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DEFICIT-SAVINGS RATIOS AS INDICATORS OF INTEREST-RATE PRESSURE: A COLLECTION OF NOTES

by

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Introduction

A widespread concern in recent years has been the growth of public sector deficits in industrial countries. Deficits have grown in both absolute terms and also expressed as a percentage of GNP. This trend has provoked worries that the public sector's borrowing may exert increasing pressure on credit markets, penalizing borrowing for private investment, or put another way, that the public sector is absorbing saving that would otherwise go for investment purposes.

As budget deficits grew within countries, with implications for credit market conditions at home and in other countries, the need arose to develop indicators suitable for international comparison. One such indicator is the ratio of government deficits to GNP. The comparatively low ratio for the United States has sometimes been taken as a reason to downplay alarm expressed over the high level of U.S. deficits. However, some observers have noted that comparisons of deficits to GNP's does not adequately capture the availability of resources in the private sectors to offset the deficits. The preferred indicator of credit market pressures induced by fiscal policy is one that relates deficits to national or private savings.

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The purpose of this collection of notes is to examine the usefulness of such ratios as exogenous indicators of the interest rate or credit market pressures generated by shifts in fiscal policies. We also consider the extent to which such ratios provide a meaningful basis for international comparisons. That is, does a ratio of a given size express the same degree of credit market pressure across countries?

The first section provides a theoretical examination of the appropriateness of different indicators of interest-rate pressure in the polar alternatives of a closed economy and an open economy with perfect substitutes. The second section provides an empirical analysis based on simulations with the Federal Reserve Board staff's Multi-Country Model (MCM); the results suggest that the effects of similar exogenous shocks to government deficits differ significantly across countries and that deficit savings ratios, far from being exogenous indicators, are substantially affected by other variables. Notwithstanding the results of sections 1 and 2, it is likely that the deficit-savings ratio will continue to be used as an indicator of credit market pressure. Section 3 addresses the issue of the preferable measures of deficits and savings to be used in such a comparison given the availability of data.

I. Indicators of Interest Rate Pressure--Theoretical Issues*

As noted in the introduction, there has been a search for simple indicators of the interest rate pressure generated by changes in fiscal policies. This effort has been motivated in part by the desire to make comparisons, either through time or across countries, of the credit market consequences of different fiscal policies. However, the case for any such indicator must be based on a quite stringent set of explicit or implicit assumptions. We show that a different indicator of interest rate pressure would be appropriate for comparison across countries under each of two alternative sets of explicit assumptions. Under the first set of assumptions, the world is viewed as a collection of closed economies that are identical in most respects. The countries may be of different size as measured by income and may have different average propensities to save. In this world an appropriate indicator of the pressure generated by a change in any country's fiscal policy on its interest rate is the ratio of the change in that country's cyclically adjusted government deficit to cyclically adjusted savings.

Under the second set of assumptions, the world is viewed as a set of not necessarily similar countries whose financial markets are closely linked. In this world of perfect capital mobility and perfectly substitutable assets, an appropriate indicator of the pressure generated by a change in any country's fiscal policy on the single world interest rate is simply the change in its cyclically adjusted budget deficit. In other words, under this second set of assumptions, a $1 increase in the U.S. government deficit generates the same pressure on world interest

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*/ This section was drafted by Gerard Caprio, Dale Henderson, and Steven Symansky.

rates as the equivalent increase in any foreign government deficit. However, before turning to these two cases, we shall review briefly reasons for standardizing our deficit and saving calculations at some point of the business cycle.

Consider an exogenous increase in government spending (or decrease in taxes). It might seem that such an increase in the deficit would lead both to a rise in the ratio of the government deficit to savings (D/S) and to higher interest rates. If it did, one might be tempted to infer that a rise in the deficit/savings ratio indicates upward pressure on interest rates resulting from expansionary fiscal policy. There are at least two reasons to exercise caution in making such an inference. First, as shown below, an exogenous increase in government spending may lead to a fall rather than a rise in the deficit/savings ratio. Second, a more expansionary fiscal policy is not the sole exogenous change that is consistent with increases in both interest rates and the deficit/savings ratio.

An exogenous fiscal stimulus increases income and the interest rate but may raise or lower the deficit/savings ratio. Note that in a closed economy the deficit/savings ratio can be rewritten as one minus the investment/savings ratio (I/S):

$$(1) \quad D/S = (S - I)/S = 1 - I/S.^{1/}$$

D/S rises if I/S falls following a fiscal stimulus. The increase in income raises savings, and the rise in interest rates lowers investment

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1/ Note that here we are defining S as private saving rather than national saving as in section's II and III. The argument of this section holds regardless of the savings variable employed.

and may raise savings. However, if investment responds positively enough to changes in income, I/S might rise and D/S would then decline. Note that the larger the marginal tax rate, the more likely it is that I/S will rise because the larger the marginal tax rate, the smaller the effect of the increase in income on savings.[2/]

Exogenous shocks other than expansionary fiscal policy can also lead to increases in both the interest rate and the deficit/savings ratio. Consider an exogenous decrease in the money supply which lowers income and raises the interest rate. In a closed economy, the deficit/savings ratio can be rewritten as:

$$(2) \quad D/S = D/(I + D).$$

The decline in income as a result of contractionary monetary policy raises the deficit and lowers investment. Investment spending also declines with the increase in interest rates. Therefore, as long as investment spending is positive, the percentage increase in the numerator (D) exceeds the percentage increase in the denominator (I + D) which may, of course, actually fall, so that the deficit/savings ratio must rise.

The above drawbacks to the use of changes in the deficit/savings ratio as an indicator of interest rate pressure attributable to variations in fiscal policy stem from the endogeneity of both the numerator and the denominator (D and S). The traditional way of avoiding this problem is to look at the change in the full employment, or cyclically adjusted, deficit. We shall follow this practice; we also

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2/ In section II it is pointed out that an exogenous increase in government spending leads to a fall in D/S in the German sector of the Multi-Country Model. In the German sector, investment is highly income elastic and the tax rate is high (0.5).

adjust the savings variable-- a theoretically easy but empirically slippery task. It should be noted that we could evaluate each variable at any level of income. If the economy in question is not in the neighborhood of full employment, some other income level might be more appropriate.

A. The Closed Economy Case

To begin with we consider the case in which the world is composed of a collection of closed economies that differ only with respect to size as measured by income and the average propensity to save. A conventional model of a closed economy is given by:

$$(3) \quad I(Y, r) + g_0 - gY - t_0 - tY - S[Y - t_0 - tY, r] = 0,$$

$$(4) \quad L(Y, r) - M = 0.$$

The actual government deficit is given by

$$(5) \quad D = g_0 - gY - t_0 - tY,$$

and the cyclically adjusted deficit is given by

$$(6) \quad D_{CA} = g_0 - gY_{CA} - t_0 - tY_{CA}.$$

The change in the cyclically adjusted deficit,

$$(7) \quad \Delta D_{CA} = \Delta g_0 - Y_{CA}\Delta g - \Delta t_0 - Y_{CA}\Delta t,$$

is approximately equal to the exogenous part of the change in the actual deficit,

$$(8) \quad \Delta D_{EX} = \Delta g_0 - Y\Delta g - \Delta t_0 - Y\Delta t$$

Since

$$(9) \quad \Delta D_{CA} - \Delta D_{EX} = (Y - Y_{CA})\Delta g + (Y - Y_{CA})\Delta t,$$

$\Delta D_{CA} \rightarrow \Delta D_{EX}$ as the terms $(Y - Y_{CA})\Delta g$ and $(Y - Y_{CA})\Delta t$ each approach zero.

The effect of an exogenous increase in the deficit on the interest rate is given by

$$(10) \quad \Delta r = (L_Y/A)\Delta D_{EX},$$

where[3/]

$$A = L_r(I_Y - g - t - S_Y) - L_Y(I_r - S_r).$$

Expressing the right-hand side of (10) in terms of elasticities and semi-elasticities, we have

$$(11) \quad \Delta r = k(\Delta D_{EX}/S),$$

3/ Note that $S_Y = S_Y d(1 - t)$.

where[4/]

$$k = \eta_{LY}/B,$$

$$B = \varepsilon_{LY}[(I/S)\eta_{IY} - (G/S)\eta_{GY} - (T/S)\eta_{TY} - \eta_{SY}]$$

$$- \eta_{LY}[(I/S)\varepsilon_{Ir} - \varepsilon_{Sr}].$$

We can also write

$$(12) \quad \Delta r_{CA} = k_{CA}(\Delta D_{CA}/S_{CA}),$$

where

$$k_{CA} = \eta_{LY}/B_{CA}$$

$$B_{CA} = \varepsilon_{LY}[(I/S_{CA})\eta_{IY} - (G/S_{CA})\eta_{GY} - (T/S_{CA})\eta_{TY}$$

$$- (S/S_{CA})\eta_{SY}] - \eta_{LY}[(I/S_{CA})\varepsilon_{IY} - (S/S_{CA})\varepsilon_{SY}].$$

Clearly, $\Delta r \to \Delta r_{CA}$ as $Y \to Y_{CA}$ since $S \to S_{CA}$[5/]. The closer the economy is to cyclically adjusted output, the better is Δr_{CA} as an approximation to Δr.

4/ $\eta_{SY} = \eta_{SY}d\eta Y dY$. η_{ij} represents the elasticity of i with respect to j and ε_{ij} represents the semi-elasticity of i with respect to j.

5/ Note that if in equations (3) and (4) we start out away from full employment, g_0 or t_0 will have to be adjusted in order to consider a fiscal policy experiment in the neighborhood of cyclically adjusted output.

If k_{CA} is constant across countries, then $\Delta D_{CA}/S_{CA}$ is an indicator of the interest rate pressure generated by exogenous changes in fiscal policy that is appropriate for cross-country comparisons. k_{CA} will be constant across countries if (1) the income elasticities of money demand, savings, investment, government spending, and taxes, (2) the interest rate semi-elasticities of money demand, savings and investment, and (3) the ratios of investment, taxes and government spending to cyclically adjusted savings are the same across countries. Some readers will see no reason for these parameters to be identical across countries, while others will expect, a priori, no differences. Of course, k_{CA} could be constant across countries if, by chance, the inter-country differences in the parameters just listed were exactly offsetting.

IB. The Two-Country, Perfect Substitutes Case

Now consider the case in which the world is composed of a set of countries which may be quite different but whose financial markets are closely linked. In particular, suppose that each country in a two-country world produces its own specialized output and that the imperfectly substitutable goods are traded internationally. Residents of each country hold the money of their country but not foreign money. Securities denominated in the two currencies are perfect substitutes and exchange rate expectations are static, so there is, in effect, one world interest rate.[6/] Exchange rates are flexible. There is exogenous government spending in both countries but no endogenous government

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6/ All that is really required for our result is that expected rates of change in exchange rates be independent of any current or expected future variables.

spending or exogenous or endogenous taxes.[7/]

Given the above assumptions, the equilibrium conditions of the model are[8/]

$$(13)\quad I(Y, r) + g_0 - S(Y, r) + Z(Y, \overset{*}{Y}, e) = 0$$

$$(14)\quad \overset{*}{I}(\overset{*}{Y}, r) + \overset{*}{g}_0 - \overset{*}{S}(\overset{*}{Y}, r) - Z(Y, \overset{*}{Y}, e) = 0$$

$$(15)\quad L(Y, r) - M = 0$$

$$(16)\quad \overset{*}{L}(\overset{*}{Y}, r) - \overset{*}{M} = 0$$

Foreign variables are indicated with asterisks. Since securities are perfect substitutes $\overset{*}{r} = r$. Given our assumption regarding fiscal policy $\Delta D_{CA} = \Delta g_0$ and $\Delta \overset{*}{D}_{CA} = \Delta \overset{*}{g}_0$.[9/]

In this case the change in the world interest rate is proportional to the sum of the changes in the cyclically adjusted government deficits of all countries, i.e.,

$$(17)\quad \Delta r = q(\Delta D_{CA} + \Delta \overset{*}{D}_{CA}),$$

7/ This last assumption is made for simplicity and does not affect our results.

8/ This model is the same as the one used by Mundell (International Economics, Chapter 18, Appendix) except that here investment is income sensitive and savings are sensitive to interest rate changes.

9/ In other words, the change in the cyclically adjusted deficit is equal to the exogenous change in the deficit.

where

$$q = L_Y \overset{*}{L}{}^*_Y / C > 0,$$

$$C = \overset{*}{L}_r L_Y (\overset{*}{I}_Y - \overset{*}{S}_Y) + L_r \overset{*}{L}{}^*_Y (I_Y - S_Y)$$

$$- L_Y \overset{*}{L}{}^*_Y (I_r - S_r + \overset{*}{I}_r - \overset{*}{S}_r).$$

It must be assumed that $C > 0$ in order to obtain conventional results for the effects of familiar disturbances.

In this model, then, an increase in the cyclically adjusted government deficit in either country has the same effect on the world interest rate. Stated alternatively, $1 of extra spending by the United States government would exert the same interest rate pressure as the equivalent increase in spending by any foreign government under the assumption that assets are perfect substitutes. This result is intuitive in a 1-good model or in a 2-good model in which the fraction of revenue spent by each government on each good is identical. In our model, one might suppose that increased government spending in country 1 would raise Y by more than increased government spending abroad. However, with freely floating exchange rates, it is readily verified that $\Delta Y/\Delta D_{CA} = \Delta Y/\Delta \overset{*}{D}_{CA}$ and that $\Delta \overset{*}{Y}/\Delta D_{CA} = \Delta \overset{*}{Y}/\Delta \overset{*}{D}_{CA}$ because the exchange rate changes to eliminate excess demands. In other words, if government spending rose at home and declined abroad by an equal amount, there would be no change in either country's income. The exchange rate, which, in our model, does not directly affect other markets, is free to vary so as to eliminate the excess demand at home and the excess supply abroad. Since either fiscal policy change (ΔD_{CA} or $\Delta \overset{*}{D}_{CA}$) has the same impact on Y (or on $\overset{*}{Y}$), it

follows from (15) and (16) that either fiscal policy change has taken some impact on the world interest rate.[10/]

10/ It can be shown that $\Delta Y/\Delta D_{CA} = \Delta Y/\Delta \overset{*}{D}_{CA}$ and that $\Delta \overset{*}{Y}/\Delta D_{CA} = \Delta \overset{*}{Y}/\Delta \overset{*}{D}_{CA}$; that is, an increase in the cyclically adjusted government deficit in either country has the same effect on income in a given country.

II. Deficit Savings Ratios--A Quantitative Assessment*

This section provides a quantitative analysis of ratios of government deficits to domestic savings, as indicators of the pressure of public sector borrowing on domestic credit markets. As outlined in the preceding section, the usefulness of these indicators, particularly for making comparisons across countries, can be limited in two respects. The first concerns the extent to which identical exogenous shocks to deficit-savings ratios differ across countries with respect to their impacts on domestic interest rates, income and prices. That is, do similar values of ratios imply similar degrees of credit-market pressure across countries? The second concerns the extent to which deficit-savings ratios are influenced by other variables and the extent to which such influences differ across countries. If the ratios are significantly affected by variables other than discretionary government spending and financing decisions, they could be misleading indicators of comparative exogenous credit market pressures across countries.

Our quantitative analysis of these issues is based on simulations with the Federal Reserve Board staff's Multicountry Model (MCM). The simulation results suggest both that the effects of similar exogenous shocks to government deficits differ significantly across countries and that deficit-savings ratios are substantially affected by other variables. Of course, these results are conditional upon the particular structure and parameters of the model employed.[1/]

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*/ This section was drafted by Peter Hooper. Steve Symansky, Ralph Tryon, Joerg Dittmer and Caryl McNeilly contibuted to the simulation results reported here.

1/ The MCM is described in detail in Guy V. G. Stevens, et. al. The U.S. Economy in an Interdependent World: A Multicountry Model, Federal Reserve Board, Washington D.C., 1983. The current version of the model is presented in "FRB Multicountry Model," Quantitative Studies Section, Division of International Finance, Federal Reserve

After discussing the simulation results, we briefly consider modifications to the ratios and their interpretation that would increase their usefulness for interventional comparisons of this type.

To address these issues, simulations were run with the U.S., German, Canadian, and U.K. single-country sectors of the MCM. In each country, the government budget deficit was shocked exogenously by an amount equal to 5 percent of gross national savings (roughly 1 percent of GDP).[2/] This was achieved by increasing government spending beginning in 198001, and holding the increment to spending constant in real terms over a four-year simulation period through 198304. An effort was made to standardize monetary policies in order to increase the comparability of the results across countries. Each country was assumed to target on a key monetary aggregate. In the U.S. and U.K. simulations M1 was held unchanged from its historical and projected path. In the German case, central bank money was used as the target variable, and in the Canadian case the non-borrowed monetary base was used.[3/]

We consider first the simulated effects of the budget deficit shocks on interest rates, income and prices in the four different countries. These are shown in Table 1, at intervals of 1, 4, 8, 12 and 16 quarters following the imposition of the spending shock. The qualitative results are fairly similar across countries and can be summarized as follows. Increased government spending raises domestic

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2/ The ratios of gross national savings to GDP are generally on the order of 0.2, ranging from .19 for the U.S to .22 for Germany. See Table (2) in Section III.

3/ The current structure of the Canadian model precluded us from using M1. The Japanese sector of the MCM was excluded from these simulations because the existing financial structure of that model was not set up to exogenize a monetary aggregate.

income and expenditures and the demand for money. Given fixed money growth, short-term interest rates rise to equilibrate the money market. Long-term interest rates generally rise more slowly, reflecting term-structure relationships. (In the U.K. model the long-term rate is directly affected by an increased supply of long-term government bonds to finance the deficit.) The rise in interest rates depresses domestic expenditures with a distributed lag, offsetting some of the initial stimulus; it also causes an initial appreciation of the domestic currency. The currency soon depreciates, however, as income growth stimulates imports--the decline in the current account leads to a depreciation through changes in expectations about the equilibrium real exchange rate, given imperfect substitutability of assets in the long run. The depreciation, in turn, stimulates net exports with a distributed lag. Domestic wages and prices rise with a lag as the increase in domestic expenditure puts upward pressure on labor demand and capacity utilization, and as the currency depreciation raises import prices. (A fall in prices in the U.K. case is due to the continuing lagged effects of the initial appreciation of the pound, which are offset only with a long lag by the subsequent depreciation.)

While there is some qualitative similarity across countries, the quantitative impacts differ substantially. Interest rates rise much faster in the United States than in other countries. This difference reflects in large part a substantially lower (in absolute terms) estimated interest elasticity of money demand in the United States than in other countries.[4/] German interest rates catch up to U.S. rates after

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4/ The estimated interest elasticity of demand deposits in the MCM, U.S. sector is about .08, compared with roughly .31 for Canada and .28 for Germany.

four years because the longer-run increase in nominal GNP, hence money demand, is much greater in Germany than in the United States.

The longer-run impact on real income is substantially greater in Germany than in the United States for three reasons: 1) the estimated interest elasticities of consumption and investment expenditures are much lower (in absolute terms) in Germany, 2) the accelerator response of investment to income is substantially greater in the German model and 3) the mark depreciation in the German simulation is 2-3 times greater than the dollar depreciation in the U.S simulation, with the resulting lagged stimulus to German real net exports correspondingly larger. Prices rise more in Germany than in the United States in longer run, due to the greater increase in aggregate demand, the larger currency depreciation, and the greater openness of the German economy. (Note that the domestic income and price effects of the currency depreciations are slightly overstated in these single-country simulations because foreign income and prices, which would be expected to move in an offsetting direction, have been held exogenous.)

Next we consider the endogeneity of the deficit-savings ratios and differences in the behavior of those ratios across countries. The impacts of the exogenous government spending shocks on the government deficit (including its major components) and on gross national savings and deficit-savings ratios are given in Table 2. For purposes of comparison across countries, these impacts have been expressed as percentages of nominal GNP (except for the deficit-savings ratios, which are expressed in percent terms).

The endogenous components of government deficits include tax receipts (which rise with nominal income), government interest payments

(which rise with interest rates and the budget deficit), transfer payments (which rise as output and employment falls) and the effects of inflation on government spending. In Table 2, interest payments are included with transfer payments in all cases except the U.S. results. Also, the effects of inflation on government spending are measured as the difference between "Total" and "Exogenous" government spending. This difference is noticeable for Germany and Canada, where the fiscal shocks had a significant impact on domestic prices.

Significant differences between the exogenous spending shock and the government deficit arise in the U.S. and German simulations. In the U.S. case, the rise in the deficit initially falls short of the exogenous spending increase due to an increase in tax receipts. After four years, however, with the rise in interest rates and decline in GNP, interest and transfer payments exceed tax receipts and the deficit rises well above the inital exogenous spending shock. In the German case, the change in the deficit never reaches the level of the spending shock, as a large increase in tax receipts more than offsets increased spending and transfers. In fact, within two years the initial deficit becomes a small surplus. This result reflects two factors: 1) a high aggregate marginal tax rate in the German model (about 0.5 of nominal GNP) and 2) a substantial increase in German nominal income, as discussed above. In the Canadian and U.K. cases, changes in endogenous components of the budget about offset one another, and the deficit does not differ greatly from the initial shock.

The change in gross national savings is equal to the change in private savings (as defined by disposable income minus consumption) plus government savings (as defined by the government-budget surplus, or minus

the budget deficit).[5/] By manipulation of the GNP identity, this is also equal to the change in gross private investment plus net exports.[6/] Private savings rise with nominal income in each of the country simulations. In most cases, the rise in private savings is less than the decline in government savings, so that national savings fall and the deficit-savings ratio rises. In the German case, however, the deficit-savings ratio falls, as national savings rise and the government deficit declines. The rise in national savings in the German case reflects, among other factors, a relatively strong accelerator effect of GNP growth on investment and the stimulus to net exports of a relatively large depreciation of the mark.

The deficit-savings ratio numbers reported in Table 2 were calculated under the assumptions that government budgets initially were in balance, and that gross national savings initially amounted to 1/5 of GNP in each country. Thus, an exogenous shock to government spending (and the deficit) equal to 1 percent of GNP, or 5 percent of gross savings, moves the ratio from zero to +5 percent on impact. One indication of the endogeneity of the ratio is the degree to which the impacts reported in Table 2 differ from +5 percent.

In brief, the simulation results presented here illustrate that the responses of interest rates, income and prices to fiscal shocks can differ substantially across countries. The behavioral and institutional factors underlying these differences suggest that analysis of relative credit market pressures based on international comparisons of deficit-

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5/ As discussed in Section III, some preference might be given to gross national savings as the denominator for the deficit savings ratio.

6/ Government investment is treated as current government spending in the data shown in Table 2.

savings ratios alone is potentially misleading. The results also illustrate the degree of endogeneity of budget deficits and national savings. Differences in marginal tax rates, transfer payments and national debt levels across countries imply significant differences in the behavior of budget deficits as income, prices and interest rates vary over the business cycle. It is also evident that savings behavior can vary across countries, reflecting differences in the cyclical responses of domestic expenditure, among other factors. These differences, combined with the fact that countries rarely are perfectly in phase cyclically, reinforce the view that ratios of current government deficits to domestic savings may not be a very meaningful basis for comparing exogenous credit market pressures imposed by different fiscal policies across countries.

Having illustrated the empirical difficulties associated with these ratios, what can be done to increase their usefulness? First, the problem that endogeneity poses for international comparison might be neutralized to some degree by adjusting the ratios for cyclical fluctuations, as was suggested in the preceeding section. At a minimum, tax receipts should be adjusted for cyclical differences across countries, using potential GNP or some other cyclically-neutral income measure. To be consistent, the denominator of the ratio, savings, probably should be adjusted for cyclical swings in income as well. In addition, given the importance of debt service payments in government budgets, it may be advisable to try to adjust for cyclical variation in interest rates, although this would be more difficult (do we adjust for transitory shifts in monetary policy as well as income?).

Finally, if an appropriate set of ratios could be computed

along these lines, the simulation results discussed above may provide some guidance to a more meaningful interpretation of those ratios. Based on the models we have considered, an exogenous shift in the deficit-savings ratio appears to exert greater pressure on domestic credit markets--as measured by increased interest rates--in the United States than in at least three other major industrial countries. Also, "crowding out" appears to have a more detrimental impact on real growth in the United States than in other countries. However, the cost in terms of increased inflation appears to be somewhat lower in the United States.

Table 1

Simulated Interest Rate, Income and Price Effects of Exogenous Government Deficit Increase Equal to 5% of Gross National Savings

	Number of Quarters Following Shock				
	1	4	8	12	16
U.S.					
Interest Rates ('00 Basis Pts.)					
3-Mo. Treas. Bill Rate	1.5	2.7	2.9	2.4	2.5
L-T Govt. Bond Rate	0.5	0.7	1.1	1.2	1.3
AAA Corporate Bond Rate	0.8	1.1	2.0	2.6	2.8
GNP (%)	1.6	1.0	0.4	0.3	0.1
GNP Deflator	-0.2	0.1	0.4	0.7	0.5
Germany					
Interest Rates ('00 Basis Pts.)					
Short Term	0.4	0.8	1.2	2.0	2.4
Long Term	0.1	0.3	0.5	0.9	1.2
GNP (%)	1.3	1.9	2.3	2.8	2.5
GNP Deflator (%)	0.0	0.1	0.4	1.3	2.5
Canada					
Interest Rates ('00 Basis Pts.)					
Short Term	0.1	0.3	0.5	0.8	1.1
Long Term	0.0	0.1	0.2	0.4	0.6
GNP (%)	1.1	1.1	1.0	0.9	0.7
GNP Deflator (%)	-0.2	0.3	0.7	1.1	1.4
U.K.					
Interest Rates ('00 Basis Pts.)					
Short Term	1.0	0.4	-0.1	0.4	0.5
Long Term	0.4	0.4	0.6	1.2	1.5
GNP (%)	1.0	1.0	1.3	1.3	1.1
GNP Deflator	0.3	-0.4	-0.9	-0.4	-0.1

Table 2

Simulated Impacts of Exogenous Government Spending Increases on Government Deficits and Gross National Savings

(All results except those for deficit-savings ratios are expressed as percentages of nominal GNP.)

	Numbers of Quarters Following Shock				
	0	4	8	12	16
U.S.					
Government Spending (Exog.)	.9	.9	.9	.9	.9
" " Total	.9	.9	.9	.9	1.0
Transfers	0	0	0	0	0
Interest Payments	0	0	0	0	0
Taxes	.2	.3	.3	.3	.2
Government Deficit	.6	.7	.8	.9	1.3
Gross National Savings	.1	-.3	-.3	0.3	0.3
Deficit-Savings Ratio (%)	3.0	3.6	4.1	4.5	6.6
Germany					
Government Spending (Exog.)	1.2	1.2	1.2	1.2	1.2
" " Total	1.2	1.3	1.3	1.4	1.6
Transfers	.1	-.04	-.1	.1	.4
Taxes	.7	.9	1.3	1.9	2.3
Government Deficit	.7	.3	0.1	-.3	-.3
Gross National Savings	-.5	-.2	.2	.5	.5
Deficit-Savings Ratio (%)	3.6	1.5	-.5	-1.5	-1.5
Canada					
Government Spending (Exog.)	1.0	1.0	1.0	1.0	1.0
" " Total	1.0	1.1	1.2	1.2	1.2
Transfers	.1	.2	.2	.3	.2
Taxes	.3	.4	.5	.5	.4
Government Deficit	.8	.8	.9	.9	1.0
Gross National Savings	-.2	-.4	-.4	-.5	-.7
Deficit-Savings Ratio (%)	4.0	4.1	4.6	4.6	5.2
U.K.					
Government Spending (Exog.)	1.1	1.1	1.1	1.1	1.1
" " Total	1.1	1.1	1.0	1.0	1.0
Transfers	.2	.3	.3	.6	.8
Taxes	.2	.1	.1	.4	.4
Government Deficit	1.2	1.1	1.2	1.3	1.4
Gross National Savings	-.01	-.4	-.6	-.5	-.3
Deficit-Savings Ratio (%)	6.0	5.6	6.2	6.7	7.3

III. Indicators of Credit Market Pressure--Data Accounting Isues.*

In this section we concentrate on questions concerning those observable variables and ratios which might be used to represent savings drain or credit market pressure. The wider question, whether any ratio of endogenous variables, defined for an individual country in an international economy, and not cyclically-corrected, can serve as an exogenous indicator of pressure was considered in the preceding sections.

The framework we use derives from the UN System of National Accounts (SNA). In the SNA, the major sectors of the economy -- government, households, corporations and rest of world -- have a consistent set of accounts.[1/] In particular, the government's transactions are -- like the others -- divided into a current account and a capital account.[2/] This treatment differs from the U.S. National Income and Product Accounts which treats all public expenditures, including capital formation, as current expenditures. In the SNA the difference between current expenditures and revenues constitutes the saving (or dis-saving) of the government. Saving balances are also drawn for the other sectors of the economy. The SNA then draws another balance, taking account of "receipts" (mainly capital consumption allowances) and expenditures (primarily capital formation). The balance on current and capital accounts is then net lending or net borrowing of

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*/ This section was drafted by Raymond Lubitz.

1/ Throughout this section we use the terms "public sector" and government interchangeably. The public sector often refers to government plus public enterprises. The former term refers primarily to non-marketable activities, and this is what is meant in the body of the section. In an appendix to this section we discuss some issues concerning the more-broadly-defined public sector.

2/ The OECD Occasional Study Public Sector Budget Balances (OECD, Paris, 1976) explains some of the SNA concepts, focusing in particular on the public sector accounts.

the public sector. (Equivalent balances are also drawn for the other sectors.)[3/] Net lending corresponds to the "budget balance." When SNA data are used, it is the concept that is typically used to compare public sector balances and savings. However, in the SNA framework, such comparisons of budget balances and savings compare conceptually different balances -- the saving balance for the economy as a whole with the net lending (or borrowing) of the public sector. In the U.S. NIPA, since there is no distinction between current and capital accounts for the public sector, the budget-balance national-saving comparison is more reasonable.[4/] Of course, even within the SNA framework, one might look at public-sector net lending/national saving to show what the government leaves for private sector investment, and this is what such comparisons presumably intend. But since public capital formation is also taking place, one cannot infer that the difference between national saving and government net borrowing is what is available for capital formation for the nation as a whole.

On the basis of this discussion, our view is that the comparison of budget balances and saving is less preferable than the comparison between government saving (or dis-saving), i.e., the current balance, and national saving. It is more appropriate for questions concerning the "drain" on savings (or addition to savings) of the government.

3/ Thus the household sector, in addition to its net saving (or dis-saving), which is the change in its net worth, may also borrow to acquire capital goods. These transactions, in its capital account, do not affect its net saving, but do affect its net lending (or borrowing).

4/ It should be noted that the U.S. budget also does not include capital account "receipts" so that the budget deficit on the U.S. NIPA basis differs from the SNA.

The question arises as to whether there is a more appropriate denominator (other than saving) to compare to net lending (or borrowing) of the government. Such a denominator is not apparent, because net lending (or borrowing) of the country as a whole is simply the current account balance.5/

In addition to the two balances already mentioned -- saving and net lending -- a third government financial concept is also often used, and refers to the government's total claim on the credit markets. OECD statistics refers to this total as "net indebtedness," but in general discussion abroad it is often known as the public sector borrowing requirement (PSBR). It is the sum of the government's net lending (or borrowing) plus the acquisition of financial assets. Thus, if the public sector plays the role of financial intermediary -- both lending and borrowing -- its net lending (or budget balance) position is unaffected, but its total borrowing requirement rises.

The PSBR may be compared to some concept of total credit demands in the economy.6/ One deficiency of these ratios is that they look at national credit markets in isolation. They do not deal with the problem of including essentially intermediary activities of the non-

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5/ Net lending (or borrowing) is -- in schematic terms -- the difference between saving and investment (excluding transfers) for the private sectors; for the public sector net lending is the budget balance. For the economy (I-S) + (G-T) = current account. It might be added that net lending of the private sector (S-I) also does not seem an appropriate denominator for (G-T).

6/ It might be argued that it is desirable to net intermediary transactions out from the numerator and denominator of the comparison. But this would return us to the net lending concept. It does not seem appropriate to compare government net lending with total credit -- since the latter (even excluding financial intermediaries) -- does include transactions made by other sectors in both lending and borrowing roles.

financial sectors. And, of course, it is an endogenous ratio and cannot be taken as an exogenous measure of credit market pressure.

Another drawback of these measures is that they simply look at credit market funds. Other outlets for the investment of financial assets, which are substitutable in portfolios for securities, are not included. One might be tempted to use the total change in financial assets as the denominator in the ratio for government borrowing; however, this would involve double-counting of the claims and liabilities of financial intermediaries.

Two other aspects of the comparisons should be raised. The first concerns the scope of government. Although much of the public discussion focuses on central government deficits, we think that there is a strong case for using general government as the basis of comparison. The central government budget is often used presumably because it is the focus of fiscal policy and because data are more readily available. However, countries differ on the location and financing of government activities among different levels of government; consequently, in order to compare government activity it is artificial to look at central government alone. Moreover, within a country, the financing of a given government function can shift between central and local governments. While the general government balance may be unaltered by this shift, the central government balance would change.[7/]

A second question concerns gross versus net saving. Ideally, (at least from the standpoint of economic growth theory) net saving and

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7/ In the IMF's World Economic Outlook (Occasional Paper 9, 1982) the limitations of the central government balance are explained at somewhat greater length than here. (p. 105) Despite this, the comparisons using the central government seem to be given preference in the IMF presentation.

capital accumulation are preferable to gross measures. However, the statistical and theoretical problems in calculating capital consumption make net savings statistics less reliable than gross.

It might be noted that the ratio of capital consumption allowances to gross savings varies widely across countries:

Capital Consumption Allowances/Gross Saving (SNA)

(1975 - 1981)

Canada	52.0
France	51.4
Germany	52.0
Italy	46.7
Japan	41.3
U.K.	62.6
U.S.	67.0

The United States has the highest ratio. To some extent this probably reflects a higher U.S. capital-output ratio and therefore higher ratio of depreciation to GNP. But the high level of British depreciation (where one would not expect a high capital-output ratio) suggests this is not the whole story. Other real factors -- age distribution of the capital stock, lifetime of capital equipment, rate of obsolescence -- may also play a role. It is reasonable to think that the data also reflect differing tax treatment of depreciation as well as different procedures followed by the national accounts statisticians in different countries in estimating depreciation. In justifying the use of gross rather than net ratios, one might also note that while capital accumulation reflects net

investment, replacement investment is a carrier of new technology and thus also contributes to economic growth. Although we show both net and gross, the latter calculations are to be preferred.8/

Two sets of tables are attached. The first set compares general government saving and national saving. In Table 1 government net saving and national net saving are shown as ratios of GDP; in Table 2 the same ratios are shown for gross saving. These tables differ from the more usual presentations in which public sector deficits are compared to private savings rather than national savings. The rationale for making the comparison with respect to private savings is that the public sector deficit is seen as "draining" away resources from the private sector. International comparisons on either basis will be the same, so that which ratio is shown is not of great import. However, while much of the discussion suggests that the public/private comparison is theoretically the correct one, a contrary argument might be advanced. Some economists have argued that private agents are more concerned with the total amount of their saving, i.e., with national saving, whether privately or publically performed, so that private saving will offset public dissaving. In extreme versions of this argument, private saving completely

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8/ The IMF and OECD in presenting saving ratios generally focus on gross ratios. The IMF staff in the World Economic Outlook appears to argue that gross ratios are in principle preferable to net ratios (see pp. 105-6) because, among other reasons, they correspond to the financial and investment flows that actually occur in the economy; firms do not distinguish between net and replacement investment, and any such national distinction does not match that between retained earnings and capital consumption allowances. These arguments strengthen the case that in practice gross flows are preferable to net; however, if net data corresponding to theoretical concepts were available, they would be preferable. The IMF approach is more appropriate to a credit flows analysis than to a resources analysis where the concern is the growth of the capital stock.

offsets public dis-saving. Although the extreme version need not be accepted, some offset may exist; if private saving does vary inversely with public saving, we cannot assume that the public deficit absorbs some fixed amount of private saving. Thus, national saving would be the more appropriate variable with which to compare public saving. It is of interest to note that the calculations of Blades and Sturm show that the coefficient of variation across countries of national saving ratios is lower than that of household ratios, for comparably defined savings concepts, suggesting some offset.9/

Turning to the tables, since government saving may be either positive or negative -- i.e., either add to or subtract from private sector -- the ratio of government saving/GDP to national saving/GDP is ambiguous. We have adopted the convention of placing parentheses around negative net government saving and negative ratios. Tables 1 and 2 show that for the 1975-80 period that the U.S. ranked high in terms of government dis-saving -- or low in terms of government gross saving.

Table 3 shows borrowing by general government (corresponding to the PSBR or net indebtedness), expressed as a percentage of credit market borrowing by all non-financial sectors. The table indicates that the United States is below the average for the other countries for the 1975-80 period. It is also of interest to note the very high Japanese borrowing ratios, despite the strong government saving performance. This disparity (if it is such) may reflect the large amount of capital formation undertaken by the public sector in Japan -- so that while

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9/ See Derek Blades and Peter Sturm, "The Concept and Measurement of Saving: The United States and Other Industrialized Countries" in Federal Reserve Bank of Boston, Saving and Government Policy, Conference Series No. 25, October 1982.

government saving is high, borrowing is also high to help finance the high capital formation.

As a final comment on these tables, and the issue of the endogeneity of all the ratios presented here, one might tentatively put forth the view that a 5 or 6 year average does allow some of the endogeneity to wash out for purposes of international comparisons. And for individual countries a given year's ratio compared to a longer-period average may also be of some use. However, the limited usefulness of the ratios, even averaged over a period of years, should be kept in mind. These averages do not represent equilibrium positions with which individual year's movements can be compared, and the cause of the individual year's movements must still be known.10/

International comparisons for longer-period averages do have some significance for the savings drain argument. But this issue should be put in a wider context. The rate of saving and investment in a country, on economic welfare considerations, should be partly a function of existing capital/labor and capital/output ratios. If the United States has a higher level of capital intensity than the other major industrial countries, its relatively low saving ratio is to that extent justified. One might illustrate this point with the conclusion of the FR study, Public Policy and Capital Formation, that the U.S. saving level is close to optimal -- although the composition of investment is not.

10/ In recent unpublished work by the OECD Secretariat, full employment savings and budget balances are compared. As our theoretical discussion indicates, this is the direction such work should go, although there are difficult estimation problems in making the full employment estimates. Our discussion here is limited to what actual data may tell us.

Appendix: Public Enterprises Borrowing

The discussion in the text has been in terms of general government which in the SNA essentially covers those activities of government that provide non-marketed services (agencies providing small amounts of marketable services may also be included in general government). But the "public sector" encompasses more than this since marketable services are provided by various types of government entities -- departments, public corporations, nationalized industries. The SNA envisages the collection of data for the "public sector" -- general government plus government enterprises. The OECD Secretariat has assembled and estimated data from various sources on government enterprises.[11/] They do not claim completeness or full comparability for the series they constructed. However, the work is interesting and relevant for the issues raised in this note. We show below net lending as a share of GDP for both public enterprises and public sector (public enterprises plus general government) for 1975-78 for the available major countries.

Net Borrowing as a Share of GDP
(1975-78)

	Public Enterprises	Public Sector
Canada	3.1	5.8
France[a/]	1.2	2.5
Japan	3.4	7.5
United Kingdom	1.4	5.8
United States	0.6	1.8

a/ 1975-77.

11/ They originally appeared in Definition and Measurement of the Public Sector (unpublished, OECD, April 1981); this work will appear in a revised form in the Review of Income and Wealth.

The United States has the lowest ratio of public enterprise borrowing as a share of GDP for the five countries shown; this, of course, makes the United States look "better" in the total public sector comparison.

One should not push such comparisons too far for several reasons. First, definitions of public enterprises across countries differ. Second, the range of activities covered by public enterprises differs widely among countries so that differences in public enterprises' borrowing reflect to some extent different national divisions of economic functions between public and private enterprises. Third, public enterprise borrowing may, from an economic point of view, be the same as any private enterprise's borrowing, and should not therefore be viewed on the same footing as general government's borrowing. However, public enterprises do borrow from government, or receive government guarantees, so that they are not always economic actors in the marketplace in the same way that private enterprises are. Also, public enterprises may base their investment, pricing and employment decisions on "social" criteria and not simply follow strict market criteria. To the extent that they do so, and incur greater losses or make smaller profits as a result of these "social" decisions, then their borrowing is indeed a function of pursuing social objectives as in the case of general government. To that extent it is legitimate to add public enterprise borrowing to general goverrment borrowing since they both are the consequences of political/social activities of the public sector, and it is not the same as a private enterprise raising funds for investment purposes. Of course, it is impossible to make this distinction concerning the cause of public enterprise borrowing in the statistics, and it is perhaps wisest to stick

to the comparisons based on general government as in the text. However, in interpreting the statistics in presentations such as Tables 1 and 2, the omission of the public enterprises should be kept in mind. Since the U.S. public enterprise borrowing ratio is the lowest for the available major countries, if one assumes that the social/economic split on the "causes" of this borrowing are similar across countries, then the total U.S. public sector borrowing ratio is "improved" on a comparative basis.

Table 1

General Government Saving and Net National Saving[2/]
(Percent of GDP)

	1975	1976	1977	1978	1979	1980	1981	1975-1981 Average[2/]
Canada								
Government Saving	0.1	0.4	(0.4)	(1.3)	(0.3)	(0.5)	0.3	(0.3)
National Saving	10.1	10.9	10.0	9.1	11.0	10.7	10.4	10.1
Ratio	0.7	3.5	(4.2)	(14.8)	(3.1)	(4.9)	2.4	(2.9)
France								
Government Saving	1.1	2.8	1.6	0.3	1.4	2.5	0.4	1.5
National Saving	12.1	11.2	11.5	11.4	11.6	10.4	7.6	10.8
Ratio	8.9	25.0	14.2	2.2	12.4	24.1	5.5	13.2
Germany								
Government Saving	(0.7)	1.4	2.3	2.0	2.0	1.8	0.3	1.3
National Saving	9.5	11.1	10.8	11.7	11.8	10.4	8.6	10.6
Ratio	(7.3)	12.2	21.5	17.3	16.9	17.1	4.0	11.7
Italy								
Government Saving	(7.1)	(5.1)	(4.3)	(5.7)	(5.4)	(4.0)	(7.4)	(5.6)
National Saving	9.8	12.1	12.3	12.3	13.2	13.0	8.7	11.6
Ratio	(72.5)	(42.4)	(34.6)	(46.1)	(40.6)	(30.9)	(86.0)	(50.4)
Japan								
Government Saving	3.2	2.0	2.3	1.4	2.4	2.6	2.8	2.4
National Saving	19.2	19.8	18.9	19.2	18.4	18.5	17.7	18.8
Ratio	16.5	10.0	12.0	7.2	13.1	14.0	15.6	12.6
United Kingdom								
Government Saving	(0.3)	(1.0)	(0.3)	(1.6)	(1.0)	(1.4)	(1.3)	(1.0)
National Saving	5.1	5.6	8.6	8.8	8.9	6.8	4.9	7.0
Ratio	(5.1)	(17.6)	(3.5)	(18.6)	(11.3)	(19.9)	(25.7)	(14.5)
United States								
Government Saving	(3.1)	(1.6)	(0.4)	0.7	1.2	(0.7)	(0.5)	(0.6)
National Saving	5.1	5.7	6.9	8.0	7.6	5.0	5.6	6.3
Ratio	(60.3)	(27.0)	(5.6)	9.2	15.1	(13.3)	(9.1)	(13.0)

1/ Dissaving is shown by use of parentheses.
2/ The ratio is the average of the annual ratios.

Source: OECD, National Accounts.

Table 2

General Government Gross Saving (Dissaving) and Gross National Saving[1/]
(Percent of GDP)

	1975	1976	1977	1978	1979	1980	1981	1975-1981 Average[2/]
Canada								
Government Saving	1.6	1.8	1.1	0.2	1.2	1.0	1.8	1.3
National Saving	21.1	21.5	19.8	20.0	22.0	21.9	21.4	21.1
Ratio	7.5	8.6	5.6	1.0	5.4	4.7	8.6	5.9
France								
Government Saving	2.0	3.8	2.7	1.3	2.5	3.7	1.6	2.5
National Saving	23.0	23.0	22.7	22.6	22.8	21.9	19.4	22.2
Ratio	8.9	16.5	11.7	5.7	11.1	16.7	8.3	11.3
Germany								
Government Saving	(0.1)	1.9	2.9	2.6	2.6	2.4	1.0	1.9
National Saving	20.8	22.2	21.8	22.8	23.0	22.1	20.8	21.9
Ratio	(0.7)	8.6	13.2	11.4	11.2	10.9	4.8	8.5
Italy								
Government Saving	(6.8)	(4.8)	(4.0)	(5.4)	(5.1)	(3.8)	(7.2)	(5.3)
National Saving	20.1	22.2	22.6	22.4	23.0	22.6	18.9	21.7
Ratio	(33.7)	(21.8)	(17.8)	(24.2)	(22.1)	(16.6)	(38.0)	(24.9)
Japan								
Government Saving	3.6	2.5	2.8	1.9	3.0	3.2	3.5	2.9
National Saving	32.2	32.6	31.9	32.3	31.6	31.9	31.9	32.1
Ratio	11.2	7.5	8.6	5.9	9.4	10.0	10.9	9.1
United Kingdom								
Government Saving	1.1	0.3	1.0	(0.4)	0.2	(0.1)	0.1	0.3
National Saving	15.8	16.4	19.6	20.2	20.4	18.9	17.3	18.4
Ratio	6.7	1.9	4.9	(2.1)	1.1	(0.2)	0.7	1.9
United States								
Government Saving	(1.5)	(0.1)	1.1	2.2	2.7	0.9	1.0	0.9
National Saving	17.5	17.9	19.0	20.3	20.4	18.3	18.9	18.9
Ratio	(8.5)	(0.3)	5.6	10.8	13.2	5.0	5.4	4.5

1/ Dissaving is shown by use of parentheses.
2/ The ratio is the average of the annual ratios.

Source: OECD, National Accounts.

Table 3

Net Funds Raised by General Government as a Share of Total Funds Raised by Non-Financial Sectors[1/]

	1975	1976	1977	1978	1979	1980	1981	1975-1981 Average
Canada	24.9	19.0	28.6	32.5	15.2	27.5	22.0	24.3
France	27.3	14.8	13.4	23.3	12.5	8.4	15.4	16.5
Germany	42.8	30.4	26.4	25.9	21.8	17.1	26.4	27.3
Italy	57.1	53.6	51.4	54.2	43.9	52.1	53.0	52.2
Japan	36.3	40.8	46.7	56.0	48.8	47.5	45.5	45.9
United Kingdom	46.3	26.2	37.7	19.2	28.0	23.2	10.3	27.3
United States	46.2	30.8	21.6	18.1	14.3	26.8	27.0	26.4

1/ The denominator of the ratio is net funds (i.e., gross borrowing less redemptions) raised on credit markets by total non-financial domestic sectors plus rest of world. For Japan the denominator excludes the rest of the world.

Source: OECD, Financial Accounts.