A DYNAMIC SHIFT-SHARE ANALYSIS

OF

ECONOMIC IMPACT REPORT

THE NEVADA ECONOMY
A Dynamic Shift-Share Analysis

of the Nevada Economy

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OF THE NEVADA ECONOMY

EXECUTIVE SUMMARY

This study investigates the response of the Nevada economy as a whole and the regional Nevada economies of Clark County, Washoe County and Balance of State to two recessions of 1981-82 and 1990-1991.

OVERVIEW

• The increased volatility of the Nevada economy to the national recession of 1981-82 led to formulation of the Nevada Commission on Economic Development and focusing of economic diversification in the state.

• By understanding the changes in response by the Nevada economy from the recessions of 1981-82 and 1990-91, economic development and diversification plans can be effectively targeted.

• Dynamic shift-share analysis was employed to estimate differential employment impacts by the economy of the state of Nevada to the recessions of 1981-82 and 1990-91.

BACKGROUND

• Nevada was the fastest growing state in the nation growing from 800,500 in 1980 to 1,201,833 in 1990 or a 50.1% increase in population during the decade.

• Most population growth occurred in the metropolitan Nevada counties of Clark and Washoe where 83% of the state’s population resided in 1990.

• During the 1981-82 national recession, the economy of the state of Nevada was adversely impacted. This impact may be due to the legalization of New Jersey casinos.

• In 1983, the Nevada legislature created the Nevada Commission on Economic Development. This commission’s task was to formulate and enact policies to diversify the state’s economy.
SHIFT-SHARE ANALYSIS

- Shift-share analysis has been employed by regional scientists for forecasting, strategic planning and policy evaluation.

- Shift-share analysis focuses on the difference between regional or county growth rates and national values.

- Traditional shift-share analysis decomposes county growth into the national and county components.

- Actual growth in a county is decomposed into national growth, industrial mix and competitive components.

- The national component reflects expected growth in a county had it grown at the same rate as the nation.

- Industrial mix refers to the initial industrial structure of a given county. If an area is growing faster than the national average, it may be due, in part, to a concentration of rapid growth industries.

- Competitive component derives the comparative advantage of a county economy.

DYNAMIC SHIFT-SHARE

- Traditional shift-share analysis provides information as to change in a county economy over a specific time period.

- However to derive differential impacts over two recessions, dynamic shift-share analysis is employed.

- Dynamic shift-share analysis can be used to investigate impacts of policy initiatives by comparing responses of a state, regional or county economy over two recessions.

- The severity of individual recessions differs at the national and state, regional or county levels and may exhibit different patterns of national and regional industrial response.

- Dynamic shift-share analysis can derive differential response of state, regional or county economies as “pure employment” effect and “pure recession” effect.

- “Pure employment” effect addresses the differential response if the characteristics of the recession were held constant but base employment is allowed to change.
• “Pure recession” effect addresses the differential response if the base employment between two recessions is held constant but the characteristics of the two recessions are allowed to change.

RESULTS OF TRADITIONAL SHIFT-SHARE ANALYSIS

• Monthly employment for the state of Nevada, Clark County, Washoe County and Balance of State counties were used for the shift-share analysis.


• During the 1981-82 recession, the state of Nevada realized total employment decline of 22,926 jobs, Clark County realized a loss of 13,220 jobs, Washoe County realized a loss of 4,535 jobs and Balance of State counties realized a loss of 5,123.

• Much of the total employment loss can be attributed to a loss in the competitive component of total employment change for the State of Nevada, Clark County, Washoe County and Balance of State.

• Statewide, the Service Sector saw the largest decrease in competitive share, perhaps indicating the influence of legalized gaming in Atlantic City. Clark County, like the state, saw the largest decrease in competitive share in the Service Sector. Washoe County realized a decline in the Service Sector, but the largest declines in employment occurred in the Construction Sector and Mining Sector. For Balance of State, the largest decrease in employment occurred in the Construction and Mining Sectors.

• During the 1990-91 recession, the impacts differed from the 1981-82 recession.

• Nevada became more competitive between the two recessions with competitive gains realized in the casino industry.

• Clark County, like the state, saw a positive pattern in competitive impact during the 1990-91 recession.

• Washoe County and Balance of State both showed smaller losses in competitive advantage than in the earlier recession.
DYNAMIC SHIFT-SHARE RESULTS

• The pure employment effect contains information solely about the effect of changes in employment base which occurred between the onset of both recessions.

• Results indicated that for the State, Clark County, Washoe County and Balance of State that the change in base did not dampen the effect of the 1990-91 recession.

• The pure recession effect contains information concerning the change in characteristics of the two recessions.

• The pure recession effect indicated that the state of Nevada was more competitive than during the 1981-82 recession.

• Results of the dynamic shift-share analysis indicated a dampening of the 1990-91 recession as opposed to the 1981-82 recession. This dampening occurred at the state level, Clark County, Washoe County and Balance of State.

• Factors attributable to this dampening are industrial productivity increases, state government education programs and state financial programs to increase efficiency.

• Also during the 1990-91 recession, the State of Nevada Commission and Economic Development, Nevada Small Business Development Center and university outreach extension activities were in existence, which was not the case during the 1981-82 recession. These programs appear to have dampened the impacts of the 1990-91 recession.
Introduction

The state of Nevada was the fastest growing state in the nation during the 1980’s. Population in the state of Nevada grew from 800,508 in 1980 to 1,201,833 in 1990 or a 50.1 percent increase (U.S. Department of Commerce, 1990). Most of the population growth occurred in the metropolitan counties of Clark and Washoe where approximately 83 percent of the state’s total population resides. Developments in the Gaming Sector, especially in Clark County have been the primary impetus for employment and income growth in Nevada’s metropolitan counties. The nonmetropolitan counties have a smaller population base, but many of the rural counties also experienced rapid growth during this same time period. Developments and/or expansion in the economic sectors of mining, agriculture and gaming sectors along with activities by the U.S. Department of Defense and Energy have stimulated economic growth in non-metropolitan Nevada.

The economy of Nevada primarily based on legalized gambling has often been described as recession proof (Cargill, 1979). However, with the national recession 1981-1982, along with the opening of legalized gambling in Atlantic City, the state of Nevada, specifically metropolitan Nevada, realized reduced economic activity. During this same time period, metal and agricultural prices decreased along with the cancellation of the MX missile deployment, the non-metropolitan counties of Nevada likewise realized recessionary pressures.

With these state-wide occurrences, the 1983 Nevada legislature created the Nevada Commission on Economic Development. The commision was charged with development and implementation of statewide plans for economic development and diversification. However, before such state and local efforts are enacted, an analysis of impacts of previous statewide economic cycles is required.

Also, during the 1980’s several Department of Defense and Department of Energy projects, such as Yucca Mountain nuclear waste depository have been projected for construction and operation in Nevada. Not only government investments, but the private sector has also formulated expansionary investments in casino gaming and mineral extraction. However, before forecasting future impacts of construction and operation of federal government projects as well as private sector expansions, an analysis is required to examine the impacts of past economic expansions and contractions on the Nevada economy. Examining economic sectoral reactions to past events, analytical procedures can be improved to forecast Nevada impacts from potential federal government and private sector developments. One such analytical procedure is shift-share analysis.

From the literature, there are three basic uses of shift-share analysis which are forecasting, strategic planning and policy evaluation.

A typical application of shift-share analysis for forecasting involves computing the competitive effect for the local economy and then carrying the competitive effect forward one period in combination with national and sectoral growth forecasts from other models. This usually requires making the assumption that the competitive effect is stable over time. (Brown

Shift-share’s use in strategic planning involves using the magnitudes of three components of shift-share analysis, explained in the next section, to assess the strengths and weaknesses of local businesses. It is within this context that shift-share can be useful as a tool to analyze the important factors driving growth in regional economics. (Curtis 1972; Randal 1973; Ledebur and Moomaw 1983; Doeringer et al. 1987; Harris et al. 1987; Luke et al. 1988; Senf 1988).

Shift-share’s use in policy evaluation generally compares the size of the competitive effect before and after a change in policy. Any difference in the size of the competitive effect serves as a rough measure of the impact of the policy measure. (Moore and Rhodes 1973; Isseman and Merrifield 1982; Bartels et al 1982; Terevo and Okko 1983; Mead and Ramsay 1982; Grimes and Ray 1988).

Therefore for this paper, an analysis of the state of Nevada’s response to two recessions will be analyzed using shift-share analysis. In pursuance of this objective, this paper is divided into three parts. First, a discussion of the components of traditional shift-share analysis will be presented. Second, a discussion of the components of dynamic shift-share analysis will be analyzed and economic sectors which contribute the most to growth or decline in the state of Nevada between two recessions will be identified.

Description of Traditional Shift-Share Components

Shift-share analysis is based on a set of identity equations, each of which depicts some aspect of economic growth. Shift-share analysis focuses on the difference between regional and national growth rates. Shift-share analysis is not a behavioral model; that is, it does not explain why a region grows or declines differently than the nation. It merely develops a framework for examining the components of growth or decline.

Shift-share analysis does provide insights in evaluating performance of the local economy. By identifying the industries that have positive comparative advantage, regional and state economic development practitioners may be able to target industries for possible relocation or expansion.
The traditional shift-share model decomposes growth of economic variables such as income or employment into their national and regional components (Selting and Loveridge 1993). The components of growth in Nevada within the context of national growth are:

(1) the effect of national overall growth rate component or national share (N)

(2) the difference in the industrial structure or composition of Nevada and the nation; the industrial mix component (IM)

(3) the amount of growth not due to nationwide growth or industry wide growth, the Competitive Effect (C).

Therefore the algebraic shift-share equation for three components of growth occurring in the i-th sector and the j-th county during the period of analysis can be written as:

\[ \text{ChE}_j = \sum_{i=1}^{n} (N_{ij} + IM_{ij} + C_{ij}) \]

Where:

\( \text{ChE}_j \) is the actual growth in the “j”th region;
\( N_{ij} \) is the national growth by economic sector “i” in region “j”,
\( IM_{ij} \) is the industrial mix component of economic sector “i” in region “j”,
\( C_{ij} \) is the competitive effect of economic sector “i” in region “j” and
\( n \) is the number of sectors in region “j”.

National Growth

The national growth component reflects expected growth in the region had it grown at the same rate as the nation. The national growth component is calculated by multiplying the base year employment in each economic sector by the growth rate of total national employment between the base year and terminal year. The national growth component may be stated mathematically as:
(2) \[ N_{ij} = E_{ij} \cdot n \]

Where:

- \( N_{ij} \) is the national growth component for the “i”th economic sector in the “j”th region.
- \( E_{ij} \) is the base year employment for sector “i” in region “j” and
- \( n \) is the growth rate during the period of analysis for all sectors in the nation.

The national growth component for the region is the sum of the economic sector’s national growth component in the region, or stated mathematically as:

(3) \[ N_j = \sum_{i=1}^{n} NE_{ij} \]

Where:

- \( N_j \) is the national growth component for region “j”.

**Industrial Mix Component**

Industry mix refers to the initial industrial structure of a given region. The purpose of the industrial mix component is to measure the influence of fast or slow growing industries within a regional economy. If an area is growing faster than the national average, it may be due, in part, to a concentration of rapid growth industries. For example, the Service Sector of the national economy has been growing faster than all other national economic sectors. Given that a large proportionate share of Nevada’s economy is in service related industries, it would not be too surprising to see Nevada’s rate of economic growth far exceeding national growth. However, this might not be a sign of a healthy economy, because a reversal in this one economic sector could cause overall regional economic reversal. By isolating the industry mix component, it becomes clearer when positive and diversified growth is occurring.

The industrial mix component can be stated mathematically as:

(4) \[ IM_{ij} = E_{ij} \cdot (n_i - n) \]

Where:

- \( IM_{ij} \) is the industrial mix component for sector “i” in region “j”; and
- \( n_i \) is the growth rate during the period of study for sector “i” in the nation.
The industrial mix component for the region is the sum of the economic sector’s industrial mix components in the region, or stated mathematically as:

\[ IM_j = \sum_{i=1}^{n} IM_{ij} \]

Where:

- \( IM_{ij} \) is the industrial mix component for region “j”.

**Competitive Component**

This component, competitive component, at the economic sector level is often considered the most important component in terms of regional development. A positive sectoral competitive component (sometimes called competitive share component) has been interpreted as an indicator of a region’s competitiveness with other regions for a particular economic sector. The competitive component, therefore, is considered by many economists to be the dynamic element in regional employment increases and the main component to be considered in any economic development plan (Andrikopoulos 1977; Curtis 1972; Kalbacher 1979; Petrulis 1979).

The competitive component may be stated mathematically as:

\[ C_{ij} = E_{ij} \cdot (r_{ij} - n_i) \]

Where:

- \( C_{ij} \) is the competitive component for sector “i” in region “j”; and
- \( r_{ij} \) is the growth rate during the period of study for sector “i” in region “j”,

The competitive component for the region is the sum of the economic sector’s competitive component in the region or stated mathematically as:

\[ j = \sum_{i=1}^{n} C_{ij} \]

Where:

- \( C_j \) is the regional shift component for region “j”.
The traditional shift-share economy over a specific time period. However, if an analysis is required to estimate the impacts of a policy change over two recessions, traditional shift-share analysis would prove inadequate. used to investigate differential responses of the Nevada economy over two recessions.

As mentioned earlier, the state of Nevada during the 1981-82 recession sensitivity to the national recession. With the legalization of casino gaming in New Jersey, the state of Nevada legislature created the Nevada Commission on Economic Development. The economy. By diversifying Nevada’s economy, it was hoped to mediate impacts of future national recessions and provide additional avenues for economic growth. Dynamic shift-share analysis can economy to the 1981-1982 recession and the 1990-91 recession. Before applying dynamic shift-share procedures to the state of Nevada, the next section will briefly outline the components of

Dynamic Shift-Share Analysis

Increased volatility of the Nevada economy during the 1980’s and 1990’s has stimulated sectors’ employment but this view assumes that the severity of a recession within a region is dependent solely on the extent to which the state’s economic base is diversified (Echeverri-Carroll

However, severity of a recession is considerably more complex. The severity of individual recessions differ at the national and regional levels and may exhibit different patterns of national

Recently, a dynamic shift-share technique has been developed by Mead and Ramsay examination of a region’s differential response to two recessions. This dynamic technique has been applied in New England, (Mead and Ramsay, 1982), Nebraska (Riefler, 1986) and Texas to analyze the different responses of the Nevada economy to the 1981-1982 and 1990-1991 national recessions.
An extension of the traditional shift-share technique which permits analysis of the differential regional response to two recessions was completed by Mead and Ramsay (1982). Using vector notation, traditional shift-share analysis can be expressed as:

\[
\text{ChE} = W'(N + I + R)
\]

where \(N\), \(I\) and \(R\) are column vectors with dimensions equal to the number of regional economic sectors and \(W'\) is a row vector containing the employment base for each sector. As its “\(i\)"th element, the vector \(N\) has the constant percent change in total national employment, vector \(I\) has the difference between the percent change in national employment and vector \(R\) has the difference between the percent change in regional employment for the “\(i\)"th sector and the percent change for that sector at the national level.

Unfortunately, the relative importance of changes in the four components or the effect of these components on changes in county employment in response to two separate recessions cannot by determined from equation (8). To derive an approximation of the differential county employment impacts between two recessions, equation (8) must be differentiated as:

\[
d\text{ChE} = [dW' + I + R] + [dN + dI + R]
\]

\[
d\text{ChE} = [(E_1 - E_0)(N_0 + I_0 + R_0)] + [E_0(N_1 - N_0) + (I_1 - I_0) + (R_1 - R_0)]
\]

In equation (9) and (10) the subscript “\(0\)" denotes the base or earlier recession. Also recall that:

\[
\begin{align*}
\text{(11) } & dW = E_1 - E_0 \\
\text{(12) } & dN = N_1 - N_0 \\
\text{(13) } & dI = I_1 - I_0 \\
\text{(14) } & dR = R_1 - R_0
\end{align*}
\]

Where:

\(dW\) is the change in employment base between the two recessions.

\(dN\) is the change in overall national growth rate between the two recessions.

\(dI\) is the change in industrial mix growth rate between the two recessions and
dR is the change in competitive share growth rate between the two recessions.

From equation (9), \( dW'\left[ N_0 + I_0 + R_0 \right] \) is denoted as “pure employment” effect. Using the “pure employment” effect, the characteristics of the recession are held constant and measure the portion of the regional impact that is due to change in the base employment. The second term in equation (9) or \( W'(dN + dI + dR) \) is referred to as the “pure recession” effect. Using the “pure recession” effect, the employment base between two recessions is held constant but the characteristics of the two recessions are allowed to change.

Using the dynamic shift-share procedures outlined in equations 9 and 10, the differential reaction of the Nevada economy between the 1981-82 recession and the 1990-91 recession can be isolated. From these results, differential recessionary impacts due to national or regional policy changes may be derived.
Results

For the dynamic shift-share analysis, monthly seasonally adjusted employment data was used. The dynamic shift-share analysis was employed at the state level and for three Nevada regions. These three regions were Clark County, Washoe County and Balance of State. Analysis at the regional level was made to determine if differential responses occurred at the substate level. Table 1 shows the eight non-agricultural economic sectors used for this analysis. Also from National Bureau of Economic Research information (U.S. Department of Commerce, 1993), the 1980-82 recession covered July 1981 to November 1982 and the 1990-91 recession covered July 1990 to March 1991.

Table 1. Non-Agricultural Sectors Used for the Analysis.

<table>
<thead>
<tr>
<th>Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
</tr>
<tr>
<td>Construction</td>
</tr>
<tr>
<td>Manufacturing</td>
</tr>
<tr>
<td>Transportation and Public Utilities</td>
</tr>
<tr>
<td>Wholesale Trade</td>
</tr>
<tr>
<td>Retail Trade</td>
</tr>
<tr>
<td>Services</td>
</tr>
<tr>
<td>Government</td>
</tr>
</tbody>
</table>

State of Nevada

In Table 2, the employment decrease during the 1981-82 recession (-22,926 jobs) for the state of Nevada was far greater than the employment decrease during the 1990-91 recession (-885 jobs). During the first recession, the competitive component for the state of Nevada declined by 18,855 jobs indicating a loss in comparative advantage. The Service Sector in the state of Nevada realized the largest decrease in competitive share indicating the competitive impacts of the opening of casino gaming in New Jersey. During the 1981-82 recession, all eight nonagricultural economic sectors realized job loss during the recession with the largest percentage decrease in employment occurring in the Mining Sector (-27.9%) and Construction Sector (-26.8%), respectively.
Table 2. Shift-Share Analysis of Total Effects in the State of Nevada, 1981-82 Recession and 1990-91 Recession

<table>
<thead>
<tr>
<th>Components</th>
<th>1981-82 Recession</th>
<th>1990-91 Recession</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>-14,789</td>
<td>-11,498</td>
<td>3,291</td>
</tr>
<tr>
<td>Industrial Mix</td>
<td>10,718</td>
<td>4,352</td>
<td>-6,366</td>
</tr>
<tr>
<td>Competitive</td>
<td>-18,855</td>
<td>6,261</td>
<td>25,117</td>
</tr>
<tr>
<td>Total Change</td>
<td>-22,926</td>
<td>-885</td>
<td>22,041</td>
</tr>
</tbody>
</table>

However during the second recession, the competitive effect for the state of Nevada was positive. The only negative job loss impact was the overall national economy decline. As opposed to the 1981-82 recession, the competitive component for the Service Sector for the state of Nevada was positive indicating competitive gains within the casino industry during this time period. During the 1990-91 recession, only four of the eight non-agricultural economic sectors realized employment loss in the state (Mining, Construction, Manufacturing and Government Sectors). The largest percentage of job loss during the 1990-91 recession occurred in the Construction Sector (-11.2%) while Finance, Insurance and Real Estate Sector realized the greatest percentage of job increase during the 1990-91 recession (+3.6%).

In Table 3, the differential employment effects of the two recessions have been decomposed (using the 1981-82 recession as the base period). The pure employment effect contains information solely about the effect of changes in the state’s employment base which occurred between the onset of two recessions (Mead and Ramsay 1982). The negative value (-13,735 jobs) indicates that the change in economic base which occurred between the two recessions did not dampen the effect in the state of Nevada of the 1990-91 recession.

The overall pure employment effect may be further decomposed into three components as shown in equation 9. The negative value for the first component $dW_{N0}$, indicates that with respect to the increased size of employment base alone, an increase in the number of jobs lost would be expected during the second recession (Mead and Ramsay 1982). Thus, the expected effect of the 1990-91 national recession on Nevada employment (assuming that it exactly replicated the earlier recession) would be a loss of 7,758 jobs (Riefler 1986). This reduces the potential dampening effect of the overall pure employment effect.
The positive value of the second element or $dW' I_0$, indicates the beneficial effect of interrecessional job redistribution into sectors whose national counterparts outperformed the U.S. economy (Mead and Ramsay 1982; Riefler 1986). Total net job savings afforded by shifts into fast growing industries in the state of Nevada was 5,879.

The negative sign on the third element of pure employment effect, $dW' R_0$, indicates the negative effects of interrecessional employment redistribution into the region’s industries relative to their competitiveness with their national counterpart (Mead and Ramsay 1982; Riefler 1986). Redistribution into regionally noncompetitive sectors during the two recessions realized a job loss of 11,856.

The pure recession effect as shown in Table 3 contains information about the effect of changes in characteristics of the recession. The information is uncontaminated by changes in the employment base which may have occurred during the interrecession (Mead and Ramsay 1982; Riefler 1986). A positive value (23,022 jobs in the present study) indicates that changes in the characteristics of the recession have lessened its impact on the Nevada employment base. The overall pure recession effect may also be further decomposed into three components as shown in equation 9. The positive sign on the value for the first component, $W'dN$, indicates that at the national level the 1990-91 recession was less severe than the 1980-82 recession. The effect of a less severe national recession in 1990-91 was an expected increase of 7,247 jobs in the state of Nevada.
Table 3. Decomposition of Differential Effects of the 1981-82 Recession and 1990-91 Recession, State of Nevada

<table>
<thead>
<tr>
<th>Category of Jobs</th>
<th>Number of Jobs</th>
<th>- - - - - - - - Percent - - - - - - - -</th>
<th>- - - - - - - - Percent - - - - - - - -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure Employment:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dW'N₀</td>
<td>-7,758</td>
<td>-83.3</td>
<td></td>
</tr>
<tr>
<td>dW'I₀</td>
<td>5,879</td>
<td>63.1</td>
<td></td>
</tr>
<tr>
<td>dW'R₀</td>
<td>-11,856</td>
<td>-127.7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>-13,735</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pure Recession:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W₀ 'dN</td>
<td>7,247</td>
<td>77.6</td>
<td></td>
</tr>
<tr>
<td>W₀ 'dI</td>
<td>-8,412</td>
<td>-90.1</td>
<td></td>
</tr>
<tr>
<td>W₀ 'dR</td>
<td>24,186</td>
<td>260.5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23,022</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>9,286</td>
<td>112.5</td>
<td>-12.5</td>
</tr>
</tbody>
</table>
Changes in the characteristics of the two recessions could be limited to their differential severity. However, the difference in the two recessions could include the pattern of which industries were favored and which were negatively impacted. The negative sign on the value for the second component of the pure recession effect, \( W'dl' \), indicates that the pattern of industrial responses was not only different but detrimental to the Nevada economy (Mead and Ramsay 1982). The net effect of this changed industrial response pattern was the expected loss of 8,412 jobs.

The positive sign on the value for the third component of the pure recession effect, \( W'dR' \), indicates that the Nevada economy was more competitive during the 1990-91 recession than it was during the earlier downturn. During the later recession, the Service Sector in the state of Nevada outperformed the national sector which increased it's competitive advantage.

From Table 3, certain implications as to economic growth may be attributed to endogenous and exogenous impacts on policies (Mead and Ramsay 1982). The pure employment effect is referred to as an endogenous impact; that is, state policies could be enacted to increase the size of the employment force between the two recessions. From Table 3, endogenous impacts from the pure employment effect were negative and did not dampen the recessionary impacts of the 1990-91 recession.

However examining the pure recession effect, the exogenous impacts at the national level did not dampen the recessionary impact of the 1990-91 recession in the state of Nevada. Increased competitiveness by industrial productivity increases, state government education programs and state government financial programs to increase efficiency all contributed to this positive value. Also during this time period the state of Nevada saw the creation of the Nevada Commission on Economic Development, creation and expansion of county economic development authorities, the location of the Nevada Small Business Development Center and other extension education programs into the state of Nevada from the University and Community College System of Nevada.

Clark County, Nevada

In Table 4, the employment decrease in the 1981-82 recession (-13,220 jobs) for the state of Nevada while during the 1990-91 recession Clark County actually gained employment (+2,762 jobs). During the first recession the competitive component for the state of Nevada declined by 11,864 jobs indicating a loss in competitive advantage. The Service Sector in the Clark County, Nevada realized the largest decrease in competitive share indicating the competitive impacts of the opening of casino gaming in New Jersey. During the 1981-82 recession, all eight nonagricultural economic sectors realized job loss during the recession with the largest percentage decrease in employment occurring the Mining Sector (-37.6%) and Construction Sector (25.6%), respectively.

<table>
<thead>
<tr>
<th>Components</th>
<th>1981-82 Recession</th>
<th>1990-91 Recession</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>-8,439</td>
<td>-7312</td>
<td>1,127</td>
</tr>
<tr>
<td>Industrial Mix</td>
<td>7,082</td>
<td>2,768</td>
<td>-4,315</td>
</tr>
<tr>
<td>Competitive</td>
<td>-11,864</td>
<td>7,306</td>
<td>19,170</td>
</tr>
<tr>
<td>Total Change</td>
<td>-13,220</td>
<td>2,762</td>
<td>15,982</td>
</tr>
</tbody>
</table>

However, during the second recession, the competitive effect for Clark County, Nevada was positive. The only negative job loss impact was the overall national economy decline. As opposed to the 1981-82 recession, the competitive component for the Service Sector for Clark County, Nevada was positive indicating competitive gains within the casino industry during this time period. During the 1990-91 recession, only one of the eight non-agricultural economic sectors realized employment loss in Clark County, Nevada (the Construction Sector). The percentage of job loss during the 1990-91 recession for the Construction Sector was -16.7% while the Finance, Insurance and Real Estate Sector realized the greatest percentage of job increase during the 1990-91 recession (+4.5%).

In Table 5, the differential employment effects of the two recessions have been decomposed (using the 1981-82 recession as the base period). The pure employment effect contains information solely about the effect of changes in Clark County’s employment base which occurred between the onset of two recession (Mead and Ramsay, 1982). The negative value (-10,724 jobs) indicates that the change in economic base which occurred between the two recessions did not dampen the effect in Clark County, Nevada of the 1990-91 recession.

The overall pure employment effect may be further decomposed into three components as shown in equation 9. The negative value for the first component, \( dW'N_0 \), indicates that, with respect to the increased size of employment base alone, an increase in the number of jobs lost would be expected during the second recession (Mead and Ramsay 1982). Thus, the expected effect of the 1990-91 national recession as Clark County employment (assuming that it exactly replicated the earlier recession) would be a loss of 7,758 jobs (Riefler, 1986). This reduces the potential dampening effect of the overall pure employment effect.

The positive value of the second element, or \( dW'I_0 \), indicates the beneficial effect of inter-recessional job redistribution into sectors whose national counterparts outperformed the U.S. economy (Mead and Ramsay 1982; Riefler, 1986). Total net job savings afforded by shifts into fast growing industries in Clark County, Nevada was 4,835.
Table 5. Decomposition of Differential Effects of the 1981-82 Recession and 1990-91 Recession, Clark County, Nevada

<table>
<thead>
<tr>
<th>Category of Jobs</th>
<th>Number of Jobs</th>
<th>- - - - - Percent - - - - -</th>
<th>Endogenous</th>
<th>Exogenous</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pure Employment:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dW'N₀</td>
<td>-5,899</td>
<td>-</td>
<td>-112.0</td>
<td></td>
</tr>
<tr>
<td>dW'I₀</td>
<td>4,835</td>
<td>91.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dW'R₀</td>
<td>-9,660</td>
<td>-184.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>-10,724</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pure Recession:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W₀'dN</td>
<td>4,135</td>
<td></td>
<td>78.3</td>
<td></td>
</tr>
<tr>
<td>W₀'dI</td>
<td>-5,659</td>
<td>-107.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dW₀'dR</td>
<td>17,499</td>
<td>333.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>5,251</td>
<td>129.0</td>
<td>-29.0</td>
<td></td>
</tr>
</tbody>
</table>
The negative sign on the third element of pure employment effect, \( dW'R_0 \), indicates the negative effects of interrecession employment redistribution into the region’s industries relative to their competitiveness with their national counterpart (Mead and Ramsay 1982; Riefler 1986). Redistribution into regionally noncompetitive sectors during the two recessions realized a job loss of 9,660.

The pure recession effect as shown in Table 5 contains information about the effect of changes in characteristics of the recession. This information is uncontaminated by changes in the employment base which may have occurred during the interrecession (Mead and Ramsay 1982; Riefler, 1986). A positive value (15,975 jobs in the present study) indicates that changes in the characteristics of the recession have lessened their impact on the Clark County, Nevada employment base.

The overall pure recession effect may also be further decomposed into three components as shown in equation 9. The positive sign on the value for the first component, \( W'dN \), indicates that at the national level, the 1990-91 recession was less severe than the 1981-82 recession. The effect of a less severe national recession in 1990-91 was an expected increase of 4,135 jobs in Clark County, Nevada.

Changes in the characteristics of the two recessions could be limited to their differential severity. However, the difference in the two recessions could include the pattern of which industries were favored and which were negatively impacted. The negative sign on the value for the second component of the pure recession effect, \( W_0'dI \), indicates that the pattern of industrial responses was not only different but detrimental to the Clark County economy (Mead and Ramsay, 1982). The net effect of this changed industrial response pattern was the expected loss of 5,659 jobs.

The positive sign on the value for the third component of the pure recession effect, \( W_0'dR \), indicates that the Clark County, Nevada economy was more competitive during the 1990-91 recession than it was during the earlier downturn. During the later recession, the Service Sector in Clark County, Nevada outperformed the national sector which increased it’s competitive advantage.

From Table 5, certain implications as to economic growth may be attributed to endogenous and exogenous impacts or policies (Mead and Ramsay 1982). The pure employment effect is referred to as an endogenous impact, that is, state policies could be enacted to increase the size of the employment force between the two recessions. From Table 5, endogenous impacts from the pure employment effect were negative and did not dampen the recessionary impacts of the 1990-91 recession.

However, examining the pure recession effect, the exogenous impacts at the national level did not dampen the recessionary impacts in Clark County, Nevada of the 1990-91 recession. Of interest is the change in competitiveness in the Clark County, Nevada economy between the two recessions. This was the primary influence of a dampening of the 1990-91 recession in Clark County, Nevada. Increased competitiveness by industrial productivity increases, state
government education programs and state government financial programs to increase efficiency all contributed to the positive value.

Washoe County, Nevada

In Table 6, the employment decrease in the 1981-82 recession (-4,535 jobs) for Washoe County, Nevada far exceeded the employment change in the 1991-92 recession (-2,437 jobs). During the first recession, the competitive component for Washoe County declined by 3,241 jobs indicating a loss in comparative advantage. The Service Sector in Washoe County realized the largest decrease in competitive share indicating the competitive impacts of the opening of casino gaming in New Jersey. During the 1981-82 recession, all eight nonagricultural economic sectors realized job loss during the recession with the largest percentage decrease in employment occurring in the Construction Sector (-22.0%) and Mining Sector (-18.6%) respectively.

Table 6. Shift-Share Analysis of Total Effects in Washoe County, Nevada 1981-82 Recession and 1990-91 Recession

<table>
<thead>
<tr>
<th>Components</th>
<th>1981-82 Recession</th>
<th>1990-91 Recession</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>-3,994</td>
<td>-2,513</td>
<td>1,480</td>
</tr>
<tr>
<td>Industrial Mix</td>
<td>2,700</td>
<td>951</td>
<td>-1,748</td>
</tr>
<tr>
<td>Competitive</td>
<td>-3,241</td>
<td>-869</td>
<td>2,372</td>
</tr>
<tr>
<td>TOTAL CHANGE</td>
<td>-4,535</td>
<td>-2,431</td>
<td>2,104</td>
</tr>
</tbody>
</table>

However, during the second recession, the competitive effect for Washoe County was negative but substantially less than the 1981-82 recession. The negative job loss impact was primarily the overall national economy decline. As opposed to the 1981-82 recession, the competitive component in the 1990-91 recession for the Service Sector for Washoe County, Nevada was less negative indicating competitive gains within the casino industry during this time period. During the 1990-91 recession, six of the eight non-agricultural economic sectors realized employment loss in Washoe County, Nevada (Mining, Construction, Transportation and Public Utilities, Trade, Service and Government Sectors). The largest percentage of job loss during the 1990-91 recession occurred in the Mining, Sector (-10.1%) while Finance, Insurance and Real Estate Sector realized the greatest percentage of job increase during the 1990-91 recession (+2.7%).
In Table 7, the differential employment effects of the two recessions have been decomposed (using the 1981-82 recession as the base period). The pure employment effect contains information solely about the effect of changes in the state’s employment base which occurred between the onset of two recessions (Mead and Ramsay 1982). The negative value (1,051 jobs) indicates that the change in economic base which occurred between the two recessions did not dampen the effect of the 1990-91 recession in Washoe County, Nevada.

The overall pure employment effect may be further decomposed into three components as shown in equation 9. The negative value for the first component, \(dWN_0\), indicates that with respect to the increased size of employment base alone, an increase in the number of jobs lost would be expected during the second recession (Mead and Ramsay 1982). Thus the expected effect of the 1990-91 national recession on Washoe County, Nevada employment (assuming that it exactly replicated the earlier recession) would be a loss of 934 jobs (Riefler 1986). This reduces the potential dampening effect of the overall pure employment effect.

The positive value of the second element, or \(dWl_0\), indicates the beneficial effect of interrecessional job redistribution into sectors whose national counterparts outperformed the U.S. economy (Mead and Ramsay 1982; Riefler 1986). Total net job savings afforded by shifts into fast growing industries in Washoe County, Nevada was 881.

The negative sign on the third element of pure employment effect, \(dWR_0\), indicates the negative effects of interrecessional employment redistribution into the region’s relative to their competitiveness with their national counterpart (Mead and Ramsay 1982; Riefler 1986). Redistribution into regionally noncompetitive sectors during the two recessions realized a job loss of 997.

The pure recession effect as shown in Table 7 contains information about the effect of changes in characteristics of the recession. This information is uncontaminated by changes in the employment base which may have occurred during the interrecession (Mead and Ramsay 1982; Riefler 1986). A positive value (2,610 jobs in the present study) indicates that changes in the characteristics of the recession have lessened its impact on the Washoe County, Nevada employment base.

The overall pure recession effect may also be further decomposed into three components as shown in equation 9. The positive sign on the value for the first component, \(W'dN\), indicates that at the national level the 1990-91 recession was less severe than the 1981-82 recession. The effect of a less severe national recession in 1990-91 was an expected increase of 1,957 jobs in Washoe County, Nevada.

Changes in the characteristics of the two recessions could be limited to their differential severity. However, the difference in the two recessions could include the pattern of which industries were favored and which were negatively impacted. The negative sign on the value for
Table 7. Decomposition of Differential Effects of the 1981-82 Recession and the 1990-91 Recession, Washoe County, Nevada

<table>
<thead>
<tr>
<th>Category of Jobs</th>
<th>Number of Jobs</th>
<th>Percent Endogenous</th>
<th>Percent Exogenous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure Employment:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$dW_{N_0}$</td>
<td>-934</td>
<td>-59.7</td>
<td></td>
</tr>
<tr>
<td>$dW_{I_0}$</td>
<td>881</td>
<td>56.3</td>
<td></td>
</tr>
<tr>
<td>$dW_{R_0}$</td>
<td>-997</td>
<td>-63.9</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>-1,051</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pure Recession:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$W_0'dN$</td>
<td>1,957</td>
<td>124.7</td>
<td></td>
</tr>
<tr>
<td>$W_0'dI$</td>
<td>-2,153</td>
<td>-137.3</td>
<td></td>
</tr>
<tr>
<td>$W_0'dR$</td>
<td>2,807</td>
<td>179.9</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>2,610</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>1,560</td>
<td>112.6</td>
<td>-12.6</td>
</tr>
</tbody>
</table>
the second component of the pure recession effect, $W_0 \cdot dI$, indicates that the pattern of industrial responses was not only different but detrimental to the Washoe County, Nevada economy (Mead and Ramsay 1982). The net effect of this changed industrial response pattern was the expected loss of 2,153 jobs.

The positive sign on the value for the third component of the pure recession effect, $W_0 dR$, indicates that the Washoe County, Nevada economy was more competitive during the 1990-91 recession than it was during the earlier downturn. During the later recession, the Service Sector in Washoe County, Nevada outperformed the national sector which increased its competitive advantage.

From Table 3, certain implications as to economic growth may be attributed to endogenous and exogenous impacts or policies (Mead and Ramsay 1982). The pure employment effect is referred to as an endogenous impact, that is, state policies could be enacted to increase the size of the employment force between the two recessions. From Table 7, endogenous impacts from the pure employment effect were negative and did not dampen the recessionary impacts of the 1990-91 recession.

However, examining the pure recession effect, the exogenous impacts at the national level did not dampen the recessionary impacts of the 1990-91 recession in Washoe County. Of interest is the change in competitiveness in the Washoe County, Nevada economy between the two recessions. This was the primary influence of a dampening of the 1990-91 recession in the state of Nevada. Increased competitiveness by industrial productivity increases, state government education programs and state government financial programs to increase efficiency all contributed to this positive value.

**Balance of State, Nevada**

In Table 8, the employment decrease in the 1981-82 recession (-5,123 jobs) for the Balance of State, Nevada far exceeded the employment change in the 1990-91 recession (-1,635 jobs). During the first recession, the competitive component for the Balance of State, Nevada declined by 3,686 jobs indicating a loss in comparative advantage. The Construction and Mining Sectors in the Balance of State, Nevada realized the largest decrease in competitive share. During the 1981-82 recession, seven of eight nonagricultural economic sectors realized job loss during the recession with the largest percentage decrease in employment occurring in the Construction Sector (-40.6%) and the Finance, Insurance and Real Estate (-20.6%) respectively.

However during the second recession, the competitive effect for the Balance of State, Nevada was less negative. The job loss from overall national recession was greatest in the 1990-91 recession. During the 1990-91 recession, five of the eight non-agricultural economic sectors realized employment loss in the State (Mining, Manufacturing, Transportation and Public Utilities, Services and Government Sectors). The largest percentage of job loss during the 1990-91 recession occurred in the Government Sector (-8.27%) while the Construction Sector realized the greatest percentage of job increase during the 1990-91 recession (+17.6%).
<table>
<thead>
<tr>
<th>Components</th>
<th>1981-82 Recession</th>
<th>1990-91 Recession</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>-2,363</td>
<td>-1,675</td>
<td>688</td>
</tr>
<tr>
<td>Industrial Mix</td>
<td>926</td>
<td>634</td>
<td>-292</td>
</tr>
<tr>
<td>Competitive</td>
<td>-3,686</td>
<td>-594</td>
<td>3,092</td>
</tr>
<tr>
<td>TOTAL CHANGE</td>
<td>-5,123</td>
<td>-1,635</td>
<td>3,488</td>
</tr>
</tbody>
</table>
Table 9. Decomposition of Differential Effects of the 1981-82 Recession and the 1990-91 Recession, Balance of State, Nevada

<table>
<thead>
<tr>
<th>Category of Jobs</th>
<th>Number of Jobs</th>
<th>- - - - - Percent - - - - -</th>
<th>- - - - - Percent - - - - -</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Endogenous</td>
<td>Exogenous</td>
</tr>
<tr>
<td>Pure Employment:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dWN(_0)</td>
<td>-922</td>
<td>-38.7</td>
<td></td>
</tr>
<tr>
<td>dWI(_0)</td>
<td>186</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td>dWR(_0)</td>
<td>-1,110</td>
<td>-46.7</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,846</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pure Recession:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W(_0)' dN</td>
<td>1,158</td>
<td>48.5</td>
<td></td>
</tr>
<tr>
<td>W(_0) dI</td>
<td>-597</td>
<td>-24.8</td>
<td></td>
</tr>
<tr>
<td>W(_0) dR</td>
<td>3,660</td>
<td>154.1</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>4,221</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>2,376</td>
<td>76.4</td>
<td>23.6</td>
</tr>
</tbody>
</table>
In Table 9, the differential employment effects of the two recessions have been decomposed (using the 1981-82 recession as the base period). The pure employment effect contains information solely about the effect of changes in the state’s employment base which occurred between the onset of two recessions (Mead and Ramsay 1982). The negative value (-1.846 jobs) indicates that the change in economic base which occurred between the two recessions did not dampen the effect in Balance of State, Nevada of the 1990-91 recession.

The overall pure employment effect may be further decomposed into three components as shown in equation 9. The negative value for the first component, $dW_N$, indicates that with respect to the increased size of employment base alone, an increase in the number of jobs lost would be expected during the second recession (Mead and Ramsay 1982). Thus, the expected effect of the 1990-91 national recession on the Balance of State, Nevada (assuming that it exactly replicated the earlier recession) would be a loss of -922 jobs (Riefler 1986). This reduces the potential dampening effect of the overall pure employment effect.

The positive value of the second element or, $dW_I$, indicates the beneficial effect of inter-recessional job redistribution into sectors whose national counterparts outperformed the U.S. economy (Mead and Ramsay 1982; Riefler 1986). Total net job savings afforded by shifts into fast growing industries in Balance of State, Nevada was 186.

The negative sign on the third element of pure employment effect, $dW_R$, indicates the negative effects of interrecessional employment redistribution into the region’s industries relative to their competitiveness with their national counterpart (Mead and Ramsay 1982; Riefler 1986). Redistribution into regionally noncompetitive sectors during the two recessions realized a job loss of 1,110.

The pure recession effect as shown in Table 9 contains information about the effect of changes in characteristics of the recession. This information is uncontaminated by changes in the employment base which may have occurred during the interrecession (Mead and Ramsay 1982; Riefler 1986). A positive value (4,221 jobs in the present study) indicates that changes in the characteristics of the recession have lessened the impact on Balance of State, Nevada employment base.

The overall pure recession effect may also be further decomposed into three components as shown in equation 9. The positive sign on the value for the first component, $W'dN$, indicates that at the national level the 1990-91 recession was less severe than the 1980-82 recession. The effect of a less severe national recession in 1990-91 was an expected increase of 1,158 jobs in the Balance of State, Nevada.

Changes in the characteristics of the two recessions could be limited to their differential severity. However, the difference in the two recessions could include the pattern of which industries were favored and which were negatively impacted. The negative sign on the value for the second component of the pure recession effect, $W_0'dI$, indicates that the pattern of industrial responses was not only different but detrimental to the Balance of State, Nevada economy. The net effect of this changes industrial response pattern was the expected loss of 597 jobs.
The positive sign on the value for the third component of the pure recession effect, \( W_0dR \), indicates that the Balance of State, Nevada economy was more competitive during the 1990-91 recession than it was during the earlier downturn. During the later recession, the Construction Sector and Service Sector outperformed the national sectors which increased it’s competitive advantage.

From Table 3, certain implications as to economic growth may be attributed to endogenous and exogenous impacts or policies (Mead and Ramsay 1982). The pure employment effect is referred to as an endogenous impact; that is, state policies could be enacted to increase the size of the employment force between the two recessions. From Table 3, endogenous impacts from the pure employment effect were negative and did not dampen the recessionary impacts of the 1990-91 recession.

However, examining the pure recession effect, the exogenous impacts at the national level did dampen the recessionary impacts in the Balance of State, Nevada in the 1990-91 recession. Of interest is the change in competitiveness in the Balance of State, Nevada economy between the two recessions. This was the primary influence of a dampening of the 1990-91 recession in the Balance of State, Nevada. Increased competitiveness by industrial productivity increases, state government education programs and state government financial programs to increase efficiency all contributed to this positive value.
Conclusion

This paper examined the differential impacts for the state of Nevada and three sub-state regional economies of the 1981-82 recession and 1990-91 recession. Results showed that

(a) the two recessions had different impacts, and
(b) different sub-regions of the state reacted differently to the impacts.

Further, the second recession had a less severe impact than the first recession because the economic structure of the state had changed between recessions, improving its competitive advantage. Possible factors influencing these changes are noted, and these factors should be further investigated.

As stated earlier, before new economic development or diversification programs are initiated, an analysis of past reactions to national recessions is required. The analysis should also investigate potential distributional differences between sub-regions of the state of Nevada. By understanding past changes and distributional impacts of these changes, programs and models may more accurately reflect the characteristics of Nevada’s economy.


