

Socioeconomic Analysis and Economic Base Assessment of Wallowa County, Oregon

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Project Summary

This report depicts socioeconomic characteristics and trends in Wallowa County, Oregon. The analysis begins by providing background information about the county, which is then followed by a more detailed description of various socioeconomic trends, including an analysis of population, employment, industrial make-up, income, and quality of life. Finally, using the IMPLAN input-output model, this report concludes with an economic base analysis that further details economic conditions within the county.

Background Information

Population and Geography

Wallowa County is the most northeastern county in Oregon, sharing borders with the states of Washington and Idaho. The county is mostly mountainous, and it includes several headwaters to tributaries of the Columbia/Snake River system. Within the county's mountainous terrain lies the Wallowa Valley, which is host to the only four incorporated cities in the county. These cities include Enterprise, which is the county seat, Joseph, Lostine, and Wallowa. The term "incorporated cities," however, is somewhat of a misnomer, and Enterprise, Joseph, Lostine, and Wallowa are best described as small towns. Enterprise is the largest of these towns, with a population of slightly more than 2,000. Joseph is the next largest, with a population of about 1,200, followed by Wallowa, with a population of about 750 people. Lostine has the smallest population with only around 200 people. These towns account for approximately three-fifths of the county's population, which totals about 7,000 people. Aside from the four small towns, the remaining residents live in small, scattered communities throughout the county.

With a population of slightly more than 7,000 and the remarkably small size of the towns within the county, the rural nature of Wallowa County should not be underemphasized. The county in many ways exemplifies rural. None of Wallowa's residents live in what the U.S. Census defines as an "urban area." Moreover, the population density in the county is only 2.3 persons per square mile, which is amongst the smallest population densities in the United States. The nearest, somewhat larger community of any size is the town of LaGrande, with a population of close to 12,000 people, in neighboring Union County. Lagrande, however, is relatively far

away considering the mountainous landscape of the region, and most of Wallowa's residents work within the county rather than commute outside of Wallowa for employment.

Approximately three-quarters of the land in Wallowa is publicly owned, including the Wallowa-Whitman National Forest, Hells Canyon National Recreation Area, the Eagle Cap Wilderness Area, and various state-operated recreation areas. While a range of federal, state and local agencies administer public lands within the county, the Wallowa-Whitman National Forest, which is administered by the U.S. Forest Service, accounts for more than 90 percent of Wallowa's public lands.

History and Resource Use

Wallowa County was historically Nez Perce Tribal land. In 1877, the U.S. government forced the Nez Perce to leave, though the tribe retained rights to hunt, graze livestock on, and fish some of the lands in the county, and over the past few decades there have been increasing efforts to strengthen ties between the Wallowa County community and the Nez Perce tribe.

Much of the past century was a period of heavy resource use and extraction in the county. For example, many of the timber tracts in the region, which were mostly dominated by old growth forest, were easily accessible and therefore harvested. Also, ranchers consistently maintained large stocks of cattle and had long seasons of use in the Wallowa Valley. Timber extraction and range use over the past 100 years exacted a high ecological price on the land, especially during the first 60 or 70 years of the century. Limited knowledge pertaining to sound management practices along with a socio-political climate supporting overutilization of resources contributed to ecological vulnerability. Today there remains heavy pressure on the county's natural resources. Though the rangelands are considered to be in better shape than they have been at any time over the past 100 years, these lands, along with the county's riparian habitats and forests, remain ecologically threatened.

The Economic Situation Today

The current economic situation in Wallowa is largely related to the county's small population and community size, limited population growth, and the natural resource base within the area. The most important industries of Wallowa, including the timber and wood products industries, agriculture, and tourism, have historically been and remain closely connected to the

area's natural surroundings. Wallowa faces challenges similar to those that are found in rural communities throughout much of the U.S. In some ways, Wallowa has been able to meet these challenges, though current and future economic stability in the county is uncertain.

Wallowa's economy traditionally relied upon timber and wood products along with agriculture. From the early 1900s up until the 1960s, the wood products industry was a major component of Wallowa employment. Starting with the closing of a mill in Wallowa in 1964 and continuing with the closing of a few mills in the 1990s, particularly a large Boise-Cascade mill in Joseph, the county has seen employment in the timber and wood products sector gradually decline over the past few decades.

As previously mentioned, approximately three-quarters of the land in Wallowa is publicly owned. Thus, administrative decisions related to these public lands have a profound impact upon the county's economic situation. As is the case with public lands elsewhere in the U.S., different interest groups value these lands for seemingly incompatible uses. Ranching, timber, farming, environmental, and tourism interests often conflict with one another, if not in Wallowa itself, then in Washington, DC, where the decisions and efforts of various interest groups often dictate how federal lands in places such as Wallowa are utilized. Federal and sometimes state regulations concerning, amongst other things, timber harvesting, the protection of wildlife, and water quality can have a profound impact upon the ways in which a majority of the county's natural resources are used and maintained.

For example, in the early 1990s federal policy restricted timber harvests from public lands. At the same time there was a downturn in the market price for lumber, and the combination of these events staggered the county's economy. Around the same time, the listing of anadromous salmonids under the Endangered Species Act had an adverse effect upon the local fishing and tourist industry. Issues that are international in scope, such as forest conservation efforts in the developing world, can also have an effect – sometimes a positive one – upon the economy and way of life in Wallowa.

The economic situation in Wallowa does not compare favorably with much of the rest of Oregon, though compared to the rest of the United States the economy is not extraordinarily bad, especially considering the small population size and rural nature of the county. Despite environmental and economic issues of concern, the quality of life in the county, when compared to Oregon and much of the rest of the United States, remains high. Wallowa has been ranked

near the top of the state in terms of health care, low crime rates, education, and voter participation. Wallowa's social and economic conditions are explored in further detail below.

Detailed Socioeconomic Trends and Characteristics

Population

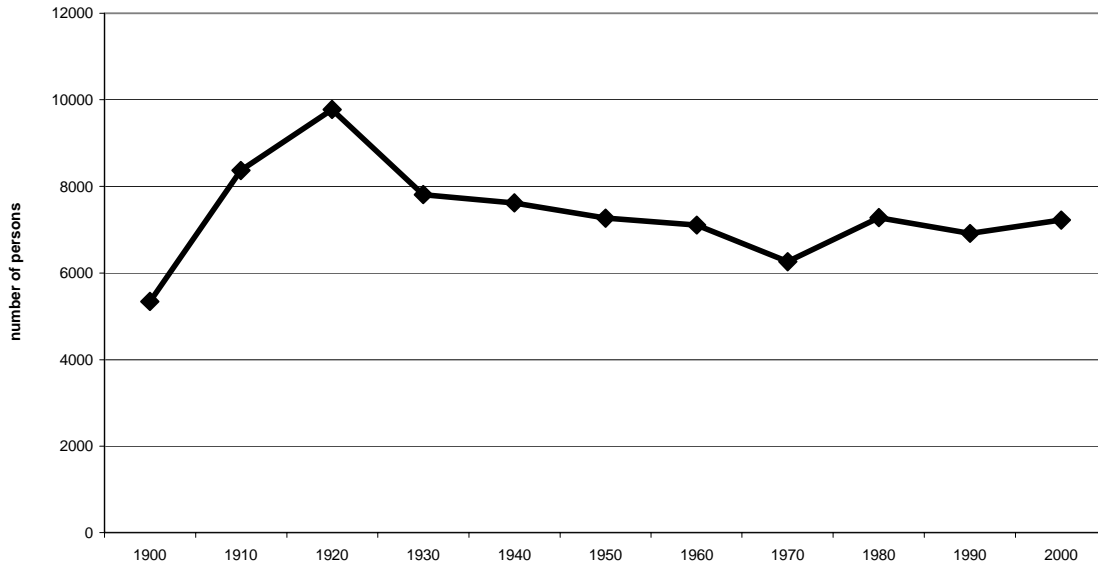
Population change in many ways relates to changing socioeconomic conditions within a place. Population growth or decline is a reflection of a region's ability to attract and retain residents, and maintaining a healthy economy typically requires at the very least a stable if not a growing population. Extensive immigration into a region typically means the availability of employment opportunities; it may also be indicative of natural amenities that attract retirees or workers who are seeking a certain quality of life. On the other hand, extensive outmigration, and hence population stagnation or decline, is typically indicative of limited or a loss of employment opportunities. In some scenarios, environmental degradation may be the source of such opportunity loss.

Wallowa has consistently had one of the smallest populations in Oregon, and the population size and population density of the county are both extremely small by U.S. standards. The county's population size has changed relatively little over the past 100 years, hitting a peak of nearly 10,000 persons in the 1920's, though remaining fairly constant at about 7,000 persons over time (*see* Figure 1). Thus, while the population of the U.S. has basically quadrupled over the past century, Wallowa's population has remained virtually stable. Although stagnant and even declining population is not completely untypical for a place of Wallowa's rural nature, such population trends are nonetheless indicative of relatively little if any economic growth within the region over time.

As indicated in Figure 1, there was a notable dip in Wallowa's population between 1960 and 1970, when the population dropped by close to 12 percent. But annual population figures between 1970 and 1998 (Figure 2) indicate that by the early 1980s, the county's population had risen back to 1960 levels, reaching a peak in 1984 but then dipping again in 1988. As was the case throughout the 1970s, there was a gradual rise in population in Wallowa between the late 1980s and mid-1990s, but over the past few years the county's population has begun to fall again.

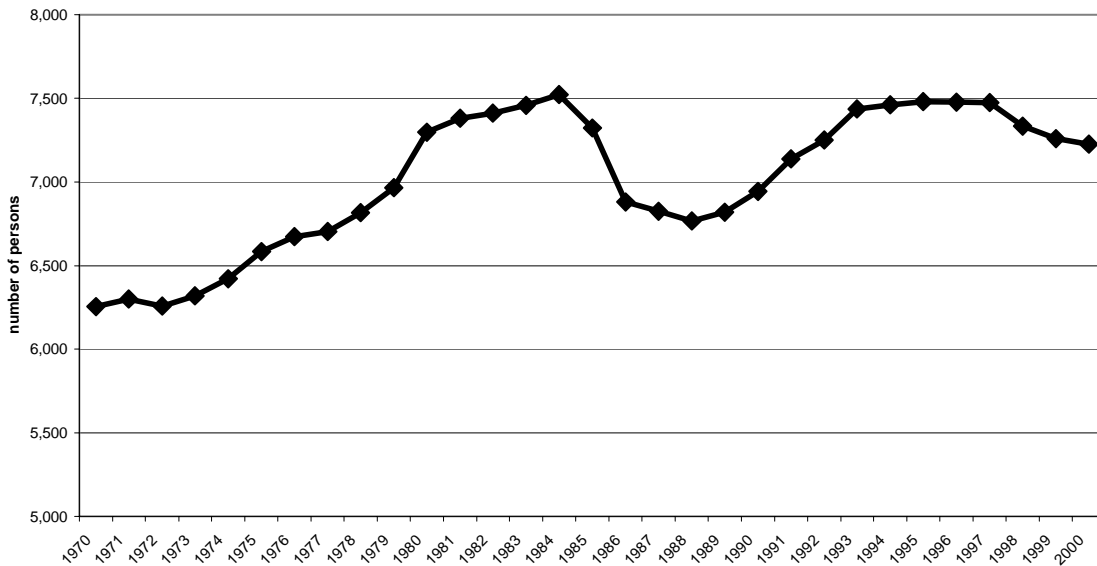
In general, however, current trends point toward population stability in Wallowa, with an influx of retirees and second homeowners replacing those who are leaving the region due to lack of employment opportunities.

Figure 1. Decennial Population Change; Wallowa; 1900-2000



Data Source: U.S. Census

Figure 2. Annual Population Change; Wallowa; 1970-2000



Data Source: Bureau of Economic Analysis, Regional Accounts Data, Local Area Personal Income, CA1-3 Population, Number of Persons.

Today, Wallowa's population is approximately 7,200 people. The slight fluctuations in population over time and limited population growth are perhaps indicative of the county's changing and limited employment opportunities, often typical of a region that has a natural resource economic base. Recent declines in population likely reflect the plant closures and loss of more than 200 jobs in the wood and timber industry in the mid-1990s. While this loss of jobs has caused relatively young residents to leave the county and seek employment elsewhere, some of these population losses have been countered by retirees and second homeowners who have recently come to the county due primarily to the natural amenities offered in the region.

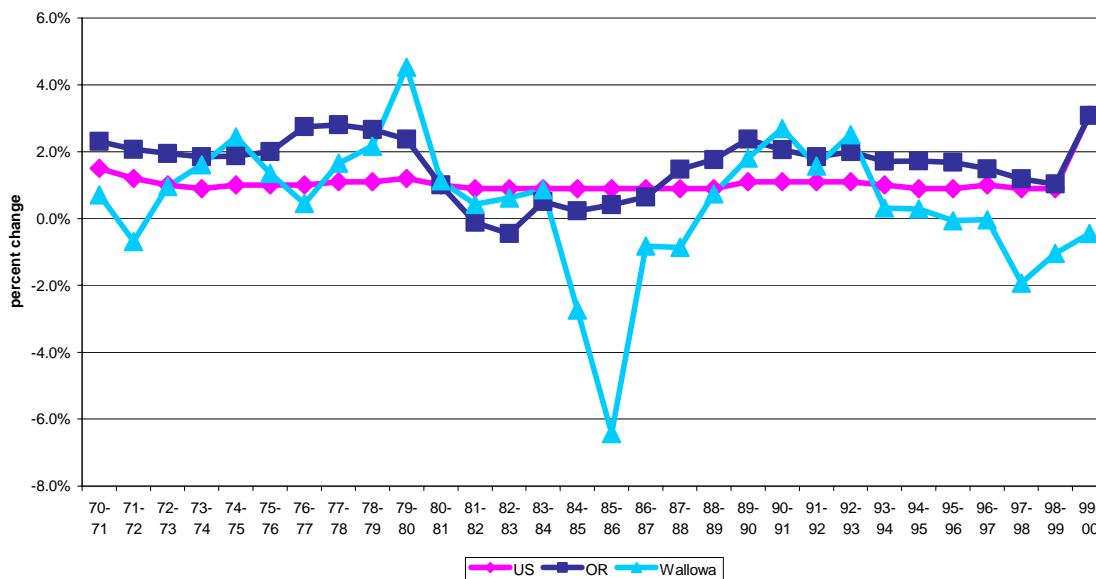
This recent influx of retirees is evident in statistics relating to the changing nature of the age profile within the county. While the age profile is generally reflective of broader trends throughout the U.S., there has nonetheless been a relative increase in those 65 and older living in the county over the past few decades. In the 1960s the percent population aged 65 and older was slightly less in Wallowa than on average in the U.S.; however, by 2000 the elderly population was somewhat higher than the U.S. average, with the percent of the population 65 and older in Wallowa being 18.9 percent, compared to only 12.4 percent for the entire nation. Aside from this difference, the county should generally be considered as having an age structure that is similar to the U.S. Furthermore, there is not a significant enough influx of retirees so that the county should be considered a "retirement destination" per se. Nonetheless, the recent influx of retirees and second homeowners are trends that will likely continue in the future. Such patterns of migration have already impacted housing costs within the county, as housing prices in Wallowa have close to doubled in the 1990s. This rise in housing prices has placed increasing economic pressures on many long-time, less affluent residents of the county.

As previously suggested, population trends in Wallowa, though perhaps similar to some rural areas in the U.S., are in extreme contrast to population growth rates in the U.S. as well as in the state of Oregon. While Wallowa's population is virtually the same now as it was 50 years ago, the Oregon's population as well as the nation's population have both approximately doubled during the same period of time. As is demonstrated in Figure 3, U.S. population growth has remained steady over the past few decades, growing at a rate of about 1 percent each year. The population of Oregon has typically grown at a higher rate than the U.S. in any given year, with its highest rate of growth being 3.1 percent from 1999 to 2000. Notably, however, the 1980s

were a time of slower population growth in the state, and Oregon's total population actually slightly declined between 1981 and 1983.

As Figure 3 demonstrates, Wallowa's rates of population change have noticeably fluctuated when compared to the U.S. and Oregon. Overall, during the period 1970 to 2000 population growth in Wallowa has not kept pace with Oregon or the rest of the nation (*see* Figure 4). Although the path of population growth and decline in Wallowa has at times mirrored trends in Oregon, at other times it has not. Most importantly, however, while Oregon has experienced fairly steady population growth over the past few decades, Wallowa has not. As the state has continued to witness relatively fast population growth compared to the rest of the nation over the past few decades, the county of Wallowa has basically stood in contrast to this trend.

Figure 3. Population; Absolute Percent Change; U.S., OR, and Wallowa; 1970-2000

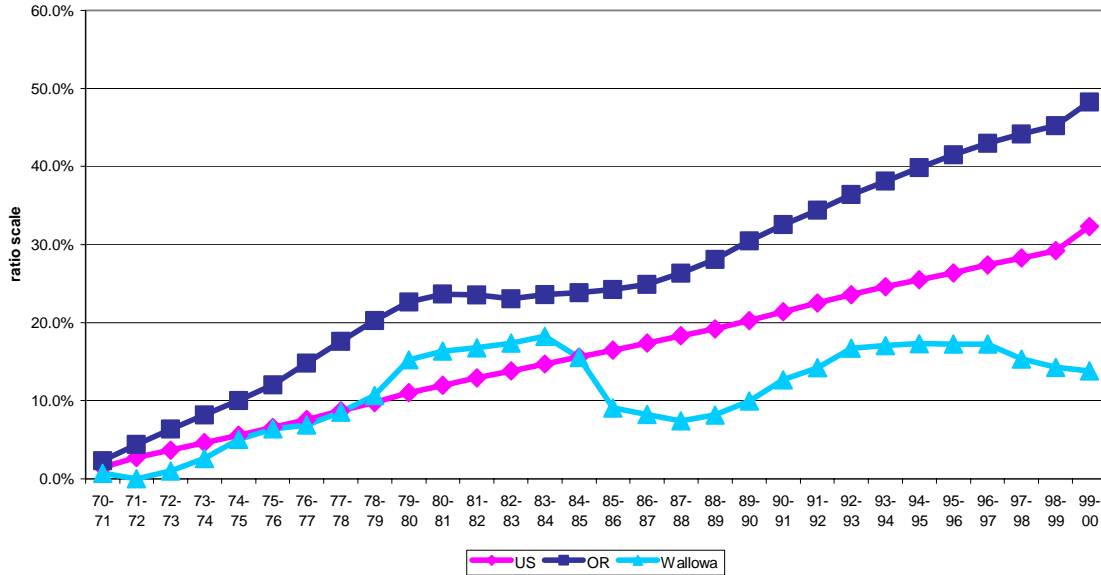


Data Source: Bureau of Economic Analysis, Regional Accounts Data, Local Area Personal Income, CA1-3 Population, Number of Persons.

A few other demographic characteristics are also of note. As previously mentioned, the population of Wallowa is considered completely rural, meaning that there is not one place within the county that qualifies as urban according to U.S. Census measures. Furthermore, the county is not within close proximity to any metropolitan areas. Finally, the population of the county is virtually entirely white. Despite its history of having once been home to the Nez Perce tribe,

throughout the twentieth century the county consistently has had a non-hispanic, white population. While the percent of white, nonhispanic population in the U.S. at large is approximately about 70 percent, in Wallowa this number is close to 100 percent.

Figure 4. Population; Relative Percent Change; U.S., OR, and Wallowa; 1970-2000



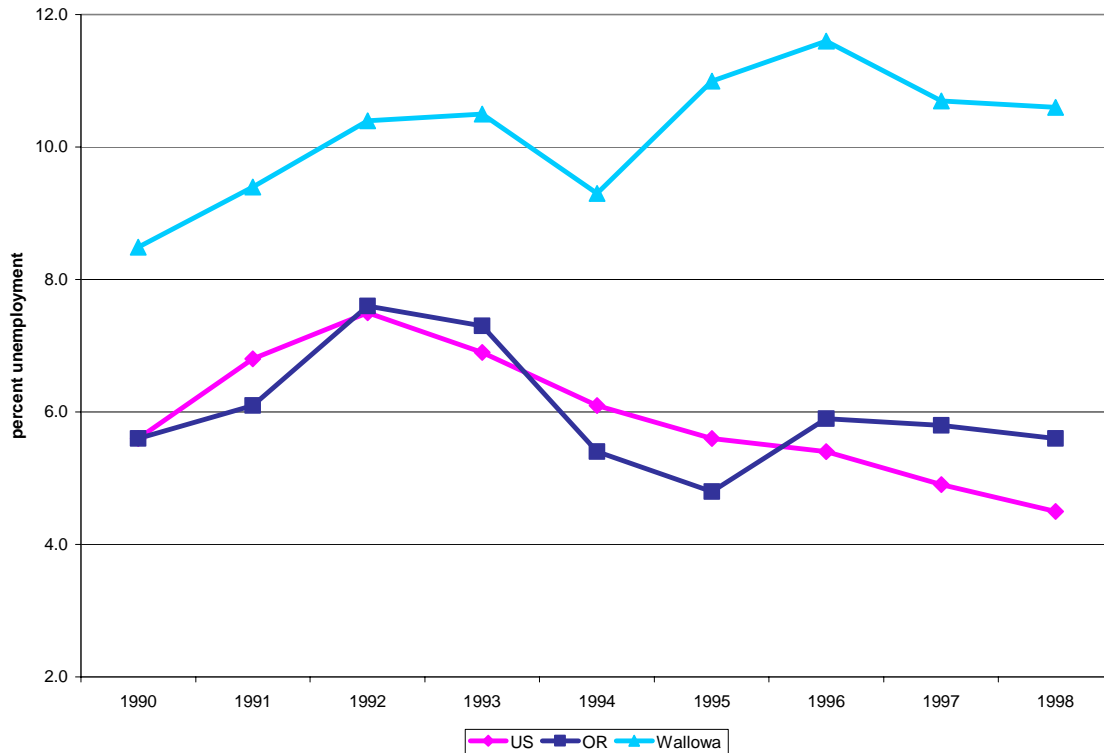
Data Source: Bureau of Economic Analysis, Regional Accounts Data, Local Area Personal Income, CA1-3 Population, Number of Persons.

Employment

High rates of unemployment have been a relatively persistent problem in Wallowa over time. However, unemployment rates in Wallowa are generally typical of unemployment rates in rural areas of the U.S., though recent trends suggest a greater disparity between Wallowa and the rest of the U.S. than had been the case in the past. As is demonstrated in Figure 5, the rise and fall of unemployment rates in Wallowa in the early 1990s mirrored trends in the state of Oregon and the U.S. at large, with unemployment rates being about 2 percent higher in Wallowa than in the rest of the U.S. during that time. Rural areas typically have unemployment rates at least 2 percent higher than the U.S. average. However, with the mill closures in the mid-1990s, along with, as previously discussed, other policy decisions related to the natural resource based industry in the county, unemployment has risen over the past few years. This rise is somewhat

dramatic when considered in the context of national trends. In 1998, unemployment rates in Wallowa were more than double the U.S. average.

Figure 5. Unemployment Rate; U.S., OR, and Wallowa; 1990-1998

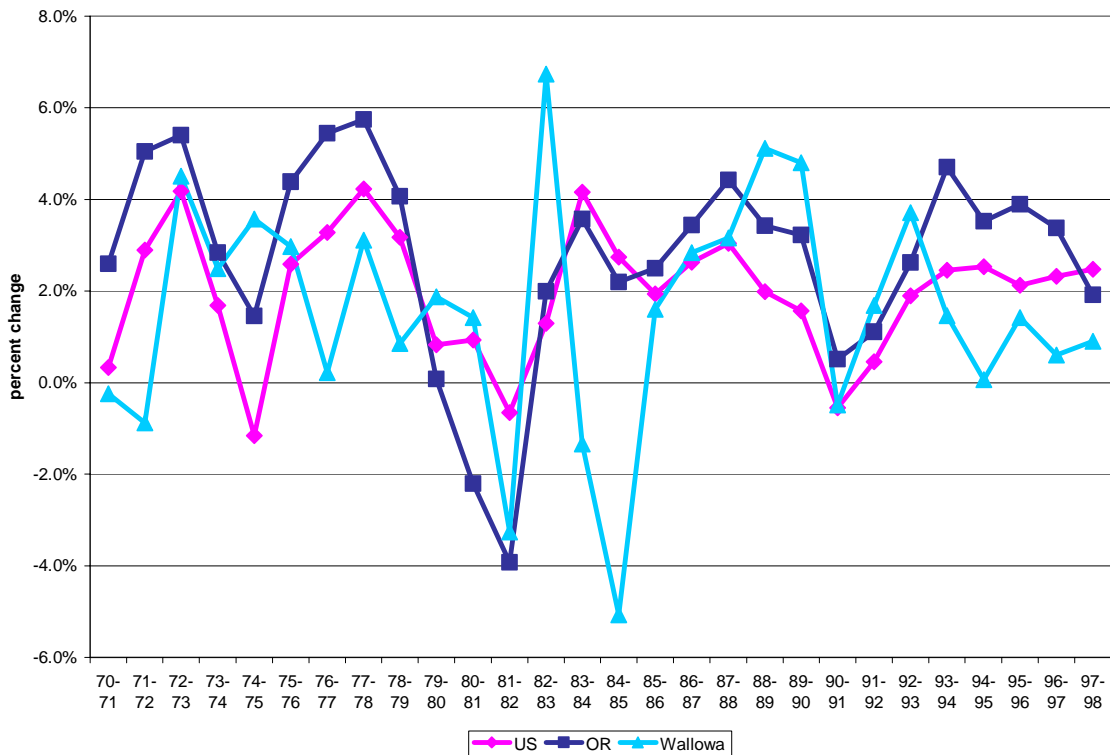


Data Source: Bureau of Labor Statistics, Local Area Unemployment Statistics, Unemployment Rates, NSA

As Figure 6 indicates, in most years there has been job growth in Wallowa County, as the percent change in total number of jobs in the county has generally been positive since 1970. Between 1981 and 1982, however, the county lost 3.3 percent of its total employment, mirroring a trend of declining rates of employment growth that had been taking place in Oregon for the previous five years. The county again lost a significant number of jobs, more than 5 percent, between 1984 and 1985, though this had come after a year of rapid job growth in the county. In general, however, job growth has not kept pace in Wallowa when compared to the rest of the state as well as the nation. Between 1970 and 1998 total employment in Wallowa County increased by only 14 percent compared to a remarkable 121 percent increase in the state and 43 percent growth in the nation during the same period of time. Between 1990 and 1998 there has been some job growth in Wallowa County, as the total number of jobs in the county increased by

close to 10 percent between 1990 and 1998, while in Oregon the number of jobs increased by around 25 percent. Nonetheless, unemployment remains high in the county, and recent trends indicate that increasing jobs may not necessarily draw people into the county, perhaps due to Wallowa's extremely rural nature.

Figure 6. Percent Change in Total Full-time & Part-time Employment; U.S., OR, & Wallowa; 1970-1998

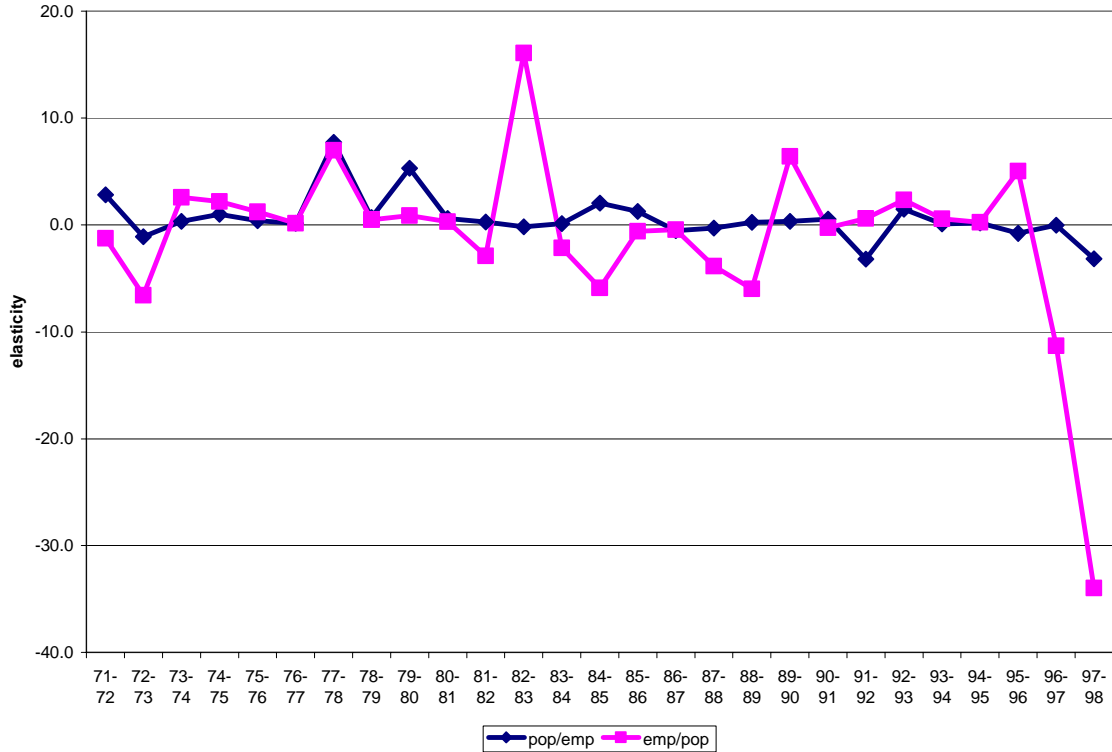


Data Source: Bureau of Economic Analysis, Regional Accounts Data, Local Area Personal Income, CA25- Total Full- and Part-time Employment by Industry.

Trends in employment, whether in terms of total number of jobs or percent unemployed, are in many ways related to population. Changes in population typically reflect changes in employment opportunity in a region. For example, the growth of an industry within a particular region may draw people to that region; conversely, the loss of employment opportunity may cause outmigration. It is also true that amenities related to quality of life can draw people to a region. In such an instance, economic growth and increasing employment typically takes place to meet the demands of an increasing population. Figure 7 compares population and total employment change rates from 1970 to 1998 by way of elasticity measures. Elasticity is a

concept that measures the responsiveness or sensitivity of one variable to another. A value equal to one is referred to as unit elasticity or proportional change, while a value greater than one is elastic and less than one, inelastic.¹

Figure 7. Population and Employment Elasticity; Lagged ($\Delta X/\Delta Y_{t-1}$); Wallowa, OR; 1970-1998



Data Source: Bureau of Economic Analysis, Regional Accounts Data, Local Area Personal Income, CA1-3 Population, Number of Persons and CA25- Total Full- and Part-time Employment by Industry.

In Wallowa, employment has been slightly more responsive to population change over time rather than vice-versa. Over the past few years, there have been a growing number of employment opportunities within the county, but population has not been increasing to meet these demands. This suggests that even with increased employment opportunities in the county, issues such as the quality of life within the region or earnings related to the types of jobs available in the county might keep people from moving to Wallowa for reasons of employment.

¹ Elasticity measure = $\Delta X/\Delta Y$. Unit elasticity ($\Delta X=\Delta Y$); Elastic ($\Delta X>\Delta Y$); Inelastic ($\Delta X<\Delta Y$). This measure is Lagged ($\Delta X/\Delta Y_{t-1}$)

However, it is important to note that the elasticity measures in Figure 7 indicate no clear trends within the county over time. Furthermore, the small population size of Wallowa along with the limited number of jobs in the county make it difficult to formulate any strong assumptions based upon these findings.

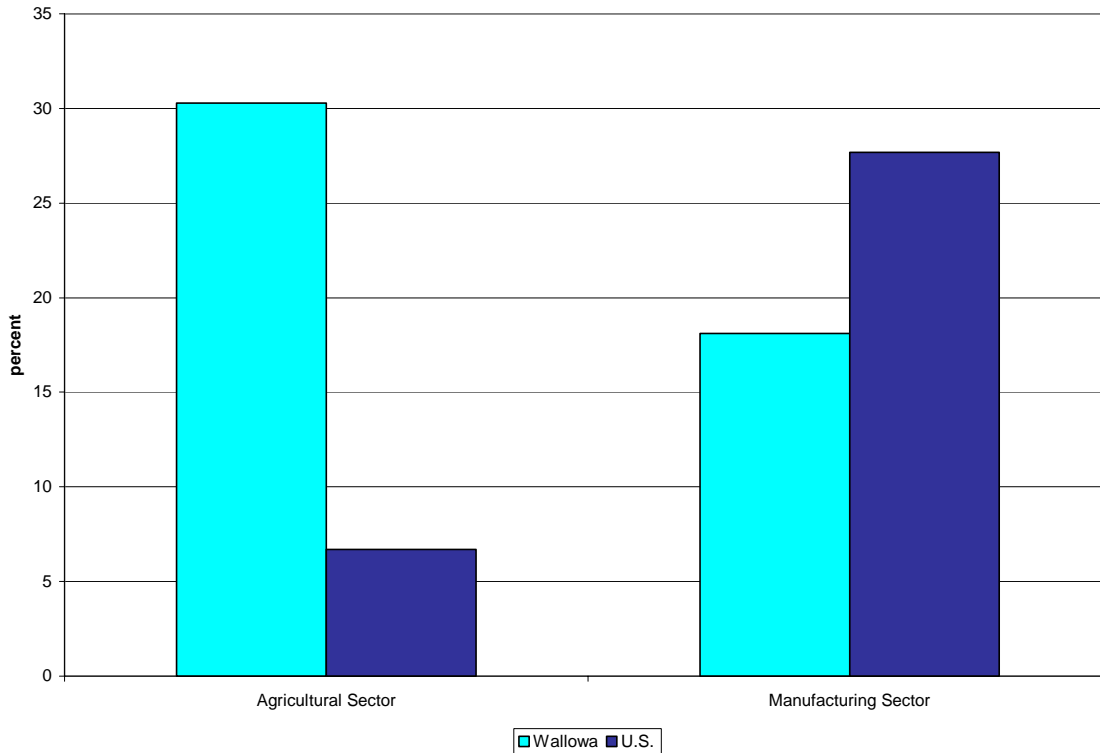
In any event, it is worth noting that population growth rates may not be real responsive to growing employment opportunity. In general, as employment has grown within the region, population has grown along with it to meet these demands, though recent figures suggest that employment growth may not necessarily result in population growth in the future. Lately, employment has been growing at rates faster than the population, suggesting that population may not be especially responsive to increasing job opportunity and that the county may have a difficult time attracting workers even if there is economic opportunity.

Industry

This part of the analysis examines changing patterns of employment by industry in Wallowa over time. Compared to the rest of the U.S., Wallowa has consistently had much higher rates of employment in the agriculture, forestry, and fishing sector (hereafter referred to as the agricultural sector) and lower rates of employment in the manufacturing sector (see Figures 8 and 9). For example, in 1960 more than 30 percent of those employed in the county were employed in the agricultural sector, and this number remained high in 1980, especially when compared to the rest of the U.S. The agricultural sector includes establishments primarily engaged in agricultural production (e.g., farms, ranches, etc.), forestry (establishments primarily engaged in the operation of timber tracts, tree farms, etc.), commercial fishing (including fish hatcheries), hunting and trapping, and related services (e.g. soil preparation services, veterinary and other animal services, farm management services, etc).

Conversely, Wallowa has somewhat consistently had lower rates of employment in the manufacturing sector compared to the rest of the U.S. The manufacturing sector includes a wide range of industries. Notably, especially in the case of Wallowa, these industries include establishments involved in wood processing. Wallowa has virtually no employment in mining, and service sector jobs, though somewhat less than on average in the rest of the U.S., have grown over time, generally reflecting national trends.

Figure 8. Percent Employment by Selected Sectors: U.S. & Wallowa; 1960

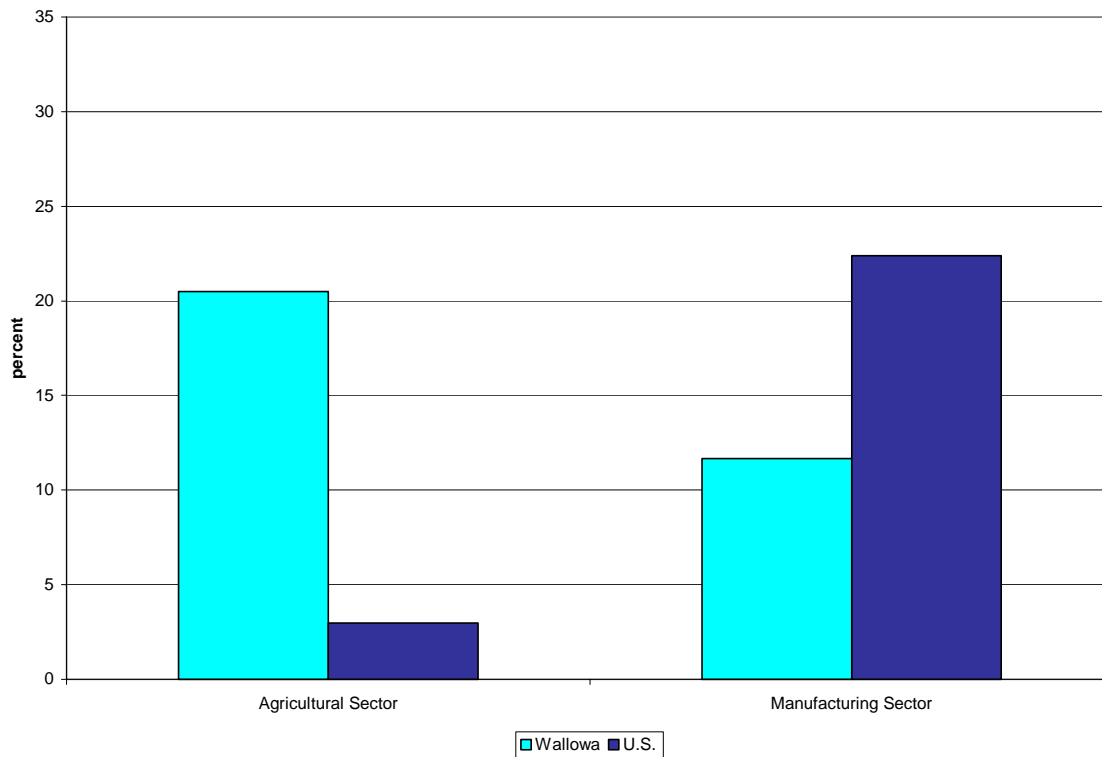


Data Source: 1960 U.S. Census.

According to Bureau of Economic Analysis figures, 18.8 percent of the population in Wallowa was employed either full or part-time as farmers or in the agricultural sector in 1998, compared to 3.1 percent for the entire U.S.² This high rate of agriculturally related employment highlights the importance of agriculture and forestry in the county. Some of the manufacturing jobs in the county are also linked to this sector, and the percent of full and part-time jobs in the manufacturing sector in Wallowa, 9.9 percent, was similar to the national average in 1998, which was 12.2 percent. Table 1 indicates the largest employers by industry in the county, disaggregated by sector names as utilized by the IMPLAN model. These sector names are in many ways related to Standard Industrial Classification (SIC) codes.

² Bureau of Economic Analysis, Regional Accounts Data, Local Area Personal Income, CA25- Total Full- and Part-time Employment by Industry.

Figure 9. Percent Employment by Selected Sectors: U.S. & Wallowa; 1980



Data Source: 1960 U.S. Census.

Table 1: Largest Employers by Industry in Wallowa; 1998

Industry	Total Employed
Accounting, Auditing and Bookkeeping	495
State & Local Government - Non-Education	372
Hay and Pasture	355
State & Local Government - Education	249
Miscellaneous Retail	222
Federal Government - Non-Military	177
Sawmills and Planing Mills	168
Eating & Drinking	164
Banking	161
Automotive Dealers & Service Stations	142

Data Source: IMPLAN Model, base year 1998

While agriculture, timber and timber-related industries, and tourism, can be considered, as will be discussed later, the economic base of the county, the top two employers in Wallowa are the accounting, auditing, and bookkeeping industry and non-education related state and local government. Accounting, auditing, and bookkeeping jobs have grown somewhat dramatically

over the past few years, and it is likely that a large number of these jobs are held by individuals that have moved to the region somewhat recently, perhaps to seek out the quality of life offered in the county. There are very few manufacturing industries within the county, with forest-related industries and foundries being the only manufacturing industries employing more than 50 people total within the county.

Noteworthy on this list, however, is the large number of jobs held in the agricultural sector, specifically what the IMPLAN model terms as the Hay and Pasture sector, which includes the production of a variety of farm commodities. Despite a short summer growing season with occasional frost, much of the Wallowa Valley is farmed. The most important agricultural product in the county is beef, though hay, forage crops, and small grains are principal crops, as indicated by the large amount of employment in the Hay and Pasture sector. Raising cattle is especially important to Wallowa's economy. Due in part to nationally known purebred stockbreeders headquartered in Wallowa, the quality of cattle in the county is considered high. Many of these cattle graze public lands, though grazing on these lands is under increasing scrutiny from environmental advocacy groups.

Also noteworthy is the large number of jobs in the federal government-non-military sector. Many of these jobs are related to the national forests and the timber industry in the region, as are the large number of jobs in the sawmills and planing mills industry. The timber and wood products industry has been and remains an important industry in Wallowa. Due in part to the aforementioned federal policy restrictions of the early 1990s, and as alluded to previously, three timber mills closed in the county in the early and mid-1990s, including a relatively large Boise Cascade mill in Joseph. The mill had the highest union wage jobs in the county. A small mill in Joseph reopened in 1996, though timber supplies to the mill have remained unstable. In total, throughout the 1990s the lumber and wood products sector has lost more than 200 jobs.

Though not a primary employer in the county, the tourism industry has grown significantly in Wallowa in recent years. The growth in tourism is related to the natural scenery and recreational activities that Wallowa has to offer. The peak tourist season in the county is July through September, with mostly hunters and fly-fishers continuing to visit the county through early December. What could be opportunities for winter sports, such as skiing and snowmobiling, are limited by poor winter travel conditions.

Somewhat related to the tourist industry, over the past few years there has been an emergence of art galleries in the county, due in large part to the location of several bronze foundries in the area. These bronze foundries serve the needs of local and even international artists, and Wallowa is beginning to develop a reputation for its art, especially bronze sculptures, some of which sell for more than \$50,000. In sum, a range of activities serves to make the industrial structure of Wallowa fairly diversified, especially considering the rural nature of the county. There is obviously a greater dependence on natural resources than what is typically found elsewhere, and this dependence especially relates to forestry and agricultural activities.

Income

Income serves as one of the main indicators of regional economic prosperity. While there are multiple measures of income, two of the most widely measures used in tracking economic growth are per capita income and personal income.³ In the early 1970s, per capita income in Wallowa County was similar and at times slightly higher than the U.S. average (*see* Figure 10). However, after a brief drop in 1976 and recovery in 1979, per capita income in Wallowa declined significantly and fluctuated around 80 percent of the U.S. average throughout the 1980s and early 1990s. More recently, per capita income in the county has fared even worse, dropping to a low of 70 percent of the U.S. average in 1999. The decline in the early 1980s and then the stabilization throughout that decade was somewhat reflective of trends in Oregon more generally, though per capita income levels in Oregon have always compared somewhat more favorably with the rest of the U.S. The recent precipitous decline in Wallowa is in contrast to the latest trends in the state, which has had, for the most part, a modest rise in income relative to the rest of the nation throughout the 1990s.

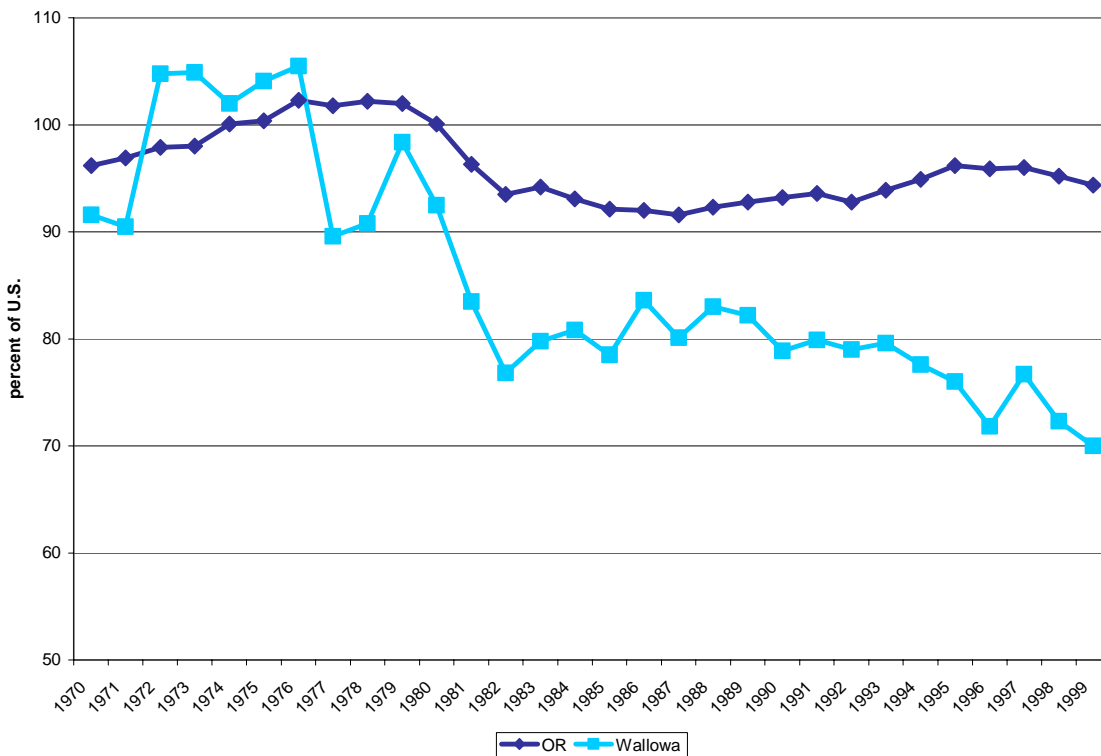
Figure 11 further demonstrates change in per capita income over time, demonstrating real per capita income growth between 1970 and 1999. While the state of Oregon and the U.S. have both demonstrated relatively consistent real per capita income growth over the past three decades, with such income being more than 45 percent higher in 1999 than in 1970, per capita income growth in Wallowa during the same period of time has increased by only 15 percent. The relatively vast difference in real per capita income growth between the U.S. and Wallowa

³ Personal income, as defined by the U.S. Department of Commerce, Bureau of Economic Analysis, is the sum of wages and salaries, dividends, rents, and interests, transfer payments, other labor income, and income of proprietors.

provides an indication of how the county has gone from having per capita income levels that were similar to the rest of the nation in the 1970s to levels that are now only 70 percent of the U.S. average.

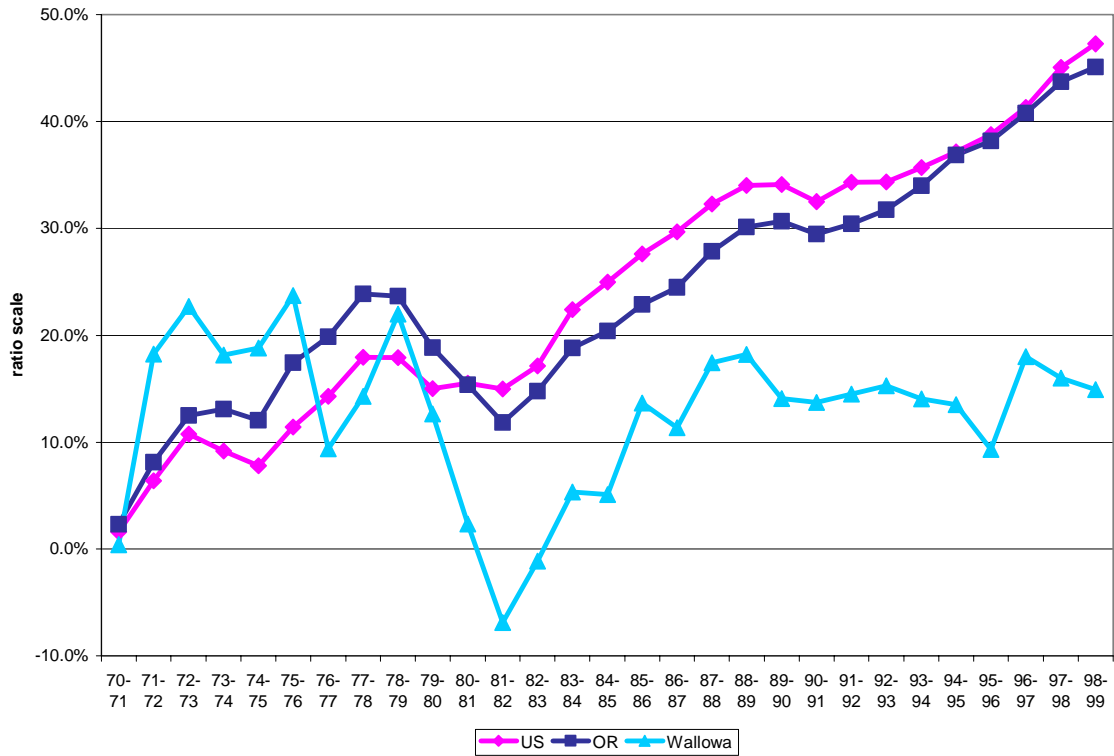
It should be noted, however, that current rates of per capita income in Wallowa are typical of a county that is highly rural in nature. In the United States as a whole, per capita income levels are typically higher in metropolitan than in non-metropolitan areas (ERS, 2001), and rural, non-metropolitan counties in the U.S. typically have per capita incomes that are only 70 to 80 percent of the U.S. average, and sometimes much lower. What is perhaps most remarkable about per capita income in Wallowa is how well it compared to the rest of the U.S. during the 1970s. The decline relative to the U.S. average over time suggests that a once relatively prosperous rural area has had a significant shock to its economy and has had a difficult time recovering. This shock occurred in the late 1970s and early 1980s, and in the early 1980s the county actually had less in terms of real per capita income than it did ten years prior.

Figure 10. Per Capita Income; Percent of the U.S.; OR & Wallowa; 1970-1999



Data Source: Bureau of Economic Analysis, Regional Accounts Data, Local Area Personal Income, CA1-3 Per Capita Personal Income, Percent of U.S.

Figure 11. Per Capita Income; Relative Change; Real (2000) Dollars; U.S., OR & Wallowa; 1970-1999



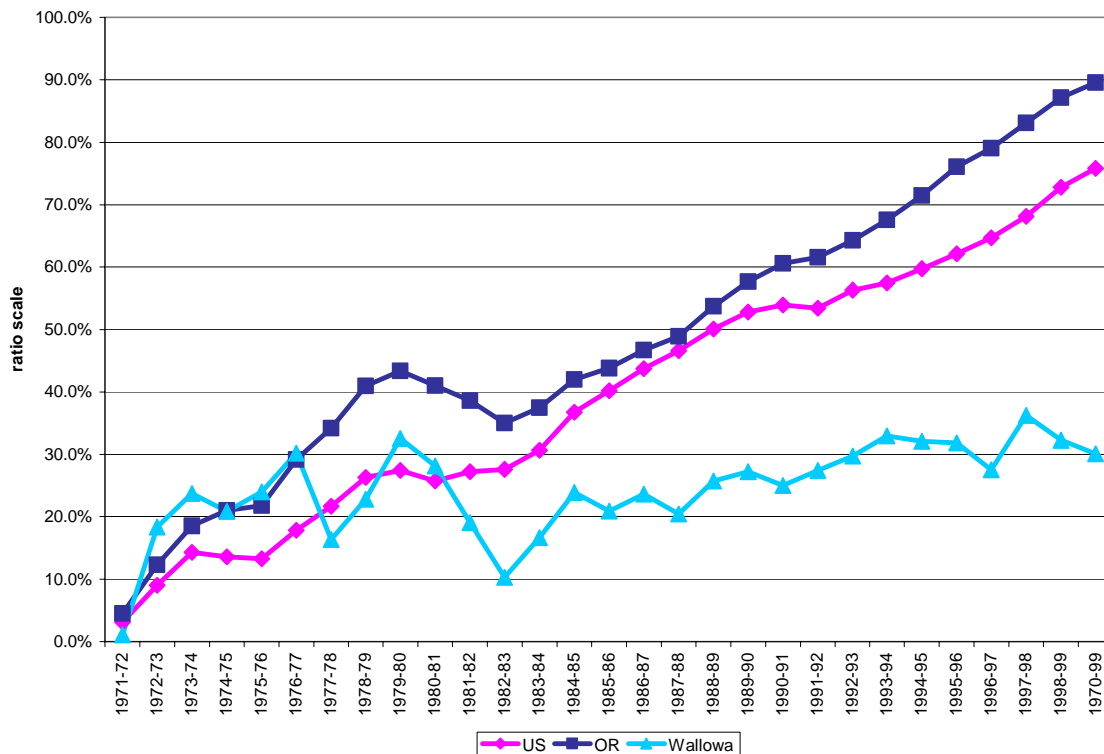
Data Source: Bureau of Economic Analysis, Regional Accounts Data, Local Area Personal Income, CA1-3 Per Capita Personal Income, Percent of U.S.

Aggregate measures of income, such as county-level total personal income, can also be a useful measure of economic performance. However, they can be deceiving, and variation can occur due to a number of factors, especially population size. Since the 1970s, there has been a lack of growth in aggregate personal income in Wallowa County, and in many respects this is a reflection of the county's lack of population growth. Figure 12, which demonstrates real income growth in the U.S., Oregon, and Wallowa County over time, shows that total personal income has increased in the state of Oregon by close to 90 percent since 1970, compared to 76 percent in the rest of the U.S. In Wallowa the increase has only been 30 percent. Relatively rapid population growth in Oregon helped the state have growth in personal income at a much faster rate than the rest of the U.S., especially as the state's population was growing quickly during the 1970s. The same can be said of Wallowa County during that time. As population levels began to recover in the county after the drop-off in the 1970s, personal income began to grow. However, the stagnating population base, and its relationship to lack of personal income growth, is evident

in the chart from the mid-1980s on, as personal income in the county has grown at a modest pace since that time.

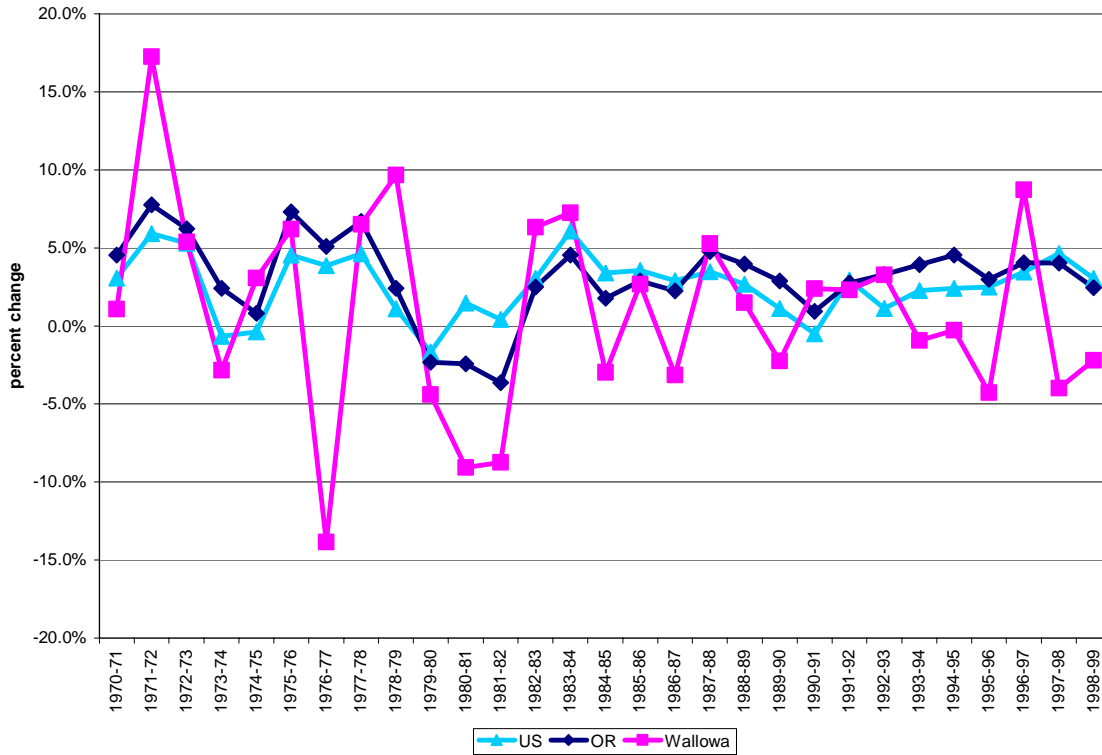
Up until the mid-1980s, personal income change in the county fluctuated somewhat wildly between growth and decline (*see* Figure 13). After stabilizing a bit from the mid-1980s to the mid-1990s, income is showing trends towards increased fluctuation again. Recently, income has fluctuated relatively less, but this has occurred at a time when income in the U.S. has been increasing at a fast rate, a rate averaging around 3 percent per year throughout the 1990s. With only modest growth in some years, and significant decline in others, total personal income in Wallowa has not been able to keep pace with the rest of the state or the nation. Again, this is in many respects a reflection of virtually zero population growth in the county.

Figure 12. Personal Income; Real (2000) Change; U.S., OR & Wallowa; 1970-1999



Data Source: Bureau of Economic Analysis, Regional Accounts Data, Local Area Personal Income, CA05 Personal Income by Major Source and Earnings by Industry,

Figure 13. Personal Income; Real (2000) Relative Change; U.S., OR & Wallowa; 1970-1999



Data Source: Bureau of Economic Analysis, Regional Accounts Data, Local Area Personal Income, CA05 Personal Income by Major Source and Earnings by Industry,

Quality of Life and Environment

The quality of life in a county or region should not be measured by population, employment, and income figures alone. Thus, it is worth noting that economic conditions aside, the quality of life in Wallowa seems to compare favorably with much of the rest of the U.S. Educational attainment rates, including high school as well as college educational attainment rates, have been consistently better than the U.S. average since the 1960s. This is somewhat remarkable considering the rural nature of the county. However, there has been concern recently about dwindling numbers of students in the schools, as the county's demographics are becoming increasingly skewed towards older generation families whose children have already completed school.

Available statistics also indicate that health care in the county may be better than much of the rest of the U.S., which again is remarkable considering the rural nature of Wallowa. The

county has more physicians per capita than many nonmetro as well as metropolitan counties in the U.S., and it also has very low infant mortality rates, which in most years since the late 1970s has been zero. Accessibility in terms of transportation and communication does not seem to be a major problem in Wallowa either, as phone ownership as well as car ownership in the county is better than the U.S. average, though these figures only give no indication in terms of accessibility to advanced communications.

Information from the Environmental Defense Fund (EDF) indicates that environmental quality in Wallowa in terms of air and water pollution compares favorably to the rest of the nation as well as to much of the state, as total air, ground, and water toxic releases in the county are low compared to the rest of the nation, and a "cancer risk score" corresponding to these releases as assigned by the EDF is also low. Pollution level rankings for water bodies are similar to rankings in the rest of the state. Moreover, according to the Economic Research Service's amenity code, the county enjoys better than average quality of life. Thus, while the environment in many ways is threatened in terms of agricultural and industrial uses, the quality of life in terms of air, water, and amenities in general is high for the citizens residing and recreating in the county.

Furthermore, in terms of overall quality of life as related to employment, most of the residents, more than 96 percent, work within the county. This is significantly higher than the U.S. county-level median, which in 1990 was about 75 percent. This low rate of commuting is likely due to the difficulty and distance involved in traveling from any of the four main towns in the region to an area of significant population size. Moreover, the average travel time to work for those living in the county is only 12 minutes, which is about two-thirds of the U.S. average. This low travel time to work is likely related to people within the accounting and agricultural sectors often working at "home." Finally, over time Wallowa has actually performed much better in terms of rates of poverty when compared to the rest of the nation, though recently national rates of poverty have lowered and are now similar to the rate of poverty in Wallowa, which is around 15 percent. In general, the quality of life in Wallowa compares favorably to the rest of the United States.

Economic Base Analysis

The remainder of this analysis will assess the economic base of Wallowa County. It is therefore relevant to first provide a brief description of economic base theory as well as a description of input-output models, especially the IMPLAN model. This discussion is by no means exhaustive, and readers should refer to any number of references on economic base theory as well as input-output modeling for a further understanding of these concepts; some references are included in the bibliography of this report. Furthermore, IMPLAN offers a variety of means to analyze the economic base of a community, county, or region, and this analysis provides only a limited assessment of Wallowa's economic base through the use of IMPLAN.

Economic Base Theory

The use of IMPLAN relates to concepts in regional economics such as economic base theory, linkages, and multiplier effects. All of these concepts are considered important to understanding how economies, especially local economies, function, and they are also considered important to understanding how certain events might affect the structure and performance of an economy.

In general, local economic performance is often considered dependent upon a community's economic base. According to economic base theory, a regional economy consists of "basic" and "nonbasic" sectors. The basic sector primarily consists of industries that sell a large portion of their goods and services outside the region, while nonbasic industries serve markets primarily within a region. It is important to note that export industries do not have to explicitly produce commodities, as "export" activities can include services, activities that draw money from tourists visiting from outside of the region, federal government transfer payments, and so on.

The development of an economy and economic growth over time involves basic sector industries utilizing a region's comparative advantage or advantages, which may include the availability of, for example, natural resources or uniquely skilled labor. Regions often pursue various policy measures, such as attracting specific industries to a region, to exploit their

comparative advantage. Besides exports, a variety of entities and processes are vital to the functioning of a regional economy, including businesses that support export producers and a resident population that buys both locally and externally produced goods and services. Thus, when considering and analyzing the dynamics of a regional economy, it is important to consider the variety of producers and consumers within the region. Input-output analysis helps to identify these dynamics, primarily through the analysis of a region's current economic structure and through further analysis of what structural changes are needed to foster growth.

A key to economic base theory and input-output analysis is examining the linkages between industries within a region, especially in terms of commodities used in production. A simplistic example of the linkages between an industry and its suppliers and consumers is depicted in Figure 14.⁴ Industry I purchases the inputs needed to produce its products, such as labor, parts and transportation, and utilities. Those transactions or accounts with suppliers of goods and services are referred to as backward linkages. Forward linkages exist between an industry producing a good or service and its consumers. Those consumers may be households⁵, the outside world⁶ (exports outside the region), other local industries (intermediate demand⁷), or institutions (e.g. government⁸) that may use the product of industry I for consumption (final demand⁹) or as inputs to which they will add further value in the production of their own product.¹⁰ It is important to realize here that the selling of a product to another sector can be as an intermediate good (used in the production process, such as flour to a bakery for making bread) or for final demand (such as electricity sold to a household).

Final demand for goods and services are what drive input-output models. In order to meet final demands, industries respond by way of direct or indirect supply in the sense that each producing industry generates its own demand that other industries must fulfill. This is an iterative process that is captured in input-output through what are known as multipliers. Broadly

⁴ Derived from conceptual model presented in *IMPLAN Pro Version 2 (2000) User's Guide, Analysis Guide, and Data Guide*.

⁵ Households are considered both consumers of goods and services as well as sellers (e.g. labor) and are defined as individuals or families either employed or residing in the region.

⁶ The outside world refers to individuals and activities other than government outside of the region.

⁷ Intermediate or inter-industry demand refers to transactions among private industries within the region.

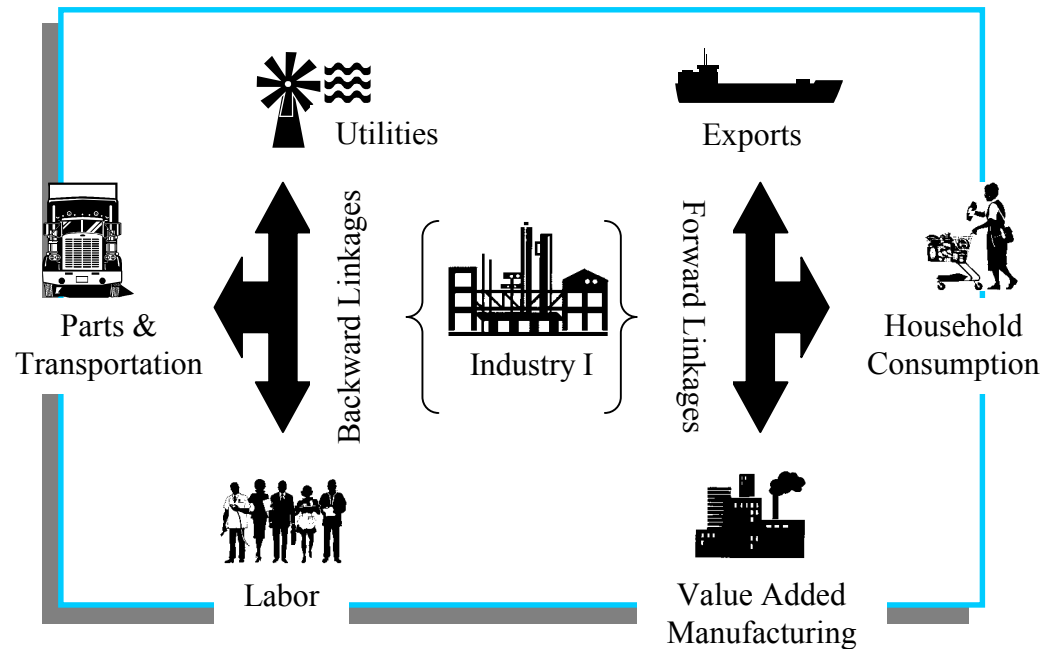
⁸ Government can be Federal, state, or local public authorities within or outside the region.

⁹ Final demands are sales of output considered to be in its final form, ready for the final stage of use rather than additional processing. In other words, they are goods and services leaving the region's stream of processing activity by way of exports, household or public sector consumption, or through incorporation into capital stock.

¹⁰ Value added is the portion of total value of output exclusively contributed by the intermediate industry.

defined, the multiplier is a means of measuring the total effect that a unit of change in an economy has upon the total economy.

Figure 14. Forward and Backward Linkages Supporting Industry



More specifically, multipliers break the round by round impacts of economic stimuli into three components: direct effects, indirect effects, and induced effects. Direct effects represent the response of an industry to a change in demand for a product produced by the industry. For example, the direct effect on the automotive industry of a large increase in demand for automobiles may be one thousand new jobs.

Indirect effects represent the response by all other industries to the initial change in demand. For example, the increased demand for automobiles will require increased electricity, a greater supply of steel, and so on from industries that supply the automobile industry. Induced effects represent the impacts to all local industries that result from the growth in expenditures of households.¹¹ Those expenditures stem from the generation of new income by way of the direct

¹¹ The input-output model treats households as a separate industry and changes in spending from within that industry reflect increases or decreases in income and/or population that result from changes in final demand. Induced effects

and indirect effects. For instance, the initial change in automobile manufacturing output may yield new jobs, thus producing additional income, of which a portion is spent within the regional economy, creating additional demands for goods and services in multiple industries, and so on.¹²

Related to multiplier effects is the concept of economic leakages. Economies, whether within a region or on a national scale, are interconnected. Commodity production tends to rely upon a variety of goods and services, and these goods and services can either be supplied from within or outside of the region. When commodities that a particular industry utilizes in the production process must be imported from outside the region, this causes what is known as an economic leakage. Economic leakages result in income loss to a community. In such a scenario, local economic development efforts may focus upon import substitution policies, where goods and services imported from outside of the region are replaced by goods and services produced locally. Eliminating economic leakages strengthens the multiplier effects of the export base. Thus, imported commodities that are tied directly to a region's export base are important candidates when a local community is considering focusing its efforts on attracting industry.

It should be recognized that the size and location of the study area, and even the make-up of its population, might significantly alter the amount of leakages, and therefore, the magnitude of multipliers. For instance, the greater the size of a region, the greater the opportunity there may be to conduct economic activity within that region (e.g. a larger selection of businesses from which to make purchases). Also, locations near major economic centers may lose more in terms of leakages than remote, rural locations. In such a situation, for example, residents may travel outside of the region in question to the metropolitan area to purchase goods and services, at least more frequently than they would if they were living in a more remote location.

In sum, it is important to realize that local economic sustainability and growth are linked to a variety of factors and processes including the following: geographic location; retention and expansion of the current export base; the substitution of imports with local production; the capture of local demand for goods and services; and obtainment of government transfers. It is important to remember that an export can be virtually anything that brings "outside" money into the local economy. The decline of one exportable commodity typically must be accompanied by

from other factors, such as government and investment, may also be counted, but the most prevalent measure is household alone.

¹² Regional purchase coefficients, an econometrically derived measure of trade flows, are used to adjust for those portions of industry purchases made outside the region.

the growth of another, or a region's economy will suffer. Major reasons for the decline of an existing exportable commodity include changes in demand from outside the region, exhaustion of a natural resource, decreasing comparative advantage relative to a competing region, and technological change.

There are many methods used to describe and analyze the economic base of a regional economy. Among those methods is input-output analysis, which provides detailed information on individual sectors in relation to their contribution to the local economy. One of the main uses of an input-output model is to assess some sort of "external shock" to an economy, such as increased demand from the outside world for a locally manufactured product or service, a policy measure affecting the utilization of a particular natural resource upon which a local economy is dependent, or something such as a change in tax rate that could affect all sectors of an economy, including households.

Input-output analysis stresses the effects of change from final demand backward to intermediate and primary supply sectors.¹³ Therefore the method is market rather than input oriented and pays no attention to resource constraints or forward or complementary linkage effects.¹⁴ As such, input-output is said to be a demand-driven model of a regional economy that implicitly assumes that input supplies needed to meet demand are immediately forthcoming with no additive cost. For example, if export demand for a region's manufacturing products increased so that the sector's demand for labor exceeded the local labor force then it is inferred that workers from outside the region would move into the region, thus filling the additional need. Conversely, a supply-driven model is dependent on the availability of input resources and assumes unlimited demand of regional products. Accordingly, supply-driven models work forward from primary supply to final demand, and changes in the draw upon primary supplies, rather than final demand, give rise to income and employment growth.

¹³ Inputs are known as factors of primary supply where they are inputs entering the region's processing system for the first time (e.g. labor and capital imports).

¹⁴ The technical limitations of input-output are based on the following assumptions: 1. The output of each sector is produced with a unique set of inputs, as such, there is no substitution of inputs. 2. The amount of input purchased is determined solely by level of output. Therefore, price effects, changes in technology, and economies of scale are not accounted for. 3. There are no external economies of scale (no agglomeration economies or new industries are included in an additive manner). 4. The in-state and out-of-state distribution of purchases and sales is fixed. 5. There are no constraints on resources, supply is infinite and perfectly elastic. 6. Local resources are efficiently employed, meaning there is no under employment of resources. All new employment stems from employees moving into the region and anyone who loses their job will leave the region.

The two models of economic growth are complementary, and if taken together would provide greater insight into the real processes of change. However, the impacts of changes to input supplies are not as easily detected as that which is due to changes in input demand. For instance, besides some special occasions where technological difference is prevalent within a sector, goods normally pass through successive stages of processing that can be defined in a general production function. Therefore, the necessary increase in inputs due to change in output demand can reasonably be determined. Increases to supply, on the other hand, are not readily traceable. It cannot legitimately be stated that the increased availability of a particular supply will be used for the process and handling of any one product, unless, once again, the form of that input is highly specialized. Given that difficulty, there is presently no model that adequately incorporates the two approaches. As such, input-output remains one-sided and the user must be aware of the implications of that bias.¹⁵

Input-output modeling requires the application of rigorous mathematical procedures to an itemized framework of regional accounts, which is information that describes the transactions between a specified region and the rest of the world as well as among the economic activities within that region.¹⁶ Such modeling is made relatively easy by the availability of computer software programs and databases specifically designed for such analysis. A number of programs have been developed, one of which is IMPLAN (IMPact analysis for PLANning), a modeling system introduced by the USDA Forest Service (Alward et al, 1989), but which is now used by a range of researchers for a variety of tasks.¹⁷

IMPLAN can be used to construct custom input-output models for any county or multi-county region in the United States.¹⁸ The research presented in the remainder of this work is the result of its application to Wallowa County, Oregon. The county model was constructed from relevant IMPLAN Pro 1998 data sets and parameters obtained from the Minnesota IMPLAN Group. The model and its interpretation reported here should be understood as descriptive in

¹⁵ To guard against misleading conclusions the analysis results must be checked against the known conditions of the study region. For instance, knowledge of excess capacity or resource shortages should be considered during the process of interpretation and wherever possible the analytical technique should be modified to reflect those conditions.

¹⁶ For a full explanation of methods a useful source is Miller and Blair, 1985.

¹⁷ IMPLAN was made available to the public through a joint effort by the Center for Community Economic Development and the University of Wisconsin Extension and is currently available for purchase through the Minnesota IMPLAN Group, Inc.

¹⁸ Databases are also available by zip-code designation, therefore regions may also be specified on that basis.

nature and should not be used for any detailed analysis without further consultation with the primary investigators.

Some important details of the specificities of the model are as follows. First, this analysis utilizes, for the most part, Type SAM multipliers, which include industry as well as social accounting information. Furthermore, most of the analysis relies upon fairly broad sectoral aggregations, which limits the details of the analysis, providing a fairly broad portrayal of the Wallowa economy. Nonetheless, these broad aggregations are particularly useful considering the exceptionally small size of Wallowa's economy. Greater detail regarding sectors would likely be necessary if this analysis was attempting to answer a question regarding a specific policy initiative, demand for a specific product, or, in general, a question of a specific nature. Included in each of the following subsections are brief descriptions of the nature of the analysis along with corresponding results.

Commodity Supply

This section of the analysis examines the commodity production of industries and institutions in Wallowa County. So to avoid confusion, it is important to note that industries consist of businesses producing goods and services, while commodities are the goods and services themselves. Commodity supply represents the product base of a community upon which other economic activity is dependent. This analysis considers two different forms of commodity supply: industry commodity production and institutional commodity sales, and it further includes total as well as net commodity supply.

Table 2 includes Wallowa County's industry commodity production, institutional commodity sales, total commodity supply, and net commodity supply. Industry commodity production indicates the total commodities produced by each of the industries within the county, and it is presented in Table 2 as a percentage of total production of all commodities in the county. In 1998, Wallowa industries produced \$273 million worth of commodities, with manufacturing commodities accounting for the largest percentage of this production, followed by agricultural commodities. Agricultural commodity production as a percent of total commodity production is much higher in Wallowa than in most other places, though such findings are to be expected considering the importance of the forestry and agricultural sectors in Wallowa.

Institutional commodity sales include commodities produced by non-industry sources such as households. In Wallowa, institutional commodity sales are small relative to industry commodity production, accounting for only 3.5 percent of total commodity supply in the county. Such a finding is somewhat typical. As is the case with industry commodity production, Table 2 presents institutional commodity sales as a percentage of all commodity sales in the county. Service and agricultural commodities are the leading institutional commodity supplies.

Total Commodity Supply is simply industry commodity production and institutional commodity sales combined. As is indicated in Table 2, commodity supply in Wallowa totals \$283 million. Manufactured goods are clearly the leader in total commodity supply, followed by agricultural products and then services. Total agricultural commodity supply is quite high in Wallowa.

Table 2. Commodity Supply; Percent of Total; Wallowa, OR; 1998

Commodity	Industry Commodity Production	Institutional Commodity Sales	Total Commodity Supply	Net Commodity Supply
Agriculture	13.9%	35.7%	14.7%	14.4%
Mining	0.0%	0.1%	0.0%	0.0%
Construction	10.4%	0.0%	10.0%	10.5%
Manufacturing	20.2%	2.7%	19.6%	18.2%
TCPU	7.8%	0.5%	7.6%	7.5%
Trade	10.6%	2.8%	10.4%	10.6%
FIRE	13.0%	0.0%	12.6%	12.6%
Services	12.9%	43.9%	14.0%	14.6%
Government	10.7%	0.0%	10.3%	10.8%
Other	0.4%	14.3%	0.8%	0.6%
Total*	273.2	9.9	283.1	269.7

Total percentages may not sum to 100 due to rounding

*Millions of Dollars

Net commodity supply is the commodity supply available for local and domestic consumption, which includes domestic but not foreign exports.¹⁹ To be more specific, foreign exports include commodities that are exported beyond national borders, while domestic exports are commodities exported outside of the region in question but remain within national boundaries. The majority of total commodity supply, slightly more than 95 percent, remains available for local consumption and domestic export consumption. Thus, very little of what is

¹⁹ Local commodity demand + domestic commodity demand = net commodity supply = total commodity supply – foreign exports.

produced in Wallowa County is being exported directly to foreign markets. However, it is important to note that much of what is produced in Wallowa could nonetheless be inputs to the production of exported commodities or could be sold to domestic companies involved in foreign trade. Moreover, in an IMPLAN model of this type, the majority of net commodity supply, whether in a metropolitan or nonmetropolitan area, is typically indicated as being available for local consumption or domestic export consumption.

Industry production is further broken down into production as a percentage of market shares by individual sectors (Table 3). Market shares are the percentage of the total production of a commodity that is produced by each industry. In general, and not simply in relation to the IMPLAN model, industry sectors are defined by the product that they produce. For example, the manufacturing sector is so named due to its production of manufacturing commodities. However, industries also produce commodities that are not typically associated with their sector, such as when the manufacturing sector produces what are understood to be service commodities.

In general, the majority of Wallowa industries are single commodity type, which is typical for most places, whether rural or urban. One notable finding is the level of service provisions provided by the government sector. In Wallowa, the service industry produces 81.7 percent of all service commodities, while the government sector produces 11.1 percent of these commodities. The government provision of services is a larger percent of market share than one would find in many other rural and especially metropolitan areas. It is also of note that the government sector accounts for 8 percent of the market share of agricultural commodity supply. This is not surprising for a county with such a large land area owned by the federal government, and other counties with relatively large amounts of federal lands share similar situations. Many areas of the country have much smaller agricultural commodity market shares related to the government sector than does Wallowa, all of which further highlights that economic conditions within Wallowa County are in many ways tied to government, especially federal government, policies and practices.

Table 3. Market Share of Commodity Produced; Percent of Total; Wallowa, OR; 1998

Commodity / Industry	Agri-culture	Mining	Const-ruktion	Manu-facturing	TCPU	Trade	FIRE	Service	Government	Other
Agriculture	91.5%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%
Mining	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Construction	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Manufacturing	0.0%	68.7%	0.0%	99.2%	0.0%	0.0%	0.0%	3.1%	0.0%	1.4%
TCPU	0.0%	0.0%	0.0%	0.0%	90.2%	0.0%	0.0%	1.8%	0.0%	0.1%
Trade	0.0%	0.0%	0.0%	0.0%	0.0%	98.4%	0.0%	0.0%	0.0%	0.3%
FIRE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	98.9%	1.9%	0.0%	0.0%
Services	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	81.7%	0.0%	0.0%
Government	8.0%	31.3%	0.0%	0.0%	9.8%	1.6%	1.0%	11.1%	100.0%	0.0%
Other	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	38.6%
Households	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.8%
Capital	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	38.7%
Inventory	0.5%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Total percentages may not sum to 100 due to rounding

Commodity Demand

As is the case with commodity supply, commodity demand can also be broken into two categories: intermediate commodity demand and institutional commodity demand. Intermediate commodity demand is locally generated demand by industries for local and/or imported commodities. Institutional commodity demand is local demand by non-industry sources, such as households, governments, and other institutions, for local or imported commodities. Though the IMPLAN model generates commodity purchases in terms of gross values, only total purchases (in millions of dollars) are presented in Table 4, while amounts of total commodity demand are indicated as a percent of total demand. The leading intermediate commodity demands in Wallowa County are for manufacturing and FIRE commodities (*see* Table 4). FIRE commodities are also among the leaders for institutional demand.

In Table 5, intermediate commodity demand is broken into industry sectors. This table provides an indication of local industry's backward linkages, though the extent to which local production is used to meet local demand will be discussed in a later section. To provide an indication of how to read Table 5, one can see that 53.8 percent of the construction industry's total demand is for manufacturing commodities. In short, however, nothing in terms of intermediate commodity demand or institutional commodity demand in Wallowa is particularly surprising or remarkable.

Table 4. Commodity Demand; Percent of Total; Wallowa, OR; 1998

Commodity / Industry	Intermediate Commodity Demand	Institutional Commodity Demand	Total Gross Commodity Demand
Ag, Fishing, Forestry	7.4%	0.6%	3.1%
Mining	2.4%	0.0%	0.9%
Construction	3.2%	11.8%	8.7%
Manufacturing	35.2%	14.7%	22.2%
TCPU	10.1%	6.2%	7.6%
Trade	10.9%	16.3%	14.3%
FIRE	19.8%	20.0%	19.9%
Services	0.9%	14.6%	9.6%
Government	0.9%	14.6%	9.6%
Other	0.7%	1.8%	1.4%
Total*	114.12	198.07	312.19

Total percentages may not sum to 100 due to rounding
 *Millions of dollars

Table 5. Intermediate Commodity Demand; Percent of Total; Wallowa, OR; 1998

Industry/ Commodity	Agri-culture	Mining	Con-struction	Manu-facturing	TCPU	Trade	FIRE	Services	Government
Agriculture	21.0%	0.0%	0.6%	2.9%	0.0%	0.6%	1.2%	0.2%	0.0%
Mining	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
Construction	3.9%	0.0%	0.2%	1.6%	7.8%	2.3%	18.0%	3.3%	37.8%
Manufacturing	33.2%	0.0%	53.8%	57.9%	10.9%	21.8%	2.4%	18.8%	16.0%
TCPU	10.6%	0.0%	7.4%	9.9%	43.8%	14.0%	7.9%	11.1%	21.3%
Trade	13.6%	0.0%	16.3%	12.6%	4.9%	9.5%	1.3%	5.4%	2.7%
FIRE	11.8%	0.0%	3.1%	2.8%	6.0%	12.5%	45.5%	14.7%	6.4%
Services	5.6%	0.0%	18.2%	11.0%	23.7%	36.2%	20.5%	42.9%	11.7%
Government	0.2%	0.0%	0.4%	0.6%	0.9%	2.5%	3.1%	3.4%	2.7%
Other	0.0%	0.0%	0.0%	0.6%	1.7%	0.4%	0.1%	0.2%	1.1%
Total Demand*	10.38	0	12.76	24.61	5.87	4.73	6.72	9.45	1.88

Total percentages may not sum to 100 due to rounding
 *Millions of dollars

Total institution commodity demands include household and government demand as well as capital formation, inventory purchases, and foreign exports. In Wallowa County households make up the largest proportion of institutional commodity demand (*see* Table 6). Household commodity demand consists of payments by individuals and households to industries for goods and services used for personal consumption. For households, 27.9 percent of commodity demand is for services, typical for a region of this and other sizes.

It is noteworthy, however, that spending patterns can differ dramatically when disaggregated by income level and commodity types. For instance, spending on services is greatest in Wallowa County for the lowest two income groups, 35.3 percent for those below \$5 thousand and 34.1 percent for those between \$5-10 thousand, compared to 24.1 percent for the next highest income group (*see* Table 7). In addition, Table 7 indicates that households in all income ranges spend more on services than any other commodity, followed by FIRE. Trade and manufacturing are also big sources of household commodity demand. Again, these results are typical for most counties and regions.

Table 6. Institutional Commodity Demand; Percent of Total; Wallowa, OR; 1998

Institution/ Commodity	Sum of Households	Sum of Federal Gov.	Sum of State & Local Gov.	Capital	Inventory
Agriculture	0.7%	0.0%	0.4%	0.0%	10.0%
Mining	0.0%	0.0%	0.0%	0.0%	0.0%
Construction	0.0%	0.3%	20.1%	82.4%	0.0%
Manufacturing	19.0%	3.0%	6.8%	5.7%	1.3%
TCPU	7.6%	0.1%	4.1%	1.8%	14.0%
Trade	19.3%	0.1%	1.5%	7.2%	11.3%
FIRE	22.9%	0.2%	3.1%	2.5%	0.0%
Services	27.9%	1.0%	5.9%	0.3%	0.0%
Government	0.7%	95.1%	58.0%	0.0%	0.0%
Other	1.9%	0.1%	0.1%	0.0%	63.3%
Total Demand*	133.93	8.89	33.57	20.18	1.50

Total percentages may not sum to 100 due to rounding

*Millions of dollars

Table 7. Household Commodity Demand; Percent of Total; Wallowa, OR; 1998

Household Income/ Commodity	<\$5k	\$5-10k	\$10-15k	\$15-20k	\$20-30k	\$30-40k	\$40-50k	\$50-70k	\$70k+
Agriculture	0.7%	0.7%	0.8%	0.8%	0.7%	0.6%	0.7%	0.6%	0.5%
Mining	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Construction	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Manufacturing	16.1%	17.7%	20.9%	20.4%	19.4%	18.1%	19.8%	19.0%	17.7%
TCPU	8.5%	8.5%	9.2%	8.3%	7.7%	7.1%	6.9%	6.7%	6.8%
Trade	16.1%	15.9%	19.3%	18.8%	20.4%	19.0%	20.6%	20.6%	19.2%
FIRE	21.2%	20.8%	23.3%	21.9%	22.1%	23.1%	24.5%	23.6%	24.8%
Services	35.3%	34.1%	24.1%	27.5%	27.1%	29.6%	24.8%	26.4%	28.1%
Government	0.6%	0.6%	0.7%	0.8%	0.7%	0.6%	0.7%	0.6%	0.8%
Other	1.6%	1.7%	1.7%	1.6%	1.9%	1.8%	2.0%	2.5%	2.1%
Total Demand*	5.75	9.90	13.21	15.22	23.89	25.14	15.82	15.73	9.27

Total percentages may not sum to 100 due to rounding

*Millions of dollars

When commodity types are further disaggregated, there are some interesting trends as indicated in Table 8. For example, owner-occupied dwellings are the commodity most in demand for the majority of income groups. Also, as income increases, a larger percent of income is used for housing. Households with income greater than \$70 thousand spend slightly more than 15 percent of total income on owner-occupied dwellings, while households with income less than \$5 thousand spend only around 7 percent of income on this commodity. Also, as income goes up, expenditures on insurance tend to rise. The reverse is true for hospitals, or what can be considered a proxy for health care: poorer households tend to spend a larger percentage of their income on health care. The data in Table 8 are indicative of broader societal trends that are not specific to Wallowa County. Nonetheless, it is of note that the variations in the income make-up of a county can result in vast differences in what types of commodities are purchased in a county, and if the income make-up of the residents in Wallowa County were to change, overall commodity purchase patterns would also likely change.

Table 8. Top Household Commodity Demands; Percent Total All Commodity Demands by Income Group; Wallowa, OR; 1998

Household Income/ Commodity	<\$5k	\$5-10k	\$10-15k	\$15-20k	\$20-30k	\$30-40k	\$40-50k	\$50-70k	\$70+
Own.-occ. Dwellings	7.1%	5.5%	8.0%	7.9%	8.1%	9.8%	11.0%	12.5%	15.1%
Hospitals	9.7%	9.4%	4.1%	8.8%	7.3%	9.4%	4.9%	5.0%	4.6%
Doctors/Dentists	4.4%	4.5%	5.4%	5.2%	5.3%	4.7%	5.7%	5.9%	5.3%
Real Estate	8.5%	8.7%	8.0%	6.5%	5.7%	4.7%	3.6%	2.0%	1.2%
Eating & Drinking	4.0%	2.6%	3.6%	4.0%	4.4%	4.4%	4.9%	4.7%	5.0%
Banking	3.7%	4.1%	4.4%	3.8%	4.3%	4.3%	4.7%	4.0%	3.1%
Wholesale Trade	3.3%	3.5%	4.1%	3.8%	3.9%	3.6%	3.8%	3.8%	3.4%
Insurance Carriers	1.4%	1.6%	2.3%	2.6%	2.9%	3.4%	4.0%	4.2%	4.8%
Miscellaneous Retail	2.1%	2.3%	3.0%	2.6%	3.2%	2.8%	3.0%	3.0%	2.6%
Automotive Dealers	1.4%	1.6%	2.3%	2.1%	2.7%	2.5%	2.7%	2.6%	2.1%

Table 9 includes government commodity demands. Demand is broken down by federal as well as by state and local expenditures. Federal expenditures include military purchases, non-military purchases, and investment, while state and local expenditures include non-education, education, and investment expenditures. Non-military federal expenditures are for, amongst other things, the management of public lands. State and local non-education expenditures are for

activities such as police protection. Federal as well as state and local investment expenditures are for capital goods and construction.

The majority of federal government commodity demand is not military related, exemplifying the limited role of federal military activity in the region. Counties and regions with large military complexes or defense-related activities typically have a greater commodity demand from defense rather than non-defense related activities, though this is not the case in Wallowa. Also, there is a relatively greater disparity between state and local education and non-education expenditures in Wallowa than one might find elsewhere in the country, with non-education expenditures being about twice the amount of education expenditures. The majority of non-education commodity demand is for state and local government. Much of the rest of government commodity demand, both federal as well as state and local, is typical of what one might expect in an area with such a preponderance of federal lands. For example, federal non-defense commodity demand is primarily for government commodities, and state and local investment commodity demand is primarily related to construction commodities.

Table 9. Government Commodity Demand; Percent of Total; Wallowa, OR; 19

Institution/ Commodity	Federal Non- defense	Federal Defense	Federal Investment	State & Local Non-education	State & Local Education	State & Local Investment
Agriculture	0.0%	0.0%	0.0%	0.7%	0.1%	0.0%
Mining	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Construction	0.2%	0.0%	18.9%	6.6%	1.2%	97.4%
Manufacturing	3.7%	0.0%	74.3%	9.7%	3.9%	2.0%
TCPU	0.2%	0.0%	0.0%	5.8%	3.2%	0.0%
Trade	0.1%	0.0%	5.4%	2.3%	0.6%	0.3%
FIRE	0.4%	0.0%	0.0%	5.4%	0.2%	0.0%
Services	1.6%	0.0%	0.0%	9.5%	2.2%	0.0%
Government	93.7%	100.0%	0.0%	59.9%	88.5%	0.0%
Other	0.1%	0.0%	0.0%	0.0%	0.1%	0.2%
Total Demand*	5.695	3.124	0.074	18.631	9.399	5.542

Total percentages may not sum to 100 due to rounding

*Millions of dollars

Finally, in this section of the analysis it is pertinent to discuss commodity exports, which include both foreign as well as domestic exports. As previously mentioned, foreign exports are shipments from local industries to destinations outside of the U.S., while domestic exports are shipments outside of the local area but within the country. Domestic exports account for slightly

more than three quarters of all exports from the county. Perhaps most stunning is the share that agricultural products have as domestic exports, an exceptionally large 82.7 percent (*see* Table 10). Furthermore, although manufacturing commodities make up the greatest percentage share of foreign exports at 47.3 percent, agricultural commodities compose an exceptionally large share of foreign exports at 20.1 percent. The share for agricultural commodity exports is relatively high compared to places of a similar nature, and it provides an indication of how agricultural products are such an important part of the county's economic base.

Considering the relatively large extent to which agricultural products are exported from the region, both domestically and internationally, it is worth understanding exactly what these export commodities are. Table 11 includes the percentage contribution to total exports for the top ten exported agricultural commodities from the county, and it also includes the total amount of agricultural commodity exports.²⁰ More than one-quarter of all domestic exports are forestry products, while cattle (ranch fed and range fed combined) also make up a significantly large portion of the domestic export sector. Forestry products also make up close to 2 percent of all foreign exports, though the leading international export commodities are grains and commercial fishing commodities. The large share of exports for agricultural commodities, especially forestry commodities, further emphasize how domestic and international concerns and policy measures related to issues such as biodiversity, old-growth forest protection, and other forestry related issues can have a profound impact on the economy of Wallowa County and its economic base.

Table 10. Commodity Exports; Percent of Total; Wallowa, OR; 1998

Export/Commodity	Foreign	Domestic	Total
Agriculture	20.1%	82.7%	67.8%
Mining	0.0%	0.0%	0.0%
Construction	0.0%	3.0%	2.3%
Manufacturing	47.3%	0.0%	11.3%
TCPU	9.7%	0.3%	2.5%
Trade	4.5%	0.0%	1.1%
FIRE	11.5%	14.0%	13.4%
Services	1.6%	0.0%	0.4%
Government	0.0%	0.0%	0.0%
Other	5.3%	0.0%	1.3%
Total*	13.42	42.80	56.22

Total percentages may not sum to 100 due to rounding

*Millions of dollars

²⁰ Includes only the top 10 agricultural, fisheries, and forestry commodity exports in the county.

Table 11. Commodity Exports; Agricultural Sector; Percent of Total; Wallowa, OR; 1998

Export/Commodity	Foreign	Domestic	Total
Forestry Products	1.8%	27.4%	21.3%
Feed Grains	2.7%	14.4%	11.6%
Ranch Fed Cattle	0.3%	12.9%	9.9%
Range Fed Cattle	0.2%	9.2%	7.0%
Hay and Pasture	1.1%	7.3%	5.8%
Food Grains	10.3%	3.0%	4.7%
Dairy Farm Products	0.0%	5.0%	3.8%
Commercial Fishing	3.1%	1.4%	1.8%
Cattle Feedlots	0.0%	1.4%	1.1%
Poultry and Eggs	0.0%	0.6%	0.5%
Total*	13.42	42.80	56.22

Total percentages may not sum to 100 due to rounding

*Millions of dollars

Consumption Patterns

The next part of the analysis considers the topics discussed in the previous two sections, commodity supply and commodity demand, in conjunction with one another. Consumption patterns, while providing an indication of the intersection of supply and demand, further reveal areas of growth potential in a local economy. Table 12 includes information about the domestic supply/demand ratio, average regional purchase coefficients (RPC), and average regional sales coefficients (RSC).

The domestic supply/demand ratio is the relationship of net commodity supply (previously indicated in Table 2, which is the total commodity supply available for local and domestic consumption) to total gross commodity demand in the region (previously indicated in Table 4). It is important to stress here that this ratio includes supply that can be used both within the county or elsewhere within the U.S. If supply exceeds demand then the ratio is set to one, as is the case with agricultural and construction commodities in Wallowa. For all other commodities in Wallowa, demand exceeds supply, though for government commodities the supply/demand ratio is close to one, and the supply/demand ratio for FIRE is quite high relative to other rural areas of the country.

Regional purchase coefficients represent the proportion of local commodity demand actually purchased from local producers. For example, a RPC of .50 for a given commodity indicates that for each \$1 of local need for that commodity, 50 percent will be purchased from local producers. Essentially, a RPC measures local demand that is satisfied by local supply, and

remaining demand must therefore be satisfied by imports. It is similar to the domestic supply/demand ratio, except that where the supply/demand ratio assumes availability, an RPC assumes actual purchases. Construction commodities have the highest RPC in Wallowa, and though this is typical of most counties, the RPC for this commodity is somewhat higher than one might expect to find elsewhere. Government also has a high RPC, though this is a very typical finding. The RPC for agricultural commodities, however, is somewhat low, especially considering that the supply/demand ratio for this product is 1. This may be because much of the agricultural production in the region involves cattle, and demand in Wallowa for agricultural products is for a range of such products.

Regional sales coefficients indicate the fraction of net commodity supply used to meet county gross commodity demand. For example, if the RSC for agriculture is .75, then 75 percent of agricultural commodities that are produced within the region are also consumed within the region, while the remaining 25 percent are exported outside of the region. What stands out in terms of RSCs in Wallowa is the fact that so little of the agricultural supply is used to meet local demand. Again, this is likely indicative of agricultural endeavors primarily involving cattle, though it also indicates that perhaps there could be a greater share of forestry-related manufacturing industries within the county. Also, there is a somewhat higher RSC for manufacturing commodities than found in other places, possibly indicating the extent to which local artisans utilize commodities from the local foundries, which is one of the only manufacturing industries within the county.

By considering the difference between RSCs and RPCs for various commodities, it is possible to assess where there is room for growth in a local economy. For example, a high RSC but a low RPC for a particular commodity indicates that while most of the supply of a given commodity within a region is going to meet local demand, there is still excessive demand for that particular commodity that is not being met by local supply. On the other hand, if an RSC is low, then this suggests that commodities are being sold to industries and institutions outside of the region to meet demand elsewhere. In such a scenario, economic development efforts could be aimed at attracting such industries that are outside of the region but that are currently purchasing commodities from within the region.

In Wallowa, the service sector has a high RSC but relatively low RPC, suggesting that service supply in the region is only partially going to meet local demand. With an RSC of .99 but

a RPC of only .63, there may be room for expansion in the local service sector, as much of the demand for services is being met by supply from outside of the county. Trade also shows potential for local growth.

The opposite is the case for agricultural commodities, where most of the supply does not go to meet local demand. At the same time much of the agricultural commodities consumed are imported. This reflects the relatively high degree of specialization in agricultural production in the county, especially in terms of beef and timber production. In other words, especially in regards to agricultural products, many of the commodities that are consumed in the county are not produced there, and, simply put, the county produces more than enough beef than it can be expected to consume. At the same time, there may be room to try to attract industries to the region that are currently outside of the region but are purchasing Wallowa's timber products.

Table 13 includes the top ten export commodities in the agricultural sector. These commodities were previously discussed in reference to Table 11. It is clear that majority of these commodities are being exported from the county, as is evident in the very low RSCs. It is doubtful, considering the nature of these industries, that a significantly larger portion of these commodities could be consumed within the county. However, what is perhaps most notable here is that the domestic supply/demand ratios indicate that the domestic markets for all of these products are saturated, indicating little room for growth in demand for these commodities, at least domestically.

Table 12. Comparison of Commodity Supply and Demand; Wallowa, OR; 1998

Commodity	Domestic S/D Ratio	Average RPC	Average RSC
Ag, Fishing Forestry	1.00	0.37	0.09
Mining	0.01	0.01	1.00
Construction	1.00	1.00	0.95
Manufacturing	0.71	0.71	0.89
TCPU	0.85	0.84	0.93
Trade	0.74	0.74	0.98
FIRE	0.76	0.63	0.79
Services	0.63	0.63	0.99
Government	0.98	0.98	1.00
Other	0.39	0.39	0.70

Table 13. Comparison of Commodity Supply and Demand;
Agriculture Sector; Wallowa, OR; 1998

Commodity	Domestic S/D Ratio	Average RPC	Average RSC
Forestry Products	1.00	0.00	0.00
Feed Grains	1.00	0.11	0.03
Ranch Fed Cattle	1.00	0.96	0.09
Range Fed Cattle	1.00	0.97	0.20
Hay and Pasture	1.00	0.11	0.04
Food Grains	1.00	0.10	0.00
Dairy Farm Products	1.00	0.10	0.00
Commercial Fishing	1.00	0.04	0.00
Sawmills and Planing Mills- General	1.00	0.78	0.08
Logging Camps and Logging Contractors	1.00	0.99	0.47

Table 14 indicates intermediate commodity imports, institutional commodity imports, and total imports for Wallowa County in terms of share of total commodity imports. Total imports is a combination of intermediate and institutional imports. In 1998 Wallowa County imported close to \$38 million of intermediate commodity imports and slightly more than \$47 million of institutional imports. The largest share of intermediate imports was for manufacturing commodities, while for institutional imports the largest share of commodities imported was services. Though not exceptionally different compared to other regions, there are nonetheless relatively higher leakages occurring in terms of intermediate commodity demand for manufacturing products and institutional commodity demand for services. Also, though intermediate commodity demand for agricultural commodities appears to be relatively low, this is somewhat higher than one might find in similar regions. Thus, agricultural commodities are a greater percent share of intermediate commodity imports in Wallowa than in counties of a similar nature. This likely has to do with industries in the region being specialized in terms of cattle production, and a large amount of feed grains are imported into the region. Forestry products manufacturers in the county, primarily the mills, are not importing much in terms of commodities, which is to be expected.

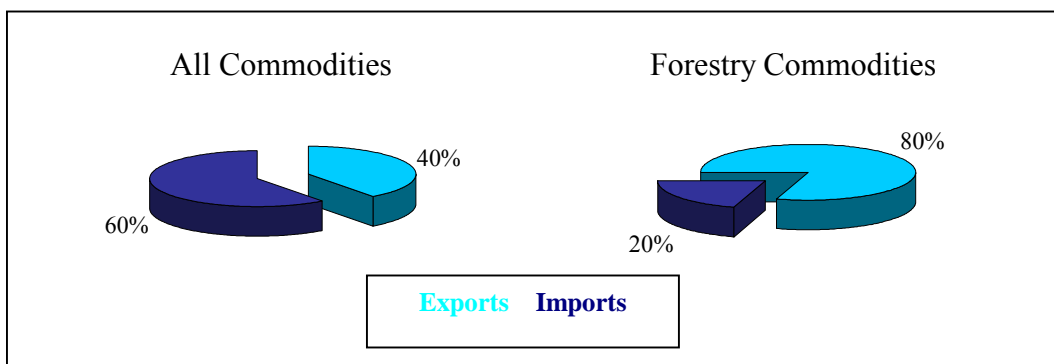
Table 14. Commodity Imports; Wallowa, OR; 1998

Import/ Commodity	Intermediate	Institutional	Total
Agriculture	14.2%	1.6%	7.2%
Mining	7.1%	0.0%	3.2%
Construction	0.0%	0.0%	0.0%
Manufacturing	30.9%	17.8%	23.6%
TCPU	4.8%	4.0%	4.3%
Trade	7.4%	15.2%	11.8%
FIRE	12.2%	25.1%	19.4%
Services	22.0%	30.4%	26.7%
Government	0.1%	1.3%	0.8%
Other	1.3%	4.5%	3.1%
Total*	37.71	47.60	85.32

Total percentages may not sum to 100 due to rounding
 *Millions of dollars

Figure 15 demonstrates the trade balance for all commodities as well as for only forestry-related products. While 60 percent of all commodities are being imported into Wallowa, with only 40 percent of the county's products being exported, this ratio is not surprising nor is it indicative of poor economic conditions for a county of Wallowa's size. Counties of a similar size and rural nature often tend to import much more than they export – typically at a much higher level than is the case for Wallowa. Thus, relative to rural counties of a similar nature, Wallowa's level of self-sufficiency is fairly high. Considering forestry related products only, however, Figure 15 demonstrates that exports are much larger than imports. Logging camps and contracts (presumably from national forest lands) as well as sawmill and planing mill commodities are quite large exports here. Again, it seems apparent that more forestry-related manufacturing industries within the county could help mitigate some of these leakages.

Figure 15. Trade Balance; Percent of Total Imports & Exports; Wallowa, OR; 1998



Economic Contributions

A relative measure of the economic contributions of industries to a region can be ascertained from examining the value of each industry’s total production (output), number of jobs (employment), and related income flows (i.e. value added). Table 15 provides this information for the aggregated industry sectors, while Table 16 includes the same information for the top ten industries in the agricultural sector.

Table 15. Output, Employment & Value Added; Percent of Total; Wallowa, OR; 1998

Industry	Industry Output	Employment	Employee Compensation	Proprietor Income	Other Property Income	Indirect Business Tax	Total Value Added
Agriculture	14.1%	16.7%	8.3%	16.1%	19.7%	15.9%	13.2%
Mining	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Construction	10.4%	6.5%	7.1%	16.9%	1.7%	1.9%	6.2%
Manufacturing	20.6%	8.3%	13.9%	4.2%	14.2%	5.3%	12.3%
TCPU	7.3%	3.9%	6.1%	5.3%	8.8%	9.8%	7.1%
Trade	10.6%	17.2%	14.6%	9.7%	8.6%	41.6%	13.8%
FIRE	13.2%	6.4%	8.2%	5.0%	33.8%	20.5%	16.5%
Services	11.9%	21.9%	10.2%	42.7%	3.7%	5.0%	11.7%
Government	11.7%	18.5%	31.4%	0.0%	8.2%	0.0%	18.5%
Other	0.3%	0.6%	0.3%	0.0%	1.4%	0.0%	0.6%
Total*	273.18	4671.00	80.66	18.98	49.50	9.93	159.06

Total percentages may not sum to 100 due to rounding
 *Millions of dollars

In 1998 industries in Wallowa produced a total of \$273 million worth of output, with a higher percentage of output from the agricultural sector as well as the FIRE sector and a slightly lower output from the manufacturing than what is typically found in a county of a similar size and rural nature. Again, these figures demonstrate the importance of the agricultural sector to Wallowa County's economy, and they further underscore the fact that the manufacturing industry is not particularly strong in this region. As is demonstrated in the percent employment column in Table 15, services, government, agriculture, and trade are all exceptionally high employers in the county.

In the IMPLAN model there are four sub-components of value-added, all of which are included in Tables 15 and 16. These subcomponents include employee compensation, proprietary income, other property type income, and indirect business tax. To provide further detail, each of these subcomponents were analyzed in turn.

Employee compensation refers to wage and salary payments, as well as benefits which include the following: health and life insurance, retirement payments, and any other non-cash compensation. Basically employee compensation includes all income paid to workers by employers, and it is typically the largest component of value-added. In 1998, government, which includes schools, state and local government, and federal government and military, generated the largest percentage of employee compensation in the county (31.4 percent). Trade, manufacturing, and then services followed government. While agriculture ranks only fifth in this category, it is nonetheless a much greater contributor to employee compensation in Wallowa than it is in areas of a similar nature.

Proprietary income consists of payments received by self-employed individuals as income. This includes any income received for self-employed work as reported on federal tax forms, and it typically includes income received by private business owners, doctors, lawyers, and so on. Proprietary income, along with indirect business taxes, is typically a much smaller component of value added, especially when compared to employee compensation. Figures in Wallowa are quite typical of what would be found elsewhere, especially with the service sector being the largest contributor to proprietary income.

Other property type income includes payments for rents, royalties, and dividends. More specifically, this includes payments to individuals in the form of rents received on property, royalties from contracts, dividends paid by corporations, and corporate profits. In Wallowa, manufacturing property type income stands out as being relatively low, while property income from the agricultural sector is remarkably high.

Indirect business taxes include excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses. These taxes occur during the normal operation of businesses but do not include taxes on profit or income. Indirect business taxes are typically the smallest components of value added. In Wallowa, the trade sector contributed the most to this component of value added, and this is a typical finding. In sum, government, FIRE, trade, and then agriculture are the largest contributor to value added in terms of indirect business taxes, with the agricultural sector contributing significantly more to value added than it does in places of a similar nature, and manufacturing contributing slightly less.

Table 16 includes the same information found in Table 15, except the information is in dollar figures and refers to the top 10 industries in the county that are either in the agricultural or

manufacturing sectors. The information in this table clearly highlights the importance of the logging industry as well as the cattle industry in Wallowa County in terms of value added. What is particularly notable here is the total output as well as the value added from the sawmills and planing mills in the county. Though mills are not as big a part of the local economy as they once were, it is clear from these figures that such mills add a tremendous amount of value added to Wallowa's local economy. Considering the extent of this value added, it is easy to see how the loss or opening of a mill could have a dramatic effect upon Wallowa's economy.

Table 16. Output, Employment, & Value Added; Agricultural Sector and Forestry-Related Manufacturing Industries; Percent of Total; Wallowa, OR; 1998

Industry	Industry Output*	Employment	Employee		Other Property Income*	Indirect Business Tax*	Total Value Added*
			Compensation*	Proprietor Income*			
Sawmills and Planing Mills	28.74	168	5.38	0.39	2.35	0.27	8.39
Logging Camps and Logging Contractors	20.32	111	3.58	0.27	4.17	0.21	8.22
Hay and Pasture	8.61	355	1.08	1.07	2.11	0.60	4.86
Forestry Products	6.50	28	0.16	-0.12	3.09	0.02	3.15
Ranch Fed Cattle	6.27	95	1.55	0.50	0.38	0.24	2.67
Range Fed Cattle	5.02	83	1.24	0.49	0.28	0.17	2.18
Food Grains	2.72	61	0.38	0.32	0.97	0.21	1.88
Brass, Bronze, and Copper Foundries	2.51	62	1.44	0.08	0.17	0.02	1.71
Dairy Farm Products	2.23	12	0.75	0.35	0.23	0.02	1.34
Forest Products	2.13	25	0.26	0.17	1.33	0.09	1.85
Total for All Industries	273.18	4671	80.66	18.98	49.50	9.93	159.06

Total percentages may not sum to 100 due to rounding
 *Millions of dollars

The industry to industry impact of economic activity can be determined by examining production relationships in the region. The benefit of examining such relationships is that it allows for the estimation of changes to total economic contribution based on change in demand. One way to accomplish this is to state the patterns of expenditures made by a sector as proportions of all inputs needed to produce one dollar of output in a given sector, thus identifying linear production relationships.²¹ This information is commonly presented in what is known as direct requirements tables (Tables 17 and 18).²²

The direct requirements tables in this analysis should only be read down. Each column essentially represents a “production recipe” for one dollar of output for the purchasing sector at

²¹ This is done by dividing the dollar value of inputs purchases from each sector by total expenditures.

²² This is also referred to as the matrix of technical coefficients excluding households and imports, which if included would set the total row to one for each industry.

the column head.²³ Each number in the column is the dollar amount of inputs required from the processing sector on the left in order to produce that unit of output. For example, as is indicated in Table 17, every dollar of output from the agricultural sector in Wallowa requires an additional 16 cents worth of output from the agricultural sector, 13 cents from the manufacturing sector, and so on. Given this example, an additional dollar of output by the agricultural sector leads to the purchase of a total of 45 cents from other firms located in the region.²⁴ The remaining requirements for a dollar of output are either obtained from institutions (i.e. households) within the region or are imported. Therefore, in reference to the above example, 55 cents of the remaining direct requirements for the agricultural sector are either imported or obtained from local institutions. In sum, assessing direct requirements as they relate to how they are met from within and outside the region gives a sense for the level of industry and inter-industry self-sufficiency of a region. The greater the need for external intermediate inputs and supplies means that a local economy has a greater dependency on the outside world and that there is a large degree of leakages from the economy. Moreover, as dependency increases, a local economy becomes in many ways more susceptible to exogenous factors of change.

Assuming the direct requirements table represents the spending patterns necessary for additional production in all sectors, the effects of a change in a final demand for output in one can be traced to that of another. For instance, in table 18, a one dollar unit change in demand for sawmills and planing mills output results in an additional 28 cents worth of demand in logging camps products, 8 cents from sawmills and planing mills, and an additional 35 cents from other sectors. Therefore, the direct effect of a one dollar change in demand for sawmills and planing mills products would be 171 cents (the initial change plus the direct effect). However, as previously mentioned in relation to multiplier effects, the indirect effects must then be estimated by carrying those changes through the impacted sectors. In other words, the 71 cents worth of new demand on all other sectors must be accounted for. This is accomplished by multiplying the value of the direct effects by the numbers in the relevant columns, which would result in an additional region-wide impact of approximately 40 cents for a total of approximately 210 cents.²⁵

²³ This production formula is assumed to be constant and the same for all sector establishments regardless of input prices or production levels (e.g. no economies of scale).

²⁴ Sums may not be exact due to rounding.

²⁵ Initial change + direct effect + indirect effect

Table 17. Direct Requirements Table; All Sectors; Wallowa, OR; 1998

Purchasing / Processing Sectors	Agri-culture	Mining	Const- ruction	Manu- facturing	TCPU	Trade	FIRE	Service	Govern- ment
Agriculture	0.16	0.00	0.01	0.03	0.00	0.00	0.01	0.00	0.00
Mining	0.00	0.00	0.01	0.03	0.04	0.00	0.00	0.00	0.00
Construction	0.01	0.00	0.00	0.01	0.02	0.00	0.03	0.01	0.02
Manufacturing	0.13	0.00	0.34	0.36	0.04	0.05	0.01	0.08	0.01
TCPU	0.03	0.00	0.04	0.05	0.15	0.03	0.02	0.04	0.01
Trade	0.05	0.00	0.10	0.07	0.02	0.02	0.00	0.02	0.00
FIRE	0.05	0.00	0.02	0.02	0.03	0.03	0.14	0.07	0.01
Services	0.02	0.00	0.13	0.08	0.11	0.09	0.06	0.20	0.01
Government	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00
Other	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
TOTAL	0.45	0.00	0.65	0.65	0.44	0.24	0.27	0.43	0.08

Table 18. Direct Requirements Table; Selected Sectors; Wallowa, OR; 1998

Purchasing / Processing Sectors	Ranch Fed Cattle	Range Fed Cattle	Logging Camps	Sawmills	Foundries
Ranch Fed Cattle	0.09	0.00	0.00	0.00	0.00
Range Fed Cattle	0.00	0.19	0.00	0.00	0.00
Logging Camps/Contractors	0.00	0.00	0.08	0.28	0.00
Sawmills and Planing Mills	0.00	0.00	0.00	0.08	0.00
Brass, Bronze, and Copper Foundries	0.00	0.00	0.00	0.00	0.00
Total	0.57	0.57	0.60	0.71	0.32

However, the cycle of effects does not stop after just two rounds. The process continues until the level of indirect effects becomes insignificant – until the multiplier process has completely run its course. IMPLAN calculates the sum of these effects, which are referred to as total requirements and are presented in Table 20 for the aggregated sectors in Wallowa County.²⁶ Each column value indicates the total dollar value of output required from the processing sector by the purchasing sector for a one dollar increase in its final demand.²⁷ For example, the first element in the manufacturing column (.02) indicates the total dollar increase in agricultural sector production that results from a one dollar increase in final demand for manufacturing products. The second element indicates the total increase in mining output (.00) due to that same one-dollar increase in final demand for manufacturing products. The one-dollar effect across

²⁶ The total requirements table is also referred to as the Leontief inverse table.

industries continues to be captured down the row, totaling an industry-wide effect of basically 1.65 times the original change to the construction industry.

Table 19. Total Requirements Table; All Sectors; Wallowa, OR; 1998

Purchasing / Processing Sectors	Agri-culture	Mining	Const-ru-ction	Manu-facturing	TCPU	Trade	FIRE	Services	Govern-ment	Other
Agriculture	1.06	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Mining	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction	0.02	0.00	1.01	0.01	0.03	0.01	0.04	0.01	0.02	0.00
Manufacturing	0.14	0.00	0.34	1.36	0.07	0.06	0.03	0.10	0.02	0.00
TCPU	0.04	0.00	0.06	0.07	1.14	0.03	0.02	0.05	0.02	0.00
Trade	0.05	0.00	0.10	0.08	0.02	1.02	0.01	0.03	0.00	0.00
FIRE	0.04	0.00	0.03	0.03	0.03	0.03	1.10	0.06	0.01	0.00
Services	0.03	0.00	0.10	0.07	0.08	0.06	0.04	1.13	0.01	0.00
Government	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Total	1.37	0.00	1.65	1.63	1.38	1.21	1.24	1.37	1.08	1.00

An additional interpretation of the total requirements table is the amount of openness within the economy based on its measure of economic linkages. As mentioned previously, highly linked economies are more self-sufficient in production and are less dependent on outside input sources. A perfectly self-sufficient economy is referred to as a closed economy, whereas open economies are those that must rely on imports and therefore have leakages. The degree of linkage or openness of the Wallowa economy can be obtained by reviewing the off-diagonal values in the total requirements table.²⁸ The larger the values the more tightly linked (closed) the economy; likewise, the smaller the values the more open the economy. The table can be difficult to interpret, however, therefore two illustrative examples for individual sectors are given (Figures 16 and 17).

Figures 16 and 17 show the multiplier or ripple effect of a one hundred dollar unit change in final demand for agricultural and government output, respectively. The smaller graph on the left begins with round 0, the initial change; therefore, the small graphs in both figures 16 and 17 are similar scales and can be directly compared. Round 0 is dropped in each of the larger graphs so that the changes are visually more apparent. Clearly, the industry-wide direct effect of the

²⁷ Total requirements are representative of inter-industry effects only (i.e. direct plus indirect), therefore induced effects are not included in the measure.

²⁸ Off-diagonal values are those that are less than one.

change to agriculture is somewhat than that for government, as the impact of the unit change is barely detectable in the smaller figure for government. In addition, the scale of effects in the larger graph is approximately 6 times greater for agriculture than it is for government. Furthermore, as the larger graphs reveal, the backward linkages of the both sectors are similar in extent, though the agricultural sector has exceptionally greater linkages with the manufacturing sector, while the government has much greater linkages with the construction sector. The initial 100 dollars circulates through approximately the same number of rounds of economic activity for both the government and agricultural sectors, although a greater percentage of the 100 dollars leaks out of the economy in the first round when applied to the government sector.

From a policy perspective, the preferred sectoral change would depend on the desired outcome. Nonetheless, these results indicate that a one hundred unit change in the agricultural sector would result in a fairly diversified outcome throughout the economy, impacting a variety of sectors, including the manufacturing, services, and trade sectors. There would also be greater dollar returns from a one hundred unit change in the agricultural sector. However, it is also important to note that the scales of the large graphs are quite small, and compared to other counties of a similar nature, it appears as though there are less local linkages in Wallowa than one might expect to find elsewhere, indicating a lack of self-sufficiency in the local economy.

Figure 16. Ripple Effect; One Hundred Agricultural Units; Wallowa, OR; 1998

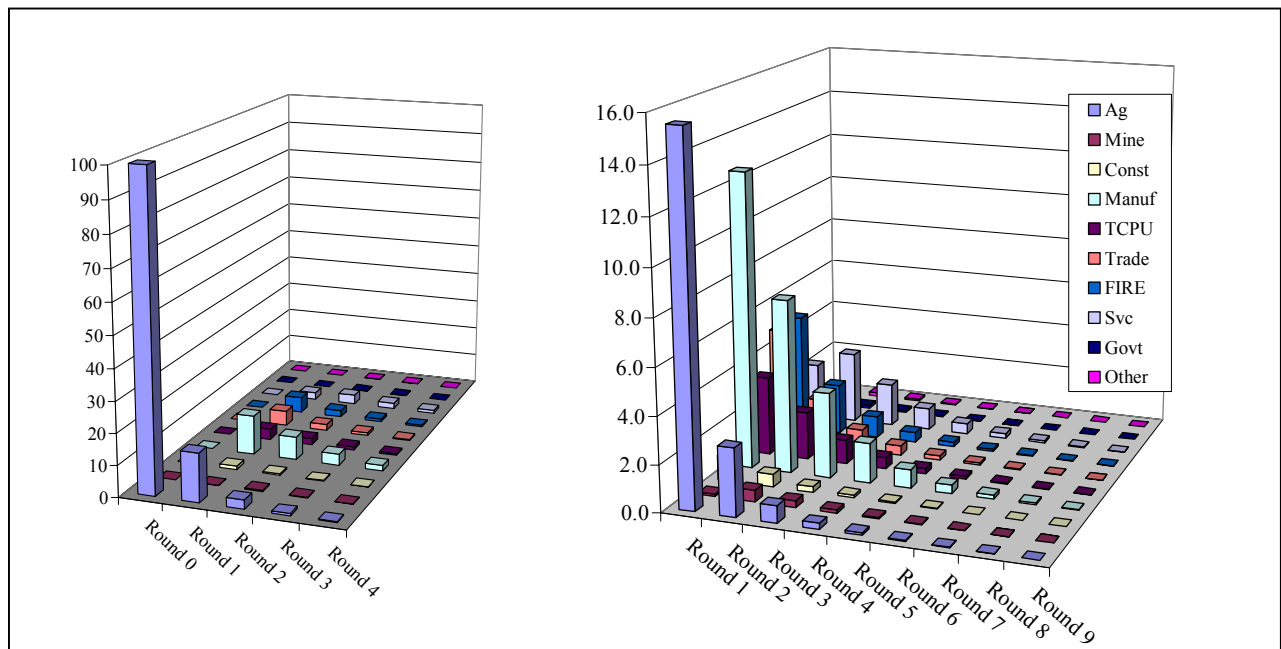
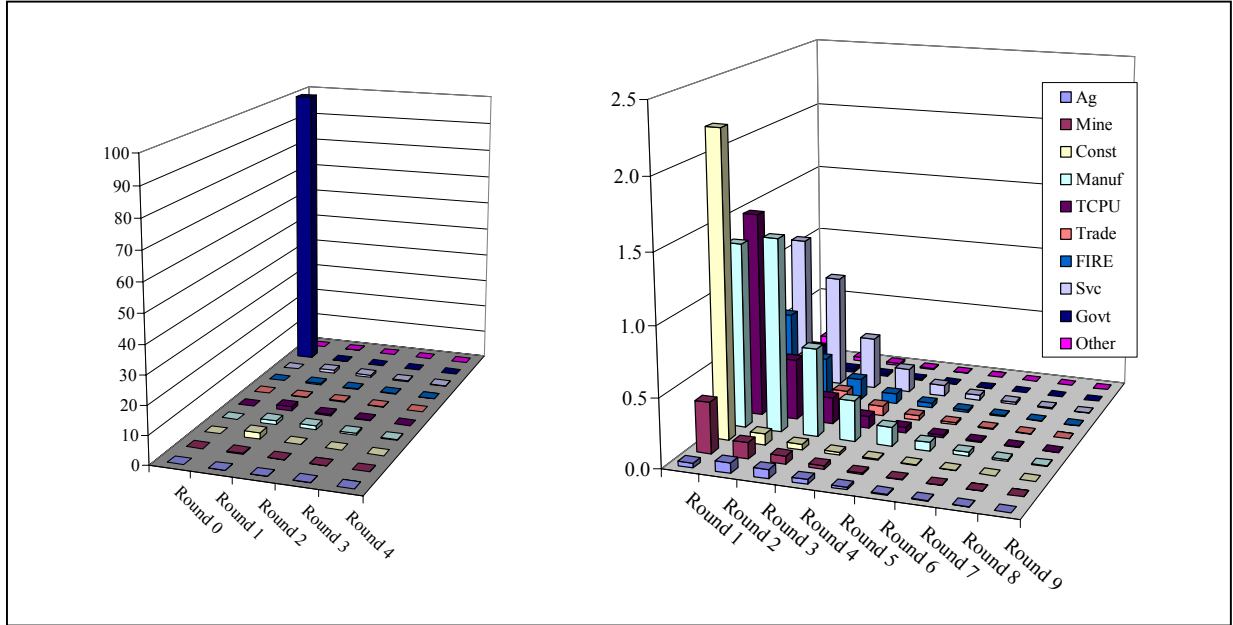


Figure 17. Ripple Effect; 100 Government Units; Wallowa, OR; 1998



Conclusion

The input-output analysis of Wallowa County has revealed the county's continued dependence on natural resources, particularly rangelands used for cattle as well as the forests in the county. Cattle and timber-related industries are clearly Wallowa's economic base, as a large percentage of the commodities produced by these sectors are exported from the county. The forestry sector is a major contributor to Wallowa's economy through the exporting of timber as well as through its relationship to the mills located in the county. It is clear that there could be more extensive linkages between the timber industry and related manufacturing sectors within the county, especially considering the vast tracts of forest resources in Wallowa and the amount of timber that is typically harvested from the area. Furthermore, timber-related manufacturing industries are high value added industries and can have an inordinately strong, positive effect upon a local economy.

It is of note, however, that the recent trend within the county has been for timber-related industries, particularly mills, to close. This is perhaps related to the current quality of the timber, unreliable yields from forests in the region especially in the context of government policy, and

any number of market forces, which may include the high cost of union wages. Indeed, before the Boise-Cascade mill in Joseph closed in the mid-1990s, it was paying the highest union wages in the county. To suggest that the county should set goals towards attracting forestry-related manufacturing industries to the region, especially in light of recent mill closures, could be unreasonable. Nonetheless, there are any number of manufacturing industries, especially related to timber, that could be viable and economically prosperous industries for the county.

As is the case with the forestry industry, there are fairly limited linkages between the cattle industry and other sectors of the economy in the county. Ranch fed and range fed cattle are primarily exported from Wallowa. While other agricultural sectors, particularly the hay and pasture sector, are linked to cattle production in the county, virtually no manufacturing sectors in Wallowa are linked to this commodity. Though Wallowa's rangelands have been ecologically threatened in the past, these lands are now in the best condition that they have been in over the past 100 years. Considering the renowned quality of cattle produced in the county and the likelihood that this industry will remain sustainable in the future, this may be an area to target for future growth in the region, especially in terms of linkages and perhaps in terms of international exports.

Nonetheless, potential growth in local and domestic markets for all of the agricultural commodities produced in the county appears to be limited, as the domestic markets are already saturated. Due to structural limitations in the model, however, it was not possible to estimate market potential as it pertains to foreign markets, and this may be an area for future growth. Other potential areas of growth as indicated in the analysis are in the FIRE, services, trade, and manufacturing sectors. All of these sectors have excess demand in comparison to both local and domestic supply and each sector is currently a source of leakage from the local economy, and this is particularly the case for the service and manufacturing sectors. Thus, there appears to be a number of viable alternatives by which the Wallowa economy could diversify.

Considering the natural scenery and opportunities for recreational activities of the area, there seems to be prospects for the region to capitalize on its natural amenities to draw residents and tourists to the region. In this respect, tourism-related services is seemingly an area where the local economy could grow and diversify. This suggestion is supported by trends indicating that Wallowa is increasingly becoming a destination for retirees as well as second homeowners. Furthermore, there is a small but growing community of artisans in the region who are

developing a reputation for bronze sculptures, which could be a small but nonetheless substantive part of future tourism-related efforts.

Much of the interest for tourists as well as retirees is undoubtedly related to the natural scenery, and hence, at least in part, the forests of the region. Furthermore, as has been indicated, the forestry sector is a critical part of Wallowa's economic base. Thus, the sustainability of the forests in the region seems critical to the county's future economic vitality. Many of the forests in the county are considered unhealthy due to insect and disease epidemics, and some of the forests have died off. There are also extended periods of low precipitation, and timber management techniques, including a history of fire exclusion, have left many of the forests vulnerable to extreme fires.

Aside from these ecological concerns, there is the possibility of conflicting interests in terms of the use of the county's forest resources. Excessive logging in areas such as Wallowa is typically seen as a threat to the tourist industry, while protection of the forests can have an adverse impact upon the forestry industry. Sustained, diverse uses of the region's natural resources will be necessary if the region wants to maintain or improve economic conditions. Otherwise, the forestry industry will likely grow at the tourist industry's expense, or vice-versa, or new industries will need to develop within the county. At one time, the U.S. government, and particularly the Forest Service, was primarily interested in receiving sustained timber yields from federal forestlands. This has somewhat changed recently, as the need to protect endangered species, promote biodiversity, and support recreational activities has constrained timber harvests. Federal policy regarding forests is indeed representative of conflicting interests related to forest use, and such policies have already had an impact upon the Wallowa economy and will likely continue to do so in the future.

In general, and especially considering the closing of large mills in the county in the mid-1990s, the economy of Wallowa is being built more around tourism, retirement, and second homeowners, all of which is related to the natural amenities that the region has to offer. This analysis has painted neither a bleak nor a particularly bright picture of Wallowa County's future. It appears as though Wallowa has many things working in its favor, such as a decent quality of life, an economy that, while not particularly vibrant, is similar if not better when compared to many rural economies elsewhere in the U.S., and an extensive natural resource base upon which the county can build its future, especially in regards to tourism-related activities. In general,

Wallowa County needs to consider circumstances that rural communities throughout much of the nation must address. The county must retain and expand the current export base, and if this is not possible, it should attempt to diversify its economy. Indeed, diversification is a key to promoting the health of almost any rural economy. Most importantly, however, it seems as though Wallowa should seize what is seemingly becoming the region's comparative advantage: a natural resource base and quality of life that can attract residents and visitors from outside the region.

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