

STATE FISCAL ADJUSTMENT AND TAX REFORM: A DYNAMIC SCORING ANALYSIS

John Merrifield and Barry Poulson

1. INTRODUCTION

The fiscal stress experienced in the states during the Great Recession was unprecedented. A clear divergence emerged as some states responded to fiscal stress with reduced spending and tax cuts to promote economic growth (WSJ, 2013). Despite the substantial literature on fiscal adjustment and tax reform at the national level, economists have just started to measure the impact of large changes in state fiscal policy in response to recessions. This is the first study to use dynamic scoring simulation to analyze comprehensive fiscal adjustment at the state level encompassing both fiscal rules and tax reform. The impact of fiscal adjustment is evaluated with respect to economic growth and also budget stabilization over the business cycle.

This analysis finds that fiscal adjustment based on spending constraints can reduce revenue shortfalls and fiscal stress in periods of recession. To the extent that fiscal adjustment with tax reform generates higher economic growth, states are better positioned to respond to fiscal stress during recessions. Thus fiscal adjustment with tax reform can promote budget stability as well as economic growth.

2. FISCAL ADJUSTMENT

2.1. Fiscal Adjustment at the National Level

All of the OECD countries incurred deficits and accumulated debt during the Great Recession, but there has been a clear divergence in fiscal policies pursued in response to this fiscal stress, which has renewed debate over Keynesian stimulus policies versus fiscal

adjustment and fiscal rules (for a review of the recent literature on fiscal rules and fiscal consolidation see Alesina et. al. 2014; Alesina and Ardagna, 2010, 2012; and Guajardo, 2014). The debate is especially intense in Europe because of the considerable variation in the fiscal consolidation adjustments each country has made to fulfill new fiscal rules (Gobbin and Van Aarle 2001, Von Hagen and Strauch 2001, Bird and Mandilaras 2013, Agenor and Yilmaz 2011). On the one side of this debate are those opposed to fiscal rules constraining fiscal policy on the grounds that this limits the ability of governments to pursue countercyclical fiscal policy. Opponents argue that some fiscal rules, such as balanced budget requirements, are pro-cyclical, increasing the amplitude of business cycles. Others argue that these negative effects are offset by positive benefits. Most important from that perspective are fiscal rules that prevent unconstrained growth in government spending accompanied by increasing deficits and unsustainable debt. Proponents argue that unconstrained growth in government spending can be a source of macroeconomic instability. There is an extensive literature on the macroeconomic effects of fiscal policy constraints, much of it focused on the overspending bias in discretionary fiscal policy Fatas and Mihov (2006); (for a survey of the literature on fiscal rules and fiscal consolidation adjustments in OECD countries see Merrifield and Poulson 2014a and 2014b).

2.2 Fiscal Adjustment at the State Level

The origin of state level fiscal stress can be traced to rapid growth in state spending. State spending's share of GDP rose from 4% in the 1950s to 10% in the 1990s (Holcombe and Sobel, 1997, Merrifield, 2000). The growth in state spending just before the Great Recession was unprecedented. 37 states had FY 2005-08 general fund expenditure growth in excess of personal income growth.¹ Across all fifty states, annual general fund expenditure growth averaged five percent more than personal income growth. In some states general fund expenditure grew at double digit rates during these years.

Many states had Great Recession revenue shortfalls and budget deficits (Chapman, 2009; Eaton, 2009; Kalika, 2009; Vock et al, 2009).² Some states responded to this fiscal stress with tax hikes that often became permanent, ratcheting up state revenue and spending over the business cycle. The response to fiscal stress also involved off-budget spending, and spending substitutes such as regulation and unfunded mandates on local governments (Bennet and Dilorenzo, 1987; Merrifield, 1994). Federal fiscal stimulus played a major role in ratcheting up state spending during the Great Recession. When the federal stimulus money ended, states financed the higher level of spending through higher taxes and/or borrowing.

What distinguishes state-level from national fiscal adjustment is the ubiquitous role for fiscal rules governing fiscal policy. At the U.S. national level, fiscal rules that might constrain fiscal policy have been eroded or are nonexistent (Merrifield and Poulson 2014a). The 16th Amendment removed constitutional constraints on the ability of the federal government to impose income taxes. There are no constitutional constraints on the ability of the federal government to incur deficits and accumulate debt. Statutory provisions such as the requirement for federal approval to increase the debt ceiling have been pro forma exercises. Budget rules such as sequestration have imposed temporary constraints on spending but have had little impact on the long run growth in federal spending which has increased to 25% of GDP and is projected to increase to 36% of GDP over the next few decades (Congressional Budget Office, 2012).

Every state has constitutional and/or statutory provisions requiring a balanced budget and limiting debt (Merrifield and Poulson, 2013). Thirty-two states have tax and expenditure limits (TEL) to constrain the growth in revenue and/or spending. Forty-seven states have budget stabilization and emergency funds to stabilize spending during periods of recession and during emergencies. A variety of other fiscal rules may constrain fiscal policy at the state level, including line item veto and supermajority vote requirements to raise taxes or issue debt.

There is an extensive literature on these fiscal rules at the state level focusing primarily on the impact individual rules have on state revenue and spending (Merrifield and Poulson 2013). Fiscal rules can play an important role in fiscal adjustment in the states. However, when they are non-binding or non-existent, this has led to fiscal stress in economic downturns, and typically some tax increases which ratchets up spending over the business cycle (Poterba 1994, Wagner and Elder 2005, Chapman 2009, Eaton 2009, Kaleton 2009, Vock et. al. 2009).

Most studies focus on the impact of individual fiscal rules on state revenue and spending (Merrifield and Poulson 2013). But how they work together is another useful perspective. For example, tax and expenditure limits may be linked to budget stabilization or emergency funds. The absence of one fiscal rule may diminish the impact of other fiscal rules as a constraint on revenue and spending. Colorado's TABOR Amendment, for example, is often cited as the most stringent state tax and expenditure limit (New 2001 and 2003, Poulson 2004, Poulson and Kaplan 1994). However, TABOR is not linked to a budget stabilization fund. Because TABOR ratcheted down revenue and spending during periods of recession, and because it is not linked to a budget stabilization fund, TABOR increased fiscal stress in periods of recession. That in turn undermined support for TABOR and led to changes that weakened the constraints it imposed on revenue and spending. The experience with TABOR in Colorado also reveals linkages between tax and expenditure limits and tax reform. After TABOR was triggered in the late 1990s, the state rebated \$3.25 billion in surplus revenue to taxpayers. The large rebates signaled that permanent tax cuts were in order. Colorado reduced the state income tax, sales tax, business personal property tax and a variety of other taxes. The outcome for state revenue and spending reflected the fact that TABOR set the stage for tax reform (Poulson 2004, 2009a, 2009b).

California's now emasculated GANN Amendment was like the TABOR Amendment (New 2001 and 2003, Poulson 2004, Vock et al. 2009) until the late 1980s when California

exempted major portions of the state budget from it. Thereafter, state spending rose much more rapidly than state income. California responded to revenues shortfalls during recent recessions, especially the Great Recession, with higher taxes and debt. California also created a budget stabilization fund.

State fiscal adjustment will clearly be influenced by the unique experience with fiscal rules in each state; state fiscal adjustment reflects the impact of both the fiscal rules and the fiscal policies pursued within the framework of those rules in individual states. Only recently have economists attempted to measure the impact of large fiscal changes at the state level. Much of this literature focuses on the impact fiscal rules have on short run business cycles (Fatas and Mihov 2006). Agenor and Yilmaz (2011) is one of the first studies exploring the impact of state fiscal rules on economic growth, budget stability, and fiscal sustainability. They simulate alternative fiscal rules under a range of plausible parameter configurations to determine which fiscal rules perform better in terms of economic growth, distinguishing this criteria from that of short run macro-stability over the business cycle. Dynamic scoring simulation analysis is beginning to provide more rigorous analysis of state fiscal adjustment, and several studies have used this methodology to measure the impact of fiscal rules (Schunk and Woodward 2005, Merrifield and Monson 2011, and Merrifield and Poulson 2013).

In this study we use dynamic scoring simulation to analyze comprehensive fiscal adjustment at the state level encompassing both fiscal rules and tax reform. We simulate key linkages between tax and expenditure limits, budget stabilization and emergency funds, and capital funds. Within the framework of those fiscal rules we simulate alternative tax reforms, including tax rebates, income tax cuts, and substitution of the sales tax for the income tax. The impact of these fiscal adjustments is evaluated with respect to economic growth and also budget stabilization over the business cycle. Sensitivity analysis assesses the importance of key

parameters, including the relationship between changes in the marginal tax rate and economic growth, and the size of the budget stabilization fund.

3. DYNAMIC SCORING

3.1 The Dynamic Scoring Model

The new literature on state fiscal adjustment utilizes dynamic scoring analysis (Schunk and Woodward, 2005, Merrifield and Monson, 2011, Merrifield and Poulson, 2013). The centerpiece of the dynamic scoring model is a limit on the growth in state spending referred to as a tax and expenditure limit (TEL). In the dynamic scoring model specified in this analysis, the TEL caps general fund (GF) spending growth at population growth plus inflation. Our research (Merrifield and Poulson, 2013) reveals that this TEL results in more stable growth in state spending over the business cycle than TELs that limit the growth in spending based on personal income or other measures of aggregate economic activity.

Our dynamic scoring analysis has four key features omitted from the Schunk and Woodward (2005) simulation. First, consistent with the critical issues cited in some of the recent TEL debates, our simulation allocates funds to a rainy day fund and an emergency fund. Second, it funds investment projects, and counter-cyclical spending increases, including acceleration of capital spending. Third, our simulations use dynamic scoring, namely that fiscal policy changes impact economic growth. Our simulation revises personal income and future tax revenues when dollars shift between the public and private sectors, or when tax rates drop, and when idle fund balances accrue interest payments. Fourth, the study simulates the impact on economic growth of tax reforms in the context of fiscal adjustment.

With effective spending caps in place, periods of rapid growth generate surplus revenue. After allocating surplus revenue to the budget stabilization, emergency, and capital fund, additional surplus revenue is allocated to tax rebates. After examining TEL outcomes without tax

rate changes, we maximize income tax cuts with a budget stabilization constraint, and then examine sales tax for income tax substitution. In all of the simulations, the budget stabilization constraint requires that spending grow at or close to the spending cap of inflation and population growth. The rationale is that the fiscal stress of budget instability would result in pressures to raise taxes and/or weaken the fiscal rules. The potential for tax reform with fiscal adjustment depends upon each state's unique tax structure.

3.2 Dynamic Scoring Model Without Tax Rate Change

In all of our simulations, the annual spending growth limit is the sum of inflation and population growth. Surplus revenue above that limit is prioritized as follows: (1) Emergency Fund;³ (2) Rainy Day Fund (RDF); (3) Capital Investment Fund; and (4) Tax Rebates. So, surplus funds flow to the Emergency Fund until the fund balance reaches its target level. In the model without any changes tax rates:

$$\text{Emergency Fund Balance} = \text{EMERG}_t \tag{1}$$

$$\text{IF}(\text{SURP}_t > \text{EDEF}_t) \rightarrow \text{EMERG}_t = \text{TARGEM}$$

$$\text{IF}(\text{SURP}_t < \text{EDEF}_t) \rightarrow \text{EMERG}_t = (1+r_t)(\text{EMERG}_{t-1} - \text{DISAST}_t) + \text{SURP}_t$$

Where: SURP_t = Surplus ($\text{RSPEND} - \text{RREV}$) in year t .
 EDEF_t = Emergency Fund Deficit; gap between balance and target.
 $\text{EDEF}_t = \text{TARGEM}_t + \text{DISAST}_t - \text{EMERG}_{t-1}$
 DISAST_t = disaster spending in time t .
 TARGEM = target balance of emergency fund.

Surplus revenue left over after mandated Emergency Fund deposits then flow to the RDF until it hits the account balance cap. Based on the Holcombe and Sobel (1997) recommendation that the RDF limit be sufficient to cover three consecutive worst-case revenue declines, and because the Great Recession was more severe than the basis for RDF norms, our default RDF target is an unusually high 25% of the general fund (GF) spending level. Later, we use a more conventional ten percent limit in a sensitivity analysis test of the importance of that parameter.

$$\text{Rainy Day Fund Balance} = \text{RDF}_t \quad (2)$$

$$\text{IF}(\text{EMERG}_t < \text{TARGEM}): \underline{\text{RDF}}_t = ((\text{RDF}_{t-1} \times (1+r_t)) - \text{RDFDEB}_t)$$

$$\text{IF}(\text{EMERG}_t \geq \text{TARGEM}):$$

$$\text{IF}(\text{RDF}_{t-1} \geq \text{TARGRDF}_t) \rightarrow \underline{\text{RDF}}_t = \text{RDF}_{t-1} - \text{RDFDEB}_t$$

$$\text{IF}(\text{RDF}_{t-1} < \text{TARGRDF}_t):$$

$$\text{IF}((\text{RDF}_{t-1} \times (1+r_t)) + \text{AVSURP}_t - \text{RDFDEB}_t) < \text{TARGRDF}_t:$$

$$\underline{\text{RDF}}_t = ((\text{RDF}_{t-1} \times (1+r_t)) + \text{AVSURP}_t - \text{RDFDEB}_t)$$

$$\text{IF}((\text{RDF}_{t-1} + \text{AVSURP}_t - \text{RDFDEB}_t) > \text{TARGRDF}_t): \underline{\text{RDF}}_t = \text{TARGRDF}_t$$

Where: RDFDEB_t = RDF debit in time t.

AVSURP_t = available surplus after emergency fund deposits.

TARGRDF_t = target balance for RDF.

RDF Debits occur when revenue growth cannot sustain spending growth at the rate of inflation plus population growth. And when there is a revenue drop, additional funds move from the RDF to the General Fund; equal to half the drop in revenue from the previous year so that spending can rise faster than population plus inflation in severe economic downturns. The rationale is that periods of recession typically see an increased demand for health expenditures, unemployment compensation, and welfare. That combination of rules could relieve pressure to raise taxes in order to offset budget deficits in recession years, and thus avoid the resulting spending ratchet from one business cycle to the next. Our simulations also include countercyclical spending from the Capital Fund. The Capital Fund finances extra construction when recent personal income growth is below average personal income growth over the prior ten years, with an annual withdrawal cap of 67% of the Capital Fund balance; a cap that approximately balances Capital Fund withdrawals and deposits over the business cycle.

$$\text{Revised Spending Level} = \text{RSPEND}_t \quad (3)$$

$$\text{IF}(\text{RREV}_t \geq \text{RREV}_{t-1}):$$

IF((RSPEND_{t-1} x CAP_t) < RREV_t): RSPEND_t = RSPEND_{t-1} x CAP_t

IF((RSPEND_{t-1} x CAP_t) > RREV_t):

IF((RDF_t > ((RSPEND_{t-1} x CAP_t) - RREV_t)): RSPEND_t = RSPEND_{t-1} x CAP_t

IF((RDF_t < ((RSPEND_{t-1} x CAP_t) - RREV_t)): RSPEND_t = RREV_t + RDF_t

IF(RREV_t < RREV_{t-1}):

IF(((RSPEND_{t-1} x CAP_t) + b(RREV_{t-1} - RREV_t)) < RREV_t):

RSPEND_t = (RSPEND_{t-1} x CAP_t) + b(RREV_{t-1} - RREV_t)

IF(((RSPEND_{t-1} x CAP_t) + b(RREV_{t-1} - RREV_t)) > RREV_t):

IF(RDF_t > ((RSPEND_{t-1} x CAP_t) + b(RREV_{t-1} - RREV_t)) - RREV_t):

RSPEND_t = ((RSPEND_{t-1} x CAP_t) + b(RREV_{t-1} - RREV_t))

IF((RDF_t < (((RSPEND_{t-1} x CAP_t) + b(RREV_{t-1} - RREV_t)) - RREV_t)):

RSPEND_t = RREV_t + RDF_t

Where: RREV_t = revised GF revenue for fiscal year t.

CAP_t = cap on GF spending growth rate for fiscal year t.

RSPEND_t = revised GF spending for fiscal year t.

b = share of revenue decrease to convert into countercyclical spending increase, RDF account balance permitting.

The money accumulated in the various funds does not remain idle, but rather is invested in the private sector. Thus there is no opportunity cost incurred until the money is transferred to the General Fund (GF). The RDF and emergency fund balances earn interest at the rates recorded by the State Treasurer's Office. The interest earned grows the account balance until the account target is reached, and then interest earnings accrue to the General Fund.

This dynamic scoring model captures the impact of a shift in resources from the private to the public sector. The simulations employ a conservative estimate of six percent for the opportunity cost rate (Dahlby, 1998). Consistent with Barro (1990), we assume that the opportunity cost rate applies to small changes typical of marginal transfers of resources from

private to public use. When our TEL reduces resource transfers from the private to the public sector, personal income rises.

$$\mathbf{RPI}_t = \mathbf{RPI}_{t-1} + (\mathbf{API}_t - \mathbf{API}_{t-1}) + (\mathbf{OCR} \times (\mathbf{SURP}_t - \mathbf{EMERG}_t)) \quad (4)$$

Where: \mathbf{RPI}_t = revised personal income in fiscal year t.

\mathbf{API}_t = actual personal income in fiscal year t.

\mathbf{SURP}_t = GF surplus ($\mathbf{RSPEND} - \mathbf{RREV}$) in t.

\mathbf{EMERG}_t = emergency fund spending in t.

\mathbf{OCR} = opportunity cost rate (0.06, 0.09).

Additional personal income generates additional tax revenue for the General Fund.

$$\mathbf{RREV}_t = \mathbf{AREV}_t + \sum_T((\mathbf{RPI}_t - \mathbf{API}_t) \times \mathbf{MTR}_{Tt}) + \mathbf{SI}_t \quad (5)$$

Where: \mathbf{RREV}_t = revised revenue for fiscal year t.

\mathbf{AREV}_t = actual revenue for fiscal year t.

\mathbf{MTR}_{Tt} = Marginal Rate for State Tax T in fiscal year t from Reed et al (2011).

\mathbf{SI}_t = RDF and emergency fund surplus interest.

3.3 Dynamic Scoring Model With Income Tax Cuts

Our second dynamic scoring model incorporates income tax cuts alongside rebates of still-remaining surplus funds. Tax cuts impact economic growth more than tax rebates because tax rebates are viewed primarily as transitory private income rather than permanent income.

Transitory income will be used mostly to pay down debt, with little impact on consumption or investment spending. Because permanent tax cuts impact permanent income, people raise their consumption and planned investment spending to a greater extent, and increase productive activity. Permanent tax cuts in one state relative to that in another state will also create incentives for mobility of labor and capital into that state.

Marginal tax rates vary with tax structure (Reed, Rogers, and Skidmore, 2011; Miller and Russek, 1997). The nationwide marginal tax rate is the average of the total marginal rates levied by the states. In this study changes in income tax rates change a state's relative marginal tax rate, and this change is estimated using the weight of income tax marginal tax rates as a share of the total marginal tax rate in each state.⁴ Poulson and Kaplan (2008) find that every one percent

drop in a state's total marginal tax rate relative to the nation's average marginal tax rate raises that state's growth rate between 0.251 and 0.374 percent (RMTR).⁵ We modify equation (1) to include a growth adjustment factor (GA) that is greater than one for years in which a permanent income tax rate cut is made and thereafter.

$$\mathbf{RPI}_t = (\mathbf{RPI}_{t-1} \times \mathbf{GA}_t) + (\mathbf{API}_t - \mathbf{API}_{t-1}) + (\mathbf{OCR} \times (\mathbf{SURP}_t - \mathbf{EMERG}_t)) \quad (6)$$

Where: \mathbf{GA}_t = Income Tax Growth Adjustment Factor for fiscal year t.

$$\mathbf{GA}_t = 1 + (\mathbf{RMTR} \times \mathbf{CHMTR}_t)$$

\mathbf{CHMTR}_t = change in the Reed et al (2011) state-level marginal tax rate for fiscal year t.

In the baseline simulation, GA is based on the conservative 0.25% impact of tax cuts estimated by Poulson and Kaplan (2008). For the dynamic scoring model, we adjusted the RREV equation to account for the static revenue losses (SRLS) caused by a one percentage point cut in the income tax marginal tax rate.

$$\mathbf{RREV}_t = (\mathbf{AREV}_t \times (1 - \mathbf{SRLS}_t)) + \sum_T((\mathbf{RPI}_t - \mathbf{API}_t) \times \mathbf{MTR}_{Tt}) + \mathbf{SI}_t \quad (7)$$

Where: $\mathbf{SRLS}_t = (\mathbf{CHMTR}_t / \mathbf{MTRINC}_t) \times \mathbf{INCTAXPCT}_t$

$\mathbf{INCTAXPCT}_t$ = the income tax share of total state GF revenue.

\mathbf{MTRINC}_t = Reed et al (2011) total MTR for the state income taxes.

Our revenue estimates reflect the static revenue loss from tax rate reduction, and the increased revenue that results when lower tax rates increase the rate of growth in personal income.

3.4 A Dynamic Scoring Model Substituting Sales Taxes for Income Taxes

As the literature survey points out fiscal reforms to promote economic growth should also consider tax substitution (Arnold 2008, OECD 2010).⁶ Taxes on income create disincentives for productive activity, including work, savings, investment, and entrepreneurial activity. Taxes on consumption have a negative impact on consumption spending. Ceteris paribus, a revenue neutral substitution of the sales tax for the income tax should have a positive impact on the growth in personal income.

Changes in a state's sales tax rate change that state's relative marginal tax rate, and this change is estimated using the weight of the sales tax marginal tax rate as a share of the total marginal tax rate in each state.⁷ In our third dynamic scoring model, substitution of the sales tax for the income tax yields a smaller growth adjustment factor, GA' , than the income tax reductions, alone, would have produced. Equation (8) replaces equation (6).

$$\mathbf{RPI}_t = (\mathbf{RPI}_{t-1} \times \mathbf{GA}'_t) + (\mathbf{API}_t - \mathbf{API}_{t-1}) + (\mathbf{OCR} \times (\mathbf{SURP}_t - \mathbf{EMERG}_t)) \quad (8)$$

Where: GA'_t = Sales Tax Growth Adjustment Factor for fiscal year t .
 $GA'_t = 1 + (\mathbf{RMTR} \times (\mathbf{CHMTR} - \mathbf{MTRSALES}))$
 $\mathbf{MTRSALES}$ = the MTR increase due to sales tax increase.

We substitute equation (9) for (7) to account for the static revenue gains (SRGN) caused by the increase in the sales tax marginal rate. Our revenue estimates reflect the static revenue loss from the income tax rates reductions, the static revenue gains from the sales tax increase, and the increased revenue that results when lower income tax rates increase the rate of growth in personal income more than the sales tax increase curtails it.

$$\mathbf{RREV}_t = ((\mathbf{AREV}_t \times (\mathbf{1} - \mathbf{SRLS}_t)) + \mathbf{SRGN}_t) + \sum_T((\mathbf{RPI}_t - \mathbf{API}_t) \times \mathbf{MTR}_{Tt}) + \mathbf{SI}_t \quad (9)$$

Where: $\mathbf{SRGN}_t = \mathbf{MTRSALES}_t \times \mathbf{RPI}_{t-1}$

4. DYNAMIC SCORING EMPIRICAL ANALYSIS

In the states that pursued fiscal adjustment a major objective was increased economic growth. In this study we estimate the potential for further reductions in income tax rates consistent with a budget stabilization constraint that requires that spending grow at or close to the spending limit based on population growth and inflation. Legislation substituting the sales tax for the income tax has been introduced in a number of states in recent years, and we explore this tax reform assuming the same budget stabilization constraint. Substitution of the sales tax for the income tax changes a state's marginal tax rate relative to the average marginal tax rate for the states as a whole. That tax reform will impact the state's economic growth and budget

stabilization over the business cycle. This tradeoff in the impact of tax reform on economic growth and budget stabilization is unique to the tax structure in each state.

We selected three states in the Rocky Mountain region for this dynamic simulation analysis, Montana, Colorado, and Utah. The potential for fiscal adjustment with tax reform differs in each state because of the considerable differences in their tax structure. Montana has personal income tax rates higher than the national average rates, but has no state sales tax. The potential for reductions in income tax rates, as well as substitution of a state sales tax for the income tax is greater in Montana than in the other states. In Colorado income tax rates and sales tax rates are below the national average rates. Thus, there is less potential for reductions in income tax rates and/or substitution of the sales tax for the income tax in Colorado compared to Montana. In Utah income tax rates are comparable to the national average rates, while sales tax rates are above the national average rates. While there is potential for reduction in income tax rates, substitution of sales taxes for income taxes is constrained by the higher level of state sales taxes compared to the other states.

4.1 Montana

Over this period Montana enacted a reduction in the top income tax rate, but that rate remains significantly above the average top income tax rate for the states as a whole. Montana has no state sales tax. The simulation analysis in the following table reveals substantial benefits to fiscal adjustment with tax reform in Montana. The first panel in the table describes the outcomes of these fiscal rules with tax rebates and no changes in tax rates. There is a modest increase in economic growth over the period as a whole, 0.17%, worth almost one billion dollars in extra personal income. The higher economic growth generates a .40% increase in revenue equal to \$113 million over the period. Spending is reduced about 10 percent. There is no budget stabilization problem. Spending grows at the spending cap each year and there are no spending

cap shortfalls. The budget stabilization, emergency, and capital fund reach their caps as shown by the balances in these funds at the end of the period. Total rebates over the period equal 7.7% of actual revenue or \$2.4 billion.

TABLE 1. MONTANA COUNTERFACTUAL*

	Income Tax Rebates	40% Income Tax Cut	Sales Tax Substitute for Income Tax
Personal Income Growth			
additional Income (millions of dollars)	984	10389	18771
% of actual income	0.17%	1.81%	3.26%
personal Income Growth rate difference	0.03%	0.27%	0.43%
Revenue Generated by Increased growth			
cumulative increase (million dollars)	113	535	822
cumulative increase (% of simulated revenue)	0.40%	1.90%	2.61%
Spending Reduction			
cumulative spending reduction (million dollars)	3003	3466	3138
cumulative spending reduction (percent of actual spending)	9.58%	11.06%	10.01%
Budget Stabilization			
average spending cap shortfall (steady growth)	0	6.78%	0
# of years below spending cap (steady growth)	0	12	0
Budget Stabilization, Emergency, and Capital Funds (FY2012)**			
budget stabilization fund (million dollars)	407	21	407
budget stabilization fund percent of spending	25.58%	1.34%	25.58%
emergency fund (million dollars)	33	30	33
emergency fund share of worst case emergency	100.19%	94.84%	100.19%
capital fund (million dollars)	31	12	25
Tax Rebates			
cumulative tax rebates (million dollars)	2436	222	2124
cumulative tax rebates share of actual revenue	7.70%	0.70%	6.72%

*Cumulative results for FY1994-FY2012 in 2012 dollars

**Fund balances for FY2012

Table 1's second panel simulates a 40% reduction in Montana's income tax. This tax reform yields a significant personal income gain; an additional 1.81%, worth an additional \$10 billion during the 1994-2012 period. The increased economic growth generates a state revenue increase of 1.90 %; more than half a billion dollars. These fiscal rules reduce spending about 11% or \$3.5 billion over the period. This tax cut is accompanied by budget instability as reflected in spending cap shortfalls. There are twelve years in which simulated spending fails to grow at the spending cap rate of inflation and population growth. However, most of these years of spending cap shortfalls occur before the income tax cut and before the growth effects of the income tax cut take place. \$222 million in tax rebates are paid out over the period.

Table 1's third panel simulates the implementation of a sales tax equal to the average sales tax for all states. That sales tax generates enough revenue, including through increased growth, to facilitate elimination of Montana's income taxes, while sustaining population plus inflation spending growth. The tax shift further boosts personal income growth over the previous scenario. Simulated, 1994-2012 cumulative personal income is 3.26% above the level it actually attained. The cumulative increase in personal income over the period is \$19 billion. The higher growth in income generates 2.61% more in revenue, equal to \$822 million over the period. With these rules in place spending is reduced about 10% or \$3.1 billion. This tax reform achieves better budget stabilization than the income tax cut alone simulated above. Spending grows at the spending cap with no spending cap shortfalls. The budget stabilization, emergency and capital funds reach their caps by 2012, or earlier. In addition to the income tax elimination, more than \$2 billion in surplus revenue is rebated to tax payers over the period.

Montana increased state spending very rapidly in the periods of economic growth; in some years at double digit rates. Montana also experienced fiscal stress with revenue shortfalls during recessions. As a result, Montana could benefit greatly from fiscal adjustment with tax

reform. Montana is also in an enviable position because it now has no sales tax, and can eliminate the income tax by just imposing a sales tax equal to the national average sales tax rate. With these fiscal rules in place and substitution of a sales tax for the income tax, Montana could achieve budget stability and a much higher rate of economic growth.

4.2 Colorado

The Colorado results show how tough it is to stabilize the budget over a volatile business cycle. The past two recessions, and especially the ‘Great Recession’ caused sharp state revenue declines. The revenue volatility arose from volatility in income, independent from the TABOR Amendment and other fiscal rules. Fiscal consolidation and tax reform could increase economic growth and improve budget stabilization over the business cycle in Colorado.

During the past decade Colorado replaced a graduated income tax with a flat rate income tax, lowering the rate almost in half. Colorado also cut the state sales tax, the business personal property tax, and a variety of other taxes and fees. As a result, Colorado has lower state tax rates than most other states. This study shows that with fiscal rules in place there is ample room for further tax reform in Colorado.

Table 2’s first panel simulates the fiscal rules with tax rebates to dispose of surplus revenue; no change in tax rates. Slower spending growth and tax rebates boosted personal income by 0.19%; a cumulative, 1994-2012 rise in personal income of nearly \$7 billion. That extra personal income yielded a 0.73% rise in revenue equal to \$1 billion. The fiscal rules cut spending 3.23% or \$4.3 billion over the period. Since our general fund revenue data did not include the federal funds that offset large differences in Great Recession revenues and spending, our simulation finds large, Great Recession spending cap shortfalls and budget cuts. Over that three-year period, the spending cap shortfalls average 17.41%. The emergency and capital funds finished the period at their cap. With a 2012 uptick in the economy, the budget stabilization fund

bounces back from its Great Recession zero balance. Prior to the Great Recession, these fiscal rules yielded substantial surplus revenues, with tax rebates of 4.91% of revenue or \$6.7 billion.

TABLE 2. COLORADO COUNTERFACTUAL*

	Income Tax Rebates	33% Income Tax Cut	Sales Tax Substitute for 44% Income Tax Cut
Personal Income Growth			
additional Income (millions of dollars)	6996	71160	33434
% of actual income	0.19%	1.96%	0.92%
personal income growth rate increase	0.01%	0.17%	0.06%
Revenue Generated by Increased growth			
cumulative increase (million dollars)	1009	2784	1963
cumulative increase (% of simulated revenue)	0.73%	2.54%	1.46%
Spending Reduction			
cumulative spending reduction (million dollars)	4289	25226	731
cumulative spending reduction (percent of actual spending)	3.23%	19.02%	0.55%
Budget Stabilization			
average spending cap shortfall (steady growth)	17.41%	18.84%	1.25%
# of years below spending cap (steady growth)	3	18	1
Budget Stabilization, Emergency, and Capital Funds (FY2012)**			
budget stabilization fund (million dollars)	313	254	1
budget stabilization fund percent of spending	4.84%	4.89%	0.01%
emergency fund (million dollars)	149	115	159
emergency fund share of worst case emergency	111.68%	107.57%	97.40%
capital fund (million dollars)	23	22	29
Tax Rebates			
cumulative tax rebates (million dollars)	6700	1992	2400
cumulative tax rebates share of actual revenue	4.91%	1.46%	1.76%

*Cumulative results for FY1994-FY2012 in 2012 dollars

**Fund balances for FY 2012

Table 2's second panel simulates the fiscal rules plus a 33% cut in the income tax rate. With a 33% drop in Colorado's income tax, personal income rises more than when tax rebates dispose of surplus revenues. However, the tax cut creates budget instability. Spending cap shortfalls and budget cuts are much worse during the 'Great Recession' compared to the tax rebate option. Tax cuts alone were not a good option for Colorado to promote economic growth while stabilizing the budget over the unusually volatile business cycles of 1994-2012.

Table 1's third panel simulates a state sales tax equal to the average sales tax rate for all states, offset by a reduction in the income tax. That increase in the sales tax finances a 44% reduction in income tax rates without budget instability. This partial substitution of sales taxes for income taxes generates a personal income increase of 0.92% over the period. The cumulative increase in income is close to \$33.4 billion. The higher growth rate generates increased revenue equal to 1.5% or \$2 billion. With these rules in place, simulated spending is 0.55% or \$731 million less than the 1994-2012 actual. There is a significant improvement in budget stabilization with this reform compared to the tax cut only simulation. There is one spending cap shortfall of 1.25%, but no spending cuts. Substantial funds accumulate in the budget stabilization, emergency, and capital funds by the end of the period. Tax rebates equal to 1.76% of revenue or \$2.4 billion are paid out over the period.

Colorado has an effective tax and spending limit, the TABOR Amendment, and has cut the income tax rate almost in half. The optimal fiscal consolidation and tax reform to both stimulate economic growth and stabilize the budget over the business cycle in Colorado is to substitute sales taxes for income taxes and reduce the income tax rates further. This substitution of sales taxes would offset a 44 per cent reduction in income tax rates beyond the income tax cuts already reflected in the data. Additional tax cuts beyond that would be accompanied by greater budget instability.

4.3. Utah

Like Colorado, Utah has experienced great volatility in revenue and spending during recent recessions. This instability limits the extent to which Utah can enact income tax cuts or tax shifts to promote economic growth without budget instability. During the past decade Utah cut the top income tax rate to a level roughly comparable to that for the states as a whole. Since Utah's sales tax is already above the average state sales tax rate, it will be difficult to further raise that rate to further cut income tax rates.

Table 3's first panel describes the simulation for these fiscal rules combined with tax rebates to dispose of surplus revenue; no change in tax rates. There is a 0.33% increase in personal income, with a cumulative rise in personal income equal to half a billion dollars over the period. The increased growth generates 1.25% more in revenue; equal to more than one billion over the period. With these rules in place, spending falls almost 10% or \$8.4 billion over the period. There is no budget stabilization problem with this reform, spending grows at the spending cap with no spending cap shortfalls in any year. By the end of the period, the funds in the budget stabilization, emergency, and capital funds are at their caps. The amount rebated to taxpayers is equal to 8% of revenue or almost \$7 billion.

Table 3's second panel describes the TEL simulation with a 9% cut in the income tax, which is all that is possible without forcing large Great Recession budget cuts. This income tax rate cut results in a more modest increase in growth rates compared to the tax rebate-only option. The revenue generated by the tax cut is correspondingly lower. With these rules in place, spending falls by 10% or \$8.9 billion. Spending cap shortfalls occur in two years averaging 4.31%. The budget stabilization fund zeroes out at the end of the period. Tax rebates equal to 5.39% of revenue or \$4.7 billion is paid out over the period.

TABLE 3. UTAH COUNTERFACTUAL*

	Income Tax Rebates	9% Income Tax Cut	Sales Tax Substitute Income Tax Eliminated
Personal Income Growth			
additional Income (millions of dollars)	4841	3828	47892
% of actual income	0.33%	0.26%	3.29%
personal Income Growth rate increase	0.03%	0.02%	0.51%
Revenue Generated by Increased growth			
cumulative increase (million dollars)	1103	956	2596
cumulative increase (% of simulated revenue)	1.25%	1.14%	3.46%
Spending Reduction			
cumulative spending reduction (million dollars)	8423	8860	13094
cumulative spending reduction (percent of actual spending)	9.72%	10.22%	15.11%
Budget Stabilization			
average spending cap shortfall (steady growth)	0	4.31%	5.46%
# of years below spending cap (steady growth)	0	2	18
tax cut induced shortfall			
Budget Stabilization, Emergency, and Capital Funds (FY2012)**			
budget stabilization fund (million dollars)	542	0	151
budget stabilization fund percent of spending	11.04%	0	3.28%
emergency fund (million dollars)	90	90	84
emergency fund share of worst case emergency			88.87%
capital fund (million dollars)	90	90	0
Tax Rebates			
cumulative tax rebates (million dollars)	6968	4682	683
cumulative tax rebates share of actual revenue	8.02%	5.39%	0.79%

*Cumulative results for FY1994-FY2012 in 2012 dollars

**Fund balances for FY 2012

The third panel describes the simulation with a rise in the sales tax sufficient to eliminate the income tax. This pushes the sales tax rate in Utah well above the average sales tax rate for all states. This tax reform generates a significant, 3.29%, rise in real personal income over the period as a whole. The cumulative personal income gain is \$48 billion. Higher growth boosts revenue 3.46% or \$2.6 billion. With these fiscal rules in place, spending falls 15%; roughly \$13 billion. Spending cap shortfalls occur averaging 5.46%, but Utah would avoid spending cuts. At the end of the period, the budget stabilization fund and emergency fund contain large balances, but not the capital fund. Rebates equaled 0.79% of revenue or \$683 million.

The revenue generated by the increased growth that results from the substitution of increased sales tax revenue for income tax revenue could allow for some gradual reduction in the size of the sales tax increase. But even with those reductions, the shift would still leave Utah's sales tax rate well above the national average.⁸ In order to avoid an excessively high sales tax rate Utah might instead opt for a lower sales tax, retaining a small income tax rate to do that.

With fiscal adjustment and tax reform, Utah can increase growth without fiscal stress. Just offsetting pre-recession surplus revenue with tax cuts rather than tax rebates would generate higher economic growth, but this would result in some budget instability. Increasing the sales tax as a substitute for the income tax would boost economic growth the most but with some instability and the problems of an unusually high sales tax rate. Utah faces a real tradeoff between tax reforms to promote economic growth and budget stability.

5. DYNAMIC SCORING SENSITIVITY ANALYSIS

5.1 The Growth Adjustment Factor

Marginal tax rates vary with tax structure (Reed, Rogers, and Skidmore, 2011). The nationwide marginal tax rate is the average of the total marginal rates levied in each state. The Poulson and Kaplan (2008) finding that every one percent drop in a state's aggregate marginal

tax rate relative to the nation’s average marginal tax rate raises that state’s growth rate between 0.251 and 0.374 percent formed the basis for the Growth Adjustment for years in which a permanent income tax rate cut is made and thereafter. In the sensitivity analysis, the higher estimate of 0.374 replaces the 0.251 employed until now. For our three states, the larger Growth Adjustment yields an additional 1-2 percent rise in Personal Income (detailed results of sensitivity analysis are available upon request from the authors). Table 4 provides a closer look at the Colorado simulation outcomes with the higher growth adjustment factor.

With the higher growth adjustment factor, Colorado can use the sales tax increase to fund a 50% reduction in income tax rates through 2008. Over the period as a whole the higher growth rate generates \$60.4 billion in new income, almost twice that simulated with the lower growth adjustment. The larger growth rate yields significant changes in both revenue and spending. Revenue rises nearly \$2.8 billion with higher growth; a roughly \$800 million increase over the revenue outcome with lower growth. The higher growth rate eliminates the one episode of spending cap shortfall seen with the lower growth adjustment. The budget stabilization fund, emergency fund, and capital fund all accumulate large surpluses by the end of the period. A billion dollars in surplus revenue is rebated to taxpayers.

TABLE 4. COLORADO COUNTERFACTUAL*

	(0.251 Growth Adjustment)	(0.374 Growth Adjustment)
	Sales Tax Substitute for Income tax 44% Income Tax cut	Sales Tax Substitute for Income Tax 50% Income Tax Cut
Personal Income Growth		
additional Income (millions of dollars)	33434	60406
% of actual income	0.92%	1.67%
personal income growth rate increase	0.06%	0.11%
Revenue Generated by Increased growth		

cumulative increase (million dollars)	1963	2782
cumulative increase (% of simulated revenue)	1.46%	2.09%
Spending Reduction		
cumulative spending reduction (million dollars)	731	695
cumulative spending reduction (percent of actual spending)	0.55%	0.52%
Budget Stabilization		
average spending cap shortfall (steady growth)	1.25%	0.00%
# of years below spending cap (steady growth)	1	0
Budget Stabilization, Emergency, and Capital Funds**		
budget stabilization fund (million dollars)	1	56
budget stabilization fund percent of spending	0.01%	0.70%
emergency fund (million dollars)	159	159
emergency fund share of worst case emergency	97.40%	96.18%
capital fund (million dollars)	29	22
Tax Rebates		
cumulative tax rebates (million dollars)	2400	1016
cumulative tax rebates share of actual revenue	1.76%	2.09%

*Cumulative results for FY 1994-2012 in 2012 dollars

**Fund balances for FY2012

5.2 The Cap on the Budget Stabilization Fund

In the simulations, above, we used a budget stabilization cap of 25% of general fund spending. In this sensitivity analysis we used the more common 10% cap. In Utah and Montana, there was little impact on budget stability. In Colorado, however, the size of the BSF is a key determinant of budget stability. For example, in the simulations in which a higher sales tax is offset by a 44% reduction in the income tax, a 25% cap on the budget stabilization fund results in only one year of spending cap shortfall, during the Great Recession, equal to 1.25% of revenue. With the smaller 10% cap on the BSF Colorado experiences two years of spending cap shortfalls averaging 7.58%.

The size of the BSF is even more important in simulations with the higher growth adjustment factor. As noted above in these simulations with a 25% cap on the BSF Colorado experiences no budget instability. However, with the smaller 10% cap on the BSF Colorado experiences significant budget instability, ten years of spending cap shortfalls averaging 3.39%.

This sensitivity analysis underscores the important role that a BSF can play in a state like Colorado with great volatility in revenue and spending over the business cycle. It also reinforces the major thesis of this study that it is the combination of fiscal rules and fiscal policies that determines the impact they have on budget stability as well as economic growth. A large BSF may be very important in one state but unimportant in other states. It is not enough that Colorado has the most stringent tax and expenditure limit in the country. In the absence of a sizeable BSF Colorado is likely to experience great volatility in revenue and spending over the business cycle; that in turn undermines support for the fiscal discipline measures. As noted earlier, Colorado did weaken the TABOR Amendment after the 2001 recession. This flaw perhaps also explains why California abandoned a similar tax and expenditure limit in the late 1980s.

This sensitivity analysis reveals that the potential for and constraints on fiscal reform are unique to the fiscal rules and fiscal structure in place in each state. States like Montana and Utah may be able to stabilize their budgets with a smaller BSF cap. States like Colorado face tradeoffs in choosing the size of the budget stabilization fund cap. Expertise of the State Treasurer in making investment decisions with the larger fund becomes more important. A large BSF account balance becomes a target for rent seekers whose actions could undermine fiscal rules for disposition of the funds. A state might avoid these problems with a smaller BSF account balance. This may put more pressure on legislators to trim spending in periods of recession, but some spending cut pressures are probably healthy as long as they don't lead to pressures to increase taxes.

6. CONCLUSIONS

In this study, state fiscal adjustment is simulated based on fiscal rules, including tax and expenditure limits, budget stabilization and emergency funds, and capital funds. These fiscal rules are combined with tax reforms, including tax rebates, income tax cuts, and substitution of sales taxes for income taxes. Fiscal adjustment with tax reform in three states is evaluated with respect to economic growth and budget stability.

To the extent that this fiscal adjustment generates higher economic growth, these states are better positioned to respond to fiscal stress over the business cycle. Higher rates of economic growth are accompanied by increased tax revenue. More importantly, when fiscal adjustment is based on spending constraints this will reduce revenue shortfall and fiscal stress in periods of recession. Thus fiscal adjustment can promote budget stability as well as economic growth.

Dynamic scoring analysis reveals the important linkages between fiscal rules and fiscal policies. Each state analyzed could benefit from fiscal adjustment with tax reform, however, the potential for and constraints on these fiscal reforms reflect the unique fiscal rules and fiscal structure in place in each state. Combining fiscal adjustment with tax reform is likely to involve some tradeoffs between economic growth and budget stabilization.

Each of the tax reforms is accompanied by higher rates of economic growth which in turn generates increased tax revenue. Slower spending growth with rebates of surplus tax revenue, alone, is the least growth enhancing tax reform strategy. A larger boost to economic growth is generated by substituting a sales tax for the income tax and/or cutting income tax rates. The potential for substituting sales taxes for income taxes depends upon the tax structure in each state. That potential is greatest in states with low or zero sales tax rates, such as Montana and Colorado, but is more limited in states with sales tax rates greater than the average national sales tax rates, such as Utah.

Montana is one of the few states with no state sales tax. Since Montana also has other significant revenue sources other than the income tax the potential for substituting the sales tax for the income tax is greater in Montana than that for the other states analyzed in this study. It is possible for Montana to impose a state sales tax equal to the average national sales tax and completely eliminate the state income tax, without incurring a budget stabilization problem. With that tax reform, Montana experiences much higher rates of economic growth. However, it is difficult to see how Montana could successfully implement these tax reforms without effective rules in place to constrain the growth in state spending. Montana has no tax and expenditure limit, budget stabilization or emergency fund, or capital fund. This was reflected in the incredibly rapid growth in state spending that led to severe fiscal stress during the Great Recession.

Colorado has one of the most effective tax and spending limits in the country. Linking that tax and expenditure limit to a budget stabilization, emergency, and capital fund would significantly improve budget stabilization. Even though Colorado has a low sales tax compared to other states, the potential for substituting sales taxes for income taxes is limited in Colorado. Colorado can increase that sales tax to equal the national average sales tax rate and decrease income tax rates to promote higher economic growth, but at some point greater income tax cuts are accompanied by greater budget instability. Colorado also experiences great volatility in revenue and spending over the business cycle, so a large budget stabilization fund is a prerequisite to budget stability.

Utah has a sales tax rate that exceeds the average national sales tax rate, so the potential for growth enhancing substitution of sales taxes for income taxes in Utah is limited. The simulation for Utah is for a sales tax rate above the average national sales tax rate, combined with elimination of the income tax. This tax reform generates higher rates of economic growth

and increased revenue which in turn could allow for a reduction in the sales tax rate toward the average national sales tax rate. However, in Utah there is a tradeoff in tax reforms designed to promote economic growth and to stabilize the budget over the business cycle. Thus dynamic scoring analysis reveals both the potential for and the limits to tax reforms in which sales taxes are substituted for income taxes.

Dynamic scoring analysis provides a more rigorous and comprehensive analysis of fiscal adjustment and tax reform at the state level. An entirely different picture emerges of the potential for and constraints on fiscal reform compared to previous studies focused on a specific fiscal rules or fiscal policies. This analysis has important implications for both research and public policy in state finance. A piecemeal approach is not likely to give an accurate picture because it fails to capture these linkages between fiscal rules and fiscal policy. Studies that aggregate fiscal policies for the states as a whole are not likely to capture the important differences in fiscal rules and fiscal structure unique to each state.

Fiscal reforms are often enacted by state legislatures piecemeal without comprehending the fiscal system as a whole. A fiscal reform successfully enacted in one state may be ineffective or even counterproductive with respect to economic growth and budget stability in another state. Dynamic scoring analysis is beginning to provide answers to these important issues in state finance.

REFERENCES

- Alesina, Alberto, Carlo Favero, and Francesco Giavazzi, 2014. The output Effect of Fiscal Consolidation Plans, *Journal of International Economics*, 2014 pp. 1-41.
- Alesina, Alberto, and Silvia Ardagna, 2012. The Design of Fiscal Adjustment, NBER *Working Papers* no. 18423.
- Alesina, Alberto, and Silvia Ardagna, 2010. Large Changes in Fiscal Policy: Taxes Versus Spending, *Tax Policy and the Economy*, vol. 24, pp. 35-68

- Agenor, P. and Yilmaz, D., 2011. The tyranny of rules: fiscal discipline, productive spending, and growth in a perfect foresight model. *Journal of Economic Policy Reform*, 14(1), 69-99.
- Arnold, D., 1990. *The Logic of Congressional Action*. Yale University Press, London.
- Arnold, J., 2008. Do tax structures affect aggregate economic growth? empirical evidence from a panel of OECD countries. *OECD Working Papers* No. 643.
- Barro, R., 1990. Government spending in a simple model of endogenous growth. *Journal of Political Economy* 98 (1), 103–117.
- Bird, G., and Mandilaras, A., 2013. Fiscal imbalances and output crises in Europe: will the fiscal compact help or hinder? *Journal of Economic Policy Reform*, 16(1), 1-16.
- Chapman, S., 2009. A hole they dug for themselves. Reasonline (July 30), <http://www.reason.com/news/show/135123.html>
- Congressional Budget Office, 2012. *The Long-Term Budget Outlook*, June.
- Dahlby, B., 1998. Progressive taxation and the social marginal cost of public funds. *Journal of Public Economics* 67 (1), 105-122.
- Eaton, L., 2009. “Pinched States Wrestle with More Cuts.” *Wall Street Journal*, July30, A3.
- Fatas, A., and Mihov, I., 2006. The macroeconomic effect of fiscal rules in the U.S. states. *Journal of Public Economic*, 90:101-117.
- Gobbin, N., and Van Aarle, B., 2001. Fiscal adjustments and their effects during the transition to the EMU. *Public Choice*, 109: 269-299.
- Guajardo, Jaime, Daniel Leigh, and Andrea Pescatori, 2014. Expansionary Austerity? International Evidence, *Journal of the European Economic Association*, vol 12, issue 4, pp. 949-968.
- Holcombe, R. and Sobel, R., 1997. *Growth and Variability in State Tax Revenue*. Greenwood Press, London.
- Kalika, M., 2009. Governor’s try to convince voters that budget woes are theirs, too. *Wall Street Journal* October19, A2.
- Kenny, Lawrence W., and Stanley L. Winer, 2006. Tax Systems in the World: An Empirical Investigation into the Importance of Tax Bases, Administrative Costs, Scale and Political Regime, *International Tax and Public Finance*, 13, pp. 181-215.
- Merrifield, J. and Monson, D., 2011. Simulation of a constitutional spending limit for a conservative state: with dynamic adjustment and sensitivity analysis. *Public Budgeting and Finance* 31 (3), 1-25.

- Merrifield, J., 2000. State government expenditure determinants and tax revenue determinants revisited.” *Public Choice* 102 (1-2), 25-50.
- Miller, S. and Russek, F., 1997. Fiscal structure and economic growth at the state and local level. *Public Finance Review* 25 (2), 213-237.
- Merrifield J. and Poulson, B., 2013. State fiscal policies for budget stabilization and economic growth: a dynamic scoring analysis. *Cato Journal*, vol.34, no.1 (winter).
- Merrifield J. and Poulson, B., 2014a. Fiscal rules in Sweden and Switzerland: Lessons for the U.S. paper presented at the Southern Economic Association meetings November, 2014.
- Merrifield J. and Poulson, B., 2014b. Rules-based policy options for addressing our federal fiscal crisis. paper presented at the Southern Economic Association meetings November, 2014.
- New, M., 2001. Limiting government through direct democracy: the case of tax and expenditure limitations. *Cato Institute Policy Analysis* 420.
- New, M., 2003. Proposition 13 and state budget limitations: past success and future options. *Cato Institute Briefing Papers* 83.
- Organization for Economic Cooperation and Economic Development, 2010. Tax policy and economic growth. *OECD Tax Policy Studies* No. 20.
- Poterba, J., 1994. State responses to fiscal crises: the effects of budgetary institutions and politics. *The Journal of Political Economy*. 102 (4), 799–821.
- Poulson, B., 2004. *Tax and Spending Limits: Theory, Analysis, and Policy*. Independence Institute *Issue Paper* IP-2-2004.
- Poulson, B., 2009a. “A Fiscal Roadmap for Colorado.” Independence Institute *Issue Paper* IP-8-2009.
- Poulson, B., 2009b. “What Is At Stake In The Current Battle Over Colorado’s Tax and Spending Limits.” Independence Institute *Issue Background* IB-2009-C.
- Poulson, B., 2012. Personal income tax reform in the states: lower, flatter, and fairer. *Inside ALEC*, American Legislative Exchange Council, June, pp. 9-13.
- Poulson, B. and Kaplan, J., 1994. A rent seeking model of TELs. *Public Choice* 79 (1-2), 117-134
- Poulson, B. and Kaplan, J., 2008. State income taxes and economic growth. *Cato Journal* 28 (1), 53-71.

Reed, W. R., 2008. The robust relationship between taxes and state economic growth. *National Tax Journal* 61(1), 57-80.

Reed, W. R., 2009. The Determinants of U.S. Economic Growth: A Less Extreme Bounds Analysis, *Economic Inquiry*, 47 (4) pp. 685-700

Reed, R., Rogers, C., and Skidmore, M., 2011. On estimating marginal tax rates for U.S. states. *National Tax Journal*, 64 (1), 59-84.

Schunk, D. and Woodward, D., 2005. Spending stabilization rules: a solution to recurring state budget crises. *Public Budgeting and Finance* 25 (4), 105-124.

Vock, D., Prah, P., Fehr, S., Stephen, M., Maynard, M., Gramlich, J., and Leonard, K., 2009. *Beyond California: States in Fiscal Peril*. Pew Center on the States, Washington, DC.

Von Hagen, J. and Strauch, R., 2001. Fiscal consolidation: quality, economic conditions and success. *Public Choice*, 109 (3-4), 327-346.

Wall Street Journal, 2013. *States rift in taxes widens*. Friday May 24, A3.

NOTES

¹ The 37 states had FY 2005-08 general fund expenditure growth (NASBO data) that topped Calendar 2004-2007 personal income growth (BEA data). A 1/26/09 Wall Street Journal editorial ("States of Fiscal Distress) said, "The state spending binge of the last five years has been unprecedented in American history."

² Demands for state government services tend to be countercyclical, whereas the revenue stream is pro cyclical (Holcombe and Sobel, 1997, p.14)

³ To limit the scope of our effort, we do not explore the sensitivity of our findings to changes in the emergency fund cap (2% of general fund spending) or the occurrence of a major emergency.

⁴ Note that income tax cut refers to percentage reductions in the income tax marginal tax rate

⁵ A number of studies have estimated the impact of state taxes on state income (for a survey of this literature see Reed, 2008, and 2009). We use the range estimated by Poulson and Kaplan (2008) because that range is roughly comparable to that in other studies, and because that study isolates the impact of state income taxes from other state taxes.

⁶ For a discussion of the impact of tax structure on economic growth see Kenny and Winer (2006).

⁷ Note that income tax cut refers to percentage reductions in the income tax marginal tax rate

⁸ Adding the national average sales tax MTR of 2.43% would increase Utah's sales tax MTR to 5.37%. Substituting the sales tax for the income tax boosts revenue enough to cut the sales tax increase from 2.43% to 1.8%.