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## **The Effect of State Corporate Income Tax Cuts on Job Creation**

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## **Abstract**

This paper compares the employment growth of states that enacted corporate income tax cuts in the past twenty three years with those making no changes. Overall employment comparisons from 1990 to 2012 suggest that a reduction in corporate income tax is associated with faster job creation. The states that cut corporate income taxes started with slower employment growth than the states that made no changes. However, the growth gaps between the two groups of states disappeared in about five years after the tax cuts were made. Regression results confirm the observation that lower corporate taxes have a significant and positive effect on employment growth. The action of a tax cut also has the additional but temporary benefit of promoting job creation as businesses adjust to the new tax rate. However, this benefit is temporary and only occurs during first year of the enactment of a tax cut.

# The Effect of State Corporate Income Tax Cuts on Job Creation

## 1. Introduction

One of the most far-reaching consequences of the “great recession” of 2008 and 2009 was the massive job loss and the subsequent slow recovery. Since the recession started in December 2007, the U.S. economy shed over 8.7 million jobs by February 2010. Job losses continued after the recession officially ended in June 2009. Almost four years after the recession, national employment has increased by only 6.2 million through April 2013, still 2.5 million short of its pre-recession peak [BLS, 2013].

The sluggish job growth has led to stubbornly high unemployment. In October 2009, the national unemployment rate reached 10.0% [BLS, 2013]. Though the labor market has been growing sporadically since the recession ended, the unemployment rate remained at an elevated level of 7.5% in April 2013 [BLS, 2013]. This is significantly higher than the 5% to 6% unemployment rates in 2006 and 2007 before the recession began. Many economists predict job creation will remain weak for the next two years with unemployment staying over 7.0% until 2014 [Federal Reserve Bank of Philadelphia Survey of Professional Forecasters, 2013].

Given this environment, it is not surprising that many state and local governments around the country, such as California, Virginia, and Wisconsin [Brian, 2010; Bauer, 2010], have made job creation and economic development their first priorities. Of the various state policy tools directly affecting business, one option is to cut state corporate taxes to stimulate job creation. Such a change in policy seems ill-advised during this time when most state governments are saddled with budget shortfalls. But it is also possible that a cut in corporate income tax may stimulate economic growth enough to offset the lost tax revenues, which argues for taking action despite the slow economic recovery.

Although the debate on the interaction between tax cuts and economic growth is not new, many of the past discussions focused on federal taxes [Romer and Romer, 2010]. Due to the inactions of the federal government on economic policy, this paper examines whether a cut in a state corporate tax rate can affect employment growth at the state level. We choose the state corporate tax because it is a policy tool states can directly influence; and a large majority of states have corporate taxes, thus ensuring a wide application of the study results. The results of this study should be useful for policymakers, policy analysts and government economists, as they are often tasked to evaluate the effects of potential policy changes, with tax policy being one of the most fundamental fiscal policies for the federal as well as state government.

In this paper, we evaluate the effect of tax cuts through two approaches. The first approach is a direct comparison. Data are collected on state corporate income tax rates and employment for the past 23 years. For states that lowered their corporate income taxes during that period, we compare their job creation performance with states whose tax rates were not changed. The second is an econometric approach where we establish a fixed-effect panel model to quantify the impacts, if any, of a tax cut on job growth as well as the timing of the effect of a tax-cut action.

The next section provides a brief review of the studies related to the research question, followed by a description of the current status of state corporate income taxes in the nation. Section 4 compares the job growth of tax cutting states and those without changes, while Section 5 quantifies the results between a tax cut and employment growth through a fixed-effect panel model.

## 2. Brief Literature Review

General economic theory on profit maximization indicates that firms seek to maximize profits and minimize costs. In those models, high taxes act as additional costs to reduce a firm's profitability and its ability to invest and hire more workers [Wu, 2010].

At the federal level, Romer and Romer [2010] performed an exhaustive analysis on federal corporate taxes. They provided evidence that federal tax increases had "a large, rapid, and highly statistically significant negative effect on output." In their study, output was measured as gross domestic product (GDP). The study also found that higher taxes increased the unemployment rate in the nation. Their study on federal taxes used national time series data, thus not capable of detecting the effect of state taxes.

There is a plethora of empirical studies on state and local taxes on regional economic activities, such as income growth, a firm's location choice and establishment growth, capital investment, foreign investment, and employment. However, the empirical results of state corporate tax on economic activities are not conclusive [Deller and Stallmann, 2007].

Early studies on state taxes and economic growth were summarized in a comprehensive review of literature conducted by Bartik [1992]. Using a modified Delphi method summarizing dozens of studies conducted since 1979, Bartik [1992] concluded "that taxes have quite large and significant effects on [economic] activity," such as employment, output, business capital stocks, and number of business establishments. Of the fifty-seven interregional studies reviewed, 70% reported at least one statistically significant negative effect of taxes on one or more measures of economic activity. More specifically, Bartik [1992] summarized that state and local business taxes (including business property tax and corporate income tax) had a negative impact on local business activities, with the average elasticity of state and local tax being  $-0.3$ , ranging between  $0.1$  and  $-0.6$ .

A few years later, Wasylenko [1997], in a second review of the literature on the link between taxation and economic growth, pointed out that even though Bartik's [1992] review identified negative effects of state and local taxes on economic activities, the magnitudes of the effects varied widely. The tax effect depends on the source of data and economic variables used—employment, income, investment, or firm locations. In terms of the effect of business tax on employment, two of the three studies included in the review indicated a negative and significant effect of business tax. Wasylenko [1997] found that over time, tax differences between states have become less important in employment growth, perhaps because states have adopted similar tax systems.

Debates on the effect of state and local taxes continued. Since then, a study by Pjesky [2006] raised questions on the robustness of the effect of state and local taxes. Pjesky [2006] attempted to replicate and expand on what he identified as five “influential” studies on the roles of state and local taxes in regional economic performance. Through the replication effort, Pjesky [2006] concluded that the estimated tax effects in those studies were sensitive to model specification and the time periods examined. As a result, it is not prudent to make any definitive statements about the relationship between state and local taxes and regional economic activity, as taxes can have both positive and negative effects on economic activities.

More recently, Reed [2008] attempted to resolve the conflicting results from the existing literature and provided a robustness test on the relationship between state and local taxes and personal income growth as the indicator of regional economic growth. This study tested the robust relationship between state tax and personal income by varying different control variables, different estimation methods, as well as data structures (annual data versus 5-year data interval), and time period. This study used per capita personal income as the dependent variable, and tax burden (total state and local taxes as a percentage of personal income) as the key independent variable. He found that state and local taxes used to fund general expenditures

are associated with significant, negative effects on per capita income growth. This finding is generally robust across alternative control variable specifications, alternative estimation procedures, and different time periods. While this study is illuminating on the effect of state and local income taxes on per capita income and the approach to achieve a robust estimate, it did not address the issue of the effect of state corporate taxes on job creation.

The above review of the literature suggests that the effects of state and local taxation on economic activities vary and it depends on the types of state taxes and economic activities. Studies should choose carefully the economic indicators and tax types. As Wasylenko [1997] pointed out, “job growth is still the variable politicians identify most often with prosperity.” Under the current economic environment of inept job creation, we chose employment as the dependent variable in our study. We also choose corporate income tax because that is the most important business-related tax for states when they try to attract business and improve their business climate. The remainder of this literature review summarizes studies that are narrowly focused on state corporate income taxes and/or state employment growth.

Even with a narrowed focus, the literature remains inconclusive on state corporate taxes and job creation. Goss and Phillips [1994] found that state personal income taxes had a negative and significant impact on state-level employment growth from 1982 to 1992 but corporate taxes had little effect. Carroll and Wasylenko [1994] implemented a switching regression model to analyze a set of state and local tax variables on state-level employment from 1967 to 1988. They found that corporate income tax had little effect on non-farm employment for both the 1970s and 1980s. But the same tax had negative effect on manufacturing employment in the 1970s but not the 1980s.

The conflicting literature justifies another look at how state corporate income tax can affect job creation. Our study contributes to the literature in the following three aspects. Firstly, it

evaluates the effect of state corporate income tax on employment growth directly, rather than other variables that have been explored such as per capita income, business establishment, and capital investment. In addition, our study focuses not only on the level of the tax rate, but also on whether the action of a cut in the state corporate income tax rate can benefit job creation. Thirdly, using the most up-to-date employment and tax data, our study covers the period of the most recent recession and subsequent slow recovery.

### **3. State Corporate Income Taxes, 1990-2012**

State corporate income tax is a tax based on business profits. It emerged in the first half of the 20<sup>th</sup> century. By 1930, 23 states adopted corporate income taxes, and the number reached 40 states ten years later [Felix, 2009]. As of 2012, Nevada, Wyoming, Texas, Ohio, South Dakota, and Washington are the only states that do not tax corporate income. Thirty-one states have flat tax rates, while the remaining fourteen have a progressive tax structure where multiple tax rates are applied depending on the size of the corporate income [Tax Foundation, 2013]. Calculated with U.S. Census Bureau data, Felix [2009] found that the importance of corporate income taxes on overall state revenues has been declining since the 1980s, from a national average peak of 10% in the 1980s to about 7% in 2007. The declining importance of the state corporate income tax is due to multiple reasons, including states cutting tax rates, offering tax breaks to corporations in competing for businesses, and overall corporations' aggressive tax avoidance strategies [Fox and Luna, 2002].

The levels and structures of state corporate taxes are evolving continuously. In the past twenty-three years, dozens of states made changes to their corporate income taxes in response to changing political or fiscal environments. Tax increases are often proposed when governments are facing a budget shortfall. The political climate also affects the evolution of

state corporate taxes. For instance, republicans often favor lower taxes. Consequently, when they are in power, they have a tendency of cutting tax rates.

[Table 1 Here]

Table 1 identifies the changes in state corporate income taxes from 1990 to 2012 based on data compiled by the Tax Foundation [2013]. All states (including the District of Columbia) are classified into four groups. From 1990 to 2012, twenty-one states did not make any changes to their corporate taxes. They are classified as “no change” or control states. It is with this group of states that the employment growth of the tax-cutting states is compared in the first stage of the analysis. As Figure 1 shows, the average corporate tax rate of those states was constant at 5.3% from 1990 to 2012.

The seven states from 1990 to 2012 that consistently reduced their corporate tax rates are classified as tax-cutting states. Some of the tax cuts are small. For example, Colorado lowered its corporate income tax rate from 4.75% to 4.63% in 2000. Other states significantly reduced their corporate income taxes. New York, West Virginia, and Arizona lowered their tax rates more than three times in 23 years. Arizona’s rate was reduced from 9.3% in 1990 to 7.0% in 2012, while that of New York was reduced from 9.0% in 1990 to 7.1% in 2012. The average corporate income tax rate of the tax-cutting states fell from 8.6% in 1990 to 6.9% in 2012.

On the other hand, seven states have consistently increased their corporate income taxes from 1990 to 2012 and are classified as tax-increasing states. States with sizable tax increases include Alabama, Indiana, Illinois, and Maryland. The average tax rate of those states rose from 5.3% in 1990 to 7.5% in 2012. The tax rate in the tax-increasing states started from a position lower than the tax cutting states in 1990, but moved higher than the group since 2008.

The “other” group includes the states that both increased and decreased their corporate income taxes since 1990, such as New Hampshire, Vermont, and the District of Columbia. This group also includes states that have shifted away from taxing corporate profits. For example, Ohio has gradually phased out the corporate income tax during this period and replaced it with commercial activity taxes (CAT) based on gross receipts. As Figure 1 shows, the average tax rates of those states fluctuated from 1990 to 2012.<sup>2</sup>

[Figure 1 here]

#### **4. Correlation between Tax Cut and Employment Growth**

Table 2 presents the employment growth rates from 1990 to 2012 based on whether a state made changes to its corporate income taxes.<sup>3</sup> In this table, employment growth rates of three groups of states are presented—control, tax-cutting, and tax-increasing states. The employment growth rates are 5-year averages to remove annual fluctuations.

[Table 2 here]

The comparisons of employment growth for states in the three groups suggest that a reduction in corporate income tax is associated with relatively faster employment growth. The states that cut corporate income taxes started with slower employment growth than the control group. From 1991 to 1995, the average annual employment growth rate in tax-cutting states was -0.10%, while that of the control states was 2.12%--a difference of more than two percentage points. As more states cut taxes, the gap in employment growth between tax-cutting states and the control states narrowed. In the second half of the 1990s, the average annual

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<sup>2</sup> Those states are excluded from comparisons in Section 4, as the changes in different directions make the effect of tax changes less clear-cut.

<sup>3</sup> The employment data are from the U.S. Department of Labor’s Quarterly Census of Employment and Wages. The full year data for 2013 are not yet available.

employment growth of the tax-cutting states was slightly higher than that for the control states. After 2000, the employment growth of tax-cutting states kept pace with those of the control states. While tax-cutting states experienced slightly larger percentages in employment decline during the last recession (-0.60% as opposed to -0.36% from 2006 to 2010), they also rebounded faster than the control states. The overall impression is that, starting from the disadvantaged status in the early 1990s, job growth in tax-cutting states have grown relatively faster and have caught up with control states. This effect is more easily demonstrated in Figure 2.

[Figure 2 Here]

The experience of the tax-increasing states is different. In all time periods in the last twenty three years, their job growth was consistently lower than the control states (Table 2). The difference is more dramatic between tax-cutting and tax-increasing states. In the first half of the 1990s, annual job growth in tax-cutting states was 1.6 percentage points lower than tax-increasing states. But job growth in tax-cutting states overtook tax-increasing states in the second half of the 1990s; and has been consistently higher, regardless of whether the national economy is in recession or in expansion.

These observations imply that tax cuts are associated with faster job growth in the past twenty-three years, but they do not conclusively establish a statistical link. Moreover, since tax-cutting states were grouped together and they enacted tax cuts at different times, the exact effect of tax cuts can be muddied. To establish a clear and quantitative connection between tax cuts and job creation, we performed an econometric analysis.

## 5. Econometric Analysis

### 5.1. Model Specification and Data

The econometric analysis is based on a panel dataset of 50 states and the District of Columbia, spanning from 1990 to 2012. This timeframe was chosen due to the availability of the state-level corporate tax and employment data. During this timeframe, there are over 30 states that changed their corporate tax rate. This variation makes it possible to estimate the effect of the tax change on employment. In addition, the long time period allows us to control for other independent factors on employment [Goolsbee and Maydew, 2000]. Since the dataset is in time-series and cross-sectional format, panel data econometric models perform better than pooled ordinary least square (OLS) models. We also performed a Hausman test on the model specification, which suggests that fixed effect panel models are appropriate.

In a fixed-effect panel model, both state-specific and time-specific fixed factors can exist. Time-specific factors capture macroeconomic conditions that affect all states—such as recessions, global influences, interest rates, and federal government spending. With a time-specific fixed-effect model, we don't specify those factors separately. Similarly, state-specific impacts are captured by state fixed factors.<sup>4</sup> F-tests indicate no strong presence of state fixed factors, but there are strong time-specific fixed factors. As a result, the econometric model is estimated with time-specific fixed factors only. More specifically, the model is expressed as follows:

$$EG_{i,t} = \beta_1 PG_{i,t-1} + \beta_2 Tax\_Rate_{i,t} + \beta_3 Tax\_Cut\_Ind_{i,t-L} + \gamma_t + \varepsilon_{i,t}$$

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<sup>4</sup> The F-test on the state-fixed effect yields a P-value of 0.58, suggesting that we cannot reject null hypothesis of the no state fixed factor at 95% confidence level. The F-test on the time-specific fixed effect yields a P-value of 0.0, indicating rejecting null hypothesis of the no time-specific fixed factor.

where the dependent variable  $EG_{i,t}$  refers to the annual employment growth rates in state  $i$  and year  $t$ . It is calculated based on the statewide employment data from the Quarterly Census of Employment and Wages (QCES), released by the Bureau of Labor Statistics [BLS, 2013]. This data source has been used in a number of empirical studies examining employment growth and tax policies [Gabe 2003; Wu, 2010].

The two key explanatory variables in this study are state corporate income tax rates ( $Tax\_Rate_{i,t}$ ), and the variable representing the action of a tax cut ( $Tax\_Cut\_Ind_{i,t}$ ).  $Tax\_Rate_{i,t}$  represents the level of corporate tax rate in state  $i$  at year  $t$ , while  $Tax\_Cut\_Ind_{i,t}$  is constructed as a dummy variable that takes the value of one if a state reduces its corporate income tax rate in year  $t$ , and zero otherwise. In theory, the tax rate variable is expected to have a negative impact on employment growth because higher taxes imply less profit for businesses and less capacity of hiring [Huber and Runkel, 2009]. If the action of a tax cut has additional benefit on job growth, the  $Tax\_Cut\_Ind_{i,t}$  variable should have a positive sign.

In this model, we choose to use the statutory tax rate (or absolute tax rate) as the key independent variable, rather than the relative tax rate (or tax burden) as other studies have done [e.g. Reed, 2008]. The relative tax rate, as a percentage of actual tax revenue paid in total profits, may have a more direct impact on corporate profit and employment decisions. But the tax burden is less transparent and not directly linked to the tax rate that policymakers can control. The relative tax rate deviates from the absolute tax rate in that it is the composite of the tax rate and other practices, such as tax incentives and exemptions, as well as corporations' tax avoidance strategies. The purpose of this study is to provide evidence to support or oppose whether a tax cut can promote job creation. This study aims to delineate the effect of the statutory tax rate and a tax-cut action, rather than the effect of the less transparent business tax burden, even though it may have a stronger association with employment growth.

A tax-cut indicator variable is used, in addition to the tax rate variable, to capture the effect of a sudden change in tax policy. To illustrate the difference between the effect of the *Tax\_Rate* and *Tax\_Cut\_Ind* variables, consider the following scenario. Assume two similar states—state A and B—have the same corporate tax rates at 5%. State A has kept this rate steady for many years while state B recently reduced the tax rate from 6% to 5%. Since state B just changed its tax policy, businesses are in the process of adjusting to the lower tax rate. Their actions during this period might be different from businesses in state A, where no such adjustment process occurs. The variable of *Tax\_Cut\_Ind* can capture differences in business responses during this adjustment period. If the estimated coefficient of *Tax\_Cut\_Ind* is positive and significant, that will imply additional benefits exist and state B will grow faster than state A during the adjustment period.

We also test the timing of the effectiveness of a tax cut. If a tax cut has additional benefits on employment growth, does this benefit take place immediately or is there a time lag? We estimated several models with different time lags. Let  $L$  be the variable representing the time lag in years 0 to 5 in this study.  $Tax\_Cut\_Ind_{i,t-L}$  explores the effect of a tax cut enacted  $L$  years ago on the employment growth in year  $t$ . Additional tests show that when  $L$  is greater than 5, the coefficient estimates of the *Tax\_Cut\_Ind* variable are generally minimal.

As noted earlier, data on corporate income tax rates were obtained from the Tax Foundation [2013]. As of 2012, for example, thirty-one states have fixed tax rates; five had no corporate income tax, while 14 states have progressive tax systems, with businesses subject to different tax rates based on the amount of income. For those states, an average tax rate for all income brackets is used in the econometric analysis.

Outside those two key variables of interest, one control variable included in this model is the lagged population growth rate ( $PG_{i,t-1}$ ). Overall population growth can drive a large part of

the employment growth of a state, both in labor demand and labor supply [Friedburg, 2000; Hamermesh and Trejo, 2000]. This variable is expected to have a positive impact on employment growth. Statewide population data are obtained from the U.S. Census Bureau [2013], from which year-over-year population growth rates were computed for each state. Lastly, the time-specific fixed factors are represented by  $\gamma_i$  in the econometric models. The summary statistics of those data are listed in Table 3.

[Table 3 Here]

## **5.2. Regression Results-Key Conclusions**

Six fixed-effect models were estimated, with different time lags on the tax cut variable. The regression results are listed in Table 4.

Overall, the fixed-effect panel models explain around 70% of the annual state employment growth in the past twenty three years, with an adjusted  $R^2$  ranging from 0.69 for Model 2 (1-year lag in tax cut) and 0.71 for Model 4 (3-year lag in tax cut). Considering that state employment growth is affected by a complex set of global, national, and regional factors, the performance of this simple model with only three independent variables is satisfactory.

[Table 4 Here]

Three key results are concluded from the regression. First, population growth has a positive and significant effect on employment growth in all six models. One percent of population growth in the previous year contributes an average of 0.49% growth in state employment, making it one of the fundamental driving forces for job creation. Other studies on state employment growth found similar positive and significant influences from population growth [Deming, 1999; Edmiston, 2006]. For example, Edmiston [2006] discovered that the

elasticity between state population and employment growth is 0.587, which is consistent with the result estimated from our study. Population growth affects both labor supply and labor demand [Friedberg, 2000; Hamermesh and Trejo, 2000]. Large population changes imply an increased demand for workers, as more residents purchase from retail, restaurants, health care, and other consumer services establishments in the state. In addition, high population growth also implies more people are in the local labor market, driving up the labor supply. Consequently, it is not surprising that population has a strong effect on employment growth.

The second key result is that the level of the tax rate has a negative and significant effect on the pace of state employment growth for all six models. This result implies that higher state corporate income tax rates reduce employment growth because a higher tax rate represents a direct reduction in business profits, impeding the ability of businesses to expand and hire more workers. The average coefficients of all six models show that employment in a state with a corporate income tax rate that is one percentage point lower than other states grows about 0.03 to 0.05 percentage points faster, other things equal. This implies that the elasticity of state corporate income tax on employment is about -0.2, which is consistent with the findings of earlier studies. For example, Bartik's [1992] literature review of the effect of state and local tax summarized that the average elasticity of those taxes on economic activities was -0.3, ranging from 0.1 to -0.6.

The third key result is that a tax-cut action also has additional benefits to state employment growth. Unlike the *Tax\_Rate* variable, this effect is not uniformly significant across the six models. The coefficient of the *Tax\_Cut\_Ind<sub>t,i-L</sub>* variable is positive and significant when  $L=0$ , meaning that the tax-cut action has some immediate benefits in boosting employment growth in the year when a tax cut was implemented. When  $L=1$ , the coefficient becomes insignificant, but positive, implying that there might be some residual benefits associated with a tax cut; but the model cannot conclusively detect them. The effect becomes close to zero in all

years afterwards, implying the action of a tax cut has no additional benefits in the following years.

The fact that a tax cut has additional, but temporary benefits indicates that those benefits occur as a result of businesses adjusting to the new tax policy. When a tax cut is enacted, businesses need to evaluate and respond to the new policy. Some of the expansion or staffing plans may be accelerated following a tax cut. Moreover, a tax cut always comes with great publicity and public debates. Some businesses may be actively involved in the lobbying efforts to reduce the corporate income tax. As a result, when it is enacted, those involved businesses may be motivated to demonstrate that a tax cut helps the economy by increasing investments or hiring. The public debate of the policy changes can also reinforce the image of the state as a business-friendly place, potentially boosting business expansion or relocation. For businesses in the process of an expansion and relocation decision, the action of a tax cut may steer the site selection process to tax-cutting states. This change in businesses' behavior may explain the incremental and temporary benefits of a tax cut action. However, once the adjustment process is complete—in about one year—and publicity associated with the tax cut dies down, the temporary benefit disappears. Businesses, however, still enjoy a lower tax rate afterwards; as lower taxes can continue to benefit job creation in the long run.

The panel structure of the econometric model specifications reveals the effect of individual states cutting rates, rather than all states cutting tax rates simultaneously. The boost in employment from a tax cut, estimated in this model, includes not only new jobs resulting from organic expansion of the employment base, but also jobs created due to relocation as businesses chase after lower taxes. As a result, the coefficient estimated here are presumably larger than the effects of all states cutting taxes simultaneously. When all states are cutting

taxes simultaneously, the job creation due to relocation will be negated, akin to a cut of federal corporate income tax.<sup>5</sup>

### **5.3. Fiscal Implications**

This study indicates that cutting corporate income tax is associated with faster employment growth. While a tax cut can benefit employment growth in the state-wide economy, state government officials often want to understand if a tax cut will be revenue positive, negative, or neutral. Cutting corporate income tax in exchange for faster job growth is fundamentally a trade-off between corporate income and individual income taxes. Reducing corporate tax rates will lead to lower corporate income tax revenues, while faster job growth results in more wages and salaries, leading to additional individual income tax revenues.<sup>6</sup>

Naturally, this trade-off will vary by states. For those states that have no individual income taxes, cutting corporate taxes would be revenue negative.<sup>7</sup> Similarly, the revenue impact will also vary when states with different personal income tax rates cut corporate taxes by the same amount. This section illustrates the fiscal trade-off of an average state, with average corporate and individual income tax rates. This illustration assumes that individuals in jobs created due to tax cuts will earn the average wage of the state.

Utilizing estimated state corporate tax revenues estimated by Ernst and Young and the Council on State Taxation [2012], Table 5 illustrates the net fiscal impact of various levels of cut

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<sup>5</sup> The authors thank an anonymous referee for this suggestion.

<sup>6</sup> The authors thank an anonymous referee and the editor for their suggestions to performing this exercise. While faster job growth after a tax cut can potentially boost corporate profits; those secondary fiscal effects are believed to be minor and are not included in this exercise.

<sup>7</sup> The states without individual taxes typically have higher sales tax, which can increase after a cut in corporate tax rate. That would offset corporate tax revenue reduction to some degree. The revenue trade-off between the corporate income and sales taxes are more complicated, as it depends on the marginal propensity of consumption for consumers, as well as allocation of consumption among goods subject to sales tax, and those that are exempt. Since only a small number of states do not have individual income tax, we did not explore this further in this paper.

in corporate income tax rates. For example, if the tax rate was cut by 100 basis points (one percentage point), an average state will lose \$157.5 million in corporate tax for the year; meanwhile, the additional job creation can generate \$27.0 million individual income taxes, resulting in a net revenue loss of \$130.5 million. However, if the corporate tax rate is reduced by 50 basis points, the state will lose \$78.8 million of corporate income tax revenue while individual income tax can increase by \$25.4 million, for a net loss of \$53.4 million. The analysis shows that if the degree of a tax cut is 15 basis points, an average state can generally break even.

[Table 5 Here]

The reason that a smaller tax cut is more beneficial to a state's fiscal health lies in the fact that the tax cut action (represented by the dummy variable) has the additional affect in promoting employment growth. The model coefficient estimate indicates that each tax cut action, regardless of the degree of the cut, has a positive effect on job growth. To enjoy such temporary benefits more, it is better to have a series of moderate tax cuts, rather than a deep tax cut in one setting, because businesses react not only to the tax rate itself, but also the publicity surrounding the tax-cut action.

#### **5.4. Endogeneity**

While the main regression results indicate that tax cuts can stimulate changes in state employment, further exploration is needed whether those effects are caused as a result of endogenous tax policy. If policymakers change the tax rate based on the state's output or employment growth performance, this endogeneity will bias the coefficient estimates presented in Table 4. On the other hand, it is also possible that the tax cut actions are independent of the economic performance, thus exogenous. For example, if the tax cut is mainly driven by political forces and depends on which party is in control of the state legislature, a change in tax rate may be exogenous to the economic performance.

To further understand whether tax cuts in state corporate income tax in the past twenty three years is endogenous of the employment, we used a technique employed by Goolsbee and Maydew [2000]. We estimated a logit model of tax policy action. The dependent variable is a binary variable, taking the value of one if a state reduces its corporate tax rate for the year, and zero otherwise. The explanatory variables are one-year lagged state corporate tax rates, one-year lagged state employment growth rates and one-year lagged population growth rates. Those variables represent the general tax and economic conditions.

[Table 6 here]

The policy regression results suggest that among the economic variables, such as state employment and population growth rates, none is significant at the 5% level. The explanatory power of the policy regression is very small, indicating that decisions to enact a tax cut may not be endogenous to the economic variables used in our study. The only variable that is significant is the one-year lagged state corporate tax rate. The positive and significant coefficient suggests that high tax states are more likely to reduce the corporate tax rate. That seems to suggest that the decision to cut tax is decided not by economic conditions, but by factors outside the economy, the same conclusion reached by Goolsbee and Maydew [2000]. The endogeneity of the tax-cut action is not a serious issue in this study.<sup>8</sup>

### ***5.5. Policy Implications***

The regression results show that generally lower corporate tax rates can result in faster employment growth. More importantly, the action of a tax cut has the added bonus of boosting employment growth in the short term. This has important implications for state policymakers. As

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<sup>8</sup> While the corporate tax changes in the past twenty three years are exogenous, there might be indirect endogeneity, as corporate income taxes may be correlated with other taxes, which could be endogenous to economic conditions. Future research is needed to test the correlation of state corporate income taxes with other state taxes. The authors thank an anonymous referee for this insight.

the economy climbs out of recession, citizens remain worried about a slow job recovery. The persistently slow job growth four years after the recession officially ended highlights the urgent need for effective policies that can stimulate job creation. States that enact a tax cut now can help alleviate the lingering impact of the recession. Additionally, if a future tax is implemented when the early signs of a weak economy emerge, it may successfully forestall or alleviate the impact of the pending recession on that state.

The fact that the action of a tax cut has significant additional benefit in the first year of the policy implementation also has important policy implications. Due to the additional benefits of the tax-cut action, it is beneficial for the state to enact the tax cuts in a series of small steps, rather than a dramatic reduction in the tax rate as one event. By reducing the tax rate with a series of small steps, the tax-cut discussion will remain constant in public discourse and will reinforce the state's image as business friendly. The publicity can also help attract businesses in the process of relocation and expansion decisions.

From the perspective of state fiscal health, enacting tax cuts in a series of small and gradual steps over the years are likely to be revenue neutral and even positive for the state budget. By doing so, the state will not experience the drastic tax revenue reduction due to a deep tax cut, thus avoiding painful cuts in other areas such as education, healthcare, and transportation, which can adversely affect employment in those sectors.

## **6. Conclusions**

This paper contributes to the literature by taking two approaches to establish the link between a cut in state corporate income taxes and employment growth. Overall employment comparisons show that states that cut corporate income taxes started with slower year-over-year employment growth than states making no changes in corporate income tax rates. In later years, the tax-cutting states have caught up or even grew faster in terms of job creation. The

fixed-effect panel regression model finds that state corporate tax rates have a significant negative effect on employment growth. In addition, the tax-cut action has the added benefit of employment growth in the short term, as businesses react to the new policy and adjust to the policy change. This additional benefit is temporary, lasting only for one year.

There are a couple areas for extensions and future researches. First, this study only focuses on the easily measureable statutory corporate tax rate, not other state corporate income practices that could affect business profits and employment, such as methods of allocating national profits, depreciation rules, and other tax incentives and exemptions. Future research should quantify such variables and include them in the regression model. Secondly, this paper focuses on corporate income tax as a direct policy measure that states can influence at a time of slow job growth. There are other taxes that could be related to corporate income taxes, but not exogenous to economic conditions. The indirect endogeneity may introduce bias in the effect in the corporate income tax. Future research is needed to test the correlation of state corporate income taxes with other state taxes such as sales, personal income, or property taxes, and include those variables in the study.<sup>9</sup>

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<sup>9</sup> The authors thank an anonymous referee for this suggestion.

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## Appendix 1: Tables in Paper

**Table 1. State Corporate Income Tax Changes (1990-2012)**

Tax-Cutting States	No Change/Control States	Tax-Increasing States	Other States
Arizona	Alaska	Alabama	Arkansas
California	Delaware	Illinois	Connecticut
			District of Columbia
Colorado	Georgia	Indiana	Florida
Idaho	Hawaii	Maryland	Kansas
New York	Iowa	Missouri	Kentucky
North Dakota	Louisiana	Nebraska	Massachusetts
West Virginia	Maine	Tennessee	Michigan
	Minnesota		New Hampshire
	Mississippi		New Jersey
	Montana		North Carolina
	Nevada		Ohio
	New Mexico		Oregon
	Oklahoma		Pennsylvania
	Rhode Island		Texas
	South Carolina		Vermont
	South Dakota		
	Utah		
	Virginia		
	Washington		
	Wisconsin		
	Wyoming		

Source: The Tax Foundation

**Table 2. Average Annual Employment Growth Rate**

	No Change States	Tax-Cutting States	Tax-Increasing States
1991-1995	2.12%	-0.10%	1.50%
1996-2000	2.48%	2.77%	1.74%
2001-2005	0.53%	0.34%	-0.12%
2006-2010	-0.36%	-0.60%	-0.77%
2011-2012	1.23%	1.47%	1.16%

**Table 3. Descriptive Statistics**

	Employment Growth	Population Growth	Average Tax Rate	Tax Cut Ind
1991	-1.67%	1.07%	6.62%	0.00
1992	0.46%	1.13%	6.60%	0.01
1993	1.90%	1.07%	6.29%	0.06
1994	2.76%	0.98%	6.26%	0.07
1995	2.52%	0.94%	6.38%	0.12
1996	2.04%	0.91%	6.19%	0.04
1997	2.64%	0.95%	6.17%	0.03
1998	2.46%	0.91%	6.33%	0.13
1999	2.27%	0.90%	6.27%	0.12
2000	2.25%	3.36%	6.21%	0.18
2001	-0.18%	1.02%	6.21%	0.06
2002	-1.09%	0.95%	6.15%	0.13
2003	-0.35%	0.87%	6.24%	0.01
2004	1.15%	0.93%	6.23%	0.00
2005	1.75%	0.92%	6.54%	0.01
2006	1.70%	0.95%	6.47%	0.04
2007	1.12%	0.99%	6.47%	0.00
2008	-0.41%	0.92%	6.38%	0.13
2009	-4.82%	0.86%	6.02%	0.13
2010	-0.61%	0.75%	6.04%	0.03
2011	1.22%	0.73%	6.11%	0.05
2012	1.52%	0.74%	6.11%	0.03

**Table 4. Regression Results**

Variable	Model 1 L=0	Model 2 L=1	Model 3 L=2	Model 4 L=3	Model 5 L=4	Model 6 L=5
State Population Growth ( <i>PG</i> )	0.5037*	0.5002*	0.5086*	0.4973*	0.4549*	0.4121*
Corporate Tax Rate ( <i>Tax_Rate</i> )	-	-0.0493*	-	-0.0391*	-	-0.0329*
Tax Cut Indicator	0.04952*	3.68	0.0434*	2.79	0.0313*	2.26
	0.0038*	0.0009	-0.0001	-0.0018	0.0012	0.0022

(Tax_Cut_Ind)	2.43	0.59	0.08	1.08	0.68	1.23
Year Fixed Effect Estimate (γ)						
1992	0.0106*	0.0107*				
	5.61	5.64				
1993	0.0219*	0.0220*	0.0216*			
	11.51	11.57	11.40			
1994	0.0293*	0.0295*	0.0291*	0.0289*		
	15.39	15.48	15.36	15.23		
1995	0.0238*	0.0242*	0.0238*	0.0237*	0.0237*	
	12.51	12.75	12.63	12.52	12.66	
1996	0.0180*	0.0181*	0.0178*	0.0177*	0.0175*	0.0181*
	9.63	9.60	9.53	9.45	9.50	9.73
1997	0.0234*	0.0234*	0.0230*	0.0230*	0.0227*	0.0232*
	12.55	12.54	12.39	12.33	12.38	12.55
1998	0.0218*	0.0219*	0.0215*	0.0215*	0.0211*	0.0216*
	11.66	11.71	11.57	11.48	11.47	11.64
1999	0.0208*	0.0212*	0.0208*	0.0207*	0.0204*	0.0208*
	11.16	11.41	11.28	11.18	11.08	11.29
2000	0.0234*	0.0207*	0.0204*	0.0202*	0.0200*	0.0202*
	10.91	11.08	11.03	10.91	10.93	10.91
2001	-0.0146*	-0.0143*	-	-0.0147*	-	-0.0122*
	6.21	6.10	6.34	6.22	5.87	5.13
2002	-0.0088*	-0.0087*	-	-0.0090*	-	-0.0089*
	4.74	4.63	4.85	4.80	5.09	4.81
2003	-0.0021	-0.0021	-0.0024	-0.0024	-0.0029	-0.0023
	1.13	1.10	1.31	1.28	1.54	1.26
2004	0.0133*	0.0134*	0.0130*	0.0129*	0.0125*	0.0128*
	7.15	7.17	7.00	6.93	6.79	6.91
2005	0.0165*	0.0167*	0.0162*	0.0161*	0.0159*	0.0162*
	8.81	8.83	8.66	8.59	8.56	8.62
2006	0.0170*	0.0171*	0.0167*	0.0165*	0.0164*	0.0168*
	9.06	9.11	8.95	8.83	8.85	9.01
2007	0.0110*	0.0110*	0.0106*	0.0105*	0.0103*	0.0108*
	5.87	5.84	5.66	5.57	5.57	5.74
2008	-0.0041*	-	-	-0.0042*	-	-0.0038*
	2.19	0.0037**	0.0041*	2.25	0.0043*	2.04
2009	-0.0441*	-0.0439*	-	-0.0443*	-	-0.0440*
	23.62	23.39	0.0442*	23.78	0.0445*	23.79
2010	-0.0067*	-0.0066*	-	-0.0071*	-	-0.0068*
	3.61	3.55	0.0070*	3.85	0.0073*	3.71
2011	0.0091*	0.0093*	0.0089*	0.0089*	0.0087*	0.0092*
	4.81	4.91	4.73	4.72	4.69	4.90
2012	0.0135*	0.0137*	0.0133*	0.0132*	0.0128*	0.0133*
	7.3	7.42	7.25	7.18	7.00	7.28
Observation	1047	1047	997	947	897	847
R-Square	0.6910	0.6893	0.7037	0.7072	0.7041	0.6999

Note: \* Significant at 95% level, \*\* Significant at 90% level.

Numbers below coefficient estimate are T-value.

**Table 5: Estimated State Fiscal Impact-First Year of Tax Cut (2011 Base)**

Tax Cut Action	Decrease in Corporate Tax Revenue (\$Million)	Increase in Individual Tax Revenue (\$Million)
100 Basis Point Reduction	\$157.5	\$27.0
50 Basis Point Reduction	\$78.8	\$25.4
30 Basis Point Reduction	\$47.3	\$24.8
20 Basis Point Reduction	\$31.5	\$24.5
15 Basis Point Reduction	\$23.6	\$24.3
10 Basis Point Reduction	\$15.8	\$24.2

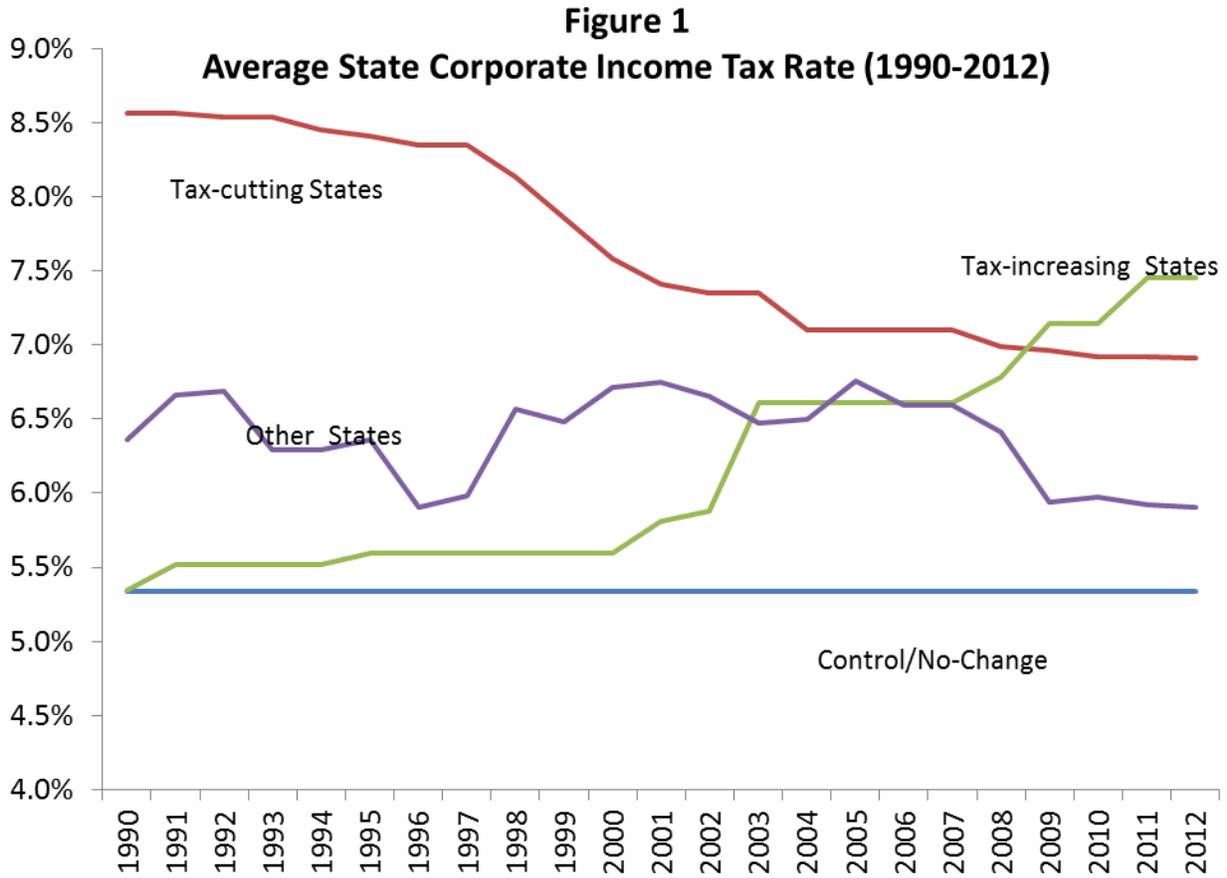
**Table 6. Logit Regression for Tax Cut**

Variable	
Intercept	-4.2589*
	65.66*
Lagged Employment Growth	14.8482
	2.3531
Lagged Population Growth	-13.1567
	0.85
Lagged Tax Rate	20.1341*
	9.98
Observation	1173

Note: \* Significant at 95% level, \*\* Significant at 90% level.

Numbers below coefficient estimate are Wald Chi-square value.

## Appendix 2: Figures in Paper



**Figure 2**  
**State Average Employment Growth Rates (1991-2012)**

