



UNIVERSITY OF MASSACHUSETTS SCHOOL OF PUBLIC HEALTH AND HEALTH SCIENCES

Lottery Revenue and MGM Springfield: Statewide and Local Analysis

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Executive Summary

Research Objective

The objective of this research is to monitor and describe changes in lottery revenue statewide, in Springfield, and in the communities surrounding MGM Springfield for the purpose of identifying potential impacts associated with expanded casino gambling. This report first briefly describes overall sales trends in Massachusetts during the first year of operation of MGM Springfield. This is important because lottery sales statewide are the largest source of local aid for all communities. This is followed by a more detailed analysis of Springfield and the designated surrounding communities. While the amount of local aid going to these communities is not based on local lottery sales, but instead statewide sales overall, a more detailed local analysis is important since any potential impact on lottery sales from the casino may be more pronounced and have greater economic impact (on the earnings of local lottery vendors, for example) nearer the casino if gamblers that live near the casino are more likely to visit than those living at greater distance.

This research is undertaken due to the Commonwealth's concern that expanded casino gambling may decrease lottery revenue, and therefore local aid. The 2011 Expanded Gaming Act explicitly declares that "enhancing and supporting the performance of the state lottery and continuing the commonwealth's dedication to local aid is imperative to the policy objectives of this chapter."¹ Moreover, casino license eligibility required the applicant to "demonstrate to the commission how the applicant proposes to address lottery mitigation, compulsive gambling problems, workforce development and community development and host and surrounding community impact and mitigation issues as set forth in the memoranda of understanding required under this chapter." Consequently, the Massachusetts Gaming Commission has requested an analysis of the lottery as part of its research program. In order to assess whether there is an impact from the casino, it is first necessary to know what happened to lottery sales after the opening of the casino. Our data allows for accurate estimation of the change in lottery sales following the opening of the MGM Springfield casino and this report presents that information.

Whether any change in lottery sales in Springfield and the surrounding communities was caused by the casino cannot be determined at this point. Our research identifies correlation between the opening of casinos and changes in lottery revenue. It does not establish causation. Simply because lottery revenue decreased after the casino opened does not mean the casino caused the decrease. We do not know if decreased lottery expenditures were spent inside the casino. In addition, we only have one year of lottery sales after the opening of MGM Springfield. Because it is not possible to determine a trend in lottery sales based on a single year of data or a simple year-over-year comparison, this report describes the changes that occurred in lottery revenue during the first year of operation. We provide different comparisons such as year over year, comparable time periods, and others. However, based on the volatility of the lottery sales data and the relatively brief period of time since the MGM Springfield casino opened, it is unwise to expect or explore meaningful differences. Subsequent reports will examine these important trends when further years of data become available and allow a clearer distinction between a longer-term change in lottery sales from year-to-year variation.

¹ The Expanded Gaming Act can be found at <https://malegislature.gov/Laws/SessionLaws/Acts/2011/Chapter194>.

Key Findings

What happened to lottery sales statewide during the first year of operation of MGM Springfield?

- Lottery sales statewide increased 6.50% in the first year after the opening of MGM Springfield compared to the year before.
- Over fiscal years 2003-2019, lottery revenue has increased at a 1.70% annual rate; recent growth is above the historical average.
- The Lottery generated \$1.1 billion in profit (the key source of local aid) in fiscal year 2019; an all-time record.

What happened to lottery sales in Springfield during the first year of operation of MGM Springfield?

- Total lottery sales in Springfield decreased 3.05% in the first year after the opening of MGM Springfield compared to the year before.
- The decline in sales in Springfield may reflect random annual fluctuation in lottery sales or unusually high sales in Springfield in the year just prior to the casino opening.
- Further years of data will be used to establish trends in the data after the opening of MGM Springfield in order to better distinguish random fluctuation in lottery sales from a casino impact.

What happened to lottery sales in the MGC designated surrounding communities during the first year of operation of MGM Springfield?

- Total lottery sales in the designated surrounding communities decreased 0.38% in the first year after the opening of MGM Springfield compared to the year before.
- Lottery sales increased in five of the designated communities in the first year after the opening of MGM Springfield compared to the year before.
- Lottery sales decreased in three of the designated communities in the first year after the opening of MGM Springfield compared to the year before.
- Total lottery sales increased in Chicopee (0.16%), Longmeadow (2.03%), Ludlow (1.90%), West Springfield (0.72%), and Wilbraham (7.81%).
- Total lottery sales decreased in Agawam (-2.68%), East Longmeadow (-2.37%), and Holyoke (-3.08%).

Introduction

The Massachusetts State Lottery has been operating since 1972. In fiscal year 2018, lottery tickets could be purchased at over 8,000 licensed lottery vendors throughout the Commonwealth and total sales were nearly \$5.3 billion, an increase of 3.81% compared to fiscal year 2017, and in fiscal year 2019 total sales were \$5.5 billion, an increase of 4.09% over fiscal year 2018. For fiscal year 2019, instant games (scratch-off tickets) accounted for 66.7% of lottery sales. Keno, the next most popular game, contributed 19.1% of total sales.

Lottery revenues are the largest source of unrestricted local aid in Massachusetts and the second largest source of all municipal support, after Chapter 70 education aid. Local Aid is distributed from a single pool according to a formula devised by the Legislature; local sales do not determine the amount of local aid that a municipality receives. In fiscal year 2019, the Lottery netted \$1.1 billion, an increase of 10.7% compared to fiscal year 2018, which went to Local Aid to cities and towns, with a small portion going to the Massachusetts Cultural Council and Massachusetts Council on Compulsive Gambling.² In fiscal year 2019, Springfield received \$40,199,748 in local aid, which represents 10.2% of the town's total state aid and 6.0% of total municipal receipts.

What are Local Aid Lottery Disbursements?

Local Aid lottery disbursements to cities and towns come from a combination of Lottery “net profit distributed to the Commonwealth”—essentially all the money Lottery makes after expenses—plus casino operator Local Aid assessments, which are combined into one pot and then distributed according to a formula by the Massachusetts Legislature to the cities and towns. Since gaming venues opened in 2015, Lottery contributions have typically represented 90% or more of the Local Aid pool.

The significance of direct local aid varies across communities based on the magnitude of their other sources of revenue – from 0.04% of total receipts in Chilmark to 15.1% in Adams. As reported on the Lottery website, Everett received \$7,336,124 in local aid in fiscal year 2019 (9.5% of Everett's total state aid and 2.9% of its total municipal receipts), and Plainville received \$805,600 (17.8% of the town's total state aid and 2.0% of total municipal receipts).³ Lottery revenues are the largest source of the statewide Local Aid pool, typically accounting for more than 90% of the total distributed to municipalities. The other source of income into the statewide Local Aid pool is from assessments on casino operators.

With the introduction of expanded gambling in Massachusetts, the Commonwealth has made the protection of the Lottery and its vendors a priority. Chapter 23K, Section 1 of the 2011 Expanded

² Total amount of lottery profits distributed to towns in the form of local aid comes from the Statutory Basis Financial Report from the Massachusetts Comptroller. FY 2019 was not available at the time of analysis, but see <http://www.ma.comptroller.info/comptroller/docs/reports-audits/sbfr/2018/2018sbfr.pdf> for FY18 detail and breakdown of typical proportions.

³ Data on State lottery disbursements comes from the Massachusetts Lottery and can be found at [http://www.masslottery.com/about/communities/with Local Aid by town listed at](http://www.masslottery.com/about/communities/with%20Local%20Aid%20by%20town%20listed%20at) <http://www.masslottery.com/about/communities/complete-list.html>. Data on state aid and total receipts for Massachusetts communities comes from the Massachusetts Department of Revenue, Division of Local Services and can be found at <http://www.mass.gov/dor/local-officials/municipal-databank-and-local-aid-unit/data-bank-reports/municipal-budgeted-revenues.html>.

Gaming Act states that “enhancing and supporting the performance of the state lottery and continuing the commonwealth’s dedication to local aid is imperative to the policy objectives of this chapter.”⁴ Section 4 gives the newly created Massachusetts Gaming Commission the power to “coordinate with the office of the treasurer and receiver general on implementing any measures necessary to protect the commonwealth’s lottery and gaming interests.”

The Legislature also placed conditions on all prospective casino operators, aimed at protecting the Lottery. Section 15 (1) of the Expanded Gaming Act states that any applicant for a gaming license must “agree to be a licensed state lottery sales agent under chapter 10 to sell or operate the lottery, multi-jurisdictional and keno games; demonstrate that the lottery and keno games shall be readily accessible to the guests of the gaming establishment and agree that, as a condition of its license to operate a gaming establishment, it will not create, promote, operate or sell games that are similar to or in direct competition, as determined by the commission, with games offered by the state lottery commission, including the lottery instant games or its lotto style games such as keno or its multi-jurisdictional games.” Section 15 (6) requires any applicant to “demonstrate to the commission how the applicant proposes to address lottery mitigation” in order to be eligible for a casino license.

As Massachusetts moves forward with the introduction of casino gambling, one priority of the Massachusetts Gaming Commission and the SEIGMA project is to determine how lottery-product-buying behavior may be affected by the introduction of casino gambling in Massachusetts. There are a handful of academic and professional papers examining the impact of casino legalization on lottery sales or tax revenue. Nearly all of these studies, none of which have been conducted in Massachusetts, find the introduction of casino gambling to be associated with a modest negative impact on lottery expenditures. However, there is evidence that the negative association between casino gambling and lottery expenditures is not permanent, with negative impacts decreasing over time, and dependent on distance, with lottery sales closer to a casino more negatively impacted than those more distant.⁵ In 2018, at \$765, Massachusetts has the highest per capita lottery sales in the nation amongst states without video lottery terminals (VLTs), with the next highest non-VLT state being Georgia at \$407 per capita.⁶ This may be in part because of the prize structures offered by the Massachusetts Lottery. In fiscal year 2018, Massachusetts paid back 73.5% of revenue as prizes, considerably higher than the U.S. average of 63%. The relative popularity of the Massachusetts Lottery, to some extent, may insulate it from potential negative impacts as casino gambling continues to expand. Yet, the lottery’s prominent role in Massachusetts local aid also means that the consequences of a reallocation of spending towards the casinos and away from the lottery are potentially greater.

In the event that the expansion of casino gambling in Massachusetts leads individuals to spend less money on lottery and more money at the casinos, this will not necessarily lead to a reduction in local aid funds. As detailed in Figure 1, the Category 2 slots parlor that opened in Plainville in the summer of 2015 allocates 82% of its tax revenue to local aid, while the Category 1 resort casinos located in Springfield

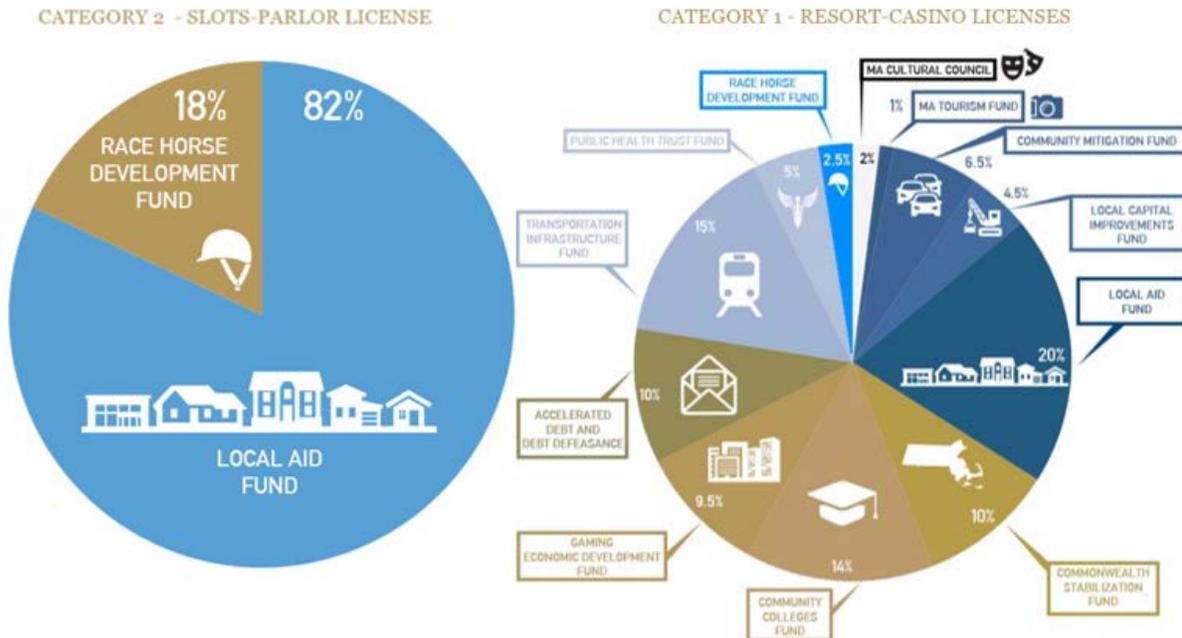
⁴ The Expanded Gaming Act can be found at <https://malegislature.gov/Laws/SessionLaws/Acts/2011/Chapter194>.

⁵ For a summary of these studies, see Nichols (2017), Lottery Revenue and Plainridge Park Casino: Analysis of First Year of Casino Operation. Available at [https://www.umass.edu/seigma/sites/default/files/MA%20Lottery%20Revenue%20and%20Plainridge%20Park%201%20Year%20Analysis%20\(final\).pdf](https://www.umass.edu/seigma/sites/default/files/MA%20Lottery%20Revenue%20and%20Plainridge%20Park%201%20Year%20Analysis%20(final).pdf).

⁶ La Fleur’s 2019 World Lottery Almanac.

and Everett allocate 20% of their tax revenue to local aid.⁷ Thus the net impact on local aid will depend on changes in both casino and lottery revenue. In order to determine the impact of expanded gambling on Massachusetts, the monitoring of lottery performance, statewide, and in the communities near the new casinos, is a priority of the SEIGMA team. With the context of its significance to the Commonwealth in mind, this report details the work that the SEIGMA team has done to date to monitor the impact of expanded gambling on the Massachusetts Lottery.

Figure 1: Allocation of Gross Gaming Revenue Taxes for Category 1 and 2 Casinos



Source: The Massachusetts Gaming Commission.

MGM Springfield was the first resort-style casino to open in Massachusetts on August 24, 2018. This followed three years after the opening of Plainridge Park Casino (a slot parlor) in Plainville on June 24, 2015. Encore Boston Harbor, in Everett, Massachusetts, held its grand opening on June 23, 2019.

MGM Springfield is located in downtown Springfield near I-91. There was previously a collection of buildings, many of which were demolished to make way for the casino. Other buildings and facades were preserved, including a state armory originally constructed in 1895. The construction of MGM Springfield began in March 2015 and the casino opened August 24, 2018. MGM Springfield casino contributes 20% of tax revenue to local aid. As of December 2019, a total of \$88,531,426 has been collected in state taxes from MGM Springfield.⁸

⁷ From the Massachusetts Gaming Commission. More information can be found at <http://massgaming.com/the-commission/budget/>

⁸ <https://massgaming.com/wp-content/uploads/Revenue-MGM-12-2019.pdf>

Strengths and Limitations of Data

Before presenting our results, it is important to recognize both the strength and limitations of our data. We have data on lottery sales. Sales are reported for the state and for individual cities on a fiscal year basis. Fiscal year data allow an examination of longer-term trends and variability and provide context and a reference point for changes in lottery revenue after the casino opening. We also have data on sales for each lottery agent. The agent-level data allow for a more detailed geographical analysis, such as distance from the casino or by zip code. The agent-level data are weekly, more current, and allow for a more precise before and after comparison than fiscal year data, which does not coincide with the casino opening dates. Finally, our data are actual lottery sales and therefore provide an accurate account of total expenditures. In order to assess whether there is an impact from the casino, it is first necessary to know precisely what happened to lottery sales. Our data allow us to determine this with complete accuracy.

This said, our data are not perfect and have limitations. First and foremost, while we have data on total sales at a very granular level, this research identifies correlation between the opening of casinos and changes in lottery revenue. It does not establish causation. We do not know if any changes that occur in lottery revenue result from spending in the casino. In addition, we only have one year of lottery sales after the opening of MGM Springfield. Because it is not possible to determine a trend in lottery sales based on a single year of data or a simple year-over-year comparison, this report describes the changes that occurred in lottery revenue during the first year of operation. However, based on the volatility of the lottery sales data and the relatively brief period of time since the MGM Springfield casino opened, it is unwise to expect or explore meaningful differences. Subsequent reports will examine these important trends when further years of data become available and allow a clearer distinction between a longer-term change in lottery sales from year-to-year variation.

Massachusetts Overall Sales Trends

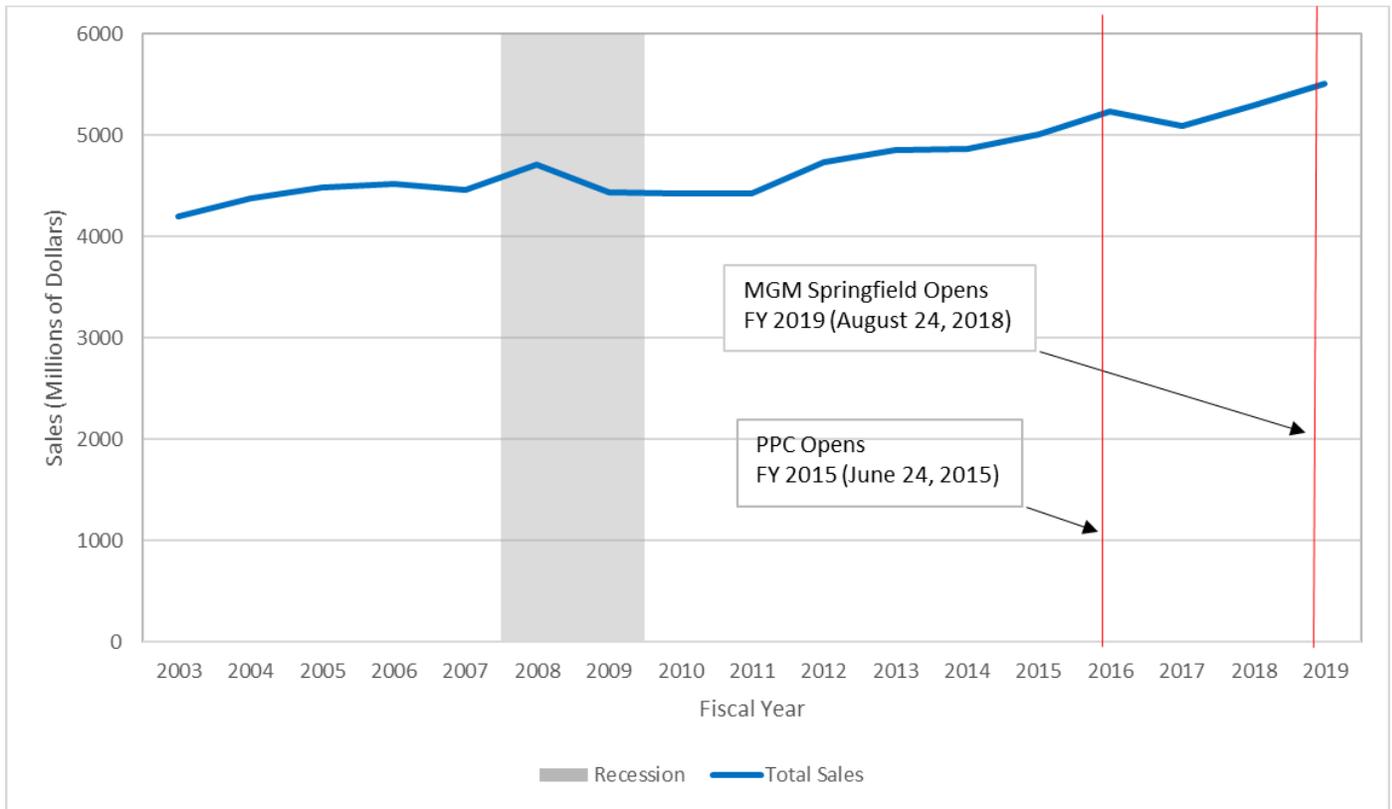
Statewide Sales Trends (2003-2019)

In this section, we examine sales trends in Massachusetts over time and relative to the New England and national averages. We also examine the annual percentage change in lottery sales. This not only provides context and a reference point for changes that occur following the opening of the MGM Springfield casino but is important because lottery sales statewide are the largest source of local aid for all communities.

Lottery sales in Massachusetts over the 2003-2019 fiscal year period have generally grown slowly but steadily (see Figure 2). Average annual sales growth over this period is 1.70%.⁹ Like many states, lottery sales during the recession flattened or decreased. Since 2012, lottery sales have generally increased year-over-year and are trending upward.

⁹ Sales are in nominal dollars and not adjusted for inflation, which averaged 2.04% over the sample period. In inflation adjusted dollars, revenue for fiscal year 2019 was approximately the same as revenue for fiscal year 2015 and is below revenue for fiscal year 2003. In inflation adjusted dollars, the annualized growth rate from 2003-2019 was -0.33%. See Appendix A, Figure A1, for inflation-adjusted (real dollar) lottery sales.

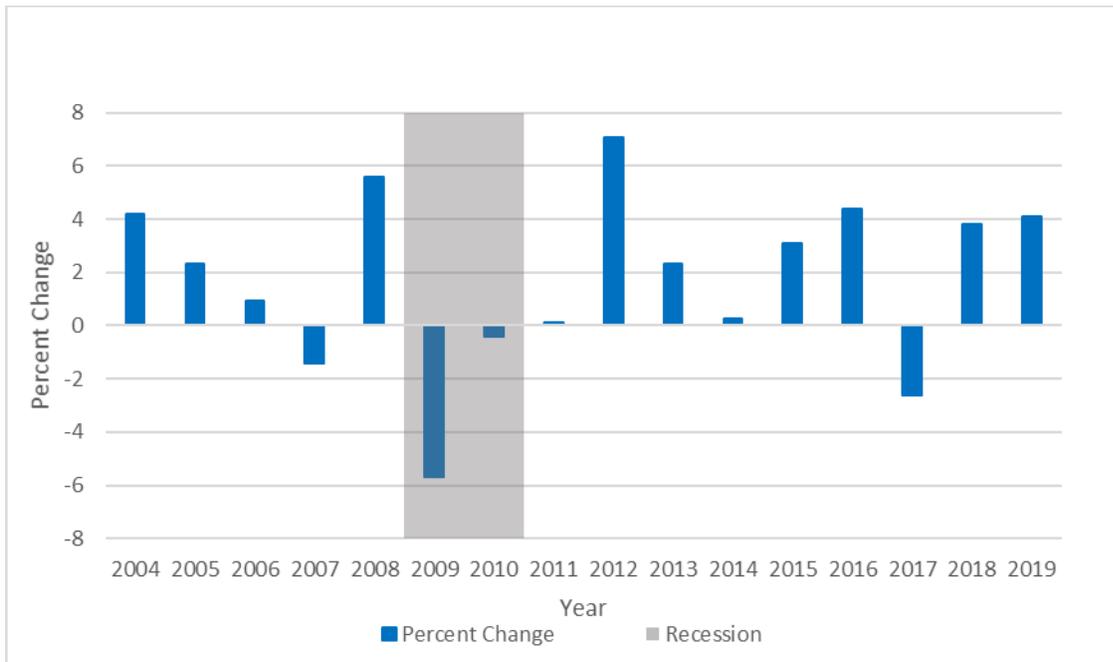
Figure 2: MA Lottery Sales, FY 2003-2019, Not Adjusted for Inflation



Source: MA Lottery, FY 2003-2019, nominal dollars. Lottery revenues declined during the recession, were relatively flat until 2011, but have generally increased since 2012. The average annual growth in nominal lottery revenue between 2003 and 2019 was 1.70%.

Figure 3 presents the annual percentage change in lottery revenues between 2004 and 2019 in more detail (see Appendix A for annual percentage changes of inflation-adjusted dollars). Massachusetts lottery sales decreased 5.5% between 2008 and 2009, followed by several years of little to no growth. In 2012, sales growth increased over 7.0%, followed by two years of slower growth before rebounding again in fiscal years 2015 and 2016. Sales in fiscal year 2017 decreased by 2.6%, but increased again in 2018 by 3.8% and 4.1% in 2019. Figure 3 also demonstrates the year-to-year variation that occurs in lottery revenue growth, even in non-recession years, reinforcing the prudence in not placing too much emphasis on a single year of increased or decreased revenue.

Figure 3: Percent Change in Lottery Sales, FY 2003-2019

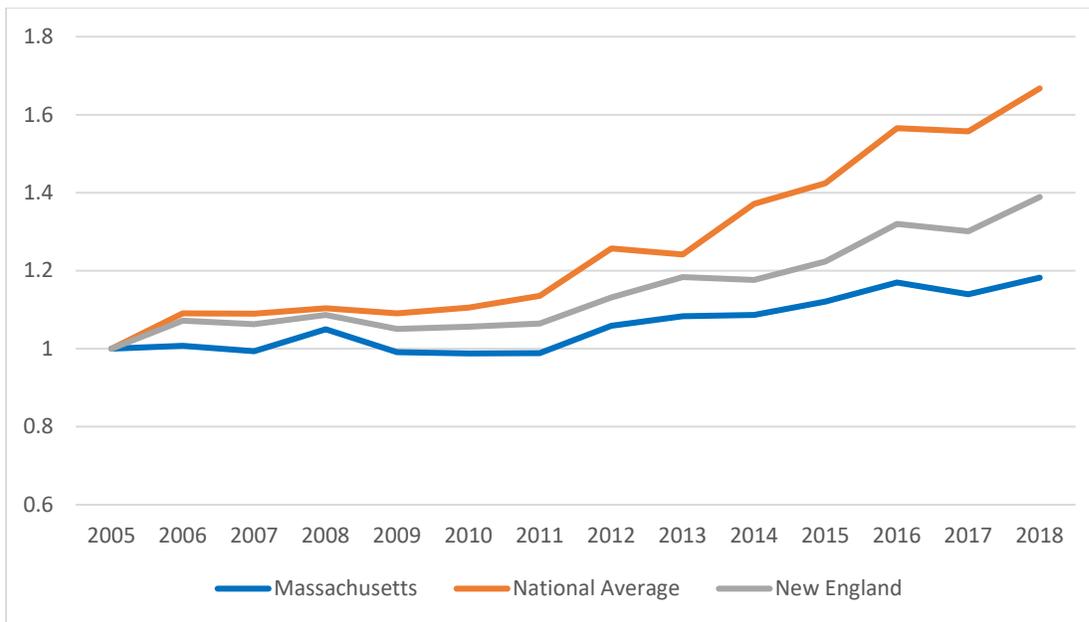


Source: MA Lottery, FY 2003-2019, nominal dollars. This figure shows annual growth rates. The declines in revenue during the recession are evident. After declining 2.16% in FY 2017, lottery revenue increased 3.80% in FY 2018 and 4.09% in FY 2019.

Massachusetts Sales Trends by Region and Relative to Other States (2003-2018)

Figure 4 shows fiscal year lottery sales for Massachusetts relative to other states in the US and New England for the period from 2005-2018. Lottery sales for 2019 in other states are not yet available. To make the sales values comparable, all sales are relative to sales in fiscal year 2005 (2005=1). Only states that had lotteries in existence since 2005 and states without video lottery terminals (VLTs) are included. VLTs are a different product more similar to slot machines than traditional lottery games that comprise the Massachusetts Lottery. For this reason, New England states in Figure 4 are represented by Maine, Vermont, New Hampshire, and Connecticut. Rhode Island, which has VLTs, is excluded.

Figure 4: Relative Lottery Sales, Massachusetts, National Average, and New England, FY 2005-2018

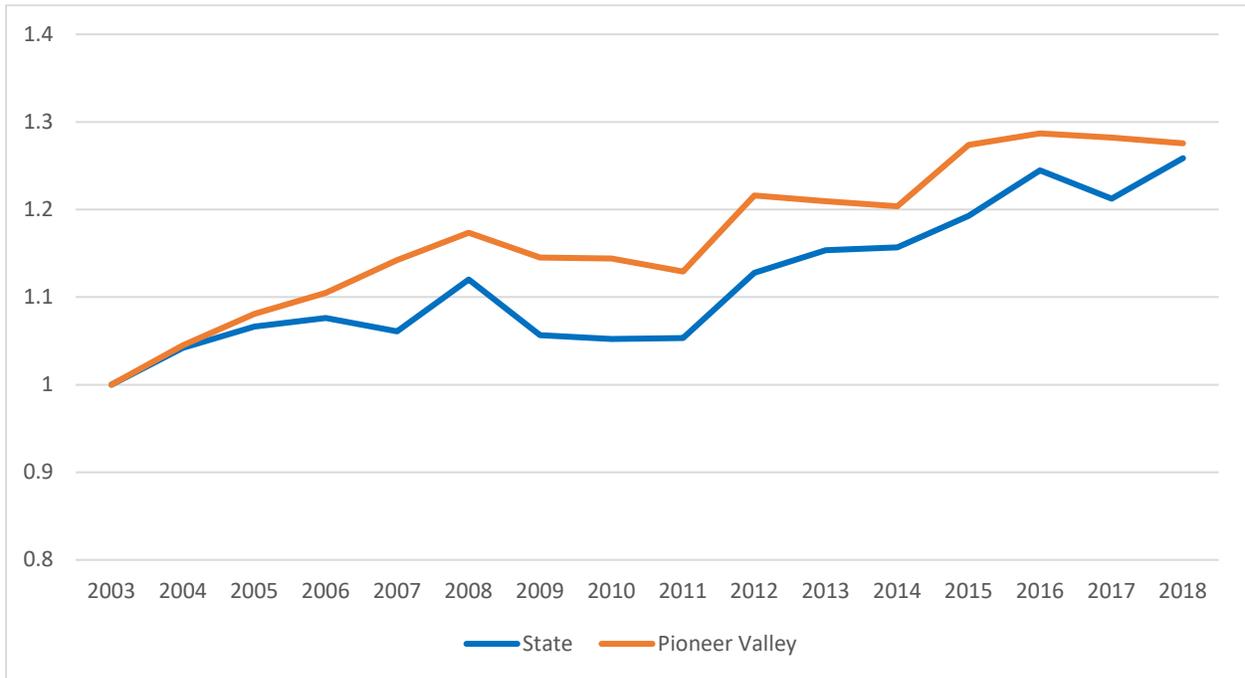


Source: LaFleur's World Lottery Almanac, 2005-2019. Sales relative to sales in 2005 (2005=1). States recover following the recession. Growth in Massachusetts less than national average and other New England states.

Figure 4 demonstrates that sales in other states have recovered and grown faster than Massachusetts since fiscal year 2012. The exact reasons for this are not clear, but it should be noted that states with the fastest growth include Arizona, California, and Florida. These states have experienced marked population growth, including a growing retirement population. However, growth in Massachusetts has also lagged behind the other New England states, although the gap is less pronounced. Finally, while revenue *growth* in Massachusetts has lagged the nation as a whole and other New England states, the Massachusetts Lottery is one of the largest in the nation in terms of total sales, not just per capita sales. As late as fiscal years 2012 and 2013, total annual sales in Massachusetts exceeded those in Florida and California. In fiscal year 2018, Massachusetts had the third highest non-VLT lottery revenue, behind only California (\$6.9 billion) and Florida (\$6.7 billion).¹⁰ While growth has been slower in Massachusetts, the lottery is still one of the largest and most mature in the nation, both in per capita and absolute terms.

¹⁰ La Fleur's 2019 World Lottery Almanac.

Figure 5: Relative Lottery Sales, Massachusetts and Pioneer Valley Region, FY 2003-2018



Source: MA Lottery, FY 2003-2018, nominal dollars. Sales are relative to sales in 2003 (2003=1). This figure shows relative lottery sales for Massachusetts and the Pioneer Valley region. Lottery revenue in the Pioneer Valley grew faster than the state as a whole but has slowed in recent years.

Lottery sales for fiscal years 2003 to 2018 for the entire state and for the Pioneer Valley region (Franklin, Hampden, and Hampshire Counties) are presented in Figure 5. All sales are relative to sales in 2003 (2003=1). Sales in the Pioneer Valley have grown at an annual rate of 1.63% over 2003-2018, slightly higher than the state as a whole. However, Figure 5 also demonstrates a slowdown in sales growth in the Pioneer Valley beginning in 2015, with sales remaining relatively unchanged or declining.

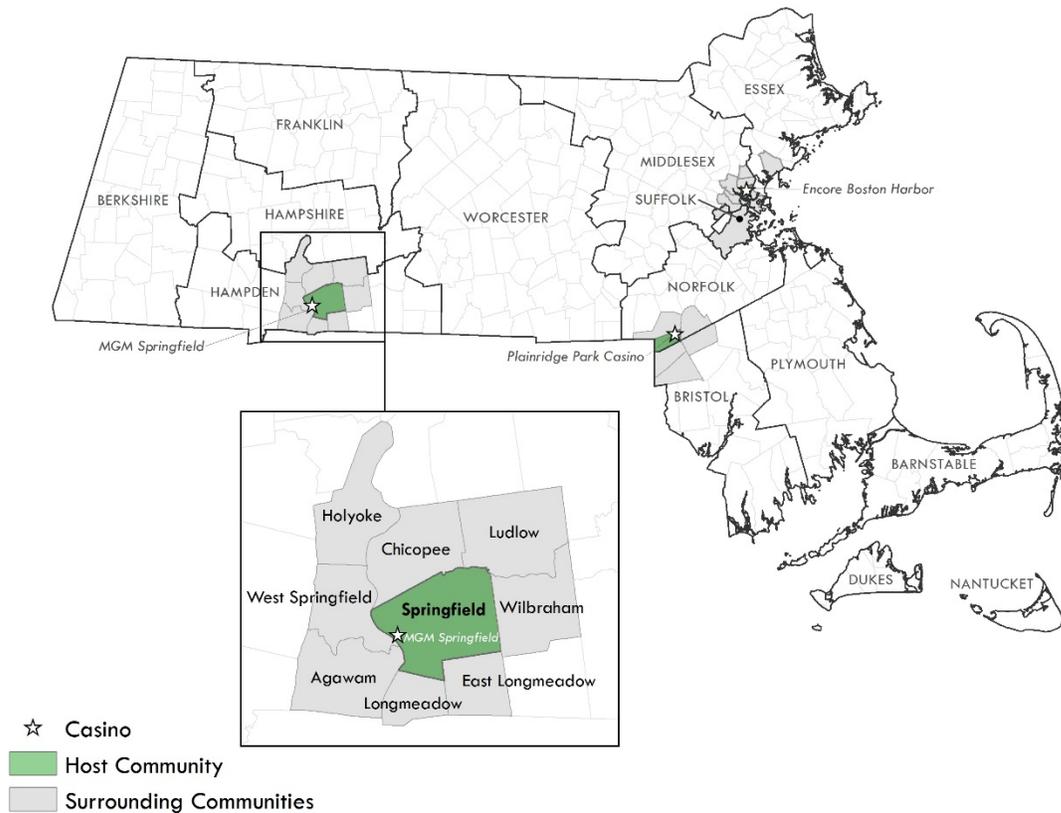
Massachusetts, Springfield, and Surrounding Community Sales Trends (2003-2018)

In order to provide context for how growth in lottery revenue in Springfield and the surrounding communities compares historically with the rest of Massachusetts, this section presents long-term trends and annual growth rates in lottery sales in Springfield and the Massachusetts Gaming Commission’s (MGC) designated surrounding communities of Agawam, Chicopee, East Longmeadow, Holyoke, Longmeadow, Ludlow, West Springfield and Wilbraham (see Figure 6).¹¹ It shows how these areas have generally grown at a rate similar to the state but also shows how growth rates vary across each individual community. Springfield and the surrounding communities are not included in the state totals or growth rates.

¹¹ Surrounding community selection by the MGC was based on an application process where cities had to successfully argue anticipated impacts.

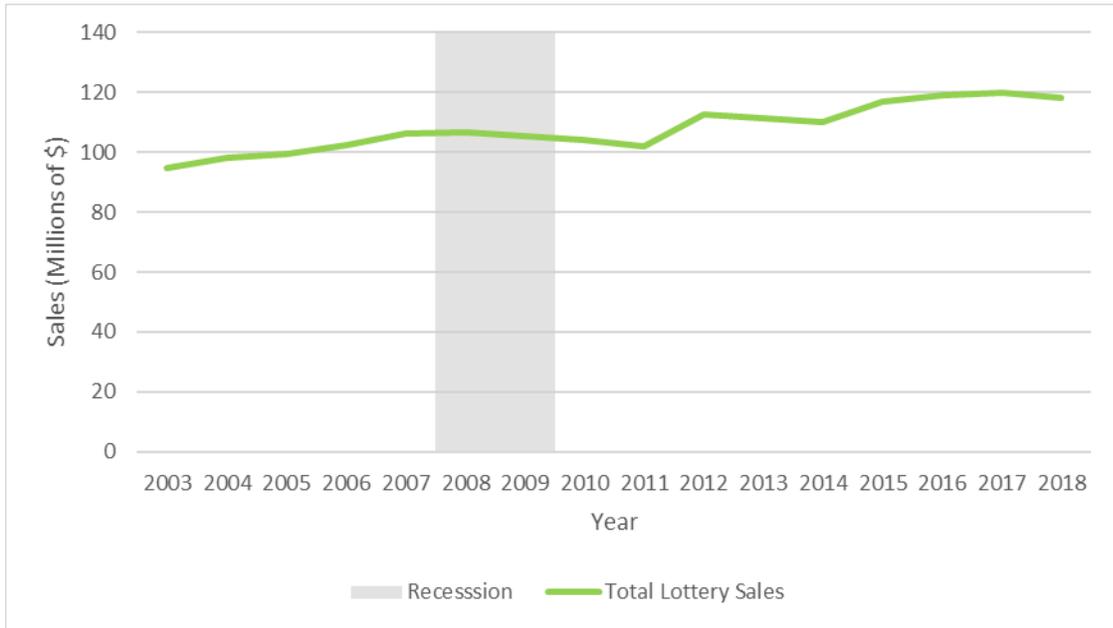
Total lottery sales in Springfield and the surrounding communities in fiscal year 2018 were \$305.5 million, 5.7% of the state total. Not surprisingly given its larger population, Springfield accounted for the largest share of sales at \$118.3 million; 2.2% of total sales statewide. During 2018, approximately 196 lottery vendors/agents operated in Springfield and approximately 327 operated in the designated surrounding communities, although this number varies over time as agents open and close.

Figure 6: Springfield and MGC-designated Surrounding Communities



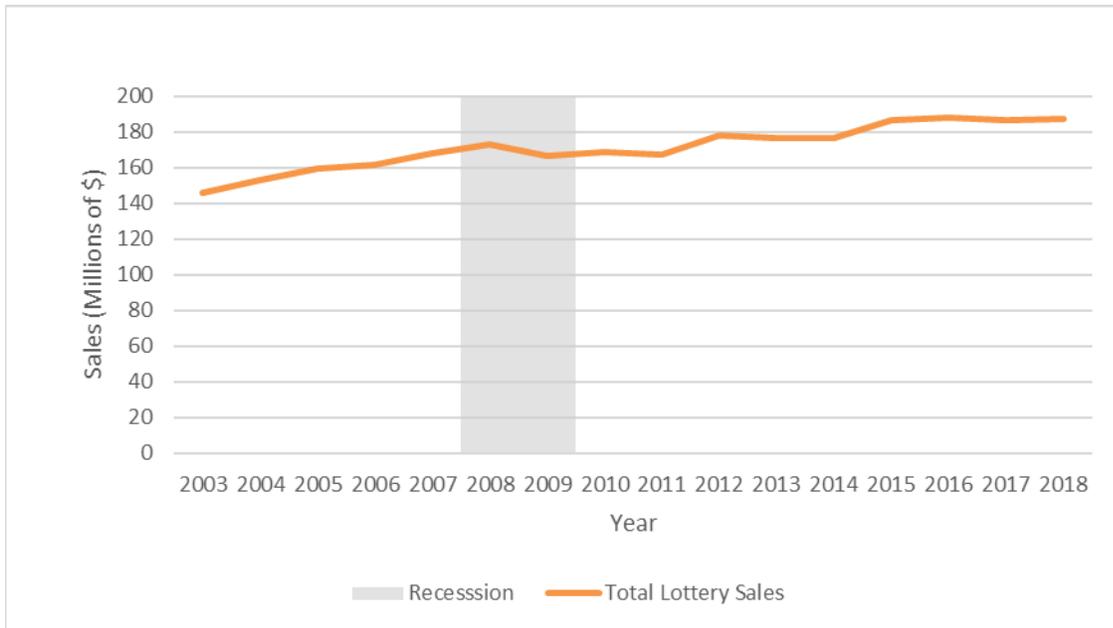
Figures 7 and 8 show total lottery sales in Springfield and the designated surrounding communities over fiscal years 2003 to 2018. In both cases, lottery sales have grown slowly. The average annual growth rates over this time are 1.49% and 1.69% for Springfield and the surrounding communities, respectively. This growth is nearly identical to the 1.54% growth rate for the state as can be seen in Figure 9, which shows relative sales (2003=1) for Springfield, the surrounding communities and Massachusetts.

Figure 7: Nominal City of Springfield Lottery Sales, FY 2003-2018



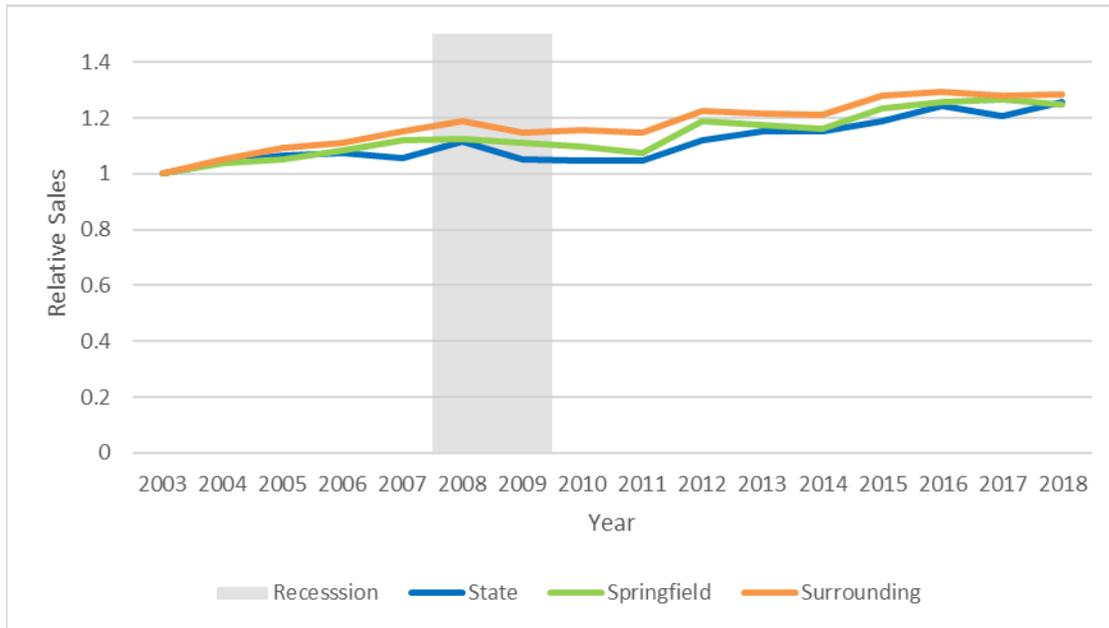
Source: MA Lottery, FY 2003-2018, nominal dollars. Lottery sales in Springfield have been slow but have followed the state.

Figure 8: Nominal Lottery Sales for Springfield's MGC designated Surrounding Communities, FY 2003-2018



Source: MA Lottery, FY 2003-2018, nominal dollars. The surrounding communities of Agawam, Chicopee, East Longmeadow, Holyoke, Longmeadow, Ludlow, West Springfield, and Wilbraham grew slightly faster than Springfield and the state.

Figure 9: Relative Lottery Sales in Springfield and Surrounding Communities vs. Massachusetts, FY 2003-2018

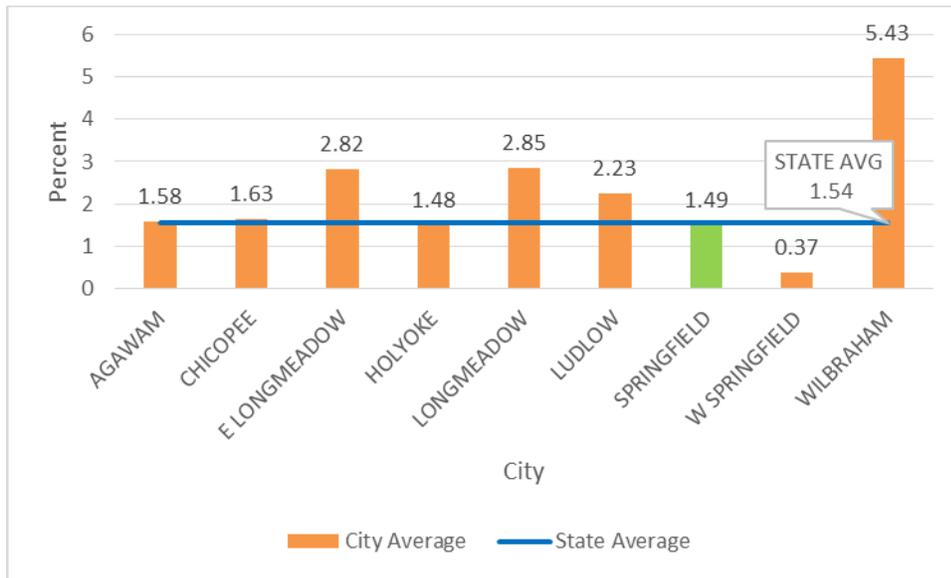


Source: MA Lottery, FY 2003-2018, nominal dollars. Sales are relative to sales in 2003 (2003=1). Lottery Sales in Springfield and the designated surrounding communities have grown at nearly the same rate. Annual growth for the state is 1.54% versus 1.49% for Springfield and 1.69% for the surrounding communities.

Figure 10 shows average annual growth rates over fiscal years 2003-2018 for Springfield and each designated surrounding community. For comparison, the state average growth rate is also shown. Lottery growth in Springfield has been nearly identical to the state average over this time period as have the surrounding communities of Agawam, Chicopee, and Holyoke. East Longmeadow, Longmeadow, Ludlow, and Wilbraham have all grown more rapidly than the state as a whole with Wilbraham exhibiting the most rapid growth (5.40%).¹² Lottery revenue growth in West Springfield, at 0.37%, has been noticeably lower than either Springfield or any of the other designated surrounding communities.

¹² Wilbraham’s annualized growth, in part, reflects a large 33% increase in sales in 2010, a level that was maintained as sales continued to increase in later years. We are not certain of the exact reason for this.

Figure 10: Average Annual Growth Rates in Springfield and Surrounding Communities vs. Massachusetts, FY2003-2018



Source: MA Lottery, FY 2003-2018, nominal dollars. Lottery Sales in Springfield have grown at nearly the same rate as the state. Annual growth for the state is 1.54% versus 1.49% for Springfield.

Springfield and Surrounding Community Analysis: First Year of MGM Springfield Operation

Host and Surrounding Community Analysis

The analysis so far has examined fiscal year data to provide an overview of trends in lottery revenue growth in Massachusetts, Springfield, and the designated surrounding communities. The analysis below focuses on agent-level sales before and after the opening of MGM Springfield casino. This allows a more detailed examination by agent and time period and provides more precise insight into changes in lottery revenue over time. The MGM Springfield casino opened August 24, 2018. We compare lottery revenue for the first year after the casino opened with the year before. Specifically, the period after the casino opens consists of lottery sales from August 19, 2018 to August 24, 2019. The pre-casino-opening year is August 20, 2017 to August 18, 2018.

A few things to note about the agent-level lottery data. Firstly, lottery data are aggregated to bi-weekly or monthly sales data rather than analyzed weekly. This is because Instant ticket sales are only reported every two weeks. Examining the data weekly would introduce false variation in the data since Instant sales appear as zero for the weeks when sales are not recorded. Secondly, there is a lottery agent within the MGM Springfield casino. That agent did not exist prior to the opening of the casino, unlike the agent in Plainridge Park Casino which operated at the racetrack prior to the casino opening. Earlier reports examining Plainridge Park Casino revealed large, significant increases in lottery sales for that agent (Nichols, 2018; Nichols, 2017). No such comparison is possible for MGM Springfield.

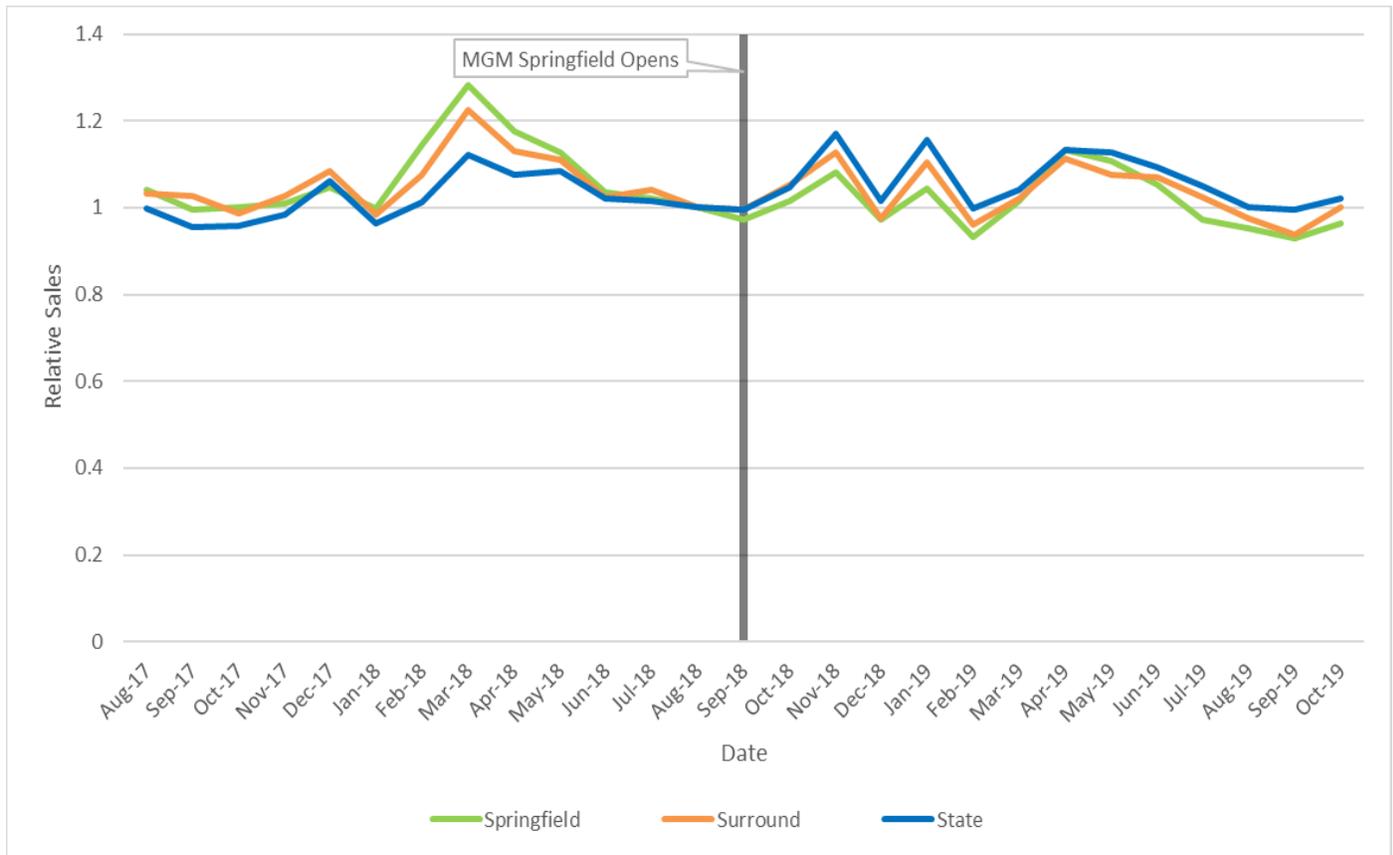
Figure 11 shows monthly total lottery sales over the period August 20, 2017 to September 28, 2019 for the communities of Springfield, the MGC-designated surrounding communities, and the rest of Massachusetts excluding Springfield and the surrounding communities. Because lottery sales in these areas are vastly different in size (total lottery sales in the rest of Massachusetts are obviously much greater than total sales in Springfield, for example), an index is created and all sales data are reported relative to total sales during the month prior to the casino opening (July 22-August 18, 2018). Thus, relative monthly sales equal 1 for all areas for the July 22-August 18, 2018 period. Values greater than 1 signify monthly sales data that exceed sales during the July 22-August 18 period, whereas values less than 1 signify lower monthly sales compared to the July 22-August 18 period. This index allows for meaningful comparison of lottery sales and growth across the different geographic areas. Additionally, sales are reported monthly rather than bi-weekly to reduce the variability in the data, making visualization of the data easier.

Figure 11 demonstrates that the trend of lottery sales in Springfield and the rest of the state are generally similar, consistent with the fiscal year sales data discussed above. Lottery sales in Springfield, however, are generally above or equal to relative sales for the state level prior to the casino opening but below afterwards. In fact, the average value of relative sales for Springfield the year prior to the casino opening is 1.07, implying lottery sales, on average, are 7% higher in the year prior to opening *relative to the monthly period of July 22-August 18, 2018*. The average value for the state over the same period is 1.02. After the casino opens the average value for Springfield is 1.02 compared to 1.07 for the state. Thus, sales in Springfield are lower on average after the opening of the casino but higher in the rest of the state relative to sales the month prior to the casino opening.

Sales for the surrounding communities also demonstrate a trend that follows the state as a whole. As in Springfield, relative sales also decline in the surrounding communities after the opening of the casino although to a lesser extent than Springfield. The average value of relative sales for the surrounding communities during the year prior to opening is 1.06, implying sales, on average, are 6% higher than the month prior to the casino opening. For the year after the casino opening relative sales average 1.04.

It is important to remember that the relative sales index reported above is normalized on a single, one-month period in order to demonstrate trends and patterns in the sales data. Overall, Figure 11 shows no strong evidence of a large and significant negative impact on lottery sales after the opening of the casino. If the opening of the casino had a large negative impact on sales in either Springfield or the surrounding communities, we would expect to see a “break” in the data where relative sales decline and diverge from the rest of the state. This is not evident. However, because relative sales in Springfield are on average lower after the casino opened, more analysis of the changes in revenue before and after the casino are presented in Figure 12 and the following section.

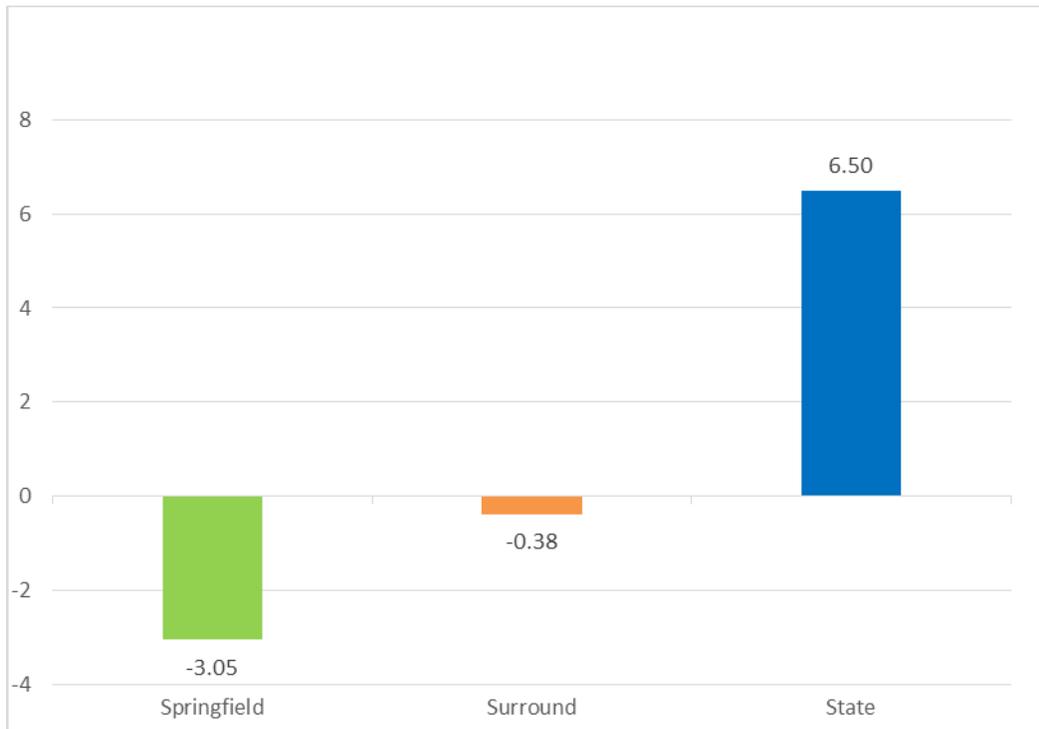
Figure 11: Relative Monthly Lottery Revenue over Time in Springfield, Surrounding Communities, & Rest of Massachusetts



Source: MA Lottery, monthly sales relative to the month prior to opening (July 22-August 18, 2018), nominal dollars. A value of 1 implies that sales during that period were equal to sales during July 22-August 18, 2018. A value greater than 1 represents higher sales, less than 1 lower sales. Relative sales in Springfield, the surrounding communities, and the rest of the state follow a similar trend. No large, noticeable change in any location occurs following the opening of the casino.

Figure 12 shows the percentage change in total lottery sales for the year after the opening of MGM Springfield from the year prior for Springfield, the surrounding communities collectively, and the remainder of the state. In the first year after the opening of MGM Springfield casino, total lottery sales in Springfield decreased on average 3.05% compared to the year before. Total lottery sales in surrounding communities decreased 0.38%. In contrast, sales in the remainder of the state, excluding Springfield and the surrounding communities, increased 6.50%.

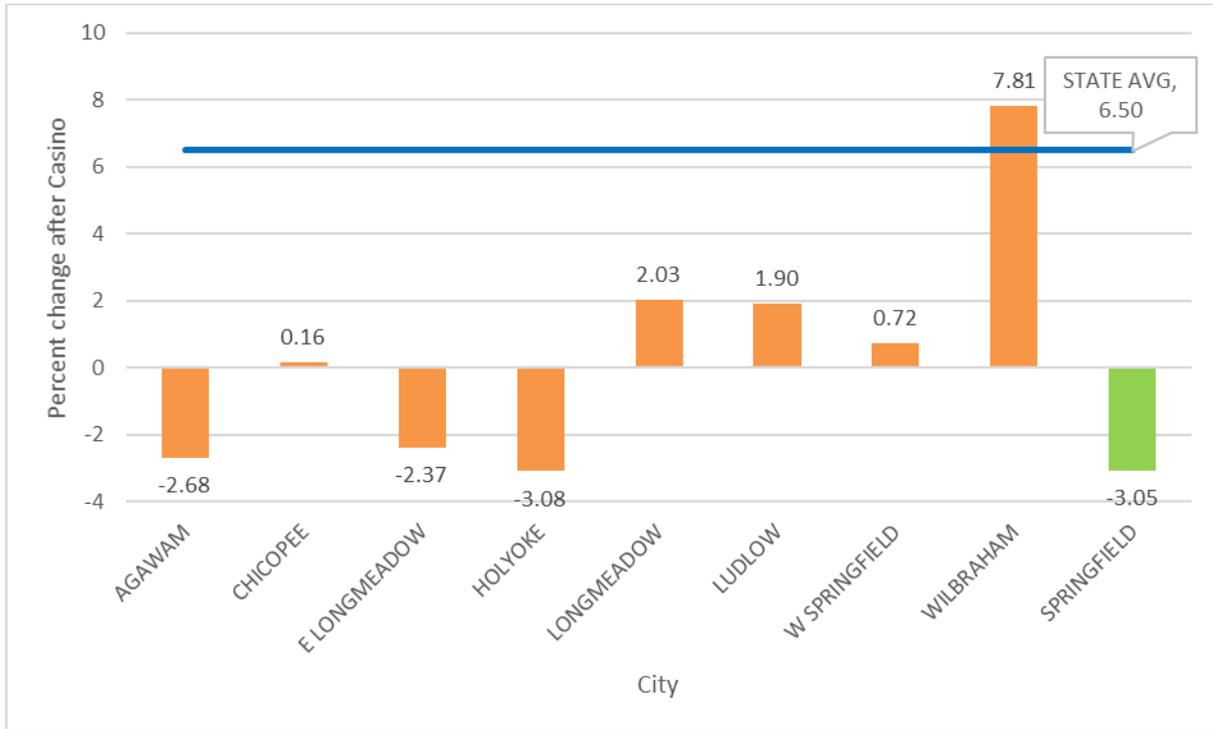
Figure 12: Percent Change in Total Lottery Sales After MGM Springfield Opening



Source: MA Lottery, bi-weekly sales data August 19, 2018 to August 24, 2019 compared to same period the year before (August 20, 2017 to August 18, 2018). Sales in Springfield and the surrounding communities decline whereas sales in the remainder of the state increase.

Whether the decrease in revenue in Springfield is related to the opening of the MGM Springfield casino or other unobserved factors such as normal variation in lottery data or varying local economic conditions cannot be determined at this stage. That will require more data across years and confirmation from other sources, for example, patron surveys, to determine if any change in lottery spending is caused by the casino. Nevertheless, additional inquiry into lottery activity by agent and community in the host and surrounding communities provides useful context to the decrease in total sales exhibited in Figure 12. Figure 13 shows results for the surrounding communities individually, followed by a more detailed examination of Springfield.

Figure 13: Percent Change in Total Lottery Sales After MGM Springfield Opening by Community



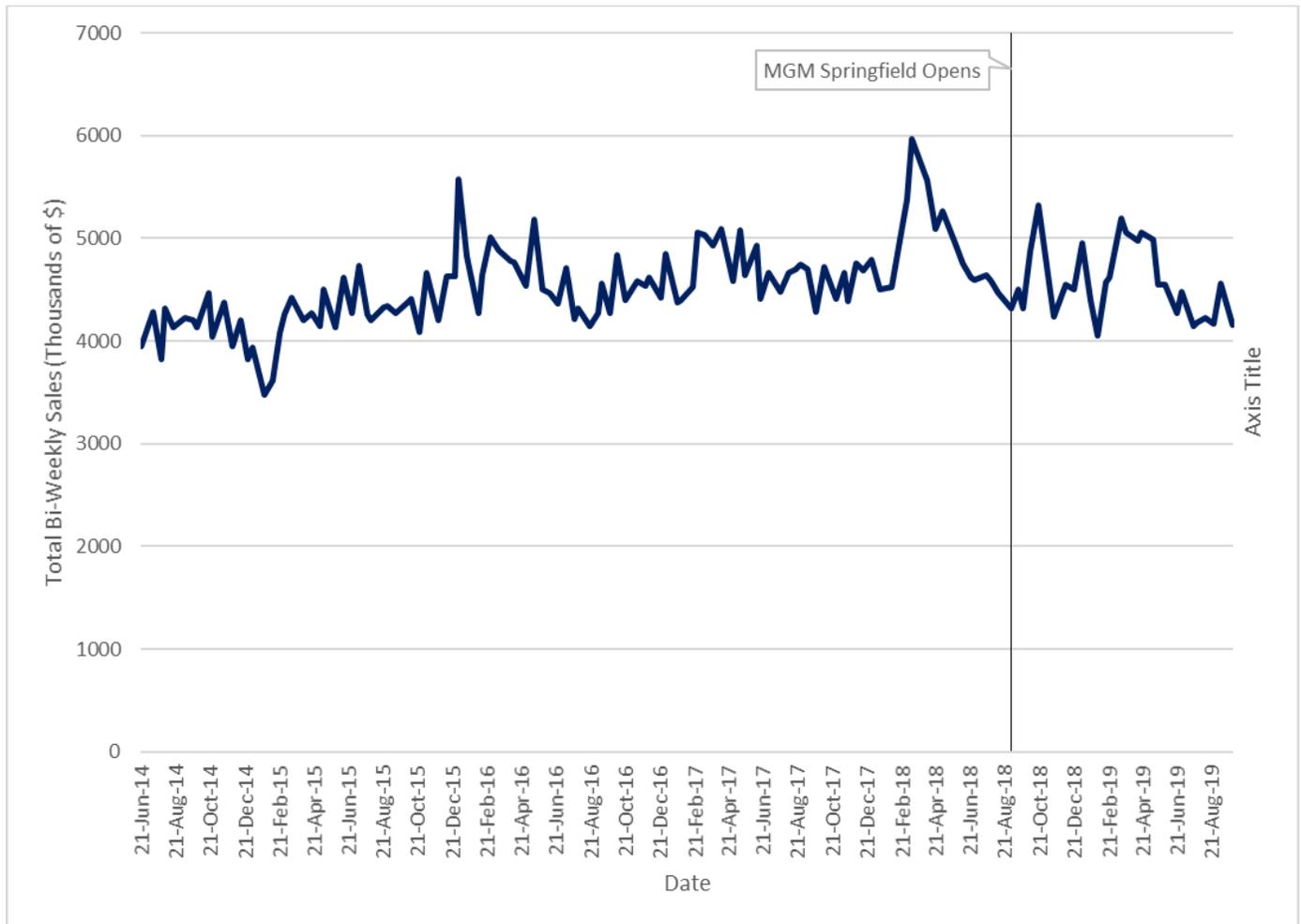
Source: MA Lottery, bi-weekly sales data August 19, 2018 to August 24, 2019 compared to same period the year before (August 20, 2017 to August 18, 2018). Sales in surrounding communities vary, with three of the communities experiencing decreased lottery revenue and five increased lottery revenue.

Figure 13 reveals that the 0.38% decrease in total sales in the designated surrounding communities is not distributed evenly. Five of the surrounding communities experienced increases in lottery revenue during the first year after the casino opening relative to the year prior to opening, whereas three experienced decreases in revenue. Decreases in revenue range from 2.37% in East Longmeadow to 3.08% in Holyoke. Wilbraham experienced the largest increase in lottery revenue, 7.81%, and the only community where the increase in sales exceeded the state average. The smallest increase, 0.16%, occurred in Chicopee. Whether these changes reflect a softening of the lottery market in the surrounding communities (with the exception of Wilbraham) cannot be determined, but there is no evidence of lottery sales systematically decreasing across all surrounding communities.

A Detailed Examination of Springfield

Because Springfield is the casino host community and the initial contrasting change in lottery sales in Springfield compared to the rest of the state, we take a more detailed examination of other aspects of lottery activity in Springfield in order to better understand whether the observed changes are possibly a result of the casino. Specifically, this section reports the results from the following analyses: a difference-in-differences analysis of Springfield compared to the rest of the state over various time periods; the number of lottery agents closing versus opening in order to gauge whether there is a widespread decrease in demand for lottery tickets resulting in numerous agents no longer selling lottery tickets; and the geographic distribution of lottery sales, to determine if larger decreases in lottery sales occur closer to the casino as suggested by a simple gravity model of economic activity.

Figure 14: Bi-Weekly Lottery Revenue in Springfield, June 2014-September 2019.



Source: MA Lottery, bi-weekly sales data June 2014 to September 2019 for Springfield. Lottery sales exhibit little growth but are volatile over time.

Figure 14 presents bi-weekly, total lottery sales in Springfield for the period June 2014 to September 2019. The opening of the MGM Springfield casino is also indicated. Lottery sales exhibit no obvious trend in terms of growth, but do exhibit volatility over time. Lottery revenue was declining prior to the opening of the MGM Springfield casino, beginning in April 2018 after reaching a peak in late February/March 2018. There is no obvious “break” or change in the series after the opening of the casino. Figure 14 confirms that the year-over-year decrease exhibited in Figure 12 above may be partly due to the higher sales in early 2018. Lottery sales reach a clear peak over February-April, 2018. Moreover, the volatility in lottery sales exhibited in Figure 14 suggest a change in sales over time is not unexpected.

Difference-in-Differences Analysis of Year-Over-Year and Longer Trend

Difference-in-differences analysis involves comparing average bi-weekly agent-level lottery sales in Springfield and the rest of the state after the casino opened with a time period before the casino opened. Results of this difference-in-differences analysis are provided in the Appendix (Tables A1 and A2). This analysis reveals two things. First, that average bi-weekly sales for agents in Springfield are below the rest of Massachusetts both before and after the opening of the MGM Springfield casino. Second, when comparing *the change* in average bi-weekly sales after the opening of the casino with the year prior to opening, average bi-weekly sales in Springfield decreased by approximately \$1,300 (4.8%) whereas sales in the rest of the state increased by nearly \$900 (3.3%). However, when comparing the change in sales after the opening of the MGM Springfield casino with average bi-weekly sales over the entire June 2014 to August 2018 period, average bi-weekly sales for agents in Springfield are \$1,070 (4.3%) higher. Thus, lottery sales in the year after the opening of the casino are in line with historical sales levels. While the state as a whole experienced a larger increase in sales, \$1,856 (7.0%) over this time period, this re-affirms that the year-over-year decrease in sales in Springfield after the opening of the MGM Springfield casino is partly due to higher sales the year prior to opening.¹³

Changes in Lottery Agent Activity: Openings, Closing, and Sales

Table 1 reports agent-level sales and opening/closing activity for the year after the MGM Springfield casino opened compared to the year prior. Springfield had 176 lottery agents in continuous operation, defined as reporting sales both before and after MGM Springfield opened. Of those agents in continuous operation, 73, or 41%, experienced an increase in total sales during the year after MGM Springfield opened compared to the year before. In contrast, 99, or 56%, of agents had lower total sales for the year after MGM Springfield opened compared with the year before.

Table 1: Agent Activity in the City of Springfield, Year After MGM Springfield Opens vs. Year Before

Number of Agents in Continuous Operation	176
Number of Agents in Continuous Operation with Increased Sales After MGM Springfield	73 (41%)
Number of Agents in Continuous Operation with Decreased Sales After MGM Springfield	99 (56%)
Number of Agents in Continuous Operation with No Change in Sales After MGM Springfield	4 (2%)
Number of Agents Closing ^a After MGM Springfield	18
Number of Agents Opening ^b After MGM Springfield	15
^a Closing refers to agents that had sales prior to the opening of MGM Springfield casino but had no sales after the opening of MGM Springfield casino. ^b Opening refers to agents that had no sales prior to the opening of MGM Springfield casino but had sales after the opening of MGM Springfield casino.	

¹³ A difference-in-differences analysis beginning June 2015 and June 2016 reveal a similar conclusion. In both cases, the change in Springfield (\$171 increase from 2015, \$344 decrease from 2016) are statistically insignificant, suggesting no significant difference in sales after the opening of the casino. In both instances, the state grew more rapidly.

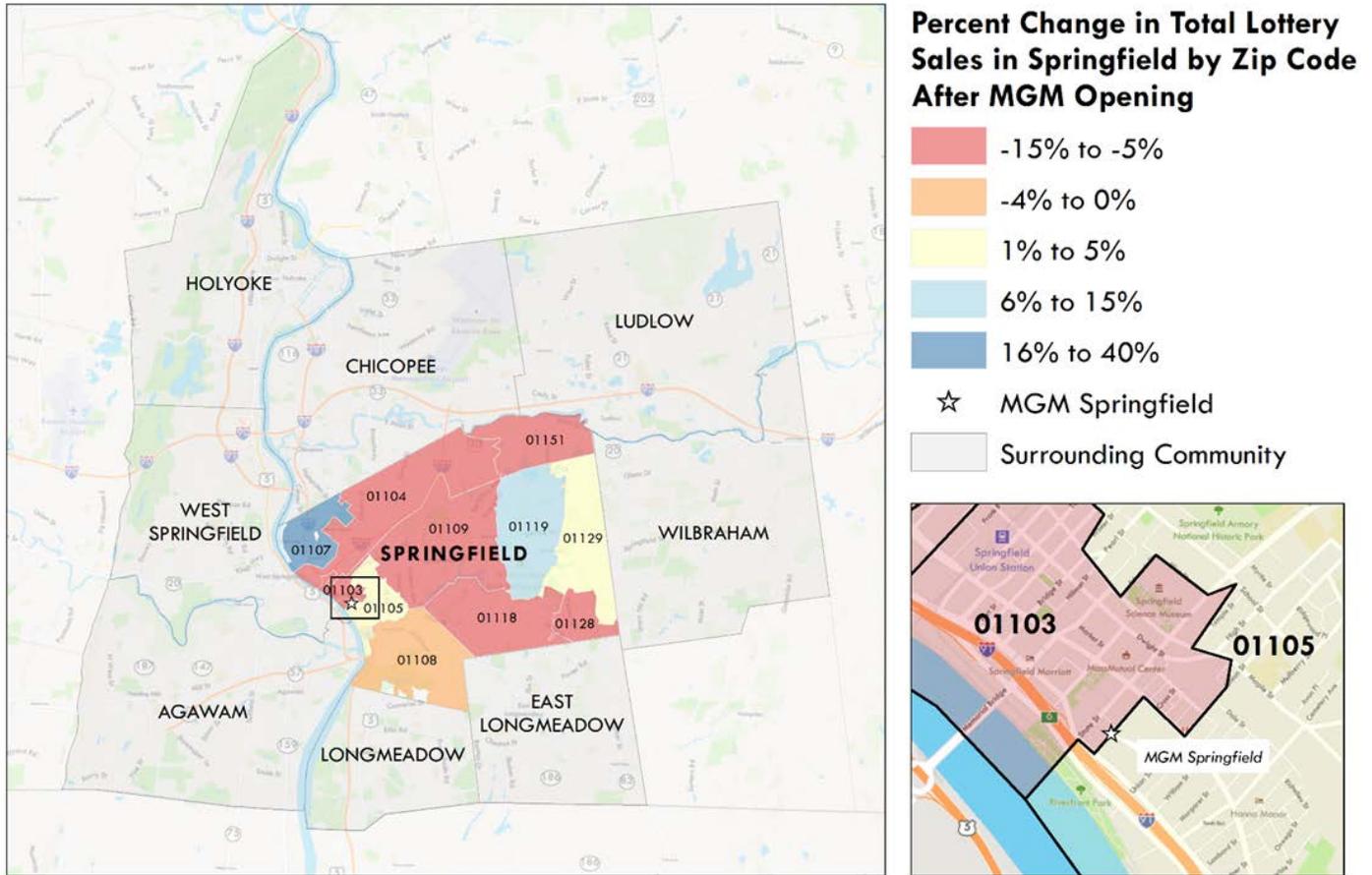
Table 1 also reports the number of agents closing, defined as having sales during the year before the casino opened but not after, and opening, defined as having sales after the casino opened but not before. While 18 agents closed, 15 opened.

Table 1 does not exhibit any evidence of a widespread negative impact of the MGM Springfield casino on lottery sales. While a majority of agents had lower sales after the casino opened, it is not a large majority. While we cannot ascertain why sales decreased, or increased for that matter, it does not appear that there was a widespread impact across all agents.

Year-Over-Year Change in Sales in Springfield by Zip Code

Figure 15 illustrates the year-over-year change in total lottery sales in the city of Springfield by zip code for lottery agents that were in operation over the entire two-year period (year after opening vs year before). This is done in order to analyze changes in existing sales as opposed to changes that may occur due to agents opening or closing. The lottery agent located inside the MGM Springfield casino is therefore not included in the results shown in Figure 15. The casino is located in zip code 01103 but near the border of 01105 (see inset in Figure 15). Sales in zip code 01103 decreased by 12.90% after the casino opened compared to the year before. When including sales from the MGM Springfield casino sales still decline in 01103 by 8.43%, so there is no evidence that the decline in sales is solely due to increased sales by the agent located within the casino. While sales in several zip codes of the immediate neighborhoods surrounding the casino decline year-over-year, sales within zip code 01105 directly adjacent to the casino increase by 2.94%. Moreover, these are averages, and do not reflect the experience of every agent. The correlation between an agent's percent change in sales and distance (in miles) from the casino is 0.00021, or practically zero, suggesting that lottery agents located closer to the casino are not uniformly experiencing larger decreases (or increases) in sales than those located further away.

Figure 15: Percent Change in Total Lottery Sales in the City of Springfield by Zip Code, Year After Opening vs Year Before.



Summary and Future Work

The MGM Springfield casino opened August 24, 2018. Lottery sales statewide increased 6.50% statewide in the first year after the opening of MGM Springfield compared to the year before. Over fiscal years 2003-2019, lottery revenue has increased at a 1.70% annual rate, so the recent growth in lottery revenue is well above the historical average. Moreover, the Lottery generated \$1.1 billion in profit in fiscal year 2019, an all-time record. Clearly, the opening of MGM Springfield and the continued operation of Plainridge Park Casino has not resulted in a statewide decrease in lottery sales. This is important because lottery sales statewide are the largest source of local aid for all communities.

In contrast, total lottery sales in Springfield in the first year after the opening of the casino decreased 3.05% compared to the year prior to opening. Sales in the designated surrounding communities decreased 0.38% but varied by community. With the exception of Wilbraham, however, where sales increased 7.80%, each of the designated surrounding communities fared worse than the state as a whole. Lottery revenue decreased in Agawam (-2.68%), East Longmeadow (-2.37%), and Holyoke (-3.08%) after the opening of the casino. Lottery revenue in Chicopee (0.16%), Longmeadow (2.03%), Ludlow (1.90%), and West Springfield (0.72%) increased, but at rates below the state.

The decrease in sales in Springfield stands in contrast to the experience of Plainville one year after the opening of Plainridge Park Casino where, excluding sales from the agent in Plainridge Park Casino, sales increased 1.96%, but were below the state average increase of 5.19%. So, while lottery sales were “softer” in Plainville following the opening of the casino, they did not decrease. Moreover, if sales from Plainridge Park Casino are included, lottery sales in Plainville increased significantly more (25.78%) in Plainville than the rest of the state (Nichols, 2017). As has been noted in previous reports, the MGM Springfield casino is larger and has more amenities than Plainridge Park Casino, while Springfield is a larger place and the casino may therefore have a different economic relationship to the community. Continued monitoring of lottery sales in Springfield will reveal whether the decrease in lottery sales is a longer-term change or unique to the first year of operation. The opening of Encore, which is also a resort-style casino, will also be monitored to examine impacts on lottery revenue in Everett and the surrounding communities.

At this point, given that we only have one year of data, we cannot attribute the decrease in lottery revenue in Springfield to the casino. There is evidence that the decrease could reflect random fluctuation or unusually high sales in Springfield in the year just prior to the casino opening. And of course, we do not know if the money not spent on lottery was spent in the casino. Additional data and analysis, including patron spending behavior, should allow for more definitive conclusions to be made and distinguish between a longer-term, casino-induced change in revenue from normal year-to-year variation. Going forward, the Massachusetts Lottery has generously agreed to continue to provide us agent-specific data. This will allow us to continue to analyze the impact of MGM Springfield casino over time. Moreover, now that all three casinos are opened in Massachusetts, further analysis of statewide versus regional impacts will be possible.

References

Nichols, M. (2018), *Lottery Revenue and Plainridge Park Casino: Analysis After Two Years of Casino Operation*. Amherst, MA: University of Massachusetts Donahue Institute, Economic and Public Policy Research Group.

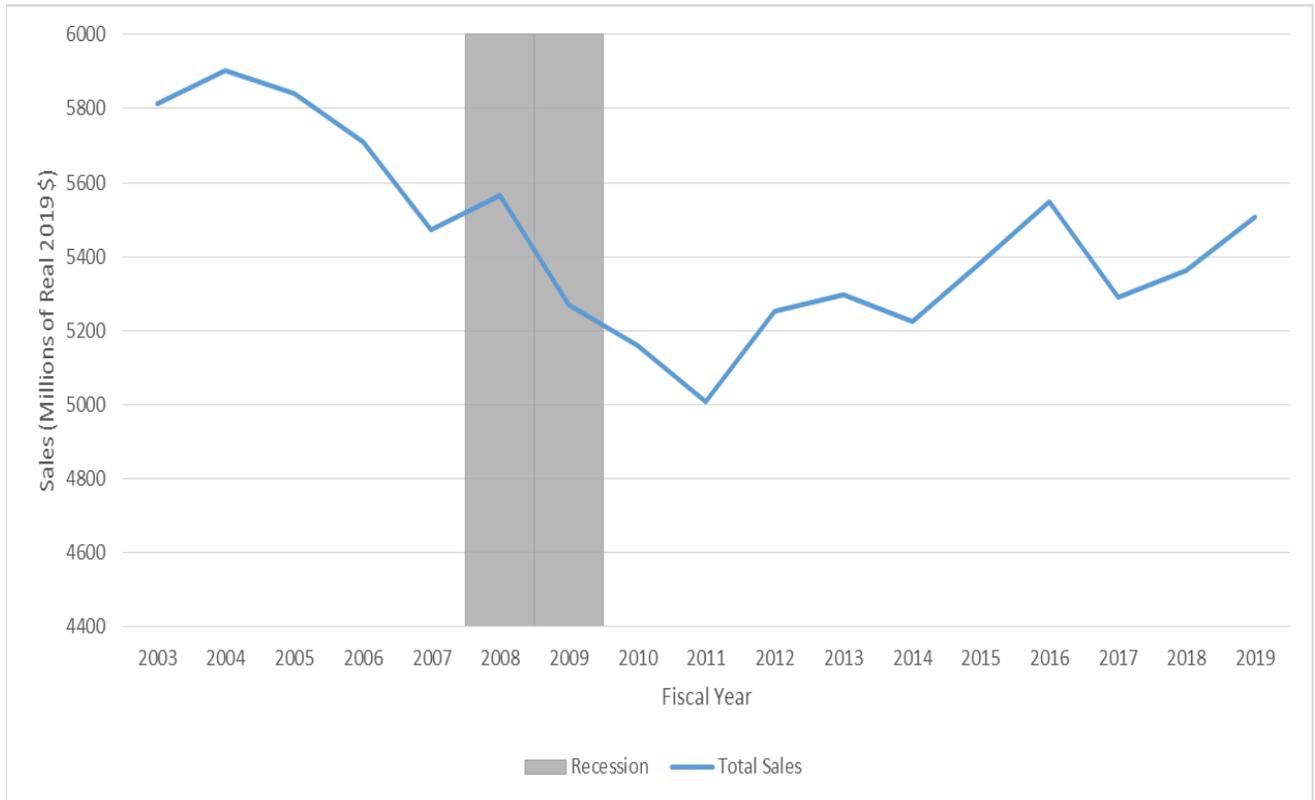
Nichols, M. (2017), *Lottery Revenue and Plainridge Park Casino: Analysis of First Year of Casino Operation*. Amherst, MA: University of Massachusetts Donahue Institute, Economic and Public Policy Research Group.

Appendix A

Inflation Adjusted Lottery Sales

Figure A1 shows total lottery sales expressed in real 2019 dollars. Nominal dollars have been adjusted for inflation using the Bureau of Labor Statistics CPI-U, the Consumer Price Index for all Urban Consumers.

Figure A1: Total Lottery Sales, 2003-2019 (in 2019 Dollars)

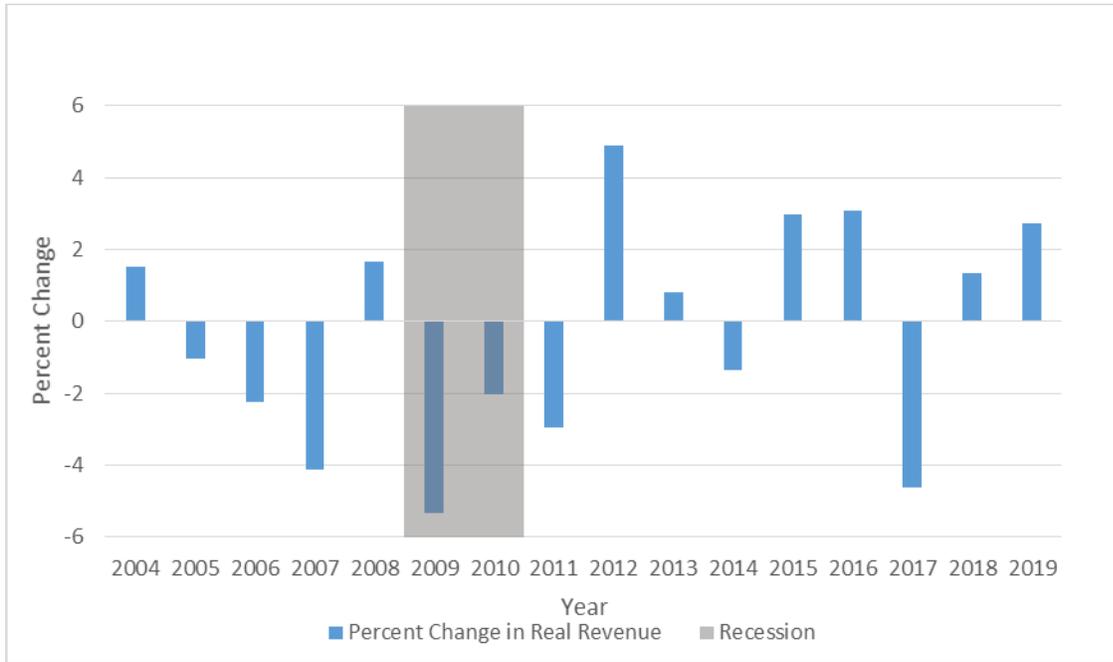


Source: MA Lottery and Bureau of Labor Statistics

Figure A1 shows that nominal lottery sales growth over the period of 2003 to 2019 has not kept up with inflation. The annualized inflation rate over this period was 2.04%, which exceeded the 1.70% annualized growth in nominal revenues. Figure A1 demonstrates the notable decline in sales resulting from the recession and economic slowdown as well as the recovery in lottery sales beginning in fiscal year 2011. In real terms, lottery sales have recovered from the Great Recession and are approximately equivalent to real expenditures in fiscal year 2009 and 2015 but remain below expenditures prior to 2008. Inflation adjusted lottery revenue was at its lowest in Fiscal Year 2011 and has been slowly growing since.

Figure A2 illustrates the annual percentage change in inflation adjusted (2019) dollars. Adjusting for inflation, total lottery sales increased 1.31% in fiscal year 2018 and 2.74% in fiscal year 2019.

Figure A2: Annual Percent Change in Total Lottery Sales, 2003-2019 (in 2018 Dollars)



Source: MA Lottery and Bureau of Labor Statistics

Table A1: Average Bi-Weekly Lottery Sales by Agent, Springfield vs Rest of Massachusetts, Year After Opening vs. Year Before Opening

	Before MGM Springfield Casino	After MGM Springfield Casino	Difference ^a
Springfield	26,825.02 (438.56)	25,516.59 (382.36)	-1,308.43** (579.31)
Rest of State	27,347.63 (68.47)	28,250.86 (67.73)	903.22*** (96.57)
Difference in Differences			-2211.65*** (619.86)

^aA *, **, and *** represent statistical significance at the 10, 5, and 1 % level, respectively. Standard errors in parentheses.

Table A1 shows that average bi-weekly sales for agents in Springfield are lower than the rest of the state both before and after the opening of MGM Springfield casino. Average bi-weekly sales per agent decrease by just over \$1,300 during the year after the casino opened compared to the year before. Average bi-weekly sales for the rest of the state in contrast increased nearly \$900. The difference between the two, approximately \$2,200, is statistically significant at the 1% level.

Table A2: Average Bi-Weekly Lottery Sales by Agent, Springfield vs Rest of Massachusetts, June 2014-September 2019

	Before MGM Springfield Casino	After MGM Springfield Casino	Difference^a
Springfield	24,446.29 (198.33)	25,516.59 (382.36)	1,070.30** (437.10)
Rest of State	26,394.78 (32.42)	28,250.86 (67.73)	1,856.08*** (71.96)
Difference in Differences			-785.78* (461.93)

^aA *, **, and *** represent statistical significance at the 10, 5, and 1 % level, respectively. Standard errors in parentheses.

Table A2 shows average bi-weekly sales per agent in Springfield and the rest of the state, but now the pre-casino period is extended back to June 2014 (the beginning of our sample). Here too it is evident that average bi-weekly sales per agent are lower in Springfield compared to the rest of the state both before and after the casino opening. However, average bi-weekly sales in Springfield after the casino opens are now nearly \$1,000 higher when compared to the June 2014-August 2018 period. Statewide average bi-weekly sales per agent increase nearly \$1,800. The difference, \$785 is barely significant at the 10% level. This shows that the change in average bi-weekly sales in Table A1 partially reflects a higher level of sales in the year immediately prior to the casino opening and that sales in Springfield after the opening of the casino are consistent with lottery sales longer term.