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Can Taxes and Bonds Finance Government Spending?

by

Stephanie Bell [Kelton]*
Cambridge University Visiting Scholar, The Jerome Levy Economics Institute

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Levy Economics Institute
P.O. Box 5000
Annandale-on-Hudson, NY 12504-5000
http://www.levyinstitute.org

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Abstract

This paper investigates the commonly held belief that government spending is normally financed through a combination of taxes and bond sales. The argument is a technical one and requires a detailed analysis of reserve accounting at the central bank. After carefully considering the complexities of reserve accounting, it is argued that the proceeds from taxation and bond sales are technically incapable of financing government spending and that modern governments actually finance all of their spending through the direct creation of high-powered money. The analysis carries significant implications for fiscal as well as monetary policy.

1. INTRODUCTION

The optimal method by which to finance government (deficit) spending remains a controversial topic among many economists (see Modigliani, 1992; Trostel, 1993; Ludvigson, 1996; and Smith et al., 1998). Although most would agree that government financial policies require choosing among the imposition of taxes, the sale of interest-bearing debt obligations and the 'printing'/creation of government money[1] (or some combination of these), there is often strong disagreement regarding the macroeconomic consequences of these choices. The Barro-Ricardo thesis (Barro, 1974), for example, suggests that the financing choice is inconsequential. This, it is argued, is because the knowledge that bond-financed government spending will require higher taxes in the future induces households to save more now. The induced saving, which is just sufficient to purchase the new government debt, leaves private net wealth unchanged, thereby completely neutralizing the stimulative effect of government spending. Similarly, as Tobin recognizes, spending financed by issuing demand obligations (i.e. 'printing' money) might lead a monetarist Ricardian to suggest that a "money rain", like a "bond rain", will have no effect on aggregate private wealth or consumption since adjustments in the price level will prevent the *real* quantity of money from changing (1998). Thus, bond- or money-financed deficit spending yields results 'equivalent' with those that would have resulted if all spending had been financed by contemporaneous taxation.

In contrast, some Keynesians maintain that choices concerning the *source(s)* of deficit finance are indeed relevant (Blinder and Solow, 1973, 1976; Buiter, 1977; Lerner, 1973; Tobin

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[1] Government money will be used to refer to high-powered money (HPM), defined as member bank deposit balances at the Federal Reserve plus total currency outstanding. When necessary, changes in the 'money supply' (M1, M2, etc.) will be distinguished from changes in HPM.

1961). For them, the economic consequences of borrowing and 'printing' money can differ substantially from those obtained when government spending is financed solely by contemporaneous taxation. Among members of this group, most would probably agree that 'printing' money is both the least common and the least desirable method for financing the government's spending. Indeed, most would probably say that bond sales are (and should be) used to finance the excess of spending over taxation.

Despite differing beliefs regarding the *consequences* of the financing decision, both groups clearly believe that the government does choose *how* to finance its spending. What is conspicuously absent in these ongoing debates, however, is a detailed examination of the nuances of reserve accounting. Because these nuances have not been incorporated into standard analyses, many economists continue to debate the macroeconomic consequences of alternative "financing" methods. These debates follow directly from the apparent interdependence among taxes, bond sales, and deficit spending. By considering the impact of these operations on bank reserves, their interdependence can be explained as a consequence of their "reserve effects", rather than as necessary financing relationships.

Thus, this paper closely examines the "reserve effects" of the Treasury's operations by tracing through the impact of government spending, taxing and bond sales on aggregate member bank reserves. Section 2 details the impact of government spending and taxing on bank reserves as well as the significance of the resulting reserve effects. In Section 3, some important strategies for minimizing the reserve effects are introduced. The case of deficit spending is taken up in Section 4, where the reserve effects of various methods for the sale of government debt are examined. In Section 5, the complexities of reserve accounting are carefully considered, and

newly-created money is revealed as the source of all government finance. It is further argued that the proceeds from taxation and bond sales are not even capable of financing government spending since their collection implies their *destruction*. In the concluding section, it is suggested that debates concerning alternative methods for financing the government's (deficit) spending should, instead, be debates about alternative means of draining (excess) reserves from the banking system.

2. THE "RESERVE EFFECTS" OF TAXING AND SPENDING

Before examining the "reserve effects" of various Treasury operations, it is, perhaps, prudent to begin by looking closely at aggregate member bank reserves[2]. Beginning with the Federal Reserve's balance sheet, equivalent terms can be added to each side, and the entries can be manipulated algebraically in order to isolate member bank reserves[3]. The result, often referred to as the 'reserve equation', depicts total member bank reserves as the difference between alternative 'sources' and 'uses' of reserve funds. The reserve equation can be written as:

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[2] Although reserve requirements are generally met by holding a combination of vault cash and checking accounts at district Federal Reserve banks, accounts held by depository institutions at Federal Home Loan Banks, the National Credit Union Administration Central Liquidity Facility, or correspondent banks may also count toward satisfying the reserve requirement. Depository institutions do not have to meet these reserve requirements on a *daily* basis. They have a two-week "reserve period" (ending on Wednesdays) within which they must maintain *average* daily total reserves equal to the required percentage of average daily transactions accounts held during the two-week period ending the *preceding* Monday. Thus, despite being referred to as a contemporaneous reserve accounting (CRA) system, it is, in practice, lagged for two days. That is, banks always have two days (Tuesday and Wednesday) within which to acquire (*ex post*) reserves needed to eliminate a known deficiency. While some banks may choose to hold excess reserves, profit-maximizing banks will economize on reserves. Unless a bank has a preference for idle funds, it will exchange excess reserves for "earning assets" such as loans or securities.

[3] See (Ranlett, 1977, pp. 191-193) for the derivation.

Figure 1

		Sources		*Uses*
Total Member Bank Reserves	=	Federal Reserve Credit: U.S. Gov't Securities Loans to Member Banks Float + Gold + SDR Certificates + Treasury Currency	–	Currency In Circulation + U.S. Treasury Balance at Fed + Foreign Balances at Fed + Treasury Cash + Other Fed Deposits and accounts (net)

From Figure 1, it is clear that an increase in any of the bracketed terms on the left will increase reserves while an increase in any of the bracketed terms on the right will reduce them.

2.1 "Reserve Effects" of Taxing and Spending

In this section, the reserve effects of two important Treasury operations, government spending and taxing, will be analyzed. To emphasize the impact of these operations on bank reserves, the case in which all government payments and receipts are immediately credited/debited to accounts held at Reserve Banks will be considered[4].

When the government spends, it writes a check on its account at the Federal Reserve. Assuming the check is deposited into an account at a commercial bank, member bank reserves rise (by the amount of the check) as the Federal Reserve debits the Treasury's account, decreasing the right-hand bracket (RHB) in Figure 1, and credits the account of a commercial bank. Thus, a *system-wide* increase in member bank reserves results whenever a check drawn on a Treasury

[4] It is, of course, true that the Treasury keeps accounts at thousands of commercial banks and other depository institutions as well as Federal Reserve banks. This changes things considerably and will be taken up in the next section.

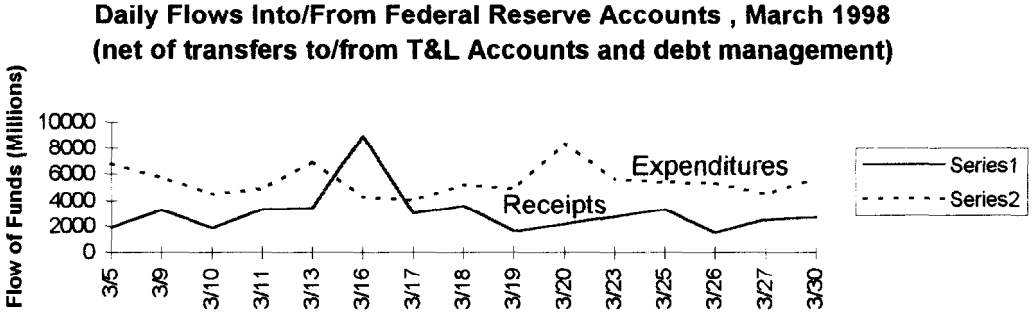
account at a Federal Reserve bank is deposited with a commercial bank. Government spending, then, increases aggregate bank reserves (*ceteris paribus*).

When, instead of *drawing* on its account at the Fed, the Treasury *receives* funds into this account, the reverse is true. For example, if a taxpayer pays his taxes by sending a check to the IRS, his bank and the banking system as a whole, lose an equivalent amount of reserves, as the IRS deposits the check into the Treasury's account at the Federal Reserve. Total member bank reserves decline as the RHB in Figure 1 increases. Thus, the payment of taxes by check results in a system-wide decrease in member bank reserves (*ceteris paribus*)[5].

If Treasury spending out of its accounts at Federal Reserve banks were perfectly coordinated with tax receipts deposited directly into the Treasury's accounts at Reserve banks, their opposing effects on reserves would offset one another. That is, if the government ran a balanced budget with *daily* tax receipts and government spending timed to offset one another, there would be no net effect on bank reserves. However, as Figure 2 shows, the Treasury's daily receipts and disbursements from accounts at Reserve banks are highly incommensurate. Indeed, they can differ by almost $6 billion.

[5] It is worth noting that government spending must originally have preceded taxation. That is, the payment of taxes could not increase the Treasury's account at the Fed (RHB term), reducing bank reserves, until the reserves had been created. Moreover, the Federal Reserve and/or Treasury, as the only agents capable of supplying them, must have been the original *source* of these reserves. This will be taken up in Section 5.

Figure 2



Source: Daily Treasury Statement, http://fedbbs.access.gpo.gov/dailys.htm

Thus, despite an attenuation of the "reserve effect" due to the simultaneous injection and withdrawal of reserves, government spending and taxation will never perfectly offset one another. Even if a more even pattern could be established, some discrepancies would persist because, as Irving Auerbach recognized, "there is no way to determine in advance, with complete accuracy, the total amount of the receipts or the speed at which the revenue collectors will be able to process the returns" (1963, p. 349). Thus, while concurrent government spending and taxation have *some* offsetting impact on reserves, the reserve effect from the Treasury's daily cash operations would still be substantial, especially "if they were channeled immediately through the Treasurer's balance at the Reserve Banks" (Auerbach, 1963, p. 333).

2.2 The Importance of the "Reserve Effect"

The inability to perfectly coordinate Treasury receipts and expenditures has serious implications for the level of bank reserves and, subsequently, the money market. Because banks are required by law to hold reserves against some fraction of their deposits but earn no interest on reserves held in excess of this amount, they will normally prefer not to hold substantial excess reserves.

Government spending, then, will leave them with more reserves than they prefer/need to hold while the clearing of tax payments will leave them with fewer reserves than are desired/required (*ceteris paribus*).

The fed funds market is the "market of first resort" for banks wishing to rid themselves of excess reserves or to acquire reserves needed to meet deficiencies (Poole, 1987, p. 10). When there is a build-up of reserves within the system, many banks will attempt to lend reserves in the federal funds market. The problem, of course, is that lending reserves in the funds market cannot help a banking *system*, which began with an 'equilibrium' level of reserves, to rid itself of excess reserves. Moreover, when the system is flush with excess reserves, banks will find that there are no bidders for these funds, and the federal funds rate may fall to a zero percent bid.

Likewise, the clearing of tax payments will leave a banking system which began with an 'equilibrium' level of reserves short of required (and/or desired) reserves. Banks will look to the funds market to acquire needed reserves, but since *all* banks cannot return to an equilibrium reserve position by borrowing federal funds, a system-wide shortage will persist. That is, like a system-wide surplus, a system-wide deficiency cannot be alleviated through the funds market[6]; attempts to do so will simply drive the funds rate higher and higher.

Importantly, the funds rate is not the only interest rate affected by changes in the level of

[6] When there is a reserve deficiency for the banking system as a whole, banks could attempt to resolve the deficiency by reducing deposits. If a single bank begins this process (selling U.S. securities to a member of the non-bank public or allowing loans to be repaid without reissuing them), it will result in a *multiple contraction* of deposits (assuming all banks follow suit). Though this would ultimately eliminate the banking system's reserve deficiency (without requiring banks to acquire additional reserves), the process takes *time* and will disrupt interest rates until 'equilibrium' is restored. Deficiencies will, therefore, usually be eliminated as the banking system acquires more reserves, not as it reduces deposits that reserves are required to 'back up'.

bank reserves. As the "focus of monetary policy", the funds rate is the "anchor for all other interest rates" (Poole, 1987, p. 11). Thus, when banks are content with their reserve positions, Treasury operations (such as government spending and taxation) disrupt these positions by adding or draining reserves, and banks react to these changes by first turning to the funds market. There, the funds rate is bid up or down and other short-term interest rates are affected. Although some individual banks will be successful in eliminating their own reserve deficiencies/excesses, the banking system *as a whole* will not be able to alleviate a shortage/deficiency on its own. Only through government adding/draining of reserves can a system-wide imbalance be eliminated. Because attempts to resolve system-wide reserve 'disequilibrium' through the funds market can affect a number of other interest rates, a variety of procedures have been developed to mitigate the adverse impact of Treasury operations on banks' reserve positions.

3. STRATEGIES FOR REDUCING THE "RESERVE EFFECT"

In the preceding discussion, the effects of government spending and taxing on bank reserves were examined by assuming that all disbursements and receipts were immediately credited/debited to the Treasury's accounts at Federal Reserve banks. This treatment allowed us to highlight the impact of each of these operations on the level of bank reserves, but it did not paint a realistic picture of the way things currently work. If things did indeed work this way, there would be an unrelenting disruption of banks' reserve positions and, subsequently, chronic turmoil in the funds market. Because these consequences are highly undesirable from a policy perspective, some important strategies have been developed to mitigate these persistent, yet unpredictable, "reserve effects". Let us move to an examination of these techniques.

3.1 The Use of Tax and Loan Accounts

The disruptive nature of the Treasury's operations was recognized under the Independent Treasury System[7] and ultimately led to the use of General and Special Depositories[8], private banks in which government funds could be kept. This was the first important strategy developed to mitigate the "reserve effect". As Ranlett recognized, the reserve effect caused by the "point inflow-continuous outflow nature of Treasury activities" could be tempered by placing certain government receipts into Tax and Loan (T&L) accounts at private depositories (1977, p. 226). Thus, the reserve drain that would otherwise accompany payments made to the government could be *temporarily* prevented[9]. The benefits of using these depositories were quickly recognized, and their functions were broadened whenever it became clear that they could be used to further mitigate the reserve effect. As the size of the government's fiscal operations grew, Special Depositories quickly became the most important group of bank depositories . As Figure 3 shows, just over two-thirds of all Federal tax receipts are currently deposited directly into T&L accounts.

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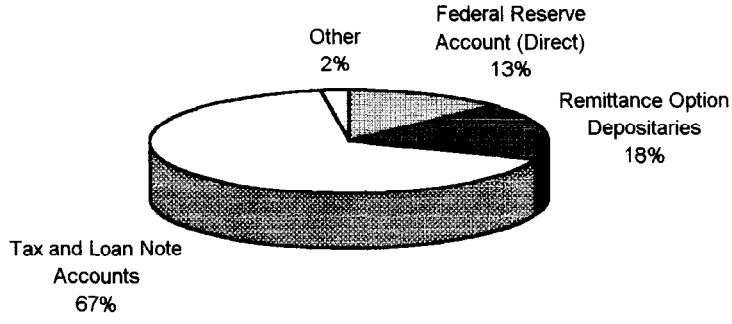
[7] The Independent Treasury System was in effect long before the establishment of the Federal Reserve System. It was established in 1840, abolished the following year, re-established in 1846, and discontinued in 1921.

[8] General Depositories have become known as "remittance-option banks" while Special Depositories are currently referred to as "note-option banks". Both are depository institutions with T&L Accounts, but a "remittance-option bank", like its predecessor, the General Depository, must remit its T&L balances to a Reserve bank the day after the funds are received. In 1978, "note-option banks" were given the opportunity to accumulate the daily tax payments they receive by transferring them from the ordinary T&L Accounts (where they are held interest-free for one day) into an interest-bearing "note account". Up to a pre-approved limit, these funds can remain in "note accounts" until the Treasury "calls" for them to be transferred to Reserve Banks (Manypenny and Bermudez, 1992, p. 728).

[9] In this case, a distinction between the 'supply of money' and HPM should be made. When tax receipts are placed into a T&L account, HPM (bank reserves and currency outstanding) is not affected. The 'money supply' (M1), however, is. When funds are transferred from demand deposits, where they are part of M1, into T&L accounts (or the Treasury's account at the Fed), which is not part of any standard measure of the money supply (M1, M2, etc.), the 'money supply' declines.

Figure 3

Disposition of Federal Tax Deposits (Nov. '97- Mar. '98)



Source: Daily Treasury Statement, http://fedbbs.access.gpo.gov/dailys.htm

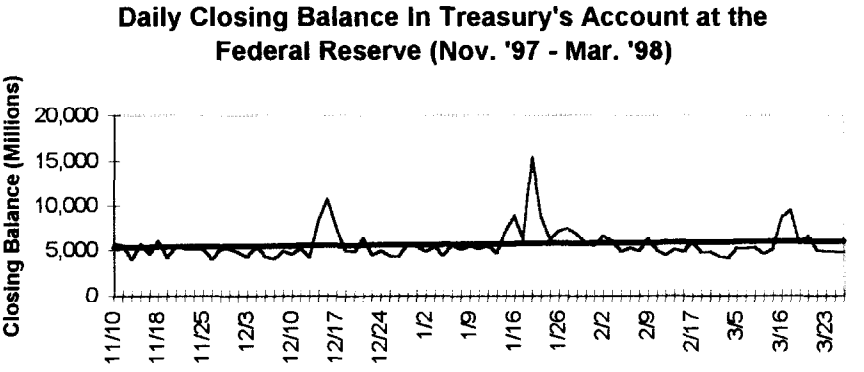
Today, the T&L accounts are by far the most important device used to guard the money market against the sizable daily differences (shown in Figure 2) between the flows of government receipts and disbursements.

3.2 Managing the Treasury's Balance at the Fed

Since almost all government spending involves writing checks on accounts at the Fed, virtually all funds in T&L accounts must eventually be transferred to Reserve banks[10]. Because only net changes in the Treasury's account at the Fed impact the aggregate level of reserves (*ceteris paribus*), maintaining "the Treasurer's balance with the Reserve Banks at a reasonably constant level" is the second strategy used to minimize the "reserve effect" of the Treasury's operations (*ibid.*, p. 364). Specifically, the Treasury "aims to maintain a closing balance of $5 billion in its Federal Reserve checking accounts each day" (Manypenny, et. al, 1992, p. 728). Figure 4 shows how successful the Treasury is in its endeavor to maintain its target closing balance.

[10] This is not because the government needs the proceeds from taxation in order to spend again, but because it *chooses* to coordinate its taxing and spending. This will be taken up in the final section.

Figure 4



Source: Daily Treasury Statement, http://fedbbs.access.gpo.gov/dailys.htm

Recall that the government receives funds into its accounts at the twelve Reserve banks as well as thousands of commercial banks each day but that nearly all government spending is done by writing checks on accounts at Reserve banks. Maintaining a closing balance of $5 billion at Reserve banks, then, *usually* requires transferring the appropriate amount from T&L accounts to the Treasury's account at the Fed. For example, if the Treasury expected to receive $5 billion directly into accounts at Reserve banks (today) and expected $6 billion in previously-issued checks to be presented for payment (today), $1 billion will need to be transferred to the Treasury's account at the Fed (today) so that there will be no *net* change in the level of reserves.

The Treasury transfers funds to cover *anticipated* shortfalls by making a "call" on T&L accounts. In most cases, advance notice is given before transferring funds from these accounts[11].

[11] Special Depositories (or note-option banks) fall into three categories: A banks, B banks and C banks. A and B banks are typically smaller institutions, while depositories that are classified as C banks are generally large banks. T&L calls are calculated as fractions of the book balance in each T&L account on the previous day. "Calls" made on A and B banks are usually made with longer lead times than calls made on C banks, and the latter are usually the only banks against which same-day or next day calls may be issued.

A "reverse-call" or "direct investment" is also possible. This would be necessary if the Treasury's closing balance at Reserve banks was expected to substantially exceed $5 billion[12]. To avoid the reserve drain that would result from an excessive closing balance, the Treasury may place some or all of the excessive funds into T&L accounts at note-option banks[13]. Whether "calling" funds *from* T&L's to make up for an expected shortfall or transferring funds *to* T&L's through direct investment (or canceling previous calls) to prevent an excessive closing balance, the amounts transferred are intended to maintain the Treasury's balance at Reserve banks as steady as possible. In pursuit of this goal, the Treasury relies on the cooperation of the Federal Reserve.

3.3 Coordination With The Federal Reserve

The Federal Reserve is extremely interested in helping the Treasury achieve its target closing balance because the Treasury's balance at the Fed is "often the biggest source of uncertainty about reserve levels" (Meulendyke, 1989, p. 159). Indeed, the Fed's ability to successfully conduct monetary policy (specifically, to hit its target funds rate) depends, to a large extent, on the Treasury's ability to hit its target closing balance. Daily contact between the Treasury and the

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[12] The closing balance in the Treasury's account at the Fed could exceed the target level for two reasons. First, previously placed T&L calls may have been too large. In this case, the amount of spending from accounts at Reserve banks is less than the sum of the payments received directly into accounts at the Fed and the amounts "called" from T&L's. Second, it is possible that the payments made to the government and deposited directly into accounts at Reserve banks exceed the amount presented for payment from these accounts. This could happen, for example, during months in which quarterly tax payments sent directly to accounts at the Fed are large enough to more than compensate for government spending.

[13] The Treasury will not, in all instances, be successful in its attempt to directly invest its excess funds. Some note-option banks will not meet the collateral requirements and will be ineligible recipients of additional T&L funds. Additionally, T&L accounts, like the Treasury's account at the Fed, may swell during unusually heavy quarterly tax payments. Because banks must pay interest on T&L accounts, they limit the size of T&L balances they are willing to accept. When direct investment is not an option, the Treasury can attempt to cancel previously scheduled calls in an attempt to draw down its balance in Reserve banks.

Fed provide the Treasury with "numerous occasions . . . to assist the Reserve authorities to achieve a desired objective" (Auerbach, 1963, p. 328).

Unfortunately, the Treasury is unable, even with the cooperation of the Federal Reserve, to completely offset the effects of its daily spending using T&L calls and direct investment. Indeed, as Table 1 shows, the Treasury's average monthly closing balance can differ substantially from its $5 billion target.

Table 1

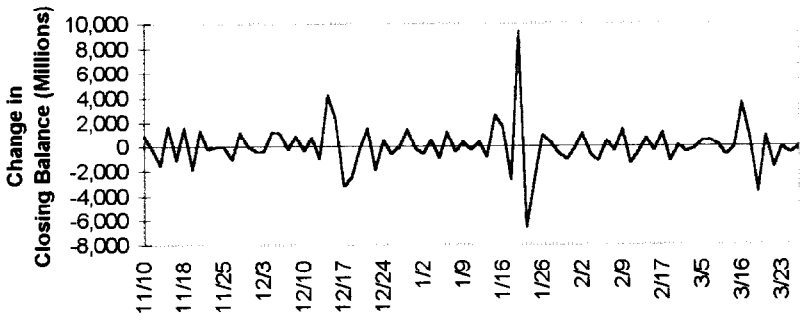
Month	Average Closing Balance ($Millions)
November 1997	5,015
December 1997	5,371
January 1998	6,563
February 1998	5,118
March 1998	5,763
5-month Average	5,618

Source: Daily Treasury Statement, http://fedbbs.access.gpo.gov/dailys.htm

This, again, is the result of the inherent uncertainty regarding the size/timing of receipts and expenditures. That is, because the payments coming into/going out of the Treasury's account at the Fed can never be precisely known in advance, transfers to/from T&L accounts will not normally offset (exactly) the shortfall/excess in these accounts. Thus, as Figure 5 confirms, one expects a non-zero change in the Treasury's daily closing balance. Despite this, changes in the daily closing balance do tend to fluctuate fairly closely around zero, deviating most drastically with quarterly tax payments.

Figure 5

Change in Daily Closing Balance (Nov. '97 - Mar. '98)



Source: Daily Treasury Statement, http://fedbbs.access.gpo.gov/dailys.htm

In sum, three important points have been made regarding the Treasury's operations. First, the Treasury recognized the disruptive nature of its cash operations and responded by maintaining accounts at private depositories. Second, the Treasury uses these accounts to diminish the reserve effect of its operations by using T&L calls and direct investments to minimize the net changes in Reserve account balances (to coordinate the flow of its receipts with its expenditures). Finally, the Treasury and the Fed cooperate to bring about a fairly high degree of harmony in managing the Treasury's balances at Reserve banks.

4. SELLING BONDS TO COORDINATE THE TREASURY'S OPERATIONS

So far we have addressed only the Treasury's attempts to balance its taxing and spending flows in order to minimize the reserve effect of its operations. Implicit in our discussion, therefore, was the notion that the government attempts to balance its budget. What if it doesn't? That is, what if the government runs a budget deficit? How does the sale of bonds affect the Treasury's cash flow operations and, subsequently, the reserve effect? There are three scenarios that must be

analyzed in order to determine the reserve effect of selling bonds, the key being by whom and how are they purchased.

First, it must be recognized that T&L accounts actually receive not only proceeds from tax payments, but also funds from the sale of government debt. When commercial banks with T&L accounts (or customers of these banks) purchase government bonds, there *may* be no immediate loss of reserves to the purchasing bank or the banking system. If, when the Treasury auctions new debt, it specifies that at least some portion of the bonds are eligible for purchase by credit to T&L accounts, Special Depositories may acquire the bonds by crediting deposits (in the name of the U.S. Treasury). These depositories, therefore, will not lose reserves as they purchase newly-issued bonds[14]. Similarly, the purchase of newly-issued government debt by a customer of a Special Depository, as long as the Treasury specifies that some (or all) of the offering is eligible for purchase by T&L credit, will leave reserves unaffected. For example, when a customer of a Special Depository purchases government securities, the Treasury *redeposits* the check into the bank on which the check was drawn. The bank then credits the Treasury's T&L account, offsetting the debit to the buyer's account. Thus, like the purchase of government debt by a Special Depository, the sale of government debt to a customer of one of these institutions can be effected without any loss of reserves.

The second method concerns the private purchase of newly-issued government debt that does not involve crediting a T&L account. When the securities are ineligible for purchase by T&L credit, and/or are not purchased by a so-called "note-option" bank (or one of its customers), the purchase of government bonds will *immediately* drain reserves from both the bank and the

[14] The reader might wonder whether additional reserves are required as a result of the larger T&L balance. The answer is no. Since the establishment of interest-bearing note accounts in November 1978, Special Depositories have been free of reserve requirements against T&L deposits.

banking system. This is because the proceeds from the sale of the securities will not stay "in the system" but will be deposited directly into one of the Treasury's accounts at a Federal Reserve bank. When bonds are sold in this way, member bank reserves decline as the Federal Reserve credits the Treasury's account, increasing the RHB in Figure 1. Thus, a bank wishing to purchase U.S. government securities, when T&L credit is not an option, will do so by drawing on its account at the Federal Reserve. A system-wide loss of reserves will, therefore, accompany every *private* purchase of newly-issued government debt not eligible for payment through T&L credit.

Finally, the sale of Treasury securities to the Federal Reserve must be considered. If the Fed purchases newly-issued bonds directly from the Treasury, it will not cause a change in member bank reserves. This, as Figure 1 makes clear, is because both the RHB (U.S. Treasury Balance at Fed) and the LHB (U.S. Government Securities) increase by the same amount, leaving total reserves unaffected. Furthermore, since the government's balance sheet can be considered on a *consolidated* basis, given by the sum of the Treasury's and Federal Reserve's balance sheets with offsetting assets and liabilities simply canceling one another out (Tobin, 1998), the sale of bonds by the Treasury to the Fed is simply an internal accounting operation, providing the government with a self-constructed spendable balance. Although *self-imposed* constraints may prevent the Treasury from creating *all* of its deposits in this way, there is no real limit on its *ability* to do so[15].

Now, the Treasury clearly has *choices* regarding the manner in which newly-issued bonds will be sold. For example, if the government *plans* to engage in deficit spending, the Treasury can sell bonds, *allow* them to be purchased by T&L credit, and thereby eliminate any immediate

[15] The Federal Reserve was, for a time, prohibited from purchasing bonds directly from the Treasury. This changed during WWII, when the Fed was authorized to purchase up to $5 billion of securities directly from the Treasury . Since then, the limit has been raised several times.

impact on reserves[16]. When the Treasury sells bonds in this way, the bonds act as a sort of *ex ante* coordination tool. Since the Treasury can control the size and timing of funds transferred from T&L accounts, this type of bond sale helps the Treasury to drain (more-or-less) the same number of reserves from the system that are being added to the system as a result of its deficit spending[17].

If, however, there is a problem with the coordination (for example if the Treasury and Fed underestimate the amount of checks that are *drawn* on the Treasury's account at the Fed), bonds could be sold in order to drain *excess* reserves. In other words, insufficient T&L calls (which result in a system-wide increase in reserves and threaten to send the overnight lending rate to a zero percent bid) could prompt the sale of bonds as an *ex post* coordination tool. In order to immediately drain the excess reserves, banks could not be allowed to purchase the bonds by crediting a T&L account, but this is something the Treasury can specify (or something the Fed can do).

5. THE NUANCES OF RESERVE ACCOUNTING

The purpose of this section is twofold. First, the commonly-held belief that taxes and bonds are used to finance government spending will be examined. First, the question will be addressed *intuitively*, drawing on the reserve effects analyzed in Sections 2-4. Second, for those who remain unconvinced by the intuitive analysis, the question as to whether the proceeds from taxes and bond sales are even capable of financing government spending will be considered. The

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[16] Boulding notes that deficit spending most commonly involves this practice (1966).

[17] Note that the government *can* deficit spend without taxing or selling bonds first but that if government spending is greater than taxation, the banking system will be left with excess reserves. The Treasury, therefore, prefers to use bonds to coordinate its deficit spending, selling them to Special Depositories (and allowing T&L credit) *before* spending from its accounts at Reserve banks. The bonds, then, allow the government to defend (*ex ante*) the fed funds rate.

argument requires an application of basic accounting principles to an analysis of reserve accounting in order to determine whether revenues from taxation and the sale of bonds are even capable of financing government spending.

Both questions seems absurd. There is surely no doubt that the proceeds from taxation and bond sales are deposited into accounts held by the U.S. Treasury (either with commercial banks or at the Federal Reserve) and that the government spends by writing checks on Treasury accounts at Reserve banks. Moreover, since funds are transferred from T&L accounts to the Treasury's account at the Fed in order to cover anticipated shortfalls in these accounts, it certainly looks as though the government uses these proceeds to finance its spending. This apparent interdependence is, undoubtedly, the basis for the treatment of taxation and bond sales as financing operations. But is the coordination of taxation and bond sales with (deficit) spending due to necessity or does it mask a more pragmatic operation?

Let us consider the argument that the coordination owes itself to necessity; that is, that the government *needs* to tax or borrow from the private sector in order to finance its spending. The question can be approached pragmatically, using the following important conclusions drawn in Sections 2-4:

1. The payment of taxes and the purchase of bonds *by the private sector* drain reserves from the banking system as the proceeds are placed into the Treasury's account at the Federal Reserve.
2. Government spending causes a system-wide increase in aggregate bank reserves.
3. Changes in the total level of bank reserves cause changes in the federal funds and other short-term interest rates.

4. The Treasury manages its closing balance in Reserve accounts by coordinating its spending, taxing and bond sales.
5. Barring self-imposed constraints, the Treasury could manufacture all of its spending balances by selling bonds directly to the Federal Reserve.

But why should the government need to take from the private sector the money (currency and/or bank reserves) that it alone is capable of creating? It seems reasonable to suggest that it is not money but bridges, armies, satellites, etc. that the government wants and that it acquires them by encouraging the population to provide them in exchange for government money. That is, it cannot be the government but the public/citizens who need the money in order to settle their tax liabilities to the state.

Indeed, the entire process of taxing and spending must, as a matter of logic, have begun with the government first creating (and spending) new government money. How, after all, could a population settle its tax liabilities using the government's money (HPM) *before* the government had made its money available? In other words, the government's purchase of goods and services using newly-created money must *first* have supplied the citizens with the means with which to pay taxes. Thus, taxes can be conceived as the means by which the government directs real resources from private to public domain. If this theory is accepted, taxes are used to create a demand for the government's money, not to "finance" the government's spending.

Similarly, bonds need not be issued in order to allow the government to spend in excess of current taxation. This, again, is because the government can always create its own spendable balance internally (on its consolidated balance sheet) by offsetting a Treasury liability against a

Federal Reserve asset (e.g., but not necessarily, a Treasury bond). In the absence of bond sales, deficit spending would result in a net increase in aggregate bank reserves. Bonds, then, are used to coordinate deficit spending, draining what would *otherwise* become excess reserves. They provide the private sector with an interest-earning alternative to non-interest-bearing government currency and allow the government to spend in excess of taxation while maintaining positive overnight lending rates.

Thus, an intuitive analysis of Treasury operations suggests a practical motivation for the coordination of taxation and bond sales with government spending. Specifically, because of the reserve effects of taxing, spending, and selling bonds, the government *chooses* to coordinate these operations in order to mitigate the impact on banks' reserve positions and, hence, on short-term interest rates. This interdependence, then, is not *de facto* evidence of a "financing" role for taxes and bonds. On the contrary, taxes can be viewed as a means of creating a demand for the government's money, HPM. Bonds, which are used to prevent deficit spending from flooding the system with excess reserves, allow the maintenance of positive overnight lending rates. Neither taxes nor bond sales, therefore, need be viewed as a financing operation.

Many readers will undoubtedly remain unconvinced, based on the intuitive analysis just presented, that the treatment of taxation and bond sales as financing operations should be discontinued. Fortunately, there is another, more powerful, method by which to argue that taxation and bond sales should not be considered financing operations. The argument is a technical one and requires an understanding that Federal Reserve notes (and reserves) are booked as liabilities on the Fed's balance sheet and that these liabilities are extinguished/discharged when they are offered in payment to the State. It must also be recognized that when currency or

reserves return to the State, the liabilities of the State are reduced and high-powered money is destroyed.

The destruction of these promises is no different from the private destruction of a promise once it has been fulfilled. In other words, when an individual takes out a loan, she issues a promise to a bank. Once she 'makes good' on that promise (i.e. repays the loan), she may 'destroy' that loan debt (liability) by eliminating it from her balance sheet. Likewise, the State, once it fulfills its promise to accept its own money (HPM) at State pay-offices, can eliminate an equivalent number of these liabilities from its balance sheet.

Thus, while bank money (M1) is destroyed when demand deposits are used to pay taxes, the government's money, HPM, is destroyed as the funds are placed into the Treasury's account at the Fed. Viewed this way, it can be convincingly argued that the *money* collected from taxation and bond sales cannot possibly finance the government's spending. This is because in order to 'get its hands on' the proceeds from taxation and bond sales, the government must destroy the money it has collected. Clearly, government spending cannot be financed by money that is destroyed when received in payment to the State!

How, if not by using the money received in payment of taxes and bond sales, does the government finance its spending? Notice that the government writes checks on an account that does not comprise part of the money supply or HPM but that *as it does*, the funds become part of the money supply (M1 if deposited into checking accounts, M2 if savings accounts, etc.) and part of HPM. It is therefore apparent that while the payment of taxes destroys an equivalent amount of money (M1 immediately and HPM as the proceeds go into the Treasury's account at the Fed), spending from this account creates an equivalent amount of new money - both bank money and

HPM. Modern governments, then, finance all of their spending through the direct creation of new (high-powered) money.

6. SUMMARY AND CONCLUSIONS

If the government (Fed and Treasury) had no regard for the "reserve effect" of its operations, it would have little use for T&L accounts. It could simply create its own spendable deposit (on its consolidated balance sheet) and then spend (adding reserves and creating money) without regard for the size/timing of its tax receipts. But this behavior would frequently leave a banking system which was previously satisfied with its reserve position with substantially more excess reserves than it wished to maintain. A system flush with excess reserves would find few bidders for these funds, and the overnight lending rate would fall toward zero. Taxes, as they drifted in, would drain a portion of the excess reserves. Still, the funds rate could remain at a zero percent bid for a prolonged period of time.

In order to move to a positive funds rate, either the Federal Reserve or the Treasury would be forced to sell bonds to drain excess reserves[18]. Banks, not wishing to hold an excessive amount of non-interest-bearing government money, would be all-too-happy to exchange non-interest-earning reserves for interest-bearing Treasury bonds. The bonds would have to be sold until enough excess reserves had been drained to yield a positive (target) funds rate. Although this process of adding and *later* draining reserves could work, it would involve substantial variation in the level of reserves and, subsequently, significant turmoil in the market for federal

[18] Note that bonds would have to be sold even if the government ran an *annually* balanced budget. This is because it is impossible to eliminate the "reserve effects" of the Treasury's *daily* operations. Thus, swings in the Treasury's daily closing balance, which threaten to move the funds rate away from its target, would induce the sale of bonds despite an annually balanced budget.

funds. Knowing that these are the undesirable effects of disregarding the reserve effects of its operations, the Treasury *chooses* to coordinate its operations, transferring funds from T&L accounts (draining reserves) *as it spends* from its account at the Fed.

Taxes are not necessary for, or even capable of, financing government spending when they are paid using high-powered money (i.e. by cash or check in a fiat money system). In order for the government to 'get its hands on' the proceeds from taxation, it must place these funds into the Treasury's account at the Fed. As it does, the banking system loses an equivalent amount of desired and/or required reserves (either immediately or as the Treasury transfers the proceeds from T&L accounts into its accounts at Reserve banks), and an equivalent amount of HPM is destroyed. Similarly, reserves are drained and HPM is destroyed when the Treasury issues bonds (immediately if T&L credit is not allowed or with a lag as the proceeds are transferred from T&L accounts). In contrast, government spending from the Treasury's account at the Fed injects reserves and creates an equivalent amount of new money (M1, M2, etc. and HPM).

It is impossible to perfectly balance (in timing and amount) the government's receipts with its expenditures. The best the Treasury and the Fed can do is to compare *estimates* of *anticipated* changes in the Treasury's account at the Fed and to transfer approximately the correct amount to/from T&L accounts. Errors due to excessive or insufficient T&L "calls" are the norm. Although "same-day calls" and "direct investments" are designed to permit the authorities to react to these errors, they are not always an option.

When the Treasury is unable to correct these errors on its own, the Federal Reserve may have to offset changes in the Treasury's closing balance. This will be necessary whenever the errors are large enough to move the funds rate away from its target rate. In fact, as argued

previously, the Treasury's balance at the Fed is "often the biggest source of uncertainty" faced by monetary policy-makers (Meulendyke, 1989, p.159). Its role as an offsetting agency is essentially forced upon it by its commitment to a target funds rate. Indeed, Poole (1975) goes further, stating that the Fed will usually abandon any other objective target in order to maintain the funds rate within its tolerance range. The adding/draining of reserves, then, is largely non-discretionary, as monetary policy is concerned primarily with maintaining the overnight lending rate. Fiscal policy, in contrast, has to do with determining the supply of high-powered money. Moreover, while both taxation and bond sales drain reserves from the banking system, neither provide the government with *money* with which to finance its spending. Indeed, both taxation and bond sales lead (ultimately) to the destruction of HPM.

An analysis of reserve accounting reveals that all government spending is financed by the direct creation of HPM; bond sales and taxation are merely alternative means by which to drain reserves/destroy HPM. The choice, then, is between alternative methods for draining reserves in order to prevent the overnight lending rate from falling to zero. In light of these findings, it is, perhaps, time to reconsider our definitions of monetary and fiscal policy as well as our treatment of taxation and bond sales as "financing" operations.

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