the private sector producers or consumers of a particular good, service or factor of production. The Government receives no equivalent compensation in return, but conditions the assistance on a particular performance by the recipient—a quid pro quo—that has the effect of altering the price or costs of the particular good, service, or factor to the subsidy recipient, so as to encourage or discourage the output, supply, or use of these items and the related economic behavior.'

And, in contrast with the explicit cash payment nature of a subsidy as set forth by the OMB, the JEC definition also specifies that:

The assistance may take the form of:
(a) Explicit cash payments;
(b) Implicit payments through a reduction of a specific tax liability;
(c) Implicit payments by means of loans at interest rates below the Government borrowing rate or from loan guarantees;
(d) Implicit payments through provision of goods and services at prices or fees below market value;
(e) Implicit payments through Government purchase of goods and services above market price; and
(f) Implicit payments through certain Government regulatory actions that alter particular market prices.[4]

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3 See Joint Committee Print, January 11, 1972, p. 18.
4 *Ibid.*

ANOTHER LOOK AT SUBSIDY COSTS

The efforts of the JEC bore fruit in the form of estimates of Federal subsidy costs more in keeping with its expanded definition of the subsidy concept. These data are shown in Table 3 for the fiscal years 1970 and 1975. However, several observations are in order' before assessing the totals. According to the Committee, its accounting for direct cash subsidies, tax subsidies, and credit subsidies is reasonably complete. Accounting estimates of benefit-in-kind subsidies are described as "csnsiderable, but not complete." Because of the difficulty in generating reliable quantitative estimates, there is no accounting of Government subsidies arising from Government purchases of goods and services at above market prices—so-called purchase subsidies.[5] Similarly, regulatory subsidies are also excluded from the estimates in Table 3.[6] Finally, the estimates shown exclude certain types of Federal assistance either held to be nonsubsidy or beyond the Committee's scope, such as some Government outlays for research and development, subsidies implicit in international tariffs and quotas, Federal grants to state or local governments used to provide general benefits rather than benefits to a specific class or group of recipients in the private sector, most public work expenditures,

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5 For additional discussion of purchase subsidies, see Joint Committee Print, January 11, 1972, p. 40.
6 The term "regulatory subsidies" is not typically associated with the issue of Government subsidies, since neither money nor payments-in-kind are extended by the Government. However, it is the Government's power to set prices, to restrict entry, and to require service that makes the subsidy possible. Despite the difficulty in quantifying these costs, the fact that they exist and their pervasiveness in the economy should be noted. Indeed, the 1975 *Economic Report of the President* devoted a full chapter to the subject. For a further excellent analytical treatment of this subject, see Richard A. Posner, "Subsidization by Pricing in the Regulated Industries," in *The Economics of Federal Subsidy Programs.* 92nd Congress, 2nd Sess., Joint Committee Print. May 8, 1972. pp. 41-54.

The Federal Subsidy Picture:

Table 3
SUMMARY OF FEDERAL SUBSIDY COSTS
(In Billions of Dollars)

	Direct Cash Subsidies		Tax Subsidies		Credit Subsidies		Benefit-in-kind Subsidies		Total Order of Magnitude	
Fiscal Year	1970	1975	1970	1975	1970	1975	1970	1975	1970	1975
Agriculture	4.4	.6	.9	1.1	.4	.7	—	—	5.7	2.5
Food	—	—	—	—	—	—	1.5	5.9	1.5	5.9
Health	.8	.6	3.2	5.8	—	—	4.6	10.2	8.6	16.6
Manpower	2.0	3.3	.6	.7	—	—	1	.1	2.6	4.1
Education	1.9	5.0	.8	1.0	1	1	.4	.4	3.2	6.5
International	1	—	.3	1.5	.6	.9	—	—	1.0	2.4
Housing	.1	1.7	8.7	12.9	3.0	1.1	—	—	11.7	15.7
Natural resources	1	.1	2.0	4.1	—	—	1	.1	2.1	4.4
Transportation	.3	.6	—	.1	—	—	.2	1.7	.5	2.3
Commerce	2.0	.3	14.1	19.3	.1	—	1.8	1.9	18.0	21.5
Other	—	—	9.4	13.1	1	1	—	—	9.5	13.2
Total order of magnitude	11.6	12.3	39.9	59.7	4.1	2.9	8.8	20.2	64.4	95.1

NOTE: Individual items may not add to totals due to rounding.
SOURCE: Federal Subsidy Programs, Joint Economic Committee (Washington: U.S. Government Printing Office, 1974), p. 5.

and subsidies provided in connection with defense procurement. Thus, even though the data in Table 3 may indicate a much larger element of subsidy costs than shown in earlier estimates, they still might be regarded as somewhat conservative in light of the exclusions noted above.

Table 3 reveals the wide difference in estimates of subsidy costs by the **JEC** as compared to those cited earlier. In fiscal year 1970, the order of magnitude of subsidy costs shown in the budget was $4.4 billion, or $5.4 billion including Government enterprise deficits. As estimated by the **JEC,** those costs exceeded $64 billion. For the 1975 fiscal year, they were essentially unchanged in the budget. As seen in Table 3, however, they had increased nearly 50 per cent, to $95 billion, according to **JEC** estimates. While these aggregate change figures are notable in themselves, the varying trends among the

different types of subsidy expenditures are of particular interest.

Direct cash subsidies represent cash payments from the Government to a firm or individual in the private sector engaged in a market activity as specified in the subsidy legislation. Among these activities are housing construction, school attendance, and production of certain crops, to name just a few. Overall, this type of subsidy showed very little change, rising from $11.6 billion in 1970 to $12.3 billion in 1975. Within this category, however, subsidies to agriculture fell dramatically, as did cash subsidies to the commerce category involving such programs as community action, model cities, and urban renewal and neighborhood development. The education category rose from less than $2 billion to $5 billion largely as a consequence of increased outlays for veterans' education and basic education opportunity grants. Other large

gains occurred in manpower — through increased manpower revenue sharing outlays— and in housing, primarily as a result of increased cash subsidies for public housing assistance.

Credit subsidies arise whenever the Government enters into a loan transaction with the effect of lowering the rate of interest below that which the borrower would otherwise have to pay. They may take the form of a straight cash payment to offset part of the interest cost of the loan; they may involve a direct loan from the Government at lower interest rates than the borrower could obtain in the private market; or they can utilize a Government guarantee or insurance of a loan to effectively lower the risk of default and thereby the rate of interest obtainable by the borrower. Overall, these credit subsidies fell from about $4 billion in 1970 to less than $3 billion in 1975. This drop was largely the result of declines in the housing category traceable to reduced assistance for mortgage insurance and low-rent public housing programs.

In contrast with stable to declining outlays for the direct cash and credit subsidies, benefit-in-kind subsidies increased during this same period nearly 130 per cent—from less than $9 billion in 1970 to over $20 billion in 1975—while tax subsidies rose $20 billion to nearly $60 billion. When the Government sells to the private sector a good or service at a price below the prevailing market price or below its actual cost in the case where a private market may not exist, a benefit-in-kind subsidy arises. One of the most notable examples is the food stamp program. Indeed, rising food stamp outlays, and to a lesser extent, increased expenditures for the school lunch program, were responsible for the nearly $4.5 billion increase from 1970 to 1975 in the food category. In the area of health, benefit-in-kind subsidies rose by about $5.5 billion in the same period as a consequence of sharp jumps in the medical assistance program (Medicaid) and in

health insurance for the aged (Medicare). Quantitatively, one other item of significance was a more than $1 billion increase in urban mass transit capital improvement grants which accounted for most of the rise in the transportation category. Although commerce showed essentially no change over the period, benefit-in-kind subsidies to the postal service continued to account for the major share of expenditures in this category.

The type of subsidy showing the largest absolute increase in Table 3 is tax subsidies. A tax subsidy is generated when a special provision in the law allows an individual or a firm engaged in a specific market activity to make a smaller tax payment to the Government than would have otherwise been the case. The estimates in Table 3 measure the reduction in revenues to the Government resulting from these special provisions. Those categories showing sizable increases between 1970 and 1975 include health, housing, natural resources, commerce, and "other." During the period, substantial and, in most cases, rising sources of revenue loss were attributable to such areas as the deductibility of medical expense and allowances for medical insurance premiums and medical care, in the health category. In housing, major areas of revenue loss resulted from the deductibility of both interest and property taxes on owner-occupied homes, as well as the failure to tax imputed net rent on owner-occupied housing. The depletion allowance accounted for the largest revenue loss in the natural resource category; while in commerce, the investment credit, individual capital gains, the accelerated depreciation range, and the exclusion of interest on life insurance savings were largely responsible for the roughly $5 billion rise in revenue shortfalls through tax subsidies during the period. The final categoiy in Table 3, "other," showed a large increase over the period as well. Both the exclusion of interest on state and local debt and the net exclusion of pension contributions for

employees accounted for most of the change. The deductibility of charitable contributions was an allowance which showed little change over the period, but was, nonetheless, responsible for an estimated revenue loss of about $3.5 billion on average per year.

A CONCLUDING OBSERVATION

The foregoing analysis demonstrates that subsidies do exert a pervasive influence on our economy. Their scope of application, their diverse forms, and the significant sums of money involved are all persuasive reasons for ongoing public concern. More than 15 years ago, the Joint Economic Committee asserted:

Federal programs aimed at supporting or improving the economic position of particular groups or industries should be constantly reevaluated in the light of changing circumstances. Whatever their initial justification, subsidy programs should be so contrived as to eliminate the necessity for their continuation. The broad changes which must be expected in our economy require frequent revision in the scope and character of these programs if they are to achieve their purposes. Failure to adapt the substance of subsidies to changing demands and

opportunities may be expected to prevent most efficient use of resources in the subsidized activities as well as in other types of economic endeavor. Where this is the case, the subsidy not only fails of its immediate objective but also imposes real costs on the entire economy over the long run.'

Their words are just as relevant today as they were in 1960. In the intervening years, the growth of subsidies has continued unabated. Whether such growth is warranted remains an appropriate subject for research. For by their nature, subsidies represent the conferring of benefits on special groups in our society, rather than on the general public. In a society which stresses the dominant role of free competitive markets, and, at a time when there is so much concern over the appropriate role and size of Government, both fiscal prudence and simple equity demand that objective and appropriate standards be applied where the public purse is involved. To that end, there should be no flagging in the effort to sharpen and to clarify what for many still remains a blurred image of the subsidy picture.

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7 U.S. Congress, "Subsidy and Subsidylike Programs of the U.S. Government," 86th Congress. 2nd Sess., Joint Committee Print, 1960, p. 1.