

The Economic and Fiscal Impacts of the University of Maryland, Baltimore on Baltimore City

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Executive Summary

The University of Maryland, Baltimore (UMB) is the fourth largest employers in Baltimore City¹ and with employment of 7,975 is the seventh largest employer in the Baltimore Metropolitan Area²; is the core public provider of health and professional educational services in Maryland and the second largest university in the City; and is the second largest university performer of research in Baltimore City. UMB impacts the City of Baltimore in many ways. The University has its main impact on the City by fulfilling its education and research mission and serving as a source of skilled and educated workers and generator knowledge and new technologies for the City, regional and State economy; however, UMB also has a significant impact on the City's economy through its operations. The University is a major source of economic activity through its purchases of goods and services from Baltimore City suppliers and the jobs held by and salaries that it pays to its Baltimore City resident workforce.

The Baltimore City economic activity generated by the University is presented in the Summary Table below. Total University spending of almost \$1.6 billion generates \$347.0 million in *Indirect Impacts*, from local purchases, and \$438.1 million in *Induced Impacts*, from the increase in City incomes associated with the University, for a total impact on the Baltimore City economy of almost \$2.4 billion. Total direct university employment of 7,975 and an additional 179 jobs directly generated by UMB's capital spending are augmented by an estimated 4,878 multiplier effect jobs, for a total employment impact of 13,031 jobs. There is a total of almost \$1.2 billion in labor income associated with these jobs and the 13,031 Baltimore City jobs created or supported by UMB represent nearly 4 percent of total jobs in the City.

Table ES1: Baltimore City Economic Activity Generated by the University of Maryland, Baltimore FY2018

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$1,592.9	\$867.3	8,154	\$52.6
Indirect	\$347.0	\$129.4	2,057	\$15.3
Induced	<u>\$438.1</u>	<u>\$159.5</u>	<u>2,821</u>	<u>\$23.7</u>
Total	\$2,378.0	\$1,156.2	13,031	\$91.6

Source: UMB, JFI and IMPLAN

The economic activity supported by the university generates an estimated \$91.6 million in combined state and local government revenues, including an estimated \$45.3 million in estimated City of Baltimore government revenues.³ While caution must be exercised in interpreting the high level government revenue estimates derived from the IMPLAN model, these estimated City fiscal impacts include:

- An estimated \$30 million in property taxes paid by City residents employed or supported by and City companies providing goods and services to the University;
- An estimated \$8 million in City income taxes from the jobs directly or indirectly supported by UMB; and
- An estimated \$7.2 million in other City government revenues.

¹ <http://commerce.maryland.gov/Documents/ResearchDocument/BaltCityBef.pdf>.

² Based on BBJ Book of Lists data – UMB is not in the report but was ranked based on employment.

³ The IMPLAN model estimates aggregated state and local government revenues. These were decomposed into their estimated state and local government revenue shares based on data from the U.S. Bureau of the Census government finances data.

Economic and Fiscal Impact Analysis

This report provides an analysis of the economic activity created by the operations of the University of Maryland, Baltimore, in Baltimore City. As described in the methodology section below, this analysis uses the IMPLAN model for the City of Baltimore to estimate the economic impacts associated with the operations, student expenditures and other related spending on the City. IMPLAN is one of the most widely used and respected models in the nation. The IMPLAN input/output model estimates the broader supply chain and employee spending impacts associated with the University in order to estimate both the linkages between and impacts of the University on the larger Baltimore City economy. These linkages are termed the “multiplier effects” of the University and measure UMB’s contribution to the overall City economy.

University of Maryland, Baltimore Revenues and Operations in Maryland

The first step in modeling the Baltimore City economic impacts associated with UMB is to estimate the direct effects, or the changes in final demand in the affected industries. In this analysis, the direct effects are the spending associated with the educational, patient care, and research operations and capital spending of the University of Maryland, Baltimore. Once these direct effects are estimated, they can be entered into an economic model to determine the change in output (a measure similar to business sales volume which measures the level of business and economic activity in a state or region), employment, and labor income attributable to the University of Maryland, Baltimore. UMB impacts the Maryland economy through five primary revenue and spending areas:

1. **Operating Revenues** – the \$1.2 billion in tuition, research, and related academic revenues of UMB and its seven component schools;
2. **Student Expenditures** – the \$67.8 million in living expenses by the UMB’s full time students. This was estimated based on full time enrollment multiplied by program-specific cost of living data for students based on available university cost of attendance data.⁴ No data were available on the place of residence of these students – so it was assumed that half live in the City;
3. **UMB Foundation** – the \$26.8 million in spending by the University of Maryland. Baltimore Foundation to support the educational and research mission of the university;
4. **FPI** – the \$319.2 million in patient care revenues associated with University of Maryland Faculty Physicians, Inc., the UMB School of Medicine’s health care delivery system; and
5. **Capital Spending** – the \$39.0 million in capital and construction spending by UMB in FY2018.

As presented in Table 1, in fiscal 2018, the University, its affiliated institutions, its students, and capital spending directly generate a total of \$1.66 billion in revenues and expenditures in the City. The University and its affiliated institutions directly employed or supported 7,975 workers who earned \$850.3 million in salaries and benefits. These revenues and expenditures represent the direct effects of the University of Maryland, Baltimore.

⁴ This analysis only includes the cost of living for full time students because these are the students retained in or attracted to Maryland by UMB. Part time students would presumably attend another Maryland college or university in the absence of UMB; however, because of the unique programs offered by UMB, many of which have only limited competing programs, this assumption is conservative and the actual levels of student living expenses could be higher. In order to void double counting with UMB’s operational impacts, all salaries and wages paid to students by the university were excluded from this analysis.

Table 1: Total Baltimore City Revenues Employment and Payroll Associated with the University of Maryland, Baltimore and Its Affiliated Institutions, Fiscal 2018

Source: UMB

Item	Millions of \$s
Total Revenues/Spending	\$1,664.5
Operating Revenues	\$1,211.6
Student Expenditures ^{1 2}	\$67.8
UMB Foundation	\$26.8
MSP-FPI	\$319.2
Capital Spending	\$39.0
Total Employment (# of Jobs)	7,975
Total Payroll and Fringe	\$850.3

(1) Less Student Stipends

(2) It was assumed 50% of students live in the City

Source: UMB

The Economic Impact of University of Maryland, Baltimore on the City of Baltimore

The University of Maryland, Baltimore is a significant source of economic activity in Baltimore City, generating a total of \$2.4 billion in economic activity, supporting 13,031 jobs earning nearly \$1.2 billion in labor income, and generating \$91.6 million in combined state and local government revenues, including an estimated \$45.3 million in City government revenues. Total direct University spending of \$1.6 billion generates \$347.0 million in *Indirect Impacts*, from purchases of goods and services from Baltimore City suppliers to support the educational, medical and research mission of the university, and \$438.1 million in *Induced Impacts*, from the increase in City incomes associated with the University, for a total impact on the Baltimore City economy of almost \$2.4 billion. Total direct university employment of 7,975 and 179 direct construction-related jobs generated by UMB's capital spending are augmented by an estimated 4,878 multiplier effect jobs, for a total City employment impact of 13,031 jobs. There is a total of almost \$1.2 billion in salaries and wages associated with these 13,031 jobs. ***Including direct and multiplier effect employment, UMB directly or indirectly supports 4 percent of all jobs in Baltimore City.*** The economic activity supported by the university generates an estimated \$91.6 million in combined state and local government revenues, including an estimated \$45.3 million in Baltimore City revenues.

Table 2: Baltimore City Economic Activity Generated by UMB, FY2018

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct ¹	\$1,592.9	\$867.3	8,154	\$52.6
Indirect	\$347.0	\$129.4	2,057	\$15.3
Induced	<u>\$438.1</u>	<u>\$159.5</u>	<u>2,821</u>	<u>\$23.7</u>
Total	\$2,378.0	\$1,156.2	13,031	\$91.6

(1) Direct jobs include the 7,975 jobs at UMB plus 179 direct construction-related jobs associated with UMB Capital Spending.

Source: UMB, JFI and IMPLAN

The University of Maryland, Baltimore is clearly an important source of economic activity for the Baltimore City economy and in order to better describe its role in the City's economy, the contribution of each of the major revenue and expenditure categories to UMB's total City impact is presented in Table 3, and the contribution of each of the university's seven major schools is presented in Table 4. Key highlights of these analyses are as follows:

- UMB's operating expenditures generate 74 percent of the City economic activity and 76 percent of the City jobs associated with the University (Table 3);
- UMB Capital Expenditures generate 2 percent of the City economic activity and 2 percent of the City jobs associated with the University (Table 3);
- Student expenditures generate 3 percent of the City economic activity and 3 percent of the City jobs associated with the University (Table 3);
- The UMB School of Medicine generates 47 percent of the City economic activity and 43 percent of the City jobs associated with the University (Table 4);
- FPI generates 20 percent of the City economic activity and 17 percent of the City jobs associated with the University (Table 3 and 4); and
- University Central Administration, which includes expenditures and employment that cannot be allocated to an individual school, is the third largest contributor to UMB's impacts, generating 12 percent of the City economic activity and 11 percent of the City jobs associated with the University (Table 4).

The full individual Baltimore City economic impact analyses for each UMB revenue and expenditure categories, and for each of the six individual schools are presented in the Appendix to this report.

Table 3: Baltimore City Economic Activity Generated by UMB, by Revenue/Expenditure Area, FY2018

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Total	<u>\$2,378.0</u>	<u>\$1,156.2</u>	<u>13,031</u>	<u>\$91.6</u>
Operating Expenditures	\$1,760.9	\$936.5	9,913	\$73.1
Student Expenditures	\$62.2	\$22.9	413	\$3.2
UMB Foundation	\$39.5	\$21.5	292	\$1.7
MSP-FPI	\$468.5	\$158.5	2,168	\$12.4
UMB Capital Spending	\$46.9	\$16.8	246	\$1.3

Source: UMB, JFI and IMPLAN

Table 4: Baltimore City Economic Activity Generated by UMB, by School, FY2018

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Total	<u>\$2,378.0</u>	<u>\$1,156.2</u>	<u>13,031</u>	<u>\$91.6</u>
School of Dentistry	\$103.5	\$50.0	570	\$4.3
School of Law	\$57.6	\$33.9	428	\$2.6
School of Medicine	\$1,106.4	\$596.6	5,641	\$46.3
School of Nursing	\$82.8	\$43.8	755	\$3.6
School of Pharmacy	\$91.3	\$50.1	545	\$3.9
School of Social Work	\$79.7	\$41.7	622	\$3.4
Graduate School	\$19.0	\$22.8	321	\$1.3
University Central Administration	\$282.8	\$120.5	1,443	\$10.9
UMB Foundation	\$39.5	\$21.5	292	\$1.7
MSP-FPI	\$468.5	\$158.5	2,168	\$12.4
UMB Capital Spending	\$46.9	\$16.8	246	\$1.3

Source: UMB, JFI and IMPLAN

The Economic Impact of University of Maryland, Baltimore Capital Expenditures on Baltimore City

The University of Maryland, Baltimore has benefitted tremendously from major capital projects to support and expand its core educational and research mission. Most recently, UMB completed its Health Sciences Facility III (HSF3), a state-of-the-art biomedical research facility that will allow for the expansion of the School of Medicine's (SOM) research operations in a facility designed to improve cross-pollination and interaction among departments, programs, centers, and institutes and increasing the SOM's standing as one of the top research institutions in the country. UMB's current largescale capital project is the \$79.0 million Central Electric Substation and Electrical Infrastructure project, a 16,128 sq. ft. facility that will house a BGE substation and recycling center. UMB will begin construction in FY2019 and the project will be completed in FY2023.

In order to describe the economic importance of UMB's capital expenditures to the City's economy, the detailed economic impacts of UMB's FY2018 capital expenditures were estimated and the total impacts of projected capital spending through FY2020 were also calculated in order to describe the impacts of UMB's capital budget on the City's economy. Key results of these analyses are as follows:

- UMB's FY2018 Capital Spending of \$35.2 million⁵ will directly create 179 construction-related jobs and when multiplier effects are included, will generate \$46.9 million in Baltimore City economic activity, support 246 total jobs earning \$16.8 million in labor income, and generate \$1.3 million in combined state and local government revenues (Table 5); and
- Over the next five fiscal years, UMB's capital spending will range from a high of \$35.2 million in FY2018 and \$13.8 million in FY2022. Over this period, UMB capital expenditures will support almost 500 direct construction related jobs in Baltimore City and 686 total City jobs when multiplier effects are included.

Table 5: Baltimore City Economic Activity Generated by UMB Capital Spending, FY2018

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$35.2	\$12.3	179	\$0.6
Indirect	\$5.8	\$2.3	30	\$0.3
Induced	\$5.9	\$2.1	38	\$0.3
Total	\$44.7	\$16.8	246	\$1.3

Source: UMB, JFI and IMPLAN

Table 6: Baltimore City Economic Activity Generated by the UMB Capital Spending FY2018-2022

	FY 2018 Actual	FY2019 - Plan	FY2020 - Plan	FY2021 - Plan	FY2022 - Plan
Direct	\$35.2	\$17.7	\$16.8	\$14.9	\$13.8
Total Impact					
Output (Mil. \$s)	\$44.7	\$24.0	\$22.7	\$20.3	\$18.7
Labor Income (Mil. \$s)	\$16.8	\$8.5	\$8.1	\$7.2	\$6.7
Employment (Jobs)	246	123	117	104	96
State and Local Government Revenues (Mil. \$s)	\$1.3	\$0.7	\$0.6	\$0.6	\$0.5

Source: UMB, JFI and IMPLAN

⁵ UMB FY 2018 includes purchases of furniture, fixtures and equipment as well as construction. Only the local margin of these purchases were included. Thus the direct effects of UMB Capital expenditures is less than the \$39 million in total spending.

The Baltimore City Fiscal Impacts of University of Maryland, Baltimore

The University of Maryland, Baltimore also has an important fiscal impact on the City of Baltimore. The salaries and wages earned by UMB staff and the jobs created and sustained by university expenditures are subject to state and local income taxes. The many private sector companies providing goods and services to the University pay state corporate income and other business-related taxes. Baltimore City residents holding the jobs created or supported by the University pay property, income, sales and other taxes and fees to state and local governments. These state and local government revenues are projected to total \$91.6 million, including an estimated \$45.3 million in City of Baltimore revenues.⁶ These estimated City fiscal impacts include:

- An estimated \$30 million in property taxes paid by City residents employed or supported by and City companies providing goods and services to the University;
- An estimated \$8 million in City income taxes from the jobs directly or indirectly supported by UMB; and
- An estimated \$7.2 million in other City government revenues.

It is important to note that these estimated City revenues are based on the high level, estimated aggregate state and local government revenue estimates from the IMPLAN model and represent a very rough estimate of Baltimore City government revenues. A more detailed fiscal analysis may yield different results.

⁶ The IMPLAN model estimates aggregated state and local government revenues. These were decomposed into their estimated state and local government revenue shares based on data from the U.S. Bureau of the Census government finances data.

Economic Impact Methodology and Terms

This economic impact analysis of the Baltimore City economic activity supported by UMB used the IMPLAN input-output model for the City of Baltimore. IMPLAN is one of the most widely used models in the nation, and can be used to analyze the impacts of companies, projects, or of entire industries. An input-output analysis examines the relationships among businesses and among businesses and final consumers. Input-output analysis is based on the use of multipliers, which describe the response of an economy to a change in demand or production. Multipliers measure the effects on an economy from a source of economic activity, in this case the revenues and expenditures associated with UMB, its students, its affiliated institutions, and capital spending.

The economic activity generated in a city, county, region or state is greater than the simple total of spending associated with the event or activity being studied. This is because as this money is earned it is, in turn, spent, earned and re-spent by other businesses and workers in the state economy through successive cycles of spending, earning and spending. However, the spending in each successive cycle is less than in the preceding cycle because a certain portion of spending “leaks” out of the economy in each round of spending. Leakages occur through purchases of goods or services from outside of the region and federal taxation. The IMPLAN multipliers used in this analysis capture the effects of these multiple rounds of spending. This analysis focuses on four measures of economic impact:

- **Output.** The total value of production or sales in all industries;
- **Employment.** The total number of full and part time jobs in all industries;
- **Labor Income.** The wages and salaries, including benefits, and other labor income earned by the workers holding the jobs created; and
- **State and Local Government Revenues.** The revenues accruing to the State of Maryland, county, City and municipal governments.

Four measures of the economic activity and impact of the Baltimore City economic activity associated with UMB are included in this report:

- **Direct effects.** The change in economic activity being analyzed—in this case the revenues and expenditures associated with UMB, its students, its affiliated institutions, and capital spending;
- **Indirect effects.** The changes in local, City, inter-industry purchases, for example the purchase of goods and services from a Baltimore City vendor to support UMB’s operations, that occur in response to the change in demand from the directly affected industries;
- **Induced effects.** The changes in spending from households as income and population increase due to changes in production; and
- **Total effects.** The combined total of direct, indirect and induced effects.

Appendix Tables Detailed Economic Impacts of University of Maryland, Baltimore – By Spending Category and School

Appendix Table 1: Baltimore City Economic Activity Generated by UMB Operating Expenditures

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$1,211.6	\$757.6	6,721	\$45.8
Indirect	\$239.9	\$66.4	1,210	\$10.4
Induced	<u>\$309.4</u>	<u>\$112.5</u>	<u>1,982</u>	<u>\$16.9</u>
Total	\$1,760.9	\$936.5	9,913	\$73.1

Source: UMB, JFI and IMPLAN

Appendix Table 2: Baltimore City Economic Activity Generated by UMB Student Expenditures

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$0.0	\$0.0	0	\$0.0
Indirect	\$0.0	\$0.0	0	\$0.0
Induced	<u>\$62.2</u>	<u>\$22.9</u>	<u>413</u>	<u>\$3.2</u>
Total	\$62.2	\$22.9	413	\$3.2

Source: UMB, JFI and IMPLAN

Appendix Table 3: Baltimore City Economic Activity Generated by the UMB Foundation

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$26.8	(*)	(*)	\$1.0
Indirect	\$5.3	\$18.9	244	\$0.2
Induced	<u>\$7.4</u>	<u>\$2.7</u>	<u>47</u>	<u>\$0.4</u>
Total	\$39.5	\$22.4	292	\$1.7

(*) The Direct jobs created by the UMB Foundation are treated as Indirect Impacts.

Source: UMB, JFI and IMPLAN

Appendix Table 4: Baltimore City Economic Activity Generated by FPI

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$319.2	\$97.3	1,254	\$5.2
Indirect	\$96.1	\$41.8	573	\$4.3
Induced	<u>\$53.2</u>	<u>\$19.3</u>	<u>341</u>	<u>\$2.9</u>
Total	\$468.5	\$158.5	2,168	\$12.4

Source: UMB, JFI and IMPLAN

Appendix Table 5: Baltimore City Economic Activity Generated by the UMB School of Dentistry

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$66.4	\$37.7	350	\$2.4
Indirect	\$13.2	\$3.6	66	\$0.6
Induced	<u>\$23.9</u>	<u>\$8.7</u>	<u>154</u>	<u>\$1.3</u>
Total	\$103.5	\$50.0	570	\$4.3

Source: UMB, JFI and IMPLAN

Appendix Table 6: Baltimore City Economic Activity Generated by the UMB School of Law

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$35.0	\$26.2	291	\$1.4
Indirect	\$6.9	\$1.9	35	\$0.3
Induced	<u>\$15.8</u>	<u>\$5.8</u>	<u>102</u>	<u>\$0.8</u>
Total	\$57.6	\$33.9	428	\$2.6

Source: UMB, JFI and IMPLAN

Appendix Table 7: Baltimore City Economic Activity Generated by the UMB School of Medicine

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$750.1	\$480.0	3,560	\$28.6
Indirect	\$148.5	\$41.1	749	\$6.5
Induced	<u>\$207.8</u>	<u>\$75.5</u>	<u>1,332</u>	<u>\$11.3</u>
Total	\$1,106.4	\$596.6	5,641	\$46.3

Source: UMB, JFI and IMPLAN

Appendix Table 8: Baltimore City Economic Activity Generated by the UMB School of Nursing

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$48.8	\$32.2	547	\$1.9
Indirect	\$9.7	\$2.7	49	\$0.4
Induced	<u>\$24.3</u>	<u>\$8.9</u>	<u>159</u>	<u>\$1.3</u>
Total	\$82.8	\$43.8	755	\$3.6

Source: UMB, JFI and IMPLAN

Appendix Table 9: Baltimore City Economic Activity Generated by the UMB School of Pharmacy

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$56.9	\$38.5	338	\$2.2
Indirect	\$11.3	\$3.1	57	\$0.5
Induced	<u>\$23.1</u>	<u>\$8.5</u>	<u>150</u>	<u>\$1.2</u>
Total	\$91.3	\$50.1	545	\$3.9

Source: UMB, JFI and IMPLAN

Appendix Table 10: Baltimore City Economic Activity Generated by the UMB School of Social Work

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$48.3	\$31.1	431	\$1.8
Indirect	\$9.6	\$2.6	48	\$0.4
Induced	<u>\$21.9</u>	<u>\$8.0</u>	<u>143</u>	<u>\$1.2</u>
Total	\$79.7	\$41.7	622	\$3.4

Source: UMB, JFI and IMPLAN

Appendix Table 11: Baltimore City Economic Activity Generated by the UMB Graduate School

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$3.5	\$17.1	220	\$0.5
Indirect	\$0.7	\$0.2	4	\$0.0
Induced	<u>\$14.8</u>	<u>\$5.5</u>	<u>98</u>	<u>\$0.8</u>
Total	\$19.0	\$22.8	321	\$1.3

Source: UMB, JFI and IMPLAN

Appendix Table 12: Baltimore City Economic Activity Generated by UMB Central Administration Expenditures

	Output (Mil. \$s)	Labor Income (Mil. \$s)	Employment (Jobs)	State and Local Government Revenues (Mil. \$s)
Direct	\$202.7	\$94.9	984	\$6.9
Indirect	\$40.1	\$11.1	202	\$1.7
Induced	<u>\$40.0</u>	<u>\$14.5</u>	<u>256</u>	<u>\$2.2</u>
Total	\$282.8	\$120.5	1,443	\$10.9

Source: UMB, JFI and IMPLAN