



UNIVERSITY OF MASSACHUSETTS SCHOOL OF PUBLIC HEALTH AND HEALTH SCIENCES

Encore Boston Harbor, First Three and a Half Years of Operation: Economic Impacts Report

Prepared by the UMass Donahue Institute's
Economic & Public Policy Research Group

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Executive Summary

Through the establishment of the casino industry in Massachusetts, lawmakers provided avenues for the creation of new jobs, revenue, and economic growth in the state. The Social and Economic Impacts of Gambling in Massachusetts (SEIGMA) study, of which the Economic and Public Policy Research unit at the University of Massachusetts Donahue Institute (UMDI) is a part, strives to understand the impact of the casinos on the people and economy of the Commonwealth.

The purpose of this Operating Report is to estimate the economic impact of the Encore Boston Harbor casino (EBH) on the Massachusetts economy during its first three and a half years of operation (June 2019-December 2022). To estimate the economic impacts, the UMass Donahue Institute's Economics and Public Policy Research unit (UMDI) includes two key sources of economic impact: casino operations (spending on vendors, employees and government entities) and patron spending (within the casino, as well as in Everett and the surrounding region). These data help us to understand the impacts of Encore Boston Harbor's continued operation. To conduct the analysis, UMDI obtained operator data collected by the Massachusetts Gaming Commission. These include employment, payroll, and purchasing data obtained directly from the casino. We also obtained revenue data from the Massachusetts Gaming Commission and data on patron spending from a survey of casino patrons conducted by the SEIGMA team. From there, UMDI employed the PI⁺ model from Amherst, MA-based Regional Economic Models Inc. (REMI) to measure direct and spin-off effects in the Massachusetts economy.¹

Employment

An analysis of payroll data found Encore Boston Harbor employed an average of 4,118 workers in 2019. That number fell in 2020 and 2021 as the casino's operations were disrupted by the COVID-19 pandemic but recovered over late 2021 and 2022. Despite facing a shutdown followed by operating restrictions for over a year, Encore Boston Harbor was able to retain many of its workers over the course of the pandemic.

Spending

UMDI analyzed data on spending by Encore Boston Harbor to outside entities, primarily private-sector vendors supplying goods and services to the casino. Over the course of the study period, Encore Boston Harbor paid \$290 million to outside entities, approximately half (52.7%) of which were Massachusetts-based firms. Most of Encore Boston Harbor's in-state vendor spending went to firms in industries such as wholesale trade, transit and ground transportation, laundry services, and construction, offering products and services where proximity to the casino is important. After falling from 2019 to 2020, vendor spending has increased in each subsequent year.

Government Revenues

State and local government entities collected \$538.6 million in tax revenue from the casino's operations. State tax revenues from the casino were heavily affected by the COVID-19 pandemic but reached a new high in 2022 at \$197.4 million. As with other casinos, these funds continue to be distributed to various state funds, including local aid, via a formula set by the Commonwealth.

¹ This study looks at the impacts generated by a single casino operation. The SEIGMA project's integrative report, due in June of 2024, will discuss social impacts.

Patrons

Based on our survey of casino patrons and available data from Encore Boston Harbor and the Massachusetts Gaming Commission, we estimate that over the nearly four-year study period, casino patrons spent almost \$3.8 billion at the casino and off-site during their visit. This includes spending on gambling and non-gambling activities at the casino, as well as non-gaming expenditures made off-site during their visit. Of those funds, we estimate 77 percent to have originated from patrons that reported they would not have spent their money in-state without the casino (this represents recaptured and new spending). Casino patrons spent an estimated \$330.1 million at Massachusetts businesses outside of Encore Boston Harbor in the course of their trip. Despite the economic benefits of recaptured and new spending, \$818.9 million in patron expenditures were reallocated away from other businesses in Massachusetts and towards the casino.

Total Combined Impacts

Although Encore Boston Harbor has been open since the summer of 2019, 2022 was its first full year of operation without any shutdowns or restrictions related to the COVID-19 pandemic. At times in the report, we focus on 2022 for this reason. In 2022, the \$1.1 billion dollars spent in and around Encore Boston Harbor by casino patrons supported an average of 3,275 positions at the casino, paying \$206 million in compensation, and created demand for \$85.4 million of intermediate goods and services purchased from vendors by Encore Boston Harbor. The casino also paid \$197.4 million in payments to government entities, although on net, consumers shifted \$167.6 million in spending away from other goods and services and towards the casino. These findings served as inputs which we used to inform our economic impact model, which estimates the secondary and tertiary 'spin off' effects of an economic event. In addition to the 3,249 jobs directly supported by the casino, new spending from vendors, government entities, and new employees, along with shifts in spending from casino patrons led to another 6,592 jobs on net, for a total of 9,867 jobs supported by the casino. The majority of those jobs are located in the Metro Boston region. Encore Boston Harbor also supported \$1.1 billion in new personal income and \$1.7 billion in new output (sales) within the Massachusetts economy, of which \$1.3 billion was value added (i.e., net new economic activity or gross state product).²

² This estimate is based on the REMI PI+ model's estimates of value added. For more information on output and value added in the context of economic modeling, see Appendix 5. The Concepts of Output and Value-Added.

Introduction

Background to the Research Project

In November of 2011, Governor Deval Patrick signed the Expanded Gaming Act into law, an act tasked with establishing the grounds for casino legalization in the Commonwealth. Through the establishment of the casino industry in Massachusetts, lawmakers provided avenues for the creation of new jobs, revenue, and economic growth in the state. To ensure these needs are met, the Massachusetts Gaming Commission (MGC)—established to oversee the implementation of the Expanded Gaming Act—organizes protective measures for communities threatened by potential social and economic impacts of gaming establishments. The UMass Donahue Institute (UMDI), as a part of the Social and Economic Impacts of Gambling in Massachusetts (SEIGMA) Research Team, is tasked with producing various analyses of economic and fiscal impacts in fulfillment of the MGC’s research agenda and mandates.

The gaming legislation allows for the creation of up to three commercial resort-style casinos in the state and one slots parlor. To reduce internal competition among casinos, the Commonwealth was divided into three licensing regions, shown in Figure 1, with each region able to attract no more than one full resort-style casino license. The slots-parlor license is not geographically limited. To date, two full resort-style licenses and one slots-parlor license have been awarded. In Region A, Plainridge Park Casino—the state’s singular slots-parlor—launched the casino industry with its opening in Plainville, Massachusetts in July of 2015. MGM Springfield, located in Springfield, Massachusetts, started as the first resort-style casino in the state, having taken residence in Region B in August of 2018. Encore Boston Harbor opened in Everett, Massachusetts in June of 2019, joining Plainridge Park Casino as the second casino in Region A and joining MGM Springfield as the second resort casino in the Commonwealth.

Figure 1. Massachusetts Gaming Commission Regions



Source: Massachusetts Gaming Commission

Methodology

Overview

The process of assessing economic impacts began with collecting primary data on any economic variable which was likely to change as a result of the casino's operations. Many of these measures were provided directly by Encore Boston Harbor, including employment counts, wages, and detailed vendor spending data. Other data, such as information on the collection and disbursement of taxes on EBH's gross gaming revenue, was provided to UMDI from state government sources. Finally, data on patron expenditure, origin, and consumption response to EBH was collected by the SEIGMA team, which administered an on-site patron survey at EBH in April 2022.

Patron Survey Methodology

SEIGMA members from both the social and economic teams collaborated closely on the Encore Boston Harbor Patron Survey, working together to create and implement the survey, and later to analyze the data and report on the findings. One of the important and unique aspects of this survey was the great lengths the team went to in order to capture a representative sample of patrons. Methodological differences between the Encore Boston Harbor Patron Survey and prior patron surveys include the timing of the survey as it relates to the opening date of the casino. Both Plainridge Park Casino and MGM Springfield were initially surveyed within a year of opening (8 months and 6 months, respectively). Although Encore Boston Harbor opened on June 23, 2019, due to the COVID-19 pandemic, with its related casino closures, gaming restrictions, and public health concerns, it was not feasible to conduct the Encore Boston Harbor Patron Survey in 2020 or 2021. Also, while past winter surveys were conducted the last weekend of February and first weekend of March, pandemic numbers were still high during that period, so the decision was made to delay this survey until April 2022.

The unique approach was also reflected in the recruitment of patrons. Teams of surveyors, wearing UMass attire, were stationed at each of the exits in Encore Boston Harbor. The surveyors had three distinct roles, which they switched off every hour. **The counter** counted and kept a tally of all exiting patrons. When the fifth exiting patron was reached, **the solicitor** approached that patron and asked if they had 5-10 minutes to complete an anonymous, self-administered survey and receive a \$5 Starbucks gift card as compensation. If the patron indicated they were not exiting the facility (i.e., just going outside to smoke or use the ATM) the solicitor recorded a 'non-exit.' Importantly, if the patron declined to participate, the solicitor recorded, to the best of their ability, the gender, race, and age range of that patron.

If the patron agreed to participate, the solicitor escorted the patron to the table where **the table monitor** provided more information about the survey and offered the patron the survey electronically (via SurveyGizmo) or on paper, depending on the patron's preference. The purpose of the self-administered format was to maximize the validity of responses to potentially sensitive questions (e.g., gambling expenditure, income).

By counting every 5th person exiting the casino, the surveyors tracked a total of 3,480 individuals. Of those, 490 people were not eligible to complete the survey.³ Additionally, due to the physical logistics of

³ Ineligible people consisted of three groups: (a) those who were not permanently leaving (i.e., exiting the casino floor to partake in non-gambling activities, accessing the ATMs, and/or temporarily going outside to smoke), (b) patrons who had already completed the survey, and (c) people who were not Encore Boston Harbor patrons (i.e., non-uniformed Encore Boston Harbor employees).

the exit areas, 131 people were ‘missed,’ meaning we did not have a chance to solicit them, mostly due to their entry into the elevators before a solicitor could approach them. In total, 2,859 eligible patrons were invited or ‘solicited’ to participate in the survey. A total of 440 patrons agreed, for an overall response rate of 15.4%. Response rates for individual questions were above 83% for all but two of the questions (spending on tips to non-gambling employees in Encore and spending on activities in Massachusetts outside of Encore during visit to area).

The patron survey data were weighted to correct for sampling biases based on: (1) period of the week and (2) certain types of people being more or less likely to answer the questionnaire. The first step in the weighting process established the population characteristics during the sampling periods. This involved combining the age category, race/ethnicity category, and gender of people who completed the survey (and reported these demographic characteristics in their survey) with the age, race/ethnicity, and gender of people who declined to complete the survey (as recorded by the survey team). The demographics of people who completed the survey were then weighted to match the gender, race/ethnicity, and age range of the total population of casino patrons during the survey periods.

The reliability and validity of this weighting procedure depends on the accuracy of the survey team in correctly identifying the age, gender, and race/ethnicity of refusals and whether there are any systematic biases in the errors. A ‘Demography Accuracy Test’ (see Appendix E) consisting of 36 pictures of people of different known ages, genders, and race/ethnicities was developed for the 2016 Plainridge Park Casino Patron Survey (Salame et al., 2017) and was used again for the MGM Springfield and the EBH study. This accuracy test was administered to 29 surveyors.⁴ An average of 81 percent of all pictures were correctly identified by the 29 surveyors, with no significant difference in picture accuracy as a function of the age, gender or race/ethnicity of the person in the picture. Surveyors themselves had an average of 80.9 percent (29.1/36) pictures correct, ranging from 56 percent to 97 percent depending on the surveyor. These results confirm the ability of the surveyors to correctly identify age range, gender, and race/ethnicity of survey refusals with reasonable accuracy, which provides support for the validity of our weighting procedure.

More information about the Encore Boston Harbor Patron Survey, including methodology and weighting, the questionnaire, results, and summary findings, as well as the concurrent License Plate Survey, can be found in a separate report available on the SEIGMA website (<https://www.umass.edu/seigma/reports>).

Economic Modeling Methodology

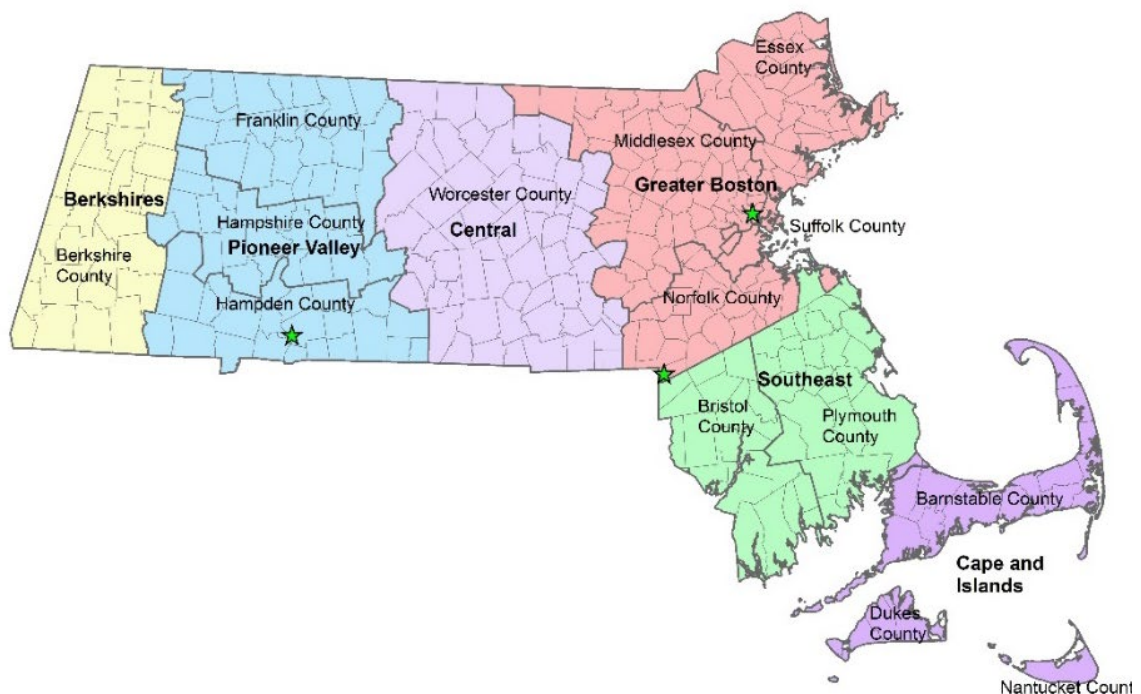
For this analysis as well as past and future economic analyses, the SEIGMA team has chosen the PI⁺ model from Massachusetts-based Regional Economic Models, Inc. (REMI). PI⁺ generates realistic year-by-year estimates of the total regional effects of specific initiatives. Model simulations using PI⁺ allow users to estimate comprehensive economic and demographic effects created by economic events such as the development and operation of a casino within a region. PI⁺ allows economists to assess a variety of effects including economic impact analysis; changes in policies and infrastructure; and state and local taxes. REMI allows for dynamic, multi-year modeling as compared to other, more simplistic modeling systems. REMI thus has significant advantages for analysis of major complex initiatives that: (a) have time-series based impacts that are likely to vary over time; (b) require the use and interpretation of

⁴ Although a total of 42 surveyors were hired for this project, due to the time and process associated with onboarding, not all were available prior to the survey to complete the Demographic Accuracy Test.

multiple economic variables; and (c) emphasize economic interactions between regions within the state that add up to a true state-level impact.

The REMI model purchased by SEIGMA is a six region, 70 sector model. Each of the six regions in the model is built from Massachusetts counties, and the 70 REMI industry sectors roughly correspond to the 3-digit codes of the North American Industry Classification System (NAICS). For the purposes of this study, PI⁺ used information on the economic concepts described above, all by region, to produce economic impact estimates. These inputs allow for the appropriate allocation of economic activity across the regions of the Commonwealth so that the model can calculate the total economic impacts for the state of EBH's operations and show how activity in one region impacts others.

Figure 2. REMI Regions



The detail and specificity of the data provided to UMDI allowed the modelers to replace some of the default assumptions of the model with project-specific information. For example, PI⁺ includes average wages by industry and region and the typical flows of goods and services among regions. The operations spending data from Encore Boston Harbor included specific information on each of these areas and therefore allowed the use of actual reported data rather than the averages built into the model which are needed in the absence of precise inputs. Appendices 2 and 3 provide detailed methodologies of the PI⁺ model and the data preparation. Appendix 5. *The Concepts of Output and Value-Added* provides a glossary of economic impact terminology.

Direct Impacts of Casino Operations

This section discusses the immediate economic impacts generated during Encore Boston Harbor’s first three and a half years of operation (June 2019-December 2022). As discussed in the Methodology section above, UMDI obtained data to measure and analyze primary spending at the casino, which serves as the basis for secondary economic effects as vendors, government entities, and employees spend the money they received from the operations of the casino. Many aspects of a firm’s operations have an immediate effect on the regional economy include hiring staff, paying wages, purchasing intermediate goods and services, and paying government taxes, fees, and community agreement payments. Direct spending in these ways triggers additional impacts in the economy. For example, Encore Boston Harbor’s spending on its own staff initiates secondary effects by creating new demand in Massachusetts as these employees spend their new paychecks. In addition to a firm’s payroll, a firm’s spending on intermediate goods and services—such as food, slot machines, and performers—supports employment and business expansion in other establishments. This section provides detail on this ‘first-round’ spending – discussing the ways Encore Boston Harbor’s primary spending and operations had a direct impact on the Massachusetts economy.

Employment and Wages

Encore Boston Harbor’s hiring and payroll represents one of its biggest economic contributions to the immediate region as well as to the broader economy. In 2022, Encore Boston Harbor’s most recent full year of operation, an average of 3,249 workers were employed at the casino in any given pay period. Collectively, employees worked over 5.7 million hours over this period, which earned them about \$206 million collectively.

Table 1 shows the regional distribution of Encore Boston Harbor’s average annual employment counts, as well as the associated totals for hours worked, and wages paid, for each year of its operation. These direct impacts are analyzed by region because workers are more likely to spend the money they earn at their job in the places where they live. Encore Boston Harbor opened approximately nine months prior to the COVID-19 pandemic, which seriously disrupted its operations.⁵ Notably, Encore Boston Harbor managed to retain and pay a substantial portion of their staff over the course of the pandemic.

⁵ For more information on the impact of the COVID-19 pandemic on the Commonwealth’s casino industry, see our previous report on this subject: Peake, T., Hall, A., Breest, K., Aron, E. (2022). *SEIGMA COVID-19 Impacts Report*. Hadley, MA: University of Massachusetts Donahue Institute, Economic and Public Policy Research Group.

Table 1. Encore Boston Harbor Employment, Hours Worked, and Wages Paid by Region, 2019 to 2022

Region	2019	2020	2021	2022
Average Annual Payroll Employment				
<i>Metro Boston</i>	3,506	2,717	2,285	2,807
<i>Southeast</i>	111	97	87	102
<i>Central</i>	40	33	28	34
<i>Pioneer Valley</i>	19	12	4	6
<i>Cape and Islands</i>	5	4	2	3
<i>Rest of World</i>	438	387	291	297
Total	4,118	3,250	2,697	3,249
Total Hours Worked				
<i>Metro Boston</i>	4,422,100	4,626,816	3,989,226	4,985,287
<i>Southeast</i>	137,986	162,047	146,243	171,233
<i>Central</i>	48,873	54,132	49,742	59,492
<i>Pioneer Valley</i>	22,646	19,054	5,938	9,947
<i>Cape and Islands</i>	6,229	6,821	1,986	5,053
<i>Rest of World</i>	555,914	666,426	501,132	507,425
Total	5,193,747	5,535,296	4,694,267	5,738,436
Total Wages Paid (Millions of Dollars)				
<i>Metro Boston</i>	\$118.1	\$132.0	\$130.1	\$176.4
<i>Southeast</i>	\$3.64	\$4.60	\$4.71	\$6.27
<i>Central</i>	\$1.34	\$1.58	\$1.74	\$2.35
<i>Pioneer Valley</i>	\$0.51	\$0.56	\$0.24	\$0.40
<i>Cape and Islands</i>	\$0.18	\$0.41	\$0.05	\$0.18
<i>Rest of World</i>	\$18.90	\$23.15	\$20.38	\$20.64
Total	\$142.70	\$162.33	\$157.24	\$206.20

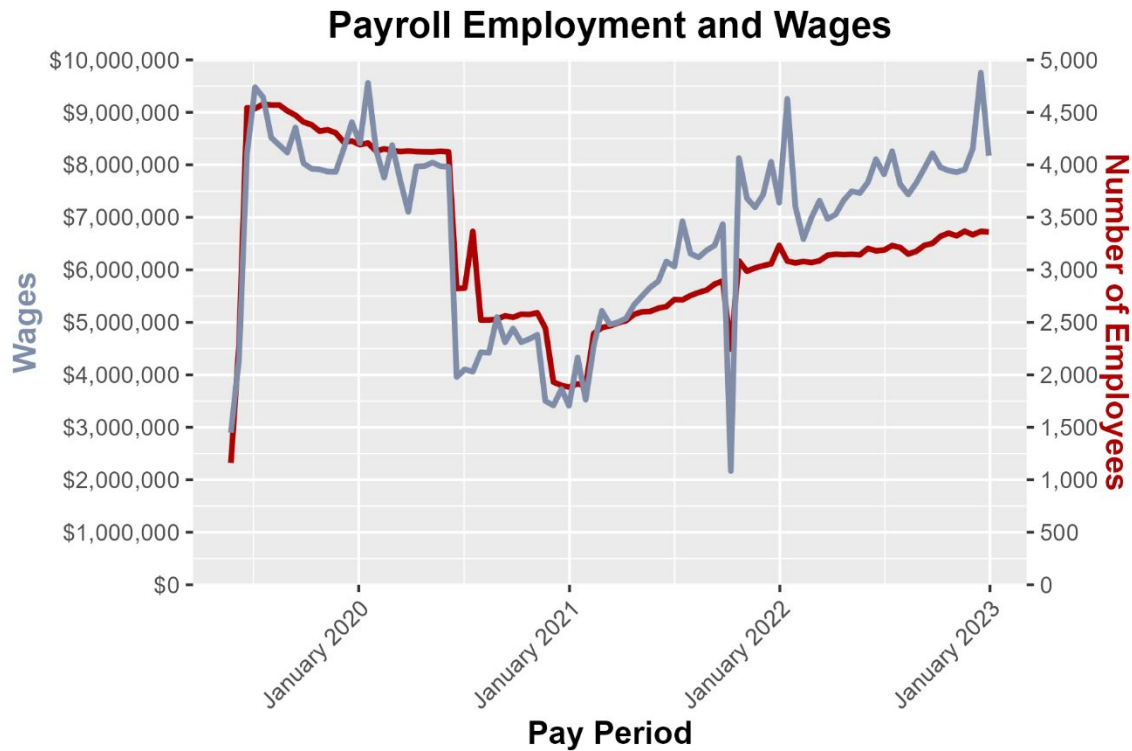
Source: Encore Boston Harbor

Note: "Rest of World" refers to employees living in regions outside of Massachusetts

Figure 3 shows the count of people employed at Encore Boston Harbor for each biweekly payroll date, as well as the total wages paid to employees during that pay period. The high point for employment at Encore Boston Harbor was shortly after opening, when just over 4,500 individuals were employed at the casino. The SEIGMA team has observed a similar trend in Massachusetts' two other casinos, Plainridge Park Casino and MGM Springfield, where employment was also highest in the first months of operation and gradually tapered off. It is, however, impossible to know whether this would have been the long-term trend at Encore Boston Harbor, had the operations of the casino not been disrupted by the COVID-19 pandemic. Wages follow a similar pattern to employment, falling during the early stages of the pandemic and rising after reopening, but even while the casino was entirely shut down, millions of dollars were being paid to employees each pay date. One thing to note is that in Figure 3, the substantial increase in wages in 2021 which is shown in Table 1 is not apparent. This suggests that much of the additional money paid to Encore Boston Harbor employees in 2021 did not occur as part of the regular pay periods. While it is not noted in the records supplied to the SEIGMA team, paychecks can occur

outside of those regular intervals for a number of reasons, with bonuses and paid time off (PTO) buyouts being two common reasons. This includes PTO buyouts that might occur in the case that an employee is terminated.

Figure 3. Average Bi-Weekly Employment and Wages Paid at Encore Boston Harbor, 2019-2022



Source: Encore Boston Harbor

Vendor Spending and Taxes

In addition to wages paid to employees, Encore Boston Harbor made millions of dollars in payments to various third parties in the course of its operation. Encore Boston Harbor relies on the business of different entities to provide the casino with goods and services. These payments include purchases of goods from vendors, such as food and alcohol, payments to utility companies and third-party service providers, along with payments made on behalf of employees to various unions and membership organizations and charitable contributions. Taken together, these payments amounted to \$290.4 million in Encore Boston Harbor’s first four years of operation, with \$153.1 million, or 52.7 percent of the total, going to Massachusetts-based firms mostly in industries where proximity to the casino is important.

Table 2 shows the top private industry sectors to receive payments from Encore Boston Harbor. The largest single industry in terms of spending by Encore Boston Harbor was wholesale trade, making up 16.6 percent of spending. Not far behind is the second largest industry spending category, payments for professional scientific, and technical services at 15.3 percent. Legal consulting, marketing, and IT services are some of the common vendors that are included in the professional, scientific and technical services industry. Retail trade is the third-most-prominent industry, with companies offering supplies to the casino on a smaller scale. Much of Encore Boston Harbor’s spending on transit and ground passenger transportation can be attributed to limousine and cab services.

Table 2. Top 10 Industries by Vendor Spending, 2019-2022 (in Millions of Dollars)

Industry	2019	2020	2021	2022	Total	Share
Wholesale trade	\$15.6	\$9.6	\$8.6	\$14.3	\$48.2	16.6%
Professional, scientific, and technical services	\$14.2	\$11.3	\$8.7	\$10.3	\$44.4	15.3%
Retail trade	\$7.6	\$3.4	\$8.2	\$12.0	\$31.1	10.7%
Transit and ground passenger transportation	\$6.6	\$7.9	\$7.8	\$6.6	\$28.8	9.9%
Construction	\$1.1	\$3.0	\$3.1	\$6.1	\$13.2	4.6%
Personal and laundry services	\$2.8	\$2.3	\$2.8	\$5.2	\$13.1	4.5%
Food manufacturing	\$3.6	\$2.4	\$3.1	\$3.9	\$13.1	4.5%
Motion picture and sound recording industries	\$3.6	\$2.4	\$3.0	\$3.7	\$12.7	4.4%
Insurance carriers and related activities	\$0.0	\$5.3	\$5.1	\$2.2	\$12.6	4.3%
Administrative and support services	\$4.3	\$2.4	\$2.1	\$3.3	\$12.2	4.2%
All Other Industries	\$16.6	\$12.3	\$14.2	\$17.8	\$61.0	21.0%
Total	\$75.9	\$62.3	\$66.7	\$85.4	\$290.4	100.0%

Source: Encore Boston Harbor

As shown in Table 3, approximately half of spending to vendors was to firms within Massachusetts, with the Metro Boston region of Massachusetts (Suffolk, Essex, Middlesex, and Norfolk Counties) being the largest in-state beneficiary of Encore Boston Harbor's payments to vendors. Vendor spending to other regions of Massachusetts was relatively minor. Of the regions outside of Metro Boston, the Southeast region (Bristol and Plymouth Counties) was consistently the second-largest beneficiary.

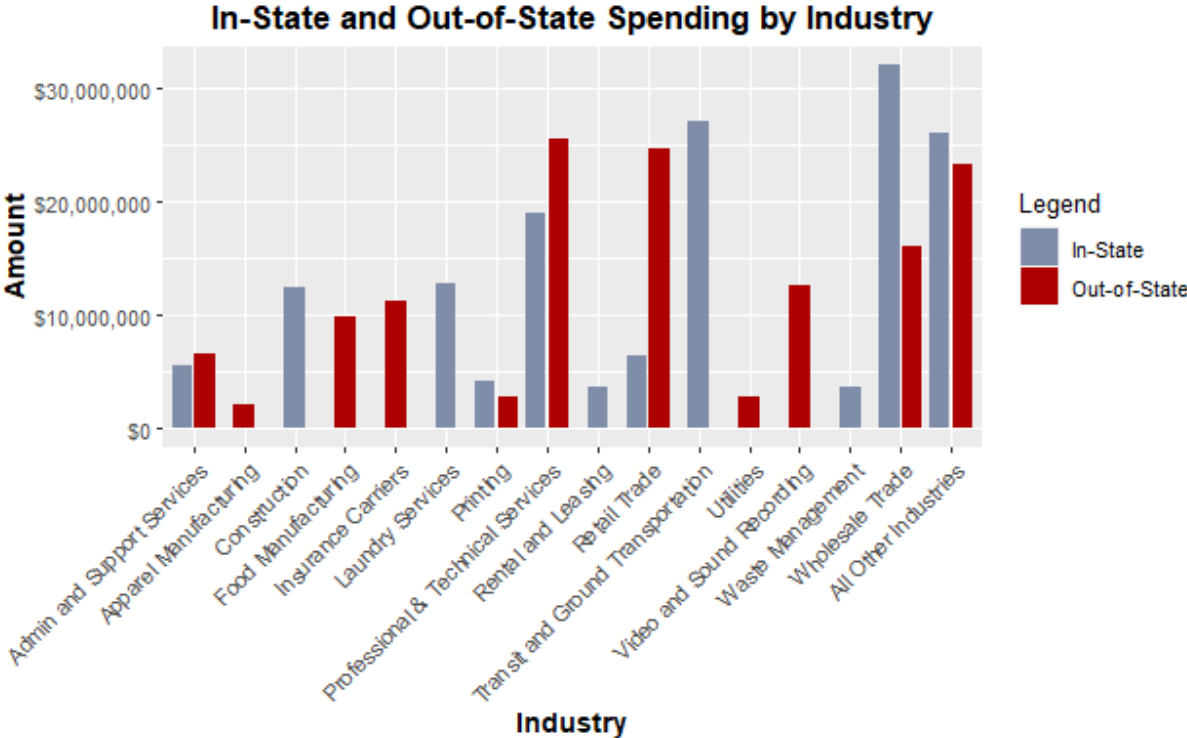
Table 3. Vendor Spending by REMI Region, 2019-2022 (in Millions of Dollars)

Region	2019	2020	2021	2022	Total	Share
Metro Boston	\$31.0	\$26.9	\$29.3	\$40.0	\$127.2	43.8%
Southeast	\$7.2	\$3.6	\$3.3	\$4.8	\$18.9	6.5%
Central	\$1.4	\$0.9	\$1.3	\$1.6	\$5.3	1.8%
Pioneer Valley	\$0.4	\$0.4	\$0.5	\$0.7	\$2.0	0.7%
Cape and Islands	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	0.0%
Rest of World	\$35.9	\$30.5	\$32.2	\$38.3	\$136.9	47.2%
Total	\$75.9	\$62.3	\$66.7	\$85.4	\$290.4	100.0%

Source: Encore Boston Harbor

Figure 4 shows Encore Boston Harbor's expenditures to both in-state and out-of-state vendors from opening until the end of 2022. As has been observed with Massachusetts' other two casinos, most of Encore Boston Harbor's in-state vendor spending went to firms in industries such as wholesale trade, transit and ground transportation, laundry services, and construction, offering products and services where proximity to the casino is important. For other services, such as manufacturing, professional and technical services, and video and sound recording, Encore Boston Harbor spent most of its funds on out-of-state vendors. In many cases, these were likely vendors with which Wynn Resorts, Encore Boston Harbor's parent company, had an existing relationship.

Figure 4. In-State and Out-of-State Spending by Encore Boston Harbor by Industry, 2019-2022

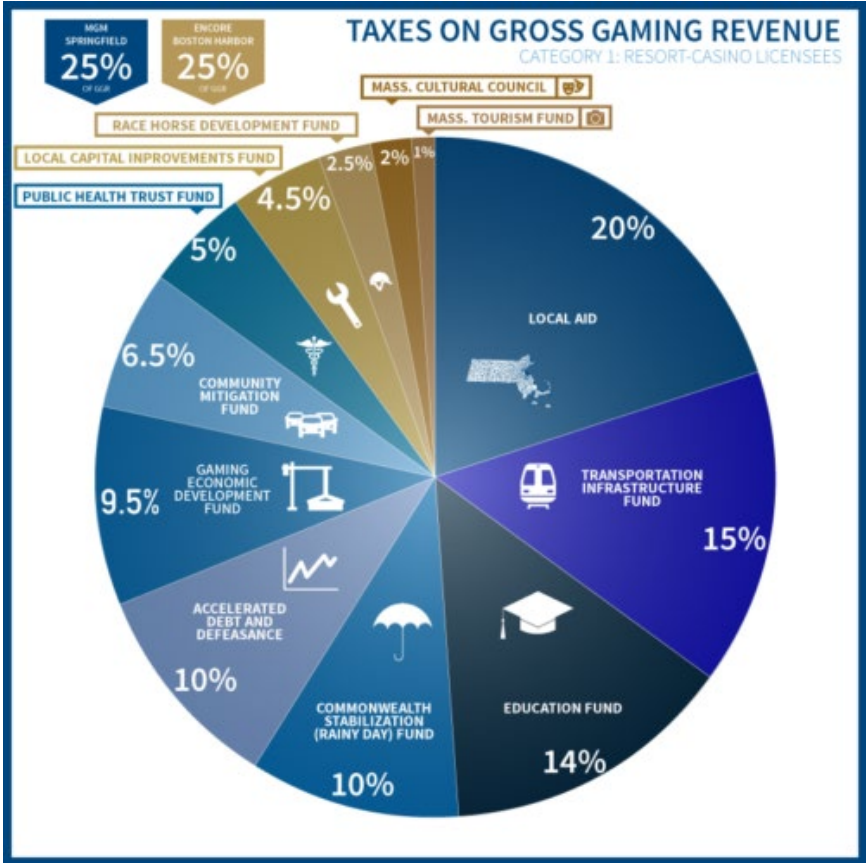


Source: Encore Boston Harbor

Public Sector Impacts from Gross Gaming Revenue

One of the most important economic impacts of a casino is the new revenue accrued by state and local governments. In exchange for exclusive rights to operate a casino within a multi-county region, Massachusetts casino operators agree to pay substantially higher state taxes than other businesses and agree to host agreements with local municipalities. These new state and local revenues result in higher levels of government spending,⁶ which creates new demand for goods and services that are difficult to attribute to the casino. Gross gaming revenue (GGR) is sourced from the bets that patrons place while gambling both on slot machines and on table games, this is referred to as 'coin-in'. The casino sets a hold percentage on these bets, which indicates the amount of coin-in to be retained as revenue. The remainder of coin-in is then returned to bettors in the form of a 'payout'. The percentage of coin-in that EBH keeps is considered its GGR. From this GGR, a resort-style casino in Massachusetts like Encore Boston Harbor is subject to a 25 percent state tax. The total collected is then divided among 12 different public funds in the state, with the majority (20%) going to Local Aid.

Figure 5. Disbursement of Taxes on Encore Boston Harbor's Gross Gaming Revenue

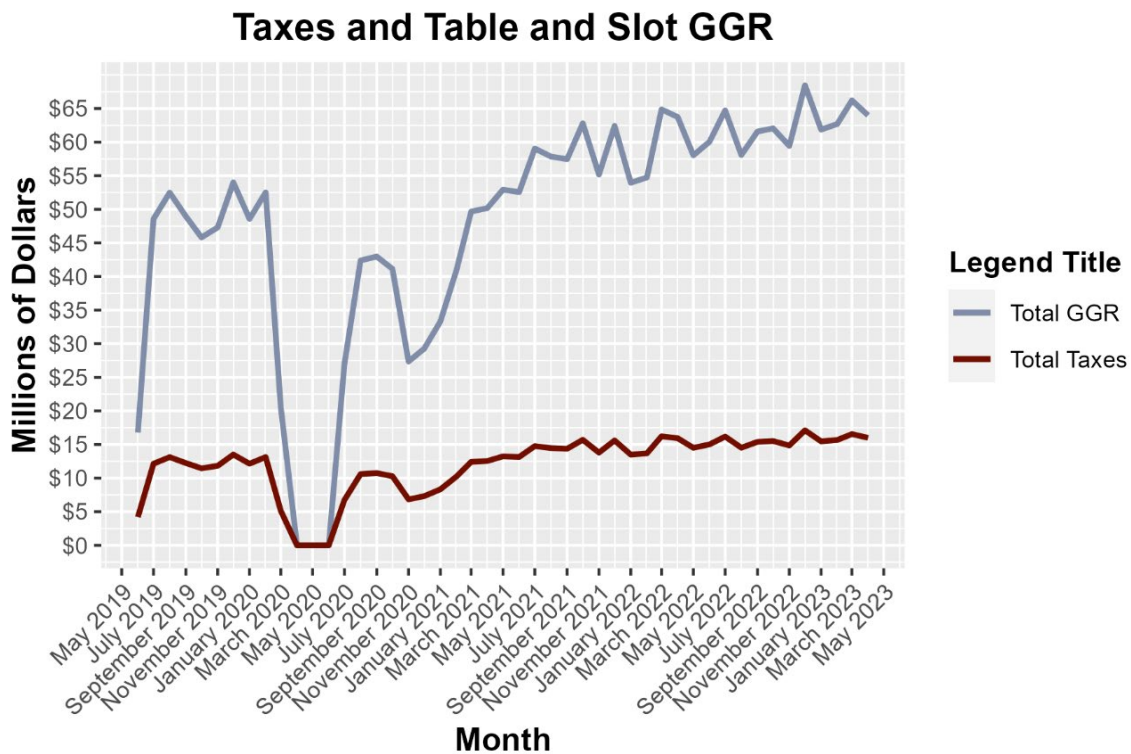


Source: Massachusetts Gaming Commission

⁶ For the purposes of economic modeling, we assume that all the revenues received by the state are spent. It is also possible that the state could save the funds or use them to offset tax increases that would otherwise be necessary. The nature of state budgetary processes makes it impossible to know with any certainty how a state’s fiscal policy would have been different without a particular revenue source, so simplifying assumptions are necessary.

Figure 6 shows Encore Boston Harbor’s monthly gross gaming revenue, and the state taxes collected from that revenue from opening through May of 2023. Predictably, revenues at Encore Boston Harbor cratered when the casino shut down due to the COVID-19 pandemic. This meant that revenue to the Commonwealth decreased as well.⁷ Since the last pandemic-related restrictions were lifted, the casino’s gross gaming revenue has gradually trended upward, with some month-to-month volatility. In turn, new revenue to the state has also gradually increased.

Figure 6. Encore Boston Harbor Casino Monthly Gross Gaming Revenue, June 2019-April 2023



Source: Massachusetts Gaming Commission

Taxes on Encore Boston Harbor’s gross gaming revenue are allocated according to a formula set in place by the Expanded Gaming Act. Other taxes paid by Encore Boston Harbor are not earmarked for a specific purpose by the local, state, or federal government entities collecting them. Of the \$401.9 million in tax revenues collected from Encore Boston Harbor from 2019 to 2022, 20 percent (\$80.4 million) went to local aid for Massachusetts cities and towns, while the remaining 80 percent was allocated to various state funds using the formula pictured in Figure 5.

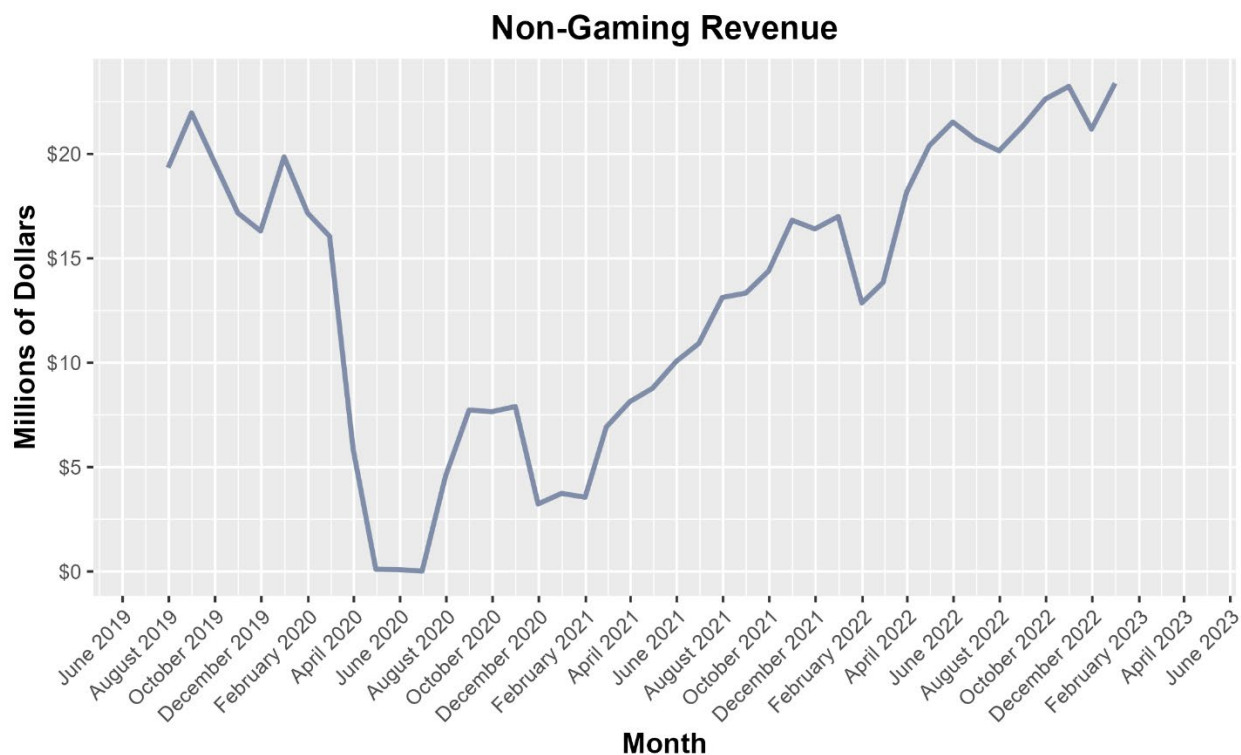
It should be noted that many of the funds which receive revenue from taxes on Encore Boston Harbor’s gross gaming revenue also receive funds from other sources, such as budget appropriations from the state legislature. There is no way to know precisely how resources would have been allocated to these funds if the Commonwealth did not receive revenue from Encore Boston Harbor and the other casinos. It is possible that an increase in funds from taxes on Encore Boston Harbor’s gross gaming revenue

⁷ In addition to these payments, Encore Boston Harbor, as well as the other license awardees, paid licensing fees which were distributed according to a different formula. Because this report seeks to study the impacts of Encore Boston Harbor’s operation, these payments are not modeled, but they may be addressed in a future report.

allowed the legislature to decrease their appropriation to a fund while preserving its operating budget. Because of the fungible nature of government funds, UMDI did not thoroughly model the exact economic impact of each fund, but rather chose to model the new funds to state and local government as new general state and local government spending.

Figure 7 shows Encore Boston Harbor’s revenue from activities other than gambling. Non-gaming revenue has comprised between 18 and 28 percent of EBH’s annual revenue, depending on the year. Over the first four years of the casino’s operation, non-gaming revenue has generally followed a trend similar to that of gaming revenue, although non-gaming revenue increased more gradually than gambling revenue after reopening.

Figure 7. Non-Gaming Revenue, August 2019-January 2023



Source: Encore Boston Harbor

Local Aid

The term ‘local aid’ in the Commonwealth of Massachusetts refers to “money that flows from the state budget to city and town budgets, helping them fund vital local services such as schools, police and fire protection, parks and public works”.⁸ Local aid is categorized into three distinct categories: General Local Aid; Chapter 70 Education Aid; and Categorical Local Aid. General Local Aid, or Unrestricted General Government Aid, primarily comprises revenues generated from the state lottery. This fund is used by the state as a mechanism to offset inequality of local services that would otherwise exist if cities and towns primarily funded their budgets with local property tax revenue. Cities and towns have flexibility in how they allocate these funds, using them to support general government spending. This

⁸ https://massbudget.org/reports/pdf/demystifying_general_local_aid.pdf

flexibility allows cities and towns to distribute resources across different programs and priorities as needed. Chapter 70 Education Aid is the most substantial portion of local aid and flows directly into school districts. Categorical Local Aid serves as financial assistance for smaller, targeted programs that address specific local needs. For General Local Aid, The Commonwealth makes direct, monthly local aid payments to cities and towns using the state’s General Fund to distribute the balance of the State Lottery and Gaming Fund, and additional funds from the General Fund and the Gaming Local Aid Fund.⁹ By statute, 20 percent of the taxes on Encore Boston Harbor’s gross gaming revenue are allocated to general local aid and thus added to these existing sources of funding. These funds are allocated to cities and towns using the same distribution formula which had previously been used, resulting in each city and town continuing to receive its expected share of a now-greater pool of local aid funds.¹⁰ The formula currently set by the Massachusetts legislature distributes local aid funds based on a city or town’s population, income, and property values. Indeed, large and economically distressed communities received the largest share of new local aid funds from Encore Boston Harbor.

When aggregated into the regions that we used for our PI+ model, 59.8 percent of local aid funds are distributed to the Metro Boston region. This may be attributed to the high population density of the region and to the fact that many of the Commonwealth’s more economically distressed cities and towns are within this region. As discussed later, contributions to the public sector, which generate spending in many areas, are one of Encore Boston Harbor’s largest economic impacts in regions of Massachusetts outside of Metro Boston.

Table 4. Distribution of Local Aid from Encore Boston Harbor Gross Gaming Revenue by REMI Region, 2019-2022 (in Millions of Dollars)

Fund/Source	2019	2020	2021	2022
Gross Gaming Revenue (GGR)	\$313.9	\$331.7	\$634.4	\$729.7
Taxes Collected from GGR	\$78.5	\$82.9	\$158.6	\$182.4
Total New Local Aid	\$15.7	\$16.6	\$31.7	\$36.5
Region	2019	2020	2021	2022
Berkshires	\$0.3	\$0.4	\$0.7	\$0.8
Cape and Islands	\$0.2	\$0.2	\$0.3	\$0.4
Central	\$1.8	\$1.9	\$3.7	\$4.2
Metro Boston	\$9.4	\$9.9	\$19.3	\$21.8
Pioneer Valley	\$1.8	\$1.9	\$3.7	\$4.2
Southeast	\$2.2	\$2.3	\$4.5	\$5.1

Source: Massachusetts State Legislature, UMDI Calculations

⁹ See Governor’s Budget FY2024 Recommendations. Section 3, Local Aid Distribution. <https://budget.digital.mass.gov/govbudget/fy24/local-aid/>. Downloaded 10/10/23.

¹⁰ For more information on local aid distribution, see https://budget.digital.mass.gov/bb/h1/fy18h1/os_18/h3.htm

Changes in Consumer Spending: Patrons and their Spending Patterns

Encore Boston Harbor's revenue is obtained through the expenditures of its patrons. Although Encore Boston Harbor's expenditures create new economic activity in the Commonwealth, one potential downside to any new, large consumer attraction is that customers might shift their spending away from other local businesses and towards the new attraction, leading to a decline in revenue for other businesses.¹¹ The casino's direct operating impacts, as described in the previous section, are therefore an incomplete accounting of Encore Boston Harbor's economic footprint. To fully capture the impact of Encore Boston Harbor's operations, we needed to estimate the magnitude and nature of these shifts in spending. These include shifts in consumer spending away from other Massachusetts businesses and toward the casino, as well as new consumer spending outside of Encore Boston Harbor by casino patrons. The following section describes our process for forming those estimates.

Patron Spending

The SEIGMA team collected data on patron spending through an on-site survey of patrons at Encore Boston Harbor. One of the greatest challenges facing researchers conducting economic impact studies is conceiving of a counterfactual for consumer behavior.¹² To determine how changes in patron behavior affect the economy, it is critical to understand how money spent at the casino would have been spent if Massachusetts had not expanded in-state gaming. To do this, SEIGMA's Encore Boston Harbor patron survey gathers information from patrons about where they live, whether they would have come to Everett without the casino, and whether they would have gambled in another state were it not for the existence of Encore Boston Harbor.¹³ Based on the patrons' answers, they are categorized into one of six patron types created by UMDI. Descriptions of the six patron types and how they were derived are given in Appendix 3. *Detailed Methodology for Data Preparation*. Patron types are then used to determine how patrons' spending is treated within our economic model and to come up with spending estimates for each patron type.

All patron spending at or around Encore Boston Harbor is classified into three spending types. **New spending** is spending which would not have occurred within Massachusetts if not for the casino. This

¹¹ In order to model the economic impacts of Encore Boston Harbor, UMDI had to model the amount of money spent at Encore Boston Harbor which would otherwise have been spent on other goods and services within Massachusetts. UMDI used the patron survey to identify patrons who likely would not have spent their money in Massachusetts were it not for the casino, and then reduced consumer spending from the remaining patrons based on the geographic origins of the patrons surveyed. Although this assumption simplifies how patrons finance their visits to Encore Boston Harbor (some patrons may spend out of savings or take on debt), UMDI believes that this assumption adequately captures the flows of regional spending in the long run, as diminished savings or greater debt will likely lead to a decrease in consumer spending at some point.

¹² In the parlance of economic modeling, a counterfactual is a statement of what would be different if something which is currently true were not true. In this case, finding a counterfactual for consumer behavior would mean finding an estimate for how Encore Boston Harbor patrons would have spent their money if Encore Boston Harbor had never opened.

¹³ Self-reported gambling expenditure tends to be somewhat unreliable due to a tendency, particularly among heavy and/or problem gamblers, to report being a 'winner.' This is despite its implausibility and objective evidence to the contrary (Williams, Volberg, Stevens et al., 2017; Wood & Williams, 2007). The analytical approach employed with these data has been shown to improve the validity of self-reported expenditures and has been used in previous reports. Consequently, the patron survey study adopted this protocol as a best-practice approach and to maintain consistency across reports. For detailed information on the patron survey, including a copy of the survey instrument, see *Patron and License Plate Report: Encore Boston Harbor 2019*. SEIGMA. June 2020 available here: www.umass.edu/seigma/reports.

includes spending by recaptured patrons (patrons who indicated that they would have travelled out-of-state to gamble if an in-state option was not available) and out-of-state patrons who indicated that they would not have made their visit to Massachusetts if the casino had not opened. **Reallocated spending** is spending from patrons whose survey responses indicate that they would have spent their money in Massachusetts regardless of whether the casino opened. This group is important to track because a key concern from some groups leading up to the opening of the casinos was that consumers would shift their spending away from other local businesses and towards the casino. Finally, **incidental spending** is spending which would have occurred regardless of whether the casino opened. On-site spending at the casino cannot be incidental but off-site spending can be; because many casino patrons would have been in Everett or the surrounding area, their off-site economic activity cannot be fully attributed to the casino. On-site and off-site patron spending is modeled differently in our economic modeling exercise depending on whether it is classified as new, reallocated, or incidental.

Although prior patron surveys had been conducted in the first year of the casino's operations, the COVID-19 pandemic forced the SEIGMA team to delay the patron survey until 2022. In a way, this is the most appropriate year regardless, as 2022 was the casino's first full year of operation without any pandemic-related restrictions, and its highest year in both gaming and non-gaming revenues. Unfortunately, it means that we were unable to gather any data on what ways the patrons who visited the casino while COVID-19 restrictions were in place were different from the ones who visited the casino once the restrictions had been lifted. In the following sections, we use the weighted shares of spending derived from the 2022 patron survey to apportion spending for all years, but we acknowledge that it is possible that those shares may have been somewhat different had the survey been conducted in those prior years.

Patron Spending at Encore Boston Harbor

Based on the results of the 2022 Patron Survey, the SEIGMA team estimates that most patrons of Encore Boston Harbor would not have spent the money they spent at the casino in Massachusetts if not for the casino. Many of these patrons are recaptured patrons who live in Massachusetts, but who would have travelled out-of-state to gamble even if the casino had never opened. A smaller number are out-of-state patrons who indicated that they would not have made the trip to Massachusetts if not for the casino. In either case, the economic impact is the same; the spending of these patrons would not have occurred in the Commonwealth had it not been for the casino. These patrons also account for a disproportionate share of total spending, a pattern that we have observed in other casinos as well. The remaining patrons are individuals whose survey responses led UMDI to conclude that the money they spent at Encore Boston Harbor would have otherwise been spent elsewhere in the Commonwealth. Their spending represents UMDI's estimate of the total spending reallocated away from other types of spending in Massachusetts and toward Encore Boston Harbor.

As shown in Table 5 65.4 percent of reported gambling spending at Encore Boston Harbor is new to Massachusetts. This is slightly higher than the 60.7 percent of patrons, whose spending the SEIGMA team identified as new to Massachusetts according to our method as described above. The remaining 34.6 percent of spending would likely have been spent on other types of goods and services within Massachusetts.

Table 5. Share of On-Site Gambling Spending by Spending Type at Encore Boston Harbor, 2019-2022

Class	Share of Respondents	Share of Spending	2019	2020	2021	2022
New	60.7%	65.4%	\$205,377,833	\$217,005,167	\$415,013,861	\$477,377,126
Reallocated	39.3%	34.6%	\$108,565,346	\$114,711,703	\$219,381,629	\$252,347,647
Total	100.00%	100.00%	\$313,943,179	\$331,716,870	\$634,395,490	\$729,724,773

Source: SEIGMA Encore Boston Harbor Patron Survey

The share of survey respondents whose on-site non-gambling spending is considered new to the Commonwealth is slightly higher than the share for gambling spending (63.3% in Table 6 versus 60.7% in Table 5). This discrepancy is the result of patrons who did not report spending money on both gambling and non-gambling activities during their stay and is to be expected, as not all casino patrons will partake in both forms of activities. This discrepancy becomes much wider when considering these patrons' shares of spending, where the SEIGMA team estimates 82 percent of non-gambling spending to be new to Massachusetts. This is a more dramatic example of the trend observed in gambling spending, where patrons whose spending is considered to be new account for a disproportionate share of the casino's revenue. Table 6 shows the breakdown of on-site non-gambling spending.

Table 6. Share of On-Site Non-Gambling Spending by Patron Type at Encore Boston Harbor, 2019-2022

Spending Type	Share of Respondents	Share of Spending	2019	2020	2021	2022
New	63.3%	82.0%	\$98,478,843	\$60,813,250	\$114,388,658	\$196,364,023
Reallocated	36.7%	18.0%	\$21,583,212	\$13,328,195	\$25,070,102	\$43,036,313
Total	100.0%	100.0%	\$120,062,054	\$74,141,445	\$139,458,759	\$239,400,335

Source: SEIGMA Encore Boston Harbor Patron Survey

Patron Spending Off-Site

Of patrons surveyed by the SEIGMA team, 39.1 percent indicated that they spent money off-site during their trip to Encore Boston Harbor. The largest off-site spending was seen in attendance at an event, show, or exhibit (33.5%), with additional spending for off-site food or beverage (21.0%), bars, pubs, or nightclubs (11.3%), and retail shopping (9.8%). In order to model new or reallocated off-site spending, UMDI utilized translator variables within the REMI model, which provide estimates of how visitors might spend their money during their visits.¹⁴

As mentioned earlier, not all the reported off-site spending at Encore Boston Harbor is new spending to the region. Based on patron survey responses, UMDI estimates that 8.7 of all the reported off-site spending by Encore Boston Harbor patrons, would have occurred regardless of whether the casino ever opened. Of the remaining spending, UMDI estimates that 71 percent is new spending which would not have occurred in Massachusetts if Encore Boston Harbor had not opened, while the remaining 20.3

¹⁴ Translator variables inside the REMI model represent a basket of goods and services purchased by a certain type of tourist, based on data provided by the US Bureau of Economic Analysis. For recaptured in-state patrons and new out-of-state patrons, their off-site spending is modeled using the translator variable for resident households, or day trippers, because most of those patrons do live within driving distance. When considering reallocated spending from out-of-state patrons who would have visited Massachusetts regardless of whether or not Encore Boston Harbor opened, the translator variable for nonresidents is used. See *Appendix 3. Detailed Methodology for Data Preparation*.

percent is reallocated spending that would have occurred elsewhere in the Massachusetts economy. Table 7 shows the breakdown of off-site spending at Encore Boston Harbor by spending type.

Table 7. Share of Off-Site Non-Gambling Spending by Encore Boston Harbor Patron Type, 2019-2022

Spending Type	Share of Respondents	Share of Spending	2019	2020	2021	2022
New	55.9%	71.0%	\$53,759,511	\$33,197,898	\$62,444,664	\$107,194,942
Reallocated	31.9%	20.3%	\$15,409,046	\$9,515,487	\$17,898,465	\$30,725,202
Incidental	12.2%	8.7%	\$6,567,233	\$4,055,438	\$7,628,207	\$13,094,878
Total	100.00%	100.00%	\$75,735,791	\$46,768,823	\$87,971,337	\$151,015,021

Source: SEIGMA Encore Boston Harbor Patron Survey

Combined Economic Impacts: REMI Results

This study involved collecting data from Encore Boston Harbor to determine the economic footprint of its operations, including employment, wages, vendor spending, and fiscal impacts from taxes and other assessments paid to the state. These activities, known as primary activities, are used both for informative analysis as well as inputs for a REMI PI+ economic model, to calculate the total economic impacts of this new activity. A second part of the analysis involved patron spending data. Survey data from patrons at the casino highlighted shifts of patron spending patterns and doubled as inputs for a REMI PI+ economic model. The resulting model of economic impact on Massachusetts details effects in the private sector, such as the shift in private sector activity (i.e., employment and wages, vendor spending and reallocation of patron spending) as a result of the casino, and in the public sector, such as the economic activity resulting from new state and local government spending made possible by taxes and other government revenue from Encore Boston Harbor.

Casino Operations

Daily casino operation involves spending money in a number of ways, each of which generates economic impacts locally, regionally and across the state. Casino operations generate new job openings in the Commonwealth yielding paychecks for Massachusetts households. Operational spending results in revenue for other private sector firms, including many in Massachusetts, as well as taxes and fees paid to government entities. The year 2022 was Encore Boston Harbor’s first full calendar year of operation without pandemic-related operation restrictions. To use that year as an example, revenue generated by the casino in 2022 enabled Encore Boston Harbor to employ an average of 3,275 workers and pay \$206 million in wages. At the same time, Encore Boston Harbor spent \$85.4 million on vendors, membership organizations, and charitable causes. An additional \$197.4 million went to state and local government entities in Massachusetts. In total, Encore Boston Harbor spent \$488.7 million in payments to various Massachusetts entities in 2022.

Table 8. Summary of Primary REMI Inputs, 2019-2022
Inputs based on operator data and government reports

Measure	Units	2019	2020	2021	2022
Average Employment	Jobs	2,123	3,250	2,696	3,275
Total Wages	Millions of Dollars	\$142.7	\$162.3	\$223.8	\$206.0
Intermediate (e.g., B2B) Spending	Millions of Dollars	\$75.9	\$62.3	\$66.7	\$85.4
Government Revenue	Millions of Dollars	\$86.0	\$87.6	\$167.6	\$197.4

Source: Encore Boston Harbor; SEIGMA Encore Boston Harbor Patron Survey

Patron Spending at Encore Boston Harbor

Patron survey data was used in the REMI modeling exercise to estimate the amount of money which left the rest of the Massachusetts economy as casino patrons shifted their spending away from their usual activities and towards the casino (reallocation). Although on-site patron spending drives Encore Boston Harbor’s revenues, patron spending at Encore Boston Harbor is not an economic impact in and of itself. Rather, the impacts of patron spending on the local economy are seen when the casino uses those revenues to pay employees and purchase goods and services from other firms, or when state and local governments spend revenues collected from the casino. The SEIGMA team conducted a survey on Encore Boston Harbor patrons because questions about the origin and behavior of Encore Boston Harbor’s patrons have broader public policy implications beyond direct economic impacts. The economic implications of those survey findings are explored in the Patron Spending section of this

report, and the results are described in further detail in SEIGMA’s Encore Boston Harbor Patron Survey report.¹⁵

Based on the findings of that report, the SEIGMA team estimates that, in each year of its operation, Encore Boston Harbor attracted visitors who spent millions of dollars in new off-site spending in the course of their visits. Annual estimates range from as low as \$42.7 million in 2020 to \$137.9 million in 2022, with the pandemic playing a major role in the magnitude of that spending. Shifts in consumer spending affected Massachusetts businesses outside of the casino in both positive and negative ways. The SEIGMA team was able to estimate many of these impacts based on patron survey responses. On one hand, we estimate that patrons spent \$330.1 million at businesses outside of Encore Boston Harbor during their visits over the course of the study period. On the other hand, we also estimate that patrons shifted \$818.9 million away from other Massachusetts businesses during the same time, and instead spent that money at the casino leading to a net loss in consumer spending to businesses outside the casino. It should be noted that the source of this spending is patrons only, and in this discussion is not counterbalanced by new spending by casino employees, or the spending of firms that did business with the casino.¹⁶ Table 9 shows the components of that change from 2019 to 2022. Details on these figures and the data used to derive them can be found in the full patron survey report entitled *Patron and License Plate Survey Report: Encore Boston Harbor 2019*.

Table 9. Net Change in Consumer Spending Outside of Encore Boston Harbor, 2019-2022

Measure	Units	2019	2020	2021	2022
New Off-Site Spending by Casino Visitors	Millions of Dollars	\$69.2	\$42.7	\$80.3	\$137.9
Reallocated In-State Consumer Spending	Millions of Dollars	-\$135.9	-\$129.8	-\$247.7	-\$305.5
Net Off-Site Consumer Spending	Millions of Dollars	-\$66.7	-\$87.1	-\$167.3	-\$167.6

Source: SEIGMA Encore Boston Harbor Patron Survey

Combined Economic Impacts

The employment and spending impacts of the casino discussed in detail above form the basis of inputs to the REMI model. Modeling these direct employment and spending impacts allows us to estimate the magnitude of the ‘ripple effects’ of that initial spending known as secondary impacts. In its first year of operation, the direct employment, wages, vendor spending, and fiscal activity associated with Encore Boston Harbor generated an annualized¹⁷ total of 6,007 jobs, with 4,911 of those jobs existing in the private sector. The remainder were government positions supported by the revenue generated by Encore Boston Harbor, along with additional taxes collected from new economic activity. These estimates, along with estimates of output (sales), value added (i.e., net new economic activity or gross state product), and personal income, shown in Table 10, represent the net economic impact of Encore Boston Harbor’s operating impacts, which were overwhelmingly positive, and its impacts on consumer spending outside of the casino, which, although mixed, were on net negative. Over the next three years,

¹⁵ This report and other reports from the SEIGMA research team can be found at www.umass.edu/seigma/reports.

¹⁶ This estimate does not include new consumer spending from casino employees or vendors, which are estimated using the REMI model. These spending estimates, along with the operational impacts, are the inputs to that model.

¹⁷ Encore Boston Harbor opened in June 2019. Because REMI models make certain assumptions about the compensation and labor productivity of workers over the course of the year, employment numbers for 2019 were adjusted to reflect the share of the year that the casino was operational. The casino’s actual economic impact was certainly substantially smaller prior to the opening of the casino, and substantially larger after, with the number presented here acting as a sort of annual average.

these economic impacts, both positive and negative, would grow in magnitude, but on net, the casino's economic contribution would continue to grow.

By 2022, for example, we estimate Encore Boston Harbor's operating impacts created or supported 11,032 jobs in the Commonwealth, while shifts in consumer spending towards the casino and away from other firms are estimated to have cost the Commonwealth 1,164 jobs. On net, we estimate the casino's economic footprint in 2022 to be 9,867 jobs, with 7,483 of those jobs being in the private sector.¹⁸ The casino also contributed a net of \$1.7 billion in output in Massachusetts, with \$1.3 billion of that being net new, or value added, and \$1.1 billion in net new personal income.

Table 10. Economic Impacts of Encore Boston Harbor, 2019-2022

Component	2019	2020	2021	2022
Total Employment				
<i>Operating Impacts</i>	6,493	8,583	9,126	11,032
<i>Consumer Spending Impacts</i>	-485	-537	-1,045	-1,164
Net Impacts	6,007	8,045	8,081	9,867
Private Non-Farm Employment				
<i>Operating Impacts</i>	5,381	7,351	7,018	8,590
<i>Consumer Spending Impacts</i>	-469	-513	-1,001	-1,106
Net Impacts	4,911	6,837	6,016	7,483
Output (Millions of Dollars)				
<i>Operating Impacts</i>	\$933.1	\$1,686.9	\$1,512.2	\$1,993.2
<i>Consumer Spending Impacts</i>	-\$103.4	-\$124.9	-\$247.3	-\$310.4
Net Impacts	\$829.5	\$1,561.7	\$1,264.7	\$1,682.3
Value Added (Millions of Dollars)				
<i>Operating Impacts</i>	\$662.7	\$1,102.6	\$1,164.5	\$1,517.3
<i>Consumer Spending Impacts</i>	-\$63.4	-\$76.0	-\$150.7	-\$190.4
Net Impacts	\$599.3	\$1,026.4	\$1,013.7	\$1,326.6
Personal Income (Millions of Dollars)				
<i>Operating Impacts</i>	\$577.4	\$776.5	\$899.3	\$1,177.3
<i>Consumer Spending Impacts</i>	-\$38.3	-\$45.9	-\$90.7	-\$114.9
Net Impacts	\$539.0	\$730.4	\$808.5	\$1,062.2

Source: Regional Economic Models, Inc., UMDI Calculation

Note: 2019 Employment Numbers are Annualized

Encore Boston Harbor, and the state government which receives revenue from it and many of the vendors that support it, are located in the large Metro Boston region which makes up the economic hub of the Commonwealth. It is therefore not surprising that in each of these measures, economic impacts are concentrated in that region. Many of the impacts in outlying regions can be attributed to wages from commuters, payments to vendors, or spending by state or local government entities that received funding from Encore Boston Harbor's operations. Table 11 shows the distribution of Encore Boston Harbor's economic impacts by region.

¹⁸ The REMI model's footprint analysis estimates the number of jobs supported, which could be in the form of new jobs or in the form of new support for existing jobs.

Table 11. Regional Economic Impacts of Encore Boston Harbor, 2019-2022

Topic/Region	2019	2020	2021	2022
Total Employment				
<i>Metro Boston</i>	4,635	6,591	5,993	7,389
<i>Southeast</i>	540	588	737	894
<i>Pioneer Valley</i>	292	290	510	591
<i>Central</i>	421	450	656	769
<i>Berkshires</i>	31	31	54	62
<i>Cape and Islands</i>	88	95	130	161
Total	6,007	8,045	8,081	9,867
Private Non-Farm Employment				
<i>Metro Boston</i>	3,993	5,861	4,783	5,994
<i>Southeast</i>	420	456	509	630
<i>Pioneer Valley</i>	141	136	228	266
<i>Central</i>	275	296	381	451
<i>Berkshires</i>	15	14	23	27
<i>Cape and Islands</i>	68	73	91	115
Total	4,911	6,837	6,016	7,483
Output (Millions of Dollars)				
<i>Metro Boston</i>	\$622.4	\$1,310.8	\$893.2	\$1,209.3
<i>Southeast</i>	\$81.5	\$101.2	\$135.0	\$172.9
<i>Pioneer Valley</i>	\$42.3	\$47.4	\$84.3	\$106.3
<i>Central</i>	\$65.0	\$79.7	\$118.9	\$150.4
<i>Berkshires</i>	\$4.6	\$5.2	\$9.2	\$11.6
<i>Cape and Islands</i>	\$13.7	\$17.4	\$24.0	\$31.9
Total	\$829.5	\$1,561.7	\$1,264.7	\$1,682.3
Value Added (Millions of Dollars)				
<i>Metro Boston</i>	\$476.3	\$877.5	\$793.0	\$1,045.1
<i>Southeast</i>	\$48.2	\$59.8	\$79.9	\$102.6
<i>Pioneer Valley</i>	\$25.2	\$28.2	\$50.2	\$63.3
<i>Central</i>	\$38.6	\$47.3	\$70.7	\$89.5
<i>Berkshires</i>	\$2.7	\$3.1	\$5.4	\$6.9
<i>Cape and Islands</i>	\$8.2	\$10.5	\$14.4	\$19.3
Total	\$599.3	\$1,026.4	\$1,013.7	\$1,326.6
Personal Income (Millions of Dollars)				
<i>Metro Boston</i>	\$413.0	\$572.0	\$596.9	\$796.4
<i>Southeast</i>	\$55.7	\$71.8	\$86.6	\$110.2
<i>Pioneer Valley</i>	\$18.9	\$21.4	\$38.0	\$46.7
<i>Central</i>	\$40.8	\$52.1	\$68.4	\$85.1
<i>Berkshires</i>	\$2.0	\$2.2	\$3.9	\$4.9
<i>Cape and Islands</i>	\$8.6	\$10.9	\$14.9	\$18.9
Total	\$539.0	\$730.4	\$808.5	\$1,062.2

Source: Regional Economic Models, Inc., UMDI Calculation

Note: 2019 Employment Numbers are Annualized

Table 12 shows the shares of employment impacts associated with various sources of employment demand. The largest among these sources of demand is the casino itself, which consistently employs just over half of the individuals within its economic footprint. Some jobs are supported by intermediate demand, or employment demand created by business-to-business spending, either from the casino itself or from other firms that have benefitted from its economic activity. Additional demand for employment is generated through induced employment demand, or the additional demand for goods and services created when individuals, including casino employees and vendors, spend additional money in their communities, and when new economic activity induces additional investment from government entities and private-sector firms. Finally, some of the demand for new employees comes directly from state and local government entities, who can hire new workers with the additional revenue they receive from Encore Boston Harbor’s operations.

Table 12. Employment Impacts of Encore Boston Harbor by Demand Source, 2019-2022

Employment Impacts by Employment Source	2019	2020	2021	2022
Private Non-Farm	4,911	6,837	6,016	7,483
Casino Employment	1,963	3,250	2,697	3,249
Business to Business	968	1,007	970	1,292
Induced	1,979	2,580	2,349	2,942
<i>Consumption-Based</i>	1,012	1,153	812	1,182
<i>Other Induced</i>	967	1,427	1,537	1,760
Government	1,096	1,208	2,065	2,385
Total	6,007	8,045	8,081	9,867

Source: Regional Economic Models, Inc., UMDI Calculation

Note: 2019 Employment Numbers are Annualized

Overall, by 2022, the \$1.1 billion dollars¹⁹ spent in and around Encore Boston Harbor by casino patrons supported an average of 3,275 positions at the casino, paying \$206 million in compensation, and created demand for \$85.4 million of intermediate goods and services purchased from vendors by Encore Boston Harbor. The casino also paid \$197.4 million in payments to government entities, although on net, consumers shifted \$167.6 million in spending away from other goods and services and towards the casino. This new economic activity led to an estimated 9,867 jobs in Massachusetts (including the 3,275 jobs at the casino), the majority of which (7,389) are within the Metro Boston region.

¹⁹ Calculated as the sum of gross gaming revenue, non-gaming spending, and estimated off-site spending.

Conclusion

Although Encore Boston Harbor has been open since the summer of 2019, 2022 was its first full year of operation without any shutdowns or restrictions related to the COVID-19 pandemic. Therefore, we assume that 2022 was the most normal year of operations so far, and for this reason can use data from that year to draw conclusions about EBH's operating impacts. In 2022, the \$1.1 billion dollars spent in and around Encore Boston Harbor by casino patrons supported an average of 3,275 positions at the casino, paying \$206 million in compensation, and created demand for \$85.4 million of intermediate goods and services purchased from vendors by Encore Boston Harbor. The casino also paid \$197.4 million in payments to state and local government entities. This number includes the tax payments on gross gaming revenue that were made to the state. In addition to these gains for government, net impacts for state business was negative. On net, consumers shifted \$167.6 million in spending away from other goods and services and towards the casino.

These findings about direct impacts served as inputs which we used to inform our economic impact model, which estimates the secondary and tertiary 'spin off' effects of an economic event. In addition to the 3,249 jobs directly supported by the casino, new spending from vendors, government entities, and new employees, along with shifts in spending from casino patrons led to another 6,592 jobs on net, for a total of 9,867 jobs supported by the casino. The majority of those jobs are located in the Metro Boston region. Encore Boston Harbor also supported \$1.1 billion in new personal income and \$1.7 billion in new output within the Massachusetts economy, of which \$1.3 billion was value added (i.e., net new economic activity or gross state product).

About this Report

Previous iterations of this report examining the economic impacts of Plainridge Park Casino and MGM Springfield focused on the casino's first year of operations. Due to logistical and public health delays, the SEIGMA team was not able to conduct a survey of Encore Boston Harbor patrons until April of 2022, which meant that was the first year that we could make estimates of patron behavior which are important to our economic impact model. This seemed appropriate, because, as stated elsewhere, 2022 was Encore Boston Harbor's first full year of operation without shutdowns or restrictions related to the pandemic. In writing this report, the SEIGMA team did not emphasize the minutiae of the regulatory landscape faced by the casino over those years, or the casino's responses to that landscape, as that was the topic of another report just last year. In comparison to previous reports, the SEIGMA team also took a more focused approach, emphasizing the regional economic impacts of the casino's operation. Analysis of the casino's hiring and spending decisions in terms of equity and worker well-being will get more coverage in another report which is being produced at the same time as this one.

As this report is being produced, the SEIGMA team is discussing changes to our methodology for surveying casino patrons and generating regional spending estimates. Although our team members worked hard to collect the data necessary for this project under difficult circumstances, the cost of the process has prompted us to explore alternative methods for producing these analyses that may allow the team to generate estimates of the casinos' economic impacts on a more frequent basis.

This report allowed the SEIGMA team to gain valuable insight into the ways that Encore Boston Harbor interacted with Massachusetts' economy as it resumed normal operations after the COVID-19 pandemic. Unfortunately, with only nine months of operation prior to its closure due to pandemic restrictions, we can only speculate as to how the pandemic changed Encore Boston Harbor's long-term growth trajectory, or how closely current operations resemble a long-term normal state for the casino's operations. A potentially interesting topic for future study would be to examine how Massachusetts' other casinos, which were open for a longer period of time prior to the shutdown, operated during the same window of time.

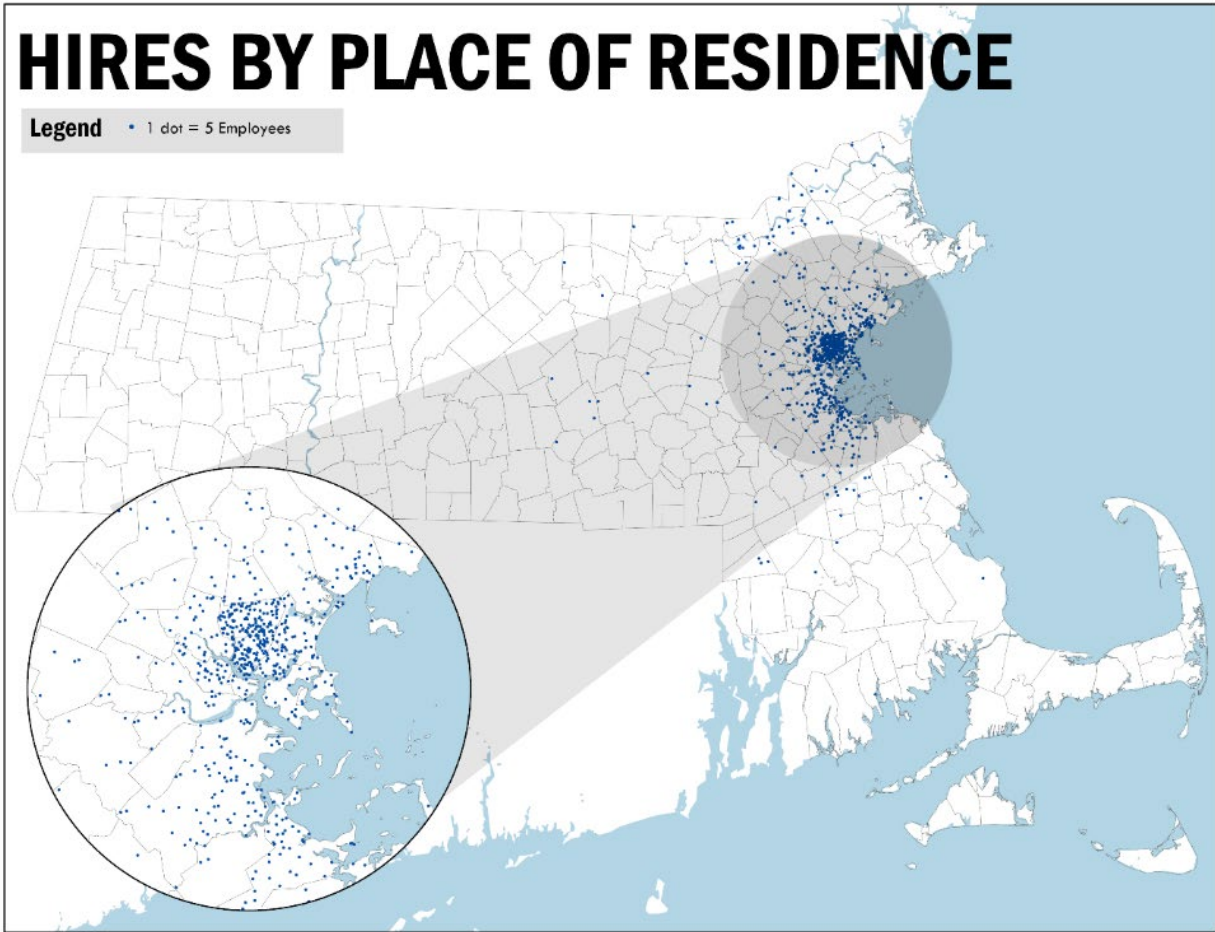
Appendix 1. Local Direct Impacts

Table 13. Average Annual Employment by Place of Residence, 2019-2022

City	2019	2020	2021	2022	Share
Everett	577	413	322	411	12.4%
Boston	604	390	292	363	11.9%
Malden	406	326	300	373	10.1%
Revere	258	178	142	181	5.4%
Quincy	144	122	122	181	4.1%
Lynn	166	117	94	121	3.6%
Chelsea	163	114	87	108	3.4%
Medford	154	109	87	91	3.2%
Somerville	129	90	84	103	2.9%
Saugus	48	41	38	53	1.3%
All Others	1,855	1,427	1,200	1,331	41.8%
Total	4,504	3,327	2,769	3,314	100.0%

Source: Encore Boston Harbor

Figure 8. Map of Encore Boston Harbor Employees, 2019-2022



Source: Encore Boston Harbor

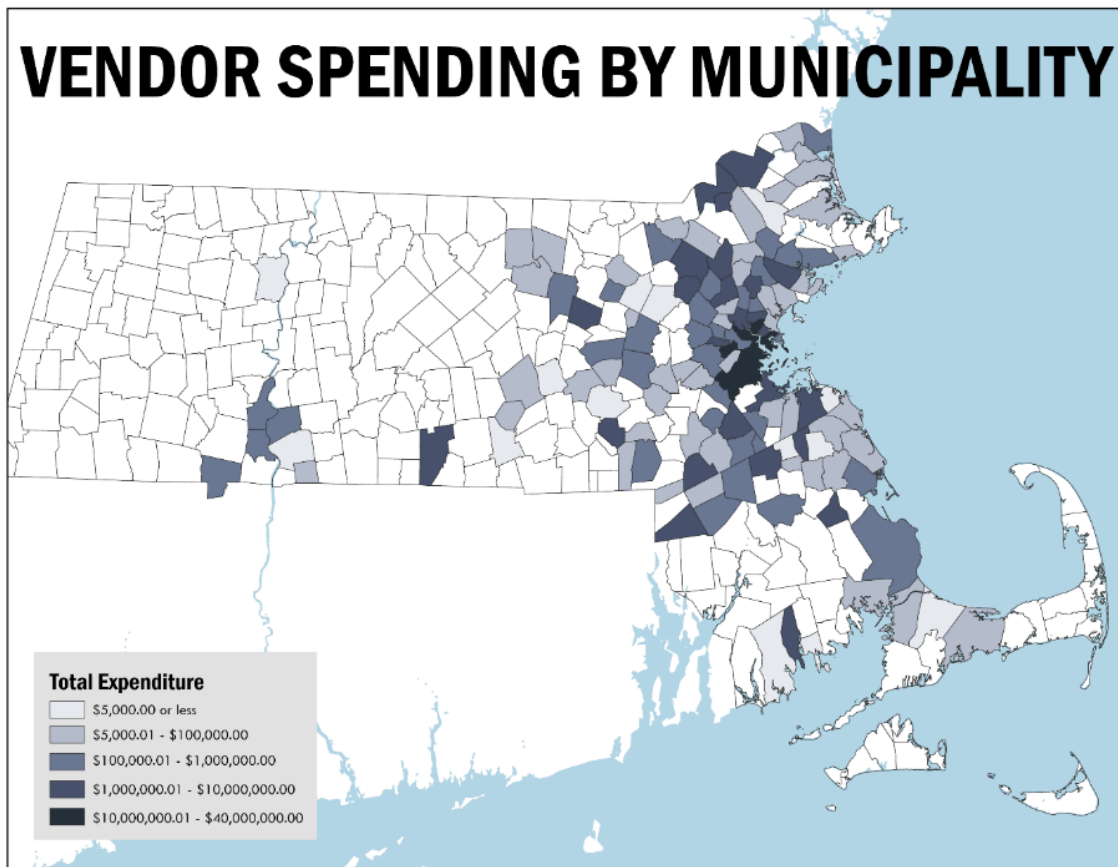
Note: Each dot represents five hires at Encore Boston Harbor within the ZIP code area derived from their most recent paycheck between June 2019 to December 2022. The total number of hires (3,827) differs from the average total employment because it includes all individuals who held a job at Encore Boston Harbor at any point from 2019 to 2022, including people may have quit or been terminated at any point during that period.

Table 14. Encore Boston Harbor Vendor Spending in Massachusetts by City/Town, 2019-2022

City	2019	2020	2021	2022	Share
Boston	\$8.7	\$8.2	\$9.1	\$11.1	24.2%
Everett	\$5.5	\$7.6	\$8.1	\$7.4	18.7%
Somerville	\$3.0	\$1.7	\$2.3	\$4.4	7.5%
Chelsea	\$2.5	\$1.6	\$1.4	\$2.3	5.1%
Brockton	\$2.0	\$1.5	\$1.5	\$2.3	4.7%
Wilmington	\$0.4	\$0.5	\$0.9	\$3.4	3.4%
New Bedford	\$0.9	\$1.0	\$1.0	\$1.5	2.9%
Peabody	\$0.7	\$0.8	\$0.5	\$0.8	1.8%
Woburn	\$1.2	\$0.5	\$0.5	\$0.6	1.8%
Malden	\$0.7	\$0.7	\$0.5	\$0.6	1.6%
All Others	\$14.1	\$7.7	\$8.6	\$12.6	28.1%
Total	\$39.8	\$31.6	\$34.6	\$47.1	100.0%

Source: Encore Boston Harbor

Figure 9. Map of Encore Boston Harbor Vendor Spending in Massachusetts by City/Town, 2019-2022



Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS. Basemap and Layout by Kazmiera Breest, 2023.

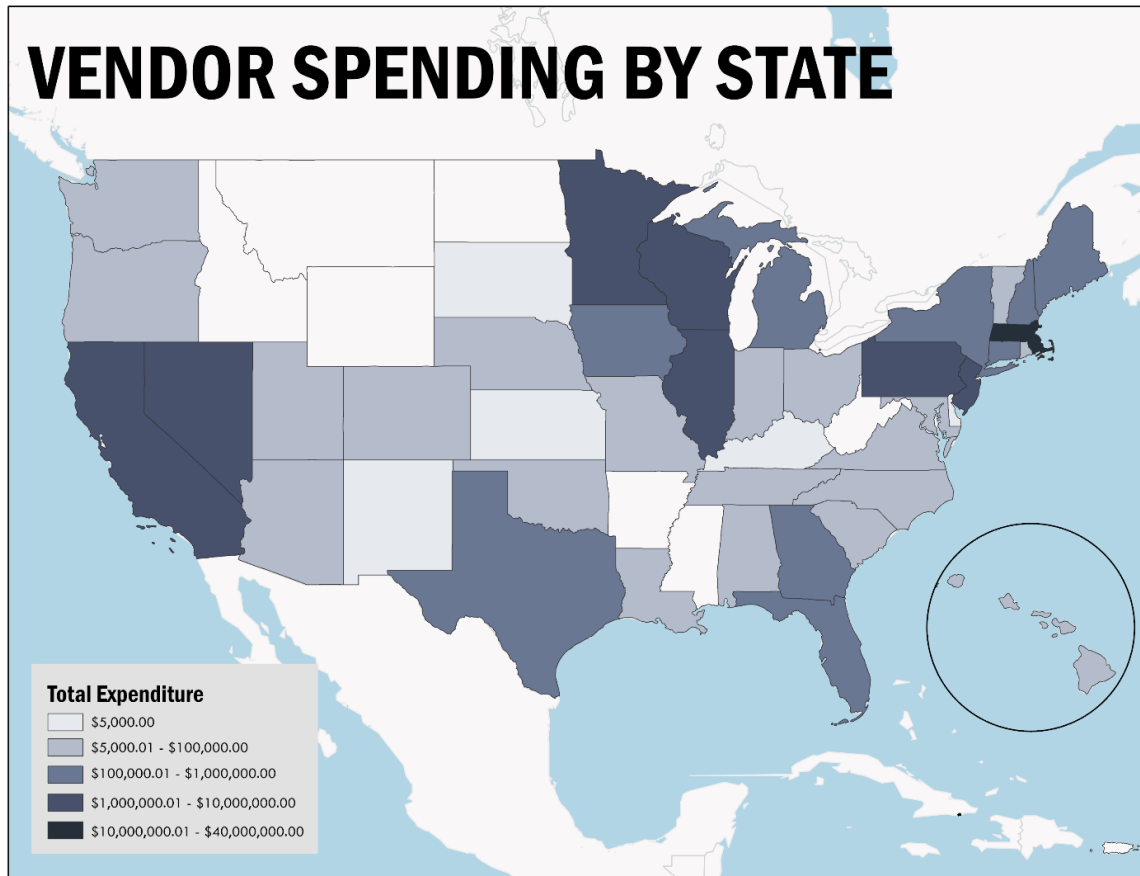
Source: Encore Boston Harbor

Table 15. Encore Boston Harbor Vendor Spending by State, 2019-2022

State	2019	2020	2021	2022	Share
Massachusetts	\$39.8	\$31.6	\$34.6	\$47.1	52.7%
California	\$10.0	\$5.2	\$2.4	\$5.0	7.8%
Illinois	\$3.8	\$2.8	\$2.9	\$3.6	4.5%
Minnesota	\$0.1	\$5.5	\$5.4	\$1.6	4.3%
Wisconsin	\$3.0	\$2.4	\$3.0	\$3.6	4.1%
Pennsylvania	\$0.3	\$0.7	\$4.0	\$6.7	4.0%
Nevada	\$4.2	\$1.7	\$1.8	\$3.5	3.9%
New Jersey	\$3.8	\$1.6	\$2.4	\$2.9	3.7%
Connecticut	\$1.9	\$1.4	\$2.0	\$2.7	2.7%
New York	\$1.2	\$1.4	\$1.9	\$2.5	2.4%
All Others	\$7.9	\$8.0	\$6.8	\$6.2	10.0%
Total	\$75.9	\$62.3	\$67.0	\$85.5	100.0%

Source: Encore Boston Harbor

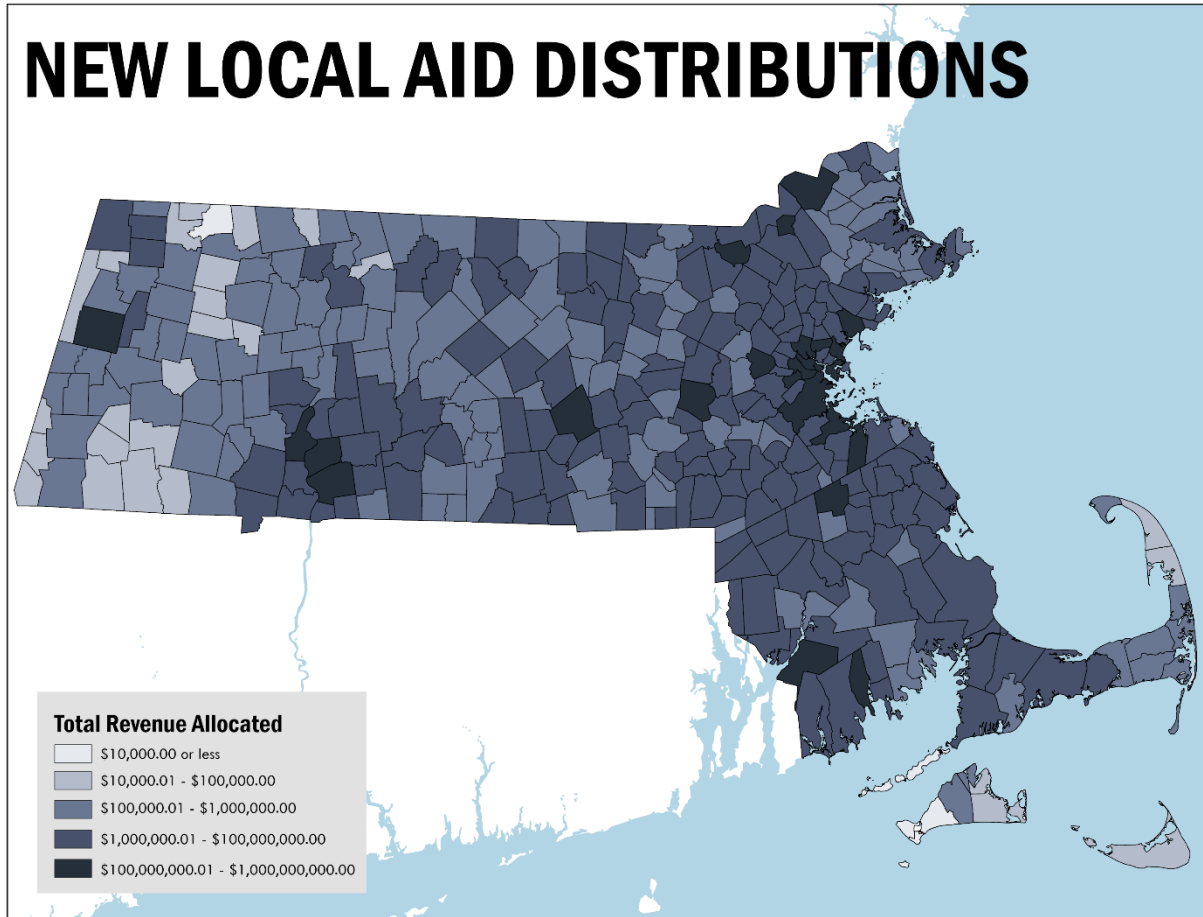
Figure 10. Map of Encore Boston Harbor Private Vendor Spending by State, 2019-2022



Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, Esri, Garmin, FAO, NOAA, USGS, EPA. Basemap and Layout by Kazmiera Brest, 2023.

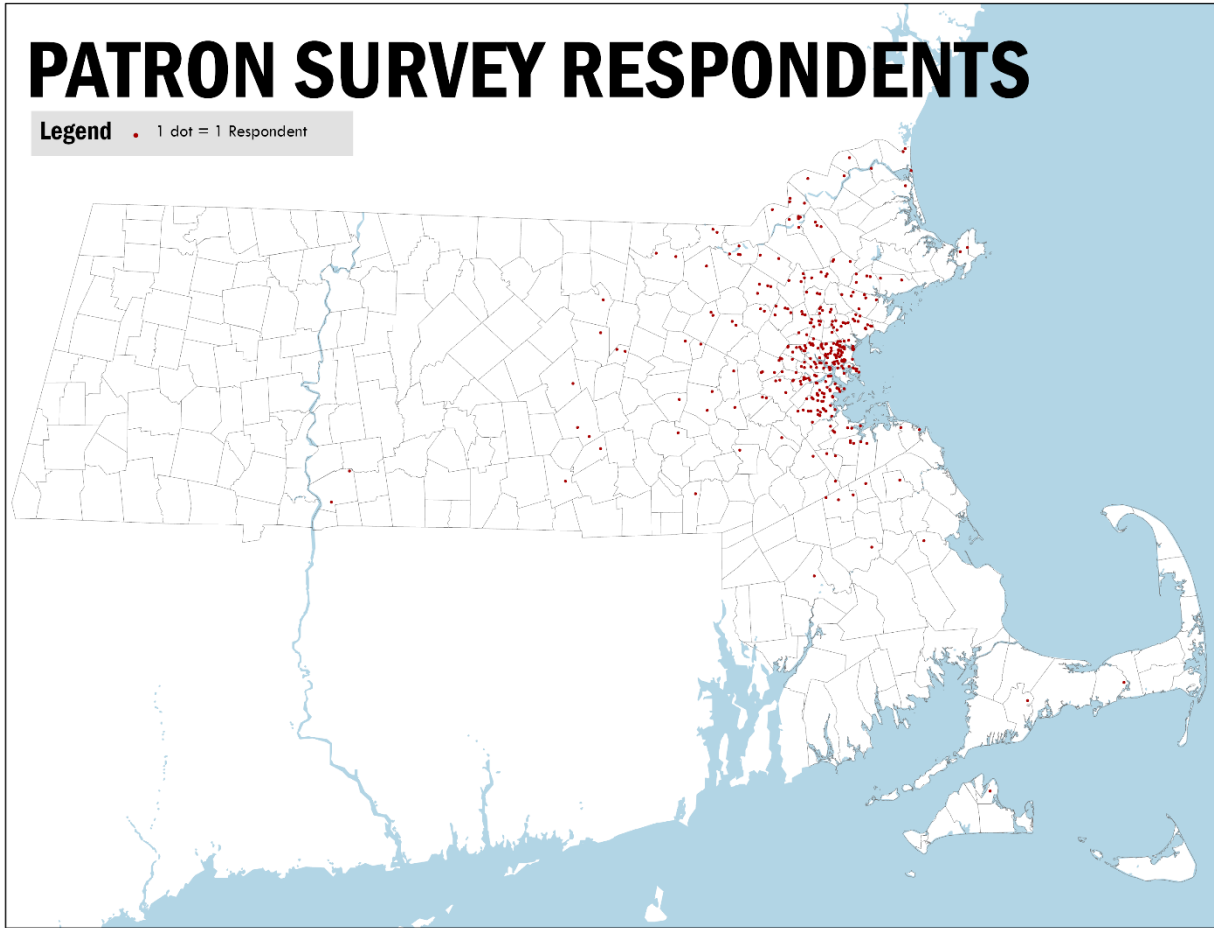
Source: Encore Boston Harbor

Figure 11. New Local Aid Money from Encore Boston Harbor Gross Gaming Revenue by City/Town, 2019-2022



Source: Massachusetts State Legislature, UMDI calculations

Figure 12. Map of Survey Respondents by Encore Boston Harbor Patron Type, 2019-2022



Source: Encore Boston Harbor Patron Survey

Appendix 2. The PI+ Model

PI+ is a structural economic forecasting and policy analysis model. It integrates input-output, computable general equilibrium, econometric, and economic geography methodologies. The model is dynamic, with forecasts and simulations generated on an annual basis and behavioral responses to compensation, price, and other economic factors.

The model consists of thousands of simultaneous equations with a structure that is relatively straightforward. The exact number of equations used varies depending on the extent of industry, demographic, demand, and other detail in the specific model being used. The overall structure of the model can be summarized in five major blocks: (1) Output and Demand, (2) Labor and Capital Demand, (3) Population and Labor Supply, (4) Compensation, Prices, and Costs, and (5) Market Shares. The blocks and their key interactions are shown in Figure 13 and Figure 14.

Figure 13. REMI Model Linkages

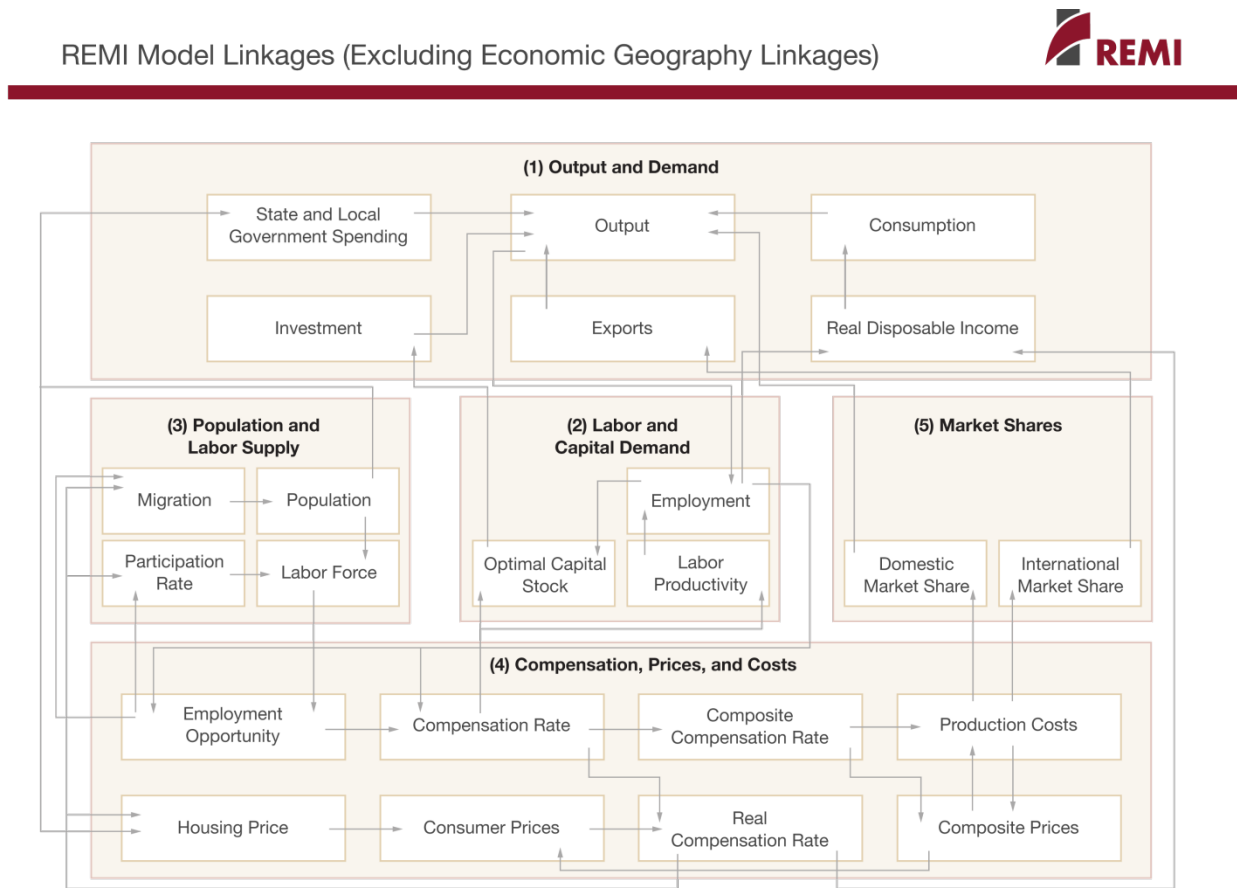
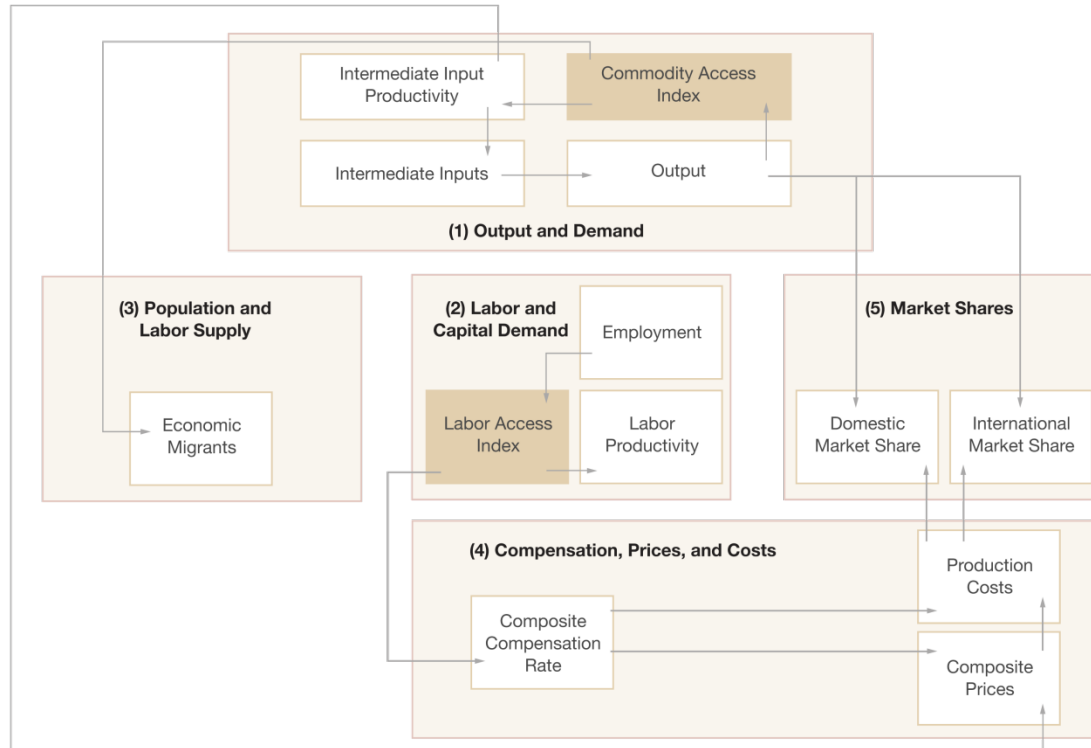


Figure 14. Economic Geography Linkages



The Output and Demand block consists of output, demand, consumption, investment, government spending, exports, and imports, as well as feedback from output change due to change in the productivity of intermediate inputs. The Labor and Capital Demand block includes labor intensity and productivity as well as demand for labor and capital. Labor force participation rate and migration equations are in the Population and Labor Supply block. The Compensation, Prices, and Costs block includes composite prices, determinants of production costs, the consumption price deflator, housing prices, and the compensation equations. The proportion of local, inter-regional, and export markets captured by each region is included in the Market Shares block.

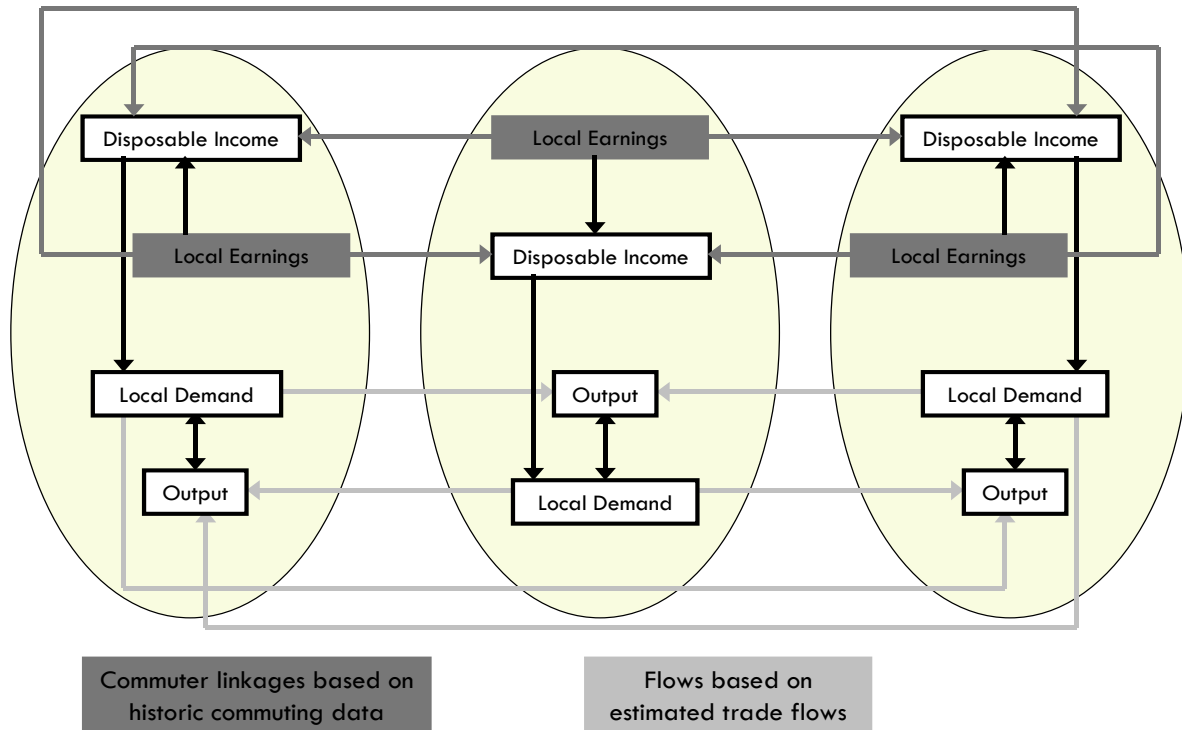
Models can be built as single region, multi-region, or multi-region national models. A region is defined broadly as a sub-national area, and could consist of a state, province, county, or city, or any combination of sub-national areas.

Single-region models consist of an individual region, called the home region. The rest of the nation is also represented in the model. However, because the home region is only a small part of the total nation, changes in the home region do not have an endogenous effect on the variables in the rest of the nation.

Multi-regional models have interactions among regions, such as trade and commuting flows. These interactions include trade flows from each region to each of the other regions. These flows are illustrated for a three-region model in Figure 15.

Figure 15. Trade and Commuter Flow Linkages

Trade and Commuter Flow Linkages



Multiregional national models also include a central bank monetary response that constrains labor markets. Models that only encompass a relatively small portion of a nation are not endogenously constrained by changes in exchange rates or monetary responses.

Block 1. Output and Demand

This block includes output, demand, consumption, investment, government spending, import, commodity access, and export concepts. Output for each industry in the home region is determined by industry demand in all regions in the nation, the home region's share of each market, and international exports from the region.

For each industry, demand is determined by the amount of output, consumption, investment, and capital demand on that industry. Consumption depends on real disposable income per capita, relative prices, differential income elasticities, and population. Input productivity depends on access to inputs because a larger choice set of inputs means it is more likely that the input with the specific characteristics required for the job will be found. In the capital stock adjustment process, investment

occurs to fill the difference between optimal and actual capital stock for residential, non-residential, and equipment investment. Government spending changes are determined by changes in the population.

Block 2. Labor and Capital Demand

The Labor and Capital Demand block includes the determination of labor productivity, labor intensity, and the optimal capital stocks. Industry-specific labor productivity depends on the availability of workers with differentiated skills for the occupations used in each industry. The occupational labor supply and commuting costs determine firms' access to a specialized labor force.

Labor intensity is determined by the cost of labor relative to the other factor inputs, capital, and fuel. Demand for capital is driven by the optimal capital stock equation for both non-residential capital and equipment. Optimal capital stock for each industry depends on the relative cost of labor and capital, and the employment weighted by capital use for each industry. Employment in private industries is determined by the value added and employment per unit of value added in each industry.

Block 3. Population and Labor Supply

The Population and Labor Supply block includes detailed demographic information about the region. Population data is given for age, gender, and race, with birth and survival rates for each group. The size and labor force participation rate of each group determines the labor supply. These participation rates respond to changes in employment relative to the potential labor force and to changes in the real after-tax compensation rate. Migration includes retirement, military, international, and economic migration. Economic migration is determined by the relative real after-tax compensation rate, relative employment opportunity, and consumer access to variety.

Block 4. Compensation, Prices and Costs

This block includes delivered prices, production costs, equipment cost, the consumption deflator, consumer prices, the price of housing, and the compensation equation. Economic geography concepts account for the productivity and price effects of access to specialized labor, goods, and services.

These prices measure the price of the industry output, considering the access to production locations. This access is important due to the specialization of production that takes place within each industry, and because transportation and transaction costs of distance are significant. Composite prices for each industry are then calculated based on the production costs of supplying regions, the effective distance to these regions, and the index of access to the variety of outputs in the industry relative to the access by other uses of the product.

The cost of production for each industry is determined by the cost of labor, capital, fuel, and intermediate inputs. Labor costs reflect a productivity adjustment to account for access to specialized labor, as well as underlying compensation rates. Capital costs include costs of non-residential structures and equipment, while fuel costs incorporate electricity, natural gas, and residual fuels. The consumption deflator converts industry prices to prices for consumption commodities. For potential migrants, the consumer price is additionally calculated to include housing prices. Housing prices change from their initial level depending on changes in income and population density.

Compensation changes are due to changes in labor demand and supply conditions and changes in the national compensation rate. Changes in employment opportunities relative to the labor force and occupational demand change determine compensation rates by industry.

Block 5. Market Shares

The market shares equations measure the proportion of local and export markets that are captured by each industry. These depend on relative production costs, the estimated price elasticity of demand, and the effective distance between the home region and each of the other regions. The change in share of a specific area in any region depends on changes in its delivered price and the quantity it produces compared with the same factors for competitors in that market. The share of local and external markets then drives the exports from and imports to the home economy.

Choice of Model and How it Was Built

SEIGMA assesses indirect economic impacts in two ways. The first is by measuring changes in economic indices (e.g., employment, business starts/failures) in secondary data sources (e.g., labor market statistics). The second is by economic modeling, using proprietary programs (i.e., REMI) that model the Massachusetts economy and project the likely impacts of new economic activity after inputting the direct/known casino impacts listed above.

The research team is experienced in building complex economic impact models and has used economic modeling to complete impact analyses and assess the economic contributions of many different types of facilities and industries throughout the state. The SEIGMA team has been using a customized REMI PI+ model of Massachusetts with six sub-state regions that align with existing economic linkages in the Commonwealth. The PI+ model is built using a variety of public sector data series and is built from county-level data and aggregated to larger regions, as needed. The PI+ software generates realistic year-by-year estimates of the total regional effects of specific initiatives.

We chose the REMI PI+ model for the SEIGMA project because it allows for dynamic, multi-year modeling as compared to other, more simplistic modeling systems (e.g., IMPLAN, RIMS II). REMI thus has significant advantages for major complex initiatives that: a) have time-series based impacts that are likely to vary over time; b) require the use and interpretation of multiple economic variables; and c) emphasize economic interactions between regions within the state that add up to a true state-level impact.

The PI+ model serves to provide two critical elements to assess the economic impacts of casinos. First, the modeling allows us to estimate how the changes created directly by the casinos and the taxes they generate ripple through the rest of the state economy. Second, the economic impact modeling is the best way to measure the net impact of the casinos after accounting for the reallocation of spending around the state and among industry sectors.

The analysis to estimate the total contribution of the casinos economic activities is built on the basic premise that an initial investment in one sector and region of an economy (i.e., through the operation of a casino) spurs additional economic activity in other sectors and regions as the money is re-spent. The total economic contribution of the investment is estimated by tracing the flow 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.

However, to measure statewide net economic impacts requires a more rigorous analysis that accounts for economic activity that is *net new* to the state versus *re-distributive*. In particular, we use information from the patron and population surveys which are part of the full SEIGMA study to determine what proportion of visitor expenditures are from out-of-state trips, recaptured trips (money kept in state rather than leaving to be spent elsewhere), and reallocated (money diverted from other uses in the state). This kind of careful accounting—combined with data on the location of casino facility expenditures and the residential location of employees—is necessary to credibly isolate the effects of casino impacts on the broader regional and state economies.

Use of Patron Survey Data to Customize the Model

The research uses key quantitative data inputs as the basis for the economic impact modeling. However, there is some information needed for the model that cannot be gathered as quantitative data. The actual amount of spending is easy to determine as this information is reported in data sets provided to the MGC. However, ultimately, the economic impact of those expenditures depends on the spending behavior of the patrons. For example, the casino spending of a patron who used to gamble in Connecticut who is now gambling in Massachusetts has a different economic impact than a patron who never gambled out of state and would otherwise have spent money on goods and services in the local economy. In short, there is no way to apportion the known amounts of spending without the use of subjective data, in this case collected through the Patron Survey.

The Operating impacts analysis leverages the data from the Encore Patron Survey to customize the model and its assumptions. We use the Patron Survey data to estimate flows of spending where no better data exists. For example, to estimate the impact of casinos, we need to determine the share of patron spending which is recaptured versus reallocated from other in-state expenditures. For this study, Patron Survey questions are the only source of information allowing the team to determine these spending patterns.

Player card data would enable us to develop more precise estimates in some areas. However, the SEIGMA team has been unable to obtain player card data from the casinos. Furthermore, the Patron Survey provides critical data on spending that is not captured by Player Card data. For example, player card data does not include information about patron choices about spending and thus would not give us a way to estimate whether a patron's spending is recaptured or reallocated.

For more information on recaptured and reallocated spending and how the Patron Survey questions enable these estimates, see the Patron Survey and License Plate reports at www.umass.edu/seigma/reports.

Appendix 3. Detailed Methodology for Data Preparation

Employment, Wages, Value Added, and Output

Employment data was provided to UMDI directly from EBH. Since not all employees worked the full year, and because employees were a mixture of full-time and part-time, an employment number for the PI⁺ model was calculated by dividing the total number of hours worked by Encore Boston Harbor employees by the average yearly hours worked for an employee of a non-hotel casino in 2016. Average annual hours were calculated using the average weekly hours worked for workers in a casino without a hotel from the Bureau of Labor Statistics and multiplying this number by 52.

The PI⁺ model makes certain assumptions about the expected wages, value-added, output, and intermediate inputs based on employment numbers, region, and industry. Because UMDI had more precise data for all of these values based on actual wages, sales, and vendor spending data, the policy variables for wages, value added, and output were adjusted to reflect known values rather than expected averages. Intermediate inputs were modified as described below.

Intermediate Inputs

EBH provided UMDI with quarterly records of vendor spending, including the vendor name, amount spent, and the zip code of the vendor. The data did not contain information about the industry of the vendor, so UMDI manually assigned NAICS codes to each vendor, making educated guesses when detailed information on the vendor was not available online. These records were then combined and used to populate a list of policy variables for intermediate demand by industry and region, replacing the intermediate demand which would be assumed by the model. Spending on vendors located outside of the state was not modeled because UMDI was using a PI⁺ model that only included regions of Massachusetts. This may slightly underestimate the actual economic impact of Encore Boston Harbor, as new business in other states may have 'downstream' effects which positively impact Massachusetts. These effects would likely be very small and are impossible to estimate within the limitations of UMDI's current model.

Commuter Adjustment

A higher share of Encore Boston Harbor employees in Metro Boston commute than what would be assumed by the model based on historic commuting patterns. UMDI took the difference between the model's assumptions of wage leakages from the Metro Boston region and the actual wage leakages and used the Commuter Earnings policy variable within the PI⁺ model to adjust them.

Government Spending

As is typical in economic-impact modeling exercises, the assumption was made that any new state or local government revenue would be spent in the same year. Therefore, the amount of government spending imputed into the model is equal to the amount of new government revenue calculated. UMDI also chose to adhere to the best practice of not modeling the fiscal impacts of EBH's federal tax revenue, as federal fiscal policy is considerably more complex and difficult to estimate.

State government spending was calculated by adding up all of the state taxes paid by Encore Boston Harbor (except for taxes on gross gaming revenue) and spreading them across the model's six regions based on their previous shares of state government spending.

Local government spending was calculated by adding up all of the taxes and host and surrounding community payments paid by Encore Boston Harbor to local governments, by region, and adding to it each region's share of new local aid funds coming from taxes on Encore Boston Harbor's gross gaming revenue.

Consumer Spending

Although it may seem counterintuitive, no attempt was made to model the patron spending at Encore Boston Harbor. The reason for this is that the impacts of that spending – Encore Boston Harbor's employment, wages, vendor spending, and tax payments – are already known, so modeling this spending would create a problem of 'double-counting.' Instead, SEIGMA's patron survey was used to capture the spending which did not directly occur at Encore Boston Harbor, that is, the new off-site spending by Encore Boston Harbor visitors, and spending reallocated by Massachusetts residents and visitors from other Massachusetts businesses to Encore Boston Harbor.

For the purposes of this analysis, UMDI used Encore Boston Harbor's gross gaming revenue as reported by the MGC to capture the total amount of patron gambling spending at EBH. EBH provided non-gaming revenue numbers for June through December of 2019 and calendar year 2020, 2021, and 2022. Off-site patron spending was estimated by taking a ratio of reported off-site non-gambling spending to reported on-site spending and applying it to the figure for on-site non-gambling spending.

UMDI estimated the total amount of off-site spending by Encore Boston Harbor visitors by taking the ratio of reported off-site spending to the reported on-site non-gambling spending and applying it to the actual on-site non-gambling spending of \$91.9 million. The resulting \$83.6 million was then allocated across regions and patron types based on shares of reported off-site spending. The off-site spending of patrons who indicated that they would have been in the area regardless of whether Encore Boston Harbor had opened or not (reallocated in-state incidental patrons and captured out-of-state incidental patrons) was excluded because it cannot be attributed to Encore Boston Harbor. This money was then allocated as new consumer spending on a basket of goods and services estimating the spending behavior of tourists on daytrips. Their consumption was modeled using a translator variable within the REMI model.

In order to calculate the reallocated spending of in-state patrons, UMDI added up the total amount of reallocated spending (all spending by reallocated in-state patrons and all on-site spending by reallocated in-state incidental patrons) and assigned it to a consumption reallocation variable, based on the home region of the patrons. This variable assumes that the patrons spend less on a general basket of goods and services as they spend more at Encore Boston Harbor, with a built in elasticity assumption which designates some consumption items as easier to consume less of than others (for example, it is easier to spend less at restaurants and bars than it is to spend less on rent).

For reallocated out-of-state incidental patrons (out-of-state patrons whose visit to Massachusetts was not prompted by Encore Boston Harbor and who would not have otherwise spent their money at an out-of-state casino), spending was reduced using a tourism translator variable which represents a basket of typical goods and services purchased by nonresident tourists. In our analysis of Plainridge Park Casino, this spending was then spread across the six regions in the model based on each model's share of consumption of each good or service, but given the Pioneer Valley's relative distance from the

commercial and population centers in Massachusetts, UMDI determined that it would be best to concentrate that reallocated spending within the Pioneer Valley.

Patron Types

Patron Type Definitions

The SEIGMA team collected data on patron spending through an on-site survey of patrons at Encore Boston Harbor. The six patron types are defined by a combination of attributes based on questions in the survey. A **captured** or **recaptured** patron is someone who indicated that, had Massachusetts never expanded in-state gaming, they would have spent the money that they spent at Encore Boston Harbor at an out-of-state casino. A **reallocated** patron is someone who indicated that, had Encore Boston Harbor never opened, they would have spent the money they spent at Encore Boston Harbor on other goods and services within Massachusetts. A **new** patron is an out-of-state patron who would not have visited Massachusetts were it not for Encore Boston Harbor. An **incidental** patron is someone whose visit to Everett (if from Massachusetts) or to Massachusetts (if from out-of-state), was not prompted by Encore Boston Harbor.

Recaptured in-state patrons are people who live in Massachusetts but who would have gambled out-of-state if not for the in-state option. For modeling purposes, UMDI treats all spending reported by recaptured in-state patrons as new to the state. This includes their off-site spending, as UMDI assumes that, if Encore Boston Harbor did not exist, recaptured in-state patrons would be spending money on similar off-site expenditures in another state. Technically speaking, the on-site spending of recaptured in-state patrons is not used as an input in the model because the casino's revenues, which go to hire and pay employees, purchase intermediate goods and services, and pay state and local governments, are already captured in greater detail elsewhere in the modeling process.

Reallocated in-state patrons are people from Massachusetts who would not have visited Everett were it not for the casino, but who also would not have gambled out-of-state. In other words, these are patrons who, were it not for the casino, would have likely spent their money on goods and services other than gambling. Therefore, the decision to visit Encore Boston Harbor implies a movement (or reallocation) of spending from an activity in one region to a different activity in another. For simplicity, this is represented in the model as a decrease in consumption of a general basket of goods and services in the region where the patron lives, equal to the on-site and off-site expenditures of the patron. It is offset by an increase in off-site spending in the region that hosts the casino. On-site spending is already captured in the modeling of casino revenues.

Reallocated in-state incidental patrons are like reallocated in-state casino visitors, except that they indicated that Encore Boston Harbor did not prompt their visit to Everett. For example, they may live in Everett itself, or they may have been running errands or visiting family in Springfield. In any case, they would have been in the area regardless of the presence of a casino. The primary way that this affects the economic modeling is that UMDI cannot assume that their spending outside of the casino would not have occurred if not for the existence of Encore Boston Harbor. Therefore, it is neither added to the model as new spending nor reallocated from another region.

New out-of-state patrons are visitors from other states who would not have visited Massachusetts were it not for Encore Boston Harbor. Though these residents live outside of Massachusetts, for modeling

purposes, they are exactly the same as recaptured in-state patrons, as their expenditures during that visit would not have occurred within the Commonwealth if not for Encore Boston Harbor.

Captured out-of-state incidental patrons are people who would have visited Massachusetts regardless of whether Encore Boston Harbor existed, but who chose to gamble here rather than in their home state now that it does exist. These are patrons who live out of state, who reported that Encore Boston Harbor did not prompt their visit to Massachusetts, but also reported they would have spent the money that they spent at Encore Boston Harbor on gambling at an out-of-state casino if Encore Boston Harbor did not exist. Similar to reallocated in-state incidental patrons, these patrons are drawn to Everett by a purpose unrelated to the existence of the casino, but their stay would probably have been shorter and less expensive were it not for Encore Boston Harbor. The survey responses of these patrons do not have any effect on the economic model because their spending at Encore Boston Harbor is already captured through employment, payroll, vendor spending, and fiscal data. Any spending these patrons do off-site is also assumed to be part of the regular course of their visit to Massachusetts, which would have occurred without the casino.

Reallocated out-of-state incidental patrons are patrons whose visit to Massachusetts was not prompted by Encore Boston Harbor, and who would not have otherwise spent the money they spent at Encore Boston Harbor on gambling out-of-state. In other words, they are out-of-state visitors who would have come to Massachusetts without the casino and instead chose to spend their time and money at Encore Boston Harbor rather than elsewhere in Massachusetts. Our economic model treats these patrons in a similar way to the reallocated in-state casino visitors. The one exception is that instead of having their spending reallocated from a regional consumption basket to casino revenues, it is reallocated from a basket of goods and services frequently consumed by tourists in Massachusetts.

Table 16. Patron Type Definitions

Patron Type	Q1 Origin	Q20 Would have gambled elsewhere	Q5 Casino prompted visit (from MA)	Q6 Casino prompted visit (not from MA)	On Site Spending	Off Site Spending
Recaptured In-State	In-State	Yes	N/A	N/A	Not Modeled	Modeled, New
Reallocated In-State	In-State	No	Yes	N/A	Modeled, Reallocated	Modeled, Reallocated
Reallocated In-State Incidental	In-State	No	No	N/A	Modeled, Reallocated	Not Modeled
New Out-of-State	Out-of-State	N/A	N/A	Yes	Not Modeled	Modeled, New
Captured Out-of-State Incidental	Out-of-State	Yes	N/A	No	Not Modeled	Not Modeled
Reallocated Out-of-State Incidental	Out-of-State	No	N/A	No	Modeled, Reallocated	Modeled, Reallocated

Appendix 4. Glossary for Economic Impacts

In this section, UMDI defines terms common to economic modeling and analysis that are used in this report. They are as follows:

Employment: Employment is a count of jobs, not people, by place of work. It counts all jobs with the same weight regardless of whether the position is full- or part-time or the labor of a self-employed proprietor. Additionally, jobs are counted as job-years, which are equivalent to one job lasting for one year. This is a similar concept to 'person-hours.' Jobs often carry over from year to year and therefore the jobs in one year include many of the same jobs as in the previous year. For example, if a new business opens with 10 employees, then the host community of that business will have 10 more jobs than it would have had in every future year that the company maintains its workforce. For example, over 5 years, the business will have created 50 job-years (10 jobs at the company x 5 years = 50 job-years) though it is possible that it is not the same 10 people who are working there over time. When reviewing changes in employment across multiple years, knowledge of the concept of job-years is vital to proper interpretation.

Output: Output is the total economic value of production, sales, or business revenues, whether final (i.e., purchased by the end user) or intermediate (used by another business to produce its own output). It includes the value of inputs to production, wages paid to employees, capital expenses, taxes, and profit. It is useful as an indicator of business activity, but it should not be construed as net new economic activity.

Personal Income: Personal income is income and benefits from all sources earned by all persons living in an area. It excludes the income earned by non-resident workers who commute into an area but includes the income of residents who commute out.

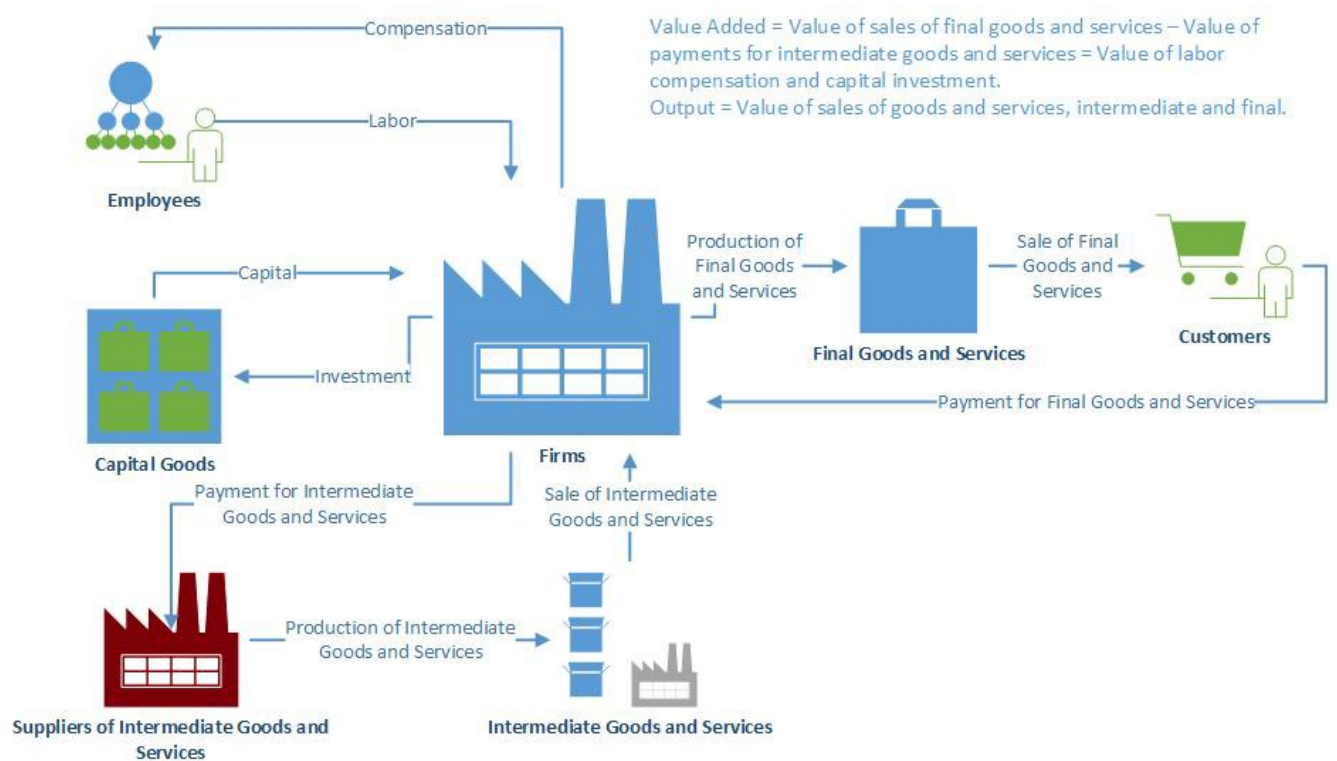
Value Added: Value added is the value of all final goods and services created in an economy. It represents new economic activity and is also known as gross product or net economic impact. It differs from output by the value of inputs to production. Value added provides a useful summary of the economy which is why all nations and U.S. states report their economic growth in this way, calling it either gross domestic product or gross state product as appropriate. Its usefulness derives from the elimination of the double-counting inherent in output, which stems from the inclusion of inputs. An example of the double-counting of inputs can be found and simplified in the process of making and selling a loaf of bread. A farmer sells wheat to a mill, which then sells flour to a baker, who then sells bread to the final customer. The sale price of the bread includes the cost of all necessary inputs including growing the wheat, milling the flour, and baking the bread. Value added only counts the sale price of the bread to the final consumer which is the net new value created in the economy. On the other hand, output counts the revenues earned by every business in the supply chain which means that the value of the wheat and flour are counted more than once.

Appendix 5. The Concepts of Output and Value-Added

This appendix serves to clarify the distinctions between two related economic concepts discussed in this report – output and value added.

For any firm to produce goods and services to be sold on the market, it needs to pay for the things required to produce them. It needs to compensate workers for their labor and invest in the capital goods (machinery, for example) which those workers will use. It also needs to purchase intermediate goods and services from other firms. Workers then use the firm’s capital goods to turn the intermediate goods and services purchased from other firms into final goods and services. These final goods and services are the output of the firm, and are equivalent to the value of its sales or revenue.

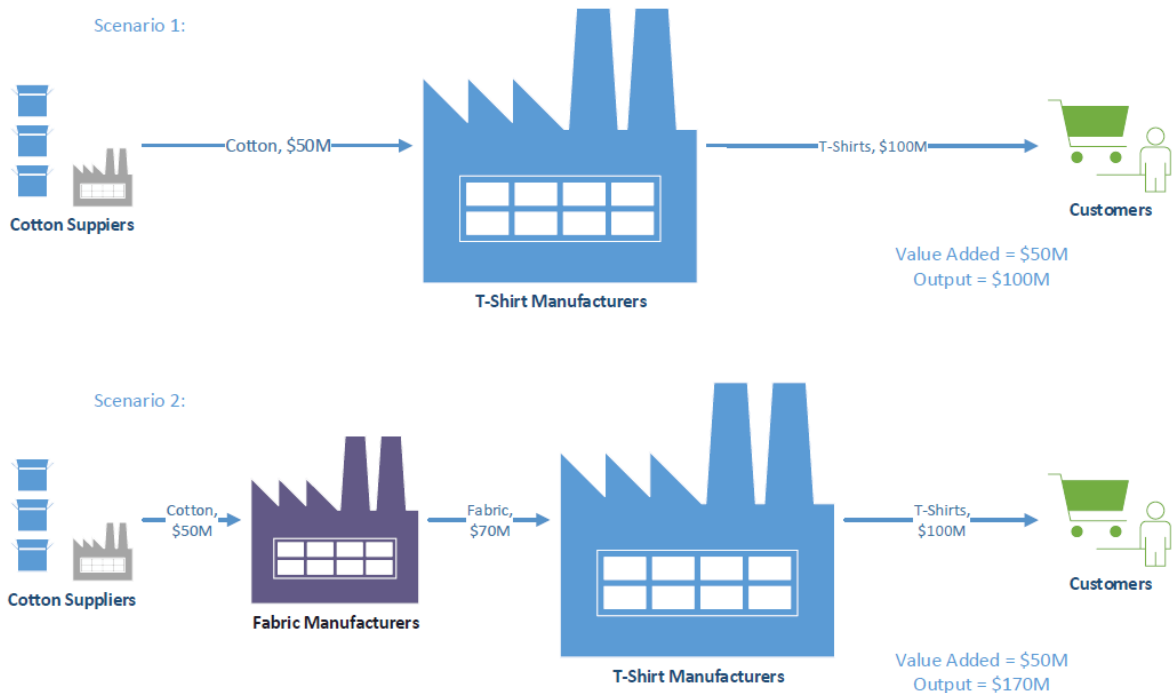
The concept of **value added** captures only the portion of the output which is directly created by the firm’s capital goods and labor. In other words, value added is the value of the final goods and services produced minus the cost of the intermediate goods and services which were purchased to produce them. This can be interesting when examining an individual firm, because two firms can have similar outputs but very different value added, depending on the cost of their intermediate inputs.



Consider the example of two different t-shirt manufacturers whose economic impact on a region is being evaluated. Both of the manufacturers ultimately sell \$100 million in t-shirts, and in order to produce them, both manufacturers use \$50 million in cotton. However, the structure of their supply chains is different. One of the firms takes the cotton and performs every step required to turn the

cotton into t-shirts at their facility. For this firm, value added is \$50 million (\$100 million in t-shirts minus \$50 million in cotton) and output is \$100 million. The other manufacturer instead opts to purchase fabric from a third-party fabric manufacturer, which has taken the \$50 million in cotton and turned it into \$70 million in fabric. When considering the economic impact of this operation, both firms will need to be considered. The fabric manufacturer has a value added of \$20 million (\$70 million in fabric minus \$50 million in cotton) and an output of \$70 million. The t-shirt manufacturer has a value added of \$30 million (\$100 million in t-shirts minus \$70 million in fabric) and an output of \$100 million, the same as the original factory. Considered together, this second operation has a combined value added of \$50 million, the same as the first example, but a combined output of \$170 million, much higher than the initial example. The lesson from this is that though output is a useful economic metric in many cases, it has the potential to double count the production of some goods and services and is best presented alongside value added for context.

Example: How change in supply chains can change output without changing value added



Appendix 6. Patron Survey Tables

Table 17. Share of On-Site Gambling Spending at Encore Boston Harbor by Patron Type

Patron Group	Share of Respondents	Share of Spending	2019	2020	2021	2022
Recaptured	44.2%	45.2%	\$141,824,697	\$149,854,010	\$286,589,911	\$329,655,178
Reallocated In-State Casino Visitor	26.4%	24.3%	\$76,385,798	\$80,710,330	\$154,355,338	\$177,549,992
Reallocated In-State Incidental	9.2%	9.0%	\$28,156,429	\$29,750,487	\$56,896,639	\$65,446,378
New Out-of-State	13.4%	18.9%	\$59,230,697	\$62,584,004	\$119,689,451	\$137,674,934
Captured Out-of-State Incidental	3.1%	1.4%	\$4,322,440	\$4,567,152	\$8,734,499	\$10,047,014
Reallocated Out-of-State Incidental	3.8%	1.3%	\$4,023,119	\$4,250,886	\$8,129,652	\$9,351,277
Total	100.0%	100.0%	\$313,943,179	\$331,716,870	\$634,395,490	\$729,724,773

Source: SEIGMA Encore Boston Harbor Patron Survey

Note: An asterisk indicates estimates are unreliable, relative standard error > 30%, while two asterisks indicate that the cell size is less than 6.

Table 18. Share of On-Site Non-Gambling at Encore Boston Harbor Spending by Patron Type

Patron Group	Share of Respondents	Share of Spending	2019	2020	2021	2022
Recaptured	46.0%	64.4%	\$77,353,796	\$47,767,983	\$89,850,740	\$154,241,277
Reallocated In-State Casino Visitor	25.0%	11.1%	\$13,352,798	\$8,245,701	\$15,510,019	\$26,625,102
Reallocated In-State Incidental	6.6%	4.4%	\$5,290,299	\$3,266,897	\$6,144,977	\$10,548,707
New Out-of-State	12.9%	15.7%	\$18,815,167	\$11,618,856	\$21,854,864	\$37,516,911
Captured Out-of-State Incidental	4.3%	1.9%	\$2,309,879	\$1,426,411	\$2,683,054	\$4,605,834
Reallocated Out-of-State Incidental	5.1%	2.4%	\$2,940,114	\$1,815,597	\$3,415,106	\$5,862,504
Total	100.0%	100.0%	\$120,062,054	\$74,141,445	\$139,458,759	\$239,400,335

Source: SEIGMA Encore Boston Harbor Patron Survey

Note: An asterisk indicates estimates are unreliable, relative standard error > 30%, while two asterisks indicate that the cell size is less than 6.

Table 19. Share of Off-Site Patron Spending by Patron Type

Patron Group	Share of Respondents	Share of Spending	2019	2020	2021	2022
Recaptured	44.1%	59.7%	\$45,215,672	\$27,921,855	\$52,520,520	\$90,158,770
Reallocated In-State Casino Visitor	24.9%	16.8%	\$12,699,436	\$7,842,233	\$14,751,102	\$25,322,316
Reallocated In-State Incidental	6.8%	5.5%	\$4,178,307	\$2,580,214	\$4,853,337	\$8,331,426
New Out-of-State	11.8%	11.3%	\$8,543,839	\$5,276,043	\$9,924,144	\$17,036,172
Captured Out-of-State Incidental	5.4%	3.2%	\$2,388,926	\$1,475,224	\$2,774,871	\$4,763,451
Reallocated Out-of-State Incidental	7.1%	3.6%	\$2,709,610	\$1,673,255	\$3,147,363	\$5,402,885
Total	100.0%	100.0%	\$75,735,791	\$46,768,823	\$87,971,337	\$151,015,021

Source: SEIGMA Encore Boston Harbor Patron Survey

Table 20. Share of On-Site Gambling Spending at Encore Boston Harbor by REMI Region

REMI Region	Share of Respondents	Share of Spending	2019	2020	2021	2022
Central	2.0%	0.8%	\$2,487,409	\$2,628,232	\$5,026,390	\$5,781,695
Metro Boston	95.4%	98.0%	\$307,635,213	\$325,051,782	\$621,648,771	\$715,062,631
Pioneer Valley	0.5%	0.4%	\$1,407,735	\$1,487,434	\$2,844,658	\$3,272,119
Southeast	1.5%	0.8%	\$2,412,822	\$2,549,423	\$4,875,671	\$5,608,328
Total	100.0%	100.0%	\$313,943,179	\$331,716,870	\$634,395,490	\$729,724,773

Source: SEIGMA Encore Boston Harbor Patron Survey

Table 21. Share of On-Site Non-Gambling at Encore Boston Harbor Spending by REMI Region

REMI Region	Share of Respondents	Share of Spending	2019	2020	2021	2022
Central	2.0%	0.8%	\$2,487,409	\$2,628,232	\$5,026,390	\$5,781,695
Metro Boston	95.4%	98.0%	\$307,635,213	\$325,051,782	\$621,648,771	\$715,062,631
Pioneer Valley	0.5%	0.4%	\$1,407,735	\$1,487,434	\$2,844,658	\$3,272,119
Southeast	1.5%	0.8%	\$2,412,822	\$2,549,423	\$4,875,671	\$5,608,328
Total	100.0%	100.0%	\$313,943,179	\$331,716,870	\$634,395,490	\$729,724,773

Source: SEIGMA Encore Boston Harbor Patron Survey

Table 22. Share of Off-Site Patron Spending by REMI Region

REMI Region	Share of Respondents	Share of Spending	2019	2020	2021	2022
Central	2.0%	0.8%	\$2,487,409	\$2,628,232	\$5,026,390	\$5,781,695
Metro Boston	95.4%	98.0%	\$307,635,213	\$325,051,782	\$621,648,771	\$715,062,631
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Source: SEIGMA Encore Boston Harbor Patron Survey