Regional Industry Cluster Analysis for the Gulf Coast Economic Development District

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EXECUTIVE SUMMARY

Industry cluster is a geographic concentration of firms that are interconnected via a buyer-supplier chain. Cluster analysis can provide a clear picture of the regional economy by indicating the industry clusters that are growing in importance and the ones that are declining. Analysis of industry clusters is a starting point in formulating economic development strategies. Economic development strategies designed for industry clusters will have more effect on regional growth than the ones designed for individual industries.

This study measured the performance of industry clusters in the Gulf Coast Economic Development District (GCEDD). This study is partially funded by the US Economic Development Administration. The primary objective of this study was to assess regional competitiveness in attracting and retaining industry clusters. The study analyzed industry cluster structure of the GCEDD region as a whole and each of the thirteen counties. The study utilized economic development tools such as Location Quotient, Economic Base Model, and Shift-Share Analysis to analyze the growth of industry clusters in the GCEDD region. The location quotient model quantifies the degree of concentration of clusters in a region relative to the nation or the state. It reveals the dominant clusters in the region as well as the ones that are emerging or transforming. The economic base model identifies the export-oriented clusters in the region and measures their impact on the local economy. The shift-share analysis on the other hand, measures a region's comparative advantage for industry clusters. It identifies the clusters that are mainly influenced by local factors as compared to external factors. The study

analyzed 23 industry clusters in the GCEDD region, as well as each of the thirteen counties.

Key Findings from the Study

-When Compared to the Nation

- The GCEDD region was found to be specialized in seven clusters, they are
  - Biomedical/Biotechnical,
  - Business & Financial Services Cluster,
  - Chemical & Chemical Based Products,
  - Energy,
  - Fabricated Metal Product Manufacturing,
  - Machinery Manufacturing, and
  - Transportation & Logistics;

  However, three (Business & Financial Services Cluster, Energy, and Transportation & Logistics) of the seven clusters are considered to becoming less dominant over a period of time. The decreasing concentration of Energy cluster is a result of national trend and not local economic conditions. On the other hand, the decreasing concentration of Transportation & Logistics is a result of local economic conditions.

- Export-oriented clusters in the region are
  - Biomedical/Biotechnical,
  - Chemical & Chemical Based Products,
  - Energy,
  - Fabricated Metal Product Manufacturing,
  - Machinery Manufacturing, and

- Transportation & Logistics;

These clusters export most of their goods and services and therefore bring money into the region and thus have a major influence on regional economic growth.

- Clusters favored by local economic conditions are
  - Biomedical/Biotechnical,
  - Chemical & Chemical Based Products,
  - Fabricated Metal Product Manufacturing, and
  - Machinery Manufacturing ;

These clusters are mainly influenced by local economic factors as compared to the external factors.

- The region has eight emerging clusters, out of which the Advanced Material and Computer & Electronic Product Manufacturing clusters will have a significant influence on the local economy, in the near future.

-When compared to the state

- The GCEDD region was found to be specialized in nine clusters, they are
  - Advanced Materials,
  - Biomedical/Biotechnical,
  - Business & Financial Services Cluster,
  - Chemical & Chemical Based Products,
  - Electrical Equipment, Appliance & Component Manufacturing,
  - Energy,
  - Fabricated Metal Product Manufacturing,
  - Machinery Manufacturing, and

- Transportation & Logistics;

However, four (Biomedical/Biotechnical, Business & Financial Services Cluster, Transportation & Logistics, and Fabricated Metal Product Manufacturing) of the nine clusters are becoming less concentrated over a period of time.

- Export-oriented clusters in the region are
  - Biomedical/Biotechnical,
  - Chemical & Chemical Based Products,
  - Energy,
  - Fabricated Metal Product Manufacturing, and
  - Machinery Manufacturing

These clusters export most of their goods and services and therefore bring money into the region and thus have a major influence on regional economic growth.

- Clusters favored by local economic conditions are
  - Advanced Material,
  - Chemical & Chemical Based Products,
  - Electrical Appliance Equipment & Component Manufacturing,
  - Energy, and
  - Machinery Manufacturing;

These clusters are mainly influenced by local economic factors as compared to the external factors.

- The region has eight emerging clusters, out of which the Glass & Ceramics and Computer & Electronic Product Manufacturing clusters will have a significant impact on the local economy, in the near future.

Comparing regional clusters with respect to the nation as well as the state helped in identifying regional differences in cluster growth. For example, the Biomedical/Biotechnical cluster was growing well as compared to the nation, but not as well compared to the state. This indicates that other regions in the state favor Biotech cluster growth as compared to the GCEDD region. Conversely, the Advanced Materials cluster was less concentrated in the region as compared to nation, but was found to be more concentrated as compared to the state. This indicates that within Texas, the Advanced Materials cluster is growing well in the GCEDD region as compared to other regions.

The growth of some of the clusters (for instance the biotech cluster) is significantly affected by local economic factors that can be modified or improved by the local policy makers. Therefore, it is the responsibility of the local economic development agencies to assess the local economic factors that would favor the location of industry clusters. The first and the foremost thing a local economic development agency should consider doing is to identify the target clusters. The target clusters are the ones that are: 1. export-oriented; 2. have location quotient greater than one; 3. have a positive value for change in location quotient; 4. favored by local economic factors; 5. large employers; and 6. have a high gross industry product. Once target clusters are identified, the local economic development agencies should conduct surveys, interviews and focus group discussions with industry experts to identify their industry location preferences. The local agencies can also gather information from research publications, news articles, and other regional sources that provide vital data for economic development.

Since the study used aggregate data, local economic development agencies should be careful in interpreting and applying the results to any particular industry. Moreover, the results differ with respect to the reference area (state or nation). The results from this study should be combined with other techniques or data for designing strategies. We do not recommend formulating major decisions based on these results alone. Since economic development tools are time-based, it is desirable to repeat the analysis on a regular basis for monitoring the growth of industry clusters.

CHAPTER I

INTRODUCTION

1.1 Background

Over the past decade, industry cluster development has become an important economic development strategy. A recent survey of state cluster initiatives indicates that as many as 40 states consider industry cluster development as a critical strategy in promoting economic development (Akundi 2003). Originally, the relationship between industry clusters and economic development was proposed by Perroux (1950) in his growth pole/development pole theory. Perroux argued that well-established firms in a region serve as growth poles (catalyst) to smaller firms in geographic proximity by spreading positive economic effects. Later, Perroux (1988) added time to his growth pole theory and indicated that economic development by industry clusters proceeds in two stages: the first stage involves clustering of business and firms, while during the second stage growth spreads to other regions through goods, investment and knowledge. Perroux conceives economic space as a conceptual and homogenous environment where firms buy from and sell to one another following agglomeration (centripetal) and dispersion (centrifugal) force (Sambidi 2007).

Agglomeration economies (centripetal forces) are considered to be one of the principal driving forces behind clustering of industries. The concept of agglomeration economies implies that the performance of one firm is influenced by other firms located nearby. If a firm benefits by locating near an existing firm, then there exist positive economies of scale. Conversely, if a firm is not benefiting by locating near an existing firm, then this is the case of negative economies of scale. Agglomeration economies are

further divided into localization economies and urbanization economies. Localization economies involve technical externalities and knowledge spillovers (Marshall-Arrow-Romer (MAR) externalities) that are specific to an industry whereby the productivity or growth of a firm in a given industry and in a given region is assumed to increase the performance of other firms in that industry (van Oort 2004). These externalities include labor market pooling, production of new ideas, transfer of knowledge, and supply of intermediate goods. Urbanization economies reflect economic externalities that are transferred to firms of different industries as a result of savings generated by operating in a city with good infrastructure, favorable community attitude, tax credits and subsidies, and favorable socioeconomic factors (van Oort 2004). All these factors are not specific to a particular industry, but favor all industries, thus resulting in sectoral diversity. This is the reason why there are a wide variety of industries in major metropolitan areas (Sambidi 2007). However, there are some disadvantages with industrial cluster development, such as increase in local land rents, wages, congestion, and utility costs. These disadvantages eventually divert the new firms away from the region.

An industry cluster is defined as "a loose, geographically bounded collection of similar and/or related firms that together create competitive advantage for member firms and the regional economy" (Barkley and Henry 2001). There are two types of industry Clusters: Intra-industry clusters, where firms within a given industry facing similar problems and utilizing similar technologies, collaborate to solve those problems and develop new products; and Inter-industry clusters, where firms belonging to different industries are connected through buyer-supplier chains (Lall, Koo, and Chakravorty 2003). Localization economies lead Intra-industry clusters to regional specialization,

whereas urbanization economies lead inter-industry clusters to regional diversity. Industry clustering is a vital strategy for economic development as it encourages localization economies, facilitate industrial reorganization, encourage networking among firms, enhance workforce development, manage labor supply, and permit greater focusing of public resources (Barkley and Henry 2001).

Porter (1990) popularized the use of cluster methodology for regional analysis. Cluster methodology is used to identify groups of industries within a region that together possess a competitive advantage. According to Porter (1990), the four determinants of industry competitiveness, which he calls the "diamond of competitive advantage", are (1) factor conditions, (2) demand conditions, (3) related and supporting industries, and (4) firm strategy, structure and rivalry. *Factor conditions* include factors of production such as skilled labor force, specialized infrastructure, and educational institutions that are utilized by all firms within the cluster. *Demand Conditions* indicate the presence of local customers who will ensure industry cluster firms to be innovative in product development. *Related and supporting industries* refer to firms that supply raw materials. Finally, *firm strategy, structure and rivalry* refer to firms developing strategies and competing against other firms within the same industry cluster, thus being motivated to be innovative. Porter (2000) argues that all the above factors will motivate the cluster firms to innovate and upgrade, which in turn will boost the local economy and keep it growing.

1.2 Industry cluster *versus* Single industry

Generally speaking, economic development mostly concentrates on individual industries and often misses the opportunity to recognize the underlying reasons of industry growth

and development (Cortright 2006). Instead of providing economic incentives to individual firms, such as workforce training grants, it would be appropriate to direct the grant for cluster-wide workforce training which will improve the skill-level of the workforce for whole cluster. A regional economic performance, measured in terms of the creation of quality jobs, growth in income and exports, is considered to be a function of industry cluster, rather than a single industry (Waits, Rex, and Melnick 1997). Cluster analysis can provide a clear picture of the regional economy by indicating the industry clusters that are growing in importance and the ones that are declining. Cluster analysis in itself is not a solution for economic development, but is a necessary tool for identifying the solution. As such, it should be considered as a starting point for developing and designing economic development strategies for economic growth. Cluster analysis can aid in proper allocation and configuration of limited resources, and in infrastructure development. Economic development strategies based on cluster analysis will have a long-term effect on regional growth when compared to the ones designed for individual industries.

The first step in designing a cluster-based economic development policy is to understand the existing cluster structure of the region and to identify the clusters with comparative advantages. An industry cluster is considered to have a comparative advantage in a region if it grows significantly faster compared to other regions. Economic development officials should design and develop strategies based on cluster performance. Importance should be given to the clusters that are not yet established, but are emerging and have a potential for growth. Emerging clusters are the ones in immediate need of policy incentives for future growth. However, economic development agencies should

also design policies for the improvement of well-established clusters, because they are the drivers of regional economy.

The state of Texas started utilizing cluster analysis in 2004, when Governor Rick Perry, announced the Texas Target Industry Cluster Initiative, a statewide market-driven economic development strategy to identify and develop industry clusters with regional comparative advantage. Some studies have analyzed industry clusters in the Houston MSA region as a part of nation or state-wide study, but none of them focused specifically on the 13-county Houston-Galveston region or the Gulf Coast Economic Development District (GCEDD). The purpose of this study is to analyze the cluster structure of the GCEDD region and to determine the strengths and weaknesses of different clusters that exist in the region. The study utilizes different economic tools, such as local employment analysis, gross domestic product, payroll, location quotient, shift-share analysis, and economic base models to determine industry clusters' comparative advantage in the region. This baseline study examines the period from 2001 through 2005, and compares the GCEDD region as a whole and each of the 13 counties with state and nation. The study is designed to aid the local economic development officials in better understanding the competitive strengths and challenges of the region's industry clusters. Based on the knowledge gained from this study, policy makers can design strategies to retain and attract industry clusters, thereby boosting regional economy and providing employment opportunities for local residents.

1.3 Objectives

The primary objective of this study is to assess regional competitiveness in attracting and retaining industry clusters. Specifically, the study analyzes industry cluster

structure of the GCEDD region and each of the thirteen counties. The study also aims to measure the economic performance of the region. Based on industry earnings, Gross Regional Product (GRP) and Gross County Product (GCP) are estimated in the study. Utilizing different economic development tools the study aims at determining the target clusters for the GCEDD region. Some of the concepts of cluster analysis contained herein were derived from a study of regional clusters sponsored by US Economic Development Administration and conducted by Purdue Univ. Center for Regional Development, Indiana Business Research Center, and Strategic Development Group, Inc. The study will be partially funded by the U.S. Economic Development Administration.

1.4 Data

The data required for the study is collected from multiple sources, such as US Census Bureau, Bureau of Labor Statistics, Bureau of Economic Analysis, and United States Department of Agriculture. Cluster definitions and data are obtained from Indiana Business Research Center, which along with Purdue Center for Regional Development and Strategic Development Group maintains a database of industry clusters.

1.5 Organization of the Study

The remainder of this study comprises of three subsequent chapters plus an appendix. Chapter 2 provides an economic overview of the GCEDD region and the thirteen counties, in terms of different socioeconomic characteristics. Economic performance of all the thirteen counties as measured by employment, income, wages, unemployment and poverty rate, is presented in the chapter. The second chapter also identifies the top industries and industry sectors in terms of employment and gross domestic product.

Chapter 3 deals with industry cluster analysis. The chapter mainly covers economic development tools, such as location quotient, shift-share, and economic base model, aimed to determine industry clusters with comparative advantage.

Chapter 4 summarizes the main findings and conclusions from the study. The chapter also discusses about limitations and future research.

CHAPTER II

Regional Economy of the GCEDD

2.1 Socioeconomic Characteristics

This chapter presents a summary of the existing structure of economic activity in the Gulf Coast Economic Development District (GCEDD), which serves thirteen counties along the upper Gulf Coast of Texas (Figure 2.1). This 13-county area, known as the Gulf Coast Planning Region-16, covers approximately 12,500 square miles and contains more than 5.5 million people. At present, the region includes the 6th largest metropolitan area and the 4th largest city in the nation. The 13 counties differ significantly from each other in terms of socioeconomic characteristics. For example, as indicated in table 2.1.1, county population in the region ranges from 20,700 to 3,763,000 (US Census) and median household income ranges from $34,000 to $70,000 (USDA/ERS). Houston is the major city in the region. Nine (Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller) of the thirteen counties fall within the Houston-Sugar Land-Baytown Metropolitan Statistical Area (HMSA), However, not all counties are urban in nature. Among the counties included in the Houston-Sugar Land-Baytown MSA, Austin, Chambers, Liberty, and Waller County are relatively rural. In addition to the four counties mentioned above, the GCEDD region includes three more rural counties, which include Colorado, Matagorda, and Wharton County. The study uses the Index of Relative Rurality (IRR) developed by Waldorf (2006). The index is based on population, population density, extent of urbanized area, and distance to the nearest metropolitan area. The index is scaled from 0 to 1, zero being the most rural place and

Figure 2.1.1 Gulf Coast Economic Development District Counties and City Boundaries

1 being the most urban place (table 2.1.1). With respect to the socioeconomic characteristics, Matagorda County has the highest unemployment rate (8.1%) in the region with 21.3 % of residents of all ages living in poverty. Fort Bend County has the highest median household income of $70,000, whereas Matagorda County has the lowest ($34,000). Fort Bend County also accounts for the highest percentage of persons with a

Table 2.1.1. Socioeconomic and Demographic Characteristics of GCEDD Counties[1]

County	Total Establishments[a]	Employment[a]	Average Annual Wage[a]	Unemployment Rate[a]	Population[b]	Net Domestic Migration[b]	Net International Migration[b]	Poverty % All Ages[b]	Education in 2000[2b]	Per Capita Personal Income[c]	Median Household Income[b]	2000 Index of Relative Rurality
Austin	803	9285	$34,332	4.5	26018	283	61	11.9	17.3	$30,259	$43,684	**0.52**
Brazoria	4280	78791	$38,314	5.7	277821	3844	749	11.8	19.6	$29,869	$50,795	**0.32**
Chambers	570	8489	$41,220	6.1	28491	174	50	11.4	12.1	$33,249	$53,961	**0.49**
Colorado	595	6326	$26,915	4.5	20701	-36	72	17.5	14.4	$27,463	$35,111	**0.55**
Fort Bend	7204	109763	$42,987	5.2	466231	15385	1914	8.1	36.9	$36,286	$70,202	**0.22**
Galveston	4888	87411	$35,526	5.7	277330	3308	834	13.3	22.7	$33,146	$46,012	**0.22**
Harris	90745	1867791	$49,248	5.6	3762844	-25872	33932	17.9	26.9	$41,703	$44,085	**0.06**
Liberty	1040	16174	$29,162	6.7	75221	-211	109	18.4	8.1	$26,332	$37,428	**0.47**
Matagorda	837	10230	$35,370	8.1	37989	-467	163	21.3	12.5	$22,599	$33,975	**0.43**
Montgomery	7080	103203	$37,250	4.7	379028	11821	1209	11.0	25.3	$34,978	$59,210	**0.31**
Walker	914	22500	$28,099	5.6	63318	442	109	22.6	18.3	$19,223	$35,064	**0.39**
Waller	665	12514	$30,947	5.5	34801	-225	101	18.7	16.8	$26,543	$40,921	**0.48**
Wharton	1146	15086	$27,327	5.1	41403	-240	123	16.0	14.3	$26,093	$35,593	**0.47**

Note: [1] All variables are measured for 2005, unless and until mentioned otherwise.
[2] Percent of persons with a college degree (at least 4 year degree), 2000
[a] Source: Bureau of Labor Statistics
[b] Source: US Census Bureau and Economic Research Service(ERS/USDA)
[C] Source: Bureau of Economic Analysis
[d] Source: Prof. Brigitte S. Waldorf and Indiana Business Research Center

college degree (37 %), whereas Liberty County accounts for the lowest (8.1%). With respect to the average annual wage, Harris County accounts for the highest average annual wage of $49,000, while Colorado accounts for the lowest ($27,000). Net domestic migration[1] is highly positive in Fort Bend and Montgomery County, whereas it is highly negative in Harris County. On the other hand, Net international migration[2] is highly positive in Harris County, indicating that Harris County residents are moving out to the surrounding counties, while international immigrants are moving into Harris County. This is reflected in the Houston Area Survey conducted by Kleinberg (2008), which illustrated Harris County's growing Hispanic and Asian population, and decreasing Anglo population.

2.2 Labor Mobility

This section deals with commute patterns in the GCEDD region. Mean travel time to work for population 16 years and older in Houston is 27.4 minutes (US Census 2000), indicating that people usually reside away from their work place. This is specially the case with respect to above middle-class individuals who prefer to locate away from the city. There are several reasons for this including: quality of life in the region, proximity to prime schools, housing costs, crime rate, and other household costs. Because of these reasons, in spite of having high average annual wages, median household income is generally low in urban areas compared to the sub-urban areas. For example, Harris County, which includes most of Houston, has an annual average wage of $49,000, which is high compared to Fort Bend and Montgomery County's average annual

Footnote: [1]Net Domestic Migration is defined as the difference between domestic in-migration to an area and domestic out-migration from it during the period. Domestic in-migration and out-migration consist of moves where both the origins and destinations are within the United States (excluding Puerto Rico).Generally, it accounts for movement between regions, states, and counties (US Census Bureau). [2] International Migration is the migration of people across country borders. Net International Migration is defined as the difference between international in-migration to an area and international out-migration from it during the period (US Census Bureau).

wage of $43,000 and $37,000, respectively; however, median household income of Harris County ($44,000) is relatively low compared to Fort Bend ($70,000) and Montgomery ($59,200). This is also indicated by fact that poverty rate is relatively high in Harris County (18%) as compared to Fort Bend (8%) and Montgomery County(11%). Thus, indicating that most of the people working in urban counties reside in surrounding sub-urban counties.

Data for this section is computed using the *On The Map* data- tool of the US Census Bureau's Longitudinal Employment-Household Dynamics[3]. Tables 2.2.1 to 2.2.13 illustrate the top ten counties of residence for the workforce of a given county. For example, out of the total Brazoria County workforce (72,204 primary jobs), 40,602 reside in Brazoria (56%), whereas, 13,661 live in Harris (19%), followed by Galveston (4,040), Fort Bend (2,200) and Matagorda County (985). It is interesting to observe that most of the people working in Chambers and Waller County live in Harris County, and not in respective counties.

Table 2.2.1. Top 10 Counties of Residence for Austin County Workforce in 2004

Home County	All Jobs	Primary Jobs	All Private Jobs	Private Primary Jobs
Austin	4229	3921	3168	2939
Harris	1165	1094	1100	1037
Colorado	401	379	367	347
Fort Bend	344	327	281	268
Washington	241	221	203	184
Travis	187	183	178	174
Wharton	183	166	162	146
Dallas	154	140	149	135
Waller	110	107	91	89
Brazos	108	101	96	90

Mean travel time to work for population 16 years and older is 29 minutes (US Census 2000)

Footnote: [3] "Jobs are defined as jobs for a specific individual that meet the definition of beginning-of-quarter employment. Primary job is the single job with the highest pay for a specific individual that meets the definition of beginning-of-quarter employment. Note that the number of primary jobs is the same as the number of workers, i.e., by definition each worker holds only one primary job. Ownership is defined by the classification of the firm in Quarterly Census of Employment and wages records as 'private' (private ownership). On the Map, only distinguishes 'private' and the more inclusive 'all' categories." (LEHD On The Map Technical Documentation, US Census Bureau, LEHD).

Table 2.2.2. Top 10 Counties of Residence for Brazoria County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Brazoria	42835	40602	32045	30471
Harris	14535	13661	12792	12026
Galveston	4201	4040	3122	3000
Fort Bend	2325	2200	1824	1727
Matagorda	1034	985	927	882
Montgomery	768	719	700	652
Victoria	737	724	678	665
Jefferson	694	644	565	520
Bexar	651	592	603	544
Dallas	506	470	495	459

Mean travel time to work for population 16 years and older is 28 minutes (US Census 2000)

Table 2.2.3. Top 10 Counties of Residence for Chambers County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Harris	2536	2479	2219	2168
Chambers	1909	1839	1060	1008
Jefferson	499	478	401	381
Liberty	440	428	292	283
Orange	132	127	128	123
Comal	112	112	102	102
Galveston	110	107	108	106
Brazoria	92	89	88	85
Hardin	91	87	89	85
Montgomery	90	84	81	75

Mean travel time to work for population 16 years and older is 25.7 minutes (US Census 2000)

Table 2.2.4. Top 10 Counties of Residence for Colorado County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Colorado	3151	2953	2490	2327
Fayette	458	441	397	382
Harris	402	384	369	354
Austin	170	163	155	148
Lavaca	167	157	125	117
Wharton	148	138	116	107
Fort Bend	90	84	62	56
Bexar	89	85	80	76
Dallas	52	49	45	42
Washington	50	47	37	34

Mean travel time to work for population 16 years and older is 26.2 minutes (US Census 2000)

Table 2.2.5. Top 10 Counties of Residence for Fort Bend County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Fort Bend	42557	40429	29412	27646
Harris	37309	34970	33824	31586
Brazoria	3064	2923	2418	2286
Dallas	1684	1567	1649	1534
Montgomery	1593	1504	1526	1439
Galveston	1587	1492	1147	1063
Wharton	1292	1222	858	801
Bexar	1189	1108	1103	1023
Travis	1119	1033	1005	921
Tarrant	984	908	961	887

Mean travel time to work for population 16 years and older is 32.3 minutes (US Census 2000)

Table 2.2.6. Top 10 Counties of Residence for Galveston County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Galveston	48446	43367	28734	26123
Harris	19351	17826	13824	12686
Brazoria	4424	4085	3034	2814
Fort Bend	1302	1216	898	838
Jefferson	1177	1075	759	697
Montgomery	819	762	643	592
Bexar	567	489	444	388
Dallas	565	513	495	453
Walker	550	498	123	112
Tarrant	499	456	460	423

Mean travel time to work for population 16 years and older is 26 minutes (US Census 2000)

Table 2.2.7. Top 10 Counties of Residence for Harris County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Harris	1246486	1166852	1054335	985108
Fort Bend	114475	107918	98345	92805
Montgomery	63748	60825	57547	54813
Brazoria	43573	41195	39087	37027
Galveston	40271	37839	37146	34939
Dallas	35071	32577	34805	32342
Bexar	24507	22507	24195	22225
Tarrant	22805	21135	22609	20951
Travis	19508	18111	18838	17483
Jefferson	15558	14204	15027	13699

Mean travel time to work for population 16 years and older is 28.1 minutes (US Census 2000)

Table 2.2.8. Top 10 Counties of Residence for Liberty County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Liberty	5792	5517	3559	3348
Harris	3269	3150	2762	2652
Montgomery	949	904	777	737
San Jacinto	413	396	346	332
Jefferson	396	377	230	212
Galveston	280	265	194	181
Polk	239	228	197	187
Hardin	238	224	179	167
Fort Bend	220	214	164	158
Brazoria	207	202	133	129

Mean travel time to work for population 16 years and older is 36.8 minutes (US Census 2000)

Table 2.2.9. Top 10 Counties of Residence for Matagorda County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Matagorda	6153	5858	4213	4012
Brazoria	650	636	587	575
Harris	561	532	515	487
Wharton	329	319	264	256
Fort Bend	232	226	209	203
Jackson	120	114	75	70
Victoria	96	92	75	71
Bexar	88	78	78	69
Nueces	87	86	79	78
Calhoun	82	78	70	66

Mean travel time to work for population 16 years and older is 23.9 minutes (US Census 2000)

Table 2.2.10. Top 10 Counties of Residence for Montgomery County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Montgomery	44410	41862	33025	30967
Harris	27447	25064	23123	21446
Dallas	1592	1459	1571	1439
Fort Bend	1507	1378	1432	1319
Tarrant	1256	1173	1244	1162
Walker	1231	1170	962	913
Bexar	1056	953	1030	929
Liberty	860	804	710	661
Brazoria	845	786	813	757
Travis	768	698	737	669

Mean travel time to work for population 16 years and older is 32.9 minutes (US Census 2000)

Table 2.2.11. Top 10 Counties of Residence for Walker County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Walker	9362	8892	4482	4090
Harris	2034	1932	1014	935
Montgomery	1428	1354	749	696
Galveston	473	457	119	109
Jefferson	459	448	97	93
Fort Bend	398	387	116	108
Madison	375	354	163	145
Brazoria	343	333	78	73
Brazos	334	327	135	131
Anderson	333	328	60	58

Mean travel time to work for population 16 years and older is 22.7 minutes (US Census 2000)

Table 2.2.12. Top 10 Counties of Residence for Waller County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Harris	4524	4027	2567	2423
Waller	2006	1838	1022	965
Fort Bend	663	609	429	413
Austin	561	528	449	426
Montgomery	359	341	292	275
Dallas	213	181	97	89
Washington	172	162	89	83
Bexar	159	140	90	84
Tarrant	150	137	91	84
Brazos	121	100	40	38

Mean travel time to work for population 16 years and older is 32.3 minutes (US Census 2000)

Table 2.2.13. Top 10 Counties of Residence for Wharton County Workforce in 2004				
Home County	**All Jobs**	**Primary Jobs**	**All Private Jobs**	**Private Primary Jobs**
Wharton	8897	8335	6610	6176
Harris	1147	1044	1026	954
Fort Bend	1104	978	786	746
Matagorda	646	579	563	515
Colorado	246	225	230	211
Brazoria	232	214	179	168
Bexar	225	206	209	192
Jackson	191	181	170	162
Victoria	160	144	132	120
Austin	88	84	75	71

Mean travel time to work for population 16 years and older is 23.8 minutes (US Census 2000)

2.3 Economic Performance

The general approach of measuring economic performance in the GCEDD region was taken from the study "Unlocking Rural Competitiveness: The Role of Regional Clusters" conducted by Purdue CRD, IBRC, and SDG Inc (2007). Economic performance of the thirteen counties is measured with indicators, such as median household income, average annual wage, unemployment rate, and poverty rate. Median household income, which includes transfer payments, wages and investment income, measures the economic well-being of a household. Average annual wage on the other hand, indicates compensation levels. Unemployment rate is utilized to assess labor availability information; whereas, poverty rate quantifies the proportion of the population living in families whose family income is below certain threshold. In addition to the four variables mentioned above, five other indicators are used to measure the economic well-being of a county (CRD, IBRC, and SDG Inc 2007). These include: average annual change since 2001 for the four indicators mentioned above, plus change in total covered employment from 2001 to 2005. Table 2.3.1 summarizes the nine economic indicators that are used to measure the economic performance. As indicated in table 2.3.1, GCEDD counties differ significantly in terms of economic well-being. For example, percentage change in total covered employment had a minimum of -5.3% and a maximum of 21.2%, indicating that within the region, some counties are experiencing significant employment growth, whereas some of them are experiencing employment reduction. These economic indicators are used to define the economic condition of the counties based on two dimensions. The first dimension defines the base year economic situation as poor, medium, or good. The three categories are defined by deviation from the average by at least half a standard deviation for at least three of the four baseline variables (CRD,

IBRC, and SDG Inc. 2007). For example, a county whose median household income and average wage exceed the respective means by at least half a standard deviation and whose unemployment rate is smaller than the average minus half a standard deviation is classified as having a good economic situation.

Table 2.3.1 Summary Statistics of Economic Variables

Economic Indicator	Mean	STD	Min	Max
Poverty Rate (2001)	17.67%	5.94%	7.50%	22.00%
Median Household Income (2001)	$33,057.80	$7,869.40	$31,093.00	$67,333.00
Unemployment Rate(2001)	5.02%	1.89%	3.90%	7.70%
Average Wage (2001)	$25,642.58	$5,021.51	$24,120.00	$43,751.00
Percentage Change in Median Household Income (2001-2005)	7.06%	4.46%	0.91%	15.38%
Percentage Point Change in Poverty Rate (2001-2005)	0.12	0.07	0.03	0.29
Percentage Change in Employment (2001-2005)	6.80%	6.90%	-5.33%	21.24%
Percentage Point Change in Unemployment Rate (2001-2005)	0.15	0.10	0.05	0.36
Percentage Change in Average Wage (2001-2005)	11.51%	4.46%	4.54%	19.31%

The second dimension defines the relative trend in economic change over time as downward, stable, or upward. These categories are defined using five variables that measure economic change. They are measured as deviation from the average by more than half a standard deviation for at least three of the five variables (CRD, IBRC, and SDG Inc. 2007). For example, a county with employment and income growth smaller than the average by more than half a standard deviation and whose poverty rate increases by more than average plus half a standard deviation is considered to be experiencing a downward trend in economic condition. Combining the two dimensions results in nine different types of economic performances represented in table 2.3.2. Of the thirteen counties in the region, only Matagorda County is indicating a downward trend in economic performance, although its baseline economic situation is medium. On the other

hand, Fort Bend County, whose baseline line economic situation is good, indicates an upward trend in economic growth. The economic performance analysis indicates that most of the counties in the region with the exception of Matagorda County are performing well.

Table 2.3.2. Distribution of GCEDD Counties Across Nine Types of Economic Performance

	Downward	Stable	Upward
Poor	-	-	-
Medium	Matagorda	Liberty, Waller, Wharton	Colorado, Walker
Good	-	Austin, Brazoria, Chambers, Galveston, Harris, Montgomery	Fort Bend

2.4 Top Industry Employers

This section discusses top industry employers in each county based on the six digit North American Industry Classification System (NAICS) codes, indicating the regional industry structure. Tables 2.4.1 to 2.4.14 shows top 20 industry employers[4] for the region and each of the thirteen counties, respectively. The data for this section comes from US Census Bureau's County Business Pattern. Most of the major employers belonging to the top five industry employers for the GCEDD region are: 1. Corporate, subsidiary, and regional managing offices (81,000), 2. Full-service restaurants (76,000), 3. General, medical and surgical hospitals (70,000), 4. Limited-Service Restaurants (66,000), and 5. Temporary help services (54,000).

Footnote: [4]Mean employment was calculated for the data points, where County Business Patterns provides a range of employment instead of the actual number.

Table 2.4.1. Top 20 Industries in GCEDD Region			
NAICS	**Industry Title**	**Employment**	**Establishments**
551114	Corporate, Subsidiary, and Regional Managing Offices	80833	919
722110	Full-Service Restaurants	76373	3000
622110	General Medical and Surgical Hospitals	69664	75
722211	Limited-Service Restaurants	65563	3399
561320	Temporary Help Services	53704	645
445110	Supermarkets and Other Grocery (except Convenience) Stores	37921	1079
621111	Offices of Physicians (except Mental Health Specialists)	34168	4047
541330	Engineering Services	33120	1538
813110	Religious Organizations	30663	2214
621610	Home Health Care Services	27108	556
561720	Janitorial Services	25440	561
522110	Commercial Banking	25348	1205
541110	Offices of Lawyers	23303	3399
452910	Warehouse Clubs and Supercenters	22898	70
441110	New Car Dealers	20805	297
721110	Hotels (except Casino Hotels) and Motels	19832	700
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	19035	32
238220	Plumbing, Heating, and Air-Conditioning Contractors	18731	1267
541710	Research and Development in the Physical, Engineering, and Life Sciences	18561	240
481111	Scheduled Passenger Air Transportation	17499	55

Table 2.4.2. Top 20 Industries in Austin County			
NAICS	**Industry Title**	**Employment**	**Establishments**
238320	Painting and Wall Covering Contractors	749	7
336112	Light Truck and Utility Vehicle Manufacturing	749	1
722211	Limited-Service Restaurants	374	18
445110	Supermarkets and Other Grocery (except Convenience) Stores	203	6
322211	Corrugated and Solid Fiber Box Manufacturing	174	1
327121	Brick and Structural Clay Tile Manufacturing	174	1
327390	Other Concrete Product Manufacturing	174	3
331210	Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	174	1
424690	Other Chemical and Allied Products Merchant Wholesalers	174	2
452112	Discount Department Stores	174	1
622110	General Medical and Surgical Hospitals	174	1
623110	Nursing Care Facilities	174	2
522110	Commercial Banking	168	8
722110	Full-Service Restaurants	137	13
447190	Other Gasoline Stations	129	10
441110	New Car Dealers	115	5
813110	Religious Organizations	113	19
444220	Nursery, Garden Center, and Farm Supply Stores	109	7
237990	Other Heavy and Civil Engineering Construction	101	3
713910	Golf Courses and Country Clubs	82	3

Table 2.4.3. Top 20 Industries in Brazoria County			
NAICS	**Industry Title**	**Employment**	**Establishments**
325211	Plastics Material and Resin Manufacturing	3749	7
722211	Limited-Service Restaurants	2934	149
722110	Full-Service Restaurants	2519	131
238220	Plumbing, Heating, and Air-Conditioning Contractors	2471	74
561320	Temporary Help Services	2037	16
238210	Electrical Contractors	1749	51
238290	Other Building Equipment Contractors	1749	5
324110	Petroleum Refineries	1749	3
325199	All Other Basic Organic Chemical Manufacturing	1749	4
452910	Warehouse Clubs and Supercenters	1749	6
813110	Religious Organizations	1417	144
445110	Supermarkets and Other Grocery (except Convenience) Stores	1414	33
561720	Janitorial Services	1092	15
624410	Child Day Care Services	1032	77
623110	Nursing Care Facilities	969	12
236220	Commercial and Institutional Building Construction	925	27
622110	General Medical and Surgical Hospitals	920	3
238990	All Other Specialty Trade Contractors	806	17
522110	Commercial Banking	796	69
325110	Petrochemical Manufacturing	749	3

Table 2.4.3. Top 20 Industries in Chambers County			
NAICS	**Industry Title**	**Employment**	**Establishments**
211112	Natural Gas Liquid Extraction	374	4
325211	Plastics Material and Resin Manufacturing	374	1
722211	Limited-Service Restaurants	374	16
722110	Full-Service Restaurants	276	13
332996	Fabricated Pipe and Pipe Fitting Manufacturing	174	2
623110	Nursing Care Facilities	174	2
711212	Racetracks	174	1
811118	Other Automotive Mechanical and Electrical Repair and Maintenance	174	1
447110	Gasoline Stations with Convenience Stores	111	12
813110	Religious Organizations	107	15
237120	Oil and Gas Pipeline and Related Structures Construction	104	4
445110	Supermarkets and Other Grocery (except Convenience) Stores	97	8
522110	Commercial Banking	92	5
624410	Child Day Care Services	88	8
441110	New Car Dealers	72	3
424460	Fish and Seafood Merchant Wholesalers	65	4
486910	Pipeline Transportation of Refined Petroleum Products	60	4
114112	Shellfish Fishing	59	2
213112	Support Activities for Oil and Gas Operations	59	9
221112	Fossil Fuel Electric Power Generation	59	1

Table 2.4.5. Top 20 Industries in Colorado County			
NAICS	**Industry Title**	**Employment**	**Establishments**
622110	General Medical and Surgical Hospitals	380	3
722211	Limited-Service Restaurants	374	19
623110	Nursing Care Facilities	303	4
722110	Full-Service Restaurants	213	14
327331	Concrete Block and Brick Manufacturing	186	3
213112	Support Activities for Oil and Gas Operations	182	7
339991	Gasket, Packing, and Sealing Device Manufacturing	174	1
522110	Commercial Banking	174	9
236220	Commercial and Institutional Building Construction	173	6
445110	Supermarkets and Other Grocery (except Convenience) Stores	163	9
447110	Gasoline Stations with Convenience Stores	157	14
813110	Religious Organizations	116	20
441110	New Car Dealers	109	3
621111	Offices of Physicians (except Mental Health Specialists)	72	9
212321	Construction Sand and Gravel Mining	59	4
212322	Industrial Sand Mining	59	2
237110	Water and Sewer Line and Related Structures Construction	59	4
238110	Poured Concrete Foundation and Structure Contractors	59	2
238150	Glass and Glazing Contractors	59	1
238220	Plumbing, Heating, and Air-Conditioning Contractors	59	8

Table 2.4.6. Top 20 Industries in Fort Bend County			
NAICS	**Industry Title**	**Employment**	**Establishments**
722110	Full-Service Restaurants	5221	186
722211	Limited-Service Restaurants	4786	253
452910	Warehouse Clubs and Supercenters	3749	9
551114	Corporate, Subsidiary, and Regional Managing Offices	3680	41
445110	Supermarkets and Other Grocery (except Convenience) Stores	2537	75
541330	Engineering Services	2512	92
813110	Religious Organizations	1993	148
622110	General Medical and Surgical Hospitals	1869	5
334413	Semiconductor and Related Device Manufacturing	1749	4
624410	Child Day Care Services	1640	127
621111	Offices of Physicians (except Mental Health Specialists)	1459	273
561320	Temporary Help Services	1262	26
448140	Family Clothing Stores	1160	32
441110	New Car Dealers	1092	19
713910	Golf Courses and Country Clubs	1022	15
522110	Commercial Banking	986	87
237310	Highway, Street, and Bridge Construction	969	11
561730	Landscaping Services	930	93
621210	Offices of Dentists	909	150
446110	Pharmacies and Drug Stores	848	40

Table 2.4.7. Top 20 Industries in Galveston County			
NAICS	**Industry Title**	**Employment**	**Establishments**
622110	General Medical and Surgical Hospitals	7499	2
722110	Full-Service Restaurants	5241	185
722211	Limited-Service Restaurants	3931	179
324110	Petroleum Refineries	1749	6
452910	Warehouse Clubs and Supercenters	1749	5
524113	Direct Life Insurance Carriers	1749	5
445110	Supermarkets and Other Grocery (except Convenience) Stores	1743	49
813110	Religious Organizations	1474	137
721110	Hotels (except Casino Hotels) and Motels	1441	60
621610	Home Health Care Services	1349	20
623110	Nursing Care Facilities	1221	12
624410	Child Day Care Services	1013	78
522110	Commercial Banking	1001	63
325199	All Other Basic Organic Chemical Manufacturing	761	4
452111	Department Stores (except Discount Department Stores)	749	5
712130	Zoos and Botanical Gardens	749	2
441110	New Car Dealers	733	14
447110	Gasoline Stations with Convenience Stores	691	131
621111	Offices of Physicians (except Mental Health Specialists)	667	112
551114	Corporate, Subsidiary, and Regional Managing Offices	612	23

Table 2.4.8. Top 20 Industries in Harris County			
NAICS	**Industry Title**	**Employment**	**Establishments**
551114	Corporate, Subsidiary, and Regional Managing Offices	68754	784
722110	Full-Service Restaurants	55167	2138
622110	General Medical and Surgical Hospitals	52768	47
561320	Temporary Help Services	47849	561
722211	Limited-Service Restaurants	44987	2399
541330	Engineering Services	29646	1263
621111	Offices of Physicians (except Mental Health Specialists)	28380	3198
445110	Supermarkets and Other Grocery (except Convenience) Stores	27088	801
561720	Janitorial Services	23036	433
621610	Home Health Care Services	23009	462
813110	Religious Organizations	21504	1388
541110	Offices of Lawyers	21370	2877
522110	Commercial Banking	19994	803
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	18487	28
481111	Scheduled Passenger Air Transportation	17499	55
541710	Research and Development in the Physical, Engineering, and Life Sciences	17499	193
441110	New Car Dealers	16124	202
611310	Colleges, Universities, and Professional Schools	15576	26
721110	Hotels (except Casino Hotels) and Motels	15233	490
238220	Plumbing, Heating, and Air-Conditioning Contractors	13981	821

Table 2.4.9. Top 20 Industries in Liberty County			
NAICS	**Industry Title**	**Employment**	**Establishments**
722211	Limited-Service Restaurants	866	35
321113	Sawmills	749	2
452910	Warehouse Clubs and Supercenters	749	2
445110	Supermarkets and Other Grocery (except Convenience) Stores	548	18
813110	Religious Organizations	420	58
621610	Home Health Care Services	374	2
622110	General Medical and Surgical Hospitals	374	2
484220	Specialized Freight (except Used Goods) Trucking, Local	357	14
623110	Nursing Care Facilities	331	5
722110	Full-Service Restaurants	274	24
621111	Offices of Physicians (except Mental Health Specialists)	271	36
522110	Commercial Banking	206	10
441110	New Car Dealers	196	9
237120	Oil and Gas Pipeline and Related Structures Construction	176	6
331222	Steel Wire Drawing	174	1
446110	Pharmacies and Drug Stores	174	8
447110	Gasoline Stations with Convenience Stores	174	34
452112	Discount Department Stores	174	2
488210	Support Activities for Rail Transportation	174	2
561210	Facilities Support Services	174	1

Table 2.4.10. Top 20 Industries in Matagorda County			
NAICS	**Industry Title**	**Employment**	**Establishments**
221113	Nuclear Electric Power Generation	1749	1
722110	Full-Service Restaurants	418	28
722211	Limited-Service Restaurants	397	22
622110	General Medical and Surgical Hospitals	374	2
445110	Supermarkets and Other Grocery (except Convenience) Stores	283	7
813110	Religious Organizations	227	35
325211	Plastics Material and Resin Manufacturing	174	1
447110	Gasoline Stations with Convenience Stores	174	27
452112	Discount Department Stores	174	1
532412	Construction, Mining, and Forestry Machinery and Equipment Rental and Leasing	174	1
561612	Security Guards and Patrol Services	174	1
621111	Offices of Physicians (except Mental Health Specialists)	174	22
621610	Home Health Care Services	174	2
623110	Nursing Care Facilities	174	2
522110	Commercial Banking	101	7
624410	Child Day Care Services	81	7
811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	81	9
441110	New Car Dealers	63	3
441310	Automotive Parts and Accessories Stores	60	7
115112	Soil Preparation, Planting, and Cultivating	59	6

Table 2.4.11. Top 20 Industries in Montgomery County			
NAICS	**Industry Title**	**Employment**	**Establishments**
551114	Corporate, Subsidiary, and Regional Managing Offices	5775	46
722110	Full-Service Restaurants	5543	178
722211	Limited-Service Restaurants	4733	223
622110	General Medical and Surgical Hospitals	3749	4
445110	Supermarkets and Other Grocery (except Convenience) Stores	2757	47
813110	Religious Organizations	2521	151
541611	Administrative Management and General Management Consulting Services	2115	78
561320	Temporary Help Services	2063	26
721110	Hotels (except Casino Hotels) and Motels	1929	34
333132	Oil and Gas Field Machinery and Equipment Manufacturing	1749	13
452910	Warehouse Clubs and Supercenters	1749	6
541214	Payroll Services	1749	12
621111	Offices of Physicians (except Mental Health Specialists)	1743	223
624410	Child Day Care Services	1192	83
522110	Commercial Banking	1185	103
452111	Department Stores (except Discount Department Stores)	880	6
621210	Offices of Dentists	860	131
441110	New Car Dealers	859	12
448140	Family Clothing Stores	814	34
713940	Fitness and Recreational Sports Centers	805	35

Table 2.4.12. Top 20 Industries in Walker County			
NAICS	**Industry Title**	**Employment**	**Establishments**
722110	Full-Service Restaurants	780	40
622110	General Medical and Surgical Hospitals	749	2
722211	Limited-Service Restaurants	544	27
452910	Warehouse Clubs and Supercenters	374	1
611519	Other Technical and Trade Schools	374	1
813110	Religious Organizations	371	33
623110	Nursing Care Facilities	347	4
621610	Home Health Care Services	322	4
445110	Supermarkets and Other Grocery (except Convenience) Stores	311	9
621111	Offices of Physicians (except Mental Health Specialists)	296	25
561110	Office Administrative Services	196	15
447110	Gasoline Stations with Convenience Stores	175	32
321114	Wood Preservation	174	1
333132	Oil and Gas Field Machinery and Equipment Manufacturing	174	4
423830	Industrial Machinery and Equipment Merchant Wholesalers	174	4
441110	New Car Dealers	174	3
444110	Home Centers	174	2
551112	Offices of Other Holding Companies	174	1
722310	Food Service Contractors	174	2
522110	Commercial Banking	167	9

Table 2.4.13. Top 20 Industries in Waller County			
NAICS	**Industry Title**	**Employment**	**Establishments**
551114	Corporate, Subsidiary, and Regional Managing Offices	1749	5
722211	Limited-Service Restaurants	721	33
236220	Commercial and Institutional Building Construction	374	6
441110	New Car Dealers	374	5
445110	Supermarkets and Other Grocery (except Convenience) Stores	374	10
623210	Residential Mental Retardation Facilities	374	2
611110	Elementary and Secondary Schools	326	6
722110	Full-Service Restaurants	314	19
624410	Child Day Care Services	236	17
441210	Recreational Vehicle Dealers	216	3
722310	Food Service Contractors	182	4
332312	Fabricated Structural Metal Manufacturing	174	3
332710	Machine Shops	174	8
333132	Oil and Gas Field Machinery and Equipment Manufacturing	174	4
333911	Pump and Pumping Equipment Manufacturing	174	1
333995	Fluid Power Cylinder and Actuator Manufacturing	174	2
441120	Used Car Dealers	174	2
446110	Pharmacies and Drug Stores	174	5
447110	Gasoline Stations with Convenience Stores	174	33
452112	Discount Department Stores	174	1

Table 2.4.14. Top 20 Industries in Wharton County			
NAICS	**Industry Title**	**Employment**	**Establishments**
337110	Wood Kitchen Cabinet and Countertop Manufacturing	749	2
622110	General Medical and Surgical Hospitals	749	2
722211	Limited-Service Restaurants	542	26
621610	Home Health Care Services	523	4
445110	Supermarkets and Other Grocery (except Convenience) Stores	403	7
623110	Nursing Care Facilities	392	4
326113	Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing	374	1
452112	Discount Department Stores	374	2
522110	Commercial Banking	331	17
621111	Offices of Physicians (except Mental Health Specialists)	302	9
722110	Full-Service Restaurants	270	31
813110	Religious Organizations	231	44
423820	Farm and Garden Machinery and Equipment Merchant Wholesalers	199	9
484220	Specialized Freight (except Used Goods) Trucking, Local	181	22
213112	Support Activities for Oil and Gas Operations	174	14
237120	Oil and Gas Pipeline and Related Structures Construction	174	2
315231	Womens and Girls Cut and Sew Lingerie, Loungewear, and Nightwear Manufacturing	174	1
326122	Plastics Pipe and Pipe Fitting Manufacturing	174	1
326140	Polystyrene Foam Product Manufacturing	174	1
339920	Sporting and Athletic Goods Manufacturing	174	2

2.5 Gross Regional Product:

The gross domestic product (GDP) is the most widely used measure of economic activity in a country and is used as a proxy for standard of living. GDP is defined as the total market value of all goods and services produced within a country in a given period of time. The GDP components include personal consumption, government expenditures, private investment, inventory growth, and trade balance. On September 26, 2007, the Bureau of Economic Analysis (BEA) introduced prototype estimates of GDP by metropolitan area (GMP). The prototype estimates are based on county earnings by industry estimates from BEA's local area personal income accounts and on the Gross State Product (GSP) (BEA 2007). The GMP are basically the sum of gross county product (GCP) controlled by GSP estimates. The BEA's formula for calculating GMP is as follows (BEA 2006):

$$GMP_{i,m,yr} = \sum_{co=1}^{N} \left(\frac{GSP_{i,st,yr}}{Earnings_{i,st,yr}} \times Earnings_{i,co,yr} \right)$$

N = number of counties in MSA

i=industry; m=metropolitan area; yr=year; co=county; st=state;

The latest year for which GMP estimates are available is 2005. However, the GMP estimates are not disclosed for all the industries, because of confidentiality issues. BEA's current-dollar GMP estimate for the Houston-Sugar Land-Baytown MSA was $316,332 millions of dollars (in current dollars). This study estimated the gross county product (GCP) for each of the thirteen counties, which were later used to calculate the GMP estimate for the Houston-Sugar Land –Baytown MSA and the gross regional product (GRP) estimate for the GCEDD region. The missing data for county-level earnings for

some industries was estimated using the imputation procedures. The estimated current-dollar GRP and GMP are presented in Table 2.5.1, along with industry-level state GDP. The estimated GMP for the Houston MSA was $312,735 millions of current dollars, which was close to the BEA's GMP estimate. The mining industry (Energy Industry) accounted for 19% of the total Houston's GMP, followed by manufacturing industry accounting for 13%. The Gross Regional Product (GRP) for the GCEDD region was estimated to be $316,120 millions of dollars, which accounts for 32% of Texas GSP. Table 2.5.2. presents GCP by industry for all the thirteen counties in the GCEDD region. Harris County accounts for 87% of GCEDD region's GRP, followed by Fort Bend and Montgomery County with 4% and 3%, respectively.

Table 2.5.1. Gross Domestic Product Estimates (Millions of Current Dollars) for 2005

Industry Sector	TX_GSP_05	HGAC_GRP_05	HMSA_GMP_05
Farm earnings	$6,899	$322	$173
Forestry, fishing, related activities, and other	$1,573	$173	$125
Mining	$97,710	$59,090	$58,905
Utilities	$31,147	$18,938	$18,828
Construction	$51,586	$17,591	$17,469
Manufacturing	$127,435	$40,035	$39,709
Wholesale trade	$65,648	$19,940	$19,812
Retail trade	$63,344	$14,621	$14,336
Transportation and warehousing	$32,363	$12,253	$12,132
Information	$40,274	$6,231	$6,195
Finance and insurance	$53,849	$13,660	$13,564
Real estate and rental and leasing	$91,433	$25,536	$25,375
Professional and technical services	$61,892	$23,219	$23,160
Management of companies and enterprises	$14,768	$5,158	$5,041
Administrative and waste services	$29,170	$9,443	$9,381
Educational services	$5,330	$1,974	$1,929
Health care and social assistance	$57,843	$12,996	$12,764
Arts, entertainment, and recreation	$5,581	$1,659	$1,650
Accommodation and food services	$23,735	$5,630	$5,543
Other services, except public administration	$20,695	$5,416	$5,318
Government and government enterprises	$107,056	$22,235	$21,326

Table 2.5.2. Gross County Product (millions of current dollars) by Industry in 2005.

Industry	Austin	Brazoria	Chambers	Colorado	Fort Bend	Galveston	Harris	Liberty	Matagorda	Montgomery	Walker	Waller	Wharton	Region
Farm earnings	-$1	$14	$8	$15	$97	-$3	$48	-$4	$52	$18	-$1	-$9	$90	$322
Forestry, fishing, related activities, and other	$3	$7	$4	$5	$11	$9	$63	$12	$19	$10	$5	$2	$22	$173
Mining	$11	$191	$120	$23	$1,597	$117	$56,125	$73	$22	$652	$7	$18	$135	$59,090
Utilities	$13	$58	$24	$3	$254	$73	$18,260	$9	$86	$106	$10	$24	$20	$18,938
Construction	$73	$930	$31	$41	$1,421	$382	$13,612	$69	$31	$890	$26	$49	$37	$17,591
Manufacturing	$203	$2,015	$212	$59	$2,015	$1,156	$32,712	$355	$65	$825	$82	$213	$122	$40,035
Wholesale trade	$42	$207	$43	$21	$717	$208	$17,916	$36	$15	$562	$31	$75	$67	$19,940
Retail trade	$74	$531	$45	$39	$817	$489	$11,169	$141	$54	$903	$104	$156	$100	$14,621
Transportation and warehousing	$18	$172	$35	$27	$155	$168	$11,319	$46	$51	$194	$14	$20	$32	$12,253
Information	$10	$60	$3	$4	$286	$108	$5,576	$16	$7	$130	$21	$5	$7	$6,231
Finance and insurance	$20	$133	$11	$19	$526	$378	$12,031	$30	$16	$422	$23	$10	$42	$13,660
Real estate and rental and leasing	$36	$455	$36	$29	$838	$482	$21,783	$178	$44	$1,524	$54	$27	$51	$25,536
Professional and technical services	$52	$296	$53	$8	$612	$296	$21,127	$14	$15	$682	$20	$20	$23	$23,219
Management of companies and enterprises	$6	$7	$12	$3	$15	$24	$4,806	$34	$87	$137	$7	$0	$19	$5,158
Administrative and waste services	$20	$167	$13	$4	$370	$132	$8,239	$22	$34	$411	$12	$5	$16	$9,443
Educational services	$4	$16	$5	$1	$43	$29	$1,790	$2	$34	$38	$3	$1	$8	$1,974
Health care and social assistance	$18	$267	$13	$39	$501	$346	$10,885	$97	$65	$610	$80	$23	$52	$12,996
Arts, entertainment, and recreation	$3	$25	$5	$4	$81	$76	$1,396	$2	$2	$58	$3	$4	$2	$1,659
Accommodation and food services	$13	$132	$13	$13	$234	$294	$4,465	$24	$19	$350	$38	$15	$20	$5,630
Other services, except public administration	$17	$203	$27	$14	$337	$204	$4,142	$47	$35	$316	$31	$16	$28	$5,416
Government and government enterprises	$77	$802	$82	$51	$1,142	$1,760	$16,233	$206	$119	$791	$647	$192	$134	$22,235
Total	$711	$6,689	$791	$421	$12,068	$6,730	$273,697	$1,407	$871	$9,629	$1,215	$865	$1,027	$316,121

The following chapter uses regional economic development tools such as location quotient, economic base model, and shift-share analysis to discuss the regional industry structure. The chapter focuses on assessing the industry cluster performance in each of the thirteen counties.

CHAPTER III

Industry Cluster Analysis Using Economic Development Tools

3.1 Introduction

Regional economic analysis can help local government agencies understand the industry cluster structure of their local economy, monitor the economic growth rate, interpret local and national trends, and forecast the impact of current policies on future growth (Quintero, 2007). The regional economic models, such as location quotient, shift-share analysis, and economic base models, are widely used by local and economic development agencies in industrial targeting, economic impact analysis, and regional comparisons (Dinc 2002). Industry cluster analysis, which utilizes the regional economic tools in assessing industry clusters, aids in directing limited resources available for business retention and attraction. The economic development tools utilized in the study are Location Quotient, Economic Base Model, and Shift-Share Analysis. These tools complement each other and together they can furnish necessary information to local economic development agencies in developing policies for business retention and attraction. Location quotient identifies strength and weakness in a local economy with respect to industry clusters. Export-oriented industry clusters, which are considered to be the drivers of local economy, are identified using the economic base model. Finally, the shift-share analysis measure performance of local economy with respect to the national trends. Industry clusters identified in this report are adopted from a study conducted at Purdue University by Purdue Center for Regional Development, Indiana Business Research Center, and Strategic Development Group Inc. in 2007.The study identified 17 industry clusters based on six-digit NAICS codes, which include Manufacturing Supercluster disaggregated into six sub clusters. This yielded a total of 17

clusters and six sub clusters. The list of clusters is presented in Table 3.1.1, the detailed composition is included in the Appendix.

Table 3.1.1 List of Industry Clusters

1	Advanced Materials
2	Agribusiness, Food Processing & Technology
3	Apparel & Textiles
4	Arts, Entertainment, Recreation & Visitor Industries
5	Biomedical/Biotechnical (Life Sciences)
6	Business & Financial Services Cluster
7	Chemicals & Chemical Based Products
8	Defense & Security
9	Education & Knowledge Creation
10	Energy (Fossil & Renewable)
11	Forest & Wood Products
12	Glass & Ceramics
13	Information Technology & Telecommunications
14	Transportation & Logistics
15	MANUFACTURING SUPERCLUSTER
	Primary Metal Mfg
	Fabricated Metal Product Mfg
	Machinery Mfg
	Computer & Electronic Product Mfg
	Electrical Equipment, Appliance & Component Mfg
	Transportation Equipment Mfg
16	Mining (**Non-Energy**)
17	Printing & Publishing

Source: Purdue CRD, IBRC, and SDG Inc. 2007

3.2 Location Quotient:

The location quotient (LQ) is defined as the ratio of industry cluster's share of the local economy and the share of the nation, or the state, or the region. This study compares the local economy (GCEDD region and each of the thirteen counties separately) with the state and the nation. Industry cluster employment is the most widely used variable in LQ analysis, even though it can be estimated using other variables, such as sales and income. LQ identifies dominant clusters in a given region. It can identify export-oriented clusters, which drive the local economy by bringing money into the region, rather than just circulating it.

LQ is calculated as follows:

$$LQ = \frac{E_i / E}{N_i / N}$$

where E_i represents regional employment in a given industry cluster *i*, *E* represents total regional employment, N_i represents national employment in a given industry cluster *i*, *N* represents total national employment. For example, industry cluster 'A' supplied 500 of the 2000 jobs in the region which means that cluster A represent 25% of the region's employment. By comparison, cluster 'A' in the nation employed 2,000 of the 20,000 jobs or 10% of the national employment. To calculate the LQ of cluster 'A' in a given region, divide the region's share of employment in that cluster by the nation's share of employment in that sector (25/10) and the LQ for cluster 'A' in the region was 2.5. LQ of greater than one indicates that the local economy is specialized in that industry and is likely exporting its products or services. A LQ equal to one indicates that a given industry cluster can serve only the local area. A value of less than one indicates that the product or service of that industry cluster must be imported in order to meet the local demand. For example, cluster 'B' in a given region had a LQ of 0.5 indicating that the region was importing good and services provided by cluster 'B' from the outside, since it is not meeting the local demand.

Change in LQ over a period of time is also considered to be a useful measure of local economic activity. It provides information on whether an industry cluster is growing or declining in concentration in a given region compared to other regions. Using beginning period LQ and change in LQ, regional industries can be grouped into four categories (Purdue CRD, IBRC, and SDG 2007):

Stars: clusters that are relatively more concentrated (LQ > 1) in the region compared to the reference area (nation/state) and becoming even more concentrated over time.

Emerging: clusters that are relatively less concentrated (LQ < 1) in the region compared to the reference area (nation/state), but becoming more concentrated over time.

Mature: clusters that are relatively more concentrated (LQ > 1) in the region compared to the reference area (nation/state), but becoming less concentrated over time.

Transforming: clusters that are relatively less concentrated (LQ < 1) in the region compared to the reference area (nation/state) and becoming even less concentrated over time.

All these categories, which represent regional cluster performance, are illustrated in bubble graph. The concept of LQ graph (bubble graph) for industry clusters is based on the work done at Purdue University (Purdue CRD, IBRC, and SDG 2007). The vertical axis indicates the end period LQ, while the horizontal axis shows the percent change of LQ over time. The LQ is increasing on the right-hand side of the graph and is decreasing on the left-hand side. Bubble size is proportional to industry cluster's relative employment within a given region/county. Clusters in the upper right quadrant are *star* clusters. These clusters are more concentrated in the region than average, and also are becoming more concentrated over time. The lower right quadrant contains *emerging* clusters. These are not as concentrated as they are at the national/state level, but are becoming more concentrated over a period of time. The upper left quadrant contains *mature* clusters. These are more concentrated in the region than average, but their concentration is declining. Finally, the lower left quadrant contains *transforming* clusters, which are less important regionally than nationally and are becoming less concentrated over time.

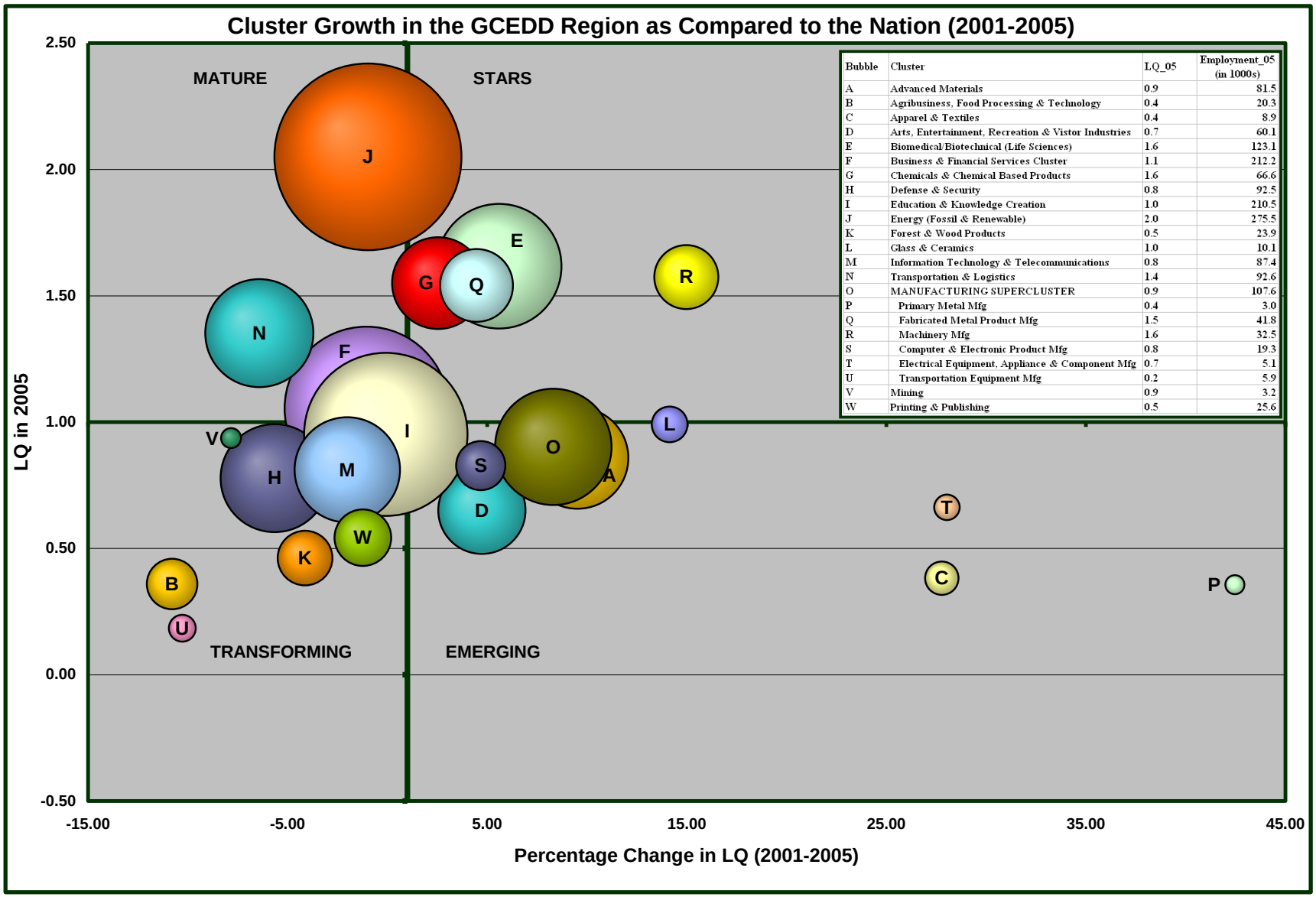
Cluster Performance: GCEDD vs Nation

Figure 3.2.1 illustrates industry cluster performance in the GCEDD region as compared to the Nation. The LQ analysis indicates that the Machinery manufacturing, Fabricated metal product manufacturing, Biomedical/biotechnical, and Chemical & chemical based products

clusters are the *star* clusters in the GCEDD region. These dominant clusters are becoming more concentrated. The Energy cluster, one of the driving forces of the local economy, is transforming from being a *star* to a *mature* cluster. The Manufacturing supercluster is moving from being an *emerging* cluster to a *star* cluster. Other clusters that are emerging and have a potential to be a future *star* cluster are: Glass and ceramics, Advanced materials, Computer & electronic product manufacturing, Arts, entertainment, recreation, & visitor industries, Apparel & textiles, Primary metal manufacturing, and Electronic equipment, appliance & component manufacturing. Industry clusters such as: Agribusiness, food processing & technology, Forest & wood products, Transportation equipment manufacturing, Printing and publishing, Defense and security, and Information technology and telecommunications are less concentrated in the region as compared to the nation, and are becoming less concentrated over a period of time. Transportation & Logistics and Mining (non-energy) industry clusters are moving from being a *mature* cluster to a *transforming* cluster.

Figure 3.2.2 illustrates the GCEDD region's cluster performance with respect to the state. The LQ analysis of regional industry clusters with respect to the state indicates that the Advanced materials, Machinery manufacturing, Chemical and chemical based products, Energy, and Electrical equipment, appliance & component manufacturing industry clusters, are the *star* clusters in the GCEDD region. These clusters are more concentrated in the GCEDD region as compared to the state, and are becoming more concentrated over a period of time. However, the Energy cluster was seen to be moving from being a *star* to a *mature* cluster. The regional Biotech cluster, which was a *star* cluster as compared to the nation, was found to be *mature* cluster when compared to the state, indicating that over a period of time the Biotech cluster in the GCEDD region is becoming less concentrated. Shift-share analysis that is presented later in this chapter

Figure 3.2.1. Industry Cluster Performance in the GCEDD Region as Compared to the Nation.



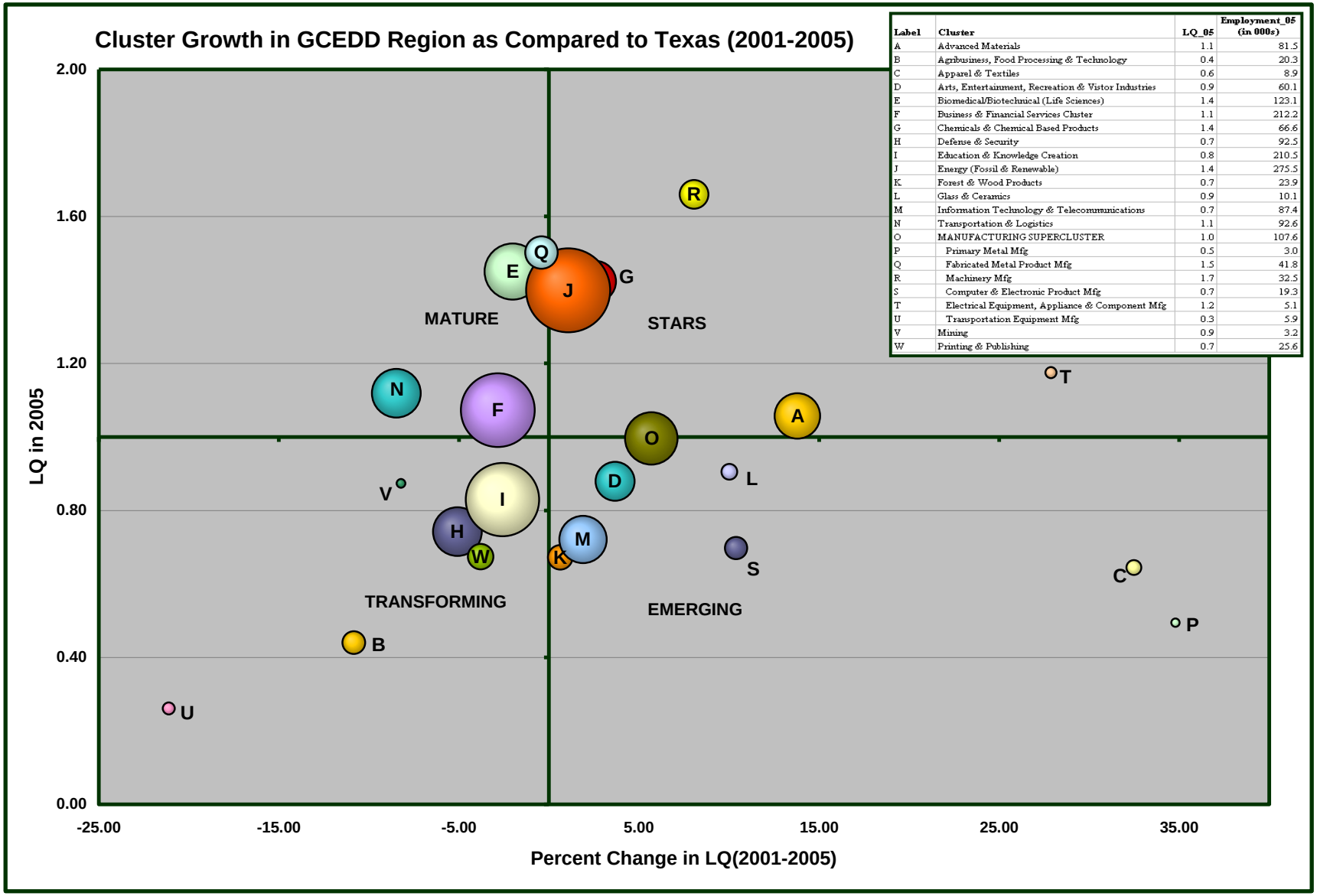
Bubble	Cluster	LQ_05	Employment_05 (in 1000s)
A	Advanced Materials	0.9	81.5
B	Agribusiness, Food Processing & Technology	0.4	20.3
C	Apparel & Textiles	0.4	8.9
D	Arts, Entertainment, Recreation & Vistor Industries	0.7	60.1
E	Biomedical/Biotechnical (Life Sciences)	1.6	123.1
F	Business & Financial Services Cluster	1.1	212.2
G	Chemicals & Chemical Based Products	1.6	66.6
H	Defense & Security	0.8	92.5
I	Education & Knowledge Creation	1.0	210.5
J	Energy (Fossil & Renewable)	2.0	275.5
K	Forest & Wood Products	0.5	23.9
L	Glass & Ceramics	1.0	10.1
M	Information Technology & Telecommunications	0.8	87.4
N	Transportation & Logistics	1.4	92.6
O	MANUFACTURING SUPERCLUSTER	0.9	107.6
P	Primary Metal Mfg	0.4	3.0
Q	Fabricated Metal Product Mfg	1.5	41.8
R	Machinery Mfg	1.6	32.5
S	Computer & Electronic Product Mfg	0.8	19.3
T	Electrical Equipment, Appliance & Component Mfg	0.7	5.1
U	Transportation Equipment Mfg	0.2	5.9
V	Mining	0.9	3.2
W	Printing & Publishing	0.5	25.6

provides further information regarding the decreasing concentration of Biotech cluster. Mainly, it will emphasize the influence of local economic conditions on the Biotech cluster growth.

The Manufacturing supercluster is moving from being an *emerging* cluster to a *star* cluster. Other clusters that are *emerging* and have a potential to be a future *star* cluster are: Glass and ceramics, Information technology and telecommunications, Computer & electronic product manufacturing, and Arts, entertainment, recreation, & visitor industries. Industry clusters such as: Education & knowledge creation, Agribusiness, food processing & technology, Transportation equipment manufacturing, Printing and publishing, and Defense and security, are considered to be less concentrated in the region as compared to the state, and are becoming less concentrated over a period of time. Transportation & logistics and Business and financial services clusters are moving from being a *mature* cluster to a *transforming* cluster.

Tables 3.2.1 to 3.2.13 present cluster performance of each of the thirteen counties in the GCEDD region as compared to the nation and the state. County-level industry cluster growth is also represented as bubble charts in figures 3.2.3-3.2.28. Among the thirteen counties, Fort Bend County had the highest number of *star* clusters (9) as compared to the nation, followed by Harris and Waller County with five each, and Chambers and Montgomery County each with four *star* clusters. Energy cluster was considered to concentrated (*star* cluster) in Chambers, Fort Bend, Harris, and Waller Counties and was found to be emerging in Colorado and Galveston counties. The Biotech cluster was found to be strong (*star* cluster) in Brazoria, Fort Bend, Harris, Liberty, Montgomery, and Walker counties. Matagorda and Wharton are the only two counties found to be specialized in Agribusiness, food processing & technology cluster. Within the GCEDD

Figure 3.2.2. Industry Cluster Performance in the GCEDD Region as Compared to the State



Label	Cluster	LQ_05	Employment_05 (in 000s)
A	Advanced Materials	1.1	81.5
B	Agribusiness, Food Processing & Technology	0.4	20.3
C	Apparel & Textiles	0.6	8.9
D	Arts, Entertainment, Recreation & Vistor Industries	0.9	60.1
E	Biomedical/Biotechnical (Life Sciences)	1.4	123.1
F	Business & Financial Services Cluster	1.1	212.2
G	Chemicals & Chemical Based Products	1.4	66.6
H	Defense & Security	0.7	92.5
I	Education & Knowledge Creation	0.8	210.5
J	Energy (Fossil & Renewable)	1.4	275.5
K	Forest & Wood Products	0.7	23.9
L	Glass & Ceramics	0.9	10.1
M	Information Technology & Telecommunications	0.7	87.4
N	Transportation & Logistics	1.1	92.6
O	MANUFACTURING SUPERCLUSTER	1.0	107.6
P	Primary Metal Mfg	0.5	3.0
Q	Fabricated Metal Product Mfg	1.5	41.8
R	Machinery Mfg	1.7	32.5
S	Computer & Electronic Product Mfg	0.7	19.3
T	Electrical Equipment, Appliance & Component Mfg	1.2	5.1
U	Transportation Equipment Mfg	0.3	5.9
V	Mining	0.9	3.2
W	Printing & Publishing	0.7	25.6

region, the Manufacturing supercluster was found to be concentrated in Fort Bend and Waller counties as compared to the nation.

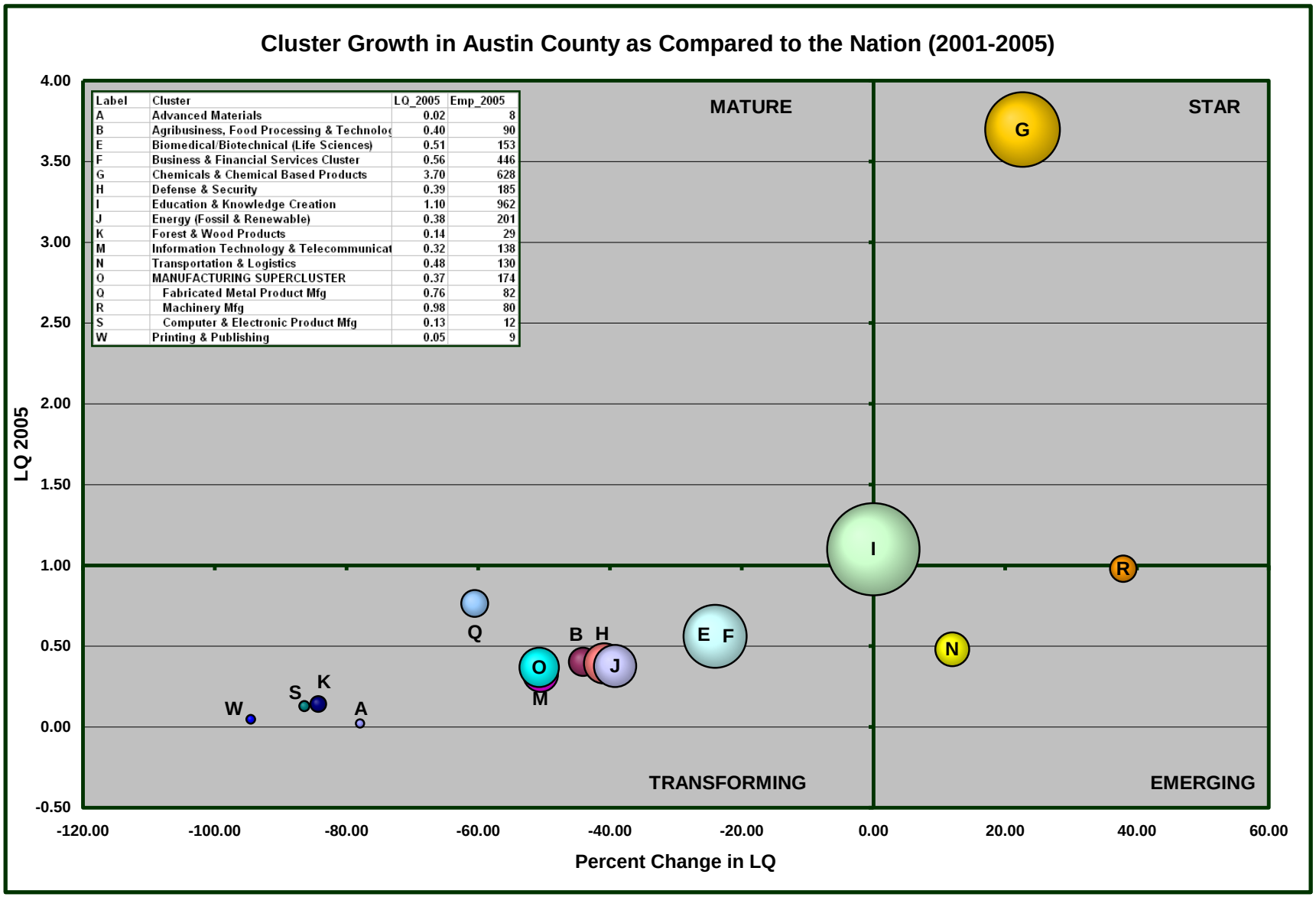
When compared to the state, again Fort Bend County had the highest number of star clusters (7), followed by Harris and Montgomery counties with six and five *star* clusters, respectively. As compared to the state, the Energy cluster was found to be dominant in Chambers and Harris County, while the Chemical and chemical based products cluster was found to be dominant in Austin, Colorado, Harris, Montgomery, and Waller counties. The Biotech cluster was found to be dominant in Brazoria, Fort Bend, Liberty and Montgomery counties. Fort Bend, Harris, and Waller counties are considered to be specialized in the Manufacturing supercluster as compared to the state. Again, within the region, only Matagorda and Wharton counties are found to be specialized in the Agribusiness cluster as compared to the state.

Table 3.2.1 Austin County Location Quotient Measures With Respect to US and Texas

	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials	0.10	0.02	-77.93	transforming	0.11	0.03	-77.07	transforming
Agribusiness, Food Processing & Technology	0.72	0.40	-44.10	transforming	0.89	0.49	-44.12	transforming
Arts, Entertainment, Recreation & Visitor Industries[1]	0.01	0.29	3140.40	emerging	0.01	0.39	3107.65	emerging
Biomedical/Biotechnical (Life Sciences)	0.67	0.51	-24.21	transforming	0.65	0.46	-29.67	transforming
Business & Financial Services Cluster	0.74	0.56	-24.06	transforming	0.76	0.57	-25.43	transforming
Chemicals & Chemical Based Products	3.02	3.70	22.61	stars	2.77	3.39	22.66	stars
Defense & Security	0.67	0.39	-40.90	transforming	0.63	0.38	-40.54	transforming
Education & Knowledge Creation	1.10	1.10	-0.01	mature	0.98	0.96	-2.51	transforming
Energy (Fossil & Renewable)	0.62	0.38	-39.23	transforming	0.42	0.26	-37.98	transforming
Forest & Wood Products	0.90	0.14	-84.28	transforming	1.25	0.21	-83.50	transforming
Glass & Ceramics[2]	0.00	7.33	-	stars	0.00	6.69	-	stars
Information Technology & Telecommunications	0.65	0.32	-50.55	transforming	0.56	0.29	-48.58	transforming
Transportation & Logistics	0.43	0.48	11.96	emerging	0.36	0.40	9.50	emerging
Manufacturing Supercluster	0.75	0.37	-50.74	transforming	0.85	0.41	-51.94	transforming
Fabricated Metal Product Mfg	1.94	0.76	-60.52	transforming	1.98	0.74	-62.37	transforming
Machinery Mfg	0.71	0.98	37.92	emerging	0.80	1.03	29.61	stars
Computer & Electronic Product Mfg	0.96	0.13	-86.40	transforming	0.76	0.11	-85.66	transforming
Printing & Publishing	0.88	0.05	-94.54	transforming	1.13	0.06	-94.68	transforming

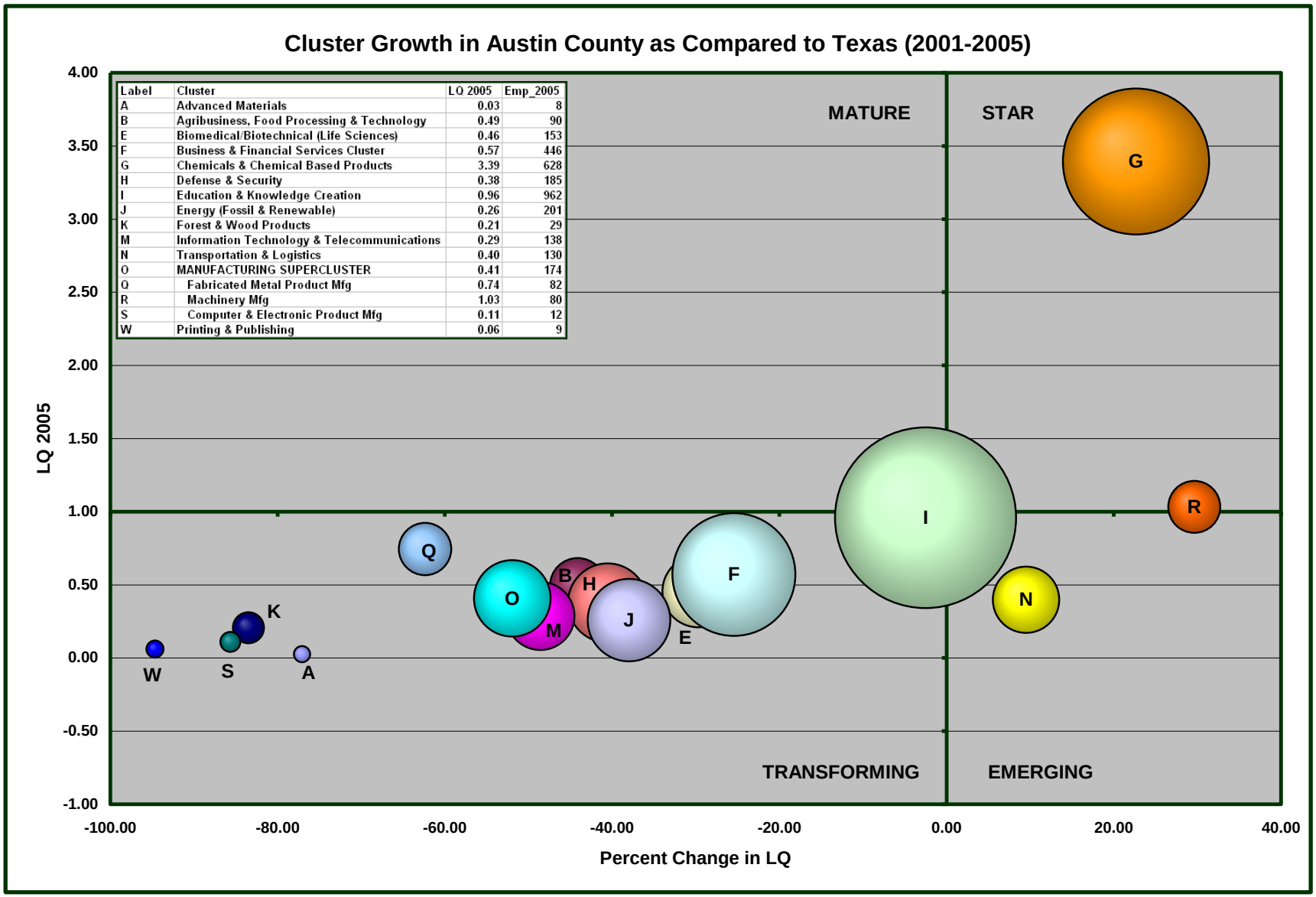
Note: [1] These clusters are not represented in bubble charts because of huge percentage change
[2]These clusters are not represented in bubble charts because percentage change cannot be calculated

Figure 3.2.3. Industry Cluster Performance in Austin County as Compared to the Nation.



Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	0.02	8
B	Agribusiness, Food Processing & Technolog	0.40	90
E	Biomedical/Biotechnical (Life Sciences)	0.51	153
F	Business & Financial Services Cluster	0.56	446
G	Chemicals & Chemical Based Products	3.70	628
H	Defense & Security	0.39	185
I	Education & Knowledge Creation	1.10	962
J	Energy (Fossil & Renewable)	0.38	201
K	Forest & Wood Products	0.14	29
M	Information Technology & Telecommunicat	0.32	138
N	Transportation & Logistics	0.48	130
O	MANUFACTURING SUPERCLUSTER	0.37	174
Q	Fabricated Metal Product Mfg	0.76	82
R	Machinery Mfg	0.98	80
S	Computer & Electronic Product Mfg	0.13	12
W	Printing & Publishing	0.05	9

Figure 3.2.4. Industry Cluster Performance in Austin County as Compared to the State.



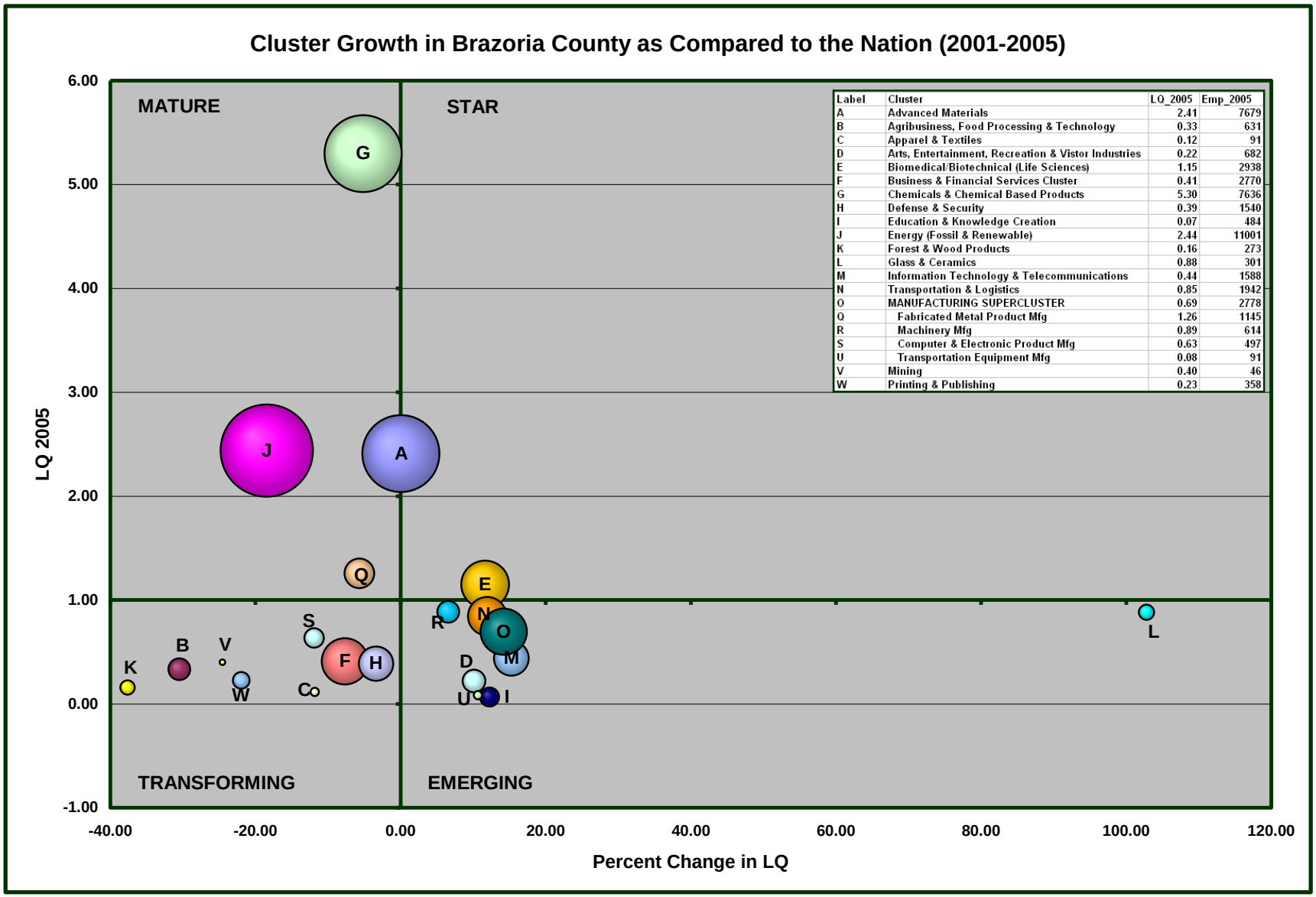
Label	Cluster	LQ 2005	Emp_2005
A	Advanced Materials	0.03	8
B	Agribusiness, Food Processing & Technology	0.49	90
E	Biomedical/Biotechnical (Life Sciences)	0.46	153
F	Business & Financial Services Cluster	0.57	446
G	Chemicals & Chemical Based Products	3.39	628
H	Defense & Security	0.38	185
I	Education & Knowledge Creation	0.96	962
J	Energy (Fossil & Renewable)	0.26	201
K	Forest & Wood Products	0.21	29
M	Information Technology & Telecommunications	0.29	138
N	Transportation & Logistics	0.40	130
O	MANUFACTURING SUPERCLUSTER	0.41	174
Q	Fabricated Metal Product Mfg	0.74	82
R	Machinery Mfg	1.03	80
S	Computer & Electronic Product Mfg	0.11	12
W	Printing & Publishing	0.06	9

Table 3.2.2. Brazoria County Location Quotient Measures With Respect to US and Texas

	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials	2.41	2.41	0.04	stars	2.86	2.97	3.93	stars
Agribusiness, Food Processing & Technology	0.48	0.33	-30.50	transforming	0.59	0.41	-30.53	transforming
Apparel & Textiles	0.13	0.12	-11.83	transforming	0.21	0.20	-8.58	transforming
Arts, Entertainment, Recreation & Visitor Industries	0.20	0.22	10.13	emerging	0.27	0.30	9.02	emerging
Biomedical/Biotechnical (Life Sciences)	1.03	1.15	11.66	stars	1.00	1.03	3.62	stars
Business & Financial Services Cluster	0.44	0.41	-7.67	transforming	0.46	0.42	-9.34	transforming
Chemicals & Chemical Based Products	5.59	5.30	-5.18	mature	5.13	4.86	-5.14	mature
Defense & Security	0.40	0.39	-3.38	transforming	0.38	0.37	-2.80	transforming
Education & Knowledge Creation	0.06	0.07	12.25	emerging	0.05	0.06	9.44	emerging
Energy (Fossil & Renewable)	2.99	2.44	-18.46	mature	2.00	1.66	-16.78	mature
Forest & Wood Products	0.25	0.16	-37.63	transforming	0.35	0.23	-34.54	transforming
Glass & Ceramics	0.43	0.88	102.79	emerging	0.41	0.80	95.46	emerging
Information Technology & Telecommunications	0.38	0.44	15.28	emerging	0.33	0.39	19.86	emerging
Transportation & Logistics	0.76	0.85	11.92	emerging	0.64	0.70	9.46	emerging
Manufacturing Supercluster	0.61	0.69	14.20	emerging	0.69	0.77	11.43	emerging
Primary Metal Mfg[1]	0.00	0.10	-	emerging	0.00	0.13	-	emerging
Fabricated Metal Product Mfg	1.33	1.26	-5.70	mature	1.36	1.23	-10.10	mature
Machinery Mfg	0.83	0.89	6.57	emerging	0.93	0.93	0.15	emerging
Computer & Electronic Product Mfg	0.72	0.63	-11.93	transforming	0.58	0.53	-7.11	transforming
Electrical Equipment, Appliance & Component Mfg[1]	0.00	1.56	-	stars	0.00	2.76	-	stars
Transportation Equipment Mfg	0.08	0.08	10.67	emerging	0.12	0.12	-2.69	transforming
Mining	0.53	0.40	-24.55	transforming	0.50	0.37	-24.87	transforming
Printing & Publishing	0.29	0.23	-21.97	transforming	0.37	0.28	-24.00	transforming

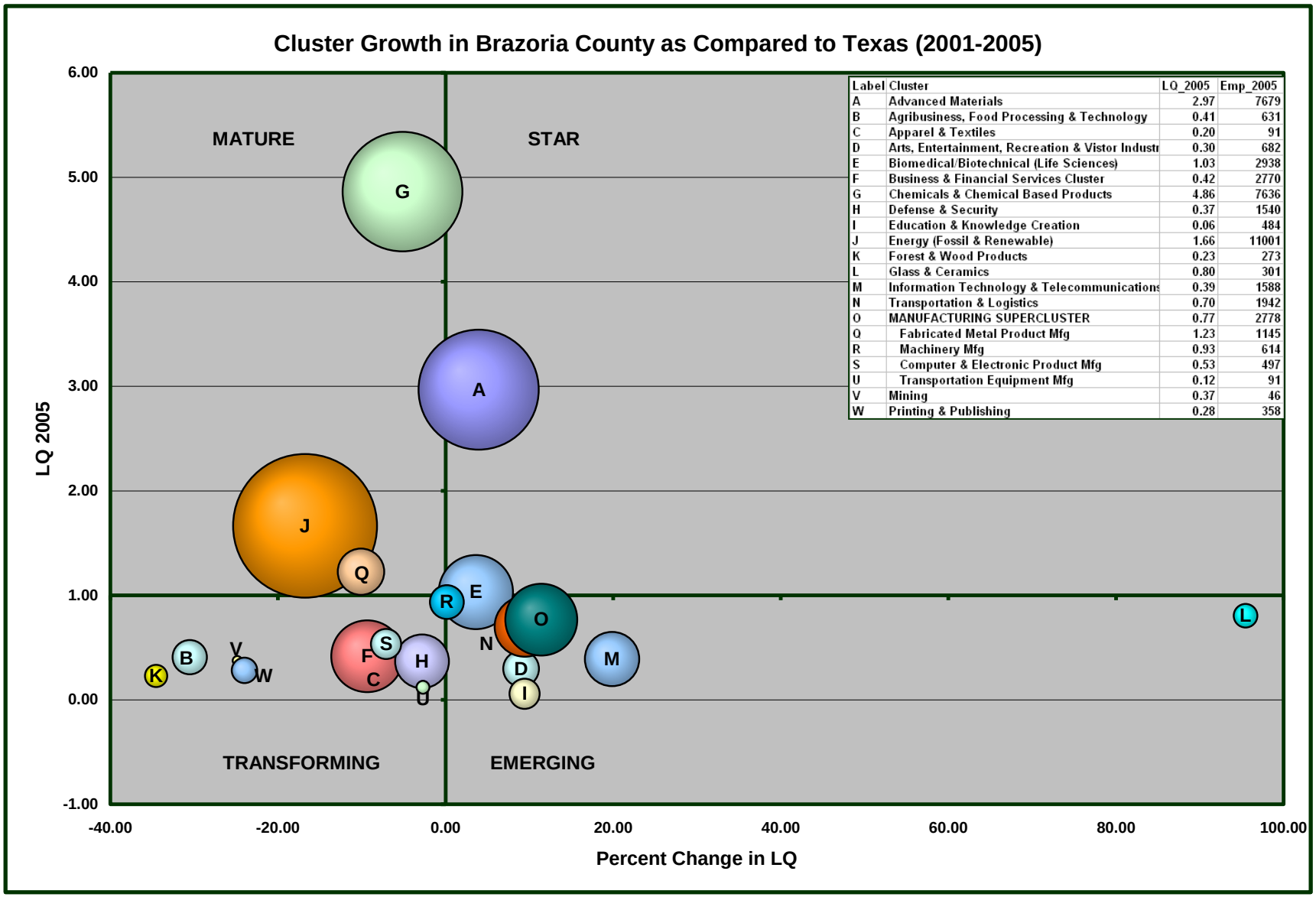
Note: [1] These clusters are not represented in bubble charts because percentage change cannot be calculated

Figure 3.2.5. Industry Cluster Performance in Brazoria County as Compared to the Nation.



Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	2.41	7679
B	Agribusiness, Food Processing & Technology	0.33	631
C	Apparel & Textiles	0.12	91
D	Arts, Entertainment, Recreation & Vistor Industries	0.22	682
E	Biomedical/Biotechnical (Life Sciences)	1.15	2938
F	Business & Financial Services Cluster	0.41	2770
G	Chemicals & Chemical Based Products	5.30	7636
H	Defense & Security	0.39	1540
I	Education & Knowledge Creation	0.07	484
J	Energy (Fossil & Renewable)	2.44	11001
K	Forest & Wood Products	0.16	273
L	Glass & Ceramics	0.88	301
M	Information Technology & Telecommunications	0.44	1588
N	Transportation & Logistics	0.85	1942
O	MANUFACTURING SUPERCLUSTER	0.69	2778
Q	Fabricated Metal Product Mfg	1.26	1145
R	Machinery Mfg	0.89	614
S	Computer & Electronic Product Mfg	0.63	497
U	Transportation Equipment Mfg	0.08	91
V	Mining	0.40	46
W	Printing & Publishing	0.23	358

Figure 3.2.6. Industry Cluster Performance in Brazoria County as Compared to the State.



Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	2.97	7679
B	Agribusiness, Food Processing & Technology	0.41	631
C	Apparel & Textiles	0.20	91
D	Arts, Entertainment, Recreation & Vistor Industr	0.30	682
E	Biomedical/Biotechnical (Life Sciences)	1.03	2938
F	Business & Financial Services Cluster	0.42	2770
G	Chemicals & Chemical Based Products	4.86	7636
H	Defense & Security	0.37	1540
I	Education & Knowledge Creation	0.06	484
J	Energy (Fossil & Renewable)	1.66	11001
K	Forest & Wood Products	0.23	273
L	Glass & Ceramics	0.80	301
M	Information Technology & Telecommunications	0.39	1588
N	Transportation & Logistics	0.70	1942
O	MANUFACTURING SUPERCLUSTER	0.77	2778
Q	Fabricated Metal Product Mfg	1.23	1145
R	Machinery Mfg	0.93	614
S	Computer & Electronic Product Mfg	0.53	497
U	Transportation Equipment Mfg	0.12	91
V	Mining	0.37	46
W	Printing & Publishing	0.28	358

Table 3.2.3. Chambers County Location Quotient Measures With Respect to US and Texas

	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials[1]	0.00	0.16	-	emerging	0.00	0.20	-	emerging
Agribusiness, Food Processing & Technology	1.85	1.25	-32.61	mature	2.28	1.53	-32.64	mature
Biomedical/Biotechnical (Life Sciences)	0.35	0.45	26.46	emerging	0.34	0.40	17.35	emerging
Business & Financial Services Cluster	0.12	0.62	402.43	emerging	0.13	0.63	393.34	emerging
Chemicals & Chemical Based Products	8.16	5.51	-32.52	mature	7.49	5.05	-32.50	mature
Education & Knowledge Creation	1.31	1.16	-11.59	mature	1.17	1.01	-13.80	mature
Energy (Fossil & Renewable)	1.49	2.08	39.45	stars	1.00	1.42	42.33	stars
Information Technology & Telecommunications	0.13	0.29	129.39	emerging	0.11	0.26	138.51	emerging
Transportation & Logistics	1.09	1.38	27.22	stars	0.92	1.14	24.42	stars
Manufacturing Supercluster[1]	0.00	0.82	-	emerging	0.00	0.90	-	emerging
Primary Metal Mfg[1]	0.00	8.00	-	stars	0.00	11.12	-	stars
Fabricated Metal Product Mfg[1]	0.00	1.14	-	stars	0.00	1.11	-	stars

Note: [1] These clusters are not represented in bubble charts because percentage change cannot be calculated

Figure 3.2.7. Industry Cluster Performance in Chambers County as Compared to the Nation.

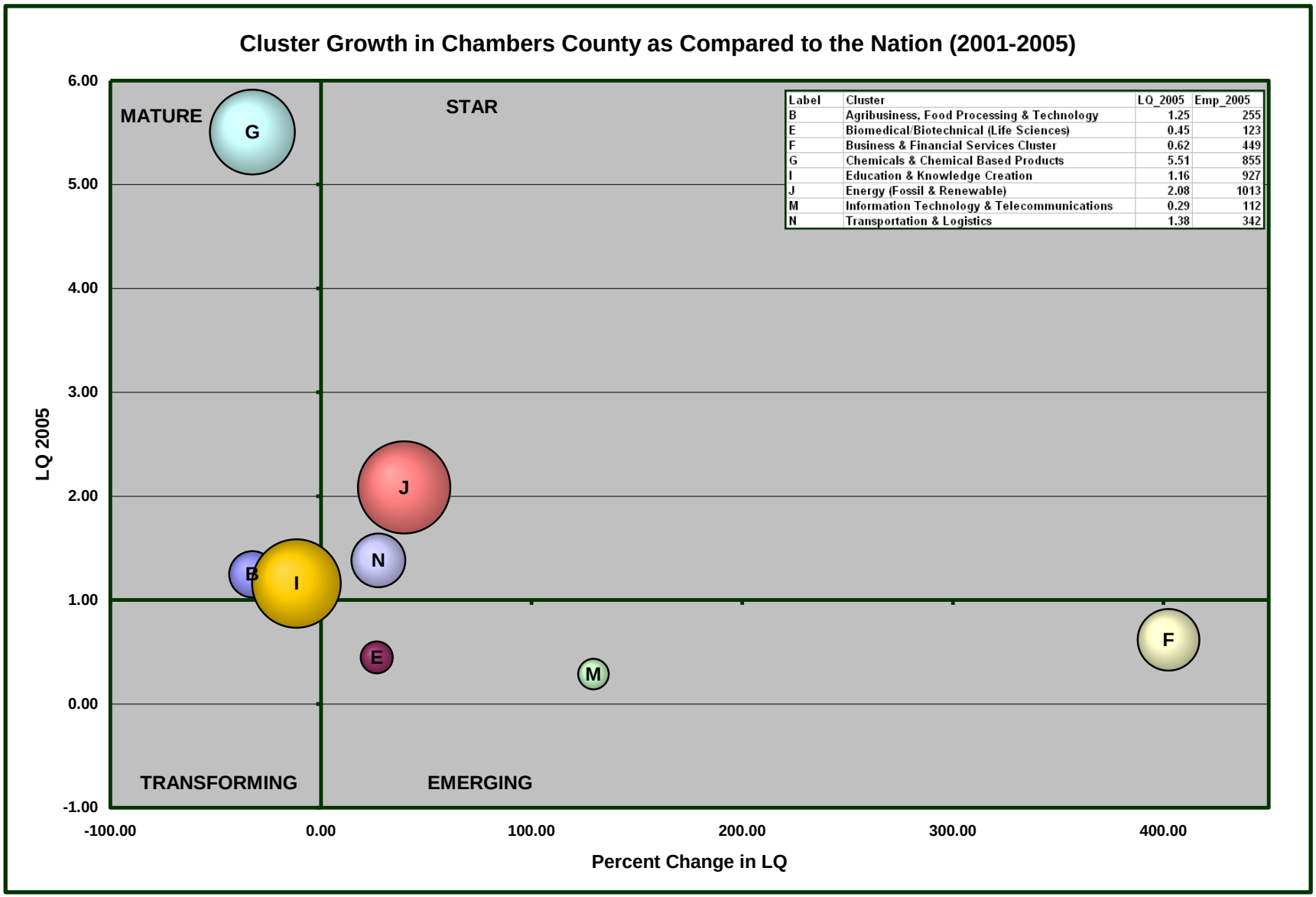


Figure 3.2.8. Industry Cluster Performance in Chambers County as Compared to the State.

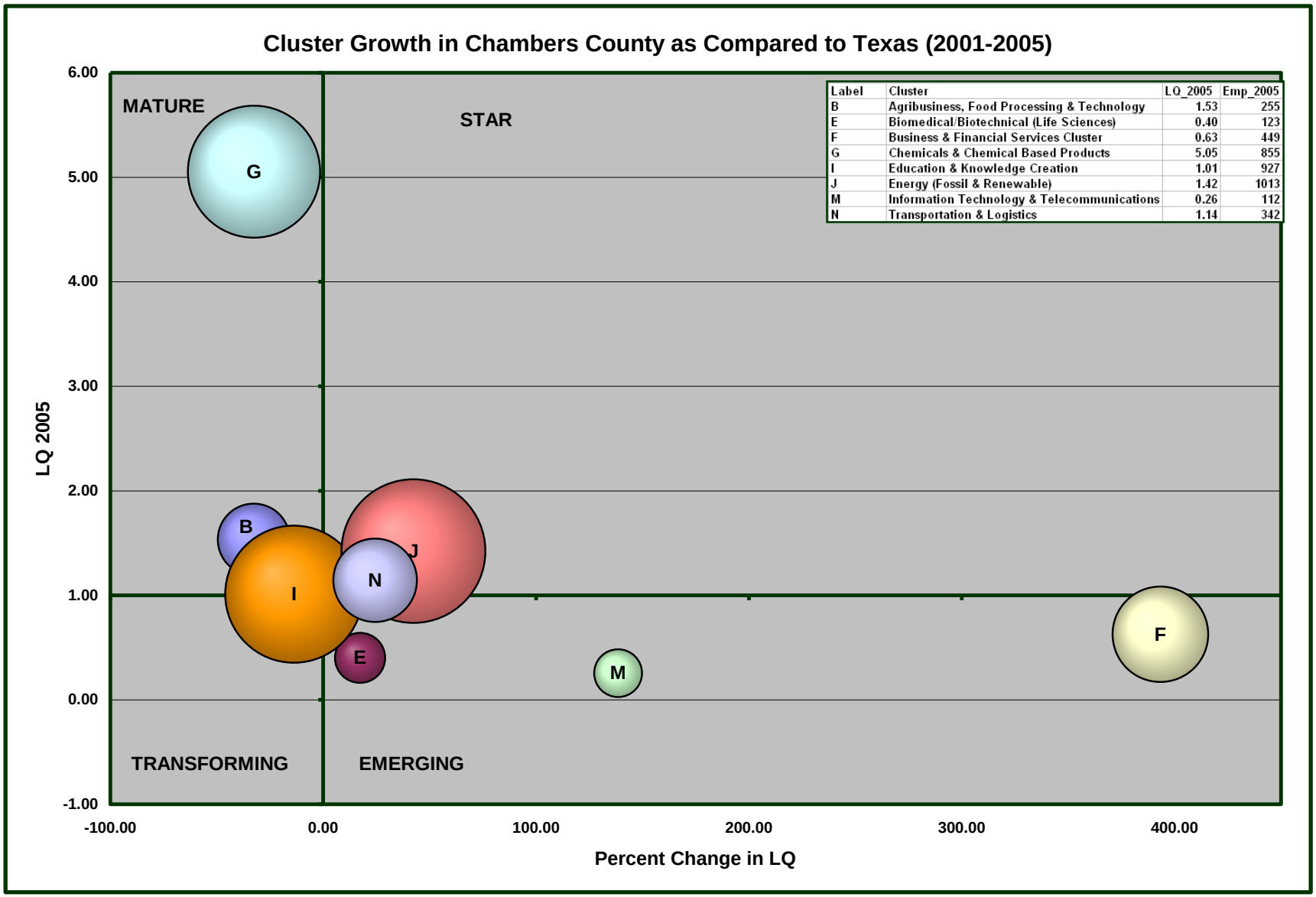
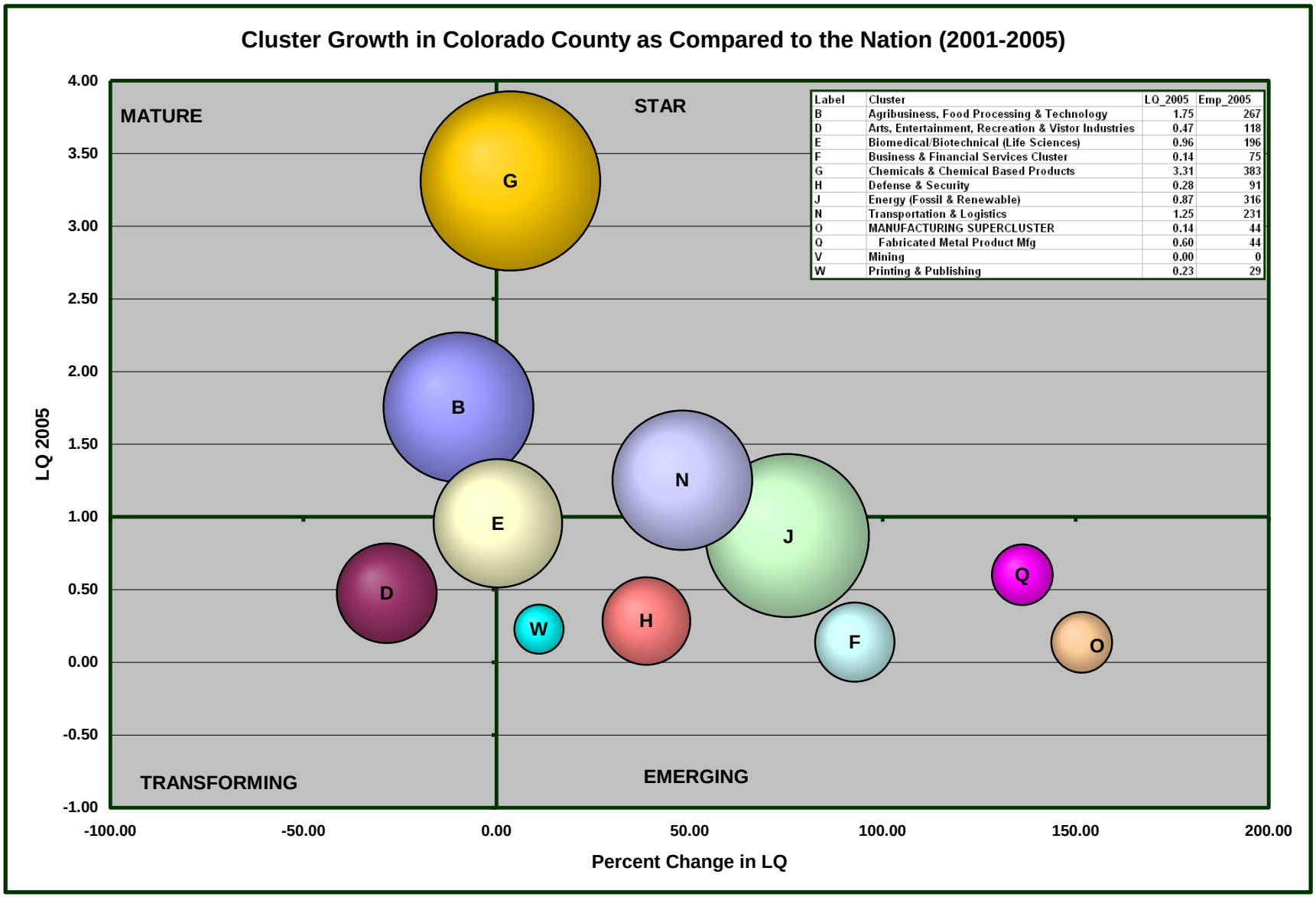


Table 3.2.4. Colorado County Location Quotient Measures With Respect to US and Texas

	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials[1]	0.00	0.05	-	emerging	0.00	0.05	-	emerging
Agribusiness, Food Processing & Technology	1.95	1.75	-9.85	mature	1.95	1.75	-9.85	mature
Arts, Entertainment, Recreation & Visitor Industries	0.66	0.47	-28.41	transforming	0.66	0.47	-28.41	transforming
Biomedical/Biotechnical (Life Sciences)	0.95	0.96	0.36	emerging	0.95	0.96	0.36	emerging
Business & Financial Services Cluster	0.07	0.14	92.79	emerging	0.07	0.14	92.79	emerging
Chemicals & Chemical Based Products	3.19	3.31	3.61	stars	3.19	3.31	3.61	stars
Defense & Security	0.20	0.28	38.83	emerging	0.20	0.28	38.83	emerging
Education & Knowledge Creation	0.00	0.05	0.00	emerging	0.00	0.05	-	emerging
Energy (Fossil & Renewable)	0.50	0.87	75.31	emerging	0.50	0.87	75.31	emerging
Forest & Wood Products[1]	0.00	0.05	-	emerging	0.00	0.05	-	emerging
Glass & Ceramics[1]	0.00	13.96	-	stars	0.00	13.96	-	stars
Information Technology & Telecommunications[1]	0.00	0.02	-	emerging	0.00	0.02	-	emerging
Transportation & Logistics	0.85	1.25	48.12	stars	0.85	1.25	48.12	stars
Manufacturing Supercluster	0.05	0.14	151.57	emerging	0.05	0.14	151.57	emerging
Fabricated Metal Product Mfg	0.25	0.60	136.19	emerging	0.25	0.60	136.19	emerging
Mining	6.20	0.00	-100.00	transforming	6.20	0.00	-100.00	transforming
Printing & Publishing	0.21	0.23	10.99	emerging	0.21	0.23	10.99	emerging

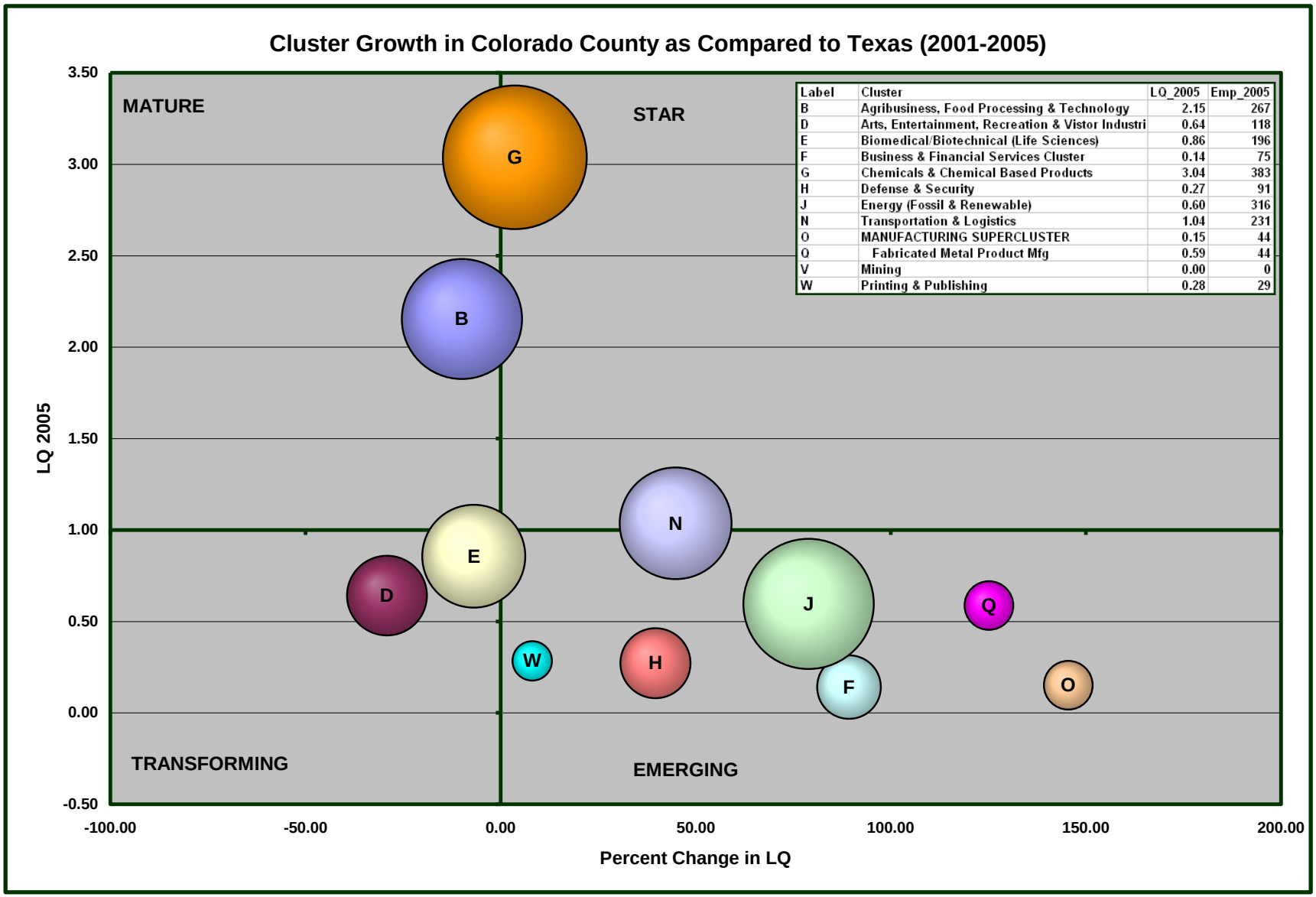
Note: [1] These clusters are not represented in bubble charts because percentage change cannot be calculated

Figure 3.2.9. Industry Cluster Performance in Colorado County as Compared to the Nation.



Label	Cluster	LQ_2005	Emp_2005
B	Agribusiness, Food Processing & Technology	1.75	267
D	Arts, Entertainment, Recreation & Vistor Industries	0.47	118
E	Biomedical/Biotechnical (Life Sciences)	0.96	196
F	Business & Financial Services Cluster	0.14	75
G	Chemicals & Chemical Based Products	3.31	383
H	Defense & Security	0.28	91
J	Energy (Fossil & Renewable)	0.87	316
N	Transportation & Logistics	1.25	231
O	MANUFACTURING SUPERCLUSTER	0.14	44
Q	Fabricated Metal Product Mfg	0.60	44
V	Mining	0.00	0
W	Printing & Publishing	0.23	29

Figure 3.2.10. Industry Cluster Performance in Colorado County as Compared to the State.

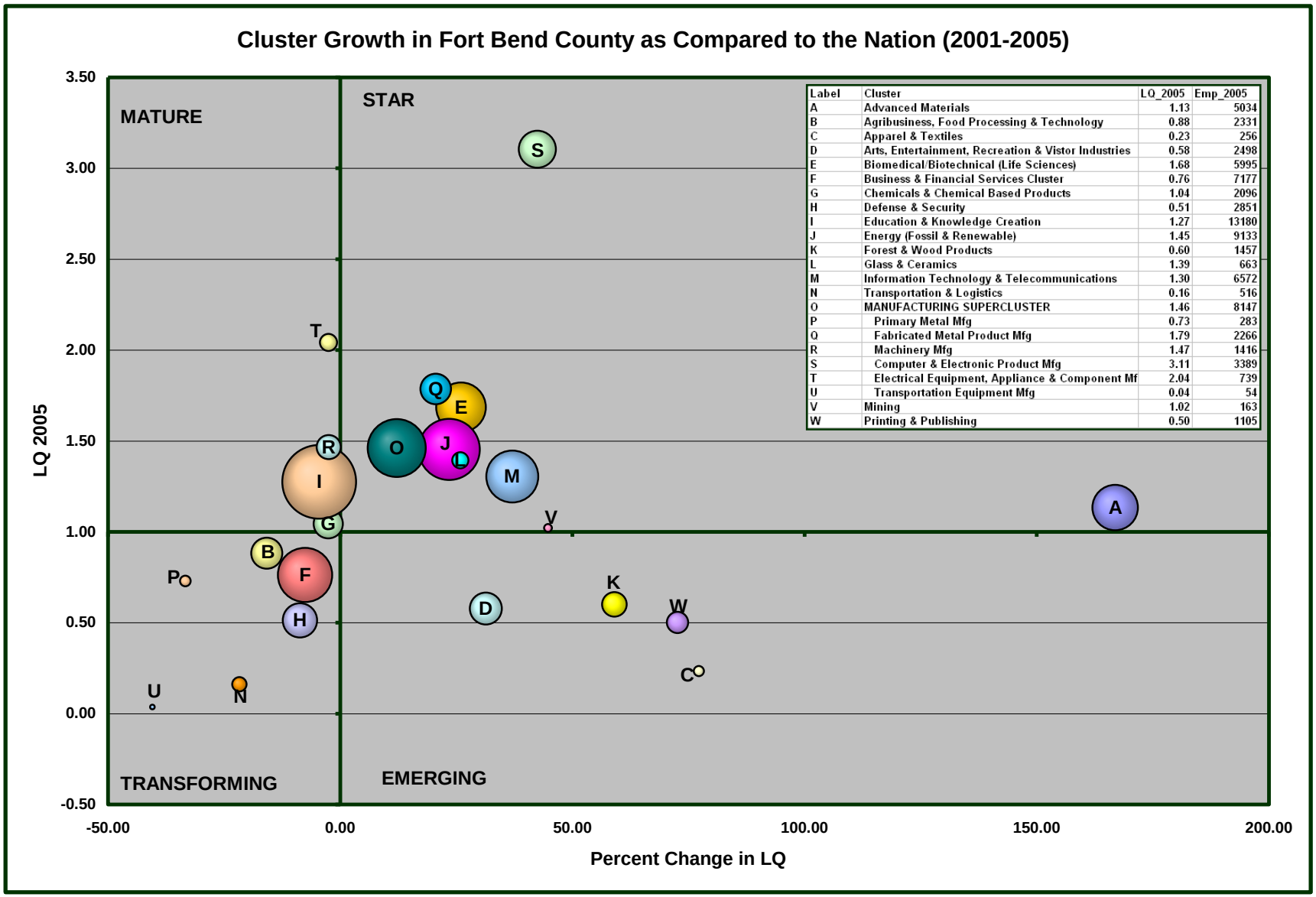


Label	Cluster	LQ_2005	Emp_2005
B	Agribusiness, Food Processing & Technology	2.15	267
D	Arts, Entertainment, Recreation & Vistor Industri	0.64	118
E	Biomedical/Biotechnical (Life Sciences)	0.86	196
F	Business & Financial Services Cluster	0.14	75
G	Chemicals & Chemical Based Products	3.04	383
H	Defense & Security	0.27	91
J	Energy (Fossil & Renewable)	0.60	316
N	Transportation & Logistics	1.04	231
O	MANUFACTURING SUPERCLUSTER	0.15	44
Q	Fabricated Metal Product Mfg	0.59	44
V	Mining	0.00	0
W	Printing & Publishing	0.28	29

Table 3.2.5. Fort Bend County Location Quotient Measures With Respect to US and Texas

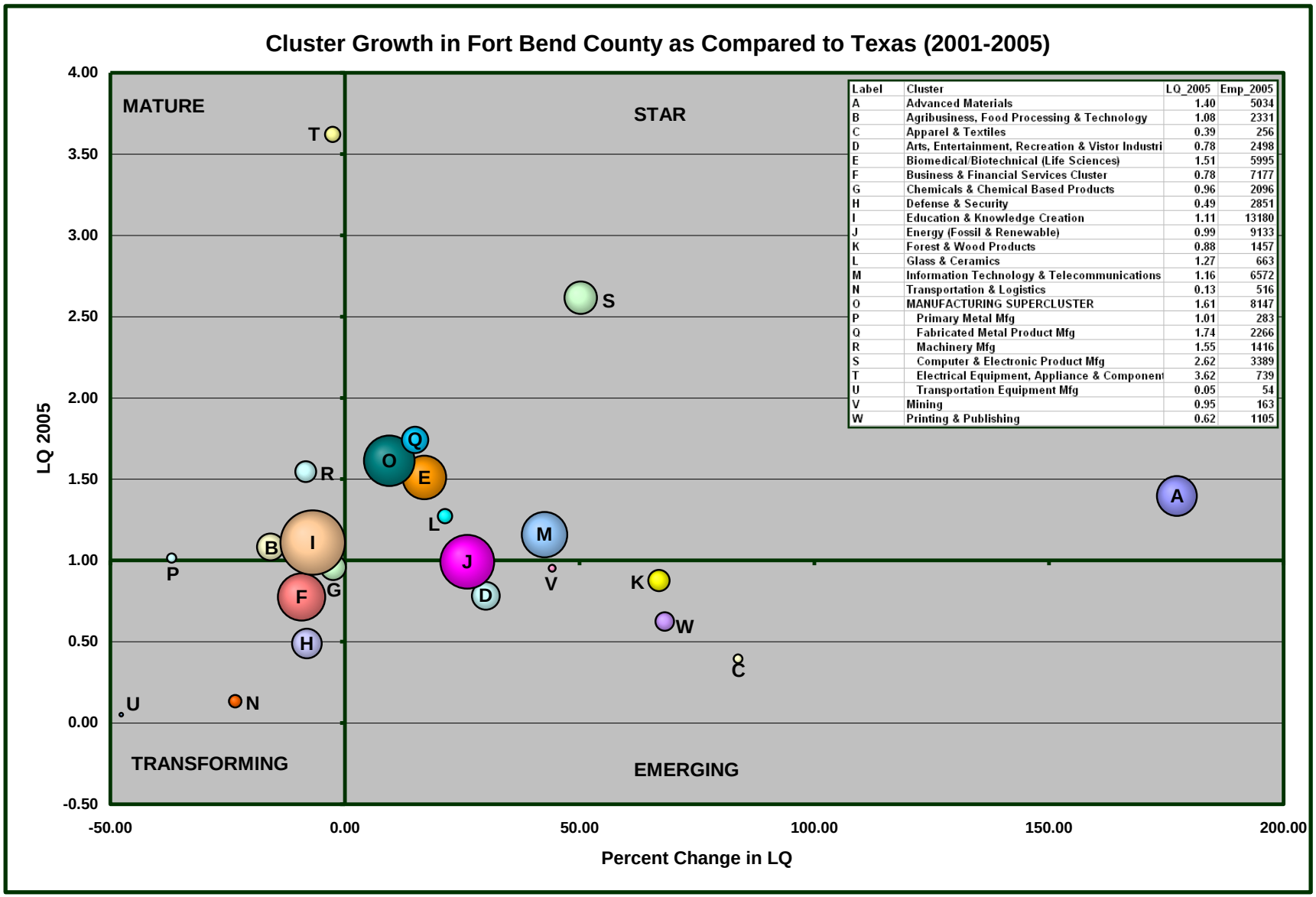
	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials	0.42	1.13	166.86	stars	0.50	1.40	177.26	stars
Agribusiness, Food Processing & Technology	1.05	0.88	-15.82	transforming	1.29	1.08	-15.86	mature
Apparel & Textiles	0.13	0.23	77.23	emerging	0.21	0.39	83.77	emerging
Arts, Entertainment, Recreation & Visitor Industries	0.44	0.58	31.34	emerging	0.60	0.78	30.01	emerging
Biomedical/Biotechnical (Life Sciences)	1.34	1.68	25.98	stars	1.29	1.51	16.90	stars
Business & Financial Services Cluster	0.82	0.76	-7.56	transforming	0.85	0.78	-9.24	transforming
Chemicals & Chemical Based Products	1.07	1.04	-2.56	mature	0.98	0.96	-2.52	transforming
Defense & Security	0.56	0.51	-8.68	transforming	0.53	0.49	-8.14	transforming
Education & Knowledge Creation	1.33	1.27	-4.52	mature	1.19	1.11	-6.90	mature
Energy (Fossil & Renewable)	1.18	1.45	23.48	stars	0.79	0.99	26.03	emerging
Forest & Wood Products	0.38	0.60	59.04	emerging	0.52	0.88	66.91	emerging
Glass & Ceramics	1.11	1.39	25.85	stars	1.05	1.27	21.30	stars
Information Technology & Telecommunications	0.95	1.30	37.05	stars	0.81	1.16	42.50	stars
Transportation & Logistics	0.21	0.16	-21.70	transforming	0.17	0.13	-23.42	transforming
Manufacturing Supercluster	1.30	1.46	12.14	stars	1.47	1.61	9.41	stars
Primary Metal Mfg	1.09	0.73	-33.35	transforming	1.61	1.01	-36.94	mature
Fabricated Metal Product Mfg	1.48	1.79	20.54	stars	1.52	1.74	14.90	stars
Machinery Mfg	1.50	1.47	-2.50	mature	1.69	1.55	-8.37	mature
Computer & Electronic Product Mfg	2.18	3.11	42.44	stars	1.74	2.62	50.23	stars
Electrical Equipment, Appliance & Component Mfg	2.10	2.04	-2.52	mature	3.72	3.62	-2.64	mature
Transportation Equipment Mfg	0.06	0.04	-40.48	transforming	0.10	0.05	-47.66	transforming
Mining	0.71	1.02	44.72	stars	0.66	0.95	44.12	emerging
Printing & Publishing	0.29	0.50	72.61	emerging	0.37	0.62	68.13	emerging

Figure 3.2.11. Industry Cluster Performance in Fort Bend County as Compared to the Nation.



Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	1.13	5034
B	Agribusiness, Food Processing & Technology	0.88	2331
C	Apparel & Textiles	0.23	256
D	Arts, Entertainment, Recreation & Vistor Industries	0.58	2498
E	Biomedical/Biotechnical (Life Sciences)	1.68	5995
F	Business & Financial Services Cluster	0.76	7177
G	Chemicals & Chemical Based Products	1.04	2096
H	Defense & Security	0.51	2851
I	Education & Knowledge Creation	1.27	13180
J	Energy (Fossil & Renewable)	1.45	9133
K	Forest & Wood Products	0.60	1457
L	Glass & Ceramics	1.39	663
M	Information Technology & Telecommunications	1.30	6572
N	Transportation & Logistics	0.16	516
O	MANUFACTURING SUPERCLUSTER	1.46	8147
P	Primary Metal Mfg	0.73	283
Q	Fabricated Metal Product Mfg	1.79	2266
R	Machinery Mfg	1.47	1416
S	Computer & Electronic Product Mfg	3.11	3389
T	Electrical Equipment, Appliance & Component Mf	2.04	739
U	Transportation Equipment Mfg	0.04	54
V	Mining	1.02	163
W	Printing & Publishing	0.50	1105

Figure 3.2.12. Industry Cluster Performance in Fort Bend County as Compared to the State.

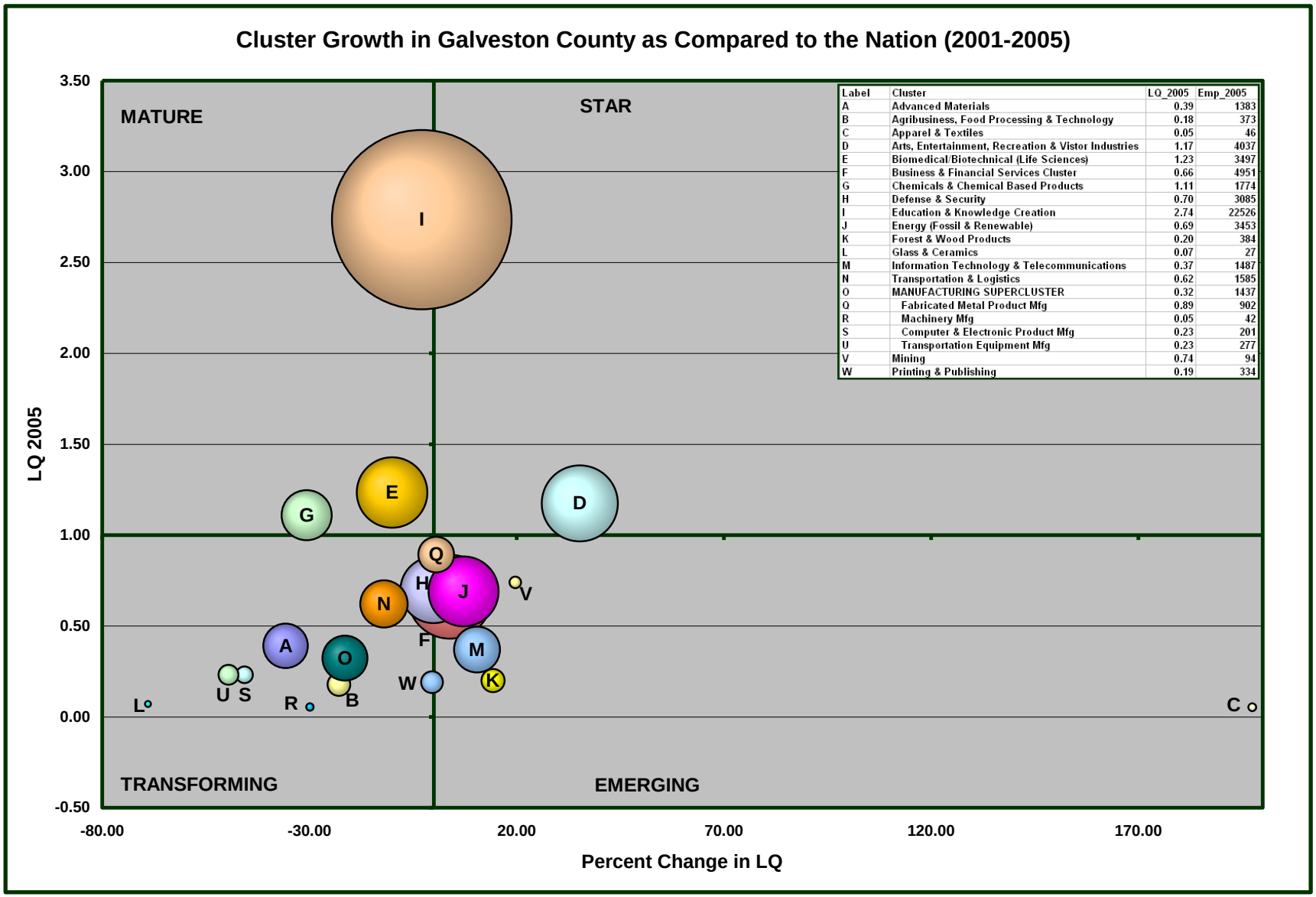


Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	1.40	5034
B	Agribusiness, Food Processing & Technology	1.08	2331
C	Apparel & Textiles	0.39	256
D	Arts, Entertainment, Recreation & Vistor Industri	0.78	2498
E	Biomedical/Biotechnical (Life Sciences)	1.51	5995
F	Business & Financial Services Cluster	0.78	7177
G	Chemicals & Chemical Based Products	0.96	2096
H	Defense & Security	0.49	2851
I	Education & Knowledge Creation	1.11	13180
J	Energy (Fossil & Renewable)	0.99	9133
K	Forest & Wood Products	0.88	1457
L	Glass & Ceramics	1.27	663
M	Information Technology & Telecommunications	1.16	6572
N	Transportation & Logistics	0.13	516
O	MANUFACTURING SUPERCLUSTER	1.61	8147
P	Primary Metal Mfg	1.01	283
Q	Fabricated Metal Product Mfg	1.74	2266
R	Machinery Mfg	1.55	1416
S	Computer & Electronic Product Mfg	2.62	3389
T	Electrical Equipment, Appliance & Component	3.62	739
U	Transportation Equipment Mfg	0.05	54
V	Mining	0.95	163
W	Printing & Publishing	0.62	1105

Table 3.2.6. Galveston County Location Quotient Measures With Respect to US and Texas

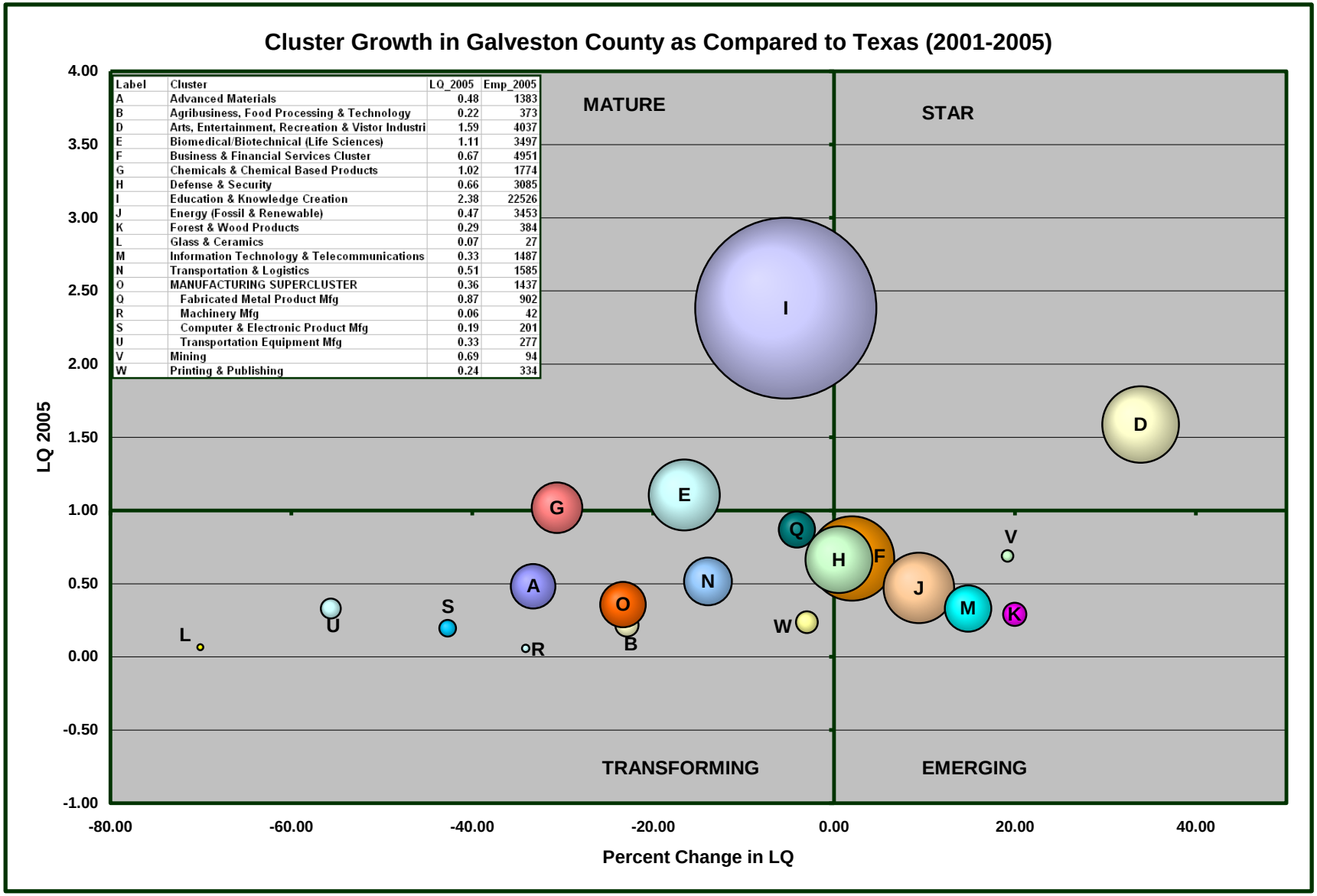
	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials	0.61	0.39	-35.79	transforming	0.72	0.48	-33.28	transforming
Agribusiness, Food Processing & Technology	0.23	0.18	-22.88	transforming	0.28	0.22	-22.92	transforming
Apparel & Textiles	0.02	0.05	197.51	emerging	0.03	0.09	208.48	emerging
Arts, Entertainment, Recreation & Visitor Industries	0.87	1.17	35.25	stars	1.19	1.59	33.88	stars
Biomedical/Biotechnical (Life Sciences)	1.37	1.23	-10.08	mature	1.33	1.11	-16.56	mature
Business & Financial Services Cluster	0.64	0.66	3.85	emerging	0.66	0.67	1.97	emerging
Chemicals & Chemical Based Products	1.60	1.11	-30.67	mature	1.47	1.02	-30.64	mature
Defense & Security	0.70	0.70	-0.07	transforming	0.66	0.66	0.52	emerging
Education & Knowledge Creation	2.82	2.74	-2.93	mature	2.52	2.38	-5.36	mature
Energy (Fossil & Renewable)	0.64	0.69	7.16	emerging	0.43	0.47	9.37	emerging
Forest & Wood Products	0.17	0.20	14.29	emerging	0.24	0.29	19.95	emerging
Glass & Ceramics	0.23	0.07	-68.95	transforming	0.22	0.07	-70.07	transforming
Information Technology & Telecommunications	0.34	0.37	10.41	emerging	0.29	0.33	14.80	emerging
Transportation & Logistics	0.71	0.62	-12.02	transforming	0.60	0.51	-13.95	transforming
Manufacturing Supercluster	0.41	0.32	-21.42	transforming	0.47	0.36	-23.33	transforming
Primary Metal Mfg	0.00	0.05	0.00	emerging	0.00	0.07	0.00	emerging
Fabricated Metal Product Mfg	0.89	0.89	0.59	emerging	0.91	0.87	-4.12	transforming
Machinery Mfg	0.08	0.05	-29.87	transforming	0.09	0.06	-34.09	transforming
Computer & Electronic Product Mfg	0.43	0.23	-45.70	transforming	0.34	0.19	-42.74	transforming
Electrical Equipment, Appliance & Component Mfg	0.00	0.00	0.00		0.00	0.00	0.00	NA
Transportation Equipment Mfg	0.46	0.23	-49.53	transforming	0.74	0.33	-55.63	transforming
Mining	0.62	0.74	19.67	emerging	0.58	0.69	19.17	emerging
Printing & Publishing	0.19	0.19	-0.42	transforming	0.24	0.24	-3.01	transforming

Figure 3.2.13. Industry Cluster Performance in Galveston County as Compared to the Nation.



Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	0.39	1383
B	Agribusiness, Food Processing & Technology	0.18	373
C	Apparel & Textiles	0.05	46
D	Arts, Entertainment, Recreation & Vistor Industries	1.17	4037
E	Biomedical/Biotechnical (Life Sciences)	1.23	3497
F	Business & Financial Services Cluster	0.66	4951
G	Chemicals & Chemical Based Products	1.11	1774
H	Defense & Security	0.70	3085
I	Education & Knowledge Creation	2.74	22526
J	Energy (Fossil & Renewable)	0.69	3453
K	Forest & Wood Products	0.20	384
L	Glass & Ceramics	0.07	27
M	Information Technology & Telecommunications	0.37	1487
N	Transportation & Logistics	0.62	1585
O	MANUFACTURING SUPERCLUSTER	0.32	1437
Q	Fabricated Metal Product Mfg	0.89	902
R	Machinery Mfg	0.05	42
S	Computer & Electronic Product Mfg	0.23	201
U	Transportation Equipment Mfg	0.23	277
V	Mining	0.74	94
W	Printing & Publishing	0.19	334

Figure 3.2.14. Industry Cluster Performance in Galveston County as Compared to the State.

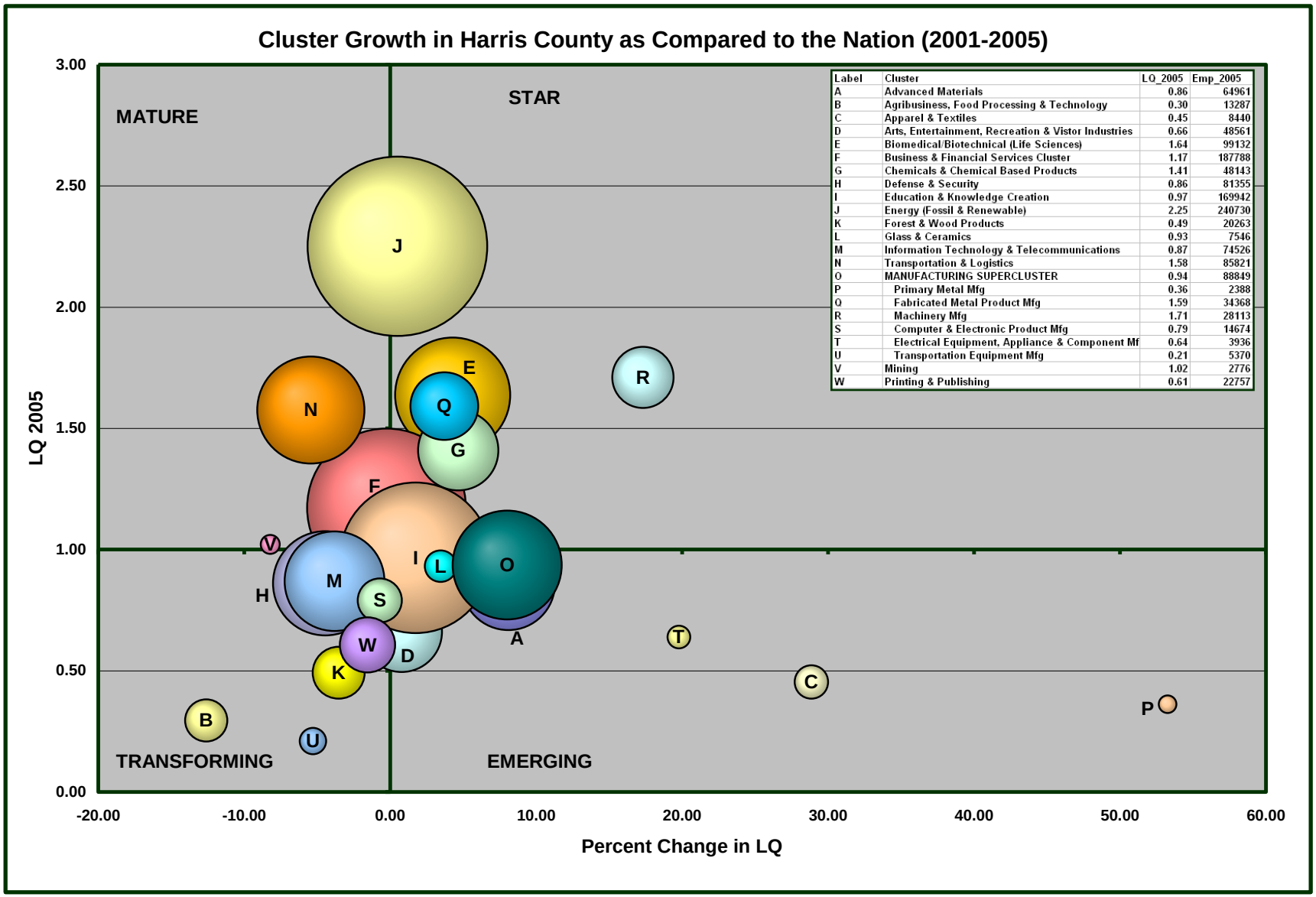


Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	0.48	1383
B	Agribusiness, Food Processing & Technology	0.22	373
D	Arts, Entertainment, Recreation & Vistor Industri	1.59	4037
E	Biomedical/Biotechnical (Life Sciences)	1.11	3497
F	Business & Financial Services Cluster	0.67	4951
G	Chemicals & Chemical Based Products	1.02	1774
H	Defense & Security	0.66	3085
I	Education & Knowledge Creation	2.38	22526
J	Energy (Fossil & Renewable)	0.47	3453
K	Forest & Wood Products	0.29	384
L	Glass & Ceramics	0.07	27
M	Information Technology & Telecommunications	0.33	1487
N	Transportation & Logistics	0.51	1585
O	MANUFACTURING SUPERCLUSTER	0.36	1437
Q	Fabricated Metal Product Mfg	0.87	902
R	Machinery Mfg	0.06	42
S	Computer & Electronic Product Mfg	0.19	201
U	Transportation Equipment Mfg	0.33	277
V	Mining	0.69	94
W	Printing & Publishing	0.24	334

Table 3.2.7. Harris County Location Quotient Measures With Respect to US and Texas

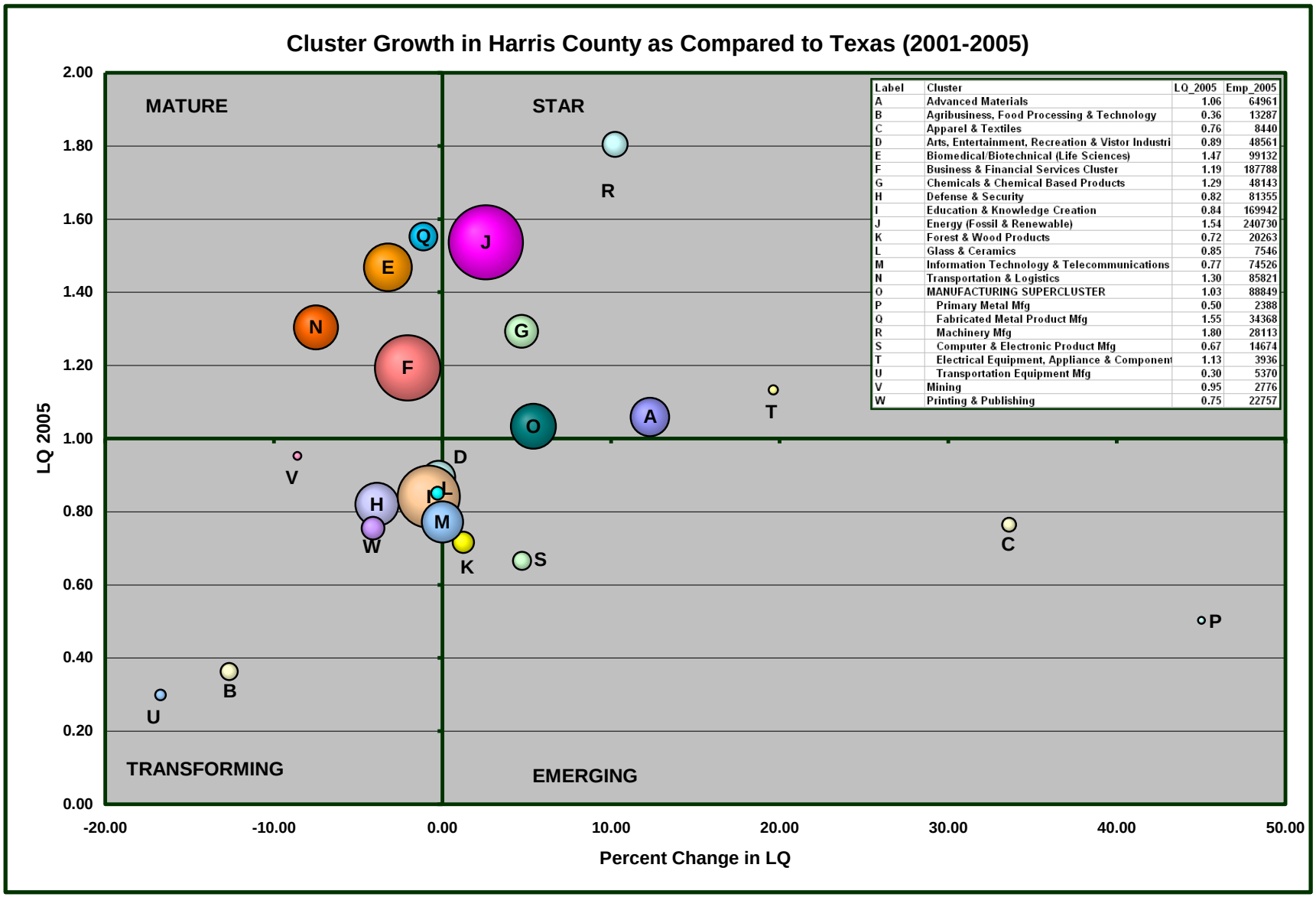
	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials	0.80	0.86	8.10	emerging	0.94	1.06	12.31	stars
Agribusiness, Food Processing & Technology	0.34	0.30	-12.60	transforming	0.42	0.36	-12.65	transforming
Apparel & Textiles	0.35	0.45	28.86	emerging	0.57	0.76	33.61	emerging
Arts, Entertainment, Recreation & Visitor Industries	0.66	0.66	0.78	emerging	0.90	0.89	-0.24	transforming
Biomedical/Biotechnical (Life Sciences)	1.57	1.64	4.27	stars	1.52	1.47	-3.24	mature
Business & Financial Services Cluster	1.18	1.17	-0.26	mature	1.22	1.19	-2.06	mature
Chemicals & Chemical Based Products	1.35	1.41	4.65	stars	1.24	1.29	4.69	stars
Defense & Security	0.90	0.86	-4.45	transforming	0.85	0.82	-3.88	transforming
Education & Knowledge Creation	0.95	0.97	1.73	emerging	0.85	0.84	-0.81	transforming
Energy (Fossil & Renewable)	2.24	2.25	0.50	stars	1.50	1.54	2.57	stars
Forest & Wood Products	0.51	0.49	-3.54	transforming	0.71	0.72	1.24	emerging
Glass & Ceramics	0.90	0.93	3.45	emerging	0.85	0.85	-0.29	transforming
Information Technology & Telecommunications	0.90	0.87	-3.82	transforming	0.77	0.77	0.00	emerging
Transportation & Logistics	1.67	1.58	-5.43	mature	1.41	1.30	-7.51	mature
Manufacturing Supercluster	0.87	0.94	8.02	emerging	0.98	1.03	5.39	stars
Primary Metal Mfg	0.24	0.36	53.27	emerging	0.35	0.50	45.02	emerging
Fabricated Metal Product Mfg	1.54	1.59	3.71	stars	1.57	1.55	-1.14	mature
Machinery Mfg	1.46	1.71	17.31	stars	1.64	1.80	10.24	stars
Computer & Electronic Product Mfg	0.80	0.79	-0.71	transforming	0.64	0.67	4.72	emerging
Electrical Equipment, Appliance & Component Mfg	0.53	0.64	19.77	emerging	0.95	1.13	19.63	stars
Transportation Equipment Mfg	0.22	0.21	-5.29	transforming	0.36	0.30	-16.72	transforming
Mining	1.11	1.02	-8.23	mature	1.04	0.95	-8.61	transforming
Printing & Publishing	0.62	0.61	-1.56	transforming	0.79	0.75	-4.12	transforming

Figure 3.2.15. Industry Cluster Performance in Harris County as Compared to the Nation.



Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	0.86	64961
B	Agribusiness, Food Processing & Technology	0.30	13287
C	Apparel & Textiles	0.45	8440
D	Arts, Entertainment, Recreation & Vistor Industries	0.66	48561
E	Biomedical/Biotechnical (Life Sciences)	1.64	99132
F	Business & Financial Services Cluster	1.17	187788
G	Chemicals & Chemical Based Products	1.41	48143
H	Defense & Security	0.86	81355
I	Education & Knowledge Creation	0.97	169942
J	Energy (Fossil & Renewable)	2.25	240730
K	Forest & Wood Products	0.49	20263
L	Glass & Ceramics	0.93	7546
M	Information Technology & Telecommunications	0.87	74526
N	Transportation & Logistics	1.58	85821
O	MANUFACTURING SUPERCLUSTER	0.94	88849
P	Primary Metal Mfg	0.36	2388
Q	Fabricated Metal Product Mfg	1.59	34368
R	Machinery Mfg	1.71	28113
S	Computer & Electronic Product Mfg	0.79	14674
T	Electrical Equipment, Appliance & Component Mf	0.64	3936
U	Transportation Equipment Mfg	0.21	5370
V	Mining	1.02	2776
W	Printing & Publishing	0.61	22757

Figure 3.2.16. Industry Cluster Performance in Harris County as Compared to the State.



Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	1.06	64961
B	Agribusiness, Food Processing & Technology	0.36	13287
C	Apparel & Textiles	0.76	8440
D	Arts, Entertainment, Recreation & Vistor Industri	0.89	48561
E	Biomedical/Biotechnical (Life Sciences)	1.47	99132
F	Business & Financial Services Cluster	1.19	187788
G	Chemicals & Chemical Based Products	1.29	48143
H	Defense & Security	0.82	81355
I	Education & Knowledge Creation	0.84	169942
J	Energy (Fossil & Renewable)	1.54	240730
K	Forest & Wood Products	0.72	20263
L	Glass & Ceramics	0.85	7546
M	Information Technology & Telecommunications	0.77	74526
N	Transportation & Logistics	1.30	85821
O	MANUFACTURING SUPERCLUSTER	1.03	88849
P	Primary Metal Mfg	0.50	2388
Q	Fabricated Metal Product Mfg	1.55	34368
R	Machinery Mfg	1.80	28113
S	Computer & Electronic Product Mfg	0.67	14674
T	Electrical Equipment, Appliance & Component	1.13	3936
U	Transportation Equipment Mfg	0.30	5370
V	Mining	0.95	2776
W	Printing & Publishing	0.75	22757

Table 3.2.8. Liberty County Location Quotient Measures With Respect to US and Texas

	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials	0.04	0.05	27.70	emerging	0.05	0.06	32.67	emerging
Agribusiness, Food Processing & Technology	0.40	0.35	-12.95	transforming	0.49	0.43	-12.99	transforming
Arts, Entertainment, Recreation & Visitor Industries	0.11	0.10	-6.27	transforming	0.14	0.13	-7.22	transforming
Biomedical/Biotechnical (Life Sciences)	1.56	2.04	30.71	stars	1.50	1.82	21.30	stars
Business & Financial Services Cluster	0.13	0.22	71.10	emerging	0.13	0.22	68.00	emerging
Chemicals & Chemical Based Products	0.85	0.90	6.50	emerging	0.78	0.83	6.54	emerging
Defense & Security	0.26	0.35	33.87	emerging	0.25	0.33	34.66	emerging
Education & Knowledge Creation	0.02	0.02	9.31	emerging	0.02	0.02	6.58	emerging
Energy (Fossil & Renewable)	0.99	0.69	-30.53	transforming	0.66	0.47	-29.10	transforming
Forest & Wood Products	0.38	0.33	-11.85	transforming	0.52	0.49	-7.48	transforming
Glass & Ceramics[1]	0.00	3.29	-	stars	0.00	3.01	-	stars
Information Technology & Telecommunications	0.20	0.12	-40.53	transforming	0.17	0.11	-38.17	transforming
Transportation & Logistics	0.57	0.55	-3.56	transforming	0.49	0.46	-5.68	transforming
Manufacturing Supercluster	0.14	0.22	62.05	emerging	0.15	0.24	58.11	emerging
Fabricated Metal Product Mfg	0.60	0.97	62.12	emerging	0.61	0.94	54.54	emerging
Computer & Electronic Product Mfg[1]	0.04	0.00	-	transforming	0.03	0.00	-	transforming
Printing & Publishing	0.08	0.09	5.44	emerging	0.11	0.11	2.71	emerging

Note: [1] These clusters are not represented in bubble charts because percentage change cannot be calculated

Figure 3.2.17. Industry Cluster Performance in Liberty County as Compared to the Nation.

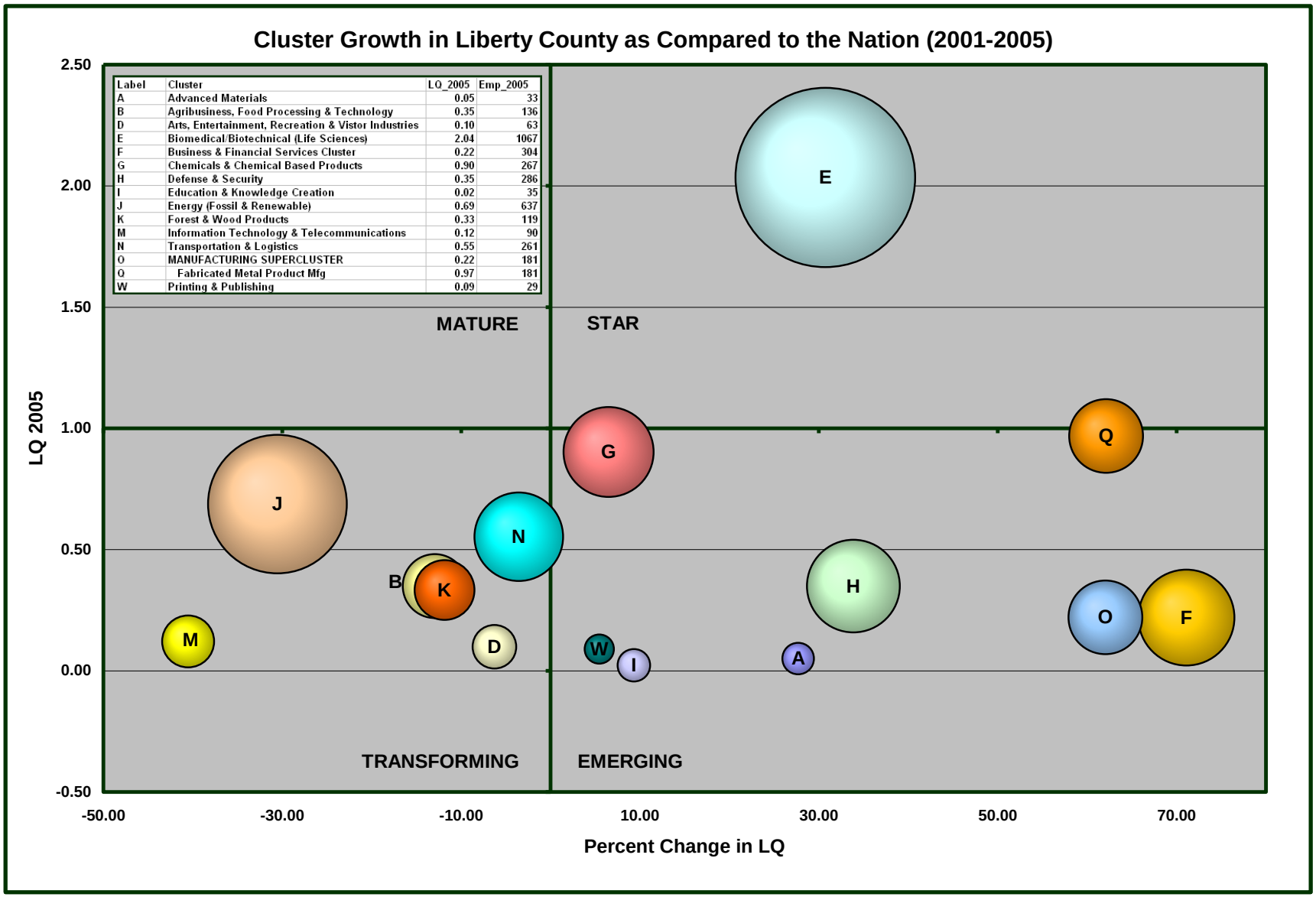
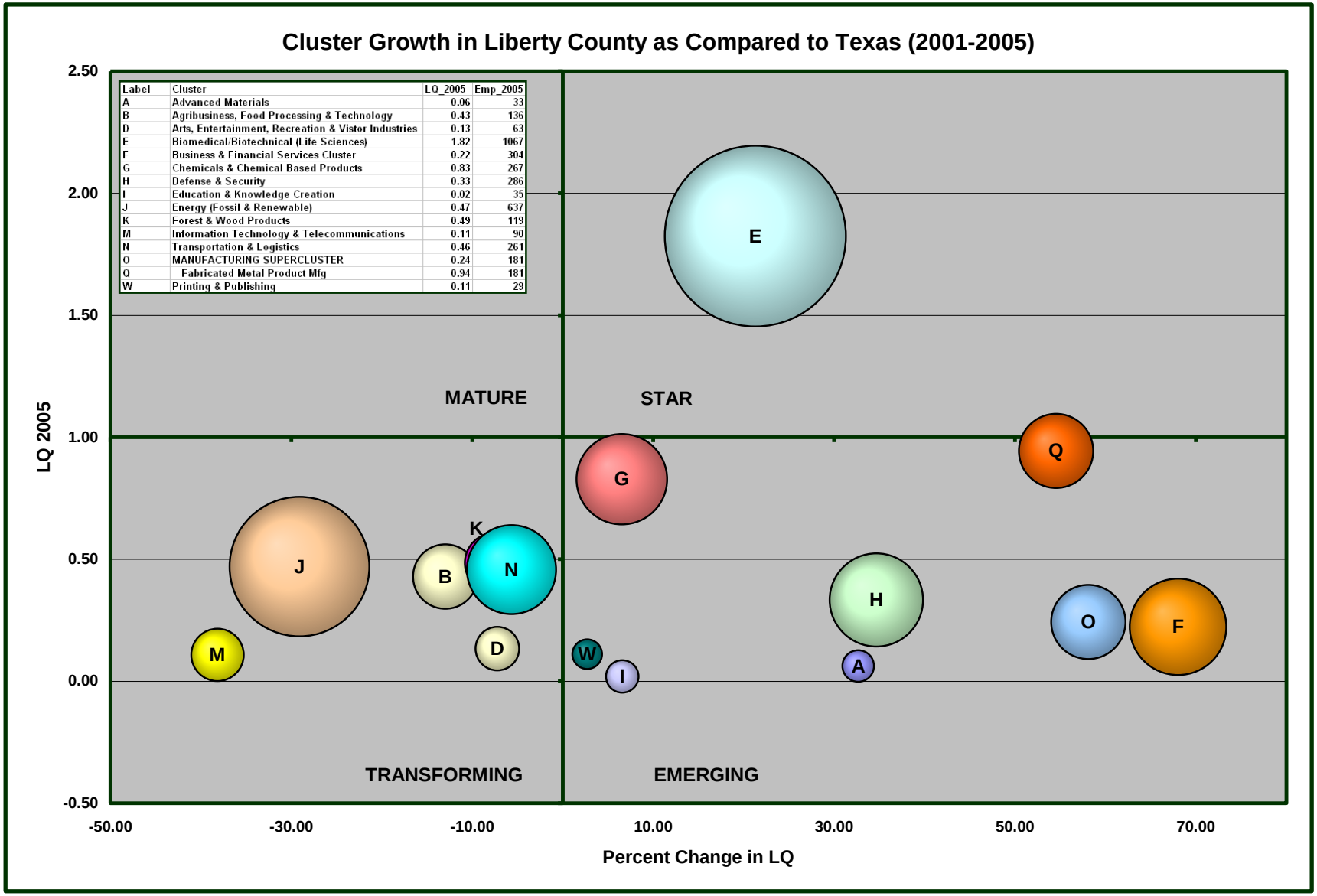


Figure 3.2.18. Industry Cluster Performance in Liberty County as Compared to the State.



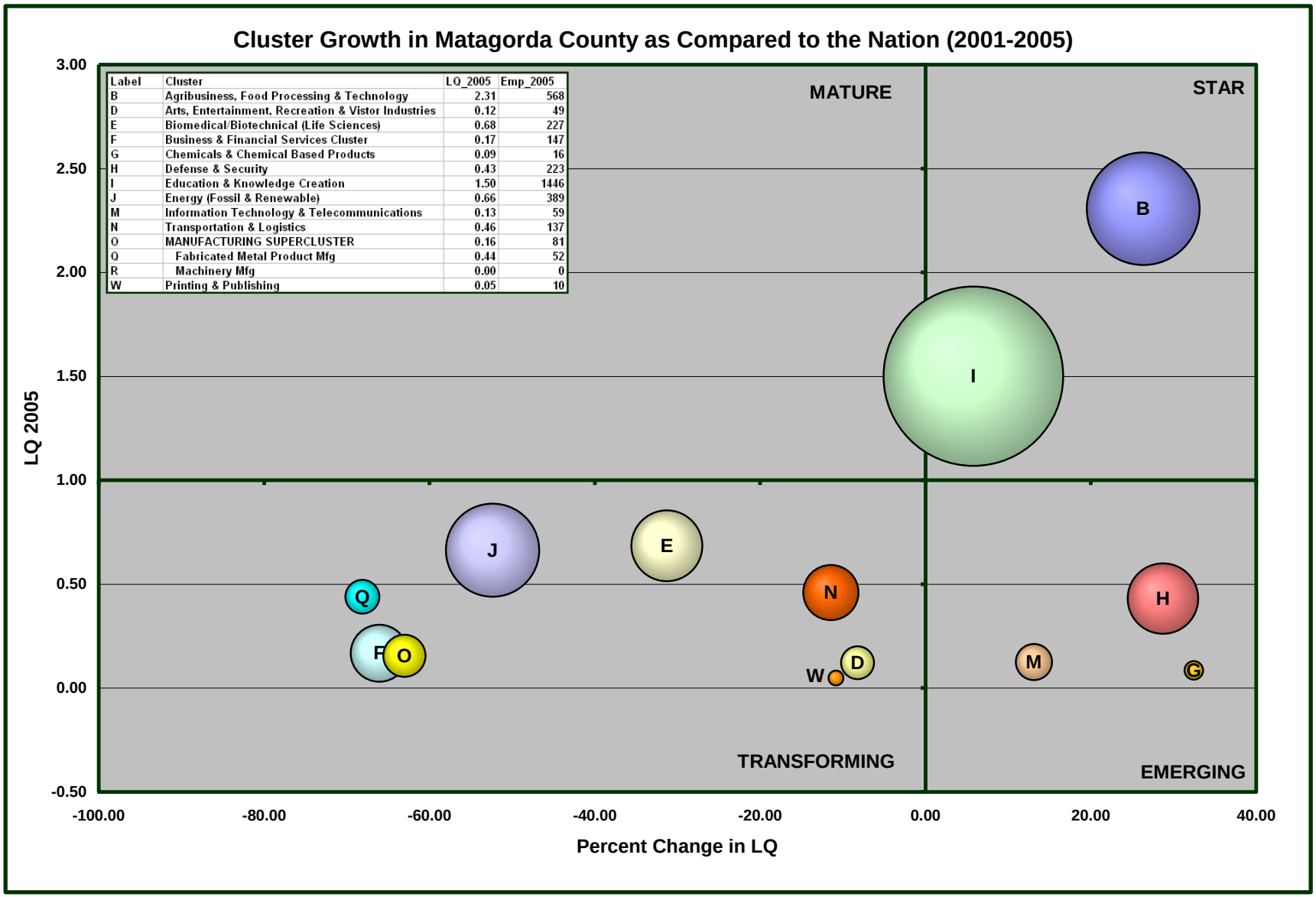
Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	0.06	33
B	Agribusiness, Food Processing & Technology	0.43	136
D	Arts, Entertainment, Recreation & Vistor Industries	0.13	63
E	Biomedical/Biotechnical (Life Sciences)	1.82	1067
F	Business & Financial Services Cluster	0.22	304
G	Chemicals & Chemical Based Products	0.83	267
H	Defense & Security	0.33	286
I	Education & Knowledge Creation	0.02	35
J	Energy (Fossil & Renewable)	0.47	637
K	Forest & Wood Products	0.49	119
M	Information Technology & Telecommunications	0.11	90
N	Transportation & Logistics	0.46	261
O	MANUFACTURING SUPERCLUSTER	0.24	181
Q	Fabricated Metal Product Mfg	0.94	181
W	Printing & Publishing	0.11	29

Table 3.2.9. Matagorda County Location Quotient Measures With Respect to US and Texas

	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials	0.03	0.00	-100.00	transforming	0.04	0.00	-100.00	transforming
Agribusiness, Food Processing & Technology	1.83	2.31	26.34	stars	2.24	2.83	26.28	stars
Arts, Entertainment, Recreation & Visitor Industries	0.13	0.12	-8.22	transforming	0.18	0.16	-9.15	transforming
Biomedical/Biotechnical (Life Sciences)	1.00	0.68	-31.30	transforming	0.96	0.61	-36.25	transforming
Business & Financial Services Cluster	0.49	0.17	-66.07	transforming	0.51	0.17	-66.68	transforming
Chemicals & Chemical Based Products	0.06	0.09	32.46	emerging	0.06	0.08	32.51	emerging
Defense & Security	0.33	0.43	28.71	emerging	0.32	0.41	29.47	emerging
Education & Knowledge Creation	1.42	1.50	5.78	stars	1.27	1.31	3.14	stars
Energy (Fossil & Renewable)	1.39	0.66	-52.36	transforming	0.93	0.45	-51.38	transforming
Information Technology & Telecommunications	0.11	0.13	13.12	emerging	0.09	0.11	17.62	emerging
Transportation & Logistics	0.52	0.46	-11.46	transforming	0.44	0.38	-13.40	transforming
Manufacturing Supercluster	0.42	0.16	-63.05	transforming	0.48	0.17	-63.94	transforming
Fabricated Metal Product Mfg	1.38	0.44	-68.12	transforming	1.41	0.43	-69.61	transforming
Machinery Mfg	0.73	0.00	-100.00	transforming	0.82	0.00	-100.00	transforming
Transportation Equipment Mfg[1]	0.00	0.21	-	emerging	0.00	0.29	-	emerging
Printing & Publishing	0.05	0.05	-10.82	transforming	0.07	0.06	-13.14	transforming

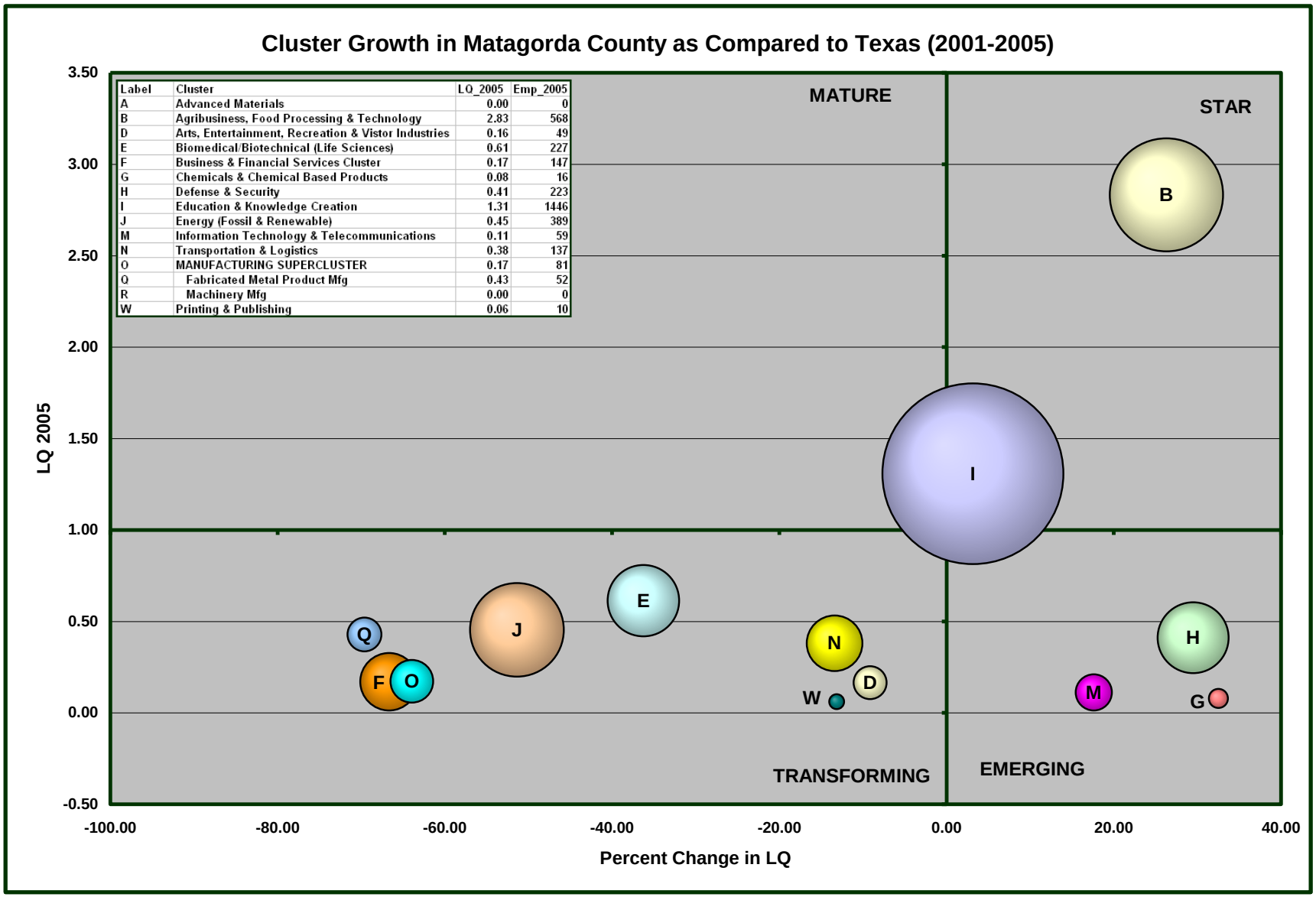
Note: [1] These clusters are not represented in bubble charts because percentage change cannot be calculated

Figure 3.2.19. Industry Cluster Performance in Matagorda County as Compared to the Nation.



Label	Cluster	LQ_2005	Emp_2005
B	Agribusiness, Food Processing & Technology	2.31	568
D	Arts, Entertainment, Recreation & Vistor Industries	0.12	49
E	Biomedical/Biotechnical (Life Sciences)	0.68	227
F	Business & Financial Services Cluster	0.17	147
G	Chemicals & Chemical Based Products	0.09	16
H	Defense & Security	0.43	223
I	Education & Knowledge Creation	1.50	1446
J	Energy (Fossil & Renewable)	0.66	389
M	Information Technology & Telecommunications	0.13	59
N	Transportation & Logistics	0.46	137
O	MANUFACTURING SUPERCLUSTER	0.16	81
Q	Fabricated Metal Product Mfg	0.44	52
R	Machinery Mfg	0.00	0
W	Printing & Publishing	0.05	10

Figure 3.2.20. Industry Cluster Performance in Matagorda County as Compared to the State.



Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	0.00	0
B	Agribusiness, Food Processing & Technology	2.83	568
D	Arts, Entertainment, Recreation & Vistor Industries	0.16	49
E	Biomedical/Biotechnical (Life Sciences)	0.61	227
F	Business & Financial Services Cluster	0.17	147
G	Chemicals & Chemical Based Products	0.08	16
H	Defense & Security	0.41	223
I	Education & Knowledge Creation	1.31	1446
J	Energy (Fossil & Renewable)	0.45	389
M	Information Technology & Telecommunications	0.11	59
N	Transportation & Logistics	0.38	137
O	MANUFACTURING SUPERCLUSTER	0.17	81
Q	Fabricated Metal Product Mfg	0.43	52
R	Machinery Mfg	0.00	0
W	Printing & Publishing	0.06	10

Table 3.2.10. Montgomery County Location Quotient Measures With Respect to US and Texas

	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials	0.47	0.52	10.63	emerging	0.55	0.64	14.94	emerging
Agribusiness, Food Processing & Technology	0.13	0.18	42.27	emerging	0.16	0.22	42.20	emerging
Apparel & Textiles	0.09	0.11	21.38	emerging	0.14	0.18	25.86	emerging
Arts, Entertainment, Recreation & Visitor Industries	0.76	0.94	23.07	emerging	1.04	1.27	21.83	stars
Biomedical/Biotechnical (Life Sciences)	1.64	2.08	26.88	stars	1.58	1.87	17.74	stars
Business & Financial Services Cluster	0.82	0.82	-0.64	transforming	0.85	0.83	-2.43	transforming
Chemicals & Chemical Based Products	1.49	1.54	3.47	stars	1.37	1.41	3.51	stars
Defense & Security	0.57	0.43	-25.12	transforming	0.54	0.41	-24.68	transforming
Education & Knowledge Creation	0.08	0.07	-5.16	transforming	0.07	0.06	-7.53	transforming
Energy (Fossil & Renewable)	1.21	1.07	-11.84	mature	0.81	0.73	-10.03	transforming
Forest & Wood Products	0.57	0.43	-24.85	transforming	0.80	0.63	-21.13	transforming
Glass & Ceramics	1.24	1.36	10.38	stars	1.17	1.24	6.39	stars
Information Technology & Telecommunications	0.67	0.55	-18.10	transforming	0.57	0.49	-14.85	transforming
Transportation & Logistics	0.36	0.37	2.04	emerging	0.31	0.31	-0.20	transforming
Manufacturing Supercluster	0.70	0.79	13.34	emerging	0.79	0.87	10.58	emerging
Fabricated Metal Product Mfg	1.51	1.70	13.01	stars	1.54	1.66	7.73	stars
Machinery Mfg	1.61	1.60	-0.54	mature	1.80	1.69	-6.53	mature
Computer & Electronic Product Mfg	0.38	0.53	41.32	emerging	0.30	0.45	49.05	emerging
Electrical Equipment, Appliance & Component Mfg[1]	0.00	0.15	-	emerging	0.00	0.26	-	emerging
Transportation Equipment Mfg	0.06	0.06	-13.12	transforming	0.10	0.08	-23.61	transforming
Mining	0.50	0.79	58.25	emerging	0.47	0.74	57.59	emerging
Printing & Publishing	0.35	0.44	25.00	emerging	0.45	0.55	21.76	emerging

Note: [1] These clusters are not represented in bubble charts because percentage change cannot be calculated

Figure 3.2.21. Industry Cluster Performance in Montgomery County as Compared to the Nation.

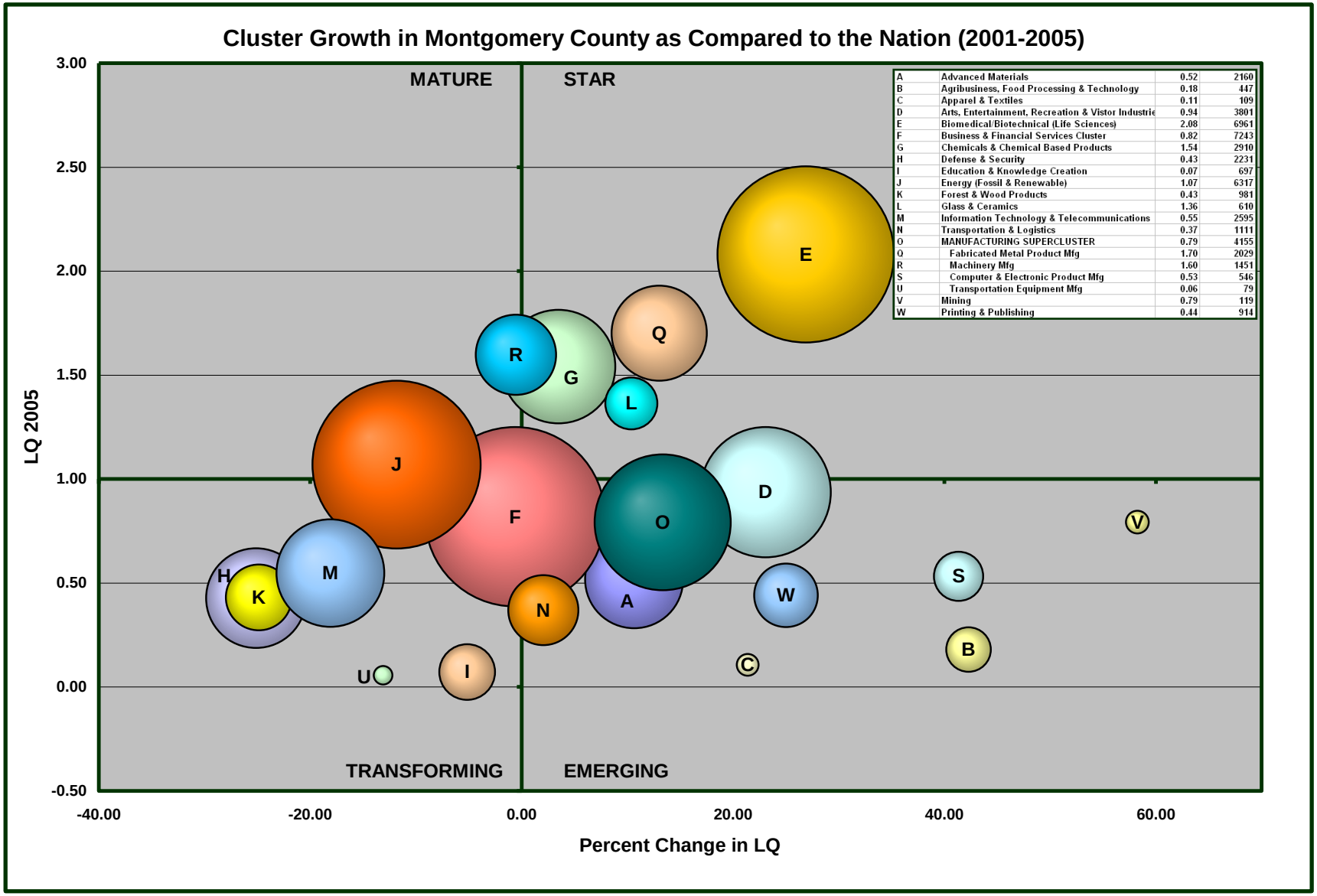
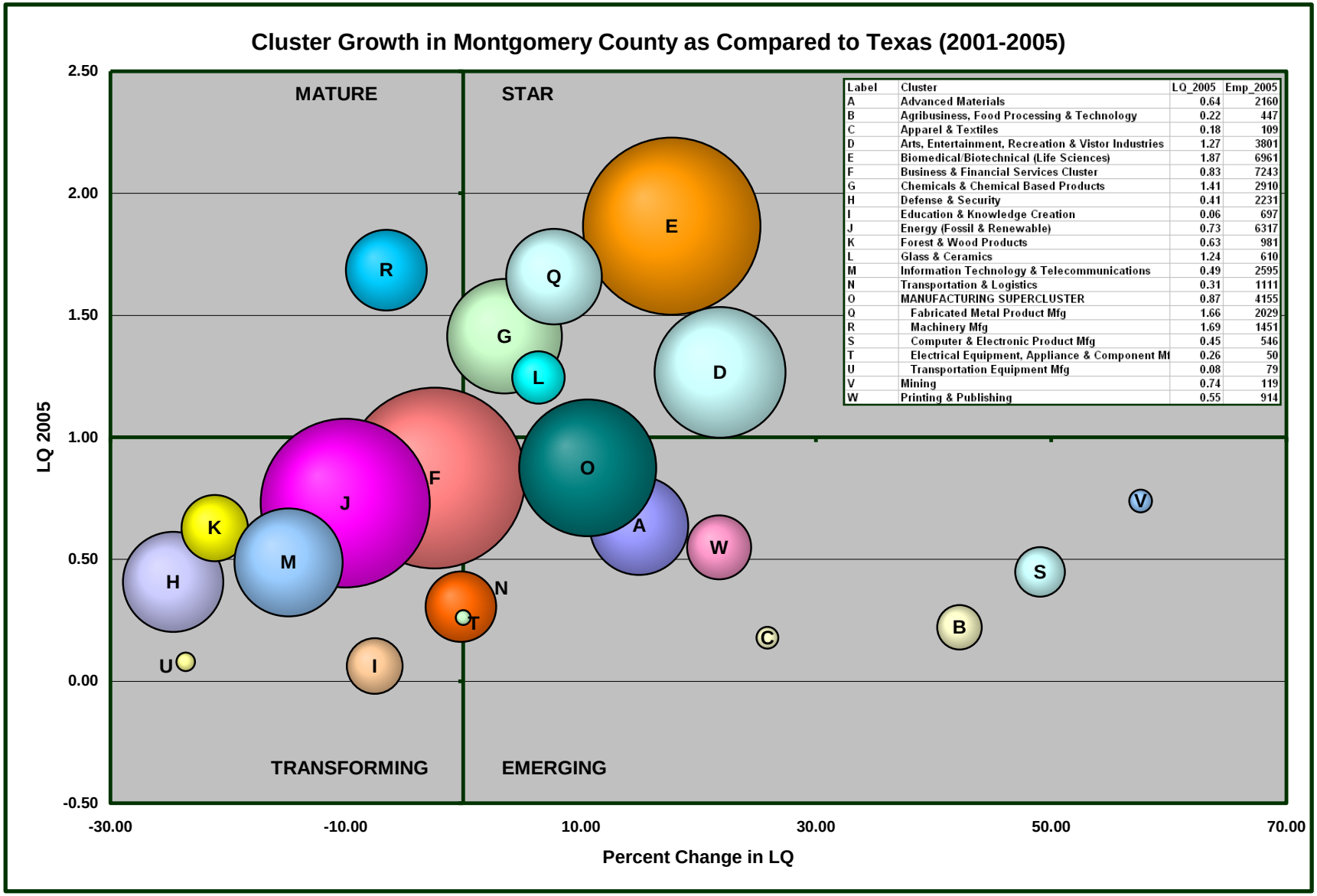


Figure 3.2.22. Industry Cluster Performance in Montgomery County as Compared to the State.

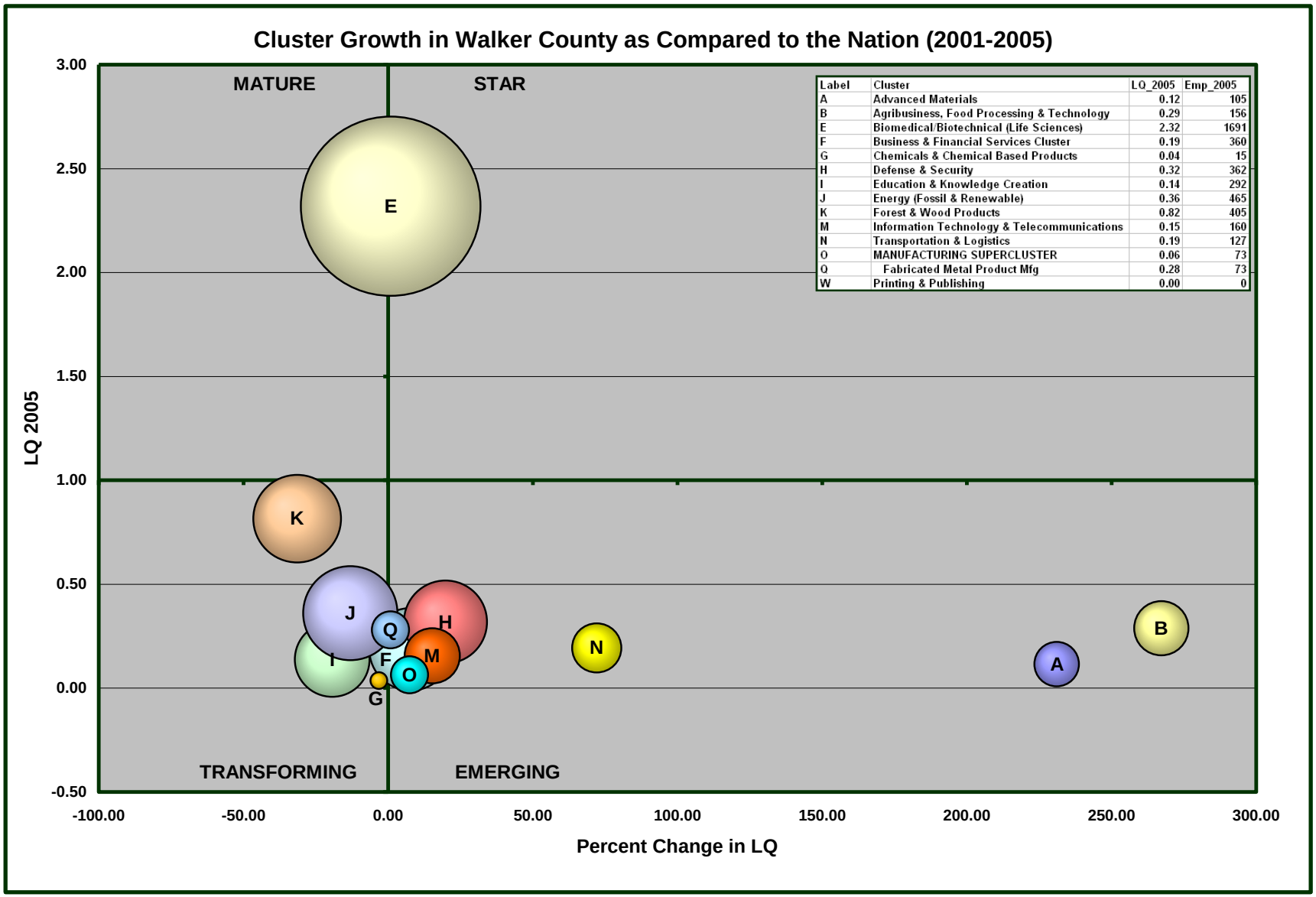


Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	0.64	2160
B	Agribusiness, Food Processing & Technology	0.22	447
C	Apparel & Textiles	0.18	109
D	Arts, Entertainment, Recreation & Vistor Industries	1.27	3801
E	Biomedical/Biotechnical (Life Sciences)	1.87	6961
F	Business & Financial Services Cluster	0.83	7243
G	Chemicals & Chemical Based Products	1.41	2910
H	Defense & Security	0.41	2231
I	Education & Knowledge Creation	0.06	697
J	Energy (Fossil & Renewable)	0.73	6317
K	Forest & Wood Products	0.63	981
L	Glass & Ceramics	1.24	610
M	Information Technology & Telecommunications	0.49	2595
N	Transportation & Logistics	0.31	1111
O	MANUFACTURING SUPERCLUSTER	0.87	4155
Q	Fabricated Metal Product Mfg	1.66	2029
R	Machinery Mfg	1.69	1451
S	Computer & Electronic Product Mfg	0.45	546
T	Electrical Equipment, Appliance & Component Mf	0.26	50
U	Transportation Equipment Mfg	0.08	79
V	Mining	0.74	119
W	Printing & Publishing	0.55	914

Table 3.2.11. Walker County Location Quotient Measures With Respect to US and Texas

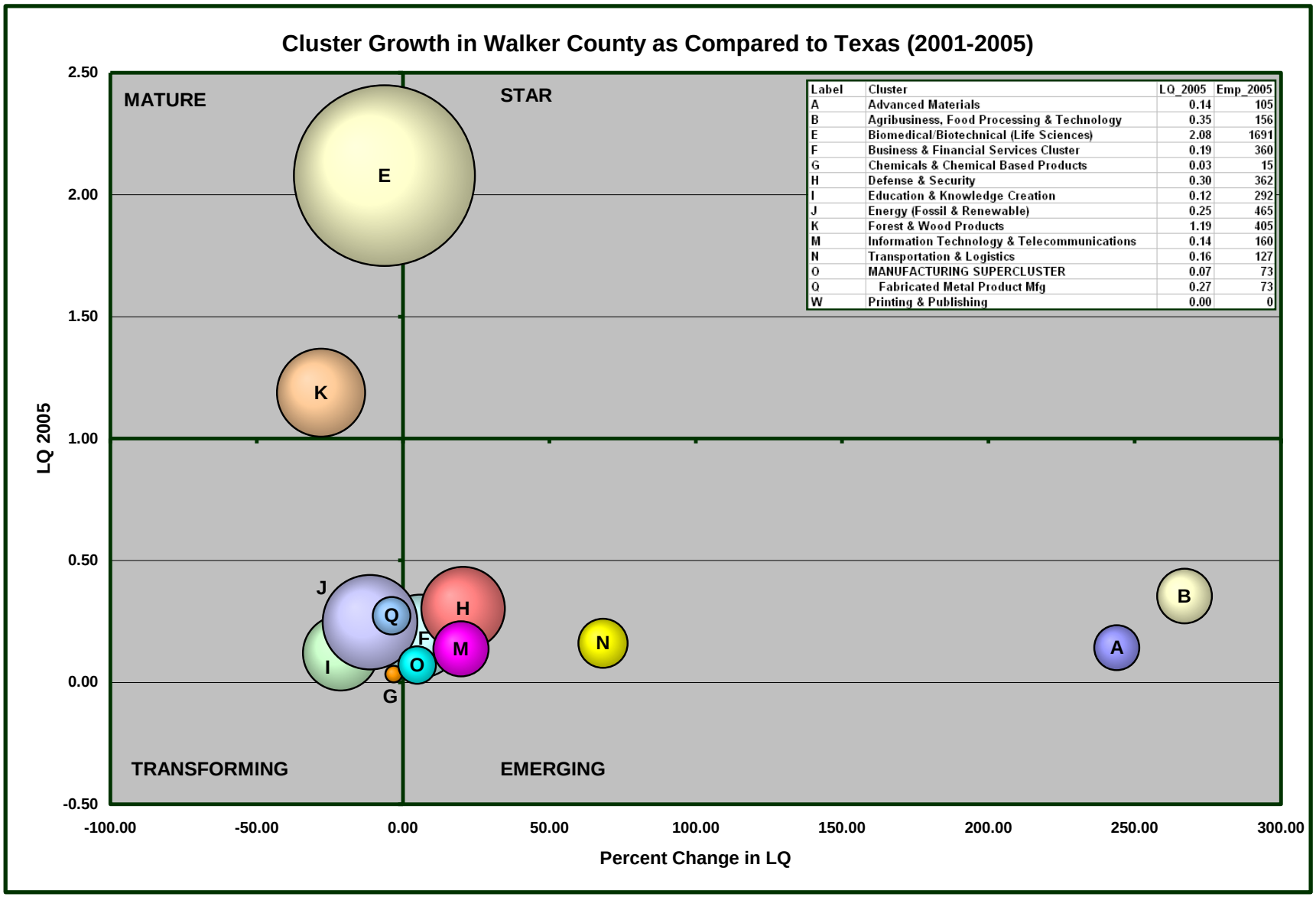
	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials	0.03	0.12	231.01	emerging	0.04	0.14	243.90	emerging
Agribusiness, Food Processing & Technology	0.08	0.29	267.22	emerging	0.10	0.35	267.03	emerging
Biomedical/Biotechnical (Life Sciences)	2.30	2.32	0.91	stars	2.22	2.08	-6.36	mature
Business & Financial Services Cluster	0.17	0.19	7.78	emerging	0.18	0.19	5.83	emerging
Chemicals & Chemical Based Products	0.04	0.04	-3.19	transforming	0.03	0.03	-3.15	transforming
Defense & Security	0.27	0.32	19.78	emerging	0.25	0.30	20.49	emerging
Education & Knowledge Creation	0.17	0.14	-19.33	transforming	0.15	0.12	-21.35	transforming
Energy (Fossil & Renewable)	0.42	0.36	-13.10	transforming	0.28	0.25	-11.31	transforming
Forest & Wood Products	1.19	0.82	-31.44	transforming	1.65	1.19	-28.04	mature
Information Technology & Telecommunications	0.13	0.15	15.24	emerging	0.11	0.14	19.82	emerging
Transportation & Logistics	0.11	0.19	72.12	emerging	0.10	0.16	68.33	emerging
Manufacturing Supercluster	0.06	0.06	7.41	emerging	0.07	0.07	4.80	emerging
Fabricated Metal Product Mfg	0.28	0.28	0.84	emerging	0.28	0.27	-3.87	transforming
Printing & Publishing	0.27	0.00	-100.00	transforming	0.34	0.00	-100.00	transforming

Figure 3.2.23. Industry Cluster Performance in Walker County as Compared to the Nation.



Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	0.12	105
B	Agribusiness, Food Processing & Technology	0.29	156
E	Biomedical/Biotechnical (Life Sciences)	2.32	1691
F	Business & Financial Services Cluster	0.19	360
G	Chemicals & Chemical Based Products	0.04	15
H	Defense & Security	0.32	362
I	Education & Knowledge Creation	0.14	292
J	Energy (Fossil & Renewable)	0.36	465
K	Forest & Wood Products	0.82	405
M	Information Technology & Telecommunications	0.15	160
N	Transportation & Logistics	0.19	127
O	MANUFACTURING SUPERCLUSTER	0.06	73
Q	Fabricated Metal Product Mfg	0.28	73
W	Printing & Publishing	0.00	0

Figure 3.2.24. Industry Cluster Performance in Walker County as Compared to the State.



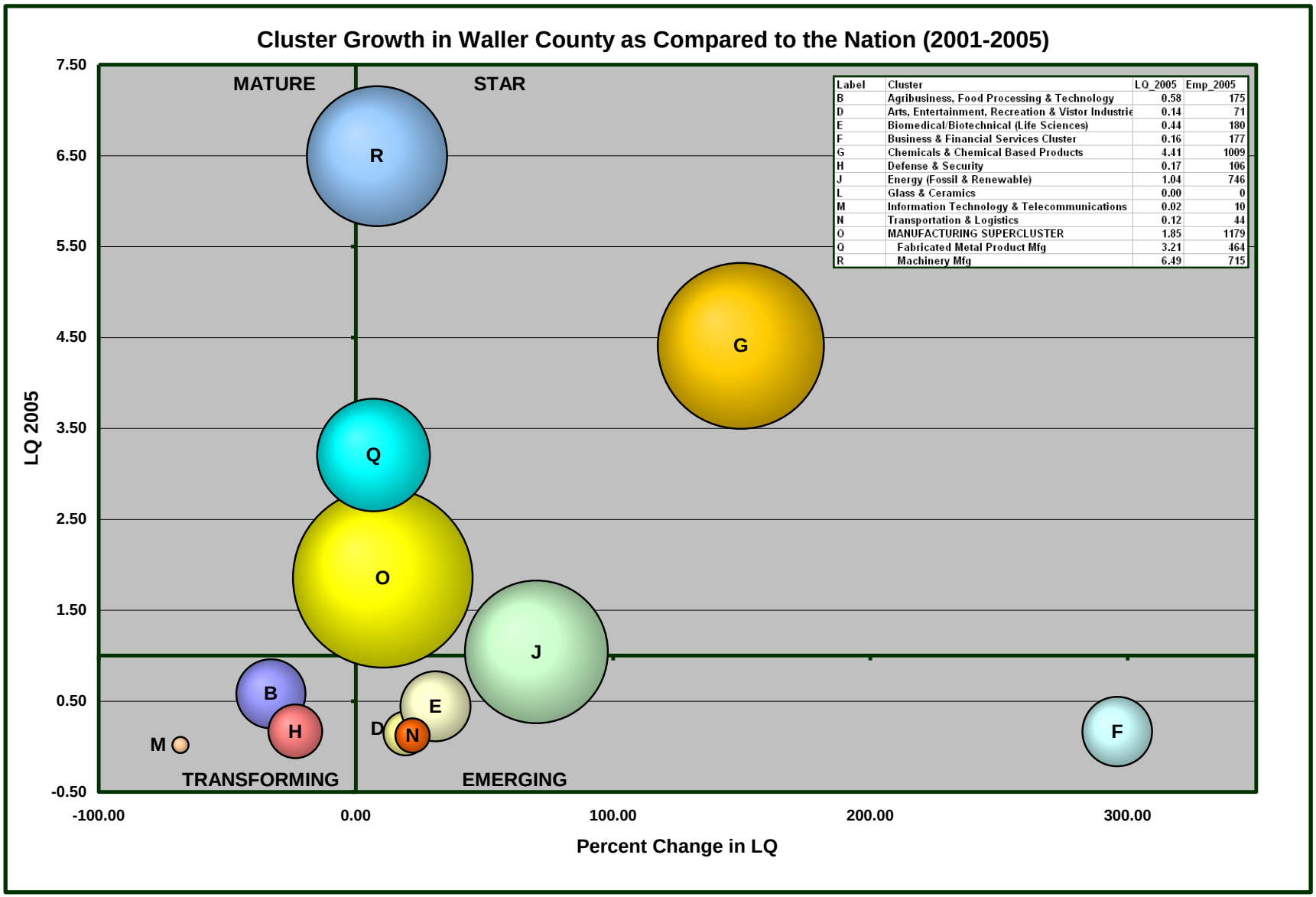
Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	0.14	105
B	Agribusiness, Food Processing & Technology	0.35	156
E	Biomedical/Biotechnical (Life Sciences)	2.08	1691
F	Business & Financial Services Cluster	0.19	360
G	Chemicals & Chemical Based Products	0.03	15
H	Defense & Security	0.30	362
I	Education & Knowledge Creation	0.12	292
J	Energy (Fossil & Renewable)	0.25	465
K	Forest & Wood Products	1.19	405
M	Information Technology & Telecommunications	0.14	160
N	Transportation & Logistics	0.16	127
O	MANUFACTURING SUPERCLUSTER	0.07	73
Q	Fabricated Metal Product Mfg	0.27	73
W	Printing & Publishing	0.00	0

Table 3.2.12. Waller County Location Quotient Measures With Respect to US and Texas

	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Agribusiness, Food Processing & Technology	0.87	0.58	-33.08	transforming	1.07	0.71	-33.11	transforming
Arts, Entertainment, Recreation & Visitor Industries	0.12	0.14	19.22	emerging	0.17	0.20	18.02	emerging
Biomedical/Biotechnical (Life Sciences)	0.34	0.44	30.92	emerging	0.33	0.40	21.49	emerging
Business & Financial Services Cluster	0.04	0.16	295.99	emerging	0.04	0.17	288.83	emerging
Chemicals & Chemical Based Products	1.77	4.41	149.61	stars	1.62	4.05	149.71	stars
Defense & Security	0.22	0.17	-23.56	transforming	0.21	0.16	-23.11	transforming
Education & Knowledge Creation[1]	0.00	0.01	-	emerging	0.00	0.01	-	emerging
Energy (Fossil & Renewable)	0.61	1.04	70.17	stars	0.41	0.71	73.68	emerging
Glass & Ceramics	5.75	0.00	-100.00	transforming	5.45	0.00	-100.00	transforming
Information Technology & Telecommunications	0.05	0.02	-68.22	transforming	0.05	0.02	-66.96	transforming
Transportation & Logistics	0.10	0.12	21.98	emerging	0.08	0.10	19.30	emerging
Manufacturing Supercluster	1.68	1.85	10.38	stars	1.90	2.05	7.70	stars
Fabricated Metal Product Mfg	3.00	3.21	6.79	stars	3.07	3.13	1.79	stars
Machinery Mfg	6.00	6.49	8.21	stars	6.73	6.85	1.70	stars

Note: [1] These clusters are not represented in bubble charts because percentage change cannot be calculated

Figure 3.2.25. Industry Cluster Performance in Waller County as Compared to the Nation.



Label	Cluster	LQ_2005	Emp_2005
B	Agribusiness, Food Processing & Technology	0.58	175
D	Arts, Entertainment, Recreation & Vistor Industrie	0.14	71
E	Biomedical/Biotechnical (Life Sciences)	0.44	180
F	Business & Financial Services Cluster	0.16	177
G	Chemicals & Chemical Based Products	4.41	1009
H	Defense & Security	0.17	106
J	Energy (Fossil & Renewable)	1.04	746
L	Glass & Ceramics	0.00	0
M	Information Technology & Telecommunications	0.02	10
N	Transportation & Logistics	0.12	44
O	MANUFACTURING SUPERCLUSTER	1.85	1179
Q	Fabricated Metal Product Mfg	3.21	464
R	Machinery Mfg	6.49	715

Figure 3.2.26. Industry Cluster Performance in Waller County as Compared to the State.

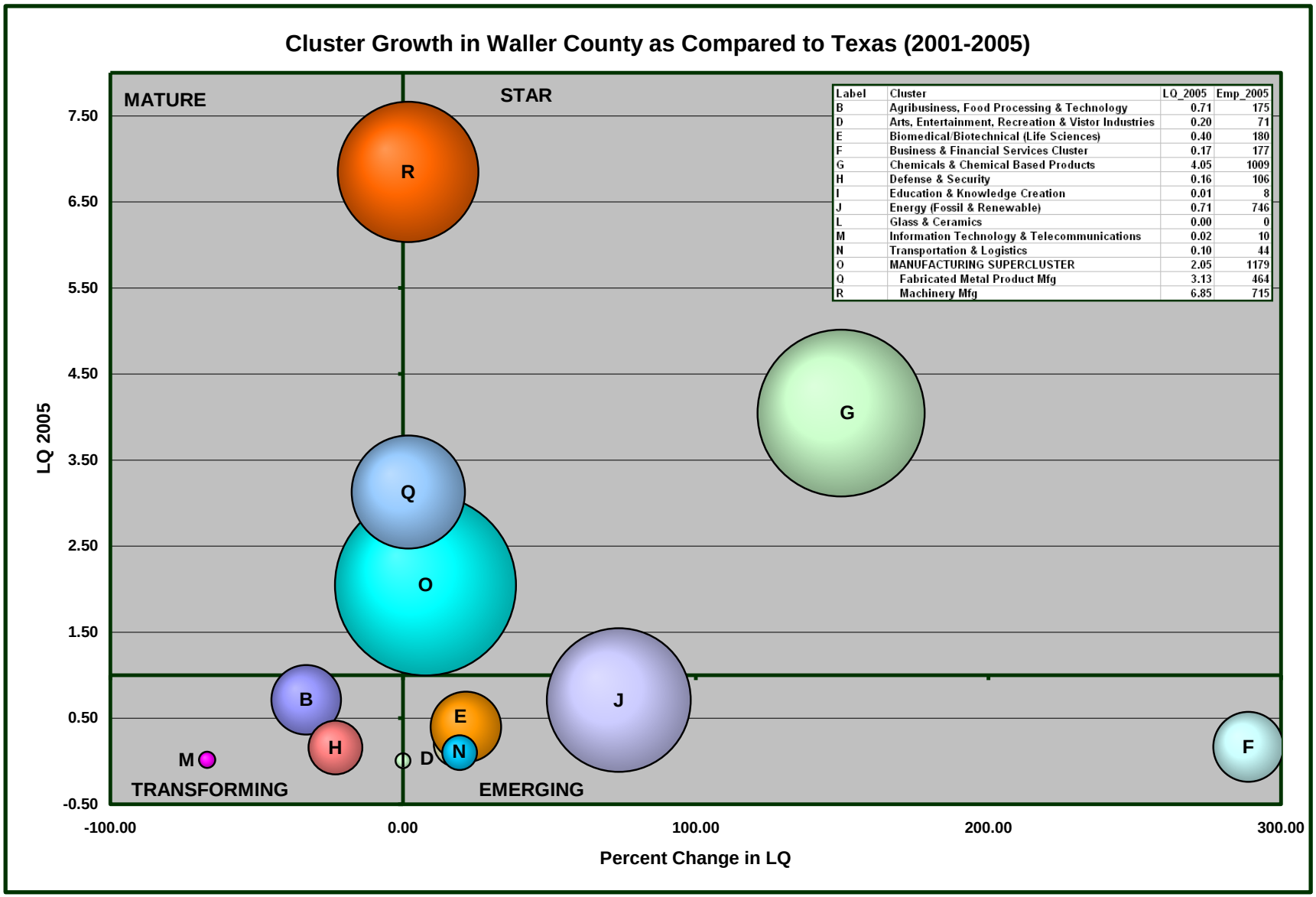
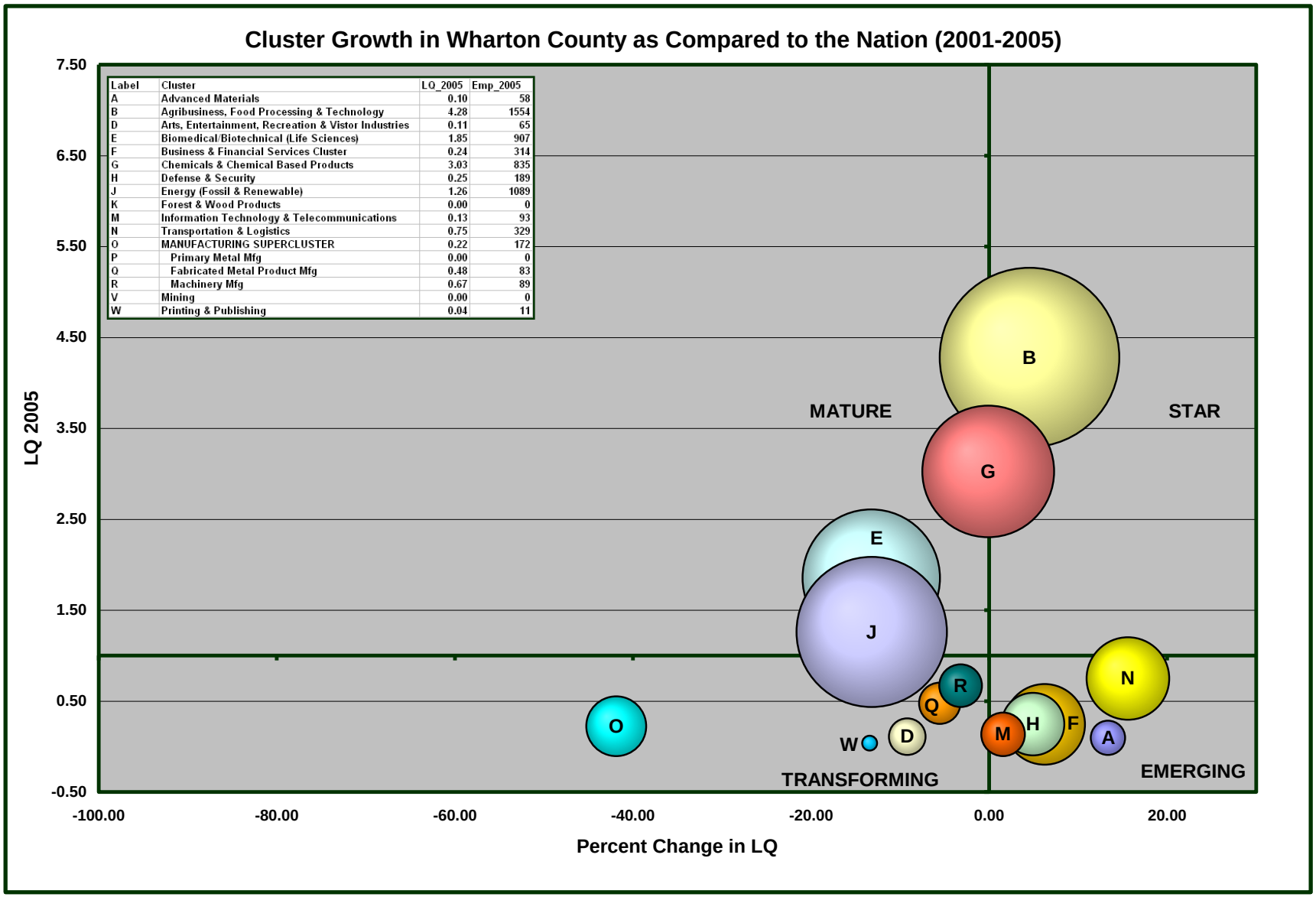


Table 3.2.13. Wharton County Location Quotient Measures With Respect to US and Texas

	US				Texas			
Cluster	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**	**LQ_01**	**LQ_05**	**LQ_PC**	**Cluster Level**
Advanced Materials	0.08	0.10	13.35	emerging	0.10	0.12	17.77	emerging
Agribusiness, Food Processing & Technology	4.09	4.28	4.53	stars	5.03	5.26	4.47	stars
Arts, Entertainment, Recreation & Visitor Industries	0.12	0.11	-9.20	transforming	0.16	0.15	-10.12	transforming
Biomedical/Biotechnical (Life Sciences)	2.14	1.85	-13.23	mature	2.07	1.66	-19.48	mature
Business & Financial Services Cluster	0.23	0.24	6.24	emerging	0.24	0.25	4.32	emerging
Chemicals & Chemical Based Products	3.03	3.03	-0.10	mature	2.78	2.78	-0.06	mature
Defense & Security	0.24	0.25	4.92	emerging	0.22	0.24	5.55	emerging
Energy (Fossil & Renewable)	1.45	1.26	-13.20	mature	0.97	0.86	-11.41	transforming
Forest & Wood Products	0.01	0.00	-100.00	transforming	0.02	0.00	-100.00	transforming
Glass & Ceramics[1]	0.00	0.50	-	emerging	0.00	0.46	-	emerging
Information Technology & Telecommunications	0.13	0.13	1.57	emerging	0.11	0.12	5.61	emerging
Transportation & Logistics	0.65	0.75	15.58	emerging	0.55	0.62	13.03	emerging
Manufacturing Supercluster	0.39	0.22	-41.89	transforming	0.44	0.25	-43.31	transforming
Primary Metal Mfg	2.19	0.00	-100.00	transforming	3.22	0.00	-100.00	transforming
Fabricated Metal Product Mfg	0.50	0.48	-5.55	transforming	0.52	0.46	-9.97	transforming
Machinery Mfg	0.69	0.67	-3.20	transforming	0.78	0.71	-9.03	transforming
Mining	1.35	0.00	-100.00	transforming	1.27	0.00	-100.00	transforming
Printing & Publishing	0.04	0.04	-13.43	transforming	0.05	0.05	-15.68	transforming

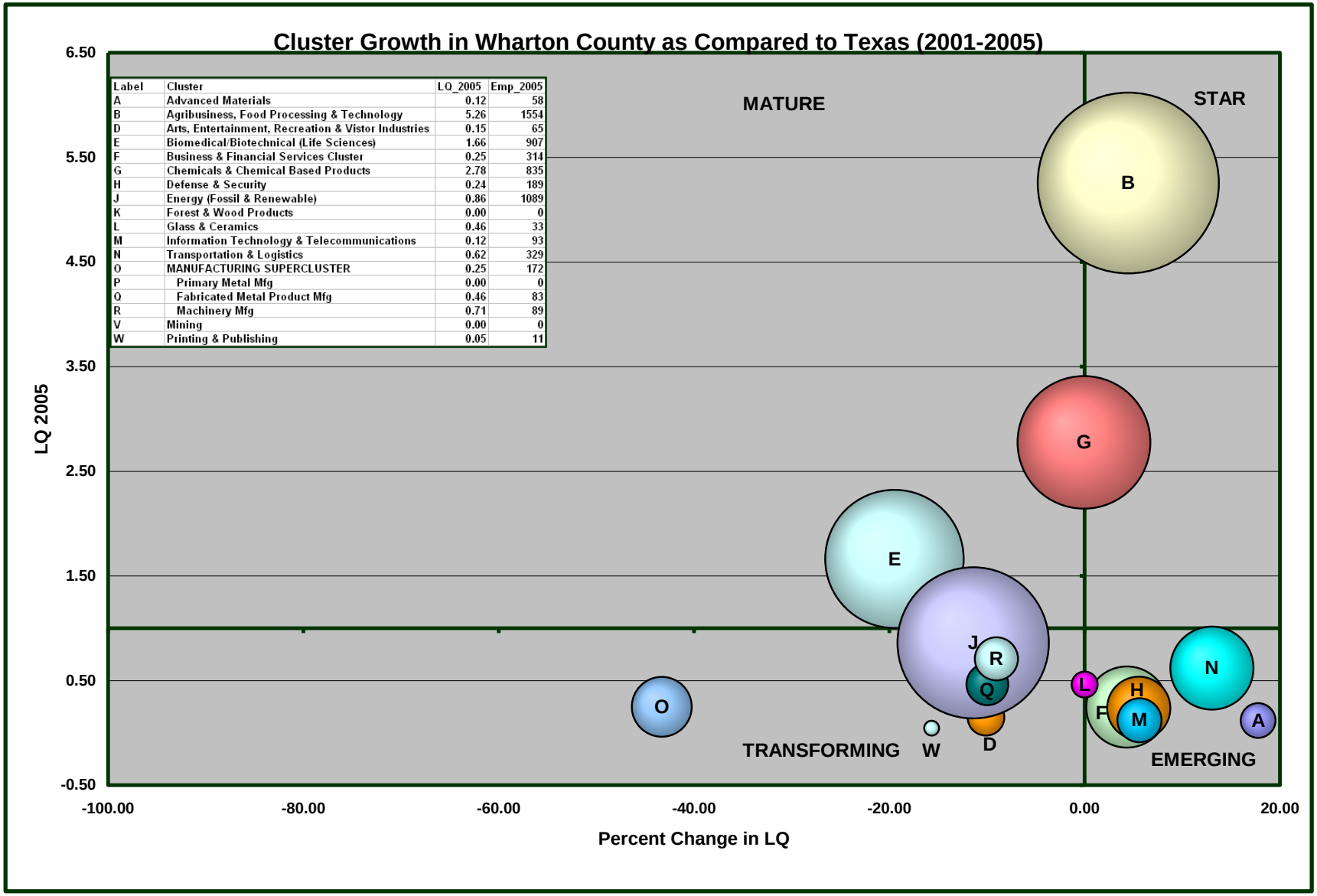
Note: [1] These clusters are not represented in bubble charts because percentage change cannot be calculated

Figure 3.2.27. Industry Cluster Performance in Wharton County as Compared to the Nation.



Label	Cluster	LQ_2005	Emp_2005
A	Advanced Materials	0.10	58
B	Agribusiness, Food Processing & Technology	4.28	1554
D	Arts, Entertainment, Recreation & Vistor Industries	0.11	65
E	Biomedical/Biotechnical (Life Sciences)	1.85	907
F	Business & Financial Services Cluster	0.24	314
G	Chemicals & Chemical Based Products	3.03	835
H	Defense & Security	0.25	189
J	Energy (Fossil & Renewable)	1.26	1089
K	Forest & Wood Products	0.00	0
M	Information Technology & Telecommunications	0.13	93
N	Transportation & Logistics	0.75	329
O	MANUFACTURING SUPERCLUSTER	0.22	172
P	Primary Metal Mfg	0.00	0
Q	Fabricated Metal Product Mfg	0.48	83
R	Machinery Mfg	0.67	89
V	Mining	0.00	0
W	Printing & Publishing	0.04	11

Figure 3.2.28. Industry Cluster Performance in Wharton County as Compared to the State.



3.3 Economic Base Analysis

The main purpose of the economic base analysis is to classify regional clusters into export and import industry categories. The analysis provides information on where a county was and where it is currently with regard to employment concentration. The economic base analysis is used to identify sectors of the local economy that serve other regions (export industries/clusters). These sectors are the backbone of local economy. The economic base theory assumes that the industry structure of local economy is made of up of two sectors:

1. *Basic Sector,* which produces and distributes goods and services for export outside the region, thus bringing wealth to the local economy. Examples of basic sector include firms in the manufacturing and energy clusters, which produce goods that are consumed within region as well as outside the region.

2. *Non-Basic Sector* whose goods and services are consumed primarily within the local area. Examples of non-basic sector include industries such as, retail trade, construction, transportation, and utilities. These firms mainly serve the local population.

The study compares county industry cluster employment to that of the state and the nation. It is important to relate the local economy to other regions because the economic activity in the local area usually depends on other regions, as well as on the state and the nation. There are several direct and indirect industry classification techniques that determine whether an industry cluster is export-oriented or not. Even though direct methods have more precision, they are not commonly used because of their intensive time, labor and financial requirements (Galambos and Schreiber 1978). Dinc (2002) proposed four different methods for classifying industry clusters into basic and non-basic sectors: 1. Assumptions Technique, 2. Location Quotient Technique, 3.Minimum Requirement Technique, and 4. Multiple Regression Analysis.

1. *Assumption Technique*: This is the simplest and most commonly used industry classification technique, which literally assumes that certain industries are basic in nature and other are non-basic. This technique assumes that all manufacturing, energy, agriculture, and federal and state government jobs are basic sector activities as they rely on external factors that are non-local in nature. Conversely, all other industries are assumed to be non-basic in nature that dependent upon local factors (Dinc 2002).

2. *Location Quotient Technique*: LQ technique identifies basic sectors by comparing the share of local industry employment with that of the nation, or the state. This is the most commonly used technique to calculate base employment. "If an industry has a greater share than expected of a given industry, then that "extra" industry employment is assumed to be basic, because those jobs are above what a local economy should have to serve local needs"(Dinc 2002 p. 18). There are three general outcomes with LQ technique: 1. A LQ of less than 1.2, indicates that the industry is non-basic in nature as it is not even meeting the local demand for a given good or service; 2. A LQ equal to 1.2, indicates that the local employment is sufficient to meet the local demand and all good services are utilized locally and nothing is exported, therefore, these industries are also considered to be non-basic in nature; and 3. Finally, industries with LQ greater than 1.2 indicates that some of the goods and services are exported to other regions, which in turn indicates that some of the employment in that industry is basic in nature. Base employment in industry *i* in region *r* is calculated as follows:

$$BE_{ir} = \left(1 - \frac{1}{LQ_i}\right) * E_{ir}$$

Where LQ_i represents location of industry *i* and E_{ir} represents employment of industry *i* in region *r*. Once the base employment is calculated, it can be used to estimate the *Base Multiplier*, which

is the ratio of the total employment in year *t* to the base employment in that year. The base multiplier is calculated as follows:

$$BM = \frac{E_r^t}{BE_r^t}$$

Where BE_r^t represents base employment of a given industry in region *r* and time *t*. E_r^t represents a given industry's total employment in region *r* and time *t*. The multiplier will provide an insight on local employment (non-base employment) based on a given change in the base employment. For example, a base multiplier value of 3.5 indicates that for every one base job created there will be additional 2.5 non-basic jobs. Base multipliers are powerful tools in analyzing and forecasting regional economic activity.

3. *Minimum Requirements Technique* (MR): This technique compares local economy with those of a sample of similar sized economies, for example, a county with one million people can be compared to four other counties of similar size (Dinc 2002). The MR technique then identifies the region with minimum share of employment for a given industry that would meet the local demand for that type of goods or services. This in turn indicates that all other regions will have some base employment, since their industry employment share is greater than the minimum share region. The MR technique then uses this minimum share to calculate a given industry's base employment. This technique is rarely used, because it is difficult to find a sample of similarly sized counties within a given geographic area.

4. *Multiple Regression Analysis*: This technique overcomes the assumption that all industries will have similar impact on the local economy (Dinc 2002). This technique is also not commonly used, since it requires a large number of observations and therefore cannot easy be performed for a small geographic region. Moreover, this technique requires data on export employment for each industry, which is hard to find.

This study utilizes the Assumption and Location Quotient Technique to identify the export-oriented clusters in the GCEDD region. The study assumes that the Business & Financial Services, Education & Knowledge Creation, and Printing & Publishing clusters are Non-basic in nature, which means that these clusters serve locally and nothing is exported. Once the export-oriented industry clusters are identified, base employment and base multiplier are estimated for those clusters. The base multiplier can be used to measure the local economic activity with respect to a given change in the base employment of a particular basic industry cluster.

Table 3.3.1 presents the estimates for base multiplier for all industry clusters across the GCEDD region and each of the thirteen counties *as compared to the nation*. The base employment and corresponding base multiplier were calculated for all the clusters in the study. With reference to the nation, the economic-base analysis indicated six export-oriented (basic) clusters for the GCEDD region. The six basic-clusters are: Biomedical/Biotechnical, Chemicals & Chemical Based Products, Energy, Transportation & Logistics, Fabricated Metal Product, and Machinery manufacturing clusters. The Transportation & Logistics cluster had the largest base multiplier value of 3.84, which means that for every one basic job created there will be additional 2.84 non-basic jobs. These non-basic jobs are associated with transportation service industries, fueling, maintenance, and insurance firms associated by this cluster. The Chemicals & Chemical Based Products cluster was found to be basic in eight of the thirteen counties. Harris County had the highest base multiplier value of 3.44 for that cluster, indicating that one basic job in that cluster would yield 2.44 non-base jobs in the county. The Biomedical/Biotechnical cluster was found to be a basic-cluster in seven of the thirteen counties, with Galveston County having the highest base multiplier value of 5.27. The Manufacturing supercluster was found to be export-oriented in Fort Bend and Waller counties with a base multiplier value of 3.17 and 2.17,

respectively. Among the thirteen counties, Fort Bend County had the highest number (nine) of export-oriented clusters in the region.

Table 3.3.2 presents the estimates for base multiplier for all industry clusters across the GCEDD region and each of the thirteen counties *as compared to the state*. With reference to the state, the economic-base analysis indicated five export-oriented (basic) clusters for the GCEDD region. The five basic-clusters are: Biomedical/Biotechnical, Chemicals & Chemical Based Products, Energy, Fabricated Metal Product, and Machinery Manufacturing clusters. The Energy cluster, which includes oil & gas extracting firms and energy related manufacturing firms, had the largest base multiplier value of 3.51, this means that for every one basic job created there will be additional 2.51 non-basic jobs. The Chemicals & Chemical Based Products cluster was found to be a basic-cluster in eight of the thirteen counties. Harris County had the highest base multiplier value of 4.41 for that cluster, indicating that one base-job in that cluster would create 3.41 non-base jobs in the county. The Biomedical/Biotechnical cluster was found to be a basic-cluster in six of the thirteen counties. The Manufacturing supercluster was found to be export-oriented in Fort Bend and Waller counties.

Table 3.3.1. Base Multiplier Estimates With Respect to the Nation

Cluster	GCEDD	Austin	Brazoria	Chambers	Colorado	Fort Bend	Galveston	Harris	Liberty	Matagorda	Montgomery	Walker	Waller	Wharton
Advanced Materials	-	-	1.71	-	-	-	-	-	-	-	-	-	-	-
Agribusiness, Food Processing & Technology	-	-	-	5.03	2.33	-	-	-	-	1.77	-	-	-	1.30
Apparel & Textiles	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arts, Entertainment, Recreation & Visitor Industries	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biomedical/Biotechnical (Life Sciences)	2.62	-	-	-	-	2.46	5.27	2.57	1.97	-	1.93	1.76	-	2.17
Business & Financial Services Cluster[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemicals & Chemical Based Products	2.82	1.37	1.23	1.22	1.43	-	-	3.44	-	-	2.85	-	1.29	1.49
Defense & Security	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education & Knowledge Creation[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy (Fossil & Renewable)	1.95	-	1.70	1.92	-	3.21	-	1.80	-	-	-	-	-	4.84
Forest & Wood Products	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glass & Ceramics	-	1.16	-	-	1.08	3.54	-	-	1.44	-	3.75	-	-	-
Information Technology & Telecommunications	-	-	-	-	-	4.29	-	-	-	-	-	-	-	-
Transportation & Logistics	3.84	-	-	3.62	4.97	-	-	2.74	-	-	-	-	-	-
MANUFACTURING SUPERCLUSTER	-	-	-	-	-	3.17	-	-	-	-	-	-	2.17	-
Primary Metal Mfg	-	-	-	1.14	-	-	-	-	-	-	-	-	-	-
Fabricated Metal Product Mfg	2.85	-	4.89	-	-	2.27	-	2.69	-	-	2.43	-	1.45	-
Machinery Mfg	2.74	-	-	-	-	3.15	-	2.41	-	-	2.67	-	1.18	-
Computer & Electronic Product Mfg	-	-	-	-	-	1.48	-	-	-	-	-	-	-	-
Electrical Equipment, Appliance & Component Mfg	-	-	2.80	-	-	1.96	-	-	-	-	-	-	-	-
Transportation Equipment Mfg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mining	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Printing & Publishing[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: [1] The study assumes that these clusters are non-basic in nature, therefore, the base multiplier estimates for these clusters is assumed to be zero

Table 3.3.2. Base Multiplier Estimates With Respect to the State

Cluster	GCEDD	Austin	Brazoria	Chambers	Colorado	Fort Bend	Galveston	Harris	Liberty	Matagorda	Montgomery	Walker	Waller	Wharton
Advanced Materials	-	-	1.51	-	-	3.52	-	-	-	-	-	-	-	-
Agribusiness, Food Processing & Technology	-	-	-	2.88	1.87	-	-	-	-	1.55	-	-	-	1.24
Apparel & Textiles	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arts, Entertainment, Recreation & Visitor Industries	-	-	-	-	-	-	2.70	-	-	-	4.76	-	-	-
Biomedical/Biotechnical (Life Sciences)	3.22	-	-	-	-	2.96	-	3.14	2.21	-	2.16	1.93	-	2.51
Business & Financial Services Cluster[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemicals & Chemical Based Products	3.37	1.42	1.26	1.25	1.49	-	-	4.41	-	-	3.41	-	1.33	1.56
Defense & Security	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education & Knowledge Creation[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy (Fossil & Renewable)	3.51	-	2.50	3.37	-	-	-	2.86	-	-	-	-	-	-
Forest & Wood Products	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glass & Ceramics	-	1.18	-	-	1.09	4.68	-	-	1.50	-	5.08	-	-	-
Information Technology & Telecommunications	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transportation & Logistics	-	-	-	-	-	-	-	4.29	-	-	-	-	-	-
MANUFACTURING SUPERCLUSTER	-	-	-	-	-	2.63	-	-	-	-	-	-	1.95	-
Primary Metal Mfg	-	-	-	1.10	-	-	-	-	-	-	-	-	-	-
Fabricated Metal Product Mfg	2.99	-	5.43	-	-	2.35	-	2.81	-	-	2.52	-	1.47	-
Machinery Mfg	2.51	-	-	-	-	2.83	-	2.24	-	-	2.46	-	1.17	-
Computer & Electronic Product Mfg	-	-	-	-	-	1.62	-	-	-	-	-	-	-	-
Electrical Equip., Appliance & Component Mfg	-	-	1.57	-	-	1.38	-	-	-	-	-	-	-	-
Transportation Equipment Mfg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mining	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Printing & Publishing[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: [1] The study assumes that these clusters are non-basic in nature, therefore, the base multiplier estimates for these clusters is assumed to be zero

Despite the usefulness of LQ and economic base analysis, the methods do not provide any basis for comparing local economy against national trends (Quintero 2007). This issue can be addressed by using shift-share analysis, which tells you who local economy is reacting to the nation trends.

3.4 Shift-Share Analysis

Shift-share analysis is another economic development tool, which complements LQ and economic base analysis. The purpose of shift-share analysis is to indicate the relative economic growth rate of the region's industries as compared to the national trends and determine regional comparative advantages. It determines how much of regional job growth can be attributed to national trends and how much can be attributed to local economic conditions There are three components involved in performing shift-share analysis, they are: National Growth, Industry Mix, and Competitive Share component.

National Growth Component (NG): This component explains how much of the regional industry's growth is explained by the overall condition of the national economy. It measures the regional economic change that would have occurred if the regions had grown at the same rate as a reference area (Dinc 2002). The NG is calculated as follows:

$$NG = E_i^t \left(\frac{N^{t+1}}{N^t} - 1 \right)$$

where E_i^t indicates regional employment in a given industry i at the beginning of a period t, N^t represents total national employment at the beginning of a period t, and N^{t+1} represents total national employment at the end of the period $t+1$.

Industry Mix Component (IM): This component determines the quantity of growth that can be attributed to the region's mix of industries. It determines the share of regional industry growth that is explained by the growth of that industry nationally. The IM is calculated as follows:

$$IM = E_i^t \left(\frac{N_i^{t+1}}{N_i^t} - \frac{N^{t+1}}{N^t} \right)$$

where E_i^t indicates regional employment in a given industry *i* at the beginning of a period *t*, N^t represents total national employment at the beginning of a period *t*, N^{t+1} represents total national employment at the end of the period *t+1*, N_i^t represents national employment in a given industry *i* at the beginning of a period *t*, and N_i^{t+1} represents national employment in a given industry *i* at the end of the period *t+1*

Competitive Share Component (CS): This component measures the change in an industry locally and nationally, representing the regions comparative advantage for that industry. This is the most important component of shift-share analysis as this is totally influenced by local economic conditions. The CS is calculated as follows:

$$CS = E_i^t \left(\frac{E_i^{t+1}}{E_i^t} - \frac{N_i^{t+1}}{N_i^t} \right)$$

where E_i^t indicates regional employment in a given industry *i* at the beginning of a period *t*, E_i^{t+1} indicates regional employment in a given industry *i* at the end of the period *t+1*, N_i^t represents national employment in a given industry *i* at the beginning of a period *t*, and N_i^{t+1} represents national employment in a given industry *i* at the end of the period *t+1*

For our analysis purpose, we also calculate expected change, which is a sum of national growth and industry mix component, which is basically the job growth that one would expect if the region follows national trend. The total economic change, which indicates a region's actual growth or decline, is determined by summing up the three components.

$EC=NG + IM$; $TEC=NG+IM+CS$;

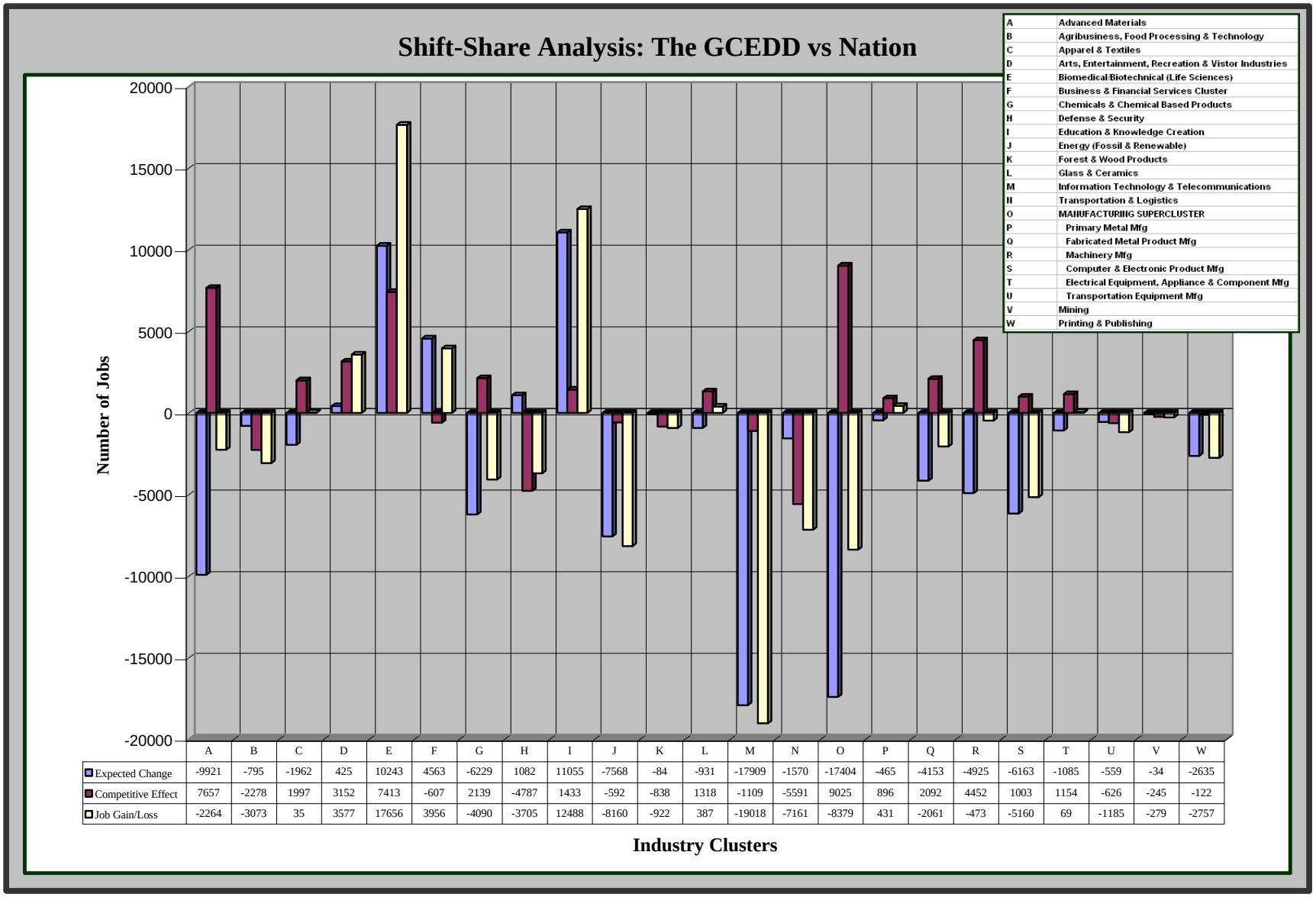
Figure 3.4.1 presents the results of shift-share analysis of industry clusters in the GCEDD region as compared to the nation. A positive competitive share for a particular cluster indicates that the

region has comparative advantage for that cluster as compared to other regions. The GCEDD region has a tremendous comparative advantage for Manufacturing, Advanced material, Apparel & textiles, and Arts, entertainment, recreation & visitor industry clusters. These industry clusters are performing relatively well in the region as compared to national trends. For example, the manufacturing supercluster lost 8.4 thousand jobs between 2001 and 2005; however, this job loss was not because of local economic conditions, but because of nation trends. Moreover, the local economic conditions mitigated the job loss as the region would have lost 17.4 thousand jobs instead of 8.4 thousand, if it followed national trend. The shift-share components are especially useful in preventing inaccurate interpretations about significant industry job growth/loss in a region (EMSI 2007). For example, if an industry is booming in a region, we would generally assume that the region favors that industry, however, shift-share analysis may reveal that the industry is growing at a faster rate nationally, indicating that the local factors have less influence on regional industry growth. This is especially the case with Biotech and Education clusters in the GCEDD region. Between 2001 and 2005, Biotech cluster gained 17.7 thousand jobs, which is mainly because of nation trend. The region was not performing as good as the nation. Same is the case with Education cluster, where the national influence had a greater impact on the regional cluster performance as compared to the local economic conditions. The cluster gained only 1.4 thousand jobs out of 12.5 thousand as a result of local economic factors, whereas it gained 11.1 thousand jobs because of the external factors. From 2001-2005, the Information technology and telecommunications cluster lost most jobs (19.0 thousand) because of external factors (non-local), which accounted for 17.9 thousand jobs lost.

Figure 3.4.2 presents the results of shift-share analysis of industry clusters in the GCEDD region as compared to the state. The GCEDD region when compared to Texas has a comparative

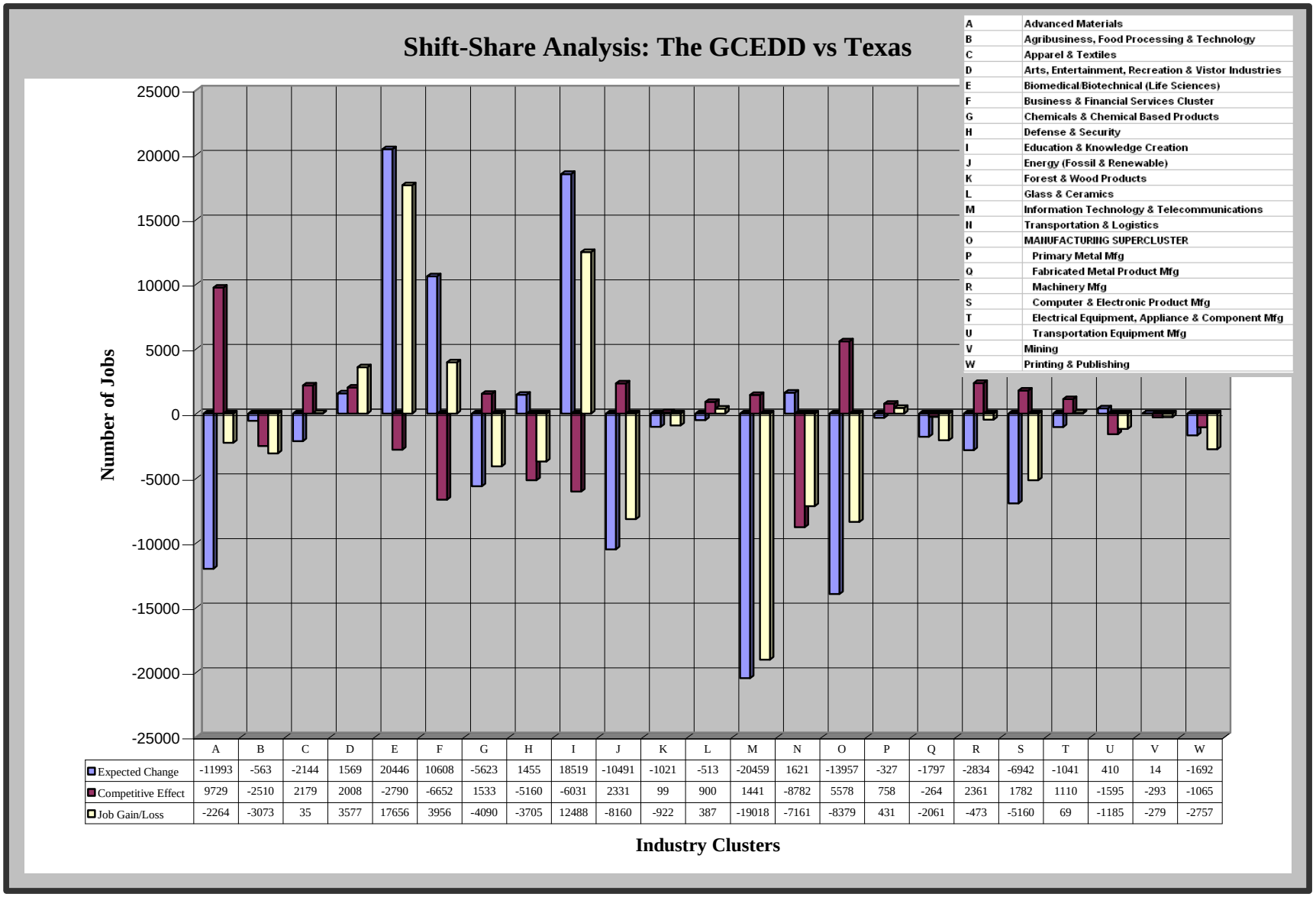
advantage for industry clusters such as: Advanced material, Manufacturing, Apparel & textiles, Arts, entrainment, recreation & visitor industries, Chemical & chemical based products, Energy, and Information technology & telecommunication clusters. For example, favorable local economic conditions have mitigated the jobs lost in advanced materials clusters because, had if the cluster followed national trend alone, it would have lost 12 thousand jobs instead of 2.3 thousand. The region, however, has a comparative disadvantage for certain industry clusters such as: Biotech, Business & financial services, and Education clusters. Between 2001 and 2005, the region gained 17.7 thousand Biotech (Life Science) jobs; however, this number was lowered by unfavorable economic conditions, which resulted in 2.8 thousand job losses. Had the region followed national trend it would have gained 20.5 thousand jobs instead of 17.7 thousand jobs. This is not a favorable result for the GCEDD region, especially with respect to the Biotech cluster, because, at present, it is one of the fastest growing clusters in the nation and it also has significant positive economies of scale. Although the shift-share analysis determines a region's comparative advantage/disadvantage with respect to a given industry cluster, it does not specify the factors responsible for the actual growth or decline. A study conducted by Sambidi and Harrison (2007) indicated that availability of venture capital firms, research institutions, and hospitals are the most significant factors affecting the location of the Biotech cluster. This indicates that the Biotech cluster prefers to locate in regions where they have good sources for financing their business , access to research institutes to collaborate with skilled labor and obtain new technology, and access to hospitals for research, testing and marketing of new biotech products (Sambidi and Harrison 2007). Tables' 3.4.3-3.4.28 presents shift-share analysis of each of the thirteen counties as compared to the nation and the state, respectively. The interpretation is same as above.

Figure 3.4.1. Shift-Share Analysis of the GCEDD Region Industry Clusters as Compared to the Nation



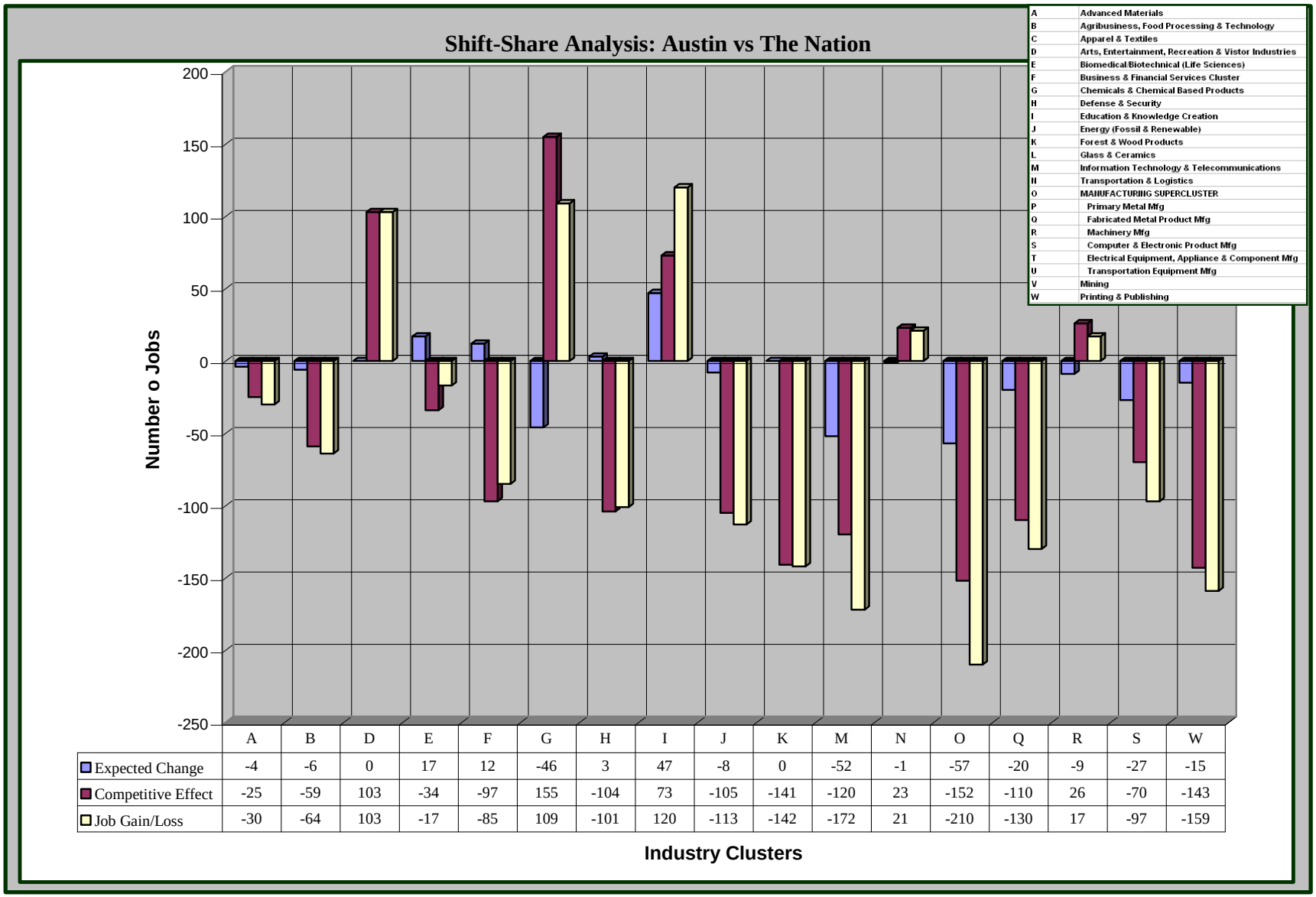
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Expected Change	-9921	-795	-1962	425	10243	4563	-6229	1082	11055	-7568	-84	-931	-17909	-1570	-17404	-465	-4153	-4925	-6163	-1085	-559	-34	-2635
Competitive Effect	7657	-2278	1997	3152	7413	-607	2139	-4787	1433	-592	-838	1318	-1109	-5591	9025	896	2092	4452	1003	1154	-626	-245	-122
Job Gain/Loss	-2264	-3073	35	3577	17656	3956	-4090	-3705	12488	-8160	-922	387	-19018	-7161	-8379	431	-2061	-473	-5160	69	-1185	-279	-2757

Figure 3.4.2. Shift-Share Analysis of the GCEDD Region Industry Clusters as Compared to the State



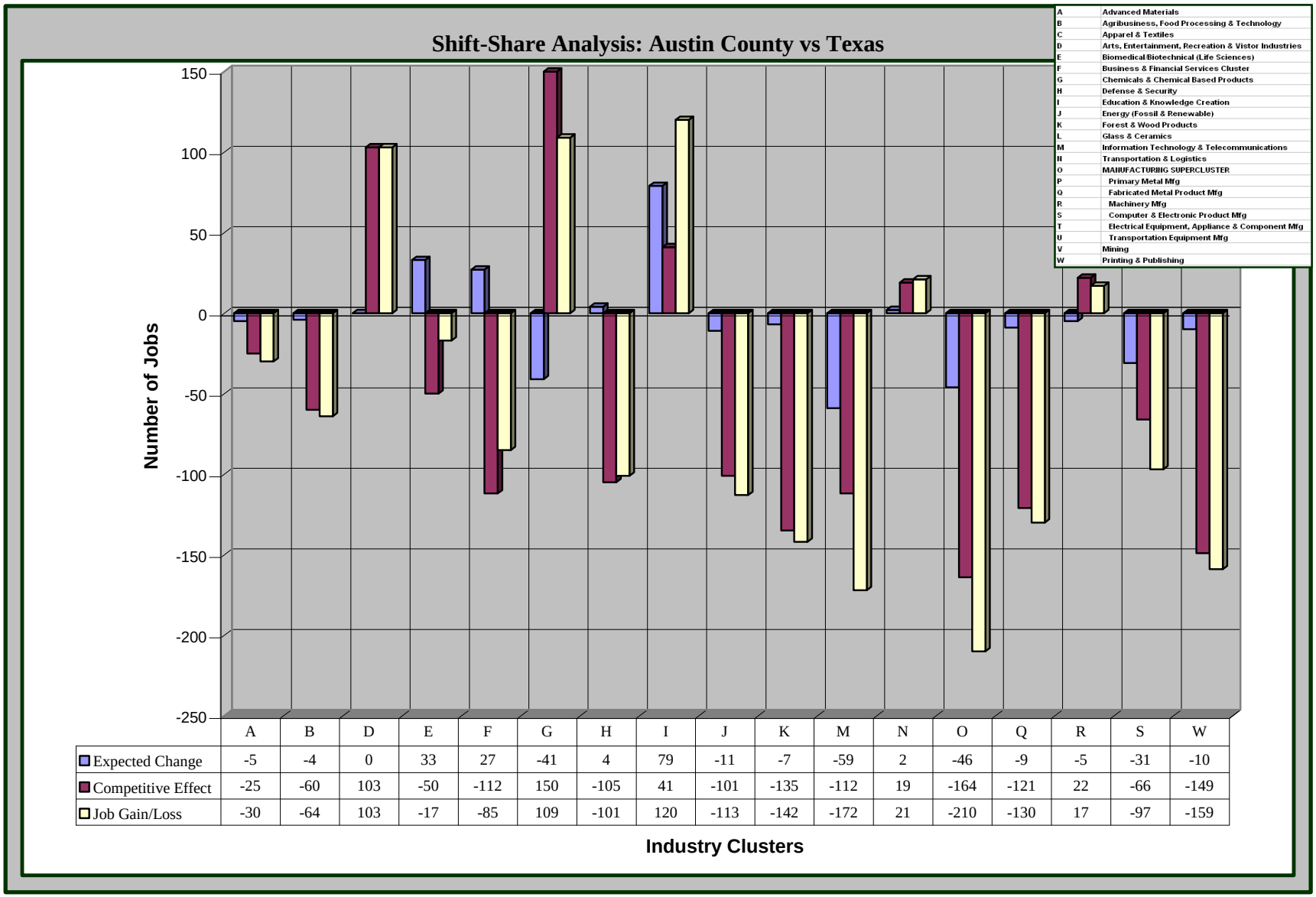
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Expected Change	-11993	-563	-2144	1569	20446	10608	-5623	1455	18519	-10491	-1021	-513	-20459	1621	-13957	-327	-1797	-2834	-6942	-1041	410	14	-1692
Competitive Effect	9729	-2510	2179	2008	-2790	-6652	1533	-5160	-6031	2331	99	900	1441	-8782	5578	758	-264	2361	1782	1110	-1595	-293	-1065
Job Gain/Loss	-2264	-3073	35	3577	17656	3956	-4090	-3705	12488	-8160	-922	387	-19018	-7161	-8379	431	-2061	-473	-5160	69	-1185	-279	-2757

Figure 3.4.3. Shift-Share Analysis of Austin County Industry Clusters as Compared to the Nation



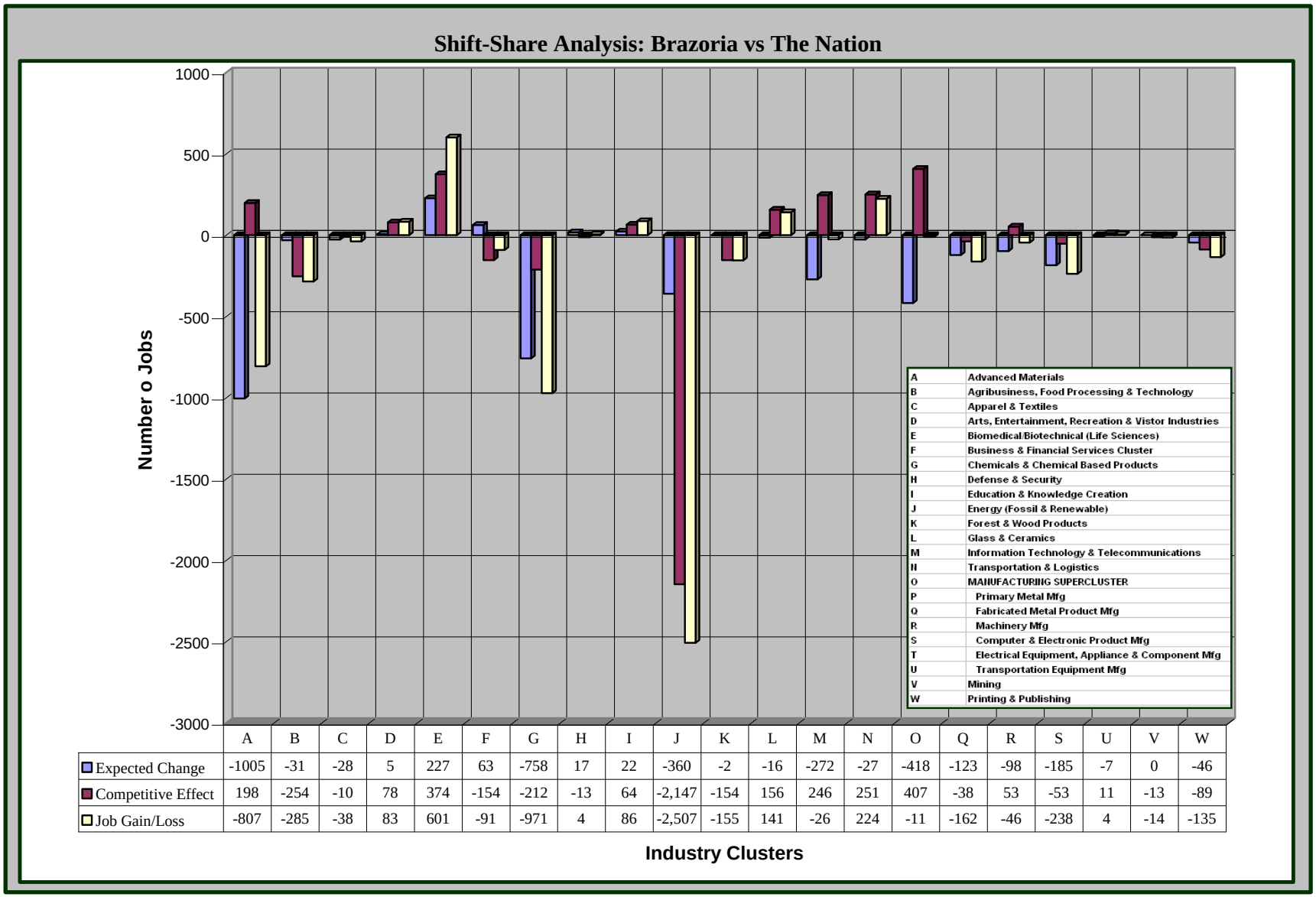
	A	B	D	E	F	G	H	I	J	K	M	N	O	Q	R	S	W
Expected Change	-4	-6	0	17	12	-46	3	47	-8	0	-52	-1	-57	-20	-9	-27	-15
Competitive Effect	-25	-59	103	-34	-97	155	-104	73	-105	-141	-120	23	-152	-110	26	-70	-143
Job Gain/Loss	-30	-64	103	-17	-85	109	-101	120	-113	-142	-172	21	-210	-130	17	-97	-159

Figure 3.4.4. Shift-Share Analysis of Austin County Industry Clusters as Compared to the State



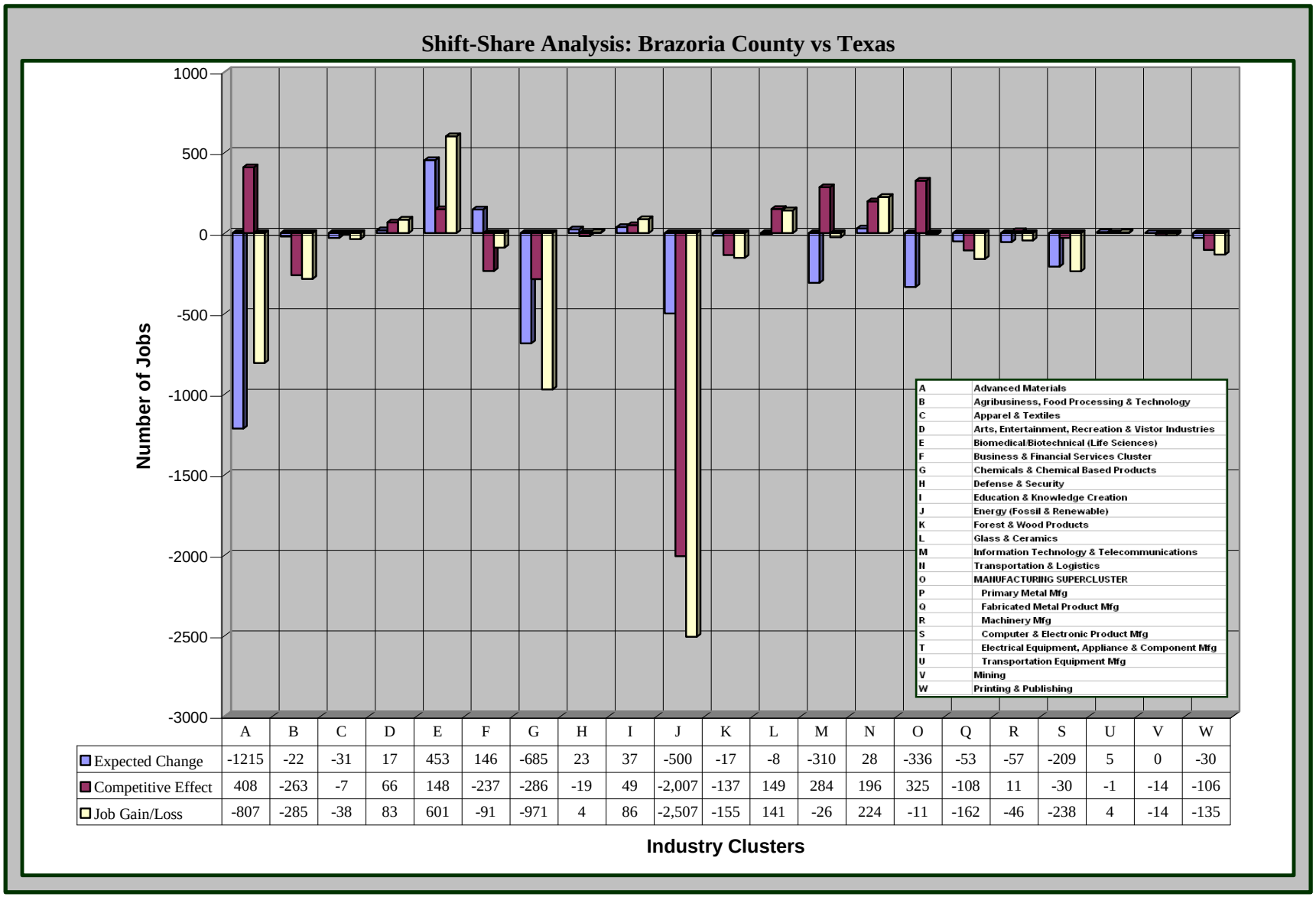
	A	B	D	E	F	G	H	I	J	K	M	N	O	Q	R	S	W
Expected Change	-5	-4	0	33	27	-41	4	79	-11	-7	-59	2	-46	-9	-5	-31	-10
Competitive Effect	-25	-60	103	-50	-112	150	-105	41	-101	-135	-112	19	-164	-121	22	-66	-149
Job Gain/Loss	-30	-64	103	-17	-85	109	-101	120	-113	-142	-172	21	-210	-130	17	-97	-159

Figure 3.4.5. Shift-Share Analysis of Brazoria County Industry Clusters as Compared to the Nation



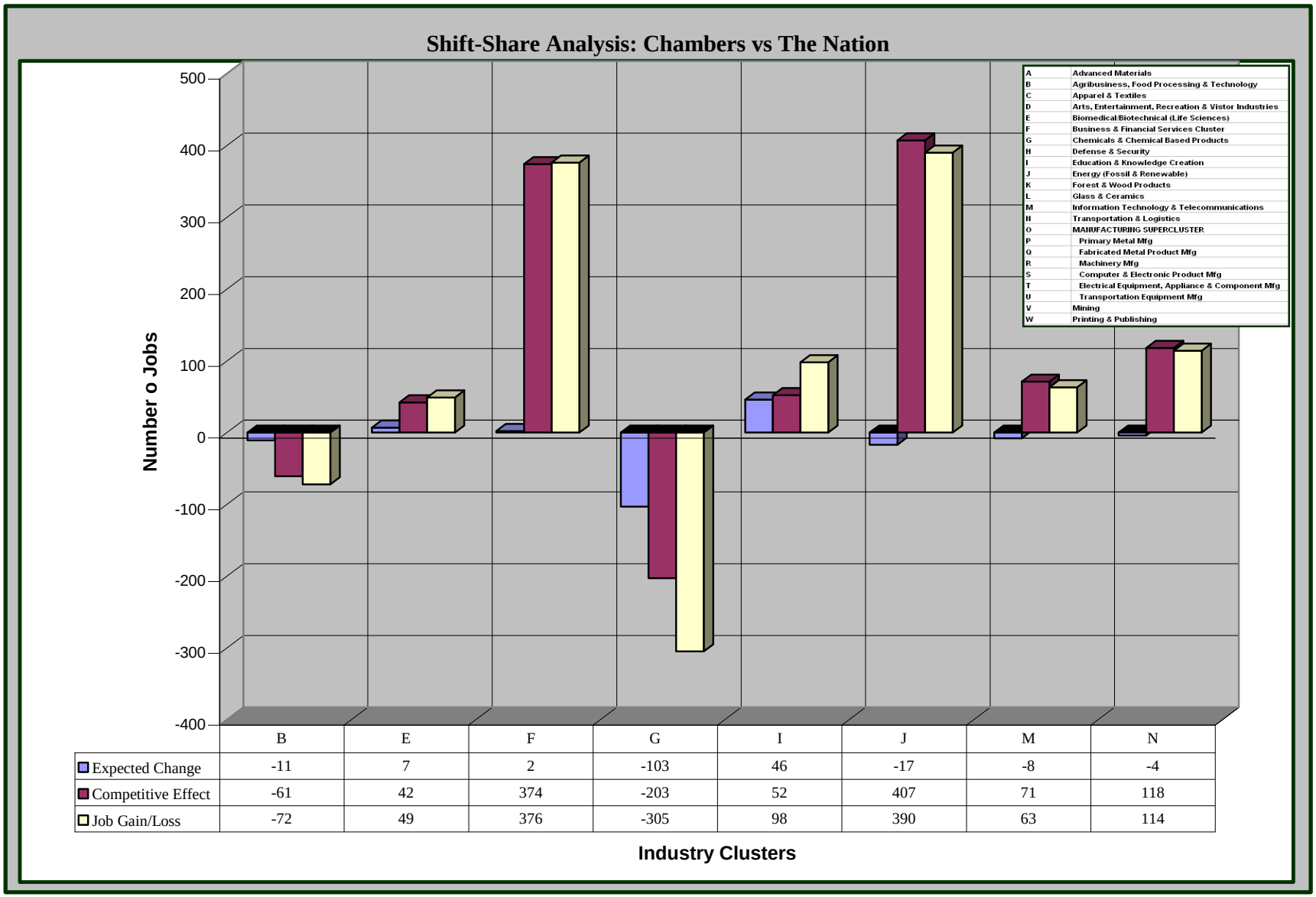
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q	R	S	U	V	W
Expected Change	-1005	-31	-28	5	227	63	-758	17	22	-360	-2	-16	-272	-27	-418	-123	-98	-185	-7	0	-46
Competitive Effect	198	-254	-10	78	374	-154	-212	-13	64	-2,147	-154	156	246	251	407	-38	53	-53	11	-13	-89
Job Gain/Loss	-807	-285	-38	83	601	-91	-971	4	86	-2,507	-155	141	-26	224	-11	-162	-46	-238	4	-14	-135

Figure 3.4.6. Shift-Share Analysis of Brazoria County Industry Clusters as Compared to the State



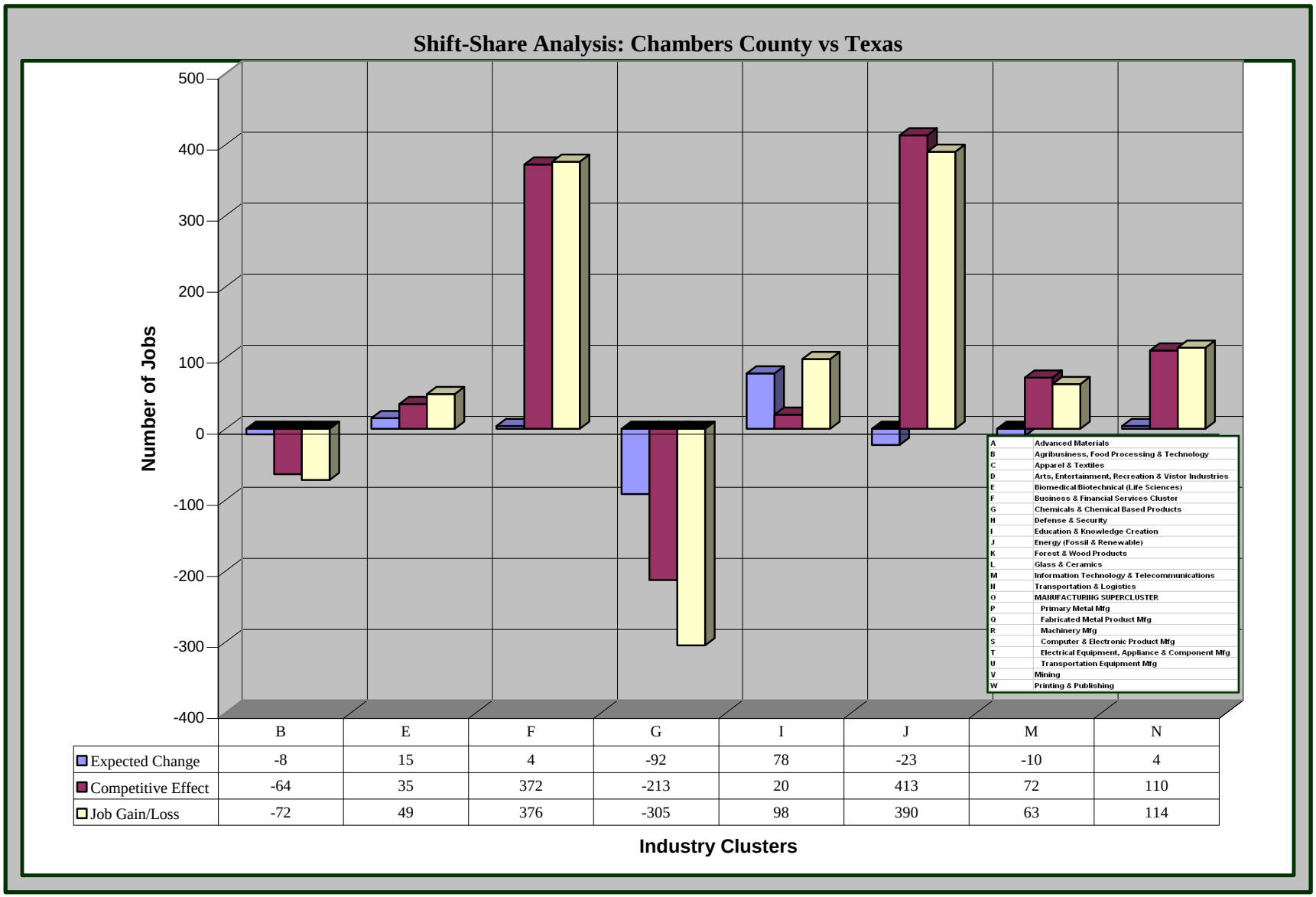
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q	R	S	U	V	W
Expected Change	-1215	-22	-31	17	453	146	-685	23	37	-500	-17	-8	-310	28	-336	-53	-57	-209	5	0	-30
Competitive Effect	408	-263	-7	66	148	-237	-286	-19	49	-2,007	-137	149	284	196	325	-108	11	-30	-1	-14	-106
Job Gain/Loss	-807	-285	-38	83	601	-91	-971	4	86	-2,507	-155	141	-26	224	-11	-162	-46	-238	4	-14	-135

Figure 3.4.7. Shift-Share Analysis of Chambers County Industry Clusters as Compared to the Nation



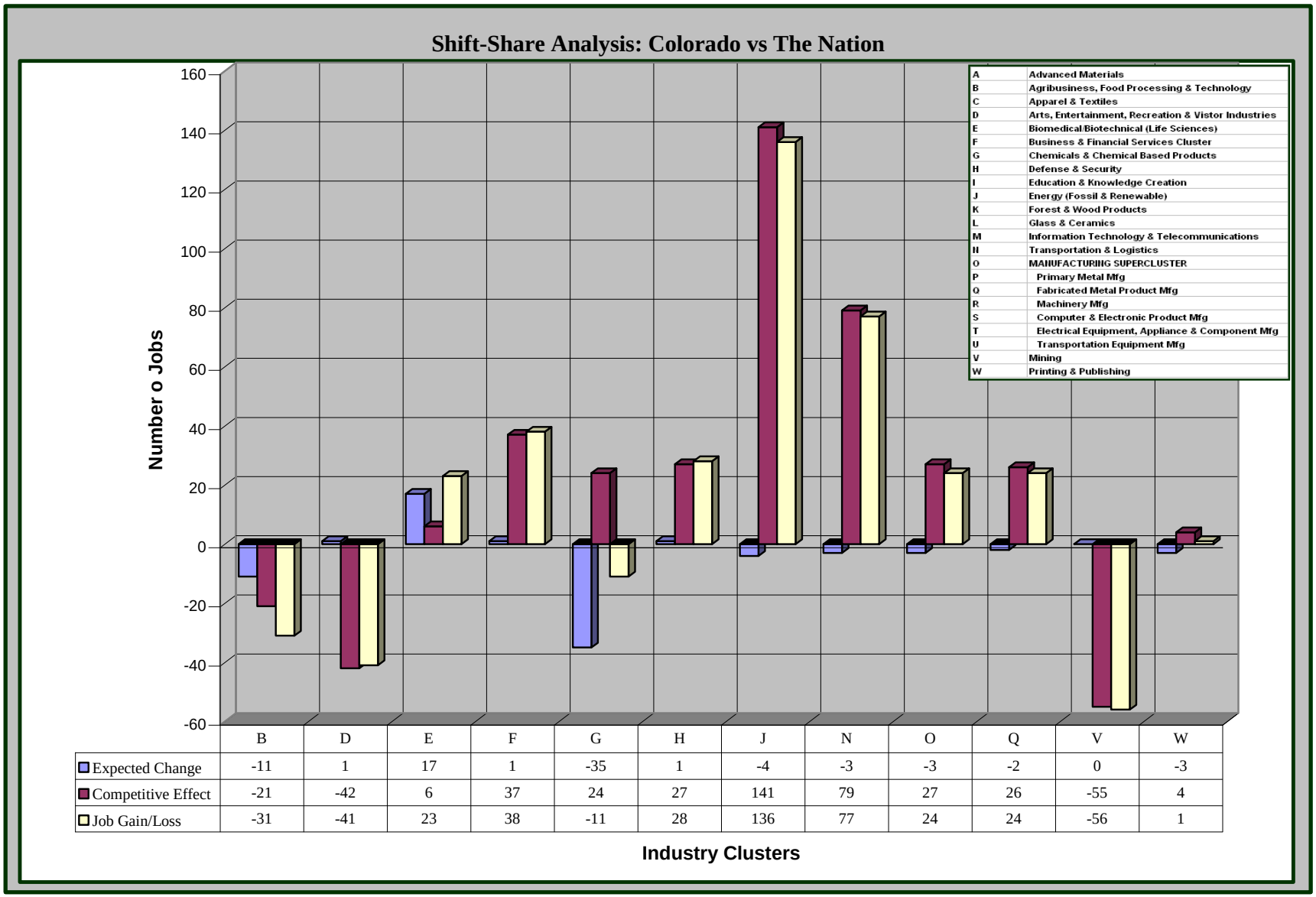
	B	E	F	G	I	J	M	N
Expected Change	-11	7	2	-103	46	-17	-8	-4
Competitive Effect	-61	42	374	-203	52	407	71	118
Job Gain/Loss	-72	49	376	-305	98	390	63	114

Figure 3.4.8. Shift-Share Analysis of Chambers County Industry Clusters as Compared to the State



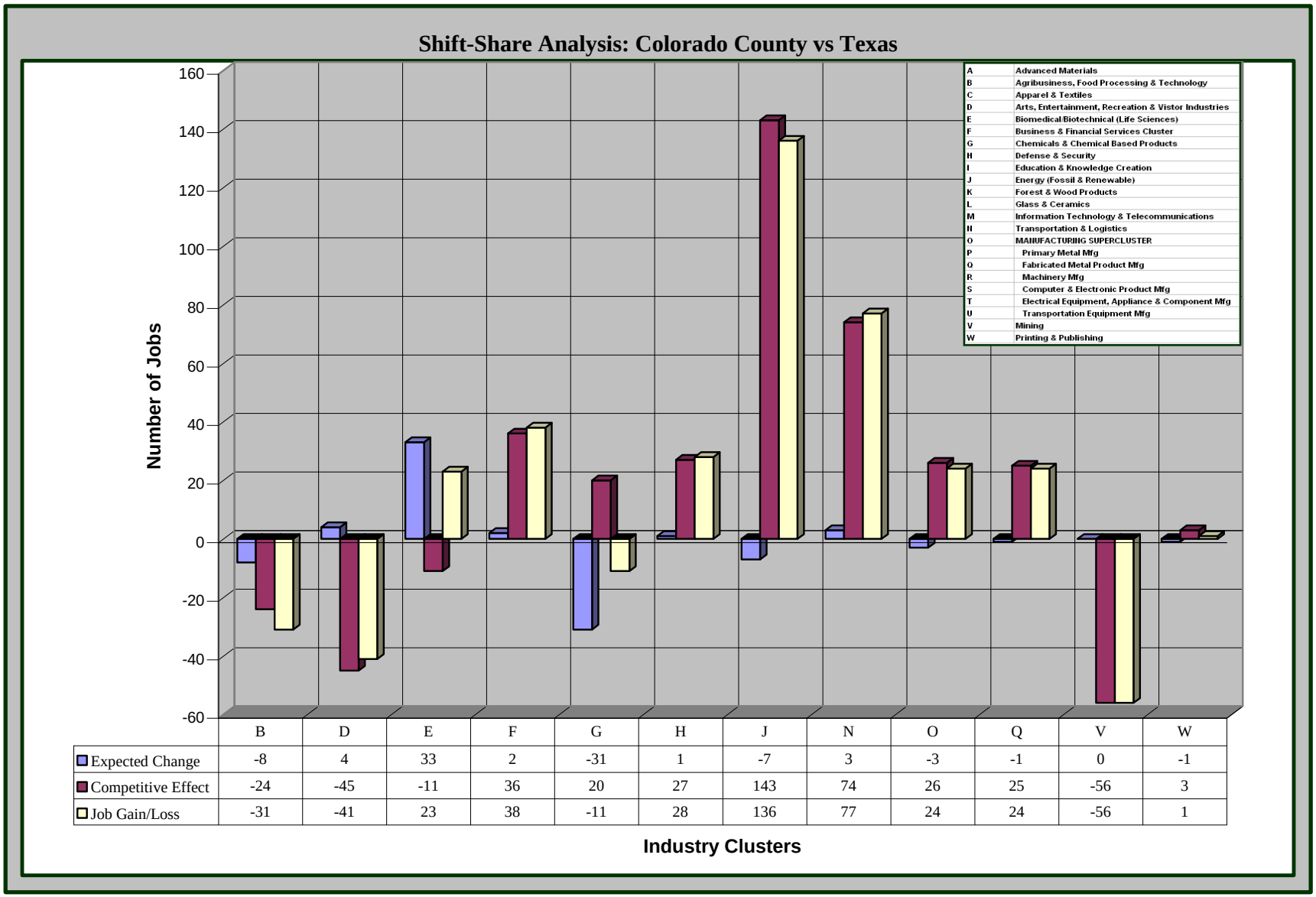
	B	E	F	G	I	J	M	N
Expected Change	-8	15	4	-92	78	-23	-10	4
Competitive Effect	-64	35	372	-213	20	413	72	110
Job Gain/Loss	-72	49	376	-305	98	390	63	114

Figure 3.4.9. Shift-Share Analysis of Colorado County Industry Clusters as Compared to the Nation



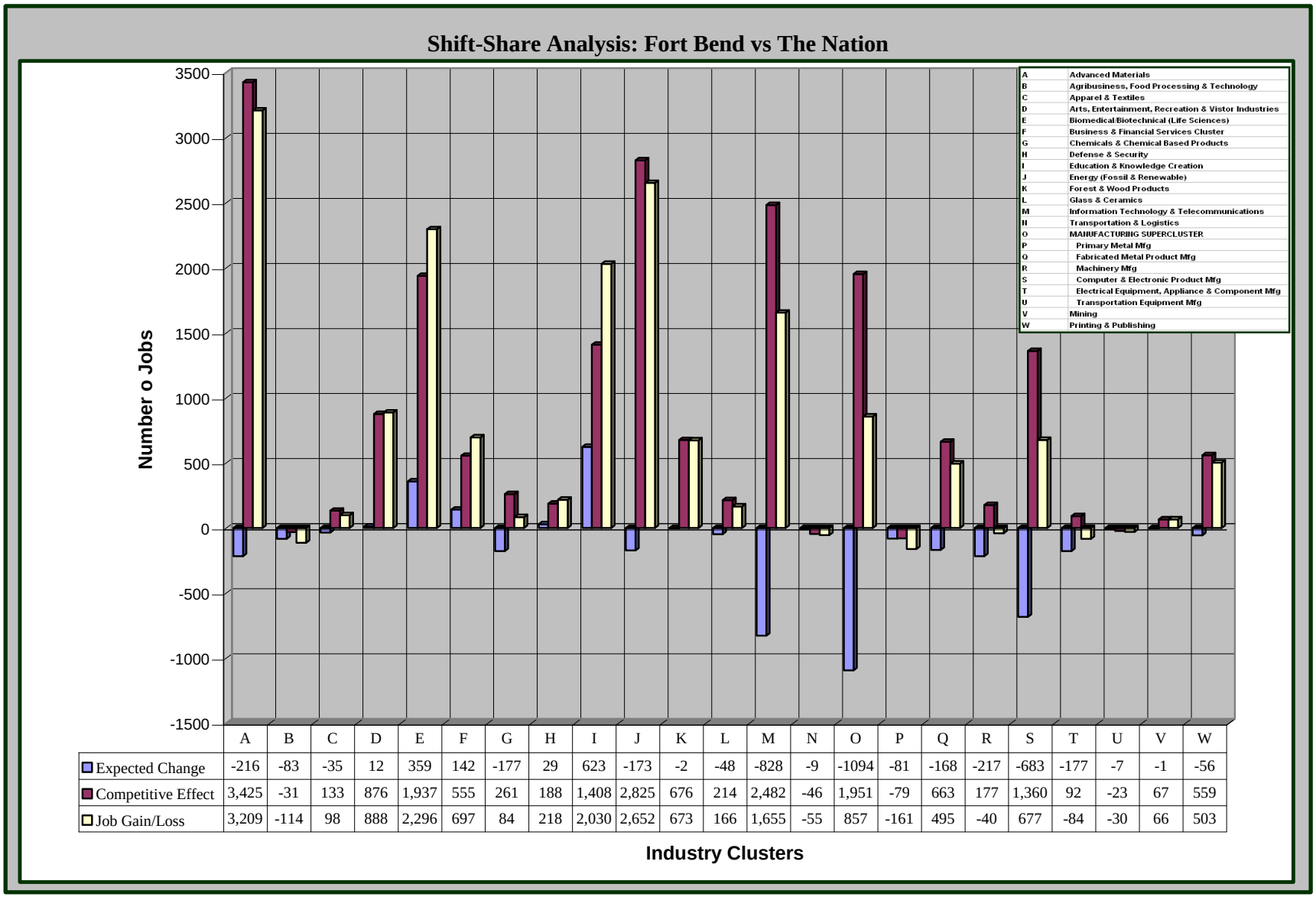
	B	D	E	F	G	H	J	N	O	Q	V	W
Expected Change	-11	1	17	1	-35	1	-4	-3	-3	-2	0	-3
Competitive Effect	-21	-42	6	37	24	27	141	79	27	26	-55	4
Job Gain/Loss	-31	-41	23	38	-11	28	136	77	24	24	-56	1

Figure 3.4.10. Shift-Share Analysis of Colorado County Industry Clusters as Compared to the State



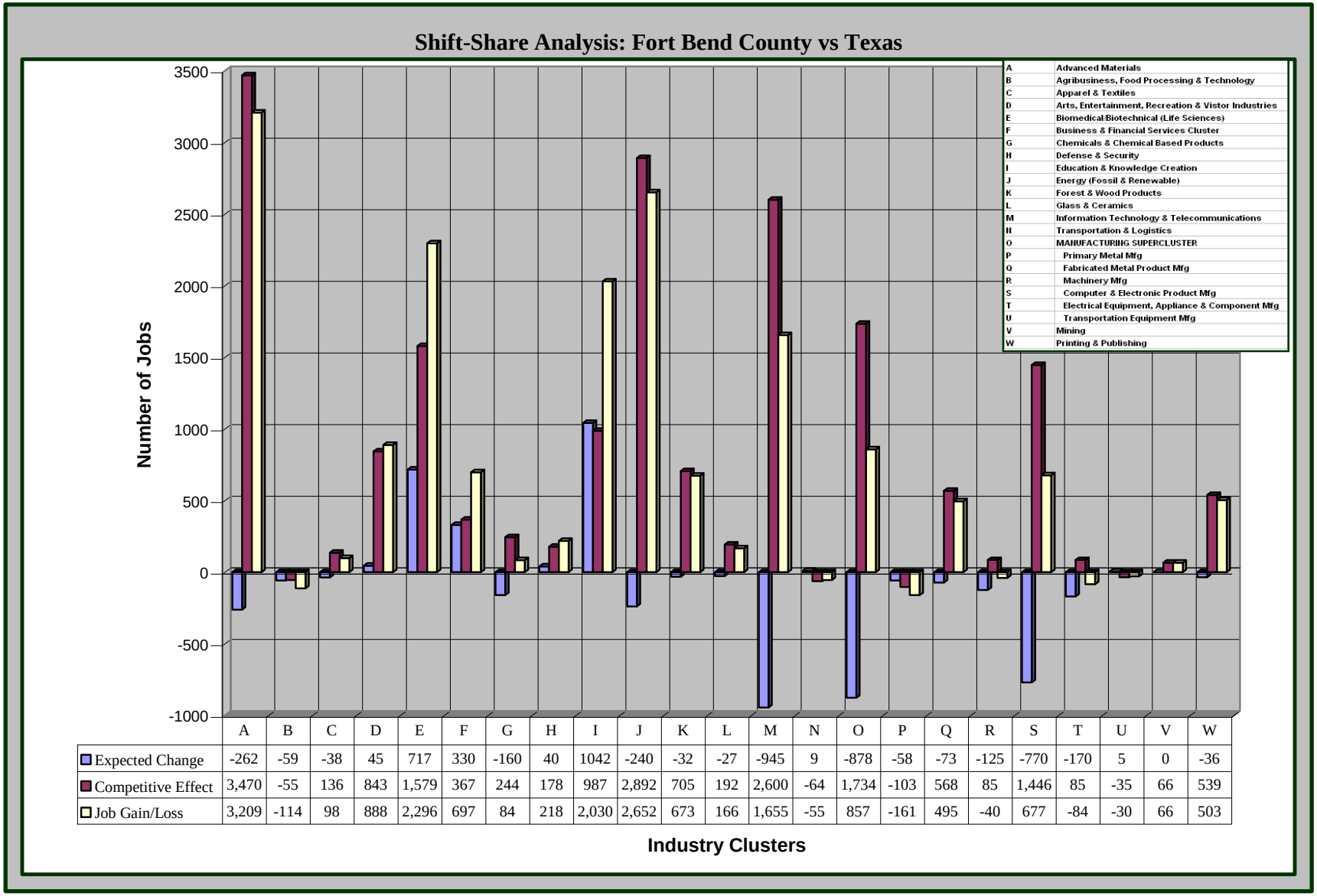
	B	D	E	F	G	H	J	N	O	Q	V	W
Expected Change	-8	4	33	2	-31	1	-7	3	-3	-1	0	-1
Competitive Effect	-24	-45	-11	36	20	27	143	74	26	25	-56	3
Job Gain/Loss	-31	-41	23	38	-11	28	136	77	24	24	-56	1

Figure 3.4.11. Shift-Share Analysis of Fort Bend County Industry Clusters as Compared to the Nation



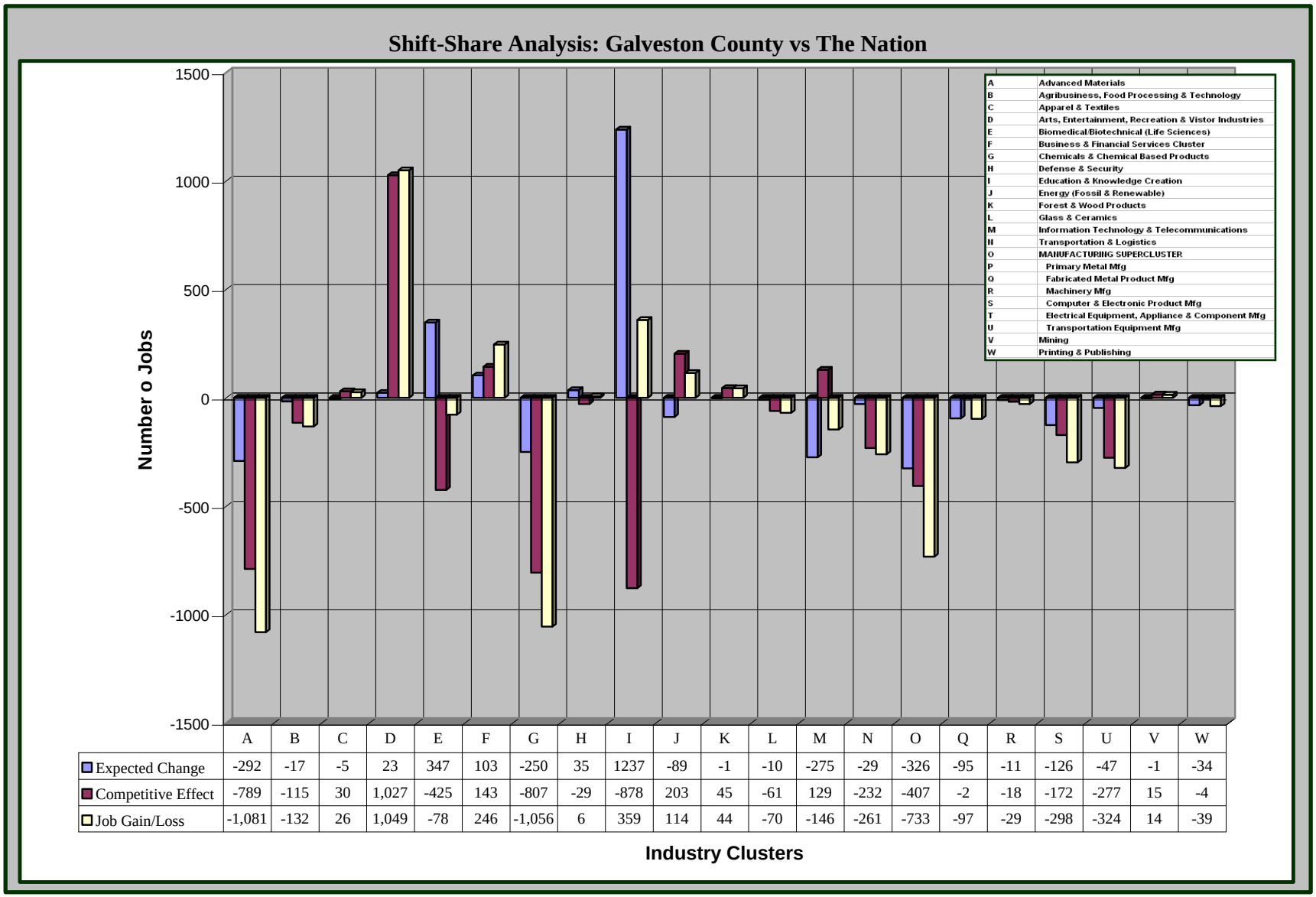
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Expected Change	-216	-83	-35	12	359	142	-177	29	623	-173	-2	-48	-828	-9	-1094	-81	-168	-217	-683	-177	-7	-1	-56
Competitive Effect	3,425	-31	133	876	1,937	555	261	188	1,408	2,825	676	214	2,482	-46	1,951	-79	663	177	1,360	92	-23	67	559
Job Gain/Loss	3,209	-114	98	888	2,296	697	84	218	2,030	2,652	673	166	1,655	-55	857	-161	495	-40	677	-84	-30	66	503

Figure 3.4.12. Shift-Share Analysis of Fort Bend County Industry Clusters as Compared to the State



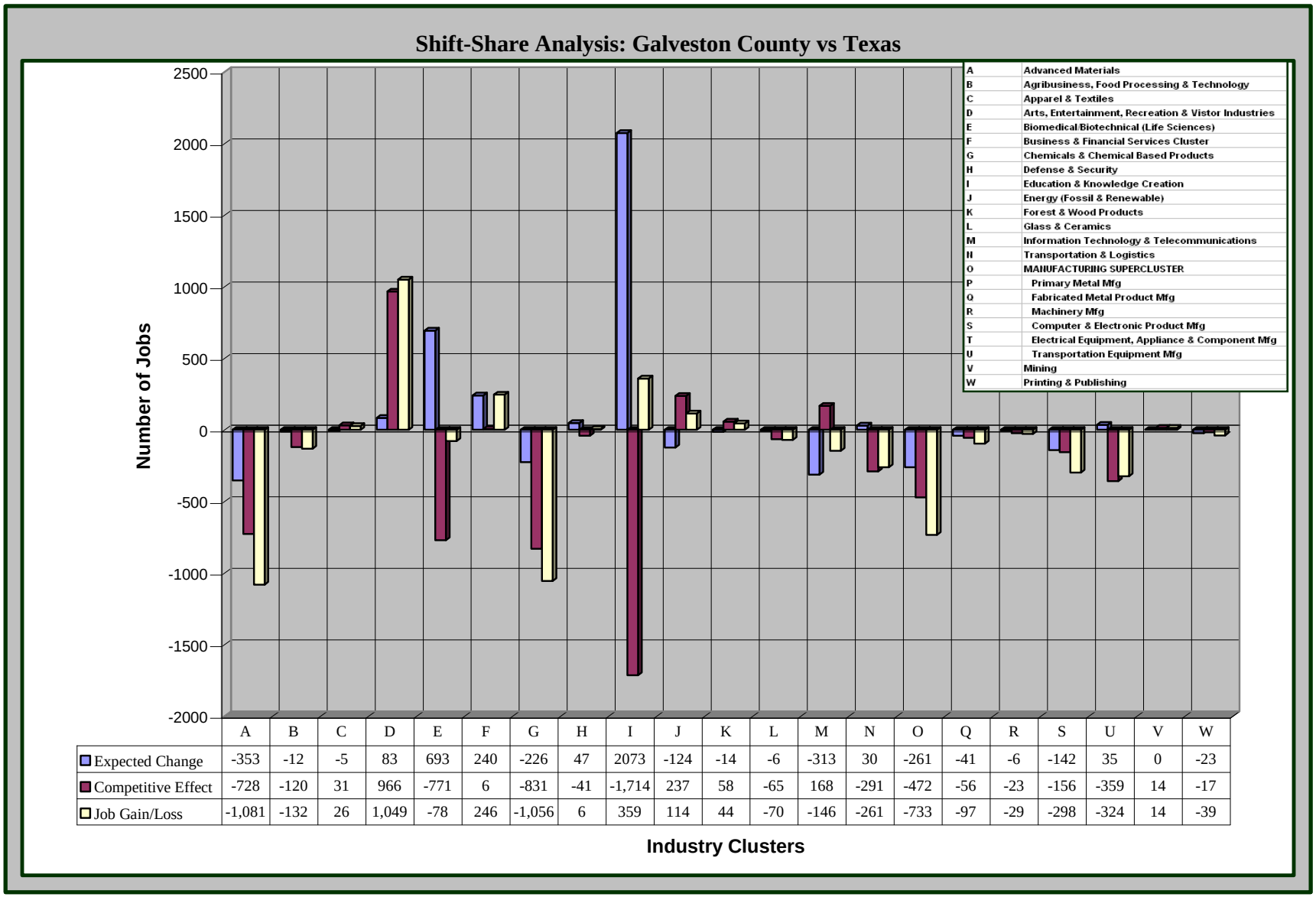
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Expected Change	-262	-59	-38	45	717	330	-160	40	1042	-240	-32	-27	-945	9	-878	-58	-73	-125	-770	-170	5	0	-36
Competitive Effect	3,470	-55	136	843	1,579	367	244	178	987	2,892	705	192	2,600	-64	1,734	-103	568	85	1,446	85	-35	66	539
Job Gain/Loss	3,209	-114	98	888	2,296	697	84	218	2,030	2,652	673	166	1,655	-55	857	-161	495	-40	677	-84	-30	66	503

Figure 3.4.13. Shift-Share Analysis of Galveston County Industry Clusters as Compared to the Nation



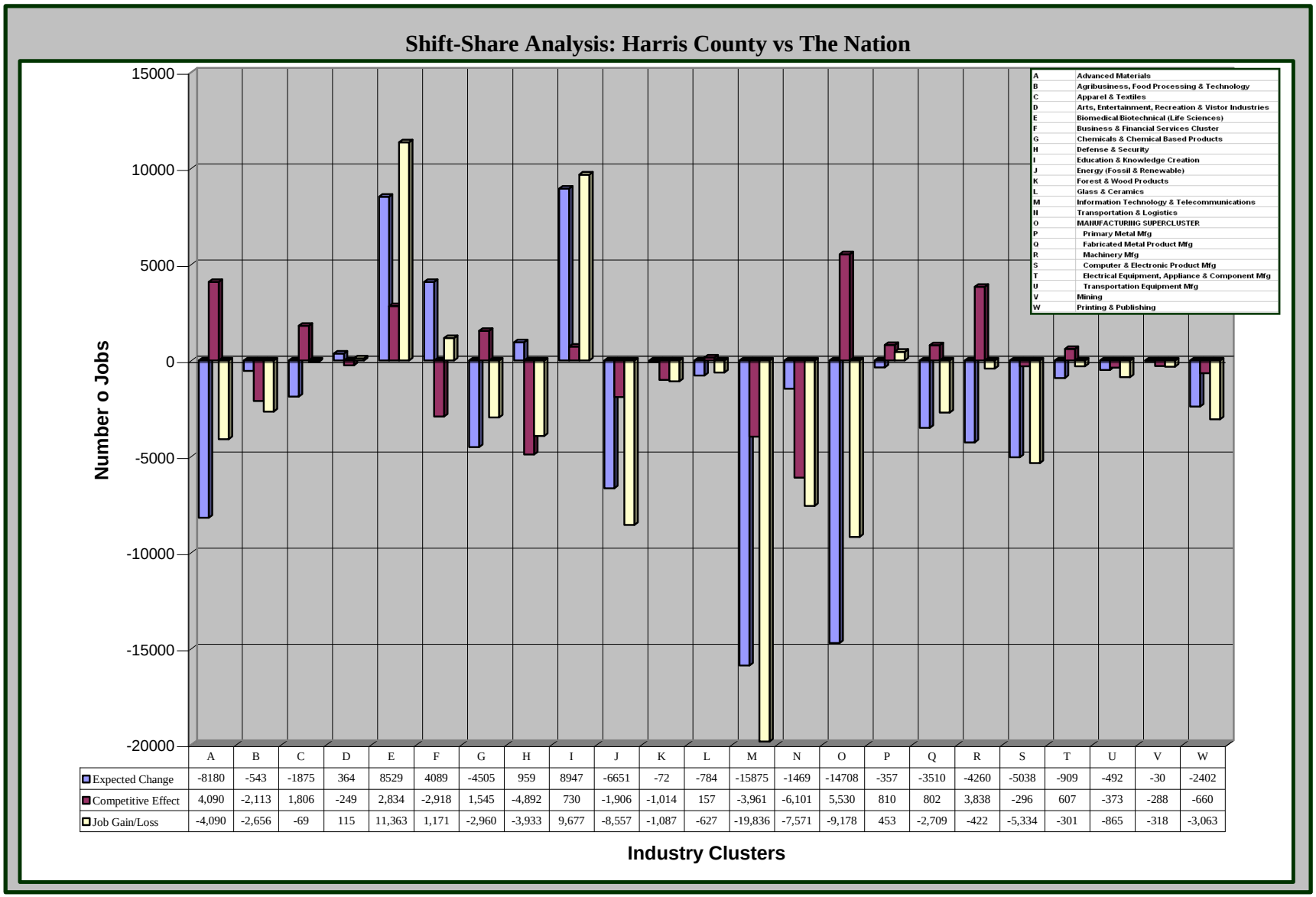
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q	R	S	U	V	W
Expected Change	-292	-17	-5	23	347	103	-250	35	1237	-89	-1	-10	-275	-29	-326	-95	-11	-126	-47	-1	-34
Competitive Effect	-789	-115	30	1,027	-425	143	-807	-29	-878	203	45	-61	129	-232	-407	-2	-18	-172	-277	15	-4
Job Gain/Loss	-1,081	-132	26	1,049	-78	246	-1,056	6	359	114	44	-70	-146	-261	-733	-97	-29	-298	-324	14	-39

Figure 3.4.14. Shift-Share Analysis of Galveston County Industry Clusters as Compared to the State



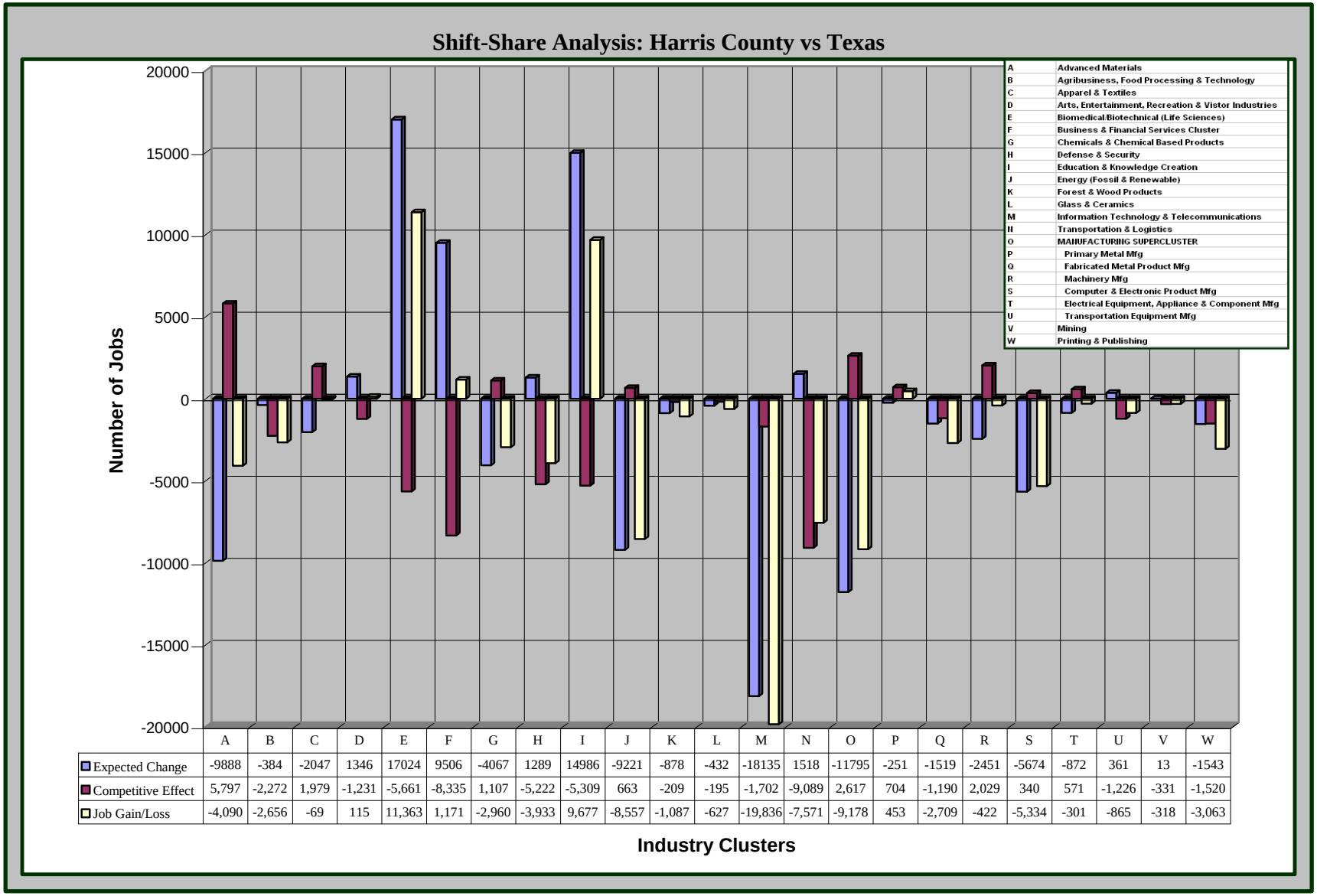
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q	R	S	U	V	W
Expected Change	-353	-12	-5	83	693	240	-226	47	2073	-124	-14	-6	-313	30	-261	-41	-6	-142	35	0	-23
Competitive Effect	-728	-120	31	966	-771	6	-831	-41	-1,714	237	58	-65	168	-291	-472	-56	-23	-156	-359	14	-17
Job Gain/Loss	-1,081	-132	26	1,049	-78	246	-1,056	6	359	114	44	-70	-146	-261	-733	-97	-29	-298	-324	14	-39

Figure 3.4.15. Shift-Share Analysis of Harris County Industry Clusters as Compared to the Nation



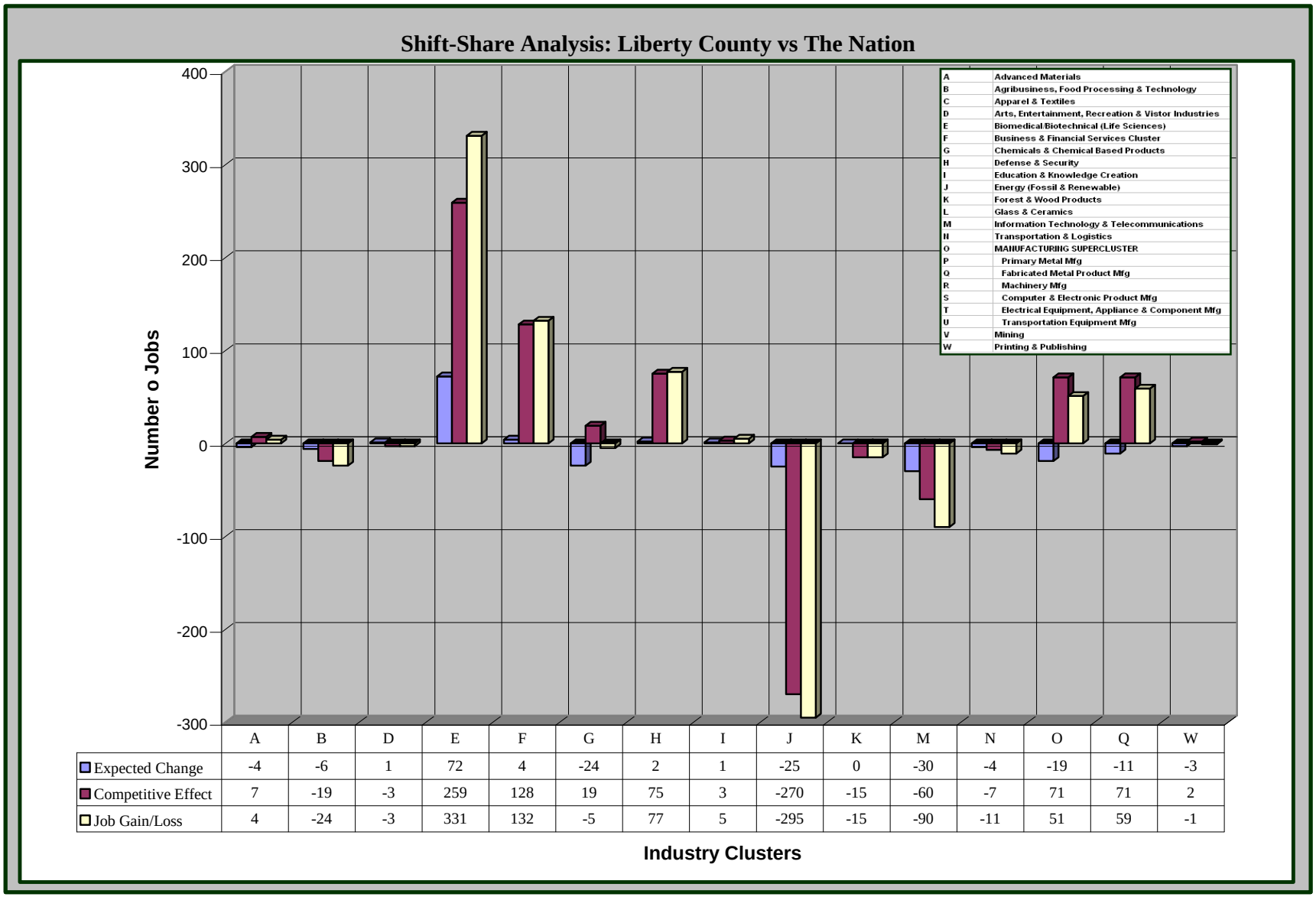
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Expected Change	-8180	-543	-1875	364	8529	4089	-4505	959	8947	-6651	-72	-784	-15875	-1469	-14708	-357	-3510	-4260	-5038	-909	-492	-30	-2402
Competitive Effect	4,090	-2,113	1,806	-249	2,834	-2,918	1,545	-4,892	730	-1,906	-1,014	157	-3,961	-6,101	5,530	810	802	3,838	-296	607	-373	-288	-660
Job Gain/Loss	-4,090	-2,656	-69	115	11,363	1,171	-2,960	-3,933	9,677	-8,557	-1,087	-627	-19,836	-7,571	-9,178	453	-2,709	-422	-5,334	-301	-865	-318	-3,063

Figure 3.4.16. Shift-Share Analysis of Harris County Industry Clusters as Compared to the State



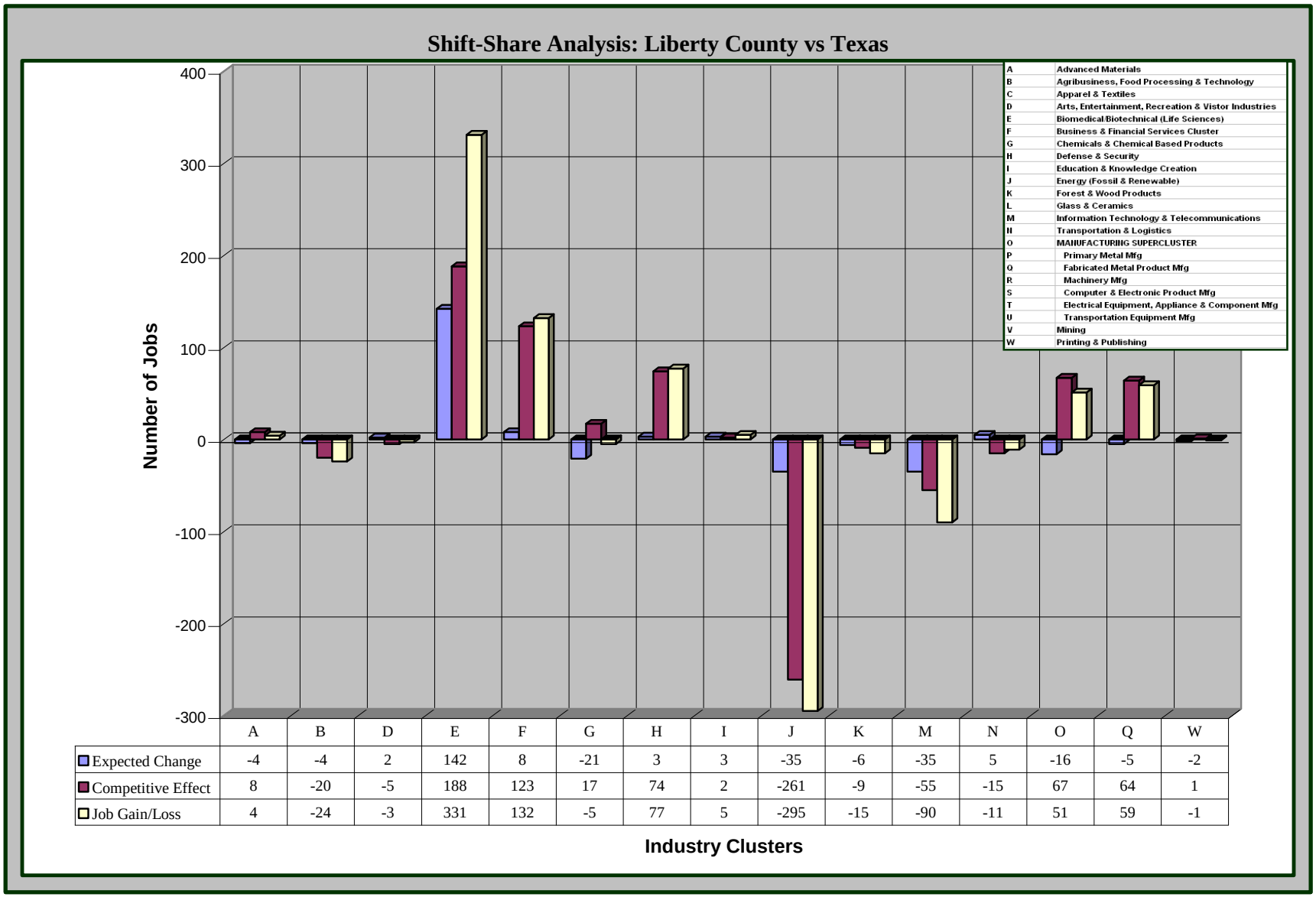
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Expected Change	-9888	-384	-2047	1346	17024	9506	-4067	1289	14986	-9221	-878	-432	-18135	1518	-11795	-251	-1519	-2451	-5674	-872	361	13	-1543
Competitive Effect	5,797	-2,272	1,979	-1,231	-5,661	-8,335	1,107	-5,222	-5,309	663	-209	-195	-1,702	-9,089	2,617	704	-1,190	2,029	340	571	-1,226	-331	-1,520
Job Gain/Loss	-4,090	-2,656	-69	115	11,363	1,171	-2,960	-3,933	9,677	-8,557	-1,087	-627	-19,836	-7,571	-9,178	453	-2,709	-422	-5,334	-301	-865	-318	-3,063

Figure 3.4.17. Shift-Share Analysis of Liberty County Industry Clusters as Compared to the Nation



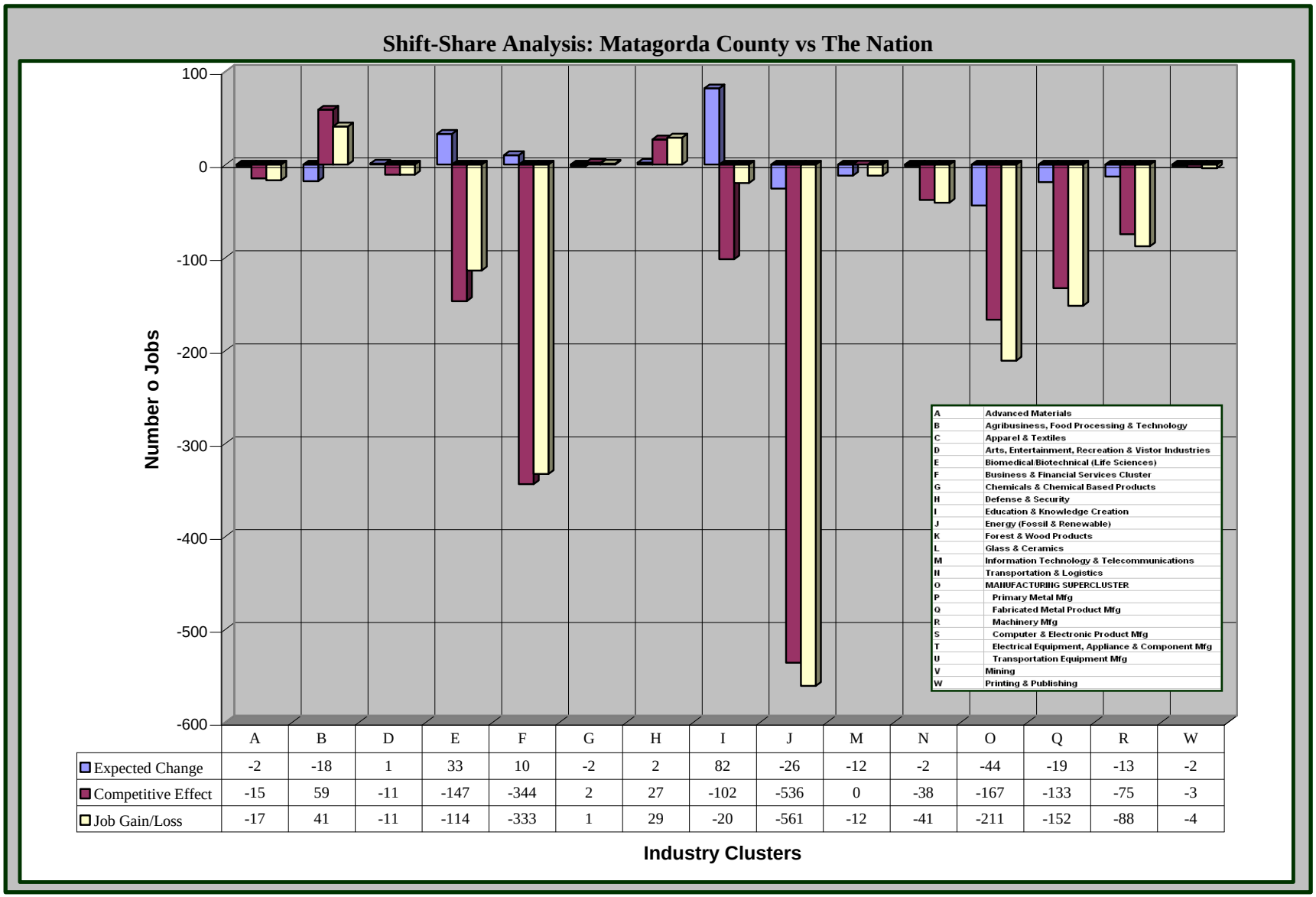
	A	B	D	E	F	G	H	I	J	K	M	N	O	Q	W
Expected Change	-4	-6	1	72	4	-24	2	1	-25	0	-30	-4	-19	-11	-3
Competitive Effect	7	-19	-3	259	128	19	75	3	-270	-15	-60	-7	71	71	2
Job Gain/Loss	4	-24	-3	331	132	-5	77	5	-295	-15	-90	-11	51	59	-1

Figure 3.4.18. Shift-Share Analysis of Liberty County Industry Clusters as Compared to the State



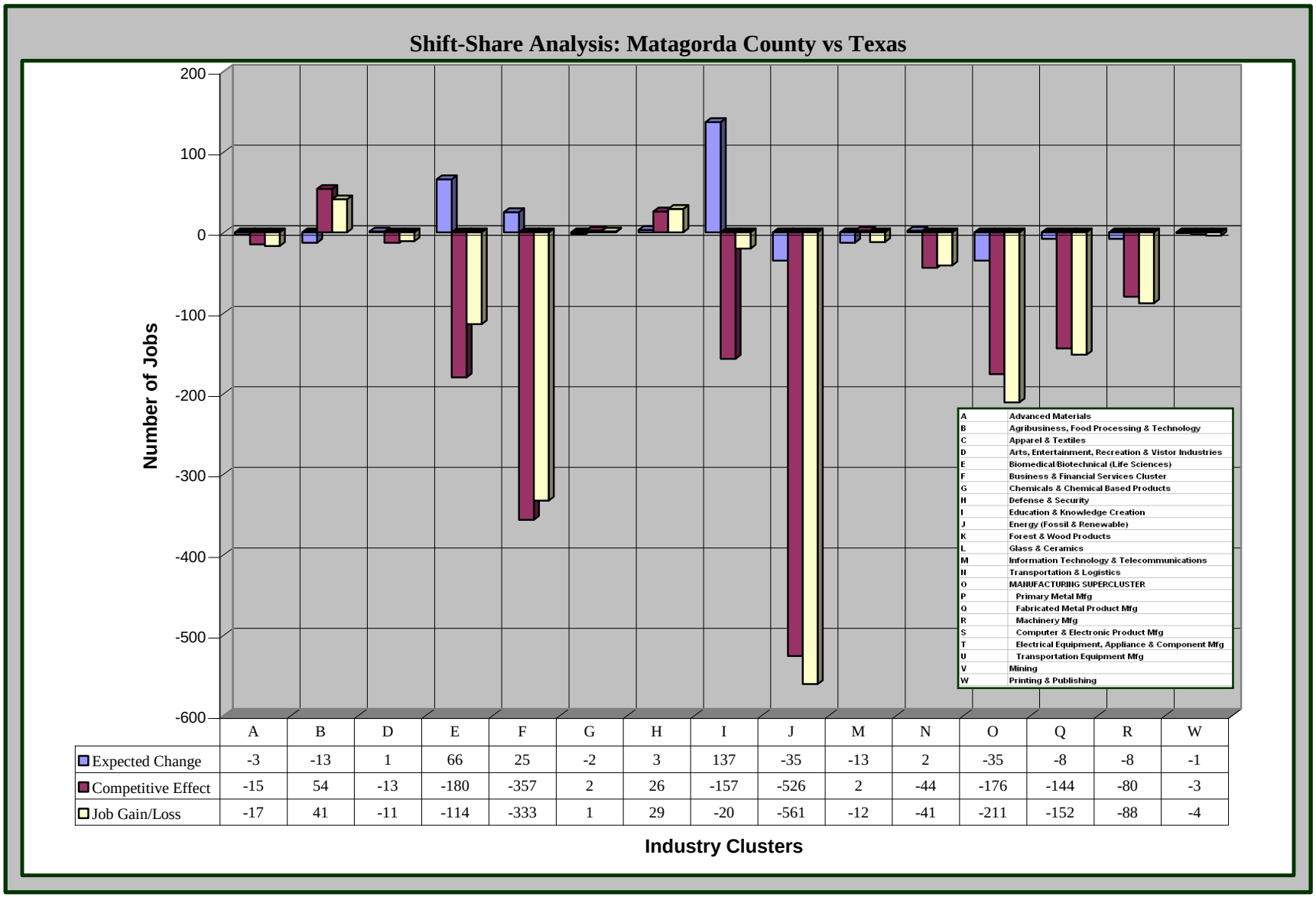
	A	B	D	E	F	G	H	I	J	K	M	N	O	Q	W
Expected Change	-4	-4	2	142	8	-21	3	3	-35	-6	-35	5	-16	-5	-2
Competitive Effect	8	-20	-5	188	123	17	74	2	-261	-9	-55	-15	67	64	1
Job Gain/Loss	4	-24	-3	331	132	-5	77	5	-295	-15	-90	-11	51	59	-1

Figure 3.4.19. Shift-Share Analysis of Matagorda County Industry Clusters as Compared to the Nation



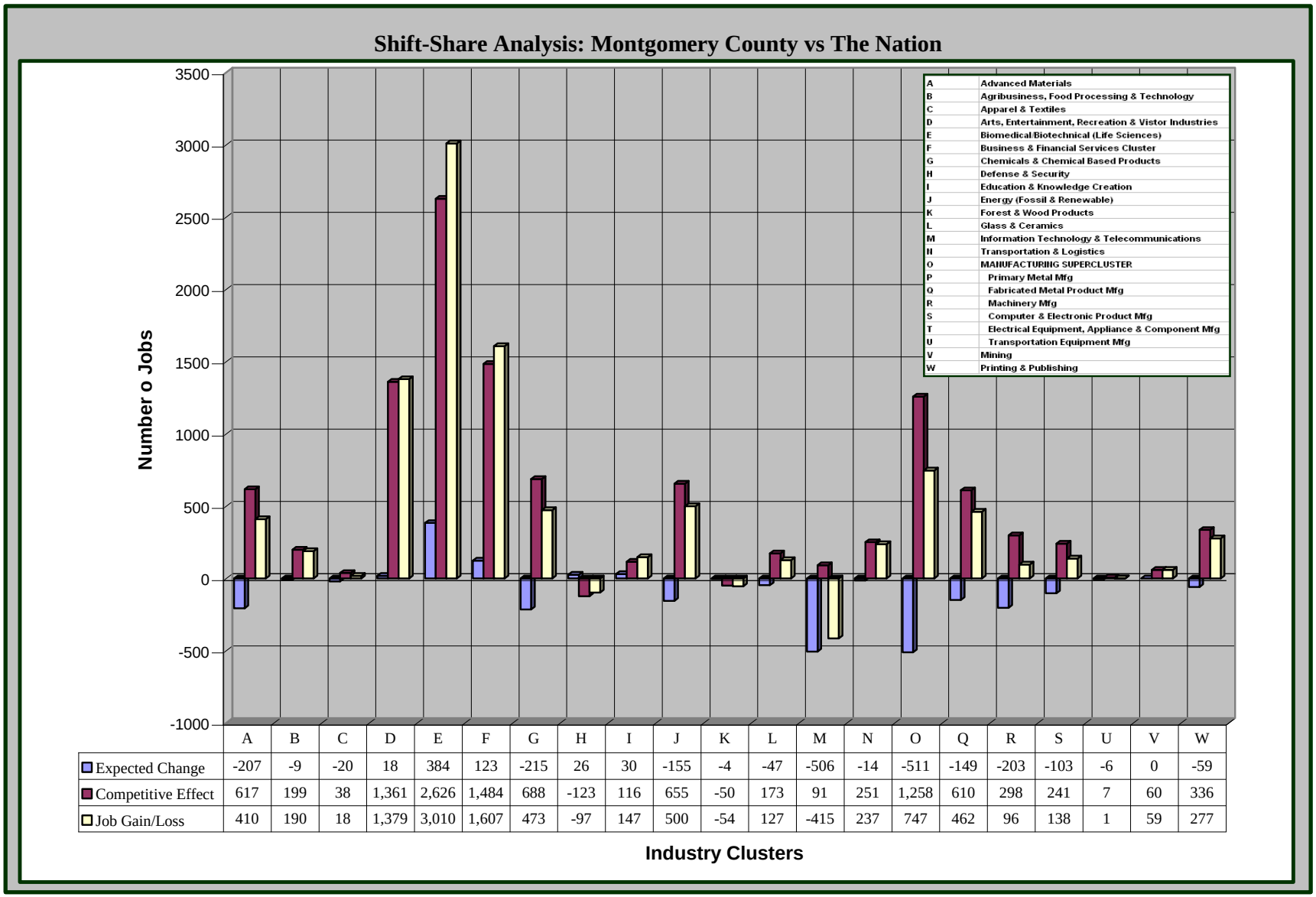
	A	B	D	E	F	G	H	I	J	M	N	O	Q	R	W
Expected Change	-2	-18	1	33	10	-2	2	82	-26	-12	-2	-44	-19	-13	-2
Competitive Effect	-15	59	-11	-147	-344	2	27	-102	-536	0	-38	-167	-133	-75	-3
Job Gain/Loss	-17	41	-11	-114	-333	1	29	-20	-561	-12	-41	-211	-152	-88	-4

Figure 3.4.20. Shift-Share Analysis of Matagorda County Industry Clusters as Compared to the State



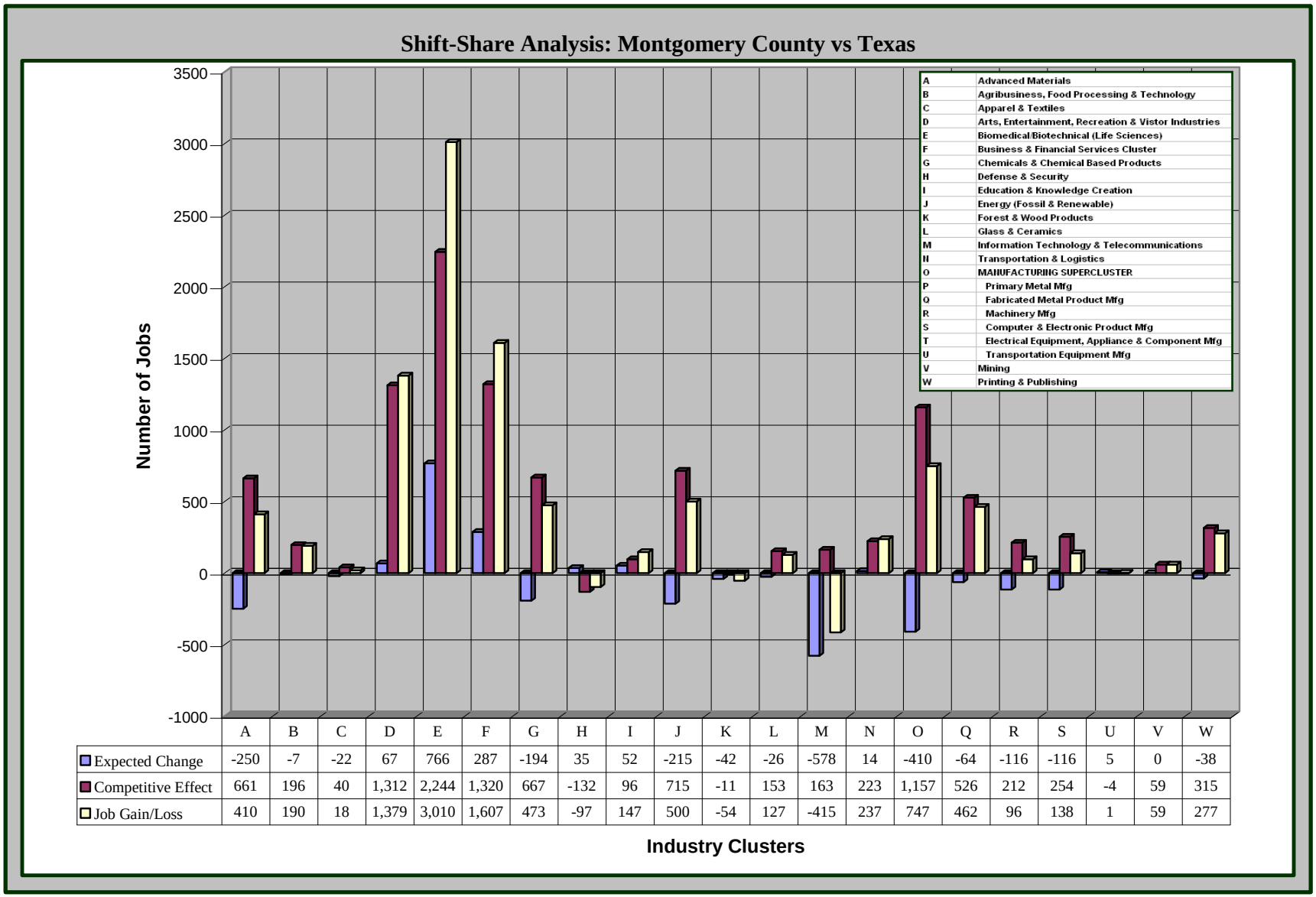
	A	B	D	E	F	G	H	I	J	M	N	O	Q	R	W
Expected Change	-3	-13	1	66	25	-2	3	137	-35	-13	2	-35	-8	-8	-1
Competitive Effect	-15	54	-13	-180	-357	2	26	-157	-526	2	-44	-176	-144	-80	-3
Job Gain/Loss	-17	41	-11	-114	-333	1	29	-20	-561	-12	-41	-211	-152	-88	-4

Figure 3.4.21. Shift-Share Analysis of Montgomery County Industry Clusters as Compared to the Nation



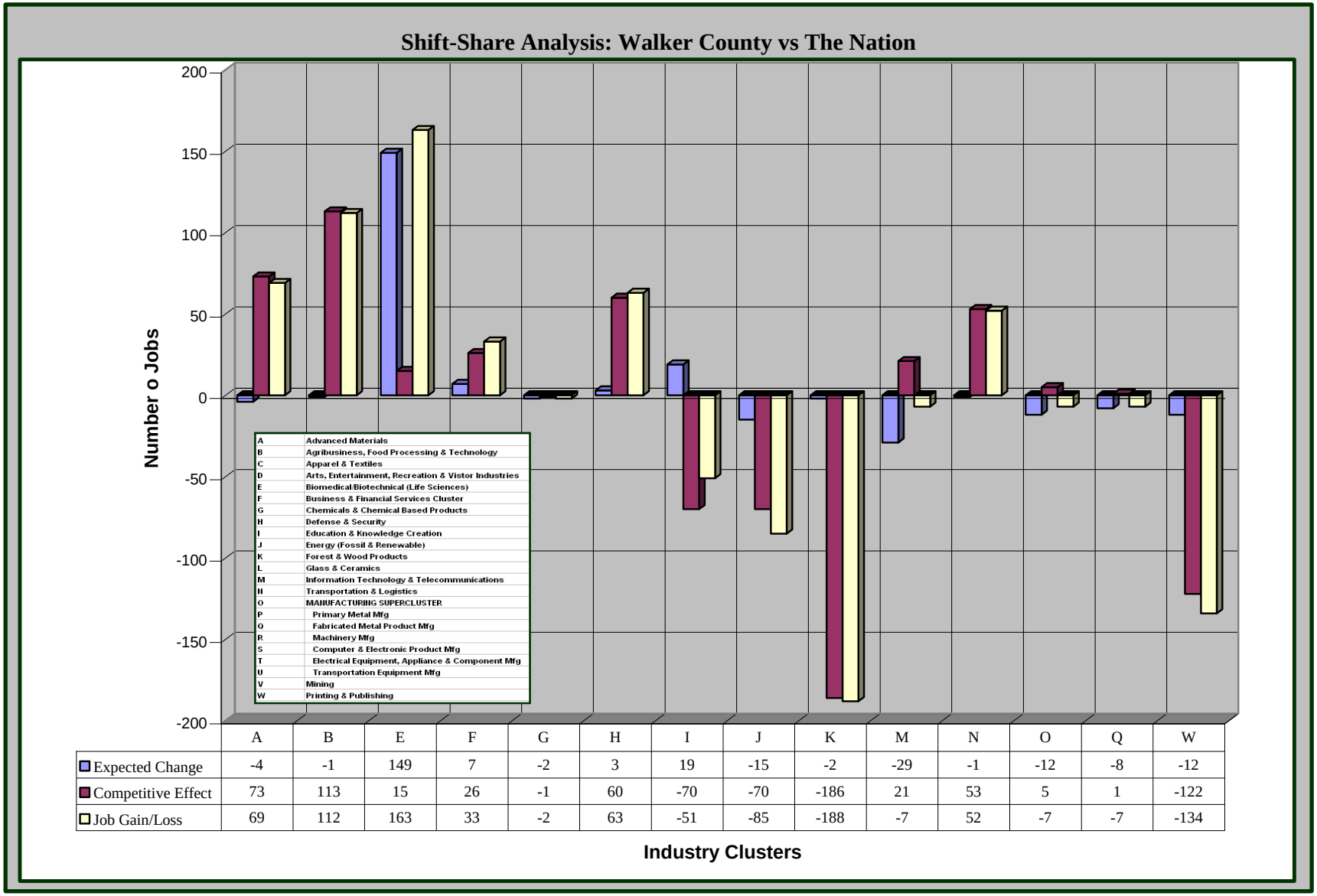
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q	R	S	U	V	W
Expected Change	-207	-9	-20	18	384	123	-215	26	30	-155	-4	-47	-506	-14	-511	-149	-203	-103	-6	0	-59
Competitive Effect	617	199	38	1,361	2,626	1,484	688	-123	116	655	-50	173	91	251	1,258	610	298	241	7	60	336
Job Gain/Loss	410	190	18	1,379	3,010	1,607	473	-97	147	500	-54	127	-415	237	747	462	96	138	1	59	277

Figure 3.4.22. Shift-Share Analysis of Montgomery County Industry Clusters as Compared to the State



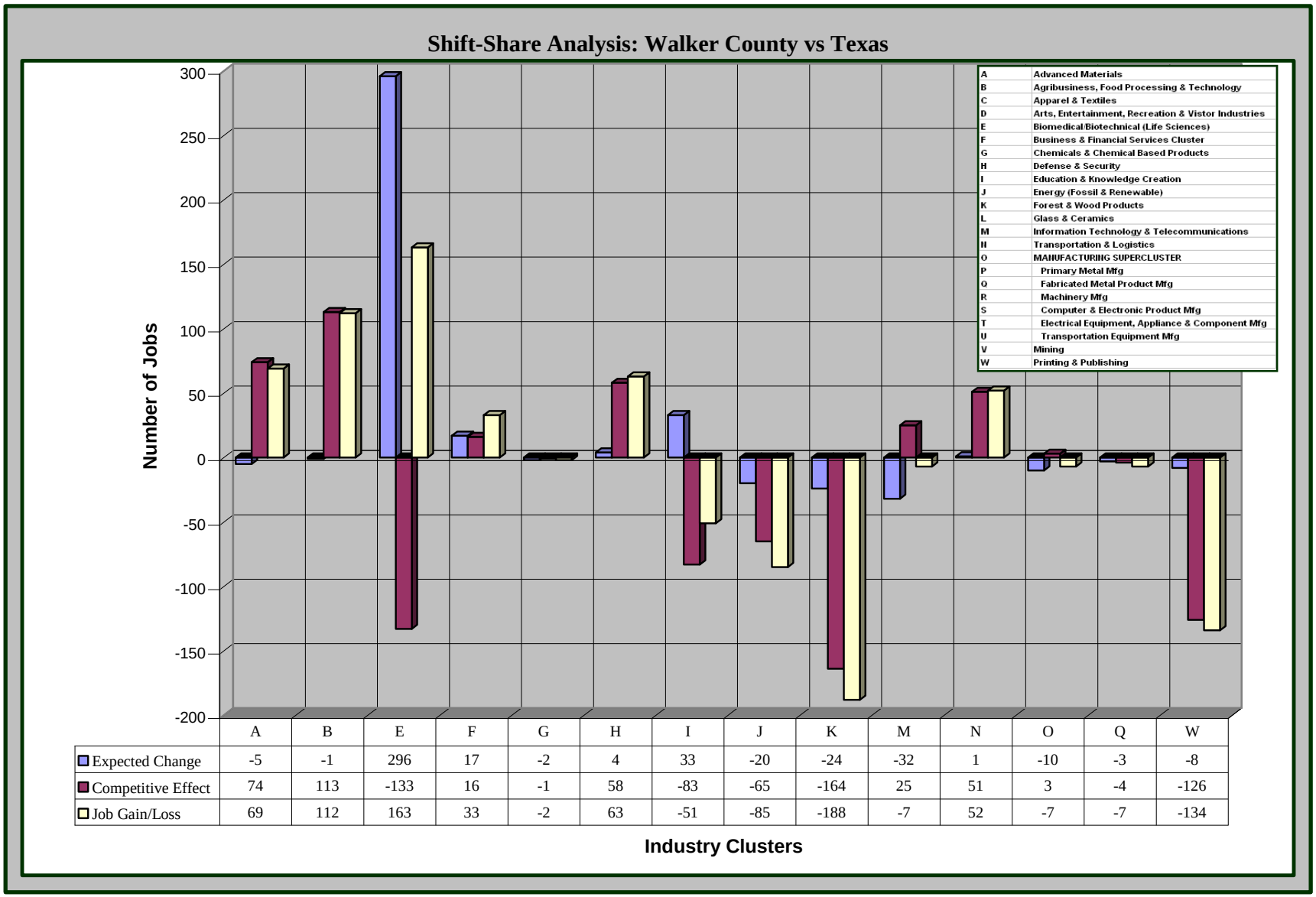
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q	R	S	U	V	W
Expected Change	-250	-7	-22	67	766	287	-194	35	52	-215	-42	-26	-578	14	-410	-64	-116	-116	5	0	-38
Competitive Effect	661	196	40	1,312	2,244	1,320	667	-132	96	715	-11	153	163	223	1,157	526	212	254	-4	59	315
Job Gain/Loss	410	190	18	1,379	3,010	1,607	473	-97	147	500	-54	127	-415	237	747	462	96	138	1	59	277

Figure 3.4.23. Shift-Share Analysis of Walker County Industry Clusters as Compared to the Nation



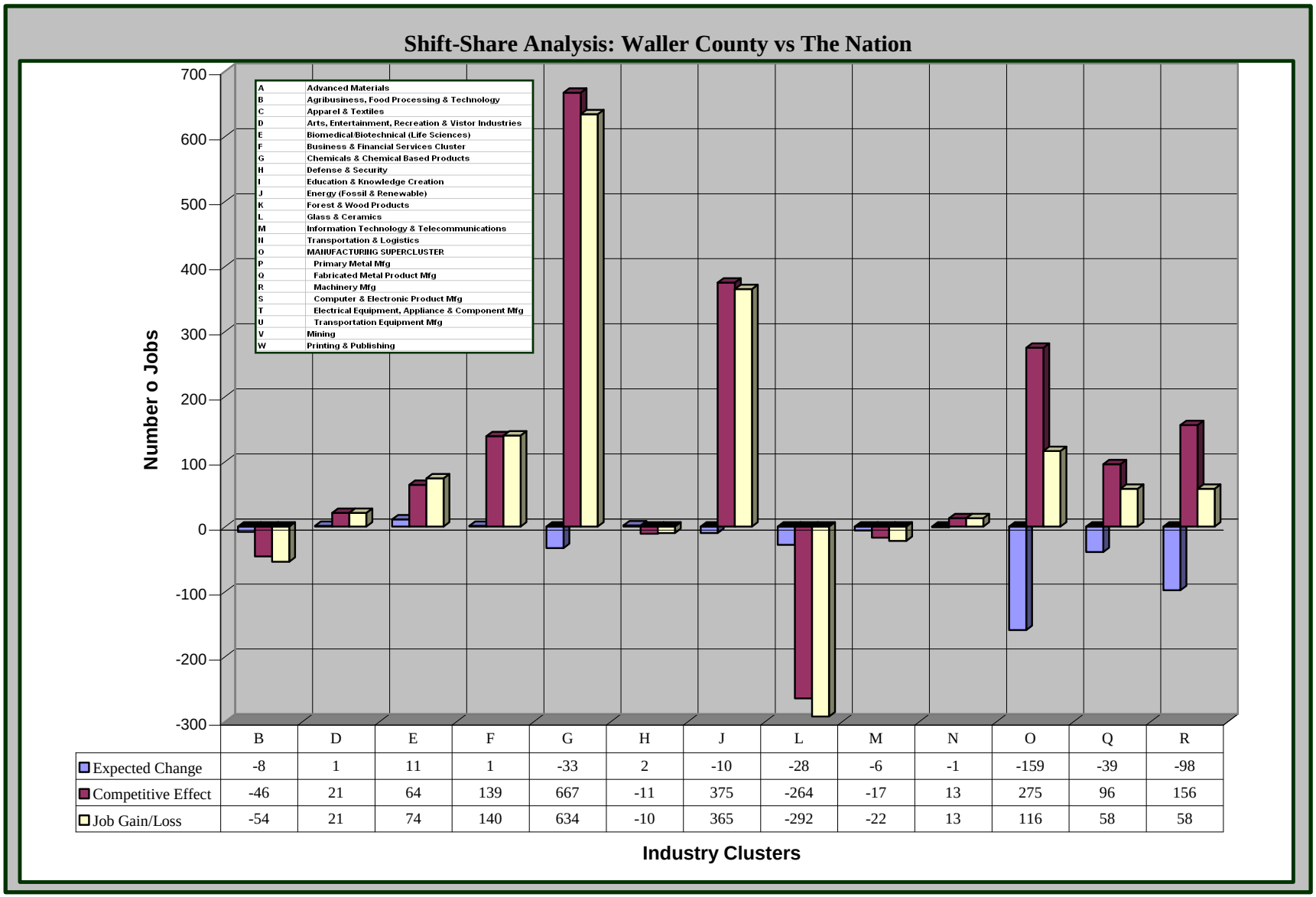
	A	B	E	F	G	H	I	J	K	M	N	O	Q	W
Expected Change	-4	-1	149	7	-2	3	19	-15	-2	-29	-1	-12	-8	-12
Competitive Effect	73	113	15	26	-1	60	-70	-70	-186	21	53	5	1	-122
Job Gain/Loss	69	112	163	33	-2	63	-51	-85	-188	-7	52	-7	-7	-134

Figure 3.4.24. Shift-Share Analysis of Walker County Industry Clusters as Compared to the State



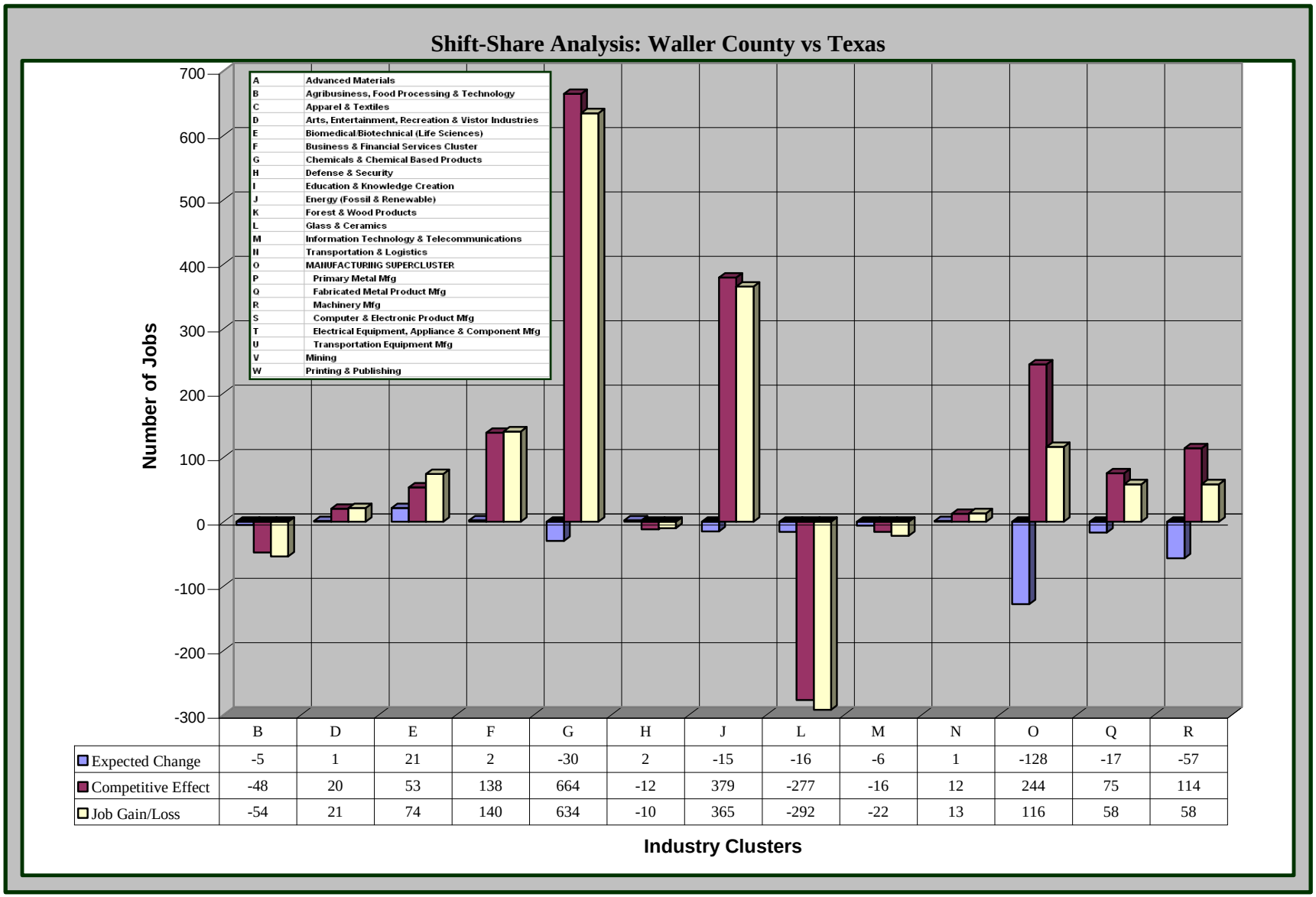
	A	B	E	F	G	H	I	J	K	M	N	O	Q	W
Expected Change	-5	-1	296	17	-2	4	33	-20	-24	-32	1	-10	-3	-8
Competitive Effect	74	113	-133	16	-1	58	-83	-65	-164	25	51	3	-4	-126
Job Gain/Loss	69	112	163	33	-2	63	-51	-85	-188	-7	52	-7	-7	-134

Figure 3.4.25. Shift-Share Analysis of Waller County Industry Clusters as Compared to the Nation



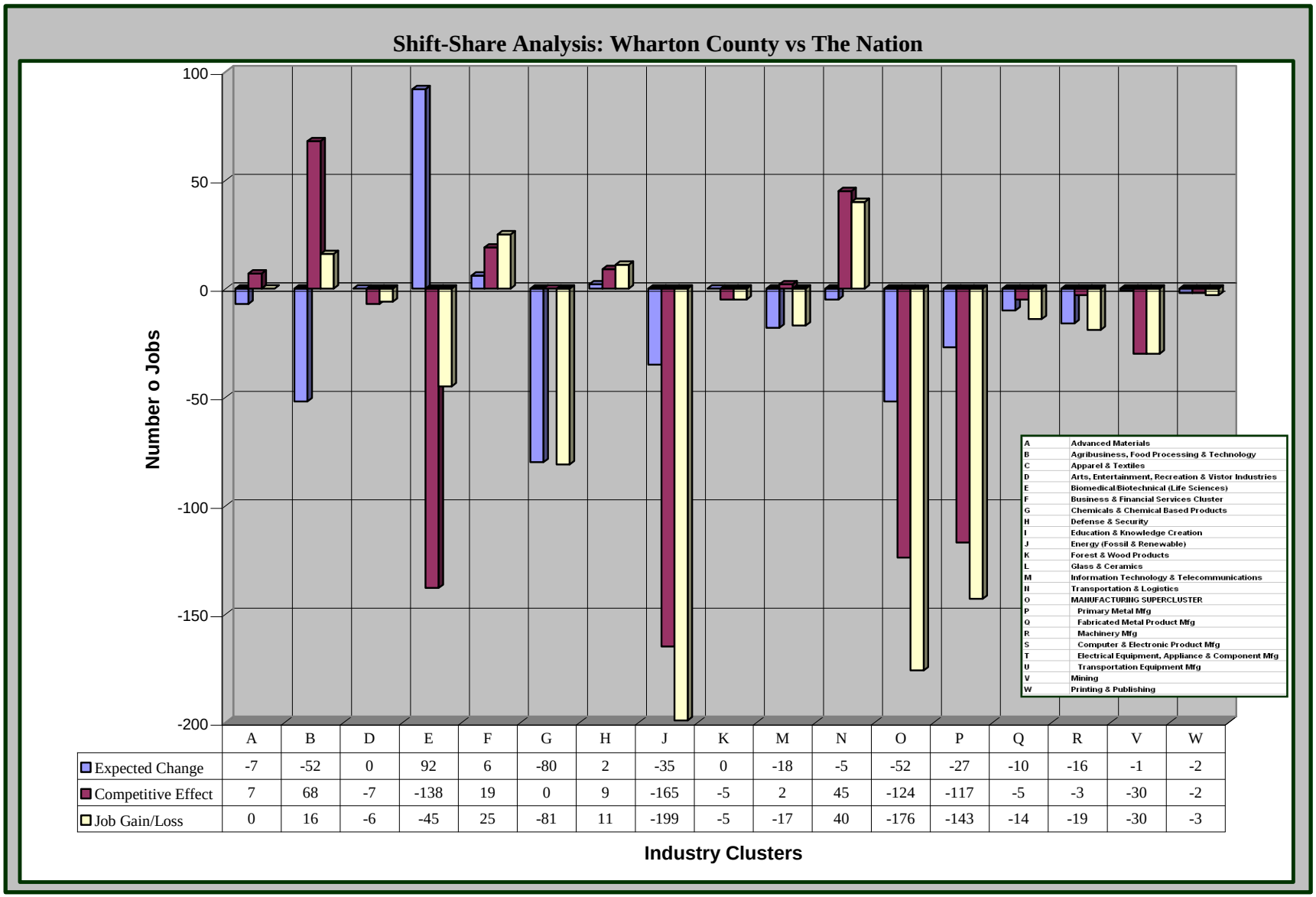
	B	D	E	F	G	H	J	L	M	N	O	Q	R
Expected Change	-8	1	11	1	-33	2	-10	-28	-6	-1	-159	-39	-98
Competitive Effect	-46	21	64	139	667	-11	375	-264	-17	13	275	96	156
Job Gain/Loss	-54	21	74	140	634	-10	365	-292	-22	13	116	58	58

Figure 3.4.26. Shift-Share Analysis of Waller County Industry Clusters as Compared to the State



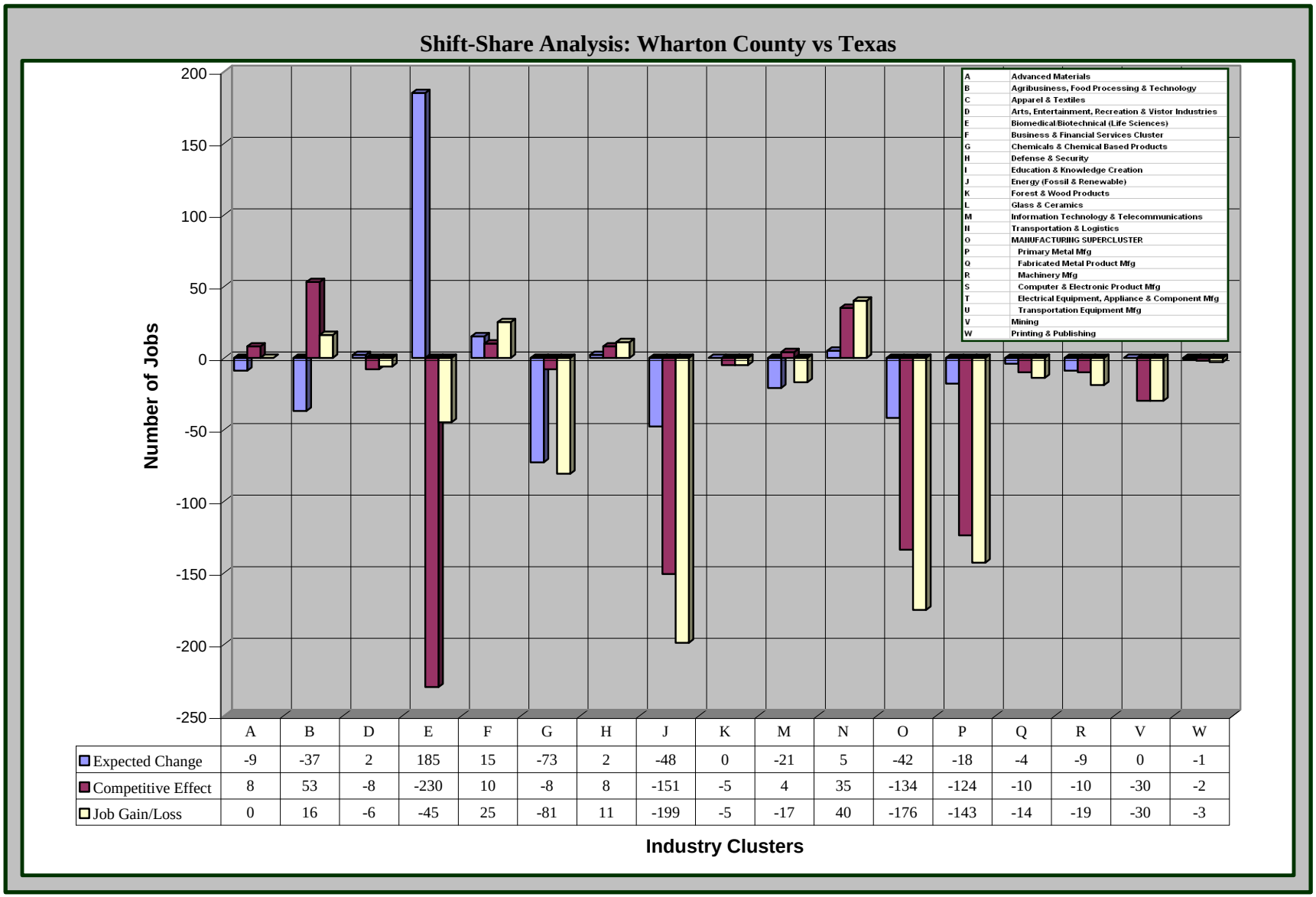
	B	D	E	F	G	H	J	L	M	N	O	Q	R
Expected Change	-5	1	21	2	-30	2	-15	-16	-6	1	-128	-17	-57
Competitive Effect	-48	20	53	138	664	-12	379	-277	-16	12	244	75	114
Job Gain/Loss	-54	21	74	140	634	-10	365	-292	-22	13	116	58	58

Figure 3.4.27. Shift-Share Analysis of Wharton County Industry Clusters as Compared to the Nation



	A	B	D	E	F	G	H	J	K	M	N	O	P	Q	R	V	W
Expected Change	-7	-52	0	92	6	-80	2	-35	0	-18	-5	-52	-27	-10	-16	-1	-2
Competitive Effect	7	68	-7	-138	19	0	9	-165	-5	2	45	-124	-117	-5	-3	-30	-2
Job Gain/Loss	0	16	-6	-45	25	-81	11	-199	-5	-17	40	-176	-143	-14	-19	-30	-3

Figure 3.4.28. Shift-Share Analysis of Wharton County Industry Clusters as Compared to the State



	A	B	D	E	F	G	H	J	K	M	N	O	P	Q	R	V	W
Expected Change	-9	-37	2	185	15	-73	2	-48	0	-21	5	-42	-18	-4	-9	0	-1
Competitive Effect	8	53	-8	-230	10	-8	8	-151	-5	4	35	-134	-124	-10	-10	-30	-2
Job Gain/Loss	0	16	-6	-45	25	-81	11	-199	-5	-17	40	-176	-143	-14	-19	-30	-3

This chapter utilized economic development tools such as, location quotient and economic-base model to identify export-oriented as well as dominant clusters in the thirteen county GCEDD region. The chapter also assessed the region's comparative advantage for industry clusters using the shift-share analysis. The following chapter will present the summary and conclusion of the study.

CHAPTER IV

Summary and Conclusions

Over the past few decades, state and local economic development planners as well as research economists have been using industry cluster analysis to understand regional cluster structure and to design and develop strategies for cluster growth. The primary objective of this study was to assess the GCEDD regional competitiveness in attracting and retaining industry clusters. Specifically, the study utilizes different regional economic tools to analyze the industry cluster structure and composition. The economic development tools may not give a comprehensible picture of the regional economy, because the results are sensitive to the time period chosen. However, they provide necessary tools for assessing the present economic condition of the region. The location quotient model is helpful in quantifying the degree of concentration of a particular cluster in a region relative to the nation or the state. It reveals the most specialized clusters in the region as well as the ones that are emerging or transforming. The economic base model identifies the export-oriented clusters in the region. This model measures the economic impact of export-oriented clusters on the local economy. The shift-share analysis on the other hand, differentiates the national and industrial contributions from local or regional contributions with regard to cluster growth. It identifies the clusters that are mainly influenced by local factors as compared to external factors. It measures a region's comparative advantage for industry clusters. The study analyzed 23 industry clusters in the GCEDD region, as well as each of the thirteen counties. The study did not discuss the results of county-level cluster analysis in depth; however, the results are reported in

tables and graphs format. Interpretation of county-level cluster analysis results is similar to that of the regional cluster analysis.

When compared to the nation, the region was found to be specialized in seven clusters (Biomedical/Biotechnical, Business & Financial Services Cluster, Chemical & Chemical Based Products, Energy, Transportation & Logistics, Fabricated Metal Product, and Machinery Manufacturing); however, three (Business & Financial Services Cluster, Energy, and Transportation & Logistics) of the seven clusters are considered to becoming less concentrated over a period of time. The main reason for the decreasing concentration of Energy cluster is the national trend; because only few jobs were lost as a result of local conditions (see Shift-Share results). Conversely, Transportation & Logistics lost most of the jobs because of local economic conditions as compared to the national trend. Except Business & Financial Services Cluster, all of the seven clusters are export-oriented clusters. Transportation & Logistics cluster was found to be the most export-oriented cluster in the region. Four of the seven clusters are favored by local economic conditions indicating that their growth in the region is better compared to nation. The four clusters are: Biomedical/Biotechnical, Chemical & Chemical Based Products, Fabricated Metal Product, and Machinery Manufacturing Clusters. The region has eight *emerging* clusters, out of which the Advanced Material and Computer & Electronic Product Manufacturing clusters will have a significant impact on the local economy, in the near future. This conclusion is based on the fact that: 1.These clusters are export-oriented in nature (basic clusters); 2. They are favored by local factors as indicated in shift-share analysis; 3. Their location quotient is approaching the threshold value of 1; and 4. These are clusters with large employment. Other emerging clusters that have the potential to be *star* cluster are

Information Technology & Telecommunications (ITT) and Glass and Ceramics cluster. The ITT cluster includes IIT related manufacturing and service industries.

When compared to the state, the region is specialized in nine clusters (Advanced Materials, Biomedical/Biotechnical, Business & Financial Services Cluster, Chemical & Chemical Based Products, Energy, Transportation & Logistics, Fabricated Metal Product, Machinery, and Electrical Equipment, Appliance & Component Manufacturing); however, four (Biomedical/Biotechnical, Business & Financial Services Cluster, Transportation & Logistics, and Fabricated Metal Product Manufacturing) of the nine clusters are becoming less concentrated over a period of time. The main reasons for decreasing concentration of Biomedical/Biotechnical and Transportation & Logistics cluster are local economic factors, because the clusters are growing well at the state-level as compared to the region.

Among the nine clusters, Biomedical/Biotechnical, Chemical & Chemical Based Products, Energy, Fabricated Metal Product Mfg., and Machinery Mfg. clusters are export-oriented in nature. Energy cluster was found to be the most export-oriented cluster in the region. Five of the nine clusters are favored by local economic conditions indicating that their performance in the region is better compared to the state. The five clusters are: Advanced Material, Chemical & Chemical Based Products, Energy, and Machinery and Electrical Appliance Equipment & Component Manufacturing clusters. The region has eight *emerging* clusters, out of which the Glass & Ceramics and Computer & Electronic Product Manufacturing clusters will have a significant impact on the local economy, in the near future. This conclusion is based on the fact that: 1.these clusters are export-oriented in nature (basic clusters); 2. They are favored by local factors

as indicated in shift-share analysis; 3. Their location quotient is slowly approaching the threshold value of 1; and 4. These are clusters with large employment.

Comparing regional clusters with respect to the nation as well as the state helps in identifying regional differences in cluster performance. For example, the Biomedical/Biotechnical cluster was performing well as compared to the nation, but not as well compared to the state. This indicates that other regions in the state favor Biotech cluster growth as compared to the GCEDD region. Conversely, the region was found to be less specialized in Advanced Materials cluster as compared to nation, but was found to be more specialized as compared to the state. This indicates that within Texas, the Advanced Materials cluster is performing well in the GCEDD region as compared to other regions.

The growth of some of the clusters (for instance the biotech cluster) is significantly affected by local economic factors that can be modified or improved by the local policy makers. Therefore, it is the responsibility of the local economic development agencies to assess the local economic factors that would favor the location of industry clusters. The first and the foremost thing a local economic development agency should consider doing is to identify the target clusters. The target clusters are the ones that are: 1. export-oriented; 2. have location quotient greater than one; 3. have a positive value for change in location quotient; 4. favored by local economic factors; 5. large employers; and 6. have a high gross industry product. Once target clusters are identified, the local economic development agencies should conduct surveys, interviews and focus group discussions with industry experts to identify their industry location preferences. The local

agencies can also gather information from research publications, news articles, and other regional sources that provide vital data for economic development.

Since the study used aggregate data, local economic development agencies should be careful in interpreting and applying the results to any particular industry. Moreover, the results differ with respect to the reference area (state or nation). The results from this study should be combined with other techniques or data for designing strategies. We do not recommend formulating major decisions based on these results alone. Since economic development tools are time-based, it is desirable to repeat the analysis on a regular basis for monitoring the growth of industry clusters.

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Important Data Resources for Economic Development

Houston-Galveston Area Council
Demographic and Economic Data: http://www.h-gac.com/rds/census/default.aspx

Community Economic Development Hot Report
http://ced.census.gov/

City-Data.com
Zip Code, City and County Profiles: http://www.city-data.com/city/Texas.html

Texas Workforce Commission Socrates
County profiles, Employer Info, and Occupational wages: http://socrates.cdr.state.tx.us/

US Census Bureau Longitudinal Employment-Household Dynamics
http://lehd.did.census.gov/led/

Texas A&M, Real Estate Center
http://recenter.tamu.edu/data/

US Census Bureau, State and County Quick Facts
http://quickfacts.census.gov/qfd/

US Census Bureau, USA Counties
http://censtats.census.gov/usa/usa.shtml

US Census Bureau, County Business Patterns and Zip Business Patterns
http://www.census.gov/epcd/cbp/view/cbpview.html
http://www.census.gov/epcd/www/zbp_base.html

US Department of Commerce, Bureau of Economic Analysis
http://www.bea.gov/

US Department of Labor, Bureau of Labor Statistics
http://www.bls.gov/

US Census Bureau, Census 2000
http://www.census.gov/main/www/cen2000.html

US Census Bureau, American Community Survey
http://www.census.gov/acs/www/

US Department of Agriculture, Economic Research Service
Economic Research Service: http://www.ers.usda.gov/Data/
National Agricultural Statistical Service: http://www.nass.usda.gov/index.asp

Appendix

NAICS Code	ADVANCED MATERIALS
212325	Clay and ceramic and refractory minerals mining
316211	Rubber and plastics footwear manufacturing
322221	Coated and laminated packaging paper and plastics film manufacturing
322299	All other converted paper product manufacturing
324191	Petroleum lubricating oil and grease manufacturing
3251	Basic chemical manufacturing
3252	Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing
32532	Pesticide and other agricultural chemical manufacturing
3254	Pharmaceutical and medicine manufacturing (except 325411)
3255	Paint, coating, and adhesive manufacturing
3256	Soap, cleaning compound, and toilet preparation manufacturing
326112	Plastics packaging film and sheet (including laminated) manufacturing
326113	Unlaminated plastics film and sheet (except packaging) manufacturing
326121	Unlaminated plastics profile shape manufacturing
32614	Polystyrene foam product manufacturing
326199	All other plastics product manufacturing
32629	Other rubber product manufacturing
327112	Vitreous china, fine earthenware, and other pottery product manufacturing
327113	Porcelain electrical supply manufacturing
327124	Clay refractory manufacturing
327125	Nonclay refractory manufacturing
32742	Gypsum product manufacturing
327910	Abrasive product manufacturing
327992	Ground or treated mineral and earth manufacturing
327993	Mineral wool manufacturing
3311	Iron and steel mills and ferroalloy manufacturing
3312	Steel product manufacturing from purchased steel
3313	Alumina and aluminum production and processing (except 331311)
3314	Nonferrous metal (except aluminum) production and processing
3315	Foundries
332111	Iron and steel forging
332116	Metal stamping
332117	Powder metallurgy part manufacturing
332313	Plate work manufacturing
332322	Sheet metal work manufacturing
332618	Other fabricated wire product manufacturing
33271	Machine shops
332812	Metal coating, engraving (except jewelry and silverware), and allied services to manufacturers
332813	Electroplating, plating, polishing, anodizing, and coloring
332911	Industrial valve manufacturing
332991	Ball and roller bearing manufacturing
332995	Other ordnance and accessories manufacturing
332997	Industrial pattern manufacturing
332999	All other miscellaneous fabricated metal product manufacturing
333298	All other industrial machinery manufacturing
333313	Office machinery manufacturing

333319	Other commercial and service industry machinery manufacturing
3335	Metalworking machinery manufacturing (except 333512, 6)
333912	Air and gas compressor manufacturing
334119	Other computer peripheral equipment manufacturing
334220	Radio and television broadcasting and wireless communications equipment manufacturing
334290	Other communications equipment manufacturing
3344	Semiconductor and other electronic component manufacturing
3345	Navigational, measuring, electromedical, and control instruments manufacturing (except 334516, 8)
33511	Electric lamp bulb and part manufacturing
335314	Relay and industrial control manufacturing
335921	Fiber optic cable manufacturing
335931	Current-carrying wiring device manufacturing
336322	Other motor vehicle electrical and electronic equipment manufacturing
336399	All other motor vehicle parts manufacturing
336419	Other guided missile and space vehicle parts and auxiliary equipment manufacturing
339111	Laboratory apparatus and furniture manufacturing
339112	Surgical and medical instrument manufacturing
339113	Surgical appliance and supplies manufacturing
339991	Gasket, packing, and sealing device manufacturing
54138	Testing laboratories
5417	Scientific research and development services

NAICS Code	AGRIBUSINESS, FOOD PROCESSING AND TECHNOLOGY
111	Crop production
112	Animal production
1141	Fishing
1151	Support activities for crop production
1152	Support activities for animal production
311	Food manufacturing
312	Beverage and tobacco product manufacturing
3253	Pesticide, fertilizer, and other agricultural chemical manufacturing
33311	Agricultural implement manufacturing
333294	Food product machinery manufacturing
42382	Farm and garden machinery and equipment merchant wholesalers
4245	Farm product raw material merchant wholesalers
42491	Farm supplies merchant wholesalers

NAICS Code	APPAREL AND TEXTILES CLUSTER
313	Textile mills
314	Textile product mills
315	Apparel manufacturing
323113	Commercial screen printing
32513	Synthetic dye and pigment manufacturing
32522	Artificial and synthetic fibers and filaments manufacturing
32791	Abrasive product manufacturing
33791	Mattress manufacturing
337121	Upholstered household furniture manufacturing

339993	Fastener, button, needle, and pin manufacturing
4243	Apparel, piece goods, and notions merchant wholesalers (except 42434)
54143	Graphic design services
54149	Other specialized design services
54184	Media representatives
54185	Display advertising
54186	Direct mail advertising
54187	Advertising material distribution services
54189	Other services related to advertising

NAICS Code	ARTS, ENTERTAINMENT, RECREATION AND VISITOR INDUSTRIES
33992	Sporting and athletic goods manufacturing
33993	Doll, toy, and game manufacturing
42391	Sporting and recreational goods and supplies merchant wholesalers
487	Scenic and sightseeing transportation
512	Motion picture and sound recording industries
515	Broadcasting (except internet)
5615	Travel arrangement and reservation services
711	Performing arts, spectator sports, and related industries
712	Museums, historical sites, and similar institutions
713	Amusement, gambling, and recreation industries
7211	Traveler accommodation
7212	Rv (recreational vehicle) parks and recreational camps

NAICS Code	BIOMEDICAL/BIOTECHNICAL (LIFE SCIENCES)
3254	Pharmaceutical and medicine manufacturing
333314	Optical instrument and lens manufacturing
334510	Electromedical and electrotherapeutic apparatus manufacturing
334516	Analytical laboratory instrument manufacturing
334517	Irradiation apparatus manufacturing
3391	Medical equipment and supplies manufacturing
42345	Medical, dental, and hospital equipment and supplies merchant wholesalers
446	Health and personal care stores
5417	Scientific research and development services
562112	Hazardous waste collection
562211	Hazardous waste treatment and disposal
621	Ambulatory health care services (except 6211, 6212, 6213)

NAICS Code	BUSINESS AND FINANCIAL SERVICES CLUSTER
323115	Digital printing
323116	Manifold business forms printing
518	Internet service providers, web search portals, and data processing services
5222	Nondepository credit intermediation
5223	Activities related to credit intermediation
523	Securities, commodity contracts, and other financial investments and related activities
524	Insurance carriers and related activities
525	Funds, trusts, and other financial vehicles
5313	Activities related to real estate (except 531320)

533	Lessors of nonfinancial intangible assets (except copyrighted works)
5411	Legal services
5412	Accounting, tax preparation, bookkeeping, and payroll services
5413	Architectural, engineering, and related services
5414	Specialized design services
5415	Computer systems design and related services
5416	Management, scientific, and technical consulting services
5418	Advertising and related services
54191	Marketing research
541922	Commercial photography

NAICS Code	CHEMICALS
325	Chemical manufacturing
326	Plastics and rubber products manufacturing
327	Nonmetallic mineral product manufacturing
4246	Chemical and allied products merchant wholesalers
4247	Petroleum and petroleum products merchant wholesalers

NAICS Code	DEFENSE AND SECURITY
212291	Uranium-radium-vanadium ore mining
23713	Power and communication line and related structures construction
32592	Explosives manufacturing
332912	Fluid power valve and hose fitting manufacturing
332992	Small arms ammunition manufacturing
332993	Ammunition (except small arms) manufacturing
332994	Small arms manufacturing
332995	Other ordnance and accessories manufacturing
33429	Other communications equipment manufacturing
334511	Search, detection, navigation, guidance, aeronautical, and nautical system and instrument manufacturing
3364	Aerospace product and parts manufacturing
3366	Ship and boat building
336992	Military armored vehicle, tank, and tank component manufacturing
339113	Surgical appliance and supplies manufacturing
4231	Motor vehicle and motor vehicle parts and supplies merchant wholesalers
423860	Transportation equipment and supplies (except motor vehicle) merchant wholesalers
5415	Computer systems design and related services
541710	Research and development in the physical, engineering, and life sciences
5616	Investigation and security services
81149	Other personal and household goods repair and maintenance
922	Justice, public order, and safety activities
92612	Regulation and administration of transportation programs
927	Space research and technology
928	National security and international affairs

NAICS Code	EDUCATION AND KNOWLEDGE CREATION
611	Educational services
51111	Newspaper publishers

51112	Periodical publishers
51113	Book publishers
516	Internet publishing and broadcasting
519	Other information services

NAICS Code	ENERGY
211	Oil and gas extraction
2121	Coal mining
213	Support activities for mining (except 213115)
212291	Uranium-radium-vanadium ore mining
2211	Electric power generation, transmission and distribution
2212	Natural gas distribution
22133	Steam and air-conditioning supply
2371	Utility system construction
2379	Other heavy and civil engineering construction (includes dams and hydroelectric facilities)
23821	Electrical contractors
23822	Plumbing, heating, and air-conditioning contractors
32411	Petroleum refineries
324199	All other petroleum and coal products manufacturing
32511	Petrochemical manufacturing
32512	Industrial gas manufacturing
325191	Gum and wood chemical manufacturing (include coke and charcoal)
325192	Cyclic crude and intermediate manufacturing
325193	Ethyl alcohol manufacturing (includes ethanol manuf.)
33241	Power boiler and heat exchanger manufacturing
33242	Metal tank (heavy gauge) manufacturing
33313	Mining and oil and gas field machinery manufacturing
333414	Heating equipment (except warm air furnaces) manufacturing (includes solar and hydronic heating equipment manufacturing)
333611	Turbine and turbine generator set units manufacturing
334413	Semiconductor and related device manufacturing
334519	Other measuring and controlling device manufacturing
3353	Electrical equipment manufacturing
3359	Other electrical equipment and component manufacturing
42352	Coal and other mineral and ore merchant wholesalers
42361	Electrical apparatus and equipment, wiring supplies, and related equipment merchant wholesalers
42369	Other electronic parts and equipment merchant wholesalers
42372	Plumbing and heating equipment and supplies (hydronics) merchant wholesalers
4247	Petroleum and petroleum products merchant wholesalers
447	Gasoline stations
45431	Fuel dealers
486	Pipeline transportation
52391	Miscellaneous intermediation (includes mineral and oil royalties dealing)
523999	Miscellaneous financial investment activities (includes oil and gas lease brokers)
532412	Construction, mining, and forestry machinery and equipment rental and leasing
533	Lessors of nonfinancial intangible assets (except copyrighted works)
54133	Engineering services
54136	Geophysical surveying and mapping services

54138	Testing laboratories
54162	Environmental consulting services
54169	Other scientific and technical consulting services
54171	Research and development in the physical, engineering, and life sciences
92613	Regulation and administration of communications, electric, gas, and other utilities

NAICS Code	FOREST AND WOOD PRODUCTS
113	Forestry and logging
1153	Support activities for forestry
23813	Framing contractors
23817	Siding contractors
23833	Flooring contractors
23835	Finish carpentry contractors
23816	Roofing contractors
321	Wood product manufacturing
322	Paper manufacturing
323117	Books printing
325191	Gum and wood chemical manufacturing
3255	Paint, coating, and adhesive manufacturing
32791	Abrasive product manufacturing
332213	Saw blade and handsaw manufacturing
33321	Sawmill and woodworking machinery manufacturing
333291	Paper industry machinery manufacturing
333991	Power-driven handtool manufacturing
337	Furniture and related product manufacturing (except 337124, 337125, 337214)
339992	Musical instrument manufacturing
339995	Burial casket manufacturing
4232	Furniture and home furnishing merchant wholesalers
4233	Lumber and other construction materials merchant wholesalers

NAICS Code	GLASS AND CERAMICS
3271	Clay product and refractory manufacturing
3272	Glass and glass product manufacturing
3273	Cement and concrete product manufacturing
327992	Ground or treated mineral and earth manufacturing
327999	All other miscellaneous nonmetallic mineral product manufacturing
3328	Coating, engraving, heat treating, and allied activities

NAICS Code	INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS
23821	Electrical contractors
333613	Mechanical power transmission equipment manufacturing
333295	Semiconductor machinery manufacturing
3341	Computer and peripheral equipment manufacturing
3342	Communications equipment manufacturing
3343	Audio and video equipment manufacturing
3344	Semiconductor and other electronic component manufacturing
334512	Automatic environmental control manufacturing for residential, commercial, and appliance use

334513	Instruments and related products manufacturing for measuring, displaying, and controlling industrial process variables
334515	Instrument manufacturing for measuring and testing electricity and electrical signals
334516	Analytical laboratory instrument manufacturing
334518	Watch, clock, and part manufacturing
3346	Manufacturing and reproducing magnetic and optical media
3353	Electrical equipment manufacturing
3359	Other electrical equipment and component manufacturing
42343	Computer and computer peripheral equipment and software merchant wholesalers
42369	Other electronic parts and equipment merchant wholesalers
5112	Software publishers
517	Telecommunications (except 5175)
518	Internet service providers, web search portals, and data processing services
5415	Computer systems design and related services
541618	Other management consulting services
5417	Scientific research and development services
92613	Regulation and administration of communications, electric, gas, and other utilities

NAICS Code	MANUFACTURING SUPERCLUSTER
331	Primary metal manufacturing
332	Fabricated metal product manufacturing (except 332992, 3, 4, 5)
333	Machinery manufacturing
334	Computer and electronic product manufacturing
335	Electrical equip, appliance and component manufacturing
336	Transportation equipment manufacturing

NAICS Code	MINING
2122	Metal ore mining
2123	Nonmetallic mineral mining and quarrying
213114	Support activities for metal mining
213115	Support activities for nonmetallic minerals
482	Rail transportation
532412	Construction, mining, and forestry machinery and equipment rental and leasing

NAICS Code	PRINTING AND PUBLISHING
323	Printing and related support activities
325910	Printing ink manufacturing
339950	Sign manufacturing
511	Publishing industries (except Internet)
51511	Radio broadcasting
51521	Cable and other subscription programming
516	Internet publishing and broadcasting
51911	News syndicates
51919	All other information services
54143	Graphic design services
541613	Marketing consulting services
5418	Advertising and related services
54191	Marketing research

541922	Commercial photography

NAICS Code	TRANSPORTATION AND LOGISTICS
481	Air transportation
482	Rail transportation
483	Water transportation
484	Truck transportation
485112	Commuter rail systems
4855	Charter bus industry
485999	All other ground passenger transportation
486	Pipeline transportation
488	Support activities for transportation
492	Couriers and messengers
493	Warehousing and storage

For more detailed breakdown of clusters, please look at
Purdue Univ. Center for Regional Development, Indiana Business Research Center, and Strategic Development Group, Inc. (Jan 2007). "*Unlocking Rural Competitiveness: The Role of Regional Clusters*". http://www.ibrc.indiana.edu/innovation/reports.html