DED Economic Impact Analysis Overview

Topics

REMI Missouri Economic Regional Model
Economic Impact Example

REMI Missouri Economic Model

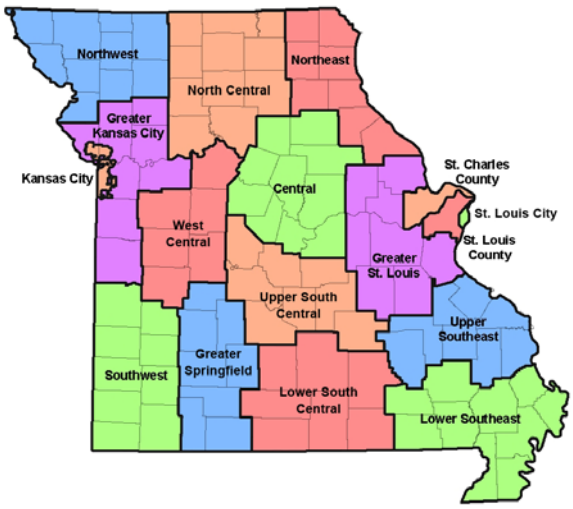
The REMI Missouri Regional Economic Model is used by the Missouri Department of Economic Development (DED) to forecast economic and policy impacts statewide and across 17 economic regions. DED uses the REMI model to assess the economic and fiscal impacts of new firms, layoffs, industrial restructuring, and tax credits.

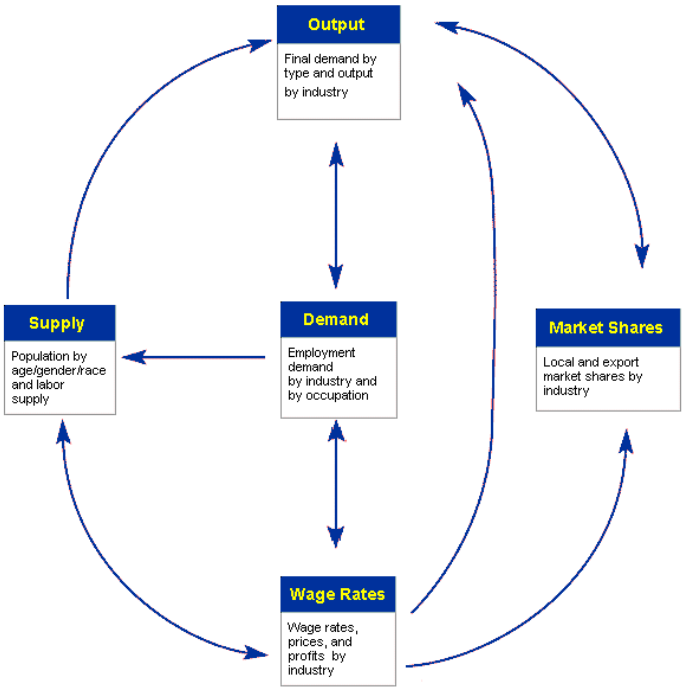
REMI Features:

- It is calibrated to regional conditions using a relatively large amount of area data, which improves performance, especially under conditions of structural economic change.
- It combines several analytical models (including input-output, general equilibrium, economic geography and econometric models), allowing it to take advantage of each specific method's strengths and compensate for its weaknesses.
- It allows the user to generate forecasts for any combination of future years, allowing the user special flexibility in analyzing the timing of economic impacts.
- It accounts for changes in prices, wage rates, migration patterns, labor participation, etc. that are generated from supply and demand movements.
- It is used by a large number of researchers under diverse conditions and has proven to perform acceptably.

The REMI Missouri Economic Model is utilized to forecast economic impacts at the regional and state level. REMI includes a model that has been built for Missouri's 17 economic regions, which are based on commuting and trade flows between counties. The model-building system uses hundreds of programs developed over the last two decades to build customized models for each area using data from the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Department of Energy, the Census Bureau and other public sources. The model is based on past and current research and development, which is subject to peer review and published in academic journals. REMI is currently used by hundreds of governmental agencies, universities, and others. Articles about the model equations and research findings have been published in professional journals such as the *American Economic Review*, *The Review of Economic Statistics*, *the Journal of Regional Science*, and the *International Regional Science Review*.

17 Region REMI Model

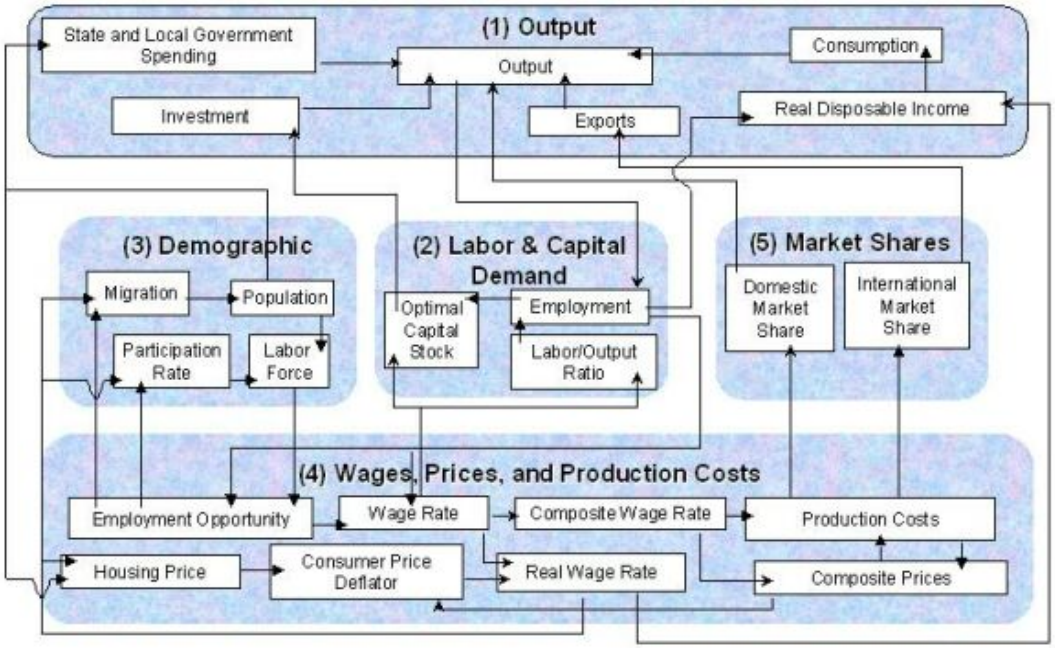




Although the model contains a large number of equations, the five block illustrations on this page describe the underlying structure of the REMI model. Each block contains several components that are shown in rectangular boxes. The lines and arrows represent the interaction of key components both within and between blocks. Most interactions flow both ways indicating a highly simultaneous structure. The *Output Block* linkages form the core of the model. An input-output structure represents the inter-industry and final demand linkages by industry. The interaction between the *Output Block* and the rest of the model is extensive.

Predicted outputs from the Output Block drive labor demand in the *Demand Block*. Labor demand interacts with labor supply in the *Supply Block* to determine wages in the *Wage Rates Block*.

Combined with other factor costs, wages determine relative production costs and relative profitability in the *Wage Rates Block* affecting the market shares and exports in the *Market Shares Block*. Market shares determine the amount of demand supplied locally, which feeds into the *Output Block* and again runs through the above process. Concurrently, the *Supply Block* determines population changes based on employment opportunity, which feeds back into output, wages and government spending.



Economic Impact Example

The following economic impact example is used to illustrate how analysis is conducted and what the results mean.

Scenario: A new manufacturing company locates in Missouri. The firm builds the plant in 2009 and starts operations in 2010. The plant will employ 100 full-time workers.

YEAR ONE: INVESTMENT ACTIVITY ONLY

- The firm will invest $10 million to build the plant in 2009.
- The state offers $1 million in tax credits.
- The firm redeems $500,000 of the tax credits in 2009 and the remainder in 2010.

ANNUAL ECONOMIC IMPACTS	1-YEAR
Employment	118
Population	12
Wage and Salary Income	$3,906,250
Total Personal Income	$4,287,720
Value-Added/Gross State Product	$6,598,948
Total Economic Output	$11,565,896

ANNUAL FISCAL IMPACTS	1-YEAR
General Revenues	$220,963
General Expenditures	$42,952

CUMULATIVE BENEFIT-COST	1-YEAR
Cumulative General Revenues	$263,914
General Revenue Benefit Ratio	**0.53**
Cumulative Total Personal Income	$4,287,720
Personal Income Benefit Ratio	**8.58**
Cumulative Gross State Product	$6,598,948
Gross State Product Benefit Ratio	**13.20**
Cumulative Output	$11,565,896
Output Benefit Ratio	**23.13**
Cumulative State Incentives (Cost Factor)	**$500,000**

Initial capital investment spending creates 118 new jobs in 2009, mostly in construction. Some workers migrate into Missouri which increases the population.

Construction, utilities, professional/tech. services, and other direct investments spur additional economic activity in business sectors that supply inputs. Jobs that result from these direct and indirect activities create further spending in such sectors as retail and food services.

These effects multiply throughout the economy. As each round of spending occurs, a portion of money is spent on imports which leaks income out of the state and eventually halts the impact.

General revenue, primarily individual income taxes followed by sales and corporate income tax, is increased by the investment impact.

General expenditures, typically a negative impact to state government, is positive in year one because reduced payouts from social services offset smaller spending increases in education, public safety, and administration.

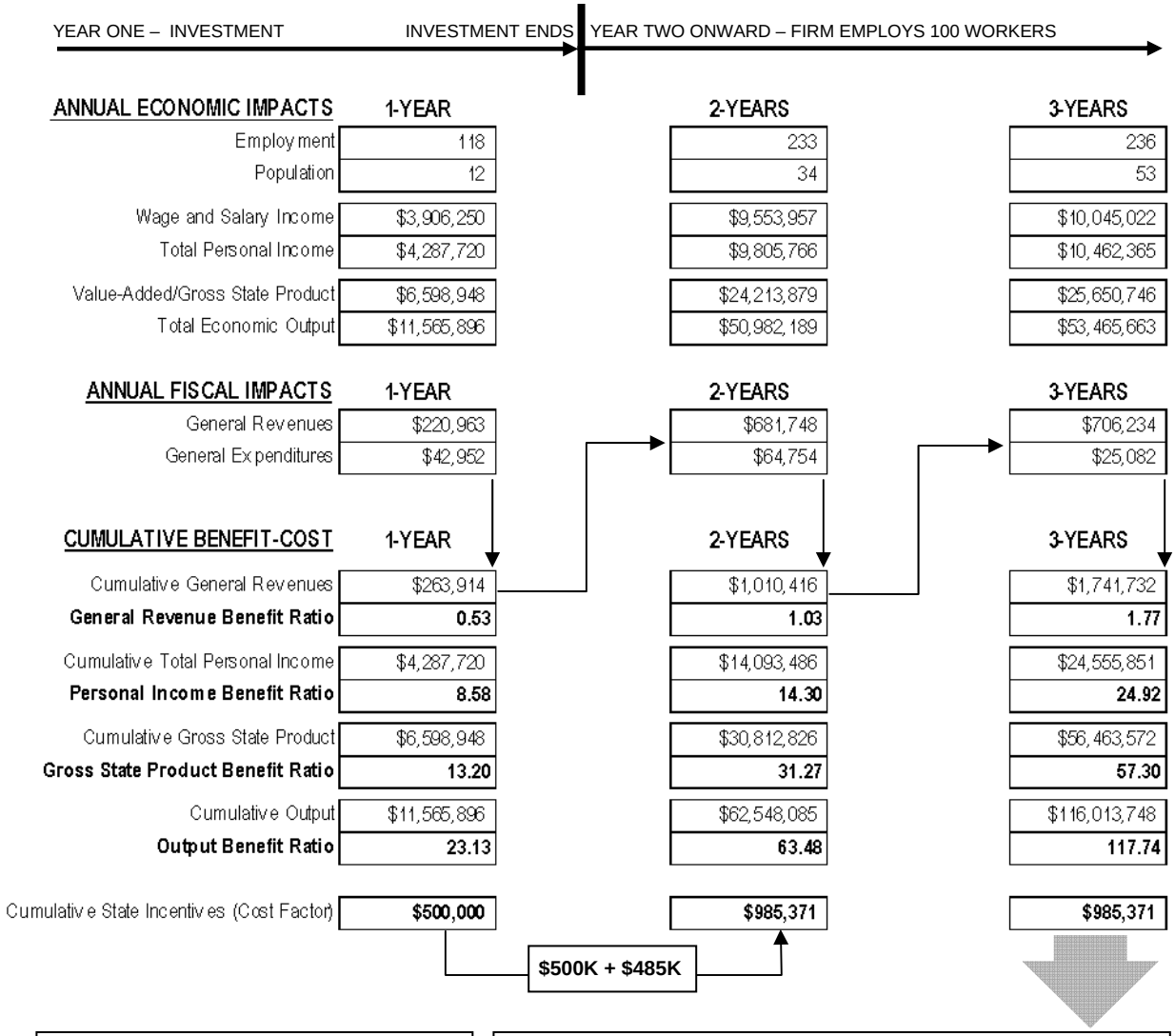
Note: MERIC adjust over two dozen fiscal categories in REMI yearly to reflect Missouri OA budget figures.

Understanding the Benefit Ratio

		GR Incentive	Personal Income Incentive	GSP Incentive
Benefit / Cost	=	$264K / $500K	$4.29M / $500K	$6.60M / $500K
Benefit Ratio	=	0.53	8.58	13.20

ADD YEARS TWO AND THREE: FIRM EMPLOYS 100 WORKERS

- The firm will employ 100 full-time workers starting in 2010. The 100 direct manufacturing jobs create an additional 133 indirect jobs in year two (total of 233) due to the purchase of inputs and spending by new workers.
- The firm redeems remaining $500,000 ($485,371 in current dollars) of tax credits in 2010. Future dollar values are discounted to present value for benefit/cost comparisons.



ANNUAL ECONOMIC IMPACTS	1-YEAR	2-YEARS	3-YEARS
Employment	118	233	236
Population	12	34	53
Wage and Salary Income	$3,906,250	$9,553,957	$10,045,022
Total Personal Income	$4,287,720	$9,805,766	$10,462,365
Value-Added/Gross State Product	$6,598,948	$24,213,879	$25,650,746
Total Economic Output	$11,565,896	$50,982,189	$53,465,663

ANNUAL FISCAL IMPACTS	1-YEAR	2-YEARS	3-YEARS
General Revenues	$220,963	$681,748	$706,234
General Expenditures	$42,952	$64,754	$25,082

CUMULATIVE BENEFIT-COST	1-YEAR	2-YEARS	3-YEARS
Cumulative General Revenues	$263,914	$1,010,416	$1,741,732
General Revenue Benefit Ratio	**0.53**	**1.03**	**1.77**
Cumulative Total Personal Income	$4,287,720	$14,093,486	$24,555,851
Personal Income Benefit Ratio	**8.58**	**14.30**	**24.92**
Cumulative Gross State Product	$6,598,948	$30,812,826	$56,463,572
Gross State Product Benefit Ratio	**13.20**	**31.27**	**57.30**
Cumulative Output	$11,565,896	$62,548,085	$116,013,748
Output Benefit Ratio	**23.13**	**63.48**	**117.74**
Cumulative State Incentives (Cost Factor)	**$500,000**	**$985,371**	**$985,371**

$500K + $485K

Benefit Ratio over Time

Beneficial impacts, such as net new General Revenue and Personal Income, are summed up along with the cumulative cost of incentives to develop the Benefit Ratio. All values are discounted to current dollar figures.

Cumulative Benefit Ratio in YEAR THREE

		GR Incentive	Personal Income Incentive	GSP Incentive
Benefit / Cost	=			
Benefit / Cost	=	$1.74M / $985K	$24.55M / $985K	$56.46M / $985K
Benefit Ratio	=	1.77	24.9	57.3