AAMC Economic Impact Analysis Using IMPLAN

Technical Documentation

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Introduction

It has become common today to measure the economic contributions to the regional economy of an organization and its members. The demand for these studies is driven by the desire to give concrete evidence and deliver economic messages to diverse audiences about the value organizations provide to the communities where they operate.

A standard way of thinking about the size of economic contributions is to collect data for an organization's direct expenses. For example, Association of American Medical Colleges (AAMC) member teaching hospitals' annual operating expenses totaled about $241 billion in fiscal year 2015, while member medical schools' annual operating expenses totaled $119 billion in fiscal year 2016. These are economically significant figures, amounting to about $1,100 per U.S. resident. But focusing on only these direct operating expenses misses the value of other secondary economic activity brought about by AAMC member teaching hospitals and medical schools. Economists at the U.S. Bureau of Economic Analysis (2013) describe these secondary (or indirect) impacts in this way:

An initial change in economic activity results in other rounds of spending—for example, building a new road will lead to increased production of asphalt and concrete. The increased production of asphalt and concrete will lead to more mining. Workers benefiting from these increases will spend more, perhaps by eating out at nicer restaurants or splurging more on entertainment. (p. 1-1)

Economists often point out that secondary impacts should be estimated because they provide an indicator of the additional value of an organization's regional economic contributions. In other words, including secondary impacts provides a more complete picture of the full economic contributions of an organization.

The full economic contribution is frequently summarized by a ratio called a "multiplier." The ratio relates the total change in the economy with the initial change brought about by industry spending. For example, an employment multiplier of 2 indicates that the creation of a job in one sector will create an additional job in another sector of the local economy; in other words, it has a total effect of 2 jobs.

Goals of Technical Documentation

The goal of this technical documentation is to describe how RTI International measured the full economic contribution of AAMC member operations, both direct and secondary impacts, on the national and state levels.

General Questions[1]

What economic model is used to estimate the economic impacts?

To illustrate an economic story and provide estimates of the size of the economic contributions made by AAMC member teaching hospitals and medical schools, this analysis used commercially available economic data and software called IMPLAN.

The IMPLAN model uses publicly available economic data to calculate all of the economic multipliers and uses them to estimate and break down the total impact into three separate effects:

1. direct effects;
2. indirect effects; and
3. induced effects.

The direct effect is associated with AAMC member teaching hospitals and medical schools that provided patient care, research, and education. To support these missions, the AAMC member teaching hospitals and medical schools incur expenses in two broad areas: (1) expenses related to purchases from other local businesses, and (2) payroll expenses for teaching hospital and medical school employees. The first expense area creates a series of "indirect effects," while the second expense area contributes to a series of "induced effects."

Direct effects represent the money spent by individuals, businesses, and other institutions for the patient care, research, and education that is provided by AAMC member teaching hospitals and medical schools. Indirect effects represent first-round money spent by AAMC members, and subsequent rounds of money represent money spent among local businesses. The first-round money includes the money spent on items such as medical devices, lab equipment, computer supplies, and public relations campaigns. Subsequent rounds of money (or indirect effects) include the money spent further upstream on items such as electronic parts for the medical devices or computers.

The last effect, the induced effect, includes all money spent by the employees who receive salaries and benefits from jobs created by AAMC members and local businesses on purchases such as those from retail clothing stores, restaurants, movie theaters, and other local businesses.

Breaking out and examining the two types of secondary effects (indirect and induced effects) helps illustrate the types of economic relationships in a large economy and the stories behind the multiplier. For example, industries that hire many employees or pay higher than average wages will tend to create larger induced effects and smaller indirect effects. In contrast, industries that are not as "labor

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1. Some of these questions are from a report by Ambargis et al. (2014).

intensive" and instead spend money on materials, energy, and other supplies will tend to create larger indirect effects.

What is the direct effect included in the analysis?

We evaluated the direct economic impact using the total value of operating expenses for AAMC member medical schools using the most recently available data: from FY 2016 for medical school expenditure data and FY 2015 for teaching hospital expenditure data.

Medical school expenditures come from the Liaison Committee on Medical Education (LCME) Part I-A Annual Medical School Questionnaire and include the total amount of operating expenditures from medical schools for fiscal year 2016 from sources such as tuition and fees, government and parent university support, grants and contracts, faculty practice plans, affiliated hospital support, gifts and endowments, and others. These expenditures are based on the sum of recorded expenditures plus not-recorded expenditures. Recorded expenditures are recorded in medical school accounts. Not-recorded expenditures materially benefit the medical school but are not recorded in medical school accounts (i.e., the medical school does not have direct control over these expenditures). Not-recorded expenditures may appear on the accounts of, for example, the medical school's parent university.

Medical school expenses are attributed to the state of the main campus for those medical schools that may have out-of-state programs. The reason for this approach is that the data do not exist at the program level. For example, the jobs and economic impact for the state of Washington reflect the University of Washington School of Medicine's regional WWAMI programs in Alaska, Idaho, Montana, Washington, and Wyoming. Despite this data limitation, it should be acknowledged that each out-of-state program has its own local impact on jobs and the economy.

Fiscal year 2015 hospital total direct expenses include inpatient, outpatient, and other hospital-based expenditures such as home health aides, as well as the direct costs of providing graduate medical education, conducting research, and running physicians' offices. Direct expenses come from the Healthcare Cost Report Information System (HCRIS) database, assembled by the Centers for Medicare and Medicaid Services (CMS), which contains actual expense data.

The economic contributions associated with the two relevant IMPLAN sectors (junior colleges, colleges, universities, and professional schools [IMPLAN code 473] and hospitals [IMPLAN code 482]) are measured with a commercially available input-output model. We used the IMPLAN 51-state data package for 2013 version 1.3 (50 U.S. states and the District of Columbia). For Puerto Rico, we used the 2015 data package purchased with resources provided by the AAMC under this project. Given that the level of expenditures is determined by our input data to the IMPLAN model, this difference in data source years does not bias our results for Puerto Rico.

Within the IMPLAN modeling tool, total expenses are treated as a change in industry output activity. We specified the event year as 2015 and report the results in 2017 dollars using price indices included in the IMPLAN software.

Are any contributions to the local economy that are measured by something other than an input-output model (for example, returns to human capital) separately identified?

No, the economic value of items such as human capital and cultural amenities is not included in this analysis. Examples of human capital include skills, knowledge, and experience obtained by individuals through education, mentoring, and other training.

How are indirect impacts defined (for example, upstream, downstream, or a combination of upstream and downstream)?

We include upstream effects, referred to by IMPLAN as indirect effects, which measure "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 leaks from the local economy, either through imports or by payments to value added. The impacts are calculated by applying direct effects to the type I multipliers" (IMPLAN Glossary 2018). The indirect effects are added to the direct and induced effects to calculate the total effect.

What geographic region is used to measure the economic contributions?

The primary analysis considers the entire contribution to the United States. RTI completed independent supplemental analyses using individual state-level IMPLAN models to estimate state-level contributions. A total of 47 models were run independently. These models include Washington, D.C., and Puerto Rico but exclude those states where no AAMC member teaching hospital or medical school is located: Wyoming, Idaho, Montana, and Alaska.

The primary economic impact results use the national model that includes trade and interactions among all U.S. states. Supplemental single-state model runs provide more granular estimates of the local state economic impacts. Using single-state models takes advantage of the economic diversity of industry trade and income linkages across states. There are, however, limitations associated with single-state IMPLAN analysis because the sum of the secondary effects (indirect and induced) cannot be estimated because some economic activities take place outside of the state. In other words, some of the spending "leaks" outside of the state economy. As a result, the size of the secondary effects are smaller relative to a national model. It is not appropriate to add up the economic impact results for supplemental IMPLAN single-state model results to create the national total impact numbers.

Operating Expenses

Are expenses used to measure the general operations, and are these expenses used with a single multiplier?

Yes, we applied the operating expenses as a measure of general operations and used a single multiplier for universities associated with IMPLAN code 473.

Do the operating expenses include those related to student services (for example, on-campus housing, cafeterias, and bookstores)?

Yes, the data sources for medical school operating expenses do include these spending categories.

Are the operating expenses adjusted to avoid double-counting the impact of local households?

Since the analysis is designed to estimate the total gross economic contributions, it is not appropriate to adjust the value of expenses to exclude expenses paid by students who are already living in the defined economic region.

Are expenses related to the operation of a teaching hospital separately identified, and are these expenses used with a single multiplier for hospitals?

Yes, expenses related to the operation of a teaching hospital are separately identified, and these expenses are used with a single multiplier for hospitals.

Capital Investment

Is the impact of spending on new construction, equipment, and software separately estimated?

No, capital investment expenditures were not available in sufficient detail to identify which specific IMPLAN industry received capital investment payments. As a result, the aggregate capital expenditures are included in total expenses for the IMPLAN model runs.

Student Spending

Is the impact of student spending based on survey data that separately identifies the types of goods or services that students purchase, and is this information applied to the appropriate multiplier?

No, the impact of student spending is not separately estimated in this analysis because detailed survey data were not available. In other words, data could not be obtained for the types of goods and services each student buys.

However, to the extent that payrolls include students, the analysis does estimate the secondary (i.e., induced) impacts brought about by the student spending of this income. In this case, the IMPLAN model uses the average expenditure patterns of households in the economy to determine the types of goods and services purchased.

Visitor Spending

Is visitor spending on only long-term or frequently reoccurring events included in the analysis?

No, the impact of visitor spending is not estimated in this analysis because detailed survey data were not available. In other words, data were not available to identify the number of visitors from outside of the local economy, the duration of their stay, and the amount of money spent on each good and service within the local economy. Omitting this effect would understate the local economy impacts because it excludes this additional visitor spending. For the national model, the excluded visitors would live outside of the United States. For the state-level models, the excluded visitors would live outside of the state. In the state-level analyses, visitor spending has a positive effect on the state being visited but also an offsetting negative effect on the state where the visitor resides.

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Appendix A. Technical Glossary

Definitions of Effects

direct effect: The total output, value added, labor income, and jobs associated with the money spent by individuals, businesses, and other institutions for patient care, research, and education that is provided *by AAMC member* medical schools and teaching hospitals.

indirect effect: The additional total output, value added, labor income, and jobs created by the first-round money spent *by AAMC members* and the subsequent rounds of money spent among local businesses. The money could be spent in the first round on items such as medical devices, lab equipment, computer supplies, and public outreach campaigns. Subsequent indirect effects include the money spent further upstream on items such as electronic parts for the medical devices or computers.

induced effect: The additional total output, value added, labor income, and jobs created as employees at AAMC member institutions spend labor income at retail clothing stores, restaurants, movie theaters, and other local businesses. Other additional induced effects occur because other jobs are created for other local businesses; the new employees at those businesses spend their labor income at retail clothing stores, restaurants, movie theaters, and other local businesses.

Definitions of Economic Impact Variables

jobs: The annual average full-time and part-time jobs supported by AAMC member teaching hospitals and medical schools. As with effects, jobs are classified as direct, indirect, or induced.

labor income: All types of employment income such as employee salaries, employee retirement, and health benefits, and all payroll taxes. As with effects, labor income is classified as direct, indirect, or induced.

total output: The total money received by an industry from a household, business, government, or other institution. As with effects, outputs are classified as direct, indirect, or induced.

total value added: The contribution to the state and U.S. gross domestic product. Total value added includes employee salaries, employee retirement and health benefits, and all payroll taxes. In addition, certain sales and property taxes and other operational fees are included. Total value added is distinguished from total output because it excludes non-salary, tax, and operational-fee-related operating expenses. Examples of these expenses include supplies and equipment, heating and air conditioning, and other maintenance expenses. As with effects, value added is classified as direct, indirect, or induced.

Appendix B. IMPLAN Glossary

direct effects: The set of expenditures applied to the predictive model (i.e., input-output [I/O] multipliers) for impact analysis. It is a series (or single instance) of production changes or expenditures made by producers/consumers as a result of an activity or policy. These initial changes are determined by an analyst to be a result of this activity or policy. Applying these initial changes to the multipliers in an IMPLAN model will then display how the region will respond economically to these initial changes.

indirect effects: 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 leaks from the local economy, either through imports or by payments to value added. The impacts are calculated by applying direct effects to the type I multipliers.

induced effects: The response by an economy to an initial change (direct effect) that occurs through respending 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 a leakage to the regional economy. This money is recirculated through household spending patterns, causing further local economic activity.

jobs: The annual average of monthly jobs in that industry (this is the same definition used by the Quarterly Census of Employment and Wages, the Bureau of Labor Statistics [BLS], and the Bureau of Economic Analysis [BEA] nationally). Thus, 1 job lasting 12 months = 2 jobs lasting 6 months each = 3 jobs lasting 4 months each. A job can be either full-time or part-time. IMPLAN jobs can be converted to full-time equivalents (FTEs). Also note that an FTE by the BLS definition is 35+ hours.

labor income: All forms of employment income, including employee compensation (wages and benefits) and proprietor income.

output: Output represents the value of industry production. In IMPLAN, these are annual production estimates for the year of the data set and are in producer prices. For manufacturers, this would be sales plus/minus change in inventory. For service sectors, production equals sales. For retail and wholesale trade, output equals gross margin and not gross sales.

total federal tax impact: All federal taxes generated by economic activity.

total state and local tax impact: All state and local taxes generated by economic activity.

value added: The difference between an industry's or an establishment's total output and the cost of its intermediate inputs. It equals gross output (sales or receipts and other operating income, plus inventory change) minus intermediate inputs (consumption of goods and services purchased from other industries or imported). Value added consists of compensation of employees, taxes on production and imports minus subsidies (formerly indirect business taxes and nontax payments), and gross operating surplus (formerly "other value added") (BEA). Gross value added is the value of output less the value of intermediate consumption; it is a measure of the contribution to gross domestic product (GDP) made by an individual producer, industry, or sector; gross value added is the source from which the primary incomes of the System of National Accounts (SNA) are generated and is therefore carried forward into the primary distribution of income account (SNA).

Source: IMPLAN Glossary. https://implanhelp.zendesk.com/hc/en-us/sections/115002653168-Glossary. Accessed March 9, 2018.