

Multiplier Definitions

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Multipliers are metrics used to calculate ripple effects associated with an expansion of industry output or household spending. For example, if the initial industry expansion is \$100 million and the output multiplier is equal to 1.9, then the total effect is the initial \$100 million in output plus \$90 million in ripple effects back through the supply chain and forward through the spending of income.

We provide both Final Demand and Direct Effect multipliers. Final Demand multipliers use as the base the direct expansion in industry output. So using the example above of \$100 million in output expansion, if this expansion results in 1,200 jobs then the employment multiplier is $1200/100 = 12$ jobs per million dollars of industry direct output expansion. Alternatively, the Direct Effect multiplier for employment uses the direct employment rather than the final demand (initial expanded output) as the base for computing the multiplier. Assuming that the direct industry expansion results in 400 jobs, then the Direct Effect employment multiplier is $1200/400 = 3$.

While we adhere to the U.S. Bureau of Economic Analysis (BEA) terms for Final Demand and Direct Effect multipliers, we decided to replace BEA's language of Type I and Type II multipliers and direct, indirect, and induced effects with terms that are consistent with sustainable planning and environmental impact life cycle analysis. So we use life cycle terminology to describe impacts and multipliers, with the industry supply life cycle representing Type 1 multipliers (direct plus indirect effects) and, combined with the household spending life cycle (induced effect), represents Type 2 multipliers. The industry supply life cycle includes production back through the supply chain of all inputs, raw materials, services, and transportation. The household spending life cycle includes all production that results from the household spending of income on goods and services. With this change towards sustainability terminology, our economic impact analysis is consistently defined with environmental impact life cycle analysis.

Following are definitions for terms you will find on our industry multiplier report.

Employment (Jobs) Multiplier

The employment multiplier is the number of jobs created by the initial expansion in industry output or household spending divided by million dollars of final demand in the case of final demand multipliers or by the direct employment increase for direct effect multipliers.

Expansion Capacity

Expansion capacity is the amount that current industry facilities can expand their output without additional investment in facilities. We assume that expansion capacity is equal to 20% of current output levels. In terms of the multipliers, local purchases for an industry are constrained to the expansion capacity level.

Household (HH) Spending Multiplier

The household spending multiplier is that portion of the total multiplier that is attributed to the spending of earnings received by households from the initial expansion in industry output.

Industry Multiplier

The industry multiplier is that portion of the total multiplier that is directly accounted for by the initial industry that expanded output.

Location Quotient (LQ)

The location quotient equals the local industry's share of total output divided by the national industry's share of total output. If an industry is over-represented locally compared to the national average, then all purchases for this industry are local. Otherwise, the amount of local purchases depends on this ratio.

Opportunity Quadrant

The opportunity quadrant classifies local industries based on their output ranking and their rank on the difference between potential (expansion capacity) and pro forma (location quotient) output multipliers. Industries in the lower left quadrant have relatively low output and low supply chain expansion capacity opportunities. Industries in the lower right quadrant have supply chain expansion opportunities but relatively low industry output levels. In this case, a strategy to seek investment in industry output may result in a big impact if the supply chain opportunities are realized. Industries in the upper left quadrant have relatively high output but minimal opportunities for supply chain expansion. In this case, a strategy to seek investment in supply chain output will leverage the existing investment in industry output. Industries in the upper right quadrant are relatively large industries locally, both in output and supply chain. Strategy for these industries is to maximize the current investment and create a locally vertically-integrated industry.

Output Multiplier

The output multiplier is the amount of output created by the initial expansion in industry output or household spending divided by the initial expansion amount.

Pro Forma

"Pro forma" is a common term in finance to represent projected results before the fact. Pro forma projections are based according to a form, such as the input-output model of the economy and location quotients that are used in economic impact projections. We use the term to emphasize that, much like a financial budget, the pro forma impact statement is a budget to be managed to, and that with active management, the budget can be hit or exceeded. That is, multipliers are not a given, the values can change. Multipliers are determined by the day-to-day decisions of persons in industry, government, and households.

Rank

The multiplier rank is on a scale from 0 to 100, with 0 representing the industry with the smallest multiplier, and 100 representing the local industry with the largest multiplier.

Roles

All businesses play important roles in sustaining an economic system. These roles may include the following:

Conservation - Conserving of natural resources. Applies to natural resource supply chains and equipment manufacturing. Conservation and productivity combine to provide necessary income levels while limiting natural resource harvesting rates to sustainable levels.

Variety - Hiring in occupations in which local opportunities are relatively few. A variety of skills are required to sustain an economic system. When local industry fails to offer opportunities across all occupational skills, people move out of the system. This outmigration can start a spiral of decline in a system. If a business plays a role in maintaining variety, it means that it provides opportunities locally to work in occupations in which there are fewer opportunities than expected and needed to maintain a vibrant and resilient system.

Productivity - Productivity growth results in income growth to sustain a growing population. Applies to industries largely responsible for productivity improvements, such as equipment manufacturing, infrastructure construction, selected information industries, and scientific research and development.

Resilience - Ability to recover from disasters, natural, personal, and other. Businesses in industries such as food, energy, water, construction, transportation supply chains, financial credit, and personal and social services play key roles in maintaining a resilient economic system.

Connections - Creating valuable relationships. Most businesses are part of supply chains that link natural resources to final consumers. While processes are an important part of what these businesses do, the interconnected relationships that are created to support each other is what brings sustainable value to an economic system.

Regeneration - Carrying on and creating new. Internal to a system must be succession capabilities and abilities to create new businesses. In an economic system, businesses involved in higher education, science and arts, and services to start-up businesses play an important role in regenerating the system. But regeneration is largely up to people, and specifically people working in occupations that have a relatively high concentration in the local system compared to other systems, and people working in occupations that have a high self-employment rate. If a business operates in an industry that employs people in these occupations, then the business itself plays an important role in fostering renewal and regeneration.

Supply Chain Multiplier

The supply chain multiplier is that portion of the total multiplier that is attributed to the supply chain of the industry that initially expanded output.

Total Multiplier

The total multiplier is the addition of the direct industry multiplier, the supply chain multiplier, and the household spending multiplier.

Value Added Multiplier

The value added multiplier is the amount of value added created by the initial expansion in industry output or household spending divided by the initial expanded industry output in the case of final demand multipliers or by the initial expanded value added for direct effect multipliers.