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## The Causal Relationship between Social Security and the Federal Budget

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As the 1990s begin, social security is once again at the center of public debate. Under current projections social security is expected to post substantial surpluses during the next two or three decades and a string of ever-increasing deficits thereafter. In the meantime the social security trust funds are projected to accumulate large reserves. At the heart of the current controversy is the question of how politicians will behave when the trust funds are temporarily flush with cash. Will the surplus funds actually be saved for future years, or will they be spent—either directly through social security expansion or indirectly through an expansion of the rest of the budget?

No binding rules on politicians dictate how surplus monies will be used. Under current law any excess revenues in the trust funds must be used to purchase new special-issue government bonds, but that does not reveal what is done with the revenues the Treasury has thus been lent. Excess social security revenues, like any other federal revenues, are available to finance the general operations of the government. They may be used to retire outstanding government debt or to finance an increase in federal spending or a reduction in federal taxes.

How political discretion determines this fiscal choice is the subject of this chapter. If tax and spending decisions in the rest of the budget are independent of social security, then any excess social security revenues reduce the federal budget deficit and allow the Treasury to retire outstanding privately held public debt. If politicians respond to the surplus social security revenues by increasing federal spending (or reducing federal taxes), then some or all of the surpluses translate into a higher deficit in the rest of the budget, with little or no reduction in the overall deficit or national debt.

The question of how politicians will use the surpluses in the coming years cannot be settled by force of conviction or ideals about political behavior. It is fundamentally an empirical question about the interrelationship between social security and other fiscal decisions.

This chapter attempts to provide an empirical analysis of several key fiscal relationships and, in so doing, to inform the debate over the advance funding of social security. In particular an empirical technique known as causality testing is used to examine the relationships between social security revenues, trust fund balances, and aggregate federal spending and between social security revenues and other federal revenues. Some understanding about the actual historical relationships between these variables can help to make informed judgments about the likely effects of the social security surpluses.

The remainder of the chapter first reviews previous empirical studies on the causal relationship between government taxation and spending, and the importance of testing the dynamic nature of political responses involving social security. Second, an empirical model is formulated and empirical findings evaluated. Finally, results are analyzed in the context of current policy deliberations.

### **The Importance of Dynamic Analysis**

Almost all solutions to fiscal problems follow from some prescribed change in spending or taxes under a static, or independent, framework. Economists have long argued for advance funding of social security under the assumption that doing so would not trigger behavior by politicians that would undermine the attainment of the stated goal: an increase in national saving.

Economic or political behavior is seldom so simple. A dynamic framework of budgetary behavior—whether in the area of social security spending or aggregate federal spending—recognizes at least four possibilities in a world of political discretion: tax decisions are influenced by expenditure decisions, expenditure decisions are influenced by tax decisions, expenditure and tax decisions are unrelated, or expenditure and tax decisions are jointly determined. Static analysis of dynamic relationships can lead to an incorrect understanding of behavior and therefore to inappropriate policy recommendations.

Only recently have economists recognized the importance of analyzing fiscal policy in a dynamic framework. Using a common method of determining causal relationships referred to as Granger causality testing, more than nine studies have attempted to establish the tax-spend relationship at the federal, state, and local levels of government. While the results are not totally in agreement, the available studies

suggest that a dynamic analysis of governmental budget behavior is appropriate and that in an examination of the historical relationship between taxes and spending, the hypothesis that expenditures will rise whenever taxes rise cannot be reasonably rejected, and vice versa.<sup>1</sup>

In this chapter this dynamic analysis is extended to social security. Before one can evaluate the likely effects of the trust fund surpluses or offer appropriate solutions, one must understand the political dynamics behind social security and other federal revenue and spending decisions. The interrelationships between the primary policy parameters—social security revenues, trust fund balances, and aggregate federal spending, as well as between social security revenues and other federal revenues—are analyzed. The more one understands about the politics of federal fiscal behavior, the less ambiguous are the effects of proposed solutions, and the higher is the likelihood that policy goals are attained.

### **The Budget Constraint Hypothesis and Social Security**

The early research on causality, which was motivated primarily by political debate on the federal budget, focused on the question, Does a tax increase *unambiguously* lower the deficit?<sup>2</sup> On one side of the issue were those who argued that budget deficits were a symptom of fiscal irresponsibility and that tax increases were the appropriate solution. The other side, which was taken by many in the Reagan administration, agreed that the growth in federal budget deficits was a symptom of fiscal irresponsibility but argued that the appropriate solution was to lower spending.<sup>3</sup>

The latter view is consistent with the budget constraint hypothesis discussed extensively by Milton Friedman.<sup>4</sup> On the assumption that there always exists a worthwhile program that someone wishes to enact, the budget constraint model of government hypothesizes that revenues determine spending levels. This follows from standard microeconomic theory of the consumer: consumers operate with scarce resources and thus are limited in the amount they can consume. The limits of current consumption are determined by accumulated wealth, current income, and the ability to borrow on future resources, which together define the budget constraint. An expanded budget constraint allows for expanded consumption opportunities.

The budget constraint hypothesis implies that the government, like individual consumers, is subject to scarce resources. (Were it not, we would have no difficulty removing poverty, hunger, homelessness, and many other problems from our broad and growing list of policy concerns.) The budget constraint facing government consists of the

means by which expenditures are funded: tax receipts and debt. Taxes are levied either directly through legislation or indirectly through inflation. The deficit is the residual between collected taxes and current spending and determines new borrowing. Although only the central government has the power to create money, the government's ability to consume is constrained by the same factors that confront private citizens.

The budget constraint analogy offers an organizing framework for relevant policy questions. One obvious question concerns the expected impact on government spending of a deficit reduction policy that includes raising taxes. With the budget constraint approach, raising taxes, by itself, serves to expand the spending opportunity set of government. This is really nothing new: Friedman has often repeated his famous maxim that "governments spend what governments receive plus whatever they can get away with."<sup>5</sup> The relevant question, then, becomes an empirical one: What does the evidence indicate about the effect of past tax increases on government expenditures?

John Cogan presents an interesting variant of the budget constraint model that focuses on the dependence of budgetary decisions on the method of finance.<sup>6</sup> His argument is developed in two parts. First, he likens the institutional arrangements in the congressional budget process to a common property resource. The common resource is the general revenue fund. The problem is that when many congressional committees draw on the general revenues, no single committee has an incentive to restrain its spending commitments. Even worse, since no single committee has any residual claim to unspent general funds, there is competition to outspend other committees. Consequently expenditures financed from general fund revenues increase much faster than the revenues themselves.

Second, he argues that the creation of tax-financed trust funds, the first of which was social security, transferred spending authority from the appropriations committees to the tax-writing committees and thereby created a revenue bias in favor of trust fund taxes and against general fund taxes. Since the tax-writing committees have exclusive jurisdiction over trust fund expenditures (and taxes), it is easier for them to capture the political benefits of spending on these programs. In addition the proceeds of trust fund taxes (for example, the social security payroll tax) are tied more closely than general fund revenues to the interests of the tax-writing committees. This analytical framework suggests a substitution of trust fund revenues for general fund revenues, with social security taxes funding a larger share of government over time.

The opposing view to the budget constraint hypothesis argues that politicians are not self-serving spenders (or tax substituters) but rather are committed to living within their means. Here the possibility that tax increases could fund additional spending rather than reduce the deficit is either highly discounted or believed to be false as there is assumed to be no innate proclivity among politicians to use higher taxes to fund larger expenditures or new programs. This view therefore implies either that there is no causal relation between increased taxes and increased spending or that the true causal relation runs from spending to taxes.

One's view of the budget constraint hypothesis greatly influences policy recommendations regarding the social security surpluses. The budget constraint hypothesis suggests that social security surpluses will lead to increases (decreases)—within and outside of social security—in federal spending (taxes). That is, since social security surpluses are really excess social security revenues, and there is no prohibition on the spending of these revenues, politicians will be inclined to increase other spending programs or trim other taxes rather than enjoy a lower federal budget deficit and national debt. If the budget constraint view of political behavior is correct, today's excess payroll taxes will not be saved for payouts of future social security benefits but will promote the relaxation of the budget constraint facing politicians.

The major alternative hypothesis is that political behavior in the area of non-social-security spending and taxation is independent of social security spending and taxation. That is, social security surpluses, or excess taxes, will have no effect on the rest of the budget, leading instead to a reduction in the overall federal deficit and the amount of federal debt held by the public. This is the usual argument for running surpluses in the first place, and it assumes that politicians resist all temptations to spend the new resources at their command.

The Granger causality test is one way to test which hypothesis regarding political decisions is correct.<sup>7</sup> Based on the predictability of a variable over time, Granger causality attempts to determine whether the forecasts of a variable  $Y$ , such as government spending, using both past values of itself and that of another variable  $X$ , such as social security surpluses, are better than forecasts based solely on lagged values of  $Y$ . If so, then  $X$  is said to one-way cause  $Y$ . If it is found that  $X$  causes  $Y$  and that  $Y$  causes  $X$ , then two-way causality exists between  $X$  and  $Y$ . Finally, if one-way causality does not exist in either direction, the fourth possibility exists: the variables bear no causal relation to one another and are truly independent.

### Empirical Evidence of Tax-Spend Causality

The available empirical evidence generally supports the view that government tax and spending decisions are causally related. Of the nine or more studies that directly test for causality, the majority find evidence of dependence between revenue and spending decisions. Neela Manage and Michael L. Marlow tested for causality in federal finances over the period 1929 to 1982.<sup>8</sup> In seven of the twelve cases studied (or 58 percent) they found bidirectional causality; in the remaining cases (42 percent) they found one-way causality running from budget receipts to budget outlays. This study concludes that even in the case of bidirectionality, one cannot reject the hypothesis that tax increases will be associated with subsequent spending increases. Using a similar framework, Rati Ram offers additional support for these results.<sup>9</sup> David Joulfaian provides evidence of two-way, or simultaneous, causality between federal taxes and spending.<sup>10</sup>

Paul R. Blackley uses causality tests on the federal tax-spend relation over the period 1929–1982.<sup>11</sup> He concludes that while it is not possible to reject the hypothesis that the tax-spend relationship is simultaneous, revenue growth appears to bear a much stronger causal link to spending growth than vice versa.

Marlow and Manage address the issue of whether the many different legislative and constitutional constraints at the state and local levels of government affect the causal relation between revenues and expenditures.<sup>12</sup> At the state level the evidence supports the budget constraint hypothesis. At the local level the evidence suggests no causality. Further testing of the same data by Abdur R. Chowdhry provides evidence that supports the budget constraint hypothesis at the local level.<sup>13</sup> Evidence of similar causality at the local level is also found by Douglas Holtz-Eakin.<sup>14</sup>

To date, only two studies do not support the budget constraint hypothesis. William Anderson, Myles S. Wallace, and John T. Warner find one-way causality running from real federal spending to real federal tax revenues.<sup>15</sup> In a study of quarterly federal tax and spending data, George M. von Furstenburg, Jeffrey R. Green, and Jin-Ho Jeogn find no significant relationship between spending and taxes.<sup>16</sup> Budgetary decisions, however, are made on an annual basis, so the use of quarterly data introduces many potential trouble spots concerning revenue and expenditure flows that have little, or possibly nothing, to do with annual political budgetary decisions.<sup>17</sup>

In sum, while the empirical evidence is somewhat mixed, most studies indicate one-way causality running from taxes to spending and therefore yield strong support for the budget constraint hypothesis.

Only one study shows causality in the other direction. The possibility that causality is complex, or bidirectional, should not be dismissed, however. While the budget constraint hypothesis appears to be at least partially correct, the alternative hypothesis may contain some validity as well.<sup>18</sup> The advantage of causality testing is that it does not impose any assumptions on behavior or causality; rather it tests for causal relations. This empirical approach allows both proponents and skeptics of the budget constraint hypothesis their day in court.

The important similarity between the federal tax and spending relation and the relation between social security and the federal budget is the existence of political discretion. Both relationships are unconstrained by rules. Therefore one cannot make *a priori* assumptions that are known to be correct about how a surplus of social security funds will be used. This chapter attempts to shed light on how politicians are likely to respond to social security's looming surpluses.

**Empirical Tests.** The data used in the causality tests are drawn from the 1989 U.S. budget. For the period 1940 to 1987, data are used for total (on- and off-budget) federal revenues and expenditures, and on social security revenues, expenditures, and reserves.<sup>19</sup> Social security is defined to include all four programs or trust funds: Old-Age and Survivors Insurance, Disability Insurance, Hospital Insurance, and Supplemental Medical Insurance. The reserve in any particular year is equal to the accumulated assets of the four trust funds as of the end of the fiscal year. These data are used to compute non-social-security expenditures (revenues), which are simply aggregate federal spending (revenues) less social security spending (revenues). The annual surplus or deficit in social security, referred to as the trust fund balance, is computed from the one-year change in trust fund reserves. The trust fund balances (rather than reserves) are emphasized here because they closely indicate, at the margin, the potential for changes in political discretionary spending opportunities.

Three technical issues should be considered before evaluating the empirical estimations. First, there are serial correlation problems in data on levels, such as annual federal expenditures, that must be corrected before using the Granger test. (The Granger test requires that each time series be stationary. The relationship between any two observations depends only on the time interval between them and not on time itself; most time series of level data contain some type of trend.) To handle this problem, the data were first-differenced: the value of the previous observation was subtracted from each observation. All the data were then transformed into annual growth rates, with additional first-differences taken until the time trend was eliminated.<sup>20</sup> The data

TABLE 6-1  
TRIVARIATE CAUSALITY TESTS BETWEEN SOCIAL SECURITY REVENUES,  
FEDERAL SPENDING, AND SOCIAL SECURITY BALANCES

Lag	Hypothesis					
	$FS = f(FS, SR)$ (SB causes FS)		$SR = f(SR, FS)$ (SB causes SR)		$SB = f(SB, FS)$ (SR causes SB)	
	F	$\Sigma SB$	F	$\Sigma SB$	F	$\Sigma SR$
1	0.96	0.15	1.85	0.11	1.14	-0.13
		0.98		1.36		1.07
2	4.01 <sup>a</sup>	-1.15 <sup>a</sup>	1.64	-0.41	3.71 <sup>a</sup>	-0.25
		2.12		1.51		1.17
3	4.93 <sup>b</sup>	-2.13 <sup>a</sup>	2.37 <sup>c</sup>	-1.01 <sup>a</sup>	0.93	-0.40
		2.43		2.07		1.10
4	2.13 <sup>c</sup>	-2.63 <sup>a</sup>	1.36	-1.00	0.30	-0.45
		2.10		1.29		0.78
5	3.23 <sup>a</sup>	-3.03 <sup>c</sup>	1.28	-1.49	0.45	-0.72
		1.98		1.24		0.83
Lag	$FS = f(FS, SB)$ (SR causes FS)		$SR = f(SR, SB)$ (FS causes SR)		$SB = f(SB, SR)$ (FS causes SB)	
	F	$\Sigma SR$	F	$\Sigma FS$	F	$\Sigma FS$
1	2.83 <sup>c</sup>	0.47 <sup>c</sup>	0.01	-0.01	0.17	-0.03
		1.68		0.09		0.41
2	3.79 <sup>a</sup>	1.33 <sup>a</sup>	1.48	0.15	1.40	0.59
		2.41		1.65		0.82
3	5.38 <sup>b</sup>	2.22 <sup>c</sup>	2.98 <sup>a</sup>	0.18	0.73	0.11
		2.80		1.39		1.04
4	4.90 <sup>b</sup>	3.37 <sup>b</sup>	1.99	0.12	0.25	0.06
		3.24		0.61		0.35
5	4.46 <sup>b</sup>	2.39 <sup>c</sup>	1.58	0.25	0.19	0.08
		1.72		0.75		0.30
Lag	$FS = f(FS)$ (SR&SB cause FS)		$SR = f(SR)$ (FS&SB cause SR)		$SB = f(SB)$ (FS&SR cause SB)	
	F		F		F	
1	3.21 <sup>c</sup>		1.03		0.73	
2	3.13 <sup>a</sup>		1.46		2.19 <sup>c</sup>	
3	4.28 <sup>b</sup>		2.31 <sup>c</sup>		0.61	
4	2.74 <sup>a</sup>		1.67		0.27	
5	3.18 <sup>b</sup>		1.58		0.30	

SR = social security revenues

FS = total federal spending

SB = social security trust fund balances

a. Significant at the .05 level (absolute value of *t*-statistic below  $\Sigma$ ).

b. Significant at the .01 level (absolute value of *t*-statistic below  $\Sigma$ ).

c. Significant at the .10 level (absolute value of *t*-statistic below  $\Sigma$ ).



on trust fund reserves required third-differencing; all other data required second-differencing.

The transformed data can be interpreted as follows. Social security revenues, non-social-security revenues, total federal expenditures, and non-social-security expenditures are measured as changes in annual growth rates. Since the first-difference of social security trust fund reserves is the current period's trust fund balance (surplus or deficit), the second-difference is the growth rate of the trust fund balance and the third-difference is the change in the growth rate of the trust fund balance. Therefore, causality tests will identify the causal relationships between changes in the growth rate of social security revenues, trust fund balances, and federal spending.

Second, there are differing views regarding the appropriate lag length to use in a causality test. Symmetric lags, ranging from one to five years, were used here.<sup>21</sup>

Third, two statistics of interest in this application of Granger causality tests are provided. One is the *F*-statistic, which is used to test the null hypothesis that all coefficients on the independent variables are zero.<sup>22</sup> Failure to reject the null hypothesis indicates that at least some subset of independent variables exerts a statistically significant effect on the dependent variable. The other statistic is the sum of the coefficients ( $\Sigma$ ).<sup>23</sup> A *t*-test on the sum of the coefficients indicates whether the causal effects on the dependent variable are permanent or transitory in nature and in what direction as evidenced by the sign on the sum of coefficients.

Table 6-1 presents the results of a trivariate causality test between total federal spending (*FS*), social security revenues (*SR*), and trust fund balances (*SB*). Since there are three variables of interest, a trivariate causality approach is used here to understand how their past values are related to one another. Three causal orderings are possible: one or more variables one-way cause one or more variables, all variables experience tridirectional causality (that is, they are simultaneously related), or none of the variables are causally related to another.

The *F*-scores displayed in the first column are associated with the null hypothesis that social security revenues or trust fund balances are significantly related to aggregate federal spending. The number 0.96, for example, in the first column and first row is the *F*-score associated with the hypothesis that *SB* is significantly related to *FS*. It is obtained by comparing the sum of squared residuals (*SSRs*) of the two equations:  $FS = f(FS, SR, SB)$  and  $FS = f(FS, SR)$ . The displayed *F*-score is obtained from the usual calculation that determines whether the change in *SSRs* is statistically different from zero. If the *F*-score exceeds the appropriate *F*-statistic, then *SB* is significantly related to *FS*. The

$F$ -scores in the middle of the first column refer to the comparison between  $FS = f(FS, SR, SB)$  and  $FS = f(FS, SB)$ ; it is associated with the null hypothesis that  $SR$  is not statistically related to  $FS$ .

Next to the  $F$ -scores are the sums of coefficients ( $\Sigma$ ) relating to the previous test of significance. As mentioned, the  $F$ -test is appropriate for testing whether all independent variables exert statistically significant effects on a dependent variable. The  $t$ -test on the sum of coefficients is appropriate for testing whether the independent variable exerts a permanent effect. The sum of coefficients is displayed along with its associated  $t$ -score below it. If the  $t$ -score exceeds its critical level, then the independent variable exerts a permanent effect on the dependent variable. Failure to exceed its critical level indicates that any effects are transitory in nature.

The results indicate that neither social security revenues nor trust fund balances are significantly explained by past values of any three of the variables. That is, with the equation of  $SR$  as the dependent variable, the  $F$ -scores associated with the influence of past values of  $FS$  and  $SB$  are generally not statistically different from zero. The only exceptions occur when three-year lags are used; even here, though, the  $F$ -scores are only marginally significant at the 10 percent level for the tests involving  $SB$  by itself and  $FS$  and  $SB$  together. Moreover, the only permanent effect from  $SB$  on  $SR$  is when it is by itself with the three-year lag specification; in this case it is a negative effect implying that past increases in  $SB$  have exerted an inverse influence on  $SR$ . When  $SB$  is the dependent variable,  $SR$  exerts a negative effect only with the two-year lag specification; the effect, however, is not permanent.

The equations with aggregate federal spending as the dependent variable indicate that both social security revenues and trust fund balances exert significant influences. Moreover, in most cases those effects are permanent. The results indicate that while past increases in  $SB$  exert negative effects on  $FS$ , past increases in  $SR$  exert positive effects. That is, the positive permanent coefficient on  $SR$  is empirical support for the tax-and-spend hypothesis. Here it is interpreted as indicating that past increases in social security revenues have exerted positive effects on total federal spending. In addition the permanent negative coefficient on  $SB$  indicates that past increases in trust fund balances have exerted inverse effects on total federal spending.

The implications for causality are as follows. There appears to be little evidence that social security revenues and trust fund balances are related to (or cause) past changes in themselves or to past changes in total federal spending. Past changes in social security revenues and trust fund balances, however, explain (or cause) significant movements in aggregate federal spending. The evidence thus suggests that over the

period examined, causation runs from social security revenues and trust fund balances to aggregate federal spending. That is, past movements in trust fund balances and revenues explain current aggregate federal spending and not vice versa. Therefore tax and spending decisions are causal in nature, with changes in social security revenues and trust fund balances leading to (causing) changes in federal spending.

Table 6-2 is similar to table 6-1 except that total federal spending is disaggregated into its social security and non-social-security components. This allows an additional test within the causality framework. Comparison of tables 6-1 and 6-2 indicates that as before, past movements in social security revenues and trust fund balances have led to, or caused, non-social-security spending. Moreover, past increases in social security revenues have caused increases in non-social-security spending.

### **Additional Tests of Causality**

While there is support for the budget constraint hypothesis in the case of the prospending effects of past increases in social security revenues, there is also evidence that past changes in the growth of trust fund balances have exerted negative and statistically significant effects on federal spending. One possible explanation for this latter result is that surplus monies in the trust funds are actually being saved, thus reducing the amount that the federal government must borrow and the amount of spending that is needed to service the government's debt. This explanation, however, conflicts with the above empirical support for the budget constraint hypothesis regarding past social security revenues and federal spending. In addition it conflicts with the finding that trust fund surpluses are not causally related to social security revenues or federal spending. Therefore the evidence in support of the argument that excess social security trust fund balances are saved and not spent is weak or nonexistent.

The results reported in tables 6-1 and 6-2 also indicate that neither federal spending nor trust fund balances are causally related to social security revenues. As such, the empirical relationship between trust fund balances and federal spending does not appear to be related in any causal fashion to increased social security revenues. Rather the relationship appears to be associated with the other determinant of trust fund balances: social security spending.

Table 6-3 contains the results of various bivariate causality tests that seek to determine why there exists an inverse causal relationship running from social security trust fund balances to federal spending.

TABLE 6-2  
TRIVARIATE CAUSALITY TESTS BETWEEN SOCIAL SECURITY REVENUES,  
NON-SOCIAL-SECURITY SPENDING, AND SOCIAL SECURITY BALANCES

Lag	Hypothesis					
	$NFS = f(FS, SR)$ (SB causes NFS)		$SR = f(SR, NFS)$ (SB causes SR)		$SB = f(SB, NFS)$ (SR causes SB)	
	F	$\Sigma SB$	F	$\Sigma SB$	F	$\Sigma SR$
1	0.82	0.14	1.82	0.11	1.14	-0.13
		0.91		1.35		1.07
2	3.87 <sup>a</sup>	-1.18 <sup>a</sup>	1.66	-0.42	3.74 <sup>a</sup>	-0.25
		2.12		1.53		1.15
3	4.82 <sup>b</sup>	-2.09 <sup>a</sup>	2.34 <sup>c</sup>	-1.02 <sup>a</sup>	0.90	-0.38
		2.32		2.08		1.05
4	2.09	-2.64 <sup>a</sup>	1.34	-1.04	0.31	-0.45
		2.08		1.35		0.77
5	3.22 <sup>a</sup>	-1.98 <sup>a</sup>	1.30	-1.61	0.46	-0.81
		3.13		1.34		0.69
Lag	$NFS = f(FS, SB)$ (SR causes NFS)		$SR = f(SR, SB)$ (NFS causes SR)		$SB = f(SB, SR)$ (NFS causes SB)	
	F	$\Sigma SR$	F	$\Sigma NFS$	F	$\Sigma NFS$
1	3.47 <sup>b</sup>	0.52 <sup>c</sup>	0.03	-0.01	0.28	-0.33
		1.86		0.02		0.53
2	4.14 <sup>a</sup>	1.37 <sup>a</sup>	1.42	0.14	1.37	0.05
		2.44		1.60		0.71
3	5.68 <sup>b</sup>	2.35 <sup>b</sup>	2.83 <sup>c</sup>	0.18	0.65	0.10
		2.91		1.39		0.98
4	5.06 <sup>b</sup>	3.96 <sup>b</sup>	1.90	0.12	0.27	0.05
		3.25		0.60		0.32
5	4.44 <sup>b</sup>	2.49 <sup>c</sup>	1.51	0.24	0.21	0.07
		1.74		0.73		0.27
Lag	$NFS = f(NFS)$ (SR&SB cause NFS)		$SR = f(SR)$ (NFS&SB cause SR)		$SB = f(SB)$ (NFS&SR cause SB)	
	F		F		F	
1	3.52 <sup>a</sup>		1.04		0.79	
2	3.26 <sup>a</sup>		1.43		2.17 <sup>c</sup>	
3	4.40 <sup>b</sup>		2.23 <sup>c</sup>		0.56	
4	2.86 <sup>a</sup>		1.62		0.28	
5	3.32 <sup>b</sup>		1.54		0.32	

SR = social security revenues

NFS = net federal spending (total federal spending minus social security spending)

SB = social security trust fund balances

a. Significant at the .05 level (absolute value of *t*-statistic below  $\Sigma$ ).

b. Significant at the .01 level (absolute value of *t*-statistic below  $\Sigma$ ).

c. Significant at the .10 level (absolute value of *t*-statistic below  $\Sigma$ ).

TABLE 6-3  
BIVARIATE CAUSALITY TESTS OF ALTERNATIVE HYPOTHESES

<i>Lag</i>	<i>Hypothesis</i>	
	<i>SB causes SS</i> <i>F</i>	<i>SS causes SB</i> <i>F</i>
2	6.57 <sup>a</sup>	0.49
3	6.29 <sup>a</sup>	0.20
4	1.89	0.38
5	0.98	0.23
	<i>SB causes NI</i> <i>F</i>	<i>NI causes SB</i> <i>F</i>
2	0.21	1.55
3	0.34	1.35
4	0.16	2.61 <sup>b</sup>
5	2.19 <sup>b</sup>	1.87
	<i>SB causes NNI</i> <i>F</i>	<i>NNI causes SB</i> <i>F</i>
2	0.23	6.88 <sup>a</sup>
3	1.16	2.33 <sup>b</sup>
4	1.87	1.40
5	0.55	1.63
	<i>SB causes DEF</i> <i>F</i>	<i>DEF causes SB</i> <i>F</i>
2	0.01	0.19
3	0.38	1.60
4	0.68	1.09
5	0.74	1.07
	<i>SB causes NDEF</i> <i>F</i>	<i>NDEF causes SB</i> <i>F</i>
2	0.03	0.52
3	0.30	1.39
4	0.75	1.01
5	0.73	0.88

*SB* = social security trust fund balances

*NI* = net interest (on- and off-budget) of U.S. government

*NNI* = *NI* - intragovernmental interest receipts of social security trust funds

*DEF* = federal budget deficit (on- and off-budget)

*NDEF* = *DEF* - intragovernmental interest receipts of social security trust funds

*SS* = social security outlays

a. Significant at the .01 level.

b. Significant at the .10 level.

The first set of causality tests are between the trust fund balances (*SB*) and social security spending (*SS*). After second-differencing the data on spending, there is evidence of a permanent inverse one-way causal relationship running from the trust fund balances to social security spending for the first two lag configurations. In other words the negative effect of the trust fund balances on federal spending appears to be related in part to their influence on social security spending.

While this may appear to run counter to the budget constraint hypothesis, the inverse relationship between federal spending and trust fund balances may be spurious, stemming from a mechanical problem that is unrelated to political behavior.<sup>24</sup> When an independent variable is jointly determined, as is clearly the case with trust fund balances, its coefficient can be difficult to interpret.

This problem does not arise in the causality tests using non-social-security spending, so one might argue that the evidence indicates that the budget constraint theory of political behavior is not supported by the past relationship between trust fund balances and non-social-security federal spending. This possibility deserves further testing since, if it is valid, it may place in doubt the earlier result concerning the positive one-way causal relationship running from social security revenues to federal spending.

To submit the data to further scrutiny, the counter hypothesis—that trust fund surpluses reduce interest payments to the public by reducing the amount of outstanding debt—is tested. Stated another way, past social security surpluses have not relaxed fiscal restraint in the rest of the budget. To test this, a bivariate causality test is performed between the net interest payments (on- and off-budget) of the U.S. government (*NI*) and the trust fund balances (*SB*).<sup>25</sup> The results are reported in table 6-3. After first-differencing the data on net interest, there is no permanent causal relationship between the two variables, suggesting that this hypothesis does not appear to have any empirical basis. As an additional test of the same hypothesis, net interest less interest receipts of the social security trust funds (*NNI*) was also considered. After first-differencing this data, the results of the causality test did not change. Social security trust fund balances bear no causal relationship to this adjusted measure of net interest.

Finally, the counter hypothesis—that social security surpluses cause, or lead to, federal government savings—is tested. Rather than a look at the effect of trust fund balances on the interest payment portion of the federal budget, their effect on the overall budget deficit is directly examined.

Two measures of the total (on- and off-budget) federal deficit are considered: *DEF* and *NDEF*. *DEF* is simply the difference between total

federal spending and total federal revenues.<sup>26</sup> *NDEF* is defined as *DEF* less the interest receipts of the trust funds. After first-differencing both measures of federal deficits, the results in table 6-3 indicate that there exists no causal relationship between social security trust fund balances and either measure of the federal budget deficit. Therefore, the past relationship between these variables appears to be one of independence. This finding is not supportive of the counterhypothesis that the social security surpluses are saved.

### Summary of the Empirical Evidence

The evidence in tables 6-1 and 6-2 provides support for the budget constraint hypothesis that past increases in social security revenues have led to an increase in federal spending. The evidence also indicates that there has been a historical one-way inverse causal relationship running from social security trust fund balances to federal spending. While the latter may appear inconsistent with the budget constraint hypothesis, however, it may stem from an empirical problem of including social security balances and social security spending in the same equation. Moreover, while some may wish to suggest that this inverse causal relation serves to invalidate the budget constraint hypothesis, the empirical evidence in table 6-3 does not contain any verification of the usual counterarguments to the budget constraint hypothesis. Specifically there is no evidence to support the view that social security surpluses lead to lower federal spending, interest payments, or deficits.<sup>27</sup>

### Conclusions

The primary purpose of this chapter is to determine whether there should be concern that the projected surpluses of the social security trust funds might be spent rather than saved. Since there exist no written, or binding, constraints on the behavior of politicians concerning this issue, the answer to this important question cannot be projected with great certainty. At best, predictions can be based on the assumption that past political behavior is a good guide to the future, and to do so, causality tests between the primary policy variables can be employed.

The empirical evidence provides support for the budget constraint theory of political behavior: increased revenues will be treated as a general loosening of the budget constraint facing politicians. In periods when social security revenues have grown, there is a causal link to expansions in federal spending—both aggregate federal spending and

non-social-security spending. This suggests that the decision to raise revenues in the 1983 Social Security Amendments will lead to an expansion in federal spending.

There is also evidence that both social security taxes and non-social-security taxes fund non-social-security programs. While taxpayers may operate on the assumption that social security taxes fund only social security spending, it appears that "a tax is a tax," when it comes to the tendency to expand government spending.

Notwithstanding the attempt to make predictions based on actual historical relations, there remains great uncertainty over future political behavior. This is merely a restatement of the fact that political decisions involving the use of social security surpluses are not subject to binding constraints. Given the importance that many place on social security, the replacement of political discretion with rules of conduct is suggested for the future relationships between social security taxes, trust fund balances, and aggregate federal spending and taxation. Absent such rules, guesses will continue about the future relationships between these important policy variables.