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Effects of Fiscal Policy on Agriculture and the Rural Economy

John Kitchen
David Orden

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Effects of Fiscal Policy on Agriculture and the Rural Economy. By John Kitchen and David Orden. Agriculture and Rural Economy Division, Economic Research Service, U.S. Department of Agriculture. ERS Staff Report No. 9131.

Abstract

We found little evidence in the literature regarding fiscal policy to support a relationship between deficits, interest rates, and exchange rates. We present some empirical evidence suggesting that real growth, the trade balance, and soybean prices are affected by Federal budget deficits. However, fiscal policy seems less important than monetary policy in the determination of real activity and interest rates. Fiscal policy is also less important than monetary policy--or commodity-specific production, use, and stocks--in the determination of agricultural commodity prices. Simulation results suggest that fiscal policy changes do not have significantly different effects on the nonmetro unemployment rate relative to the total civilian unemployment rate.

Keywords: Fiscal policy, budget deficit, economic growth, trade balance, interest rates, agricultural commodity prices, nonmetro unemployment rate

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1301 New York Ave., NW.
Washington, DC 20005-4788

June 1991

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Introduction

The purpose of this paper is to explore some preliminary ideas for addressing questions of fiscal policy effects on agriculture and the rural economy. The unprecedented peacetime Federal Government budget deficits and U.S. trade deficits during the 1980's and the outlook for continued large budget deficits in the early 1990's have raised concerns about the effects of fiscal policy on the general economy and on agriculture and other specific sectors. One concern is that debt-financed government spending could adversely affect the rural economy. Rural problems could result, in part, from the relative capital intensity and export dependence of agriculture, but also, from the distribution of other manufacturing and service industries in rural areas. If government deficit spending affects interest rates, exchange rates, and the balance of trade, then budget deficits could produce rural "crowding-out" effects, which reduce investment or demand for exported goods. If these effects were large, they could play a key role--along with other macroeconomic policies (monetary policy), supply conditions, and farm program parameters--in determining agricultural output, prices, stock levels, and trade.

The general size of crowding-out effects of debt-financed government spending is a controversial issue. At one extreme, Robert Eisner argues that the positive effect of debt-financed government spending on output has been so great in the 1980's that investment has been "crowded in," compared with what its level would have been in the absence of government debt. Eisner acknowledges, however, that the crowding in of investment may have occurred at the cost of crowding out of net exports, in which case, trade-dependent sectors would still be disadvantaged.

At the other extreme, Robert Barro and other neoclassical macroeconomists argue that current government deficits induce forward-looking consumers to increase their savings in anticipation of higher future taxes. If government dissaving is offset completely by increased private saving, no pressure on interest or exchange rates would develop to cause crowding out of either investment or net exports. Barro's argument seems to be contradicted by the national income accounts, which show net national savings to have dropped markedly in the 1980's. However, the evidence is less clear when savings are measured by changes in wealth, which may be the measure relevant to consumer behavior.

A second set of concerns arises over the direct effects of government spending on specific industries. Even if crowding-out effects are small, direct effects can be substantial as government spending replaces private spending or

as the government's spending priorities change. For agriculture, one might argue that the direct effects of government spending replacing private spending would be small due to the relatively low income elasticity of demand for most foods. The exception would be if government spending substituted for private spending by foreign consumers (with higher income elasticities of demand for food), which would induce export crowding out. For other, nonagricultural rural sectors, the direct effects of fiscal policy may be consequential. For example, from 1980-87, military expenditures rose from 23 percent to 28 percent of the government's total expenditures, while other expenditures (excluding Social Security, medicare, and interest payments) fell from 41 percent to 27 percent (Auerbach). Such a shift affects the distribution of employment and income among manufacturing and service industries. Similarly, changes in fiscal policy that affected farm program expenditures, as has occurred with the 1990 farm bill, directly affect agriculture.

A third set of concerns about fiscal policy arises over the sustainability of large budget or trade deficits. Various measures of government budget surpluses and deficits exist. Federal budget deficits were of unprecedented size in peacetime during the mid-1980's, but progress was made in reducing both the budget and trade deficits by the end of the 1980's (Orden). Figure 1 shows the total Federal budget surplus-deficit in 1982 dollars for the fiscal years 1940-92. In real terms, the Federal budget deficits during World War II swamp the deficits of more recent years. Government budget surpluses and deficits can also be measured relative to gross national product (GNP). Figure 2 shows the total Federal budget surplus-deficit of figure 1 expressed as a percentage of GNP. The deficits of recent years appear relatively smaller in figure 2 than in figure 1 due to the role of the expanding economy. Still, lower tax revenues coupled with continued growth in spending led to a substantial increase in the Federal budget deficit in 1990 and a projected significant increase in 1991. The prospect for high and growing Federal budget deficits prompted negotiations between the White House and Congress. The Omnibus Budget Reconcilliation Act of 1990 established a $500-billion deficit reduction package for the years 1991-95.

Persistence of relatively large deficits has raised concern about detrimental longrun consequences. An "ants in the basement" view of deficits, as opposed to a "wolves at the door" view--to borrow phrases coined by Charles Schultze--rests on slow deterioration of future living standards if (ignoring Eisner's and Barro's arguments) investment stays low and the cost of servicing our debt to foreigners increases as a result of fiscal policy. In this regard, the distinction between government expenditures for consumption goods versus public sector investment becomes quite important. This is another aspect of fiscal policy that exclusive focus on "crowding out" might tend to obscure.

All of these issues become important if we want to look specifically at the effects of fiscal policy on agriculture and other rural industries. With continued political pressure to bring the Federal budget back toward balance in the coming years, and with possibilities for a significant realignment of government expenditures between military and nonmilitary objectives, we need to understand fiscal policy effects on agriculture and rural prosperity.

Our findings can be summarized briefly as follows. First, although conventional wisdom continues to hold that there are linkages between fiscal policy, real activity, and the trade balance, in the empirical literature that we reviewed there is little evidence of effects of fiscal policy on interest

Figure 1
Federal budget surplus-deficit in 1982 dollars

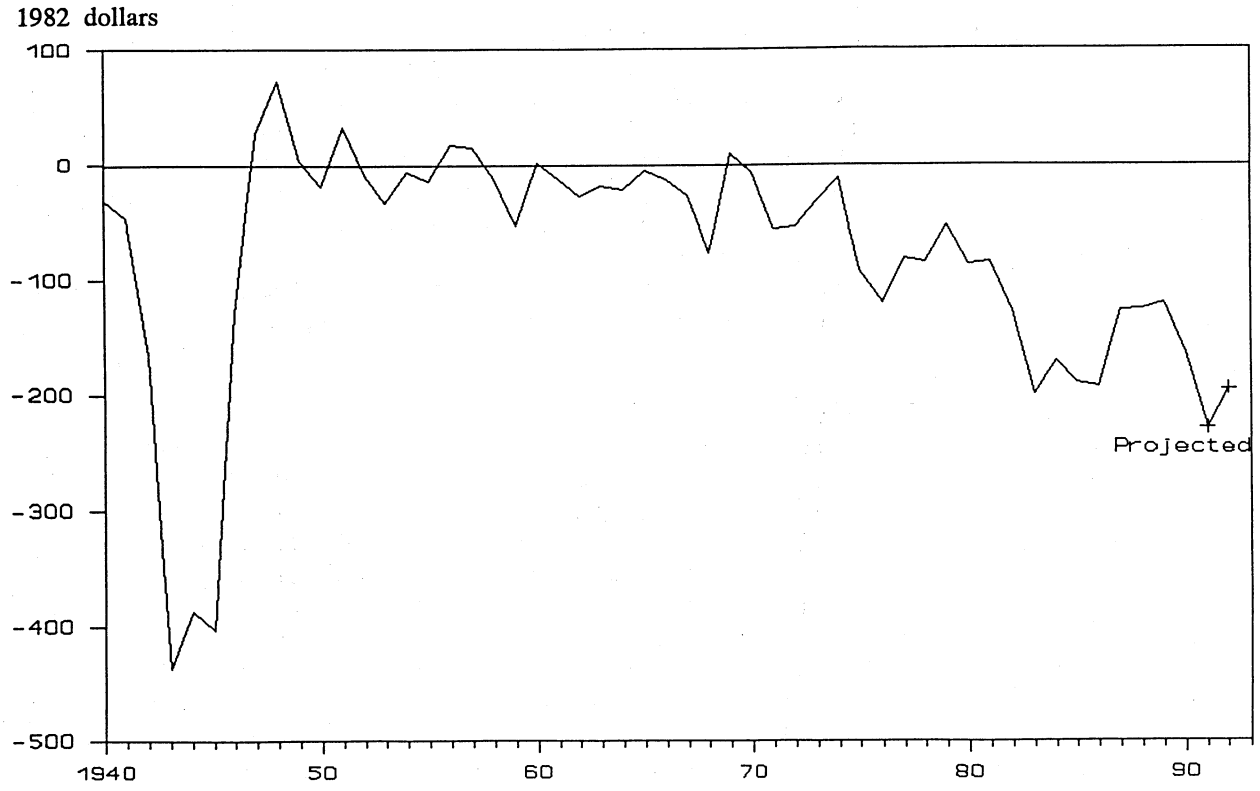
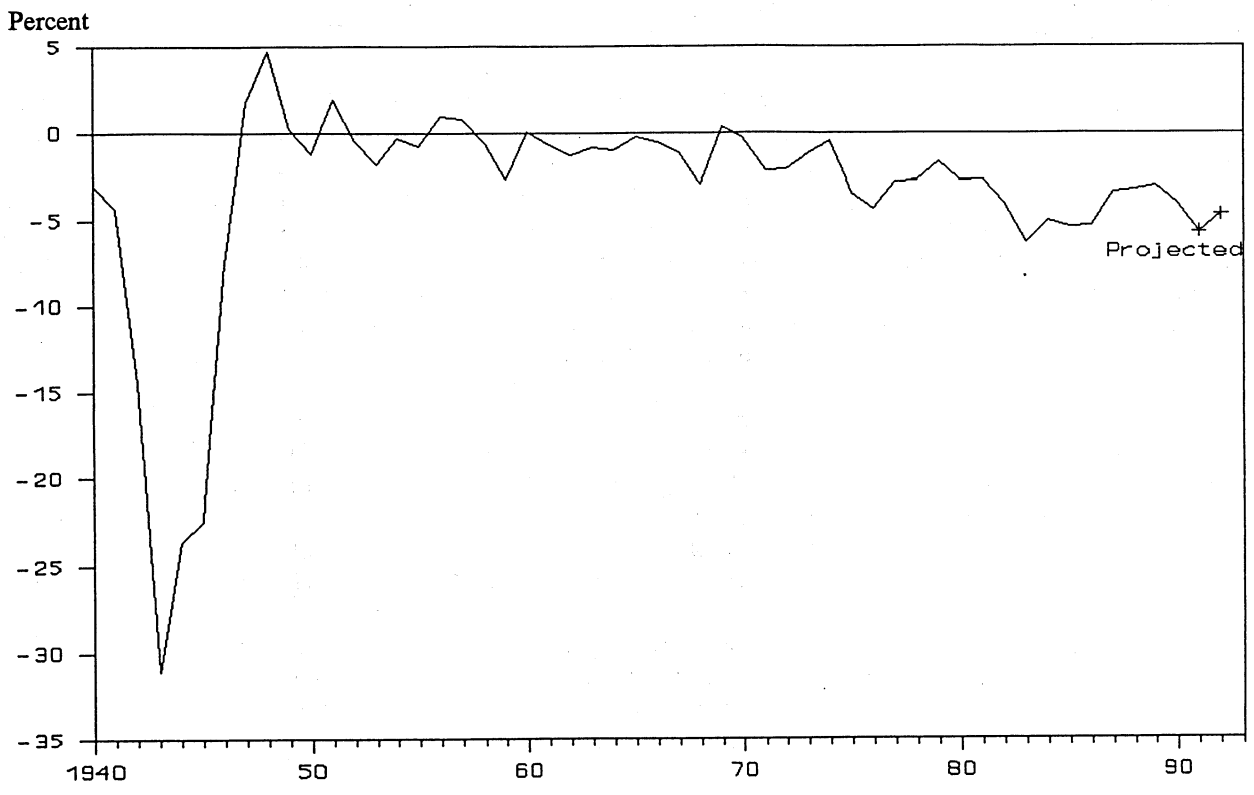


Figure 2
Federal budget surplus-deficit as a percentage of GNP



rates or exchange rates. This is important because relationships between deficits, interest rates, and exchange rates are the principal mechanisms through which crowding out would occur. In this regard, our reduced-form regressions based on an IS-LM model provide evidence of fiscal policy effects on output and the trade balance, but real money balances account for much of the explanatory power of the regressions. We also find marginal evidence of an effect of fiscal policy on the term structure of interest rates (an increase in the deficit raises long-term rates relative to short-term rates). Finally, the asset-market regressions also suggest fiscal policy effects on soybean prices.

Although the fiscal policy effects we detect are somewhat dominated by monetary phenomena, both our empirical results and simulations from a quarterly macroeconomic model suggest deficit reduction would lower real income and raise net exports, agricultural commodity prices, and unemployment rates in the short run. An expansionary monetary policy could, however, help to offset the fall in income and the increase in unemployment resulting from the restrictive fiscal policy. These results provide some preliminary quantification of the importance of fiscal policy and suggest that further evaluation of the magnitude of the direct and indirect effects of fiscal policy on agriculture and other rural sectors is warranted.

Theoretical Models

A complete survey of the theoretical literature on fiscal policy effects on the macroeconomy is beyond the scope of this paper. Rather, we describe the central themes of the alternative modeling approaches and provide some key references that develop the theory.

Keynesian Models

Models that have been labeled Keynesian have typically been based on Hicksian IS-LM or income-expenditure approaches. The standard income-expenditure approach is based on the accounting identity:

$$Y = C + I + G + (X - IM) \qquad (1)$$

where Y is income, C is consumption expenditures, I is net private domestic investment expenditures, G is government expenditures, X is foreign expenditures on domestic export goods, IM is domestic expenditures on import goods, and all variables are defined in real terms. The "injections=leakages" equality is then:

$$I + G + X = S + T + IM \qquad (2)$$

where S is private domestic savings and T is taxes. Rearranging terms yields

$$(G - T) + (I - S) + (X - IM) = 0 \qquad (3)$$

Equation 3 reveals oft-cited balancing relationships among government deficits, private investment and savings, and international capital flows. Analyses pointing to the "twin deficits problem" of the United States in the 1980's often rely simply on this identity. These analyses point to the government deficit ($G - T > 0$) as the reason for the deficit in international trade ($X - IM < 0$). More complete analyses along these lines

acknowledge the low measured private savings rate in the United States as an important contributor to the imbalance.

Implicit in these analyses are models, based on the IS-LM framework, which describe the economic effects of government spending, taxes, and deficits. The standard result from Keynesian models is that government deficit spending, without an accommodating monetary policy, leads to higher output, higher interest rates, a higher value of the dollar, and a "crowding out" of either investment or exports.[1] The accumulation of shortrun deficits into a high level of public debt leads to higher costs of servicing the debt, higher long-term interest rates, and lower income growth.

The Keynesian approach, therefore, suggests the following interpretation for the United States in the 1980's: The administration and Congress practiced an expansionary fiscal policy by maintaining Federal spending and cutting tax rates and taxes. The resulting deficits were financed by issuing government bonds. On net, private holders of government bonds considered the bonds to represent an increase in net wealth (that is, Barro's Ricardian equivalence did not hold). The result was higher expenditures and income, an increase in real interest rates, and an appreciation of the dollar. Private investment increased, perhaps because of the accelerator effect. However, real net exports were crowded out as a result of the large real appreciation of the dollar.

Not all Keynesian theorists accept the conventional explanation and interpretation of the data. For example, Eisner and Pieper (1984) and Eisner (1989) focused on problems in the measurement of key macroeconomic variables and the failure of accounting procedures and existing data to reveal correct economic valuations. Eisner and Pieper claim that the deficits have not been as large as commonly suggested, with correct measurement implying that a Federal budget surplus existed in the 1970's, and that a deficit emerged only after the 1981 tax cuts. Similar measurement problems extend to measures of saving, investment, public debt, and the net international debt position.

The standard Keynesian interpretation was used by Just and Chambers (1987) in a theoretical analysis that provided a fiscal policy explanation, as an alternative to a monetary policy explanation, for the behavior of U.S. agricultural variables in the 1980's. The macroeconomic portion of the Just and Chambers model, based on the Keynesian view, assumed that higher budget deficits lead to higher real interest rates and a higher exchange value of the dollar. Their claim is that the large Federal budget deficits in the mid-1980's were to blame for the downward pressure on program commodity prices and the resulting high level of Federal commodity support payments.

Neoclassical Models

The neoclassical theory and framework provides an alternative view of the linkages that maintain the identity among government deficits, private saving,

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[1]See Blinder and Solow, or Buiter for models of domestic investment crowding out, and Allen for an extension to the open-economy case.

investment, and international capital flows.[2] The Ricardian equivalence theorem for public debt is of particular interest. Barro (1989) illustrates the Ricardian equivalence theorem by pointing out several critical assumptions that lead to the result: (1) a representative individual with an infinite horizon, (2) individuals borrow and lend at the same interest rate as the government, (3) future taxes are perfectly foreseen, (4) taxes are lump sum, and (5) the path of government purchases is known. The Ricardian equivalence proposition emerges:

> Under these conditions, the economy's path of real interest rates, investment, consumption, and so on is invariant with shifts between taxes and budget deficits or with changes in the initial stock of public debt. (Barro 1989, p. 205)

Barro argues that "meaningful criticisms of the Ricardian result amount to deviations from the assumptions set out above" (p. 205). He examines separate criticisms in turn. In particular, the violation of the infinite horizon assumption, or the lack of intergenerational tranfers, leads to a failure of the Ricardian equivalence proposition. Under this violation, government bonds have net wealth effects and the standard "Keynesian" effects of budget deficits described above would emerge.

The neoclassical approach could be of critical importance in analyzing fiscal policy effects on agriculture. If the neoclassical models are accurate descriptions of the economy, and the assumptions generating Ricardian equivalence apply, the channels proposed by Just and Chambers for fiscal policy effects on agriculture would not be valid. That is, with Ricardian equivalence, budget deficits would not lead to higher real interest rates, higher currency exchange values, or downward pressure on commodity prices.

Review of Empirical Evidence

Numerous empirical studies of fiscal policy and budget deficit effects have been performed. In this section, we describe results from representative studies that illustrate the various empirical results that are found in the literature. Ricardian equivalence is a central issue in many of the studies. Some studies focus on the relationship between government deficit spending and various economic aggregates, such as consumption, savings, investment, and exports. Others have attempted to identify the effects of the deficit in financial markets, specifically the role of the deficit in the determination of interest rates and exchange rates. The results are mixed, and few of the results appear to be very robust. Some studies find evidence to reject the Ricardian equivalence hypotheses, while others find that it cannot be rejected. Generally, the literature finds that short-term interest rates and exchange rates are not significantly affected by government deficit spending. Some studies find evidence of deficit effects on long-term interest rates and others find no such evidence.

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[2]See Friedman (1968), Phelps (1970), Lucas (1973), and Barro (1976, 1977) for development of the neoclassical framework. Recently, Barro (1989) provided a theoretical model with a specific focus on the effects of temporary versus permanent changes in government purchases. Barro also reviewed some of the empirical evidence that other authors have provided, and he presented some additional empirical results.

The evidence for Ricardian equivalence is mixed in studies that focus on the relationship between government deficit spending and various economic aggregates, such as consumption, savings, investment, and exports. Poterba and Summers (1987) interpret aggregate savings and consumption data as suggesting that the Ricardian equivalence hypothesis fails to hold. That is, they do not find evidence that savings increase when the deficit increases, but they do observe a tendency for consumption to increase when taxes fall and the deficit rises. Leiderman and Razin (1988) also test Ricardian equivalence via economic aggregates by using a rational expectations model. Assuming a simple stochastic process for income and taxes, they derive an expression for consumer purchases involving a set of cross-equation restrictions. Their framework allows for possible deviations from Ricardian equivalence because of finite time horizons or liquidity constraints. The data do not reject the cross-equation restrictions implied by the model, and within this context they do not reject Ricardian equivalence, but some of their parameter estimates are implausible. For example, the subjective discount rate is estimated to be greater than one, and when the model is extended to allow substitution between government and private consumption, the marginal utility of government consumption is estimated to be negative. These results do not conform with the theoretical model.[3]

Studies attempting to identify the effects of the deficit in financial markets have focused on the role of the deficit in the determination of interest rates and exchange rates. Wachtel and Young (1987) use the announcement effect methodology to examine the relationship between Federal budget deficits and Treasury security interest rates. They find that announcements of unanticipated changes in the Federal deficit are positively related to both short-term and long-term interest rates. They report that the statistical significance of the coefficient for the interest rate response increases as the term to maturity for the Treasury securities increases.

Plosser (1982), Makin (1983), and Hoelscher (1983) also address the issue of deficit effects on interest rates but find little empirical support for a positive relationship between the Federal deficit or Federal debt and short-term interest rates. In a later study, Hoelscher (1986) finds that Federal deficits had a significant effect on 10-year Treasury bond rates for the postwar period and for subperiods within the postwar period. Such results for long-term interest rates do not appear to be very robust, however. Plosser (1987) finds that interest rates in the term structure are not significantly positively related to government debt shocks. In fact, the estimated coefficients suggest a negative relationship between changes in the debt and interest rates.

Further tests of the Ricardian equivalence proposition using financial market data are provided by Evans (1987). He finds no significant effects of deficits on nominal or ex-post real interest rates, even when expectations about future deficits are taken into account. He also examines the residuals from his regressions for the period before 45 major tax changes between 1908 and 1984. He finds no evidence of positive residuals before tax cuts, or negative residuals before tax increases. Evans argues that such patterns in the residuals would be expected if anticipated deficits following tax cuts raised interest rates or if anticipated surpluses from tax increases lowered interest rates. In a related study, Evans (1986) finds no empirical support

[3]Barro (1989) discusses these and additional results in some detail.

for the hypothesis that the value of the dollar increased as a result of U.S. budget deficits. Evans interprets the lack of a significant relationship between interest rates or exchange rates and budget deficits as evidence in favor of Ricardian equivalence.

Another test of Ricardian equivalence is provided by Boothe and Reid (1989). Following the strategy of Plosser's 1982 study, they examine returns over one period on Canadian bonds of various maturities compared with the known one-period bond return (the one-period rate of interest). Ex-post returns on the longer maturity bonds should differ from the known return by a risk premium (assumed to be time invariant for bonds of each maturity), unexpected changes in variables determining bond yields, and a random error. Boothe and Reid consider six policy variables that might affect yields. Three of these variables are the domestic quantities of publicly held government debt, monetized government debt, and the flow level of government purchases of goods and services. The other three variables are U.S. publicly held government debt, monetized debt, and the level of U.S. government purchases of goods and services. The latter variables are included to account for Canada being an open economy small country. Boothe and Reid argue that, for a small open economy with flexible exchange rates, domestic policy cannot affect real interest rates but can affect bond yields by affecting domestic nominal interest rates. Conversely, purely nominal world disturbances do not affect domestic interest rates because of the insulating effect of the flexible exchange rate, but disturbances affecting real world interest rates are passed through to the domestic economy. Results of their analysis suggest that Canadian monetary expansion lowers actual holding period returns, presumably by raising nominal interest rates for a fixed world real rate and, hence, lowering capital gains on the bonds. An unanticipated increase in the level of U.S. Government purchases of goods and services also lowers holding period returns, but presumably by raising real interest rates. An unexpected U.S. monetary expansion also affects holding period returns, but in this case presumably by lowering real interest rates and causing an increase in capital gains. Finally, neither Canadian publicly held government debt, nor Canadian government purchases nor U.S. publicly held debt affects holding period returns. Boothe and Reid interpret that result as evidence in favor of the Ricardian neutrality hypothesis.

Some Additional Evidence on the Effects of Fiscal Policy

In this section, we present some additional evidence on the role of fiscal policy in the economy. First, we use a simple Keynesian IS-LM framework to examine fiscal policy effects on real output. Second, we apply a similar approach to an examination of fiscal policy effects on the trade balance. Third, we consider fiscal policy effects in financial markets by providing additional information on the effects of budget deficits on interest rates in the term structure. Fourth, we use an augmented asset-market specification to address the issue of budget deficit effects on agricultural commodity prices. Finally, we summarize the effects of a $50-billion deficit reduction based on our empirical estimates, and provide comparable simulation results from a quarterly macroeconomic model.

Fiscal Policy and Real Output in a Keynesian IS-LM Framework

A simple model based on the Keynesian framework can help to illustrate some of the issues addressed in our discussion. For example, an IS-LM framework can

be developed using a money market equilibrium condition and the GNP identity (equation 1). The components of the GNP identity can be specified as:

$$\begin{aligned} C &= C_o + c_1(Y - T) - c_2 i \\ I &= I_o + b_1(Y - T) - b_2 i \\ G &= G_o \\ X &= X_o \\ IM &= IM_o + m_1(Y - T) \end{aligned} \tag{4}$$

where i is the interest rate. The money-market equilibrium condition is given by:

$$L = \phi Y - \lambda i \tag{5}$$

where L is the real money stock. We substituted the component parts into equation 1, solved the money-market equilibrium condition for i, substituted that result into the expanded equation 1, and solved the equation for Y. This yielded an expression of Y in terms of exogenous parameters and policy variables:

$$Y = \beta[(C_o + I_o + G_o + X_o - IM_o) - \delta T + \mu L] \tag{6}$$

where $\beta = \{1/[1 - (c_1 + b_1 - m_1 - (\phi(c_2 + b_2)/\lambda))]\}$, $\delta = (c_1 + b_1 - m_1)$, and $\mu = [(c_2 + b_2)/\lambda]$. Writing in difference form in terms of the policy variables yields:

$$dY = \beta(dG - \delta dT + \mu dL) \tag{7}$$

Finally, divide by Y to put the equation in terms of the rate of change of output:

$$\frac{\Delta Y}{Y} = \beta \frac{\Delta G}{Y} - \beta\delta \frac{\Delta T}{Y} + \beta\mu \frac{\Delta L}{Y} \tag{8}$$

Note that this formulation, by expressing changes in the policy variables as relative to the level of income, alleviates simultaneity problems--problems with interpreting relationships between policy variable levels and the level of real income.

Equation 8 provides the basis for an empirical specification to examine fiscal and monetary policy impacts on real growth. Only lagged values of the policy variables were used, again to minimize simultaneity problems:

$$\frac{\Delta Y}{Y} = \alpha_o + \sum_{i=1}^{n_G} \alpha_{Gi} \frac{\Delta G}{Y}(-i) - \sum_{i=1}^{n_T} \alpha_{Ti} \frac{\Delta T}{Y}(-i) + \sum_{i=1}^{n_L} \alpha_{Li} \frac{\Delta L}{Y}(-i) \tag{9}$$

Standard Keynesian theory suggests that increases in government spending lead to increased real growth, leading to the hypothesis H_G: $\Sigma \alpha_{Gi} > 0$. Similarly, the conventional Keynesian approach indicates that increases in taxes should be negatively related to real activity, H_T: $\Sigma \alpha_{Ti} < 0$. Finally, the IS-LM

framework generates the result that increases in the real money supply would lead to increases in real activity, H_L: $\Sigma \alpha_{Li} > 0$.[4]

In the framework of equation 8, fiscal policy effects are separated into government spending effects and tax effects, and the government spending parameters differ from the tax parameters. Hence, the empirical specification of equation 9 is not constrained to describe the effect of fiscal policy solely in terms of the budget deficit. Rather, the deficit's effects are separated into spending and tax components.

We estimated several variants of equation 9 using quarterly National Income and Products Accounts (NIPA) data from 1960.I (first quarter) through 1989.IV (fourth quarter). The M2 money supply data are compiled by the Federal Reserve. All variables were defined in real terms, in 1982 dollars. The equations were estimated by ordinary least squares (OLS), with polynomial distributed lags (PDL's) for the explanatory variables. The PDL specifications used third-degree polynomials, eight lags, and the far endpoint constrained to zero. The results for the estimations are shown in table 1.

The first column of results in table 1 shows coefficients from regressions in which Federal Government purchases represented the government spending variable. The second column of results shows coefficients from regressions in which total Federal expenditures represented the government spending variable. Several interesting results emerge. The coefficients are all of the hypothesized signs. The coefficients for taxes and money are statistically significantly different from zero in both equations, but neither the coefficients for Federal purchases nor the coefficients for Federal expenditures are statistically significantly different from zero.[5]

These results imply that changes in real Federal government spending do not promote future real economic growth. Note, however, that the results should not be interpreted as indicating that real government spending does not affect real income or real output. That is, a one-time increase in government spending could lead to a one-time increase in income or output in the quarter in which the spending change occurred. The results suggest only that subsequent changes in income are not significantly related to prior government spending changes.

A different interpretation exists for changes in taxes. The results imply that real economic growth is significantly negatively related to changes in real taxes relative to real output. Hence, an increase in taxes relative to output leads to lower growth, while a decrease in taxes relative to output promotes real growth.

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[4]These results from an IS-LM framework require that the IS and the LM curves are not perfectly interest rate inelastic.

[5]We also estimated the relationships using combined Federal and State and local government measures of spending and the deficit. The results are not shown because of their similarity to those reported for estimations using the Federal measures alone. Through the 1980's, State and local governments taken together ran fairly stable surpluses. As a result, changes in total government spending and deficits were defined largely by changes in the Federal components.

Table 1--Regression results for policy variable effects on real growth

$$\frac{\Delta Y}{Y} = \alpha_o + \sum_{i=1}^{8} \alpha_{Gi} \frac{\Delta G}{Y}(-i) - \sum_{i=1}^{8} \alpha_{Ti} \frac{\Delta T}{Y}(-i) + \sum_{i=0}^{8} \alpha_{Li} \frac{\Delta L}{Y}(-i)$$

Item	Regression coefficients (1)	(2)	(3)	(4)	(5)
α_o	.422*	.330	1.029*	0.682*	0.036
	(.176)	(.234)	(.223)	(.105)	(.178)
$\Sigma \alpha_{Gi}$ G = fed purchases	.637				
	(.975)				
$\Sigma \alpha_{Gi}$ G = fed expenditures		.154	-.331		
		(.866)	(.871)		
$\Sigma \alpha_{Ti}$	-2.219*	-1.769*	-1.462*		
	(.861)	(.813)	(.589)		
$\Sigma \alpha_{(G-T)}$				-1.033*	-1.044
				(.497)	(.762)
$\Sigma \alpha_{Li}$	1.342*	1.389*			1.414*
	(.264)	(.271)			(.291)
R^2	.33	.33	.16	.09	.31
DW	2.01	2.03	1.72	1.59	1.99

Standard errors in parentheses.
* = Significantly different from zero at the 0.05 level of significance.

The results in the first two columns of table 1 also imply that real economic growth is positively related to changes in the real money supply relative to output. The coefficient on the real money supply is always statistically significantly greater than zero but not significantly different from 1. This relationship likely results from the accommodative monetary policies that existed over much of the sample period. Such a result is also likely to exist when the velocity of circulation of money is stationary or tends to move about a particular level over time.

The third and fourth columns of table 1 report results for specifications of equation 9 that eliminate the monetary variables. In the third column, Federal expenditures and taxes enter separately; in the fourth column, the fiscal variables are combined into a single deficit term. Taxes and the deficit are significant in these specifications, but the explanatory power of the regressions drops noticeably. The coefficient on the deficit fails to be significant when real money growth is reintroduced into the equation, as shown in the last column of table 1.

Fiscal Policy and the Trade Balance in a Keynesian IS-LM Framework

The empirical specification and results presented above do not explicitly account for international trade variables. Potential fiscal policy-international trade relationships are, however, of particular interest in analyzing fiscal policy effects on agriculture and the rural economy. In this section, we use the above IS-LM framework to derive a specification for examining relationships between fiscal policy and international trade.

The following specification can be easily derived from the framework:

$$\Delta(X\text{-}IM) = \gamma_o + \gamma_Y \Delta Y + \gamma_L \Delta L + \gamma_G \Delta G + \gamma_T \Delta T \qquad (10)$$

The difference specification is used because the variable series are nonstationary in levels form.

To evaluate the coefficients of equation 10, we again used OLS estimation and PDL specifications. We used the merchandise trade balance as the measure of X-IM.

Table 2 provides the results for several variants of equation 10. The estimated coefficients on the fiscal policy variables are of the hypothesized signs in all of the specifications. The first column shows results for a specification with separate expenditure and tax variables. The fiscal policy variables enter signficantly in determining the trade balance, but income and money do not. The second column shows results using the deficit term rather than the separate spending and tax terms. In that restricted specification, the budget deficit term enters significantly in explaining movements in the trade balance. The third and fourth columns report results for specifications in which the real money and output variables were omitted. In the regression results reported in the third column, the expenditure and tax terms are significant at only the 10-percent level. In the fourth column, the coefficient on the deficit term is of the hypothesized sign and is signficantly different from zero.

Fiscal Policy Effects on Interest Rates and the Term Structure

The literature reviewed above can be generally interpreted as indicating that short-term interest rates and exchange rates are not significantly affected by government deficit spending. However, the results for deficit effects on long-term interest rates are mixed. As discussed above, Hoelscher (1986) finds evidence that deficits increased long-term interest rates, while Plosser (1987) shows results that indicate that government debt shocks may in fact be associated with downward movements in interest rates across the term structure. In this section, we present results that illustrate some of the problems with attempting to find a relationship between government deficits and interest rates.

Consider an equation for the liquidity preference approach to the term structure of interest rates:

$$i_{t,n} = [(1 + i_{t,1})(1 + E_t i_{t+1,1}) \ldots (1 + E_t i_{t+n-1,1})]^{1/n} - 1 + (L_n - L_1) \qquad (11)$$

where $i_{t,n}$ is the rate of interest in period t for an n period bond, E_t is the expectation operator representing the rational expectation formed and based on information available in period t, and L_n is a liquidity or risk premium on an

Table 2--Regression results for shortrun policy variable effects on the real merchandise trade balance

$$\Delta(X\text{-}IM) = \gamma_o + \gamma_Y \Delta Y + \gamma_L \Delta L + \gamma_G \Delta G + \gamma_T \Delta T + e$$

Item	Regression coefficients (1)	(2)	(3)	(4)
γ_o	0.762 (.554)	0.593 (.506)	-0.014 (.465)	-0.225 (.200)
$\Sigma \gamma_{Gi}$ G = fed. expends.	-.150* (.068)		-.117 (.063)	
$\Sigma \gamma_{Ti}$	.187* (.085)		.078 (.042)	
$\Sigma \gamma_{(G-T)}$		-.150* (.061)		-.090* (.033)
$\Sigma \gamma_{Li}$	-.003 (.029)	-.013 (.028)		
$\Sigma \gamma_{Yi}$	-.050 (.036)	-.027 (.029)		
R2	.31	.29	.15	.12
DW	1.77	2.24	1.91	2.02

Standard errors in parentheses.
* = Significantly different from zero at the 0.05 level of significance.

n period bond. The liquidity or risk premium arises because the risk for a bond with a long term to maturity differs from the risk for a bond with a short term to maturity. Note that static expectations on short-term interest rates, e.g. $E_t i_{t+j,1} = i_{t,1}$ for all $j > 0$, yield the result that the long-term interest rate is equal to the short-term rate plus the liquidity premium:

$$i_{t,n} = i_{t,1} + (L_n - L_1) \qquad (12)$$

Hence, using this formulation the interesting questions center on the determinants of the liquidity premium.

Hoelscher splits the short-term rate into a real interest rate and an inflation expectation component. Additional variables from a loanable funds equilibrium relationship (real GNP and various measures of the budget deficit) were used in empirical specifications to explain the long-term rate. Hoelscher used annual data from 1947 to 1984 in his empirical work. In contrast, Plosser used monthly and quarterly data and a vector autoregression approach to examine the response of holding period returns on government securities to unexpected changes in publicly held government debt. Plosser found small negative effects of debt surprises on interest rates.

To examine the effect of budget deficits on long-term rates, we used the following specification, which is similar to that used by Hoelscher:

$$i_{t,n} = a_o + a_1 r_{t,1} + a_2 \pi_t + a_3 Y_t + a_4 (G\text{-}T)_t + e_t \qquad (13)$$

where $i_{t,n}$ is represented by the yield on 10-year Treasury securities (n = 40 quarters); $r_{t,1}$ is the short-term real rate of interest, calculated as the 3-month Treasury bill rate minus the rate of inflation; π_t is the rate of inflation over the past four quarters; Y_t is real GNP; and (G-T) is the real Federal budget deficit. We estimated equation 13 using OLS and U.S. quarterly data for the 1961.I to 1988.IV period.

Results of the estimation are shown in table 3. For the first equation (column 1), the coefficient for the deficit effect on the long-term interest rate is significant and positive, but the Durbin-Watson statistic reveals significant serial correlation. The second column shows results with correction for serial correlation. The coefficient for the deficit is neither positive nor significant.

Table 3--Regressions results for budget deficit effects on long-term interest rates

$$i_{t,40} = a_o + a_1 r_{t,1} + a_2 \pi_t + a_3 Y_t + a_4 (G\text{-}T)_t + e_t$$

$$i_{t,40} - i_{t,1} = b_o + b_1 Y_t + b_2 (G\text{-}T)_t + e_t$$

Item	Interest rate variable			
	$i_{t,40}$	$i_{t,40}$	$i_{t,40} - i_{t,1}$	$i_{t,40} - i_{t,1}$
constant	1.09*	8.57	2.17	1.10
	(.52)	(6.19)	(.50)	(1.12)
$r_{t,1}$	-.747*	.445*		
	(.038)	(.048)		
π_t	.796*	.428*		
	(.036)	(.081)		
Y_t	.0002	-.0007	-.0008*	-.0002
	(.0002)	(.0015)	(.0002)	(.0004)
$(G\text{-}T)_t$	.016*	-.0004	.0193*	.0112*
	(.002)	(.0023)	(.0020)	(.0027)
R^2	.93	.98	.54	.77
DW	.63		.63	
rho		0.97*		.75*
		(.02)		(.07)

Standard errors in parentheses.
* = Significantly different from zero at the 0.05 level of significance.

One possible adjustment suggested by equation 12 is to constrain the coefficient on the short-term nominal rate of interest to be 1. That is, we can observe the effect of deficits on the spread between long-term and short-term rates. The third column of table 3 shows OLS results for the restricted specification. The deficit coefficient is significant and positive, but serial correlation is a problem again. The fourth column of table 3 shows results from a regression with adjustment for serial correlation. The deficit coefficient is positive and significant. This result seems to provide support for Hoelscher's contention that higher government budget deficits increase the slope of the yield curve, causing long-term rates to rise relative to short-term rates.

A more critical view of the results presented in table 3 leads us to be somewhat suspicious of the specifications and the evidence. The existence of serial correlation in the OLS results suggest that the equation may be misspecified. Table 4 shows autocorrelations for the $i_{t,40}$ (the 10-year Treasury bond rate) and also for $i_{t,1}$ (the 3-month Treasury bill rate). Both of these variables are highly autocorrelated, and they are not likely to be stationary. Since spurious regression results are likely to occur when nonstationary variables are used, the regression results in table 3 are suspect.

An alternative specification that adjusts for the nonstationarity is to use first differences rather than levels. The OLS estimation results for the change in the 10-year Treasury bond rate are (with coefficient standard errors in parentheses):

$$\Delta i_{t,40} = \underset{(.051)}{0.052} + \underset{(.045)}{0.444}\ \Delta r_{t,1} + \underset{(.071)}{0.434}\ \Delta \pi_t - \underset{(.043)}{0.033}\ \Delta Y_t - \underset{(.0021)}{0.0008}\ \Delta (G-T)_t$$

$$R^2 = .53 \qquad DW = 1.67$$

This difference specification does not suffer from the problems of serial correlation that plagued the levels specification. However, the coefficient on the budget deficit term is now negative, but not significant. The OLS estimation results using the first difference of the long-term to short-term rate spread are:

$$\Delta (i_{t,40} - i_{t,1}) = \underset{(.080)}{0.107} - \underset{(.066)}{0.143}\ \Delta Y_t + \underset{(.0032)}{0.0053}\ \Delta (G-T)_t$$

$$R^2 = .10 \qquad DW = 1.99$$

Table 4--Autocorrelations for interest rate variables

Interest rate variable	lag 1	2	3	4	5	6
$i_{t,40}$	0.971	0.933	0.895	0.851	0.804	0.764
$i_{t,40} - i_{t,1}$	.860	.696	.593	.481	.376	.227

Again, the Durbin-Watson statistic indicates no problems associated with serial correlation for this difference specification. The deficit coefficient is positive, but is significant at only about the 10-percent level. The magnitude of the deficit effect is also relatively small. For example, a $10-billion increase in the deficit translates into only a 5.3-basis-point increase in the long- to short-term rate spread. Also, note in both of these difference specifications that the effect of real output is negative, but the output effect is significant only in the change in the long-term to short-term rate spread regression. This result can be attributed to the fact that changes in real activity have stronger effects on short-term interest rates relative to long-term interest rates.

The regression results reported in this section show that it is difficult to find robust empirical results for deficit effects on long-term interest rates. Slight changes in specifications lead to substantial changes in the estimates of the deficit effect, so attention to details of the statistical specification is crucial. The results also suggest that we cannot make very strong statements about the effects of budget deficits on long-term rates. We did not find any evidence of a significant effect of budget deficits in the specifications which did not restrict the relationship between long- and short-term rates. About all we can say is that the spread between rates on long- and short-term government securities was marginally positively related to government budget deficits. Note, however, that this does not mean that budget deficits raise interest rates.

Fiscal Policy Effects on Agricultural Commodity Prices

Our final set of econometric results focuses directly on the issue of budget deficit effects on agricultural commodity prices. The standard Keynesian hypothesis is that higher budget deficits put downward pressure on agricultural commodity prices. To test this hypothesis, we used an asset-market framework that was described in a recent study by Kitchen, Conway, and LeBlanc (1990).

The asset-market approach was initially developed to examine exchange rate adjustment and to explain exchange rate reactions to macroeconomic, particularly monetary, shocks (see Dornbusch (1976) and Mussa (1982)). More recently, the asset-market approach has been extended to analyses of commodity prices. For example, Kitchen, Conway, and LeBlanc use a money market equilibrium condition and a relationship between the money and commodity markets based on the theory of storage to present theoretical relationships among money, income, and commodity prices. In the asset-market model, the equilibrium path for commodity prices is a function of expected excess money supply and expected commodity supply-demand factors (as revealed in the marginal convenience yield).

A key part of the asset-market models is the incorporation of a sticky general price level. Hence, in exchange rate models, flexible exchange rates react more than proportionally to money market shocks that affect the equilibrium general price level, while in commodity price models, flexible commodity prices react more than proportionally to money market shocks that affect the equilibrium general price level.

The equation derived by Kitchen, Conway, and LeBlanc differed from previous asset-market specifications for commodity prices by explicitly incorporating the expected marginal convenience yield. By including the marginal

convenience yield, commodity-specific supply and demand information can be directly included in asset-market analyses of commodity prices.

The empirical specification derived in the asset-market framework is given by:

$$DP_t = c + d_1Q1 + d_2Q2 + d_3Q3 - k(E_tS_{t+1} - S_{t-3}) + \sum_{j=0}^{m} h_j(DM_{t-j} - DQ_{t-j}) + \sum_{j=0}^{n} w_jDEX_{t-j} + e_t \quad (14)$$

where:

DP = the percentage change in nominal commodity price,
Q1, Q2, Q3 = quarterly dummy variables
E_t = the expectation operator,
S = commodity stocks,
DM = the percentage change in the M2 money stock
DQ = the percentage change in real output (GNP)
DEX = the percentage change in the value of the dollar, and
e = an error term.

The use of lagged values of the change in the excess money variable (DM - DQ) and the change in the exchange value of the dollar in the empirical specification reveal an assumption of an adaptive expectations mechanism. The expected value for commodity stocks was derived using an instrumental variable approach.

For purposes of examining possible government deficit effects on agricultural commodity prices, we ran regressions using the specification of equation 14, and also regressions with the specification augmented to include the deficit variable. The equations were estimated using data for soybean prices and stocks for the 1976.II-1988.III period. Observations when the soybean price was at or below the loan rate for soybeans were omitted from the sample. Results are presented in table 5. The first column of table 5 shows results for the final form of the equation that were reported by Kitchen, Conway, and LeBlanc. The specification used the current and first lagged values of the excess money term, and the current and five lagged values of the exchange rate term. Soybean prices are negatively and significantly related to the expected change in soybean stocks and to the change in the exchange value of the dollar. The coefficient on the excess money term is positive and significant, and it is also significantly greater than one. The hypothesis of the "overshooting" of the commodity price is supported by the coefficient on excess money being significantly greater than one.

The specification was then augmented to include the change in the real government deficit as an additional explanatory variable. Regressions for various lag structures for the real deficit change and the other variables were estimated. The second column of table 5 shows results for the regression for which the deficit variable entered most significantly. In that specification, only current values of the real government deficit, excess money, and exchange value of the dollar variables were used. The coefficient on the deficit variable is negative and significant, which is consistent with the "conventional wisdom" hypothesis. In general, however, the inclusion of lagged excess money and exchange rate terms reduced the absolute magnitude and significance of the deficit coefficient, whether lagged values of the deficit

Table 5--OLS regression results for budget deficit effects on soybean prices

Item	Regression coefficients (1)	(2)	(3)
constant	-9.3*	-5.7	-8.5*
	(3.2)	(3.1)	(3.0)
Q1	6.79	4.85	4.13
	(3.61)	(3.95)	(3.55)
Q2	9.22*	9.83*	8.38*
	(3.58)	(3.59)	(3.32)
Q3	4.53	4.89	4.56
	(3.46)	(3.63)	(3.29)
$E_t(S_{t+1}-S_{t-3})$	-.0399*	-.0367*	-.0375*
	(.0058)	(.0064)	(.0058)
DM - DQ	5.04*	2.49*	5.14*
	(1.29)	(1.07)	(1.22)
DEX	-2.31*	-.89*	-1.71*
	(.55)	(.33)	(.41)
Δ(G - T)		-.17*	-.16*
		(.08)	(.08)
R^2	.58	.51	.61

Standard errors in parentheses.
* = Significantly different from zero at the 0.05 level of significance.
Sample: 1976.II - 1985.III, 1986.I - 1986.II, 1987.II - 1988.III. When lagged values are used in the estimation the coefficient in the table is the sum of the coefficients for the current and lagged values of the variable, and the standard error is the standard error of the coefficients sum. The regression in the first column used the current and first lagged values of the DM-DQ term and the current and five lagged values of the DEX term. The regression in the second column used only the current values of the DM-DQ, DEX, and Δ(G-T) terms. The regression in the third column used the current value of the Δ(G-T) term, the current and first lagged values of the DM-DQ term, and the current and two lagged values of the DEX term.

were used or not. The third column in table 6 shows results for the regression that had the best fit for the augmented specifications. The coefficient for the deficit term is of the hypothesized sign, and it is significantly different from zero at the 0.05 level. The coefficient on the deficit term in the third column is -0.16. This value indicates that if the deficit were to increase by $10 billion (1982 dollars) during a quarter, soybean prices would decline by 1.6 percent, other things being equal. During the sample period considered, the largest increase in the deficit was $44 billion in the third quarter of 1982. The coefficient estimate suggests that value for a change in the deficit would have led to a 7-percent decline in soybean prices.[6]

Note, however, that monetary effects tend to be larger and more important in the determination of soybean prices as suggested by the size and significance of the coefficients for the DM - DQ term. Excess money growth averaged 1.43 percent per quarter, which, according to the regression coefficients, would have led to an average 7.4-percent increase in soybean prices.[7] The largest suggested deficit effect is less than the average monetary effect. A similar interpretaton exists for the price effects of changes in the exchange rate relative to the price effects associated with changes in the deficit. The deficit may contribute to the explanation of soybean prices, but domestic monetary and international financial variables appear to be more important. Further, commodity-specific stock effects are more important and more significant than the effects of any of the macroeconomic variables. Suggested effects on soybean prices from table 5 should be viewed as shortrun effects since production and stock responses to price changes are not incorporated into the equation.

Suggested Effects of a Changing Deficit

Our econometric results generally suggest the following. A decline in the real budget deficit would result in a decline in measured real economic growth in the short run. Lower budget deficits would also lead to a lower balance-of-trade deficit, a small decrease in the long- to short-term interest rate spread, and an increase in soybean prices.

From our estimates, a decline in the deficit by $50 billion (1982 dollars) at an annual rate would produce the following results. Over the following 3 years, the cumulative effect on real GNP growth would be in the range of -1 to -2 percentage points. For example, if real GNP were expected to grow 3 percent per year over the next 3 years, then real GNP growth over the next 3 years would be approximately 9.27 percent. The $50-billion deficit reduction we considered would reduce that growth to the 7.27- to 8.27-percent range.

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[6]We also performed similar regressions for corn prices. The general interpretation of the results is similar for corn prices as for soybean prices. Notable exceptions are that the deficit term was not significant when lagged values of the excess money and exchange rate were included and that the absolute magnitude of the coefficient tended to be larger (for example -0.28).

[7]Note that the "average" positive excess money contribution is a shortrun demand side effect that is offset by commodity production and stock effects through the convenience yield.

The estimates suggest that the merchandise trade balance would improve over the next 3 years by a cumulative amount in the range of $36 billion to $60 billion (1982 dollars). The results for real GNP growth suggest that the improvement in the trade balance would result from a fall in imports, rather than due to a rise in exports. These estimates seem to provide some support for the view that budget deficits crowd out net exports, although at less than the one-to-one relationship suggested by the twin deficits view.

The long- to short-term interest rate spread would fall over the next year by 26.5 basis points. The soybean price would increase by about 8 percent over the same period.

Simulation Results from a Quarterly Macroeconomic Model

The final aspect of our investigation was to perform scenario analyses with a quarterly macroeconomic model to illustrate the effects of fiscal policy changes. The quarterly macroeconomic model we used is a structural, simultaneous equation system based on the neoclassical-Keynesian synthesis. Along with substantial detail at the macroeconomic level, the model has forward and backward linkages to agricultural prices and equations describing the behavior of total civilian and nonmetro unemployment rates.[8] In the model, differences between the civilian and nonmetro unemployment rates are determined by real GNP growth, real interest rates, and the exchange value of the dollar.

After the model was used to construct a base scenario for a 2-year period, one alternative scenario was based on a fiscal policy shock of a 0.5-percent increase in the effective tax rate. The 0.5-percent tax rate increase initially yields a tax revenue increase and a deficit reduction of approximately $21 billion annually (1982 dollars). By the end of 2 years, total tax revenues are only $16 billion higher at an annual rate (relative to the no-tax increase base). The smaller deficit improvement after 2 years occurs because of the contractionary effects of the tax increase: after 2 years real GNP is $84 billion lower relative to base. Inflation falls by less than 0.5 percentage point and interest rates fall 10 basis points or less. Net exports are $25 billion higher cumulatively over the 2 years as a result of the tax increase. Because real growth falls relative to money supply growth, macroeconomic and financial market forces push up prices received for crops by 4 percent, soybean prices by 9 percent, and prices paid on production items by 1 percent.

Both total civilian and nonmetro unemployment rates rise relative to the base. After one year, civilian and nonmetro unemployment rates are about 0.8 percentage points higher. After 2 years, the civilian rate is 1.4 percentage points higher, while the nonmetro rate is 1.3 percentage points higher. The slightly smaller increase in the nonmetro rate in the second year is due to the effects of a lower real interest rate.

A second scenario used a fiscal shock based on a sustained $25 billion (real $82) reduction in Federal Government spending, and as a result an initial equivalent reduction in the deficit. After 2 years, the deficit is <u>higher</u> (relative to base) by about $40 billion because of lower real activity that

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[8]See Kitchen and Mack (1991) for a description of the model and for scenarios illustrating the effects of various shocks.

results from the spending cuts; real GNP is $240 billion lower relative to base after 2 years. Inflation falls by 0.5 to 1 percentage point, depending on the price measure used. Short-term interest rates are 30 to 50 basis points lower, and long-term rates are 10 to 20 basis points lower. Net exports are a cumulative $72 billion higher over 2 years because of lower imports resulting from the contraction in the domestic economy. The negative effects on real output and the resulting higher excess money growth lead to higher agricultural commodity prices. Prices received on crops are 9 percent higher, soybean prices are as much as 20 percent higher, and prices paid by farmers are about 1.5 percent higher. Such agricultural commodity price increases could be tempered by production responses.

With the fall in real activity that results from lower government spending, total civilian and nonmetro unemployment rates rise relative to the base. After 1 year, civilian and nonmetro unemployment rates are about 1.1 percentage points higher. After 2 years, the civilian rate is 1.8 percentage points higher, while the nonmetro rate is 1.7 percentage points higher.

Note that while the model has some endogenous monetary policy components, the scenarios were conducted without an exogenous shift in monetary policy. It is likely that monetary policy would change as a result of budget deficit reductions that occured due to higher tax rates and/or lower Federal spending. Interest rates could be lower and the negative effects on real activity and the increases in unemployment could be reduced as a result. However, the initial negative effect of tax increases or Federal spending cuts could not be offset unless they were known well in advance. For the $25 billion spending cut scenario, the model suggests that monetary policy would have to cut interest rates by 300 basis points or more in order to return the economy (after 1 year) to a growth path similar to that of the base scenario. Long-term rates would also have to decline by a similar or greater amount in order to promote private investment spending. Such a result requires credibility for both fiscal and monetary policymakers. That is, the market would have to be convinced that the fiscal restraint was genuine so that an expansionary monetary policy would not generate excess inflation pressures.

The model scenarios are generally consistent with the empirical results described above from our relatively simple single equation regression analyses. Changes in fiscal policy variables (government spending and taxes) can have significant effects on real activity. The fiscal policy effect on interest rates is small. There are also significant effects on agricultural prices. The role of monetary policy remains somewhat uncertain, but it appears to be the predominant force for interest rate determination and to have greater effects on agricultural prices than fiscal policy.

An additional result gained from the model is the effect of fiscal policy changes on nonmetro unemployment. The similar responses of nonmetro and total civilian unemployment rates in the scenarios suggest that general fiscal policy changes would not have significantly different effects on nonmetro real activity relative to the general economy. However, if an expansionary monetary policy were used to offset the restrictive fiscal policy, real interest rates would likely fall. Also, if monetary policy in the United States became less restrictive relative to foreign monetary policies, the exchange value of the dollar could also fall. Lower real interest rates and a lower exchange value of the dollar would produce lower nonmetro rates relative to the total civilian unemployment rate.

Conclusions

Few studies have directly addressed the importance of fiscal policy for agriculture and other rural areas. Just and Chambers used a hypothesized relationship from government budget deficits to interest rates, exchange rates, and pressures on agricultural commodity prices to obtain effects of fiscal policy on agriculture and agricultural policy variables. Specifically, Just and Chambers assumed that higher budget deficits created upward pressure on interest rates and the exchange value of the dollar, and led to downward pressure on agricultural commodity prices, but presented no evidence to support their theoretical arguments or indicate the magnitude of these effects.

Our review of the evidence in the literature and the results we presented do not provide a clear channel for fiscal policy effects on agriculture. We found little evidence in the literature to support a relationship between deficits and interest rates or deficits and exchange rates. However, we presented some empirical evidence suggesting that real growth, the trade balance, and soybean prices are affected by deficits. In general, we find that fiscal policy is not as important as monetary policy in the determination of real activity and interest rates. We also find that fiscal policy is not as important as monetary policy (or commodity-specific production and stocks) in the determination of agricultural commodity prices. Results from scenarios produced by a quarterly macroeconomic model also generally support these interpretations.

Interactions between fiscal and monetary policies are not clear. Some evidence exists to suggest that the Federal Reserve has historically accommodated some of the Federal Government's deficit spending. In practice, though, it is difficult ex post to separate the effects of monetary and fiscal policy. One interpretation is that monetary policy is more important than fiscal policy in determining the level of interest rates, but that monetary policy is determined in part by fiscal policy. Statements by Federal Reserve Chairman Alan Greenspan in 1990 that the Fed could encourage interest rate cuts given credible deficit reduction are evidence of this policy interaction.

Fiscal policy issues will continue to be important because of continued large Federal budget deficits and the efforts made to reduce them. Recent administration and Congressional Budget Office (CBO) projections of the deficit--incorporating changes specified by the Omnibus Budget Reconciliation Act of 1990 and the Budet Enforcement Act of 1990--show Federal deficits in the $220 to $318 billion range for FY90 to FY92. By FY96, the administration projects a surplus of $20 billion, while the CBO projects the deficit to fall to the $50-$60 billion range. Our analysis suggests that such deficit reductions would lead to lower economic activity, an improved trade balance, and higher agricultural commodity prices. However, if the deficit-reduction policy is viewed as credible, market expectations could change and promote lower long-term interest rates. Also, the Federal Reserve could adjust monetary policy to attempt to offset the negative effects on economic activity and related increases in unemployment. A cautious, non-inflationary lowering of short-term interest rates by the Federal Reserve would promote spending and real growth. Agriculture would likely benefit from such a combination of fiscal and monetary policies as positive pressures on agricultural commodity prices would help offset the direct reduction in farm program expenditures that are part of the deficit reduction package.

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