

Regional Economic Resiliency: Eagle County, CO (Vail)

This sheet summarizes three facets of resiliency: 1) the relative vulnerability to national economic shocks and cycles; 2) the relative capacity to bounce back or return to the previous employment peak; and 3) evidence of the creative destruction that occurs with industry restructuring.

The industry contribution to growth—either positive or negative pressure to regional employment—is expressed by a positive “empl contrib” value together with a positive skew. (See table for values.) The larger the positive skew, the greater job gains relative to job losses. Regions that do not restructure over time tend to stagnate and under-perform.

The graph to the left shows employment trends. Total and local industry employment are dashed lines—right axis—and the top traded industries as solid lines—left axis.

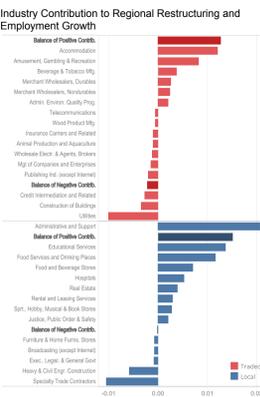
The bar chart below depicts the general nature and scale of the region’s job churn with those industries – both traded and local—that gained or lost jobs.

Resilience Metrics: Risk, Recovery and Restructuring					
Sensitivity to Shock	Beta ¹⁾	R-sq ²⁾	P-value ³⁾	Quality ⁴⁾	
Recovery Quickness	1.066	0.405	0.079	Fair	
Restructuring	0.02	0.009	n/a	2011	
Empl Contr ⁵⁾	0.085	2.09	0.175		

Economic Performance				
	2002-16	2008-16	2012-16	
Empl growth, AAR ⁶⁾	0.007	0.003	0.024	
Shannon Index, change ⁷⁾	-0.038	-0.024	-0.007	
Krugman Index, change ⁸⁾	-0.039	-0.045	-0.058	
Traded empl % ⁹⁾	36.5%	36.5%	35.1%	35.5%
Local empl % ¹⁰⁾	63.2%	63.2%	61.9%	64.5%
Shannon [0 to 1] ¹¹⁾	0.714	0.707	0.707	0.709
Krugman [0 to 2] ¹²⁾	0.861	0.831	0.842	0.793
Base year similarity [0 to 1] ¹³⁾	n/a	0.089	0.215	0.107

Demographics and Income				
	2002	2008	2012	2016
Population	44,470	52,020	51,991	52,864
Salad Days % ¹⁴⁾	40.3%	36.5%	34.9%	33.2%
HS Attainment % ¹⁵⁾	87.2%	87.2%	87.2%	88.4%
Bachelor's attainment % ¹⁶⁾	33.9%	36.2%	36.2%	35.6%
Ed Attainment Index ¹⁷⁾	0.308	0.338	0.334	0.344
Net migration ¹⁸⁾	-0.002	-0.002	-0.003	-0.003
Dependency (retirement) ¹⁹⁾	0.227	0.28	0.452	0.401
Dependency (supplements) ²⁰⁾	0.208	0.249	0.348	0.279
Per-capita personal income ²¹⁾	\$43,114	\$56,270	\$48,223	\$68,105
GDP per capita ²²⁾	\$57,873	\$66,406	\$72,140	\$69,035
Self-employment rate ²³⁾	0.207	0.201	0.165	0.165
Gen Index ²⁴⁾	0.475	0.472	0.42	0.432

Dominant Regional Clusters (Growth Clusters with LO > 1.5) ²⁵⁾	
Performing Arts	Local
Local Entertainment & Media	Local



Regional Resiliency: Risk, Recovery & Restructuring

Economic Resiliency has several facets and phases. One type of resilience is immunity to economic shocks – target hardening. This is difficult to measure and operationalize and not considered here. Another is the effect a national economic shock (like the Great Recession) has upon a region: the beta or the “**risk**” factor. This (historical) effect is calculated as the relative size or amplitude of the shock upon the region. A region dependent upon durable goods manufacturing will tend to experience a national recession more strongly by several fold, whereas a region largely dependent upon drug manufacturing or medical services like the Mayo Clinic – people get sick in good times and bad – will experience the shock less severely.



Another dimension of resilience is the ability to recover to a shock: How long does it take to get up from the mat after being knocked down. A region’s ability to achieve the same level of employment as the pre-recession peak employment – return-to-peak (RTP) – is the “**recovery**” factor. The RTP value is based on the magnitude of the drop from peak to recession trough (the drop in jobs divided by total employment at peak) and how quickly the region returns to peak relative to the national timeframe to return to peak.

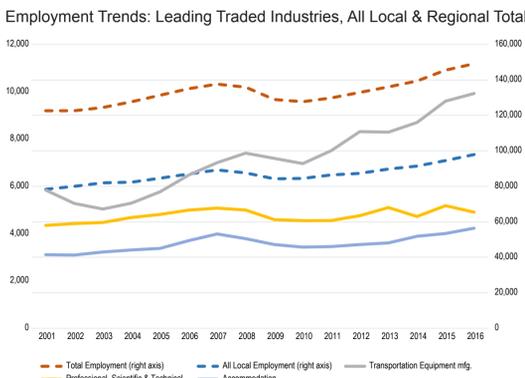
Another resilience attribute is the capacity for a region to adapt to shocks by restructuring its economy and adapt to other economic forces, such as technology, changes in consumer preferences, changes in governmental regulations or international competitive challenges like lower offshore production costs. If a region adapts by changing with the times, this reflects longer-term resilience. This adaptation entails some industries shedding jobs while other industries (one hopes) begin creating jobs at a faster rate. This “**restructuring**” and can be viewed in an evolutionary framework as an attribute of emergence in a regional complex adaptive system.

Regional Economic Resiliency: Chatham County, GA (Savannah)

This sheet summarizes three facets of resiliency: 1) the relative vulnerability to national economic shocks and cycles; 2) the relative capacity to bounce back or return to the previous employment peak; and 3) evidence of the creative destruction that occurs with industry restructuring.

The industry contribution to growth—either positive or negative pressure to regional employment—is expressed by a positive “empl contrib” value together with a positive skew. (See table for values.) The larger the positive skew, the greater job gains relative to job losses. Regions that do not restructure over time tend to stagnate and under-perform.

The graph to the left shows employment trends. Total and local industry employment are dashed lines—right axis—and the top traded industries as solid lines—left axis. The bar chart below depicts the general nature and scale of the region’s job churn with those industries – both traded and local– that gained or lost jobs.”

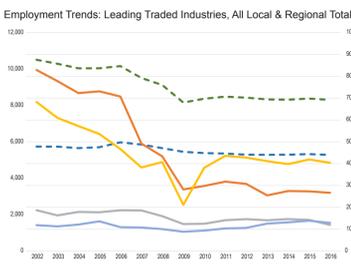
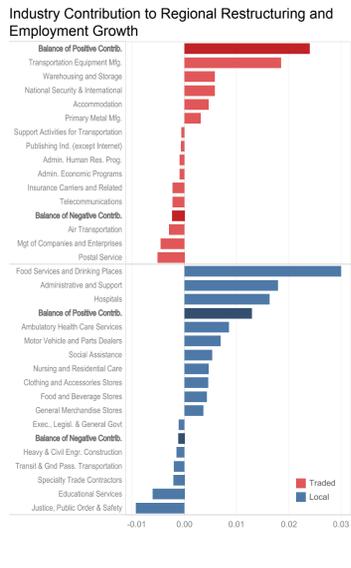


Resilience Metrics: Risk, Recovery and Restructuring					
Sensitivity to Shock	Beta ¹⁾	R-sq ²⁾	P-value ³⁾	Quality ⁴⁾	
Recovery Quickness	1.066	0.693	<0.001	Excellent	
Restructuring	0.01	0.009	2013	2011	
Empl Contr ⁵⁾	0.013	3.32	0.207		

Economic Performance				
	2002-16	2008-16	2012-16	2016
Empl growth, AAR ⁶⁾	0.012	0.012	0.023	34.1%
Shannon Index, change ⁷⁾	-0.038	-0.024	-0.003	65.4%
Krugman Index, change ⁸⁾	0.1	0.179	0.097	60.1%
Traded empl % ⁹⁾	34.6%	35.7%	34.3%	34.1%
Local empl % ¹⁰⁾	65.4%	64.2%	65.7%	65.9%
Shannon [0 to 1] ¹¹⁾	0.813	0.801	0.788	0.782
Krugman [0 to 2] ¹²⁾	0.382	0.356	0.383	0.42
Base year similarity [0 to 1] ¹³⁾	n/a	0.094	0.109	0.156

Demographics and Income				
	2002	2008	2012	2016
Population	235,494	250,596	276,536	282,613
Salad Days % ¹⁴⁾	28.8%	28.0%	28.3%	29.4%
HS Attainment % ¹⁵⁾	87.1%	88.2%	89.3%	89.3%
Bachelor's attainment % ¹⁶⁾	18.8%	19.9%	20.3%	20.3%
Ed Attainment Index ¹⁷⁾	0.346	0.399	0.391	0.391
Net migration ¹⁸⁾	-0.005	-0.008	-0.008	-0.008
Dependency (retirement) ¹⁹⁾	1.12	1.05	1.06	1.11
Dependency (supplements) ²⁰⁾	1.18	1.06	1.1	1.08
Per-capita personal income ²¹⁾	\$29,275	\$38,012	\$38,738	\$43,205
GDP per capita ²²⁾	\$44,225	\$43,078	\$45,600	\$52,304
Self-employment rate ²³⁾	0.098	0.090	0.087	0.087
Gen Index ²⁴⁾	0.482	0.474	0.476	0.476

Dominant Regional Clusters (Growth Clusters with LO > 1.5) ²⁵⁾	
Aerospace Products & Defense	Local
Hospitality & Tourism	Local
Paper & Packaging	Local
Water Transportation	Local



Regional Economic Resiliency: Trumbull County, OH (Warren)

This sheet summarizes three facets of resiliency: 1) the relative vulnerability to national economic shocks and cycles; 2) the relative capacity to bounce back or return to the previous employment peak; and 3) evidence of the creative destruction that occurs with industry restructuring.

The industry contribution to growth—either positive or negative pressure to regional employment—is expressed by a positive “empl contrib” value together with a positive skew. (See table for values.) The larger the positive skew, the greater job gains relative to job losses. Regions that do not restructure over time tend to stagnate and under-perform.

The graph to the left shows employment trends. Total and local industry employment are dashed lines—right axis—and the top traded industries as solid lines—left axis.

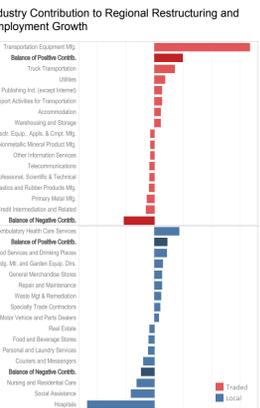
The bar chart below depicts the general nature and scale of the region’s job churn with those industries – both traded and local—that gained or lost jobs.

Resilience Metrics: Risk, Recovery and Restructuring					
Sensitivity to Shock	Beta ¹⁾	R-sq ²⁾	P-value ³⁾	Quality ⁴⁾	
Recovery Quickness	1.256	0.588	<0.001	Excellent	
Restructuring	-0.254	0.009	n/a	2011	
Empl Contr ⁵⁾	0.017	2.47	0.149		

Economic Performance				
	2002-16	2008-16	2012-16	2016
Empl growth, AAR ⁶⁾	-0.016	-0.004	-0.003	45.4%
Shannon Index, change ⁷⁾	0.022	0.003	0.009	54.8%
Krugman Index, change ⁸⁾	-0.046	-0.078	-0.195	62.0%
Traded empl % ⁹⁾	45.4%	38.0%	37.2%	36.4%
Local empl % ¹⁰⁾	54.6%	62.0%	62.8%	63.6%
Shannon [0 to 1] ¹¹⁾	0.777	0.792	0.788	0.794
Krugman [0 to 2] ¹²⁾	0.562	0.481	0.474	0.452
Base year similarity [0 to 1] ¹³⁾	n/a	0.152	0.160	0.221

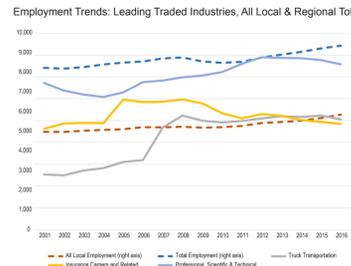
Demographics and Income				
	2002	2008	2012	2016
Population	222,063	210,575	207,289	204,908
Salad Days % ¹⁴⁾	28.1%	23.9%	22.4%	21.7%
HS Attainment % ¹⁵⁾	86.1%	87.5%	88.9%	88.9%
Bachelor's attainment % ¹⁶⁾	11%	11.4%	12.1%	12.1%
Ed Attainment Index ¹⁷⁾	0.346	0.395	0.394	0.394
Net migration ¹⁸⁾	-0.012	-0.012	-0.014	-0.014
Dependency (retirement) ¹⁹⁾	1.675	1.861	1.882	1.877
Dependency (supplements) ²⁰⁾	1.365	1.5	1.476	1.533
Per-capita personal income ²¹⁾	\$36,140	\$31,651	\$34,708	\$38,343
GDP per capita ²²⁾	\$33,633	\$30,861	\$32,632	\$33,970
Self-employment rate ²³⁾	0.087	0.080	0.077	0.077
Gen Index ²⁴⁾	0.420	0.418	0.442	0.442

Dominant Regional Clusters (Growth Clusters with LO > 1.5) ²⁵⁾	
Manufacturing Technology	Local
Local Industrial Products & Services	Local



Regional Economic Resiliency Explainers

- Beta** is a regional multiple of the severity of a national economic shock. It is the regional amplitude, or volatility, of shocks based on past economic cycles. How severe was the regional shock relative to the nation? If beta = 2, expect the regional job loss rate to be twice as high as the national rate.
- The **R-square** is how well the national economic cycles are explained by the U.S. cycles. If R-sq = 1, they move together, but as they approach zero (0) or are negative, the region beats to an increasingly different drum. P-value and “quality” indicate trustworthiness of the beta and R-sq as estimates. A p-value over 0.1 is mildly questionable whereas over 0.2 or higher increasingly so.
- The **RTP** or “Return-to-Peak” is a measure of relative magnitude of the drop from peak employment (in 2007) to the trough and the recovery to the peak level of employment. RTP compares both the relative magnitude of the economic shock and recovery – drop and return – and penalties for the length of time to return to pre-recession peak.
- Employment contribution-to-performance** measures the extent of industry restructuring following the national RTP year (assumed 2012). The greater the value, the better the performance – U.S. = 0.09. The extent to which gaining industries are greater than industries losing jobs is reflected in this metric.
- The **skew value** shows the balance between industries contributing to employment versus those shedding jobs. It shows how much job “transfer” is skewed relative to job “destruction.” U.S. = 0.13.
- Income contribution** is an aggregate showing the degree to which a region’s industries are contributing to aggregate regional income growth. It shows whether earned income (in current dollars) change is greater or lesser than job growth, industry by industry.
- Employment growth** – at an average annual rate (reference year = 2016).
- Industry diversity change** (reference year = 2016). A positive value shows increasing industry diversity.
- Industry specialization change** (reference year = 2016). A positive value shows increasing industry concentration/specialization in the region.
- Traded**: The proportion of industry employment in industries serving markets outside of the region. On average, about 38% of industries nationally are traded.
- Local**: The proportion of industry employment serving the local/regional population. Typically, for service industries, the size of the population dictates the employment demand in “local” industries. Local industry proportion is usually within a narrow band around the U.S. average of 0.82. But, depending on the regional population characteristics – e.g., seniors have a different purchasing profile than young families with children – or sources of income like wages and relative versus transfer payments, like disability, a high level of non-earned income will tend to be reflected in a larger proportion of industries serving the local population.
- U.S. value in 2016 = 0.84**. Shows extent of industry diversity. A score of 1 indicates an even proportion of industries in country/region. A score close to 0 indicates greater concentration.
- U.S. average value in 2016 = 0.75**. Shows extent of industry restructuring and/or concentration of industries. A score of 1 indicates an even proportion of industries in a country/region. A score approaching 2 indicates greater concentration.
- A comparison of regional structures** in the end of period reference year to the base year (2002). Denotes year-to-year industry structural change. A score of 0 indicates the same structure as the base year (2002). A score close to 1 implies dramatic structural change. A good measure to show the cyclical nature of job shifts peak to trough to return to peak.
- 13** Percent of population 25 to 44 years of age, considered to be the most productive age group by ageists.
- 14** Percent of population with a high school diploma only.
- 15** Percent of population with a bachelor’s degree or above.
- 16** A rough measure of the regional occupational mix and education required for those occupations. As the index increases over time for a region, it shows that the occupations in ascendance in the region are, on average, increasing in terms of educational requirements.
- 17** A rough, overall, regional attractiveness measure. A positive value indicates a net inflow of population to the region. U.S. median value across all counties in 2016 = -0.07%.
- 18** Compares with U.S. national value = 1. Greater than 1 suggests a greater dependency on supplemental transfer payments.
- 19** All income types, including transfer payments, dividends and royalties for intellectual property, etc., divided by the region’s total population.
- 21** A relative measure of productivity (over time). Regional gross value added (or GDP/output) divided by total employment.
- 22** The number of self-employed (dependents) divided by total population.
- 23** Income equality measure: A score of 1 indicates perfect income equality in a country/region (the magical thinking model). A score of 1 means perfect inequality of one person having all wealth and income and the rest of the population in complete poverty eating grubs and the rest to live day after day enough to freeze to the cold – the Venezuela socialist or North Korea command model. (And yes, it really is like that in North Korea.)
- 24** Growth clusters are industry aggregations or categories (as defined by Porter’s Cluster Mapping Project) with an IQ of 1.5 or greater in 2016. An industry cluster is a collection of related industries located in the same region that, because of that geographic proximity and input structure, enjoy lower costs, increased productivity and a specialized workforce.



Regional Economic Resiliency: Lancaster County, NC (Lincoln)

This sheet summarizes three facets of resiliency: 1) the relative vulnerability to national economic shocks and cycles; 2) the relative capacity to bounce back or return to the previous employment peak; and 3) evidence of the creative destruction that occurs with industry restructuring.

The industry contribution to growth—either positive or negative pressure to regional employment—is expressed by a positive “empl contrib” value together with a positive skew. (See table for values.) The larger the positive skew, the greater job gains relative to job losses. Regions that do not restructure over time tend to stagnate and under-perform.

The graph to the left shows employment trends. Total and local industry employment are dashed lines—right axis—and the top traded industries as solid lines—left axis.

The bar chart below depicts the general nature and scale of the region’s job churn with those industries – both traded and local– that gained or lost jobs.

Resilience Metrics: Risk, Recovery and Restructuring					
Sensitivity to Shock	Beta ¹⁾	R-sq ²⁾	P-value ³⁾	Quality ⁴⁾	
Recovery Quickness	1.026	0.837	<0.001	Excellent	
Restructuring	0.012	0.009	2013	2011	
Empl Contr ⁵⁾	0.089	1.85	0.228		

Economic Performance				
	2002-16	2008-16	2012-16	2016
Empl growth, AAR ⁶⁾	0.008	0.008	0.014	39.3%
Shannon Index, change ⁷⁾	-0.016	-0.007	0.006	60.1%
Krugman Index, change ⁸⁾	0.01	-0.048	0.044	60.1%
Traded empl % ⁹⁾	39.3%	40.2%	38.0%	37.8%
Local empl % ¹⁰⁾	60.1%	59.8%	62.0%	62.2%
Shannon [0 to 1] ¹¹⁾	0.828	0.821	0.811	0.815
Krugman [0 to 2] ¹²⁾	0.286	0.303	0.276	0.289
Base year similarity [0 to 1] ¹³⁾	n/a	0.427	0.953	0.976

Demographics and Income				
	2002	2008	2012	2016
Population	257,878	272,266	283,424	281,707
Salad Days % ¹⁴⁾	28.8%	27.4%	26.9%	27.2%
HS Attainment % ¹⁵⁾	93.1%	93.8%	93.6%	93.4%
Bachelor's attainment % ¹⁶⁾	24.2%	23.6%	23.8%	23.8%
Ed Attainment Index ¹⁷⁾	0.368	0.425	0.427	0.427
Net migration ¹⁸⁾	0.015	0.015	0.016	0.016
Dependency (retirement) ¹⁹⁾	0.85	0.892	0.895	0.927
Dependency (supplements) ²⁰⁾	0.769	0.82	0.78	0.771
Per-capita personal income ²¹⁾	\$32,082	\$38,934	\$42,166	\$45,780
GDP per capita ²²⁾	\$49,290	\$51,961	\$53,151	\$55,210
Self-employment rate ²³⁾	0.142	0.150	0.154	0.154
Gen Index ²⁴⁾	0.422	0.440	0.448	0.448

Dominant Regional Clusters (Growth Clusters with LO > 1.5) ²⁵⁾	
Automotive	Local
Education & Knowledge Creation	Local
Financial Services	Local
Information Technology & Analytical Instruments	Local
Livestock Processing	Local

