

APPENDIX A

Computing State and County Level Economic Impacts for Missouri Using the IMPLAN Input-Output Model

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Expenditures by the state of Missouri have both direct and indirect impacts on economic activity such as output, employment, labor income and tax revenues across the state. Any changes that the state makes to the current level of funding affects the amount of federal “matching funds” that it receives for a program such as Medicaid. The economic impact of a change in federal dollars for Medicaid is computed using the IMPLAN model, a widely recognized and frequently used economic model from the Minnesota IMPLAN Group (MIG) that was originally developed by the U.S. Forest Service. The current version of IMPLAN (version 2.0) was developed in 2000. The software reads the database for the state of Missouri, creates a complete set of social accounting matrices, the input-output accounts, and derives the predictive multipliers. The software enables the user to make changes in the final demand for goods and services in various sectors of the economy in order to provide results for the impact assessment. In short, IMPLAN helps estimate the broader economic impacts of a given type of business or social investment in a state, county or other geographic region.

An input-output model is a general accounting system for the economy in a geographic region, such as a state or county. Input-output accounting describes commodity flows from producers to intermediate and final consumers. The total industry purchases of commodities, services, employment compensation, value added and imports are equal to the value of the commodities produced. Purchases of final goods drive the model. Industries produce goods and services for final demand and purchase goods and services from other producers. These other producers in turn purchase goods and services. This buying of goods and services (indirect purchases) continues until spillovers from the region (imports and value added) stop the cycle.

After specifying the level of the economy to be studied, the input-output model is constructed from the IMPLAN databases for that region. The IMPLAN model allows the construction of input-output models both at the aggregated state level and at the disaggregated county level. To study the impact of changes in Medicaid expenditures at the state level, a model was constructed for the state of Missouri. The current version of IMPLAN allows one to differentiate among 528 industrial sectors. For the purposes of this study, four health care-related sectors – Doctors and Dentists, Nursing and Protective Care, Hospitals, and Other Medical and Health Services – were aggregated to form a Health Care Services sector for the state of Missouri. Changes in Medicaid expenditures were then introduced into the IMPLAN model as a change in demand for Health Care Services. Once this change is introduced, then all of the other industries in the model adjust to the change. The input-output model accounts for these adjustments across all sectors and derives the impacts on several measures. We focused on the following measures:

- ❖ *Industrial output.* This is a measure of overall business activity. It is based on the gross sales of firms for a year or, in the case of public sector activities, the total expenditures of the public entities. It is a measure that is placed on the productivity or services of the entities that are analyzed. This study uses FY2003 Medicaid expenditures as the base for estimating industrial output.
- ❖ *Labor income.* One component of economic activity is labor income, which can be further divided into earnings and salaries of workers and normal returns to proprietors.

- ❖ **Jobs.** The model measures the number of jobs, not the number of fully employed persons. In manufacturing, nearly all of the jobs are full-time, full-year. In other sectors, like retail trade and recreation and tourism, many jobs are part-time or seasonal. The model does not differentiate among full, part-time or seasonal jobs.
- ❖ **Tax revenue.** The model estimates changes in state and local tax revenue due to changes in the overall level of business activity and labor income. These then generate changes in the income of workers and profits of businesses, changes in sales and excise taxes collected, as well as changes in miscellaneous other tax revenue, including personal and business property taxes collected from individuals and property owners.

The IMPLAN model differentiates economic activity further into the following:

- ❖ **Direct effects.** These are the amounts that are directly associated with the industry or sector being studied or measured. In this case the changes in Medicaid expenditures are examined as they affect the Health Care Services sector in the state of Missouri.
- ❖ **Indirect effects.** These are the amounts associated with a change in inputs for firms that are directly affected by the change in expenditures. These could be raw commodities, manufactured goods, utilities, transportation and other businesses or professional services that would be purchased by health care providers, including doctors and dentists, hospitals and other clinics, among others.
- ❖ **Induced effects.** These are the economic outcomes that result from workers being affected in the direct industry (Health Care Services). The change in demand for inputs (the indirect values) to the Health Care Services sector (the indirect values) translates into a change in the amount that workers (from the input industries) spend from their paychecks in the region. These values are also called household values or household effects.

- ❖ **Total effect.** This is the sum of the direct, indirect and induced values. It generates the multiplier effect of transactions in the region that are attributable to the direct activity that was first measured.

After the economic relationships have been designed, the IMPLAN model calculates the economic multipliers for output, employment, labor income and the impact on tax revenue as a result of the change in economic activity in question. In this study, the *total effect multiplier* is reported. This value is simply the total value divided by the direct value in any of the categories (output, employment, income) that are reported. The change in tax revenue is calculated based on the state and local tax rates assessed on business and personal income, personal and business property taxes, sales and excise taxes. The ratio of total economic activity to the direct activity is calculated, thereby measuring how much the entire state economy reacted per a one-unit change in the direct measure. The total multiplier is used to compute the aggregate economic impact of changes in “federal matching” Medicaid expenditures due to changes in state Medicaid expenditures.

County Level Impacts

Changes in state Medicaid expenditures affect counties across the state in different magnitudes. Some of the larger counties, such as Jackson County, St. Louis County and St. Louis City are large urban population centers with a greater share of Medicaid eligible households compared to smaller rural communities. To study the impact of changes in Medicaid expenditures at a local level, IMPLAN models were constructed for every county in the state. The number of industrial sectors at the county level varies depending on the size of the county and the diversity of the county economic base. As with the state model, county level IMPLAN models were constructed by aggregating across the four health care related sectors to construct a Health Care Services sector for each county. Medicaid expenditures were allocated to each county in proportion to the actual reported FY2003 county Medicaid expenditures of the total state FY2003 Medicaid expenditures.⁴³ The aggregate effects on output, employment, and income were then calculated for each county using the same procedure described above for state level effects.

It should be noted that county-level impact multipliers are generally smaller than the state-level impact multipliers and expenditures. This is because businesses located in one county are likely to purchase inputs from many other counties in the state, and labor income earned in one county are likely to spillover as expenditures in the surrounding counties. These inter-county spillovers result in smaller county-level impact multipliers. The state-level multipliers net out the inter-county spillovers, and thus are generally larger than individual county level multipliers.⁴⁴ As a result, the sum of the county level economic impact of a change in Medicaid expenditure is smaller than the impact computed using the state level IMPLAN model.

Impact of Reduced Federal Matching Funds for Medicaid

Medicaid expenditures in the state of Missouri are financed from the state's own funds and matching grants from the federal government. The amount the state receives from the federal government depends on the federal matching rate for the state of Missouri. For general state expenditures on Medicaid the proposed matching rate for 2005 is 61.15 percent and 72.81 percent for the SCHIP program. The matching rate can be used to compute the federal matching funds that will flow into the state. For each one dollar that the state spends on Medicaid, the federal government will contribute $((1/(1-\text{matching rate})) - 1)$ toward Medicaid expenditures in the state. Therefore, for every dollar of its own revenue that Missouri allocates towards general Medicaid expenditures, the federal government allocates an additional \$1.574 to the state to spend on Medicaid. Similarly, for each dollar of its own revenue that the state allocates for the SCHIP program, the federal government allocates an additional \$2.678 to the state.⁴⁵

The federal matching funds are a significant source of revenue for the state. Cuts in state revenue allocated to Medicaid result in the loss of a substantial amount of federal matching funds. In FY2003 Missouri spent \$4.49 billion on Medicaid.⁴⁶ Out of that, approximately \$1.744 billion came from state revenue while the remaining \$2.745 billion came from federal matching grants.^{47, 48}

If the state were to cut approximately 5 percent from the state portion of general Medicaid spending, the state would save about \$87.2 million. This cut in state Medicaid expenditures will trigger a loss of \$137 million in federal matching funds. The loss in federal matching funds will adversely affect economic activity, employment in the state and also lead to a reduction in state and local tax revenue. Because the SCHIP program has a higher matching rate than Medicaid, a reduction in state SCHIP expenditures will lead to a proportionately larger loss of federal matching funds and a proportionately larger loss of economic activity, employment and tax revenue.

It should be noted that the results presented in this study understate the overall economic impact of Medicaid and the impact of cuts in state Medicaid spending to the extent that FY2003 state Medicaid expenditures understate future state Medicaid expenditures.

The economic impact of the lost federal matching funds is estimated using the IMPLAN model. Lost federal matching funds reduce output, employment, labor income and tax revenue in the state and these adverse impacts are reported in the text of the report. Medicaid expenditures are distributed among the counties according to the shares of Medicaid expenditures reported for FY2003.⁴⁹ Given differences in Medicaid eligible populations in different localities in the state, urban regions such as St. Louis City, St. Louis County and Jackson County receive larger shares of Medicaid expenditures. Cuts in Medicaid spending, therefore, have comparatively larger economic effects in these communities. The IMPLAN model is used to estimate how the loss in federal matching grants affects economic activity in each county in Missouri.