



Shift-Share Analysis of Dickinson County Employment Growth



Briefing Report Outline:

1. [2001-2010 Shift-Share Analysis Results for Dickinson County](#)
2. [Notes on Interpreting Table 1: Dickinson County Employment Growth, 2001-2010](#)
3. [Shift-Share Components of Dickinson County Employment Growth, 2001 - 2010](#)
4. [Notes on Interpreting Table 2: Shift-Share Components of Dickinson County Employment Growth, 2001-2010](#)
5. [Frequently Asked Questions - #1-2](#)
6. [Frequently Asked Questions - #3-5](#)
7. [Frequently Asked Questions - #6](#)
8. [Frequently Asked Questions - #7-8](#)

2001-2010 Shift-Share Analysis Results for Dickinson County, Kansas

The shift-share analysis results compiled in this briefing report are for evaluating employment change in the Dickinson County economy over 2001-2010. They pinpoint important differences between the industry compositions of employment growth locally versus growth in the nation at large. The results shown in the table below are explained in the brief discussion that follows. For many purposes the results reported in Table 1 may suffice. The shift-share results shown in Table 2 are intended for those interested in comparing and examining the industry pattern of local employment growth in greater depth.

Table 1: Dickinson County Employment Growth, 2001 - 2010

Industry	Employment				Actual Growth		Standardized Growth ²		Employment ³
	2001		2010		Percent	Net	Percent	Net	2010
	Level	Share ¹	Level	Share ¹					
🔍 Farm	1,098	11.2	1,001	10.6	-8.83	-97	-12.91	-142	956
🔍 Mining	101	1.0	39	0.4	-61.39	-62	47.01	47	148
🔍 Utilities	61	0.6	67	0.7	9.84	6	-5.98	-4	57
🔍 Construction	338	3.5	409	4.3	21.01	71	-9.20	-31	307
🔍 Manufacturing	1,331	13.6	1,295	13.7	-2.70	-36	-27.83	-370	961
🔍 Wholesale Trade	438	4.5	318	3.4	-27.40	-120	-2.98	-13	425
🔍 Retail Trade	1,011	10.3	1,001	10.6	-0.99	-10	-2.71	-27	984
🔍 Trans. & Warehousing	327	3.3	320	3.4	-2.14	-7	0.48	2	329
🔍 Information	49	0.5	68	0.7	38.78	19	-20.68	-10	39
🔍 Finance & Insurance	252	2.6	256	2.7	1.59	4	23.65	60	312
🔍 Real Estate, Rent. & Leasing	124	1.3	156	1.7	25.81	32	34.46	43	167
🔍 Prof. & Tech. Services	197	2.0	168	1.8	-14.72	-29	14.16	28	225
🔍 Arts, Ent., & Rec.	177	1.8	114	1.2	-35.59	-63	19.34	34	211
🔍 Accom. & Food Services	559	5.7	465	4.9	-16.82	-94	11.48	64	623
🔍 Other Services	575	5.9	584	6.2	1.57	9	8.64	50	625
🔍 Federal, Civilian	112	1.1	109	1.2	-2.68	-3	11.29	13	125
🔍 Federal Military	89	0.9	83	0.9	-6.74	-6	1.45	1	90
🔍 State Government	50	0.5	43	0.5	-14.00	-7	5.15	3	53
🔍 Local Government	1,442	14.8	1,621	17.2	12.41	179	7.00	101	1,543
🔍 Unreported	1,439	14.7	1,317	14.0	-8.48	-122	19.81	285	1,724
TOTAL	9,770	100.0	9,434	100.0	-3.44	-336	1.35	132	9,902

¹ Share: The percentage share of total employment by industry.

² Standardized Growth: at the same rate as its counterpart at the national level and each industry grown.

³ Standardized Employment, 2010: The 2010 level of employment in each industry had it grown at the same rate as its counterparts at the national level since 2001.

🔍 - By clicking on the 🔍 symbol associated with each industry category you will be linked to its corresponding definition as posted on the BEA web site.

Note: Percent growth figures may not add due to rounding by a factor of ± 0.01%.

Notes on Interpreting Table 1: Dickinson County Employment Growth, 2001 - 2010

Employment

Table 1 enumerates the employment levels and percent share of total employment for 2001 and 2010 by major industry group. The employment estimates compiled by the Bureau of Economic Analysis (BEA) measure the number of full- and part-time employees, plus the number of proprietors of unincorporated businesses. People holding more than one job are counted in the employment estimates for each job they hold. This means BEA employment estimates represent a job count, not a number-of-people employed count. Also, BEA employment is by place-of-work, rather than by place-of-residence. Therefore, the jobs held by residents of a neighboring county who commute to work in Dickinson County are included in the employment (or job) count for Dickinson County.

Actual Growth

The next two columns of Table 1 listed under "actual" growth report the percent and net change in the total number of jobs for each industry category. Over 2001-2010 a net total of -336 jobs were trimmed from the Dickinson County economy, amounting to a decline of -3.44%. The percent change results by industry permit you to distinguish between the faster and slower sectors irrespective of their relative importance, while the net change results highlight those industries that contributed most to the total net change overall.

Standardized Growth

The standardized percent and net growth numbers reported in Table 1 are hypothetical in nature. They post the changes in Dickinson County employment that would have occurred over 2001-2010 had each industry grown at the same rate as its national counterpart. The standardized "percent" growth column identifies the growth rate for each industry nationally, while the standardized "net" growth column simulates the resulting net changes in employment locally. The data not only allow one to directly compare local with national industry employment growth rates, they also translate national industry growth rates into hypothetically comparable changes in employment locally.

Although the standardized percent change reported for each industry identifies industry growth rates nationally, it should be noted that the "TOTAL" standardized percent change of 1.35% trailed the growth rate for total employment nationally of 4.99%. This arises because the proportional industry distribution or mix of employment in Dickinson County was tilted toward slower growing industries. In other words, simply by virtue of its industry mix Dickinson County was predisposed toward experiencing slower employment growth than the nation at large over 2001-2010.

Standardized Employment, 2010

Standardized employment for 2010 is the resulting level of employment in each industry for Dickinson County had each grown at the same rate as its national counterpart since 2001. This presents a hypothetical profile of the industry composition and level of local employment that would have occurred had the county directly followed national industry trends.

Shift-Share Components of Dickinson County Employment Growth, 2001-2010

The underlying purpose of shift-share analysis is to perform a numerical sort on the data that offers a construct for describing two key differences between the growth of employment in Dickinson County and the nation at large. The objective is to answer two different but interrelated questions. First, did the difference in employment growth arise because of initial dissimilarities in the industry composition of employment? Or, second, did the difference arise because of disparities in the performance of local industries in contrast with their national counterparts?

Table 2 contains the crux of the shift-share results. Differences between the extent and composition of local employment growth with comparison to the nation are broken down into the hypothetical components: national growth, industry mix, and regional shift. Each component attempts to account for a separate aspect of the disparity between the overall growths of employment locally vs. nationally over 2001-2010.

Table 2: Shift-Share Components of Dickinson County Employment Growth, 2001 - 2010

Industry	National Growth ¹		Industry Mix ²		Region Shift ³	
	Percent	Net	Percent	Net	Percent	Net
🔍 Farm	4.99	55	-17.90	-197	4.07	45
🔍 Mining	4.99	5	42.02	42	-108.40	-109
🔍 Utilities	4.99	3	-10.96	-7	15.81	10
🔍 Construction	4.99	17	-14.19	-48	30.21	102
🔍 Manufacturing	4.99	66	-32.82	-437	25.12	334
🔍 Wholesale Trade	4.99	22	-7.97	-35	-24.41	-107
🔍 Retail Trade	4.99	50	-7.69	-78	1.72	17
🔍 Trans. & Warehousing	4.99	16	-4.51	-15	-2.62	-9
🔍 Information	4.99	2	-25.67	-13	59.46	29
🔍 Finance & Insurance	4.99	13	18.66	47	-22.06	-56
🔍 Real Estate, Rent. & Leasing	4.99	6	29.47	37	-8.66	-11
🔍 Prof. & Tech. Services	4.99	10	9.17	18	-28.88	-57
🔍 Arts, Ent., & Rec.	4.99	9	14.35	25	-54.93	-97
🔍 Accom. & Food Services	4.99	28	6.49	36	-28.30	-158
🔍 Other Services	4.99	29	3.65	21	-7.08	-41
🔍 Federal, Civilian	4.99	6	6.30	7	-13.96	-16
🔍 Federal Military	4.99	4	-3.54	-3	-8.19	-7
🔍 State Government	4.99	2	0.16	0	-19.15	-10
🔍 Local Government	4.99	72	2.01	29	5.42	78
🔍 Unreported	4.99	72	14.82	213	-28.28	-407
TOTAL	4.99	487	-3.63	-355	-4.79	-468

¹ National Growth: The change in local employment that would have occurred for a specific industry had it grown at the national growth rate of all industries combined.

² Industry Mix: The additional gain (or loss) in local employment that would have occurred for a specific industry (additional to the national growth effect) due to the industry growing faster (or slower) nationally than the rate of all industries combined.

³ Regional Shift: The additional gain (or loss) in local employment for a specific industry beyond the national growth and industry mix effects resulting from the industry growing faster (or slower) than the same industry nationally.

🔍 - By clicking on the 🔍 symbol associated with each industry category you will be linked to its corresponding definition as posted on the BEA web site.

Note: Percent growth figures may not add due to rounding by a factor of ± 0.01%.

Notes on Interpreting Table 2: Shift-Share Components of Dickinson County Employment Growth, 2001-2010

National Growth

This component is the most straightforward. It calibrates the growth in Dickinson County employment that may be attributed to overall national conditions and trends. If the industry composition and growth of employment had been the same locally as nationally, then Dickinson County's employment growth over 2001-2010 would have matched the overall national rate of 4.99%.

Industry Mix

The industry mix component seeks to address and answer the question: "Did Dickinson County employment change of -3.44% lag the overall national average (4.99%) because employment was more concentrated toward slower growing industries when compared to the nation?" That is, did the Dickinson County employment growth over 2001-2010 underperform the nation simply because its industry mix was weighted more heavily toward industries that experienced slower growth at the national level?

The results are derived by multiplying local employment in each sector for 2001 by the difference between the national growth rate for each sector and the total national employment growth rate (4.99%). The industry mix results report positive values for those industries that experienced employment growth above the 4.99% national average, while negative values are posted for those industries that grew at rates less than 4.99%.

The most crucial result from the industry mix calculation is the "TOTAL" derived from summing over all industries. The negative values reported reveal that the industry composition employment for Dickinson County was tilted toward slower growing industries. Positive results would have indicated just the opposite.

Regional Shift

The third shift-share component, tagged the "Regional Shift", computes the gain (or loss) in local employment from an industry growing faster (or slower) than the same industry nationally. When employment in a local industry grows faster (or declines less) than its counterpart nationally there occurs a positive "shift" in the net "share" of national employment captured by that industry locally. The "TOTAL" reported for the regional-shift component is -468, showing that Dickinson County employment slipped an additional -4.79% because a larger proportion of industries grew more slowly locally than nationally.

Summary of the Shift-Share Results

Shift-share analysis provides a framework for describing the growth of local employment relative to the nation at large. Results for Dickinson County may be highlighted as follows: *

<u>Actual Growth</u>	=	<u>National Growth</u>	+	<u>Industry Mix</u>	+	<u>Regional Shift</u>
-3.44%		4.99%		-3.63%		-4.79%
(-336)		(487)		(-355)		(-468)

Note that the shift-share identity can be rearranged to focus on identifying the difference between local (actual) and national growth rates as the sum of the industry mix and regional shift components:

<u>Actual Growth - National Growth</u>	=	<u>Industry Mix</u>	+	<u>Regional Shift</u>
-8.43%		-3.63%		-4.79%
(-823)		(-355)		(-468)

Dickinson County's employment change over 2001-2010 of -3.44% trailed the 4.99% growth of employment nationally by -8.43%. Accounting for this difference was an industry mix inclined toward industries that experienced slower growth, coupled with the fact that a large share of local industries underperformed their counterparts nationally.

*Percent growth figures may not add due to rounding by a factor of $\pm 0.01\%$.

Frequently Asked...and Sometimes Not So Frequently Asked...Questions

Question #1: *Some of the industry categories are abbreviated. Would you explain what they stand for?*

Answer: To conserve space some of the titles for the industry categories were shortened. The industry categories in their entirety are listed as follows:

North American Industry Classification System (NAICS) Industry Categories	
Industry	
	Farm
	Forestry, Fishing, Related Activities & Other*
	Mining
	Utilities
	Construction
	Manufacturing
	Wholesale Trade
	Retail Trade
	Transportation & Warehousing
	Information
	Finance & Insurance
	Real Estate, Rental & Leasing
	Management of Companies & Enterprises
	Administrative & Waste Services
	Educational Services
	Health Care & Social Assistance
	Arts, Entertainment & Recreation
	Accommodations & Food Services
	Other Services, Except Public Administration
	Professional & Technical Services
	Federal Civilian
	Federal Military
	State Government
	Local Government

* "Other" consists of the number of jobs held by U.S. residents employed by international organizations and foreign embassies and consulates in the United States.

Question #2: *An industry category labeled "Unreported" appeared in my table. What's this?*

Answer: It is not uncommon to encounter suppressed data for selected industries, especially in small counties. Data are suppressed to avoid disclosure of confidential information regarding individual firms. Even though the concern for confidentiality may relate to only one industry, data for at least two must be suppressed as summing over the reported data and subtracting from the total yields data for the suppressed category. The program, which compiles these shift-share results, performs such a computation when suppressed data are encountered, and reports them in the "Unreported" category. For consistency, the program also contrives a corresponding "Unreported" industry category for the nation at large. Often data for the "Mining", "Manufacturing", or the "Wholesale Trade" industry categories are suppressed, and you will find that their data are paired as "Unreported" in the table.

Question #3: *Where could I get more information about what activities are included under each industry category?*

Answer: Bureau of Economic Analysis (BEA) employment data over 2001-2010 are reported on the basis of NAICS (North American Industrial Classification Standard) definitions. NAICS definitions, principles, and procedures were developed to promote comparability of national and regional economic statistics. They are prepared by the Office of Management and Budget (OMB), and were last updated and reported in the [North American Industrial Classification Standard Manual, \(2002\)](#), U.S. Government Printing Office. Most libraries should have a copy of the latest NAICS Manual.

If you plan on using economic data sometime in the foreseeable future, you should know that the decades old SIC system was replaced by the new North American Industry Classification System (NAICS, pronounced "nakes"). NAICS provides a more contemporary classification of business activity given the new and emerging changes that are reshaping our economy. It was developed by the U.S., Canada, and Mexico to produce comparable data across North America. Data reported on a NAICS basis began to appear in 1999. For more information about NAICS check out Census Bureau's NAICS internet site at <http://www.census.gov/epcd/www/naics.html>

Question #4: *Would the shift-share results be much different if the industry data were available in greater detail?*

Answer: Yes! Greater industry detail would divulge a lot more insight as to the differences between the composition and growth of industry employment locally versus in the nation at large. A redistribution of the shift-share results between totals for industry mix and regional shift components should be expected. However, without the actual data it is impossible to say what the outcome might be. The results produced here are a good starting point for identifying changes and trends in employment growth locally, but greater industry detail will generally always be more useful and offer more insight.

Question #5: *Where can I get a look at the BEA employment data for Dickinson County over all the years 2001-2010? This would give me a better idea of the time interval that might be most suitable for performing the shift-share analysis.*

Answer: The BEA employment data for Dickinson County is available on the *KS-REAP* web site. Click on the following link to view this table:

[Table CA25/CA25N - Dickinson County - Full-time and Part-time Employment by Major Industry](#)

Question #6: Although you discuss how the shift-share results are derived, would you show more explicitly how they are constructed using an example for Dickinson County from the table above?

Answer: Let's begin by looking at how the results are derived for an individual industry category. We'll use "Local Government" for illustration, since data for this sector led the employment numbers for Dickinson County in 2010.

We will use the subscript "i" as general notation for an individual industry. Shift-share analysis describes the net change in employment (ΔE_i) for each industry (i) as the sum of three individual components: National Growth (NG_i), Industry Mix (IM_i), and Regional Shift (RS_i). Using the data for Dickinson County's Local Government sector from the table above we have:

<u>Actual Growth</u>	=	<u>National Growth</u>	+	<u>Industry Mix</u>	+	<u>Regional Shift</u>
ΔE_i	=	NG_i	+	IM_i	+	RS_i
(179)		(72)		(29)		(78)

The National Growth (NG_i) component for Local Government is computed as the product of employment in Local Government for the beginning year (2001), e.g., (i.e., $E_{i,2001} = 1,442$), and the overall growth rate of employment nationally over 2001-2010 (4.99%):

$$NG_i = E_{i,2001} \times (4.99\%)$$

$$(72) \quad (1,442) \quad (4.99\%)$$

[Note: Growth rates are rounded to 2 digits. Totals are derived from unrounded values.]

The Industry Mix (IM_i) component is calculated by multiplying local Local Government employment in the beginning year (2001), (i.e., $E_{i,2001} = 1,442$), by the difference in the national growth rate for Local Government employment (7.00%) and the national growth rate for total employment (4.99%):

$$IM_i = E_{i,2001} \times (7.00\% - 4.99\%)$$

$$(29) \quad (1,442) \quad (2.01\%)$$

The Regional Shift (RS_i) component is computed by multiplying local Local Government employment in the beginning year (2001), (i.e., $E_{i,2001} = 1,442$), by the difference in Dickinson County's growth rate for Local Government employment (12.41%) and the growth of Local Government nationally (7.00%):

$$RS_i = E_{i,2001} \times (12.41\% - 7.00\%)$$

$$(78) \quad (1,442) \quad (5.42\%)$$

After results for each industry are derived they are summed (Σ) to determine the total effect for each component:

<u>Actual Growth</u>	=	<u>National Growth</u>	+	<u>Industry Mix</u>	+	<u>Regional Shift</u>
$\Sigma (E_i)$	=	$\Sigma (NG_i)$	+	$\Sigma (IM_i)$	+	$\Sigma (RS_i)$
(-336)		(487)		(-355)		(-468)

Question #7: *I'd like to learn more about shift-share analysis. Are there some textbooks, manuals, or articles you would recommend?*

Answer, Part 1: If you are interested in other explanations and illustrations of the "conventional" approach to shift-share analysis as presented above, you should find the following references helpful:

Bendauid-Val, Avrom. "Relative Regional Industrial Composition Analysis." Chapter 5. *Regional and Local Economic Analysis for Practitioners*, New York: Praeger Publishers, 1983.

Hustedde, Ron, Ron Shaffer, and Glen Pulver. *Community Economic Analysis: A How-To Manual*. North Central Regional Center for Economic Development, Iowa State University, Ames, Iowa, 1993. [Click here to link to a pdf document of this report.](#)

Answer, Part 2: Over the past several decades a number of alternative approaches and formulations of shift-share have been proposed and debated in the regional economics literature. Articles that would serve as good points of entry to this literature include:

Loveridge, Scott and Anne C. Selting. "A Review and Comparison of Shift-Share Identities." *International Regional Science Review*, Vol. 21, No. 1, 1998:37-58.

Stevens, Benjamin H. and Craig L. Moore. "A Critical Review of the Literature on Shift-Share as a Forecasting Technique." *Journal of Regional Science*, Vol. 20, No. 4, November 1980:419-437.

Answer, Part 3: Should you wish to get a more detailed overview of some of the journal articles on this topic I recommend you perform a subject search on the phrase "shift-share" at the *EconLit* web site. *EconLit* is an online database copyrighted by the American Economics Association that is produced and maintained by the *Journal of Economic Literature*. You can access it by clicking [here](#).

Question #8: *If I have questions or suggestions regarding this material whom should I contact and how would I contact them?*

Answer: Either e-mail or call me. I'd be delighted to visit with you. My address is:

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