Federal Deficits and the Stock Market

By V. Vance Roley and Lawrence D. Schall

Some analysts claim that concern about large federal budget deficits contributed to the October 1987 stock market crash. These analysts argue that concern over continued large budget deficits and the associated need to attract a continued large inflow of foreign capital led to the run-up in long-term interest rates last year that made bonds increasingly attractive relative to stocks. In this view, failure to make satisfactory progress in reducing the U.S. budget deficit was ultimately to blame for the stock market crash.

In contrast, other analysts claim that budget deficits had little if any effect on stock prices. Noting that the federal budget deficit declined substantially in fiscal year 1987, Milton Friedman, for example, characterized much of the discussion of the links between budget deficits and the stock market crash as reflecting "reliance on economic fallacies."[1] Moreover, stock prices surged throughout most of the 1980s despite mounting budget deficits. Perhaps investors did not consider budget deficits a problem. Or perhaps the stimulative fiscal policy led to such a strong economic expansion that stocks became increasingly attractive investments despite concerns that high budget deficits would raise interest rates and inflation.

The unprecedented size of recent budget deficits and of the stock market decline brought attention to the relation between budget deficits and stock prices. But it is dangerous to draw strong conclusions based on such limited information. Instead, economists rely on economic theory and data over longer periods to sort out the effects of budget deficits.

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[1] See Milton Friedman, "An Economist's Growing Garden of Fallacies," *The Wall Street Journal*, December 2, 1987.

Such an approach is taken in this article. The finding is that budget deficits resulting from expansionary fiscal policy actions have historically been associated with small improvements in stock prices. The implications for the current situation are not entirely clear, however, because budget deficits since 1982 have been unique in several respects. The first section of the article reviews a theoretical model of how stock prices are determined. The prospective effects of budget deficits on the economy and stock prices are analyzed in the second section. The third section presents empirical evidence showing that budget deficits have typically led to slightly higher stock prices. The final section draws out the implications for evaluating the recent and prospective link between fiscal policy and the stock market.

Determinants of stock prices

In this section, a simple model of stock prices is considered to identify their determinants. The factors affecting stock prices are then related to such broad economic measures as economic activity, inflation, and interest rates. These relationships are used in the next section to describe possible links between federal deficits and stock prices.

In a market dominated by rational investors, the price of a firm's stock reflects its intrinsic value. In turn, the intrinsic value of a stock depends on future as well as current earnings and risks. Changes in assessments about the firm's performance in either the current or future periods, then, should be translated into movements in current stock prices. More formally, the value of a firm's stock depends on the firm's current and prospective earnings as measured by equity cash flows.[2] Among the factors determining these cash flows are the firm's revenues, expenses, taxes, and interest payments.

Investors must thus predict future cash flows to determine how much to pay for stocks. A stock's current intrinsic value is the sum of the present values of these expected future cash flows.[3] That is, to convert expected future cash flows into current values, investors must discount these future values. The cash flow in the next period, for example, is discounted by using a single-period, risk-adjusted discount rate, which is often represented as the sum of a constant risk-free rate and a risk premium. The yield on Treasury bills is frequently taken as the risk-free rate. The risk premium is added to the risk-free rate to take into account the risk associated with future cash flows. An increase in either the risk-free rate or the risk premium raises the discount rate on stocks and thus reduces the present value of future cash flows.

Although the prices of individual stocks are viewed as reflecting the discounted value of an individual firm's expected cash flows, such aggregate economic factors as economic growth, inflation, and interest rates influence the average level of stock prices by affecting the expected cash flows of all firms, as well as the rate used to discount those cash flows. For example, the unpre-

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[2] A firm's equity cash flow can be approximated as

$$C = X - T - P - I$$

where C is the cash flow, X is the pretax operating cash flow (revenues minus expenses and capital outlays), T equals taxes, P represents net principal payments on the firm's debt, and I equals the interest payments on the firm's debt. Equity cash flows are simply referred to as cash flows in the remainder of this article.

[3] In analytic terms, a firm's equity value can be expressed as

$$S_0 = \sum_{t=1}^{\infty} \frac{E(C_t)}{(1+k)^t}$$

where S_0 is equity value in period 0, $E(C_t)$ is the expected cash flow in period t, and k is the firm's discount rate. All expected values are formed at time 0. All cash flows are nominal quantities, and k is the nominal discount rate.

dictability of aggregate economic variables may affect the risk premium incorporated in the rate used for discounting expected future cash flows. The effects of these aggregate economic factors on stock prices are considered next.

First, increases in current and expected levels of economic activity should cause stock prices to rise. This rise reflects increases in the assessments about the expected future cash flows of corporations, since cash flows and economic activity are positively related. This link accounts for the stock market being used as a leading economic indicator.

Second, an increase in the overall level of interest rates should cause stock prices to decline. If the risk premium is constant, a rise in interest rates increases the rate used to discount a firm's cash flows.[4] The higher discount rate reduces current stock prices.

Third, an increase in expected inflation should cause stock prices to fall. One reason is that increases in inflation have been related historically to declines in future economic activity.[5] So, increases in inflation are taken as signals of declines in the real value of future cash flows. Another reason inflation causes lower stock prices stems from the interaction between inflation and the tax system. By raising a firm's real, or inflation-adjusted, tax liability, inflation can reduce real after-tax cash flows. Taxes increase because of the treatment of inventory costs, depreciation, and the tax basis of assets a company sells.[6] Some of these negative tax effects might be offset by reductions in the real value of a corporate debt. On balance, though, empirical evidence confirms that higher expected inflation lowers stock prices.

Finally, more uncertainty about economic activity, interest rates, and inflation could cause the equity risk premium to rise. If more volatile interest rates lead to greater uncertainty, for example, the risk premium for stocks may rise. Similarly, increased inflation volatility could also raise the risk premium and thus the rate used for discounting future cash flows. Because higher discount rates reduce the present value of expected future cash flows, stock prices fall in response to increases in risk.

Federal deficits and stock prices: Theoretical considerations

Budget deficits affect stock prices by influencing both the overall economic climate and the valuation of alternative assets. This section discusses the possible theoretical relationship between federal deficits and stock prices. The link is examined by considering how changes in the deficit affect aggregate economic output, interest rates and inflation. As discussed in the previous section, these aggregate variables are thought to affect stock prices either through changes in the cash flows of firms or through the rate used in discounting future cash flows.

Two main cases are considered in examining the effects of federal deficits. One case assumes that enough labor and capital are available so that

[4] To keep the effects of inflation separate, assume that real interest rates increase and that the real risk premium is constant. Also, this analysis ignores the capital gain to firms due to unanticipated increases in interest rates. The value of the firm's outstanding debt falls in this case.

[5] For empirical evidence on the negative inflation-stock price relationship, as well as the inflation-future economic output link, see Eugene F. Fama, "Stock Returns, Real Activity, Inflation, and Money," *American Economic Review*, September 1981, pp. 545-565, and Charles R. Nelson, "Recursive Structure in U.S. Income, Prices, and Output," *Journal of Political Economy*, December 1979, pp. 1307-1327.

[6] Inflation creates taxable nominal gains on inventories and asset dispositions even though these gains are not real. Also, historical cost depreciation, rather than the current replacement cost of depreciable assets, is used to compute taxable income. See Martin Feldstein, "Inflation and the Stock Market," *American Economic Review*, December 1980, pp. 839-847, and Lawrence D. Schall, "Taxes, Inflation and Corporate Financial Policy," *Journal of Finance*, March 1984, pp. 105-126.

increases in output can occur with little or no pressure on the prices of goods. The other case assumes the economy is operating so near its maximum capacity that further economic stimulus leads to a rise in the prices of goods.

In the case of unemployed resources, any increase in the deficit from a discretionary tax cut or an increase in government spending most likely stimulates economic activity. A personal tax cut, for example, raises the after-tax income of households. This rise in disposable income leads in turn to increases in consumption spending and thus in aggregate demand. Similarly, higher government spending on goods and services raises aggregate demand directly. Because the increase in aggregate demand can be satisfied by employing idle resources, the likely effect on prices will be minimal. In this case, budget deficits do not cause higher inflation. Interest rates, however, are likely to rise somewhat because of the expansion in overall economic activity. In particular, the rise in income causes an increase in the demand for money.[7] If the Federal Reserve does not monetize the deficit by increasing the supply of money, the rise in money demand exerts upward pressure on interest rates. Individuals sell bonds to satisfy their increased demand for money, causing bond prices to fall and interest rates to rise.

The net effect of the increase in the deficit on stock prices is unclear. The rise in income and output increases corporate cash flows. But the rate used in discounting future cash flows also rises because of higher interest rates. So, while future cash flows are higher, the net effect on their present value is uncertain.

The net effect of deficits on stock prices would likely be positive, however, if the Federal Reserve were to monetize the increase in the deficit. The Federal Reserve could purchase Treasury securities to increase reserves in the banking system, eliminating the need to finance the deficit through borrowing from the public. The resulting increase in reserves would increase the supply of money and thus alleviate the interest rate pressure from higher money demand. As a consequence, the positive effects of higher output on stock prices probably dominate any adverse interest rate effects. By assumption, ample resources are available to meet increased demand, so the higher money supply would not heighten investors' concerns about inflation. Therefore, monetization of deficits during a period when the economy is operating well below capacity would likely lead to a positive relationship between deficits and stock prices.

In contrast, fiscal stimulus would likely lead to a decline in stock prices during periods when all of the factors of production are fully employed. An increase in the federal deficit caused by either an increase in government spending or a reduction in taxes would still raise aggregate demand. If the economy is already fully employing all available resources in producing output, the increased aggregate demand could not lead to higher output and thus higher cash flows. Instead, firms would merely raise prices on their products. The resulting rise in the general price level would reduce real, or inflation-adjusted, money holdings. To restore real money balances to their previous level, individuals would try to sell their bonds, causing interest rates to rise.[8] Deficit monetization in this case would further exacerbate inflationary concerns. So increased deficits during periods of high resource use can generally be expected to lead to lower stock prices.

[7] The demand for money also may depend on wealth. Issues related to wealth effects are not considered to keep the analysis simple. For a discussion of wealth effects, see Benjamin M. Friedman, "Crowding Out Or Crowding In? Economic Consequences of Financing Government Deficits," *Brookings Papers on Economic Activity*, 1978:3, pp. 593-641.

[8] The increase in interest rates also serves to reduce interest-sensitive private spending so that aggregate demand equals

To summarize the results in this section, standard economic analysis implies that stimulative fiscal actions increase economic output when the economy is operating at less than full employment. Interest rates could rise, however, implying an uncertain net effect on stock prices. Nevertheless, if the increase in the deficit is at least partially monetized, the effects on economic output and interest rates are more favorable for stock prices in this version of the model. In particular, output is higher and interest rates are lower in comparison with the debt-financed case. When full employment is assumed, the effect of deficits on stock prices is unambiguously negative. In this case, output remains at its full employment level, but inflation and interest rates rise.

Finally, it should be noted that these results are not exhaustive, as a number of subtle factors have not been considered. One caveat is that households may infer that higher federal debt will eventually result in higher taxes. Consider, for example, the effects of a reduction in federal taxes. To finance the increase in the deficit resulting from the tax cut, the government must sell Treasury securities. This added federal debt could be interpreted as requiring higher future taxes for debt service and retirement. So, consumers might increase their current saving or reduce their current consumption expenditures by an amount equal to the tax cut in recognition of higher future taxes.[9] If this occurs, the tax cut would have no effect on aggregate spending. As a consequence, economic output and interest rates would not change, implying no change in stock prices.

Empirical evidence

Since economic theory does not provide a clear-cut result in assessing the effects of budget deficits on stock prices, empirical evidence must be examined to determine the relationship. This section examines the historical relationship between federal deficits and stock prices. Three measures related to the federal deficit are first discussed. These measures—the structural component of the deficit, the cyclical component of the deficit, and the amount of deficit monetization—are then considered in terms of their historical performance. Next, stock prices are related to the three measures.

Historical performance of federal deficits

To measure the potential economic stimulus from the discretionary fiscal actions analyzed in the previous section, the structural deficit concept is sometimes used. The structural component of the deficit is the part that would prevail under normal economic conditions.[10] Changes in

aggregate supply. Some types of stimulative fiscal policies also could increase aggregate supply. Lower marginal tax rates, for example, could increase the work effort of labor, causing a rise in aggregate supply. For an analysis of this and other cases, see Robert J. Barro, *Macroeconomics*, John Wiley & Sons, New York, 1984.

9 This result is often labeled as the Ricardian equivalence theorem. This theory also depends on intergenerational transfers in which the size of bequests varies with the presumed tax liability of future generations. For more discussions of the Ricardian equivalence theorem, see Martin J. Bailey, *National Income and the Price Level*, McGraw-Hill, New York, 1971; Robert J. Barro, "Are Government Bonds Net Wealth?" *Journal of Political Economy*, November/December 1974, pp. 1095-1117; Levis A. Kochin, "Are Future Taxes Anticipated by Consumers?" *Journal of Money, Credit, and Banking*, August 1974, pp. 385-394, and Martin Feldstein, "Government Deficits and Aggregate Demand," *Journal of Monetary Economics*, January 1982, pp. 1-20.

10 This measure corresponds to the cyclically adjusted federal deficit constructed by the U.S. Department of Commerce. For further details, see Frank de Leeuw and Thomas Holloway, "Cyclical Adjustment of the Federal Budget and Federal Debt," *Survey of Current Business*, December 1983, pp. 25-40. This measure has also been used in other recent studies. See, for example, Guido Tabellini and Vincenzo La Via, "Money, Deficit and Public Debt: An Empirical Investigation," mimeo, University of California at Los Angeles, September 1986. Some economists advocate other measures of the deficit that correct

this component result from changes in tax or expenditure policy or from the failure to offset bracket creep and other distortions caused by inflation. On the revenue side, for example, reductions in personal or corporate tax rates would increase the structural deficit. A reduction in social security taxes would have the same result. On the expenditure side, any policy that increases budget outlays for a given level of economic activity would also increase the structural deficit. Increases in defense spending have been a good example in recent years. In addition to explicit changes in tax and expenditure policies, inflation can cause changes in both the nominal and real structural deficit. If personal tax rates are not lowered in times of inflation, for example, the real tax burden on individuals rises. The higher real tax receipts tend to reduce the inflation-adjusted value of the structural deficit. In sum, the structural deficit is constructed to represent the deficit that would occur for a normal level of economic activity under a given set of tax and expenditure policies.

The cyclical component of the deficit is the difference between the actual and structural deficits. This component changes as a result of fluctuations in overall economic activity. For an average level of economic activity, the cyclical deficit is zero. During recessions, the cyclical deficit increases as tax receipts decline and transfer payments increase. Tax receipts fall because of the declines in personal income and corporate profits, and transfer payments rise due to an increase in unemployment. So, for given federal tax and expenditure policies, cyclical deficits rise during recessions. Similarly, higher than usual levels of economic activity result in cyclical budget surpluses. In sum, this measure simply reflects the effects of business cycles on the federal deficit for a given set of tax and expenditure policies. As such, its effect on stock prices should be minimal because changes in the cyclical deficit are transitory. Moreover, stock prices should already reflect current business conditions and so should not be affected much by any associated changes in the budget deficit.

The remaining measure to be discussed is the part of the deficit monetized by the Federal Reserve. This measure corresponds to Federal Reserve purchases of federal debt securities. In purchasing these securities, the Federal Reserve increases the amount of reserves in the banking system, thus providing the basis for increases in the money supply. As discussed in the previous section, deficit monetization can result in either higher inflation or higher output than with a debt-financed deficit.

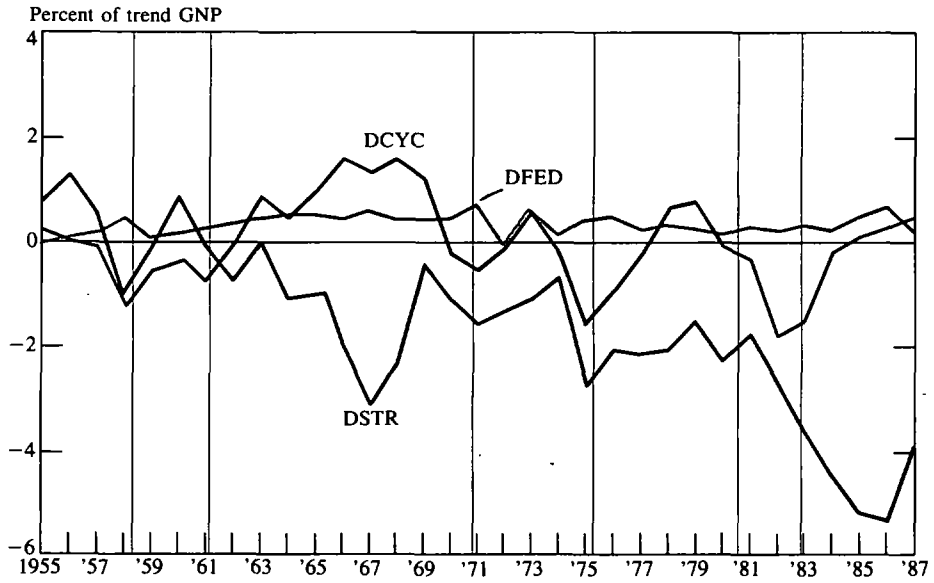
Chart 1 shows the size of the structural deficits and the cyclical deficits relative to trend GNP from 1955 through 1987.[11] Reported values are negative for deficits and positive for surpluses. The sum of the two measures equals the total federal deficit as a fraction of trend GNP. The chart also shows the Federal Reserve's net open market purchases of Treasury securities as a percent of trend GNP, a measure of the extent of monetization. Finally, the beginnings of economic expansions are marked by vertical lines to highlight the behavior of the components of budget deficits during the early stages of economic expansions.

Several patterns can be seen in Chart 1. First, except for 1955-57 and 1960, there was a structural deficit rather than a surplus. Second, the structural deficit first peaked in 1967 in association with the Vietnam War buildup, and then

for various items not included in the conventional measure. See, for example, Robert Eisner, *How Real is the Federal Deficit?* Free Press, New York, 1986.

[11] Data for 1987 represent the first three quarters of the year. Trend GNP is formed from a regression with the logarithm of GNP and linear and quadratic time variables. This measure appears to correspond more closely to the cyclical adjusted deficit measure than a simple log-linear trend.

CHART 1
Components of the federal deficit



DSTR = Structural deficit (−) or surplus (+)
DCYC = Cyclical deficit (−) or surplus (+)
DFED = Net Federal Reserve purchases of Treasury securities

Vertical lines represent the beginning of economic expansions.

recovered somewhat before soaring to record highs in the 1980s. In 1985, for example, the structural deficit was about 5 percent of trend GNP, well above the previous peak of about 3 percent in 1967. Third, in contrast to the usual behavior in the early stages of economic expansions, the structural deficits continued to expand in 1984, 1985, and 1986. The typical behavior of the structural deficit in the chart suggests that discretionary fiscal policy began tightening soon after economic expansion began. In contrast, the structural deficit in the most recent expansion continued to grow through 1986. Although somewhat smaller, the structural deficit in 1987 was still large by historical standards. Fourth, the cyclical deficit has alternated between periods of positive and negative values, which is to be expected since this part of the deficit is caused by the recurring oscillations of the general economy. Again, negative values reflect the effects of periods when economic activity is below its historical trend. Finally, the Federal Reserve's net open market purchases of Treasury securities have usually accounted for only a small portion of the total federal deficit, with no clear trend toward increased deficit monetization over time.

Estimation results

The historical effects of federal deficits on stock prices are estimated below. The main issue is whether discretionary fiscal actions leading to higher deficits have been associated historically with increases or decreases in stock prices. The structural component of the deficit is used to represent any such discretionary fiscal actions.

As indicated in the previous section, stock prices would increase, for example, if the output gain from stimulative fiscal policy outweighed any increases in interest rates and risk.

The empirical model relates unanticipated portions of the structural deficit, the cyclical deficit, and deficit monetization to the rate of return on a broad portfolio of stocks. Only unanticipated changes are considered because the expected values of each of these measures of the deficit should already be reflected in current stock prices. Moreover, most of the variation in stock prices over any given period is due to the effect of new information. To represent stock price movements, the rate of return on stocks is used. The rate of return equals the percentage change in stock prices plus the dividend yield. Because dividends move rather sluggishly over time, fluctuations in the rate of return are dominated by movements in stock prices. Thus, an increase in the rate of return can generally be associated with higher stock prices.

The specific model estimated can be represented as:[12]

$$RS_t = E(RS_t) + b_1 \cdot (DSTR^u)_t + b_2 \cdot (DCYC^u)_t + b_3 \cdot (DFED^u)_t + e_t$$

The observed rate of return on the stock market is represented by RS_t, which includes dividends and capital gains on a value-weighted portfolio of stocks. To better isolate the effects of new information about the deficit on stock returns, the expected rate of return is included as a determinant of actual stock returns. This variable is denoted as $E(RS_t)$, and it represents the predicted rate of return formed at the end of the previous period. Since predicted returns cannot be observed directly, several different measures were used for this variable to ensure the robustness of the empirical results. The remaining variables measure unanticipated changes in both the structural and cyclical components of budget deficits, in the degree of deficit monetization, and in other unspecified factors that could cause the actual rate of return on stocks to differ from the expected rate of return.

The first of these variables, $(DSTR^u)_t$, represents unanticipated changes in the structural deficit resulting from unanticipated fiscal policy actions. This measure most closely corresponds to the changes in the deficit due to discretionary fiscal policy actions and should thus measure the effects described in the previous section. The unanticipated changes in this and other variables were estimated with empirical models used to predict future values of each series. Deviations of actual values from those predicted were used to measure unanticipated changes. The deficit measures were also scaled by trend GNP. As a result, they represent unanticipated changes as a fraction of trend GNP.[13]

[12] This same general specification has been used in other recent studies on the effects of deficits on asset rates of return. However, the deficit has not been decomposed into cyclical and structural components. See Charles I. Plosser, "Government Financing Decisions and Asset Returns," *Journal of Monetary Economics*, May 1982, pp. 325-352, and Roger D. Huang, "Does Monetization of Federal Debt Matter? Evidence from the Financial Markets," *Journal of Money, Credit, and Banking*, August 1986, pp. 275-289.

[13] In forming unanticipated changes in the three variables, each of the variables divided by trend GNP is regressed on a set of information that includes data known by the end of time t. The information set includes four lagged values of the 3-month Treasury bill yield, linear and quadratic time trends, and seasonal dummy variables. The residuals from these regressions are taken as the unanticipated changes.

While this approach is fairly standard, it has some shortcomings in this application. In particular, changes in the structural deficit are taken to represent discretionary fiscal policy actions. Such actions are widely debated in the Congress, and legislation is enacted in advance of its potential effect on the economy. As a consequence, better proxies for the expected structural deficit may be available. Nevertheless, the intended results of federal tax and expenditure policies may differ from the actual outcomes, so proxies such as those used here may be appropriate.

The additional variables included in the model are intended to capture the effects of all factors other than discretionary fiscal policy actions. The unanticipated change in the cyclical component of budget deficits is denoted as $(DCYC^u)_t$. As discussed in the previous section, this component of the deficit would be expected to have little or no effect on stock prices because it reflects changes in government revenues and spending caused by fluctuations in the economy rather than by discretionary policy actions. Unanticipated monetization of debt is denoted by $(DFED^u)_t$, which is an estimate of the degree to which the Federal Reserve buys more or fewer Treasury securities than expected by investors when they form expectations of returns on stocks. Unanticipated movements in the rate of return on stocks not captured by any of these factors are represented by the random error term, e_t. Finally, the estimated effects of the various variables are reflected by the coefficients, b_1, b_2, b_3.

The estimation results of the effects of deficits on the stock market are reported in Table 1. Several versions of the model are estimated, mainly reflecting different methods of representing the expected rate of return on stocks. In the first row, the expected rate of return is assumed to be a constant over time. In the second row, the expected rate of return is represented by a constant plus the 3-month Treasury bill yield at the end of the previous period. A set of past information is used to construct the expected rate of return in the third row.[14] Again, these different versions were estimated to help ensure the robustness of the results. Finally, in the fourth row, the real rate of return on stock is considered. In this case, the expected real rate of return again is assumed to be a constant.

[14] With one exception, the information set corresponds to that used to form unanticipated changes in the deficit variables. The exception is that four-lagged values of the rate of return on stock also were included.

The results were obtained by using quarterly data from 1956 through 1985. The first three rows indicate that unanticipated changes in the structural deficit have small effects on nominal stock returns. The first row, for example, indicates that an increase in the structural deficit equal to 1 percent of GNP, which corresponds to a value of -0.01 for $DSTR^u$, is associated with a 0.17 (-0.01×-17.02) percentage point gain in the rate of return on equity. This then is the estimated effect on stock returns of policy-induced changes in fiscal policy that are likely to be long lasting.[15] The fourth row indicates that these policy-induced changes in the deficit are associated with an increase in the real rate of return on stocks. Both the transitory business cycle component of the deficit and Federal Reserve monetization were not found to have effects significantly different from zero in any of the specifications.[16]

As a whole, the results indicate that stimulative fiscal policy actions have led historically to small increases in stock prices. Discretionary fiscal policy actions leading to higher deficits have typically occurred when resources in the economy

[15] The empirical properties of the cyclically adjusted deficit measure support this proposition. The correlation of $DSTR_t$ with $DSTR_{t-1}$ is 0.87. The correlation of $DSTR_t$ with $DSTR_{t-8}$ remains fairly substantial taking a value of 0.35. Moreover, in forming empirical measures of the anticipated and unanticipated components of DSTR, the first lagged value of DSTR has a coefficient of 0.75. All of these results indicate persistent effects.

[16] To determine the effect of the recent experience on the empirical results reported in the table, the equations were re-estimated with the years of the Reagan administration deleted from the sample. The remaining subsample examined began in 1956 and ended in 1980. The results from this subsample supported the evidence from the complete sample. In particular, policy-induced changes in the deficit had small significant effects on both the nominal and real rates of return on stock. As before, increases in this component of the deficit led to higher rates of return and, therefore, higher future stock prices. The transitory business cycle component of the deficit and Federal Reserve monetization again were estimated not to have effects significantly different from zero.

TABLE 1

Response of stock prices to budget deficits (1956:Q1 to 1985:Q4)

Dependent Variable	Constant†	$DSTR^u$	$DCYC^u$	$DFED^u$	Summary Statistics $\bar{R}^2$	SE	DW
RS	0.15*	−17.02*	−19.64	12.29	0.08	0.33	1.67
	(0.03)	(6.08)	(13.44)	(8.74)			
RS−RTB	0.09*	−17.32*	−20.07	12.17	0.08	0.33	1.66
	(0.03)	(6.11)	(13.51)	(8.78)			
RS−E(RS)	0.00	−12.03*	−9.70	12.31	0.06	0.28	1.99
	(0.03)	(5.21)	(11.52)	(7.48)			
RRS	0.10*	−18.45*	−19.89	12.50	0.09	0.34	1.64
	(0.03)	(6.20)	(13.71)	(8.91)			

*Significant at the 5-percent level
†Numbers in parentheses are standard errors of estimated coefficients.
With the exceptions noted below, data are from the Citibank database.
Variables are defined as:

RS = nominal annualized quarterly rate of return on the value-weighted CRSP index (Source: University of Chicago, Center for Research in Security Prices)

RTB = 3-month Treasury bill yield on the last day of the previous quarter, calculated on an annualized coupon-equivalent basis (Sources: Board of Governors of the Federal Reserve System, H.15, and Department of the Treasury, *Treasury Bulletin)*

RRS = real annualized quarterly rate of return on the value-weighted CRSP index, calculated as $[(1+RS)/(1+\pi)]^{-1}$, where π is annualized quarterly inflation as represented by the Consumer Price Index

E(RS) = expected value of RS, formed from fitted values of a vector autoregression

$DSTR^u$ = unanticipated cyclically adjusted federal budget surplus (+) or deficit (−) divided by trend gross national product, formed from a vector autoregression

$DCYC^u$ = unanticipated federal budget surplus (+) or deficit (−) net of cyclical adjustment divided by trend gross national product, formed from a vector autoregression

$DFED^u$ = unanticipated annualized net purchases (+) or sales (−) of Treasury securities by the Federal Reserve divided by trend gross national product, formed from a vector autoregression (Source: Board of Governors of the Federal Reserve System, *Flow of Funds Accounts)*

$\bar{R}^2$ = multiple correlation coefficient corrected for degrees of freedom
SE = standard error
DW = Durbin-Watson statistic

were underemployed. The implication is that the output gains from stimulative fiscal policy slightly outweighed any increases in interest rates or risk, leading to higher stock prices.

Conclusions

The potential effects of federal deficits arising from discretionary fiscal policy on the stock market depend on numerous factors. Perhaps the most important factor is the condition of the economy. In particular, stimulative fiscal actions are most likely to raise output and corporate cash flows when the economy is in a recession. During such periods, higher budget deficits are likely to boost stock prices. When the economy is near full employment, however, the positive output effects are likely negated by higher interest rates and inflation that cause a decline in stock prices.

The empirical evidence suggests that increases in the structural deficit have historically led to slight increases in stock prices. The structural deficit has typically risen during recessions, and then decreased early in the subsequent expansions. Thus, the positive effect on stock prices has coincided with increases in output from recession levels. The deficit experience since 1982 has departed from this historical performance in that the structural component of budget deficits continued to grow even as the economy moved toward full employment. The theoretical analysis and empirical evidence in this article do not, therefore, rule out the possibility that increasing concerns about the implications of high budget deficits for interest rates and inflation contributed to the stock market crash.