DEFINING ECONOMIC IMPACT

Each time a dollar changes hands, there is an economic impact. Direct economic impact is a measure of the economic effect of the initial expenditure within the community. However, when people and businesses receive money, they re-spend much of that money locally. Indirect and induced economic impact measures this re-spending on jobs, household income, and local and state government. Consider this example:

> When a Minnesota creative worker purchases $200 of supplies from the local art supplies store, the store owner uses some of the money to pay the sales clerk (that is a *direct* economic impact). The sales clerk then re-spends some of the money for groceries; the grocery store in turn uses some of the money to pay the cashier; the cashier uses some of the money to pay his utility bill; and so on (these are *indirect* and *induced* economic impacts).

Thus, the original $200 from the artist has been "re-spent" several times. The local expenditures will continue to have an economic impact on Minnesota's economy until the money eventually "leaks out" of the state (i.e., is spent with merchants or individuals located outside Minnesota). The total economic impact is the combination of the direct, indirect and induced impacts.

Using this study's methodology, economic impact is defined as employment, resident household income, and government revenue that is supported or generated by the dollars spent in Minnesota by individual artists and creative workers who reside in Minnesota.

- Full-Time Equivalent (FTE) Jobs describes the total amount of labor employed within the State of Minnesota that is supported by the artistic spending of individual artists and creative workers. Economists measure FTE jobs, rather than the total number of employees, because it is a more accurate measure that accounts for both full-time and part-time employment. They include jobs in all industrial sectors that are supported each time the money from the original artistic expenditure is "re-spent" within Minnesota.

- Resident Household Income (also called Personal Income) includes salaries, wages and entrepreneurial income paid to Minnesota residents. It is the money that residents earn and use to pay for food, housing, other living expenses and disposable income. This is the income paid on behalf of the full-time equivalent jobs supported by artistic expenditures.

- Revenue to State and Local Government includes all funds collected by Minnesota's city, county and state governments, schools and special districts. It's not exclusively tax revenue (e.g., income tax, sales tax, property tax); it also includes license fees, utility fees, filing fees, etc.

Studying Economic Impact Using Input-Output Analysis

To derive the most reliable economic impact data, the study economists used the method of input-output analysis to measure the impact of artistic expenditures by the Minnesota's individual artists and creative workers. This method is a standard procedure for demonstrating the impact of expenditures on communities (and has also been the basis for two Nobel Prize awards in economics). It is well suited for this study because the models can be customized specifically to the unique economic factors of each of Minnesota's 11 arts regions to measure the industry directly as well as indirectly through the additional ancillary commerce that the industry creates. An input-output model is a system of mathematical equations that combines statistical methods and economic theory. It traces how many times a dollar is "re-spent" within the economy of the region of study, and the economic impact of each of those rounds of spending.

The models for each of Minnesota's 11 arts regions were customized by using detailed data on employment, incomes and government revenues provided by the U.S. Department of Commerce (e.g., County Business Patterns, Regional Economic Information System, Survey of State and Local Finance), local tax data (sales taxes, property taxes, income tax, other local option taxes and applicable fees), as well as the survey data collected from the 2,139 responding individual artists and creative workers.

The Input-Output Process

The input-output model is based on a table of 533 finely detailed industries showing local sales and purchases. The local and state economy of each community is researched so the table can be customized for each community. The basic purchase patterns for local industries are derived from a similar table for the U.S. economy for 2011 (the latest detailed data available from the U.S. Department of Commerce). The table is first reduced to reflect the unique size and industry mix of the local economy, based on data from County Business Patterns and the Regional Economic Information System of the U.S. Department of Commerce. It is then adjusted so that only transactions with local businesses are recorded in the inter-industry part of the table. This technique compares supply and demand, and estimates the additional imports or exports required to make total supply equal total demand. The resulting table shows the detailed sales and purchase patterns of the local industries. The 533-industry table is then aggregated to reflect the general activities of 32 industries plus local households (a total of 33 industries). To trace changes in the economy, each column is converted to show the direct requirements per dollar of gross output for each sector. This direct-requirements table represents the "recipe" for producing the output of each industry in the economy.

The economic impact figures for the study were computed using what is called an "iterative" procedure. This process uses the sum of a power series to approximate the solution to the economic model. This is what the process looks like in matrix algebra:

$$T = IX + AX + A^2X + A^3X + \ldots + A^nX$$

T is the solution, a column vector of changes in each industry's outputs caused by the changes represented in the column vector X. A is the 33 by33 direct-requirements matrix. This equation is used to trace the direct expenditures attributable to individual artists. A multiplier effect table is produced that displays the results of this equation. The total column is T. The initial expenditure to be traced is IX (I is the identity matrix, which is operationally equivalent to the number 1 in ordinary algebra). Round 1 is AX, the result of multiplying the matrix A by the vector X (the outputs required of each supplier to produce the goods and services purchased in the initial change under study). Round 2 is A^2X, which is the result of multiplying the matrix A by Round 1 (it answers the same question applied to Round 1: "What are the outputs required of each supplier to produce the goods and services purchased in Round 1 of this chain of events?"). Each of columns 1 through 12 in the multiplier effects table represents one of the elements in the continuing but diminishing chain of expenditures on the right side of the equation. Their sum, T, represents the total production required in the local economy in response to arts activities. Calculation of the total impact of expenditures by individual artists on the outputs of other industries (T) can now be converted to impacts on the final incomes to local residents by multiplying the outputs produced by the ratios of household income to output and employment to output. Thus, the employment impact of changes in outputs due to arts expenditures is calculated by multiplying elements in the column of total outputs by the ratio of employment to output for the 32 industries in the region. Changes in household incomes, local government revenues, and state government revenues due to nonprofit arts expenditures are similarly transformed. The same process is also used to show the direct impact on incomes and revenues associated with the column of direct local expenditures.

SECTION II. PUBLIC OPINION POLLING ABOUT THE ARTS

Developed in collaboration with the Minnesota State Arts Board, Americans for the Arts, Minnesota Compass and the Blandin Foundation.

(1) Minnesotan Involvement in the Arts: Minnesota Center for Survey Research, *2017 Minnesota State Survey.* This annual omnibus survey reaches approximately 800 households per year to complete computer assisted telephone interviews; respondents are randomly selected using a dual frame sample of both landline telephone and cell phone numbers assigned to Minnesota area codes.

(2) USA Attendance: *U.S. Trends in Arts Attendance and Literary Reading: 2002–2017, A First Look at Results from the 2017 Survey of Public Participation in the Arts, National Endowment for the Arts, 2018.*

(3) Minnesota Compass Arts Indicators: Minnesota Compass is a social indicators project that measures progress in our state, its seven regions, 87 counties and larger cities. Compass tracks trends in topic areas such as education, economy and workforce, health, housing, public safety and a host of others. Compass gives everyone in our state – policy makers, business and community leaders and concerned individuals who live and work here – a common foundation to identify, understand and act on issues that affect our communities. For more information about the data including methodologies or margins of error, please contact mnCompass@wilder.org

SOURCE: Annual Arts Benchmarking Survey supplement of the Current Population Survey, a program conducted by the U.S. Census Bureau for the Bureau of Labor Statistics.

- **ATTENDANCE:** In the Annual Arts Benchmarking Survey, an arts and culture event refers to a live music, theater or dance performance; a live book reading or a poetry or storytelling event; an art exhibit, such as paintings, sculpture, pottery, graphic design, or photography; or visiting buildings, neighborhoods, parks or monuments for their historical, architectural or design value.