

MORE JOBS, BIGGER PAYCHECKS

The *Truth* About NC's Tax Reforms

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More Jobs, Bigger Paychecks:
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The Impacts of the Sunset of the Temporary One-Percent Sales Tax Surcharge in 2011, of Income Tax Reform in 2013, and of Unemployment Insurance Reform in 2013 on North Carolina's Economy and Labor Market

Prepared for

Civitas Institute

By:

Stephanie O. Crofton, PhD
Charles T. Ingram Professor of Economics
Associate Dean, Earl N. Phillips School of Business
High Point University
scrofton@highpoint.edu

Luis G. Dopico, PhD
Research Consultant
Macrometrix
lgdopico@gmail.com
www.linkedin.com/in/luis-dopico-a0702666

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Table of Contents

Executive Summary....4

I. Introduction....7

II. Data sources and a brief review of the literature on the impacts of economic policy on economic performance....9

III. A brief review of our methodology.....12

IV. Placing North Carolina's recent changes in economic policy in perspective....14

A. Sales tax rates across states, 2000-2016....14

B. State individual income tax rates across states, 2000-2016....17

C. Maximum unemployment insurance benefits across states, 2000-2015....23

D. Maximum number of weeks for regular unemployment insurance benefits across states, 2000-2016....26

V. Nationwide average relationships between key economic policies and economic performance across states, 2000-2015....28

VI. Impacts of major changes in economic policy during 2011-2015 in North Carolina....31

A. Impacts of the sunset of the 1% sales tax surcharge in 2011....33

• State GDP increased by an additional $1.4 billion between 2011 and 2015....33

• An additional 11,000 became employed between 2011 and 2015....33

• Salaries increased by an additional $1 billion between 2011 and 2015....34

B. Impacts of income tax reform in 2013....34

• State GDP increased by an additional $800 million between 2013 and 2015....34

• An additional 8,800 became employed between 2013 and 2015....34

• Salaries increased by an additional $320 million between 2013 and 2015....35

C. Impacts of unemployment insurance reform in 2013....35

1. Impacts of reducing maximum unemployment insurance benefits in 2013....35

• State GDP increased by an additional $6.3 billion between 2012 and 2015....35

• An additional 35,000 became employed between 2012 and 2015....36

• Salaries increased by an additional $1.3 billion between 2012 and 2015....36

• The unemployment rate fell by an additional 0.6% in 2013....36

2. Impacts of reducing the maximum number of weeks of regular unemployment insurance benefits between 2012 and 2015....36

• An additional 88,000 became employed....37

• The unemployment rate fell by an additional 1%....37

VII. Conclusion....38

List of figures....39

Appendix 1: Commonly used abbreviations and terms....40

References....41

Executive Summary

In recent years, North Carolina has carried out several major changes in economic policy including: (1) the sunset of a temporary one-cent sales tax surcharge in 2011, (2) introducing a flat income tax that reduced the top rate from 7.75% in 2013 to 5.80% in 2014, (3) reducing maximum weekly unemployment insurance benefits from $522 in 2013 to $350 in 2014, and (4) reducing the maximum number of weeks for regular unemployment insurance benefits, in stages, from 26 in 2012 to 12 in 2015.

To estimate the impacts of North Carolina's recent policy changes, we assess statistically the average relationships between several key economic policies and several key measures of economic performance across the 50 U.S. states (and DC) during 2000-2015. Our analysis shows that states with lower sales tax rates, income tax rates, and lower and shorter unemployment insurance benefits experienced higher economic growth, employment growth, and growth in real salaries, and lower unemployment rates.

As summarized in Figure 1 below, we conclude that North Carolina's recent policy changes have had the following effects:

• Reducing sales tax rates in 2011 increased state GDP by $1.4 billion (B) or by $140 per capita, employment by 11,000 jobs, and salaries by $800 million (M) or by $145 per employee between 2011 and 2015.

• Reforming income taxes in 2013 increased state GDP by $800 M or by $80 per capita, employment by 8,800 jobs, and salaries by $320 M or by $58 per employee between 2013 and 2015.

• Reducing maximum unemployment insurance benefits increased state GDP by $6.3 B or by $630 per capita, employment by 35,000 jobs, and salaries by $1.26 B or by $229 per employee between 2012 and 2015, and reduced the unemployment rate by 0.6% in 2013.

• Reducing the maximum number of weeks of regular unemployment insurance benefits increased employment by 88,000 jobs and reduced the unemployment rate by 1% between 2012 and 2015.

Over a ten-year period, we project that North Carolina's recent policy changes will have even larger effects, as follows:

• Reducing sales tax rates in 2011 will increase state GDP by $3.5 B or by $350 per capita, employment by 27,500 jobs, and salaries by $2.0 B or by $364 per employee.

• Reforming income taxes in 2013 will increase state GDP by $4.0 B or by $400 per capita, employment by

44,000 jobs, and salaries by $1.6 B or by $291 per employee.

• Reducing maximum unemployment insurance benefits in 2013 will increase state GDP by $21.0 B or by $2,100 per capita, employment by 116,000 jobs, and salaries by $4.2 B or by $764 per employee.

• Reducing the maximum number of weeks of regular unemployment insurance benefits during 2012-2016 will increase employment by 358,000 jobs.

Figure 1: Summary impacts of North Carolina's recent economic policy changes on its economy and labor market

Policy change	A. Impacts from time of implementation until 2015					
	State GDP (increase)		Employment (increase)	Salaries (increase)		Unemployment rate (decrease)
	$ billion	Per capita		$ billion	Per employee	
Sunset of 1% sales tax surcharge in 2011	1.4	140	11,000	0.8	145	
Income tax reform in 2013	0.8	80	8,800	0.3	58	
Reducing the maximum amount of unemployment benefits in 2013	6.3	630	35,000	1.3	229	0.6%
Shortening the maximum length of unemployment benefits during 2013-2015			88,000			1%
	B. Projected 10-year impacts					
Sunset of 1% sales tax surcharge in 2011	3.5	350	27,500	2.0	364	
Income tax reform in 2013	4.0	400	44,000	1.6	291	
Reducing the maximum amount of unemployment benefits in 2013	21.0	2,100	116,000	4.2	764	N.A.
Shortening the maximum length of unemployment benefits during 2013-2015			358,000			N.A.

Note 1: Detailed results for panel A of this summary table may be found in Figure 9 in P. 36.

Note 2: Since the measures for various economic policies were correlated with one another, we estimated the impacts from each policy separately. Again, since the measures are correlated, the estimates for each policy may partially stand for the impacts of other related policies. Thus, estimates are not readily additive across policies.

I. Introduction

In recent years, North Carolina has carried out major changes in economic policy including large reductions in sales tax rates, income tax rates, and the size and length of unemployment insurance benefits. What impacts have these changes in economic policy had on North Carolina's economy and labor markets?

To answer this question, in section II of this report, we briefly review the academic and professional literatures on the relationships among states' economic policies and the performance of their economies and labor markets. For instance, while policy makers must make decisions about the level of services that governments will provide, the literature shows that higher tax rates and longer availability of unemployment insurance benefits detract from economic agents' incentives to engage in economic production, and thus detract from economic growth and employment growth.

Drawing on that literature review, section III presents the methodology we use in this report. We collected data that summarize key economic policies and key aspects of economic performance across the 51 main U.S. jurisdictions[1] during 2000-2015. The key measures of economic policy that we focus on include: sales tax rates, income tax rates, and the size and length of unemployment insurance benefits. The key measures of economic performance that we focus on include: economic growth, employment growth, growth in real salaries, and unemployment rates. We applied a variety of panel data statistical techniques and controlled for state GDP per capita and nationwide macroeconomic conditions.

In section IV, we explore our measures of key economic policies across states during 2000-2015 to put in perspective the magnitude of North Carolina's recent economic policy changes. North Carolina's reductions in sales tax rates, income tax rates, and the size and length of unemployment insurance benefits are, by far, among the largest implemented across states during 2000-2015.

In section V, we present our findings about the average relationships between key economic policies and several key measures of economic performance across states during 2000-2015. Confirming the findings of earlier literature, we find that states with lower tax rates and lower and shorter unemployment benefits experience more favorable economic performance. For instance, states with sales tax rates that are 1% lower experience annual economic growth rates that are 0.07% higher. States with unemployment insurance benefits that are lower by 10% (of GDP per capita) experience annual employment growth rates that are 0.1% higher. Over a ten-year period, these differences would cumulate to GDP being 0.7% larger and employment being

[1] For simplicity, throughout this report, we generally refer to the 51 main U.S. jurisdictions (50 states plus DC) as "states" or "51 states."

1% larger. For a state like North Carolina, these differences imply GDP being larger by $3.5 B and employment being larger by 55,000 more jobs.

In section VI, we apply these nationwide average relationships to the specifics of recent changes in North Carolina's economic policies. In particular, the reduction in sales tax rates in 2011 increased state GDP by $1.4 billion (B), employment by 11,000 jobs, and salaries by $800 M between 2011 and 2015. Income tax reform in 2013 increased state GDP by $800 M, employment by 8,800 jobs, and salaries by $320 M between 2013 and 2015. The reduction in maximum unemployment benefits increased state GDP by $6.3 B, employment by 35,000 jobs, and salaries by $1.26 B between 2012 and 2015, and reduced the unemployment rate by an additional 0.6% in 2013. The reduction in the maximum number of weeks of regular unemployment insurance increased employment by 88,000 jobs and reduced the unemployment rate by an additional 1% between 2012 and 2015. Section VII briefly summarizes the report.

II. Data sources and a brief review of the literature on the impacts of economic policy on economic performance

Estimating the impacts of large changes in economic policy is complex. Common methodologies used to estimate such impacts involve collecting data across multiple units of analysis (states, counties, cities, businesses, banks, individuals, etc.) over multiple periods of time (years, quarters, or months) to form "panels of data."

Common contributions in the government and professional literatures involve developing, updating, and distributing new panels of data across U.S. states over time. These panels cover a growing variety of not only measures of economic performance, but also of measures of economic, fiscal, regulatory, and legal policy. The U.S. government's Bureau of Economic Analysis (BEA 2016), Bureau of the Census (Census 2011 and 2015), and Bureau of Labor Statistics (BLS 2016) routinely release panels with much of the data on economic performance and demographics that we use in this report. These data include economic production (i.e., nominal and real [inflation-adjusted] gross domestic product, GDP), population, employment, salaries, and unemployment rates. These data serve to form the key variables that we seek to explain (the "dependent variables") and some of our independent (or control) variables. These include:

- Economic growth
- Employment growth
- Growth in real salaries
- The unemployment rate
- GDP per capita

The Tax Foundation (2016 c and d), the Tax Policy Center (2016), and the U.S. Department of Labor (DoL 2000-2016) maintain separate (state-year) panels about state tax systems and unemployment insurance systems that yield our key independent (or explanatory) variables. These include:

- State sales tax rates
- State individual income tax rates for households in the top income bracket
- State individual income tax rates for households earning $50,000
- The number of income brackets in state individual income taxes
- The maximum amount of unemployment insurance benefits payable in each state

• The maximum number of weeks of regular unemployment insurance benefits that each beneficiary may receive

As a further example of the growing number of panels available, the Cato Institute's *Freedom in the 50 States* project includes over 60 measures of fiscal and regulatory policy beginning in the year 2000 and, biennially, during 2006-2014 (Cato 2016). Academic, private, and government analysts commonly assess panels of data for a variety of, both, indirect and ultimate purposes. An example of an indirect use of data, and another common contribution from the professional literature, involves combining multiple variables into indices, hopefully helping turn complex data into more intelligible, simpler, and useful measures. Ultimately, many analysts use data panels and indices (1) to explore the links between economic policies and economic performance in general and/or (2) focus on the experience of a single state, often as a guide to that state's policymakers.

For instance, the Tax Foundation combines data about state corporate income taxes, individual income taxes, sales taxes, property taxes, and unemployment insurance taxes to yield a single *State Business Tax Climate Index*. In turn, this index may be used to highlight how tax policy evolved for a single state over time. Following its recent, major tax policy reforms, North Carolina's ranking improved from 44th to 16th within a single year, between the 2014 and 2015 editions of the index (Drenkard and Henchman 2014).[2]

Panels of data may be used to assess economic policies and their links with economic performance both informally (e.g., "visually" looking for broad patterns in the data) and formally (i.e., applying statistical techniques to analyze data). Two indices compiled by the American Legislative Exchange Council (ALEC) can be used to provide an example of an informal assessment of the links between economic policy and economic performance for a single state, i.e., North Carolina.

The *ALEC-Laffer State Economic Competitiveness Index* project includes two key indices. First, the *Economic Outlook Index* combines fifteen variables describing state economic policy. Among others, these variables include: individual and corporate income tax rates for the top brackets, a measure of the progressivity of income tax systems, measures of sales, property, inheritance, and other taxes, as well as measures of labor policies such as the minimum wage. Second, the *Economic Performance Index* combines, as its name implies, simple measures of

[2] There is a large variety of indices focusing on different aspects of economic policy. Also indices may both incorporate information more or less quickly, or be updated more or less often. For instance, the Cato Institute's indices of fiscal and regulatory policy (part of their Freedom in the 50 States project) have similar mid-ranging values for North Carolina in their 2012 and 2014 editions (17 and 17 for fiscal policy, and 25 and 26 for regulatory policy). Thus, these alternative indices present neither as negative an initial description, nor as positive a final description, nor as large a change in economic policy in North Carolina during this period. It is possible, of course, that the 2014 version of the index had yet to incorporate North Carolina's changes in tax policy.

performance: economic growth, domestic migration, and employment growth.

"Visually" comparing the recent evolution of North Carolina's ranking in these two indices provides clear, if informal, indications that lowering taxes (and reducing other forms of government intervention in the economy) had favorable impacts on economic performance. In recent years, as North Carolina reformed its tax and unemployment insurance mechanisms (lowering tax rates and unemployment benefits) its ranking in the Economic Outlook Index (again: a measure of lighter levels of government intervention) climbed markedly from 23 in 2012 annually to 22, 6, 4, and 2 by 2016. Subsequently, North Carolina's ranking in the Economic Performance Index has followed a similar upward path from 27 in 2012 annually to 15, 12, 10, and 8 in 2016 (Laffer 2012-2015).

Beyond informal assessments, the academic and professional literatures routinely apply statistical techniques to panels of data (i.e., panel data techniques) to carry out formal economic and policy analyses. Examples of these applications range very widely. For instance, Jayaratne and Strahan (1996) explore whether bank branch deregulation improves bank performance. Anderson et al. (2009) explore whether minimum wages affected high school dropout rates across counties and ethnic groups in Maryland. Crofton and Parker (2012) explore whether social media affected tourism outcomes in Atlantic Canada. Dopico and Wilcox (2013) explore whether mortgage lending affects credit union performance. Dopico (2014) explores whether government assistance programs affect the performance of small credit unions. Dopico (2016) explores what factors affect credit union asset growth.

Focusing again on state economic policy and economic performance, the academic literature has long found that higher state taxes detract from economic growth (Helms 1985) and from employment growth (Mark et al. 2000). In an example of the burgeoning recent literature about the impacts of taxation on long-term economic growth rates, Amiel (2012) shows that lower-income states which, ceteris paribus, would normally grow faster than wealthier ones, benefit from formal restrictions on government taxation and expenditures.

Chetty (2008) shows that unemployment insurance eligibility detracts from incentives to seek work and increases the duration of unemployment. Focusing on the financial crisis, Mulligan (2011) and Pantuosco and Ullrich (2014) show that longer eligibility for unemployment insurance (expanded from 26 weeks to as long as 99 following the crisis) detracts from incentives to seek work, delays reductions in unemployment, and depresses employment and production further than would be the case in the absence of extended unemployment insurance benefits.

III. A brief review of our methodology

Drawing on the examples from past literature (Amiel 2012, Pantuosco and Ullrich 2014, Drenkard and Henchman 2014, Laffer et al. 2016), we apply panel data techniques to explore the links between several measures of economic policy and several measures of economic performance, and then highlight the case of North Carolina. In particular, in section V below, first, we assess whether, during 2000-2015, states with lower (or higher) sales tax rates and income tax rates, and unemployment insurance benefits (i.e., the independent variables) experience lower (or higher) economic growth rates, employment growth rates, growth in real salaries, and unemployment rates (i.e., the dependent variables).

We used annual data for individual states for the period of 2000-2015 for several reasons: First, the period is reasonably long, including a variety of stages in the business cycle: two recessions, two expansions, and, of course, among them, the recent housing boom, housing and financial crises, and the most recent atypically-weak recovery. Second, the period is sufficiently short that its data are relevant to current conditions. And, third, the period is long enough that it includes substantial variation in economic policies, not only across states, but also within several individual states. We focused on annual data, instead of using higher frequencies, such as monthly or quarterly data, because while there were some changes in economic policy (e.g., tax rates), such changes only take place every few years.

We experimented with a variety of model specifications including, among others:

- Pooled panels using ordinary least squares (OLS) vs. panels using fixed effects regressions
- Models entering variables as levels or as first differences
- Including lagged values of the dependent variables as an independent variable and not doing so
- Several lags for independent variables, and
- Several combinations of additional independent, or control variables

Ultimately, we selected a single core specification that we applied with only slight modifications across our several dependent variables and key independent variables. Since we are investigating the impacts of a large number of measures of economic policy on a large number of measures of economic performance, and since several of our measures of economic policy were correlated with one another, we address the issue of multicollinearity by testing the impacts of policies in separate models, one at a time. Also, all results were

adjusted for heteroskedasticity and autocorrelation as necessary.

In particular, our core specifications each include:

• One key measure of economic performance (i.e., a dependent variable)

• The one-year lag of that dependent variable

• At least one measure of economic policy (i.e., the key independent variable)

• Some additional independent "control" variables: real GDP per capita, to control for the level of economic development in the state, as well as a rough proxy of voters' demand for public services and/or the effectiveness of those services,[3] and

• Annual dummy variables, to control for the evolution of nationwide economic conditions and their impacts on local economic conditions.

Finally, in section VI, we take the analysis one step further. Section V provides us with average nationwide relationships between various levels of several economic policies (e.g., tax rates) and various levels of several measures of economic performance (e.g., economic growth being higher or lower). These relationships may readily be used as estimates of the per unit "impacts" of policy changes. Armed with these per unit "impacts," we may combine them with measures of the magnitude of specific changes in policy in North Carolina and develop estimates of the impacts that these changes had on the state's economy.

[3] The predicted impact of real GDP per capita on economic performance is ambiguous. Wealthier states may have greater demands for various public services (e.g., education, healthcare, and other services) and be more willing and able to bear higher levels of taxation, since the same tax rate leaves more after-tax dollars than in poorer states. These public services may contribute or detract from economic performance, while higher tax rates may detract from economic performance by weakening economic agents' incentives to work (Amiel 2012).

IV. Placing North Carolina's recent changes in economic policy in perspective

In recent years, North Carolina has carried out major changes in economic policy including large reductions in sales tax rates, income tax rates, and the size and length of unemployment insurance benefits. To help place these changes in perspective, in this section we compare North Carolina's policies and its changes with those of all other states during 2000-2015.

The details of economic policy are complex with, for instance, tax laws and regulations that run for hundreds, if not thousands, of pages. Among many other factors, income taxes across states may differ in the number of income brackets that they use, the tax rates that apply to each bracket, and the income levels at which each bracket begins and ends. However, to assess the impacts of economic policy, statistical techniques require both (1) that all differences be readily quantifiable in a comparable manner, ideally across a large number of units (states) and a large number of periods of time, and (2) that complex differences be boiled down to relatively simple measures, such as focusing on one or two key tax rates, the number of income brackets, or some index that combines the many components of each tax system into a single measure (see, for instance, Walzack et al., 2015).

In the remainder of this section, we present some of the key measures that we have used to readily compare the economic policies of North Carolina and all other states. In particular, we explore: (1) sales tax rates, (2) the income tax rate for households in the top income bracket, (3) the income tax rates for households earning $50,000, or about the median household income, (4) the number of income tax brackets, (5) maximum unemployment insurance benefits as a percentage of GDP per capita, and (6) the maximum number of weeks of regular unemployment insurance benefits that residents of a state may receive.

A. Sales tax rates across states, 2000-2016

Figure 2 presents state sales tax rates across states during 2000-2016. The figure shows that sales tax rates vary substantially across states. Four states (Alaska, Montana, New Hampshire, and Oregon) do not have statewide general sales taxes. Two states (Colorado and Delaware) have sales taxes (or other similar taxes) with rates averaging higher than 0% but lower than 4% during 2000-2016. Twenty-eight states had sales tax rates in the 4-6% range, and 17 states had sales tax rates in the 6-8% range.

Sales tax rates have been very stable during this period within most states. Aside from the four states without

sales taxes, eighteen other states never changed their tax rates during 2000-2016. Out of the 816 state-year cases (i.e., 51 states * 16 years), 753 involved sales tax rates that did not change from year to year (92.3% of cases), 47 were increases (5.8%), and 16 were decreases (2.0%). The unweighted average of sales tax rates across states (including states without a sales tax) increased from 4.69% in 2000 to 5.15% in 2016. Among states changing their sales tax rates, most changes were relatively small. Out of the 47 increases, 26 were smaller than 1% and 21 were in the 1-2% range. Out of the 16 decreases, 11 were smaller than 1%, and 5 were decreases of 1%.

North Carolina's increase of its sales tax rate from 4.75% to 5.75% effective September 1, 2009, and its decrease to 4.75% effective July 1, 2011 (Andros et al. 2016) are both among the few changes in states' sales tax rates and among the largest changes across states during 2000-2016.

Figure 2: Sales tax rates, per state, 2000-2016

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AL	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
AK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AZ	5.00	5.00	5.00	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	6.60	6.60	6.60	5.60	5.60	5.60
AR	4.63	4.63	5.13	5.13	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.50	6.50	6.50
CA	6.00	5.75	6.00	7.25	7.25	6.25	6.25	6.25	7.25	8.25	8.25	8.25	7.25	7.50	7.50	7.50	7.50
CO	3.00	3.00	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
CT	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.35	6.35	6.35	6.35	6.35
DE	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
FL	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GA	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HI	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ID	5.00	5.00	5.00	5.00	6.00	6.00	5.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
IL	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
IN	5.00	5.00	5.00	6.00	6.00	6.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
IA	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
KS	4.90	4.90	4.90	4.90	5.30	5.30	5.30	5.30	5.30	5.30	5.30	6.30	6.30	6.30	6.15	6.15	6.50
KY	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
LA	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	5.00
ME	5.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.50	5.50	5.50
MD	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
MA	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
MI	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
MN	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88
MS	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
MO	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23
MT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NE	5.00	5.00	5.00	5.00	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
NV	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85
NH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NJ	6.00	6.00	6.00	6.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
NM	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.38	5.50	5.13	5.13	5.13	5.13	5.13	5.13
NY	4.00	4.00	4.00	4.00	4.25	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
NC	4.00	4.00	4.00	4.50	4.50	4.50	4.50	4.25	4.25	**4.50**	**5.75**	**5.75**	**4.75**	4.75	4.75	4.75	4.75
ND	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
OH	5.00	5.00	5.00	5.00	6.00	6.00	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.75	5.75	5.75
OK	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
OR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PA	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
RI	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
SC	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
SD	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.50
TN	6.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
TX	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
UT	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.65	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
VT	5.00	5.00	5.00	5.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
VA	3.50	3.50	3.50	4.50	4.50	4.00	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	5.30	5.30	5.30
WA	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
WV	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
WY	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
WI	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DC	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	6.00	6.00	6.00	6.00	5.75	5.75	5.75
Unweighted average	4.69	4.68	4.69	4.77	4.89	4.86	4.83	4.86	4.94	5.07	5.03	5.14	5.11	5.11	5.11	5.11	5.15

Sources: Tax Foundation (2016a and d).

B. State individual income tax rates across states, 2000-2016

Figure 3 and Figure 4 present respectively "income tax rates for the top wage income bracket" (hereinafter: maximum tax rates) and income tax rates for households earning $50,000, across states during 2000-2016. We present and explore maximum rates first for several reasons. In many states, the maximum rates become effective at relatively low income levels. Also, large fractions of tax revenues are paid by the highest earners. And, further, maximum rates are an indicator of the complexity of tax systems.

Figure 3 highlights that income tax rates ranged widely across states during 2000-2016. Nine states (Alaska, Florida, Nevada, New Hampshire, South Dakota, Tennessee, Texas, Washington, and Wyoming) did not have income taxes for wages during this period.[4] Seven states had maximum income tax rates that averaged more than 0% but less than 5%. There were 34 states with maximum income tax rates that averaged between 5% and 10%, and one state (California) had maximum income tax rates that averaged above 10%. The income levels at which this maximum tax rate became effective also ranged widely, from $3,000 for single filers in Alabama to $2,140,900 for married filers in New York.

[4] Several states without income taxes on wages did have income taxes for dividends and interest income. Two states (Alaska and New Hampshire) had neither sales taxes nor state income taxes, relying instead on other sources for revenues.

Figure 3: Maximum individual income tax rates, per state, 2000-2016

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AL	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
AK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AZ	5.04	5.04	5.04	5.04	5.04	5.04	5.04	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54
AR	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	6.90	6.90
CA	9.30	9.30	9.30	9.30	9.30	9.30	10.30	10.30	10.30	10.55	10.55	10.30	10.30	13.30	13.30	13.30	13.30
CO	5.00	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63
CT	4.50	4.50	4.50	4.50	5.00	5.00	5.00	5.00	5.00	6.50	6.50	6.50	6.70	6.70	6.70	6.70	6.99
DE	6.40	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	6.95	6.95	6.75	6.75	6.60	6.60	6.60
FL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GA	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
HI	8.75	8.50	8.30	8.25	8.25	8.25	8.25	8.25	8.25	11.00	11.00	11.00	11.00	11.00	11.00	11.00	8.25
ID	8.20	8.20	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.40	7.40	7.40	7.40
IL	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	5.00	5.00	5.00	5.00	3.75	3.75
IN	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.30	3.30
IA	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98
KS	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	4.90	4.80	4.60	4.60
KY	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
LA	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
ME	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.00	7.95	7.95	7.15
MD	4.85	4.80	4.75	4.75	4.75	4.75	4.75	4.75	5.50	6.25	6.25	5.50	5.50	5.75	5.75	5.75	5.75
MA	5.95	5.60	5.60	5.60	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.25	5.20	5.15	5.15
MI	4.40	4.20	4.10	4.00	4.00	3.90	3.90	3.90	4.35	4.35	4.35	4.35	4.35	4.25	4.25	4.25	4.25
MN	8.00	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	9.85	9.85	9.85
MS	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
MO	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
MT	11.00	11.00	11.00	11.00	11.00	11.00	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90
NE	6.68	6.68	6.68	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84
NV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NJ	6.37	6.37	6.37	6.37	6.37	8.97	8.97	8.97	8.97	10.75	8.97	8.97	8.97	8.97	8.97	8.97	8.97
NM	8.20	8.20	8.20	8.20	7.70	6.80	5.30	5.30	5.30	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90
NY	6.85	6.85	6.85	6.85	7.70	7.70	7.70	6.85	6.85	8.97	8.97	8.97	8.82	8.82	8.82	8.82	8.82
NC	7.75	7.75	8.25	8.25	8.25	8.25	8.25	8.00	7.75	7.75	7.75	7.75	7.75	**7.75**	**5.80**	5.80	5.75
ND	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	4.86	4.86	4.86	3.99	3.99	3.22	3.22	2.90
OH	7.23	6.98	7.50	7.50	7.50	7.19	6.87	6.56	6.24	6.24	6.24	5.93	5.93	5.93	5.39	5.33	5.00
OK	6.75	6.75	6.75	6.65	7.00	6.65	6.65	6.25	5.65	5.50	5.50	5.50	5.25	5.25	5.25	5.25	5.00
OR	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	11.00	11.00	11.00	9.90	9.90	9.90	9.90	9.90
PA	2.80	2.80	2.80	2.80	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07
RI	9.90	9.90	9.90	9.90	9.90	9.90	9.90	9.90	9.90	9.90	9.90	5.99	5.99	5.99	5.99	5.99	5.99
SC	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
SD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UT	7.00	7.00	7.00	7.00	7.00	7.00	7.00	6.98	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
VT	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.40	8.95	8.95	8.95	8.95	8.95	8.95	8.95
VA	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75
WA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WV	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
WI	6.77	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	7.75	7.75	7.75	7.75	7.75	7.65	7.65	7.65
WY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DC	9.50	9.00	9.30	8.70	9.50	9.00	8.70	8.70	8.50	8.50	8.50	8.50	8.95	8.95	8.95	8.95	8.95
Unweighted average																	
	5.53	5.47	5.49	5.47	5.51	5.52	5.42	5.37	5.33	5.54	5.52	5.45	5.42	5.43	5.40	5.36	5.28

Sources: Tax Foundation (2016b and c) and Tax Policy Center (2016).

Maximum tax rates were relatively stable for many states during this period. Aside from the nine states without income taxes on wages, nine other states never changed their maximum tax rates. Out of the 816 state-year cases, 707 involved maximum tax rates that did not change from year to year (86.6% of cases), 29 were increases (3.6%), and 80 were decreases (9.8%). Unlike sales tax rates, average maximum rates have fallen somewhat from 5.53% in 2000 to 5.28% in 2016. Among states changing their maximum tax rates, most changes were relatively small. Out of the 29 increases, 17 were smaller than 1%, 5 were in the 1-2% range, and only 7 were of at least 2%. Out of the 80 decreases, 56 were in the 0-0.5% range, 16 were small in the 0.5-1% range, and only 10 were of at least 1%.

Thus, North Carolina's reduction of its maximum tax rate from 7.75% in 2013 to 5.8% in 2014 is among the largest reductions in income tax rates during 2000-2016.

Figure 4 presents income tax rates for households earning $50,000, across states during 2000-2016. We present rates for households earning $50,000 since these tax rates are more directly relevant to median taxpayers.[5] In section V, we explore separately whether changes in maximum tax rates or changes in tax rates for households earning $50,000 each have impacts on macroeconomic or labor market performance. However, the differences between the maximum tax rates and those for households earning $50,000 have generally been relatively small, even if they have grown some in recent years. For instance, in 2000, 38 states had the same tax rates for households earning $50,000 and as the maximum tax rate (these counts include 9 states without income taxes and 8 with flat income taxes). In 7 states, the gap between the two rates was larger than 0% but smaller than 1%. In 3 states, the gap was in the 1-2% range, and in only 3 states were the gaps larger than 2%. By 2016, while the gaps were larger somewhat more often, they remained generally small. There were 34 states with the same tax rates for households earning $50,000 and as the maximum tax rate. There were 4 states with gaps in the 0-1% range, 6 in the 1-2% range, and 7 where the gap was larger than 2%, including California where the gap was 4% and New Jersey, where it was 3.45%.

[5] Middle and lower-to-middle income taxpayers may also be affected by tax rates charged to higher-income taxpayers and by corporate income taxes to the extent that those tax rates detract from incentives to engage in economic activity and, thus, from hiring lower-to-middle income workers.

Figure 4: Income tax rates for households earning $50,000, per state, 2000-2016

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AL	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
AK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AZ	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.48	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24
AR	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	6.90	6.90
CA	9.30	9.30	9.30	9.30	9.30	9.30	9.30	9.30	9.30	9.55	9.55	9.30	9.30	9.30	9.30	9.30	9.30
CO	5.00	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63
CT	4.50	4.50	4.50	4.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.50	5.50	5.50	5.50	5.50
DE	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55
FL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GA	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
HI	8.75	8.50	8.30	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
ID	8.20	8.20	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.40	7.40	7.40	7.40
IL	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	5.00	5.00	5.00	5.00	3.75	3.75
IN	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.30	3.30
IA	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92
KS	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	4.90	4.80	4.60	4.60
KY	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
LA	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
ME	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.00	7.95	7.95	7.15
MD	4.85	4.80	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
MA	5.95	5.60	5.60	5.60	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.25	5.20	5.15	5.15
MI	4.40	4.20	4.10	4.00	4.00	3.90	3.90	3.90	4.35	4.35	4.35	4.35	4.35	4.25	4.25	4.25	4.25
MN	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05
MS	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
MO	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
MT	10.00	10.00	10.00	10.00	10.00	10.00	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90
NE	6.68	6.68	6.68	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84
NV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NJ	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53
NM	8.20	8.20	8.20	7.90	7.70	6.80	5.30	5.30	5.30	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90
NY	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.45	6.45	6.45	6.45	6.45
NC	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	**7.00**	**5.80**	5.80	5.75
ND	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.44	3.44	3.44	2.82	2.82	2.27	2.27	2.04
OH	5.20	5.20	5.20	5.20	5.20	5.20	4.98	4.76	4.55	4.11	4.11	4.11	4.11	4.11	3.76	3.76	3.47
OK	6.75	6.75	6.75	6.65	7.00	6.65	6.65	6.25	5.65	5.50	5.50	5.50	5.25	5.25	5.25	5.25	5.00
OR	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
PA	2.80	2.80	2.80	2.80	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07
RI	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	3.75	3.75	3.75	3.75	3.75	3.75
SC	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
SD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UT	7.00	7.00	7.00	7.00	7.00	7.00	7.00	6.98	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
VT	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.00	7.00	6.80	6.80	6.80	6.80	6.80	6.80
VA	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75
WA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WV	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
WI	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.27	6.27	6.27
WY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DC	9.50	9.00	9.30	8.70	9.50	9.00	8.70	8.70	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	6.50
Unweighted average	5.22	5.19	5.18	5.16	5.19	5.15	5.05	5.04	4.98	4.95	4.95	4.92	4.90	4.85	4.80	4.77	4.70

Sources: Tax Foundation (2016b and c) and Tax Policy Center (2016).

Next we explore the number of income tax brackets, interpreting it as s simple measure of the complexity of income tax systems. Figure 5 presents the number of income brackets in income taxes, across states during 2000-2016. Measured by the number of brackets, the overall structure, or complexity, of income tax systems across states has remained relatively stable. About one sixth of states (nine of them) do not impose income taxes on wages. Another sixth of states (between seven or eight across years) used flat income taxes. One third of states (17 of them) used graduated income taxes with a small number of brackets (ranging from two to five brackets).[6] Kansas, for instance, has had only two brackets since 2013. A further third of states (another 17 of them) have graduated income taxes with a large number of brackets. Hawaii, for instance, had twelve brackets from 2009 to 2015. Most states change their number of brackets rarely, with 29 states not having implemented any changes in the number of brackets during 2000-2016. A few states have implemented large changes. For instance, Vermont and Rhode Island forwent flat income taxes, introducing graduated income ones (in 2003 and 2009). Utah and North Carolina forwent graduated income taxes, introducing flat income taxes (in 2008 and 2014).

[6] While progressive, or graduated, income taxes formally impose higher tax rates on higher income earners, states with flat income taxes effectively also have lower tax rates on lower incomes. By exempting the first incomes earned, flat taxes in effect are not completely flat, resulting in higher average income taxes for earners with higher incomes than for earners with lower incomes.

Figure 5: Number of income brackets in income taxes, per state, 2000-2016

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AL	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
AK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AZ	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
AR	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
CA	6	6	6	6	6	6	6	6	6	6	6	6	6	9	9	9	9
CO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CT	2	2	2	2	2	2	2	2	2	3	3	3	6	6	6	6	7
DE	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	7	7
FL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GA	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
HI	9	8	8	8	9	9	9	9	9	12	12	12	12	12	12	12	9
ID	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7
IL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
IN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
IA	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
KS	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2
KY	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6
LA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
ME	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3
MD	4	4	4	4	4	4	4	4	7	8	8	7	7	8	8	8	8
MA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MI	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MN	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4
MS	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
MO	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
MT	10	10	10	10	10	7	7	7	7	7	7	7	7	7	7	7	7
NE	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
NV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NJ	6	6	6	6	6	6	6	6	6	8	8	6	6	6	6	6	6
NM	7	7	7	7	5	4	4	4	4	4	4	4	4	4	4	4	4
NY	5	5	5	5	7	7	7	5	5	7	7	7	8	8	8	8	8
NC	3	3	4	4	4	4	4	4	3	3	3	3	3	**3**	**1**	1	1
ND	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
OH	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
OK	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	6
OR	3	3	3	3	3	3	3	3	3	5	5	5	4	4	4	4	4
PA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RI	1	1	1	1	1	1	1	1	1	5	5	3	3	3	3	3	3
SC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
SD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UT	6	6	6	6	6	6	6	6	1	1	1	1	1	1	1	1	1
VT	1	1	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5
VA	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
WA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WV	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
WI	3	4	4	4	4	4	4	4	4	5	5	5	5	5	4	4	4
WY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DC	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4
Unweighted average	3.7	3.7	3.8	3.8	3.8	3.8	3.8	3.7	3.7	4.0	4.0	3.9	4.0	4.0	3.9	4.0	3.9

Sources: Tax Foundation (2016b and c) and Tax Policy Center (2016).

Notes: 0 indicates no income tax on wages, 1 indicates a flat income tax.

C. Maximum unemployment insurance benefits across states, 2000-2015

To adjust for inflation and economic growth nationwide, and for differences in incomes across states, Figure 6 presents the maximum unemployment insurance benefits that residents in each state may receive as a percentage of state GDP per capita (hereinafter: maximum benefits) across states during 2000-2015.[7] Maximum benefits range widely across states, from about 25% of GDP per capita in Delaware to about 80% of GDP per capita in Massachusetts.[8] During 2000-2015, six states had maximum benefits in excess of 60% of GDP per capita, 28 states had maximum benefits between 40% and 60%, and 17 states had benefits under 40% of GDP per capita.

[7] To compare maximum weekly unemployment benefits and incomes, we annualize the weekly benefit (multiplying by 52) and divide by annual GDP per capita. One obtains similar results if, instead, one expresses annual GDP per capita on a weekly basis, dividing it by 52.
[8] Maximum benefits as a percentage of GDP per capita in DC ranged from 15.2% to 10.2% during this period. These low percentages are not the result of atypically low maximum benefits, but instead are the result of atypically high levels of GDP per capita. In 2015, for instance, GDP per capita in DC was about $183,000, much higher than the about $56,000 for the U.S. as a whole.

Figure 6: Maximum unemployment insurance benefits as a percentage of GDP per capita, per state, 2000-2015

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
AL	36.5	35.3	37.6	36.1	34.8	33.1	33.5	33.5	33.2	38.7	37.4	36.4	35.4	34.8	33.8	32.8
AK	38.8	36.4	35.9	33.6	30.9	27.6	25.0	23.0	20.6	31.8	30.3	28.0	27.3	28.3	29.2	32.0
AZ	33.1	32.6	32.0	30.5	34.5	32.1	30.3	29.4	30.3	32.6	32.4	31.6	30.7	30.5	29.8	29.3
AR	64.7	65.5	65.4	62.0	57.8	61.3	60.5	61.1	63.1	66.4	65.3	63.0	62.0	59.5	57.5	56.6
CA	29.5	29.6	41.3	44.2	46.1	47.6	45.1	43.5	43.0	45.2	44.6	43.4	42.0	40.6	39.1	37.3
CO	42.5	48.4	49.1	47.9	47.2	45.6	45.8	46.4	47.3	50.3	49.7	48.8	49.9	50.2	48.5	49.6
CT	48.6	48.9	49.5	48.5	46.1	45.7	44.7	43.5	45.9	48.7	49.4	49.2	50.8	51.4	49.6	48.4
DE	30.9	30.1	32.1	30.5	28.2	27.4	26.4	26.3	27.9	27.1	26.8	26.1	25.9	25.8	24.5	23.9
FL	46.8	45.1	43.4	41.5	39.1	36.4	34.7	34.0	35.1	36.9	36.9	37.2	36.2	35.2	34.0	32.7
GA	37.0	39.1	40.3	40.1	38.7	37.0	38.7	37.8	39.7	41.0	40.9	40.2	39.1	38.0	36.7	35.3
HI	56.8	57.1	56.3	54.5	51.8	50.4	50.7	50.2	54.6	58.7	58.7	57.5	56.3	52.9	52.5	51.4
ID	48.0	57.0	56.2	54.5	52.9	49.8	47.5	48.1	51.9	54.4	49.2	48.2	48.6	49.0	51.4	52.5
IL	49.3	53.7	54.6	53.8	51.1	50.8	50.1	50.7	52.5	55.5	54.3	52.3	51.6	52.3	51.4	50.1
IN	38.8	48.0	50.1	49.6	49.7	51.5	49.7	47.7	47.4	49.7	46.5	45.3	44.2	42.9	41.3	39.9
IA	51.8	55.1	52.8	52.6	49.3	49.5	49.5	48.4	50.8	53.0	51.7	49.2	48.9	49.3	48.4	49.3
KS	49.0	51.8	52.4	50.9	50.4	49.8	48.8	48.2	48.9	52.5	50.3	47.2	48.3	49.5	48.8	48.6
KY	57.8	60.6	56.5	60.7	57.9	55.1	57.7	59.1	58.3	59.7	56.6	54.7	53.1	52.0	50.5	49.1
LA	44.7	42.8	42.6	38.5	35.4	30.6	27.8	28.0	30.0	31.7	25.2	24.8	24.3	25.0	24.3	24.7
ME	71.9	71.2	71.3	68.8	69.4	67.5	68.6	69.5	71.6	73.5	71.7	71.5	73.3	73.5	72.8	72.8
MD	35.8	37.9	36.3	38.5	36.1	37.3	35.8	38.5	37.7	40.3	41.2	40.3	39.7	39.4	38.2	37.0
MA	73.8	80.3	84.6	80.5	77.1	75.3	76.6	76.3	78.8	83.4	80.6	78.4	78.4	80.4	78.3	77.5
MI	44.1	44.4	51.6	50.1	49.3	47.7	47.6	46.8	48.5	50.9	48.0	46.3	44.6	43.2	41.7	40.0
MN	54.5	59.0	59.1	57.6	56.2	56.0	55.0	56.1	55.3	59.9	59.5	57.2	56.7	56.0	56.7	56.4
MS	42.5	43.9	45.0	42.3	40.4	38.6	36.3	34.8	37.2	39.2	38.2	37.6	35.7	35.4	34.9	34.2
MO	36.5	38.2	37.5	36.1	34.6	33.4	35.0	35.4	39.6	39.7	39.0	38.9	37.8	36.6	35.6	34.5
MT	54.5	58.5	58.8	59.9	57.9	55.6	55.0	53.6	56.1	60.6	57.5	53.6	55.3	56.7	56.1	56.9
NE	31.9	37.4	37.8	36.3	35.7	35.4	33.8	32.2	32.5	33.5	33.1	30.8	33.4	32.8	32.9	32.8
NV	39.1	39.6	41.3	41.0	38.8	37.5	40.0	37.3	42.1	46.7	46.7	45.8	45.3	46.5	45.4	44.3
NH	44.0	47.8	51.7	49.2	47.0	44.8	43.3	48.6	48.6	48.2	46.6	45.7	44.4	43.6	41.9	40.7
NJ	52.1	52.8	54.4	52.5	51.9	50.9	50.3	50.2	51.4	54.9	55.7	55.4	54.4	54.5	54.2	53.0
NM	43.3	44.7	45.4	42.5	49.4	48.8	47.4	55.6	55.2	64.4	59.8	57.9	53.5	54.3	52.2	54.3
NY	43.7	46.5	45.8	44.9	42.3	39.3	37.1	35.9	36.5	35.5	33.8	33.4	31.8	31.1	30.0	30.0
NC	54.0	58.0	56.8	56.9	57.0	55.9	54.8	54.8	53.6	60.7	60.1	59.1	**60.2**	**39.4**	38.2	36.6
ND	52.5	50.7	47.4	46.5	46.4	46.2	46.0	45.6	43.0	46.0	43.0	37.4	36.1	39.4	39.2	45.4
OH	56.8	60.8	60.0	59.1	57.6	56.8	57.2	57.9	59.8	63.1	61.6	58.4	59.5	60.0	57.7	56.8
OK	55.2	53.7	55.4	52.0	44.2	43.1	43.3	44.8	48.2	55.1	55.6	51.2	42.0	42.4	46.7	55.1
OR	54.4	61.5	60.6	59.1	54.6	55.3	52.1	52.6	52.4	53.9	51.7	49.8	53.9	55.6	55.7	53.2
PA	64.9	65.4	65.5	64.4	62.8	62.3	62.0	62.4	63.4	65.7	64.3	62.4	61.6	59.8	57.5	56.1
RI	78.7	78.8	77.3	75.5	74.1	73.1	71.3	73.5	76.3	78.2	76.4	75.4	75.2	73.3	70.4	68.1
SC	44.4	46.7	47.1	46.4	46.7	46.5	44.9	43.5	47.2	48.3	47.6	46.3	45.6	44.7	43.2	41.7
SD	36.1	37.8	34.8	34.3	33.3	34.0	34.4	33.6	33.5	35.5	35.0	31.7	33.4	33.8	34.2	35.1
TN	41.4	43.6	41.9	40.5	38.3	37.5	36.4	36.3	35.7	36.5	42.2	40.8	38.8	38.0	31.2	30.0
TX	42.6	41.4	44.9	44.5	41.6	39.8	38.9	38.2	38.4	43.2	42.6	40.1	40.1	39.7	39.7	41.8
UT	51.1	56.8	57.5	57.1	52.3	50.0	47.3	47.3	50.7	54.9	54.7	52.6	53.7	53.6	53.0	52.3
VT	51.7	51.8	56.0	54.3	53.1	53.0	52.6	53.6	54.5	54.7	52.4	50.2	49.2	48.4	47.9	47.8
VA	31.6	35.2	47.7	39.1	38.4	36.2	36.6	37.3	38.5	38.0	37.2	36.9	36.2	36.0	35.4	34.3
WA	56.5	64.1	62.5	60.5	58.7	54.4	52.0	50.5	52.3	54.3	54.2	53.4	55.5	56.2	55.3	55.6
WV	70.3	72.5	70.4	72.6	70.0	67.5	65.5	63.7	65.3	64.2	61.1	57.7	57.7	56.2	54.8	55.2
WI	45.6	46.8	46.9	47.2	44.9	41.8	41.8	42.5	42.5	43.5	42.3	40.9	39.5	38.5	37.8	36.3
WY	38.7	38.7	39.9	37.7	35.3	31.8	28.7	29.3	27.2	34.3	32.3	30.5	34.5	35.3	35.3	38.7
DC	15.2	14.1	13.2	12.4	11.5	12.6	12.0	11.4	11.0	11.2	10.9	10.7	10.8	10.8	10.6	10.2
Unweighted average	47.3	49.4	50.1	48.8	47.2	46.0	45.2	45.3	46.4	49.1	47.9	46.3	45.9	45.3	44.4	44.3

Source: DoL (2000-2016).

While benefits range widely across states, changes in benefits within each state tend to be small. Out of the 816 state-year cases, the overwhelming majority (782 or 96%) involved year-on-year changes that were smaller than 5%. Of those, 529 were decreases and 253 were increases. Some states update their maximum benefits annually, more or less along with inflation. Other states do not adjust the nominal values of their maximum benefits for years at a time and periodically make somewhat large upward adjustments to make up for inflation. This pattern of years of small decreases followed by occasional large increases accounts for why years of decreases far outweigh years of increases, while maximum benefits as a percentage of GDP per capita remained relatively stable, declining only from 47.3% in 2000 to 44.3% in 2015. Larger increases (of between 5% and 15% of GDP per capita) were quite rare, at 26 cases. Larger decreases (of between -5% and -10% of GDP per capita) were very rare, at 7 cases.

North Carolina has experienced large changes in maximum benefits, both upward and downward. Between 2008 and 2009, maximum weekly benefits were increased from $457 to $505 (or from 53.6% to 60.7% of GDP per capita). Between 2012 and 2013, maximum weekly benefits were decreased from $522 to $350 (or from 60.2% to 39.4% of GDP per capita). This reduction is, by far, the largest across states during 2000-2015, with the next largest reduction in benefits having been of only 9.2% (of GDP per capita). However, this large reduction brought maximum benefits from substantially above the averages across states during 2000-2015 ($398 and 46.8% of GDP per capita) to only somewhat below them.

D. Maximum number of weeks for regular unemployment insurance benefits across states, 2000-2016

Figure 7 presents the "maximum number of weeks of regular unemployment insurance benefits" (hereinafter; maximum weeks) that residents may receive, across states during 2000-2016.[9] During 2000-2011, there was very little variation both across states and over time, with 48 or 49 states all offering a maximum number of weeks of 26. The exceptions were Massachusetts, Montana, and Washington that offered 28 or 30 weeks for some of the period. However, since then, a small number of states (eight, all of them shaded in yellow in the figure) have begun to reduce maximum weeks. Some states have engaged in relatively small reductions from 26 to 20, e.g., Arkansas, Michigan and South Carolina. Others have gone further, eventually cutting maximum weeks by about half, e.g., Florida and North Carolina (to as low as 12 weeks), Missouri (13), and Georgia (14).

North Carolina's reduction in its maximum weeks from 26 in 2012 to 20 in 2013, 14 in 2014, and 12 in 2015 was, at the time, the largest reduction across states during 2000-2015.

[9] Here, we emphasize the number of weeks of regular benefits, since this is the variable that states may control and that may result in different impacts on economic performance across states. The crisis-related "emergency unemployment compensation" (EUC) and "extended benefits" (EB) could extend benefits up to 99 weeks, were designed to respond to the level of unemployment in each state, but were largely determined by federal policy (Mulligan 2011).

Figure 7: Maximum number of weeks of regular unemployment insurance benefits, per state, 2000-2016

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AL	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
AK	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
AZ	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
AR	26	26	26	26	26	26	26	26	26	26	26	26	25	25	25	20	20
CA	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
CO	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
CT	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
DE	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
FL	26	26	26	26	26	26	26	26	26	26	26	26	23	23	16	14	12
GA	26	26	26	26	26	26	26	26	26	26	26	26	20	20	20	20	14
HI	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
ID	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
IL	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
IN	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
IA	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
KS	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	16
KY	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
LA	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
ME	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
MD	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
MA	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MI	26	26	26	26	26	26	26	26	26	26	26	26	20	20	20	20	20
MN	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
MS	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
MO	26	26	26	26	26	26	26	26	26	26	26	26	20	20	20	20	13
MT	26	26	26	28	28	28	28	28	28	28	28	28	28	28	28	28	28
NE	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
NV	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
NH	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
NJ	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
NM	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
NY	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
NC	26	26	26	26	26	26	26	26	26	26	26	26	26	**20**	**14**	**12**	**13**
ND	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
OH	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
OK	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
OR	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
PA	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
RI	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
SC	26	26	26	26	26	26	26	26	26	26	26	26	20	20	20	20	20
SD	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
TN	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
TX	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
UT	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
VT	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
VA	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
WA	30	30	30	30	26	26	26	26	26	26	26	26	26	26	26	26	26
WV	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
WI	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
WY	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
DC	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Unweighted average	26.2	26.2	26.2	26.2	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	25.6	25.5	25.2	25.0	24.5

Source: DoL (2000-2016).

V. Nationwide average relationships between key economic policies and economic performance across states, 2000-2015

Confirming the findings of earlier literature, we find that states with lower tax rates and lower unemployment benefits experience more favorable economic performance. Figure 8 presents nationwide average relationships between key economic policies and key measures of economic performance across states during 2000-2015. In the figure, we present the measures of economic policy across columns: sales tax rates, income tax rates for households earning $50,000, income tax rate for households in the top income bracket,[10] maximum unemployment insurance benefits as a percentage of GDP per capita, and the maximum number of weeks of unemployment insurance benefits that residents of a state may receive. We present the measures of economic performance across rows: economic growth, employment growth, growth in real salaries, and the unemployment rate.

[10] We tested whether the number of income tax brackets (as a rough proxy for the complexity of tax systems) affected several key measures of economic performance. We did not find this measure of economic policy to have statistically significant impacts on economic performance either alone, or in models with other measures of economic policy.

Figure 8: Nationwide average relationships between key economic policies and key measures of economic performance (abridged results), across states during 2000-2015

		Income tax rate for households		Unemployment insurance	
	Sales tax rate	earning $50,000	in the top bracket	Maximum benefits as a % of GDP per capita	Maximum weeks of regular benefits
	(1)	(2)	(3)	(4)	(5)
1. Economic growth	-0.07**	-0.04*	-0.04*	-0.02***	
2. Employment growth	-0.05*	-0.04*	-0.04*	-0.01***	-0.05**
3. Growth in real salaries	-0.10***	-0.05**	-0.04**	-0.01*	
4. Unemployment rate	0.02**			0.03***	0.07**

Note 1: * denotes significance at the 10% level (or somewhat reliable results), ** denotes significance at the 5% level (or reliable results), and *** denotes significance at the 1% level (or very reliable results). Empty cells denote that results were not significant at the 10% level.

Note 2: We obtain similar results for the sales tax models whether sales taxes are unlagged or lagged by one period. The impacts of income tax rates take place with a lag of one year. The unemployment insurance measures are entered unlagged into their models.

Note 3: Since several of our measures of economic policy (i.e., independent variables) were correlated with one another, models including them simultaneously would suffer from multicollinearity. To address this issue, we tested the impacts of most policies separately, one at a time. Thus, the results in each cell in this figure are each from a separate model that included one measure of economic performance (i.e., a dependent variable) and only one measure of policy (a key independent variable) one at a time. Most models included also the following other "control" independent variables: a lag of the dependent variable, annual dummy variables, and real GDP per capita (results for those additional independent variables are not shown here).

Note 4: The models for the impacts of tax rates on employment growth do not include lags of the dependent variable. All other results in the figure are broadly robust to whether lags of the dependent variable are included in the models or not.

Note 5: Results for the maximum number of weeks of benefits are estimated only for the period when there was substantial variation across states, i.e., 2010-2015.

Note 6: The larger estimated impacts for sales tax rates than for income tax rates should likely not be interpreted to mean that sales tax rates are a greater disincentive to economic production than income tax rates. Instead, the smaller estimated impact for state individual income tax rates is likely due to the fact that, far larger, federal income taxes swamp state income taxes in most economic agents' decisions.

Note 7: The models for the impacts of unemployment insurance measures on the unemployment rate are entered as first differences, implying that their impacts take place over the short term, and not over extended periods of time.

Note 8: In this figure, we present results from pooled panels (using OLS regressions). Our results for tax rates were not robust across fixed effects panel regressions. We interpret these results to imply that the relationship between lower tax rates and economic performance manifests itself over the long-term, i.e., states changing their tax rates should expect that the impacts of those changes do not take place immediately. In contrast, results for unemployment insurance benefits were broadly robust across OLS and fixed effects regressions. We interpret these results to imply that the relationship between unemployment insurance benefits and economic performance manifests itself both over the long term across states, and over the short term for individual states that implement changes in unemployment insurance benefits.

Figure 8 shows that, during 2000-2015, states with lower sales tax rates, lower income tax rates, and lower or shorter maximum unemployment insurance benefits have experienced more favorable economic performance. The differences in performance across states with lower vs. higher tax rates are large. For instance, states with sales tax rates that were 2% lower (by about one standard deviation of cross-state variation, or of 4% instead of 6%) experienced annual economic growth rates that were 0.14% higher, annual employment growth rates that were 0.10% higher, and annual growth in real salaries that was 0.20% higher. Over a ten-year period, for an economy of the size of North Carolina (i.e., with GDP of about $500 B, 5.5 M employees, and about $200 B in salaries),[11] these differences would result in GDP being larger by $7 B, employment being larger by 55,000 jobs, and salaries being larger by $4 B. Alternatively, one could express these differences as GDP per capita being $700 higher or annual salaries per employee being $727 higher.

States with income tax rates for households earning $50,000 that were 3% lower (by about one standard deviation, or of 4% instead of 7%) experienced annual economic growth rates that were 0.12% higher, annual employment growth rates that were 0.12% higher, and annual growth in real salaries that was 0.15% higher. We found broadly similar impacts on economic performance whether we used income tax rates for households earning $50,000 or for the top income brackets (see columns 2 and 3 of Figure 8). Over a ten-year period, these differences would result in North Carolina's GDP being larger by $6 B, employment being larger by 66,000 jobs, and salaries being larger by $3 B. GDP per capita would be $600 higher and annual salaries per employee would be $545 higher.

States with maximum amounts of unemployment insurance benefits (as a percentage of GDP per capita) that were 10% lower (by about one standard deviation, or of 40% instead of 50%) experienced annual economic growth rates that were 0.2% higher, annual employment growth rates that were 0.1% higher, growth in real salaries that was 0.1% higher, and unemployment rates that were 0.3% lower. Over a ten-year period, these differences would result in North Carolina's GDP being larger by $10 B, employment being larger by 55,000 jobs, and salaries being higher by $2 B. GDP per capita would be $1,000 higher and annual salaries per employee would be $364 higher.

States with maximum numbers of weeks of regular unemployment insurance benefits that were lower by four weeks (by about one standard deviation since 2010, or of 22 weeks instead of 26 weeks) experienced annual

[11] Non-salary income includes, among others: employee benefits, government transfers (including retirement income), proprietors' income, rents, and interest, dividends, and capital gains (the last three also, in part, as retirement incomes).

job growth rates that were 0.2% higher, and unemployment rates that were 0.28% lower. Over a ten-year period, these differences would result in North Carolina's employment being larger by 110,000 jobs.

VI. Impacts of major changes in economic policy during 2011-2015 in North Carolina

North Carolina's recent, major changes in economic policy have resulted, thus far, in sizable increases in economic growth, employment, and salaries, and reductions in unemployment rates. As long as these policies (lower tax rates and lower unemployment benefits) remain in place, North Carolina may expect economic growth, employment growth, and growth in real salaries to continue to be higher than in states without those policies, on a continued basis.

Figure 9 applies the nationwide average relationships between economic policies and economic performance that we computed in section V to the specifics of the recent, major changes in economic policy in North Carolina. Columns 1-3 quantify the key components of North Carolina's recent, major policy changes. Again, panel A highlights that with the sunset of the temporary sales surcharge, the sales tax rate fell from 5.75% on June 30, 2011 to 4.75% on July 1, 2011. Panel B highlights that with income tax reform, the income tax rate for households earning $50,000 fell from 7% in 2013 to 5.8% in 2014, and for the top income bracket from 7.75% to 5.8%. Panel C highlights that with unemployment insurance reform, the maximum benefit as a percentage of GDP per capita fell from 60.2% in 2012 to 39.4% in 2013, and the maximum number of weeks during which regular unemployment insurance benefits may be received fell, in stages, from 26 in 2012 to 12 in 2015.

Figure 9: Estimated impacts of recent, major changes in economic policy in North Carolina

Policy changes			Estimated impacts of policy changes				
			Nationwide average impacts		North Carolina impacts		
Type of policy	Policy level: before and after	Amount of policy change	Economic measure for which impacts are estimated	Impacts per unit of policy change	Annual impacts (=(3)*(5))	Cumulative impacts (if applicable)	Period for cumulative impacts
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Sunset of the temporary 1% sales tax surcharge							
Sales tax rate	5.75%: Jun. 2011 4.75%: Jul. 2011	-1%	Economic growth Employment growth Real salary growth	-0.07 -0.05 -0.10	0.07% 0.05% 0.10%	0.28% or $1.4B 0.20% or 11,000 jobs 0.40% or $0.8B	2012-2015
B. Income tax reform							
Income tax rate for households earning $50,000	7.00% in 2013 5.8% in 2014	-1.2%	Economic growth Employment growth Real salary growth	-0.04 -0.04 -0.05	0.05% 0.05% 0.06%	0.10% or $0.50B 0.10% or 5,500 jobs 0.12% or $0.24B	2014-2015
Income tax rate for the top income bracket	7.75% in 2013 5.8% in 2014	-1.95%	Economic growth Employment growth Real salary growth	-0.04 -0.04 -0.04	0.08% 0.08% 0.08%	0.16% or $0.80B 0.16% or 8,800 jobs 0.16% or $0.32B	2014-2015
C. Unemployment insurance reform							
Maximum benefits as a % of GDP per capita	60.2% in 2012 39.4% in 2013	-20.8%	Economic growth Employment growth Real salary growth Unemployment rate	-0.02 -0.01 -0.01 0.03	0.42% 0.21% 0.21% -0.62%	1.26% or $6.3B 0.63% or 35,000 jobs 0.63% of 1.26B N.A.	2013-2015
Maximum number of weeks of regular benefits	26 in 2012 12 in 2015	-14	Employment growth Unemployment rate	-0.05 0.07	0.70% -0.98%	1.6% or 88,000 jobs N.A.	2013-2015

Note 1: The cumulative impacts for maximum weeks are computed by adding the products of the impact per unit and the magnitude of the policy change in each year, e.g., a policy change of -6 weeks in 2013 (= 20 – 26), of -12 weeks in 2014 (= 14 - 26), and – 14 in 2015 (= 12 – 26).

Note 2: The estimates for each policy change are not readily "additive." Many policy changes are correlated with one another. Tested within a single model or regression, their multicollinearity would result in each policy change not being found to have statistically significant impacts. Tested one at a time, policy changes are found to have statistically significant impacts. However, since their impacts were not computed testing all policy changes in the same model, it is likely that the estimates for each separate policy stand, to some extent, for other correlated policy changes. In sum, the estimates of the impacts for various policy changes may not be readily added.

Columns 4-5 present again the nationwide average impacts of changes in economic policy on several measures of economic performance. (These estimates replicate those presented above in Figure 8). Colum 6 computes estimates of annual policy impacts in North Carolina, by assuming that the policies in the state would have the same average impacts (per unit) as in other states during 2000-2015. In particular, we compute the contents of column 6 simply by multiplying column 3 (the magnitude of the policy change in North Carolina) and column 5 (the average impact per unit nationwide).

Column 7 presents the cumulative size of those impacts, for the cases in which the annual impacts may be assumed to continue to take place on an ongoing basis, i.e., if states with lower tax rates grow faster by a certain amount, then North Carolina would retain that growth advantage as long as it retained its lowered tax rates.[12] Column 8 presents the period over which we computed those cumulative impacts, in each case from the change in policy through 2015.

A. Impacts of the sunset of the 1% sales tax surcharge in 2011

The sunset of the 1% sales tax surcharge has increased North Carolina's annual economic growth by 0.07%, annual employment growth by 0.05%, and its annual growth in real salaries by 0.10% indefinitely.

•State GDP increased by an additional $1.4 billion between 2011 and 2015

By allowing its 1% temporary sales tax rate surcharge to sunset, annual economic growth rates in North Carolina are 0.07% higher than they would be otherwise. Over the four full calendar years since the sunset of the surcharge (2012-2015), these annual advantages cumulate to 0.28% of GDP, GDP being larger by $1.4 B, or GDP per capita being larger by $140. Over a ten-year period, GDP will be larger by $3.5 B and GDP per capita by $350.

•An additional 11,000 became employed between 2011 and 2015

Lower sales tax rates similarly resulted in annual employment growth rates that are 0.05% higher than they

[12] Of course, the size of these policy impacts need not remain constant indefinitely. Estimating such policy impacts likely requires sample periods that are long enough to be representative (i.e., not driven by a particular circumstance in the recent business cycle), but short and recent enough to remain relevant, since economic conditions and relationships do change over time. Thus, these estimated impacts are more likely to be valid for a brief period of time (i.e., several years). To perform similar computations further in the future, analysts would have to update these estimates with, then, more recent data.

would be otherwise. Over the four full calendar years since the sunset of the surcharge, these annual advantages cumulate to 0.20% of North Carolina's employment, or 11,000 additional jobs. Over a ten-year period, employment will be higher by 27,500.

•Salaries increased by an additional $1 billion between 2011 and 2015

Lower sales tax rates also resulted in annual growth rates in real salaries that are 0.10% higher than they would be otherwise. Over the four full calendar years since the sunset of the surcharge, these annual advantages cumulate to 0.40% of annual salaries, total salaries being higher by $800 M, or annual salaries per employee being higher by $145. Over a ten-year period, total salaries will be higher by $2.0 B and salaries per employee will be higher by $364.

B. Impacts of income tax reform in 2013

Income tax reform has increased each of North Carolina's annual economic growth, employment growth, and growth in real salaries by 0.08% indefinitely.

•State GDP increased by an additional $800 million between 2013 and 2015

By lowering its income tax rates, for instance from 7.75% to 5.8% for the top income bracket, annual economic growth rates in North Carolina are 0.08% higher than they would be otherwise. Over the two-year period since income tax reform (2014-2015), these annual advantages cumulate to 0.16% of GDP, GDP being larger by $800 M, or GDP per capita being larger by $80. Over a ten-year period, GDP will be larger by $4.0 B and GDP per capita by $400.

Also, during 2014-2015, cumulative economic growth totaled 4.79% for North Carolina and 4.55% for the U.S. as a whole, i.e. an advantage for North Carolina of 0.24%. Thus, the cumulative impact from income tax reform accounts for a sizable fraction of North Carolina's growth advantage relative to the U.S. during that period (42% = 0.10% / 0.24%).

•An additional 8,800 became employed between 2013 and 2015

Lower income tax rates similarly resulted in annual employment growth rates that are 0.08% higher than

they would be otherwise. Over the two-year period since income tax reform, these annual advantages cumulate to 0.16% of North Carolina's employment, or 8,800 additional jobs. Over a ten-year period, employment will be higher by 44,000.

•Salaries increased by an additional $320 million between 2013 and 2015

Lower income tax rates also resulted in annual growth rates in real salaries that are 0.08% higher than they would be otherwise. Over the two-year period since income tax reform, these annual advantages cumulate to 0.16% of annual salaries, total salaries being higher by $320 M, or annual salaries per employee being higher by $58. Over a ten-year period, total salaries will be higher by $1.6 B and salaries per employee by $291.

C. Impacts of unemployment insurance reform in 2013

Changes in unemployment insurance in North Carolina have been deeper than those for sales tax rates and income tax rates. The reduction in the sales tax rate amounts to less than ½ of the standard deviation in the cross-state variation in sales tax rates. The reduction in maximum tax rates amounts to about 2/3 of the standard deviation in its cross-state variation. In contrast, the reduction in maximum unemployment insurance benefits amounts to more than 3/2 of the standard deviation in its cross-state variation. Applying a far larger policy change, it is not surprising that the estimated impacts of unemployment insurance reform are larger than those from reductions in tax rates.

1. Impacts of reducing maximum unemployment insurance benefits in 2013

By reducing its maximum unemployment insurance benefits, North Carolina has increased its annual economic growth rates by 0.42%, annual employment growth rates by 0.21%, and annual growth in real salaries by 0.21% indefinitely.

•State GDP increased by an additional $6.3 billion between 2012 and 2015

By reducing maximum weekly benefits from $522 (or 60.2% of GDP per capita) in 2012 to $350 (or 39.4%) in 2013, North Carolina has annual economic growth rates that are 0.42% higher than they would be otherwise. Over the three-year period since unemployment insurance reform (2013-2015), these annual advantages

cumulate to 1.26% of state GDP, GDP being larger by $6.3 B, or GDP per capita being larger by $630. Over a ten-year period, GDP will be larger by $21.0 B and GDP per capita by $2,100.

During 2013-2015, cumulative economic growth totaled 6.07% for North Carolina. Thus, unemployment insurance reform accounts for a sizable fraction of North Carolina's economic growth during this period (16% = 1.26% / 6.07%).

•An additional 35,000 became employed between 2012 and 2015

Lower maximum benefits similarly resulted in annual employment growth rates that are 0.21% higher than they would be otherwise. Over the three-year period since unemployment insurance reform, these annual advantages cumulate to 0.63% of North Carolina's employment, or 35,000 additional jobs. Over a ten-year period, employment will be higher by 116,000 jobs.

•Salaries increased by an additional $1.3 billion between 2012 and 2015

Lower maximum benefits also resulted in annual growth rates in real salaries that are 0.21% higher than they would be otherwise. Over the three-year period since unemployment insurance reform, these annual advantages cumulate to 0.63% of employment, total salaries being higher by $1.26 B, or annual salaries per employee being higher by $229. Over a ten-year period, total salaries will be higher by $4.2 B and salaries per employee by $764.

•The unemployment rate fell by an additional 0.6% in 2013

Lower maximum benefits further resulted in North Carolina's unemployment rate falling by 0.6% more than it would have fallen otherwise. Between 2012 and 2013, the U.S. unemployment rate fell from 7.9% to 6.7% (by 1.2%) and North Carolina's unemployment rate fell from 8.9% to 6.8% (by 2.1%, or by 0.9% more than the national average). Thus, the impacts of the reduction in maximum benefits in North Carolina account for a large fraction (2/3 = 0.6% / 0.9%) of North Carolina's advantage in unemployment reduction relative to the U.S. during that period.

2. Impacts of reducing the maximum number of weeks of regular unemployment insurance benefits between 2012 and 2015

By reducing its maximum number of weeks of regular unemployment insurance benefits, North Carolina

increased its annual employment growth rates by 0.70%. However, the reliability of the very large size of this impact and/or whether it may be maintained indefinitely must be interpreted with caution. While fewer weeks of benefits likely increased employment growth, particularly in the short term, the nationwide average impacts are estimated relying mostly on the typical experience of states during 2000-2015. In contrast, the very large decline in the maximum number of weeks in North Carolina is far from typical.

•An additional 88,000 became employed

Reducing the maximum number of weeks of regular unemployment insurance benefits from 26 in 2012 to 20 in 2013, 14 in 2014, and 12 in 2015 for residents in North Carolina resulted in annual employment growth rates that were 0.30%, 0.60%, and 0.70% higher for each of those years than they would have been otherwise. Over the three-year period since unemployment insurance reform, these annual advantages cumulate to 1.60% (= 0.30% + 0.60% + 0.70%) of North Carolina's employment, or an additional 88,000 jobs. Over a ten-year period, employment will be higher by 358,000.

During 2013-2015, cumulative employment growth totaled 6.27% for North Carolina. Thus, unemployment insurance reform accounts for a very sizable fraction (26% = 1.60% / 6.27%) of North Carolina's employment growth during this period.

•The unemployment rate fell by an additional 1%

By reducing its maximum number of weeks of unemployment insurance benefits between 2012 and 2015, North Carolina also reduced its unemployment rate by 1% more than it would have been reduced otherwise. During this period, the U.S. unemployment rate fell from 7.9% to 5% (by 2.9%) and North Carolina's unemployment rate fell from 8.9% to 5.6% (by 3.3%, or by 0.4% more than the national average). Thus, the impacts of the reduction in the maximum number of weeks of regular benefits in North Carolina alone may account for North Carolina's advantage in unemployment reduction relative to the U.S. during that period.[13]

[13] Changes in unemployment insurance policy are among the myriad of factors explaining the evolution of unemployment rates in North Carolina, other states, and the U.S. as a whole. Some of these factors result in falling unemployment rates, and others in rising unemployment rates. We may observe directly the actual levels of and changes in unemployment rates in North Carolina and the U.S., and assess the impacts of various factors. In this case, the reduction in the maximum number of weeks has an impact of -0.98% which is a fraction of the reductions in both North Carolina (-3.3%) and in the U.S. (-2.9%), but that is larger than the difference between the reductions in North Carolina and the U.S. (0.4%). The fact that the impact of this one policy in North Carolina (1.0%) is larger than the difference between the changes in North Carolina and the U.S. (0.4%) simply means that other factors (other policy changes, other changes in regional economic conditions, etc.) otherwise imposed upward pressures on the unemployment rate in North Carolina or downward pressures elsewhere.

VII. Conclusion

In this report, we show that North Carolina's recent reductions in sales tax rates, income tax rates, and the size and length of unemployment insurance benefits are, by far, among the largest changes in economic policies across states during 2000-2015.

We also confirm the findings in earlier literature, showing that states with lower tax rates and lower and shorter unemployment insurance benefits experience more favorable economic performance.

Applying our findings about nationwide average relationships to the specifics of North Carolina's recent policy changes, we conclude that:

•Reducing sales tax rates in 2011 increased state GDP by $1.4 B or by $140 per capita, employment by 11,000 jobs, and salaries by $800 M or by $145 per employee between 2011 and 2015.

•Reforming income taxes in 2013 increased state GDP by $800 M or by $80 per capita, employment by 8,800 jobs, and salaries by $320 M or by $58 per employee between 2013 and 2015.

•Reducing maximum unemployment insurance benefits increased state GDP by $6.3 B or by $630 per capita, employment by 35,000 jobs, and salaries by $1.26 B or by $229 per employee between 2012 and 2015, and reduced the unemployment rate by 0.6% in 2013.

•Reducing the maximum number of weeks of regular unemployment insurance benefits increased employment by 88,000 jobs and reduced the unemployment rate by 1% between 2012 and 2015.

Over a ten-year period, we project that North Carolina's recent policy changes will have even larger effects, as follows:

•Reducing sales tax rates in 2011 will increase state GDP by $3.5 B or by $350 per capita, employment by 27,500 jobs, and salaries by $2.0 B or by $364 per employee.

•Reforming income taxes in 2013 will increase state GDP by $4.0 B or by $400 per capita, employment by 44,000 jobs, and salaries by $1.6 B or by $291 per employee.

•Reducing maximum unemployment insurance benefits in 2013 will increase state GDP by $21.0 B or by $2,100 per capita, employment by 116,000 jobs, and salaries by $4.2 B or by $764 per employee.

•Reducing the maximum number of weeks of regular unemployment insurance benefits during 2012-2016 will increase employment by 358,000 jobs.

List of figures

Figure 1: Summary impacts of North Carolina's recent economic policy changes on its economy and labor market 6

Figure 2: Sales tax rates, per state, 2000-2016 18

Figure 3: Maximum individual income tax rates, per state, 2000-2016 20

Figure 4: Income tax rates for households earning $50,000, per state, 2000-2016 23

Figure 5: Number of income brackets in income taxes, per state, 2000-2016 25

Figure 6: Maximum unemployment insurance benefits as a percentage of GDP per capita, per state, 2000-2015 27

Figure 7: Maximum number of weeks of regular unemployment insurance benefits, per state, 2000-2016 30

Figure 8: Nationwide average relationships between key economic policies and key measures of economic performance (abridged results), across states during 2000-2015 32

Figure 9: Estimated impacts of recent, major changes in economic policy in North Carolina 36

Appendix 1: Commonly used abbreviations and terms

B	Billion
DoL	U.S. Department of Labor
GDP	Gross domestic product, a measure of economic production within an area, such as a country or a subdivision of a country (e.g., a state)
Income tax	State individual income tax, i.e., not including federal income taxes or state corporate income taxes
M	Million
Maximum benefits	Maximum weekly amount of unemployment insurance benefits that a resident of a state may obtain. We often express this concept annualized, as a percentage of GDP per capita
Maximum tax rate	Maximum state individual income tax rate for households in the top income bracket
Maximum weeks	Maximum number of weeks of regular unemployment insurance benefits that a resident of a state may obtain
OLS	Ordinary least squares, a common technique for statistical analysis
States	The 51 main U.S. jurisdictions, including the 50 states and DC

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