A Net Economic Benefit Analysis

The Economic Benefits of the Cow Creek Tribe to Douglas County, Oregon

Prepared for the Cow Creek Band Of Umpqua Tribe Of Indians

Robert Whelan and
Alec Josephson

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ECONorthwest
ECONOMICS • FINANCE • PLANNING

888 SW Fifth Avenue
Suite 1460
Portland, Oregon 97204
503-222-6060
www.econw.com

Section I

Executive Summary

The Cow Creek Band of Umpqua Tribe of Indians ("Cow Creek") engaged ECONorthwest to determine the extent to which the Cow Creek benefit the economy of Douglas County, Oregon. The Cow Creek are indigenous to Douglas County. In recent years, they have invested heavily in local economic development projects, spent heavily on social programs, and donated large sums to area charities, and state and local governments. This report only addresses the net impacts of the Cow Creek in Douglas County.

Overview

ECONorthwest was asked to conduct a two-part analysis. The first part was to determine how much better off the Douglas County economy was in 2004 because of the Cow Creek. The second analysis measured the total county and local property taxes paid by Cow Creek employees in Douglas County.

The results of these analyses are described in four parts of this report:

- **Section One** is the executive summary, which highlights the major research findings of this report (page 1).
- **Section Two** provides background information on the Douglas County economy, the Cow Creek, Indian tribes, and the methodologies and data used in this analysis (page 3).
- **Section Three** is a discussion of the economic impact model and the results from it (page 15).
- **Section Four** delves into the results of an analysis of property tax records and reveals the amount of County and local property taxes paid by the employees of the Cow Creek that live in Douglas County (page 23).
- **Appendix A** explains economic impact analyses, how they are conducted, and how they should be interpreted (page A-1).

Major Findings

The analysis presented in this report found that the Cow Creek, through its government and economic development activities in Douglas County, had significant economic impacts on the local economy. Furthermore, the Cow Creek held only a small fraction of all the tax-exempt property in Douglas County while the employees of the Tribe and its tribal businesses paid in excess of $1.1 million in residential property taxes. Specifically:

- The total economic output of Douglas County in 2004 was more than $107.1 million greater than it would have otherwise been without the Cow Creek (page 16).

- There were 1,610 more payroll jobs in Douglas County in 2004 than there would have been if not for the Cow Creek (page 18).

- If there were no Cow Creek Tribe, total payrolls in Douglas County would have been nearly $40 million or 3.9 percent less in 2004. In addition, self-employed workers and small businesses would have earned about $6.4 million less. The resulting economic weakness would have filtered throughout the economy resulting in lower property values for homes and commercial real estate (page 21).

- Like other governments, lands held in trust for the Cow Creek are exempt from property taxes. However, the Tribe only accounts for 2 percent of all the value of tax-exempt properties in Douglas County. Other types of property holders that account for greater shares of all the exempt property in the County include disabled veteran homeowners, businesses in enterprise zones, farmers, owners of forestlands, religious organizations, and local and federal governments (page 25).

- Property taxes imposed in Douglas County on the residences of Cow Creek employees in 2004 totaled at least $1,135,655 (page 25).

- This analysis only describes the net impact of the Cow Creek. It only counts the net increase in jobs and dollars in the County because of the Cow Creek. It excludes employment and spending that would have occurred anyway in 2004 even if the Cow Creek were not in the County. Thus, unlike many studies that measure gross impacts, this research takes the much more conservative approach by isolating just the net economic impacts (page A-8).

Section II Background and Methodologies

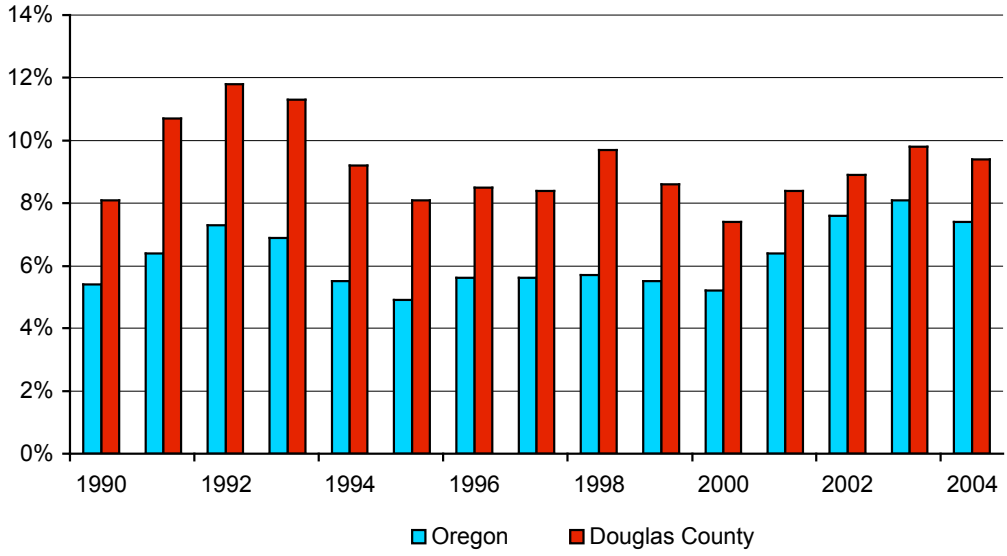
To provide a context for the analysis in this report, we begin with a description of Douglas County and an overview of the Cow Creek and federally recognized tribes in general. In addition, this section includes discussions of the data and methodologies used in this research.

Douglas County's Economy

Douglas County is Oregon's fourth largest in area. It was home to 41,637 households according to the July 1, 2005 estimate from Claritas, Inc. The population was 103,496.

Historically, the economy of Douglas County has been timber-dependent and it has suffered from persistently high unemployment. Figure 1 compares the unemployment rates in Douglas County and the state of Oregon since 1990.

Figure 1: Average Annual Unemployment Rates for Douglas County and the State of Oregon, 1990 to 2004



Source: Oregon Employment Department

In March 1992, a month before the Cow Creek opened their first large economic development project, the Cow Creek Bingo Hall, Douglas County had a 13.6 percent unemployment rate—5.2 percent above the statewide average at that time. In part, through further economic development efforts by the Cow Creek and others, the county unemployment rate fell to 7.4 percent according to the most recent (September 2005) report by the Oregon Employment Department. The gap between the county and state unemployment rates had narrowed to 1.9 percent.

The Cow Creek

Douglas County is the home of the Cow Creek Umpqua Indians. The economic impacts of the Cow Creek on the county are a consequence of the wages they pay, investments they make, and their purchases of goods and services in the county. The flows of dollars from the Cow Creek are a consequence of the Tribe's government and business activities. Overwhelmingly, these activities occur within the borders of Douglas County, Oregon.

History

The Cow Creek occupy the inland areas of what is today Douglas County, Oregon. In 1853, soon after the discovery of gold in southwest Oregon, the Tribe entered into a treaty which ceded their land to the federal government for 2.3 cents an acre—a tiny fraction of the true market value at that time. The initial Cow Creek reservation was settled and sold by non-Indians after the Tribe was scattered in the wave of "terminations" following the Rogue Valley War.

In 1954, Congress terminated the Cow Creek Band. After a long battle, the federal government reversed its position and disavowed termination. On December 27, 1982, President Reagan signed "PL 97-391," which restored the Cow Creek as an Indian tribe and established formal relations with the United States Government through its trust agency, the Bureau of Indian Affairs ("BIA").[1]

Following recognition by the federal government, the Cow Creek sought compensation for its 1853 land claims. In 1988, after a protracted battle, the Cow Creek received a $1.5 million settlement from the United States Government.

The Tribe determined to place the principal amount of the settlement in a permanent endowment and use the interest to finance tribal programs and services, and early economic development efforts necessary to stimulate job growth. A loan from the BIA in 1991 assisted construction of a bingo hall, which prospered and grew to become what is today the Seven Feathers Hotel & Casino Resort. Earnings from the resort have been reinvested in various tribal programs and job-creating businesses, all centered in Douglas County. By 2005, the Cow Creek became the third largest private employer in Douglas County.[2]

Principal Government and Business Activities of the Cow Creek

The Cow Creek have a direct impact on the Douglas County economy through their spending on tribal government and business activities. These consist of various entities, which spend money through the hiring of employees, payments to local construction contractors, and purchases of goods and services. Furthermore, the Cow Creek are a major contributor to charities as well as other non-profits and local governments in Douglas County.

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[1] http://www.cowcreek.com/story/x01history/index.html

[2] Paul Craig, News Review, "*Experts: County Employment Continues to Change*," February 27, 2005.

Tribal Government Activities

The government activities of the Cow Creek consist mostly of basic services for general government, social and health services, and education. The largest funding source for these activities is the casino. However, other significant sources include federal and state grants, taxes levied on tribal businesses, investment earnings, and tribal business income.

An overwhelming share of the spending by Cow Creek tribal government occurs in the Douglas County economy, because that is where many of the tribe's members reside. Among the Cow Creek government activities, many of which serve Tribal employees, patrons, and neighbors as well as Tribal members, are:

Tribal education programs. Tribal government has several education programs including adult education, vocational training, higher education, a library grant program, tutoring programs, children's programs, and others.

Tribal burial benefits. The burial fund helps tribal members pay funeral and interment costs of deceased family members.

Housing. This program offers financial assistance to tribal families for needed home repairs and helps with down payments.

Nesika Health Group. Health and dental insurance are provided to tribal members and employees of tribal businesses through the Nesika Health Group, which is wholly owned by the Cow Creek.

Childcare assistance. The Cow Creek provide safe and quality childcare for low-income families that could not otherwise afford care while working, training for jobs, or attending school.

Healthcare programs. The Cow Creek Tribe operates a Health and Wellness Center as well as healthcare programs including tobacco prevention and cessation, providing over-the-counter medical supplies, mental health and family counseling, and prevention services.

Gaming Commission. The Cow Creek have a gaming commission that is independent of the casino. The Cow Creek Gaming Commission licenses and runs background checks on casino employees and suppliers, monitors gaming to ensure legal compliance and fairness, establishes control standards, and conducts audits. In addition to the Cow Creek Gaming Commission, the Oregon State Police and the National Indian Gaming Commission also regulate and audit the Tribe's casino operations to ensure the safety and integrity of gaming operations.

Other government activities. Tribal government engages in a variety of other functions including planning, research, legal, cultural, financial administration, tribal enrollment, natural resource work, transportation and road maintenance, family and child services, property management, and economic development.

Tribal Business Activities

Following federal recognition, the Cow Creek have made a concerted and successful effort at stimulating job growth in Douglas County to elevate the economic wellbeing—of both tribal and non-tribal members—in the community. This led to the formation and acquisition of numerous businesses. Among the Tribe's business activities are:

Seven Feathers Hotel & Casino Resort. Located in Canyonville, the centerpiece of the resort is a 50,000 square foot casino with an adjoining 147-room luxury hotel, a 22,000 square foot convention center, several restaurants, a gallery, and other amenities.

Umpqua Indian Foods. This company manufactures, wholesales, and retails jerky, other meat products, gift baskets, and other gift items in downtown Canyonville.

Seven Feathers Truck & Travel Center. Designed as a full-service truckstop for the Canyonville exit on I-5, the travel center caters to truckers as well as passenger and recreational vehicles. The travel center sells motor fuels and tires. It also has a convenience store and a private lounge and shower rooms for professional truck drivers.

Creekside Restaurant. Associated with the travel center in Canyonville is the 250-seat Creekside Restaurant, which is open 24 hours a day.

Creative Images. The CiMediaGroup is a Roseburg based company engaged in custom printing, graphic design, media projects, videography, and web design.

Rio Communications. The Cow Creek recently relocated the headquarters of this firm to Roseburg. Rio is a telephone and Internet service company with sales throughout Oregon. They have branch offices in Portland, Medford, Bend, and Eugene.

Canyonville Cubbyholes. This is a self-storage provider located in Canyonville.

Hospitality Division. This subsidiary of the Cow Creek's Umpqua Indian Development Corporation oversees several small lodging operations including the Valley View Motel, the Riverside Inn, the Holiday Motel, and the Rivers West RV Park.

Umpqua Indian Utility Cooperative ("UIUC"). This Tribal utility operates the Tribe's Canyonville area utilities. UIUC purchases electricity from the Bonneville Power Administration and distributes it to the Tribe's resort, the Creekside Restaurant, and travel center in Canyonville. Soon it will also operate the Tribe's new water and sewer system.

K-Bar Ranch. The ranch is a cattle operation, which also produces hay and other feed crops.

Donations in 2004

The Cow Creek donate large amounts of money to schools, nonprofits, charities, local governments, and other community needs. In 2004 alone, the Cow Creek donated a cumulative total of $1,010,666 to charitable, non-profit and local government causes in Douglas County, and $605,894 to similar entities in neighboring counties.

The Cow Creek Foundation, which is funded through casino profits, issued $469,798 in grants to Douglas County charities. The Seven Feathers Resort donated another $198,733 on top of that. The Cow Creek Tribe gave over $342,000 to Douglas County schools, communities, and charities in the county in 2004.

In 2004, there were well over 250 recipients of tribal donations. Below is a sample of 30, which reflect the range of organizations in Douglas County that benefited from the Cow Creek:

South Umpqua High Booster Club

St. Francis Xavier Kitchen & Hospitality Center

Umpqua Community College

Douglas County Sheriff's Office

Land of Umpqua Discovery Days

FFA

Boys and Girls Club of Umpqua Valley

Douglas County Fairgrounds

Cobb Street Children's Learning Center

Umpqua Valley Christian School

Roseburg Rescue Mission

Yoncalla Summer Athletic Program

March of Dimes

City of Roseburg

Myrtle Creek Volunteer Fire Department

Roseburg Area Chamber of Commerce

Phoenix School

Douglas County Library

4-H Livestock Auction

Canyonville Park Board

Myrtle Creek Summer Festival

Family Development Center

Salvation Army

Douglas County Youth Development Program

South County Clothe a Child

Greater Douglas County United Way

Lookingglass Elementary School

Southern Oregon Humane Society

Douglas County Cancer Services Committee

Roseburg Little League

Tribal Governments

Although tribes lost or transferred most of their lands to the United States, they retained certain sovereignty. Tribes, as other governments, actively guard against encroachments on their sovereignty.[3]

There are currently 562 federally recognized tribal governments in the United States. Each has a formal governmental structure, tribal members, and nearly all have trust lands. These governments have the authority to create laws and be governed by them subject to the limitations of Congress and federal case law.

The Meaning of Federal Recognition

Federal recognition means that tribes have a constitutionally guaranteed status as a sovereign entity similar to a state government.

Like state governments, tribal governments have many responsibilities to their constituents. Thus, tribal governments often provide members services such as healthcare, housing, education, job training, public safety and courts, social services, public infrastructure, and economic development. Two federal agencies, the Bureau of Indian Affairs ("BIA") and the Indian Health Service ("IHS"), provide some benefits and services to recognized Indian tribes, as well.

The ability of tribes to provide services, even with federal help, is often grossly insufficient to properly address the needs of their members. Therefore, tribes pursue economic development opportunities as a means of generating income for tribal members and to help secure stability for future generations.

As with other governmental entities, such as cities, counties, and states, federally recognized tribal governments, like the Cow Creek, are not subject to taxes. Businesses owned by tribal governments, just as businesses owned by states, counties, and cities, are also exempt from taxation. Individual members of federally recognized tribes, as well as businesses owned by individual tribal members, are generally subject to federal, state, and local taxes.[4]

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[3] http://www.goia.wa.gov/FAQ/FAQ.htm

[4] See the United States Internal Revenue Service at http://www.irs.gov/govt/tribes/article/0,,id=102543,00.html

Tribal sovereignty gives federally recognized tribes the right to govern themselves resulting in a government-to-government relationship with the United States. Tribes have the right to form their own government, hold elections, regulate domestic relations of their members, administer justice and enforce laws, levy taxes, and determine its membership. Tribes also may establish their own regulations in a number of areas including gaming.[5] These rights apply within the borders of a tribe's trust lands.

Trust Land

Nationally, about 55.7 million acres of land are held in trust by the United States for American Indians, Indian tribes, and Alaska Natives. Most of it is reservation land, however, some trust land is not on reservations. There is no practical legal distinction between tribal trust and tribal reservation lands.

Indian trust lands are lands associated with a specific tribe that are held in trust by the United States government on behalf of the tribe or an individual tribal member.[6] When land is put into trust for a tribe, title of the property goes to the federal government. The Secretary of the Interior serves as trustee for such lands with many routine trustee responsibilities delegated to BIA officials. As with other property controlled by the federal government, reservation and trust lands are exempt from property taxes.

Net Economic Impact Methodology

ECONorthwest used a widely recognized software system, called IMPLAN, to build a model of the Douglas County economy.[7] IMPLAN provides county-level estimates on production, consumption, employment, employee compensation, small business income (mostly the labor earnings of the self-employed and family owned businesses), and taxes for each of 509 economic sectors. An in-depth discussion of this modeling system, its use in determining economic impacts, and its strengths and weaknesses can be found in the Appendix to this report, which begins on page A-1.

[5] http://www.nativevillage.org/

[6] http://www.usgs.gov/usgs-manual/500/500-6.html

[7] IMPLAN (for Impact Analysis for PLANning) was developed by the U.S. Department of Agriculture in cooperation with the Federal Emergency Management Agency and the Bureau of Land Management of the U.S. Department of the Interior to assist federal agencies in their land and resource management planning. Applications of IMPLAN by the U.S. Government, public agencies, and private firms span a wide range of projects, from broad resource management strategies to individual projects such as proposals for developing ski areas, coal mines, transportation facilities, and harvesting timber or other resources. ECONorthwest has applied the model to a variety of public and private sector projects in the Pacific Northwest including, most recently, wind power generation facilities, federal assistance for residential care facilities, and various projects financed by new markets tax credits.

Simply citing Cow Creek tribal expenditures and the impacts that occur would produce an upper bound estimate of the tribe's impact on the local economy. This upper bound estimate is often referred to as a measure of the "gross" economic impacts. Gross economic impacts offer a perspective on the magnitude of overall economic activity that can be traced back to expenditures and activities by the Cow Creek. Gross impacts do not necessarily reflect the creation of new jobs or income.

Instead of measuring gross impacts, ECONorthwest was asked to measure the "net" economic impacts of the Cow Creek Tribe. Using a net impact approach enables us to answer the following question: How much better off is the Douglas County economy because of the Cow Creek Tribe? The complete net impact analysis and the findings revealed by it are discussed in detail in Section III, which begins on page 15.

Economic Impact Data

In order to implement the IMPLAN model, the various expenditures by the Cow Creek Tribe must be attributed to the 509 industry sectors handled by the IMPLAN model. ECONorthwest relied extensively on the audited financial statements from the Cow Creek for calendar year 2004 and some special compilations requested from tribal staff. Key to the analysis was identifying only those expenditures originating from net new contributions to the Douglas County economy.

Tribal Spending

For modeling purposes, we categorized tribal activities into the following two groups: 1) tribal government, and 2) business or economic development activities. This categorization scheme is appropriate for two reasons. First, expenditures by tribal government are fed into the economic impact model differently than those of tribal businesses.[8] Second, this categorization scheme proved quite useful to identify revenues and expenditures across activities (intersegment transfers) and prevent possible double counting. Both of these are discussed in detail below.

[8] Impact analysis can be performed at two levels. There is a "Simple Analysis" which looks at changes in demand for some particular industry that is contained in the IMPLAN model of the region. This level of analysis is used for the tribe's business spending. There is also a "Complex Analysis" which looks at a new activity or industry not contained in the IMPLAN model of the region. The Complex Analysis requires that the user know the output, employment, income, and first round of indirect purchases. This level of analysis is used for the tribe's government activities.

Tribal Government Spending

The Cow Creek tribal government offers a variety of services, including: educational and housing programs, childcare and medical assistance, the gaming commission, and various other functions such as planning, research, legal, cultural, financial and administration. There is no generic tribal government sector in IMPLAN. Because the spending categories of the Cow Creek cut across many different economic sectors, a method called "complex analysis" had to be used. It required that a "production function" (in simple terms a spending pattern) be developed that matches the functions of the Cow Creek tribal government. It was based on the actual government spending actions of the Tribe.[9]

The direct effects of the Cow Creek's tribal government activities are based on employment and personal income data supplied by the Tribe. The direct output effects of Cow Creek tribal government activities were calculated using an expenditure approach. That is, the value of tribal government (direct output) is the sum of labor and non-labor operating expenses. This is similar to the manner in which IMPLAN measures direct government output for states.

To estimate the indirect effects of Cow Creek's tribal government activities, the analysis identifies changes in output for each industry from which Cow Creek purchases goods and services. The direct impacts in this model are more precisely described as the first round of indirect impacts. Subsequent rounds of indirect impacts occur as providers to the Tribe purchase goods and services from other businesses that will also need to buy goods and services. The indirect impacts of tribal government are what the IMPLAN model reports as direct and indirect impacts.

To calculate the induced impacts, the Tribe's estimate of disposable income to tribal government employees is used. This disposable income is distributed among industry sectors using IMPLAN's breakdown of personal consumption expenditures for medium-income households in Douglas County.

Tribal Business Spending

Expenditure and revenue data for the Cow Creek Tribe's various business activities were acquired from independently audited annual financial statements and used as inputs in the economic impact model.[10]

[9] "Cow Creek Band of Umpqua Tribe of Indians Basic Financial Statements and Independent Auditor's Report," December 31, 2004, by The Sells Group, P.S., Lynnwood, WA.

[10] "Umpqua Indian Development Corporation Financial Statements and Independent Auditor's Report," December 31, 2004, by The Sells Group, P.S., Lynnwood, WA, and "Seven Feathers Resort Division of the Umpqua Indian Development Corporation D/B/A Seven Feathers Hotel & Casino Resort Report on Financial Statements Two Years Ended December 31, 2004, by Conway, Stuart & Woodbury, CPAs, Las Vegas, NV.

The business activities conducted by the Cow Creek are all recognized or specified as existing industry sectors in the IMPLAN model of Douglas County. Therefore, revenues for these businesses were modeled as changes in demand in the relevant industry sector. This type of impact analysis is often called a "Simple Analysis." For example, if the Tribe receives revenues from its hotels, then those revenues are counted as a direct output impact and IMPLAN estimates the indirect and induced impacts.[11]

The Cow Creek's business activities—particularly the Seven Feathers Hotel & Casino Resort—attract non-local visitors to Douglas County who then purchase goods and services from other local businesses. For instance, they may purchase gasoline and merchandise, eat at restaurants, and stay at a hotel not owned by the Tribe. ECONorthwest estimated these expenditures by non-local visitors and included them in the impact model.

Special Data Considerations

The IMPLAN model is flexible enough to allow the user to incorporate primary source data where possible. In some cases, ECONorthwest relied on detailed financial data to exclude expenditures that do not generate current economic activity, such as depreciation and amortization. We also excluded expenditures that could potentially lead to double counting or were known to occur outside the local, Douglas County economy. These latter two data issues are discussed in further detail below.

Intersegment Transfers

ECONorthwest removed potential sources of double counting by identifying intersegment transactions. Typical of many governments and large businesses, the financials of the Cow Creek contain transactions between divisions—expenditures of one entity, such as the casino, may appear as revenue in another, such as Umpqua Indian Foods. These intersegment transactions were identified and the double counting they would cause eliminated.

Isolating Douglas County Expenditures

Much of the spending by the Cow Creek tribal government and businesses results in a dollar-for-dollar impact on the Douglas County economy. Local labor purchases and the purchases of locally supplied materials and services, for example, provide a strong stimulus to local activity.

[11] Cow Creek businesses differ slightly from industry averages in employment, payroll and benefits. As a result, the actual data from audited financials and W-2 payroll statistics were used to adjust the production functions of certain sectors in the IMPLAN model so that the direct changes in output, employment, and income estimated by the IMPLAN model matched those supplied by the Tribe.

The IMPLAN model contains purchasing assumptions[12] for each industry sector that are specific to Douglas County. Instead of relying entirely on these purchasing assumptions, ECONorthwest worked closely with Cow Creek staff to identify spending that is known to occur outside of Douglas County. This spending, of course, is not included in the impact analysis.[13] For example, gaming revenues that are shared or distributed to tribal members who live outside of Douglas County are not included in the impact analysis.

Not all purchases have a dollar-for-dollar impact. Equipment purchases, for example, will do so only if the equipment happens to be manufactured in Douglas County. Otherwise, the impact on Douglas County will be limited to the retail, wholesale, transportation, and other margins on the sale that are enjoyed by local entities.

The IMPLAN system permits a sector-by-sector breakout of these margins, and allows the user to over-ride these margin assumptions using primary source data if available. For instance, instead of the estimated retail margin embedded in the IMPLAN model, ECONorthwest was able to use actual retail margins for the Seven Feathers Truck & Travel Center using data from the Tribe's financials.

Components of Net Impacts

Net impact analysis only counts impacts that are new or additive to the local economy. That is, only spending and other economic activities that would not have occurred "but for" the existence of the Cow Creek Tribe are counted. To accomplish this, the impact model is driven using data that only represents new dollars to the Douglas County economy. There are three primary sources of these dollars. They are:

1. Expenditures by non-local sources that would have spent their money at places outside of Douglas County had it not been for the Cow Creek Tribe are the primary contributor to net economic impacts. The Tribe, in essence acts as an "exporter" of goods and services that are produced in Douglas County by selling to people and businesses located in other states or counties. Trucks off I-5 refueling at the Seven Feathers Truck & Travel Center that would otherwise have refueled in Jackson County would be an example of an export. So would Federal grant money awarded to the Cow Creek to fund a new clinic program, as that would also represent new dollars to the Douglas County economy.

[12] These purchasing assumptions are called "Regional Purchase Coefficients." They specify the ability of local suppliers to meet or satisfy a change in demand for a good or service.

[13] Excluding spending that occurs outside of Douglas County imparts a conservative bias to this analysis by assuming none of the non-local spending makes its way back to the county. For instance, spending by tribal members who receive gaming distributions, but live outside of Douglas County, has no economic impact on Douglas County.

2. Expenditures by local sources (Douglas County residents and businesses) that would have been spent outside of Douglas County *but for* the Cow Creek Tribe. This is called "import substitution," and it is a significant contributor to the net economic impact of the Tribe. An example of import substitution would be a person from Roseburg that formerly traveled to Reno to gamble, but now stays in Douglas County and gambles at the Seven Feathers Casino. The amounts are large. Recent data show that the average tourist spends $507 per trip to Reno, which includes $177 in gaming.[14] By staying in Douglas County, a person could spend the same $177 in gaming at Seven Feathers and spend the remaining $330 in trip savings elsewhere in the local economy.
3. The third effect is a deduction. In this analysis, allowances must be made for "direct substitution," which is spending by locals that would have gone to other local businesses *but for* the Cow Creek Tribe. An example would be the purchase of gasoline made at the Tribe's travel center by a Douglas County resident that would have bought fuel at another local station had the Cow Creek travel center not been there.

Property Tax Analysis

The Cow Creek, being a major employer in Douglas County, indirectly supports local government through the property taxes paid by the Tribe's employees. To measure the magnitude of this, an analysis was done where a list of employee addresses of those who worked for the Cow Creek in 2004 was matched against the Douglas County property tax rolls. It reveals the taxes paid by those employees to the County and various local taxing jurisdictions. An explanation of the results of this research begins on page 23.

Data Used in the Property Tax Analysis

There were two main sets of data used in the tax analysis. The Cow Creek provided a list of addresses of employees that received W-2 forms for work performed for the Tribe or its business entities in 2004. The second database set was the 2005 property roll master file, publicly available from the Douglas County Assessor's Office, which was downloaded by ECONorthwest on October 18, 2005. Some property tax data in this report came from the Oregon Department of Revenue, which publishes countywide summaries of property values and taxes each year.

Property taxes for homes and manufactured housing were taken directly from the master file. Some employees, however, lived in apartment buildings, had post office box addresses, or other addresses from which specific residential street addresses could not be discerned. For these the median property tax per housing unit by Zip Code was used.

[14] Calculated from data reported by the Reno-Sparks Convention & Visitors Authority "2003 Marketing Report."

Section III

Net Economic Impacts

Overview of the Net Economic Impacts

The Cow Creek Tribe's government and various businesses have a significant net economic impact on the Douglas County economy. The Cow Creek attract new spending within the borders of Douglas County, thus supporting new jobs and investment spending that would not otherwise occur.

Interpreting Net Impacts

It is important to understand that the number reported in this analysis only represent the net impacts of the Cow Creek and not the entire effects of the Tribe's governmental and economic development activities felt in Douglas County. As this analysis will show, the Cow Creek had a net direct jobs impact of 750 yet the Tribe actually employed an average of 1,168 workers in 2004. Thus, the net direct job impacts are approximately 35 percent less than the actual gross number of jobs at the Tribe.

To give a better understanding of how this net modeling approach yields impact estimates that are more conservative than those measured in the typical gross impact analysis, the following illustration is provided:

- The Seven Feathers Hotel & Casino Resort provides gaming, lodging, eating and drinking, and other services. The value of these services represents the "gross" direct output of the casino resort. However, the "net" direct output is much smaller. Suppose the sum of spending by non-local visitors (exports) and import substitution less any spending that was diverted from other Douglas County businesses (direct substitution) is 40 percent of total revenues. Then only 40 percent of the output of the Seven Feathers Resort would be counted in a net analysis.

- Earnings from the net output of the Seven Feathers Hotel & Casino Resort are used to fund tribal government and other business activities. If the casino generates $10 million to finance tribal government programs, only $4 million of that total would be used in the net impact analysis (40 percent of $10 million).

Impact Results

The Cow Creek's government and business activities were separated in order to develop expenditure data to be used as inputs into the economic impact model. The impact results, however, are reported together.

Table 1 displays the direct, indirect, and induced effects of the Cow Creek's activities on output, wages, small business income, other income, and jobs for Douglas County. These represent the net impacts of the Tribe and are based on spending in Douglas County that would not have occurred in the absence of the Tribe.

Table 1: Net Economic Impacts of the Cow Creek Tribe in 2004, by Type

Impact Type	Output	Wages	Small Business Income	Other Income	Net Jobs*
Direct	$53,060,000	$24,330,000	$3,330,000	$6,060,000	750
Indirect	25,750,000	8,200,000	1,800,000	3,100,000	380
Induced	28,310,000	11,450,000	1,250,000	3,160,000	480
Total	$107,120,000	$43,980,000	$6,380,000	$12,320,000	1,610

** The Cow Creek provided the annual equivalent of 1,168 jobs in Douglas County in 2004. Of these, 750 jobs would not have otherwise existed had the Cow Creek not been in the County. These 750 jobs represent the net direct economic impact of the Tribe on the County's economy.*

Economic Output

The output measures reported in Table 1 are an indication of the total sales that are likely generated because of Cow Creek's activities in 2004. The Cow Creek directly generated $53.1 million in economic activity in Douglas County in 2004. Even with their significant gaming and tribal government operations, approximately 65 percent of this economic activity occurred in the service and government sectors.

For many businesses or organizations, the direct impacts are generally concentrated in one sector. However, with the Tribe's various government functions, wide-ranging portfolio of business activities and capital expenditures, the direct impacts are spread among several sectors. For instance, of the $53.1 million in direct output generated by the Tribe, approximately 17 percent is in the construction sector, seven percent in the retail and wholesale trade, five percent in finance, insurance and real estate, and three percent in manufacturing.

Employment and Income

The direct wage, income and job impacts are also significant. In 2004, the Tribe directly generated approximately $24.3 million in net direct wages (over $30 million in gross impact) and supported 750 net jobs (over 1,100 jobs when measured as a gross impact) in the County that would otherwise not exist if not for the employment opportunities offered by the Cow Creek. These wage, income, and employment impacts represent the net direct impacts of the Tribe on the local economy.

Spending on intermediate goods and services by the Tribe or other vendors that provide services to the Tribe (indirect purchases) generate additional impacts in other sectors of the Douglas County economy. As reported in Table 1, the indirect impacts consist of $25.8 million in overall economic activity. This includes $8.2 million in wages, $1.8 million in income for small business owners, and $2.5 million in other income such as rental income, dividends, and corporate profits.

Approximately 260 jobs are created by tribal and other businesses spending on intermediate goods and services. Although indirect spending by the Tribe and others benefit many sectors of the local economy, the net indirect impacts include major capital expenditures and donations by the Tribe. As such, the construction (38.6 percent) and service (30.3 percent) sectors receive the majority of indirect job impacts.

Induced Effects of Higher Incomes and Charitable Donations

As described earlier, the Cow Creek donated over $1.0 million to over 250 recipients in Douglas County in 2004, including schools, nonprofits, and other charitable causes. When the Cow Creek Tribe makes donations, the recipients will purchase goods, services, or labor. When the Cow Creek contributes equipment or provides services, those contributions free up cash to be spent on other things. Such spending generates indirect and induced impacts in the local economy. ECONorthwest estimates that approximately 30 percent of the indirect service sector impacts, or almost 35 jobs, are traced to the contributions and donations the Cow Creek make to non-profits and others in Douglas County.

Consumption spending by households (induced purchases) whose incomes are linked to the Tribe's government and business activities result in additional economic impacts. As shown in Table 1, approximately $28.3 million in new economic activity is generated because of the additional income generated for Douglas County households. This includes $11.5 million in wages and $1.3 million in income for local, small business owners. In addition, 480 jobs are induced by rising incomes.

Overall Net Impacts

Overall, the scale of economic impacts generated by the Cow Creek on Douglas County in 2004 is impressive. In total, the Cow Creek generated approximately $107.1 million in net, new economic activity. The total, net contribution of the Tribe also includes approximately $44.0 million in wages, $6.4 million in income for small business owners, and 1,610 jobs.

Multiplier Effects

As Table 1 suggests, spending by the Cow Creek has a "multiplier effect" on the Douglas County economy.[15] The multiplier effect can be measured in terms of incomes, jobs, or taxes (see page A-10 for an explanation of multiplier effects).

[15] The Cow Creek purchase labor, and goods and services. In the next round of spending, tribal employees spend some of their income. In addition, businesses that supply the Cow Creek must themselves purchase labor, and goods and services. In each round of spending, some spending "leaks" out of the local economy as workers and businesses pay their taxes, save some of their income or profits, or purchase goods and services from non-local sources ("imports"). Spending will continue to filter throughout the economy until all of it is gone in the form of leakages. The multiplier, therefore, represents the extent to which an economy is able to meet the needs of local businesses and households. A larger, more diverse economy will be able to accommodate their spending, thus leakages will be smaller, and the multiplier effects on other sectors will be larger.

For example, on a net basis, the Cow Creek directly generated 750 jobs during 2004. Tribal spending is responsible for another 860 jobs in other sectors of the Douglas County economy. The employment multiplier on tribal activities, therefore, is approximately 2.2. Thus, for every ten tribal employees, approximately 12 jobs are generated in other sectors of the Douglas County economy. On a net basis, these are new jobs for the community that otherwise would not have occurred but for the Tribe.

Impact on Economic Diversification

The scope of impacts attributed to the Cow Creek is similarly impressive, and bodes well for other Douglas County workers and business owners. Indeed, the diversity of tribal activities and the higher-than-average compensation paid by the Tribe yield benefits for both the Cow Creek Tribe and others in Douglas County.

The economic diversity and strength engendered by the Cow Creek has three benefits. First, it helps insulate Douglas County from economic shocks. Secondly, it spreads the indirect and induced effects more broadly throughout the local economy. Finally, the above average wages of many Cow Creek workers fuels a more vibrant local economy through higher spending.

Table 2 provides additional details on the total economic impacts broken out by major industry sector.

Table 2: Net Economic Impacts of the Cow Creek Tribe in 2004, by Major Industry Sector

Industry Sector	Output	Wages	Small Business Income	Other Income	Jobs
Natural Resources	$1,850,000	$250,000	$20,000	$30,000	30
Construction	13,320,000	4,040,000	1,330,000	540,000	170
Manufacturing	4,510,000	1,120,000	10,000	380,000	30
Trans, Comm, Utilities	6,020,000	1,540,000	250,000	1,060,000	50
Trade	9,730,000	3,350,000	490,000	360,000	160
Finance, Insurance, Real Estate	8,800,000	1,160,000	230,000	2,200,000	80
Services	47,780,000	23,760,000	4,050,000	7,090,000	940
State and Local Government	15,110,000	8,750,000	0	670,000	150
Total All Industries	$107,120,000	$43,970,000	$6,380,000	$12,330,000	1,610

Note: State and Local Government includes Cow Creek tribal government.

Table 2 clearly shows that spending by the Cow Creek Tribe on tribal government and business activities has ramifications for many other areas of the Douglas County economy. For instance, approximately 940 jobs and $23.8 million in wages for employees in service-related industries are either directly or indirectly generated by the Tribe. This is important because the service sector encompasses a wide range of occupations, with workers of different skills and abilities. Employment and income opportunities, therefore, are generated for workers of every income level.

In addition, significant employment and income impacts are found in the construction (170 jobs, $4.0 million in wages); wholesale and retail trade (160 jobs, $3.4 million in wages); government (150 jobs, $8.8 million in wages);[16] and the finance, insurance, and real estate sectors (80 jobs, $1.2 million in wages).

Table 3 shows the local industries that benefit the most from the ripple effects—i.e., the indirect and induced impacts—associated with Cow Creek activities. Ranked by job impacts in descending order, construction, state and local government, and food services are at the top of the list. (State and local government does not include tribal employment. Thus, employees at local school districts, for example, benefit.)

Table 3: Industries Affected by the Indirect and Induced Spending Generated by Cow Creek Tribal Activities, Top 15 in Descending Order

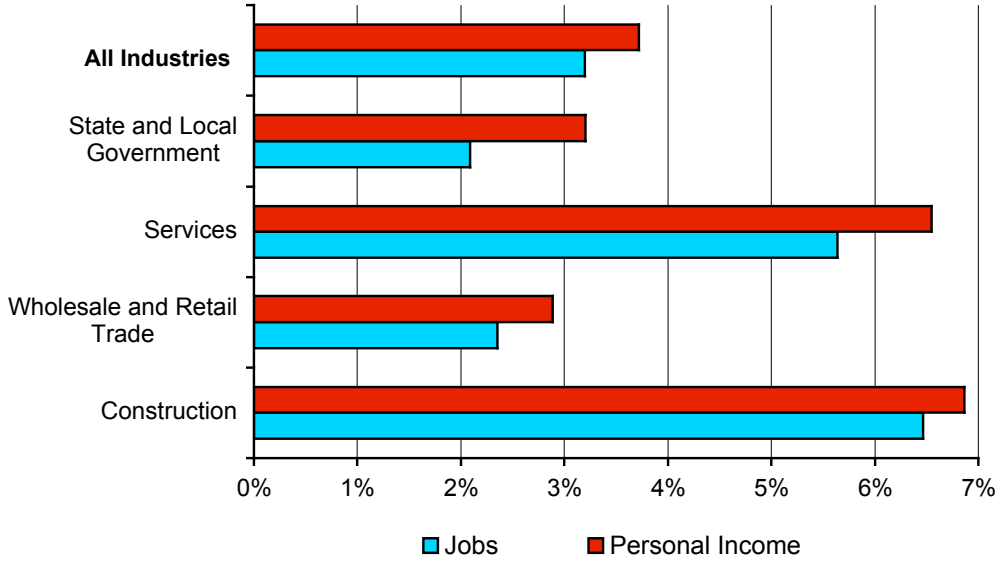
	Industry
1.	Construction
2.	State and local government
3.	Food services and drinking places
4.	Real estate
5.	Employment services
6.	Offices of physicians, dentists, and other health care
7.	Food and beverage stores
8.	Hospitals
9.	General merchandise stores
10.	Insurance agencies, brokers and related
11.	Arts, entertainment and recreation
12.	Nursing and residential care
13.	Civic, social and professional organizations
14.	Wholesale trade
15.	Social assistance- except child day care services

The impacts shown in this analysis take into account any spending by Douglas County residents at the Tribe's various business activities that was diverted from other local businesses. Even so, service and trade sectors affected by that substitution show net jobs gains primarily because of the wage and income benefits that accrued to County residents from the Cow Creek's activities in 2004. Food services and drinking places are third on the list in terms of jobs gained because of the indirect and induced spending generated by the Tribe. In addition, grocery and general merchandise stores make the list of top 15 affected industries.

[16] This includes employment and payroll for Cow Creek Tribal government.

Figure 2 illustrates the importance of Cow Creek Tribal activities on Douglas County.

Figure 2: Net Job and Income Impacts Attributed to the Cow Creek Tribe As a Percent of Douglas County in 2004



Notes: 1. State and Local Government includes Cow Creek tribal government.
2. Personal income is the sum of wages and business income.

Source: ECONorthwest calculations using 2001 IMPLAN data.

In 2004, the Cow Creek Tribe accounted for approximately 3.2 percent of the employment and 3.7 percent of the personal income in Douglas County on a net basis. Capital spending by the Tribe produced significant benefits for local construction workers and contractors. The Tribe also accounted for 5.6 percent of all service sector jobs and 3.2 percent of government sector jobs in 2004. Those jobs that can be traced back to the Tribe's government and business activities accounted for an even larger share of income because tribal employees are paid better than similar workers elsewhere in the county.

Possible Economic Outcomes Without the Cow Creek Tribe

Using a net impact analysis framework makes it possible to examine what Douglas County would have looked like, in 2004, without the Cow Creek's government and business activities. From any economic measure, the net contributions of the Tribe in 2004 were positive. Indeed, even after subtracting out redirected spending, without the Tribe the county would have had approximately 1,610 fewer jobs in 2004.

Initially, job losses affect Douglas County by putting more people on the unemployment rolls. Those who are unable to find gainful employment either drop out of the labor force (these are called "discouraged workers") or move out of the area. When large numbers of workers are forced to drop out of the labor force, social problems tend to increase as the economic burdens on families become severe.

Heads of families with children who cannot find good jobs are likely to move. Indeed, since the late 1980's the Douglas County economy has been hard hit by national recessions and subsequent declines in the wood products industry. Although the economy has adjusted and the industry mix changed, losses in this primary industry reveal themselves in population growth trends for the county. According to US Census data, Douglas County's population grew by only 3.9 percent between 1990 and 2000, compared to 20.4 percent in Oregon, as a whole.

Table 4 shows what the Douglas County economy would have looked like with and without the Cow Creek Tribe in 2004. That is, it depicts the actual economic performance in 2004, and then evaluates the net jobs and incomes generated by the Tribe under the following two mobility scenarios: 1) jobs and incomes are lost but workers remain in the county, and 2) jobs and incomes are lost and workers leave Douglas County.

Table 4: The Douglas County Economy With and Without the Net Economic Impacts of the Cow Creek Tribe in 2004

Economic Health Indicator	2004 Actual Economic Performance	Economy Without the Cow Creek Tribe	Net Difference (percent)
If unemployed stayed in county			
Douglas County population	102,350	102,350	0.0%
School age population (5-17)	18,661	18,661	0.0%
Labor force	47,806	47,806	0.0%
Employed	43,713	42,103	-3.7%
Unemployed	4,093	5,703	39.3%
Unemployment rate	8.6%	11.9%	3.3%
Total payroll (millions $)	$1,140.2	$1,096.2	-3.9%
If unemployed left the county			
Douglas County population	102,350	98,119	-4.1%
School age population (5-17)	18,661	17,763	-4.8%
Labor force	47,806	46,196	-3.4%
Employed	43,713	42,103	-3.7%
Unemployed	4,093	4,093	0.0%
Unemployment rate	8.6%	8.9%	0.3%
Total payroll (millions $)	$1,140.2	$1,096.2	-3.9%

Sources: Bureau of Labor Statistics, Oregon Employment Department, Portland State University Population Research Center, and the US Census.

If we take the Cow Creek Tribe's government and business activities out of the Douglas County economy in 2004, the net loss of 1,610 jobs would have a profound effect. Under a scenario in which these unemployed workers remain in the county, then the number of unemployed workers would have increased by approximately 39.3 percent. Under this scenario, the unemployment rate in December 2004 would have gone from 8.6 percent to 11.9 percent.

On the other hand, if we assume that the 1,610 unemployed workers would have moved out of the county, the economic impacts would also be severe. Job losses would cause payrolls to fall approximately 3.9 percent, which would translate into a direct loss to businesses because of reduced sales. In addition many self-employed and small business owners would sustain losses in incomes totaling about $6.4 million. State and local government revenues would also fall as the movement of workers and families out of Douglas County would likely create a depressing effect on property values.

Movement out of Douglas County by unemployed workers would lead to a contraction across demographic groups. Even if we assume that ten percent of the workers have another household member employed in the Cow Creek tribal government or one of its businesses, the loss of 1,610 jobs would cost Douglas County up to 4,231 residents, 898 school-aged children, and 1,449 households.

Given that approximately 72 percent of the households in Douglas County own their own homes, the decline in the number of households would have devastating effects on the quality of neighborhoods and, in turn, on property values and tax revenues for local taxing jurisdictions. In addition, commercial businesses would have had fewer customers and a smaller pool of consumer spending to cater to, which would have lessened the value of commercial real estate.

Property Taxes

In fiscal year 2004-05, approximately $62.8 million in property taxes was imposed in Douglas County.[17] The analysis presented here finds that in excess of $1.1 million in property taxes were imposed on the residential properties of the employees of the Cow Creek that lived in Douglas County.

Property Tax

As most Oregon homeowners know, county tax assessors send out property bills in October each year. The assessor collects property taxes for numerous local jurisdictions and not just the county government itself. Taxes due are calculated by multiplying the tax rates of each jurisdiction with the net assessed value of the property.

The Douglas County Assessor's Office reported that the real market value of properties in the county were about $7.2 billion in the last fiscal year. Property taxes of $62,771,000 were imposed.

Table 5: Real Market Value, Net Assessed Value, and Property Taxes Imposed in Douglas County, FY 2004-05

Douglas County Property	Fiscal Year 2004-2005
Real market value	$7,236,702,000
Net assessed value	5,608,699,000
Property taxes imposed	62,771,000

Source: Oregon Property Tax Statistics, fiscal year 2004-05, Oregon Department of Revenue.

The net assessed value of properties in Douglas County was just over $5.8 billion. The net assessed value is the value of a property subject to taxation. It is usually calculated by the county assessor's office and is normally less than the market value. Some properties, such as utilities and large factories are assessed by the state on behalf of counties.

Tax bills are sent to property holders; however, many non-owners also pay property taxes. Renters indirectly pay as property owners include the cost of taxes in their rent calculations. Many commercial businesses implicitly pay property taxes through triple net lease agreements.

[17] This figure and other countywide property tax data in this section come from the publication "Oregon Property Tax Statistics, Fiscal Year 2004-05." Published by the Oregon Department of Revenue and available online at http://www.oregon.gov/DOR/STATS/statistics.shtml.

Exemptions

Some types of property are assessed for less than full value. Farms and forestlands are often "specially-assessed" and are taxed much less than are other types of land used for commercial purposes. Homes of disabled veterans, historic properties, commercial buildings under construction, and businesses in enterprise zones are among the special classes that receive exemptions in Douglas County, which reduces assessed values.

Many properties are fully exempt and incur no property taxes. Land and buildings owned by governments, including most properties held by tribal governments, are 100 percent exempt.

Leading the list of 100 percent tax-exempt properties are those held by the U.S. government followed by school district and church owned properties and local governments. Among the partially exempt properties, the largest beneficiaries of tax exemptions are owners of farms followed by veterans, and holders of forestland.

In Table 6, the real market and assessed taxable values of properties in Douglas County that are subject to tax exemptions are shown. Almost $3.8 billion of land, buildings, and other properties were subject to full or partial property tax exemptions in Douglas County. Land held by the Cow Creek accounted for 2 percent of that total.

Table 6: Exempt and Partially Tax Exempt Properties in Douglas County, Real Market and Assessed Values, FY 2004-05

Property Description	Real Market Value	Assessed Value
Federal	$1,208,843,000	$0
Veterans exemptions	558,854,000	321,282,000
Farm Use - specially assessed	549,723,000	45,194,000
Forest land - specially assessed	433,244,000	249,075,000
School districts	213,810,000	-
Religious organizations	129,732,000	-
County	127,938,000	-
City	105,229,000	-
Enterprise zone exemptions	87,604,000	8,989,000
American Indian (Cow Creek)	85,383,049	1,155,376
Other municipal corporations	84,595,000	-
Literary & charitable organizations	80,277,000	-
State	53,797,000	-
Other business & housing exemptions	35,774,000	15,648,000
Fraternal organizations	6,285,000	-
Historic property exemptions	4,779,000	2,048,000
Charitable schools & daycares	3,178,000	-
Burial grounds	1,212,000	-
All other social welfare	45,000	-
Total Exempt and Partially Exempt	$3,770,302,049	$643,391,376

Sources: Oregon Property Tax Statistics, fiscal year 2004-05, Oregon Department of Revenue. Data for American Indians from the Douglas County Assessor Office's 2005 property roll database - master file (downloaded by ECONorthwest on October 18, 2005).

Property Taxes on the Homes of Cow Creek Employees

The Cow Creek sent out W-2 forms to 1,647 people that worked for the Tribe or its businesses during 2004. Some received more than one form because they worked for multiple Cow Creek employers.

A W-2 is a standard Internal Revenue Service document used to report wages for income tax calculation purposes. People who received payment at any time in 2004 for work done for the Cow Creek, including workers who were also tribal members, all received W-2's.

Of the 1,647 recipients of W-2's, 224 or 13.6 percent lived outside of Douglas County. Approximately another 123 shared a residence with another Cow Creek employee. After deducting these, the analysis uncovered 1,300 unique Douglas County home addresses of employees. The total property tax on those residences was $1,135,655 or 1.8 percent of the total property taxes imposed by Douglas County.

Appendix A Economic Impact Analysis

This appendix describes the general method of analysis used to estimate the economic impacts of an initial stimulus, such as a new development, an industry, or a new business project. Economic impact analysis can also be used to predict the effects of policy decisions causing changes in the economy.

This appendix starts with a discussion of what economic impacts are and how they can be measured. It then delves into the workings of IMPLAN, which is the most widely used model for predicting economic impacts. This appendix concludes with a brief description of the limitations of input-output modeling.

Economic Impacts

The economy consists of numerous individual entities. Among them are households, consumers, tourists, businesses, nonprofits, and governments. Each makes decisions regarding work, spending, charity, savings, and investment. All of them try to optimize, with varying degrees of success and failure, their effectiveness in meeting their own goals. There is a constant struggle to adjust to changes both internally and externally. As a result, the interactions between independently acting entities are highly fluid.

Ironically, this independence has the collective effect of enhancing the overall performance of the economy. However, it also presents a problem when one wants to know what impact a particular entity has on the economy. That is because while some entities are directly linked through formal relationships, most are loosely tied to one another through series of transactions that are many steps removed. Precisely measuring all the impacts through a maze of transactions is futile.

Fortunately, economists have tools to estimate economic impacts. The most widely used is a framework known as input-output modeling. This technique gives highly sophisticated mathematical consideration to various elements of the economy. It measures the ripple effects of an economic stimulus by calculating the impacts of its spending flow from one entity to the next.

A sector is a group of establishments that produce similar goods or services. Examples of sectors include construction, farming, shoe stores, truck manufacturing, and elementary schools. The establishments in a sector can be businesses, nonprofits, or government entities. For each sector, one of several economic impacts may be reported. The most common are the number of jobs, income, and economic output, which is the value of production.

Purpose of Measuring Impacts

There are a number of reasons economists conduct an impact analysis. A common task is measuring the economic consequences of a proposed development. An example is the estimation of the employment and income that result from a new manufacturing facility. Community leaders use these estimations to weigh costs and benefits of the project. Policy makers use the forecast of additional tax revenue to evaluate permitting options.

An alternative task may involve considering the optimal course of action given a set of pending decisions. Land managers frequently conduct analyses of development alternatives to determine which yields the highest return. Land use planners use impact analysis to consider appropriate geographical placement for commercial zoning.

Impact analysis is also used to evaluate the effectiveness of an ongoing or completed project. These types of post-project analyses typically contrast actual outcomes (*e.g.*, number of jobs created or amount of income generated) with projected outcomes. The results can indicate if the project was as effective as anticipated and the reasons why.

Throughout the body of this text, we will illustrate some of the core concepts by using an example. Assume that we are analyzing an isolated county with three dairies. The three dairies are all the same size and they sell all their milk locally. A new dairy is being considered. It is expected to have the same sales and employment as the other three dairies now have. We want to know what the gross and net economic impacts of the new dairy would be.

Input-Output Models

One approach to economic impact analysis is known as input-output modeling. Input-output was first put to practical use by Professor Wassily Leontief in the late 1930's. Leontief went on to win the Nobel Prize in economics for this contribution.

An input-output model is a mathematical representation of regional inter-industry relationships. The model is based on linkages between economic sectors. Each unique linkage explains how spending in one sector affects production in all others. Linkages allow us to estimate the domino effect that a change in one sector has on the entire economy. This section details the salient features of an input-output model and the predictive tools economists use to conduct these analyses.

Linkages

Businesses in an economy are linked by their patterns of purchases and sales of goods and services. For example, the linkages for our dairy's production of milk and cheese include the purchase of cattle, food, and health care for the animals; farmers to care for and extract milk from the animals; and transportation services to bring raw milk to the production facility. Machinery must be purchased to process the liquid, package the final product, and transport it from the facility to distributors. Adding this dairy would increase the demand for production of each element required to bring milk and cheese to the market. All the goods and services that are components of the milk and cheese we buy at the grocery store are linked to those goods.

Another way of describing linkages is as production inputs and outputs. The input-output analytical method takes its name from these linkages in an economy. An input-output model describes how a change in demand for a good or service works its way through countless linkages in the economy. For a given change in demand, input-output models can estimate the resulting total change in an economy of output, employment, and income.

Final Demand

Final demand is the sum of all purchases of goods and services for final consumption within an economy. Final demand is an important component of input-output analysis because it represents the demand that an economic event generates. The subsequent ripples that a stimulus sends through a region are precisely what economists want to measure.

Input-output analysis works by taking the economic changes caused by a stimulus and solving for the new levels of local output that will be required to service that demand. We illustrate this by returning to our dairy example.

The construction of a new plant would require much more than just the milk used for its final product. Construction workers would need to be hired to build a large facility. All the wages, raw materials, and construction equipment must come from somewhere. Additionally, during the operations phase, the dairy would require a team of new employees, a fleet of trucks and drivers to transport the product, and numerous additional elements of its production process.

The seven categories of final demand

Input-output analysis is founded on the fact that one producer's inputs represent another's outputs. These factors of production are the economic activities that impact analysis helps us understand. There are seven different types of final demand.

Personal consumption expenditures: The largest component of final demand comes from household spending. Households consume a wide variety of goods and services. Examples include food, energy, housing, transportation, and anything else that is required for sustenance and recreation.

Federal government: Government purchases are broken down into two categories: military and non-military. Military expenditures include any purchases made in the interest of national defense. Non-military expenditures include all other purchases made by the federal government for the remaining services it provides.

State and local government: State and local government purchases are broken down into two categories: education and non-education. Spending on public education goes primarily to compensate teachers, but also includes things like textbooks and supplies. Non-education spending includes anything not spent for public education such as policing, fire fighting, and state-sponsored healthcare. Tribal governments can also be included.

Inventory: Inventories accumulate anytime an industry fails to sell all of its output from a given year. Goods can be sold out of inventory any time sales exceed production. Industries rarely sell exactly what they produce each year, so this category is a widely used tool for reconciling economic activities.

Capital formation: A large component of productive capability is capital. Industries use varying quantities of capital depending on the nature of goods and services they provide. The manufacturing sector, for example, tends to require large investments in property, plant, and equipment for the goods it produces. This category of final demand contains all spending on capital equipment.

Foreign exports: Just as some economies must import goods and services from outside their borders, other economies sell a significant portion of their output overseas. Demand for final goods and services that come from other countries fall into this category. While the consumption of these dollars happens elsewhere, recall that input-output is concerned with where goods and services are produced.

Inter-institutional transfers: Any dollars that flow between non-industrial institutions are considered transfers. For example, households pay money to the federal government in the form of taxes. The federal government pays money to households in the form of welfare and social security.

Leakages

The spending and re-spending caused by linkages is not an endless process. Some dollars are taxed, saved, or spent and earned outside the borders of an economy. Input-output analysis considers the dollars that go outside a local economy to have "leaked" out. These dollars provide no further economic benefit.

The economic benefits of output are felt in places where goods or services are produced, not where they are used. Leakages occur whenever output requires that goods and services be bought from another region. The term leakage refers to dollars that must be spent outside of the local economy to purchase intermediate goods and services.

Undeveloped economies and/or smaller geographic regions tend to import a significant proportion of their total goods and services. Since a small economy produces few goods or services, most must originate elsewhere. This means that small economies tend to leak more economic activity than larger, more developed economies. It follows that impacts from a new project are usually lower for small economies.

IMPLAN

One of the most common software packages used to conduct input-output analyses is IMPLAN (for IMpact analysis for PLANning). IMPLAN was developed by the US Forest Service in cooperation with the Federal Emergency Management Agency and the Bureau of Land Management to assist federal agencies in their land and resource management planning.

Applications of IMPLAN by the US Government, public agencies, and private firms span a wide range of projects. Examples include new factories, resorts, proposals for developing coalmines, and harvesting timber. IMPLAN can also be applied to a variety of policy issues. Predicting the effects of a tourism marketing campaign or for measuring the importance of an existing industry on a local community are common examples.

IMPLAN uses a large database of regional and national data to forecast economic activity. It reports the impacts of a project, development, policy change, or other economic event. These impacts are broken down by various sectors of an economy in a geographic area. IMPLAN uses several different measures of impacts and explains the extent to which they are linked to the project being analyzed. This helps us explain, among other things, how much spending in one sector affects production in all others.

Specifying the Geography of the Economy

The first step in conducting an input-output analysis using IMPLAN is to specify the geographic area being analyzed. IMPLAN can estimate input-output linkages and economic impacts for economies that range in size from the entire U.S. down to an individual county, or any grouping of counties and states in between.

Generally, the total impacts of a project are greater if you define the economy broadly because there are fewer leakages. However, many of the impacts are a result of dollars simply being reallocated from spending on one thing to another. Thus, the net benefit of a project is usually smaller when a larger geographic area is specified.

IMPLAN generates a model of the economy within the specified geographic area. The model includes a description of the relevant input-output linkages and the portion of economic activity that leaks out of the modeled economy.

Sectors

IMPLAN breaks an economy down to 509 separate sectors, based on the North American Industry Classification System ("NAICS"). They correspond closely to the U.S. Bureau of Economic Analysis' sector scheme for tracking industries and employment. Examples of sectors are sawmills, single-family home construction, cement manufacturing, grain farming, legal services, food stores, postal services, state and local government enterprises, television broadcasting, and public elementary and secondary schools.

IMPLAN estimates four types of impacts for each of the 509 individual sectors or groups of sectors: employment, taxes, value added, and output. IMPLAN can further breakdown each type of economic impact into three sub-categories: direct, indirect, and induced impacts. We illustrate these different impacts using the dairy example and focusing on employment impacts.

Four Types of impacts

There is no all-inclusive measure of economic impacts. Instead, analysts must select from the four types of impacts. They will then report those that are the most relevant to their research. The four types of impacts are:

(1) Employment: The total number of payroll employees, including part time workers. The self-employed are not counted, however, their earnings are captured under proprietor income.

(2) Taxes: Total federal, state, and local tax revenues.

(3) Value Added: This is the additional value created at a particular stage of production or through image and marketing. It may be calculated by taking the sum of the wages, proprietor income, other income, and indirect business taxes, which are defined below:

- **Wages** represent the total cash and non-cash compensation of workers on payroll. This includes the value of benefits.
- **Proprietor Income**, sometimes called small business income, is a form of labor earning by self-employed workers and the working owners of small businesses.
- **Other Income** counts the various forms of property income. It includes rents, royalties, dividends, and corporate profits.
- **Indirect business taxes** are the excise and sales taxes paid by individuals to businesses.

(4) Output: The total value of the production of a sector is its output. For most sectors, output is approximately equal to sales. The notable exceptions are government and the trade sectors. The output of government sectors is approximately equal to revenues. For the trade sector, which consists of firms that buy goods and re-sell them, output is roughly the difference between what they sell goods for and what they paid to procure them. The trade sector consists of wholesalers and retailers.

Three subcategories of impacts

For any given type of impact, its effects on the economy can be reported on one of three levels. The starting point is the direct impact.

For the manufacturer of milk, the **direct** impact as measured by employment would be the change in the number of jobs because of the given change in milk sales. For example, a million dollar increase in milk sales might increase employment at the dairy by ten employees. Another way of thinking about this relationship is that it takes ten employees to produce one million dollars worth of milk. Direct impacts, therefore, describe the changes in economic activity of sectors that first experience a change in demand because of a policy decision or project whose impacts are being analyzed.

Indirect impacts are the second stage of impacts that occur as a change in demand ripples through an economy. The linkages among firms and sectors drive indirect impacts. An increase in milk sales increases the demand for the inputs used to make it. Indirect employment impacts are the change in employment at firms that manufacture the inputs.

In the example, a million dollars of milk sales might generate ten jobs directly and four jobs indirectly in the various businesses that supply the dairy and farmers who raise the cattle. Those indirect beneficiaries then spend money for supplies and services, which results in another round of indirect spending.

Induced impacts capture the final stages of economic consequences of a change in output. Induced impacts are generated by the additional spending of households who benefit from the higher wages and business income they earn through all of the direct and indirect activity.

In the example, a million dollar increase in milk sales generates the equivalent of 14 direct and indirect jobs. These 14 jobs mean 14 new paychecks. In addition, some local business proprietors, such as contractors, also see their incomes rise. The induced impact is the increase in household expenditures caused by all of this new income. Completing our example, one million dollars in milk sales might result in 12 new induced jobs. Typically, these impacts are spread throughout the sectors of an economy and are larger than the indirect impacts.

Net Versus Gross Impacts

At the outset, one should decide whether the question being posed for analysis requires that net or gross impacts be determined. A common mistake is to use the results from a gross impact analysis to answer a question about the benefits or improvement to an economy due to a project. This often leads to unrealistic, if not preposterous, claims about economic benefits.

A gross impact analysis measures where every dollar from a stimulus is spent in the local economy and how many jobs those dollars paid for. Gross impact analysis is appropriate when the purpose of an analysis is to identify how much economic activity can be traced back to the stimulus. You must measure net impacts if the question requires a calculation of economic benefit.

Net impacts are often considerably smaller than gross impacts, but provide a truer picture of the benefits from a stimulus. A net impact analysis can help answer questions about what a stimulus will do. This could include how many new jobs will be created, what will be the net increase in economic output, how much will local taxes rise, or how much more housing would be needed to accommodate the growth?

Net impact analysis considers only those economic activities that occurred because of the stimulus. The difference is that gross impacts include economic activities that would have occurred anyway had the project or stimulus not occurred. We can explain this by giving a simple example using our dairy.

Suppose an economic impact analysis is run using projected sales (output) of our hypothetical new dairy. For this analysis, IMPLAN is modeling the impacts of only the county in which the dairy is located. Direct, indirect, and induced impacts will be considered.

Although some would be inclined to call these impacts the “benefits” to the county of the new dairy, the reality is that IMPLAN would only be reporting gross impacts. The problem is that much of the milk sold by the new dairy would result in lost sales to the other local dairies. It is unlikely that consumers would buy any more milk because of the new dairy. They would simply be spreading their purchases out over four dairies instead of just three. The gains from the output of the new dairy are mostly offset by losses in the sales, and ultimately employment, at the other three. Thus, the net impact would be much smaller than gross impacts.

A net impact analysis would consider the effects of competition from the new dairy on the other three. This allows an economist to forecast the net change in total output of all the dairies in the county. This change would be used as the input for IMPLAN instead of the total figures for the new dairy.

New Money

IMPLAN models using net figures for inputs can be difficult to construct. An easier alternative approach is to quantifying sources of new money brought into the local economy by the stimulus. The major sources are:

1. **Exports**. The term "exports" in an impact analysis refers to sales made to consumers and businesses that do not reside in the local economy being studied—even if they are not sold outside the United States. When a stimulus results in a sector selling more goods and services to buyers from outside the local economy (including tourists), positive net economic impacts occur. Thus, in our earlier example, if the new dairy causes countywide milk sales to other places to go up, there would be an increase in exports and higher net economic impacts.

2. **Import Substitution**. If local consumers were buying milk produced from outside the county, but because of the new dairy they are now buy more locally produced milk, that increase is called "import substitution." In other words, county residents are substituting their purchases of dairy products originating from other places with output from the local dairies, thus, less money leaks out of the county, and that causes economic benefits.

3. **Price Changes Affect Spending.** The new dairy lowers the cost of producing milk in the county. Local residents buy the same amount of milk as they did when there were only three dairies in the county (because the price was driven down). This gives them more money for all other goods and services, thus having the same effect as increasing incomes. However, there is a partial offset because lower milk prices would cause some residents to buy more dairy products.

The difference between the net and gross impacts of a stimulus depends on various factors, some of which can be affected by strategies. Generally, if the stimulus being analyzed would be producing something in a local economy that is not currently being supplied locally and is in demand by area residents, the net economic impact is going to be high. Alternatively, if it is something that is widely available and purchased locally, with comparatively few cross economic border sales, then the net impacts would likely be small compared to the gross impacts.

Sometimes, strategies can be effected that would improve the net economic impacts of a project. Going back to the dairy example, if the new dairy introduced popular and new varieties of cheese not produced by the three other dairies in the county, import substitution would be higher and so would the net economic impacts. Similarly, if the new dairy were to hire all of its workers from the county resident workforce rather than commuters from other places, its net impact would be stronger.

Multipliers

Multipliers summarize the impacts on the economy because of a change in a sector or group of sectors. For example, a total output multiplier effect of 1.58 for the dairy industry would indicate that for each dollar increase in output by the local dairy industry, you could expect a $1.58 increase in total economic output countywide. The first dollar would be the direct output. The other 58 cents would be the combined impacts of local indirect and induced output.

Few economic statistics are as misused as the multiplier effect. There are three common mistakes people make.

First, they often fail to identify the type of multiplier. There is no all-encompassing multiplier effect. Any one stimulus has job, income, output, wage, business income, tax, and other income multipliers. The phrase "multiplier effect" must always be qualified with the type of impact being considered. In the dairy example, we used the output multiplier.

The second mistake is using gross impacts instead of net to calculate multiplier effects. This leads to some extraordinary claims. We have seen reports of job multipliers of three-to-one and higher—implying that a project would generate three jobs for every one the project itself would directly pay for. Although there are exceptions, such claims are usually spurious. If they were not, governments could remedy chronic unemployment by subsidizing such three-to-one projects.

For the purposes of most readers and policymakers a multiplier effect is interpreted as a simple measure of how much a change in one type of impact in a sector (or stimulus) affects the economy as a whole. Therefore, one should use net impacts and not gross to estimate multiplier effects.

Finally, geography matters with multiplier effects. The greater the economy being measured, the fewer leakages, and the higher the multipliers become if you are using gross impacts. However, if you calculate net impacts, the opposite can occur. The larger you make your definition of the local economy, the smaller export sales and import substitutions become (since your definition of local is much broader). Thus, the reporting of multiplier effects or use of them must be qualified by their geographic scope.

Limitations of Input-Output Models

Input-output models are important tools for assessing industries, policy changes, new projects, and the like. However, like many quantitative tools, they have certain limitations. Here we will highlight some limitations of input-output models.

Snapshot

Input-output models are constructed to measure the flow of inputs and outputs in an economy over the course of a single year. We often refer to the results from an input-output model as a "snapshot" economic impact analysis.

As it is usually used to assess the current importance of a sector on an economy, such as the effect on total annual employment for a county or group of counties, this snapshot constraint is often not an issue. For future developments, the snapshot limitation is more problematic. If projects have a construction phase followed by an operations phase, something one often sees in environmental impact studies, two input-output analyses can be done. For the operations phase, an input-model is often run for a normal operating year in the future—one where revenue growth has stabilized. Occasionally, studies require running a series of input-output models for a series of future years.

Static Versus Dynamic

Input-output models are static, which means they do not have a feedback mechanism that takes the forecast for previous years to affect the forecast of future years. Input-output models consist of fixed linkages between sectors. These linkages are based on a historical structure of the economy (usually some recent year). Static models contrasts with dynamic models, which make multiple year forecasts that allow the events of one year to change the linkages in future years, thus simulating the long-term changes in the structure of the economy one might expect.

If we go back to the dairy example, an input-output analysis of the county would allow us to take a one-year snapshot of the new dairy's impacts on the local economy. A dynamic model, however, would show impacts over many years and how the structure of the economy might change. In this case, a fourth dairy might stimulate the building of a packaging factory or an expansion in dairy farms. Those would be dynamic effects.

Input-output models can be used to predict some types of dynamic effects. For example, you can estimate how changes in milk prices would affect the output of different sectors. However, effects that are more complex would require the use of special models, such as REMI (the acronym for "Regional Economic Models, Inc.").

Constant Returns to Scale

Linkages in input-output models are based on historical data. Those linkages are fixed, meaning that any change in output will result in a proportionate increase of all inputs. For example, the ratio of employees to output in the dairy industry is constant. Ratios of factors like the amount of locally produced agricultural inputs to dairy output are also constant. Normally this is not a significant problem, but in cases where the stimulus is atypical or unusually large, the regional linkages can deviate substantially from those used in an input-output model.

For example, if we were to triple the assumed output of the new dairy, input-output analysis would simply triple all of the impacts. The number of direct hires would be three times larger, even though such a large operation would probably employ fewer people.

Consider a dairy with ten employees who produce 1,000 gallons of milk each month. If that dairy wanted to increase production to 2,000 gallons, the owner would likely have to make significant changes to the operation to double the output. If the same change in production were considered for a dairy with 100 employees who produce 50,000 gallons of milk each month, the new level of production would not require much effort because it is spread over many more people and a much more developed infrastructure. Economists refer to this concept as economies of scale.

Another problematic element of the input-output modeling approach is that it would assume a tripling of the amount of indirect output from local dairy farms (purchases of raw milk). However, the tripling of purchases would probably far exceed the capacity of local farms, causing the new dairy to buy more of its milk from other counties than the historical averages. Unfortunately, these historical averages are what the input-output linkages are based upon. The net effect of these problems is an overstatement of the actual economic impacts that a stimulus of this type would produce.

Fixed Commodity Input Structure

A fixed commodity input structure means that firms do not respond to price changes by substituting different goods in the production process. For example, an additional dairy farm will increase the supply of dairy products, which will tend to lower dairy product prices, including the price of cheese. The lower price of cheese would cause schools to offer more of it in their lunch programs. Input-output analysis assumes that the lower price of cheese has no effect on its consumption by schools, or other industries.

No Supply Constraints

Input-output models assume that a local economy never runs out of the ability to produce what local industries can consume. This demand side assumption means that local industry has unlimited access to raw materials and intermediate goods and services.

Price Effects

An input-output model, being a static model, does not consider price effects. In our example, a new dairy that would be triple the normal size could cause raw milk prices to rise substantially, which would affect the value of the output of farms and impinge on the profit margins of the dairies. Input-output models do not capture these price effects.

Time

It is obvious that most of the economic impacts that input-output analysis considers take place over time. Recall the three categories of economic impact: direct, indirect, and induced. These impacts are far from instantaneous. Sometimes the effects of a large project can span several decades. The direct purchase of intermediate goods and the payment of wages and benefits will also span that period. The indirect effects of those purchases are sometimes slow to ripple through the economy. Induced effects can take even longer, as many wage earners save earnings and do not use insurance benefits for a long time.

To account for this variable in an input-output analysis, economists must consider the fact that inflation erodes purchasing power over the years. If economic impacts are to be reported accurately, each dollar needs to be presented in terms of its economic value today. Economists must use a base year when conducting input-output analysis. All transactions that take place after that base year are discounted to account for expected changes in purchasing power.

The inflation assumptions that are built into an input-output analysis can have a profound impact on its results. Underestimating inflation by just one percent will inflate the net present value of a multi-million dollar project by a wide margin.