Industry Cluster Analyses for Capital Region Planning and Development District, Louisiana, USA

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Louisiana Vision 2020 and long-term strategic plans support industry clusters-based investment strategies to stimulate regional economic development. The state offers various forms of incentives including tax credit on investment, or job creation, sales and use of tax exemptions to attract new investments and startups and support small business growth and expansion. To take advantages of these programs, the state regional planning and development districts have identified target industry clusters as pillar for economic development through Comprehensive Economic Development Strategies. The Capital Region Planning Commission has identified seven mature target-industries and three emerging industries for the Capital Region Planning and Development District. The seven clusters include chemicals and new energy production; fabricated structural metals; software design; technical research & consulting; advanced shared services; and agribusiness, food processing & technology. The three emerging sectors are health care, film production & entertainment services, and emerging fuel sectors & renewable energy. In this study, I use location quotient and shift share analyses to highlight the uniqueness of a regional economy. Major results indicate that the growth target industry clusters depend on national trend and have no regional comparative advantage. The results may be an indication of structural shift from an economy dominated by old industry clusters to one dominated by new and emerging industry clusters. Policy makers and education systems need to develop the capacity to accommodate anticipated labor mobility and to provide a sustainable labor pipeline in the high growth and emerging industries.

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INTRODUCTION

The Capital Region Commission aims to enhance regional collaboration by promoting economic development and improving education and workforce development skills to foster a more diverse economy that meet the needs of both existing and emerging industries. Among prioritized activitites include identifying and supporting new and emerging industries through industry cluster and value chain analyses, establishing greater opportunities for entrepreneurism and business development in collaboration with the region's universities, community colleges, and vocational schools and working with existing industries to indentify workforce needs and deficiencies. To achieve these objectives the Capital Region Planning Commission plans to support seven mature target-industries and three emerging industries for the Capital Region Planning and Development District. The seven clusters include chemicals and new energy production; fabricated structural metals; software design (enterprise, industrial, and gaming applications); technical research and consulting; advanced shared services; and agribusiness, food processing & technology. The three emerging sectors are health care, film production and entertainment services, and emerging fuel sectors and renewable energy. The metrics for measuring the impact include national and local employment growth, industry output, and alignment with regional labor and infrastructure assets.

The purpose of this study was therefore to identify those areas of the economy in which a region has comparative advantages and to develop short and long-term economic development strategies. One of the unique features of cluster analysis is the focus on linkages between firms and on implications for shared strategies in which companies selectively compete in some respects (e.g., output markets) yet cooperate in other respects (e.g., joint training programs). I use location quotient and the shift-share analyses results to compare concentration of employment in an existing industry cluster to the national level concentration of employment in the same cluster and highlights the uniqueness of a regional economy. Combined with employment growth rate, the location quotient identifies mature, high growth, and emerging industries. Mature industry clusters are those that have high concentrations (LQ > 1.2), but are associated with negative employment growth rate. These industries may have or used to have competitive advantage in the region, which is declining over time. These industry clusters still have strong employment concentrations regionally, but need careful attention to ensure that they have the necessary resources to retain or expand employment. High growth industry clusters are those that have both a high concentration (LQ > 1.2) and have positive employment growth rate. These industry clusters have strong competitive advantage and show potential for growth. Emerging industry clusters show positive employment growth but the LQ is less than one. These clusters show a potential for growth, but do not necessarily represent a strong competitive advantage in the region. These industry clusters may require additional infrastructure or incentives to continue their growth. Declining industry clusters have LQ that is less than one and are experiencing negative job growth.

A shift-share ratio is similar to a location quotient ratio in that it highlights the uniqueness of a regional economy, but it does so in terms of job growth rather than total jobs in an industry. It paints a picture of how well the region's current industries are performing by systematically examining the national, regional and industrial components of employment change. A value of the shift-share approximates a dynamic

account of total regional employment growth that is attributable to growth of the national economy, a mix of faster or slower than average growing industries, and the competitive nature of the local industries. It decomposes employment changes within an economy over a specified period into three mutually exclusive factors. The share of regional job growth attributed to growth of the national economy; the share of regional job growth attributed to the regional's mix of industries; and share of regional job growth that describes the extent to which factors unique to the region have caused growth or decline in regional employment.

The first component (national growth effect) means that if the nation as a whole is experiencing employment growth, it will exert a positive influence on the regional job growth. This component describes the expected change by virtue of the fact that the regional economy is part of a changing national economy. The component is for estimating the number of additional employment in the cluster had the regional employment followed the national growth for all sectors. The component therefore measures regional employment change that would have occurred if a specific industry cluster's employment in the region had grown at the same rate as the national industrial growth rate. The measure holds the regional employment shares constant.

The second component (industry mix effect) isolates the fact that nationwide, some industry clusters have grown faster or slower than others. It represents a contribution attributed to a national industry cluster to the change in the number of jobs in the regional industry cluster. The component estimates jobs created/not created in each industry due to differences in industry and total national growth rates. It is the share of regional employment change attributed to the local industry mix and reflects the degree to which the region specializes in industries either growing fast or slowing nationally. A region with many industries that are growing fast nationally will have a positive industry mix effect whereas a region with a concentration of industries that are declining nationally the industry mix effect is negative. The sum of the national growth effect and industrial mix effect is the expected growth change. It is the expected job growth in the regional industry cluster if it exactly follows national trends. The ratio is for estimating the total regional employment of the industry assuming that the region is growing proportionately to the national growth rate.

The third component (region share effect) is due to local comparative advantage associated with regional natural resources, linked industries, or favorable local labor situations. It is used to estimates the number of additional regional employment due to regional specialization and local factors. The component shows the change in regional employment due to differences between the regional industry cluster growth (decline) rate and the industry cluster's national growth rate. The regional share shows how significantly the growth rates vary from one region to another (Sakashita, 1973). It identifies local area's economic strengths and represents the region's competitive position towards contributing to regional job growth. In particular, the local share component points to industries that enjoy local comparative advantage. Industries with high regional competitiveness effects highlight the region's competitive advantages or disadvantages. The local shift share shows the number of jobs created/not created because of the region's competitiveness. It identifies the region's leading and lagging industries.

DATA SOURCE

The primary source of information on employment by industry is from the StatsAmerica website at http://www.statsamerica.org. The data available for industry cluster analysis constitute 17 clusters across the United States and allows combining individual counties to defined custom regions. The aggregated industry clusters use the three-digit NAICS sectors classification that minimizes the problems caused by data suppression in a more-detailed NAICS levels. Six sub-clusters for the manufacturing super cluster produce the following products: primary metals; fabricated metal products; machinery; computer and electronic products; electrical equipment, appliance and components; and, transportation equipment. The analysis uses a three-point 2002, 2007, and 2012 as the latest employment data available is for 2012. The five-year interval is optimal in terms of capturing potential structural change in the economy. The first aggregated data includes all parishes served by the Capital Region Planning and Development Commission (Region 2), that is, Ascension, East Baton Rouge, East Feliciana, Iberville, Livingston, Pointe Coupee, St. Helena, Tangipahoa, Washington, West Baton Rouge, and West Feliciana.

MAIN RESULTS

For the Capital Region Planning and Development District, industry clusters showing stability and growth (at the national level) are the chemicals, new energy production and emerging fuel sectors that are contained in the chemicals and chemical products and Energy clusters. The computer and electronic product manufacturing and information technology and telecommunications cluster that support software design industries are still weak to support a rapid growth of these targeted industries. The agribusiness, food processing and technology industry cluster that supports food processing and technology shows insignificant growth in both concentration and employment. All major employers (i.e., chemicals and chemical products, energy (fossil and renewable), education and knowledge creation) had no regional comparative advantage. Employment growth depends on cluster's growth at the national level. Emerging industries are relatively small in terms of concentration and employment. Compared to 2002/07 and 2007/12, most of the non-traded clusters were moving towards declining clusters. These results may be an indication of structural shift from an economy dominated by small and many industry clusters to one dominated by growth and emerging but few industry clusters.

The policy and education systems will need to develop the capacity to accommodate anticipated labor mobility and to provide a sustainable labor needs in the high growth and emerging industries. Studying the declining industry clusters would map the extent of inter-sectoral labor mobility, skill differentials in mobility, the impact of the type of training on mobility and changes in mobility patterns. There is also a need to study the major employers to identify value-adding activities to create spoke industries that may buy from or sell to these mature and growing clusters. It also important to note that industry cluster formation is not a dogma but a dynamic process shaped by regional circumstances and characteristics of mature, growth and emerging industries. This means that an identification of clusters and knowledge regarding linkages is a dynamic

process and very important in implementing industry cluster-based economic development strategies.

Figure 1: Relationship between Location Quotient and Employment Growth Rate
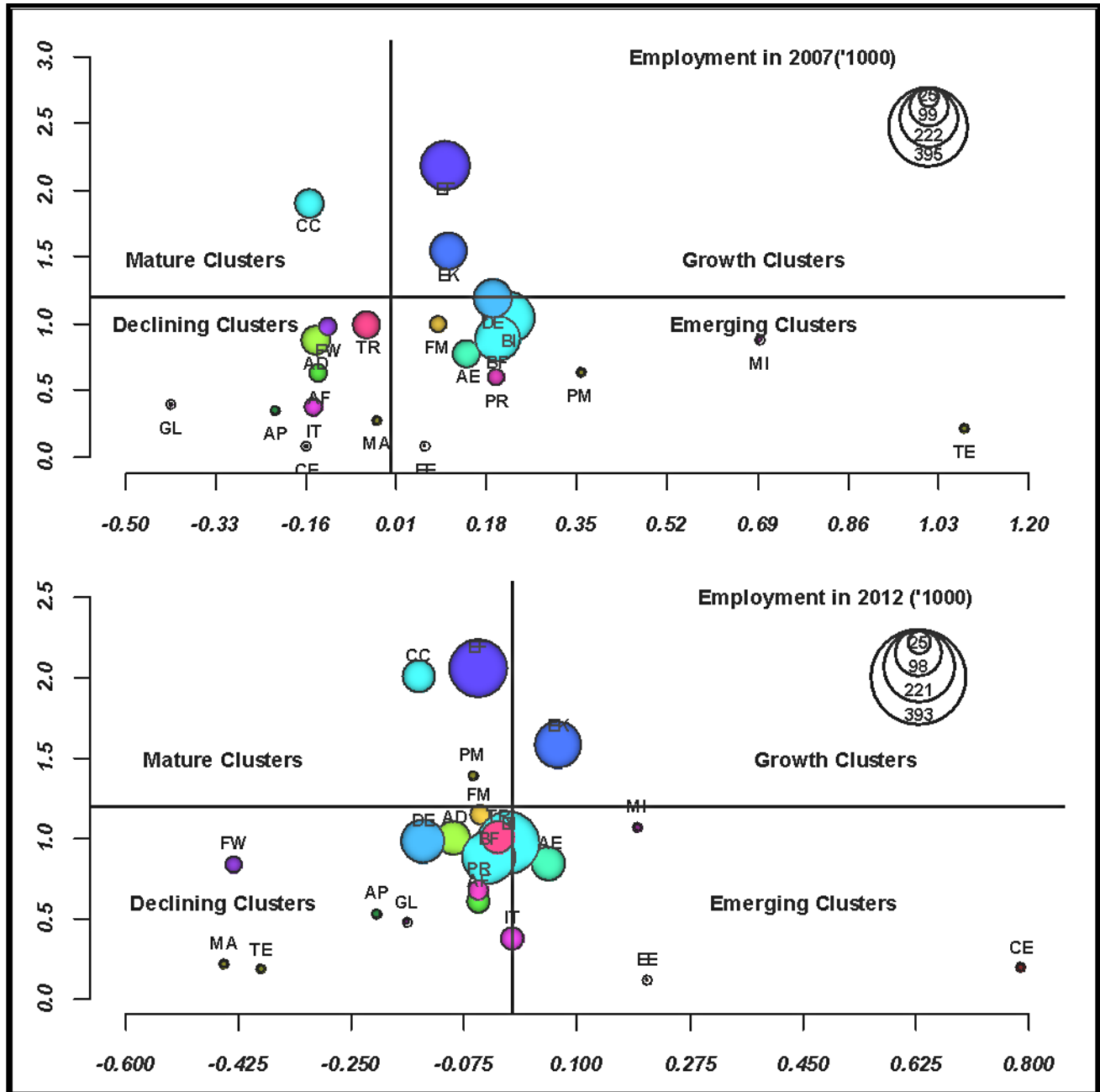
Figure 2: Key for Figure 1

Complete Key to the Abbreviations in the Graphs

Industry	Abreviation
Advanced Materials	AD
Arts, Entertainment, Recreation & Vistor Industries	AE
Agribusiness, Food Processing & Technology	AF
Apparel & Textiles	AP
Business & Financial Services	BF
Biomedical/Biotechnical (Life Sciences)	BI
Chemicals & Chemical Based Products	CC
Computer & Electronic Product Mfg	CE
Defense & Security	DE
Electrical Equipment, Appliance & Component Mfg	EE
Energy (Fossil & Renewable)	EF
Education & Knowledge Creation	EK
Fabricated Metal Product Mfg	FM
Forest & Wood Products	FW
Glass & Ceramics	GL
Information Technology & Telecommunications	IT
Machinery Mfg	MA
Mining	MI
Primary Metal Mfg	PM
Printing & Publishing	PR
Transportation Equipment Mfg	TE
Transportation & Logistics	TR

Appendix 1: Louisiana Economic Development and Planning Districts