

Is the Social Security Trust Fund Worth Anything?

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This Version: June 2003

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Abstract

With over \$1 trillion in assets, the U.S. Social Security trust fund is the largest pension reserve in the world, and potentially a model for other developed countries facing future financing problems. But are those assets actually “worth anything?” This question has generated a heated debate in the U.S. as policymakers debate options for Social Security reform, with the understanding that the characterization of the trust fund influences these decisions. Some observers claim that the trust fund is not worth anything while others argue that it is valuable. However, different reasons are given for the same position.

This paper provides a unified conceptual framework for thinking rigorously about the assets accumulated in the trust fund. Multiple perspectives of the trust fund are identified and are summarized under two categories: (I) storage technology arguments and (II) ownership arguments. Storage technology arguments focuses on whether the trust fund surpluses actually reduce the level of debt held by the public or, alternatively, are used to “hide” smaller on-budget surpluses. Ownership arguments focus on property rights, i.e., how trust fund credits should be allocated regardless of whether they reduce the debt held by the public.

Only the storage technology argument can be empirically tested, as we do herein. We find that there is no empirical evidence supporting the claim that trust fund assets have reduced the level of debt held by the public. In fact, the evidence suggests just the opposite: trust fund assets have probably *increased* the level of debt held by the public. Moreover, the adoption of a “unified budget” framework in the late 1960s appears to play a statistically significant role in this result. We show how this counterintuitive result can be explained by a simple “split the dollar game” where competition between two political parties exploits the ignorance of voters who don’t understand that the government’s reported budget surplus actually includes the “off-budget” Social Security surplus. To be sure, this evidence is based on a limited annual time series (1949 – 2002) and so the results should be interpreted with caution. But the empirical tests are, if anything, biased toward finding a reduction in the level of debt held by the public, and not the increase that we find.

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JEL Codes: H5, H6

I. Introduction

Following an approximate two-percentage point increase in payroll taxes starting in 1983, the Social Security trust fund has grown from \$14 billion in assets to over \$1.3 trillion today. The trust fund invests primarily in Treasury securities that are issued specially for the trust fund.¹ Although the trust fund buildup was projected during the early 1980s to keep Social Security solvent until around 2060, the most current 2003 Social Security Trustees' Report estimates that the trust fund will be depleted in 2042 (Figure 1). However, as Figure 1 suggests, Social Security benefit payments are projected to exceed payroll tax revenue in the year 2018.

The inter-related issues of whether the \$1.3 trillion trust fund is “worth anything” and whether the important date for public policy purposes is the cost-revenue crossover date (2018) or the trust fund exhaustion date (2042) has been a source of considerable debate for many years. This debate was heightened after The Commission to Strengthen Social Security, established by President Bush, released its Interim Report in July 2001 and its Final Report in December 2001. The Commission recommended to the President that voluntary personal accounts, similar to 401(k)s, can be used to augment traditional Social Security benefits.

While the projected trust fund exhaustion date has traditionally been the popular focus in the press, the Commission's Interim Report highlighted the cost-revenue crossover date (at that time, estimated as 2016 by the Social Security Trustees) as more relevant. (The Trustees estimated the trust fund exhaustion date as 2038 when the Commission wrote its report.) The Commission argued that assets in the trust fund failed to increase national saving and so could not count toward pre-funding of future benefits.

¹ Technically, the Managing Trustee of the trust fund has the right to purchase other risk-less government securities, but the exact choice is economically immaterial and the choice is not germane to the debate considered herein. Currently, the Disability Insurance trust fund holds a very small amount of marketable securities.

The Commission's claims about the trust fund drew a flood of responses from academics and policymakers. A Lexis-Nexis search reveals that the Commission's remarks about the trust fund generated several dozen articles in newspapers and magazines worldwide.

Opponents of personal accounts have accused the Commission of, in the words of House Minority Leader Richard Gephardt (D-Mo.), "misstating facts" by questioning the worthiness of trust fund assets. Gephardt continued: "If the full faith and credit of the United States government is not an asset, I don't know what is."² Noting that the trust fund will have \$5 trillion worth of assets in 2016, Alan Blinder stated that "It's irresponsible to frighten people."³ Along with co-authors, Henry Aaron, Alicia Munnell, and Peter Orszag (2001, p. 11), he wrote:

The Social Security Trust Fund currently holds more than \$1 trillion in Treasury securities. These assets are backed by the full faith and credit of the U.S. Government. ... The Treasury bonds held by the Social Security Trust Fund are every bit as "real" as the Treasury bonds held by private investors. ... These [trust fund] cash-flow surpluses have raised national saving and investment and thus have helped to expand national income. They have bolstered our ability to pay Social Security benefits in the future...

Paul Krugman (2001, p. 13) called the Commission report "sheer, mean-spirited nonsense" and "twisted logic":

Just as a private pension fund uses earnings on its assets to pay benefits, the Social Security system can use earnings from this trust fund to pay benefits. ... Social Security benefits can be paid out of the general budget – a transfer of revenue that is clearly justified if payroll tax receipts have meanwhile been used to pay off the national debt, releasing large sums that would otherwise have been consumed by interest payments.

Alicia H. Munnell and R. Kent Weaver (2001, p.11) wrote:

The real crisis date, [the Commission] now say[s] is not 2038, but 2016. ... This argument is incorrect. It implies that the taxes in excess of benefit payments that working people have paid to prefund the system since 1983 are worthless. ... The excess payroll

² In "U.S. Representative Richard Gephardt (D-MO) Holds Radio Roundtable." Federal Document Clearing House, Inc., July, 20, 2001.

³ In Heidi Przbyla, "Critics Ramp Up Campaign Against Bush's Social Security Plan." Bloomberg, July 23, 2001.

taxes that have been used to build up reserves in the trust funds have increased national saving. ... The argument that the federal government will have to raise taxes or cut spending to redeem Social Security in 2016 does not make the system's assets any less "real." If General Motors or IBM redeemed the government bonds in their pension funds, the Treasury would also have to raise new funds to pay them off.

But other people see it differently. *Newsweek* columnist Allan Sloan (2001) wrote:

Let's say that you set up a \$1 million trust fund to pay for your retirement. But instead of putting in \$1 million of cash or stocks, you give the fund a \$1 million IOU from yourself. When your Golden Years arrive, you want the million bucks. To get it, you need to fork over \$1 million to redeem the IOU. The fact that the fund has the IOU doesn't make it any easier for you to come up with the money.

Smetters (1999), Diamond (2000, 2003), O'Neill (2002), and Shoven (2003) give less heated thoughts.

Interestingly, these debates are not new. The meaning and purpose of the trust fund has been hotly debated even before Roosevelt approved the Social Security Act on August 14, 1935 (Schieber and Shoven, 1999). Moreover, the debate was so contentious that the first academic article on the issue, published in *The Quarterly Journal of Economics* in 1937, was unsigned in order to protect the author's identity.⁴

The writer of this article has asked that his name be not signed to it. We believe it to deserve careful attention. – The Editors

Overview

The current paper provides a unified framework for thinking rigorously about the Social Security trust fund. Debate over the trust fund's worth is much subtler than a matter of accounting; indeed, there is implicit agreement about the math. The disagreement is really about how to *characterize* the trust fund with an understanding that its characterization may affect policy decisions. In particular, if the trust fund is perceived as "real," this belief helps create a

“pecking order” for future spending, moving Social Security toward the front of the line since trust fund assets represent monies “owed” to Social Security (e.g., Schlesinger, 1959). Indeed, Senator Moynihan in 1990 even suggested reducing the Social Security payroll tax in order to move Social Security to a strict pay-as-you-go system in order to reduce the political strength of these claims – claims that he believed were not backed by real assets.

This paper identifies the multiple perspectives of the trust fund and organizes the arguments under two categories: (I) storage technology arguments and (II) ownership arguments. Storage technology arguments focus on whether the trust fund reduced the level of debt held by the public. Ownership arguments focus on property rights, i.e., how trust fund credits should be allocated regardless of whether they reduced debt held by the public.

Only the storage technology argument can be empirically tested, as we do herein. We find that there is no empirical evidence supporting the claim that trust fund assets have reduced the level of debt held by the public. In fact, the evidence suggests just the opposite: trust fund assets probably actually *increased* the level of debt. We show how this counterintuitive result can be explained by a simple “split the dollar game” where competition between two political parties exploits the ignorance of voters who don’t understand that the government’s reported budget surplus actually includes the “off-budget” Social Security surplus. To be sure, this empirical evidence is based on a limited time series that is subject to the standard criticisms of time-series evidence. But the econometrics specification is, if anything, somewhat biased toward finding a reduction in the level of debt held by the public, and not the increase that we find.

⁴ I am grateful to Andrew Rettenmaier and Tom Saving for pointing me to this article.

II. Budget Arithmetic

The following equation gives the primary “unified budget surplus” at time t , which is decomposed into the “on-budget” (non-Social Security) surplus and “off-budget” (Social Security) surplus:

$$(1) \quad S_t \equiv \overbrace{\left(T_t^{NS} - G_t^{NS} - r_t TF_t\right)}^{\text{On-Budget}} + \overbrace{\left(T_t^S + r_t TF_t - B_t\right)}^{\text{Off-Budget}},$$

where

- S_t : unified primary budget surplus at time t .
- T_t^{NS} : non-Social Security tax revenue at time t .
- G_t^{NS} : non-Social Security government spending at time t .
- r_t : interest rate paid on trust fund assets, TF_t .
- T_t^S : Social Security tax revenue received at time t .
- B_t : Social Security benefits paid at time t .
- TF_t : Beginning-Of-Year (B.O.Y.) trust fund value at time t :

$$(2) \quad TF_t = \sum_{s=0}^{t-1} (T_s^S - B_s) \prod_{u=s+1}^{t-1} (1 + r_u),$$

where $t = 0$ is the first period of consideration.

The B.O.Y. debt held by the public at time $t+1$, D_{t+1} , equals

$$(3) \quad D_{t+1} = (1 + r_t)D_t - S_t = -\sum_{s=0}^{t-1} S_s \prod_{u=s+1}^{t-1} (1 + r_u).$$

In budget nomenclature, Social Security (along with a small postal fund) is considered “off budget” while the rest of the unified surplus is deemed “on budget.”

III. Points of Agreement

As summarized in Table 1, scholars on both sides of the debate seem to agree on some basic tenets. First, each side agrees that Social Security has been running fairly large primary surpluses since 1983 – i.e., $T_t^S > B_t$ for $t = 1983, 1984, \dots, 2003$. These surpluses plus interest have produced a trust fund that today holds over one trillion dollars of government bonds (i.e., $TF_{2003} \approx \$1.3$ trillion) that are backed by the full faith and credit of the U.S. government. Actual pieces of paper are printed, and those pieces of paper happen to be stored in West Virginia.

Second, each side relies upon, even if just for the sake of argument, the Social Security Trustees' "intermediate" cost projections. The latest projections state that the value of payroll contributions collected by Social Security will exceed the value of benefits paid by Social Security ($T_t^S > B_t$) until $t = 2018$, at which point contributions will fall below benefit payments ($T_t^S < B_t$; $t > 2018$). By 2018, the trust fund, TF_{2017} , will hold approximately \$5 trillion in bonds.⁵ The trust fund is projected to be depleted of assets in 2042.

Third, *for a given level of debt held by the public*, the Social Security trust fund is *not* an asset to the *government as a whole*. For example, the Clinton Administration, in its 2000 fiscal year budget, wrote:

These [trust fund] balances are available to finance future benefit payments and other trust fund expenditures – but only in a bookkeeping sense. ... They do not consist of real economic assets that can be drawn down in the future to fund benefits. (p. 337)

In particular, the entire trust fund enters on both sides (assets and liabilities) of the government's balance sheet or, equivalently, not at all. Beginning in 2018, Social Security benefits must be financed, in part, from interest income paid by Treasury on bonds held in the trust fund. A few

⁵ As shown in Figure 1, the trust fund continues to grow in value for about seven years after benefit payments begin to exceed revenue in 2018 because of interest income earned on its outstanding stock of assets.

years later, when payroll revenue plus interest falls below benefit payments, the bonds in the trust fund itself must be redeemed in order to finance Social Security benefits. By equations (1) and (3), the government can avoid the increasing the debt held by the public in 2018 only by increasing taxes or by decreasing spending.

Fourth, for a *given* level of debt held by the public, 2018 is the *latest* date in which fiscal action must be taken to address the demographic problems facing Social Security. As mentioned above, in 2018 the federal government must come up with resources by increasing taxes, decreasing spending, or issuing additional debt to the public.

Fifth, whether investment by the trust fund into *non*-government securities could influence the federal government's tax and spending decisions might depend on the accounting treatment of such investments. Under accrual type of accounting, the purchase of these assets would not affect the unified budget surplus; only, interest income, dividends and capital gains or losses would be shown to reduce or increase outlays (CBO, 2003a). There is little reason, therefore, to believe that the government's spending and tax decisions would be influenced if it decided to purchase non-government securities. However, if, alternatively, the purchase of non-government securities were treated under standard "cash accounting" principles then these purchases must be treated as an outlay (OMB Circular A-11), thereby reducing the reported unified surplus. In this case, the government might choose higher levels of taxes or lower levels of spending. In other words, the actual accounting methodology applied to the purchase of non-government securities could have important political-economy ramifications. The federal government typically uses cash accounting for most of its activities that do not interact with the securities market. But accrual accounting is more often used in interactions with the securities markets, including loans and loan guarantees. While accrual accounting would more accurately

reflect the underlying costs of the purchase of non-government securities, federal accounting rules do not currently indicate the accounting approach that would be used (CBO, 2003a). As a result, some of the proposals to invest the trust fund in private equities explicitly specify accrual accounting treatment in order to avoid the appearance of a reduced unified surplus.

IV. Storage Technology Based Arguments

The debate over whether the \$1.3 trillion trust fund is worth anything is more fascinating than simple accounting. Table 2 summarizes my characterization of the different perspectives of the trust fund. The perspectives are broadly grouped by those arguments that are storage based (this section) and those arguments that are ownership based (the next section). Within both broad categories, two opposing views of the trust fund emerge, for a total of four perspectives.

The storage-based perspective of the trust fund assumes that the distinction between off-budget surpluses and on-budget surpluses is made in the hope that these two separate “mental” accounts provides a storage technology that prevents Social Security surpluses from being used to finance larger amounts of non-Social Security spending or tax cuts. Whether this hope is naïve or well founded is investigated empirically later in this paper.

View: The Trust Fund is Valuable

This perspective assumes that the trust fund has increased national saving by reducing the debt held by the public. Equation (1) shows that an increase in the value of the payroll tax, T_t^S , as in the early 1980s, increases the size of the unified surplus, assuming, quite critically, ceteris paribus, i.e., no change in government spending (G_t^{NS} or B_t) or other taxes (T_t^{NS}). This view is compatible with the idea that policymakers focus only on the *on-budget* surplus when setting

non-Social Security spending and taxes. By equations (2) and (3), the trust fund increases dollar-for-dollar with the decrease in the debt held by the public, assuming no change in other fiscal variables.

Hence, according to this view, the trust fund should be “mentally credited” to Social Security because it has reduced the value of the outstanding debt held by the public. To be sure, the government still has to make some difficult fiscal policy decisions on or before 2018. But these decisions are not made any more difficult by the need to repay Social Security. So any shortfall to the government as a whole, starting in 2018, should be viewed as a general revenue problem and so should not particularly influence the discussion of Social Security benefits or taxes or reform options. So, if hypothetically, the cost-revenue crossover date were projected to occur at some finite point in the near future but the trust fund itself was forecasted to never become exhausted (due to interest income), Social Security benefits and payroll taxes should not be adjusted. This perspective is the position taken by many of the critics of the Social Security Commission’s Interim Report, as quoted earlier.

View: The Trust Fund **isn’t** Valuable

This view takes issue with the *ceteris paribus* assumption above. As argued by Elmendorf and Liebman (2000), historically, the *unified* surplus has received much more attention in the popular press and by policymakers than the on-budget surplus. As a result, policymakers might focus on the size of the unified surplus when making spending and tax decisions. Recall from equation (1), that the unified budget surplus combines Social Security surpluses with non-Social Security surpluses. According to this view, that unification has allowed the political process in the past to spend *more* on non-Social Security programs, G_t^{NS} , or

reduce non-Social Security taxes, T_t^{NS} , while still allowing policymakers to report a smaller unified deficit (e.g., Buchanan, 1990, argues that this outcome is likely).

Policymakers have gotten away with the extra spending because the general population doesn't realize that unified surpluses include off-budget, Social Security surpluses. As Brookings Institution scholar Barry Bosworth (1996, p. 104) put it:

Most Americans are normally very surprised to learn that the surplus is being used to finance other programs, and that in most public discussions the budget deficit is defined to include the finances of social security.

The issue of whether the trust fund increased national saving or increased non-social security spending was also the focus of a debate more than a decade ago. As noted earlier, Senator Moynihan in 1990 even suggested reducing payroll taxes in order to basically eliminate the trust fund. Like many social activists, he was concerned about the regressive nature of payroll taxes that he felt were simply being used as a substitute for more progressive taxation:

We cannot continue to use regressive payroll taxes to finance general government expenses. That is not acceptable.⁶

Getting rid of the trust fund, he thought, would create an impetus for serious reform and remove what he believed were claims to the trust fund that were not backed by real increases in saving.

Indeed, since personal accounts were viewed as politically untenable during the 1990s, many leading liberals were quite open about their distrust of the government's ability to save trust fund assets. In 1990, Congressman Richard Gephardt, for example, stated that:

[The government] should stop borrowing on workers retirement benefits ... People should be secure in the knowledge that the system will be able to send out their monthly Social Security checks. If the practice of borrowing against Social Security monies continues, that security is threatened.⁷

⁶ Quoted by Pat Wechsler, "Will Social Security be there for you?" *Newsday*, Jan., 14, 1990: 79.

⁷ "Senate begins debating \$1.1 trillion fiscal 1990 budget." UPI, May 2, 1989.

What Democrats want to do is we want to stop the stealing of [trust] funds to mask the deficit.⁸

In 1996, Senator Tom Daschle (D-SD) remarked:

Right now we are using Social Security trust funds to pay for other spending in the federal budget, and that to me is unacceptable. That isn't what we should be doing. That money should be held in trust. ... No, there is no such fund per se.⁹

Under this view, therefore, Social Security surpluses did not generate a smaller level of debt held by the public, and so there is little additional debt capacity to credit to Social Security. Therefore, Social Security should not *automatically* be off the table in discussing the fiscal shortfalls starting in 2018. This view was that taken in the Interim Report by the President's 2001 Social Security Commission (2001, p. 9) (relying on the 2001 Trustees Report):¹⁰

Bonds were deposited in the Trust Fund over time, resulting in a Fund balance now exceeding \$1 trillion. The problem is that when Social Security begins running cash deficits in 2016 and must begin redeeming the Fund's bonds, the nation will face the same difficult choices as if there had been no Trust Fund all ... This situation arose because past payroll taxes were not truly saved.

Members of the Clinton Administration seemed to tacitly agree with this view. In 1999, the Clinton Administration proposed a Social Security "lock box" in which Social Security surpluses would, in theory, no longer be used to finance on-budget spending. In their plan, the Social Security trust fund would receive an additional "credit" for the saved surpluses. Social Security experts across the political spectrum criticized the Clinton proposal as an act of "double counting." But members of the Clinton Administration argued that their additional credit was a

⁸ "GOP is 'messing around' with Social Security tax cut." The Washington Times, February 2, 1990: A4

⁹ Interviewed by Robert Novak, "There really is no SS trust fund," The State Journal-Register (Springfield, IL), December 5, 1996: 6.

¹⁰ To the extent that *future* Social Security surpluses are also spent, one could argue that Social Security begins imposing fiscal problems when future Social Security surpluses reach their peak, prior to 2018. However, this view is fairly extreme since the Social Security surpluses remain positive until 2018, even if smaller in size.

logical way of giving Social Security credit for “saving” surpluses relative to a baseline policy in which the money would have been spent on larger values of G_t^{NS} . In other words, the lock-box mechanism would have been redundant under the view that trust fund surpluses increased national saving. (To be sure, to some policymakers, this proposal no doubt sounded like rewarding a thief for not stealing anymore.) The Clinton proposal, though, was naïve in that it did not offer a clear lock-box mechanism to ensure new saving. But it is noteworthy that the Clinton Administration seemed to agree that trust fund surpluses were not being saved.

V. Ownership Arguments

The arguments presented in the previous section hinge on whether Social Security surpluses reduced the debt held by the public. In contrast, the ownership argument presented in this section does not. It contends that the trust fund is the property of Social Security beneficiaries *regardless* of whether Social Security surpluses were saved. The counterargument is that a property claim does not exist; hence, generational equity is all that matters.

View: The Trust Fund is Valuable

According to this perspective, trust fund surpluses should be credited to Social Security *even if* the government *spent* the surpluses elsewhere. In equation (1), this spending would take the form of non-Social Security spending, G_t^{NS} , becoming larger with larger payroll taxes T_t^S .

This perspective contends that the government has to come up with resources to pay off the Social Security trust fund in the same way it would have to come up with the resources to pay off any private pension. The government would have to pay back a private pension

regardless of what the government did with the proceeds. So, according to this view, why should Social Security be treated differently? As Aaron (1999) has stated it,

Social Security holds real reserves that can be sold to meet benefit obligations ... [I]t is illogical to deny the reality of those assets because fiscal policy outside Social Security was mismanaged for most of the last twenty years.

Hence, assets in the trust fund are intended to finance Social Security benefits, and so there is no particular reason why Social Security policy variables should be on the negotiation table except to the extent that the trust fund itself is projected to become exhausted. In particular, the cost-income crossover date itself is immaterial when deciding Social Security policy.

View: The Trust Fund **isn't** Valuable

A contrarian view, though, is that, even if some or all of the trust fund surpluses were *saved* (i.e., on-budget surpluses did not decline in response), what matters for judging pay-as-you-go fiscal programs is their impact on generational equity. Since, for a given level of debt held by the public, the trust fund is not a net asset to the government as a whole (Section III), its value is irrelevant for determining generational incidence. So, even if all previous surpluses were saved, those surpluses maybe did not do enough to relieve the generational burden being placed on future generations under reasonable demographic and economic projections. A “fair” allocation, therefore, might involve changing Social Security taxes or benefits even before the trust fund is exhausted. This view is implicit in the Generational Accounting literature.

The Heat Source?

Notice that these two arguments are statements about property. The first perspective essentially argues that a “promise made is a promise kept.” Specifically, if the government

convinced one generation to accept an increase in payroll taxes in order to finance their future Social Security benefits, the government should make good on its promise, regardless of what the government did with the money.

The second perspective, in sharp contrast, argues that the “government” is really just a conduit for future generations, and future generations never agreed to a mostly pay-as-you-go policy that extracts resources from them, i.e., there is no property right. While previous generations could have made the situation even worse for future generations by not saving trust fund surpluses, the baseline policy itself might still be bad under reasonable projections. Fiscal policy, therefore, must be judged by what is fair, quite independently of trust fund accounting.

The more philosophical nature of these property-based arguments does not mean that they are less important than the storage-based arguments. But it is likely that the philosophical nature of these arguments underlie some of the frustration in the trust fund debate.

Indeed, even those who appear to cling to the particular storage-based argument, by claiming that the trust fund has reduced the amount of debt held by the public, seem to also be influenced by the belief that not counting the trust fund assets as “real” would allow the government to renege on past promises. After all, one would hardly refer to the *scientific* claim that off-budget surpluses have hidden larger on-budget expenditures as “sheer, mean-spirited nonsense,” to quote Paul Krugman (referenced earlier). The tone of these types of remarks suggests that the Social Security trust fund debate is about more than just testable hypotheses.

VI. Did Past Social Security Surpluses Reduce the Debt Held by the Public?

It has sometimes been argued that one could never know what would have happened if there was no trust fund since that counterfactual world is unobservable. But that argument is

incorrect. To be sure, we will never know what the world would have looked like if, e.g., the Microsoft Windows operating system were an open platform instead of closed. But, in our case, the annual variation in the on-budget and off-budget surpluses allows us to test whether Social Security surpluses have been used to mask smaller on-budget surpluses.

Empirical Test

Denote the “modified primary” on-budget surplus shown in equation (1) as,

$$(4) \quad \tilde{S}_t^{ON} \equiv S_t^{ON} + r_t TF_t = T_t^{NS} - G_t^{NS} .$$

In particular, T_t^{NS} includes interest payments except to the off-budget accounts. Similarly, denote the “primary” off-budget surplus as

$$(5) \quad \tilde{S}_t^{OFF} \equiv S_t^{OFF} - r_t TF_t = T_t^S - B_t .$$

In this section, we estimate the following linear regression equation:

$$(6) \quad \tilde{S}_t^{ON} = \alpha + \beta \cdot \tilde{S}_t^{OFF} + \Theta_t + \varepsilon_t$$

α is the intercept term, Θ_t is a vector of control variables, and ε_t is the random error.¹¹

If past Social Security surpluses were used to reduce the debt held by the public in the past, we would expect there to be no relationship between \tilde{S}_t^{ON} and \tilde{S}_t^{OFF} , i.e., for $\beta = 0$. In this case, every dollar of off-budget surplus was used to reduce the level of debt held by the public by one dollar, increasing the government’s borrowing capacity. If, however, larger off-budget surpluses were historically used to pay for larger non-Social Security spending or non-Social Security tax cuts, we would expect \tilde{S}_t^{ON} and \tilde{S}_t^{OFF} to move in opposite directions, i.e., for $\beta < 0$.

¹¹ The regression analysis focuses on the “modified primary” surpluses in order to be consistent with theory in the presence of a trust fund with interest income. However, the empirical results reported herein are unchanged if attention is instead restricted to the standard off-budget and on-budget surplus definitions.

For example, if $\beta = -1$ then every dollar of Social Security surplus was used to hide one less dollar of on-budget surplus; the debt held by the public was not reduced. As shown later in the paper, the inequality $\beta < -1$ is also theoretically possible, i.e., off-budget surpluses were *more than* spent on the on-budget accounts, producing a *larger* level of debt held by the public.

Estimation Issues

To be sure, the estimates herein are based on a limited time series. For this reason, the results herein should be interpreted with some caution. However, the ability to establish *causality*, which typically represents one of the major issues confronting time series evidence, is less important for our purpose. For example, suppose that $\beta < 0$ is estimated. This finding could be interpreted in two different ways. It could imply that policymakers increased off-budget surpluses in response to smaller (often negative) on-budget surpluses. But it could mean that policymakers reduced on-budget surpluses in response to larger off-budget surpluses. The exact interpretation isn't clear. Yet, for our purposes, it is also not very relevant. In both cases, we are testing whether policymakers hide smaller on-budget surpluses with off-budget surpluses.

The potential for omitted variable bias, though, is an important concern. In particular, it is possible that some common factor could cause on-budget and off-budget surpluses to either move together or in opposite directions even though policymakers did not purposely use off-budget surpluses to mask smaller (possibly negative) on-budget surpluses. For example, the presence of a negative on-budget surplus is *not* itself an indication that off-budget surpluses are being spent if policymakers would have still chosen a negative on-budget surplus if the off-budget surpluses did not exist; such a situation might arise during a recession. Similarly, the presence of a positive on-budget surplus is not itself an indication that off-budget surpluses are

saved; the on-budget surplus could have been even higher without the off-budget surplus. Hence, we must attempt to control for these other potential determinants with the control variables, Θ_t .

However, while the potential for omitted variable bias is an important issue, the estimated value of β is, if anything, likely to be biased *upward* for two reasons. First, external macroeconomic shocks are likely to produce a positive relationship between \tilde{S}_t^{ON} and \tilde{S}_t^{OFF} . For example, as the economy expands, the Social Security and non-Social Security tax bases more or less expand together; moreover, non-Social Security transfer payments will decrease. As a result, both surpluses will tend to increase in response to this common macroeconomic shock, potentially producing the appearance of $\beta > 0$. Similarly, after a negative economic shock, both surpluses will tend to decline together, again producing the appearance of $\beta > 0$. While we can attempt to control for macroeconomic shocks, any control will not work perfectly; some positive bias, therefore, will likely remain. Second, changes over time in general attitudes toward government spending and taxes can also produce an upward bias in the value of β . While time variables can be used to try to control for changes in attitudes over time, any control will not be perfect, and so some positive bias presumably remains.

In sum, the appearance of a *negative* value for β , which is what we actually find below, is much more suggestive than a zero or positive value. In particular, if we estimate a zero or positive value for β , it could simply mean that our analysis has failed to properly control for macroeconomic shocks and changes in general attitudes over time. A negative value for β , however, is much more difficult to explain without reference to purposeful political choices.

OLS Estimation

Although the trust fund was almost depleted by the early 1980s, Social Security surpluses have been a non-trivial share of the government's total surplus since the late 1940s.¹² The data, therefore, begins in 1949 and ends in the most recent year, 2002. It is measured on an annual basis. All relevant variables are converted to 1996 dollars using the GDP chain-weighted deflator. But, due to economic growth, variables closer to 2002 are still much larger than those closer to 1949. Hence, to control for heteroskedasticity and to insure roughly equal weighting, all variables, except for the time indices, are divided by the relevant year's real *potential* GDP as constructed by CBO (2003b).¹³ (The qualitative results were unaffected by this normalization.) The hypothesis that the \tilde{S}_t^{ON} series contains a unit root can be rejected at the 5% significance level by the augmented Dickey-Fuller test. We, therefore, focus on "traditional" standard errors.

Table 3 presents OLS regression results corresponding to equation (6) for several different sets of control variables. Robust (Huber/White/sandwich estimators) of the standard errors are shown in parentheses.¹⁴ In Specification 1 in Table 3, there are no macroeconomic or time control variables. In particular, the on-budget surplus is simply regressed on the off-budget surplus and an intercept term. Notice that $\beta = 0.524$, although it is not statistically significant from zero at the 5 percent error level. In other words, the on-budget and off-budget surpluses generally tend to move together when we have not controlled for any type of macroeconomic shocks or for changes in general attitudes toward government spending and taxes over time.

¹² A previous version of this paper focused on the time period since 1979, which produces similar results. I am grateful to Peter Orszag for pointing out the importance of the on- and off-budget surpluses before this date.

¹³ The results were also robust to normalizing by actual GDP. However, theoretically, dividing by actual GDP presents potential endogeneity problems whereas potential GDP provides a more exogenous normalization. I am grateful to Alan Auerbach for suggesting this normalization to me.

¹⁴ The shown robust standard errors are very similar to the non-robust; consistently, the White's test reveals that the non-robust errors are not heteroskedastic. The null hypothesis of no serial correlation also cannot be rejected using the Durbin-Watson test, the Breush-Godfrey LM test (with three lags), or Durbin's alternative test.

Although we can have very little confidence in this relationship (since it is not statistically significant), this estimate shows that the relationship between on-budget and off-budget surpluses is certainly not biased *downward* before adding the control variables.

Specifications 2 through 4 add additional control variables: *actual* GDP; time; time squared; and, the wages and salary base. The time variables help control for changes in attitude over time. The wage and salary base is also useful because Social Security revenue is sensitive to fluctuations in this base while on-budget revenue also depends on capital income that is more closely reflected in GDP. Notice that as more control variables are added, the value of β turns negative and becomes statistically significant from zero at the 2 percent error level. With all of the control variables in place (Specification 4), the value of β is estimated as -2.755. In words, a one-dollar increase in off-budget surpluses is correlated with a roughly \$2.76 decrease in on-budget surpluses -- and, hence, a \$1.76 decrease in the unified surplus.

Hence, off-budget Social Security surpluses not only appear to have failed to decrease the debt held by the public, each dollar of Social Security surplus appears to have actually increased the debt held by the public in the past by \$1.76. At first glance, this dramatic overspending of Social Security surpluses seems entirely implausible. However, the next section presents a simple game theory model that is consistent with this result.

The signs of the other variables are reasonable in Specification 4. A larger “GDP” and “Wages and Salaries” increase the on-budget surplus. (These two variables, however, are highly collinear and, therefore, only jointly significant.) The negative linear time trend suggests that politicians became more comfortable with declining surpluses over a large part of the sample (that includes the 1980s and 1990s) but at a rate that was decreasing in magnitude (the positive non-linear time trend). The results herein are fairly robust to the selected time period. In

particular, $\beta = -2.446$ (significant at 2%) even after dropping the Reagan years, 1981 – 1988.¹⁵

The fact that the value of β is not significantly different from zero without the control variables and only becomes highly significantly and negative once the control variables are added is fairly telling. This set of facts makes it particularly hard to claim that on-budget and off-budget surpluses just happened by chance to move in opposite directions over time. The results herein could only be forcefully challenged if additional control variables caused the estimated value of β to once again become insignificant. I found that other potential control variables (in particular, political variables including the president's party and whether Congress and the president were of the same political party) had little effect on the results.

Alternative Estimation Strategies

Table 4 shows the results of Specification 4 (with all of the control variables) using quantile (median) regressions. Relative to OLS, median regressions are less sensitive to outliers. The point estimate for β is now -3.533 and is statistically significant from zero at the 2 percent error level. However, this number is not statistically significantly different from the point estimate, -2.755 , from the OLS analysis above. Hence, we cannot conclude with much confidence that reducing the impact of outliers actually strengthens the results relative to before.

Although there is little evidence of either heteroskedasticity or serial correlation in the errors (see the footnote above), Table 4 also shows the results corresponding to maximum likelihood estimation of a model in which the error term, ε_t , can take a General Autoregressive (with 2 lags) Conditional Heteroskedastic (with 3 moving average terms) form. The results of

¹⁵ A previous draft of this paper used a shorter time series and less sophisticated estimation techniques. Bosworth and Burtless (2003) argue that the results in that draft are not robust to limiting the sample to years 1983 – 2002. But their estimates don't incorporate as many controls. The results herein hold even over this short period.

the GARCH(2,3) specification are almost identical to the OLS estimates. These results were robust to additional lags and additional MA terms.

Johnson's Commission on Budget Concepts

When President Johnson's Commission on Budget Concepts released its report in 1967, it argued for drawing the primary focus of the nation's budget on the unified surplus measure. As President Clinton's 2000 Budget States, "the principle of a 'unified,' all-inclusive budget was established by President Johnson's Commission on Budget Concepts largely to forestall a trend toward moving favored programs off-budget – which had been done explicitly to shield those programs from scrutiny and funding discipline." (Analytical Perspectives, p. 21). The Commission's recommendations were first implemented in Fiscal Year 1969, corresponding approximately to calendar year 1970 herein. One of the potential problems with the move to a unified measure, however, is that the public and policymakers might have failed to distinguish between its components, allowing Social Security surpluses to finance other fiscal priorities.

Tables 5 and 6 investigate the potential importance of the adoption of the unified budget measure. Table 5, in particular, reports the results from all three estimation strategies when the data is restricted to the 1970 – 2002 period. This Table shows that the estimated value for β is negative, statistically significant from zero, and similar in magnitude relative to the entire 1949 - 2002 period shown in the earlier Tables. Table 6 shows the results corresponding to the period 1949 – 1969. Now the estimated value for β , while still negative, is *not* significant from zero even at a high error level. Moreover, it is smaller in magnitude for the OLS and median regressions than for the whole sample; for the GARCH regression, the point estimate is around zero. These results suggest that the switch to the unified measure in 1970 might have introduced

a new era in which Social Security surpluses were used to mask larger amounts of non-Social Security spending and tax cuts. Prior to 1970, there appears to be little evidence of such activity.

The last row of Table 6 presents more rigorous evidence of a structural break between the 1949 – 1969 and 1970 – 2002 time periods for all three estimation strategies. For each strategy, a Wald statistic is constructed corresponding to a test of equal parameter values between the two periods. The last row in Table 6 shows that the null hypothesis of equal parameters is rejected at the 0.4% significance level for the robust OLS model; it is rejected at the 1.3% significance level for the median regression; and, at the 0.03% level for the more robust GARCH model.¹⁶

VII. A Simple Model of “Excessive Spending” ($\beta < -1$)

The remainder of this section presents a very simple “Divide the (cheap) dollar” game that explains how off-budget surpluses could be excessively spent in the on-budget account, that is, $\beta < -1$. The model relies on voter’s ignorance: voters do not realize that government’s reported surplus measure also includes “off budget” Social Security surpluses. In other words, voters observe the size of the Social Security trust fund but they do not realize that truly saving the Social Security surpluses also requires that the level of debt held by the public is reduced dollar for dollar. It is not too surprising that voters might not understand this “double counting” aspect of the federal government’s budget. Commenting on this particular complexity, Shoven (2001, p. 11) notes, “Compared with the set of U.S. government budget documents issued every April, War and Peace is a short story. It also is much easier to follow.”

Social Security surpluses, therefore, represent a potential “internal” source of government spending that is cheaper politically for politicians to spend relative to “external” sources of

financing such as higher tax rates. Indeed, although the exact mechanisms differ, asymmetric information also underlies most principal-agent models in the corporate finance literature on the relative costs of internal versus external financing. In those models, the Modigliani-Miller theorem fails, as shareholders fail to accurately see through the corporate veil. In the model herein, though, political competition between two parties (i.e., the agents) enhances the cost of the principals' (i.e., voters') ignorance: competition entices agents to chase cheap internal dollars, producing excessive spending that is driven by off-equilibrium payoffs.

Split the Dollar Game

To be specific, consider two political parties, D and R , with different ideological goals, maybe reflecting their different constituencies. Party D wants to increase government spending while Party R wants to decrease tax rates. Given the current level of tax rates and government spending, swing (and say decisive) voters are fairly indifferent to either policy change but they do care about decreasing the government's reported surplus. These voters, therefore, "blame" (or "credit") Party D or R for a reduction (or increase) in the reported surplus in proportion to the amount of the *perceived* change in the surplus caused by that party. This "blame" (or "credit"), therefore, places some restraint on the ideological desires of each Party.

Case 1: No Trust Fund

Consider first the case in which there is no trust fund and, hence, no source of cheap internal off-budget surplus funds. Higher amounts of government spending or a reduction in

¹⁶ It is well known that the probability of a type I error (incorrectly rejecting the null hypothesis) under this Wald statistic exceeds the underlying critical level. Still, the shown critical levels are much smaller than the expansions sometimes done to the critical levels.

taxes, therefore, require using costly external dollars or to report a smaller surplus. Since either financing option is observable to voters, suppose that the government reports a higher surplus.

Table 7a shows the payoffs to a simple normal form coordination game corresponding to \$1 tax expenditure at the margin. Purely for exposition purposes, we assume a linear payoff structure and so we restrict the strategy space of each Party. Specifically, Party *D* can either “do nothing” or attempt to “grab \$1” for its own purposes, namely, increasing government spending. Similarly, Party *R* can either “do nothing” or attempt to “grab \$1” for its own purposes, namely decreasing taxes.¹⁷ In each case, however, the Party’s actions are also penalized according to the negative dollar impact that they are perceived to make on the reported surplus.

Consider first Cell 4 in Table 7a. Both parties take no fiscal policy action, producing no change in their net scores. Now consider Cell 3 in which Party *D* grabs \$1 by increasing government spending while Party *R* does nothing. While Party *D* gets \$1, it is also fully blamed for decreasing the reported surplus by \$1, producing a net score of \$0. Cell 2 shows the similar situation for Party *R* in which they grab \$1 in the form of a tax cut but also receives the full blame for reducing the surplus, producing a net score of \$0. In Cell 1, both parties grab \$1 and so the unified surplus now decreases by \$2. In this case, both parties share equal blame, equal to \$1 each, and so the net scores to both Parties is \$0. In sum, the Parties are indifferent between the different strategies at the margin since each Party bears the full cost of its impact on the unified surplus. So we can think of Table 7A as describing the initial equilibrium.

Case 2: The Presence of a Trust Fund

Now let's introduce a "cheap" \$1 of Social Security surplus into this economy and see how Parties *R* and *D* compete for spending it. The payoffs to different strategies are shown in Table 7b, which, as we will now show, has a unique Nash equilibrium (Cell 1).

Let's first consider the off-equilibrium strategies starting with Cell 4 where the \$1 Social Security surplus is devoted to increasing the reported surplus. By assumption, the public does not know that the reported surplus includes the new \$1 Social Security surplus and so we assume that they credit the \$1 increase in the reported surplus to some other event outside of either Party's control such as a "revenue surprise" like in the late 1990s in the United States. Both parties are credited \$0.50 for saving the money.

But alas Cell 4 will not be chosen. The reason is that both Parties would want to grab the \$1 Social Security surplus for their own use. In particular, devoting the extra \$1 Social Security surplus to either an increase in government spending or a decrease in taxes produces the same unified surplus as before the "cheap" extra dollar arrived. Since the public does not realize that the reported surplus includes Social Security surpluses, it would not realize that the Social Security surplus has been spent. So both Parties have the incentive to try to grab the dollar. In particular, Party *R* has the incentive to reduce taxes (Cell 2) while Party *D* has the incentive to increase government spending (Cell 3). But neither Cells 2 nor 3 can be equilibriums: the Party that does not grab a dollar in either of these Cells has the incentive to grab.

Cell 1, therefore, emerges as the unique Nash equilibrium. At Cell 1, neither Party has an incentive to change their strategy. At Cell 1, the reported unified surplus is \$1 lower than it was before the arrival of the \$1 Social Security surplus. So, each Party is blamed \$0.50 for

¹⁷ The analysis herein simply focuses on the incentive facing each Party. A more complete model with logrolling or other mechanisms is needed to show how these incentives are implemented into law. The analysis herein ignores

increasing the government's reported surplus by \$1, which reduces their respective net scores to \$0.50. But notice that the \$1 Social Security is more-than-fully spent in equilibrium, producing an actual reduction in the unified surplus. In other words, the \$1 of Social Security surplus has not only failed to reduce the debt held by the public, it actually increased this debt by \$1.

In terms of our earlier regression formulation, this political competition would produce a value of $\beta = -2$. However, with a larger strategy space (i.e., Parties can attempt to grab more than \$1), it is quite straightforward to show that $\beta < -2$ is also possible. Instead of restricting the strategy space, an alternative but more complicated model would produce a unique equilibrium with concave payoff functions. But this more complicated setting is not needed for our purposes.

The above analysis quite critically assumes that voters blame each Party for the reduction in the reported surplus according to the perceived amount grabbed by each Party. However, if voters thought hard about the issue, they might more rationally blame each Party according to the actual number of dollars grabbed by each Party regardless of the change in the reported surplus. In this case, the incentive for each Party to attempt to grab Social Security surplus dollars would be undermined. In reality, however, it is more likely that most voters simply respond to changes in the reported surplus and cast their blame (or credit) accordingly. Indeed, politicians in the past have routinely made an effort to divorce their fiscal policies from their true costs by attempting to convince voters that the changes in taxes or spending could even pay for themselves, either in full or in part, as part of "supply side economics" or the "reinvention of government." In face of these complexities, it is not surprisingly, therefore, that voters might look at some simple summary metrics when judging fiscal policy. It is even less surprising that politicians might exploit the voters' ignorance in order to advance various fiscal objectives.

this complication and assumes that Parties can choose their preferred strategy within the stated strategy space.

VIII. Conclusions

This paper provides a unified conceptual framework for thinking rigorously about the assets accumulated in the Social Security trust fund. Multiple perspectives of the trust fund are identified and are summarized under two categories: (I) storage technology arguments and (II) ownership arguments. Only the storage technology argument can be empirically tested. We find that there is no empirical evidence supporting the claim that trust fund assets have reduced the level of debt held by the public. In fact, the evidence suggests just the opposite: trust fund assets may have actually increased the level of debt. To be sure, this empirical evidence is based on a limited annual time series (1949 – 2002); hence, the results should be interpreted with caution. But the empirical tests are, if anything, biased toward finding a reduction in the level of debt held by the public, and not the increase that we find. Still, these empirical results would do little to convince those observers who believe that the trust fund establishes irrevocable property rights regardless of the fiscal behavior by the rest of the government. Hence, the heated debate over the meaning of the trust fund may not be resolved by empirical testing alone.

Nonetheless, going forward, the results herein suggest that a newer mechanism might be needed in order to prevent Social Security surpluses from being spent elsewhere. In 1999, the Clinton Administration proposed the creation of a “lock box” whose purpose was to provide a better storage technology. The “lock box” was defined as “broken” if the on-budget surpluses ever turned negative. However, this definition was somewhat naïve and, for example, could even rule out automatic stabilizers and other countercyclical actions during recessions -- fiscal policies that might have been undertaken even without the availability of Social Security surpluses. Whether Social Security surpluses are spent or saved does not depend on whether the on-budget surplus is negative or even positive. Instead, this determination depends on how the

on-budget surplus (positive or negative) *changes* in response to the presence of off-budget surpluses. It is unlikely that a complicated budget rule that incorporated this feedback, as captured in the regression analysis herein, could ever be implemented. Creating a more safe storage technology, therefore, might require the adoption of personal accounts that augment the current Social Security system (Mariger, 1999; Smetters, 1999, and Shoven, 2001).

Figure 1
Social Security Income, Costs and Trust Fund

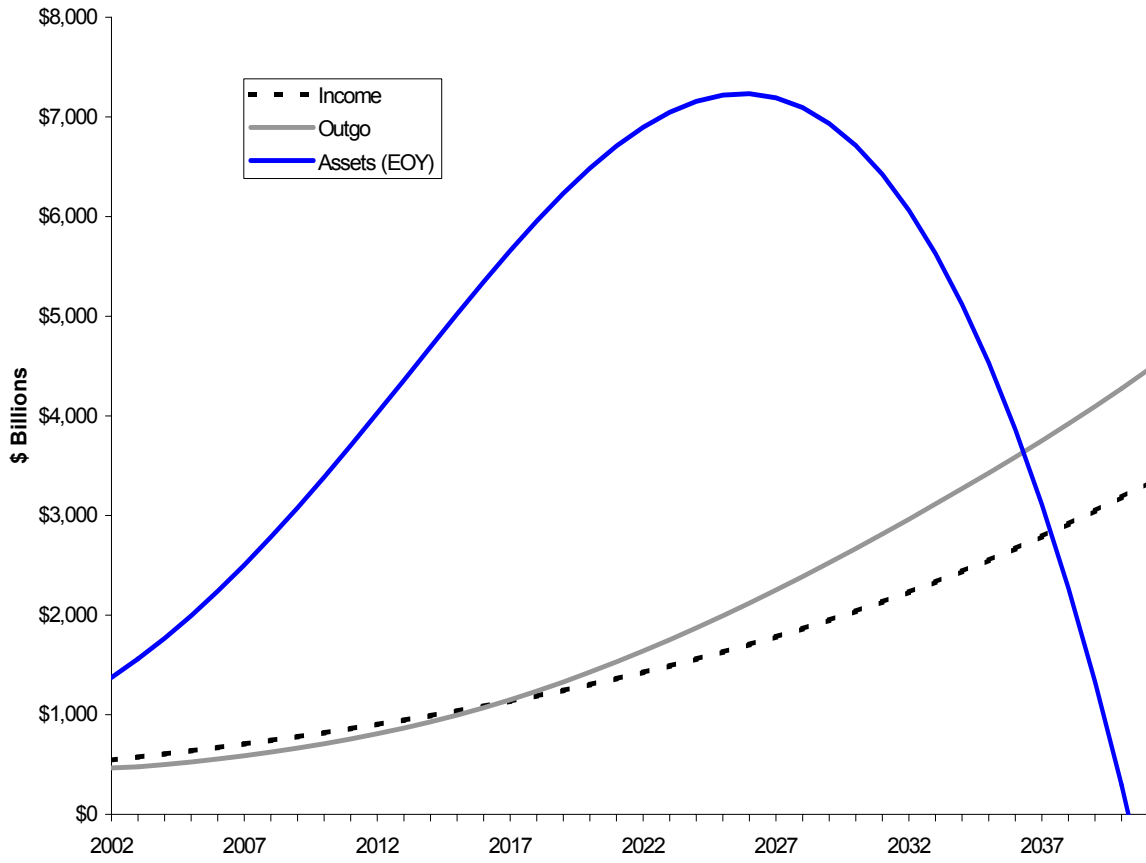


Table 1
Points of Agreement

- The Social Security trust fund currently holds over \$1.3 trillion of bonds that are backed by the “full faith and credit” of the U.S. government.
- 2018 is the projected year in which Social Security benefits will exceed contributions; the trust fund is projected to be depleted in 2042.
- For a given level of debt held by the public, the trust fund is not a net asset to the government as a whole.
- For a given level of debt held by the public, 2018 is the latest date in which some fiscal action must be taken to address the demographic-driven problems facing Social Security.
- The portfolio held by the trust fund would have little impact on the government’s spending and tax decisions under the accrual accounting methodology that the federal government currently uses for loans and loan guarantees. However, if standard cash flow accounting were used then the purchases of non-government securities would reduce the reported surplus and, therefore, could influence government spending and tax policies.

Table 2
Characterization of the Disagreement

| <i>The Storage Technology View</i> | <i>The Ownership View</i> |
|--|---|
| <p style="text-align: center;"><u>The Trust Fund is Valuable</u></p> <ul style="list-style-type: none"> • Trust fund surpluses decreased the debt held by the public, thereby increasing the government’s debt capacity. • This increase in debt capacity should be “mentally credited” as assets to Social Security and so shortfalls between 2018 and 2042 are a general-revenue problem. | <p style="text-align: center;"><u>The Trust Fund is Valuable</u></p> <ul style="list-style-type: none"> • Whether trust fund surpluses decreased the debt held by the public is irrelevant. • Trust fund surpluses should be mentally credited to Social Security even if the government spent the trust fund surpluses. Why should Social Security be held liable for the actions of the rest of the government? A promise made is a promise kept. |
| <p style="text-align: center;"><u>The Trust fund isn’t Valuable</u></p> <ul style="list-style-type: none"> • Including “off budget” surpluses in the government’s reported surplus measure allowed the government to run a smaller on-budget surplus (maybe negative). Hence, there is no (or little) additional debt capacity to credit to Social Security. • Social Security, therefore, should not be off the table in discussing fiscal shortfalls starting in 2018 since Social Security is the primary cause of those shortfalls. | <p style="text-align: center;"><u>The Trust fund isn’t Valuable</u></p> <ul style="list-style-type: none"> • Whether trust fund surpluses decreased the debt held by the public is irrelevant. • The trust fund is not a net asset to the government as a whole (Table 1) and so it does not impact generational equity. The “government” is just a conduit for future generations, which did not promise anything. Fiscal policies must be judged on the basis of a fair resource allocation between generations. |

Table 3
Least Squares Regression with (Robust) Standard Errors: 1949 - 2002
(Dependent Variable: Modified Primary On-Budget Surplus, \tilde{S}_t^{ON})

| Independent Variable | Specification | | | |
|-----------------------------|---------------------|---------------------|--------------------------|--------------------------|
| | 1 | 2 | 3 | 4 |
| S_t^{OFF} | 0.524 (0.736) | -0.643 (0.688) | -2.292** (0.877) | -2.755** (0.649) |
| GDP_t | | 0.449** (0.094) | 0.431** (0.084) | 0.006 (0.119) |
| Year (t) | | | -0.0036** (0.0008) | -0.0043** (0.00074) |
| Year ² (t^2) | | | 0.000047** (0.000012) | 0.000066** (0.000011) |
| Wages and Salaries | | | | 0.582** (0.128) |
| Intercept Term | -0.019** (0.002) | -0.458** (0.093) | -0.377** (0.078) | -0.256** (0.077) |
| R^2 | 0.01 | 0.27 | 0.54 | 0.69 |

Notes: Robust Standard errors shown in parentheses
Two asterisks (**) indicates significance at the 2% level

Table 4
Other Estimation Strategies: 1949 - 2002
(Dependent Variable: Modified Primary On-Budget Surplus, \tilde{S}_t^{ON})

| Independent Variable | Specification | |
|--|------------------------------|------------------------|
| | Quantile (Median) Regression | GARCH(2,3) |
| S_t^{OFF} | -3.533** (1.001) | -2.763** (0.786) |
| GDP_t | 0.115 (0.145) | 0.156 (0.087) |
| Year (t) | -0.005** (0.0008) | -0.004** (0.0005) |
| Year² (t^2) | 0.00007** (0.00001) | 0.000063** (0.0000) |
| Wages and Salaries | 0.662** (0.151) | 0.473** (0.082) |
| Intercept Term | -0.394** (0.096) | -0.350** (0.069) |

Notes: Standard errors shown in parentheses

Two asterisks (**) indicates significance at the 2% level

Table 5
All Estimation Strategies: 1970 - 2002
(Dependent Variable: Modified Primary On-Budget Surplus, \tilde{S}_t^{ON})

| Independent Variable | Specification | | |
|--|----------------------|------------------------------|----------------------|
| | Robust OLS | Quantile (Median) Regression | GARCH(2,3) |
| S_t^{OFF} | -2.83** (0.73) | -3.733** (1.487) | -2.542** (0.864) |
| GDP_t | 0.059 (0.162) | 0.013 (0.327) | 0.196 (0.217) |
| Year (t) | -0.003 (0.004) | -0.003 (0.0065) | -0.006 (0.0059) |
| Year² (t^2) | 0.00005 (0.00004) | 0.00006 (0.00006) | 0.00008 (0.00005) |
| Wages and Salaries | 0.737** (0.25) | 0.854* (0.429) | 0.561 (0.353) |
| Intercept Term | -0.417** (0.14) | -0.449** (0.211) | -0.393** (0.166) |

Notes: Standard errors shown in parentheses
 One asterisk (*) indicates significance at the 5% level
 Two asterisks (**) indicates significance at the 2% level

Table 6
All Estimation Strategies: 1949 - 1969
(Dependent Variable: Modified Primary On-Budget Surplus, \tilde{S}_t^{ON})

| Independent Variable | Specification | | |
|---|-----------------------|------------------------------|----------------------|
| | Robust OLS | Quantile (Median) Regression | GARCH(2,3) |
| S_t^{OFF} | -0.476 (1.413) | -1.986 (2.116) | 0.217 (3.655) |
| GDP_t | 0.208 (0.157) | 0.232 (0.187) | 0.187 (0.612) |
| Year (t) | 0.001 (0.003) | 0.0002 (0.005) | 0.003 (0.007) |
| Year² (t²) | -0.00003 (0.00009) | -0.00002 (0.0001) | -0.00008 (0.0001) |
| Wages and Salaries | -0.161 (0.233) | -0.227 (0.263) | -0.167 (0.588) |
| Intercept Term | -0.133 (0.114) | -0.111 (0.151) | -0.131 (0.354) |
| 1970 Structural Break (Prob > Wald Stat.) | 0.004** | 0.013** | 0.0003** |

Notes: Standard errors shown in parentheses
Two asterisks (**) indicates significance at the 2% level

“1970 Structural Break” indicates the test for a structural break between the periods 1949 – 1969 and 1970 – 2002. “Prob > Wald Stat.” indicates the significance level of the rejection of the null hypothesis of identical parameters between the two periods. For the GARCH model, “Wages and Salaries” during both time periods were excluded from the test in order to avoid a flat log likelihood function.

Table 7a
Case 1: No Trust Fund
The “Divide the Extra (Costly) Dollar” Game

| R, D | Payoffs to Party D | |
|---------------------------------|----------------------------------|---------------------------------|
| Payoffs To Party R | 1 | 2 |
| | Tax ↓, Spending ↑: +1.0, +1.0 | Tax ↓, Spending ↑: +1.0, 0.0 |
| | Surplus Δ: -1.0, -1.0 ----- | Surplus Δ: -1.0, 0.0 ----- |
| | Net effect: +0.0, +0.0 | Net effect: +0.0, 0.0 |
| | 3 | 4 |
| Tax ↓, Spending ↑: 0.0, +1.0 | Tax ↓, Spending ↑: 0.0, 0.0 | |
| Surplus Δ: 0.0, -1.0 ----- | Surplus Δ: +0.0, +0.0 ----- | |
| Net effect: 0.0, +0.0 | Net effect: +0.0, +0.0 | |

Table 7b
Case 2: The Presence of the Trust Fund
The “Divide the Extra (Cheap) Dollar” Game

| R, D | Payoffs to Party D | |
|--------------------------|--|--|
| Payoffs To Party R | 1 | 2 |
| | Tax ↓, Spending ↑: +1.0, +1.0 Surplus Δ: -0.5, -0.5 ----- Net effect: +0.5, +0.5 | Tax ↓, Spending ↑: +1.0, 0.0 Surplus Δ: 0.0, 0.0 ----- Net effect: +1.0, 0.0 |
| | 3 | 4 |
| | Tax ↓, Spending ↑: 0.0, +1.0 Surplus Δ: 0.0, 0.0 ----- Net effect: 0.0, +1.0 | Tax ↓, Spending ↑: 0.0, 0.0 Surplus Δ: +0.5, +0.5 ----- Net effect: +0.5, +0.5 |

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