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Change, stability and acceleration in economic growth

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Most Hoosiers hate the idea of roundabouts on the road—when they are announced. More citizens hate them when they are finally built. Yet after a while, they are accepted and, eventually, appreciated and even praised. Here in Indiana, we have seen this pattern in Bloomington, Carmel, Princeton and Washington.

Change is not sought by the majority of citizens. Yet, people commonly say, “Change is the only constant.”

There are several ways of expressing economic growth.¹ Perhaps the simplest indicator of growth (or decline) is the change in earnings. *Aggregate earnings equal the number of jobs times the average compensation for those jobs.*²

An increase in the number of jobs is nominally good. Mayors, governors and presidents seek election on positive changes in the number of jobs. They seek

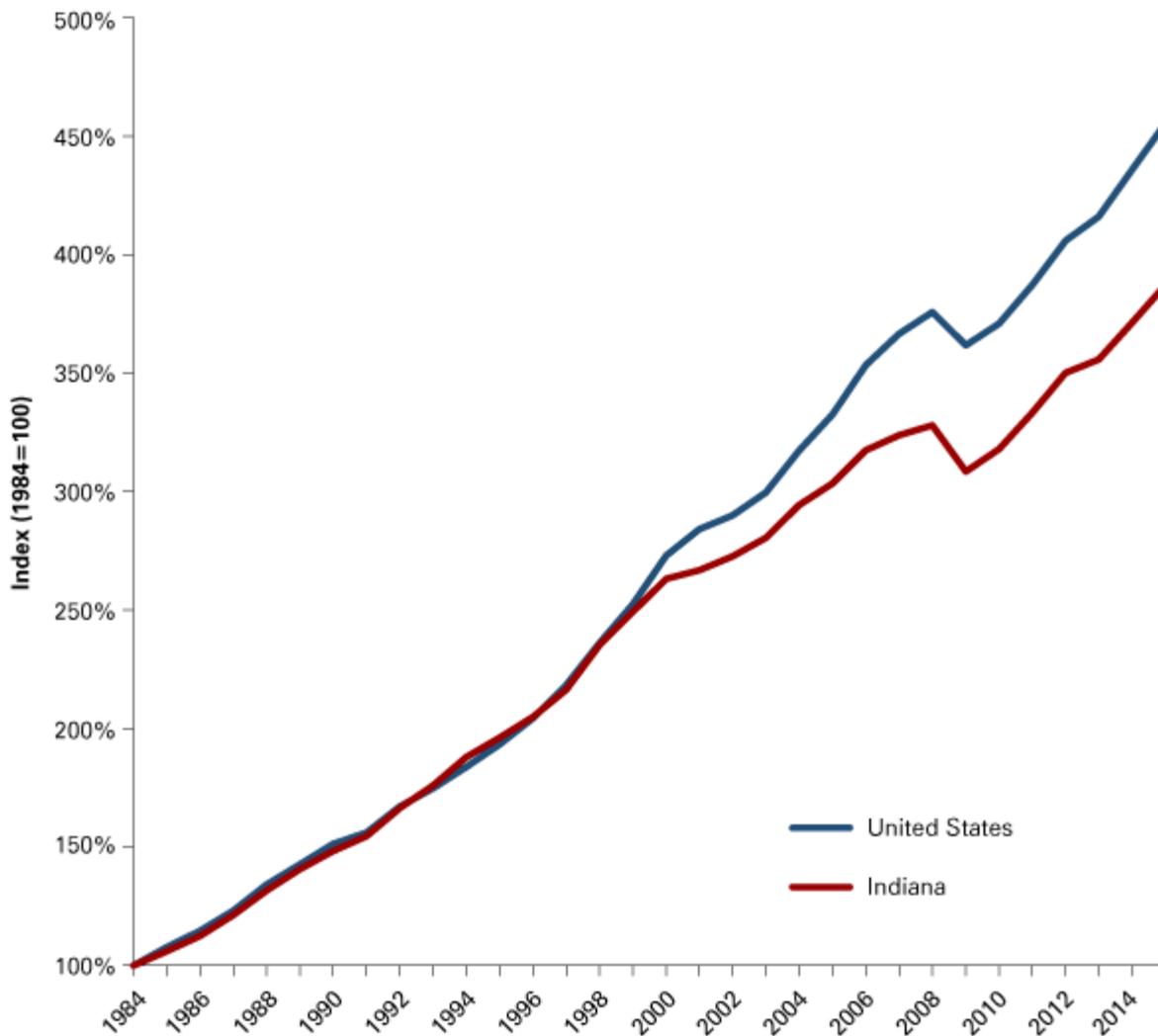
excuses when jobs decline. Thoughtful people recognize that an increase in the number of jobs is not necessarily “good” when it means people must take added employment because of added, unwanted responsibilities or calamity in their lives.

Similarly, increases in wages or benefits are accepted as positive when they suggest increased skills, higher productivity or increased demand for the output of labor. However, higher earnings may be indicative of higher risks or labor shortages due to warfare or natural disasters.

How Indiana compares to the U.S.

The comparative growth paths of nonfarm earnings in the United States and Indiana from 1984 to 2015 are illustrated in **Figure 1**.

Figure 1: Index of nonfarm earnings



Source: U.S. Bureau of Economic Analysis

Those paths are similar, if not identical, for the first 15 years, beginning in 1984, with the nation's average annual growth rate exceeding Indiana's by a mere 0.02 percent. However, in the next span of 11 years, Indiana trails the U.S. by an annual average of 1.5 percent. Thereafter, the two are once more on fairly parallel paths, with Indiana behind by just 0.06 percent per year (see **Table 1**).

Table 1: Average annual growth rates in nonfarm earnings

Years	United States	Indiana	Indiana–U.S.
1984-1998	5.89%	5.87%	-0.02%
1999-2009	3.96%	2.49%	-1.46%
2010-2015	3.92%	3.86%	-0.06%

Note: The results shown in column four may not match the differences in the prior two columns due to rounding.

Source: U.S. Bureau of Economic Analysis

During this 31-year stretch of time, Indiana exceeded the nation's rate of earnings 11 times and fell behind 20 times. This divergence of Indiana from the national growth path probably has nothing to do with any political event or any initiative by the state. We'll have to delve into what happened at a later date.

Our interest here is the nature of those growth paths. It seems reasonable to assume that, as with most changes in life, *some growth is preferred to none, and more is preferred to less—until it is too much*. Growth (or decline) has both costs and benefits associated with it. Growth in nonfarm earnings likely means the number of jobs is increasing and/or earnings per job are advancing. More jobs and more earnings help reduce joblessness, stimulate trade and advance living conditions.

Rapid growth, however, can lead to traffic congestion, increased job turnover rates, added demands on existing space, inconvenient construction activities, disruption of familiar routines, frustration, noise and a sense of bedlam in the environment. Households, businesses and governments must adjust to growth's pace and patterns.

How fast is too fast? We would presume a steady rate of growth would have advantages over a volatile or highly variable growth rate. Further, we could speculate about the positive and negative effects of acceleration and deceleration in growth rates, as well as the stability or volatility of those rates.

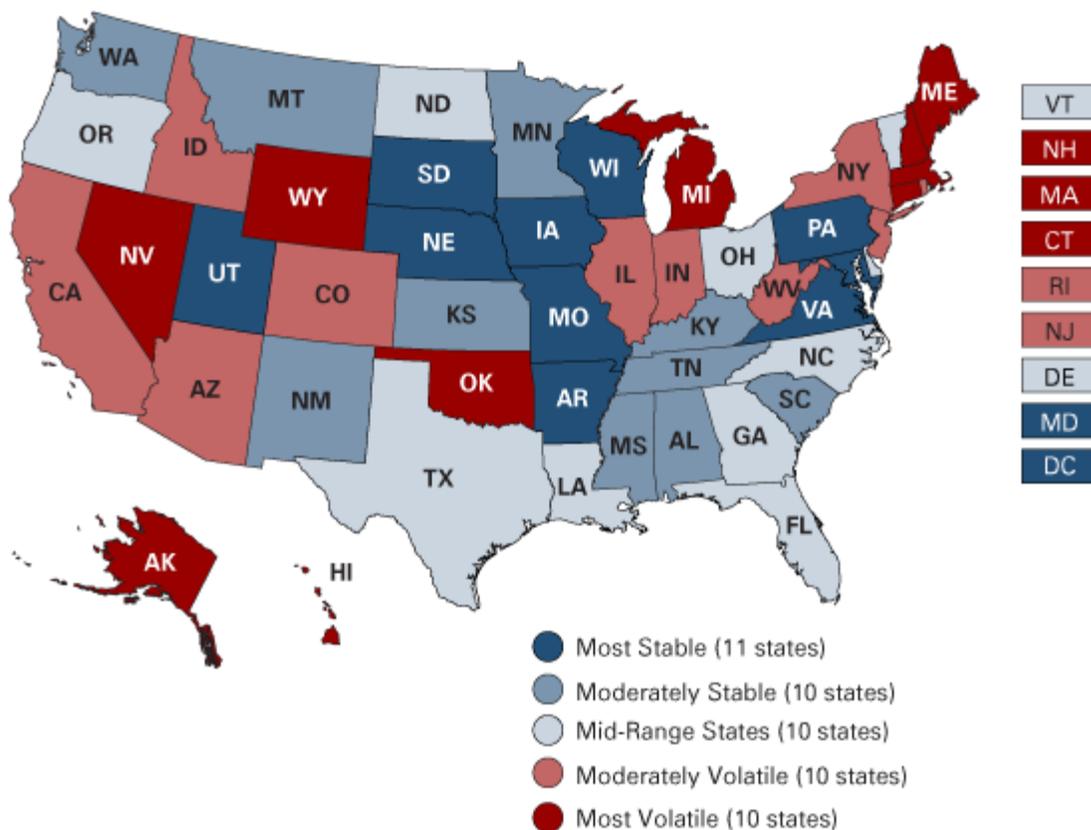
Does all this sound obscure? Yet, aren't these questions at the heart of our concerns about the American and Chinese economies, the economies of Texas and Indiana, as well as those of Hamilton and Grant counties?

Comparing states

From 1984 to 2015, American nonfarm earnings grew at an average annual rate of 5.0 percent. Indiana ranked 42nd among the 50 states (plus the District of Columbia) at 4.5 percent. Nevada was the fastest-growing state (7.0 percent on average over that 31-year period), while West Virginia trailed all states with just a 3.7 percent growth rate.

The spread around the average of all states was low, yielding a stability index value of 0.13, where 1.0 is highly volatile and zero is perfectly stable.³ The most volatile state was Wyoming, followed by Michigan and Oklahoma (see **Figure 2**). Nebraska was the most stable in its growth rate, followed by South Dakota and Arkansas. Indiana scored 0.61 on the stability index and ranked 35th among the 50 states (or the 16th most volatile state).

Figure 2: Stability of growth rates for nonfarm earnings, 1984 to 2015



Source: U.S. Bureau of Economic Analysis

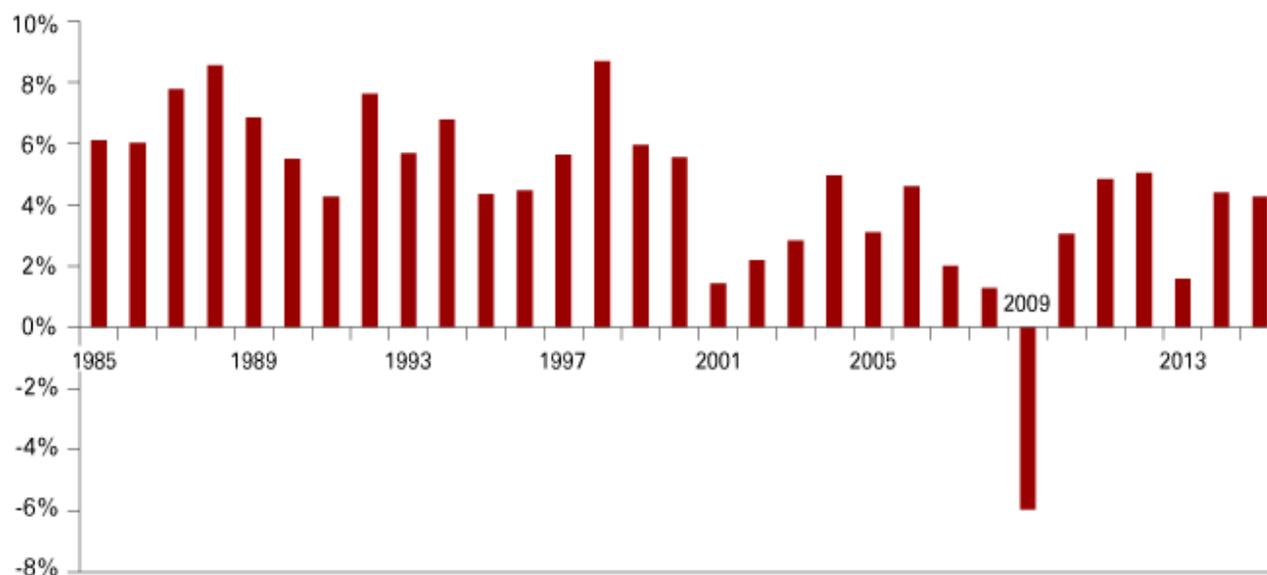
We may imagine that states would prefer to have high rates of growth with low

volatility. Utah seems to have been closest to achieving that goal. The Beehive State ranked third with a growth rate averaging 6.3 percent and eighth in stability with an index score of 0.47. Nevada, by contrast, ranked first in rate of growth, but 45th in stability.

Change over time

Growth rates and their stability are two attributes of change. Consider the growth rates of Indiana's nominal nonfarm earnings as shown in **Figure 3**.

Figure 3: Indiana's nonfarm earnings growth rates



Source: U.S. Bureau of Economic Analysis

Each year, starting in 1985 and running through 2000, the state's growth rates exceeded 4 percent, peaking in 1998 at 8.7 percent. Then, in 2001, the bursting silicon bubble deflated Indiana's earnings growth to a 1.4 percent increase. They rose steadily to 5 percent in 2004, fell again, and recovered to 4.6 percent in 2006. Then the deceleration began to negative territory in 2009 before recovery took over. Despite this subsequent improvement, we have yet to see 6 percent growth again.

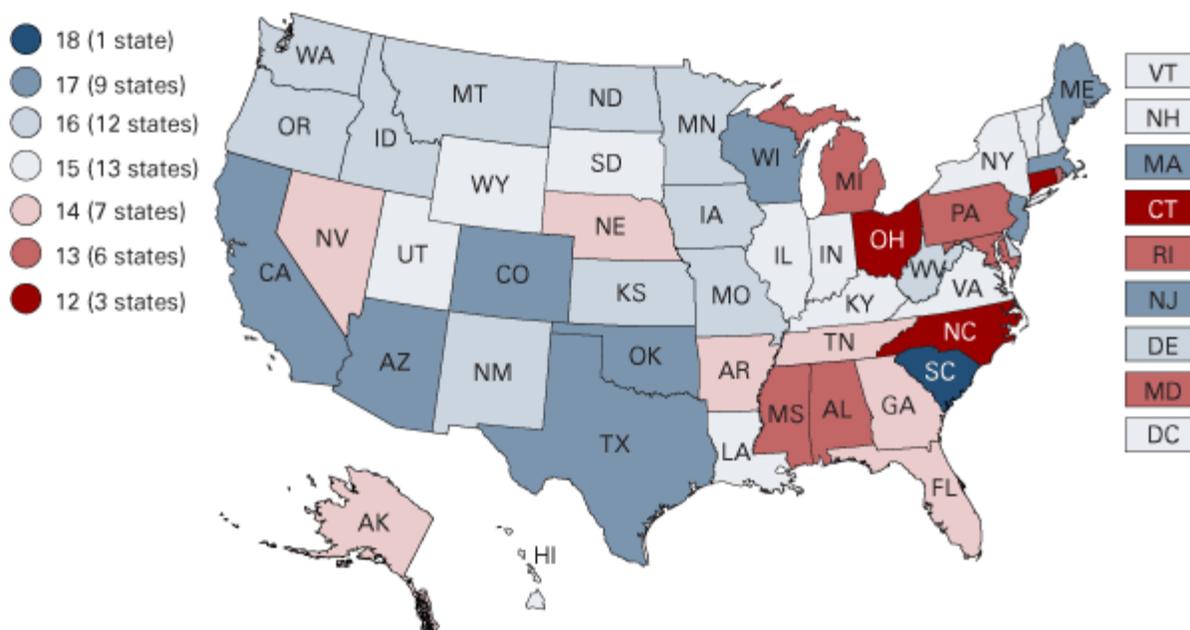
Only in 2009 did growth become negative, decelerating in Indiana, as in the

nation. In that year, Indiana's earnings dropped from a 1.3 percent growth rate to -5.9 percent, a slowdown or deceleration of 7.2 percentage points.

Indiana, like 31 other states, suffered only one year of decline in earnings between 1985 and 2015. Maryland and the District of Columbia had a perfect record: no years of negative growth. Michigan and 10 other states as diverse as Maine, Alaska and Hawaii had just two downturns each. Massachusetts, Nevada, New Hampshire, New York and Oklahoma each had three years of decline, while Wyoming alone experienced four such years.

The nation over this period had a 16-14 record of speed-ups (accelerations of growth) and slowdowns (decelerations). Only South Carolina managed an 18-12 record. Indiana was in a group of 13 "perfectly balanced" states (including the District of Columbia) with 15 accelerations and 15 decelerations. Connecticut, North Carolina and Ohio trailed the nation with 12 accelerating and 18 slowing years (see **Figure 4**).

Figure 4: Number of years of acceleration in nonfarm earnings, 1985 to 2015

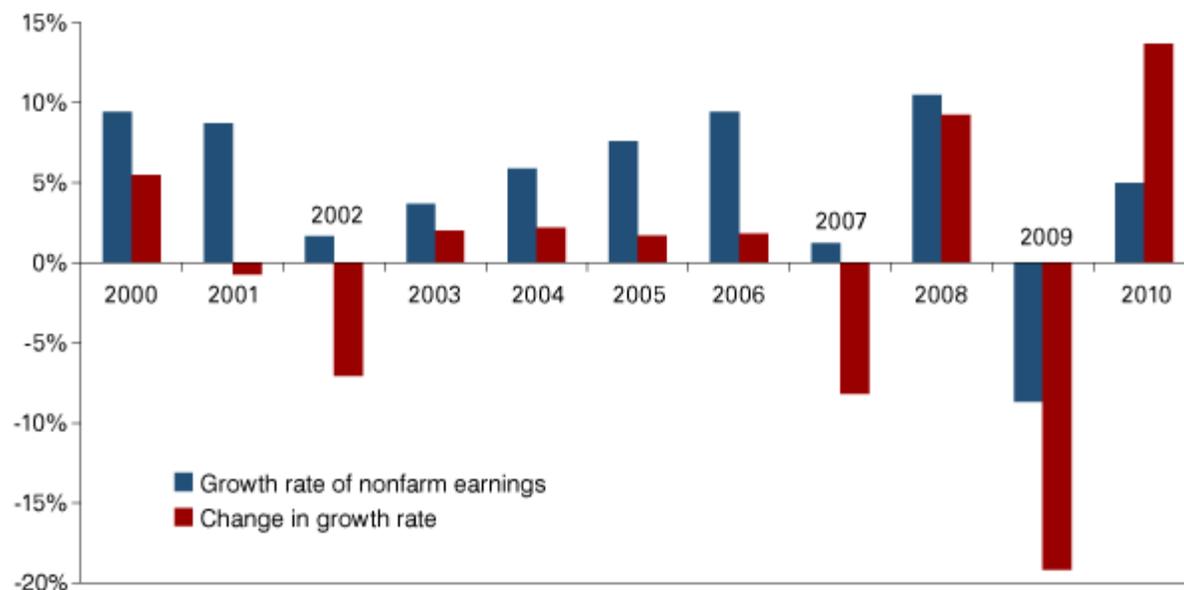


Source: U.S. Bureau of Economic Analysis

Is it the acceleration and deceleration, the speed-ups and slowdowns of economic

activity that are the most disturbing and most costly aspects of change? Often, these movements give citizens, businesses and governments the sense of riding a roller coaster. Consider Oklahoma from 2000 to 2010 in **Figure 5**.

Figure 5: Oklahoma's roller coaster ride



Source: U.S. Bureau of Economic Analysis

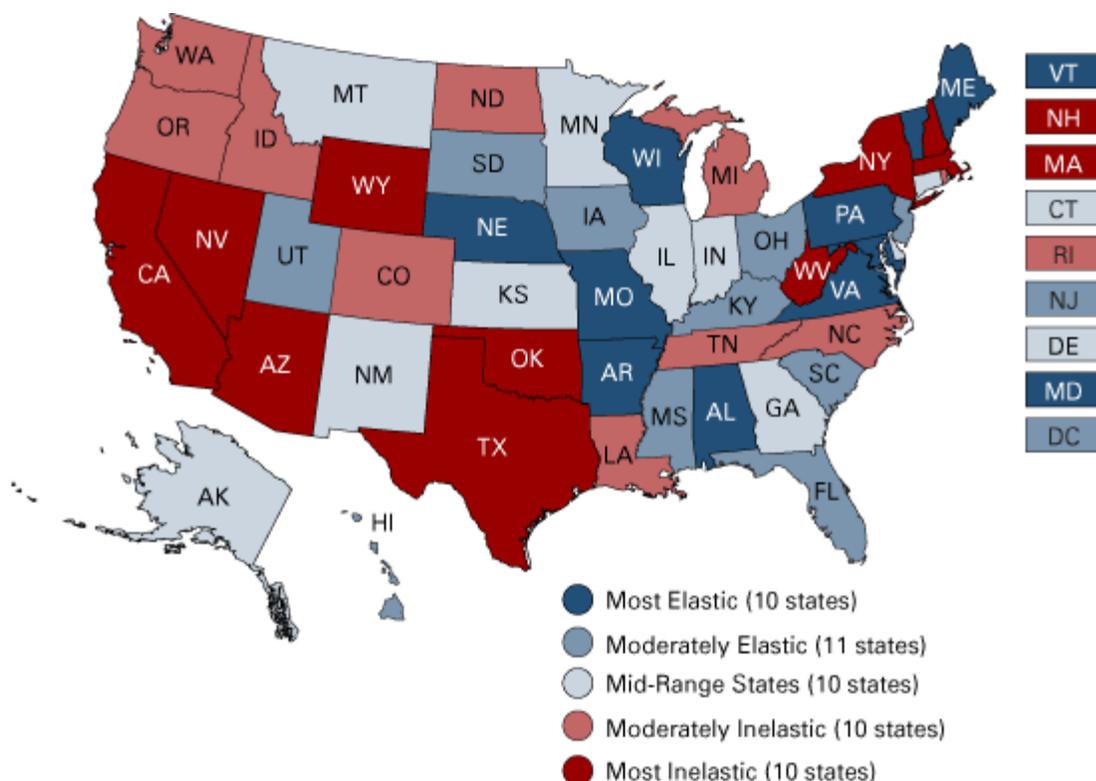
The decade began for Oklahoma with a 9.4 percent growth rate, which was 5.5 percentage points ahead of the preceding year. This was followed in 2001 by a small slowing of growth in nonfarm earnings and a 7 point slowdown in 2002. There followed four exhilarating years of rising growth with virtually constant acceleration. Then, the rapid-fire alternating deceleration and acceleration of the next four years left the economy in shambles.

The total changes of the growth rates for Oklahoma's nonfarm earnings over the years 2000 to 2010 equaled 71.3 percentage points. This compared with a 29.9 point change for the nation and a 31 point change for Indiana. May we call this the "Bumpiness Index of Change," or shall we think of these oscillations as the elasticity or fickleness of state economies?⁴

Where could a thrill seeker find the most exciting economic roller coaster ride?

In **Figure 6**, the red states were the bumpiest over the 30 years between 1986 and 2015. Blue states are calmer. (No political values are attached to this characteristic.) No one should be surprised that Wyoming, Oklahoma and Texas offered the strongest oscillations in growth rates. The least blood-curdling rides were found in the economies of Missouri, Arkansas and Nebraska.

Figure 6: Bumpiness elasticity of nonfarm earnings, 1986 to 2015



Source: U.S. Bureau of Economic Analysis

Conclusion

The world pays a great deal of attention to growth rates. In particular, the media seems to get special joy from comparing reported rates of growth with anticipated or expected results. This is true for stock prices, GDP, unemployment rates, quarterly earnings and a host of other measures.

Perhaps by discussing stability and volatility in change, as well as acceleration and deceleration (the bumpiness, oscillations or elasticity of an economy), our

friends in the media will have new opportunities for speculation. In fact, they, along with more serious politicians and economic developers, might look closely at the costs and the benefits of differential growth patterns.

If this article has stimulated any interest, we could examine Indiana's counties in a future issue of this publication. Send us a tweet ([@IUibrc](#)) or email us at ibrc@iupui.edu to indicate your interest.

Notes

1. No differentiation is made here between growth and development. Growth is best thought of as more, while development is the addition of diversity or additions of functionality in economic activity.
2. This article considers only nominal nonfarm earnings because they dominate total earnings (99.2 percent of total U.S. earnings in 2015) and are far more mobile than farm earnings. Farm earnings, which are tied to the land, are erratic because of weather, government program payments and speculation. Most economic development activity is associated with moving nonfarm earnings from one jurisdiction to another. To derive real earnings would involve adjusting the data by a common deflator which would make no difference in the analysis. Available indices such as the BLS Consumer Price Index or the BEA Personal Consumption Expenditure Deflator are not differentiated by state; the BEA Implicit Regional Price Deflator is available for only the years 2008 to 2013.
3. The standard deviation of the states' average annual rates of change was 0.65 percent, yielding a coefficient of variation of only 0.13 (which is referred to here as the stability index).
4. Bumpiness = $\sum_{i=1}^n (\text{abs} ((\text{NFE}_{i+1}/\text{NFE}_i)-1))$ where abs = absolute value and NFE = nonfarm earnings.

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