



# The Economic Impacts of a Casino at Suffolk Downs

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*Prepared by Regional Economic Models, Inc*

*For*

*The Boston Redevelopment Authority*

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## Executive Summary

This study considers the construction and operation of a casino hotel on the site of the Suffolk Downs racetrack, assessing the economic impact of the proposed development on the local economy of Suffolk County and regional economies across the Commonwealth. The Boston Redevelopment Authority contracted with Regional Economic Models, Inc. (REMI) to conduct this analysis.

Suffolk Downs, in partnership with Caesar's Entertainment, is expected to begin construction of the resort facility alongside the existing racetrack at Suffolk Downs in July 2014. The facility will have a two-phase opening process, with roughly half of the final gaming space expected to open to the public in September 2015. The facility's full gaming capacity and 300-room luxury hotel are expected to open in September of 2016.

This report is built on the REMI PI<sup>+</sup> model, a dynamic regional and macroeconomic policy analysis model. REMI's proprietary modeling software provides regional economic forecasting, policy analysis, and databases, which integrate economic theory to provide year-by-year simulation forecasts. The economic impact of the development was modeled across three regions, namely Suffolk County, the four counties surrounding Suffolk and the remaining nine counties of Massachusetts.

The results of the analysis demonstrate positive economic effects for Suffolk County and the rest of Massachusetts. Compared with a "no-build" scenario, we find an increase in employment that averages 6,032 jobs per year over the operation phase. Output and Gross Regional Product are also improved as a result of the project at annual averages of \$1.89 billion and \$1.26 billion over the simulation period, respectively. The developer's commitment to the small businesses of East Boston and its pledge to hire locally, as detailed in the Host Community Agreement, strengthen employment and local spending growth in Suffolk County while stimulating growth throughout the surrounding region.

The purpose of this analysis is not to make a policy recommendation but to objectively quantify the effects of casino gaming at Suffolk Downs with the data available. In line with this goal, REMI has presented its findings in the following sections. In summary, we find that the net economic effects of introducing gaming into the existing economic ecosystem of East Boston to be positive for Suffolk County and the rest of Massachusetts.

## Introduction

The Boston Redevelopment Authority contracted with Regional Economic Models, Inc (REMI) to produce an economic impact assessment of the opening of a casino hotel on the site of the current Suffolk Downs racetrack.

On November 22, 2011, Governor Deval Patrick signed a bill expanding gaming in the Commonwealth of Massachusetts. The bill, “An Act Establishing Expanded Gaming in the Commonwealth”, split Massachusetts into three regions that would each get the opportunity to open one resort casino. A license for one slots facility was also available to be located anywhere within the state. The Massachusetts Gaming Commission expects the law to create thousands of jobs in construction, hospitality, tourism and other industries, while encouraging Massachusetts residents who currently spend money at gambling facilities in Connecticut and Rhode Island to do so locally, benefitting the overall economy of Commonwealth.



**Figure 1: Gaming Regions. Source: Massachusetts Gaming Commission**

Under the provisions of this bill, Suffolk Downs in partnership with Caesar’s Entertainment has applied for the sole license in Region A to build and operate a resort casino alongside the existing horse track in East Boston. The developer will invest \$1 Billion to construct a resort-style destination gaming establishment on the property consisting of two distinct gaming areas providing between 150,000 and 250,000 square feet of gaming space with between 4,000 and 6,600 gaming positions (combinations of slot and table games). The project also calls for the

creation of a World Series of Poker™ area, one luxury hotel with 300 rooms (with the possibility for a second hotel of 150 rooms at a later date), and between 24,000 and 46,000 square feet of meeting and entertainment space. Additionally, the project means to include other amenities such as bars, nightclubs, and between 10 and 17 restaurants, including fine dining concepts, casual dining and a local marketplace, collectively containing between 1,700 and 2,600 seats. This will be complimented by up to 30,000 square feet of retail space, including a spa, thoroughbred horse racing, simulcast wagering, a seven-story parking garage with up to 2,600 standard spaces, 450 valet spaces 2,100 additional surface spaces, and a central utility plant.

The developer has included a “best effort” commitment of \$150 Million in local and regional spending annually during operations, with \$50 Million to the City of Boston, and a firm \$5 Million commitment to the area of East Boston. Also within the Host Agreement is a commitment by the developer to provide 2,500 construction jobs during construction, 800 permanent jobs during the year prior to Early Opening, 2,225 permanent jobs upon Early Opening, and 4,000 permanent jobs after Full Build and for the remainder of the license period. The developer has also committed to continued operation of the race track, ongoing job training and employee benefits, and has also importantly pledged to hire 50% of staff from Boston residents.

The developer’s Host Community Agreement with the City of Boston will be the subject of a referendum vote. Contingent upon passage of the referendum and Gaming Commission approval, the proposal will move into the second and final application phase with the filing of a site-specific final proposal. Licenses are expected to be awarded by April 2014.

As proposed, the project will proceed in four phases; Licensure, Construction, Early Opening and Full Opening. Construction is slated to commence in July, 2014, with an expected opening date of September 1, 2015. The Full Opening phase is expected to be completed and full operations are expected to commence on September 1, 2016.

This report focuses on the economic impacts of the construction and operation of the proposed facility at Suffolk Downs. The sections that follow provide a project timeline, study methodology, description of inputs, description of results, concluding statements, and appendices.

## **Project Timeline**

### **Project Timeline**

The project was modeled in four phases, namely Licensure, Construction, Early Opening and Full Opening. The inputs associated with the modeling of each phase are described in the Inputs section.

### **Licensure Phase**

The Licensure Phase spans from the date of this report to the commencement of construction activity, currently anticipated in July, 2014. During this period, the application process will be completed and subsequently, pending approval, the licensing and permitting process will also be completed.

### **Construction Phase**

Construction on the project is expected to commence in July 2014 and last approximately 14 months. Total capital investment for the project is expected to total over \$1 Billion and will include improvements to transportation infrastructure in addition to onsite construction.

For modeling purposes, the Construction Phase refers to the construction period prior to the commencement of Early Opening operations in September, 2015, even though some aspects of construction activity will continue during the Early Opening phase. Specifically, the Construction Phase spans the period from July, 2014 to August 31, 2015.

### **Early Opening Phase**

The Early Opening Phase is expected to begin on September 1, 2015. The newly renovated existing grandstand building at Suffolk Downs will open to the public a year before the full project is complete, providing up to 125,000 square feet of gaming space and at least six restaurants. Horseracing and simulcast betting will be available during this phase and at least 1,800 parking spaces will be available to receive patrons. As mentioned above, construction will continue on the full-build portion during this Early Opening phase.

For modeling purposes, the Early Opening Phase refers to the operation of these amenities prior to the Full Opening, expected on September 1, 2016. Specifically, it spans the 12 month period from September 1, 2015 to August 31, 2016.

### **Full Opening Phase**

The Full Opening Phase is assumed to begin on September 1, 2016, the expected date of full operations. This phase will include the opening of a 300-room luxury hotel and additional gaming, restaurant, meeting, and parking space.

The fully completed development will include two distinct gaming areas providing up to 250,000 square feet of gaming space, up to 17 restaurants, and 30,000 square feet of retail space. The resort will include at least one luxury hotel with 300 rooms and 5,150 parking spaces. The facility will include thoroughbred horseracing, simulcast betting and up to 46,000 square feet of meeting space.

Subsequent to the proposed project's completion, a second hotel of 150 rooms may be constructed on the property. However at the time of publishing, information and timing is only available on the first hotel.

## Methodology

This report is built upon three pillars: the PI<sup>+</sup> model, model input data, and model assumptions. Each is described below.

### Model

PI<sup>+</sup> is a dynamic regional and macroeconomic policy analysis model. REMI's proprietary modeling software provides regional economic forecasting, policy analysis, and databases, which integrate economic theory to provide year-by-year simulation forecasts. PI<sup>+</sup> incorporates market signals such as prices, wages, input factor substitution, induced investment flows, and labor migration, variables which are not all available in other models. PI<sup>+</sup> is a tool for evaluating the total economic and demographic effects of policy changes. The model uniquely implements several economic methodologies, including input/output tabulation, general equilibrium, econometrics, and economic geography, into produce single-region and multiple-region models. The specific configuration of PI<sup>+</sup> used for this model is the same used by the Boston Redevelopment Authority. BRA has utilized PI<sup>+</sup> for nearly a decade in policy and economic impact analyses. Using the same model provides consistency with past studies in the region.

The model includes economic impact simulations for 70 industries in three unique regions. REMI models follow the North American Industry Classification System (NAICS), a 2-through-6 digit hierarchical classification system of industries. There are 23 broad (2-digit NAICS code) industry classifications, and within those, NAISC recognizes 70 sub-industries (3-digit NAICS code); these are the industries considered within the PI<sup>+</sup> model. As an example, Accommodation and Food Services (NAICS: 72) encompasses both the subsectors of Accommodation (NAISC: 721) and Food Service (NAICS: 722). This level of specificity is necessary to reflect economic impacts through industries more precisely, allowing for better policy decision making.

The three regions being considered are Suffolk County, the Four County Region (Essex, Middlesex, Norfolk, Plymouth), and the Rest of Massachusetts. By defining our regions in this manner, we can forecast economic impacts specifically for Boston and Suffolk County. This also allows us to isolate the economic impact to the nearest counties surrounding Suffolk, as well as in the remainder of the state. Boston Redevelopment Authority analyzes other projects using the same three regions, again because of the advantage of observing Suffolk County in isolation. Though these regions are different from the three regions defined by the Massachusetts Gaming Commission, we found that the regional definitions within the report are more useful in drawing conclusions for our economic impacts of interest.

**Table 1: Layout of Regions of PI+ model**

<b>Region Number</b>	<b>Region Name</b>	<b>State</b>	<b>FIPS</b>	<b>County Name</b>
1	Suffolk County	MA	25025	Suffolk
2	Four County Region	MA	25009	Essex
2	Four County Region	MA	25017	Middlesex
2	Four County Region	MA	25021	Norfolk
2	Four County Region	MA	25023	Plymouth
3	Rest of MA	MA	25001	Barnstable
3	Rest of MA	MA	25003	Berkshire
3	Rest of MA	MA	25005	Bristol
3	Rest of MA	MA	25007	Dukes
3	Rest of MA	MA	25011	Franklin
3	Rest of MA	MA	25013	Hampden
3	Rest of MA	MA	25015	Hampshire
3	Rest of MA	MA	25019	Nantucket
3	Rest of MA	MA	25027	Worcester

## Inputs

Inputs used in this analysis are a combination of existing data and assumptions. The data are provided directly from the project developer and the City. Assumptions are based upon supplemental forecasts and analysis provided by the City, REMI, and other third party consultants hired by the City.

### **Licensure Phase**

The Licensure phase includes the period prior to the start of construction.

- Pre-license costs and track losses were modeled as demand for professional and technical services and a reduction in revenue for the race track, which is under the Spectator Sports industry.

### **Construction Phase**

The Construction phase is modeled by applying budgetary projections from the developer to various industries in the REMI model. The following details that process.

- Total construction hard costs were modeled as industry sales for construction. We used the City's estimate of transportation and offsite improvements of \$50 million.
- Design, consulting and project management costs were modeled as demand for professional and technical services.
- IT, supplies, and equipment were modeled as spending on producers' durable equipment.
- Pre-opening costs were modeled according to the pattern of intermediate demand for the private, non-farm sectors for the Accommodations industry (which includes casinos with hotels). The total amount was put in 2016.
- REMI used its estimate of earnings for the construction sector. Earnings include wages, benefits, and proprietors' income. For 2014 the average annual earnings rate for construction in Suffolk County is \$110,662, which, assuming 40 hrs/week, is \$53/hour.
- Unless otherwise indicated, all project costs were spread across the years 2014, 2015, and 2016 based upon the months of construction in each calendar year.

## Early and Full Opening Phases

The Early and Full Opening Phases include inputs related to the operation of the proposed resort.

- The employment and operation of a casino hotel is classified under Accommodations by the federal government's industry classification system, NAICS.
- The site is assumed to fully operate after September 1, 2016.
- Labor productivity is calculated based upon 2019 (the stabilized year) projections from the proponent and used as a guide for all other years in the analysis. See more detailed discussion of labor productivity in Appendix B.
- Employment and revenue forecasts were given for years 2016-2019 as the project opens and ramps up to stabilized performance. Revenue growth from 2019 onward was given at 2% per year. For 2020 onward the employment at the site is assumed to be constant. See Resort Employment and Compensation below. The benefit of this analysis is its coverage of multiple years.
- REMI used its estimates of compensation for the Accommodations industry. For Suffolk County in 2014, the average annual compensation rate is \$51,234. See Resort Employment and Compensation in Appendix B.
- We used revenue projections including internal comps (i.e. free incentives given to patrons by the casino) as the number influencing employment and intermediate demand. Even though the casino foregoes payment it must still provide services of this value.

## Visitor Spending

- We assumed that all spending by Massachusetts residents at the site would come at the expense of other existing spending, less money brought back from out-of-state casinos.
- “Massachusetts residents in 2011 continued their 19-year flirtation with New England’s gaming venues by spending nearly \$909 million on gaming and non-gaming amenities at Connecticut's destination resort casinos and at the slot parlors in Rhode Island and Maine, and by making more than 7.1 million visits to those same facilities, or the seventh year in a row, Massachusetts residents patronizing New England's casinos and slot parlors, collectively, generated more tax revenues to Connecticut, Rhode Island and Maine state governments combined than did the residents of any other state.” – Clyde Barrow, Director at the Center for Policy Analysis, and author of the UMass New England Casino Gaming Update, 2013.

- Based on projections by a City consultant, we assumed that approximately 90% of casino revenue at Suffolk Downs will come from Massachusetts residents. Massachusetts resident spending on other categories is assumed to be 75% of the given food and beverage spending and 20% of the given hotel spending.
- REMI assumed that 75% of the current out-of-state casino spending by Massachusetts residents will come back to Massachusetts. This assumption is based on the ideas of Clyde Barrow in his New England Casino Gaming Update, 2013. We acknowledge that this assumption is imperfect but without additional data we feel that it is at the very least sound. This spending was allocated across the state's regions by the proportion of disposable income and population 21 and over according to REMI data.

### **Tax Revenues**

- All taxes were calculated using revenues net of comps.
- We assume that 25% of the Gross Gaming Revenue (GGR) will go directly to the state in the form of taxes.
- We assume certain negotiated upfront fees going toward the City of Boston, totaling \$33.4 million, to be paid over 4 equal installments two years after construction. These upfront funds will remain local and go towards school capital improvements, East Boston Neighborhood Business Program, construction of a new community center, and park improvements.
- In addition to the upfront fees, we assume certain negotiated annual fees to the City of Boston, according to the schedule and formula contained in the Host Community Agreement. These annual fees range from \$20 million annually during Early Opening to over \$52 million in 2019 and beyond.
- We assumed all taxes were spent in the year they were collected.
- We did not assume any changes in the tax percentages or fees for categories such as sales tax, hotel taxes, and restaurant taxes.
- After examination of the spending categories, we decided that they closely resembled the typical pattern of government spending and so we modeled both state and local spending according to these patterns.

## Results

This section of the report focuses on the major macroeconomic indicators of employment, output, gross regional product, personal income, and population. Each concept will be described and placed in context.

### Employment

- The count of jobs in the economy
- Shown in annual differences relative to the base, no-build case
- The Employment Curve describes:
  - The relationship between the construction and operations phases
  - Labor market dynamics

On the graph in Figure 2, the construction phase is best seen in 2014 and 2015. The construction activity directly creates approximately 1,000 jobs on an annualized basis in each year. Table 2 shows the employment impacts of only the construction activity.

**Table 2: Suffolk County Incremental Employment Impacts of Construction**

<u>Category</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>Average</u>
<b>Total Employment</b>	662	1,256	671	863
<b>Direct Employment</b>	614	1,187	573	982
<b>Multiplier</b>	1.08	1.06	1.17	0.88
<b>Percent Change</b>	0.09%	0.17%	0.09%	N/A

The impacts of the operations of the casino in isolation (post-construction, fully operational) are shown in Table 3.

**Table 3: Suffolk County Incremental Employment Impacts of Casino Operations**

<u>Category</u>	<u>2017</u>	<u>2021</u>	<u>2025</u>	<u>2029</u>	<u>2033</u>	<u>Average</u>
<b>Total Employment</b>	7,510	7,306	7,089	6,780	6,510	6,032
<b>Direct Employment</b>	3,983	3,986	3,999	3,999	3,999	3,998
<b>Multiplier</b>	1.89	1.83	1.77	1.70	1.63	1.51
<b>Percent Change</b>	0.98%	0.79%	0.67%	0.60%	0.56%	N/A

Figure 2 shows the employment impacts of the complete simulation, highlighting total employment followed by the top five sectors.

**Figure 2: Total Suffolk County Incremental Employment Impacts**

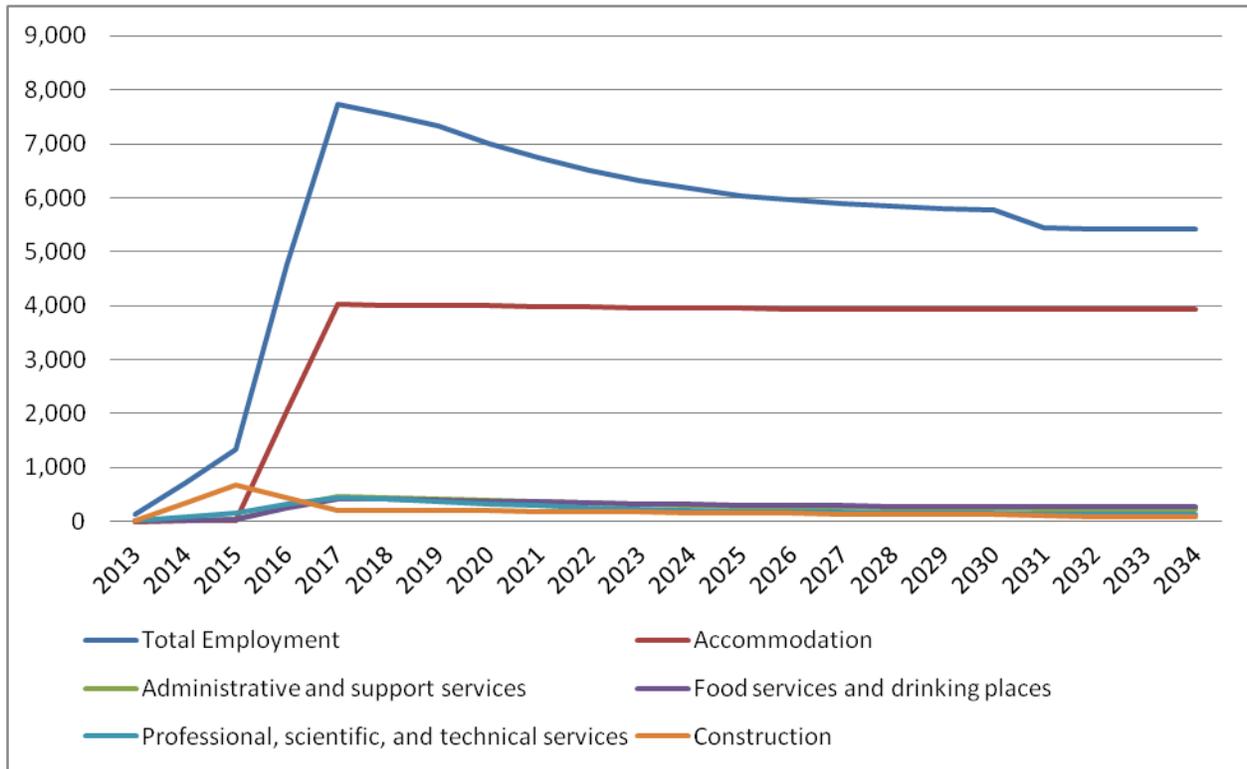


Figure 2 above shows that Construction sector employment is influenced. The Accommodation sector employment (the sector of the resort casino) peaks in 2017 after the casino is fully operational, and experiences stable employment for years after. Administrative, Professional, and Food are mainly supported by demand from other businesses for their services; each of these other sectors have substantial input into the Accommodation industry. While the direct shock of Accommodation’s jobs is relatively constant, total employment gains slowly decrease. This is because rising demand for labor raises wages initially, but the increasing cost of labor will eventually cause companies to reduce their demand for labor, thereby slightly decreasing total employment. This eventual decrease in regional employment is a common phenomenon for large-scale developments such as this, and is to be expected. The developer’s commitment to 4,000 permanent jobs per year upon full build mitigate this effect.

## Output and Gross Regional Product

Output and gross product are the two concepts commonly used to quantify economic growth.

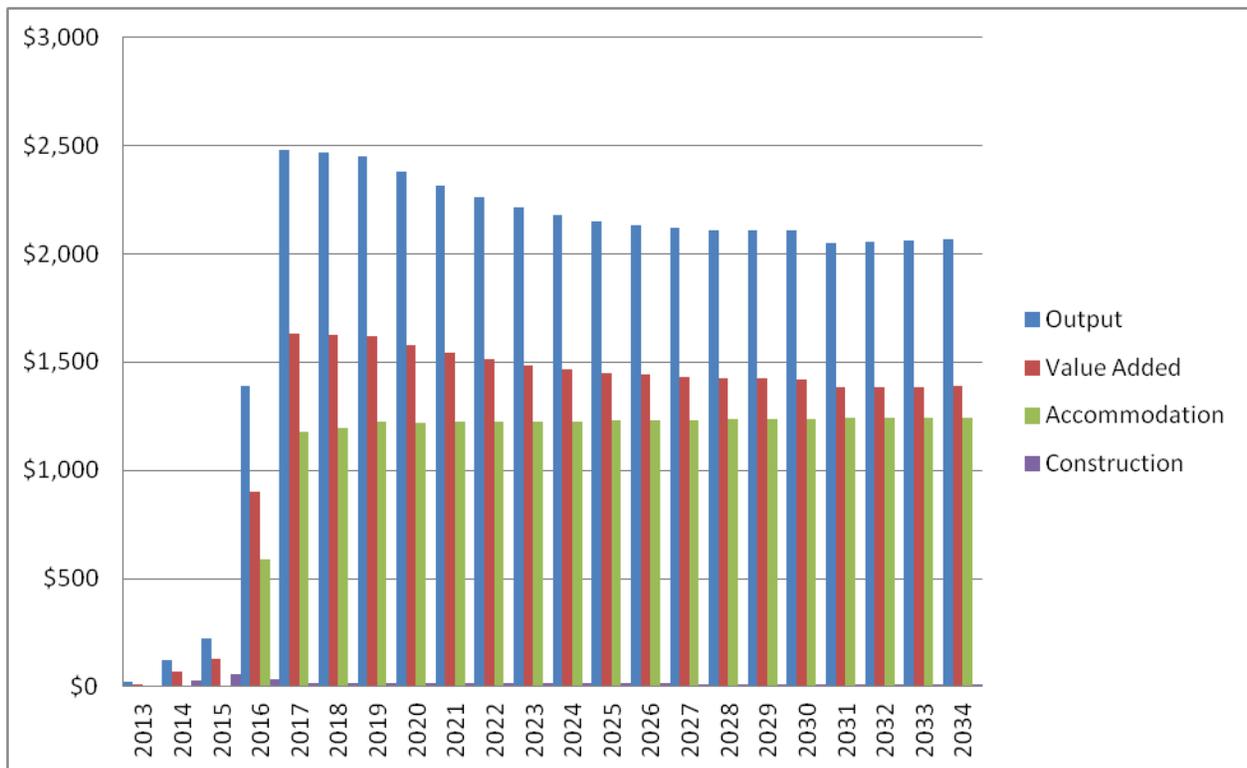
### Output:

- The same as revenues or business activity
- Every transaction where money is exchanged is counted toward output
- Expected to increase by \$1.89 billion per year for Suffolk County (on average)
  - Cumulative long-term increase for Suffolk County: \$41.47 billion (2013 to 2034)
  - Over the life of the License (2014-2028): Average \$1.9 billion and cumulatively \$29 billion

### Gross Regional Product (GRP):

- Value added of net new economic activity
- Expected to increase by \$1.26 billion per year for Suffolk County (on average)
  - Cumulative long-term increase for Suffolk County: \$27.7 billion (2013 to 2034)
  - Over the life of the License (2014-2028): Average \$1.3 billion and cumulatively \$19 billion

**Figure 3: Suffolk County Incremental Output and Value Added, Totals and Selected Sectors, Millions of Fixed 2012 \$**



## Personal Income

### Personal Income:

- The sum of income earned by all residents of a region from all sources, or more simply, the amount of money people who live in an area make regardless of where they work

Each of the jobs shown in Figure 2 comes with a paycheck. However, the workers who occupy these jobs do not necessarily live in Suffolk County. In fact, throughout most of the past couple of decades, Suffolk County has had more jobs than men, women, and children. These excess jobs have historically been filled by commuters from other counties. However, within the Host Agreement, developers will reserve 50% of the jobs created for Boston residents. This commitment will help offset what has historically been significant leakage of economic benefits to other regions.

Figure 4 shows earnings compared to personal income.

### Earnings:

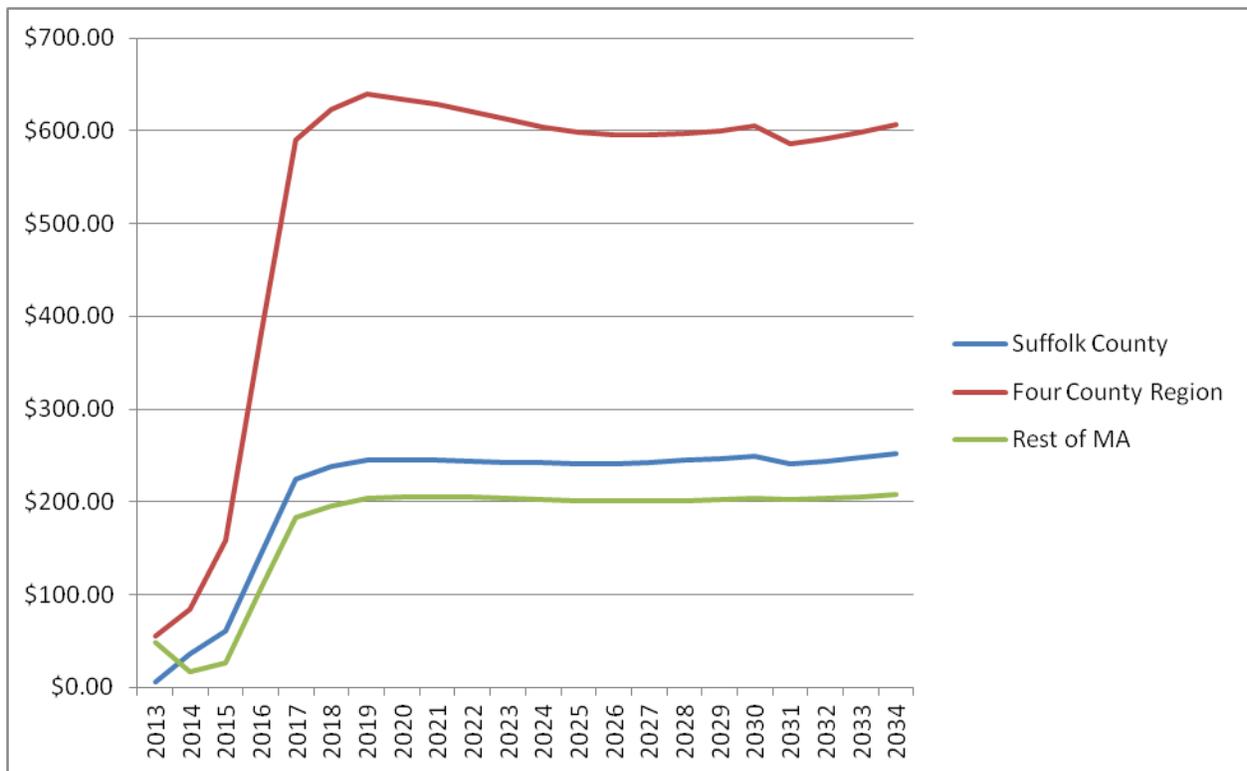
- Total of salary, benefits, and self-employment income paid to people working in the region
- Earnings are higher than personal income
  - Indicates large amounts of people working in Suffolk County but residing elsewhere

**Figure 4: Suffolk County Incremental Earnings and Personal Income**



Figure 5 shows the total personal income of all regions. It shows the outward flow of money due to commuters from Suffolk County to other parts of the state. This figure shows us that Suffolk County is an employment base for workers in a large area. Taken together, Figures 4 and 5 show that due to commuter flows a large amount of the potential economic impacts of the casino leak out of Suffolk County. The developer has pledged a best effort commitment to hire at least 50% of all employees from the City of Boston. This commitment raises the level of personal income within the graph from where it might have stood without local employment commitments and helps create more secondary and tertiary economic benefits.

**Figure 4: Regional Net Commuter Income Flows, Millions of 2012 \$**



## Population

One of the important dynamic features of  $PI^+$  is the demographic component. Specifically applicable to this report are economic migration and population. Economic migrants are domestic movements of people who come to a new location to take advantage of a comparatively better economy. Mainly as a result of growing employment opportunity, economic migrants move into Massachusetts adding to the population. These migrants are aware of established commuting patterns when choosing their location so, given the discussion in the income section above, we can expect many of the migrants to choose the Four County region over Suffolk County.

Figure 6 shows the net number of new migrants for each region. Figure 7 shows population and the cumulative effect of migration. The rapid peak and decrease of migration is a further reflection of the labor market dynamics in PI<sup>+</sup> described in the employment section of this report. In that section we discussed how an abrupt increase in labor demand can bid up wages. In this section we are focused on how labor supply adjusts in the face of new employment opportunities. Part of this adjustment occurs when current residents, who were not previously participating in the labor force, enter. In this case, labor force increases without population increasing. The other, and larger, part of the adjustment occurs with the inflow of economic migrants who arrive quickly and just as quickly satisfy the increased labor demand. In other words, an initial surge of migrants is typically sufficient to meet the new demand thereby negating the need for ongoing in-migration in the future.

**Figure 5: Regional Incremental Net Annual Economic Migration**

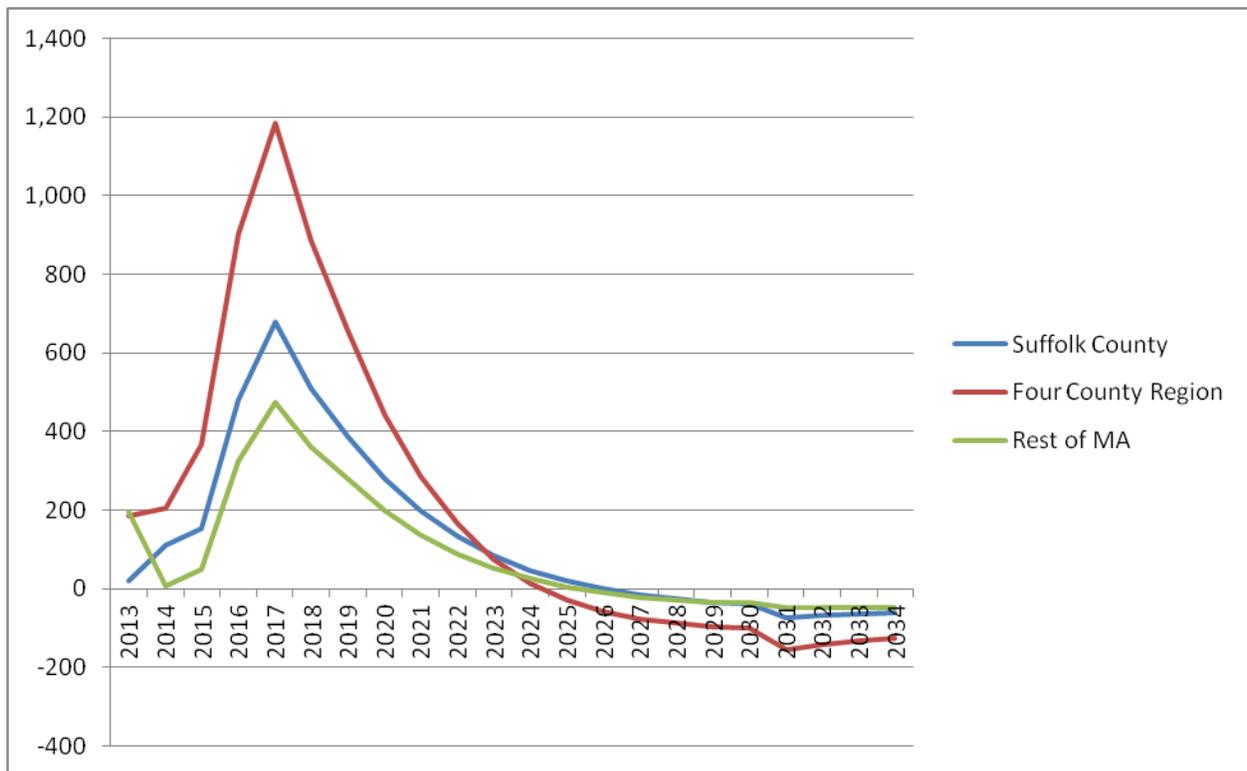
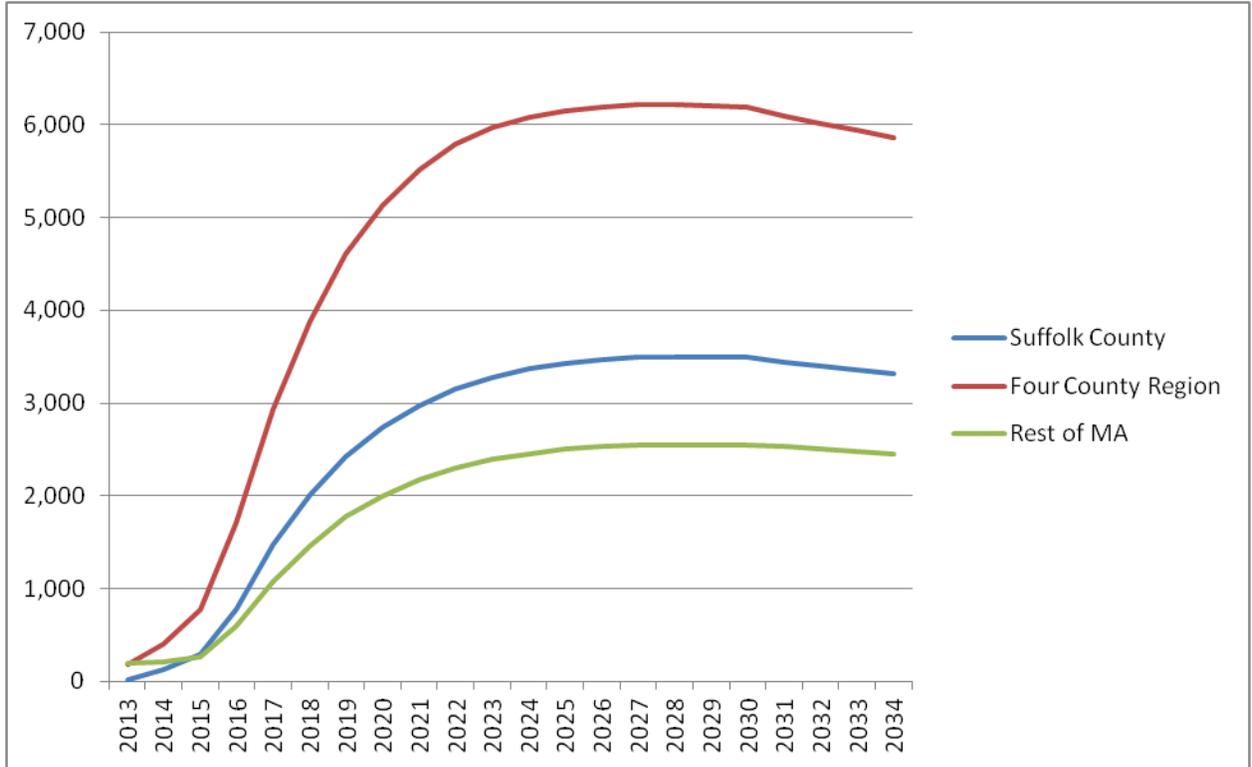


Figure 7 shows population and the cumulative effect of migration.

**Figure 6: Regional Incremental Population Change**



## Conclusion

In Massachusetts, the next few years will bring large-scale changes in the entertainment industry. With the introduction of gaming to locations throughout the state, residents and non-residents alike will have a new competitor for their spending. However, the environment in which gaming enters Massachusetts is very different than the market of the past. Previously, states introduced gaming with an eye toward the tourist market and as a lucrative export. With more states legalizing gambling, it has become a common activity which has had the effect of taking ever more money out of local markets and into out-of-state casinos. In today's environment, the goal with the introduction of casinos has shifted away from the export market to recapturing spending and tax dollars leaving the state for other casinos.

This analysis shows the effects of opening a resort casino in East Boston. The construction, operation, and tax payments of the casino will have wide-ranging economic effects, including bringing money back into the state. The employment impact is positive throughout the forecast. The firm \$5 Million commitment to East Boston will help support small business in the area during the operations phase. Output and GRP also show improvements compared to a "no build" scenario. Despite large amounts of leakage due to commuters, Suffolk County sees growth in personal income. This commuting relationship also brings benefits to the rest of Massachusetts through income and population growth. However, given the developer's "best effort" commitment to employ locally, we see a mitigation of the standard leakage throughout the rest of Massachusetts in favor of Suffolk county growth. This is driven by the repatriation of jobs and local spending within the City of Boston. Ideally, this influx of income into the community will encourage the development of secondary and tertiary employment opportunities. This influx will also benefit small business and should offset the impacts of the construction of this casino at a local level.

The purpose of this analysis is not to make a policy recommendation but to objectively quantify the effects of casino gaming at Suffolk Downs with the data available. In line with this goal, REMI has presented its findings in the preceding sections. In summary, we find that the economic effects of gaming in East Boston to be positive for Suffolk County and the rest of Massachusetts.

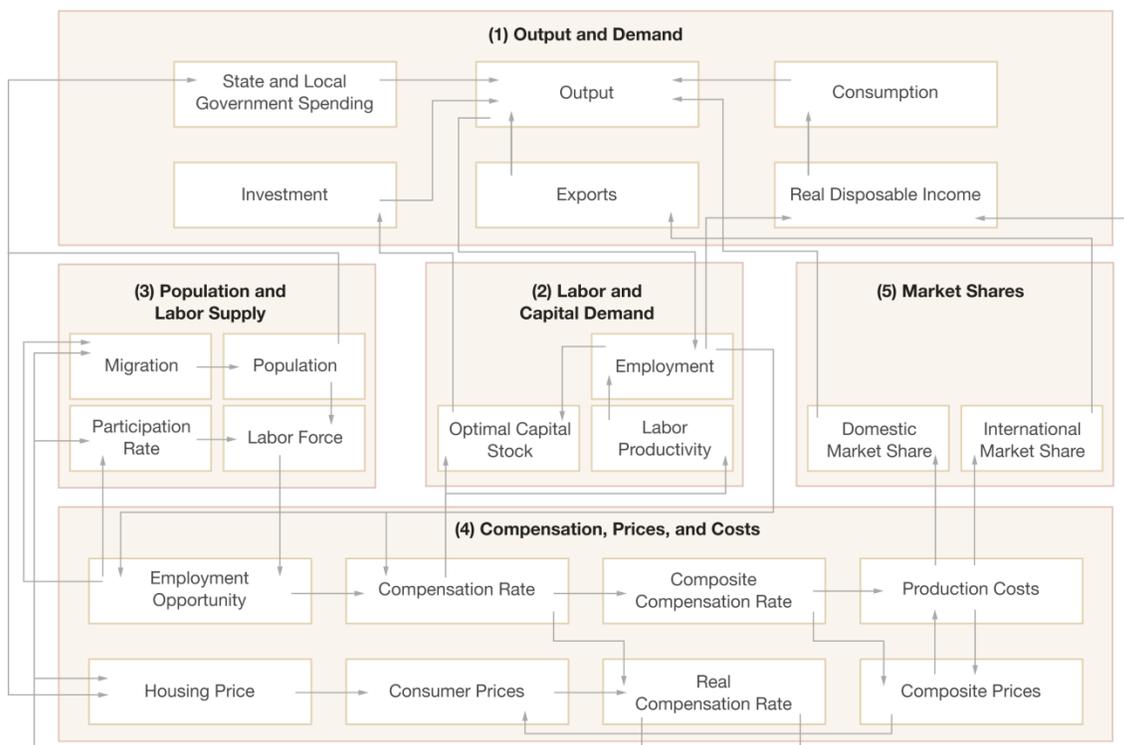
## Appendix: Model Description

PI<sup>+</sup> 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.

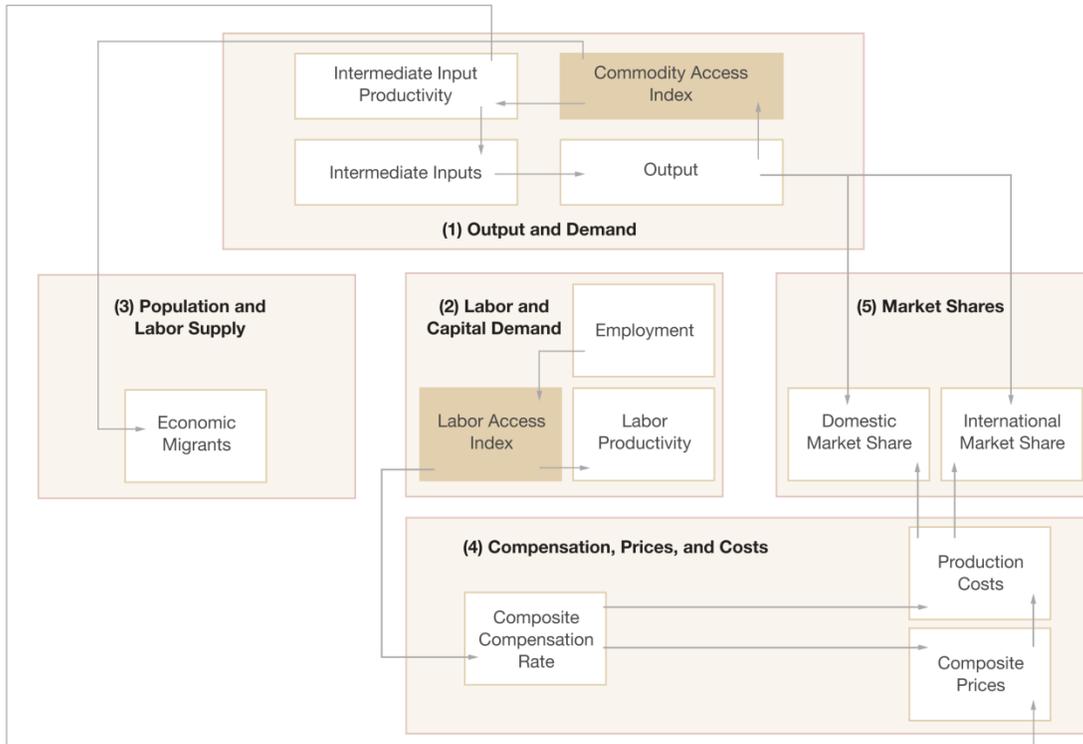
The model consists of thousands of simultaneous equations with a structure that is relatively straightforward. The exact number of equations used varies depending on the extent of industry, demographic, demand, and other detail in the specific model being used. The overall structure of the model can 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 Figures 8 and 9.

**Figure 7: REMI Model Linkages**

REMI Model Linkages (Excluding Economic Geography Linkages)



**Figure 8: 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 the 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.

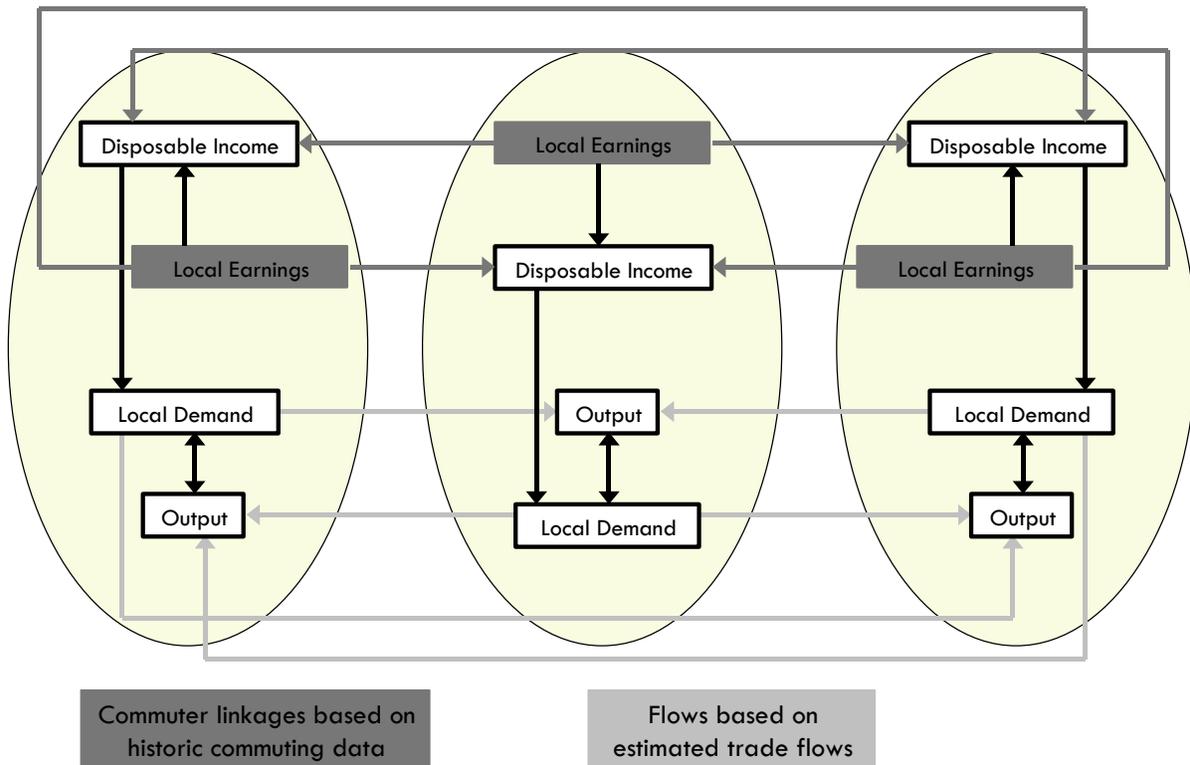
Single-region models consist of an individual region, called the home region. The rest of the nation is also represented in the model. However, since the home region is only a small part of

the total nation, the changes in the 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 10.

**Figure 9: 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, taking into account 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.

## Appendix B: Input Detail

### Construction Wages and Employment

As a further note on employment, the proponent's data asserts that there will be about 2,500 construction jobs at the site over the 26 month construction period. However, our initial estimation did not show the same number of workers will be needed. The total hard costs estimate (which also includes offsite improvements) only creates about 1,080 construction jobs. This disparity is likely due to differing estimates of labor productivity in the construction sector. For example, REMI assumes labor productivity of \$285,066 per employee in 2014.

### Labor Productivity

Unsurprisingly, the labor productivity, i.e. revenue per employee for a casino hotel is very different from that of a regular hotel. Accordingly, the labor productivity input for this facility is adjusted to match the rate given by the proponent. Specifically, we used 2019 (the stabilized year) as a guide: \$1.14 billion in total property revenue with 4,000 employees.

### Resort Employment and Compensation

For the years 2016 – 2019, non-construction employment was calculated using proponent estimates for the number of jobs in each project phase. The number of jobs in each calendar year reflects a blended expected number of jobs relative to the proportion of each year expected spent in respective phases of the project. After 2019, employment was assumed to be constant which implies that the productivity of the employees grows but at a slower rate than the Accommodations industry as a whole. This assumption captures the reality that many of the jobs at a casino are face-to-face and not as subject to productivity changes.

### Not Modeled

License fees and financing costs were not modeled in the Licensure phase. The taxes and fees paid by the casino to the city and state are included elsewhere. Financing costs are not the driver of any local economic impacts because they are paid to a bank or banks that could be anywhere in the world.

We did not model tenant allowance costs in the Construction phase because it is not clear that it would result in any construction or fit-out that is not already included in the hard costs above. Furthermore, if it does result in any activity, it is unknown how much, of what nature, and when.

Contingency funds were not modeled in the Construction phase because it may, by definition, not be needed at all.