BUDGET DEFICITS, CURRENT ACCOUNT DEFICITS AND INTEREST RATES: THE SYSTEMATIC EVIDENCE ON RICARDIAN EQUIVALENCE

by

Roger C. Kormendi*

and

Aris Protopapadakis**

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***Kormendi/Gardner Partners and University of Michigan Business School**
kormendi@kgpartners.com

****University of Southern California, Marshall School of Business, FBE**
aris.protopapadakis@marshall.usc.edu

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Abstract

The recent reemergence of large U.S. government budget deficits has rekindled the debate as to whether deficits adversely impact real interest rates. The conventional "crowding out" hypothesis predicts that there would be such an adverse effect; the Ricardian "deficit neutrality" hypotheses predict no adverse impact. However, in a fully open economy, budget deficits affect the economy through the current account rather than the interest rate channel. Under the conventional view, current account deficits react one-for-one to budget deficits; under the Ricardian view, neither real interest rates nor current account deficits would react.

In this paper, we examine the systematic evidence on the impact of budget deficits on both real interest rates and current account deficits. We test the conventional "crowding out" hypotheses against the Ricardian "deficit neutrality" alternative. Because our tests are structured on both interest rates and current account deficits, they have validity regardless of the extent of the openness of the U.S. economy over the time period of the analysis.

We structure a series of tests that explore the impacts of both current and expected future budget deficits on (1) both interest rates and current account deficits; (2) across a variety of specification issues including data non-stationarity, lag structure, auxiliary variables, term structure, and functional form; and (3) over the period 1976 through 2002 which contains spectacular "natural experiment" variation in the data that should allow any links between budget deficits and interest rates or current account deficits to be easily detected.

Our results are systematic and dramatic. Over the full structure of the specification space, there is no evidence of any positive effects of either current or expected future budget deficits on either real interest rates or current account deficits. Because of the large variation in the data generated by the natural experiment, economically significant effects can be clearly rejected. Moreover, when viewed over the full structure of the specification space, there appears to be a relatively significant and systematic negative effect of budget deficits on current account deficits (and sometimes but not systematically on interest rates). This latter effect is consistent with augmentations to an underlying Ricardian framework based on either uncertainty effects or intertemporal deadweight loss effects.

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"Economists like to think of economics as a science. In a science, however, repeated contradictions of a paradigm lead to its abandonment if there is a sensible alternative. One paradigm in economics implies that large deficits produce high interest rates. This paradigm is not supported by the facts."
Paul Evans, AER (1985)

I. INTRODUCTION

Is the challenge in the above quote by Paul Evans as applicable today as it was in 1985? The long-standing conventional textbook paradigm implies that increasing budget deficits will raise real interest rates, the so-called "crowding out" effect. The alternative and more recent Ricardian paradigm implies that deficits should have no impact on real interest rates. The academic empirical debate of the mid-eighties produced strong evidence in favor of Ricardian "deficit neutrality," i.e., no positive relation between budget deficits and interest rates. In the nineties, however, some authors began to find at least partial evidence in support of the conventional view. With the abrupt disappearance of the recent budget surplus and the looming

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large deficits, the idea that high deficits produce high interest rates, and therefore "crowd out" private investment and economic growth, has reemerged.

In a fully open economy, however, one should never have expected budget deficits to have an impact their principal impact on real interest rates, though deficits may impact *nominal* interest rates through related expectations of inflation. Rather, standard textbook effects should materialize primarily through the current account.

Following Rubin, Orszag, and Sinai (2003) and Reynolds (2004), we refer to the standard textbook paradigm as the "Conventional Model", and to the more recent paradigm as the "Ricardian Model". In this paper, we examine the systematic evidence of the impact of budget deficits on both real interest rates and current account deficits, to test the Conventional Model against the Ricardian Model. From the point of view of empirical research, it is fortunate that the period since the 1980s has generated a spectacular "natural experiment" that should allow any links between budget deficits and interest rates or current account deficits to be easily detected.

We present a series of tests that explore the impacts of both current and expected future budget deficits on real interest rates and current account deficits. We structure these tests across a variety of specifications that span those that have appeared in the literature over the past two decades. We account for issues of the non-stationarity and lag structure of the data, we explore the sensitivity of the results to the inclusion of various auxiliary variables, and we address issues of the functional form of the testing equations.

Our results are systematic and dramatic. Unlike previous results, our tests are valid regardless of whether the U.S. economy is fully closed, fully open or somewhere in between. Unlike previous results, our tests cover virtually the full structure of the relevant specification space and the full period of time over which an incredible natural experiment has taken place. Unlike previous results, our results produce strong and consistent patterns.

We find no evidence in favor of conventional effects of budget deficits on either real interest rates or current account deficits. And, because of the large variation in the data generated by the natural experiment these results are not a manifestation of a lack of power in the tests. The standard errors are small, and economically significant effects can be clearly rejected.

Moreover, when viewed over the full structure of the specification space, an interesting empirical regularity appears that has been hinted at in earlier work, but has not been observable as clearly as in these results. Namely, rather than a positive effect, there appears to be a relatively significant and systematic negative effect of budget deficits on current account deficits, and sometimes but not systematically on interest rates. This latter effect is consistent with either uncertainty or supply-side based augmentations to the Ricardian framework suggested by Barro (1974), Kormendi (1983) and others.

II. BACKGROUND AND ANALYTICAL ISSUES

A. The Emergence of the Ricardian Paradigm in the Eighties

The Conventional Model that reaches back many decades prior to the 1970's, implies that government borrowing to cover budget deficits should compete in capital markets with private sector borrowing for limited private sector savings. The result is to bid up interest rates, "crowd out" private sector investment and thereby reduce future economic growth. For this reason, budget deficits were unambiguously viewed as being "bad" for the economy. This paradigm was so "obvious" and ingrained in economic thinking, and so totally reflected in the financial press and the general policy debate, that no one seriously questioned either its theoretical or empirical validity.

In 1974, in an article that shook the established beliefs of economists, Robert Barro introduced the Ricardian Equivalence Proposition (REP), and at the same time laid out the technical conditions (related to generational linkages, non-distortionary taxes, rational expectations, no borrowing constraint, and the like) under which REP would be expected to hold exactly. Under the Ricardian paradigm, rational consumers are mindful of the present value of the future taxes implied by current deficits, and increase their savings accordingly to fully offset the new government borrowing. Thus, in a pure Ricardian world budget deficits should be neutral and there should be no real interest rate effects.

In the early 1980's, the rapid and large increase in the size of the U.S. government budget deficits pushed these two competing paradigms to the forefront of both the policy debate and scientific academic research. While the theoretical foundations of Ricardian Equivalence were settled relatively quickly, over the course of the 1980's an empirical debate raged regarding the empirical applicability of the Ricardian proposition in a real world of imperfect generational linkages, distortionary taxes and limited rationality.

This academic debate produced strong evidence that there is no positive relation either between budget deficits and interest rates or between budget deficits and private consumption. One strand of literature —led by Evans (1985, 1987, 1988), Plosser (1987) and others— examines the effects of budget deficits on interest rates. The results came down on the side of no interest rate effects of budget deficits, consistent with the Ricardian view.

In the other strand of this literature —Kormendi (1983), Kormendi and Meguire (1986, 1990, 1995), Feldstein and Elmendorf (1990), Modigliani and Sterling (1986, 1990), Graham (1995) and others— debated the empirical evidence on whether budget deficits had the wealth effect on private sector consumption required for the U.S economy to be non-Ricardian. KM were able to reject the Conventional Model specifications and the results of each of the critical papers in favor of the Ricardian alternative; they apply a consistent methodology of nesting the specifications of the critical papers along with their own into a joint structure, and they test the competing hypotheses in that fully nested specification,.[1]

[1] It has been sometimes been asserted that there are just as many or more articles in numbers showing positive results and that thus one should believe that by the weight of the evidence. For example, Bernheim (1989) argued that his list of supporting papers was as big as the list of papers supporting the Ricardian paradigm. More recently, Gale (2001) has attempted to tabularize this "counting analysis" by showing many more papers in the "support crowding out" column than in the "support neutrality" column. However, if one paper nests all the others in a fully structured specification space then the results of the one would outweigh all the individual non-nested results. In essence, this is what Kormendi and Meguire (1986, 1990) did in the AER debate cited earlier. By nesting the specifications of the critical papers along with their own and testing the competing hypotheses in a fully nested, KM were able to reject the specifications and results of the critical papers supporting "crowding out" in favor of the Ricardian "debt neutrality" alternative. Such a structured specification space approach has not been attempted with respect to the interest rate effects literature.

B. The Resurrection of the "Crowding Out" Paradigm in the Nineties

Despite the evidence from the 1980's, the proposition that high deficits lead to high interest rates has returned to policy-making thought. With the looming large deficits of the 2000's the importance of the budget deficits as a policy issue has intensified, and the idea that high deficits produce high interest rates and therefore "crowd out" private investment has resurfaced; see for example Rubin, Orzsag, and Sinai (2003)[2]. Moreover, a variety of simple tests that reexamine the interest rate effects and include long-term forecasts of deficits found some support for the "crowding out" view; see, for example, Gale and Orszag (2003), Laubach (2003) and the papers cited therein.

Ruben et. al. (2004) discuss the risk of financial disarray that stems from the market's concern that government may default on its debt obligations; it can be thought of as the consequences of government violating its budget constraint. Extensive discussion and modeling of these issues is found in the "financial crisis" literature. It is not obvious at all that these considerations apply to any part of the U.S. historical record we (and the literature we cite) examine.

C. Open Economy Issues

With the emergence of a large U.S. current account deficit by the 1980's, it was no longer possible to entertain the proposition that the U.S. economy was predominantly a closed economy. The "twin deficits" – simultaneous budget and current account deficits– were frequently noted in the literature but only sometimes in connection with the Ricardian proposition. The twin deficits of the 1980's might appear to be the natural outcome of a non-Ricardian economy experiencing a significant expansion of its budget deficits, as the U.S. did. However, as we shall see below, a more systematic investigation does not support this interpretation.[3]

In a fully open economy, the Conventional Model predicts that it is not interest rates but the current account that must respond to changes in the budget deficit. This flows directly from the accounting identity $SAV = INV + DEF + CAB$; if private savings (SAV) are unaffected by the deficits and private investment (INV) responds to the real worldwide interest rate, the current account balance (CAB) must respond to the deficit (DEF) one-to-one.[4] If, however, savings respond one-to-one to the budget deficit according to the Ricardian paradigm, there will be no impact on the current account.

In Appendix A, we present a simple but unified theoretical exposition of the expected effects of budget deficits on the current account deficit and real interest rates under both the Conventional and the Ricardian paradigms. We show explicitly the open economy implications for structuring tests of Ricardian Equivalence in the context of the budget deficit, current account, and real interest rate nexus. We show that any tests that focus only on real (or nominal) interest rates will not have the power to pick up non-Ricardian effects in an open economy context.

[2] See also Reynolds (2004) for a detailed critique of the Rubin, Orszag, and Sinai paper and its inability to explain the broad movements of key variables in question over the past two decades.

[3] Kormendi and Meguire's results on the neutrality of private sector consumption with respect to budget deficits, which arguably span both closed and open periods for the U.S economy, suggests that a different underlying cause of the observed "twin deficits" should be explored. One such explanation is that there was an unobservable "expectations of future returns" shock that induced contemporaneous intertemporal adjustment in both the public and private sectors towards increased borrowing against the greater future opportunities to support both increased consumption and investment. It is important to note that when the budget deficits turned into surpluses in the late nineties, the large current account deficits did not decline, as predicted by the Conventional Model.

[4] This statement is strictly true for a small economy. In the case of a large open economy, any potential effect would show up in the world interest rate. But even the US contributes a relatively small fraction to world savings; thus this effect is likely to be small.

The following table summarizes the predictions of the competing paradigms across open and closed economies for both interest rates and current account balance, when the government budget surplus changes:[5]

	Closed	Partly Open	Open
Real Interest Rates			
Conventional Model	(-)	(-)	**0**
Ricardian Model	**0**	**0**	**0**
CAB			
Conventional Model	**n.a.**	(+)	(+)
Ricardian Model	**n.a.**	**0**	**0**

This table shows that if the economy is closed, the appropriate distinguishing test is on real interest rates; if the economy is open, the appropriate distinguishing test is on the *CAB*. The real interest test has power only to the extent that the economy is closed, while the *CAB* test has power to the extent that the economy is open. Performing both tests is appropriate when there is uncertainty about the degree of openness.

The interest rate results of the 80's that are consistent with "debt neutrality" cannot be viewed as definitive or convincing in part because they do not have power in open economies. Since the beginning of the floating exchange rate period it has been hard to argue that the U.S. economy is not fully open. Thus, it is critical to structure tests over both interest rate and current account specifications in order to have validity regardless of the extent of the openness of the U.S. economy over the time period of the analysis.

It is important to note here that given this international "openness", at least for the OECD countries, finding an effect from domestic deficits to domestic interest rates presents a serious

5 Our data and analysis is done in terms of "surpluses", which seems to be the obvious terminology. However, much of the literature discusses "deficits". We follow this convention in the first part of the paper, but at this point

economic puzzle that goes beyond the question of Ricardian equivalence. Any economist's priors for such tests should be "no effect" on interest rates, regardless of one's choice between the Conventional and the Ricardian Models.

D. Natural Experiment

Over the course of the 1990's and the early 2000's, the U.S. experience with budget deficits has been dramatic, to say the least. Early in the 1990's large deficits were expected to continue "as far as the eye can see." By 1998 large budget surpluses emerged unexpectedly, and once again they were expected to continue into the indefinite future. By 2002 large budget deficits unexpectedly reemerged, and again they are expected to continue into the (now perhaps less foreseeable) future.

Taken by itself, the experience of the past decade has in a sense been as close to a natural experiment as one generally comes by in macroeconomics. And if one includes the 1970's and 1980's, it is hard to argue that the whole thirty plus years have been anything less than an ongoing natural laboratory in which to test the Ricardian nature of the U.S. economy. From insignificant budget deficits in the 1970's to large deficits in the 1980's and early 1990's to large surpluses in the mid to late 1990s, to deficits once again in the early 2000's, the movements in U.S. budget deficits have been large and varied, and have certainly been important enough so that non-neutralities should be evident in any reasonably well-designed empirical tests.

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we switch to the "surplus" language, with the exception of some unavoidable lapses.

E. A First Order Look at the Data

Charts 1 - 3 present graphically the data on budget surpluses, real interest rates and the current account balance for the period 1972 – 2002. Between 1972 and 1980, budget surpluses are relatively small and negative, real interest rates are low, and the current account balance is small, both positive and negative.

Beginning in 1980, the budget surplus declines rapidly and remains very large and negative, reaching a low in 1994. Also starting in 1980, real rates rise rapidly and then decline slowly and uniformly through 1994. The current account balance is in deficit and starts declining in 1984, reaches a low point in 1988, it then rises in 1991, when it goes briefly into surplus because of the Gulf War payments received. It subsequently reverts to large and growing deficits.

After 1994, the budget surplus increases rapidly and becomes positive in 1999. However, real interest rates rise somewhat and stay modestly high until 2001; the current account balance declines precipitously through this period. In 2002, the budget surplus declines abruptly and becomes negative, with forecasts of very large deficits in the near future. Real rates however, decline, and the current account balance remains highly negative.

This first order look at the data does not show any of the systematic positive relations between budget deficits and either real interest rates or current account deficits that would support the "crowding out" paradigm[6]. Nonetheless, it is possible that this first order look misses underlying relations that are obscure but detectable by a more sophisticated analysis. Thus we proceed with formal tests.

F. The Organization of This Paper

We present definitive evidence on the empirical validity of the Ricardian Equivalence proposition for the U.S. economy over the course of the afore-mentioned "natural experiment"—the 1970's through the early 2000's.

In Section III, we discuss the data and our empirical methodology. Section IV contains the empirical evidence on the relation between current account deficits and budget deficits. Regardless of the structural specification involved, the evidence is uniformly consistent in rejecting the conventional "crowding out" hypothesis in favor of the Ricardian "debt neutrality" hypothesis. Section V contains the empirical evidence on the relation between interest rates and budget deficits. Again regardless of the structural specification, the evidence is uniformly consistent in favoring the Ricardian "deficit neutrality" paradigm over the "crowding out" paradigm. In Section VI, we conclude with some conceptual and policy implications associated with understanding the Ricardian nature of the U. S. economy revealed by the evidence presented. In addition to the results mentioned in this paper, a more detailed set of results over the broad structure of the specification space is available upon request from the authors.

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[6] See Reynolds (2004) for a more comprehensive look at the first order variables in the relevant data series and how the Conventional view cannot account for such movements.

III. EMPIRICAL METHODOLOGY

A. Data

Data for all our quarterly macroeconomic variables are from DataStream, and they are defined below.

The data for the CBO surplus forecasts are from various CBO publications. Data from 1976 through 2000 were kindly provided by Kevin Kliesen of the Federal Reserve Bank of St. Louis. Starting in 1981, there are fairly regular issues of the "Interim Economic and Budget Outlook" issued between July and September. Starting in 1986, there are also various issues of CBO's "Analysis of the President's Budgetary Proposals", issued between February and April of each year. We combine these sources to form a quarterly series of budget surplus forecasts. We assign each forecast to the quarter it is issued. For example, data for the main annual CBO report issued in January or February of each year are assigned to the 1st quarter of that year.[7] The data from the "Analysis of the President's Budgetary Proposal" are assigned to the 2nd quarter of the year, while the data from the interim report are assigned to the 3rd quarter.

Particularly in recent years, we have CBO forecast updates for 3 of the 4 quarters. We construct data for the missing quarters by simple interpolation. Given the amount of additional information we can include by using all the available quarterly data, interpolating when necessary seems a reasonable procedure.

We follow Gale & others and construct a 5-year forward CBO forecast, as a measure of the future forecast surplus. The surplus forecasts for the subsequent five years are highly correlated with each other, and each of the forecasts is also highly autocorrelated. The correlations of the annual forecasts range from 0.98 (year-1 with year-2) to 0.85 (year-1 with year-5). The 1st order autocorrelation of the year-1 forecasts is 0.69 and for year-5 it is 0.71. Using a single variable, rather than 5 highly correlated future forecasts, to capture the forecast information is likely to sharpen inference.[8]

We also use 1-year ahead inflation forecasts from the "Survey of Professional Forecasters," SPF, consistently collected by the Federal Reserve Bank of Philadelphia. These forecasts are available from 1970.[9] Prior to 1992:1, the SPF forecasts are for the *GNP* deflator, between 1992 and 1995:4 they are for the *GDP* deflator, and after 1995:4 they are for the chain-weighted *GDP* price index. The forecasts are for average inflation over the 4 quarters, beginning with the quarter after the survey date.

The SPF forecasts seem rather efficient. The average inflation over the period is 4.32%, with a standard deviation of 2.59%. The average forecast inflation is 4.30% with a standard deviation of 1.98%. The correlation between the forecast and current inflation is 0.93, and the correlation between the forecast and the realized inflation is 0.79.

We subtract the SRP inflation forecast from the market yields to obtain the real rates. It would be desirable to have separate inflation forecasts for the different maturities of interest rates but these are not available. However, given the autocorrelation of inflation and the inflation forecasts, we feel that the 1-year forecast adequately represents future inflation prospects.

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7 There are 2 early forecasts that were issued in December, and they are assigned to the 4th quarter.

8 To aggregate the CBO forecasts: we first form simple trend forecasts of *NNP* and *GDPD* for the following 5 years, then we deflate each of the CBO forecasts with the appropriate *NNP* or *GDPD* forecast, and finally we sum over the current and the following 5 years. We deflate with the trend forecasts of *NNP* and *GDPD*, to avoid disproportionately representing the out-year values in a growing economy.

9 The survey also collects 10-year forecasts from 1979. However, those data are semiannual until 1991, and they are a mixture of the Blue Chip Indicators (1979 – 1991), occasionally the Livingston Survey, and the Professional Forecasters since 1991. For the matching dates, the correlation between the 1-year and the 10-year forecasts is 0.98.

B. Methodology

We mainly use quarterly data for our investigation. Compared to higher frequency data, quarterly data makes it possible to control for government expenditures and the level of economic activity.[10] It also allows us to use the almost quarterly updates issued by the CBO. Particularly in the asset markets, this additional data should enhance our ability to detect significant effects. Using annual data provides very few degrees of freedom, and it also makes it impractical to allow lagged influences in the regression models.

Some researchers have used daily announcement data. Their results suggest that the effects of surplus announcements on interest rates are at best temporary; see Quigley & Hudak (1994), Kitchen (1996). This may reflect a liquidity effect, information issues or it may be that market participants use the surplus announcements to infer the general state of the economy. Furthermore, with surplus surprises alone it is not possible to control for concurrent expenditure surprises, which should affect yields under all theories.

The preceding theoretical discussion is consistent with the following linear empirical model.

$$
\begin{aligned}
LHS_t = & \sum_{i=0}^{I} \beta_{SURP,i} FEDSRP(t-i) + \sum_{j=0}^{J} \beta_{CBO,j} SURP5CBO(t-j) \\
(1) \qquad & + \sum_{k=0}^{K} \beta_{EXP,k} FEDEXP(t-k) + \sum_{l=0}^{L} \beta_{NNP,l} NNP(t-l) \\
& + \sum_{m=0}^{M} \beta_{AUX,m} AUX(t-m) + \beta_0 + \sum_{n=1}^{N} \rho_n LHS(t-n) + u_t
\end{aligned}
$$

where,

[10] There are 2 caveats that must be mentioned. One is that if a change in government revenues is associated with changes in marginal tax rates, this may well have an effect on yields under both models, because it affects various economic tradeoffs. The other caveat is that in our empirical investigation we use projected CBO surpluses without

LHS	Stands for the (i) *CAB*, the Current Account Balance (current $s) or (ii) the real yields, defined below
FEDSRP	Federal Government Budget Surplus (current $s)
SURP5CBO	CBO's 5-year Federal Budget Surplus Forecast (current $s)
FEDEXP	Federal Government Expenditures (current $s)
NNP	Net National Product (current $s)
AUX	Auxiliary variables: Gross Private Investment, *M2*, and *NYSE* Stock Index.

For broad economic and policy purposes it is important to (i) identify all permanent effects of surpluses, (ii) separate out the effect of federal expenditure changes from the effect of concurrent surpluses, and (iii) separate the influence of general macroeconomic conditions from those of the surpluses. To this end, we include both the current federal surplus and the *CBO*s 5-year estimate of future surpluses. *FEDEXP* is included to separate out the economic effects of expenditures from those of the surpluses. Finally, *NNP* accounts for the scale increases of *CAB* as the economy expands. It also accounts for the level of economic activity.

The "auxiliary" variables are used to condition the model.

INVALL	*Gross Private Investment* is intended to capture changes in investment demand that can affect the *CAB* and the yields independent of fiscal policy.
NYSE	The *NYSE Index* is intended to capture the possible impact of wealth changes on the LHS variables; e.g., the highly negative *CAB* in the 1990s may have been a result of the high wealth levels experienced by the economy during that period.
M2	A broad measure of the money supply, it is intended to capture the effect of monetary policy on real yields and possibly on the *CAB*

using any matching projected government expenditures. Thus, we are unable to control for expenditures as uniformly as we would like.

Most of our macroeconomic variables are known to be nonstationary. Therefore, we transform the regression model to be consistent with the OLS assumptions. We report results for two separate transformations, both of which result in stationary variables. Generally these transformed variables have low autocorrelations as well as low contemporaneous correlations.

(1) We deflate all the quantity variables by *NNP* and take 1st differences; the variables have the prefix *R* for ratios and *DR* for the difference in the ratios; we will refer to this as the *NNP*-deflated model.

(2) We deflate all the quantity variables by the *GDPD* and take first differences; we will refer to this as the *GDPD*-deflated model.

The reader may wonder: why not use growth rates? The main reason is the instability created by taking growth rates for variables that fluctuate between positive and negative values. The *CAB* and both measures of the surplus have this property.[11] The numerical instability resulting from taking growth rates around sign changes makes it much harder for the surpluses to "explain" the *CAB*, particularly since their sign changes do not coincide in time. This same instability would make it very difficult to detect a relation between the surpluses and the yields, which do not share such instability.[12] Our transformations result in a statistically well-behaved *CAB* variable, which retains the essential information of its evolution.[13] We use the same two transformations of the RHS variables for both the *CAB* and the interest rate investigation.

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[11] The *CAB* is negative most of the time but up to 1982 it fluctuates between positive and negative, and it becomes positive again in 1992. The federal surplus is often close to zero until the early 80s and it becomes positive between 1999 and 2001. The CBO surplus forecast has similar features.

[12] It is also possible that some spurious correlation from an outlier created by this numerical instability may contaminate our results, given the relatively small sample size.

[13] A general concern with estimating first differences or growth rates is that if the series are cointegrated, important information is lost. In our case, there is no theoretical or empirical reason to suggest that the *CAB* or real interest rates should be cointegrated with nonstationary variables like*NNP* and *Surpluses*.

For the yields, we report result for the 1-year T-Bill rate, the 10-year T-Bond rate, the 9-year forward T-Bond rate 1 year out, and the AAA rate. This collection of rates spans the maturity spectrum, and it also allows us to assess any impact of surpluses on firms' cost of debt. We investigate the forward rate because some researchers suggest that studying the long-term rate directly necessarily involves the short term rate, which may obscure the expected impact of surpluses on future interest rates.[14]

We compute the 9-year forward rate that applies to year 1, from the definition of long term yields: $(1+{}_0i_{10})^{10} = (1+{}_0i_1)(1+{}_1f_2)(1+{}_2f_3)...(1+{}_9f_{10})$, where i is the spot interest rate and ${}_mf_n$ is the forward rate that applies between periods m and n; $n>m$. This can be written more compactly as $(1+{}_0i_{10}) = \left[(1+{}_0i_1)(1+{}_1f_{10})^9\right]^{1/10}$. The implied 9-year forward rate for year 1 then is:

$$1+{}_1f_{10} = \frac{(1+{}_0i_{10})^{10/9}}{(1+{}_0i_1)^{1/9}}.$$

To assess the lag lengths that may be required in the *CAB* regressions as well as to provide an initial look at the data, we estimate bivariate regressions of our key variables on *CAB*, with 8 lags each. Table 1 Panels A and B displays the results: Panel A contains the *NNP*-deflated results, while Panel B contains the *GDPD*-deflated ones.

For both our specifications, the *CAB* exhibits a 4-lag and an 8-lag seasonal (1 year and 2 years). The significance of the other variables depends somewhat on the specification. In both

[14] Laubach (2003) and Canzoneri, Cumby & Diba (2002) study the "term structure premium" and report significant results; they interpret their findings as evidence of a significant impact of deficits on long term interest rates. We believe that this interpretation is potentially very misleading. The following example will suffice to clarify: in an economic slowdown, short-term interest rates and budget surpluses tend to fall. Since in an efficient market the long-term rate must fall by less (if at all) because of this temporary decline in economic activity, it necessarily implies that the term premium rises. This behavior will result in a positive relation between surpluses and short-term rates but a *negative* relation between surpluses and the term premium –consistent with the Conventional Model hypothesis. Controlling for economic activity will account for the positive correlation *but not* for the negative

cases a *FEDEXP* variable is significant at the 5% level or less, and in one case the lag 5 *FEDSRP* is significant. The sums of the coefficients (next to the last row) of the surpluses and expenditures all have the "correct" sign, even though many individual coefficients have the "wrong" sign, according to the Conventional Model. The tables report F-tests of the significance of the surplus or expenditure variables in the presence of the *CAB* lags. Each set of variables is significant at the 5% level for the *NNP*-transformed model; only *FEDEXP* is significant for the *GDPD*-deflated model. This statistical significance is encouraging because it shows that there is explanatory power in the chosen variables. All the adjusted R^2s are above 50% (not shown). All further tests involving the *CAB* include lag 1, 4 and 8.

The bivariate results for the yields are not shown here to conserve space. Relatively few lagged variables are significant, and only the first lag of the real yields is ever significant. Accordingly, all the yield regressions include only the 1st lag of the real yields.

We strike a balance between the need to exclude superfluous lags because of the limited number of observations, and the desire to capture all important lagged effects, by allowing 2 lags for *FEDEXP* and *NNP*, 3 lags each for *DRFEDSRP* and *SURP5CBO*, and fewer lags to the other auxiliary variables. It should be noted that the autocorrelations of the explanatory variable are quite low; the 1st order autocorrelations for *DRFEDEXP* and *DRFEDSRP* and *DRSURP5CBO* are respectively 0.30, -0.05, and 0.29; higher order autocorrelations are much smaller.[15] We present results with and without lagged RHS variables, in order to be sure that we are not ignoring possible lagged or cumulative effects.

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correlation between the term premium and surpluses. Interpreting this negative relation as evidence that deficits "cause" long-term rates to rise is incorrect.

[15] The corresponding 1st order autocorrelations for *DRLFEDEXP* and *DRLFEDSRP* and *DRLSURP5CBO* are –0.02, –0.08, and 0.25, respectively.

In the next two sections we present the results for the *CAB*, followed by the results for the four real yields.

We present our main findings in the following order:

(a) Regressions that include the principal variables (*expenditures* and *surpluses*) without RHS lags, with and without the auxiliary variables. Lags of the LHS variable are included in all the regressions. We report relevant Wald or F-statistics, on the effects of including the auxiliary variables and the two measures of surpluses.

(b) A similar set of regressions that include lags of the RHS variables, along with an extended set of Wald and F-statistics. These statistics reveal both joint significance of selected variables and the magnitude and significance of the sums of all lagged coefficients of the surplus variables. This last is important because it helps determine the cumulative impact of these variables.

(c) As appropriate, we also discuss but do not display results from models we have estimated with intermediate numbers of lags.

IV. BUDGET AND CURRENT ACCOUNT SURPLUSES

A. Design

The Conventional Model predicts that an *increase* in the surplus will *increase* the *CAB*; its coefficients should be positive. The "Ricardian" neutrality proposition predicts no significant impact of the surplus on the *CAB*.

The *NNP*-deflated model in equation 1 is,

$$\begin{aligned}(2)\qquad RCAB_t = &\sum_{i=0}^{I} \beta_{SURP,i} RFEDSRP_{t-i} + \sum_{i=0}^{I} \beta_{CBO,i} RSURP5CBO_{t-i} \\ &+ \sum_{i=0}^{I} \beta_{EXP,j} RFEDEXP_{t-i} + \beta_{NNP,1} + \sum_{j=1}^{J} \beta_{NNP,j} \frac{NNP_{t-j}}{NNP_t} \\ &+ \sum_{k=0}^{K} \beta_{AUX,k} RAUX_{t-k} + \frac{\beta_0}{NNP_t} + \sum_{n=1}^{N} \rho_n RCAB_{t-n} + \varepsilon_t .\end{aligned}$$

The prefix "*R*" means that the variable is divided by *NNP*; the prefix is "*DR*" means that it also 1st differenced.

The *GDPD*–deflated model is,

$$\begin{aligned}(3)\qquad RLCAB_t = &\sum_{i=0}^{I} \beta_{SURP,i} RLFEDSRP_{t-i} + \sum_{i=0}^{I} \beta_{CBO,i} RLSURP5CBO_{t-i} \\ &+ \sum_{i=0}^{I} \beta_{EXP,i} RLFEDEXP_{t-i} + \sum_{j=1}^{J} \beta_{NNP,j} RLNNP_{t-j} \\ &+ \sum_{k=0}^{K} \beta_{AUX,k} RLAUX_{t-k} + \beta_0 + \sum_{n=1}^{N} \rho_n RLCAB_{t-n} + \eta_t\end{aligned}$$

The prefix "*RL*" means that the variable is divided by *GDPD*; the prefix is "*DRL*" when it also 1st differenced. Both models are estimated in 1st differences.

B. Results

Table 2 Panels A & B, show results from regressions that include only the current values of the critical variables – *FEDEXP*, *FEDSRP* and *SURP5CBO*, as well the auxiliary variables. There is no evidence that either surplus variable influences *CAB* in the direction required by the Conventional Model. *FEDSRP* is never significant at the 5% level but its sign is always positive. *SURP5CBO* is not significant by itself but it is highly significant in the full model. However, this significant coefficient, as well all the others have negative signs, opposite to the prediction of the Conventional Model. The steady-state impacts of the surpluses are also not significant.

FEDEXP is not significant but in one instance when it has the predicted negative sign. *DRLNNP* is significant with the correct sign, while *DINNP* is not significant.[16] *INVALL* is highly significant in all the regressions that it appears but surprisingly it has a positive coefficient.

The explanatory power of the model (R^2) is quite high. Overall, the model seems to track a significant proportion of the changes in the *CAB* (ratio or real). However, the surplus measures are generally not significant at the 5% level; and the only significant coefficient has the wrong sign. The evidence clearly does not support the Conventional Model.

These preliminary results make it clear that any significant effects of surpluses must arise from lagged values and their interactions with the other RHS variables.

Table 3, Panels A & B show the results of estimating the *NNP*- and *GDPD*-deflated versions of the full model and several variations; Table 4 displays the associated hypotheses tests. The first columns in Table 3 show the results of estimating the full model (with all the auxiliary variables), while the first panel of Table 4 contains test results for the full model. The

---

[16] *INNP* is the inverse of *NNP*. This accounts for the very large coefficient as well as for the positive sign. *D* means 1st differenced, as elsewhere in the paper.

remaining columns of Table 3 show selected regressions where some sets of variables have been omitted; panel B of Table 4 contains test results for these "sparse" regressions.

It is clear that the surplus variables are rarely significant individually, and they frequently have a negative sign. Even though the regressions generally have high R^2s, most of the coefficients are not individually significant.[17] Panel A of Table 4 reports Wald tests of joint significance, as well as the significance of sums of coefficients for the full model. The sums of the surplus coefficients measure the full impact of the two surplus measures on the *CAB*. This is particularly important information when coefficients don't always have the same sign, as in this instance.

The joint significance tests on the full model uniformly reject the hypothesis that the surpluses, current or forecast, exert a statistically significant influence on the *CAB*, separately or jointly, and for both specifications. The coefficients of the surplus variables are not statistically different from zero. Furthermore, the sums of the surplus coefficients are not significant. The sum of the *FEDSRP* coefficients is positive but the sum of the *SURP5CBO* coefficients is negative.[18]

Panel B of Table 4 displays regression test results where the variables of interest are added to relatively sparse models, to assess in more detail the significance of the surplus variables. It shows that in the absence of *FEDEXP*, *NNP* and the other auxiliary variables,

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[17] We also tried a specification with 2 lags each for *DRFEDSRP* and *DRSURP5CBO* and fewer lags for some of the auxiliary variables. The estimating precision seems to increase somewhat but the *surplus* variables are still not significant and the conclusions do not change.

[18] We multiply the *SURP5CBO* coefficients by 6 in order to make them comparable to the *FEDSRP* coefficients. Recall that the *SURP5CBO* is the sum of the current and 5 future forecasts added together, which makes it roughly 6 times as large as the *FEDSRP*.

SURP5CBO is frequently significant at the 5% level. But since the sums of its coefficients are negative, this evidence does not favor the Conventional Model.[19]

FEDSRP is never significant by itself in these regressions. By comparison, *FEDEXP* is highly significant. When either or both surplus variables are added to a model that includes *CAB* lags, *FEDEXP*, and some or all of the auxiliary variables, the significance of the surplus variables falls dramatically. The contemporaneous correlations between the expenditure and surplus variables are either negative or low, this implies that multicollinearity is not the reason for the precipitous decline of the significance of the surplus variables.[20]

	DRFEDEXP	*DRFEDSRP*
DRFEDSRP	-0.73	
DRSURP5CBO	-0.11	0.13

Using annual data with only 1 lag for each of critical variables gives very similar results. We conclude that there is simply no evidence that the *CAB* is influenced by the surplus variables over the sample period.

[19] We also investigated the possibility of including State and Local surpluses in our surplus variables. The results were generally weaker than the ones we report here, with no evidence of a significant impact of this alternative measure of surpluses.

[20] The corresponding data for the *DRL* variables is:

	DRLFEDEXP	*DRLFEDSRP*
DRLFEDSRP	-0.57	
DRLSURP5CBO	-0.15	0.12

V. BUDGET SURPLUS AND REAL INTEREST RATES

A. Design

Next we examine the relation between real yields and our measures of government surpluses. The Conventional Model requires that an *increase* in the surplus should *decrease* the real yields; its coefficients should be negative. The Ricardian Model predicts no significant impact of the surplus on real yields.

We use the framework in equation 1 with only slight adjustments. The *NNP*-deflated model from equation 1 becomes,

$$
\begin{aligned}
RLYIELD_t &= \sum_{i=0}^{I} \beta_{SURP,i} RFEDSRP_{t-i} + \sum_{i=0}^{I} \beta_{CBO,i} RSURP5CBO_{t-i} \\
&\quad + \sum_{i=0}^{I} \beta_{EXP,i} RFEDEXP_{t-i} + \sum_{j=1}^{J} \beta_{NNP,j} RLNNP_{t-j} \\
&\quad + \sum_{k=0}^{K} \beta_{AUX,k} RAUX_{t-k} + \beta_0 + \rho_1 RLYIELD_{t-1} + \varepsilon_t
\end{aligned} \tag{3}
$$

where *RLNNP* is *NNP* deflated by *GDPD*. The *GDPD*-deflated model is very similar, except that the ratios on the RHS are replaced by the real variables. Both versions of the specification are estimated in 1^{st} differences.

In the discussion that follows we concentrate on the detailed results of the *NNP*-deflated model, to conserve space.[21] The results from the two specifications are very similar but the results from the *NNP*-deflated model are slightly better, in terms of overall fit and levels of significance for the variables of interest. There are no instances of conflicts in inference between the results.

[21] The results of specifications not shown here are available from the corresponding author.

B. Results With No Lags

The regression results with only contemporary RHS variables are in Table 5. For all the four yields we examine, *FEDSRP* is statistically significant only when there are no other RHS variables in the regression but its coefficient is positive, i.e., it has the wrong sign for the Conventional Model. *SURP5CBO* is never significant at conventional levels of significance, by itself or in combination with other RHS variables; however, its coefficient is uniformly negative.

The regressions seem reasonably specified. The coefficients of the auxiliary variables almost always have the expected signs –*M2* is negative, *NNP* and *INVALL* are positive, and the *NYSE* is negative. *FEDEXP* occasionally have negative coefficients for the 1-year yield but its coefficients are never significant. The R^2s of the complete regressions is respectable, ranging from 35.4% for the 1-year yield differences (where there is some evidence of over-differencing) to 10.4% for the AAA rate.

The joint hypotheses F-tests in Table 6 show that in the presence of all the auxiliary variables, *FEDSRP* and *SURP5CBO* are jointly significant for the longer maturity yields, even though the individual coefficients are not.[22] However, it is difficult to interpret this as evidence in favor of the Conventional Model for two reasons. The first is that the two coefficients though individually insignificant (at the 5% level) have opposite signs. The second reason is that in the partial model regressions it is evident that *FEDSRP* is the dominant variable and its coefficient invariably has the wrong sign for the Conventional Model.

We also examine the steady-state effect of *FEDSRP* and *SURP5CBO*. The steady-state impact of *FEDSRP* is not significant at the 5% level but it sign is positive. . The steady-state impact of *SURP5CBO* however is significant for *9-year forward* and the *AAA* real yields for the

"*DR*" specification and has the correct sign. But the steady-state impact of the two surplus variables is not significant when the coefficients are added together. The last row of each panel reports the steady-state impact of *SURP5CBO* in a regression that excludes *FEDSRP*, in an attempt to isolate the effect of *SURP5CBO*. We find *SURP5CBO* is no longer significant at the 5% level. As shown in the discussion above, *SURP5CBO* loses its significance when by itself. Here again we get additional confirmation that it is not possible to evaluate the CBO surplus effect separately from the federal surplus.

When we evaluate the two variables together, we conclude tentatively that measurable effects of *FEDSRP* are not consistent with the Conventional Model. The coefficient of *FEDSRP* indicates a reliable but opposite effect to that predicted by the Conventional Model. This opposite effect may be an indication that an increase in the surplus reflects government spending lower than is measured by the unified budget and thus not captured by our *FEDEXP* variable.[23]

C. Results With Lags

It is possible that some of the impact of surpluses may be missed by not including their possible lagged effects. Setting aside the potential market efficiency issues raised by lagged effects on the changes in yields, in Tables 7 and 8 we present results that use a lag structure similar to that described in the *CAB* regressions.[24]

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[22] Table 6 shows the results for both the *DR* and *DRL* specification. It clearly shows that there are few differences between the two, and that the results of the *DR* specification are slightly stronger.

[23] The significant negative coefficients we find are always associated with the CBO forecast. This of course may be because of the additional information the forecast may bring to bond pricing. An alternative possibility is that, unlike the federal surplus, we don't have a federal expenditure forecast variable, to account for the possibility that the CBO forecasts imply federal expenditure changes.

[24] This lag structure is less rich. We allow only the 1st lag for the yield, and eliminate the 3rd lag of *NNP*.

The results again fail to support the Conventional Model. In the full model shown in Table 7, none of the *FEDSRP* coefficients are statistically significant, and they are frequently positive. When the auxiliary variables including *FEDEXP* are excluded, the current *FEDSRP* is significant for all the government yields but its sign is always positive. Table 8 shows that in the full model the sums of the lags as well the steady-state impact are uniformly positive and not significant for all the yields. Introducing all the *FEDSRP* lags never seems to have a jointly significant effect.

The results for *SURP5CBO* are only somewhat different. In Table E7, only the 3rd lag of the *SURP5CBO* is significant in the full model. This coefficient always has a positive sign while the rest of the *SURP5CBO* coefficients are all negative but insignificant. Even in the absence any other RHS variables only the 3rd lag of the *SURP5CBO* is significant.

Table 8 shows that, unlike *FEDSPR*, the *SURP5CBO* coefficients are jointly significant in the full model but the only individually significant coefficients are all positive. At the same time the sum of the coefficients and the steady-state impact are both negative but far from significance; this is confirmed by the Wald test on the full model and the F-test for adding *SURP5CBO*. This finding is consistent with the possibility that it takes time for the market to adjust to the CBOs surplus forecast, and that temporary imbalances in the demand for bonds are reversed within three quarters (significant and positive lag-3 coefficient).[25] The full model excluding only *FEDSRP* (not reported here) produces very similar results.

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[25] We also estimated a short lag model, where we allowed only 1 lag for all the RHS variables. In that case, the *SURP5CBO* coefficients are no longer jointly significant. However, for the long term yields, their sums are significant at the 5% level. Again the *FEDSRP* coefficients are not significant and generally have a positive sign. It is difficult to interpret this result, however, because it is unclear how to combine the *FEDSRP* and the *SURP5CBO* coefficients. When we eliminate *FEDSRP* from the model, the sum of the *SURP5CBO* coefficients is no longer significant. Thus, the significance of *SURP5CBO* cannot be evaluated in the absence of *FEDSRP*. If we combine the coefficients of both variables, they are *not* jointly significant, and their sums are not significant either.

We conclude that the evidence available on the federal and CBO surplus forecasts does not support the hypothesis that these surpluses have a significant impact on real yields in the US economy.

VI. CONCLUSIONS AND POLICY IMPLICATIONS

We find results that range from Ricardian to the opposite of the conventional textbook model using fully replicable data and structures that carve out a very large and important part of the specification space. We do not attempt to undertake micro-structural tests, but stake out the basic reduced form/correlation structure approach. We would argue that no one can do research in this area without encompassing these most straightforward data and results. That is, one would fundamentally have to nest the full structure of our specification space results into whatever augmented analysis they are doing and show that not only in a small corner of the space but over the full structure of the space they can overturn our neutrality/supply side results. The space we have staked out is the most straightforward and massive part. It encompasses:

- stationary and non-stationary structures
- lag structure specification
- auxiliary variables specifications
- both interest rate and current account structures to accommodate variable openness

If someone wanted to overturn our results, they would have to employ one or more of the following strategies.

- Better auxiliary variables that work systematically better across the whole specification space structure not only in a little corner of the space.
- A micro-structural approach that shows why the reduced-form results are overturned by the structural approach, again over the whole of the space.
- More data, the addition of which shows why this particularly strong and interesting natural experiment timeframe generated spurious results.

Our results are too clear, too systematic, too stable, too strong, over too important a period of analysis to be overturned with anything else. We started by asking: Is the challenge in the above quote by Paul Evans as applicable today as it was in 1985? Our answer is an unequivocal *yes*! These results suggest that it is time for the profession as a whole to recognize that Ricardian "debt neutrality" is the default paradigm for the profession.

As a result of this research, one cannot argue that deficits such as those that have emerged recently are a reason to roll back tax cuts or to fail to make the existing tax cuts permanent. The results fully support, however, reducing the level of growth of government spending to bring down the deficit to more traditional levels that are more reasonable in the long run.

APPENDIX A

A Simple Expositional Framework

In Figure 1, we present a simple "textbook" level graphical analysis of the conventional "crowding out" paradigm that budget deficits raise real rates of interest and "crowd out" private sector investment.

In Figure 2, we present the open economy version of the "crowding out" paradigm in which budget deficits do not increase real interest rates, which are set by world capital markets, but rather cause an increase in the current account deficit. Under this modified open economy version, there is no "crowding out" of private sector investment, but the foreign indebtedness of the economy increases.

In Figures 3 and 4, we present the Ricardian version of the analysis in Figures 1 and 2, in which neither real interest rates nor the current account deficits are affected by budget deficits, due to the increase in private sector savings that in essence pay for the future implications of the current period budget deficits.

In Figures 5 and 6, we present a brief analysis of the effects of uncertainty as to the future implications of current budget deficits, which reverses the implications of the "crowding out" paradigm, whether in open economy or closed economy form. Alternatively, if the tax cuts that open up the deficits have beneficial supply side effects, while the implied future tax increases have adverse supply side effects, then savings would also adjust more than one for one per the analysis in the figures.

Figure 1: Closed Economy – Standard Analysis

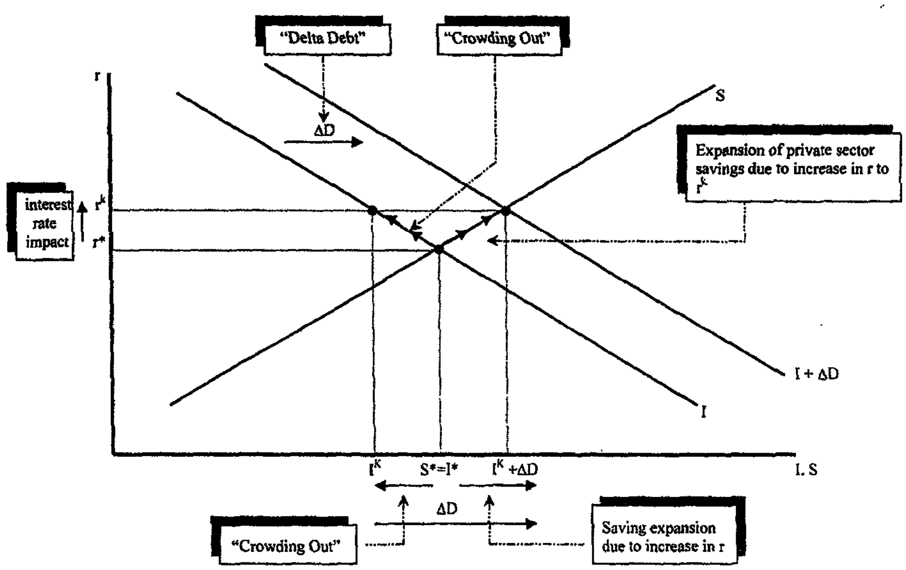

Figure 2: Open Economy – Standard Analysis

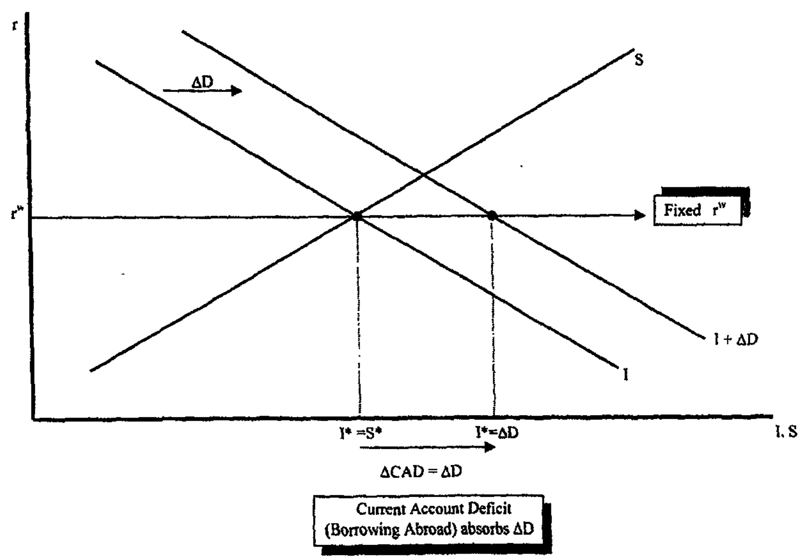

Figure 3: Closed Economy – Ricardian Analysis

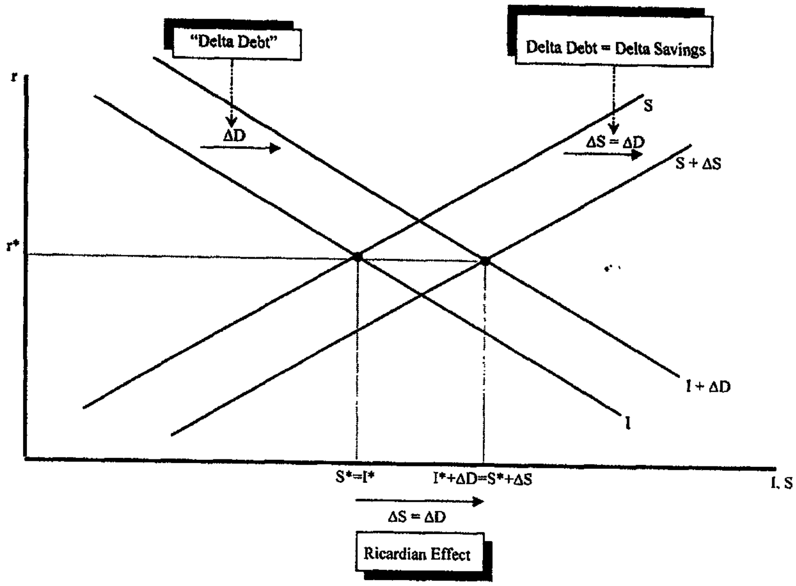

Figure 4: Open Economy – Ricardian Analysis

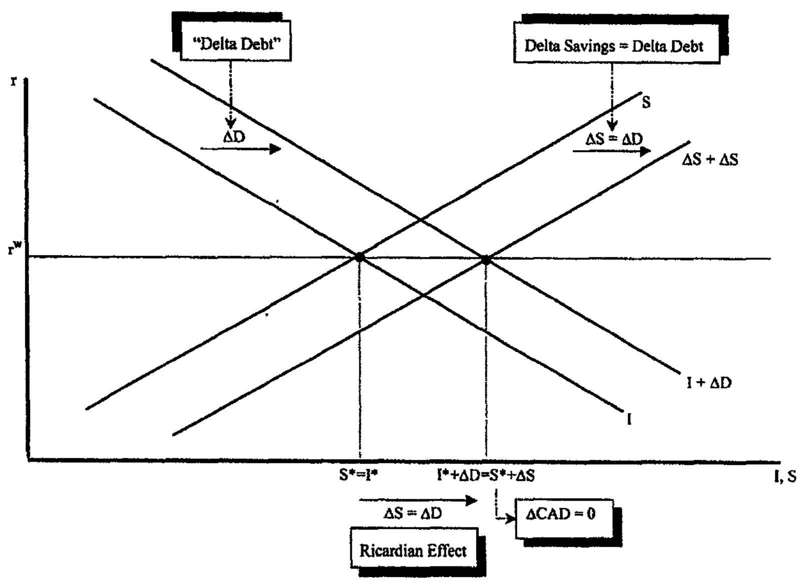

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Figure 5: Closed Economy – Augmented Ricardian Analysis

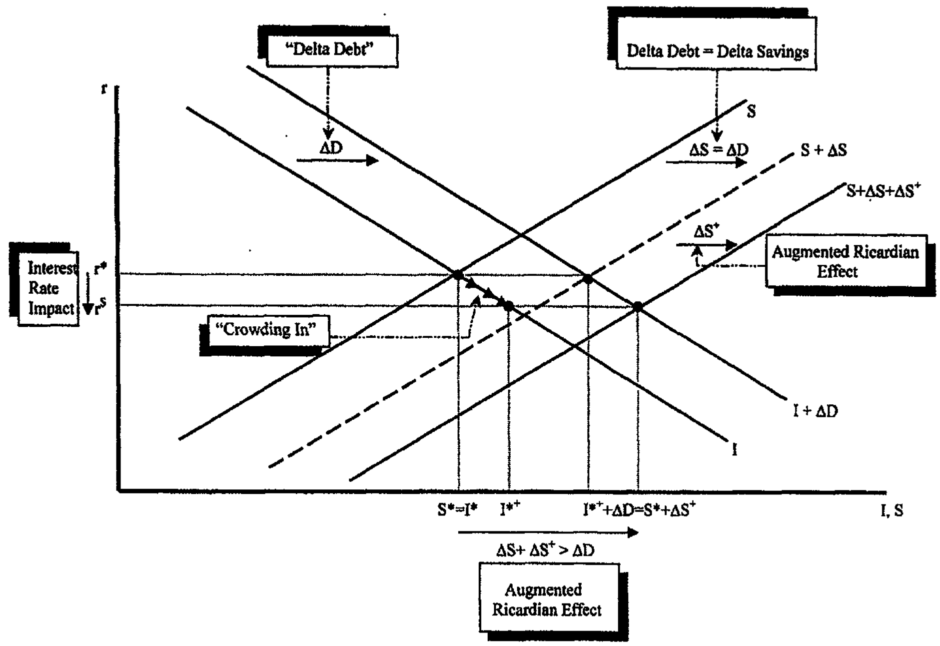
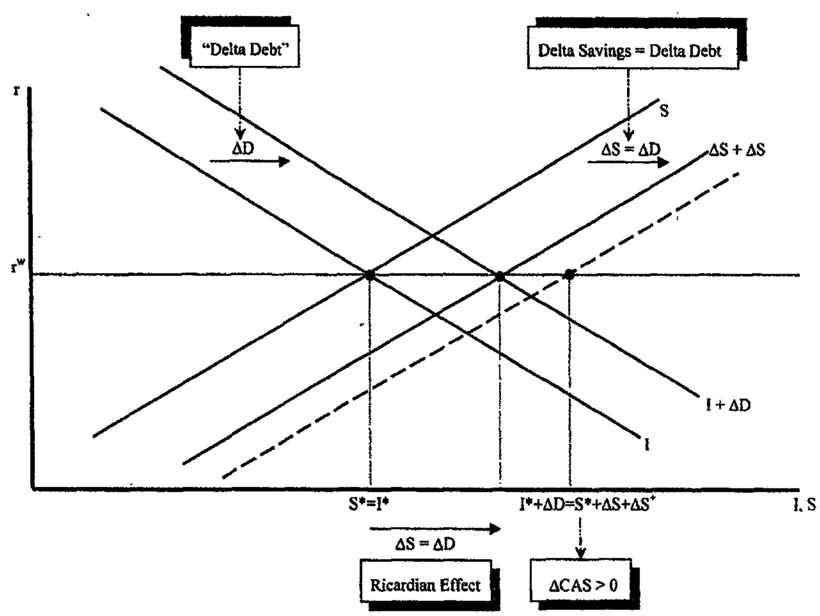


Figure 6: Open Economy – Augmented Ricardian Analysis



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An Intertemporal Budget Constraint Approach

The intertemporal government budget constraint in any general equilibrium model is, $\sum_{t=0}^{\infty}\frac{g_t}{(1+r)^t}=\sum_{t=0}^{\infty}\frac{\tau_t}{(1+r)^t}$, where g is government expenditures, τ is real tax receipts, and r is the real interest rate.

In its simplest form the "Ricardian Equivalence" statement is that the rational consumer's budget constraint is, $\sum_{t=0}^{\infty}\frac{c_t}{(1+r)^t}=a_0+\sum_{t=0}^{\infty}\frac{y_t-\tau_t}{(1+r)^t}\equiv a_0+\sum_{t=0}^{\infty}\frac{y_t-g_t}{(1+r)^t}$, because of the government intertemporal budget constraint (c is consumption and a is initial assets). This means that the consumer's budget constraint is unaffected by mere rearrangements of tax payments holding government expenditures fixed, and therefore such rearrangement will not affect behavior. This result holds in any economy without borrowing constraints and where the lives of the consumers, either directly or through care for the utility of offsprings, are the same as that of the economy. The result is unaffected by production or international trade.

This equation shows what should and what should not be empirically important. The implication for saving and investment is that since budget deficits do not disturb the consumption plan, savings adjust fully to changes in the government surplus so that there should be no effect on the interest rate, or the difference between saving and investment (the current account).

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CHART 1

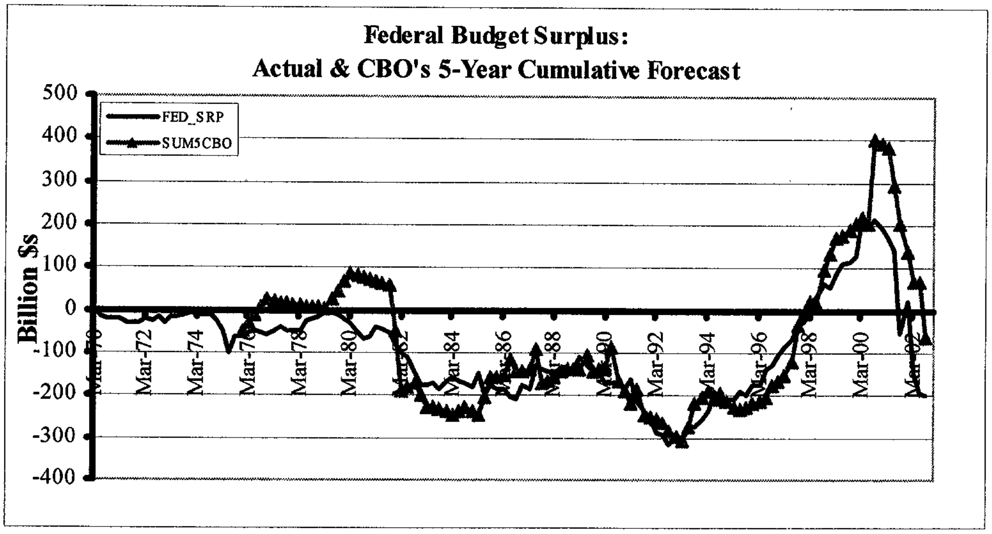

CHART 2

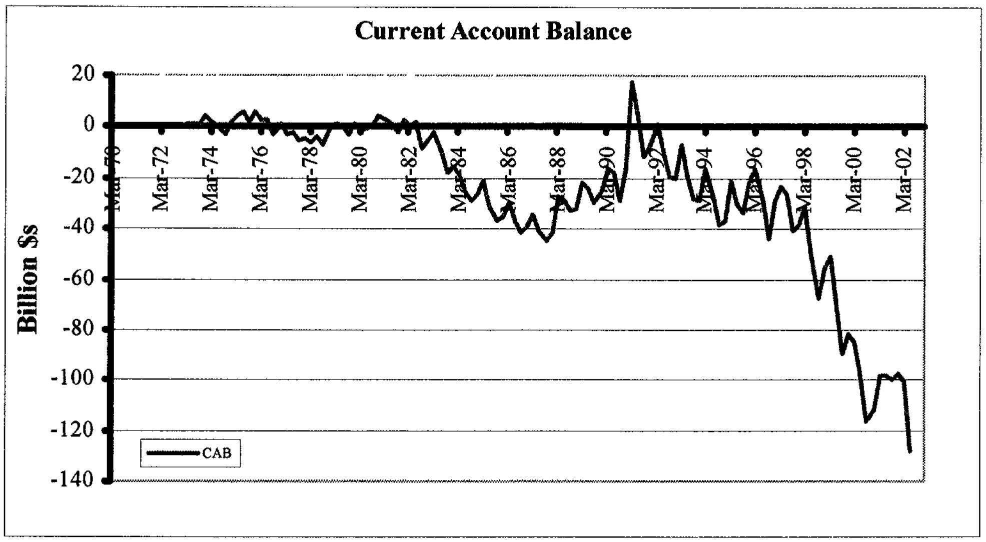

CHART 3

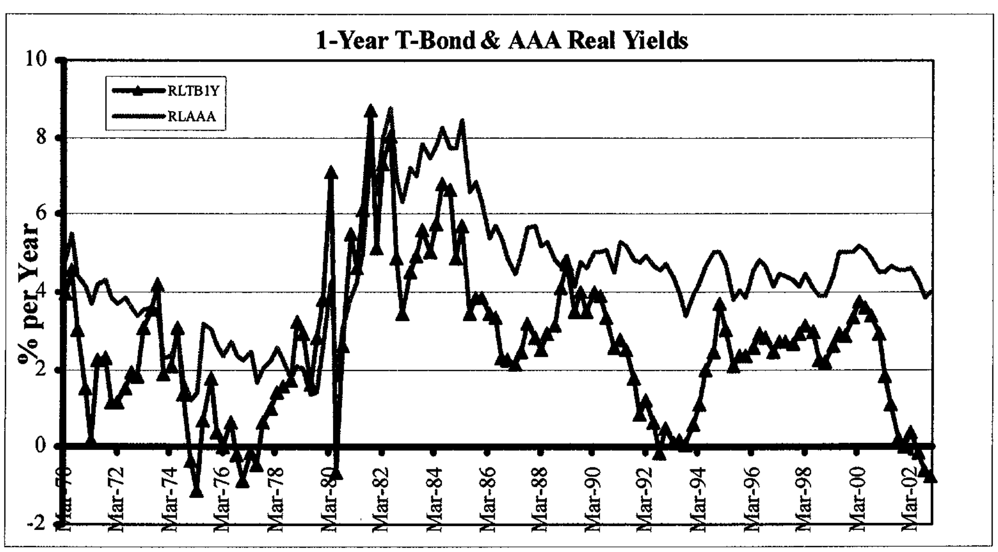

TABLE 1
BIVARIATE REGRESSIONS
CAB ON FEDERAL EXPENDITURES, ACTUAL AND PROJECTED SURPLUS

PANEL A
First Differences of the *NNP*-Deflated Variables

Variable	Coeff	P-value	Variable	Coeff	P-value	Variable	Coeff	P-value	Variable	Coeff	P-value
C	-0.0113	[.399]		-0.0159	[.222]		-0.0086	[.503]		-0.0095	[.457]
DRCAB(-1)	-0.0015	[.991]		0.0468	[.735]		0.0550	[.694]		0.0803	[.521]
DRCAB(-2)	**-0.2015**	**[.017]**		**-0.2515**	**[.003]**		**-0.2279**	**[.018]**		**-0.1931**	**[.026]**
DRCAB(-3)	0.0288	[.764]		0.0011	[.991]		0.0427	[.715]		-0.0607	[.502]
DRCAB(-4)	**0.3755**	**[.001]**		**0.3439**	**[.000]**		**0.2839**	**[.007]**		**0.4789**	**[.000]**
DRCAB(-5)	-0.1189	[.161]		-0.1286	[.153]		-0.1404	[.122]		-0.1429	[.136]
DRCAB(-6)	0.0073	[.929]		0.0715	[.407]		0.0054	[.948]		0.0460	[.636]
DRCAB(-7)	-0.1208	[.184]		-0.0828	[.349]		-0.0902	[.342]		-0.0146	[.890]
DRCAB(-8)	**0.2923**	**[.007]**		**0.3164**	**[.002]**		**0.3834**	**[.000]**		0.2139	[.053]
			DRFED_SRP	0.0088	[.739]	DRSURP5CBO	-0.0006	[.834]	DRFED_EXP	-0.0774	[.077]
			DRFED_SRP(-1)	-0.0256	[.225]	DRSURP5CBO(-1)	-0.0048	[.055]	DRFED_EXP(-1)	**0.0889**	**[.009]**
			DRFED_SRP(-2)	0.0242	[.368]	DRSURP5CBO(-2)	0.0033	[.358]	DRFED_EXP(-2)	-0.0372	[.415]
			DRFED_SRP(-3)	0.0392	[.087]	DRSURP5CBO(-3)	0.0057	[.162]	DRFED_EXP(-3)	-0.0386	[.221]
			DRFED_SRP(-4)	-0.0061	[.723]	DRSURP5CBO(-4)	-0.0037	[.213]	DRFED_EXP(-4)	0.0348	[.242]
			DRFED_SRP(-5)	**0.0308**	**[.007]**	DRSURP5CBO(-5)	0.0049	[.118]	DRFED_EXP(-5)	-0.0457	[.116]
			DRFED_SRP(-6)	-0.0071	[.666]	DRSURP5CBO(-6)	-0.0013	[.620]	DRFED_EXP(-6)	-0.0164	[.647]
			DRFED_SRP(-7)	0.0216	[.268]	DRSURP5CBO(-7)	-0.0001	[.961]	DRFED_EXP(-7)	0.0033	[.919]
			DRFED_SRP(-8)	0.0338	[.085]	DRSURP5CBO(-8)	0.0033	[.091]	DRFED_EXP(-8)	-0.0361	[.235]
Coeff Sum			**DRFED_SRP**	**0.1197**		**DRSURP5CBO**	**0.0067**		**DRFED_EXP**	**-0.1245**	
F-Test					**[.042]**			**[.035]**			**[.018]**

PANEL B
First Differences of the *GDPD*-Deflated Variables

Variable	Coeff	P-value	Variable	Coeff	P-value	Variable	Coeff	P-value	Variable	Coeff	P-value
C	-0.0082	[.294]		-0.0091	[.244]		-0.0066	[.391]		0.0169	[.321]
DRLCAB(-1)	0.1181	[.463]		0.1371	[.424]		0.1350	[.382]		0.1342	[.323]
DRLCAB(-2)	-0.1986	[.035]		**-0.2043**	**[.049]**		-0.1827	[.102]		-0.1709	[.127]
DRLCAB(-3)	-0.0105	[.921]		-0.0116	[.914]		0.0192	[.887]		0.0109	[.919]
DRLCAB(-4)	**0.3480**	**[.003]**		**0.3783**	**[.002]**		**0.3164**	**[.010]**		**0.4421**	**[.002]**
DRLCAB(-5)	-0.1817	[.089]		-0.1459	[.155]		-0.1601	[.135]		-0.1689	[.154]
DRLCAB(-6)	0.0038	[.969]		0.0368	[.745]		-0.0238	[.821]		-0.0020	[.986]
DRLCAB(-7)	-0.0305	[.813]		-0.0003	[.998]		-0.0012	[.993]		-0.0141	[.916]
DRLCAB(-8)	**0.3539**	**[.002]**		**0.3487**	**[.001]**		**0.3897**	**[.001]**		**0.2932**	**[.016]**
			DRLFED_SRP	-0.0128	[.675]	DRLSURP5CBO	-0.0026	[.283]	DRLFED_EXP	**-0.1554**	**[.013]**
			DRLFED_SRP(-1)	-0.0119	[.643]	DRLSURP5CBO(-1)	-0.0036	[.167]	DRLFED_EXP(-1)	0.0091	[.856]
			DRLFED_SRP(-2)	0.0256	[.372]	DRLSURP5CBO(-2)	0.0033	[.335]	DRLFED_EXP(-2)	-0.0512	[.259]
			DRLFED_SRP(-3)	0.0438	[.150]	DRLSURP5CBO(-3)	0.0054	[.167]	DRLFED_EXP(-3)	0.0214	[.649]
			DRLFED_SRP(-4)	-0.0044	[.855]	DRLSURP5CBO(-4)	-0.0013	[.686]	DRLFED_EXP(-4)	-0.0072	[.879]
			DRLFED_SRP(-5)	0.0238	[.125]	DRLSURP5CBO(-5)	0.0022	[.561]	DRLFED_EXP(-5)	-0.0195	[.652]
			DRLFED_SRP(-6)	-0.0062	[.760]	DRLSURP5CBO(-6)	-0.0019	[.554]	DRLFED_EXP(-6)	-0.0491	[.247]
			DRLFED_SRP(-7)	0.0055	[.807]	DRLSURP5CBO(-7)	-0.0016	[.694]	DRLFED_EXP(-7)	-0.0108	[.810]
			DRLFED_SRP(-8)	0.0267	[.281]	DRLSURP5CBO(-8)	0.0019	[.434]	DRLFED_EXP(-8)	0.0012	[.977]
Coeff Sum			**DRLFED_SRP**	**0.0902**		**DRLFED_CBO**	**0.0019**		**DRLFED_EXP**	**-0.2616**	
F-Test					**[.395]**			**[.194]**			**[.315]**

TABLE 2

CAB ON ACTUAL AND PROJECTED SURPLUSES AND FEDERAL EXPENDITURES

PANEL A: *NNP*-Deflated Variables --No RHS Variable Lags

Variable	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
C	0.0113	[.512]	-0.0112	[.365]	-0.0105	[.397]	-0.0107	[.385]	0.0108	[.544]
DRCAB(-1)	-0.0739	[.242]	-0.0671	[.402]	-0.0640	[.424]	-0.0685	[.370]	-0.0680	[.302]
DRCAB(-2)	-0.0844	[.208]	-0.1334	[.071]	-0.1441	[.051]	-0.1287	[.082]	-0.0919	[.170]
DRCAB(-4)	**0.3879**	**[.000]**	**0.3581**	**[.003]**	**0.3588**	**[.003]**	**0.3686**	**[.002]**	**0.3786**	**[.001]**
DRCAB(-8)	**0.2893**	**[.006]**	**0.3498**	**[.002]**	**0.3378**	**[.002]**	**0.3275**	**[.003]**	**0.3174**	**[.004]**
DINNP	2947.96	[.338]							2985.06	[.354]
DRFED_EXP	0.0315	[.547]							-0.0022	[.958]
DRINV_ALL	**0.1107**	**[.000]**							**0.1005**	**[.000]**
DRM2	**0.0452**	**[.009]**							**0.0447**	**[.010]**
DRNYSE	0.0057	[.070]							0.0055	[.076]
DRFED_SRP	0.0318	[.171]	0.0171	[.462]			0.0263	[.266]		
DRSURP5CBO	**-0.0045**	**[.009]**			-0.0030	[.149]	-0.0039	[.089]		
R^2 – D.W.	**67.4%**	**1.55**	**55.5%**	**1.77**	**55.9%**	**1.81**	**56.6%**	**1.81**	**65.7%**	**1.53**

PANEL B: *GDPD*-Deflated Variables –No RHS Variable Lags

Variable	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
C	0.0125	[.155]	-0.0078	[.247]	-0.0079	[.240]	-0.0078	[.246]	0.0139	[.122]
DRLCAB(-1)	-0.0343	[.496]	0.0012	[.988]	-0.0022	[.978]	-0.0043	[.955]	-0.0290	[.577]
DRLCAB(-2)	**-0.1810**	**[.007]**	**-0.1778**	**[.013]**	**-0.1936**	**[.008]**	**-0.1853**	**[.013]**	**-0.1778**	**[.009]**
DRLCAB(-4)	**0.3565**	**[.000]**	**0.3365**	**[.004]**	**0.3273**	**[.005]**	**0.3368**	**[.003]**	**0.3581**	**[.000]**
DRLCAB(-8)	**0.2869**	**[.005]**	**0.3790**	**[.001]**	**0.3659**	**[.002]**	**0.3573**	**[.001]**	**0.3079**	**[.004]**
DRLNNP	**-0.0801**	**[.000]**							**-0.0770**	**[.000]**
DRLFED_EXP	-0.0185	[.748]							-0.0381	[.376]
DRLINV_ALL	**0.1048**	**[.000]**							**0.0985**	**[.000]**
DRLM2	0.0270	[.157]							0.0248	[.170]
DRLNYSE	0.0060	[.055]							0.0058	[.056]
DRLFED_SRP	0.0154	[.516]	0.0017	[.948]			0.0101	[.693]		
DRLSURP5CBO	**-0.0037**	**[.019]**			-0.0034	[.096]	-0.0037	[.074]		
R^2 – D.W.	**73.6%**	**1.62**	**57.9%**	**1.68**	**58.7%**	**1.70**	**58.8%**	**1.71**	**72.7%**	**1.62**

TABLE 3
CAB ON ACTUAL AND PROJECTED SURPLUSES AND FEDERAL EXPENDITURES

PANEL A; 3 RHS Variable Lags
DRCAB; *NNP*-Deflated

Variable	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
C	-0.0017	[.925]	-0.0093	[.440]	-0.0093	[.445]	-0.0105	[.374]	-0.0006	[.971]
DRCAB(-1)	0.0385	[.581]	-0.0164	[.853]	-0.0649	[.393]	-0.0382	[.643]	0.0422	[.488]
DRCAB(-2)	-0.0932	[.180]	-0.1472	[.060]	**-0.1537**	**[.038]**	-0.1280	[.082]	-0.1044	[.137]
DRCAB(-4)	**0.4556**	**[.000]**	**0.3897**	**[.001]**	**0.3737**	**[.003]**	**0.3815**	**[.001]**	**0.4616**	**[.000]**
DRCAB(-8)	**0.2395**	**[.010]**	**0.2975**	**[.006]**	**0.3110**	**[.004]**	**0.3131**	**[.003]**	**0.2347**	**[.011]**
DINNP	-204.72	[.941]							-416.21	[.881]
DINNPLG1	-0.7562	[.536]							-0.9544	[.389]
DINNPLG2	0.3804	[.802]							1.1160	[.435]
DINNPLG3	1.6066	[.279]							2.1462	[.055]
DRFED_EXP	-0.0285	[.587]							-0.0396	[.310]
DRFED_EXP(-1)	0.1015	[.061]							**0.0887**	**[.039]**
DRFED_EXP(-2)	-0.0297	[.574]							-0.0485	[.199]
DRINV_ALL	**0.0917**	**[.007]**							**0.0992**	**[.001]**
DRINV_ALL(-1)	0.0054	[.843]							0.0060	[.794]
DRM2	0.0368	[.063]							0.0350	[.056]
DRNYSE	**0.0075**	**[.033]**							0.0065	[.069]
DRNYSE(-1)	-0.0044	[.204]							-0.0044	[.133]
DRFED_SRP	0.0026	[.926]	0.0101	[.664]			0.0086	[.690]		
DRFED_SRP(-1)	0.0198	[.517]	-0.0213	[.237]			-0.0142	[.442]		
DRFED_SRP(-2)	0.0312	[.295]	0.0198	[.401]			0.0270	[.298]		
DRFED_SRP(-3)	0.0129	[.661]	**0.0528**	**[.042]**			**0.0534**	**[.037]**		
DRSURP5CBO	-0.0021	[.391]			-0.0013	[.576]	-0.0018	[.558]		
DRSURP5CBO(-1)	-0.0033	[.156]			-0.0041	[.074]	**-0.0054**	**[.033]**		
DRSURP5CBO(-2)	0.0026	[.449]			0.0026	[.523]	0.0015	[.686]		
DRSURP5CBO(-3)	-0.0004	[.885]			0.0046	[.206]	0.0033	[.353]		
R^2 -- D.W.	**76.6%**	**1.68**	**59.7%**	**1.92**	**60.4%**	**1.78**	**63.4%**	**1.85**	**75.0%**	**1.69**

PANEL B 3 RHS Variable Lags
DRLCAB; *GDPD*-Deflated

Variable	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
C	**0.0338**	**[.027]**	-0.0075	[.277]	-0.0077	[.241]	-0.0079	[.232]	**0.0350**	**[.009]**
DRLCAB(-1)	0.0310	[.612]	0.0437	[.651]	-0.0079	[.915]	0.0180	[.836]	0.0304	[.595]
DRLCAB(-2)	**-0.2034**	**[.008]**	**-0.1770**	**[.028]**	**-0.1673**	**[.022]**	**-0.1572**	**[.040]**	**-0.2158**	**[.004]**
DRLCAB(-4)	**0.4178**	**[.000]**	**0.3691**	**[.001]**	**0.3418**	**[.004]**	**0.3650**	**[.000]**	**0.4142**	**[.000]**
DRLCAB(-8)	**0.2409**	**[.001]**	**0.3415**	**[.001]**	**0.3785**	**[.001]**	**0.3665**	**[.000]**	**0.2428**	**[.001]**
DRLNNP	**-0.0642**	**[.000]**							**-0.0743**	**[.000]**
DRLNNP(-1)	**-0.0418**	**[.004]**							**-0.0367**	**[.001]**
DRLNNP(-2)	-0.0011	[.941]							0.0021	[.869]
DRLNNP(-3)	0.0137	[.222]							0.0176	[.089]
DRLFED_EXP	-0.0713	[.178]							-0.0631	[.088]
DRLFED_EXP(-1)	0.0230	[.654]							-0.0011	[.977]
DRLFED_EXP(-2)	-0.0755	[.125]							**-0.0819**	**[.020]**
DRLINV_ALL	**0.0930**	**[.000]**							**0.1003**	**[.000]**
DRLINV_ALL(-1)	0.0077	[.700]							0.0014	[.936]
DRLM2	0.0174	[.336]							0.0183	[.268]
DRLNYSE	0.0049	[.142]							0.0046	[.143]
DRLNYSE(-1)	-0.0053	[.064]							**-0.0051**	**[.035]**
DRLFED_SRP	-0.0083	[.740]	-0.0146	[.583]			-0.0109	[.641]		
DRLFED_SRP(-1)	0.0157	[.567]	-0.0123	[.544]			-0.0026	[.896]		
DRLFED_SRP(-2)	0.0114	[.641]	0.0233	[.298]			0.0342	[.164]		
DRLFED_SRP(-3)	0.0093	[.745]	0.0592	[.072]			**0.0620**	**[.047]**		
DRLSURP5CBO	-0.0023	[.342]			-0.0024	[.206]	-0.0032	[.236]		
DRLSURP5CBO(-1)	-0.0013	[.525]			-0.0033	[.119]	**-0.0055**	**[.026]**		
DRLSURP5CBO(-2)	0.0028	[.418]			0.0025	[.504]	0.0015	[.700]		
DRLSURP5CBO(-3)	-0.0003	[.911]			0.0052	[.140]	0.0034	[.297]		
R^2 -- D.W.	**82.4%**	**1.73**	**61.4%**	**1.84**	**62.3%**	**1.67**	**65.3%**	**1.80**	**81.4%**	**1.74**

TABLE 4
HYPOTHESES TESTS WITH THE FULL AND SPARSE MODELS
P-values for F- and Wald Tests

PANEL A: Full Model --3 RHS Variable Lags

Panel A.1: *DRCAB*; *NNP*-Deflated

	Coeff	P-Values
Joint Significance of *FED Surpluses*		[.871]
Joint Significance of *CBO Surpluses*		[.340]
Joint Significance of *FED&CBO Surpluses*		[.725]
Joint Significance of *FED Expenditures*		[.241]
Joint Significance of *FED Expenditures, FED&CBO Surpluses*		[.326]
	Coeff	**P-Values**
Sum of *FED Surplus* coefficients	0.067	[.323]
Steady–state impact *FED Surplus*	0.185	[.368]
Sum of *CBO Surplus* coefficients*6	-0.020	[.383]
Steady–state impact of *CBO Surplus*	-0.056	[.404]
Sum of ALL *Surplus* coefficients	0.061	[.447]
Steady–state impact ALL *FED Surpluses*	0.129	[.477]

Panel A.2: *DRLCAB*; *GDPD*-Deflated

	Coeff	P-Values
Joint Significance of *FED Surpluses*		[.922]
Joint Significance of *CBO Surpluses*		[.450]
Joint Significance of *FED&CBO Surpluses*		[.779]
Joint Significance of *FED Expenditures*		[.167]
Joint Significance of *FED Expenditures, FED&CBO Surpluses*		[.276]
	Coeff	**P-Values**
Sum of *FED Surplus* coefficients	0.028	[.639]
Steady–state impact of *FED Surplus*	0.055	[.652]
Sum of *CBO Surplus* coefficients*6	-0.006	[.795]
Steady–state impact of *CBO Surplus*	-0.013	[.797]
Sum of ALL *Surplus* coefficients	0.022	[.676]
Steady–state impact ALL *FED Surpluses*	0.042	[.687]

Panel B: Sparse Models –3 RHS Variable Lags

Panel B.1: *DRCAB*; *NNP*-Deflated

	P-Values
Joint Significance of *FED Surpluses* (only *CAB* lags present)	[.084]
Joint Significance of *CBO Surpluses* (only *CAB* lags present)	**[.043]**
Joint Significance of *CBO Surpluses* (only *CAB* lags and *FED SURP* present)	[.064]
Joint Significance of *FED&CBO Surpluses* (only *CAB* lags present)	**[.029]**
Joint Significance of *FED Expenditures* (only *CAB* lags and *NNP* present)	**[.001]**
Joint Significance of all auxiliary variables	**[.000]**
Joint Significance of *FED Surpluses* (all auxiliary variables present)	[.941]
Joint Significance of CBO Surpluses (all auxiliary variables + *Fed SURP* present)	[.349]
Joint Significance of *CBO Surpluses* (*CAB* lags, *NNP* and *FED Expenditures* present)	[.618]

Panel B.2: *DRLCAB*; *GDPD*-Deflated

	P-Values
Joint Significance of *FED Surpluses* (only *CAB* lags present)	[.122]
Joint Significance of *CBO Surpluses* (only *CAB* lags present)	**[.050]**
Joint Significance of *CBO Surpluses* (only *CAB* lags and *FED SURP* present)	**[.049]**
Joint Significance of *FED&CBO Surpluses* (only *CAB* lags present)	**[.032]**
Joint Significance of *FED Expenditures* (only *CAB* lags and *NNP* present)	**[.000]**
Joint Significance of all auxiliary variables	**[.000]**
Joint Significance of *FED Surpluses* (all auxiliary variables present)	[.891]
Joint Significance of *CBO Surpluses* (all auxiliary variables + *Fed SURP* present)	[.456]
Joint Significance of *CBO Surpluses* (*CAB* lags, *NNP* and *FED Expenditures* present)	[.349]

Table 5

YIELDS ON ACTUAL AND PROJECTED SURPLUSES AND FEDERAL EXPENDITURES

(includes LHS lag and auxiliary explanatory variables)

No RHS Variable Lags

DRLTB1Y; DR

Variable	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
C	-0.0391	[.844]	-0.0274	[.819]	-0.0169	[.892]	-0.0270	[.824]	-0.0239	[.904]
DRLGS1YR(-1)	**-0.4756**	**[.006]**	-0.3258	[.068]	-0.3150	[.096]	-0.3240	[.075]	**-0.4884**	**[.003]**
GRLNNP	0.9166	[.963]							-1.6464	[.933]
DRFED_EXP	-0.2396	[.738]							-0.5195	[.320]
DRINV_ALL	0.0594	[.834]							0.0116	[.964]
DRM2	**-0.6463**	**[.013]**							**-0.6864**	**[.006]**
DRNYSE	-0.0472	[.111]							-0.0467	[.111]
DRFED_SRP	0.2078	[.391]	**0.6671**	**[.016]**			**0.6765**	**[.015]**		
DRSURP5CBO	-0.0109	[.715]			0.0153	[.652]	-0.0043	[.893]		
R^2 -- D.W.	**35.4%**	**2.30**	**18.8%**	**2.29**	**9.9%**	**2.18**	**18.8%**	**2.30**	**34.9%**	**2.26**

DRLTB10; DR

Variable	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
C	-0.0727	[.573]	-0.0083	[.912]	-0.0006	[.994]	-0.0064	[.932]	-0.0351	[.793]
DRLGS10YR(-1)	-0.2568	[.065]	-0.1815	[.177]	-0.2115	[.146]	-0.1829	[.187]	**-0.2936**	**[.027]**
GRLNNP	10.3594	[.443]							4.3126	[.760]
DRFED_EXP	0.3999	[.432]							-0.0607	[.873]
DRINV_ALL	0.1341	[.549]							0.0494	[.820]
DRM2	-0.1769	[.222]							-0.2442	[.091]
DRNYSE	-0.0258	[.256]							-0.0270	[.237]
DRFED_SRP	0.3401	[.082]	**0.3449**	**[.017]**			**0.3924**	**[.008]**		
DRSURP5CBO	-0.0281	[.116]			-0.0098	[.566]	-0.0211	[.217]		
R^2 -- D.W.	**20.8%**	**2.00**	**10.7%**	**1.99**	**2.9%**	**2.06**	**12.4%**	**2.06**	**16.2%**	**1.92**

DRLF1_10; DR

Variable	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
C	-0.0813	[.520]	-0.0067	[.927]	0.0009	[.990]	-0.0046	[.949]	-0.0422	[.748]
DRLF1_10(-1)	-0.2041	[.120]	-0.1470	[.230]	-0.1857	[.167]	-0.1519	[.234]	**-0.2439**	**[.048]**
GRLNNP	12.0090	[.369]							5.6943	[.684]
DRFED_EXP	0.4858	[.330]							-0.0129	[.973]
DRINV_ALL	0.1468	[.508]							0.0539	[.804]
DRM2	-0.1172	[.389]							-0.1893	[.163]
DRNYSE	-0.0230	[.306]							-0.0240	[.286]
DRFED_SRP	0.3693	[.058]	**0.3173**	**[.020]**			**0.3669**	**[.009]**		
DRSURP5CBO	-0.0291	[.089]			-0.0119	[.451]	-0.0224	[.163]		
R^2 -- D.W.	**18.1%**	**1.97**	**8.9%**	**1.96**	**3.8%**	**2.04**	**8.4%**	**2.02**	**12.6%**	**1.90**

DRLAAA; DR

Variable	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
C	-0.0140	[.896]	0.0104	[.870]	0.0165	[.793]	0.0127	[.841]	0.0160	[.887]
DRLAAA(-1)	-0.2368	[.105]	-0.1896	[.184]	-0.2134	[.175]	-0.1982	[.186]	-0.2567	[.065]
GRLNNP	5.8822	[.596]							0.9412	[.937]
DRFED_EXP	0.4454	[.320]							0.0220	[.947]
DRINV_ALL	0.1888	[.347]							0.1053	[.582]
DRM2	-0.0594	[.630]							-0.1118	[.372]
DRNYSE	-0.0317	[.065]							-0.0323	[.060]
DRFED_SRP	0.3127	[.068]	0.2001	[.106]			**0.2514**	**[.049]**		
DRSURP5CBO	-0.0266	[.129]			-0.0159	[.305]	-0.0231	[.152]		
R^2 -- D.W.	**10.4%**	**2.04**	**7.2%**	**2.00**	**5.7%**	**2.10**	**10.2%**	**2.08**	**6.1%**	**1.96**

TABLE 6
HYPOTHESES TESTS FOR REAL YIELDS–No RHS Variable Lags

Panel A
P-Values For Selected Tests –*DR* Variables

	1-Yr	10-Yr	Forward	AAA
F-Test P-Values				
Joint Significance of *FED&CBO Surpluses* (only the *Yield* lag present)	**[.0004]**	**[.001]**	**[.011]**	**[.032]**
Joint Significance of *FED&CBO Surpluses* (all auxiliary variables present)	[.958]	**[.001]**	**[.0002]**	**[.001]**
Joint Significance of all auxiliary variables (only the *Yield* lags present)	**[.000]**	**[.000]**	**[.000]**	**[.002]**
Coefficient and T-Test P-Values				
Steady–state impact of *FED Surplus*	0.141 [.463]	0.270 [.099]	0.307 [.071]	0.253 [.070]
Steady–state impact of *CBO Surplus*	-0.044 [.621]	-0.134 [..064]	-0.145 [.049]	-0.129 [.039]
Steady–state combined impact of *FED & CBO Surpluses*	0.097 [.622]	0.137 [.408]	0.161 [.345]	0.142 [.383]
Steady–state impact of *CBO Surplus* in the absence of *FED* surplus	-0.032 [.710]	-0.111 [.108]	-0.119 [.090]	-0.109 [.074]

Panel B
P-Values For Selected Tests –*DRL* Variables

	1-Yr	10-Yr	Forward	AAA
F-Test P-Values				
Joint Significance of *FED&CBO Surpluses* (only the *Yield* lag present)	**[.028]**	**[.038]**	[.141]	[.113]
Joint Significance of *FED&CBO Surpluses* (all auxiliary variables present)	[.999]	**[.046]**	**[.012]**	**[.015]**
Joint Significance of all auxiliary variables (only the *Yield* lag present)	**[.000]**	**[.000]**	[.093]	**[.001]**
T-Test P-Values				
Steady–state impact of *FED Surplus*	0.112 [.728	0.396 [.153]	0.463 [.106]	0.386 [.103]
Steady–state impact of *CBO Surplus*	-0001 [.999	-0.228 [.099]	-.0256 [.069]	-0.213 [.076]
Steady–state combined impact of *FED & CBO Surpluses*	0.115 [.731	0.168 [.541]	0.207 [.466]	0174 [.464]
Steady–state impact of *CBO Surplus* in the absence of *FED* surplus	0.014 [.931]	-0.177 [.176].	-0.197 [.138]	-0.164 [.152]

TABLE 7
YIELDS ON ACTUAL AND PROJECTED SURPLUSES AND FEDERAL EXPENDITURES
Three RHS Variable Lags

DRLTB1Y DR

Variable	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
C	-0.2638	[.333]	-0.0144	[.908]	-0.0152	[.899]	-0.0205	[.867]	-0.0063	[.979]
DRLGS1YR(-1)	**-0.4990**	**[.015]**	-0.3655	[.080]	-0.3341	[.070]	-0.3863	[.086]	**-0.4671**	**[.020]**
GRLNNP	6.7625	[.797]							-5.0415	[.850]
GRLNNP(-1)	18.5663	[.276]							5.4430	[.744]
GRLNNP(-2)	-0.5064	[.976]							-3.6073	[.845]
DRFED_EXP	0.0206	[.975]							-0.5210	[.345]
DRFED_EXP(-1)	0.5874	[.429]							0.3116	[.590]
DRFED_EXP(-2)	-0.4054	[.460]							-0.4194	[.303]
DRINV_ALL	-0.0486	[.872]							0.0994	[.710]
DRINV_ALL(-1)	-0.0680	[.803]							0.0413	[.877]
DRM2	**-0.7852**	**[.009]**							**-0.7254**	**[.024]**
DRM2(-1)	0.1090	[.648]							0.1588	[.492]
DRNYSE	-0.0374	[.259]							-0.0371	[.238]
DRNYSE(-1)	**0.0584**	**[.038]**							0.0315	[.165]
DRFED_SRP	0.2019	[.486]	**0.6932**	**[.018]**			**0.6768**	**[.054]**		
DRFED_SRP(-1)	0.1037	[.799]	0.2449	[.363]			0.2847	[.424]		
DRFED_SRP(-2)	-0.0242	[.951]	0.0454	[.854]			0.1210	[.681]		
DRFED_SRP(-3)	0.3653	[.221]	-0.0339	[.845]			0.0332	[.881]		
DRSURP5CBO	-0.0052	[.838]			0.0266	[.416]	0.0035	[.906]		
DRSURP5CBO(-1)	-0.0529	[.073]			-0.0370	[.118]	-0.0451	[.116]		
DRSURP5CBO(-2)	-0.0286	[.233]			-0.0004	[.990]	-0.0175	[.619]		
DRSURP5CBO(-3)	**0.0555**	**[.046]**			**0.0530**	**[.032]**	0.0319	[.314]		
R^2 -- D.W.	**47.5%**	**2.232**	**20.6%**	**2.27**	**16.2%**	**2.16**	**25.3%**	**2.26**	**28.9%**	**2.33**

DRLTB10Y DR

Variable	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
C	-0.0700	[.664]	-0.0027	[.972]	-0.0052	[.945]	-0.0089	[.907]	0.1038	[.513]
DRLGS10YR(-1)	-0.2345	[.129]	-0.1700	[.250]	-0.2276	[.085]	-0.2015	[.188]	-0.2377	[.110]
GRLNNP	11.9443	[.457]							1.4109	[.935]
GRLNNP(-1)	-1.6611	[.892]							-8.9746	[.484]
GRLNNP(-2)	-4.84703	[.665]							-5.5857	[.632]
DRFED_EXP	0.428351	[.384]							-0.1524	[.682]
DRFED_EXP(-1)	0.1769	[.692]							0.2980	[.323]
DRFED_EXP(-2)	-0.356495	[.373]							-0.3134	[.262]
DRINV_ALL	0.082357	[.734]							0.1290	[.576]
DRINV_ALL(-1)	0.0033	[.987]							0.1630	[.394]
DRM2	-0.273725	[.103]							-0.2707	[.143]
DRM2(-1)	0.0433	[.794]							0.1055	[.529]
DRNYSE	-0.0191	[.474]							-0.0223	[.367]
DRNYSE(-1)	**0.0441**	**[.034]**							0.0204	[.277]
DRFED_SRP	0.2789	[.194]	**0.3484**	**[.024]**			**0.3501**	**[.037]**		
DRFED_SRP(-1)	-0.0810	[.782]	-0.0726	[.639]			-0.0271	[.883]		
DRFED_SRP(-2)	-0.0210	[.942]	0.0169	[.920]			0.0960	[.596]		
DRFED_SRP(-3)	0.1991	[.319]	0.0218	[.884]			0.0372	[.831]		
DRSURP5CBO	-0.0261	[.163]			-0.0049	[.767]	-0.0160	[.383]		
DRSURP5CBO(-1)	-0.0234	[.190]			-0.0225	[.164]	-0.0234	[.177]		
DRSURP5CBO(-2)	-0.0226	[.183]			-0.0086	[.663]	-0.0170	[.397]		
DRSURP5CBO(-3)	**0.0397**	**[.040]**			**0.0376**	**[.021]**	0.0294	[.107]		
R^2 -- D.W.	**33.9%**	**1.95**	**11.2%**	**2.01**	**11.8%**	**2.03**	**18.5%**	**2.03**	**21.6%**	**2.06**

DRLF1_10 DR

Variable	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
C	-0.0570	[.720]	-0.0021	[.978]	-0.0044	[.952]	-0.0082	[.911]	0.1085	[.496]
DRLF1_10(-1)	-0.1699	[.237]	-0.1270	[.339]	-0.2003	[.098]	-0.1600	[.243]	-0.1840	[.180]
GRLNNP	13.8475	[.372]							3.3598	[.841]
GRLNNP(-1)	-4.7566	[.688]							-11.3022	[.370]
GRLNNP(-2)	-4.93896	[.652]							-5.5036	[.624]
DRFED_EXP	0.485062	[.319]							-0.1163	[.748]
DRFED_EXP(-1)	0.1128	[.794]							0.2940	[.309]
DRFED_EXP(-2)	-0.350573	[.377]							-0.3049	[.265]
DRINV_ALL	0.097934	[.683]							0.1307	[.571]
DRINV_ALL(-1)	-0.0022	[.992]							0.1695	[.362]
DRM2	-0.202809	[.202]							-0.2095	[.225]
DRM2(-1)	0.0196	[.904]							0.0864	[.603]
DRNYSE	-0.0158	[.550]							-0.0194	[.427]
DRNYSE(-1)	**0.0436**	**[.038]**							0.0199	[.308]
DRFED_SRP	0.2994	[.164]	**0.3194**	**[.028]**			**0.3210**	**[.038]**		
DRFED_SRP(-1)	-0.1147	[.685]	-0.1097	[.459]			-0.0662	[.695]		
DRFED_SRP(-2)	-0.0200	[.944]	0.0179	[.915]			0.0951	[.589]		
DRFED_SRP(-3)	0.1818	[.358]	0.0296	[.846]			0.0389	[.825]		
DRSURP5CBO	-0.0276	[.133]			-0.0078	[.618]	-0.0174	[.326]		
DRSURP5CBO(-1)	-0.0194	[.250]			-0.0206	[.191]	-0.0205	[.211]		
DRSURP5CBO(-2)	-0.0226	[.189]			-0.0095	[.618]	-0.0171	[.371]		
DRSURP5CBO(-3)	**0.0385**	**[.040]**			**0.0360**	**[.021]**	0.0294	[.087]		
R^2 -- D.W.	**31.1%**	**1.92**	**9.7%**	**1.98**	**10.7%**	**2.01**	**17.2%**	**2.01**	**18.6%**	**2.04**

DRLAAA DR

Variable	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
C	-0.0830	[.559]	0.0110	[.867]	0.0126	[.841]	0.0062	[.921]	0.0771	[.568]
DRLAAA(-1)	-0.2196	[.171]	-0.1695	[.278]	-0.2369	[.105]	-0.2164	[.190]	-0.1834	[.237]
GRLNNP	11.5587	[.385]							1.7234	[.906]
GRLNNP(-1)	-1.2682	[.903]							-9.4475	[.366]
GRLNNP(-2)	-0.87951	[.928]							-0.1196	[.991]
DRFED_EXP	0.448588	[.312]							-0.0467	[.884]
DRFED_EXP(-1)	0.3480	[.367]							0.3619	[.148]
DRFED_EXP(-2)	-0.119771	[.722]							-0.2201	[.313]
DRINV_ALL	0.092861	[.680]							0.1419	[.489]
DRINV_ALL(-1)	-0.0456	[.794]							0.0645	[.685]
DRM2	-0.136381	[.295]							-0.1192	[.399]
DRM2(-1)	-0.0228	[.873]							0.0051	[.971]
DRNYSE	-0.0232	[.218]							-0.0246	[.172]
DRNYSE(-1)	**0.0396**	**[.018]**							0.0226	[.098]
DRFED_SRP	0.2247	[.276]	0.1798	[.187]			0.1829	[.209]		
DRFED_SRP(-1)	-0.0106	[.968]	-0.1404	[.290]			-0.0834	[.589]		
DRFED_SRP(-2)	0.0905	[.709]	0.0545	[.688]			0.1136	[.448]		
DRFED_SRP(-3)	0.2563	[.138]	0.1094	[.385]			0.1267	[.380]		
DRSURP5CBO	-0.0239	[.166]			-0.0103	[.446]	-0.0159	[.336]		
DRSURP5CBO(-1)	-0.0265	[.093]			-0.0262	[.071]	-0.0284	[.063]		
DRSURP5CBO(-2)	-0.0099	[.507]			0.0067	[.684]	0.0001	[.994]		
DRSURP5CBO(-3)	0.0255	[.101]			**0.0238**	**[.046]**	0.0182	[.194]		
R^2 -- D.W.	**31.1%**	**1.93**	**9.1%**	**2.01**	**12.2%**	**2.06**	**17.1%**	**2.03**	**14.5%**	**2.06**

TABLE 8
HYPOTHESES TESTS FOR REAL YIELDS –3 RHS Variable Lags
Wald Test P-Values

PANEL A: Full Model–*DR* Variables

	1-Yr	10-Yr	Forward	AAA
Joint Significance of *FED Expenditures*	[.655]	[.559]	[.517]	[.504]
Joint Significance of *FED Surpluses*	[.466]	[.412]	[.362]	[.240]
Joint Significance of *CBO Surpluses*	**[.017]**	**[.018]**	**[.023]**	**[.026]**
Joint Significance of *FED&CBO Surpluses*	[.058]	[.055]	[.062]	**[.049]**
Joint Significance of *FED Expenditures, FED&CBO Surpluses*	[.079]	[.090]	[.103]	[.078]
	Coeff [P-Value]	**Coeff [P-Value]**	**Coeff [P-Value]**	**Coeff [P-Value]**
Sum of *FED Surplus* coefficients	0.647 [.383]	0.376 [.467]	0.346 [.496]	0.561 [.206]
Steady–state impact of *FED Surplus*	0.431 [.381]	0.305 [.466]	0.296 [.495]	0.460 [.203]
Sum of *CBO Surplus* coefficients*6	-0.188 [.467]	-0.194 [.283]	-0.186 [.296]	-0.209 [.177]
Steady–state impact of *CBO Surplus*	-0.125 [.467]	-0.158 [.280]	-0.159 [.293]	-0.171 [.175]
Sum of ALL *Surplus* coefficients	0.459 [.486]	0.182 [.693]	0.160 [.723]	.352 [.371]
Steady–state impact ALL *FED Surpluses*	0.306 [.485]	0.147 [.692]	0.137 [.723]	0.289 [.369]

PANEL B: Sparse Model –*DR* Variables

	1-Yr	10-Yr	Forward	AAA
Joint Significance of *FED Surpluses* (only the *Yield* lag present)	[.123]	[.118]	[.140]	[.261]
Joint Significance of *CBO Surpluses* (only the *Yield* lag present)	[.116]	[.092]	[.094]	[.070]
Joint Significance of *CBO Surpluses* (only the *Yield* lag and *FED SURP* present)	[.214]	**[.048]**	[.086]	[.068]
Joint Significance of *FED&CBO Surpluses* (only the *Yield* lag present)	**[.018]**	[.085]	[.056]	[.078]
Joint Significance of *NNP & FED Expenditures* (only the *Yield* lag present)	**[.0001]**	[.044]	[.067]	[.191]
Joint Significance of all auxiliary variables	**[.000]**	[.091]	[.172]	[.248]
Joint Significance of *FED Surpluses* (all auxiliary variables present)	[.599]	[.558]	[.517]	[.391]
Joint Significance of *CBO Surpluses* (all auxiliary variables + *Fed SURP* present)	**[.023]**	**[.024]**	**[.030]**	**[.033]**
Joint Significance of *FED&CBO Surpluses* (all auxiliary variables present)	[.074]	[.071]	[.078]	[.064]
Joint Significance of *CBO Surpluses* (the *Yield* lag, only *NNP* and *FED Expenditures* present)	[.198]	[.137]	[.140]	[.132]

NOTES FOR TABLE 1

Table 1 shows the results of bivariate regressions, where the LHS variable is the 1st difference of the ratio *CAB/NNP –DRCAB–* in Panel A and the 1st difference of the ratio *CAB/GDPD –DRLCAB–* the "real" Current Account Balance. All the regressions include 8 lags of the LHS variable, and a constant. We report the coefficient and the associated small-sample P-values. The standard errors are robust to heteroscedasticity.

The last two rows of each panel show the sum of the lagged coefficients (without significance levels) and the P-Value of the regression F-test. All the results are for quarterly data.

NOTES FOR TABLE 2

Table 2 shows results of a series of regressions for *DRCAB* in Panel A and *DRLCAB* in Panel B. All the regressions include lags 1, 2, 4, and 8 for the LHS variable, a constant, and no lags for the RHS variables. The results are for the following models in order from left to right: (1) the full model, (2) only the actual federal surplus, (3) only the CBO's forecast federal surplus, (4) both actual and forecast surpluses, (5) all the auxiliary variables without the surplus variables. We report the coefficient and the associated small-sample P-values. The standard errors are robust to heteroscedasticity.

The last row shows the R^2 of each regression and the Durbin-Watson coefficient. The data are quarterly.

NOTES FOR TABLE 3

The results in Table 3 have the same form as Table 2, except that lags of the RHS variables are included.

Table 3 shows results of a series of regressions for *DRCAB* in Panel A and *DRLCAB* in Panel B. All the regressions include lags 1, 2, 4, and 8 for the LHS variable and a constant. For the RHS variables we allow 3 lags each for the two surplus variables –Fed surplus and the CBO projection– and 3 or fewer lags for the remaining, auxiliary, variables. The results are for the following models in order from left to right: (1) the full model, (2) the actual federal surplus, (3) the CBO's forecast federal surplus, (4) both actual and forecast surpluses, all the auxiliary variables without the surplus variables. We report the coefficient and the associated small-sample P-values. The standard errors are robust to heteroscedasticity.

The last row shows the R^2 of each regression and the Durbin-Watson coefficient. The data are quarterly.

NOTES FOR TABLE 4

Table 4 shows P-values of F- and Wald tests for hypotheses based on the regressions in Table 3; these regressions include lagged RHS variables.

Panels A of Table 4 show results of hypotheses on the full model with lags –the model on the left-hand side of Table 3. Panel A.1 and A.2 show P-values of F-tests for *DRCAB* and *DRLCAB*, respectively. The hypotheses tested are in order by row:

1) The coefficients of the federal surplus are not jointly statistically significant.
2) The coefficients of the CBO's surplus forecast are not jointly statistically significant.
3) The coefficients of the CBO's surplus forecast and the federal surplus *combined* are not jointly statistically significant.
4) The coefficients of federal expenditures are not jointly statistically significant.
5) The coefficients of the CBO's surplus forecast, the federal surplus, and federal expenditures *combined* are not jointly statistically significant.

The lower half of panels A.1 and A.2 show P-values of Wald tests for sums of coefficients. The sum of the coefficients measures the steady-state, permanent effect of a variable. The hypotheses tested in order by row are:

1) The sum of the federal surplus coefficients is zero.
2) The steady-state effect of the federal surplus is zero. This is the sum of the surplus coefficients divided by 1 minus the sum of the AR coefficients.
3) The sum of the CBO's surplus forecast coefficients is zero. These coefficients are multiplied by 6 in order to make them comparable in magnitude with the surplus coefficients; the CBO surplus is the sum of the current and the following 5 years of forecasts, all adjusted by *NNP*.
4) The steady-state effect of the CBO surplus is zero. This is the sum of the surplus coefficients divided by 1 minus the sum of the AR coefficients.
5) The sum of the CBO's surplus forecast coefficients and the federal surplus coefficients is zero.
6) The combined steady-state effect of the CBO and federal surplus is zero. This is the sum of all the surplus coefficients divided by 1 minus the sum of the AR coefficients.

Panels B of Table 4 show results on the partial or "sparse" model with lags –the models to the right of the full model in Table 3. Panel B.1 and B.2 show P-values of F-tests for *DRCAB* and *DRLCAB*, respectively. The hypotheses tested are in order by row:

1) The federal surplus coefficients are not jointly statistically significant in the presence of the lags of the LHS variable.
2) The CBO's surplus forecast coefficients are not jointly statistically significant in the presence of the lags of the LHS variable.
3) The CBO's surplus forecast coefficients are not jointly statistically significant in the presence of the lags of the LHS variable and the federal surplus and its 3 lags.
4) The CBO's surplus forecast and the federal surplus coefficients are not jointly statistically significant in the presence of the lags of the LHS variable.
5) Federal expenditure coefficients are not jointly statistically significant in the presence of the lags of the LHS variable and *NNP* and its 3 lags.

6) All the auxiliary variables and their lags are not jointly statistically significant in the presence of the lags of the LHS variable. The auxiliary variables are: *NNP* with 3 lags, federal expenditures with 2 lags, gross private investment with 1 lag, *M2*, and the NYSE index.
7) The federal surplus coefficients are not jointly statistically significant in the presence of the lags of the LHS variable and all the other auxiliary variables and their lags.
8) The CBO's surplus forecast coefficients are not jointly statistically significant in the presence of the lags of the LHS variable, the federal surplus and its 3 lags, and all the other auxiliary variables and their lags.
9) The CBO's surplus forecast coefficients are not jointly statistically significant in the presence of the lags of the LHS variable, *NNP* and federal expenditures and their lags.

NOTES FOR TABLE 5

Table 5 shows results of a series of regressions for the changes in real yields, *DRLyield*. The regressions have the same form as those reported in Table 2. We report results for four yields: 1-year T-Bill rate (*TB1Y*), 10-year T-Bond rate (*TB10Y*), the implied 9-year forward rate (*F*1_10), derived from the 1-year and 10-year rates, and the AAA corporate bond rate (*AAA*). The RHS variables are in *DRLvar* form, i.e., they are deflated by *NNP* and then 1st differenced. We do not report the results for *DRLVar* to conserve space. The results we report are slightly more flattering to the "standard" view. However, we do report results of the hypotheses tests for both versions in Table 6.

The regressions include only lag1 for the LHS variable, a constant, and no lags for the RHS variables. The results are for the following models in order from left to right: (1) the full model, (2) only the actual federal surplus, (3) only the CBO's forecast federal surplus, (4) both actual and forecast surpluses, (5) all the auxiliary variables without the surplus variables. These are the same models reported in Table 2 for *CAB*. We report the coefficient and the associated small-sample P-values. The standard errors are robust to heteroscedasticity.

The last row shows the R^2 of each regression and the Durbin-Watson coefficient. The data are quarterly. We report the coefficient and the associated small-sample P-values. The standard errors are robust to heteroscedasticity.

NOTES FOR TABLE 6

Table 6 reports P-values of F-tests and T-tests for hypotheses based on the regressions in Table 5; these regressions have no lagged RHS variables. Panels A and B contain results for RHS variables of the form *DRvar* and *DRLvar*, respectively, for the 4 real yields we study.

The hypotheses tested are in order by row:

1) The coefficients of the CBO's surplus forecast and the federal surplus *combined* are not jointly statistically significant in the presence of LHS lags only.
2) The coefficients of the CBO's surplus forecast and the federal surplus *combined* are not jointly statistically significant in the presence of all the auxiliary variables.
3) The auxiliary variables are not jointly statistically significant in the presence of LHS lags.
4) The steady-state effect of the federal surplus is zero. This is the surplus coefficient divided by 1 minus the AR1 coefficient.
5) The steady-state effect of the CBO's surplus is zero. This is the CBO surplus coefficient divided by 1 minus the AR1 coefficient.
6) The combined steady-state effect of the CBO and federal surplus is zero. This is the sum of the surplus coefficients divided by 1 minus the AR1 coefficient.
7) The steady-state effect of the CBO's surplus is zero in a regression that excludes the federal surplus.

NOTES FOR TABLE 7

Table 7 shows results of a series of regressions for the changes in real yields, *DRLyield*. We report results for four yields: 1-year T-Bill rate (*TB1Y*), 10-year T-Bond rate (*TB10Y*), the implied 9-year forward rate (*F*1_10), derived from the 1-year and 10-year rates, and the AAA corporate bond rate (*AAA*). The RHS variables are in *DRLvar* form, i.e., they are deflated by *NNP* and then 1st differenced. We do not report the results for *DRLVar* to conserve space. The results we report are slightly more flattering to the "standard" view.

The regressions include only a constant, lag-1 for the LHS variable, 3 lags for the surplus variables, and 2 or fewer lags for the auxiliary variables. The results are for the following models in order from left to right: (1) the full model, (2) only the actual federal surplus, (3) only the CBO's forecast federal surplus, (4) both actual and forecast surpluses, (5) all the auxiliary variables without the surplus variables. These are the same models reported in Tables 2 and 3 for *CAB*.

The last row shows the R^2 of each regression and the Durbin-Watson coefficient. The data are quarterly. We report the coefficient and the associated small-sample P-values. The standard errors are robust to heteroscedasticity.

NOTES FOR TABLE 8

Table 8 reports P-values of F- and Wald tests for hypotheses based on the regressions in Table 7; these regressions include lagged RHS variables. We report results only for RHS variables of the form *DRvar*, to conserve space. These results are somewhat more flattering to the conventional model compared to those that use *DRLvar*. Results not reported here are available for the authors.

Panel A of Table 4 shows P-values of F-tests for hypotheses on the full model with lags (the model on the left-hand side of Table 7) for the 4 yields *TB1Y*, *TB10Y*, *F1_10*, *AAA*. The hypotheses tested in the upper half of the panel are in order by row:

1) The coefficients of the federal surplus are not jointly statistically significant
2) The coefficients of the CBO's surplus forecast are not jointly statistically significant.
3) The coefficients of the CBO's surplus forecast and the federal surplus *combined* are not jointly statistically significant.
4) The coefficients of federal expenditures are not jointly statistically significant.
5) The coefficients of the CBO's surplus forecast, the federal surplus, and federal expenditures *combined* are not jointly statistically significant.

The lower half of the Panel A shows P-values of Wald tests for sums of coefficients. The sum of the coefficients measures the steady-state, permanent effect of a variable. The hypotheses tested in order by row are:

1) The sum of the federal surplus coefficients is zero.
2) The steady-state effect of the federal surplus is zero. This is the sum of the surplus coefficients divided by 1 minus the AR1 coefficient.
3) The sum of the CBO's surplus forecast coefficients is zero. These coefficients are multiplied by 6 in order to make them comparable in magnitude with the surplus coefficients; the CBO surplus is the sum of the current and the following 5 years of forecasts, all adjusted by *NNP*.
4) The steady-state effect of the CBO's surplus forecast coefficients is zero. This is the sum of the CBO surplus coefficients divided by 1 minus the AR1 coefficient.
5) The sum of the CBO's surplus forecast coefficients and the federal surplus coefficients is zero.
6) The combined steady-state effect of the CBO and federal surplus is zero. This is the sum of all the surplus coefficients divided by 1 minus the sum of the AR1 coefficient.

Panel B of Table 4 shows P-values of F-tests for hypotheses on the partial or "sparse" model with lags –the results to the right of the full model results in Table 7. The first part of Panel B shows the results for *DRCAB* while the second part shows the results for *DRLCAB*. The structure of the hypotheses is very similar to those reported for *CAB*. The hypotheses tested are in order by row:

1) The federal surplus coefficients are not jointly statistically significant in the presence of the lags of the LHS variable only.
2) The CBO's surplus forecast coefficients are not jointly statistically significant in the presence of the lags of the LHS variable only.
3) The CBO's surplus forecast coefficients are not jointly statistically significant in the presence of the lags of the LHS variable and the federal surplus and its 3 lags.

4) The CBO's surplus forecast and the federal surplus coefficients are not jointly statistically significant in the presence of the lags of the LHS variable.
5) Federal expenditure coefficients are not jointly statistically significant in the presence of the lags of the LHS variable, *NNP* and federal expenditures and their lags.
6) All the auxiliary variables and their lags are not jointly statistically significant in the presence of the lags of the LHS variable. The auxiliary variables are: *NNP* with 3 lags, federal expenditures with 2 lags, gross private investment with 1 lag, *M2*, and the NYSE index.
7) The federal surplus coefficients are not jointly statistically significant in the presence of the lags of the LHS variable and all the other auxiliary variables and their lags.
8) The CBO's surplus forecast coefficients are not jointly statistically significant in the presence of the lags of the LHS variable, the federal surplus and its 3 lags, and all the other auxiliary variables and their lags.
9) The CBO's surplus forecast and the federal surplus coefficients are not jointly statistically significant in the presence of the lags of the LHS variable, the federal surplus and its 3 lags, and all the other auxiliary variables and their lags.
10) The CBO's surplus forecast coefficients are not jointly statistically significant in the presence of the lags of the LHS variable, *NNP* and federal expenditures and their lags.