"The Fiscal Significance of the TEL Cap Choices"

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Introduction

Early economic analysis of tax and expenditure limits (TELs) assessed their effectiveness as state and local revenue and/or spending restraints. That perspective reflected the origin of TELs during the 1970s in taxpayer initiatives, such as Howard Jarvis' Prop 13 in California.

TELs are now also seen as potentially significant elements of fiscal adjustment policies and efforts to accelerate economic growth, especially in light of the Pandemic-created fiscal stress. Rather than the 'business as usual' approach of coping with stress with higher taxes alongside some spending cuts, some states responded with fundamental fiscal reforms. Some states rejected the federal stimulus funds to avoid the difficult task of cutting the spending supported by the one-time federal subsidies. In some states, spending cuts were combined with tax reforms designed to promote higher rates of economic growth. Further, linking the TEL to a budget stabilization fund (BSF) could allow states to build up reserves in periods of rapid growth to offset revenues shortfalls and sustain spending in periods of recession. A related issue is the usefulness of BSFs to limit the TEL effect of 'ratchet down' spending over the business cycle. By making surpluses larger and more frequent, TELs can also set the stage for tax reforms. Our purpose is to measure those effects.

The literature review traces how the analysis of TELs has expanded to address a wider range of issues encompassing the response of states to fiscal stress. We use dynamic scoring simulation analysis to explore this wider range of impacts from TELs on state fiscal policies over the period 1999-2013. The next section discusses the dynamic simulation model and the data base used in the simulation analysis. In the empirical section, the simulation results are analyzed with respect to the major issues in this literature: constraining government spending; stabilizing state budgets; the 'ratchet down effect'; and the supply side effect on economic growth and revenues.

Fiscal Stress in the States

The states' fiscal stress during the last two recent recessions can be traced to rapid growth in spending (Stansel and Mitchell 2008). The GDP share of state spending rose from 4% in the 1950s to 10% in the 1990s (Holcombe and Sobel 1997; Merrifield 2000). Following the 2001 attack on the World Trade Center, the U.S. experienced a major recession that we will refer to as the '911 recession'. Beginning in 2009, the U.S. experienced the sharpest recession since the 1930s, now referred to as the 'Great Recession'. Between these two recessions the states enacted unprecedented spending growth.[1] 37 states had 2005-08 general fund expenditure growth in excess of personal income growth.[2] Several states increased spending at double digit rates, and the last 15 years saw significant budget instability (Table 1). Unstable spending destroys investments in politically vulnerable programs, it creates uncertainty about future business conditions, and it can yield significant turnover (Sobel 1998) for policymakers most closely tied to the tough decisions necessitated by budget shortfalls. Even when we exclude four states for which some expenditure data look suspect[3], the average state standard deviation in 1999-2012 year-to-year General Fund spending change is 8.60%. Only 22 states avoided '911 Recession budget cuts, with an average drop of 5.9% for those 26 states. In 2008, a boom year for most states, there were still four states with budget cuts that averaged 13.3%; and in 2010 at the bottom of the Great Recession, 40 of 48 states in our data set were spending less; an average of 13.1% below 2008 spending. In 2012, two years after the Great Recession bottom, nationally, 41 states increased spending by an average of 7.3%. The other seven states added another Great Recession budget cut averaging 2.9%.

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[1] 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] The 37 states had FY 2005-08 general fund expenditure growth (NASBO.org data) that topped Calendar 2004-2007 personal income growth (BEA data). We omit the 'FY' from our text since all further discussion is for fiscal years.

[3] Our data are described later. Because of missing data, we excluded Alaska and New Mexico, completely. Alabama and Wyoming had some expenditure data anomalies that led us to exclude them from the standard deviation calculation, but not elsewhere because our simulations relied primarily on unsuspicious, verified revenue data.

Table 1: Volatility of State Spending During Recent Recessions

	FY2003 change (Trough of the '911 Recession)	FY2008	FY2008-10 change (Trough of the Great Recession)	FY2012
Actual Avg Budget Cut	5.9%	13.3%	13.1%	2.9%
Actual # w/o [net] Cuts	22	44	8	41
Actual Avg Budget Increase	3.9%	8.5%	10.5%	7.3%

States often respond to the fiscal stress created by slower economic growth by raising tax rates that further increase the business cycle-induced variability in revenue (Poterba 1996; Gold 1983; Douglas and Gaddie 2002; Wagner and Elder 2005; Chapman 2009; Eaton 2009; Kalita 2009; Vock et al. 2009). Indeed, the fiscal stress of the '911 Recession led to tax hikes that financed the large, mid-decade spending growth. The federal fiscal stimulus money that propped up state spending during the Great Recession permanently increased spending in the states that raised taxes or borrowed money to replace the temporary federal funds (Young and Sobel 2013). Fiscal stress also influences off-budget spending (Bennett and DiLorenzo 1982; Merrifield 1994), and it expands use of spending substitutes such as regulation and assigning more tasks to local governments. Fiscal stress-induced tax hikes and spending cuts can have pro-cyclical effects, and tax increases slow economic growth (Poulson and Kaplan 2008).

There was more than the usual amount of diversity in the fiscal stress policy responses.[4] There were the usual fiscal stress-induced tax hikes often ratchet up state revenue and spending over the business cycle. But, increasingly, states responded with fiscal consolidation, which means a look at underlying causes of unsustainable increases in spending, and likely smaller role for tax hikes to address budget shortfalls. Consolidation may not cut spending or cut it much, but it may

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

attempt to restrain spending growth. In contrast to the near-futile fiscal consolidation efforts at the national level where the debt ceiling routinely rises, nearly every state has some firm spending level limits and budget stabilization rules. Only Vermont lacks a balanced budget requirement. Thirty-two states have tax and expenditure limits (TEL) to address fiscal expansion (Waisenen 2010; Zycher 2013), though weakly in many cases. Forty-seven states have reserve funds that can help them stabilize spending during recessions and for emergency response. A variety of other fiscal rules may constrain state fiscal policies, including line item veto and supermajority vote requirements to raise taxes or issue debt.[5]

Literature Review

The TEL literature tells us that the typically weak existing TELs had only a small effect on state budgets (Abrams and Dougan, 1986; Bails, 1990; Poterba, 1994; Poulson and Kaplan, 1994), but that a TEL can effectively constrain the growth in state spending (Elder, 1992; Kousser et al., 2008; Merrifield, 2000; Merrifield and Monson, 2011; Mitchell, 2010; Mitchell and Tusyznski, 2011; New, 2001, 2003; Poulson, 2004; Stansel, 1994; Stansel and Mitchell, 2008). Several design issues determine their effectiveness. Generally, TELs linked to population growth and inflation are seen as the most restrictive. Seven states have that type of TEL: Arkansas, California, Colorado, Nevada, Ohio, Utah, and Washington. Each of those TELs constrained the state spending growth for a while, but each TEL was amended and modified to reduce its effectiveness as a spending constraint.

Most states base their TEL caps to some measure of personal income, typically annual or average annual rate of growth in personal income, or income per capita. Seventeen state have this type of TEL. Six states link their TEL to spending as a share of personal income. When

[5] Similar issues arise in the discussions of state fiscal rules and fiscal consolidation and fiscal adjustment at the national level (Agenor and Yilmaz 2011, Fatas and Mihov 2006, Bird and Mandilaras 2013). Critics argue that state rules such as the balanced budget requirement are pro-cyclical and depress productive public investment and spending.

these TELs did impose a binding constraint on spending, the instability in personal income growth created volatility in state spending over the business cycle.

TELs that link spending growth to personal income are often non-binding, and when they are binding, the instability of personal income growth creates periods of costly fiscal instability and uncertainty (Crain, 2003; Holcombe and Sobel, 1997; Kioko, 2011; Krol, 2007; Mitchell, 2010; Mullins and Wallin, 2004; Schunk and Woodward, 2005; Shadbagian, 1996; Wagner and Elder, 2005; Waisenan, 2010), which may be responsible for the amendments that made some TELs less effective spending restraints. Economic conditions and the business cycle phase when TELs take effect are key determinants of effectiveness. For example, they seemed to be more binding in low income states. Florida introduced a TEL in the recession phase of the business cycle that was never binding, the spending cap rose more rapidly than actual growth in state revenue.

When TELs use actual spending instead of allowed spending as the base for the cap on the next budget, budgets that spend less than the allowed amount ratchet-down all future spending limits; a controversial, so-called ratchet-down effect. Ten states do such annual “rebasing” (Kioki, 2011) of their TEL. Five states use actual revenue or expenditures as the base for future budget caps: Connecticut, Montana, New Jersey, Texas, and Washington. Another five states set the limit as a percent of annually estimated revenues: Delaware, Iowa, Missouri, Oklahoma, and Rhode Island. Colorado was in the first group until its rebasing controversy led to passage of Referendum C in 2005, which eliminated the potential for ratchet-down effects by changing the base of each year’s spending limit to the previous year’s cap.

TEL effectiveness also depends on the disposition of surplus revenue. Four states simply keep the surplus revenue in the general fund: Arkansas, Hawaii, South Carolina, and Texas. That defers spending to a later period but has little impact in constraining spending in the long run. Four states mandate rebating surplus revenue to taxpayers, which can reduce spending in the long run, California, Colorado, Massachusetts, and Oregon. Thirteen states allocate a portion of the surplus revenue to a budget stabilization fund, often referred to as a rainy day fund or reserve fund. Surplus revenue may also be earmarked for emergency funds, capital funds, maintenance and repair, education, or debt relief (Merrifield and Monson 2011; Primo 2006; Waisenen 2010; Zycher 2013).

The fiscal stress experienced by the states during recent recessions renewed interest in the role that fiscal rules can play in budget stabilization (Reuben and Rosenberg 2009; Wagner and Elder 2005 and 2007; Wagner and Sobel 2006; Wagner 2003 and 2004; Thatcher 2008; McNichol 2013; Henchman 2012). BSF rules governing deposits and withdrawals vary widely (Holcombe and Sobel, 1997; Knight and Levinson 1999; Reuben and Rosenberg, 2009; Wagner and Elder, 2005, 2007; Wagner 2003 and 2004; Wagner and Sobel, 2006). Wagner and Elder (2005) found that states with strict rules for BSF deposits and withdrawals experience a twenty percent reduction in spending volatility, as measured by the cyclical variability of per capita spending over time. Stansel and Mitchell (2008) found that states with stricter BSF withdrawal rules experienced less fiscal stress during the 2001 recession.

In states without strict rules focused on stabilization, savings often migrate from the BSF to finance current General Fund outlays, regardless of the state of the economy, leaving insufficient BSF money to offset the revenue shortfalls of recessions (Wagner and Elder 2005). Some states' rules allow BSF use for emergencies, and define emergency so broadly that it allows virtually any type of outlay. The BSF may sit un-used or under-used if rules mandate rapid BSF money replacement, or when reserve accounts with an official budget stabilization mission also finance special projects, lawsuit settlements, and true 'emergency' spending. For example, during the 2011 Texas legislative session, Governor Perry cited hurricane preparedness as the reason to oppose most of the requested appropriations from the state's BSF. A 2014 ballot proposition called for financing some water projects from Texas' reserve account.

The extensive literature on state fiscal rules focuses mostly on the impact specific rules have on state budgets (Poterba 1996; Merrifield and Poulson 2013). But since the absence of one fiscal rule may diminish the impact of other rules as a constraint on revenue and spending, some studies have examined combinations of fiscal rules (Fatas and Mihov 2006; Merrifield and Monson 2011; Poterba 1994; Schunk and Woodward 2005; Wagner and Sobel 2006). Schunk and Woodward (2005) were the first to simulate effects of a TEL/BSF combination. Wagner and Sobel (2006) tested the hypothesis that some BSFs adopted in the 1980s were designed to circumvent TELs. They found that states with TELs were much more likely to adopt BSFs, but without stringent deposit and withdrawal rules. That study is consistent with earlier research by Poulson and Kaplan (1994) exploring TELs within the framework of a rent seeking model. They find that stringency in the design and TEL implementation reflects the interaction of rent seeking groups and taxpayers.

An important refinement in this literature on TELs is the analysis of their impact on economic growth (Amiel et al, 2012; Deller et al, 2012; Lav, 2009; Lav and Williams, 2010; Lyons and Johnson, 2006; Mcguire and Rueben, 2006; Merrifield and Monson, 2011; Stallman and Deller, 2010; Stallman, 2011). The empirical results in these studies are mixed. A major issue is whether a drop in the state's share of personal income accelerates economic growth (Bergh and Henrekson, 2011; Dahlby, 1998; Ladner and Schlomach, 2007; McBride, 2012; Peterson, 1994; Spencer and Yohe, 1970). For 1980-90, Peterson estimated a 22.1% private rate and a 7.0% public rate of return. The 15.1% gap is a proxy for the marginal cost of shifting resources from the private to the public sector. But some studies suggest that shifting resources from the private to the public sector can increase economic growth. One study (Amiel, Deller, and Stallman, 2011) concludes that "more restrictive TELs tend to be associated with faster convergence and higher rates of economic growth for lower income states. But as income increases, the positive impact of TEL restrictiveness on overall growth declines, and for very high income levels more restrictive TELs have either very little impact or negative impact on growth." The explanation for a potential negative impact of TELs on growth is unclear. That study hypothesizes that "in lower income states with restrictive TELs, state governments must use their more limited resources to provide the more productive public goods that are necessary for economic growth. In other words, TELs can impose some level of fiscal discipline that has a positive impact on the economy. But as income grows, the demand for higher level goods and services, such as recreational services or higher levels of spending on education, also grows, and restrictive TELs may prevent the required investments, placing downward pressure on growth." The Merrifield and Monson (2011) simulation of a population-plus-inflation-based TEL included separate, strict rules budget stabilization and emergency preparedness funds, and dynamic scoring of tax rebate effects. With only rebates, the more stable, slower rate of spending growth initiated in 1990 yielded 0.85% additional personal income by 2009.

A binding TEL will yield a mixture of tax rebates and lower tax rates. Despite the tedious nature of tax rebates, controversy over the basis for estimating the appropriate rebate for each taxpayer, and evidence that permanent tax cuts have larger economic growth effects than one-time rebates (Padquit, 2011; Poulson and Kaplan, 2008; Taylor, 2008), it will probably take some persistence in the payment of rebates to elicit the permanent cuts. Indeed, Colorado's TABOR Amendment yielded large tax rebates for several years in the late 1990s, before state legislators responded with several permanent tax cuts. Our forthcoming analysis assumes a rebate-cut mix.

Tax cuts impact economic growth more than tax rebates because tax rebates are seen primarily as transitory private income rather than permanent income. Transitory income mostly pays down debt, with little impact on consumption or investment spending. When 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.

Poulson and Kaplan (2008) measured the relationship between marginal tax rates (MTR) and state economic growth. The MTR is the increment in taxes paid when personal income rises. MTRs vary with tax structure (Reed, Rogers, and Skidmore, 2011). The nationwide MTR is the average of the marginal rates levied in each state. Poulson and Kaplan (2008) find that a drop in the MTR in state X relative to others is associated with higher economic growth in state X. Their regression analysis indicates that every one percentage drop in a state's aggregate MTR relative to the nation's average MTR raises that state's growth rate between 0.251 and 0.374 percent (RMTR).

Merrifield and Poulson (2014) used the Poulson and Kaplan (2008) estimates of the relationship between marginal tax rates and state economic growth to explore the impact of different TEL measures on economic growth in three states. What is clear from that analysis is that the heterogeneity of TEL rules matters in measuring their impact on economic growth. Further, the specific attributes of individual states, most importantly their level of income and unique tax structure, determine the impact that TELs have on their economic growth.

Dynamic Simulation Analysis of TELs

In this study we apply a dynamic simulation model to the basic TEL design options that include the four most widely adopted TEL designs. Other TEL designs are variations of these four, so our analysis is likely to capture the experience of states with those fiscal rules. Our population growth plus inflation TEL caps are similar to those adopted in seven states. The ones in California (1979 GANN Limit) and Colorado (1992 Taxpayer Bill of Rights) were at various points in time viewed as the most stringent state TELs. Because some legislators claim that external pressures, such as federal Medicaid mandates, can make population growth plus inflation TELs too stringent, one of our simulation models caps spending growth at population growth plus inflation plus 20%.

Personal income growth is the basis of most TEL caps, so the most recent annual rate of growth in personal income limits spending growth in one of our simulations, and a second simulation caps general fund spending growth at the average annual rate of growth in personal income during the previous ten years. The TEL designs linked to personal income growth are generally viewed as less stringent measures; indeed, often utterly unbinding as in the Florida example noted earlier. Legislators often ignore or easily evade statutory TEL/BSF measures. In this study we assume that the limits imposed on revenue and spending are binding constraints. The study focuses on differences in the design of these TEL/BSF measures, not on the extent to which they are enforced.

The noteworthy parameters of our baseline simulations are that spending is at the cap amount if revenue, or revenue plus BSF account balance, is equal to or greater than the cap amount. The BSF deposit-withdrawal rules allocate 100% of positive differences between revenue and the spending cap amount to the BSF, up to the BSF account balance cap of ten percent of expected General Fund spending. The full BSF balance is available each year to bridge gaps between revenue and the spending cap.

The TELs impact economic growth when they decrease the shift of resources from the private sector to the public sector. We employ a conservative estimate of six percent for the opportunity cost rate (Dahlby, 1998) of shifting resources from the private to the public sector. Consistent with Barro (1990), we assume that the opportunity cost rate applies to small changes typical of marginal transfers of resources form the private to the public sector. When the TEL reduces resource transfers from the private to the public sector, personal income rises.

TELs also impact economic growth when surplus revenue is offset by tax cuts or rebates. When a surplus (Revenue > [Exp + BSF Deposit]) triggers a reduction in a state's Marginal Tax Rate, we employ the conservative estimate in Poulson and Kaplan (2008) that a one percentage decrease in a state's marginal tax rate relative to the national average tax rate increases that state's rate of economic growth 0.251 percent.

We relied most heavily on the National Association of State Budget Officer's (NASBO.org) General Fund revenue, excluding Federal funds, data which begins with Fiscal Year 1998. Data problems forced us to exclude Alaska and New Mexico, which eliminated the need to assess whether Alaska should be excluded, which is common, because of its unique revenue mix. We used population estimates from the Census Bureau, price index data (CPI) from the US Department of Labor, and personal income data from the Bureau of Economic Analysis. For the simulation analysis we used the time period from 1993 to 2013, years in which the economy was growing, so that the results are not biased by the choice of starting and ending years.

After computing population plus inflation rates, and allowing for data availability lags[6], we computed each state's revised General Fund spending for 1998 onward as follows:

$$RSPEND_t = (RSPEND_{t-1} \times (1 + TEL_t)) \quad (1a)$$

When: $RSPEND_t < RREV_t$
or $RSPEND_t < RREV_t + BSF_t$

$$\text{Otherwise: } RSPEND_t = RREV_t + BSF_t \quad (1b)$$

With: $RSPEND_t$ = revised General Fund (GF) spending in fiscal year t
TEL_t = the spending growth rate cap for fiscal year t as a decimal
BSF_t = fiscal year t budget stabilization fund account balance
$RREV_t$ = year t General Fund revenue revised via dynamic scoring

A cap 'shortfall' occurs when: $RSPEND_t < (RSPEND_{t-1} \times (1 + TEL_t))$. Then:

$$SHORTFALL_t = RSPEND_t - (RSPEND_{t-1} \times (1 + TEL_t)) \quad (2)$$

$SHORTFALL_t \leq 0$. Shortfalls occur only after depletion of the BSF. The shortfall rate for year t is:

$$SHFALLRATE_t = SHORTFALL_t/RREV_t \quad (3)$$

Shortfalls reduce the RSPEND base for subsequent years creating the so-called ratchet-down effect (Poulson, 2009; Kioko, 2011). The year t ratchet-down effect is: $1 - (RSPEND_t/(RSPENDMAX_t))$. $RSPENDMAX_t$ is the spending level in year t if there had been no shortfalls prior to year t, or in year t. BSF outlays eliminate, reduce, or delay the ratchet-down effects of recessions.

[6] Fiscal year N budget making must rely on the calendar year N-2 population estimate, and the May, N-1 CPI.

We estimated a First Year (t=0) BSF account balance by applying the TEL cap to five previous years of spending data,[7] and allocating the net difference between actual and simulated spending to BSF_0. When cap level spending tops revenue $\{(RSPEND_{t-1} \times (1 + TEL_t)) > RREV_t\}$, we debited the BSF as follows:

$$BSFDEBIT = (RSPEND_{t-1} \times (1 + TEL_t)) - RREV_t), \text{ or } BSF_t, \text{ whichever is less.} \quad (4)$$

When cap level expenditure is less than revenue $\{(RSPEND_{t-1} \times (1 + TEL_t)) < RREV_t\}$, we deposited funds into the BSF as follows:

$$BSFDEPOSIT = (RREV_t - RPSEND_t) \text{ or } ((RSPEND_t \times 0.1) - BSF_{t-1}), \text{ whichever is less.} \quad (5)$$

When $RREV_t > RSPEND_t$, surplus revenue may also be available for taxpayer rebates, and for deposit into other state accounts, such as for emergency preparedness and capital investment.

$$SURPLUS_t = (RREV_t – RSPEND_t) – (BSF_t – BSF_{t-1}) \quad (6)$$

Surpluses, as defined above, trigger proportional marginal tax rate reductions. For example, a surplus that is ten percent of revised revenue, together with a parameter that mandates dissipating half of the surplus immediately (NCYC = 0.5), means a five percent, across-the-board MTR cut. If the TEL growth rule is a target rather than a limit, shortfalls, as defined above, trigger MTR increases. That generates personal income and tax revenue adjustments via dynamic scoring. When $SURPLUS_{t-1} > 0$, $GROWTH_t$ is:

$$GROWTH_t = (NCYC \times (SURPLUS_{t-1}/RREV_{t-1}) \times MTR_{t-1} \times RMTR) + GROWTH_{t-1} \quad (7)$$

Where: NCYC = 0.5 in our simulations. Individual states would set NCYC at the perceived non-cyclical share of the surplus or shortfall.
MTR_t = average MTR_t from Skidmore et al (2011) adjusted for MTR changes.
RMTR = growth rate increase per percentage point drop in MTR_t; from Poulson and Kaplan (2008).

To limit the scope of the analysis, we mostly examined the TEL growth rules as limits, not targets. So, in our simulations, $GROWTH_t = GROWTH_{t-1}$ in zero surplus or shortfall years. To examine the TEL rules as growth targets (not limits), when $SHORTFALL_t < 0$:

[7] Our General Fund expenditure data series begins five years sooner than the revenue data series.

$$GROWTH_t = (NCYC \times SHFALLRATE_t \times MTR_{t-1} \times RMTR) + GROWTH_{t-1} \quad (8)$$

$$RPI_t = ((RPI_{t-1} \times (1 + ((API_t - API_{t-1})/API_{t-1})) \times (1 + GROWTH_t)) + (OCR \times SURPLUS_t) \quad (9)$$

Where: RPI_t = revised personal income in fiscal year t.
API_t = actual personal income in fiscal year t.
OCR = opportunity cost rate (0.06).

Our simulations employ a conservative estimate of six percent for the opportunity cost rate (Dahlby, 1998) for shifting resources from the private to the public sector. 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. So, when our TEL reduces resource transfers from the private to the public sector, personal income rises.

MTR changes directly affect tax collections (STATIC), and then the personal income change that results from the MTR changes impacts tax revenue collection (DYNAMIC).

$$RREV_t = STATIC_t + DYNAMIC_t \quad (10)$$

When $SURPLUS_t \geq 0$:

$$DYNAMIC_t = (RPI_t - API_t) \times ((MTR_t/100) \times (1 - (NCYC \times (SURPLUS_{t-1}/RREV_{t-1})))) \quad (11a)$$

$$STATIC_t = ((1 + ((AREV_t - AREV_{t-1})/AREV_{t-1})) \times RREV_{t-1}) \times (1 - (NCYC \times (SURPLUS_{t-1}/RREV_{t-1}))) \quad (11b)$$

Where: $AREV_t$ = actual revenue for fiscal year t.

With a TEL rule-based growth target, when $SHORTFALL_t < 0$, DYNAMIC and STATIC will reflect a MTR increase:

$$DYNAMIC_t = (RPI_t - API_t) \times ((MTR_t/100) \times (1 - (NCYC \times SHFALLRATE_t))) \quad (11c)$$

$$STATIC_t = ((1 + ((AREV_t - AREV_{t-1})/AREV_{t-1})) \times RREV_{t-1}) \times (1 - (NCYC \times SHFALLRATE_t)) \quad (11d)$$

Recall that a shortfall occurs only after the depletion of the BSF. In many years, for many states, SURPLUS and SHORTFALL equal zero, and equations (11a) and (11c) become identical; likewise for (11b) and (11d). Even when $SURPLUS_t$ and $SHORTFALL_t$ are zero, $DYNAMIC_t$ can still be non-zero because of net MTR changes prior to year t.

Empirical Results

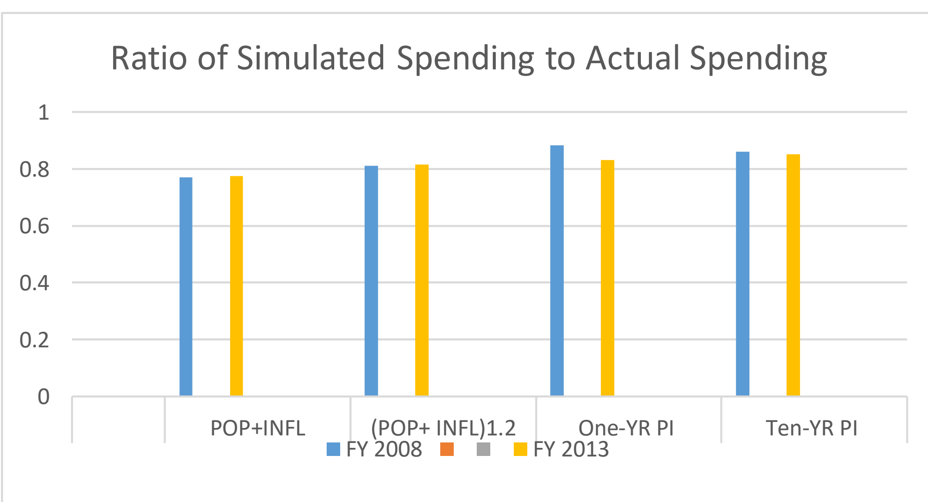
We present the simulation results that address the major issues in the TEL literature. First, we compare the effectiveness of TELs in constraining state spending. The second measures compare the impact of different TELs on budget stabilization over the business cycle. The third measures capture the 'ratchet down effects' of the different TELs. The fourth measure captures the impact of the TELs on economic growth and revenues. We present results for two growth years (FY 2008 and FY 2013) and two recession years: FY 2003, the peak of the '911 Recession', and for FY 2010, the peak of the 'Great Recession'. The more detailed simulation results are presented in a technical appendix.

Constraining State Spending

The dynamic simulation analysis indicates that each of the TEL measures would have significantly reduced state spending over the time period analyzed. For each TEL basis we examined, Table 2 compares the ratio of simulated spending to actual spending for 2008 and

Table 2: Ratio of Simulated to Actual Spending

TEL Cap Basis	FY 2008	FY 2013
POP+INFL	77.10%	77.50%
(POP+ INFL)1.2	81.10%	81.60%
One-YR ΔPI	88.30%	83.10%
Ten-YR Avg ΔPI	86.10%	85.10%

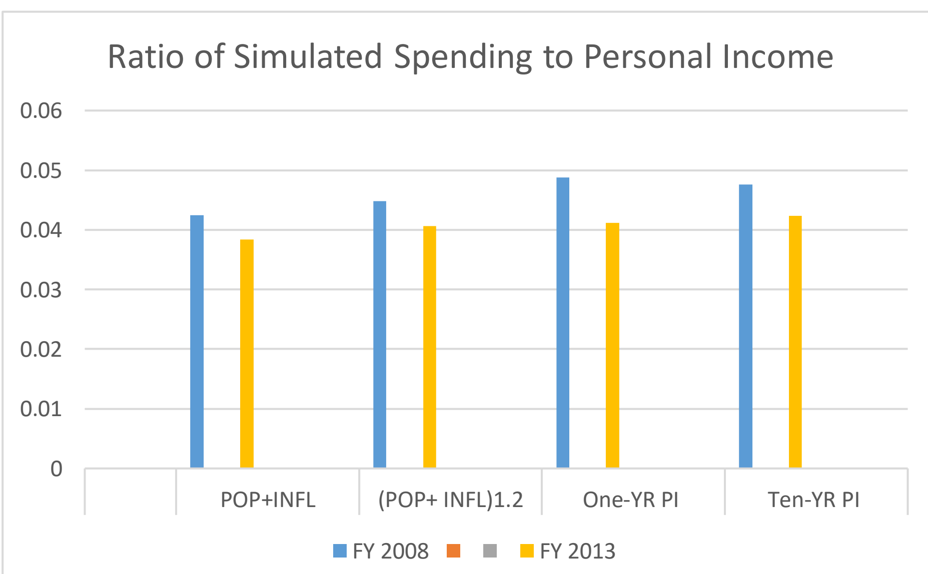


2013; TEL impacts undistorted by the effects of recession. We see that TEL measures based on population growth and inflation are up to eleven percent more stringent in constraining state spending than TELs based on personal income growth; averaging about twice the reduction achieved by a Personal Income TEL basis. However, the fact that TELs based on personal income growth would have significantly reduced spending reveals the extent to which actual spending growth exceeded personal income growth over the period, despite the impact of two recessions.

Those results are consistent with another measure of spending constraint, the ratio of simulated spending to personal income (Table 3). Again, we use the years FY 2008 and FY 2013 as the basis for our comparisons. The average ratio of actual spending to personal income at the

Table 3: Ratio of Simulated Spending to Personal Income

TEL Cap Basis	FY 2008	FY 2013
POP+INFL	4.25%	3.84%
(POP+ INFL)x1.2	4.48%	4.06%
One-YR PI	4.88%	4.12%
Ten-YR PI	4.76%	4.24%

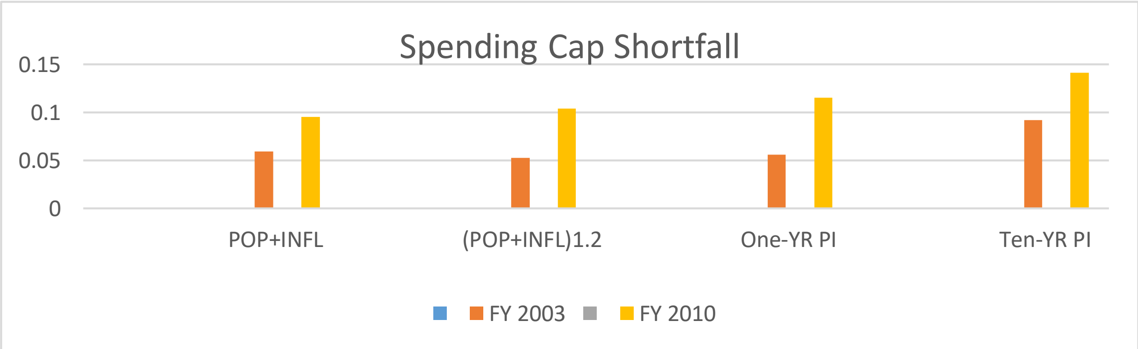


beginning of the period was 5.5 percent. The sharpest drop in the ratio of simulated spending to personal income by the end of the period is for the TEL linked to population growth and inflation, 3.84 percent, leaving spending 0.4% larger at 4.24% with the least stringent Personal Income TEL.

Since other chapters in this volume deal extensively with budget stabilization funds, we limit our attention to this issue to the spending gap, i.e. the shortfall (Table 4) between simulated spending and the spending cap imposed by the TEL during recessions. TELs linked to population growth plus inflation are more effective in stabilizing the budget over the business cycle (smaller shortfalls, fewer states have them), but even with those fiscal rules in place, many states would have seen sizable shortfalls in spending during the recession years. For example, when the TEL basis comparison is the average personal income increase in the previous ten years versus population plus inflation, more than twice as many states (35 vs. 17) have shortfalls, and the average shortfall of the 35 is more than half again as big (9.2% vs. 6.0%) as the shortfall of the seventeen. The severity of the 'Great Recession' is captured in the simulations. During the 'Great Recession', only about 1/3 as many states achieve spending growth at the cap amount as during the preceding '911 Recession.

Table 4: Spending Cap Shortfalls of States with Shortfalls

TEL Cap Basis	FY 2003	FY 2010
POP+INFL	6.0% / 17	9.5% / 38
(POP+INFL)1.2	5.3% / 19	10.4% / 38
One-YR PI	5.6% / 28	11.5% / 40
Ten-YR PI	9.2% / 35	14.1% / 45



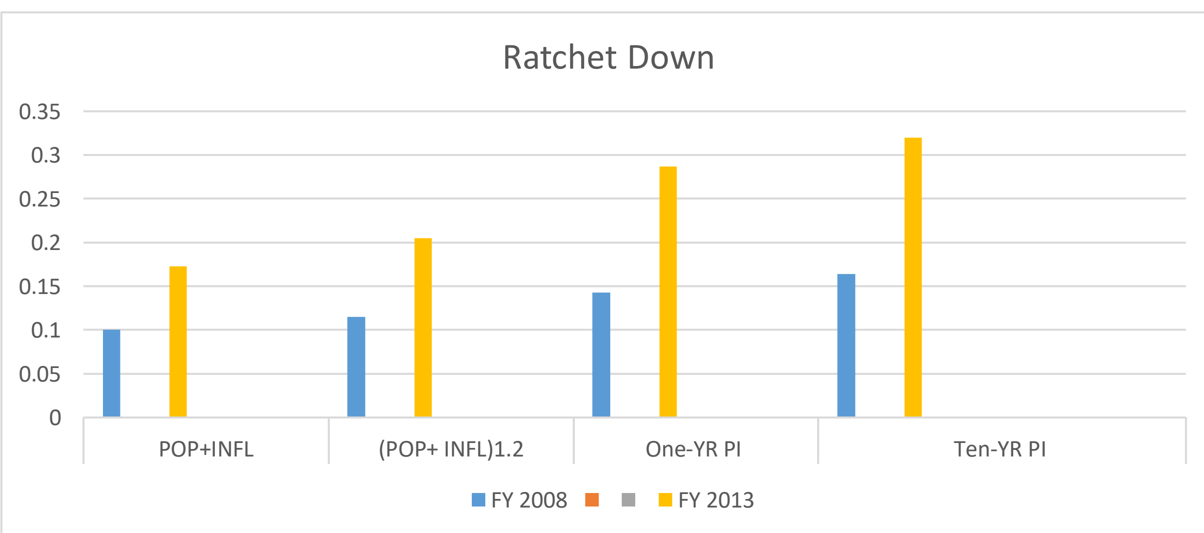
‘Ratchet Down Effects’

Since our simulations set the cap amount for each year as growth from the current year, shortfalls will ratchet-down future spending limits. In another study, (Merrifield and Poulson, 2014) we explore the alternative approach in which the TEL limit is applied to the prior year limit, and the TEL limit grows over time independent from actual revenue and spending.

Table 5 provides the ratchet-down effects of the different TELs. Years of economic growth and recovery, FY 2008 and FY 2013, are chosen to capture this ‘ratchet down effect’. Because the ‘ratchet down effects’ are cumulative over time, the average ‘ratchet down’ in FY 2013 is greater than that in FY 2008 for all TEL designs. With the population plus inflation TELs fewer states see ratchet-down effects, and where present, the ratchet-down effects are smaller. Part of the reason for the large differences between the population-plus-inflation and personal income TELS, and between the simulated 2008 and 2013 spending with the personal income TELs and the no-shortfall level is

Table 5: Ratchet-Down Effects of those Ratcheted Down

TEL Cap Basis	FY 2008	FY 2013
POP+INFL	10.0% / 25	17.3% / 43
(POP+ INFL)1.2	11.5% / 30	20.5% / 45
One-YR PI	14.3% / 43	28.7% / 48
Ten-YR PI	16.4% / 44	32.0% / 48



that the personal income TELs are widely non-binding in the long-run; binding in some states in high economic growth years, but not over multiple years. The so-called personal income TEL ratchet-down effects are larger than the difference between simulated and actual spending. That is, most states would have spent more in 2008 and 2013 than they actually spent those years had they grown their General Fund spending every year by the personal income TEL cap rate. The ratchet-down effects are largely responsible for the Table 2 result that simulated spending is below actual, even when spending can grow as fast as personal income. So, limiting spending growth over previous actual spending to personal income growth amounts to a long-run strategy to shrink the relative size of *most* state governments. For those who favor that, note from Table 6 that four states were capable of increasing spending growing every year through 2008 by either personal income growth measure. It may have taken the severity of the Great Recession to knock them off that path.

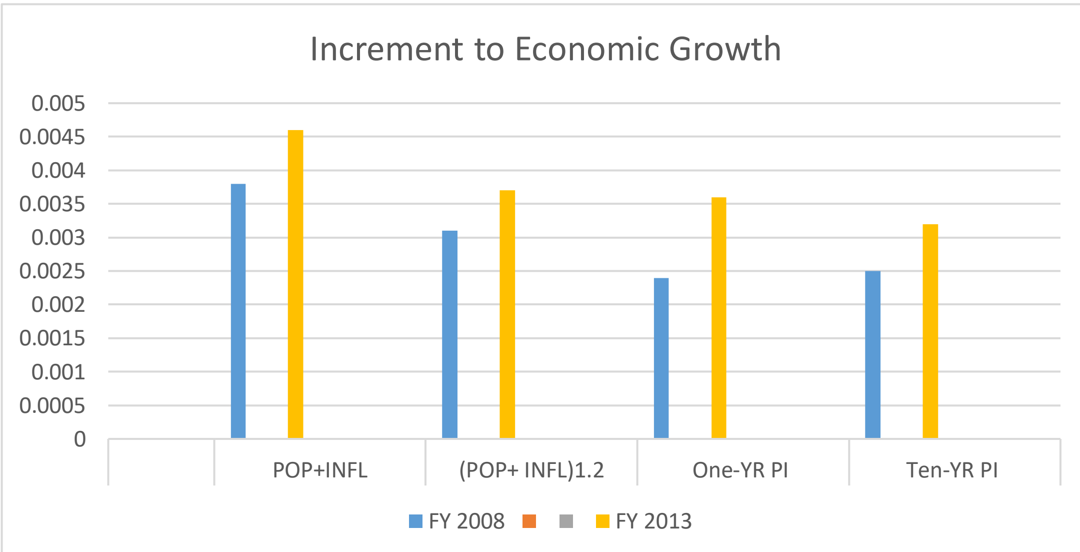
The Supply Side Effects of TELs: Economic Growth and Revenue

In our dynamic simulation analysis each of the TEL designs reduce state spending as a share of personal income and thus stimulate a higher rate of economic growth. In these simulations we assume an across the board cut in the marginal tax rate for each state relative to the national average marginal tax rate, any residual surplus is then offset by tax rebates. In the dynamic simulation model these tax cuts stimulate higher rates of economic growth over and above the stimulus to economic growth from decreased spending as a share of personal income.

Table 7 reveals that the TELs linked to inflation plus population growth are accompanied by greater increments to growth compared to TELs based on personal income growth.

Table 6: Personal Income Growth

TEL Cap Basis	FY 2008	FY 2013
POP+INFL	0.38%	0.46%
(POP+ INFL)1.2	0.31%	0.37%
One-YR PI	0.24%	0.36%
Ten-YR PI	0.25%	0.32%



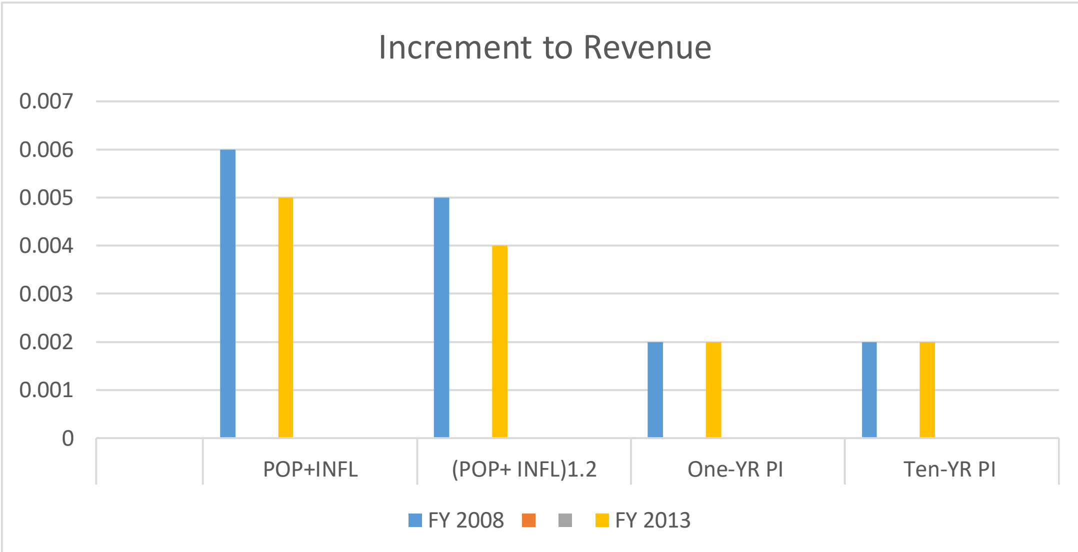
While the difference in growth rates is not great, over time this differential in growth rates can result in significant differences in personal income per capita. The increments to growth are cumulative over time, so the increments to growth are larger in FY 2013 than in FY 2008.

The supply side effect of TELs on state revenue is of course determined by their impact on economic growth. Again we have chosen the years of growth and recovery, FY 2008 and FY 2013 to illustrate the supply side effect of TELs on revenue growth. As we would expect, the increments to revenue growth (Table 7) with TELs linked to inflation plus population growth are greater than that for TELs based on personal income growth. The increments to revenue growth are also cumulative, so the increments to revenue growth in FY2013 exceed that for FY 2008.

Table 7: Increment to Revenue

TEL Cap Basis	FY 2008	FY 2013
POP+INFL	0.6%	0.5%
(POP+ INFL)1.2	0.5%	0.4%

One-YR PI	0.2%	0.2%
Ten-YR PI	0.2%	0.2%



Sensitivity Analysis

In the baseline simulations several assumptions are made in estimating the BSF. The first sensitivity test compares the findings of our simulations with the BSF limit set at ten percent of General Fund spending to a zero balance cap. While the elimination of the BSF reduced spending and thus increased personal income, it also increased the number and size of ratchet-down effects. However, differences in the four TELs we simulated affected budget stability much more than the difference between a zero and ten percent BSF account limit.

Sensitivity tests for other model parameters yielded more straightforward outcomes. The baseline simulations combine tax cuts with tax rebates. The sensitivity tests with tax rebates only resulted in modest increments to growth and revenue in the long run. For the TELs to generate significant increases in economic growth and revenues it is essential that surplus revenue be offset with permanent tax cuts rather than temporary tax rebates.

Finally, sensitivity tests were conducted using the upper bound estimates in Poulson and Kaplan (2008) for the output effects of reductions in the marginal tax rate. As we would expect, with that parameter, and surplus revenue offset by tax cuts, the TELs are associated with even greater increments to economic growth and revenues, but the other findings were not greatly affected by the dynamic scoring rate.

Conclusion

The fiscal stress experienced by the states in recent recessions has renewed interest in TELs. Most of the literature on TELs focuses on their role in constraining state spending. More recently the research on TELs has explored their impact in stabilizing state budgets over the business cycle. Recent research has also explored the supply side impact of TELs in promoting economic growth and the increased revenue that accompanies that growth.

In this study a dynamic simulation model explores differences in the impact of four TEL designs that are representative of the TEL measures introduced in most states. These include two population growth plus inflation TELs and two personal income growth TELs. The dynamic simulation model was estimated for 48 states over the period 1993-2013. These dynamic simulation results provide insight into the design of TELs.

Each of the TELs would have reduced state spending relative to actual state spending over this period. These measures would also have reduced state spending relative to personal income over the period. This evidence reveals the extent to which the actual TEL measures in place in the states were eroded, allowing state spending to outpace the growth in personal income over this period. As we would expect, the TEL measures based on population growth plus inflation are more stringent in constraining the growth in state spending than the measures based on personal income growth, and now we know by how much. Individual states can use our model to assess how the TEL alternatives would impact them.

A comparison with actual spending over the business cycle reveals that each of our TEL designs would have improved budget stability during recent recession. Different measures are introduced to compare spending stability, including measures of variance, and measures of the cyclical component of spending. Simulated spending shortfalls relative to spending caps are also used to measure the effectiveness of the TEL measures in stabilizing spending during recessions. While all the TEL measures would have reduced these spending gaps, the TELs linked to inflation plus population growth are more effective in stabilizing budgets over the business cycle compared to TELs based on personal income growth. These TEL measures would have allowed the states to build up sizeable BSF funds in the years of economic growth and recovery.

A controversial issue in this TEL literature is the ‘ratchet down effect’ of TELs over time. The ‘ratchet down effect’ of TELs linked to inflation and population growth are not as great as that for TELs based on personal income growth. These ratchet down effects’ are cumulative over time.

The TEL measures based on population growth and inflation are more effective in promoting economic growth than those based on personal income growth. They are also more effective in generating the increased revenue to offset the static revenue loss from tax cuts.

Sensitivity analysis reveals that when the TELs are linked to tax rebates rather than tax cuts they are significantly less effective in promoting higher rates of economic growth and increased revenue. Linking TELs to a BSF modestly reduces their effectiveness in promoting economic growth and increased revenue.

These dynamic simulation results reveal important tradeoffs in the design of TELs.. Most states have chosen a TEL based on personal income growth because these measures are less stringent in constraining the growth in state spending compared to TELs based on population growth plus inflation. However, the TEL designs linked to population growth and inflation have significant advantages compared to TELs based on personal income growth. The TELs based on population growth and inflation achieve better budget stabilization, and are accompanied by less ratchet down effect over the business cycle. They also stimulate higher rates of economic growth and revenue.

The TEL based on population growth plus inflation (1.2) would appear to be a good compromise in this tradeoff. That TEL is not as stringent in constraining the growth in spending, yet has the advantage of improved budget stabilization and higher growth in income and revenues. These tradeoffs in the design of TELs are important to consider, especially in states attempting to recover and grow from recent recessions. A more modest rate of growth in state spending may be a price worth paying for states to achieve better budget stability as well as a higher rate of economic growth. Improved budget stability may also be necessary to politically sustain stringent TELs.

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Appendix A

More Detailed Tables and More Findings

Table A1 GF/PI

TEL Cap Basis	FY1999	FY2003	FY2008	FY2010	FY2013
Pop+Infl	5.28%	4.85%	4.25%	4.10%	3.84%
(Pop+Infl)x1.2	5.33%	4.95%	4.48%	4.26%	4.06%
One-Yr ΔPI	5.50%	5.20%	4.88%	4.40%	4.12%
Ten-Yr Avg ΔPI	5.55%	5.18%	4.76%	4.42%	4.24%

Table A2 Sim GF ÷ Actual GF

TEL Cap Basis	FY1999	FY2003	FY2008	FY2010	FY2013
Pop+Infl	94.6%	90.3%	77.1%	80.5%	77.5%
(Pop+Infl)x1.2	95.5%	92.1%	81.1%	83.4%	81.6%
One-Yr ΔPI	98.7%	96.8%	88.3%	86.1%	83.1%
Ten-Yr Avg ΔPI	99.6%	96.3%	86.1%	86.2%	85.1%

Table A3 # of states with GF at Cap

TEL Cap Basis	FY1999	FY2003	FY2008	FY2010	FY2013
Pop+Infl	46	31	47	10	48
(Pop+Infl)x1.2	46	29	46	10	48
One-Yr ΔPI	35	20	40	8	46
Ten-Yr Avg ΔPI	47	13	43	3	46

Table A4

Shortfall	for those with a	Shortfall		

TEL Cap Basis	FY1999	FY2003	FY2008	FY2010	FY2013
Pop+Infl	3.16%	5.95%	5.79%	9.51%	0.00%
(Pop+Infl)x1.2	4.57%	5.26%	7.94%	10.41%	0.00%
One-Yr ΔPI	5.4%	5.6%	4.7%	11.5%	1.0%
Ten-Yr Avg ΔPI	2.9%	9.2%	3.9%	14.1%	7.3%

Table A5

Personal Income Gain

TEL Cap Basis	FY1999	FY2003	FY2008	FY2010	FY2013
Pop+Infl	0.02%	0.18%	0.38%	0.40%	0.46%
(Pop+Infl)x1.2	0.01%	0.15%	0.31%	0.33%	0.37%
One-Yr ΔPI	0.02%	0.10%	0.24%	0.25%	0.36%
Ten-Yr Avg ΔPI	0.02%	0.12%	0.25%	0.27%	0.32%

Table A6

Increment to Revenue

TEL Cap Basis	FY1999	FY2003	FY2008	FY2010	FY2013
Pop+Infl	0.02%	0.21%	0.46%	0.54%	0.59%
(Pop+Infl)x1.2	0.02%	0.17%	0.37%	0.43%	0.48%
One-Yr ΔPI	0.03%	0.10%	0.29%	0.33%	0.46%
Ten-Yr Avg ΔPI	0.02%	0.14%	0.31%	0.36%	0.42%

Table A7

w/o Ratchet-Down

TEL Cap Basis	FY1999	FY2003	FY2008	FY2010	FY2013
Pop+infl	45	26	23	6	5

(Pop+infl)x1.2	44	21	18	4	3
One-Yr ΔPI	35	9	5	0	0
Ten-Yr Avg ΔPI	47	10	4	0	0

Table A8	Ratchet-	Down Effect of	Those	Ratcheted Down	
<u>TEL Cap Basis</u>	FY1999	FY2003	FY2008	FY2010	FY2013
Pop+infl	2.1%	9.4%	10.0%	16.9%	17.3%
(Pop+infl)x1.2	2.3%	10.3%	11.5%	20.1%	20.5%
One-Yr ΔPI	5.4%	12.8%	14.3%	28.5%	28.7%
Ten-Yr Avg ΔPI	2.9%	14.3%	16.4%	30.8%	32.0%