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A Dynamic Shift Share Analysis of Economic Growth in West Virginia

Janaranjana Herath, Tesfa G.Gebremedhin and Blessing M. Maumbe¹

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Abstract

A regional economy consists of industries with a variety of economic potentials. A growth or decline in any of these sectors affects the overall growth of the economy. Analysis of economic growth by sector of a particular region helps policy makers, community leaders and researchers in better decision making and problem solving. This study attempts to analyze the employment growth pattern and policy implications in the economic development of West Virginia using a dynamic shift share analysis. The study uses employment data for 38 years from 1970 to 2007 for the empirical analysis. Results indicate that agriculture, mining and manufacturing are no longer the backbone of the economy of West Virginia. The three sectors showed employment declined within the 38-year period. Service and financial insurance and real estate are the most robust sectors contributing 91 percent of employment growth from 1970 to 2007. Apart from these two sectors, the wholesale and retail and construction sectors showed positive economic growth. Identification of investment priorities within these potential sectors and implementation of a comprehensive regional development policy plan would definitely accelerate the economic growth of West Virginia.

Key Words: Dynamic shift share, employment, economic growth, West Virginia

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1. Introduction

The dynamic and changing regional economies have been capturing the attention of policy makers, community leaders, and researchers (McNamara 1991; Knudsen, 2000.). A regional economy consists of firms and industries with a variety of economic potentials. Growth or decline in any of these sectors occurs by technological innovation, capital and labor productivity, location, changes in product demand, and shifts in input costs, which directly or indirectly affect the overall growth of the economy (Gebremedhin and Lass, 1995; Bartik 2004). As various sectors affect economic growth of a particular region differently, understanding the comparative advantage of these sectors becomes important in development decisions of the region (Deming, 1996; Melachroinos, 2002). Thus, it is essential to know the competitiveness of a particular state or region in economic development endeavors, as it makes the opportunity for policy options or investment decisions.

The identification of comparative advantage of sectors and services becomes more important in less developed regions than the developed regions. West Virginia is a low income state that seeks economic growth and development. The total population of West Virginia was 1,819,777 in year 2009, of which 56 percent of the population lived within an urban area and the remaining 44 percent lived in rural areas (ERS-USDA). West Virginia reported the 5th highest poverty rate, 17.4 percent in year 2008 (Bureau of Labor Statistics, 2008). At present, the rural poverty rate is 19.9 percent and the figure is five points higher than the urban poverty rate. The unemployment rate is 9.5 percent which is one of the highest rates in the country compared to rates of many other states (Bureau of Labor Statistics).

The average population density was about 75 people per square mile and the average per capita income was \$31,624 in 2008 (ERS-USDA). The per capita income in rural area was \$29,200 compared to \$33,578 in urban area. Manufacturing, services, mining and tourism are the major economic sectors in West Virginia. The leading production of bituminous coal, natural gas, stone, cement salt and oil contribute significantly to the state's economy. Farming is practiced throughout West Virginia, but not in a form of large scale cash-crop agriculture (ERS-USDA). Nearly 82 percent of total agricultural production comes from livestock products and the remaining 18 percent comes from crops. Moreover, major manufacturing goods in West Virginia are machinery, plastic and hard wood products, fabricated metals, chemicals, aluminum, automotive parts and steel. The largest share of gross product in the service sector is comprised of the community, business and personal services groups and most of these services are provided by private health care, law firms, repair shops and hotels. Tourist activities such as skiing and white-water rafting are popular and bring significant revenue to the state. Thus, the main objective of this paper is to analyze the employment growth pattern and policy implications in relation to the economic development of West Virginia at sector level, using a dynamic shift share analysis.

The rest of the paper is organized into four sections. Section two provides the theoretical framework. Section three covers the methodology and data sources. Section four describes the empirical results and analysis. Section five presents the conclusions and policy implications.

2. Background and Framework

The shift share method of analyzing regional growth was originated in the 1940s by Daniel Creamer and was summarized by Dunn in 1960 (Shi and Yang, 2008). According to Dunn (1960), the main feature of shift share analysis is the computation of geographical shifts in

economic activity. The analysis has been used heavily since its formal inception in the 1960s (Ashby 1968; Fothergill and Gudgin, 1979). It has been popular in the fields of regional economy, political economy, urban studies, geography and marketing in the last 40 years (Knudsen, 2000; Shi and Yang, 2008). The technique is generally applied to describe historical growth trends, forecast regional growth, analyze the effects of policy initiatives, or develop strategic planning for communities (Selting and Loveridge, 1992). However, the analysis has generally been used for describing regional and industrial growth and examining the competitiveness of regional and industrial growth in a particular time period (Sirkaya, Uysal and Toepper, 1995). Ireland and Moomaw (1981) and Andrikopoulos, Brox, and Carvalho (1987) showed the suitability of shift-share analysis in predicting investment decisions at the regional level. Rigby and Anderson (1993) investigated variations in labor productivity, by incorporating average labor productivity in an industry at a given time and by estimating the change when output is held constant. The authors showed the potential gains in employment with the productivity changes under constant output. McDonough and Sihag (1991) expanded the shift-share technique by developing a methodology for selecting and including both primary- and secondary-base economies in the shift-share model. This becomes practical when the technique is applied to sub-regional economies, whose economic performance is usually tied to the economies of both the state and the nation.

The technique has been used heavily in analyzing regional and international growth impacts. Barff and Knight III (1988) applied dynamic shift share analysis to measure the employment growth from 1939 to 1984 in New England by using data from U.S Bureau of Labor Statistics. They found that either large changes in regional industrial mix or major differences

between regional and national growth rates were the main factors affecting employment growth in New England.

Harris et. al (1994) used dynamic shift share analysis to investigate the economic impacts of the State of Nevada. They examined the differential impacts of the state of Nevada and three sub-regional economics from 1981 to 1982 recession and from 1990 to 1991 recession. The results indicated that the two recessions periods had different impacts while different sub-regions of the state reacted differently to the impacts.

Gebremedhin and Lass (1995) used traditional static shift share analysis in comparing the economic changes of industrial sectors in West Virginia and Massachusetts. The study was done for the period 1981 to 1991. The results showed that employment in West Virginia and Massachusetts decreased their share to total U.S. employment. Moreover, employment has declined in agriculture, manufacturing and the government sectors of the two states.

A study done by Fernandez et. al (2005) in Spain using spatial shift share analysis showed that higher competitive effects are found in the agriculture and construction sectors, while the industry and services sectors showed lower results in employment growth in Spain.

The study by Andrikopoulos, Brox, and Carvalho (1990) based on shift-share analysis, produced more accurate results compared to an analysis using aggregate employment changes. They reported in the study the measurement of regional attractiveness in the manufacturing sector in the province of Quebec in Canada. The study revealed that shift-share is useful for analyzing historical employment patterns and identifying their causes through regression analysis.

Shift share analysis has been used significantly to study trade issues with the effect of globalization, especially in Europe. Markusen, Noponen, and Driessen (1991) used dynamic shift

share analysis in tracking the sensitivity of regional growth to international flows, decomposing shift-share components into import, export, and domestic market segments and a productivity component. They merged data on regional employment, national employment and output, and international trade, to compare the experience of U.S. regions for the period from 1978 to 1986. Results revealed that some regions, like New England and the Pacific, have relatively positive industrial mixes for both export and domestic market growth, while others, particularly the East and North Central region, have negative ones.

Esteban (2000) used shift share analysis to elucidate the existing interregional inequality in aggregate productivities per worker within the European Union instead of productivity gaps which are uniform across sectors. Result showed that interregional variation can be explained only by uniform productivity gaps and the role of regional specialization is a minor one. The findings became important in regional development policies focusing on actions producing uniform increases in regional productivities like infrastructures and human capital.

Melachroinos (2002) examined the dynamics of manufacturing-employment change in thirteen European Union countries between 1978 and 1996, using shift-share techniques. Results revealed the gains of European integration over this period and they found that the geography of manufacturing employment has remained almost unharmed too. The processes operating at European scale also seemed to have the biggest impact on labor increment in each member state.

Wilson et. al. (2005) used dynamic shift share analysis to examine the export performances of China in electronics compared to the East Asian Newly Industrialized Economies exporting to the U.S, European Union and Japan from 1988 to 2001. They found that China emerged as a serious competitor in the export market for electronic goods, but this

position in the market has not been a dominant one. China's main gains have been in consumer electronics and telecommunication equipments.

Hoppes, (1997) used a shift share model to investigate, describe, and analyze disease and death rates in Missouri. Using statistical data on death rates by type of disease, shift share components of change were estimated at national, structural and regional scope. The results are useful in allocating health care funding and targeting specific diseases for funding.

Shi et. al. (2007), applied the technique of shift share analysis to tourism in China, based on international tourism receipts from 1995 to 2004. The study examined the spatial competitiveness of international tourism in Jiangsu Province in comparison with its neighbors by applying a spatially extended shift-share model and a modified dynamic shift-share model. The results indicated that the growth of international tourism receipts in Jiangsu is mainly attributable to the national component and the competitive component. Further, Zhejiang is the most important rival to Jiangsu during the period of 1995 and 2004. In order to upgrade the competitiveness of tourism in China, it was essential for Jiangsu to undertake proper positioning, promoting and marketing strategies and to cooperate and integrate with its main rivals.

In the context of regional economic growth analysis, various methods like optimization technique, shift-share, economic base, input-output, and benefit-cost analysis, have been used (Selting and Loveridge, 1992; Quintero, 2007). Even though these models show some variations in measurement, precision, accuracy, and simplicity, each method of analysis have been used as a guide for policy makers and researchers in answering basic questions related to state or regional problems (Hustedde et al. 2005). Shift share analysis, in particular, compared to the other methods, is widely used by regional development practitioners, where data limitations are minimal (Knudsen, 2000; Quintero, 2007). Furthermore, shift share analysis is important in

selecting and understanding the key leading sectors in a region, which needs developing local industry partnership.

3. Methodology

Analyzing the factors affecting economic growth can be done using a variety of different methods of analysis (Selting and Loveridge, 1992). Shift share analysis is a popular and simple technique used in analyzing employment growth in a region over a specific period of time (Barff and Knight III, 1988; Hoppes, 1991; Esteban, 2000; Knudsen, 2000; Wilson and Chern, 2005; Herzog and Olsen, 2006). Shift share analysis decomposes total regional growth into three distinct effects for better analyses of employment growth (Richardson, 1978). Moreover, it focuses on comparing the regional employment growth to the national employment growth. The three distinct effects are: (1) **national growth effect (NGE)**, which is the part of the change in total employment in a region ascribed to the rate of growth of employment at the national level; (2) **industrial mix effect (IME)**, which is the amount of change the region would have experienced if each of its industrial sector had grown at the national rates, less the national growth effect; and (3) **competitive effect (CE)**, which is the difference between the actual change in employment and the employment change to be expected, if each industrial sector grows at the national rate. The sum of these three effects gives the actual change in total employment within a region over a considered time period.

Following the notation of Richardson (1978), the three growth effects for a particular region and industrial sector take the form of a;

1. National growth effect for sector i in a region $r = E_{ir} * G_n$
2. Industrial mix effect for sector i in region $r = E_{ir} (G_{in} - G_n)$
3. Competitive effect for sector i in region $r = E_{ir} (G_{ir} - G_{in})$

Where,

E_{ir} = employment in sector i in region r at the beginning of the time period

G_n = growth rate for total employment for the nation over the time period

G_{in} = growth rate in sector i for the nation for the time period

G_{ir} = growth rate in sector i in region r for the time period

Comparative static and dynamic shift share analyses are commonly used approaches in the literature. The use of comparative static approach that considers only the beginning and end years of the time period, presents problems in measuring the industrial mix effect as it does not take into account the changes overtime. Further, it does not account for the changes in the size of the region's total employment over time, which leads to 'compounding effect' (Barff and Knight III, 1988; Harris et al, 1994). A dynamic shift share analysis can overcome these problems and presents an appropriate analysis of the employment changes. A dynamic shift share approach adjusts annually for changes in industrial mix, constantly updates the total regional employment, and uses annual growth rates (Barff and Knight III, 1988). This makes it easy to present the empirical results on an annual basis for any period of time. Adding annual results over the time period is an effective way of summarizing and presenting accurate changes in employment growth (Barff and Knight III, 1988; Harris et al, 1994; Wilson, 2005). Moreover, according to Barff and Knight III, a dynamic shift share approach becomes important in the presence of large changes in regional industrial mix or in the presence of major discrepancies between regional and national growth rates.

This study is unique as it uses a dynamic shift share analysis to examine the employment growth in West Virginia using employment data for 38 years from 1970 to 2007. Apart from the analysis of total employment growth, the farm and nonfarm subsectors are independently and

closely examined to evaluate the growth impacts. Major employment subsectors of West Virginia namely mining, manufacturing, and services are scrutinized separately to examine the impacts which have not been adequately attempted before. The study examines the beneficial subsectors for rapid economic growth with potential policy implications for investments in West Virginia.

Types and Source of Data

As the study attempts to utilize a dynamic shift share analysis of employment growth in West Virginia, a panel data set was considered for a period of 38 years (1970 to 2007) based on the data availability. Two sets of data were selected, one for employment growth in West Virginia and the other for national employment growth in the United States. U.S. Bureau of Labor Statistics and U.S. Bureau of Census were the main sources of data. As the focus was on examining the growth of various sectors of West Virginia, the data collected on total employment was categorized into two main sectors, farm employment and nonfarm employment. Nonfarm employment was further divided into nine subsectors (1) mining, (2) construction, (3) manufacturing, (4) wholesale and retail trade, (5) transportation and public utilities, (6) finance, insurance and real estate, (7) services (8) government and (9) agricultural services, forestry fishing and others. Further, the change in unemployment was examined to conduct a comparative analysis with the change in employment.

4. Results

The total civilian labor force in the United States was 82.8 million in 1970 and increased by 62 percent to 153 million in year 2007. In West Virginia, labor force increased by 21 percent from 0.79 million in 1975 to 0.97 million in 2007 (Bureau of Labor Statistics). The national unemployment rate decreased from 5.9 percent to 4.6 percent during the 38-year period, with an

average employment growth rate of 6 percent in each year. In West Virginia, the average growth rate was 8.6 percent for the period from 1975 to 2007. The results indicate that the decrease of unemployment rate is lower in West Virginia compared to the national level (Figure 1). The peaks of unemployment rates are noticed around 1981 and 1982 and 1990 and 1991.

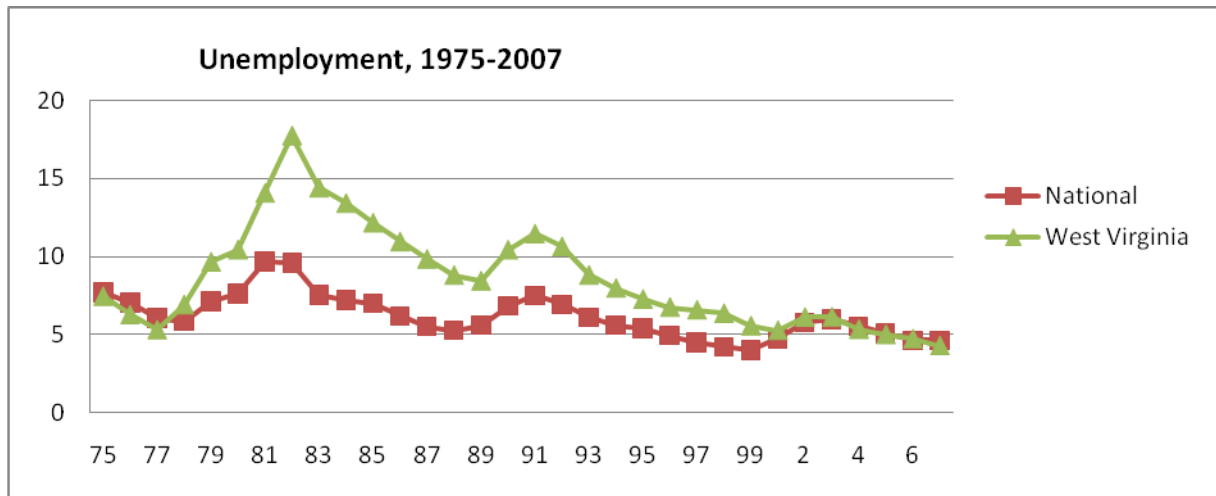


Figure 1. Unemployment rate from 1975 to 2007

In the last 38 years, the total labor force has increased by 62 percent in the United States but it increased only by 22 percent in West Virginia (Table 1). The percentage change of total labor force in West Virginia was 21 percent; it is lower than the rate at the national level. When the percentage change of farm employment increased by 23 percent in the United States; it decreased by 17 percent in West Virginia. This implies that employment creation in the farm sector in West Virginia has decreased for the last 38 years.

The nonfarm sector as a whole reports a positive change of employment both in the United States and West Virginia. However, employment related to the manufacturing sector shows a decreasing trend in both cases during the 38 years. This may be due to the recession from 1990 to 1991 followed by subsequent restructuring policies of the US economy. Moreover, employment in manufacturing industries has been declining as a result of increasing global competition and productivity gains (Deming, 1996). The percentage changes of employment in

mining, manufacturing, and transport and utilities in West Virginia show negative changes even though national figures are positive. This is due to lower growth rates in these sectors at the state level compared to sectors at the national level from 1977 to 2007. However, service, finance, insurance and real estate, agricultural services, and construction, report positive employment changes indicating high growth, both in West Virginia and the United States. The finance, insurance and real estate sector reports higher employment gains in West Virginia compared to growth at the national level (Table 1).

Table. 1. Percentage change of employment in each sector from 1970 to 2007

	National	West Virginia
Total Labor force	62.12	21.26
Total employment	62.69	36.37
Farm employment	23.06	-17.46
Nonfarm employment	67.26	38.33
<i>Agricultural services</i>	1221.81	41.28
<i>Mining</i>	17.03	-72.15
<i>Construction</i>	78.62	42.57
<i>Manufacturing</i>	-23.21	-76.92
<i>WS &RT</i>	69.5	24.43
<i>Transport and utilities</i>	52.21	-36.62
<i>Fin/Ins/RE</i>	86.98	261.36
<i>Service</i>	123.54	98.97
<i>Government</i>	56.69	33.96

Source: Bureau of Labor Statistics 1979 -2007

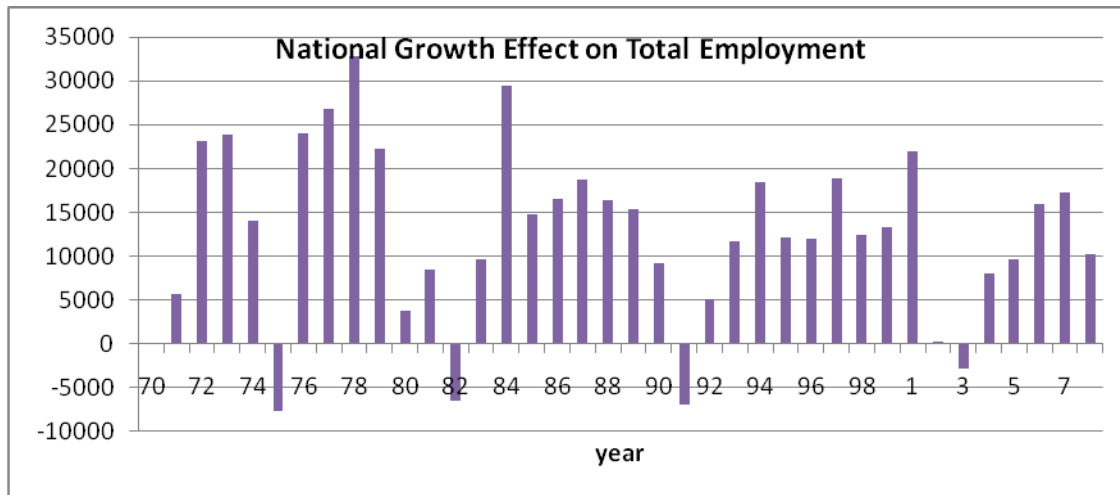


Figure 2. National Growth Effects, 1970 to 2007

Table 2. Employment growth in West Virginia, 1970 to 2007 (in thousands)

	NGE	IME	CE	Actual growth
Total employment	47831.47	2476.48	-22286.25	28,021.70
Farm employment	1509.44	-889.61	-1124.63	-504.8
Nonfarm employment	46322.03	3366.09	-21161.62	28,526.5
<i>Agricultural services</i>	185.03	4358.77	-4514.90	28.9
<i>Mining</i>	2892.44	-1701.32	-5454.19	-4,263.07
<i>Construction</i>	2626.48	785.90	-1883.19	1,529.19
<i>Manufacturing</i>	6258.85	-8025.81	-5291.74	-7,058.7
<i>WS &RT</i>	9546.43	946.85	-8026.29	2,466.99
<i>Transport and utilities</i>	2532.63	-449.93	-3751.50	-1,668.8
<i>Fin/Ins/RE</i>	2878.61	713.61	7630.88	11,223.11
<i>Service</i>	10588.01	10577.43	-3917.74	17,247.72
<i>Government</i>	8280.27	-882.65	-3091.02	4,306.6

Source: Bureau of Labor Statistics 1979 -2007

The national growth effect (NGE) shows employment growth that would have occurred if a sector in a regional or local economy had grown at the same rate as the national economy. Regarding West Virginia, national growth effect in all sectors is positive (Table 2). The nonfarm employment sector shows a higher contribution for total employment growth compared to the farm employment sector. Service, wholesale and retail, and the government subsectors of nonfarm employment sector show significant impact on national growth effect of the nonfarm sector. Thus, if the same rate of national growth has occurred, the change in employment would be higher in those subsectors in West Virginia. Figure 2 shows a slightly decreasing trend of national growth effect on total employment in West Virginia from 1970 to 2007. The national growth effect associated with a negative sign during national recessions.

The industrial mix effect (IME) measures the amount of local or regional employment sector growth compared to the national employment growth. It can be used in identifying the fast or slow growing sectors or industries in an economy. A positive industrial mix effect in a particular local employment sector indicates that it is growing faster than the national economy. If the industrial mix effect is negative, that sector is growing at a slower rate compared to the national economy. In this study, the farm employment sector shows a negative industrial mix effect indicating a slower growth rate compared to the national employment growth while the nonfarm sector exhibits a positive industrial mix effect indicating a faster growth of the sector. However, the subsectors of mining, transport and utilities, manufacturing and government show negative industrial mix effects, indicating that employment in these sectors at the state level is part of relatively slow-growing national sectors (Table 2). The positive industrial mix effects of the sub-sectors of construction, finance insurance and real estate, wholesale and retail, and service (which includes the services of business, health, engineering, management, professional

services, hotels, and personal services) show employment in these sectors at the state level is growing faster than employment at the national levels. The results indicate that the subsectors of construction, finance insurance and real estate, wholesale and retail, and service have been playing a major role in employment growth in West Virginia from 1970 to 2007 as shown in Figure 3. Figure 4 shows the change of industrial mix effect for total employment from 1970 to 2007, which was calculated by adding each sectors' industrial mix effect. It shows some negative values in certain periods especially in some years in 1970's, early 1980's and in 2000's. This may be as a result of the recessions of the national economy in those periods. The industrial mix effect for the total employment sector also indicates a negative value for the period of 1999 to 2007, showing that the growth of total economy is slower than the overall U.S economy.

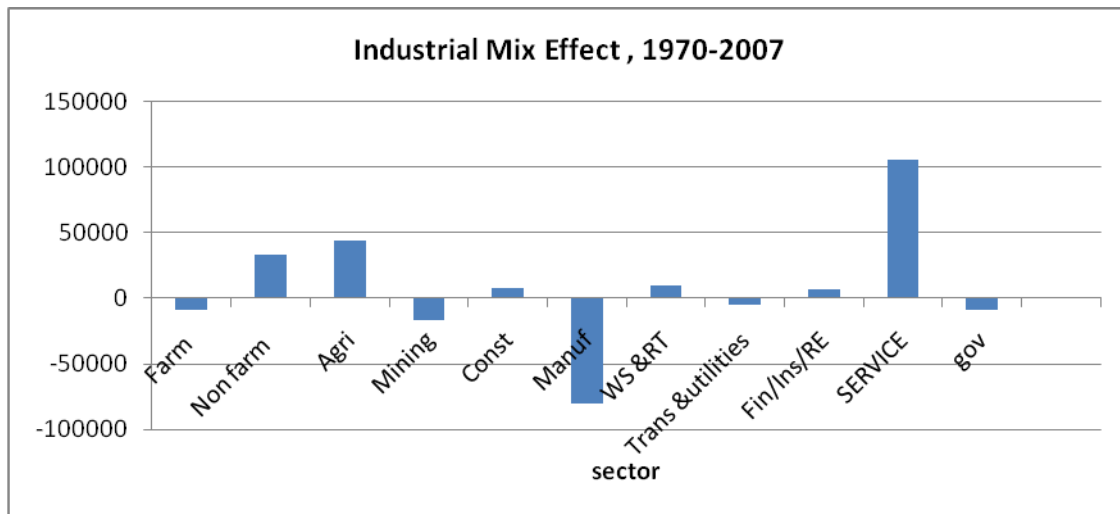


Figure. 3. Sector level industrial mix effects, 1970 to 2007

The competitive position effect (CPE) measures how a particular sector is growing in an area compared to growth of the same sector at the national level. A positive effect means that the local economy has been successful in attracting investment to a particular sector. Moreover, positive competitive effect indicates the comparative advantage for a region in a particular sector. A positive local share combined with a positive industrial mix effect show a potential competitive advantage in that sector. A negative competitive effect indicates that the local

economy is losing its share to other regions. As shown in Table 2, both the sectors of farm and nonfarm indicate negative competitive effects in West Virginia. All subsectors of industries in West Virginia also indicate negative competitive effects with the exception of the subsector of financial, insurance and real estate. The positive competitive effect of finance, insurance and real estate sector indicates its comparative advantage in economic growth in West Virginia. Thus, the local economic growth as a whole has not been successful in attracting industries and West Virginia has been losing its industries to other regions (Table 2 and Figure 5).

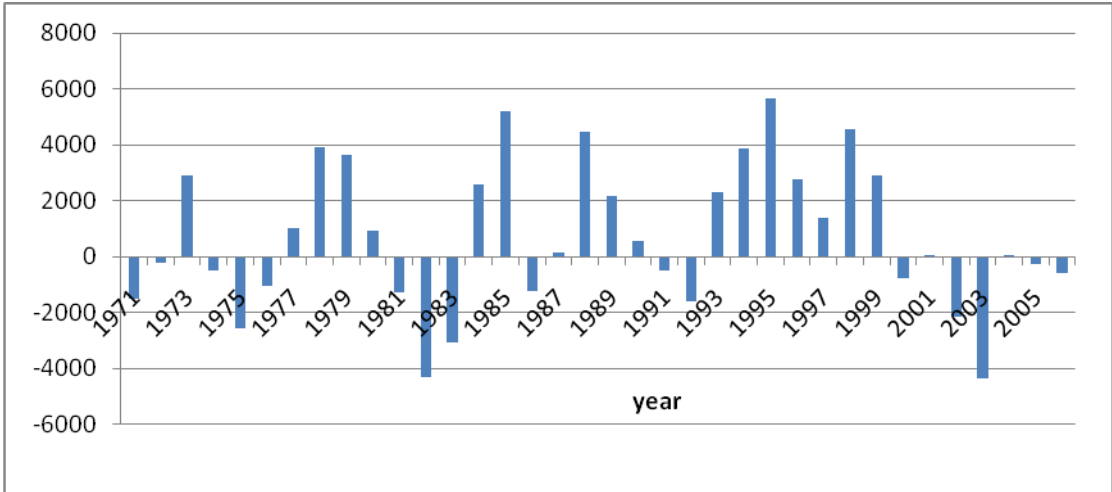


Figure 4. Industrial mix effect for total employment, 1970 to 2007

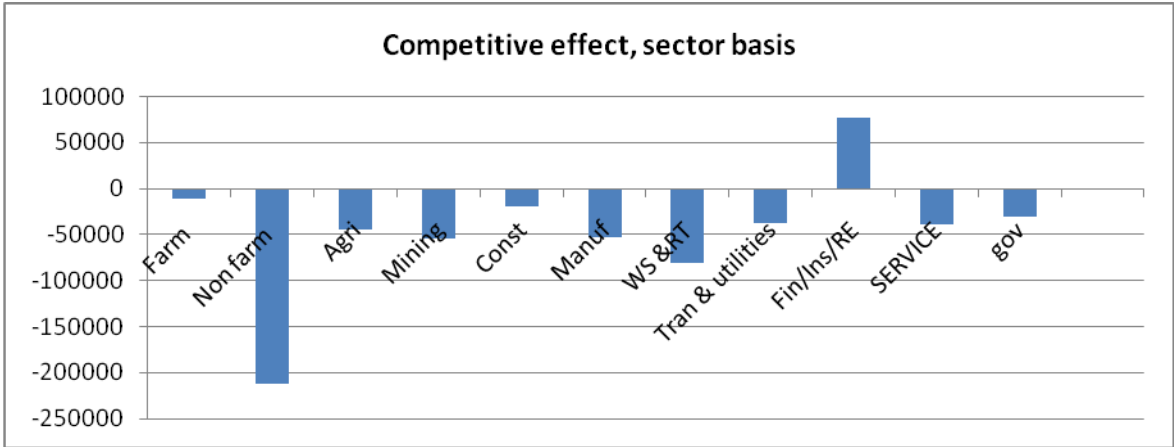


Figure 5. Competitive effect, 1970-2007 (dynamic)

The sum of the national growth effect, industrial mix effect and competitive effect gives the actual employment growth change in a particular region. The national growth effect and industrial mix effect are determined exogenously and together compose the share of economic growth of the region while the competitive effect appears as the only endogenous component in the model. The actual total employment growth in 38 years (1970-2007) is 28 million in West Virginia as depicted in Table 2. Employment growth is negative in the farming sector due to the development of nonfarm sector. This is because farming does not have any more competitive advantages in West Virginia’s economic growth. But it seems that the production of niche products like aquaculture, organic farming and pasture-beef, and the nonfarm sector holds the potential for employment growth. However, all the subsectors of the nonfarm sector do not have positive effect on the actual employment growth (Table 2).

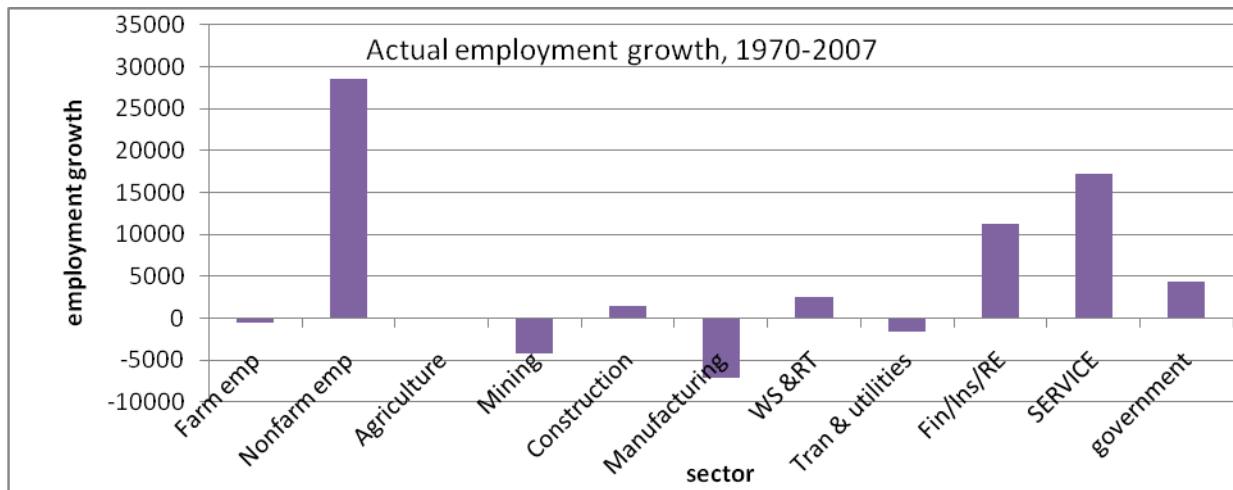


Figure. 6. Actual employment growth in West Virginia, 1970-2007

Among the subsectors, the service subsector which includes the services of business, health, engineering, management, professional services, hotels, personal services, and others mainly report the highest contribution to actual employment growth indicating the substantial

future potentials and gains in development activities. The service sector has created 17.25 million new jobs in the economy West Virginia within the last 38 years (Table 2). As the service subsector is highly labor intensive, identification and investment on comparatively efficient services are important in achieving rapid development in West Virginia.

Finance, insurance and real estate subsector reported the second highest contribution, 11.22 million employment opportunities in West Virginia (Table 2). The segment of finance includes banking, credit agencies, securities, commodity brokers, and holding and investment companies and segments of insurance and real estate consist of insurance carriers, insurance agents and brokers, real estate operators, real estate managers and agents, and developers. Of these divisions, the most efficient and optimal ones would make higher gains in the future.

The service subsector consisting of finance, insurance and real estate segments has made 91 percent of the actual employment growth in West Virginia from 1970 to 2007. The industrial mix effects in these subsectors indicate that they are the fastest growing industries in West Virginia. Thus, it clearly indicates the need for development plans directly oriented to these segments of the service sector in overcoming poverty in West Virginia. Trade (wholesale and retail), government, and construction also reveal significant contributions to economic growth in West Virginia, which contribute at least 9 percent to total economic growth (Table 2).

On the contrary, mining and manufacturing, the major employment subsectors in West Virginia indicate negative impacts on actual employment growth from 1970 to 2007. The mining industry reports 4.26 million actual employment losses in the last 38 years, indicating that investment in mining sector may not help in achieving a fast economic growth in West Virginia. According to the year 2007 labor force statistics, total number employed in mining industry is 21,682 and has been declining throughout the last three decades. However, the high

cost associated with environmental and health cost of mining hinders further investment, especially in coal mining. Nevertheless, 99 percent of the electricity supply of the state is generated by the coal industry in West Virginia (Union of concerned scientists, 2009).

Metal, chemical, plastic, wood products, aluminum, automobile and many others are included in the manufacturing subsector of West Virginia. Even though some of these industries like automobile, plastic wood products are thriving (Department of Commerce, WV, 2010); manufacturing sector reports a total of 7.06 million employment losses from 1970 to 2007 as shown in Table 2. At present, the manufacturing subsector supplies only 6 percent of the employment opportunities in West Virginia (Labor Statistics, 2010). The declining employment trend in the last two to three decades indicates that manufacturing is no longer the major driver for development of the state.

According to Federal statistics (WV Department of Commerce, 2010), 97 percent of state investments are small businesses which play a major role in the economy of West Virginia. Within the prevailing policies on new investments in West Virginia, financial supports, tax credits, research and technical support and other data based facilities are given by the state to investors. Enhancing these supports with the identified, competitive growth sectors, namely service and finance, real estate, and insurance can yield high economic gains. For instance, since 2005, West Virginia has made more than \$12.4 billion worth of new business investments in the state's economy (Department of Commerce, WV, 2010) and not all of them were in the competitive growth sectors. If those investments had been made in the competitive sectors only, present employment gains would have been much higher than what they are today.

5. Conclusion and Policy Implications

The dynamic version of shift share analysis eliminates some of the problems associated with the traditional comparative static approach and provides a more accurate allocation of

employment change among the three shift share effects. The empirical estimation on an annual basis also allows an unlimited time period and years of economic transition to be properly identified. However, the magnitude of the difference in results produced by dynamic and static approaches depends on the magnitudes of changes in the industrial mix and on the amount of difference in growth rates for total employment for the region versus the nation. Shift share analysis is mostly applied to employment changes at much lower levels of aggregation, where the potentials for significant change in industrial mix or having growth rates much different from the nation is much greater. Therefore, the technique is appropriate in measuring the economic effect in West Virginia. Moreover, the use of dynamic approach is thus especially important to relatively small economic sectors and can be utilized for analysis of a long period of time.

The dynamic shift share analysis in West Virginia provides interesting insights of employment changes in various sectors which provides better investment planning for economic development of the region. In general, the actual total employment growth is positive and has a lower percentage change compared to the rate at the national level. This provides insights about the lower growth rate of the state and the need for better policy options.

Employment growth of the farm sector has declined in the last 38 years, even though 50 percent of the state farmers consider farming as their primary occupation. Thus, agriculture is no longer the backbone of the economy of West Virginia and the future expectation in economic growth in farming is minimal. However, reconsideration of economically efficient agricultural policies that supports state farmers would be imperative as the majority of the state population is low-income small-scale farmers.

The nonfarm sector plays a major role of promoting actual economic growth in West Virginia. Significant positive changes are seen in the subsectors of trade, finance, insurance and

real estate and services. Services, and finance, insurance and real estate are the most important fast growing employment subsectors. Policy programs to invest more in these subsectors would make higher gains than any other sectors. Thus, policy development and investments targeting those sectors, with adequate facilities would boost the economic growth of the state which would attract giant investors in the long run.

The presence of negative competitive effects in many subsectors indicates the loss of shares to other economies. Even though, mining and manufacturing are two major industries in the economy of West Virginia, significant employment declines suggest that further dependency in these sectors would jeopardize the state's economy. Considerable attention on revitalization of these industries is essential to future costs and loss of revenues. In particular, issues of the environmental pollution should be addressed and mitigated with increased awareness of sustainable development.

The main implication of the findings is that agriculture, manufacturing and mining which are considered as the major sectors are no longer the major contributors of economic growth in West Virginia. Instead services, finance, insurance and real estate, wholesale and retail, and sometimes construction sectors play a significant role in the economic development of the states. Identification of investment priorities with these potential industries and implementation of a comprehensive regional development policy, and public private partnership would definitely enhance the future development of West Virginia.

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