

APPENDIX A: TERMS & DEFINITIONS

STUDY YEAR	FY 2023
DOLLAR YEAR	Presented in 2023 dollars.
TOTAL ECONOMIC OUTPUT/ ECONOMIC IMPACT	Includes organizational spending on operations, capital expenditures, labor income expenditures and value added to the economy as a result of expenditures made by an organization. It is the combined impact of direct, indirect and induced impacts.
DIRECT ECONOMIC IMPACT	All direct expenditures made by an organization due to its operating expenditures. These include operating expenditures, capital expenditures and pay and benefits expenditures.
INDIRECT ECONOMIC IMPACT	The indirect impact includes the impact of local industries buying goods and services from other local industries. The cycle of spending works its way backward through the supply chain until all money is spent outside of the local economy, either through imports or by payments to value added (multiplier effect).
INDUCED ECONOMIC IMPACT	The response by an economy to an initial change (direct effect) that occurs through respending of income received by a component of value added. IMPLAN's default multiplier recognizes that labor income (employee compensation and proprietor income components of value added) is not lost to the regional economy. This money is recirculated through household spending patterns causing further local economic activity (multiplier effect).
MULTIPLIER EFFECT	The multiplier effect is the additional economic impact created as a result of the organization's direct economic impact. Local companies that provide goods and services to an organization increase their purchasing by creating a multiplier (indirect/supply chain impacts). Household spending generated by employees of the organization and the organization's suppliers creates a third wave of multiplier impact (induced/household spending impacts).
GOVERNMENT REVENUE/ STATE AND LOCAL TAX IMPACT	Government revenue or tax revenue that is collected by governmental units at the state and local level in addition to those paid directly by an organization. This impact includes taxes paid directly by the organization itself, employees of the organization and vendors who sell products to the organization and at the household level.
DIRECT EMPLOYMENT	Total number of employees, both full-time and part-time, at the organization based on total jobs, not FTEs.
INDIRECT EMPLOYMENT	Additional jobs created as a result of an organization's economic impact. Local companies or vendors that provide goods and services to an organization increase their number of employees as purchasing increases, thus creating an employment multiplier.
INDUCED EMPLOYMENT	Additional jobs created as a result of household spending by employees of an organization and the employees of vendors. This is another wave of the employment multiplier.

APPENDIX B: DATA & METHODS

Data used to complete the contribution analysis was provided by MSU Denver. Data supplied included operating expenditures, three-year capital-spending average, pay and benefits, total employees and direct taxes paid. Primary and secondary data was used to complete the input-output models in IMPLAN. The study approach and economic-impact findings are a conservative estimate of impact and are based on actual financial information. The study is a snapshot of the economic impact of MSU Denver.

Overview And The Implan Model

The most common and widely accepted methodology for measuring the economic impacts of economic sectors is input-output (I-O) analysis. At its core, an I-O analysis is a table that records the flow of resources to and from companies/organizations and individuals within a region at a given time. For a specified region such as a state of the nation, the input-output table accounts for all dollar flows among different sectors of the economy in a given period. With this information, a model can then follow how a dollar added into one sector is spent and respent in other sectors of the economy, generating outgoing ripples of subsequent economic activity. This chain of economic activity generated by one event is called the “economic multiplier” effect.

The primary tool used in the performance of this study is the I-O model and dataset developed and maintained by IMPLAN Group LLC (formerly Minnesota IMPLAN Group Inc.). IMPLAN is a widely accepted and used software model first developed by the U.S. Forest Service in 1972. Data used in the baseline IMPLAN model and data set come largely from federal-government databases. The input-output tables themselves come from the Bureau of Economic Analysis. Much of the annual data on labor, wages, final demand and other market data comes from the Bureau of Labor Statistics, the U.S. Census Bureau and other government sources.

Government agencies, companies and researchers use IMPLAN to estimate the economic activities associated with spending in a particular industry or on a particular project. The IMPLAN model extends conventional I-O modeling to include the economic relationships among government, industry and household sectors, allowing IMPLAN to model transfer payments such as taxes. Producers of goods and services must secure labor, raw materials and other services to produce their product.

The resources transferred to the owners of that labor or those raw materials and services are then spent to secure additional goods and services or inputs to the products they sell. For example, an organization in a region may develop a company that produces trains with a value of \$1 million. However, to produce that product, they may be required to spend \$500,000 in wages and benefits, \$200,000 to suppliers of parts, \$100,000 for electricity, \$50,000 for transportation of goods and raw materials to and from the plant and \$50,000 in various professional services associated with operating a business (e.g., attorneys and accountants). The suppliers will, in turn, spend those resources on labor and raw materials necessary to produce trains. Workers and the owners of the company will buy goods and services from other firms in the area (e.g., restaurants and gas stations) and pay taxes. The suppliers, employees and owners of this second tier will, in turn, spend those resources on other goods and services whether within the study region or elsewhere. The cycle continues until all of the money leaves the region.

Implan Methodology

The model uses national production functions for over 536 industries to determine how an industry spends its operating receipts to produce its commodities. These production functions are derived from U.S. Census Bureau data. IMPLAN couples the national production functions with a variety of county-level economic data to determine the impacts at a state and congressional-district level. IMPLAN collects data from a variety of economic data sources to generate average output, employment and productivity for each industry in a given county. IMPLAN combines this data to generate a series of economic multipliers for the study area. The multiplier measures the amount of total economic activity generated by a specific industry's spending an additional dollar in the study area. Based on these multipliers, IMPLAN generates a series of tables to show the economic event's direct, indirect and induced impacts to gross receipts, or output, within each of the model's more than 536 industries.

The model calculates three types of effects: direct, indirect and induced. The economic impact of MSU Denver is the sum of these three effects.

Considerations Concerning Implan

There are three important points about the use of IMPLAN (or any other input-output model):

It is a fixed-price model. The model assumes that changes in consumption are not limited by capacity and do not affect prices. This assumption does not cause a problem for the analysis presented here because we are taking a snapshot of MSU Denver in a specific year.

As in many studies using this type of model, the direct impacts are not calculated by the model; they are a reflection of actual spending levels and patterns created by MSU Denver. Changing the level of direct spending allows us to calculate the magnitude of the indirect and induced effects associated with the initial level of spending.

Because the model continues to calculate additional spending until all of the money leaves the region (i.e., "leakage"), the larger and more economically diverse the region, the longer it will take for spending to leave the region and the larger the impact is likely to be. For example, employees of MSU Denver may spend some amount of their income on buying a car. If there are no car manufacturers in their state or county, this spending will leave the region and the multiplier effect will stop. At the national level, some portion of that same spending by that same individual may go to a national auto producer. That spending would lead to more spending at the national level than would be captured by a more regional model. The national impact will be larger than the sum in the individual states, and the individual state impact will be larger than the sum of the impacts in its congressional districts.