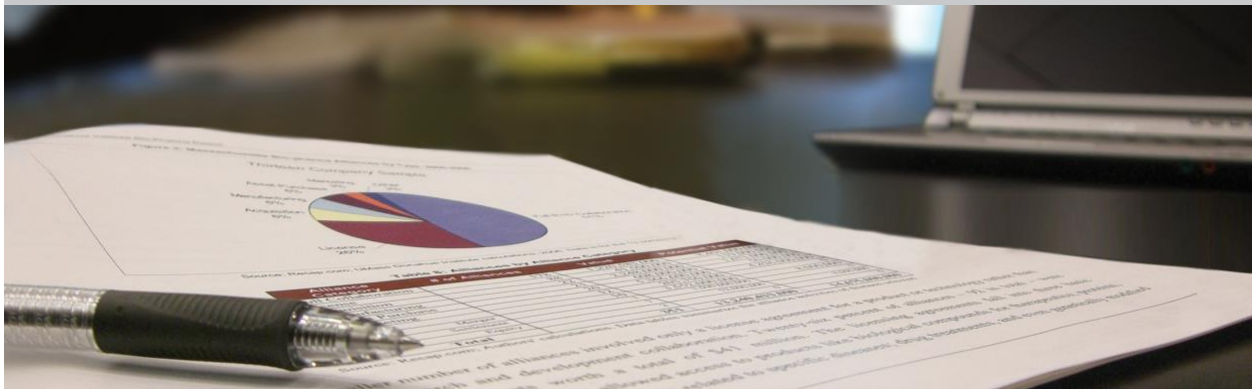


FY22 University of Massachusetts Economic Contribution Analysis

Prepared for the UMass President's Office

October 2023



UMassAmherst

Donahue Institute
Economic and
Public Policy Research

FY22 University of Massachusetts Economic Contribution Analysis

Prepared for the UMass Office of the President

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Executive Summary: UMass System Economic Contributions

The University of Massachusetts System offers invaluable educational opportunities in a wide array of disciplines and engages in important research activities recognized throughout the world. The general public tends to understand UMass's role in these key areas, but is often unaware that the institution is also a major contributor to the statewide economy. UMass not only makes a direct contribution to the Massachusetts economy through the spending and jobs supported by its academic, administration, and construction activities, but also generates a "ripple effect" that leads to an even larger impact in the economy as a result of demand on suppliers of goods and services as well as employee spending.

The purpose of this report is to perform an objective analysis to quantify the economic contributions of the University of Massachusetts System and its five campuses on the Commonwealth's economy. The results of the economic contributions analysis for fiscal year (FY) 2022 indicate that:

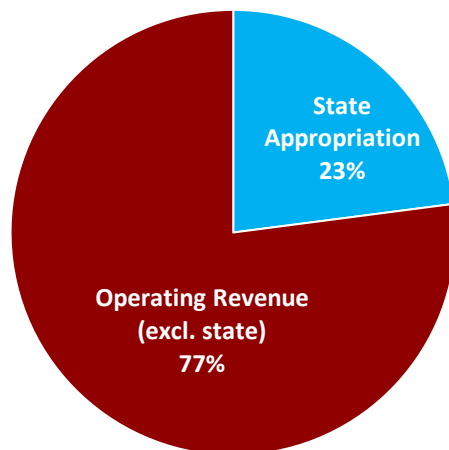
- **The UMass System generated \$8.3 billion in economic activity in FY2022.** The UMass System (across all campuses) is a key economic driver in the Commonwealth, directly or indirectly affecting every person in the state. In FY2022, the University of Massachusetts contributed \$8.3 billion in economic activity to the Massachusetts economy. This includes the contributions of the local operating expenditures of the University, one-time major construction expenditures, the spending of the University's faculty and staff, and students. Much of the UMass spending flows beyond the campuses to a variety of suppliers of goods and services, generating significant benefits for the Massachusetts economy.
- **FY2022 included significant construction at UMass campuses.** Construction spending at the UMass campuses in FY2022 was valued at about \$450 million. Construction projects were financed through University expenditures, the UMass Building Authority and the Commonwealth's Division of Capital Asset Management and Maintenance (DCAMM). Unlike other campus activities such as payroll expenditures, construction on the campuses can spike or fall from year-to-year and thus either amplify or diminish its overall effect on the Massachusetts economy depending on the cycle. The new and renovated facilities, however, continue to play important roles after they are constructed by contributing to the University's competitive position to attract students, employees, and researchers. Benefits to UMass are long-term from new or renovated academic buildings, laboratories, athletic facilities, and other key infrastructure such as heating plants and parking garages.
- **State investment in UMass leverages significantly greater economic activity.** In FY2022, the state's \$880 million investment in the UMass System helped leverage and support \$8.3 billion in economic activity in Massachusetts, an amount nine times greater than the state's investment.
- **UMass employee payroll recirculates through the Massachusetts economy causing positive economic effects.** A notable share of UMass spending also makes its way to employees in the form of salaries and wages, which is then circulated into the Massachusetts economy through typical

household spending activities. In FY2022, the University employed 16,477 full- and part-time faculty and staff (excluding student employees).

- **UMass generates additional jobs beyond the campuses.** The spending of the University, its employees and students helped to support an additional 39,497 jobs in the Commonwealth throughout FY2022. Including faculty and staff, the University supported a total of 55,974 jobs in the Commonwealth.
- **UMass student off-campus spending further supports the Massachusetts economy.** In FY2022, UMass System student enrollment was 64,789 (FTE equivalent students) and these students directly spent a substantial amount of money off-campus in the economy, which, in turn, generated additional economic activity. Seventy-five percent of enrolled students are in-state.
- **Each of the five University campuses generated substantial economic contributions for Massachusetts in FY2022.** By campus, contributions ranged from \$2.9 billion for Amherst and \$2.2 billion for the Medical School, to \$1.2 billion, \$1.2 billion and \$618 million for the Boston, Lowell and Dartmouth campuses, respectively.

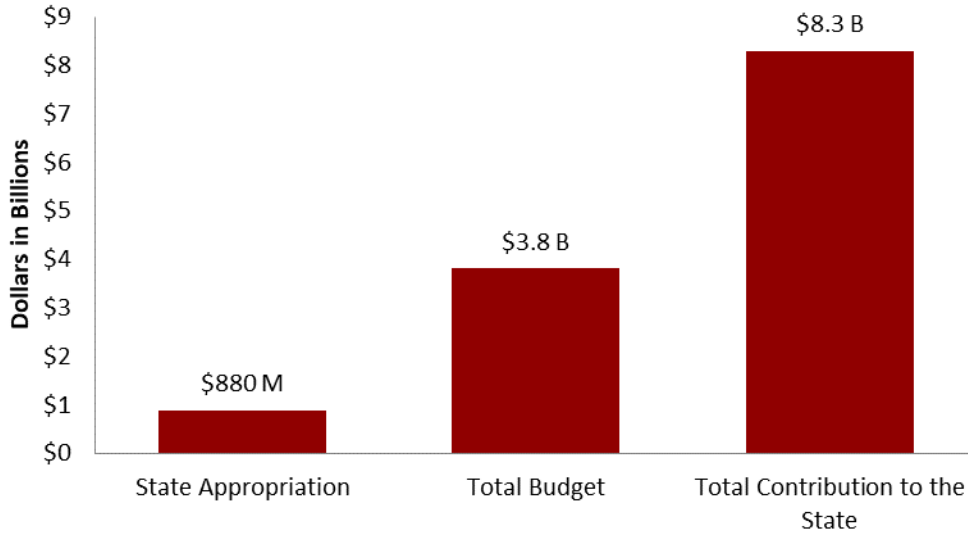
The following figures and tables illustrate the main findings of the economic contributions analysis.

Figure 1. UMass System Operating Revenues Were 77% of Total Budget while State Revenues Comprised 23% in FY2022



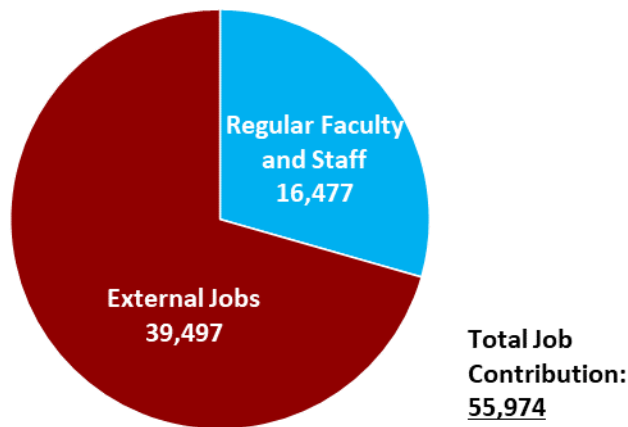
Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 2. State Investment in the UMass System Generated \$8.3 Billion in Massachusetts Economic Activity in FY2022



Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 3. The UMass System Supported 55,974 Jobs in the Massachusetts Economy in FY2022



Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Table 1. FY2022 Economic Activity Contributions of the UMass System (in thousands of dollars)

Economic Output	State Investment	Campus Expenses	Total Economic Activity (Output)
UMass Amherst	\$422	\$1,409,590	\$2,864,012
UMass Boston	\$158	\$481,706	\$1,166,936
UMass Central Administration	\$0	\$96,969	\$241,573
UMass Dartmouth	\$99	\$262,950	\$618,296
UMass Lowell	\$140	\$533,458	\$1,177,025
UMass Medical School	\$60	\$1,264,231	\$2,212,282
UMass System Total	\$880	\$3,705,830	\$8,280,124

Sources: State investment and campus budget data from Board of Trustees, Administration & Finance Committee, May 31, 2023. Total economic activity estimates derive from UMDI analysis.

Table 2. FY2022 Employment Activity Contributions of the UMass System

Employment	Regular Faculty and Staff	External Jobs	Total Jobs
UMass Amherst	6,094	13,222	19,316
UMass Boston	1,910	5,516	7,426
UMass Central Administration	304	1,339	1,643
UMass Dartmouth	1,060	2,960	4,020
UMass Lowell	1,864	5,588	7,452
UMass Chan Medical School	5,245	10,872	16,117
UMass System Total	16,477	39,497	55,974

Sources: Regular faculty and staff figures from Board of Trustees, Administration & Finance Committee, May 31, 2023. External job estimates derive from UMDI analysis.

Other Economic Impacts of the University of Massachusetts

The *UMass System Economic Contributions* analysis demonstrates the economic effects of a major university. As such, the concepts covered in the study relate to how university expenditures, construction, and student spending reverberate through the Massachusetts economy. That said, the economic effects of the University of Massachusetts go well beyond those shown in this report. When considering the full spectrum of how the University helps to drive the Commonwealth's economy, other factors (some quantified and some not) include the following:

- **More than 330,000 of the University's half million-plus alumni live in Massachusetts**, contributing their skills and knowledge to the nation's leading innovation economy; purchasing goods and services from Massachusetts businesses; and paying local and state taxes. The impacts that these alumni have on the state economy would be far greater than the economic contributions associated with the operation of a university (\$8.3 billion) shown in this report, and offer an opportunity for further analysis.
- **Each year, the University's five campuses award approximately 20,000 undergraduate and graduate degrees**. Among the UMass Class of 2022 were 4,065 business majors, 2,328 nurses and other health professionals, 1,828 engineers, 1,458 computer and information science professionals, 1,342 biological and biomedical science majors, and 902 educators. Nearly three-quarters of UMass undergraduates are working in Massachusetts five years after graduation.
- **The University's five campuses house more than 90 core research facilities** that are made available to small- and medium-size Massachusetts to accelerate their job-creating research and development activity. Core facilities range from 3D printers to electron microscopes. A 2022 survey of companies accessing the UMass system's core facilities via the Massachusetts Innovation Vouchers Program (MIVP) showed significant benefits for the participating firms. This included adding staff, raising venture capital funding, and increasing their investments in the state. Based on the survey respondents alone, the users of the Core facilities' MIVP program have a \$364 million contribution to the Massachusetts' economy. Such an impact is not covered in this report.
- **The University's \$813 million research enterprise** – the third largest behind just Harvard and MIT in Massachusetts – results in patents and technology licensing that creates jobs in established companies and forms the basis for start-up companies. In FY22, UMass inventions generated \$41 million in licensing revenue for the University and 242 patent applications. Innovation taking place at Massachusetts' universities, including the UMass system, spawns start-ups in a wide range of industries. The short and long-term effects that start-ups from the UMass system have on the Massachusetts economy (jobs, investments, wages/salaries, and overall competitiveness of the state) are also not included in this report.
- **Visitors, tourism, and recreation**. Each year, the UMass campuses attract thousands of people for campus tours, conferences, performances, and sporting events. These visitors and sports spectators generate significant economic benefits for Massachusetts through their spending for transportation,

restaurants, lodging, cultural attractions, and retail shops, among others. This is also a significant benefit for the state that is not covered in the *UMass System Economic Contributions* analysis.

Introduction

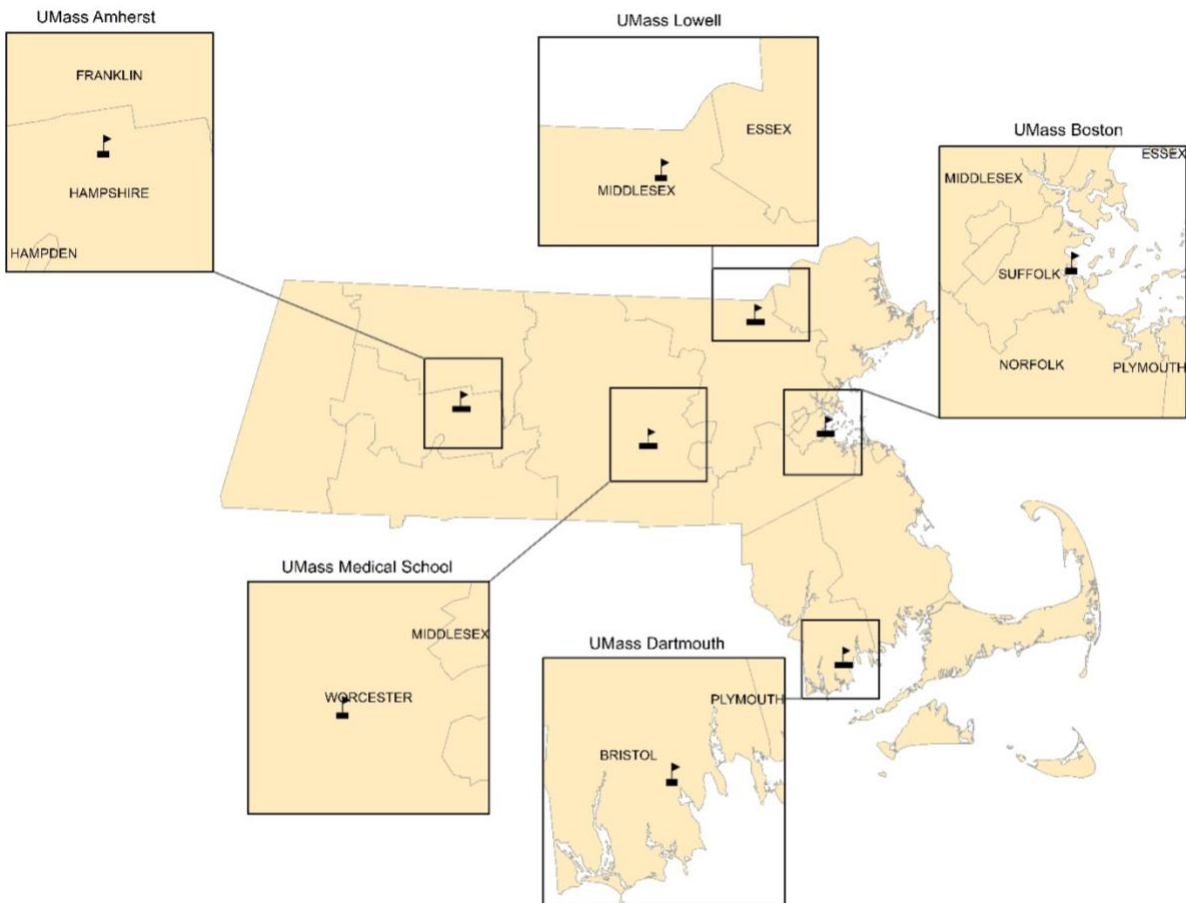
This report was prepared by the Economic and Public Policy Research (EPPR) group at the UMass Donahue Institute (UMDI) at the request of the University of Massachusetts Office of the President.

The purpose of this report is to perform an objective analysis that quantifies the economic contributions of the University of Massachusetts System and its campuses on the Commonwealth's economy. We identified certain direct, indirect, and induced economic contributions that the University of Massachusetts makes to the statewide economy. The positive economic contributions that the University of Massachusetts makes are exceptionally substantial and are based upon a highly regarded and well-documented economic impact model, Impact Analysis for Planning ("IMPLAN"), that produce economic impact multipliers appropriate for the University of Massachusetts System. The results of the analysis are based on a conservative consideration of FY2022 University expenditures. The economic impact model (IMPLAN), methodological approach, and data sources used in this analysis are described in further detail in the Appendix of the report.

This study examines the economic contributions of the entire UMass System as well as for the five campuses by following a consistent analytical framework. The study encapsulates the economic contributions of the five campuses:

- UMass Amherst
- UMass Boston
- UMass Dartmouth
- UMass Lowell
- UMass Chan Medical School

Figure 4. Map of the UMass System



Separate sections, providing more detailed data on respective economic contributions, are devoted to each campus within the body of this study. Together, these five campuses in combination with the UMass Central Administrative Services' operations (including the UMass President's Office, UMass Foundation, Edward M. Kennedy Institute for the United States Senate, and the UMass Building Authority) comprise the "UMass System".

The results of our analysis are presented in terms of UMass' economic contributions to the Commonwealth of Massachusetts' economic output (or "economic activity") and jobs in FY2022. The economic contributions are the result of three categories of expenditures that are all fundamental activities relating to the operation of the University of Massachusetts:

- **Campus expenditures**, comprising a wide variety of University spending for payroll and the purpose of purchasing goods and services required for its educational, research, and public services activities;
- **Student spending** on off-campus living expenses, books, transportation, and various personal expenses related to attending school in the UMass System; and

- **Construction expenditures** for one-time capital projects funded by the University (through the UMass Building Authority) and on behalf of the University (through the Division of Capital Asset Management and Maintenance, or DCAMM).

Beyond the economic output and jobs resulting from these four categories of expenditures, the UMass System also serves as a catalyst for the Massachusetts economy in many other ways that were beyond the scope of this study. These include urban revitalization (UMass activities can spur others to make their own investments nearby the campuses), travel and tourism (visitation to the campuses), business activities resulting from UMass innovations and industry partnerships (i.e., sales and jobs associated with start-ups or existing enterprises that apply UMass innovations to market products or services sold in the U.S. and worldwide), and entrepreneurship and business start-ups (UMass plays a direct role in various incubators, accelerators and small business support centers).

UMass Amherst Economic Contributions

The University of Massachusetts offers invaluable educational opportunities in a wide array of disciplines and engages in important research activities recognized throughout the world. The general public tends to understand UMass's role in these key areas, but is often unaware that the institution is also a major contributor to the statewide economy. UMass not only makes a direct contribution to the Massachusetts economy through the spending and jobs supported by its academic, administration, and construction activities, but also generates a "ripple effect" that leads to an even larger impact in the economy as a result of demand on suppliers of goods and services as well as employee spending.

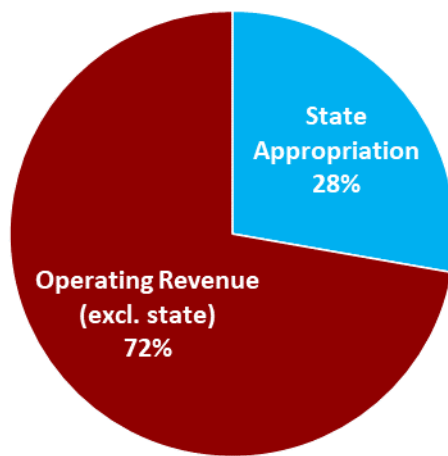
The results of the economic contributions analysis of the UMass Amherst campus for FY2022 indicate that:

- **UMass Amherst generated \$2.9 billion in economic activity in FY2022.** UMass Amherst is a key economic driver in the Commonwealth, directly or indirectly affecting every person in the state. In FY2022, UMass Amherst contributed \$2.9 billion in economic activity to the Massachusetts economy. This includes the contributions of the local operating expenditures of UMass Amherst, one-time major construction expenditures, the spending of the Amherst campus' faculty and staff, and the spending of its students. Much of the UMass spending flows beyond the campus to a variety of suppliers of goods and services, generating significant benefits for the Massachusetts economy.
- **FY2022 included significant construction at UMass Amherst.** Construction spending at the UMass Amherst in FY2022 was valued at about \$140 million. These construction projects were financed through University expenditures, the UMass Building Authority and the Commonwealth's Division of Capital Asset Management and Maintenance (DCAMM). Unlike other campus activities such as payroll expenditures, construction on the campuses can spike or fall from year-to-year and thus either amplify or diminish its overall effect on the Massachusetts economy depending on the cycle. The new facilities, however, continue to play important roles after they are constructed by contributing to the University's competitive position to attract students, employees, and researchers.
- **State investment in UMass Amherst leverages significantly greater economic activity.** In FY2022, the state's \$422 million investment in UMass Amherst helped leverage and support \$2.9 billion in economic activity in Massachusetts, an amount seven times greater than the state's investment.
- **UMass Amherst employee payroll recirculates through the Massachusetts economy causing positive economic effects.** A notable share of UMass Amherst's spending also makes its way to employees in the form of salaries and wages, which is then circulated into the Massachusetts economy through typical household spending activities. In FY2022, UMass Amherst employed 6,094 staff (excluding student employees).
- **UMass Amherst generates additional jobs beyond the campus.** The spending of UMass Amherst, its employees and students helped to support an additional 13,222 jobs in the Commonwealth throughout FY2022. Including faculty and staff, UMass Amherst supported a total of 19,316 jobs in the Commonwealth.

- **UMass Amherst student off-campus spending further supports the Massachusetts economy.** In the FY2022, UMass Amherst student enrollment was 29,804 (including undergraduate and graduate students) and these students directly spent a significant amount of money off-campus in the economy, which, in turn, generated additional economic activity.

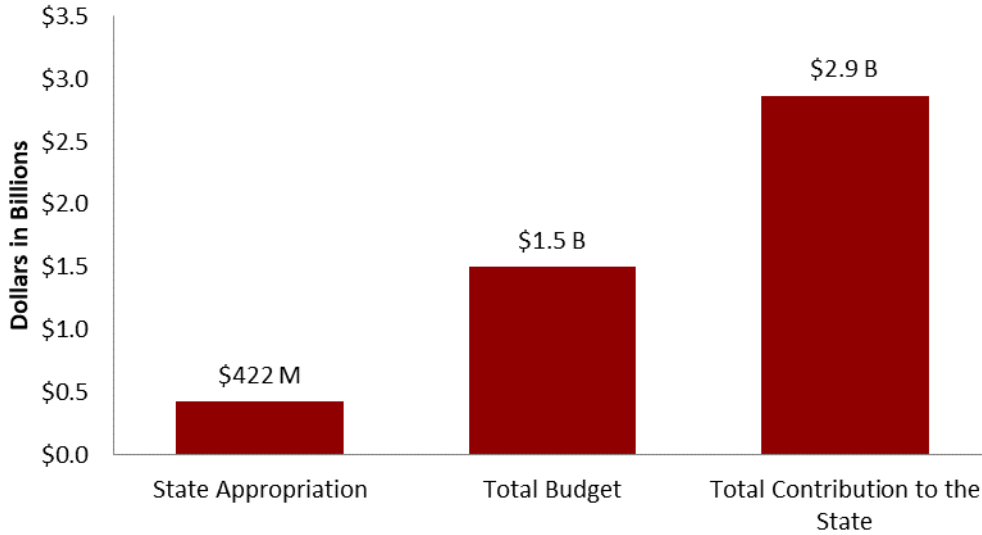
The following figures and tables illustrate the main findings of the economic contributions analysis.

Figure 5. UMass Amherst Operating Revenues Were 72% of Total Budget while State Investment Comprised 28% in FY2022



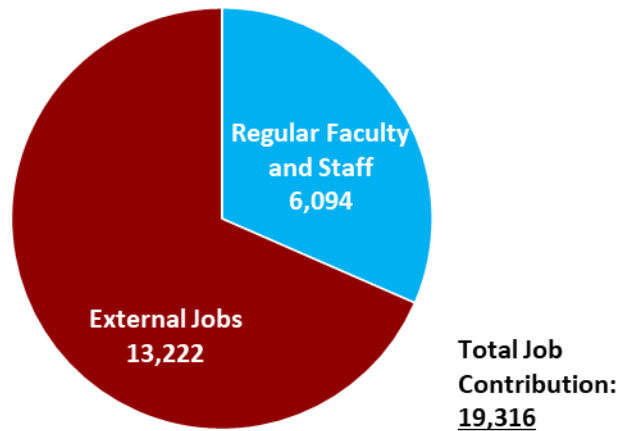
Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 6. State Investment in UMass Amherst Generated \$2.9 Billion in Massachusetts Economic Activity in FY2022



Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 7. UMass Amherst Supported 19,316 Jobs in the Massachusetts Economy in FY2022



Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Table 3. Summary of FY2022 Economic and Employment Contributions of UMass Amherst (dollar figures in thousands)

Economic Output	State Investment	Campus Expenses	Total Economic Activity (Output)
	\$422	\$1,409,590	\$2,864,012
Employment	Regular Faculty and Staff	External Jobs	Campus Total
	6,094	13,222	19,316

Sources: State investment and campus budget data were sourced from Board of Trustees, Administration & Finance Committee, May 31, 2023 report. Total economic activity estimates derive from UMDI analysis.

UMass Boston Economic Contributions

The University of Massachusetts offers invaluable educational opportunities in a wide array of disciplines and engages in important research activities recognized throughout the world. The general public tends to understand UMass's role in these key areas but is often unaware that the institution is also a major contributor to the statewide economy. UMass not only makes a direct contribution to the Massachusetts economy through the spending and jobs supported by its academic, administration, and construction activities, but also generates a "ripple effect" that leads to an even larger impact in the economy as a result of demand on suppliers of goods and services as well as employee spending.

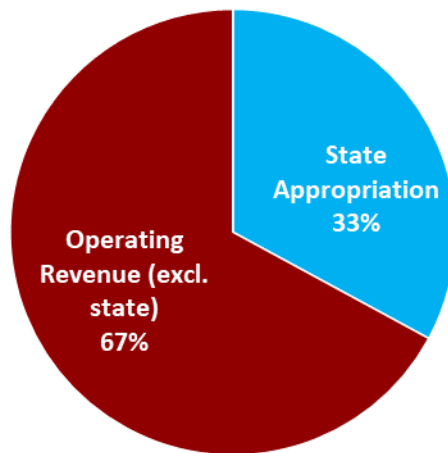
The results of the economic contributions analysis of the UMass Boston campus for FY2022 indicate that:

- **UMass Boston generated \$1.2 billion in economic activity in FY2022.** UMass Boston is a key economic driver in the Commonwealth, directly or indirectly affecting every person in the state. In FY2022, UMass Boston contributed \$1.2 billion in economic activity to the Massachusetts economy. This includes the contributions of the local operating expenditures of UMass Boston, one-time major construction expenditures, the spending of the Boston campus' faculty and staff, and the spending of its students. Much of the UMass spending flows beyond the campus to a variety of suppliers of goods and services, generating significant benefits for the Massachusetts economy.
- **FY2022 included significant construction at UMass Boston.** Construction spending at the UMass Boston in FY2022 was valued at about \$95 million. These construction projects were financed through University expenditures, the UMass Building Authority and the Commonwealth's Division of Capital Asset Management and Maintenance (DCAMM). Unlike other campus activities such as payroll expenditures, construction on the campuses can spike or fall from year-to-year and thus either amplify or diminish its overall effect on the Massachusetts economy depending on the cycle. The new facilities, however, continue to play important roles after they are constructed by contributing to the University's competitive position to attract students, employees, and researchers.
- **State investment in UMass Boston leverages significantly greater economic activity.** In FY2022, the state's \$158 million investment in UMass Boston helped leverage and support \$1.2 billion in economic activity in Massachusetts, an amount more than seven times greater than the state's investment.
- **UMass Boston employee payroll recirculates through the Massachusetts economy causing positive economic effects.** A notable share of UMass Boston's spending also makes its way to employees in the form of salaries and wages, which is then circulated into the Massachusetts economy through typical household spending activities. In the FY2022, UMass Boston employed 1,910 staff (excluding student employees).
- **UMass Boston generates additional jobs beyond the campus.** The spending of UMass Boston, its employees and students helped to support an additional 5,516 jobs in the Commonwealth throughout FY2022. Including faculty and staff, UMass Boston supported a total of 7,426 jobs in the Commonwealth.

- **UMass Boston student off-campus spending further supports the Massachusetts economy.** In FY2022, UMass Boston student enrollment was 12,959 (including undergraduate and graduate students) and these students directly spent a significant amount of money off-campus in the economy, which, in turn, generated additional economic activity.

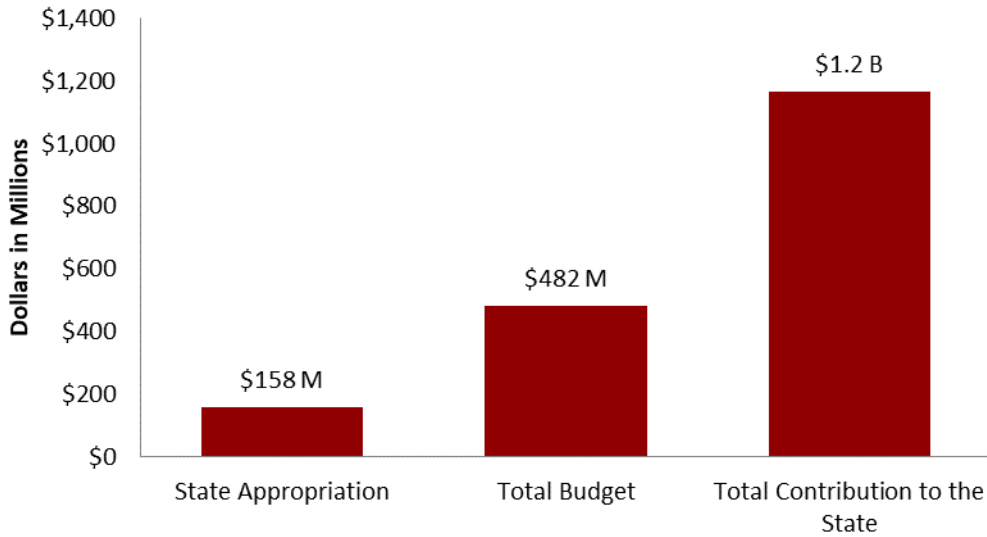
The following figures and tables illustrate the main findings of the economic contributions analysis.

Figure 8. UMass Boston Operating Revenues Were 67% of Total Budget while State Investment Comprised 33% in FY2022



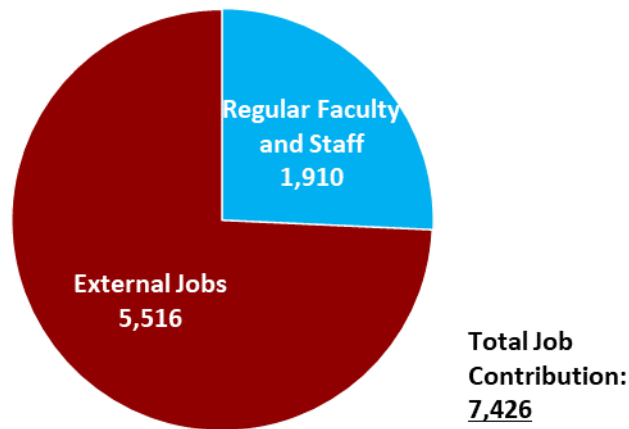
Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 9. State Investment in UMass Boston Generated \$1.2 Billion in Massachusetts Economic Activity in FY2022



Sources: Board of Trustees, Administration & Finance Committee May 31, 2023, UMDI analysis

Figure 10. UMass Boston Supported 7,426 Jobs in the Massachusetts Economy in FY2022



Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Table 4. Summary of FY2022 Economic and Employment Contributions of UMass Boston (dollar figures in thousands)

Economic Output	State Investment	Campus Expenses	Total Economic Activity (Output)
	\$158	\$481,706	\$1,166,936
Employment	Regular Faculty and Staff	External Jobs	Campus Total
	1,910	5,516	7,426

Sources: State investment and campus budget data were sourced from Board of Trustees, Administration & Finance Committee, May 31, 2023 report. Total economic activity estimates derive from UMDI analysis.

UMass Dartmouth Economic Contributions

The University of Massachusetts offers invaluable educational opportunities in a wide array of disciplines and engages in important research activities recognized throughout the world. The general public tends to understand UMass's role in these key areas, but is often unaware that the institution is also a major contributor to the statewide economy. UMass not only makes a direct contribution to the Massachusetts economy through the spending and jobs supported by its academic, administration, and construction activities, but also generates a "ripple effect" that leads to an even larger impact in the economy as a result of demand on suppliers of goods and services as well as employee spending.

The results of the economic contributions analysis of the UMass Dartmouth campus for FY2022 indicate that:

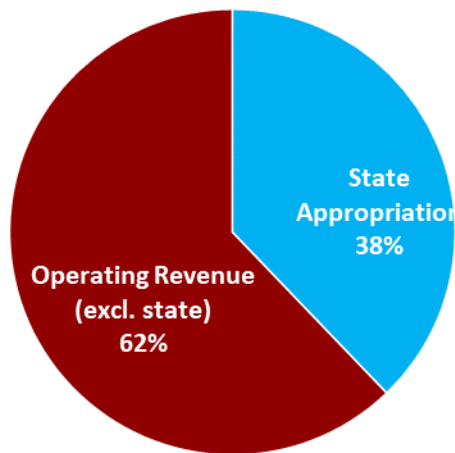
- **UMass Dartmouth generated almost \$618 million in economic activity in FY2022.** UMass Dartmouth is a key economic driver in the Commonwealth, directly or indirectly affecting every person in the state. In FY2022, UMass Dartmouth contributed \$618 million in economic activity to the Massachusetts economy. This includes the contributions of the local operating expenditures of UMass Dartmouth, one-time major construction expenditures, the spending of the Dartmouth campus' faculty and staff, and the spending of its students. Much of the UMass spending flows beyond the campus to a variety of suppliers of goods and services, generating significant benefits for the Massachusetts economy.
- **FY2022 included significant construction at UMass Dartmouth.** Construction spending at the UMass Dartmouth in FY2022 was valued at about \$53 million. These construction projects were financed through University expenditures, the UMass Building Authority and the Commonwealth's Division of Capital Asset Management and Maintenance (DCAMM). Unlike other campus activities such as payroll expenditures, construction on the campuses can spike or fall from year-to-year and thus either amplify or diminish its overall effect on the Massachusetts economy depending on the cycle. The new facilities, however, continue to play important roles after they are constructed by contributing to the University's competitive position to attract students, employees, and researchers.
- **State investment in UMass Dartmouth leverages significantly greater economic activity.** In FY2022, the state's \$99 million investment in UMass Dartmouth helped leverage and support nearly \$618 million in economic activity in Massachusetts, an amount more than six times greater than the state's investment.
- **UMass Dartmouth employee payroll recirculates through the Massachusetts economy causing positive economic effects.** A notable share of UMass Dartmouth's spending also makes its way to employees in the form of salaries and wages, which is then circulated into the Massachusetts economy through typical household spending activities. In FY2022, UMass Dartmouth employed 1,060 staff (excluding student employees).
- **UMass Dartmouth generates additional jobs beyond the campus.** The spending of UMass Dartmouth, its employees and students helped to support an additional 2,960 jobs in the

Commonwealth throughout FY2022. Including faculty and staff, UMass Dartmouth supported a total of 4,020 jobs in the Commonwealth.

- **UMass Dartmouth student off-campus spending further supports the Massachusetts economy.** In the FY2022, UMass Dartmouth student enrollment was 6,459 (including undergraduate and graduate students) and these students directly spent a significant amount of money off-campus in the economy, which, in turn, generated additional economic activity.

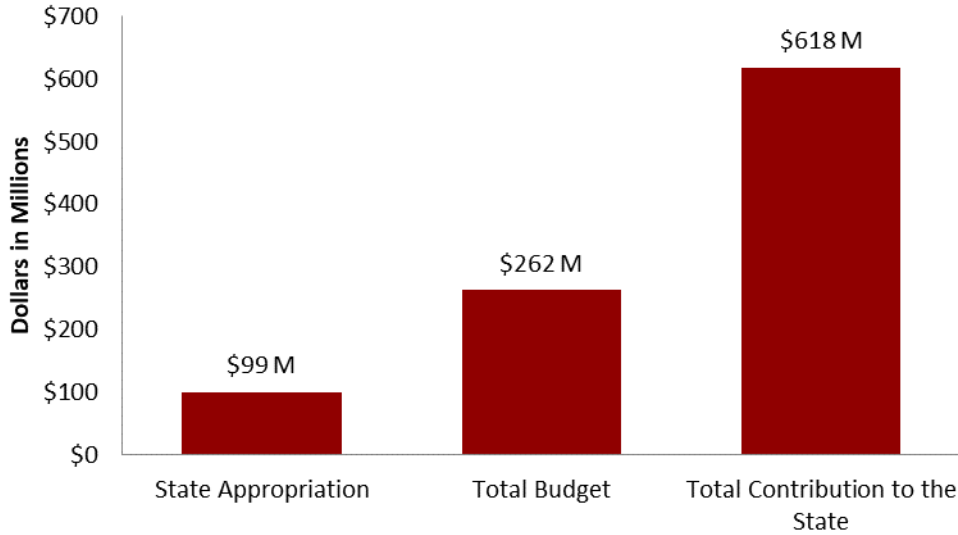
The following figures and tables illustrate the main findings of the economic contributions analysis.

Figure 11. UMass Dartmouth Operating Revenues Were 62% of Total Budget while State Investment Comprised 38% in FY2022



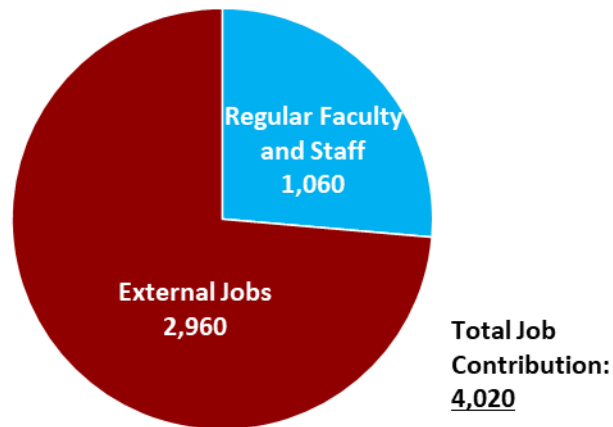
Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 12. State Investment in UMass Dartmouth Generated \$618 Million in Massachusetts Economic Activity in FY2022



Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 13. UMass Dartmouth Supported 4,020 Jobs in the Massachusetts Economy in FY2022



Sources: UMass Controller's Office, UMDI analysis

Table 5. Summary of FY2022 Economic and Employment Contributions of UMass Dartmouth (dollar figures in thousands)

Economic Output	State Investment	Campus Expenses	Total Economic Activity (Output)
	\$99	\$262,950	\$618,296
Employment	Regular Faculty and Staff	External Jobs	Campus Total
	1,060	2,960	4,020

Sources: State investment and campus budget data were sourced from Board of Trustees, Administration & Finance Committee, May 31, 2023 report. Total economic activity estimates derive from UMDI analysis.

UMass Lowell Economic Contributions

The University of Massachusetts offers invaluable educational opportunities in a wide array of disciplines and engages in important research activities recognized throughout the world. The general public tends to understand UMass's role in these key areas, but is often unaware that the institution is also a major contributor to the statewide economy. UMass not only makes a direct contribution to the Massachusetts economy through the spending and jobs supported by its academic, administration, and construction activities, but also generates a "ripple effect" that leads to an even larger impact in the economy as a result of demand on suppliers of goods and services as well as employee spending.

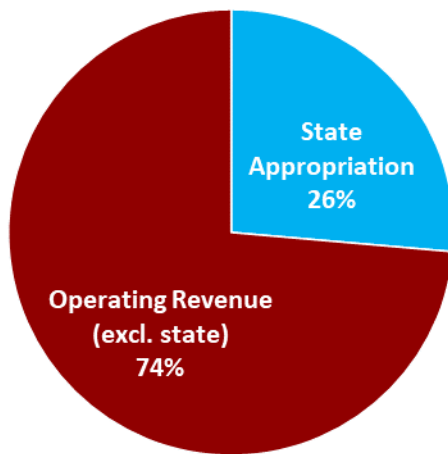
The results of the economic contributions analysis of the UMass Lowell campus for FY2022 indicate that:

- **UMass Lowell generated \$1.2 billion in economic activity in FY2022.** UMass Lowell is a key economic driver in the Commonwealth, directly or indirectly affecting every person in the state. In FY2022, UMass Lowell contributed \$1.2 billion in economic activity to the Massachusetts economy. This includes the contributions of the local operating expenditures of UMass Lowell, one-time major construction expenditures, the spending of the Lowell campus' faculty and staff, and the spending of its students. Much of the UMass spending flows beyond the campus to a variety of suppliers of goods and services, generating significant benefits for the Massachusetts economy.
- **FY2022 included significant construction at UMass Lowell.** Construction spending at the UMass Lowell in FY2022 was valued at about \$19 million. These construction projects were financed through University expenditures, the UMass Building Authority and the Commonwealth's Division of Capital Asset Management and Maintenance (DCAMM). Unlike other campus activities such as payroll expenditures, construction on the campuses can spike or fall from year-to-year and thus either amplify or diminish its overall effect on the Massachusetts economy depending on the cycle. The new facilities, however, continue to play important roles after they are constructed by contributing to the University's competitive position to attract students, employees, and researchers.
- **State investment in UMass Lowell leverages significantly greater economic activity.** In FY2022, the state's more than \$140 million investment in UMass Lowell helped leverage and support \$1.2 billion in economic activity in Massachusetts, an amount more than eight times greater than the state's investment.
- **UMass Lowell employee payroll recirculates through the Massachusetts economy causing positive economic effects.** A notable share of UMass Lowell's spending also makes its way to employees in the form of salaries and wages, which is then circulated into the Massachusetts economy through typical household spending activities. In the FY2022, UMass Lowell employed 1,864 staff (excluding student employees).
- **UMass Lowell generates additional jobs beyond the campus.** The spending of UMass Lowell, its employees and students helped to support an additional 5,588 jobs in the Commonwealth throughout FY2022. Including faculty and staff, UMass Lowell supported a total of 7,452 jobs in the Commonwealth.

- **UMass Lowell student off-campus spending further supports the Massachusetts economy.** In the FY2022, UMass Lowell student enrollment was 14,321 (including undergraduate and graduate students) and these students directly spent a significant amount of money off-campus in the economy, which, in turn, generated additional economic activity.

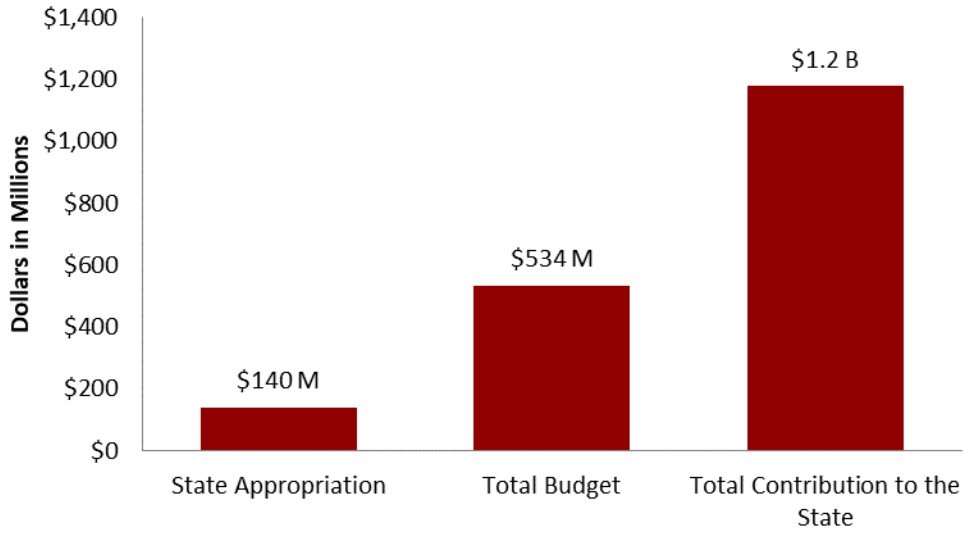
The following figures and tables illustrate the main findings of the economic contributions analysis.

Figure 14. UMass Lowell Operating Revenues Were 74% of Total Budget while State Investment Comprised 26% in FY2022



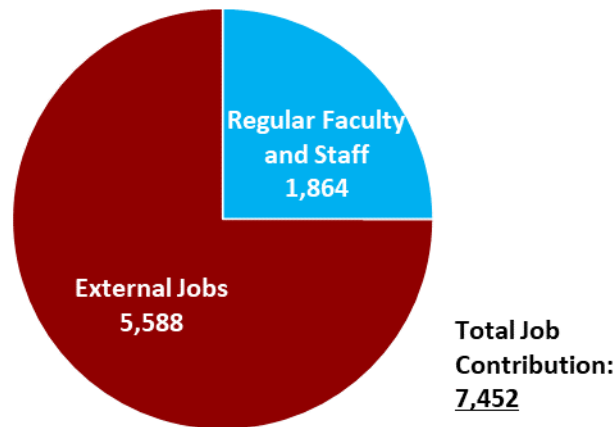
Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 15. State Investment in UMass Lowell Generated \$1.2 Billion in Massachusetts Economic Activity in FY2022



Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 16. UMass Lowell Supported 7,452 Jobs in the Massachusetts Economy in FY2022



Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Table 6. Summary of FY2022 Economic and Employment Contributions of UMass Lowell (dollar figures in thousands)

Economic Output	State Investment	Campus Expenses	Total Economic Activity (Output)
	\$140	\$533,458	\$1,177,025
Employment	Regular Faculty and Staff	External Jobs	Campus Total
	1,864	5,588	7,452

Sources: State investment and campus budget data were sourced from Board of Trustees, Administration & Finance Committee, May 31, 2023 report. Total economic activity estimates derive from UMDI analysis.

UMass Chan Medical School Economic Contributions

The UMass Chan Medical School offers invaluable educational opportunities encompassing medicine, a teaching hospital, research, nursing, and biomedical science. The general public tends to understand UMass's role in these key areas, but is often unaware that the institution is also a major contributor to the statewide economy. The UMass Chan Medical School not only makes a direct contribution to the Massachusetts economy through the spending and jobs supported by its academic, administration, and construction activities, but also generates a "ripple effect" that leads to an even larger impact in the economy as a result of demand on suppliers of goods and services as well as employee spending. Note that the following analysis also includes the employment and economic output generated by MassBiologics and ForHealth, both are components of the UMass Chan Medical School.

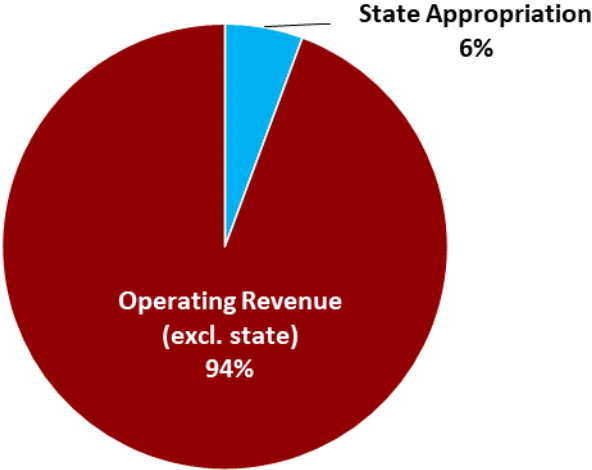
The results of the economic contributions analysis of the UMass Chan Medical School for FY2022 indicate that:

- **The UMass Chan Medical School generated \$2.2 billion in economic activity in FY2022.** The UMass Chan Medical School is a key economic driver in the Commonwealth, directly or indirectly affecting every person in the state. In FY2022, the UMass Chan Medical School contributed \$2.2 billion in economic activity to the Massachusetts economy. This includes the contributions of the local operating expenditures of the UMass Chan Medical School, one-time major construction expenditures, the spending of the Medical School's faculty and staff, and the spending of its students. Much of the UMass spending flows beyond the campus to a variety of suppliers of goods and services, generating significant benefits for the Massachusetts economy.
- **FY2022 included significant construction at the UMass Chan Medical School.** Construction spending at the UMass Chan Medical School in FY2022 was valued at about \$94 million. These construction projects were financed through University expenditures, the UMass Building Authority and the Commonwealth's Division of Capital Asset Management and Maintenance (DCAMM). Unlike other campus activities such as payroll expenditures, construction on the campuses can spike or fall from year-to-year and thus either amplify or diminish its overall effect on the Massachusetts economy depending on the cycle. The new facilities, however, continue to play important roles after they are constructed by contributing to the University's competitive position to attract students, employees, and researchers.
- **State investment in the UMass Chan Medical School leverages significantly greater economic activity.** In FY2022, the state's \$60 million investment in the UMass Chan Medical School helped leverage and support \$2.2 billion in economic activity in Massachusetts, an amount about 37 times greater than the state's investment.
- **UMass Chan Medical School employee payroll recirculates through the Massachusetts economy causing positive economic effects.** A notable share of the UMass Chan Medical School's spending also makes its way to employees in the form of salaries and wages, which is then circulated into the Massachusetts economy through typical household spending activities. In FY2022, the Medical School employed 5,245 staff (excluding student employees).

- **The UMass Chan Medical School generates additional jobs beyond the campus.** The spending of the UMass Chan Medical School, its employees and students helped to support an additional 10,872 jobs in the Commonwealth throughout FY2022. Including faculty and staff, the UMass Chan Medical School supported a total of 16,117 jobs in the Commonwealth.
- **UMass Chan Medical School student off-campus spending further supports the Massachusetts economy.** In FY2022, the UMass Chan Medical School student enrollment was 1,246 (including students in the Graduate Schools of Nursing, Biomedical Science and Medicine), and these students directly spent a significant amount of money off-campus in the economy, which, in turn, generated additional economic activity.

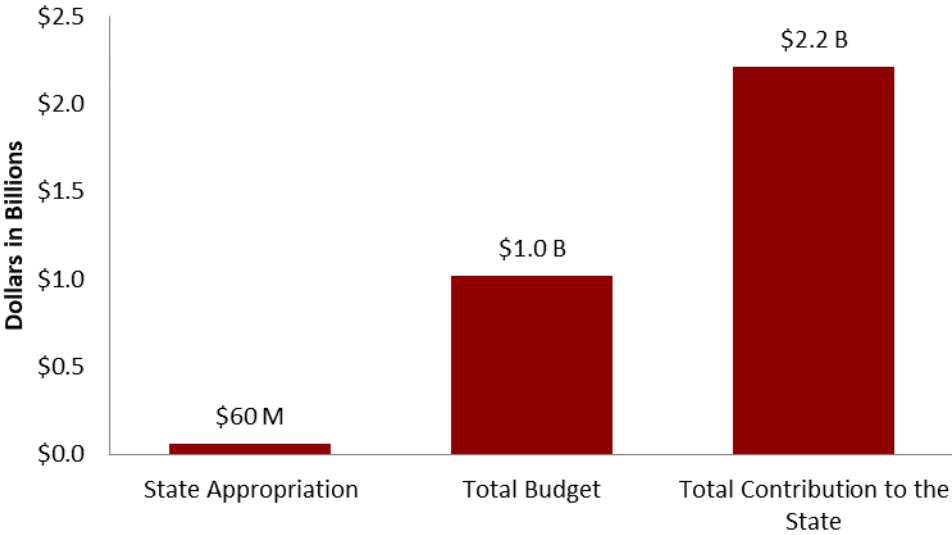
The following figures and tables illustrate the main findings of the economic contributions analysis.

Figure 17. The UMass Chan Medical School Operating Revenues Were 94% of Total Budget while State Investment Comprised 6% in FY2022



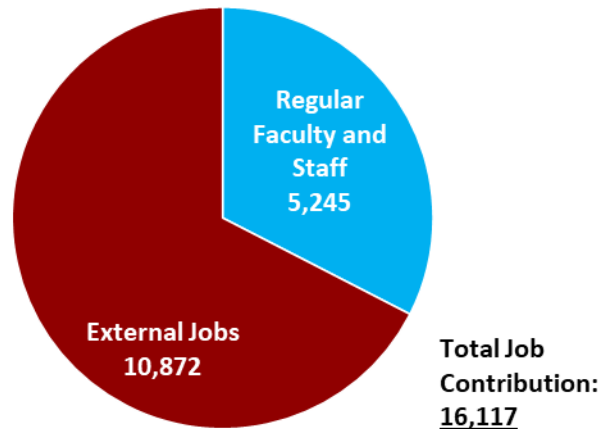
Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 18. State Investment in the UMass Chan Medical School Generated \$2.2 Billion in Massachusetts Economic Activity in FY2022



Sources: Board of Trustees, Administration & Finance Committee, May 31, 2023, UMDI analysis

Figure 19. The UMass Chan Medical School Supported 16,117 Jobs in the Massachusetts Economy in FY2022



Sources: Human Resources, UMass Chan Medical School, UMDI analysis

Table 7. Summary of FY2022 Economic and Employment Contributions of the UMass Chan Medical School (dollar figures in thousands)

Economic Output	State Investment	Campus Expenses	Total Economic Activity (Output)
	\$60	\$1,264,231	\$2,212,282
Employment	Regular Faculty and Staff	External Jobs	Campus Total
	5,245	10,872	16,117

Sources: State investment and campus budget data were sourced from Board of Trustees, Administration & Finance Committee, May 31, 2023 report. Total economic activity estimates derive from UMDI analysis.

Appendix A: Economic Contribution Analysis and IMPLAN

Economic Contribution Analysis

In a general sense, the goal of “economic contribution analysis” is to estimate the total contribution of an organization’s (in this instance, the University’s) various economic-generating activities to a regional or state economy (e.g., Massachusetts). The basic premise is that an initial investment in one sector of an economy (e.g., in higher education) spurs additional economic activity in other sectors as the money is re-spent within the region or state. The total economic contribution of the investment is estimated by tracing the flow and recirculating of money between industries and households until all of the initial investment eventually leaves the region or state through foreign or domestic trade, or is collected as a tax.

The IMPLAN Model

Input-output models, such as the IMPLAN model, examine the flow of money between industries and households in the economy. The UMass Donahue Institute built an input-output model using the IMPLAN model building software and data packages. The data used in the model are for 2022, which are the latest available. Model outputs are reported in 2022 dollars.

The IMPLAN modeling system combines the U.S. Bureau of Economic Analysis’ Input-Output Benchmarks with regional employment and wage data to construct quantitative models of the flow of goods and services between a region’s businesses and households (the final consumers), and estimates direct, indirect and induced effects of investments and ongoing economic activity. From these data, one can examine the effects of a change in one or several economic activities to estimate its effect on a specific state, regional, or local economy. The IMPLAN input-output accounts capture all monetary market transactions for consumption in a given time period. They are also based on industry survey data collected periodically by the U.S. Bureau of Economic Analysis and follow a balanced account format recommended by the United Nations. IMPLAN’s proprietary database details economic activity across hundreds of industry sectors, as well as “institutions” such as local, state and federal government and household spending. IMPLAN models reflect the most reliable and up-to-date knowledge about local spending patterns.

The total economic contribution of the UMass System as estimated by the IMPLAN model is the sum of direct, indirect, and induced effects of operating expenditures, construction expenditures, and employee and student spending.

- **Direct effects** refer to the initial investment of state funds that contribute to the University’s operating expenditures and one-time construction projects in FY2022.
- **Indirect effects** are generated by intermediate purchases for goods or services that support the educational, research and public service activities of the University. Payments made to architectural contractors, consulting firms for professional and business services, and vendors of construction materials and equipment are examples of indirect effects of state spending on the UMass System.
- **Induced effects** occur when income is spent on household-related goods and services. Employee payroll and student spending represent a significant portion of the induced impacts in this analysis.

The IMPLAN software and data package for Massachusetts are used to model the later rounds of local spending that follow. The model is specifically tailored to reflect the expenditure patterns and industry mix of Massachusetts, including information about when expenditures leave the state due to foreign and domestic trade and taxes. Finally, all rounds of spending are added together to produce the total contribution estimate. Due to recent changes to the IMPLAN income categories and revisions to its industry sector scheme, the results of earlier economic contribution analyses of the UMass System are not directly comparable to the results of the current analysis.

This analysis reports on two major types of economic contributions that are estimated by the IMPLAN model:

- **Outputs** are expenditures of the industry and supplier industries to produce the final good.
- **Employment** refers to all employees required to produce the outputs, including wage and salary employees, full-time and part-time employees, and the self-employed.

A **multiplier** is an index of how many times each dollar is re-spent in the economy of a geographical area and is expressed by a ratio of total outputs or employment to direct outputs or employment. An employment multiplier is an index of how each job in an economy supports related jobs in other industries. An output multiplier of 1.5 could be understood to mean that, out of every one dollar of direct expenditure, 50 cents is re-spent in the local economy.

Appendix B: Methodology and Data Sources

Methodology

This section details key elements of the methodological approach that the research team employed in the collection, organization and analysis of data on the economic contributions of the University of Massachusetts on the Massachusetts economy in FY2022. These economic contributions are the result of three major categories of expenditures essential to the economic activities related to the operation of the University:

- **Operating expenditures**, comprising a wide variety of University spending including payroll and for the purpose of purchasing goods and services required for its educational, research, and public services activities;
- **Student spending** on off-campus living expenses, books, transportation, and various personal expenses related to attending school in the UMass System; and
- **Construction expenditures** for one-time capital projects funded by the University (through the UMass Building Authority) and on behalf of the University (through the Division of Capital Asset Management).

At every level of the analysis, UMDI uses best practice and conservative assumptions in order to produce a complete and credible estimate of the economic contribution of the University on the Commonwealth of Massachusetts. In keeping with this approach, we undertook a detailed analysis based on the three economic activities labeled, above, and applied the IMPLAN econometric model to capture the multiplier effects of the University of Massachusetts.

UMDI uses a budget of university expenditures as shown in Board of Trustees, Administration & Finance Committee, May 31, 2023 report combined with estimates of student spending to identify University-initiated expenditures in applicable industries included within the IMPLAN proprietary economic impact modeling system.

Operating Expenditures

Operating expenditures include a wide variety of University spending for payroll and the purpose of purchasing goods and services required for its educational, research, and public services activities. Based on spending data from the Board of Trustees, Administration & Finance Committee, May 31, 2023 report, the expenditures are entered into the IMPLAN economic model for Massachusetts.

Employment

University and campus employment are reported for FY2022 from Board of Trustees, Administration & Finance Committee, May 31, 2023 report. Campus employment excludes students as their economic activity is already captured by the estimates of student expenditures. Additional external (non-University) jobs supported elsewhere in the state include those supported by rounds of spending initiated by:

- The spending of the University for purchasing the goods and services required for its educational, research and public service activities as well as the spending of UMass employees from their payroll;

- The spending on one-time construction projects (those funded through the UMass Building Authority, individual campus expenditures and the Massachusetts Division of Capital Asset Management and Maintenance [DCAMM]); and
- Student spending in the local/state economy.

Student Spending

Student spending is captured by cost-of-attendance estimates which were provided by the UMass President's Office. Student expenditures are examined entirely in terms of students' spending habits on books, transportation, personal expenses (including restaurants, groceries, clothing, and entertainment), and off-campus room and board (including food), that characterize undergraduate and graduate students enrolled at the University of Massachusetts.

Students who live on campus are treated differently from students who live off campus. This distinction is important because on-campus students pay the University directly for room and board and these payments have been captured already in the operating expenditure analysis. Student fees similarly are direct payments to the University and have been captured in the operating expenditure analysis.

The analysis assumes that all income derived from on-campus student jobs is consumed by the costs of attending the University and using University facilities.

Construction

Through investments in infrastructure and buildings, the UMass System generates significant expenditures in construction on an annual basis. This analysis captures expenditures for new non-maintenance construction; and the data for new construction are from the University of Massachusetts Building Authority and the Division of Capital Asset Management.

University of Massachusetts Building Authority (UMBA): UMBA funds construction projects on each of the campuses, and these expenditures as well as interest expenses and bond-related payments are included in this analysis.

Division of Capital Asset Management and Maintenance (DCAMM): Each campus benefits from expenditures for construction projects on their premises by the Commonwealth's Division of Capital Asset Management (DCAMM). Since these funds are spent on behalf of the University, but are not received or spent directly by the University, we have included their contribution in this analysis as part of the total overall contribution of the University.

Data Sources

A consolidated source, the Board of Trustees, Administration & Finance Committee, May 31, 2023 report was used to generate key inputs and data points used in this report, including expenditures, budgets, staff, and student numbers. In this analysis, one-time construction expenditures reflect data received from the UMass Controller's Office (for campus and DCAMM expenditures) and the UMass Building Authority. Student enrollment and student budget data ("cost of attendance"), which drive student expenditures, were provided by the UMass President's Office.