

The Colorado Revenue Limit: The Economic Effects of TABOR

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In November 2005, Colorado residents voted to suspend for five years the state's self-imposed revenue caps as outlined in the state's Taxpayer Bill of Rights (TABOR). TABOR, which was passed as a constitutional amendment in 1992, limits the growth rate of revenue to population growth and inflation. The effects of TABOR on government spending and economic growth have been hotly debated in recent years. Proponents attribute much of Colorado's economic prosperity in the period immediately following adoption of the law to the limit and its effect on government spending and taxes.¹ Opponents of TABOR argue that TABOR-induced reductions in government spending have led to curtailed government services, including those that voters and businesses care most about.²

To understand TABOR's effect on Colorado's economic health and growth, we compare Colorado with other states, controlling for prior history and economic and demographic characteristics in order to disentangle the effects of TABOR from other factors influencing Colorado's economic performance.

We begin with a description of TABOR and Referendum C, the measure enacted in November 2005 that suspended TABOR for five years and

modified some of TABOR's requirements. We compare TABOR to tax and expenditure limits (TEs) in other states. TABOR is by many measures the most binding TEL in the country. We also describe how TABOR interacts with other Colorado budget rules. We then describe the mechanism by which TELs might strengthen local and regional economies, and review the extensive empirical literature on both the effect of TELs on taxes and spending and on the effect of taxes on business location and economic growth. The meat of our analysis compares the growth rate of personal income and employment in Colorado with the growth rates in other states in the periods before and after passage of TABOR. While we find some very limited evidence for short-term increases to growth, those were not sustained in the longer term. The lack of a sustained effect holds up after controlling for economic and demographic characteristics of the states. The results of those analyses show that there is little empirical support for the notion that TABOR had a positive effect on Colorado's economy.

The Taxpayer Bill of Rights Law And Other Recent TELs

Twenty-eight states have some state spending or revenue limit in place. With the passage of TABOR in November 1992, Colorado voters approved the most restrictive measure yet. The Colorado law applies to all taxing districts within the state. Voter approval is required to approve tax increases, including tax rate increases, the imposition of new taxes, and increases in property tax assessment ratios. The law also explicitly prohibits the implementation of certain types of taxes, including new or increased real estate transfer taxes, local income taxes, state property taxes, and state income tax surcharges. It requires voter approval to change any existing spending limits (including the statutory spending limit discussed below) or revenue growth limits. Finally, and arguably most importantly, TABOR restricts general revenue to the prior year's revenue adjusted for population growth and inflation. Any excess revenue must be given back to the

¹See, e.g., New and Slivinski (2005) and Poulson and Holcombe (2005).

²The Center on Budget and Policy Priorities has summarized the direct effect of TABOR on government services (Bradley and Lyons 2005) and has evaluated how Colorado's experience is different from other states (Bradley 2005).

population through tax reductions or cash rebates.³ Voter approval is needed to override any of those provisions.⁴

TABOR is more restrictive than other TELs because of the confluence of several factors.⁵ First, because the law was passed as a constitutional amendment rather than a statutory law, it may be amended only by a popular vote. Even temporary overrides of the TABOR limit in nonemergency situations require voter approval. While there are provisions for a supermajority of the legislature to pass an override in case of an emergency, the definition of an emergency is fairly restrictive. An emergency excludes economic conditions, revenue shortfalls, and governmental salary or benefit increases. Thus, emergencies are generally limited to natural disasters. Colorado has not used the emergency provision.

There is little empirical support for the notion that TABOR had a positive effect on Colorado's economy.

Second, the growth rate mandated under TABOR is based on inflation and overall population growth. This limit is more restrictive than limits in other states that generally allow growth to increase at the rate of personal income growth or, in some cases, by the maximum of either income growth or inflation. As a result, taxes in Colorado will fall as a share of income if income grows faster than inflation. Only three other states have a limit based solely on population and inflation, and in those states, the limit either applies to the proposed rather than the enacted budget, or applies only to limited portions of the state budget.

The TABOR limit can be particularly onerous because it does not take into consideration higher natural growth rates that can occur in specific

expenditure programs. For example, if the overall population growth rate is lower than the increase in the growth rate of those under 21, the TABOR limit will lead to either a decline in per-pupil expenditures (if the same percent of revenue is earmarked for education) or cuts in real per capita spending in other areas. Also, the inflation rate for many government services is higher than the general inflation rate (for example, for medical expenditures), so the TABOR limit will require cuts in either the real level of service for a specific program (such as Medicaid expenditures) or again lead to cuts in other programs to offset the growth.

Finally, because the TABOR limit is based on the prior year's revenue rather than the prior TABOR limit, any decline in revenue due to a recession leads to a permanent decrease in spending levels. Thus, when the restrictive formula causes temporary declines in revenue from existing sources, it leads to permanent declines in revenue.⁶

Colorado's limit applies to overall revenue rather than expenditures, which are typically what state TELs limit (and what Colorado's Arveschoug-Bird limit, described below, applies to). In theory, because of balanced-budget rules in place in most states, limiting expenditures should be equivalent to limiting revenue. In practice, expenditure limits have been found to be less restrictive, in part because they tend to be less comprehensive in their coverage. It is also often the case that a TEL on expenditures applies only to general fund expenditures, giving legislatures the discretion to shift funding allocations from general funds to special fund accounts.

It is important to note that the passage of TABOR was not a static event. Supporters had tried to pass a revenue limit multiple times before 1992, and a state expenditure limit has been in place in Colorado since 1977.⁷ Since 1977, growth in Colorado's general fund spending was limited to 7 percent over the prior year's spending. It required excess revenue to be allocated first to a reserve fund and then to property tax relief. This early spending limit was

³Note that rebates were not actually triggered by TABOR until 1997.

⁴We largely relied on Colorado's Legislative Council Staff Publication No. 518 (2003) for our discussion of the specific details concerning TABOR and the other Colorado fiscal measures. For example, Appendix D of the publication lists the 19 ways money is refunded to taxpayers, including tax credits and increased deductions. The primary rebate method is through checks distributed as sales tax refunds, with amounts being based on different categories of gross income and filing status. We also reviewed the relevant sections of Colorado Constitution articles IX and X.

⁵Both opponents and supporters of TABOR generally agree that Colorado currently has the most restrictive limit in place. For a more comprehensive comparison of factors influencing the restrictiveness of various provisions of state tax and expenditure limits, see Bradley and Lav (2005) and New (2001).

⁶This feature of TABOR, which can result in a permanent ratcheting down of revenue, was changed with the passage of Referendum C in 2005.

⁷This pattern of refining limits and earmarking spending choices is not uncommon. For example, in 1978, California voters passed Proposition 13, which limited increases in property taxes, but they also specified that any new state taxes needed to be approved by two-thirds of the Legislature. In 1980 the Gann amendment passed, which was a general fund spending limit requiring rebates to be mailed if available revenue would lead to general fund spending that would exceed the limit. That was changed in 1988 with passage of Proposition 98, which specified that part of the excess revenue would go for education spending, and specified formulaically the growth rate and percentage of the general fund that must be spent on education. There have been more than 20 additional fiscal ballot measures proposed in California.

amended in 1991 (the Arveschoug-Bird provision) to limit annual appropriations to the lesser of 5 percent of Colorado personal income or 6 percent over the prior year's general fund appropriations. This 6 percent limit is less restrictive than TABOR in that it includes a number of exemptions, such as spending required for property tax reappraisals and spending required to meet federal or court mandates.⁸ Voter-approved revenue sources are also exempt from the limit and the legislature can override the spending limit for a state fiscal emergency. When TABOR was adopted in 1992, these earlier limits remained in force.

In 2000, voters passed Amendment 23, which earmarks revenue equal to one-third of 1 percent of Colorado taxable income for a State Education Fund. The diversion is exempt from the TABOR limit, so it reduced the amount of the TABOR refund in the first year of Amendment 23's implementation. However, in the following two years, the TABOR limit did not bind, and the revenue diversion resulted in a reduction in available revenue and a consequent decrease in the calculated TABOR limit in the following year (because TABOR-covered appropriations were cut). In general, the interaction between Amendment 23 and TABOR will result in more required spending on education and less revenue for other categories of spending.

In the aftermath of the recession at the beginning of this decade, those provisions would have led to an expected real decline in available revenue from fiscal 2001 to fiscal 2007 of \$1.9 billion (or about a 20 percent reduction in the fiscal 2007 budget). During the recession of 2001, revenue and spending were limited by declining revenue rather than any caps imposed by TABOR or expenditure limits. However, because the TABOR limit is based on the prior year's revenue, that decline led to a permanent ratcheting down of spending even after the economy began to recover. Thus, even though the recent recovery would have led to expanding revenue and an ability to repay programs that were cut during the recession, existing TABOR rules would have required rebating those funds to taxpayers.

The Colorado Legislative Council staff evaluated the fiscal issues facing Colorado because of the various fiscal limits and requirements in place. That evaluation led to the proposal and passage of Referendum C in November 2005.⁹ Referendum C — which had broad bipartisan support, including endorsements from the business community, the Re-

publican governor, and the Democratic legislative leadership — suspends the TABOR revenue limit for five years and changes the growth factor to apply to the prior year's limit rather than actual revenue. Referendum C earmarks the additional revenue that would exceed the TABOR limit to specific types of spending, including education expenditures, transportation financing, and payments into pension programs for public employees. It also mandates a temporary decrease in the income tax rate in 2011 from 4.63 percent to 4.5 percent. The TABOR limit will also be reset based on the year with the strongest revenue in the 2006-2011 period.

How Might a TEL Boost Economic Growth?

There are two steps in the mechanism by which TABOR might have a positive influence on the local economy. First, TABOR would need to have a significant effect on the level of taxes in Colorado. Specifically, TABOR would need to reduce tax burdens without harming spending on public services of benefit to businesses and the economy. Second, the reduced taxes would need to have a positive effect on economic growth. Luckily, there is considerable, if not completely settled, empirical literature on each of those questions.

The empirical literature on the effects of TELs on taxes and spending has evolved over the last 15 years or so. Before 1991 most studies of the effect of TELs on taxes and spending concluded that limits had little effect (for example, see the studies of New Jersey by Merriman (1987) and of Arizona by Fisher and Gade (1991)). But beginning with Preston and Ichniowski (1991), in which the authors examine the impact of TELs on municipal government spending and property taxation, more recent studies have found significant and seemingly robust effects of TELs on the level of both taxes and spending. For example, in a cross-sectional study of the states, Poterba and Rueben (1995) found that the public-sector wage premium is smaller in states with effective property tax limits. Cutler, Elmendorf, and Zeckhauser (1999) found that Proposition 2 1/2 in Massachusetts had a negative effect on the level of municipal property taxes. Dye and McGuire (1997) and Dye, McGuire, and McMillen (2005) found that the tax cap in Illinois, which was imposed on local governments in only a select number of counties, reduced the growth rate of both property taxes and spending in the affected jurisdictions. The question whether relatively stringent TELs affect the level and growth rate of taxes and spending seems to have been decisively answered in the affirmative.

Despite an even larger body of empirical evidence, the question whether taxes have a significant negative effect on economic growth remains unresolved. McGuire (2003) provides an interpretive survey of the empirical literature. The empirical studies come

⁸For a complete description of the provisions of the Arveschoug-Bird limit, see Colorado General Assembly Office of Legislative Legal Services memo dated November 1, 2004.

⁹Referendum D, an accompanying bond measure, was also part of the fiscal package proposed, but it was defeated by voters.

in two forms: those that examine the effect of differences in taxes and spending at the state, regional, or metropolitan level (interarea or interregional studies) and those that examine the effect of differences in taxes and spending at the local jurisdictional level within a metropolitan area (intrametropolitan studies). McGuire argues that the findings regarding interregional studies — the level of examination relevant for understanding the effects of TABOR on Colorado's economy — are not robust. Depending on the decade studied and the measures used, one can find significant effects of taxes on economic growth or not. Still, others who have surveyed the literature, including Bartik (1991) and Wasylenko (1997), argue that the weight of the evidence falls on the side of taxes having a statistically significant though small negative impact on business location decisions and economic growth. It is important to note that several of those studies, including one well-regarded early study (Helms 1985), found that how tax revenue is spent matters as well. Thus, reduced taxes that are accompanied by reductions in spending on services — such as education — that benefit the economy and businesses can have a negative effect on economic growth.

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In sum, the first step in the two-step mechanism needed for TABOR to have a positive effect on the economy seems to be firmly established in the empirical literature: TELs have been shown to have a significant negative effect on the level of taxes (and, importantly, spending). The empirical validity of the second step has not been demonstrated conclusively. At the interregional level, lower taxes may or may not have a significant and positive effect on business location decisions and other measures of economic growth.

An Empirical Study of the Effect of TABOR On Colorado's Economy

To explore the effect of TABOR on Colorado's economy we employ two different empirical approaches. Each method measures economic growth in two ways: annualized growth rates in employment and annualized growth rates in real per capita income. The first approach presents simple comparisons of growth rates in Colorado to those in other states before and after passage of TABOR. That method tries to identify the effect of an event by comparing Colorado's relative performance before

and after the event. That comparison of similar states before and after passage of TABOR does not control well for other factors that may have influenced the growth rates of Colorado and the other states. To control simultaneously for various factors that have been shown to influence state economic growth (for example, geographic, demographic, and industrial-mix factors), we employ regression analysis. We need to stress that these results are based on time-series comparison of Colorado to other states. To the extent that there are other contemporaneous factors that affect Colorado's growth rates that are not captured by these variables, we will attribute those effects to TABOR as well.¹⁰

Similar State Comparisons

Our first empirical strategy is to compare Colorado with other states with similar attributes and examine how growth in real per capita personal income and employment differ before and after implementation of TABOR. We consider the period from 1978 through 1992 to be the pre-TABOR period, and the period 1993 through 2003 to be the post-TABOR period.¹¹ We also further break down the post-TABOR period into the period immediately following passage (through 1998) and the five years after that (1998-2003). That way we can see if the long-run and short-run effects of the limit differ. Those results compare Colorado with several different groupings of states: states that are geographically proximate to Colorado (neighboring states and various categories of mountain and western states), states with a similar industrial mix, states with a similar reliance on military spending, states with a similarly aged population, and states with a similar distribution of people by education level.

Table 1 presents growth rates for real per capita personal income for the pre- and post-TABOR periods in the first two columns. Column three displays the difference in growth rates between the two periods, and column four shows how that difference varies from that found in Colorado, with positive and negative numbers indicating that the comparison state(s) had a bigger or smaller boost in growth between the two periods than did Colorado. For example, the figure of 0.04 percent indicates that the boost to growth between the two periods for the unweighted average of the mountain states (from 0.44 percent to 1.51 percent) was greater than

¹⁰See Lyons and Johnson (2006) for examples of potentially relevant factors that are unique to Colorado and not captured by our research method.

¹¹We explored using different pre-TABOR periods including using 5, 10, and 15 years. We chose the longest period to best capture long-run growth trends.

Table 1. Real Per Capita Personal Income: Annualized Growth Rate Before and After TABOR (1993)

Real per capita personal income (\$2,000) (annualized growth rates — % change)	15 years pre-TABOR (1)	10 years post-TABOR (2)	Diff. over time (3)	Diff. with Col. (4)	5 years post-TABOR (5)	Diff. over time (6)	Diff. with Col. (7)	1998-2003 (8)	Diff. over time (9)	Diff. with Col. (10)
Colorado	1.06%	2.10%	1.03%		2.96%	1.90%		1.24%	0.18%	
Mountain ^a	0.44%	1.51%	1.07%	0.04%	1.86%	1.42%	-0.47%	1.17%	0.73%	0.55%
Neighbors ^b	0.53%	1.75%	1.23%	0.19%	2.15%	1.62%	-0.27%	1.36%	0.83%	0.66%
West ^c	0.60%	1.34%	0.74%	-0.29%	1.73%	1.13%	-0.76%	0.95%	0.35%	0.17%
West North Central ^d	0.63%	1.90%	1.27%	0.24%	2.74%	2.11%	0.22%	1.07%	0.44%	0.26%
Industry mix ^e	0.80%	1.53%	0.73%	-0.30%	2.38%	1.58%	-0.31%	0.69%	-0.11%	-0.29%
Federal military GSP ^f	0.90%	1.61%	0.72%	-0.32%	2.21%	1.31%	-0.59%	1.02%	0.13%	-0.05%
65+ ^g	0.60%	1.59%	0.99%	-0.04%	2.27%	1.67%	-0.23%	0.92%	0.32%	0.14%
College degree+ ^h	1.60%	1.74%	0.14%	-0.89%	2.25%	0.65%	-1.24%	1.24%	-0.36%	-0.53%
Mean (all states)	0.99%	1.57%	0.59%	-0.45%	2.14%	1.16%	-0.74%	1.00%	0.02%	-0.16%
Standard deviation (all states)	0.57%	0.45%	-0.12%		0.73%	0.16%		0.61%	0.04%	

^aIncludes Arizona, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming.
^bIncludes Kansas, Nebraska, New Mexico, Utah, and Wyoming.
^cIncludes mountain, Arkansas, California, Hawaii, Oregon, and Washington.
^dIncludes Idaho, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.
^eIncludes Arizona, Florida, Utah, and Washington.
^fIncludes Alabama, Kansas, Nebraska, Oklahoma, and Washington.
^gIncludes California, Georgia, Nevada, Texas, and Wyoming.
^hIncludes Connecticut, Massachusetts, and Maryland.
Source: Authors' calculations.

Colorado's (from 1.06 percent to 2.10 percent) by 0.04 percentage points. For TABOR to have a positive effect on Colorado's economy, we would expect to see negative figures in column four.¹²

Colorado experienced growth in real per capita income of a little over 1 percent per year before the passage of TABOR. In contrast, the annualized growth rate in the post-TABOR period was double that rate at 2.10 percent, a change of 1.03 percentage points (Table 1, first row). While impressive, that increase in the growth rate of per capita personal income was similar (and even slightly smaller) than the average found overall in the mountain region and in individual mountain states.¹³ Most of

the other mountain states and neighbor states on average experienced similar changes in the growth rate of real per capita personal income.

When we examine Colorado's performance compared with other groupings of states¹⁴ — those with a similar industrial mix, a similar age distribution, or a similar amount of federal military expenditures as a share of gross state product (GSP) — we find evidence that Colorado's personal income growth rate was slightly higher than the average of states in these comparison groups (one-third of a percentage point higher compared to the groups of states defined by similar industrial mixes or shares of federal military spending). However, those differences were not statistically different. We do find that Colorado grew relatively faster than the comparison states with a similar percentage of people with a bachelor of arts or more education,¹⁵ but that result is largely

¹²To examine whether these differences are statistically different from one another, we examine the ratio of the difference-in-difference to the standard deviation of the differences in growth rates across the comparison states.

¹³The mountain states include Arizona, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. We present information on the regional average growth rate calculated as simple averages across states in the grouping. Estimates for the overall groupings weighted by the size of the state's economy show similar patterns and are available from the authors. Individual state growth rates are also available from the authors on request.

¹⁴To calculate which states qualified as similar states, we calculate the minimum of the squared deviation from Colorado's characteristics in the 1990 period.

¹⁵This grouping comprises Maryland, Massachusetts, and Connecticut. The average growth rate for these states was 1.60 percent in the pre-TABOR period compared with 1.06 percent annualized growth in Colorado.

Table 2. Employment Level: Annualized Growth Rate Before and After TABOR (1993)

Employment level (annualized growth rates — % change)	15 years pre-TABOR (1)	10 years post-TABOR (2)	Diff. over time (3)	Diff. with Col. (4)	5 years post-TABOR (5)	Diff. over time (6)	Diff. with Col. (7)	1998-2003 (8)	Diff. over time (9)	Diff. with Col. (10)
Colorado	2.39%	2.42%	0.03%		3.98%	1.59%		0.87%	-1.51%	
Mountain ^a	2.58%	2.43%	-0.15%	-0.18%	3.25%	0.68%	-0.92%	1.61%	-0.97%	0.54%
Neighbors ^b	1.55%	1.44%	-0.11%	-0.14%	2.02%	0.47%	-1.12%	0.87%	-0.69%	0.83%
West ^c	2.54%	1.94%	-0.60%	-0.63%	2.68%	0.14%	-1.45%	1.21%	-1.34%	0.18%
West North Central ^d	0.91%	1.07%	0.17%	0.14%	1.72%	0.81%	-0.78%	0.43%	-0.47%	1.04%
Industry mix ^e	3.40%	2.34%	-1.06%	-1.09%	3.41%	0.01%	-1.58%	1.28%	-2.12%	-0.61%
Federal military GSP ^f	1.37%	1.09%	-0.28%	-0.31%	1.97%	0.60%	-0.99%	0.22%	-1.15%	0.36%
65+ ^g	2.52%	2.31%	-0.21%	-0.23%	2.97%	0.45%	-1.14%	1.66%	-0.86%	0.65%
College degree ^h	1.28%	0.82%	-0.46%	-0.49%	1.24%	-0.04%	-1.64%	0.40%	-0.88%	0.63%
Mean (all states)	1.58%	1.27%	-0.31%	-0.33%	1.91%	0.33%	-1.26%	0.64%	-0.94%	0.57%
Standard deviation (all states)	1.01%	0.75%	-0.25%		1.04%	0.04%		0.65%	-0.35%	

^aIncludes Arizona, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming.
^bIncludes Kansas, Nebraska, New Mexico, Utah, and Wyoming.
^cIncludes mountain, Arkansas, California, Hawaii, Oregon, and Washington.
^dIncludes Idaho, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.
^eIncludes Arizona, Florida, Utah, and Washington.
^fIncludes Alabama, Kansas, Nebraska, Oklahoma, and Washington.
^gIncludes California, Georgia, Nevada, Texas, and Wyoming.
^hIncludes Connecticut, Massachusetts, and Maryland.
Source: Authors' calculations.

due to much faster growth in personal income in the comparison states in the period before TABOR.

In the latter two sets of columns in Table 1, we break down the post-TABOR period into the five years immediately following passage and the subsequent five years. Colorado's strong economic performance was largely concentrated in the first period as evidenced by the preponderance of negative numbers in column seven. In the subsequent five years (the final three columns of the table), many states performed better than Colorado, as evidenced by many positive figures in the final column of the table. Only the grouping of states with a similar college-educated population experienced differential growth that was statistically different from zero. None of the other figures in those two columns is statistically different from zero; thus we do not find strong evidence of a differential effect of TABOR in the short run versus the longer run.

Results for employment growth rates show that Colorado experienced a slight increase in its employment growth rate in the post-TABOR period as compared with the earlier period (an increase from 2.39 percent to 2.42 percent (Table 2). The growth rate of 2.42 percent per year over the 10-year period following TABOR masks large differences in the growth rates immediately after TABOR versus further out in time. The annualized employment growth rate was almost 4 percent in the immediate

post-TABOR period (column five, first row) compared with less than 1 percent in the 1998-2003 period (column eight, first row). This slowdown in growth rates largely reflects trends in other states throughout the country, especially other mountain states.

Compared with our other state groupings over the entire period, we find that Colorado's employment growth differences are not statistically significantly different than those of other similar states (the figures in column four are not significantly different from zero). The one exception is that Colorado performed better (at marginal statistically significant levels) than states with a similar industrial mix (1.09 percentage points better). The decomposition of employment growth performance into the early and later post-TABOR periods presents an even more dramatic story than the income per capita figures. Colorado's employment growth was stronger than other states in the period immediately following TABOR, but that relationship was not sustained and in many instances was reversed in the most recent past (compare columns 7 and 10).

Thus far, we have compared Colorado with other groupings of states with similar characteristics. However, these comparisons do not explicitly control for how those characteristics (for example, industrial mix) directly affect growth within the given states. By using a regression framework, we expand

our comparison to the growth patterns in place across all 50 states while controlling for the direct influence on economic growth of various economic and demographic factors within each state. The regression framework can also control for any systematic trends in place either regionally or in each state.

Regression Results

In our similar state comparisons, Colorado's relative performance depended on which comparison group was used. To explore in more depth the economic effects of TABOR, and to control simultaneously for various factors we believe might be influential in determining economic performance, we turn to estimation of regression equations. We employ annual changes in per capita personal income and employment as our two dependent variables, and use various characteristics of the states as our independent variables. To control for overall economic conditions in the United States, we include indicator variables for each year. In boom years, those indicator variables will be positive, while in recession years, the indicator variables will be negative.¹⁶ Not surprisingly, we find those variables are almost always statistically significant. The next set of variables we consider are those that describe the demographic makeup of the states' populations.¹⁷ We also control for the industrial mix within a state. Finally, our crucial variables are two indicator variables. One is for Colorado in the years after TABOR passed — that is, a value of one for Colorado for the years 1993-2003. The other examines the long-term effect of TABOR and takes a value of one for Colorado in the post-1998 period.¹⁸ The regressions presented exclude and then include indicator variables for different geographic groupings. In the first two specifications, there are no controls for fixed region or state effects. In the next two specifications, we include state indicator variables, while in the last

two specifications, nine regional indicators are included. Regional or state indicator variables help to control for state- or region-specific time-invariant factors that influence growth.

Although there is some limited evidence that TABOR had a positive effect on employment growth in the five years immediately following passage of the law, that short-run effect was not sustained into the second half of the decade.

Table 3 (next page) presents results for annualized changes in real per capita personal income. We find a negative effect on per capita personal income growth if a higher percent of the population is under 18 and some positive effects of having a larger percent of the population with a college degree.¹⁹ We find some effect of industrial mix on personal income growth with income growth being higher in states with higher percentages of GSP coming from manufacturing. In regressions where we include state indicator variables, we find that states with higher shares of federal military expenditures as a percent of GSP experience higher growth in per capita personal income. Turning to our hypothesis variables, we find no evidence that the passage of TABOR affected the growth of per capita personal income in Colorado in either the short term or the longer term.²⁰

Table 4 (p. 467) presents regressions with the annual change in employment as the dependent variable. We find a relatively strong relationship between the percentage of a state's economy coming from different sectors and a state's employment growth. We find higher job growth occurring in states where more of their economic base is in the service industry. This matches patterns found by other researchers and has to do with the fact that the service industry overall is growing within the United States. Not surprisingly, employment growth is lower if a higher percentage of the population is

¹⁶For space reasons, we do not present those coefficients, but they are available from the authors on request.

¹⁷Data on the percent of the population that is 18 or under and over 65 are based on estimates calculated by the U.S. Census Bureau based on decennial census figures adjusted using information from the Current Population Survey. We were unable to find a source for consistent annual estimates of the percent of the population in each state with different levels of educational attainment. We have therefore used decennial census estimates and have interpolated annual changes using a straight linear method. Because of the limited amount of variation over time with our demographic variables, it should be noted that estimates including state fixed effects will be identified on the small amount of variation remaining within states rather than across states.

¹⁸Note that these indicator variables will pick up the effect of any contemporaneous changes in factors affecting Colorado's economy that are not captured by the other included variables.

¹⁹The positive effect of having a larger percent of the population with a bachelor of arts degree reverses in models including state fixed effects. We think this is largely due to the limited amount of variation within states for this variable.

²⁰The TABOR-passed variable is an indicator variable for observations in Colorado following passage of TABOR; it equals one for years after 1992 in Colorado. The TABOR out-years variable takes a value of one for Colorado only during the period 1998-2003.

Table 3. Regression Analysis of Annual Changes in Real Per Capita Personal Income on State Characteristics, 1978-2003

	(1)	(2)	(3)	(4)	(5)	(6)
Percent population						
18 or under	-0.1072 (0.0354)	-0.1068 (0.0354)	-0.2943 (0.0728)	-0.2940 (0.0729)	-0.1043 (0.0419)	-0.1038 (0.0420)
65 or over	0.0560 (0.0380)	0.0561 (0.0380)	0.7048 (0.1315)	0.7054 (0.1316)	0.0378 (0.0461)	0.0381 (0.0461)
College degree	0.0548 (0.0205)	0.0548 (0.0205)	-0.2937 (0.0900)	-0.2938 (0.0900)	0.0509 (0.0250)	0.0510 (0.0250)
Percent GSP coming from						
Services	-0.0138 (0.0168)	-0.0135 (0.0168)	-0.0134 (0.0351)	-0.0123 (0.0356)	-0.0166 (0.0173)	-0.0162 (0.0174)
Government	0.0017 (0.0298)	0.0014 (0.0298)	-0.5049 (0.0786)	-0.5059 (0.0788)	-0.0149 (0.0335)	-0.0153 (0.0335)
Manufacturing	0.0314 (0.0088)	0.0314 (0.0088)	0.0167 (0.0294)	0.0171 (0.0295)	0.0381 (0.0106)	0.0382 (0.0106)
Finance, insurance, real estate	-0.0326 (0.0162)	-0.0326 (0.0162)	-0.1819 (0.0375)	-0.1815 (0.0376)	-0.0305 (0.0173)	-0.0306 (0.0173)
Federal military	0.0268 (0.0618)	0.0274 (0.0618)	1.2548 (0.2204)	1.2552 (0.2205)	0.0754 (0.0663)	0.0760 (0.0664)
TABOR-passed	0.0062 (0.0057)	0.0081 (0.0082)	0.0075 (0.0072)	0.0086 (0.0091)	0.0043 (0.0059)	0.0062 (0.0084)
TABOR out-years		-0.0035 (0.0110)		-0.0020 (0.0107)		-0.0035 (0.0109)
Constant	0.0080 (0.0155)	0.0079 (0.0155)	0.1167 (0.0357)	0.1164 (0.0358)	0.0097 (0.0170)	0.0095 (0.0170)
State indicator	n	n	y	y	n	n
Region indicator	n	n	n	n	y	y
Year indicator	y	y	y	y	y	y
R ²	0.4920	0.4920	0.5507	0.5508	0.5000	0.5000
Number of observations	1,250	1,250	1,250	1,250	1,250	1,250
Standard errors are reported in parentheses under coefficient estimates. Coefficients that are statistically significant at the 5 percent level are reported in bold. Source: Authors' calculations.						

over age 65.²¹ We find a strong positive role on employment growth if federal military expenditures as a share of GSP are higher, and this relationship is especially strong when we control for overall state trends. As with per capita personal income, we find little evidence of TABOR having an effect on the state's overall employment growth rate in the post-TABOR period. We do find some limited evidence that TABOR had a positive effect on employment growth in the short term (see the coefficients on the

"TABOR-passed" variable in columns two and four), but that effect is offset by larger than expected declines in the second half-decade following TABOR's passage (see the coefficients on the "TABOR out-years" variable).

Conclusion

In conclusion, using two different empirical approaches and examining two different measures of economic growth, we find that TABOR did not significantly boost Colorado's economy. Although there is some limited evidence that TABOR had a positive effect on employment growth in the five years immediately following passage of the law, that short-run effect was not sustained into the second half of the decade. Indeed, Colorado's employment growth between 1998 and 2003 was far below those of

²¹The relationship between employment growth and the age distribution reverses when state fixed effects are included. We think this is due to limited amounts of variation over time within a given state in the demographic variables.

Table 4. Regression Analysis of Annual Changes in State Employment on State Characteristics, 1978-2003

	(1)	(2)	(3)	(4)	(5)	(6)
Percent population						
18 or under	0.0077 (0.0268)	0.0100 (0.0267)	-0.3507 (0.0492)	-0.3484 (0.0491)	-0.0388 (0.0302)	-0.0357 (0.0301)
65 or over	-0.1684 (0.0300)	-0.1677 (0.0299)	0.2757 (0.0881)	0.2807 (0.0880)	-0.0879 (0.0341)	-0.0865 (0.0340)
College degree	-0.0541 (0.0160)	-0.0541 (0.0159)	-0.0383 (0.0607)	-0.0392 (0.0606)	-0.0213 (0.0184)	-0.0208 (0.0183)
Percent GSP coming from						
Services	0.0709 (0.0132)	0.0733 (0.0132)	-0.0378 (0.0238)	-0.0286 (0.0240)	0.0710 (0.0128)	0.0736 (0.0128)
Government	-0.0786 (0.0162)	-0.0798 (0.0162)	-0.4099 (0.0504)	-0.4168 (0.0504)	-0.1265 (0.0176)	-0.1283 (0.0175)
Manufacturing	-0.0259 (0.0070)	-0.0256 (0.0070)	-0.0288 (0.0199)	-0.0251 (0.0199)	0.0137 (0.0079)	0.0139 (0.0079)
Finance, insurance, real estate	-0.0023 (0.0127)	-0.0027 (0.0127)	-0.1857 (0.0253)	-0.1817 (0.0253)	-0.0133 (0.0128)	-0.0138 (0.0128)
Federal military	0.1429 (0.0405)	0.1454 (0.0404)	0.8785 (0.1443)	0.8789 (0.1440)	0.1819 (0.0409)	0.1842 (0.0408)
TABOR-passed	0.0072 (0.0045)	0.0195 (0.0065)	0.0045 (0.0049)	0.0137 (0.0061)	-0.0038 (0.0044)	0.0088 (0.0062)
TABOR-out-years		-0.0229 (0.0087)		-0.0176 (0.0072)		-0.0234 (0.0081)
Constant	0.0600 (0.0123)	0.0590 (0.0122)	0.1841 (0.0240)	0.1815 (0.0240)	0.0586 (0.0127)	0.0574 (0.0126)
State indicator	n	n	y	y	n	n
Region indicator	n	n	n	n	y	y
Year indicator	y	y	y	y	y	y
R ²	0.3821	0.3856	0.6017	0.6037	0.4588	0.4624
Number of observations	1,265	1,265	1,265	1,265	1,265	1,265
Standard errors are reported in parentheses under coefficient estimates. Coefficients that are statistically significant at the 5% level are reported in bold. Source: Authors' calculations.						

comparable states. Given our method of controlling for TABOR through time-indicator variables and our inability to control perfectly for other circumstances in Colorado at the time TABOR became law, we cannot say whether our evidence regarding the short-run effect reflects TABOR or other contemporaneous factors present in Colorado.

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