

Measuring the Economic Performance of Regions: Creative Destruction and Economic Dynamism

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What drives the economic performance of a region or state, and how do we measure it? This article is first in a series that will explore how well Indiana's economic performance compares to other states in the union and what forces may account for that performance.

Concern over global competitiveness, industrial restructuring and slowing productivity growth has led to great interest in how these factors interrelate. Some researchers have emphasized technological and knowledge requirements that have changed, or even destroyed, the economic viability of a region's industries, firms and jobs. But then again, these changes also present the opportunity to create new industries, firms and jobs. This process, this "creative destruction," a term and concept introduced by the economist Joseph Schumpeter early last century, is the hallmark of a thriving and dynamic economy. The premise is that the incessant turbulence of an economy in motion can explain patterns of economic growth and change. As new products, process and production technologies, and organizational forms emerge and new markets are created, underlying dynamics disturb the previous steady state and stimulate the emergence of new, more competitive conditions.

The appeal of labor churn was highlighted in a recent *InContext* article.¹ A major takeaway from the article is that labor churn is an indicator that members of the workforce are bettering their employment situation. That is, workers move to more desirable and higher wage jobs. In the same way, churn, whether measured by new

businesses being established or by existing businesses expanding their workforce, provides an indicator that the region is undergoing positive economic change.

For this reason, labor churn is an important indicator in the annual "State of the New Economy" report.² The Global Innovation Index also includes a measure for new business density.³ The Bureau of Labor Statistics is also in the game with its "Entrepreneurship and the U.S. Economy" analysis that uses data tracking establishment births.⁴

Business dynamics in the form of entry and exit is the mechanism by which outdated ideas and industry practices are replaced by new and potentially revolutionary ones. This dynamic is at the heart of competition creating new industries, invigorating old ones and relegating inefficient practices to the pages of history. As such, exit and entry drive the growth and prosperity of individual firms, as well as the economy at large, and is a central focus of research in both economics and management. In particular, an expanding body of research focuses on the geographic dimension of entry and exit, the effect on the formation and growth of firms, and the associated implications for local and national economies.

Localized employment churn registered as job creation and destruction dynamics can account for variations in regional productivity, job creation and changes in the standard of living. Research suggests that employment turnover and replacement dynamics have a large and significantly positive effect on regional productivity growth independent of a variety of industrial

restructuring processes that may occur at the same time.

Employment churn effects do not always exert a uniform influence on regional productivity performances, however. As the industrial belt turned to rust throughout the 1980s until the mid-1990s, job creation and destruction dynamics often canceled each other out as regions underwent industrial restructuring. Since the mid-1990s, however, the positive effects on regional productivity growth have been strong.

This article provides an investigation motivated by micro-level research on

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firm-level entry and exit, expansion and contraction. As older, inefficient and marginally productive capital is destroyed, new, efficient and productive capital is created. This implies that productivity variability is likely linked closely to job reallocation, as workers matched with unproductive capital lose their jobs and new, more productive, couplings of labor and capital are made.

Churn can also signal entrepreneurial activity. The greater portion of establishments that are births, or the significance of employment gains due to new business formation, points to people taking risks to start businesses. It also measures, to a large degree, the adaptability of a region in responding to economic stress. Workers may lose their jobs due to competitive pressure from the next state or overseas. A flexible, resilient workforce would “adapt” rather than “die.” The region would set forth to seize new business opportunities rather than hoping that an outside force—for example, an inbound relocating company—will provide their next paycheck.

A comparison of cross-sectional employment at two points in time enables the calculation of net employment growth: How many more or fewer jobs exist at the latter time period compared to the earlier time period? Thinking about how this net employment growth occurred, some establishments have expanded, some have contracted, and some establishments have either entered or exited the establishment landscape.

Net employment growth is the number of jobs created by expanding and opening establishments minus the number of jobs destroyed by contracting and closing establishments. The jobs created by expanding and opening establishments are referred to as job creation, and the jobs

destroyed by contracting and closing establishments are referred to as job destruction. It should come as no surprise that net employment growth is the difference between employment gains that are associated with establishment births plus expansions and employment losses that are associated with establishment deaths and contractions.

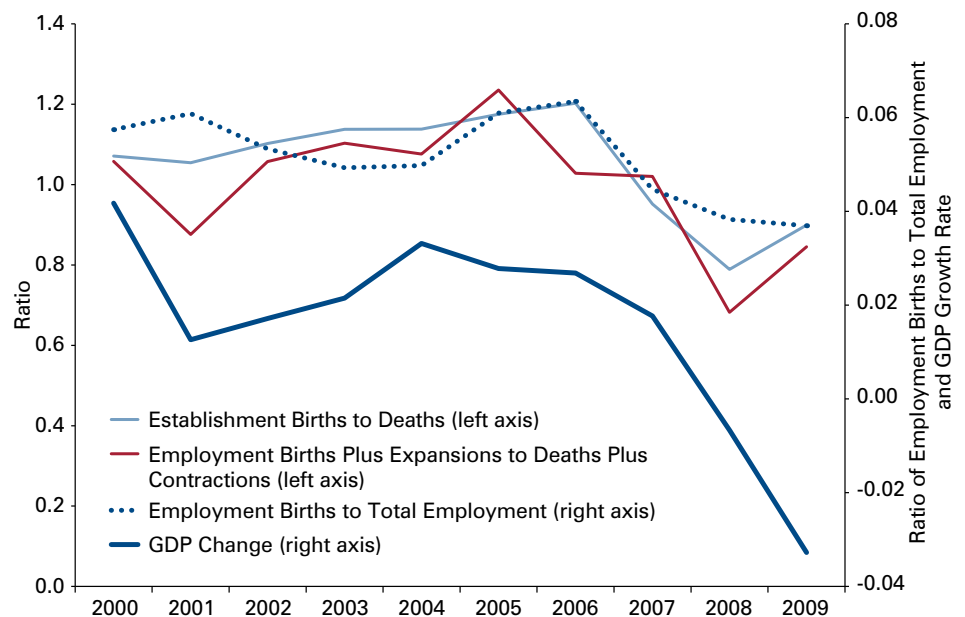
Several measures for churn have been proposed, each with some theoretical rationale. For example, focusing on establishments, if one is to hold to the “creative destruction” view of economic dynamism, then one might propose a measure that adds establishment births to deaths (as a negative) and divides by the total number of all establishments. Or, if one wants to include all types of dynamic establishments that persist but are growing (creative) or shrinking (destruction), then one might add births, deaths, expansions and contractions together and divide by the total number of establishments. Arguably, if one were more interested in entrepreneurship, it is only

establishment births as a proportion of all establishments that matter.

There are churn measures that focus on employment, not establishment, counts. One researcher summed both the absolute value of job creation and destruction together.⁵ One could add the positive job gains from births and expansions and divide by the job losses due to deaths and contractions to derive a churn ratio. Then again, if one argues that it is the number of newly employed as a result of new business formation rather than the number of new businesses formed—as in the number of establishment births—then it is the employment gains associated with births that warrant one’s attention.

The source of the churn statistics used in this analysis is the Business Dynamics Statistics data set from the U.S. Census Bureau.⁶ The data are available at a two-digit industry detail and at the county level. More current churn statistics are available from the Bureau of Labor Statistics, but these data are only available at the state level and would not allow one to assess the churn dynamics of Indiana counties.⁷ While researchers

FIGURE 1: Three Measures of Churn and GDP Growth for the United States, 2000 to 2009



Source: U.S. Census Bureau (establishments and employment) and Moody’s (GDP chained 2005 dollars)

are always keen to get more detailed and granular data, the two-digit industry breakdown does allow one to note the structural differences across states and how different industries perform relative to one another.

This analysis was not intended to be exhaustive, so the three churn formulations that showed the greatest correlation with both economic growth—i.e., change in gross domestic product (GDP) in chained 2005 dollars—and employment growth were used to measure a state’s economic dynamism. (It should come as no surprise that state GDP growth and state employment growth from 2000 to 2009 were strongly correlated: 0.82.)

Two of the three measures were employment churn:

1. Jobs gained from births and expansions divided by jobs lost from deaths and contractions (BX2DC)
2. Jobs gained from births divided by total employment (B2T)

The other measure was establishment-based:

3. Establishment births divided by establishment deaths (EB2D)

Figure 1 shows how U.S. GDP growth and churn metrics generally moved in the same direction from 2000 to 2009. While it may be too soon to tell from this Census data set (at the time of this writing the Census had not updated the data with more recent years), a similar data set compiled by the Bureau of Labor Statistics shows that the number of jobs created by births has been declining since the turn of the century.

Figure 2 shows that Indiana’s B2T measure—the entrepreneurship measure—is below the national average. Florida and Texas outshine the national average considerably. The other states were selected to provide some geographic diversity. If the Great Lakes states were plotted, they would have followed the same

pattern as Indiana—falling below the national average.

To place the raw churn statistics in context and to ease comparison across states and industries, the churn metrics were converted into what may be called a “churn quotient” or CQ. In other types of regional analysis, the quotient concept is used to measure the concentration of something relative to the national average, for example, the concentration of employment in certain occupations.

In this case, the CQ measures the relative strength of the churn dynamic (of one of the three metrics) compared to the national average for that measure. A CQ greater than 1 shows a churn dynamic greater than the national average, while a CQ less than 1 shows less churn than the national average.

In terms of industry performance, manufacturing had EB2D values of less than 1 (even during the higher economic growth period of 2003-2007), showing that there were more

establishment deaths than births over the period. Manufacturing’s CQ is less than 1 as well, highlighting that churn in manufacturing is less than the average for other industries.

It is also interesting to note how some industries respond to economic cycles. In 2000, the ratio of construction births to deaths was about one. This value shot up to 1.3 in 2005 during the housing boom and plummeted to 0.5 in 2008 as the housing market imploded. Compared to other industries, the condition of the construction industry was truly dire during the Great Recession. In 2009, the construction CQ was 0.73. Only the manufacturing CQ was worse in that year.

The Great Recession was not as harsh for the education and health care/social assistance industries, at least based on the EB2D metric. The EB2D ratio for these never fell below 1.06, even in the teeth of the recession, and their CQs both averaged 1.21 from 2000 to 2009.

■ FIGURE 2: Births to Total Employment for the U.S., Indiana and Selected States, 2000 to 2009



Source: U.S. Census Bureau

There is an important caveat for these two industries, however, and an important point to be made about the need to use several metrics before one reaches any conclusions. Another churn measure, B2T (jobs from births to total employment), shows these two industries rival only manufacturing in terms of low CQs. The B2T, or proportion of jobs associated with establishment births compared to total employment, hovers, on average for all industries, around 0.055. Put another way, about 5.5 percent of jobs are attributed to establishment births in any given year. The construction and education services industries are less than half that (CQ = 0.45). Health care is about 70 percent of the national average B2T (CQ = 0.69). This makes sense. Health care and education employment growth is going to be a function of population growth. As it happens, fast-growing states like Florida and Texas exhibit CQs in the education and health care industries well above 1.0 for the B2T metric.

For the country as a whole, services are more entrepreneurial in terms of young firms generating new jobs. In terms of the B2T, six

TABLE 1: Top 10 States and Indiana: GDP Growth and Industry Churn Quotients (Establishment Births to Establishment Deaths) for Select Industries, 2000 to 2009

State	GDP Growth Rank, 2000-2009	Employment Growth Rank, 2000-2009	Manufacturing Average CQ	Information Average CQ	Professional, Scientific and Technical Services Average CQ
North Dakota	1	6	1.29	0.86	1.13
Oregon	2	22	1.14	1.04	1.04
Wyoming	3	1	1.26	0.94	1.19
Utah	4	4	1.36	1.11	1.19
Idaho	5	10	1.27	1.10	1.21
South Dakota	6	15	1.39	0.99	1.04
Alaska	7	3	1.30	1.19	1.06
Texas	8	12	1.12	0.99	1.02
Nevada	9	2	1.26	1.13	1.13
District of Columbia	10	13	0.77	0.95	1.03
Indiana	45	49	1.02	0.98	0.99

Source: U.S. Census Bureau (establishments and employment) and Moody's (GDP chained 2005 dollars)

industries had a much greater new job dynamic than average:

1. Information
2. Finance and Insurance
3. Real Estate and Rental and Leasing
4. Professional, Scientific and Technical Services

5. Administrative, Support, and Waste Management and Remediation Services
6. Accommodation and Food Services

State Comparison

The last 15 years or so could not be considered the salad days for the Hoosier state. Even during the last period of national economic growth

TABLE 2: Top 10 GDP Growth States and Indiana: Industry Churn Quotients (Employment Associated with Births to Total Employment) for Select Industries, 2000 to 2009

State	GDP Growth Rank, 2000-2009	Employment Growth Rank, 2000-2009	Manufacturing Average CQ	Information Average CQ	Professional, Scientific and Technical Services Average CQ	Administrative, Support and Waste Management Services Average CQ
North Dakota	1	6	0.74	0.59	0.46	0.89
Oregon	2	22	1.05	0.94	0.86	0.85
Wyoming	3	1	1.14	0.43	1.03	0.90
Utah	4	4	0.89	1.26	1.35	0.96
Idaho	5	10	0.86	0.68	1.06	1.51
South Dakota	6	15	1.12	0.61	0.82	1.22
Alaska	7	3	0.29	0.29	0.57	0.85
Texas	8	12	1.26	1.21	1.20	1.15
Nevada	9	2	1.78	1.28	1.64	1.33
District of Columbia	10	13	0.18	0.41	0.77	0.88
Indiana	45	49	0.80	0.60	0.99	0.98

Source: U.S. Census Bureau (establishments and employment) and Moody's (GDP chained 2005 dollars)

TABLE 3: Top 10 GDP Growth States and Indiana: Industry Churn Quotients (Employment Associated with Births and Expansions to Deaths and Contractions) for Select Industries, 2000 to 2009

State	GDP Growth Rank, 2000-2009	Employment Growth Rank, 2000-2009	Manufacturing Average CQ	Information Average CQ	Professional, Scientific and Technical Services Average CQ	Administrative, Support and Waste Management Services Average CQ
North Dakota	1	6	1.52	1.42	1.11	1.08
Oregon	2	22	1.13	1.16	1.12	1.01
Wyoming	3	1	1.71	1.10	1.13	1.13
Utah	4	4	1.33	1.52	1.21	1.09
Idaho	5	10	1.19	1.21	1.25	1.13
South Dakota	6	15	1.72	1.67	0.99	1.12
Alaska	7	3	1.22	1.46	1.38	1.43
Texas	8	12	1.16	1.05	1.06	1.03
Nevada	9	2	1.46	1.14	1.09	1.19
District of Columbia	10	13	0.74	0.93	1.06	1.11
Indiana	45	49	1.02	1.01	1.01	1.05

Source: U.S. Census Bureau (establishments and employment) and Moody's (GDP chained 2005 dollars)

(from 2003 to 2008), the state only gained 80,000 jobs. On a relative GDP growth basis from 2000 to 2009, Indiana placed 45th; on a job growth basis, Indiana placed 49th. Manufacturing employment declined.

The churn statistics tell a similar story. **Table 1** presents the top 10 states in terms of GDP growth, along with Indiana. For the selected industries, Indiana was about average in terms of establishment birth to death rates. Had Indiana a large natural resource base (i.e., oil and gas), the outcomes would have been different. Several of the top 10 GDP growth states are in the Plains or West and have a recently booming natural resource sector.

But **Table 1** also shows that these states are not only strong in natural resources, but also saw above-average establishment formation in manufacturing and professional, scientific and technical services. Information establishment churn (this industry is considered important because it is one of the high-tech industries that are often viewed as driving innovation and growth) is not so closely aligned with economic

growth for the top 10 states. All in all, the establishment churn metrics reflect the economic and employment growth in those states. (The industry CQs are tied to the U.S. industry churn metrics, not the overall average U.S. statistic for all industries as is the case for the state comparisons.)

Table 2 presents the same states, but shows a slightly different picture. In contrast to the relatively high ratio of new establishments formed in the selected industries (as in **Table 1**), the employment attributed to those many new firms are closer to the national average for manufacturing, with the exception of Nevada and (somewhat) Texas. Utah, Texas and Nevada can attribute a greater than average share of jobs associated with new firms in information and professional, scientific and technical services.

Administrative, support and waste management was included in **Table 2** because, for the nation as a whole, this industry's employment churn was well above the national industry average, even if its establishment churn was not. This suggested that the industry may have helped drive the above-average employment gains

for the top 10 states, but as the table shows, the relative birth employment strength for the top 10 was mixed.

Table 3 presents the results of another, broader metric for churn, the one that includes expansions and contractions in older businesses. Almost without exception, the top 10 states had stronger CQ measures than the country as a whole for each of the selected industries. This may suggest that the robust job growth in these states is more attributed to older, well-established businesses rather than new start-ups. Put another way, it is the number of jobs attributed to expansions that account for the employment growth in these states. Considering both **Table 1** and **Table 3**, one might conclude that many new establishments in the top 10 are small and possibly frail, accounting for a small number of new jobs.

In terms of the experience for Indiana, the metrics register average to below average. Except for the well-below-average GDP and employment growth rates, the state is rather normal in terms of churn. The entrepreneurial measure of churn in **Table 2** shows a mixed picture for Indiana in the

selected industries—about average for the professional, scientific and technical services industry and the administrative, support and waste management industry, but below the national benchmark in manufacturing and information.

County Comparison

Given that this publication’s focus is on Indiana, our attention turns to which Indiana counties have experienced the greatest creative destruction. **Table 4** lists the top 15 Indiana counties in terms of the average establishment births to deaths ratio, together with the 2009 rankings for both establishment births to deaths and jobs attributed to new business to total employment. The results are not unexpected, at least for the 2000 to 2009 average. Hamilton County has experienced relatively fast economic and population growth over the period and the EB2D ratio average is also the top of the state. Perhaps more interesting is that the churn readings can change dramatically from year to year. Given that the economy was in recovery mode, the 2009 rankings may reflect the relative stability of some counties over the creative destruction—more on the destruction side of the ledger during the Great Recession—of the traditionally more dynamic counties.

Conclusion

Establishment and employment churn are often used to measure the degree to which a region or state is undergoing economic “creative destruction,” which is a mark of a thriving and dynamic economy. Several measures of churn were compared across states and these measures align well with the economic performance of states.

Indiana’s economic performance from 2000 to 2009 was below the national average (with state rankings in the mid to high 40s). These rankings were also reflected

TABLE 4: Selected Churn Measures for the Top 15 Indiana Counties, 2000 to 2009

County	Establishment Births to Deaths, 2000-2009 Average	Rank of Establishment Births to Deaths, 2009	Rank of Employment Births to Total Employment, 2009
Hamilton	1.25	22	8
Hendricks	1.24	30	25
Vermillion	1.16	2	54
Newton	1.15	83	73
LaGrange	1.14	3	73
Hancock	1.11	60	42
Daviess	1.11	11	37
Johnson	1.10	66	35
Boone	1.09	38	13
Harrison	1.07	18	63
DeKalb	1.07	77	18
Union	1.07	1	73
Wells	1.06	24	56
Tippecanoe	1.06	9	21
Dubois	1.06	29	69

Source: U.S. Census Bureau

in the state’s overall churn indicator rankings, even if a couple of industries tracked with the national averages. In short, the churn statistics did not mislead. Relatively speaking, the churn metrics do not show Indiana to be as dynamic as other states. The churn metrics also did not mislead in terms of the more dynamic counties in the state.

The industry detail of the churn measures can provide some insight into the sources of a state’s dynamism. The natural resource feeding frenzy has driven the performance of many Plains and Western states, but there may be more to their motor for economic growth than meets the eye. How it is that many of these same states have been shown, based on their churn metrics, to have a relatively dynamic manufacturing sector warrants further investigation. There may be state policies or other forces that helped them bolster their economic growth. If time and resources allow, look for an exploration into how those forces may affect a state’s

economic performance in future *Indiana Business Review* issues. ■

Notes

1. Timothy Zimmer, “Understanding the Benefits of Workforce Churn,” *InContext*, January-February 2014, www.incontext.indiana.edu/2014/jan-feb/article3.asp.
2. Information Technology and Innovation Foundation, “The 2012 State New Economy Index: Benchmarking Economic Transformation in the States,” December 2012, www2.itif.org/2012-state-new-economy-index.pdf.
3. Soumitra Dutta and Bruno Lanvin, eds., “The Global Innovation Index 2013: The Local Dynamics of Innovation,” www.globalinnovationindex.org/userfiles/file/reportpdf/GII-2013.pdf.
4. See www.bls.gov/bdm/entrepreneurship/entrepreneurship.htm.
5. Y. Lee and D. A. Hicks, “Schumpeterian Churn Dynamics and Regional Productivity Performance,” *International Business & Economics Research Journal* 2 (2011).
6. See www.census.gov/ces/dataproducts/bds/overview.html.
7. See www.bls.gov/bdm/.