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# **The Recent Oklahoma Energy Boom and Bust**

by

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and

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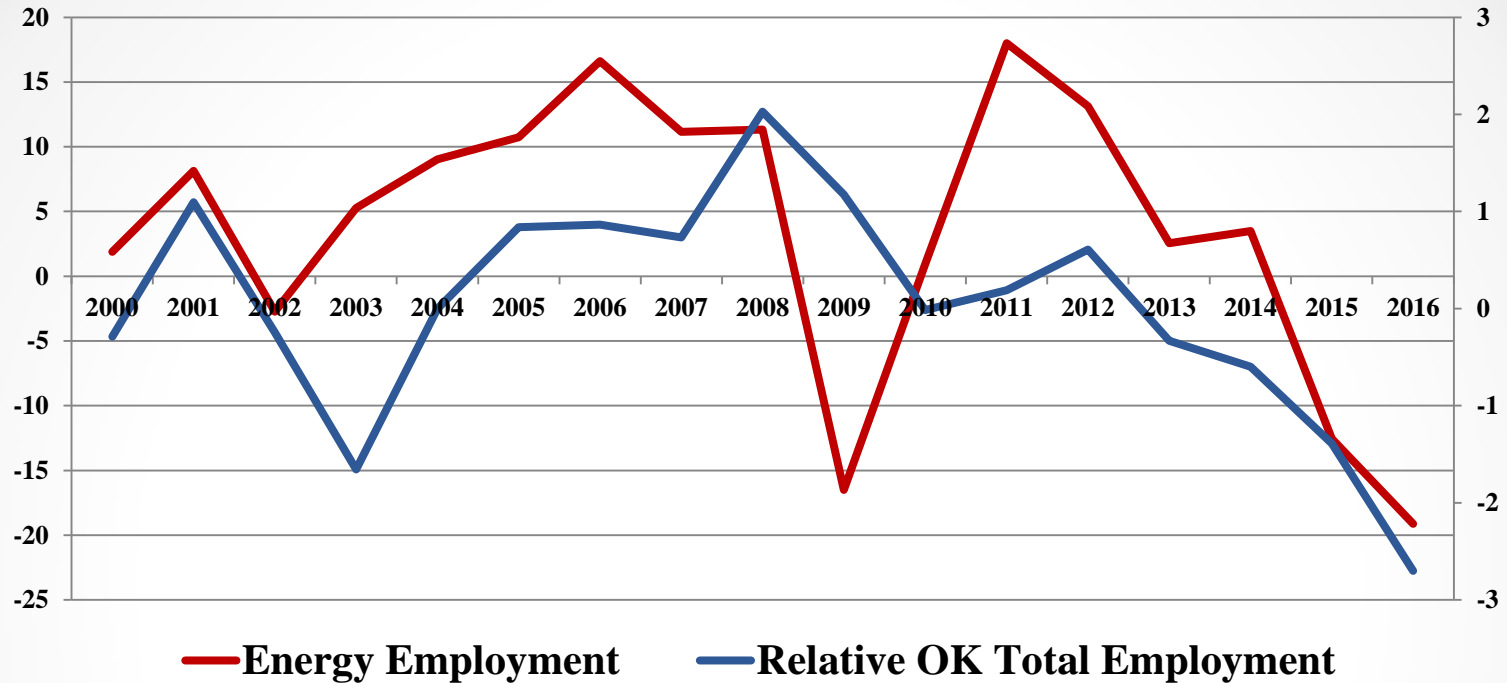
**Center for Applied  
Economic Research**

<http://economy.okstate.edu/>

- Since 2003 there have been booms and busts in energy sector employment in Oklahoma
  - 2003-2008 a boom
  - 2008-2014 contained a bust and boom with the national recession and recovery, but a net gain over the period
  - 2014-2016 a bust
  - net gain in energy sector employment over the 2003 to 2016 period

Oklahoma Net Job Creation	Energy Sector Jobs (thous.)	Total Nonfarm Jobs (thous.)
2003-2008	22.2	147.5
2008-2014	10.1	37.9
2014-2016	-18.2	-4.7
2003-2016	14.1	180.7

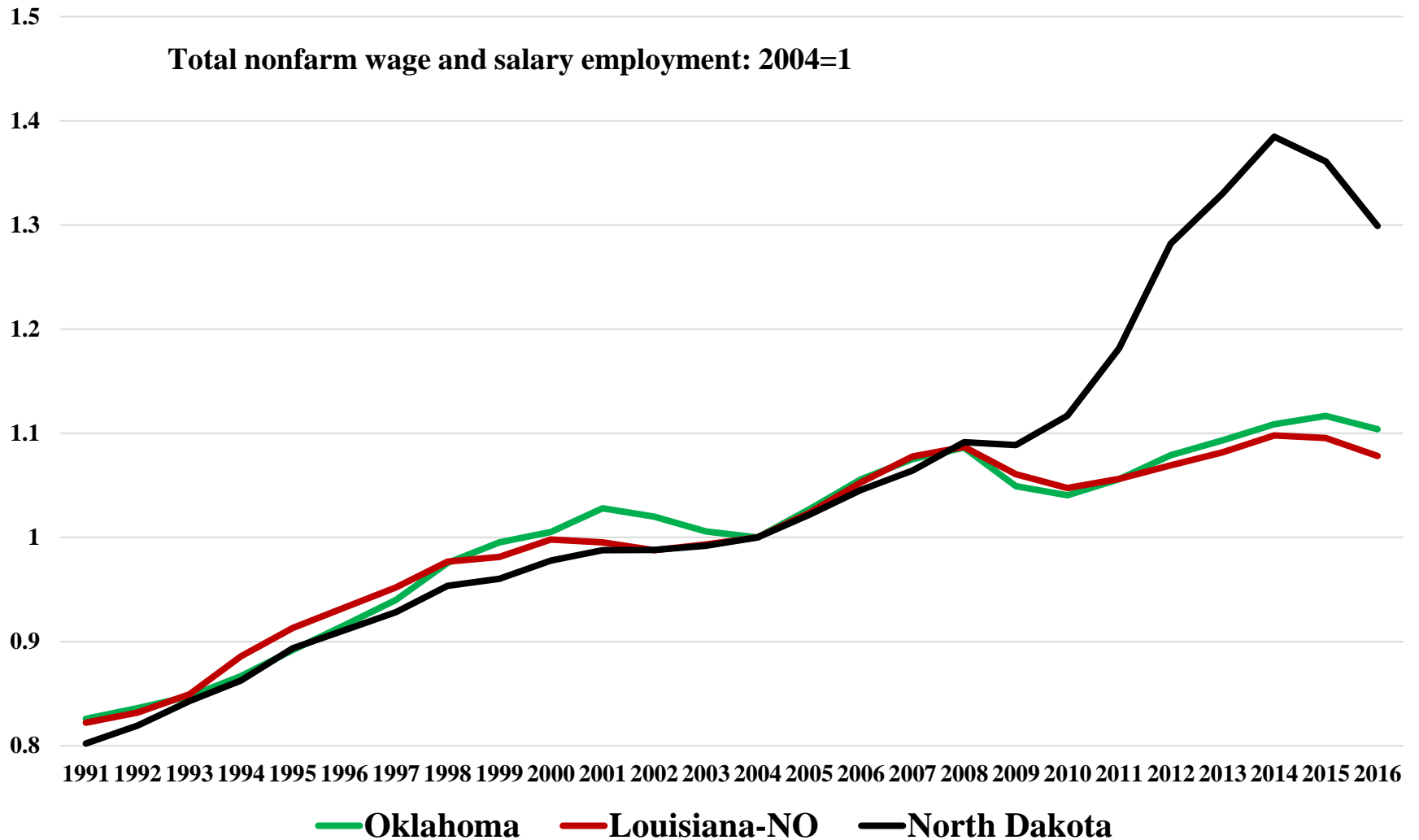
# %Change (Energy: left scale; Relative (OK-US): right scale)



Strong energy employment growth associated with Oklahoma employment growth above the U.S. average, and vice versa

Beginning with 2013, Oklahoma employment growth has been below U.S. employment growth

Two other energy states followed the same cycle as Oklahoma, though by differing scales: North Dakota and Louisiana outside of New Orleans.

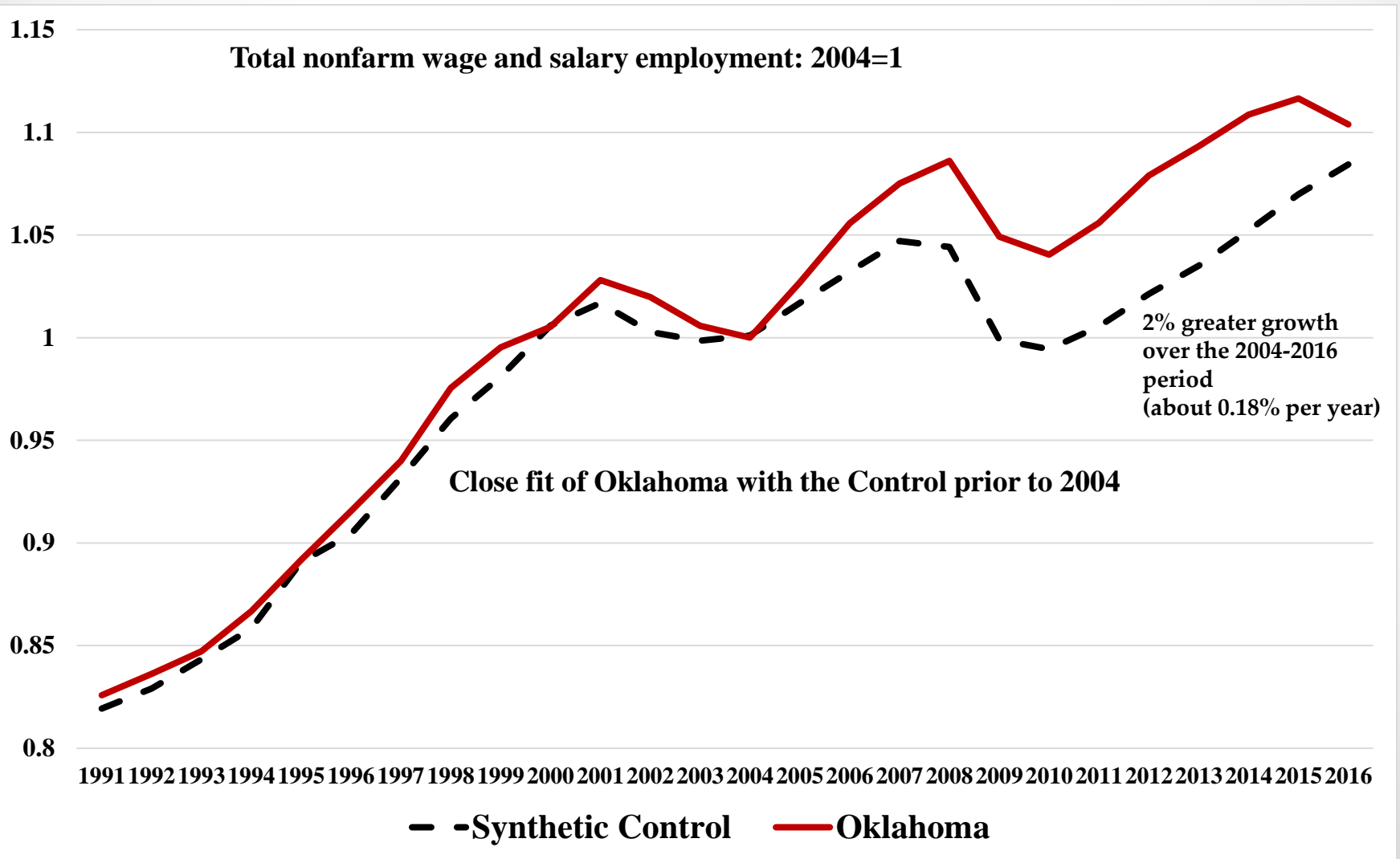


# What would have happened in these states without the energy boom/bust cycle?

- Create a composite index using historical data from a variety of other non-energy states with similar economic characteristics (other than an absence of oil and gas production) for comparison
- By design, the composite index mimics the actual data for the energy state prior to the initial energy boom (in 2004)
- The composite index is referred to as the Synthetic Control unit because it provides the baseline (control) of what would have happened in the absence of the energy cycle, and it is a synthetic (weighted average) of several states
- The weights that states receive in construction of the Synthetic Control (Composite Index) are selected to best fit the actual data for the Synthetic Control with the energy state for the period prior to the start of the energy cycle (i.e., from 1991-2004)

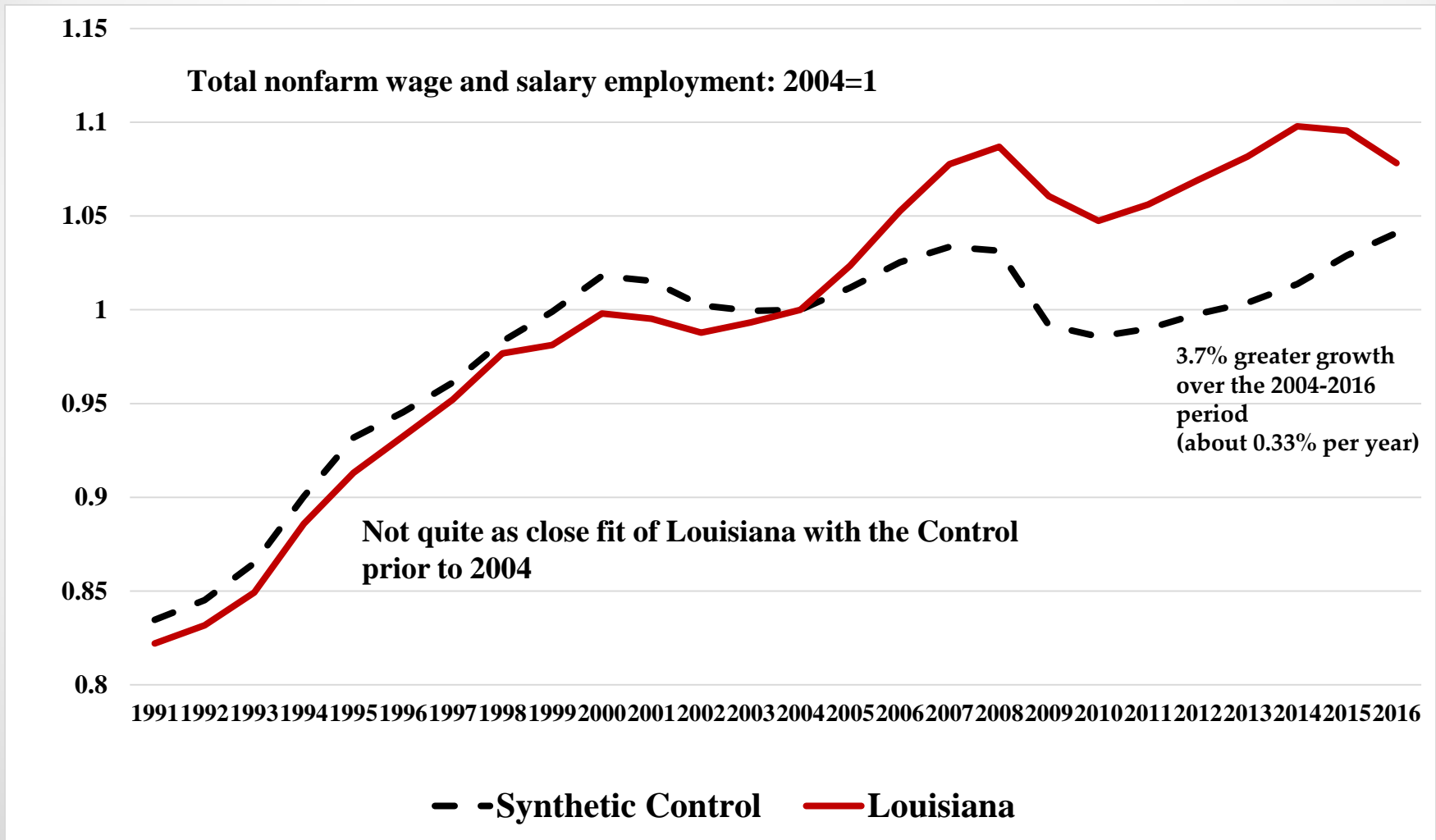
# Oklahoma vs (Synthetic) Control

Weights: KY=.523; KS=.198; CA+DE+MD+UT+VA+PA=.279



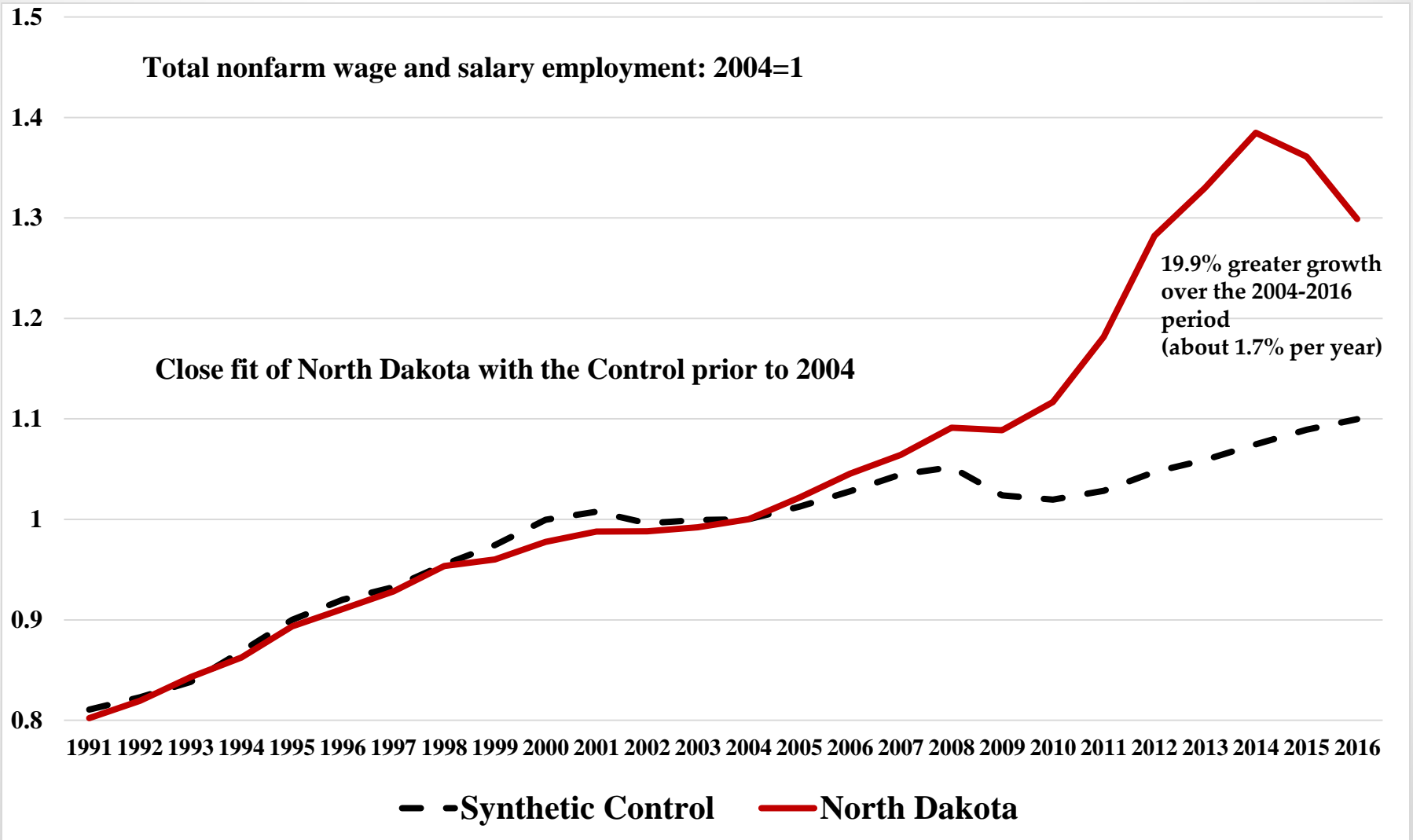
# Louisiana vs. (Synthetic) Control

Weights: MO=.324; MS=.308; AR=.303; PA+KY=.065



# North Dakota vs. (Synthetic) Control

Weights: NE=.475; SD=.343; IL=.181; MS=.001



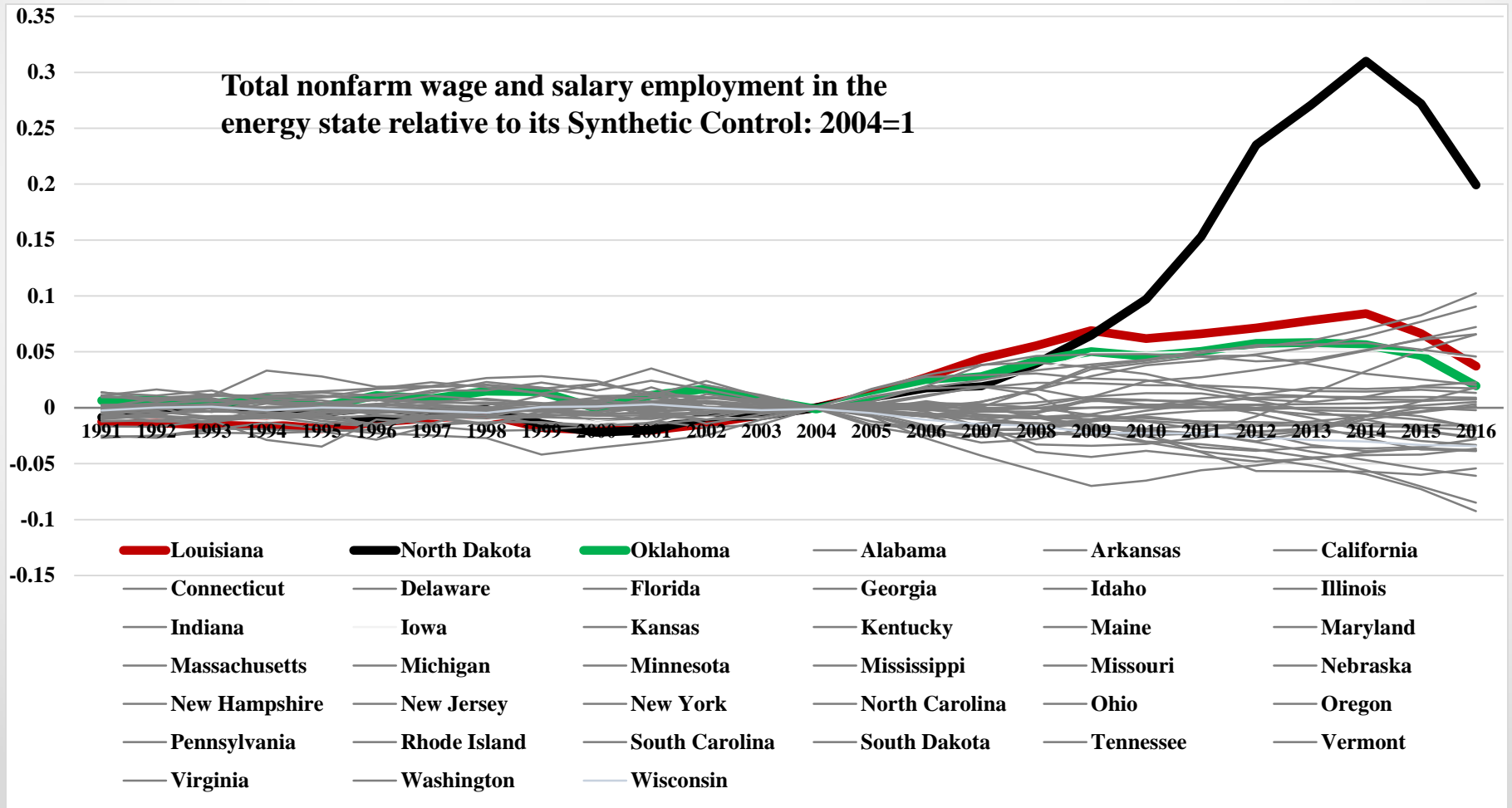


Repeating the Synthetic Control Method exercise for all non-energy states reveals the influence of the energy sector booms and busts (relative to 2004):

2009: (1) Louisiana; (2) North Dakota; (3) Oklahoma

2014: (1) North Dakota; (2) Louisiana; (6) Oklahoma

2016: (1) North Dakota; (9) Louisiana; (12) Oklahoma



Because the scale of energy development differs amongst the three states, we calculate energy employment multipliers; the ratio of the change in total nonfarm employment to energy sector employment in the energy state relative to its synthetic control

### Oil and Gas Boom State vs. Synthetic Control Unit

	ND	OK	LA
<b>2004-2008</b>			
<b>Total Employment Change</b>	<b>12,669</b>	<b>61,133</b>	<b>70,040</b>
<b>Energy Employment Multiplier</b>	<b>3.89</b>	<b>3.01</b>	<b>6.92</b>
<b>2008-2014</b>			
<b>Total Employment Change</b>	<b>86,905</b>	<b>20,940</b>	<b>36,197</b>
<b>Energy Employment Multiplier</b>	<b>3.84</b>	<b>1.73</b>	<b>-283.43</b>
<b>2014-2016</b>			
<b>Total Employment Change</b>	<b>-35,618</b>	<b>-52,803</b>	<b>-59,355</b>
<b>Energy Employment Multiplier</b>	<b>2.45</b>	<b>3.30</b>	<b>4.75</b>
<b>2004-2016</b>			
<b>Total Employment Change</b>	<b>63,956</b>	<b>29,269</b>	<b>46,882</b>
<b>Energy Employment Multiplier</b>	<b>5.43</b>	<b>2.07</b>	<b>-18.76</b>

Notes: Total change in employment is calculated as the change in total nonfarm employment over the period in the energy boom state less that of the respective synthetic control unit.

- North Dakota: the long-run multiplier (2004-2016) is larger than the multipliers over the shorter sub-periods
  - Suggestive of what are called agglomeration economies, the energy sector creating critical size in the overall economy to fuel growth more broadly in the economy
- Oklahoma: the long-run multiplier (2004-2016) is smaller than that for the initial boom period
  - Suggestive of “crowding-out” of other economic activity
- Louisiana (sans New Orleans): the negative long-run multiplier reveals that total employment increased despite energy employment declining over the 2004-2016 period
  - Suggestive of agglomeration economies; **caution** is that the pre-treatment fit for Louisiana with its synthetic control is slightly worse than it was for North Dakota and Oklahoma; the project is ongoing

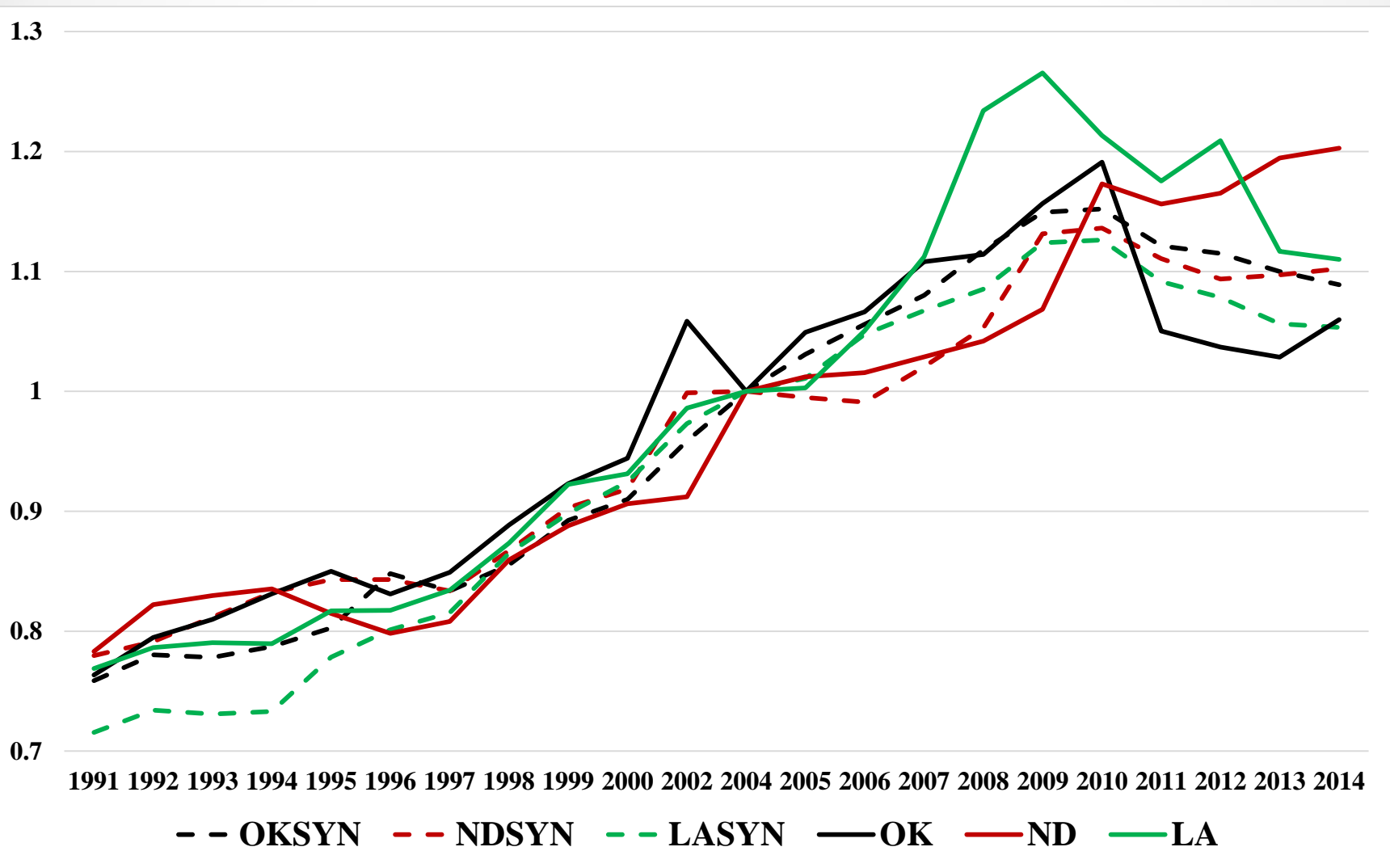
- Possible reasons for the different multipliers, particularly in the longer run, may include differences in state fiscal policy
  - In other research we showed how austerity in state fiscal policy reduced growth in Kansas and Wisconsin
- Higher taxation of energy provides additional funds for spending on state and local services, which is part of the induced spending part of multipliers
  - Oklahoma is reported to have the lowest effective tax rate on oil and gas (severance and ad valorem combined); Louisiana has the second highest rate, while North Dakota has the fifth highest rate
- States also typically cut taxes during energy booms, and raise them during busts
  - Louisiana was the only one of the three states not to cut tax rates during the energy boom; North Dakota cut its income tax; Oklahoma reduced the taxation of both personal income and energy production

# Real Per Capita State and Local Education Spending: Oil & Gas Boom States vs Synthetic Control Units

(Annual Survey of Government Finances: Urban Institute-<http://slfdqs.taxpolicycenter.org/pages.cfm>)

-all states increased education spending during the initial boom relative to their synthetic control units (2004-2008)

-only Oklahoma cut spending 2011-2014 relative to its synthetic control unit (other data sources for 2015 and 2016 suggest this has continued)



- Oklahoma was the only one of the three states to experience crowding-out of other economic activity from energy development in the longer run
- Louisiana and North Dakota appeared to experience agglomeration economies (energy development fueling growth more broadly in their economies)
- A distinguishing characteristic appears to be the relative lack of education spending in Oklahoma post-2008
  - teacher salaries began the post-2008 period among the lowest in the nation, even adjusting for cost-of-living, or even in comparison to other college educated workers in the state
- The results are robust to the construction of alternative Synthetic Control units
  - Dropping Arizona, Arkansas, Idaho, Kansas, Kentucky, Mississippi, Pennsylvania and Utah in the construction of the Synthetic Control units produces results for Oklahoma that suggest the 2004-2016 increase in energy sector employment produced a slight decrease in total nonfarm employment

The research is ongoing!

Thank you for your attention