ISSN 1745-8587

School of Economics, Mathematics and Statistics

BWPEF 0918

US Fiscal Indicators, Inflation and Output

Yunus Aksoy
Birkbeck, University of London

Giovanni Melina
Birkbeck, University of London

December 2009

Birkbeck Working Papers in Economics & Finance

US Fiscal Indicators, Inflation and Output*

Yunus Aksoy† Giovanni Melina‡

Birkbeck, University of London, Malet Street, London, WC1E 7HX, UK

December 8, 2009

Abstract

In this paper we explore the information content of a large set of fiscal indicators for US real output growth and inflation. We provide evidence that fluctuations in certain fiscal variables contain valuable information to predict fluctuations in output and prices. The distinction between federal and state-local fiscal indicators yields useful insights and helps define a new set of stylized facts for US macroeconomic conditions. First, we find that variations in state-local indirect taxes as well as state government surplus or deficit help predict output growth. Next, the federal counterparts of these indicators contain valuable information for inflation. Finally, state-local expenditures help predict US inflation. A set of formal and informal stability tests confirm that these relationships are stable. The fiscal indicators in questions are also among the ones that yield the best in-sample and out-of-sample performances.

Keywords: Information value, state-local finances, fiscal variables, Granger causality
JEL classification: E31, E62

*We are grateful to Sergio Destefanis, John Driffill, Miguel Leon-Ledesma, Ron Smith, Martin Sola, Peter Tinsley, Stefania Villa for helpful comments and discussions. We also thank audiences at the 24th Annual Congress of European Economic Association, the 41st Annual Conference of the Money Macro and Finance Research Group, and seminar participants at Birkbeck College for helpful comments. The usual disclaimer applies.

†Tel: +44-20-7631-6407; fax: +44-20-7631-6416; *e-mail*: y.aksoy@ems.bbk.ac.uk
‡Tel: +44-20-7631-6426; fax: +44-20-7631-6416; *e-mail*: g.melina@ems.bbk.ac.uk

1 Introduction

Economists often rely on non-structural autoregressive econometric models such as unrestricted VARs, to explain or to forecast in a parsimonious way variations in key macroeconomic variables such as inflation and output. While US output variations can be explained somewhat reliably with the use of a set of relevant variables such as Federal Funds rate and certain monetary aggregates next to past variations in real output itself, empirical work confronts significant difficulties in assigning informative variables to explain US inflation movements. Even the Federal Funds rate fails to provide statistically significant information content to explain inflation variations in a stable way (see for example Friedman and Kuttner (1992); Stock and Watson (2003)).

Macroeconomic theory is paying increasing attention to the interaction between fiscal and monetary policymaking in stabilizing inflation, employment and real output. Such an interaction and its consequences for macro-fundamentals are usually studied within theoretical general equilibrium modelling. However current theoretical models typically focus on aggregate spending and taxes. We believe that some government expenditure/revenues subcomponents may be better related with macroeconomic variables due to certain institutional features or preferences of policymakers. In the literature, there is already evidence that different institutional arrangements across US states yield different macroeconomic outcomes at least as far as business cycle fluctuations are concerned. For instance, Fatás and Mihov (2006) provide a thorough empirical analysis of the macroeconomic effects of the constraints on fiscal policy and find that states that face tighter restrictions show less volatile business cycles.

In this paper, we provide new stylized facts for the US economy that may motivate economic theory to explore new transmission channels of fiscal policymaking on macroeconomic outcomes. We take a non-structural, direct, statistical approach as suggested by Friedman and Kuttner (1992) and Sims (1972, 1980) and perform a systematic analysis on the informational role of a wide range of fiscal policy indicators to explain US inflation and real output movements. Reduced form/information value approach, as a preliminary test of statistical connection between certain variables, is immune to questions of

causality, exogeneity or controllability of potential instruments.

The discretionary motive or the automatic stabilizers' role in fiscal policymaking is an important and complex topic, but is not the subject matter of this paper. For a recent survey of the macroeconometric literature on the identification of discretionary fiscal policy see for istance Caldara and Kamps (2008).

By relying on straightforward statistical tests, we find that certain fiscal indicators, contain additional statistically significant information to explain US inflation and output growth next to the information contained in the Federal Funds rate and autoregressive components of inflation and real output. In particular, we find that changes in the federal budget, federal indirect taxes, as well as state-local expenditures contain valuable lead information for US inflation. Moreover, state-local budget and state-local indirect taxes are helpful in predicting US real output growth. Furthermore, informal and formal statistical tests suggest that the information content present in these variables is stable over time.

To the best of our knowledge, there is neither a theoretical explanation nor other empirical contribution highlighting the different information content of state-local fiscal variables as opposed to the federal counterparts. We suppose that one possible determinant has to do with the different institutional frameworks of the federal and state-local budgets, which we also document.

The remainder of the paper is organized as follows. Section 2 summarizes the conduct of US fiscal policy in postwar years and reviews some existing literature on state-local finances. Section 3 presents the dataset used in the paper. Section 4 reports Granger-style regressions based on inflation and real output equations that include a set of alternative fiscal indicators together with the Federal Funds rate. Section 5 conducts stability tests. Finally, Section 6 concludes.

2 Fiscal evolution in the US

Since the 1930s the presence of government in the US economy has steadily increased.

<Insert Figure 1 here>

Figure 1-(a) shows that in postwar times government expenditures have increased from 15 percent of GDP to reach almost 25 percent in the late 1950s and be around 20 percent in more recent times. If we add also transfers - which do not enter the definition of GDP - and consider total government expenditures, which we plot in Figure 2-(b), the share is even higher. In 2008 total expenditures have exceeded 35 percent of GDP.

The increase in government expenditures has been recorded both at the federal and at the state-local level. Nevertheless, while state-local receipts have always accompanied the pattern of expenditures, at the federal level expenditures have been higher than revenues for long periods of time. As Figure 1-(c) shows, in the first part of the post-war period, the federal budget followed a pattern of deficits during wartime and economic crises and surpluses during peacetime and economic expansion. From 1970 to 1997, the federal deficit was sustained and the budget never balanced. Only in 1998 the federal budget reported its first surplus since 1969. The budget was again in deficit in 2004. In 2005, it began to shrink as a consequence of an increase in tax revenues. Afterwards, a pronounced increase in the federal deficit was recorded.

As Figure 1-(c) shows, the sum of state-local budgets behaved in a different way. In aggregate terms, state-local finances have been close to balanced budget. Indeed, when it comes to US state budgets, the leitmotif is balanced budget rules. Although across the US there are disparities in the set of fiscal rules that governs a state's ability to raise and spend revenue, all states but Vermont have a more or less stringent fiscal discipline that foresees balanced budgets. The requirements of the other 49 states can be divided into four groups (Poterba, 1996):

1. In 44 states, the governor must submit a balanced budget, but the state does not have to enact a budget that matches expenditures and revenues.

2. In 37 states, the legislature must enact a balanced budget, yet actual revenues and expenditures may diverge if there are unexpected fiscal shocks after the budget is adopted.

3. In 6 states, when an unexpected deficit develops during the fiscal year, the governor has to correct the deficit in the next budget cycle. Because budget cycles in some states are biennial, this requirement permits substantial periods of budget deficits.

4. In 24 out of the 37 states with balanced budget requirements, the constitution prohibits the government from carrying deficits into the next budget cycle. This provision represents the strictest anti-deficit rule, as it requires the legislature either:

   i. to cut spending; or

   ii. to raise taxes in the fiscal year when the deficit emerges; or

   iii. to float short-term debt to be retired in the next fiscal year.

In 1987, the Advisory Council on Intergovernmental Relations (ACIR) constructed an index that characterizes fiscal discipline among state governments and ranges from 0 (lax) to 10 (stringent). Only eight states received ACIR scores of 5 or below, whereas 26 received a score of 10 (see Figure 2).

<Insert Figure 2 here>

Some researchers investigated implications of these institutional arrangements, for key macroeconomic variables, particularly for real output, and for macroeconomic policy. Sørensen and Yosha (2001), for instance, use panel estimation to show that state fiscal policy has a stabilizing influence on output, but this influence differ across business cycles expansions and downturns. When state income rises, government revenue initially increases and then reverts to its initial level, while expenditure remains roughly constant. However, when state income falls, both revenue and expenditure decline with revenue remaining low for a sustained period. Such asymmetries appear to be associated with balanced budget rules or political conservatism (that may in turn lead to constitutional balanced budget rules). More precisely, the tighter the budget rules, the less effective is fiscal policy at stimulating the economy than it is at slowing it. On the contrary, in states with relatively less strict budget rules, such as Massachusetts and New York, fiscal policy appears to mitigate economic slowdowns more than it mutes booms.

Traditionally fiscal policy has received less attention than monetary policy in the macroeconomic literature and, with few exceptions, state fiscal policy has almost been neglected. Among others, Poterba and Rueben (1999) evaluate the effects of state-level revenue and expenditure limits on borrowing costs; Bahl and Martinez-Vazquez (1990) estimate the impact of inflation on the real expenditures of US state-local government; and Sørensen et al. (2001) investigate the cyclical properties of US state-local government finances.

State-local expenditures currently account for 15 percent of US GDP, while federal expenditures have reached more than 20 percent of GDP. Hence both federal and state budgets represent large shares of the US economy. Moreover, federal and state fiscal policy are intrinsically different because institutional and constitutional arrangements foresee a different discipline for their conduct.

In the remainder of this paper we distinguish among a large set of aggregate, federal and state-local fiscal indicators and perform a systematic evaluation of their information-content role on US output growth and inflation.

3 The data

In the following empirical analysis we use quarterly seasonally-adjusted data covering the period 1955:1-2007:4. We consider US macroeconomic variables, including (i) the real output, represented by GDP expressed in chained 2000 US dollars; (ii) the price level, represented by the GDP deflator; (iii) the interest rate, represented by the three-month federal funds rate (middle rate for each quarter); (iv) thirty-one fiscal indicators belonging to government current receipts and expenditures at the national, federal and state-local levels; (v) a set of price indices for government consumption expenditures and gross investment. Most series are extracted from the database of the Bureau of Economic Analysis (BEA). Federal funds rates are extracted from the database of the Federal Reserve Board of Governors. Table 1 reports full descriptions and sources of all the series.

<Insert Table 1 here>

As the detailed fiscal variables under investigation are provided in nominal terms, we deflate them using appropriate price indices. Then, we compute percentage changes in the form of annualized log-differences.[1] Only in the cases of government deficits or surpluses we use proper percentage changes, as they may be negative numbers. We also express the real output growth and the rate of inflation as annualized log-differences. For the sake of comparability, we also annualize the interest rate. We report details of all data transformations in Table 2.

<Insert Table 2 here>

In Table 3, we report the results of unit root tests performed on all the series constructed as explained above. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests reject the null hypothesis of a unit root for real output growth and the growth rates of all the fiscal variables. The level of the interest rate satisfies stationarity properties according to the PP test at a 5 percent significant level and also according to the ADF test at a 10 percent significance level. The rate of inflation is stationary only according to the PP test. In the remainder of the paper we rely on the stationarity of all the aforementioned series.

<Insert Table 3 here>

4 Granger non-causality tests

In this section, we investigate the information content of fluctuations of fiscal indicators for output growth and inflation by means of Granger non-causality tests. By definition of Granger causality itself (Granger, 1969; Sims, 1972), we are not looking for a proper causality relationship. Instead, we aim at detecting whether, in the fluctuations of some fiscal indicators, there is exploitable information that helps predict fluctuations in output

[1] Given a quarterly variable X_t, $\Delta x_t = 400 \times (\ln X_t - \ln X_{t-1})$.

and prices, beyond those already predictable on the basis of fluctuations in output and prices themselves and other promptly observable variables, such as the interest rate.

Our specifications for real output changes and inflation follow closely Friedman and Kuttner (1992). However, while they try a number of alternative financial variables and monetary aggregates as a proxy of the monetary policy instrument, we simply use the short-term interest rate. This choice depends on the fact that we are interested in the information content of fiscal indicators and not in the comparative performance of alternative financial variables.

The specification for real output changes Δy_t is given by the following equation:

$$\Delta y_t = \alpha + \sum_{j=1}^{4} \beta_j \Delta y_{t-j} + \sum_{j=1}^{4} \lambda_j \Delta p_{t-j} + \sum_{j=1}^{4} \delta_j i_{t-j} + \sum_{j=1}^{4} \gamma_j \Delta g_{t-j} + \nu_t \tag{1}$$

The terms Δy_t, Δp_t, i_t, Δg_t, ν_t represent output growth, inflation, the short term interest rate, the change in an alternative fiscal indicator and an error term respectively.

The inflation equation takes the following specification:

$$\Delta p_t = \alpha + \sum_{j=1}^{4} \beta_j \Delta p_{t-j} + \sum_{j=1}^{4} \lambda_j \Delta y_{t-j} + \sum_{j=1}^{4} \delta_j i_{t-j} + \sum_{j=1}^{4} \gamma_j \Delta g_{t-j} + \nu_t \tag{2}$$

where all variables are defined as in equation (1).[2]

<Insert Table 4 here>

In table 4, we report a set of specification tests. With the exception of two cases, the Breusch-Pagan-Godfrey test and the White test always reject the null hypothesis of homoskedastic errors. The Breusch-Godfrey Lagrange-multiplier test fails to reject the null of uncorrelated errors. Therefore, throughout the paper we choose to run all tests based on Wald-type χ-square statistics computed by taking White heteroskedasticity-consistent standard errors. Finally, the Ramsey RESET test does not unveil further mispecification issues.

<Insert Table 5 here>

[2]We also run the tests described below using first differences of the Federal funds rate but differences in the results are negligible.

We test for Granger non-causality of the fiscal indicators by imposing the null hypothesis that all the lags of each alternative indicator are jointly insignificant, i.e. H_O : $\gamma_i = 0, \forall i = 1, ..., 4$. In Table 5, we show that fluctuations in government indirect taxes (taxes on production and import) and in the government surplus/deficit have information content on both output growth and inflation. At a more disaggregated level, fluctuations in state-local indirect taxes and deficit contain useful information for output growth (at a 1 percent significance level); for inflation it is the federal analogues to be informative (at 1 percent and 5 percent significance levels, respectively). Moreover, contributions for government social insurance at the national and federal level and the non-defense component of federal expenditures help predict output growth. Finally, state-local total expenditures, and gross investment help predict inflation at a 10 percent significance level.

Some previous studies have explored state-local finances and we surveyed them in section 2. However, to our knowledge, there are no other contributions that find an information-content role for state-local expenditures on US inflation and state-local revenues or deficits on output growth.

We also report Granger causality tests run on the Federal funds rate. In all specifications, this is significant at a 1 percent level in the output growth equation and insignificant in the inflation equation.[3] However, adding more lags of the interest rate (results not reported) helps retrieve significance also in the inflation equation. Thus, in the cases in which we find an information-content role for the fiscal variable, the latter does not substitute but adds further information to that already contained in past values of the interest rate.

<Insert Table 6 here>

In Table 6, as a measure of comparative goodness of fit, we report the Akaike information criteria (AIC) of all the estimated specifications of equations (1) and (2) in ascending order. All the specifications in which we find information content in the fiscal

[3]In the inflation equation, using four lags, the Federal funds rate is insignificant also in the absence of any fiscal variables.

variable are among the ones with the lowest AIC (top ten items in Table 5). According to AIC, the specifications including indirect taxes are the ones with the best fit.

5 Stability tests

5.1 Stability of recursive p-values

To gain initial guidance about the stability of the Granger-causality relationships above, we plot the recursive p-values of the Wald tests on the joint insignificance of the lags of each alternative fiscal indicator.

The methodology consists in computing the p-values of the Wald tests above by recursively changing the sample in the estimation. The resulting plots, using the alternative fiscal indicators, are depicted in figures 3 and 4. From top to bottom we report stability of p-values at: (a) the national government level; (b) the federal government level; and (c) the state-local government level.

We obtain recursive p-values in three different ways:

1. by fixing the endpoint (end) of the sample and making the starting point shift quarter by quarter from an intermediate point in the sample up to the initial observation. The first p-value reported refers to the sample 1980:3-2007:4; the second p-value refers to the sample 1980:2-2007:4 and so on. The last considered sample is the full sample 1955:1-2007:4.

2. by fixing the starting point (str) of the sample and making the end point shift quarter by quarter from an intermediate point of the sample up to the last available observation. The first considered sample is 1955:1-1979:4. The second sample we consider is 1955:1-1980:1 and so on up to 1955:1-2007:4.

3. by rolling the sample (rol), i.e. by shifting the starting point and the endpoint of the sample quarter by quarter. Hence the initial sample is 1955:1-1979:4, the second sample is 1955:2-1980:1 and so on up to 1980:3-2007:4.

The straight horizontal line in each quadrant of figures 3 and 4 represents the 10 percent significance level. Thus, anything below the line represents rejection of the Granger non-causality null hypothesis.

<Insert Figure 3 here>

Figure 3 shows that, in the output growth equation, recursive p-values of indirect taxes are stable at the national level and less stable at the state-local level. For government surplus/deficit, we find that both at the national and the state-local level, they are statistically significant in most subsample though not in all of them. The p-values of the non-defense part of federal expenditures and contributions for government social insurance are not stable.

<Insert Figure 4 here>

Figure 4 shows that, apart from some subsamples for government deficit and state-local investment expenditures, the remaining recursive p-values of the fiscal components for which we find an information-content role for inflation are stable.

5.2 Formal stability tests

To formally evaluate the stability of coefficients in the Granger-style specifications, we run stability tests for one or more unknown structural breakpoints in the autoregressive coefficients of the fiscal variables.

We compute three different statistics: the Quandt likelihood ratio statistic in Wald form (sup-Wald) as in Andrews (1993); the Andrews and Ploberger (1994) exponential average Wald statistic (exp-Wald); and the Andrews and Ploberger (1994) average Wald statistic (mean-Wald). We apply a 15 percent symmetric sample trimming, which allows us to check whether a breakpoint has occurred in the interval 1963:1-1998:4.

<Insert Table 7 here>

Table 7 displays the results of the tests. They fail to reject the null hypothesis of parameter constancy in all cases.[4]

[4]The approximate asymptotic p-values are provided by Hansen (1997).

5.3 Out-of-sample properties

To evaluate the out-of-sample performances of the estimated equations, we use recursive least squares. For each equation specification, we compute all feasible cases, starting from the smallest possible sample size and adding one observation at a time. At each step, we save the one-step ahead forecast error to obtain a series of recursive residuals.[5]

<Insert Table 8 here>

We use each series of recursive residuals to compute the correspondent root mean squared errors (RMSE), which we report in Table 8 in ascending order. A relatively low RMSE can be interpreted as a further indicator of stability of the specification in question in comparative terms. The ordering obtained in Table 8 is virtually coincident to the ordering implied by AIC in Table 6. The specifications where fiscal variables have stable information content for output growth or inflation are also the ones with the best out-of-sample performances. Indirect taxes yield the lowest RMSE both in the output growth and in the inflation equation.

6 Concluding remarks

By running a number of straightforward statistical tests, we provide evidence that fluctuations in certain fiscal variables contain valuable information to predict fluctuations in output and prices. Our analysis also shows that the distinction between federal and state-local fiscal indicators provides useful insights.

First, we find that variations in state-local indirect taxes as well as state government surplus or deficit help predict output growth. Next, the federal counterparts of these indicators contain valuable information for inflation. Finally, state-local expenditures help predict US inflation.

[5] To obtain the recursive residuals we scale each one-step ahead forecast error by a term proportional to the forecast variance. Namely, let $x_t' b_{t-1}$ be the forecast, where x_t' is the row vector of observations on the regressors in period t and b_{t-1} is the estimated vector of coefficients obtained by using data up to period $t-1$. The forecast error is $y_t - x_t' b_{t-1}$, where y_t is the actual observation of the dependent variable, while the forecast variance is $\sigma^2 \left(1 + x_t' \left(X_t' X_t\right)^{-1} x_t\right)$. We compute the recursive residual r_t as $r_t = \frac{\left(y_t - x_t' b_{t-1}\right)}{\left(1 + x_t' \left(X_t' X_t\right)^{-1} x_t\right)^{1/2}}$.

A set of formal and informal stability tests confirm that these relationships are stable. The fiscal indicators in questions are also among the ones that yield the best in-sample and out-of-sample performances.

In sum, we provide new stylized facts for US macroeconomic conditions related to fiscal indicators. We believe that these new stylized facts can help identify possible fiscal and monetary policy transmission channels that can be explored in future empirical and theoretical research.

References

Andrews, D. (1993). Tests for parameter instability and structural change with unknown change point. *Econometrica*, 61(4):821–856.

Andrews, D. and Ploberger, W. (1994). Optimal tests when a nuisance parameter is present only under the alternative. *Econometrica*, 62:1383–1414.

Bahl, R. and Martinez-Vazquez, J. (1990). Inflation and the real growth of state and local government expenditures. *American Economic Review*, 80(2):166–70.

Caldara, D. and Kamps, C. (2008). What are the effects of fiscal shocks? A var-based comparative analysis. *ECB Working Paper Series*, 877.

Fatás, A. and Mihov, I. (2006). The macroeconomic effects of fiscal rules in the us states. *Journal of Public Economics*, 90(1-2):101 – 117.

Friedman, B. and Kuttner, K. (1992). Money, income, prices, and interest rates. *American Economic Review*, 82(3):472–492.

Granger, C. (1969). Investigating causal relations by econometric methods and cross-spectral methods. *Econometrica*, 34(4):424–438.

Hansen, B. (1997). Approximate Asymptotic P Values for Structural-Change Tests. *Journal of Business and Economic Statistics*, 15:60–67.

Poterba, J. (1996). Budget institutions and fiscal policy in the US states. *The American Economic Review*, pages 395–400.

Poterba, J. and Rueben, K. (1999). *Fiscal Rules and State Borrowing Costs: Evidence from California and Other States*. Public Policy Institute of CA.

Sims, C. (1972). Money, income and causality. *American Economic Review*, 62(4):540–552.

Sørensen, B., Wu, L., and Yosha, O. (2001). Output fluctuations and fiscal policy: Us state and local governments 1978–1994. *European Economic Review*, 45(7):1271–1310.

Sørensen, B. and Yosha, O. (2001). Is state fiscal policy asymmetric over the business cycle? *Economic Review - Federal Reserve Bank of Kansas City*, 86(3):43–64.

Stock, J. and Watson, M. (2003). Forecasting output and inflation: the role of asset prices. *Journal of Economic Literature*, 41:788–829.

Variables	Measurement unit	Type	Freq.	Sample	Source		
Gross domestic product	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	1.1.5
Real Gross Domestic Product	Billions of 2000 dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	1.1.6
Implicit GDP deflator	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	1.1.9
Three-month federal funds rate	Percentage	MR	Q.ly	1955:1-2007:4	Federal Reserve Board		
Government Current Receipts and Expenditures:							
Current tax receipts	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.1
Personal current taxes	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.1
Taxes on production and imports	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.1
Taxes on corporate income	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.1
Contributions for government social insurance	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.1
Total expenditures	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.1
Current expenditures	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.1
Gross government investment	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.1
Net lending or net borrowing (-)	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.1
Federal Government Current Receipts and Expenditures:							
Total receipts	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.2
Current tax receipts	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.2
Personal current taxes	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.2
Taxes on production and imports	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.2
Taxes on corporate income	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.2
Contributions for government social insurance	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.2
Total expenditures	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.2
Current expenditures	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.2
Gross government investment	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.2
Federal defense expenditures	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	1.1.5
Federal nondefense expenditures	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	1.1.5
Net lending or net borrowing (-)	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.2
State and Local Government Current Receipts and Expenditures:							
Total receipts	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.3
Current tax receipts	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.3
Personal current taxes	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.3
Taxes on production and imports	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.3
Taxes on corporate income	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.3
Current transfer receipts	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.3
Total expenditures	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.3
Current expenditures	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.3
Gross government investment	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.3
Net lending or net borrowing (-)	Billions of current dollars	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.3
Price Indices for Government Consumption Expenditures and Gross Investment:							
Government expenditures	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4
Government consumption expenditures	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4
Government gross investment	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4
Federal expenditures	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4
Federal consumption expenditures	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4
Federal gross investment	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4
National defense	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4
Federal nondefense expenditures	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4
State and local expenditures	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4
State and local consumption expenditures	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4
State and local gross investment	Index numbers 2000=100	SA	Q.ly	1955:1-2007:4	BEA	NIPA Table	3.9.4

SA = seasonally adjusted; MR = middle rate; Q.ly = quarterly; BEA = Bureau of Economic Analysis; NIPA = National Income and Product Accounts

Table 1: Data sources and description.

Keywords	Variables	Transformations
gdp	Real GDP growth rate	Annualized log-difference in real GDP
inf	Inflation rate	Annualized log-difference of the Implicit GDP deflator
int	Interest rate	Annualized three-month Federal funds rate
	Government Current Receipts and Expenditures:	
gov.cur.tax	Current tax receipts	Annualized log-difference (deflated using government expenditures price index)
gov.per.tax	Personal current taxes	Annualized log-difference (deflated using government expenditures price index)
gov.pro.tax	Taxes on production and imports	Annualized log-difference (deflated using government expenditures price index)
gov.cor.tax	Taxes on corporate income	Annualized log-difference (deflated using government expenditures price index)
gov.soc.con	Contributions for government social insurance	Annualized log-difference (deflated using government expenditures price index)
gov.tot.exp	Total expenditures	Annualized log-difference (deflated using government expenditures price index)
gov.cur.exp	Current expenditures	Annualized log-difference (deflated using government consumption expenditures price index)
gov.inv.exp	Gross government investment	Annualized log-difference (deflated using government gross investment expenditures price index)
gov.sur.def	Net lending or net borrowing (-)	Annualized growth rate (deflated using government expenditures price index)
	Federal Government Current Receipts and Expenditures:	
fed.tot.rec	Total receipts	Annualized log-difference (deflated using federal expenditures price index)
fed.cur.tax	Current tax receipts	Annualized log-difference (deflated using federal expenditures price index)
fed.per.tax	Personal current taxes	Annualized log-difference (deflated using federal expenditures price index)
fed.pro.tax	Taxes on production and imports	Annualized log-difference (deflated using federal expenditures price index)
fed.cor.tax	Taxes on corporate income	Annualized log-difference (deflated using federal expenditures price index)
fed.soc.con	Contributions for government social insurance	Annualized log-difference (deflated using federal expenditures price index)
fed.tot.exp	Total expenditures	Annualized log-difference (deflated using federal expenditures price index)
fed.cur.exp	Current expenditures	Annualized log-difference (deflated using federal consumption expenditures price index)
fed.inv.exp	Gross government investment	Annualized log-difference (deflated using federal gross investment expenditures price index)
fed.def.exp	Federal defense expenditures	Annualized log-difference (deflated using national defense expenditures price index)
fed.non.exp	Federal nondefense expenditures	Annualized log-difference (deflated using federal nondefense expenditures price index)
fed.sur.def	Net lending or net borrowing (-)	Annualized growth rate (deflated using federal expenditures price index)
	State and Local Government Current Receipts and Expenditures:	
stl.tot.rec	Total receipts	Annualized log-difference (deflated using state and local expenditures price index)
stl.cur.tax	Current tax receipts	Annualized log-difference (deflated using state and local expenditures price index)
stl.per.tax.	Personal current taxes	Annualized log-difference (deflated using state and local expenditures price index)
stl.pro.tax	Taxes on production and imports	Annualized log-difference (deflated using state and local expenditures price index)
stl.cor.tax	Taxes on corporate income	Annualized log-difference (deflated using state and local expenditures price index)
stl.cur.tra	Current transfer receipts	Annualized log-difference (deflated using state and local expenditures price index)
stl.tot.exp	Total expenditures	Annualized log-difference (deflated using state and local expenditures price index)
stl.cur.exp	Current expenditures	Annualized log-difference (deflated using state and local consumption expenditures price index)
stl.inv.exp.	Gross government investment	Annualized log-difference (deflated using state and local investment expenditures price index)
stl.sur.def	Net lending or net borrowing (-)	Annualized growth rate (deflated using state and local expenditures price index)

Table 2: Data transformations.

Variables	Augmented Dickey-Fuller test (ADF)		Phillips-Perron test (PP)	
	t-stats	*p-values*	*t-stats*	*p-values*
gdp	-10.9112	(0.0000)	-10.9812	(0.0000)
inf	-2.1274	(0.2342)	-4.190879	(0.0009)
int	-2.8568	(0.0523)	-3.132269	(0.0257)
gov.cur.tax	-8.5639	(0.0000)	-16.2127	(0.0000)
gov.per.tax	-18.3438	(0.0000)	-17.9302	(0.0000)
gov.pro.tax	-7.6636	(0.0000)	-12.4060	(0.0000)
gov.cor.tax	-13.5744	(0.0000)	-13.5755	(0.0000)
gov.soc.con	-2.8618	(0.0517)	-15.8516	(0.0000)
gov.tot.exp	-9.3278	(0.0000)	-16.7690	(0.0000)
gov.cur.exp	-17.7244	(0.0000)	-17.4116	(0.0000)
gov.inv.exp	-16.2586	(0.0000)	-16.2882	(0.0000)
gov.sur.def	-13.9264	(0.0000)	-13.9145	(0.0000)
fed.tot.rec	-8.5575	(0.0000)	-15.3287	(0.0000)
fed.cur.tax	-9.1224	(0.0000)	-17.2200	(0.0000)
fed.per.tax	-19.1650	(0.0000)	-18.6149	(0.0000)
fed.pro.tax	-12.9510	(0.0000)	-12.9510	(0.0000)
fed.cor.tax	-13.0793	(0.0000)	-13.0852	(0.0000)
fed.soc.con	-2.9523	(0.0413)	-15.6640	(0.0000)
fed.tot.exp	-19.2433	(0.0000)	-18.6956	(0.0000)
fed.cur.exp	-19.4290	(0.0000)	-18.9807	(0.0000)
fed.inv.exp	-17.7737	(0.0000)	-17.6694	(0.0000)
fed.def.exp	-3.9773	(0.0018)	-15.0505	(0.0000)
fed.non.exp	-20.5565	(0.0000)	-20.5565	(0.0000)
fed.sur.def	-14.4366	(0.0000)	-14.4776	(0.0000)
stl.tot.rec	-6.0987	(0.0000)	-16.2525	(0.0000)
stl.cur.tax	-7.7403	(0.0000)	-13.0661	(0.0000)
stl.per.tax.	-15.4744	(0.0000)	-15.4320	(0.0000)
stl.pro.tax	-4.5269	(0.0002)	-12.1120	(0.0000)
stl.cor.tax	-17.5813	(0.0000)	-17.6033	(0.0000)
stl.cur.tra	-6.8350	(0.0000)	-22.0017	(0.0000)
stl.tot.exp	-5.5520	(0.0000)	-14.0800	(0.0000)
stl.cur.exp	-4.2078	(0.0008)	-12.2308	(0.0000)
stl.inv.exp.	-14.5562	(0.0000)	-14.5566	(0.0000)
stl.sur.def	-13.5389	(0.0000)	-13.5801	(0.0000)

ADF and PP tests run with the inclusion of a constant; Lag length chosen using the Schwarz Information Criterion in ADF.

Table 3: Unit root tests.

Fiscal variables	Output growth equation								Inflation equation							
	Breuch-Pagan-Godfrey		White test		Breuch-Godfrey-LM		Ramsey RESET		Breuch-Pagan-Godfrey		White test		Breuch-Godfrey-LM		Ramsey RESET	
gov.cur.tax	30.0535	(0.0177)	27.7301	(0.0340)	3.0189	(0.2210)	0.4665	(0.4946)	47.5318	(0.0001)	51.9701	(0.0000)	2.1697	(0.3380)	0.0652	(0.7984)
gov.per.tax	28.3064	(0.0291)	28.7500	(0.0257)	2.9638	(0.2272)	0.4351	(0.5095)	48.3758	(0.0000)	55.8647	(0.0000)	2.2359	(0.3269)	0.1042	(0.7469)
gov.pro.tax	21.7666	(0.1509)	17.6906	(0.3423)	2.0222	(0.3638)	0.1537	(0.6950)	39.8267	(0.0008)	44.1568	(0.0002)	0.7144	(0.6996)	0.4329	(0.5105)
gov.cor.tax	28.3674	(0.0286)	25.8150	(0.0567)	2.9231	(0.2319)	0.4035	(0.5253)	46.9386	(0.0001)	45.4516	(0.0001)	2.6063	(0.2717)	0.5991	(0.4389)
gov.soc.con	36.9278	(0.0021)	36.8698	(0.0022)	2.8672	(0.2384)	0.5367	(0.4638)	45.7168	(0.0001)	41.5154	(0.0005)	1.8356	(0.3994)	0.3145	(0.5750)
gov.tot.exp	27.1995	(0.0393)	26.8702	(0.0429)	3.4646	(0.1769)	0.5543	(0.4566)	54.1273	(0.0000)	53.2898	(0.0000)	0.6445	(0.7245)	0.6068	(0.4360)
gov.cur.exp	30.2789	(0.0166)	31.4963	(0.0116)	1.2681	(0.5304)	1.3156	(0.2514)	52.9811	(0.0000)	53.3006	(0.0000)	0.2395	(0.8871)	0.5589	(0.4547)
gov.inv.exp	29.0233	(0.0238)	30.0920	(0.0175)	7.3572	(0.0253)	0.4978	(0.4805)	42.7754	(0.0003)	35.7204	(0.0032)	4.0705	(0.1306)	1.3200	(0.2506)
gov.sur.def	37.8796	(0.0016)	43.0142	(0.0003)	2.2070	(0.3317)	0.2243	(0.6358)	40.3884	(0.0007)	39.8234	(0.0008)	2.1146	(0.3474)	0.2097	(0.6470)
fed.tot.rec	29.9266	(0.0184)	24.7488	(0.0744)	3.4300	(0.1800)	0.5644	(0.4525)	50.8298	(0.0000)	49.3910	(0.0000)	4.4853	(0.1062)	0.2476	(0.6188)
fed.cur.tax	30.6764	(0.0148)	27.3490	(0.0378)	2.8090	(0.2455)	0.2230	(0.6367)	49.9212	(0.0000)	53.5791	(0.0000)	3.1599	(0.2060)	0.1294	(0.7191)
fed.per.tax	28.1606	(0.0303)	28.2717	(0.0293)	2.5759	(0.2758)	0.1576	(0.6914)	50.3500	(0.0000)	56.7215	(0.0000)	2.6886	(0.2607)	0.1248	(0.7239)
fed.pro.tax	19.4931	(0.2439)	18.0494	(0.3210)	3.0350	(0.2193)	0.9599	(0.3272)	48.2659	(0.0000)	42.9252	(0.0003)	1.5885	(0.4519)	0.4899	(0.4840)
fed.cor.tax	27.9604	(0.0320)	25.4442	(0.0624)	3.0681	(0.2157)	0.3613	(0.5478)	45.1146	(0.0001)	42.9545	(0.0003)	2.6855	(0.2611)	0.8573	(0.3545)
fed.soc.con	35.1224	(0.0038)	36.3413	(0.0026)	2.7468	(0.2532)	0.3382	(0.5608)	46.2750	(0.0001)	38.8735	(0.0011)	1.2927	(0.5240)	0.5943	(0.4408)
fed.tot.exp	25.7500	(0.0576)	27.2292	(0.0390)	2.6871	(0.2609)	0.7787	(0.3775)	50.3289	(0.0000)	51.8220	(0.0000)	0.2669	(0.8751)	1.2105	(0.2712)
fed.cur.exp	29.3493	(0.0217)	32.8053	(0.0078)	1.9718	(0.3731)	1.3402	(0.2470)	46.0234	(0.0001)	49.8820	(0.0000)	0.1092	(0.9469)	0.8037	(0.3700)
fed.inv.exp	31.5819	(0.0113)	30.5065	(0.0155)	1.1587	(0.5603)	0.3909	(0.5318)	52.7107	(0.0000)	44.5924	(0.0002)	5.4007	(0.0672)	1.2695	(0.2599)
fed.def.exp	29.4603	(0.0210)	30.6385	(0.0150)	2.4090	(0.2998)	0.5526	(0.4573)	54.3580	(0.0000)	45.8918	(0.0001)	0.5145	(0.7732)	0.5220	(0.4700)
fed.non.exp	28.9334	(0.0244)	38.3792	(0.0013)	2.0776	(0.3539)	1.1684	(0.2797)	44.6951	(0.0002)	44.9907	(0.0001)	3.2753	(0.1944)	0.2615	(0.6091)
fed.sur.def	24.6926	(0.0754)	26.2359	(0.0508)	2.4907	(0.2878)	0.3106	(0.5773)	40.8779	(0.0006)	35.1980	(0.0037)	2.0516	(0.3585)	0.8923	(0.3449)
stl.tot.rec	30.2291	(0.0169)	23.8421	(0.0930)	2.2923	(0.3179)	0.0500	(0.8230)	44.2123	(0.0002)	46.0552	(0.0001)	3.8550	(0.1455)	0.0281	(0.8668)
stl.cur.tax	27.9141	(0.0324)	26.8247	(0.0435)	4.0794	(0.1301)	0.7210	(0.3958)	47.0357	(0.0001)	48.9691	(0.0000)	1.6514	(0.4379)	0.1654	(0.6842)
stl.per.tax.	27.8255	(0.0332)	26.8129	(0.0436)	3.5965	(0.1656)	0.9835	(0.3213)	46.2838	(0.0001)	43.3272	(0.0002)	2.1096	(0.3483)	0.1420	(0.7063)
stl.pro.tax	32.2064	(0.0094)	27.1750	(0.0396)	5.8823	(0.0528)	0.2622	(0.6086)	43.2851	(0.0003)	41.5307	(0.0005)	0.4488	(0.7990)	0.2475	(0.6188)
stl.cor.tax	34.3212	(0.0049)	30.3233	(0.0164)	3.0819	(0.2142)	0.0673	(0.7954)	48.1193	(0.0000)	49.6300	(0.0000)	2.0602	(0.3570)	0.1668	(0.6829)
stl.cur.tra	28.8225	(0.0252)	26.3949	(0.0487)	3.1574	(0.2062)	0.2996	(0.5841)	45.2999	(0.0001)	45.5043	(0.0001)	5.7273	(0.0571)	0.0883	(0.7663)
stl.tot.exp	30.6818	(0.0148)	30.1497	(0.0172)	3.3484	(0.1875)	1.0278	(0.3107)	38.7131	(0.0012)	37.4528	(0.0018)	2.7220	(0.2564)	0.5453	(0.4602)
stl.cur.exp	33.3712	(0.0066)	33.8621	(0.0057)	1.2353	(0.5392)	0.0802	(0.7771)	50.7820	(0.0000)	51.5933	(0.0000)	3.6920	(0.1579)	0.1310	(0.7174)
stl.inv.exp.	23.2621	(0.1069)	28.6264	(0.0266)	3.4686	(0.1765)	0.0756	(0.7833)	35.7884	(0.0031)	41.0812	(0.0005)	3.3281	(0.1894)	0.2161	(0.6420)
stl.sur.def	29.9090	(0.0185)	23.9147	(0.0914)	1.4805	(0.4770)	0.1695	(0.6806)	46.1062	(0.0001)	41.1203	(0.0005)	4.4023	(0.1107)	1.0180	(0.3130)

p-values in parenthesis

Table 4: Specification tests.

Fiscal variables	Output growth equation				Inflation equation			
	Fiscal variables		Federal funds rate		Fiscal variables		Federal funds rate	
	c-square	p-values	c-square	p-values	c-square	p-values	c-square	p-values
gov.cur.tax	3.5462	(0.4709)	19.0550	(0.0008)	2.1616	(0.7061)	1.4633	(0.8331)
gov.per.tax	3.0623	(0.5475)	18.4839	(0.0010)	2.0391	(0.7286)	1.4795	(0.8303)
gov.pro.tax	14.9401	(0.0048)	23.0491	(0.0001)	20.5659	(0.0004)	1.7041	(0.7900)
gov.cor.tax	1.8696	(0.7597)	17.5770	(0.0015)	5.5539	(0.2350)	1.7759	(0.7769)
gov.soc.con	10.4189	(0.0339)	15.3063	(0.0041)	2.1430	(0.7095)	1.3928	(0.8454)
gov.tot.exp	0.1661	(0.9967)	15.5148	(0.0037)	1.9437	(0.7461)	0.9218	(0.9214)
gov.cur.exp	3.8270	(0.4299)	18.5037	(0.0010)	4.3615	(0.3593)	1.3653	(0.8502)
gov.inv.exp	6.7417	(0.1502)	19.1063	(0.0007)	6.1831	(0.1859)	1.4585	(0.8340)
gov.sur.def	11.6294	(0.0203)	19.4145	(0.0007)	29.7478	(0.0000)	1.3872	(0.8464)
fed.tot.rec	2.7049	(0.6084)	15.7454	(0.0034)	1.9299	(0.7486)	1.3772	(0.8481)
fed.cur.tax	2.3115	(0.6787)	17.8673	(0.0013)	1.7567	(0.7804)	1.3025	(0.8609)
fed.per.tax	3.0183	(0.5548)	18.1214	(0.0012)	0.8239	(0.9352)	1.4074	(0.8429)
fed.pro.tax	6.1482	(0.1883)	20.1472	(0.0005)	17.4563	(0.0016)	1.4264	(0.8396)
fed.cor.tax	2.2163	(0.6960)	18.1791	(0.0011)	5.5229	(0.2377)	1.7569	(0.7804)
fed.soc.con	11.9526	(0.0177)	14.0641	(0.0071)	3.2944	(0.5098)	1.5173	(0.8236)
fed.tot.exp	0.6503	(0.9573)	15.7254	(0.0034)	4.4439	(0.3493)	1.3198	(0.8580)
fed.cur.exp	2.7462	(0.6011)	17.5932	(0.0015)	5.0941	(0.2778)	1.4917	(0.8281)
fed.inv.exp	2.1053	(0.7164)	18.0301	(0.0012)	7.3973	(0.1163)	1.4480	(0.8358)
fed.def.exp	2.8284	(0.5869)	16.6178	(0.0023)	4.4005	(0.3545)	1.3658	(0.8501)
fed.non.exp	8.3429	(0.0798)	15.2296	(0.0042)	0.8795	(0.9275)	1.4301	(0.8390)
fed.sur.def	2.4737	(0.6494)	15.8904	(0.0032)	10.0731	(0.0392)	1.6371	(0.8021)
stl.tot.rec	7.6172	(0.1066)	14.2508	(0.0065)	7.2555	(0.1230)	1.6687	(0.7964)
stl.cur.tax	6.7594	(0.1492)	16.6685	(0.0022)	5.8524	(0.2104)	1.4378	(0.8376)
stl.per.tax.	4.8029	(0.3081)	16.8764	(0.0020)	6.4619	(0.1672)	1.5752	(0.8133)
stl.pro.tax	17.6625	(0.0014)	15.8133	(0.0033)	7.1507	(0.1281)	1.2723	(0.8661)
stl.cor.tax	5.3520	(0.2530)	17.0132	(0.0019)	3.2190	(0.5219)	1.4893	(0.8285)
stl.cur.tra	0.5540	(0.9680)	16.0980	(0.0029)	4.2655	(0.3713)	1.6877	(0.7930)
stl.tot.exp	1.8923	(0.7556)	17.3636	(0.0016)	7.8744	(0.0963)	1.6760	(0.7951)
stl.cur.exp	1.2100	(0.8765)	17.3008	(0.0017)	1.3549	(0.8520)	1.4468	(0.8360)
stl.inv.exp.	7.3464	(0.1187)	16.8990	(0.0020)	8.8755	(0.0643)	1.7774	(0.7766)
stl.sur.def	29.7698	(0.0000)	16.3544	(0.0026)	7.6090	(0.1070)	1.2648	(0.8673)

Table 5: Granger non-causality tests.

Output growth equation				Inflation equation			
AIC	Fiscal variable	AIC	Fiscal variable	AIC	Fiscal variable	AIC	Fiscal variable
5.2164	gov.pro.tax	5.2732	stl.cor.tax	3.1024	gov.pro.tax	3.1529	gov.cor.tax
5.2260	stl.pro.tax	5.2772	gov.cur.tax	3.1126	fed.pro.tax	3.1541	stl.sur.def
5.2266	fed.non.exp	5.2786	fed.def.exp	3.1129	gov.sur.def	3.1546	stl.tot.rec
5.2370	fed.soc.con	5.2793	fed.inv.exp	3.1315	fed.sur.def	3.1556	fed.soc.con
5.2420	gov.soc.con	5.2811	fed.sur.def	3.1319	stl.pro.tax	3.1588	stl.cur.tra
5.2424	stl.sur.def	5.2814	stl.tot.exp	3.1339	fed.cur.exp	3.1629	gov.tot.exp
5.2480	gov.sur.def	5.2816	fed.cur.tax	3.1343	fed.inv.exp	3.1634	gov.soc.con
5.2525	stl.inv.exp.	5.2824	fed.per.tax	3.1363	stl.inv.exp.	3.1646	stl.cor.tax
5.2558	stl.tot.rec	5.2827	gov.per.tax	3.1381	stl.tot.exp	3.1663	gov.per.tax
5.2583	fed.pro.tax	5.2832	fed.cor.tax	3.1382	fed.tot.exp	3.1669	gov.cur.tax
5.2605	stl.cur.tax	5.2851	gov.cor.tax	3.1412	gov.cur.exp	3.1677	fed.tot.rec
5.2626	gov.inv.exp	5.2862	stl.cur.exp	3.1425	stl.cur.tax	3.1699	fed.cur.tax
5.2659	gov.cur.exp	5.2873	fed.tot.exp	3.1429	gov.inv.exp	3.1724	stl.cur.exp
5.2715	stl.per.tax.	5.2878	stl.cur.tra	3.1447	stl.per.tax.	3.1725	fed.non.exp
5.2716	fed.cur.exp	5.2904	gov.tot.exp	3.1500	fed.cor.tax	3.1727	fed.per.tax
5.2723	fed.tot.rec			3.1514	fed.def.exp		

Table 6: Akaike information criteria (AIC).

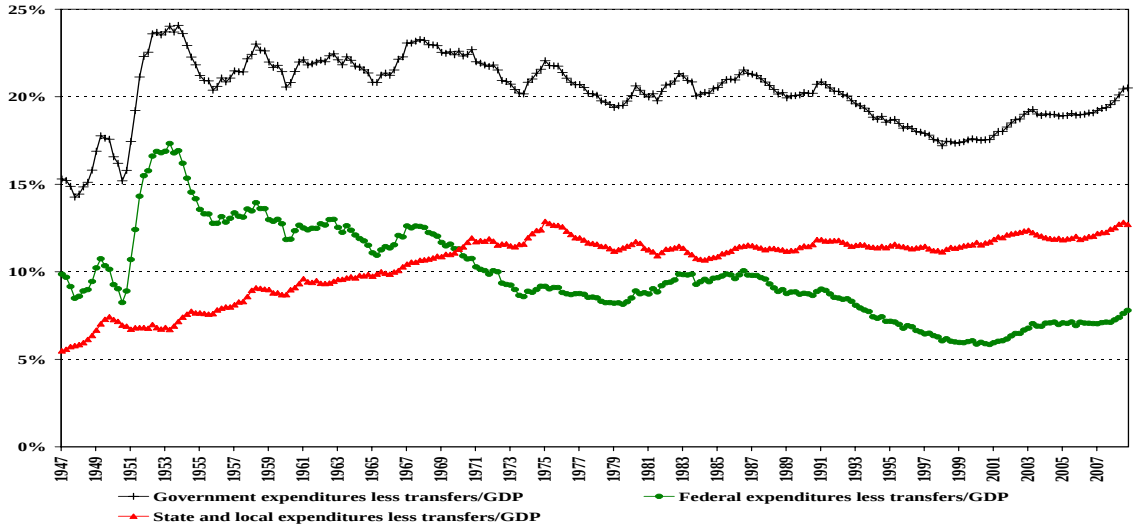
Fiscal variables	Output growth equation						Inflation equation					
	sup-Wald	p-values	exp-Wald	p-values	mean-Wald	p-values	sup-Wald	p-values	exp-Wald	p-values	mean-Wald	p-values
gov.cur.tax	3.4857	(0.9949)	0.8313	(0.9893)	1.6046	(0.9743)	2.0068	(1.0000)	0.4355	(1.0000)	0.8182	(1.0000)
gov.per.tax	6.2488	(0.8163)	0.7653	(0.9959)	1.1998	(0.9998)	2.1585	(1.0000)	0.4797	(1.0000)	0.9192	(1.0000)
gov.pro.tax	3.6859	(0.9913)	0.6293	(1.0000)	1.1685	(1.0000)	2.1380	(1.0000)	0.3874	(1.0000)	0.7272	(1.0000)
gov.cor.tax	3.9246	(0.9854)	1.1305	(0.9264)	2.0496	(0.8976)	3.9605	(0.9844)	0.9977	(0.9602)	1.6846	(0.9638)
gov.soc.con	2.9049	(0.9995)	0.4370	(1.0000)	0.8135	(1.0000)	3.2725	(0.9974)	0.9894	(0.9621)	1.7891	(0.9477)
gov.tot.exp	4.6004	(0.9571)	1.1852	(0.9103)	1.9160	(0.9249)	9.2532	(0.4563)	1.8696	(0.6615)	1.3541	(0.9956)
gov.cur.exp	6.7665	(0.7569)	1.4605	(0.8167)	2.0970	(0.8872)	6.7172	(0.7627)	1.2083	(0.9032)	1.2773	(0.9985)
gov.inv.exp	3.2391	(0.9977)	0.6918	(0.9995)	1.2691	(0.9987)	1.7932	(1.0000)	0.5309	(1.0000)	1.0441	(1.0000)
gov.sur.def	3.2011	(0.9980)	0.8185	(0.9908)	1.5689	(0.9784)	1.8732	(1.0000)	0.5818	(1.0000)	1.1377	(1.0000)
fed.tot.rec	2.9396	(0.9994)	0.8770	(0.9830)	1.6759	(0.9650)	1.8589	(1.0000)	0.4965	(1.0000)	0.9580	(1.0000)
fed.cur.tax	3.8175	(0.9883)	0.9805	(0.9640)	1.8820	(0.9313)	1.9801	(1.0000)	0.4813	(1.0000)	0.9186	(1.0000)
fed.per.tax	6.7575	(0.7579)	0.8831	(0.9821)	1.3377	(0.9964)	2.3799	(1.0000)	0.5696	(1.0000)	1.0754	(1.0000)
fed.pro.tax	3.2919	(0.9972)	0.9468	(0.9709)	1.7714	(0.9506)	2.9089	(0.9995)	0.5796	(1.0000)	1.0213	(1.0000)
fed.cor.tax	4.9948	(0.9321)	1.4144	(0.8335)	2.5471	(0.7764)	4.2364	(0.9746)	1.0575	(0.9460)	1.7772	(0.9497)
fed.soc.con	1.7895	(1.0000)	0.3882	(1.0000)	0.7444	(1.0000)	4.4583	(0.9645)	1.1141	(0.9310)	1.8468	(0.9377)
fed.tot.exp	5.4252	(0.8980)	1.3873	(0.8431)	2.1949	(0.8648)	5.9551	(0.8476)	1.0870	(0.9384)	1.3764	(0.9945)
fed.cur.exp	4.4282	(0.9660)	1.0324	(0.9522)	1.7572	(0.9529)	6.6859	(0.7664)	1.2330	(0.8954)	1.2821	(0.9984)
fed.inv.exp	4.3572	(0.9693)	0.8000	(0.9928)	1.4212	(0.9917)	2.5260	(1.0000)	0.5754	(1.0000)	1.0984	(1.0000)
fed.def.exp	1.3084	(1.0000)	0.3354	(1.0000)	0.6496	(1.0000)	2.6108	(1.0000)	0.6329	(1.0000)	1.1891	(0.9999)
fed.non.exp	5.7323	(0.8698)	1.3001	(0.8734)	2.0469	(0.8982)	5.3024	(0.9084)	1.5980	(0.7652)	2.6954	(0.7371)
fed.sur.def	5.2423	(0.9133)	1.6000	(0.7644)	3.0506	(0.6424)	3.9108	(0.9858)	1.5412	(0.7867)	2.9150	(0.6784)
stl.tot.rec	7.3565	(0.6850)	1.8982	(0.6507)	2.4108	(0.8117)	2.8370	(0.9997)	0.6660	(0.9999)	1.1650	(1.0000)
stl.cur.tax	11.3773	(0.2562)	2.8785	(0.3364)	3.0954	(0.6306)	2.4432	(1.0000)	0.6453	(1.0000)	1.2460	(0.9992)
stl.per.tax.	1.1555	(1.0000)	0.2440	(1.0000)	0.4732	(1.0000)	1.4235	(1.0000)	0.4413	(1.0000)	0.8608	(1.0000)
stl.pro.tax	3.7543	(0.9898)	0.7135	(0.9989)	1.3026	(0.9978)	1.2685	(1.0000)	0.2859	(1.0000)	0.5498	(1.0000)
stl.cor.tax	3.5535	(0.9938)	0.6951	(0.9995)	1.2068	(0.9998)	2.1726	(1.0000)	0.5280	(1.0000)	0.9489	(1.0000)
stl.cur.tra	4.0669	(0.9809)	1.1044	(0.9337)	2.1496	(0.8753)	2.5392	(1.0000)	0.6009	(1.0000)	1.1094	(1.0000)
stl.tot.exp	3.2288	(0.9978)	0.6450	(1.0000)	1.1940	(0.9999)	4.3080	(0.9715)	0.8107	(0.9917)	1.3322	(0.9966)
stl.cur.exp	2.1365	(1.0000)	0.4470	(1.0000)	0.8506	(1.0000)	1.1580	(1.0000)	0.3278	(1.0000)	0.6441	(1.0000)
stl.inv.exp.	2.9690	(0.9993)	0.4454	(1.0000)	0.7940	(1.0000)	3.2065	(0.9980)	0.9298	(0.9741)	1.6834	(0.9640)
stl.sur.def	4.4729	(0.9638)	1.1119	(0.9316)	1.8026	(0.9454)	3.4985	(0.9947)	0.7313	(0.9981)	1.3772	(0.9944)

15 percent symmetric trimming; Test sample: 1963:1-1998:4; Null hypothesis: no structural breaks in the fiscal variables; Hansen (1997) asymptotic p-values.

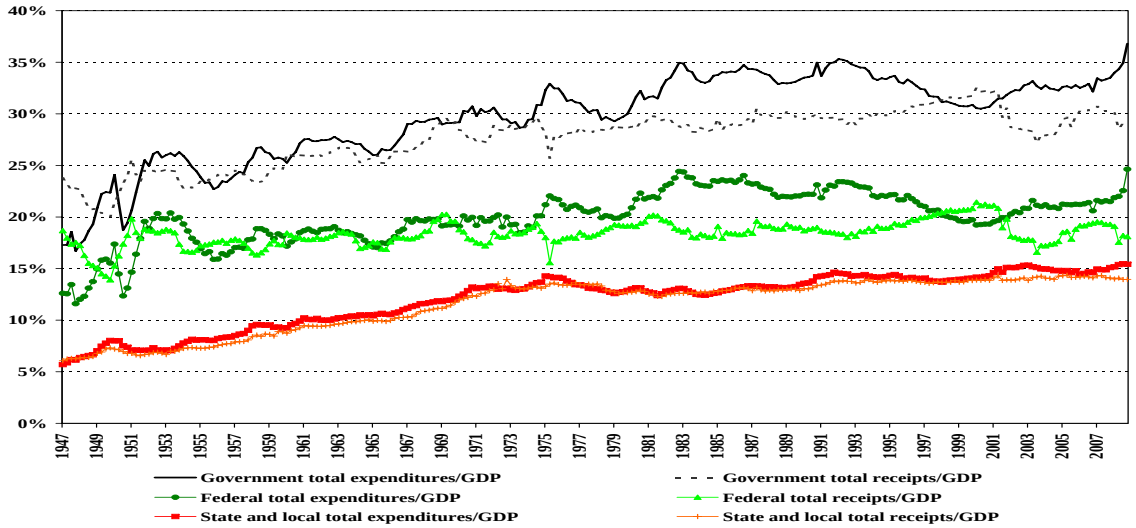
Table 7: Tests for structural breaks.

Output growth equation				Inflation equation			
RMSE	Fiscal variable	RMSE	Fiscal variable	RMSE	Fiscal variable	RMSE	Fiscal variable
3.1586	gov.pro.tax	3.2498	stl.cor.tax	1.0977	gov.pro.tax	1.1257	gov.cor.tax
3.1740	stl.pro.tax	3.2563	gov.cur.tax	1.1032	fed.pro.tax	1.1264	stl.sur.def
3.1748	fed.non.exp	3.2585	fed.def.exp	1.1034	gov.sur.def	1.1266	stl.tot.rec
3.1913	fed.soc.con	3.2597	fed.inv.exp	1.1137	fed.sur.def	1.1272	fed.soc.con
3.1994	gov.soc.con	3.2625	fed.sur.def	1.1139	stl.pro.tax	1.1290	stl.cur.tra
3.2000	stl.sur.def	3.2631	stl.tot.exp	1.1150	fed.cur.exp	1.1314	gov.tot.exp
3.2090	gov.sur.def	3.2634	fed.cur.tax	1.1153	fed.inv.exp	1.1317	gov.soc.con
3.2163	stl.inv.exp.	3.2646	fed.per.tax	1.1164	stl.inv.exp.	1.1323	stl.cor.tax
3.2216	stl.tot.rec	3.2653	gov.per.tax	1.1174	stl.tot.exp	1.1333	gov.per.tax
3.2255	fed.pro.tax	3.2659	fed.cor.tax	1.1175	fed.tot.exp	1.1336	gov.cur.tax
3.2291	stl.cur.tax	3.2691	gov.cor.tax	1.1191	gov.cur.exp	1.1341	fed.tot.rec
3.2325	gov.inv.exp	3.2709	stl.cur.exp	1.1199	stl.cur.tax	1.1353	fed.cur.tax
3.2378	gov.cur.exp	3.2727	fed.tot.exp	1.1201	gov.inv.exp	1.1367	stl.cur.exp
3.2470	stl.per.tax.	3.2735	stl.cur.tra	1.1211	stl.per.tax.	1.1368	fed.non.exp
3.2471	fed.cur.exp	3.2778	gov.tot.exp	1.1241	fed.cor.tax	1.1369	fed.per.tax
3.2483	fed.tot.rec			1.1249	fed.def.exp		

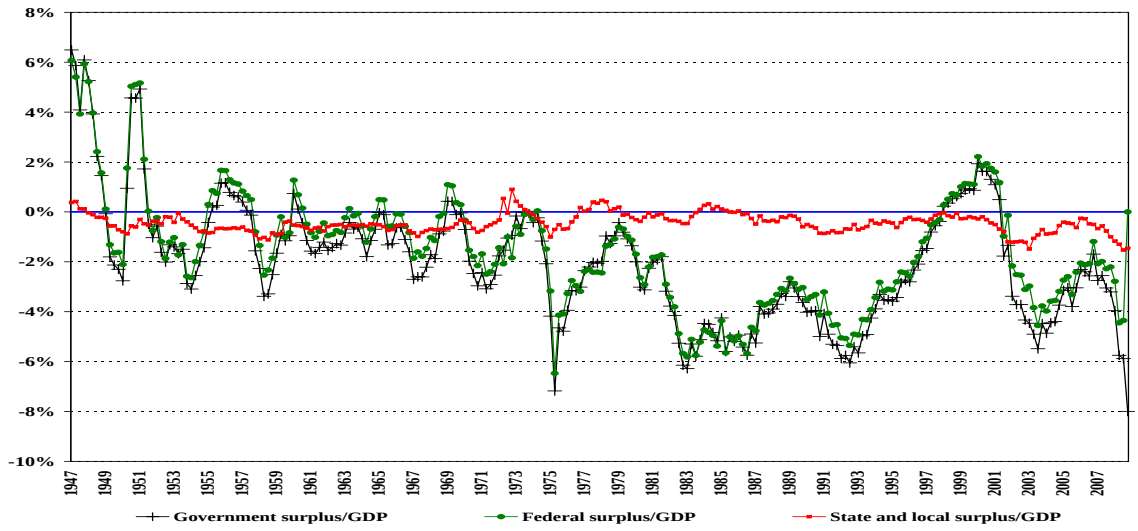
Table 8: Root mean squared errors of recursive residuals (RMSE).



(a) Government expenditures less transfers.



(b) Government total expenditures and receipts.



(c) Government surpluses or deficits.

Figure 1: US government expenditures and receipts as fractions of GDP (Source: our computations using BEA data).

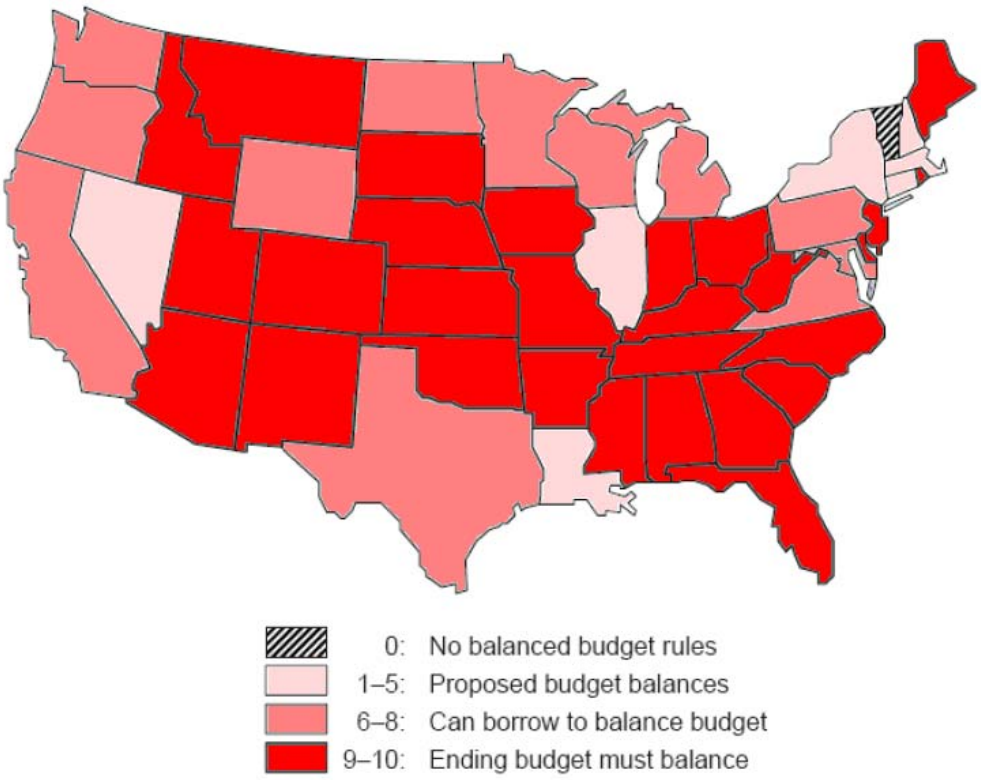
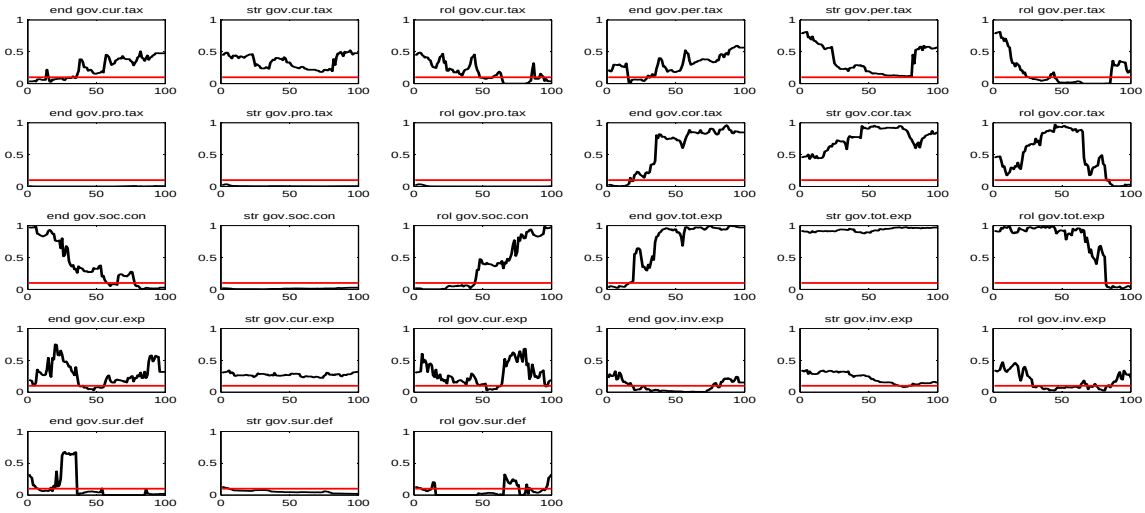
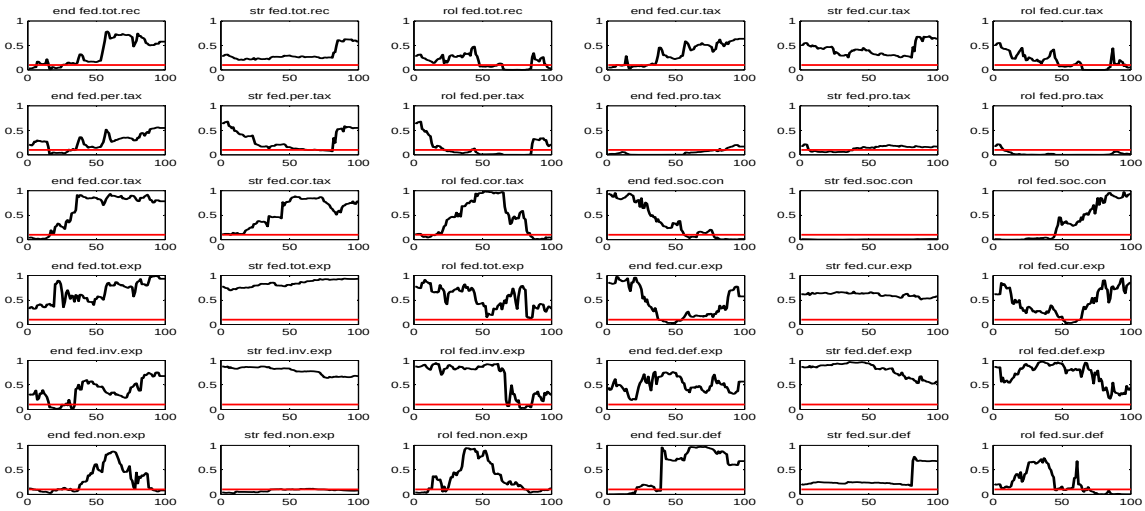


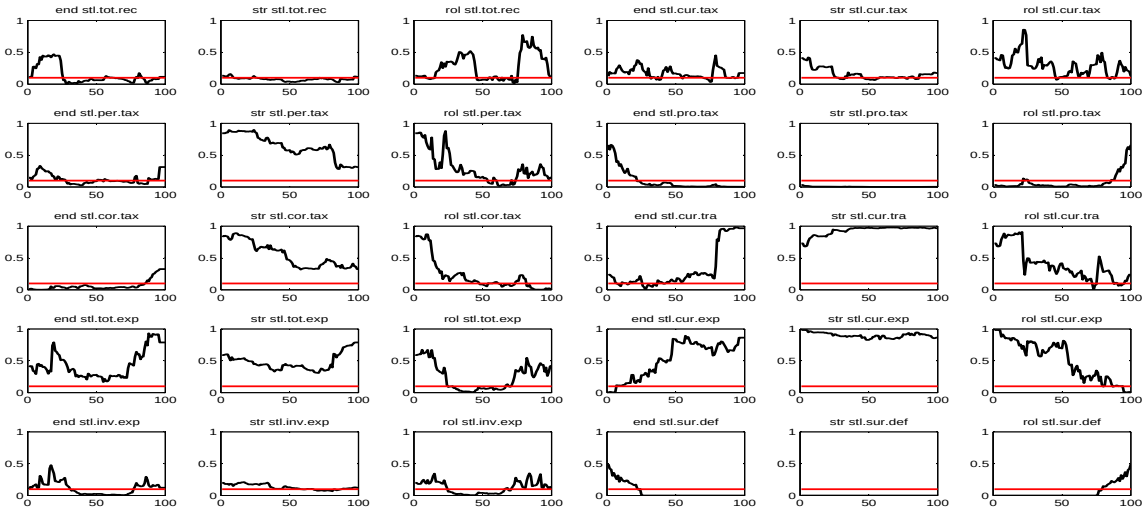
Figure 2: Balanced budget requirements in the US (Source: AICR, 1987).



(a) Government current receipts and expenditures.

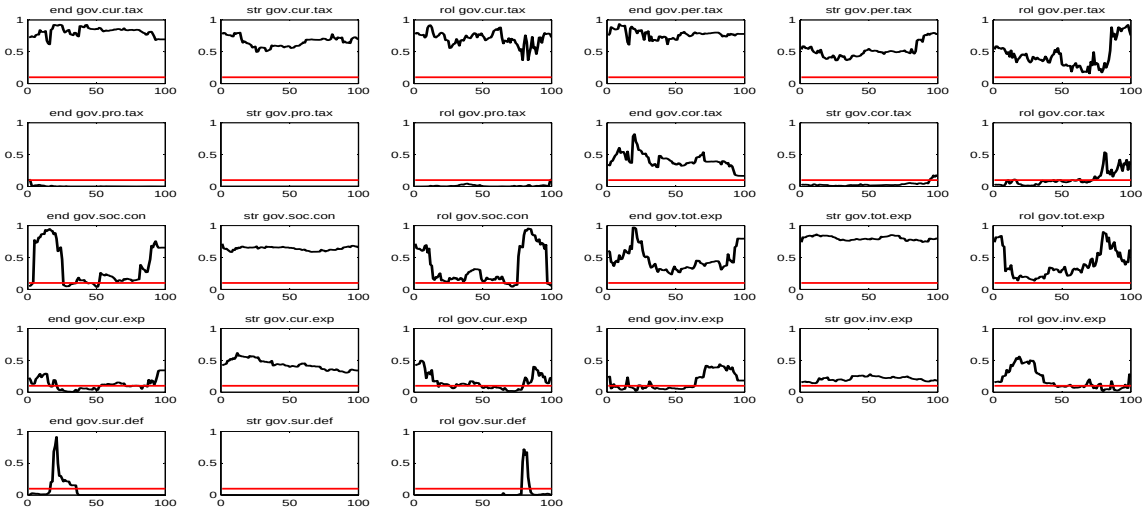


(b) Federal government current receipts and expenditures.

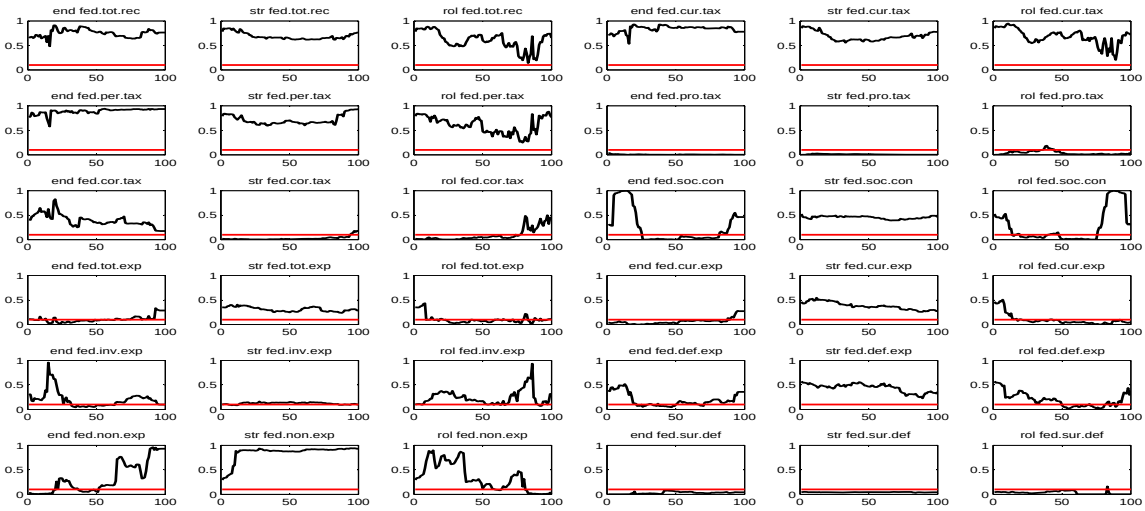


(c) state-local government current receipts and expenditures.

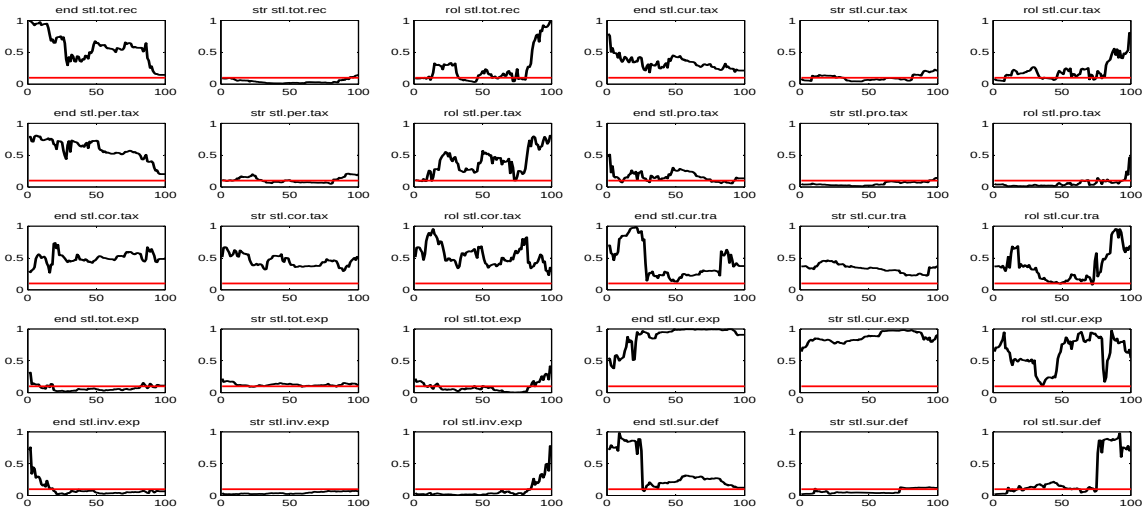
Figure 3: Recursive p-values of Granger non-causality tests on fiscal indicators in the output growth equation.



(a) Government current receipts and expenditures.



(b) Federal government current receipts and expenditures.



(c) state-local government current receipts and expenditures.

Figure 4: Recursive p-values of Granger non-causality tests on fiscal indicators in the inflation equation.