



THE ECONOMIC IMPACT OF THE EASTERN STATES EXPOSITION

PREPARED BY...

Regional Economic Models, Inc. (REMI)

PREPARED FOR...

Eastern States Exposition

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REGIONAL ECONOMIC MODELS, INC. (REMI)

REMI is a Massachusetts- and Washington, DC-based firm specializing in economic services related to modeling. It began with a research project by a professor at the University of Massachusetts-Amherst, Dr. George I. Treyz, in the 1970s when he looked into assessing the economic impact of redeveloping the I-90 corridor from Boston, then to Worcester, Springfield, and eventually out to Albany and Buffalo. In 1980, Dr. Treyz founded a firm around his research, which grew over the past thirty years to the present company. REMI provides software, support services, and issue expertise in nearly every state, the District of Columbia, and in several foreign nations. Model users are primarily in state governments, but they also include federal agencies, planning organizations, consulting firms, universities, and private industry involved in policy and infrastructure development.

Currently in Massachusetts, REMI works with the Boston Redevelopment Agency, Economic Development Research Group, ICF International, NERA Economic Consulting, and the Massachusetts Department of Revenue. REMI provides training support on the models' operation for all of our clients. This includes help with the interface, vetting data and variables, interpreting results, running in-house simulations, and finalizing the results.

ABOUT THE AUTHOR

Brett Albert is a Junior Associate Economist with REMI. Since beginning at REMI in 2012, he has overseen the launch of REMI's online forecast database, eREMI, while also contributing to multiple consulting projects and serving as a technical advisor to existing REMI clients. His previous consulting work includes assessing the economic contributions of Miami to the state of Florida and gauging the regional economic competitiveness of the Greater Birmingham area. For questions about this report, he can be reached at (413) 362-8890, or via email at Brett.Albert@remi.com.

TABLE OF CONTENTS

• Regional Economic Models, Inc. (REMI).....	p. 1
• About the Author.....	p. 1
• Overview of Project.....	p. 3
• Background of Eastern States Exposition.....	p. 3
• Methodology, Inputs, and Assumptions.....	pp. 4-5
• Analysis Results.....	pp. 6-11
○ <i>Impacts on Hampden County</i>	pp. 6-7
▪ <i>Table 1: Non-farm Industry Employment</i>	p. 6
▪ <i>Table 2: Non-farm Industry Wages and Salaries</i>	p. 6
▪ <i>Table 3: Non-farm Industry Output</i>	p. 7
▪ <i>Table 4: Summary of Macroeconomic Impacts</i>	p. 7
○ <i>Impacts on Rest of New England and New York</i>	pp. 8-9
▪ <i>Table 5: Non-farm Industry Employment</i>	p. 8
▪ <i>Table 6: Non-farm Industry Wages and Salaries</i>	p. 8
▪ <i>Table 7: Non-farm Industry Output</i>	p. 9
▪ <i>Table 8: Summary of Macroeconomic Impacts</i>	p. 9
○ <i>Total Impacts, New England and New York</i>	pp. 10-11
▪ <i>Table 9: Non-farm Industry Employment</i>	p. 10
▪ <i>Table 10: Non-farm Industry Wages and Salaries</i>	p. 10
▪ <i>Table 11: Non-farm Industry Output</i>	p. 10
▪ <i>Table 12: Summary of Macroeconomic Impacts</i>	p. 11
• Appendix A: The PI ⁺ Regional Model.....	pp. 14-19
○ <i>Methodology Integration</i>	p. 14
▪ <i>Figure 1: REMI Model Linkages</i>	p. 15
▪ <i>Figure 2: Economic Geography Linkages</i>	p. 16
▪ <i>Figure 3: Trade and Commuter Flow Linkages</i>	p. 17
○ <i>REMI Model Blocks</i>	pp. 17-19
• Appendix B: PI ⁺ Employment Results, Hampden County.....	pp. 20-22
• Appendix C: PI ⁺ Wage and Salary Results, Hampden County.....	pp. 23-25
• Appendix D: PI ⁺ Output Results, Hampden County.....	pp. 26-28
• Appendix E: PI ⁺ Summary Results, Hampden County.....	p. 29
• Appendix F: PI ⁺ Employment Results, Rest of New England and New York.....	pp. 30-32
• Appendix G: PI ⁺ Wage and Salary Results, Rest of New England and New York.....	pp. 33-35
• Appendix H: PI ⁺ Output Results, Rest of New England and New York.....	pp. 36-38
• Appendix I: PI ⁺ Summary Results, Rest of New England and New York.....	p. 39
• Appendix J: PI ⁺ Employment Results, All of New England and New York (All Regions).....	pp. 40-42
• Appendix K: PI ⁺ Wage and Salary Results, All of New England and New York (All Regions).....	pp. 43-45
• Appendix L: PI ⁺ Output Results, All of New England and New York (All Regions).....	pp. 46-48
• Appendix M: PI ⁺ Summary Results, All of New England and New York (All Regions).....	p. 49
• Works Cited.....	p. 50

OVERVIEW OF PROJECT

Regional Economic Models, Inc. (REMI) constructed this comprehensive study evaluating the economic impact of the Eastern States Exposition (ESE) on Western Massachusetts and the broader New England and New York region. The analysis is primarily based on the economic activity generated by the planning and implementation of The Big E fair. Using data provided by the Eastern States Exposition, REMI economists performed a counterfactual analysis to discern the economic footprint of ESE and their related activities on Hampden County, Massachusetts, and the rest of the New England and New York. The following report shows the impact of ESE on economic indicators such as employment, gross regional product (GRP), personal income, consumer spending, and population levels.

BACKGROUND OF THE EASTERN STATES EXPOSITION

Joshua Brooks founded the Eastern States Exposition in the early 20th century in response to the decline in farming in New England and the precipitous rise in production costs. Brooks initially wanted farmers to demonstrate new agricultural techniques and share farming technology with one another. The National Dairy Show, which was the Exposition's inaugural event, opened in 1916, and the first comprehensive exposition took place in 1917.

In an effort to expand the scope beyond simply Western Massachusetts, Brooks convinced the six states of New England to create a building that would highlight each state's culture and major products. The first building to go up was the Massachusetts building, dedicated by then-Governor Calvin Coolidge in 1919. Maine was the second state to construct their building, followed by Vermont in the late 1920s, New Hampshire in the early 30s, and Connecticut in 1938. The Avenue of States was finally completed in 1957 with the Rhode Island Building.

The initial state houses, shows, and events have culminated in what is known today as The Big E. Held for 17 days every September in West Springfield, Massachusetts, The Big E is recognized as "New England's Autumn Tradition." Numerous vendors, amusement rides, concerts, and competitions accompany the headlining Eastern States Exposition Horse Show every fall. In 2012, The Big E broke its previous attendance record with over 1.3 million people attending the fair.¹

METHODOLOGY, INPUTS, AND ASSUMPTIONS

As was discussed briefly in the overview, REMI employed what is called a “counterfactual” methodology in this analysis. Put simply, a counterfactual analysis takes certain variables out of the equation (or, in this case, the REMI PI⁺ model) in order to ascertain the economic impact of said variables.

In this simulation, we focused primarily on three areas: money spent by ESE on materials and other inputs in the production of their events, capital invested by ESE on equipment and structures, and consumption spurred on by both fair and non-fair visitors. The data used for the variables came from ESE’s internal records and publicly available financial statements. Once the data was gathered, REMI economists converted ESE’s data into policy variables (PVs) that were entered into the REMI PI⁺ model.

The exact PVs used were as follows:

- \$16.59 million in Industry Sales for the Amusement, Gambling, and Recreation industry was removed and held constant from 2013 to 2060. This represented fair revenue primarily attributable to ticket sales.
- \$10.46 million in Industry Sales for the Amusement, Gambling, and Recreation industry was removed and held constant from 2013 to 2060. This represented food and beverage sales.
- \$952,380 in Industry Sales for the Amusement, Gambling, and Recreation Industry was removed and held constant from 2013 to 2060. This represented parking and camper fees.
- \$1.55 million in Non-residential Investment was removed and held constant from 2013 to 2060. This represented a five year average of capital expenditures for ESE.
- \$493,967 in Intermediate Demand for the Repair and Maintenance industry was removed; \$220,364 in Intermediate Demand for the Waste Management and Remediation Services industry was removed; \$41,680 in Intermediate Demand for the Insurance Carriers and Related Activities industry was removed. These Intermediate Demand variables represented the operations spending of ESE.
- \$872,575 in Intermediate Demand for the Repair and Maintenance industry was removed; \$19,341 in Intermediate Demand for the Utilities industry was removed. These Intermediate Demand variables represented the maintenance and repair spending of ESE.
- \$736,606 in Intermediate Demand for the Utilities industry was removed and held constant from 2013 to 2060. This represented the non-fair spending on energy by ESE.
- \$112 million in Exogenous Final Demand for various core tourist industries was removed and held constant from 2013 to 2060. This represented consumer activity outside of the fair (local restaurants, retail shops, etc.) generated by the fair.
- \$191.31 million in Exogenous Final Demand for various core tourist industries was removed and held constant from 2013 to 2060. This represented local consumer activity generated by non-fair visitors (visitors to the ESE outside of the Big E dates).
- All endogenous investment and intermediate input values from the REMI PI⁺ model were nullified and replaced with aforementioned data from the ESE.

The REMI PI⁺ model is dynamic rather than static, so the outputs generated by these inputs were reported over a time series ranging from 2013 to 2060. This proved slightly problematic because this research primarily centered on the overall economic impact of the Eastern States Exposition, not what each region in our analysis might look like year-by-year if ESE were to somehow vanish. As such, REMI took ten year averages of each variable discussed in this paper in order to convert the dynamic outputs into more of a static analysis.

All the inputs to the model were entered as negative values. Because ESE’s economic activity is already included in the baseline scenario, the negative values serve to remove its direct effects to allow the simulation to show the total contribution of ESE to the surrounding regions. While the raw results from the model were also negative,

which corresponds to the vacuum left by the removal of ESE's activity, the signs of the results were changed from negative to positive for the results reporting in order to more clearly represent the contributions of ESE. In other words, the negative results represent what is lost from removing the contributions of ESE from an economy that already includes them, while the positive results represent adding the contributions to an economy where they did not previously exist. The results are exactly identical and have only had their signs changed to more directly describe the second case above, which more obviously fits the spirit of the analysis.

It is also important to note that the opportunity cost of ESE was not included in this report. A simple example of opportunity cost is choosing to attend the Eastern States Exposition Horse Show or watch a movie elsewhere in Hampden County. The choice of one implies the loss of the other: the opportunity cost. The goal of the simulations and analyses carried out and described in this report is not to measure the effect of removing ESE from Hampden County but rather to ascertain its economic footprint. As such, the inclusion of opportunity cost would prove detrimental to the analysis because it would inaccurately portray the economic space occupied by ESE.

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ANALYSIS RESULTS

Impacts on Hampden County

Out of the two regions in our analysis, Hampden County is impacted the greatest by economic activity spurred on by ESE. Nearly 3,000 jobs within the county are supported by ESE, approximately 2,800 of which are in private non-farm industries. Table 1 details the employment in primary industries that is generated by ESE.¹

Table 1: Top non-farm industry employment in Hampden County generated by the Eastern States Exposition

Industry	Employment Impact (Jobs)
Food Services and Drinking Places	890
Amusement, Gambling, and Recreation	734
Retail Trade	440
Administrative and Support Services	241
State and Local Government	177
Performing Arts and Spectator Sports	146
Total	2,971

Beyond its impact on employment, ESE also generates millions of dollars in personal income for Hampden County residents.² ESE supports \$91.9 million of personal income for the region, \$70.7 million of which is disposable personal income.³ This accounts for 0.41% and 0.38% of Hampden County's personal income and disposable personal income, respectively. Table 2 shows the wages and salaries in primary industries within Hampden County supported by ESE.⁴

Table 2: Top non-farm industry wages and salaries in Hampden County generated by the Eastern States Exposition

Industry	Wage and Salary Impact (Millions of Fixed [2012] Dollars)
Food Services and Drinking Places	\$16.98
Amusement, Gambling, and Recreation	\$16.68
Retail Trade	\$13.73
State and Local Government	\$11.69
Administrative and Support Services	\$5.87
Construction	\$5.56
Total	\$90.91

¹ Employment comprises estimates of the number of jobs, full-time plus part-time, by place of work. Full-time and part-time jobs are counted at equal weight. Employees, sole proprietors, and active partners are included, but unpaid family workers and volunteers are not included.

² Personal income is the income received by persons from all sources. It includes income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income with inventory valuation adjustment (IVA) and capital consumption adjustment (CCAdj), rental income of persons with CCAdj, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance.

³ Disposable personal income is the total after tax-income received by persons; it is the income available to persons for spending or saving.

⁴ Wages and salaries are defined as the monetary remuneration of employees, including the compensation of corporate officers; commissions, tips, and bonuses; voluntary employee contributions to certain deferred compensation plans, such as 401(k) plans; and receipts in kind that represent income.

As can be expected, all of the economic activity in Hampden County spurred on by ESE results in a large amount of industrial and commercial output.⁵ ESE supports \$202.2 million in private non-farm output and \$20.7 million of government output; this accounts for 0.57% of private non-farm output and 0.47% of government output in Hampden County. Table 3 shows the output of the primary non-farm industries generated by ESE.

Table 3: Top non-farm industry output in Hampden County generated by the Eastern States Exposition

Industry	Output Impact (Millions of Fixed [2012] Dollars)
Food Services and Drinking Places	\$53.20
Amusement, Gambling, and Recreation	\$42.52
Retail Trade	\$35.38
State and Local Government	\$20.69
Construction	\$15.09
Administrative and Support Services	\$13.66
Total	\$222.87

The employment opportunity and compensation predicated on ESE's activity also attracts a considerable amount of people to live in Hampden County. The sheer amount of jobs simultaneously increases the employment opportunity while also increasing the demand for labor, which in turn bids up the relative compensation rate. These two variables positively impact population within the county as individuals choose to locate close to centers of economic opportunity. Overall, ESE induces 2,204 people to live in Hampden County. This figure includes all of the economic migrants who choose to locate themselves in areas of potential advancement as well as their dependents. Table 4 summarizes the macroeconomic impact of ESE on Hampden County.

Table 4: Summary of macroeconomic impacts of the Eastern States Exposition on Hampden County

Category	Impact Amount	Units
Total Employment	2,971	Jobs
Gross Regional Product ⁶	\$139.30	Millions of Fixed (2012) Dollars
Output	\$222.87	Millions of Fixed (2012) Dollars
Personal Income	\$91.93	Millions of Fixed (2012) Dollars
Disposable Personal Income	\$70.68	Millions of Fixed (2012) Dollars
Population	2,204	People

⁵ Output is the amount of production, including all intermediate goods purchased as well as value added (compensation and profit). It can also be thought of as sales or supply. The components of output are self supply and exports.

⁶ Gross Regional Product (GRP) is the market value of goods and services produced by labor and property within the region, regardless of nationality.

Impacts on the Rest of New England and New York

While Hampden County witnesses the greatest economic benefits driven by ESE, it's important to note that this economic activity does not exist in a regional vacuum. As such, the surrounding regions around Hampden County also enjoy indirect and induced economic benefits from the exposition. This section of the analysis focuses on the economic impact of ESE on the Rest of New England and New York.

Over 2,000 jobs in the region are supported by ESE, nearly 1,900 of which are in private non-farm industries. Table 5 details the employment in primary industries within the Rest of New England and New York that is supported by ESE.

Table 5: Top non-farm industry employment in the Rest of New England and New York generated by the Eastern States Exposition

Industry	Employment Impact (Jobs)
Amusement, Gambling, and Recreation	404
Retail Trade	218
Food Services and Drinking Places	191
Accommodation	174
Administrative and Support Services	164
State and Local Government	146
Total	2,005

As is the case with Hampden County, a significant amount of income in the Rest of New England and New York is also generated by ESE. \$133.95 million in regional personal income is supported by ESE, \$105.33 million of which is disposable personal income. Table 6 shows the wages and salaries in primary industries within the Rest of New England and New York that are supported by ESE.

Table 6: Top non-farm industry wages and salaries in the Rest of New England and New York generated by the Eastern States Exposition

Industry	Wage and Salary Impact (Millions of Fixed [2012] Dollars)
State and Local Government	\$11.39
Amusement, Gambling, and Recreation	\$9.03
Professional, Scientific, and Technical Services	\$8.14
Retail Trade	\$7.67
Accommodation	\$6.42
Administrative and Support Services	\$5.77
Total	\$91.36

The economic activity spurred on by ESE results in a large amount of regional industry output. ESE supports \$235.75 million in private non-farm output and \$20.63 million in government output. Table 7 details the output in primary industries within the Rest of New England and New York that is supported by ESE.

Table 7: Top non-farm industry output in the Rest of New England and New York generated by the Eastern States Exposition

Industry	Output Impact (Millions of [Fixed] 2012 Dollars)
Real Estate	\$26.25
Accommodation	\$25.38
Amusement, Gambling, and Recreation	\$23.30
State and Local Government	\$20.63
Retail Trade	\$19.79
Professional, Scientific, and Technical Services	\$16.38
Total	\$256.35

Economic migrants choose to locate in New England and New York to take advantage of the employment opportunity and compensation caused by ESE. The jobs and overall economic activity of ESE increases the employment opportunity and bids up the demand for labor. In turn, these variables put positive pressure on population within the region as individuals choose to locate close to centers of economic opportunity. ESE induces approximately 1,400 people to live in the Rest of New England and New York. This figure includes all of the economic migrants that choose to locate themselves in areas of potential advancement as well as their dependents. Table 8 summarizes the overall macroeconomic impact of ESE on the Rest of New England and New York.

Table 8: Summary of macroeconomic impacts of the Eastern States Exposition on the Rest of New England and New York

Category	Impact Amount	Units
Total Employment	2,005	Jobs
Gross Regional Product	\$160.53	Millions of Fixed (2012) Dollars
Output	\$256.35	Millions of Fixed (2012) Dollars
Personal Income	\$133.95	Millions of Fixed (2012) Dollars
Disposable Personal Income	\$105.33	Millions of Fixed (2012) Dollars
Population	1,410	People

Total Impacts, All of New England and New York

As a whole, all of New England and New York is positively impacted by ESE. Nearly 5,000 jobs within the region are supported by ESE, approximately 4,600 of which are in private non-farm industries. Table 9 details the employment in primary industries supported by ESE.

Table 9: Top non-farm industry employment in New England and New York generated by the Eastern States Exposition

Industry	Employment Impact (Jobs)
Amusement, Gambling, and Recreation	1,138
Food Services and Drinking Places	1,081
Retail Trade	658
Administrative and Support Services	405
State and Local Government	323
Performing Arts and Spectator Sports	239
Total	4,977

In addition to employment, ESE generates hundreds of millions of dollars in personal income for New England and New York residents. ESE creates \$225.91 million in personal income and \$176.01 million in disposable personal income for the region. Table 10 shows the wages and salaries in primary industries within the region that are supported by ESE's economic activity.

Table 10: Top non-farm industry wages and salaries generated by the Eastern States Exposition

Industry	Wage and Salary Impact (Millions of Fixed [2012] Dollars)
Amusement, Gambling, and Recreation	\$25.71
State and Local Government	\$23.08
Food Services and Drinking Places	\$21.78
Retail Trade	\$21.39
Administrative and Support Services	\$11.64
Construction	\$10.49
Total	\$182.26

New England and New York enjoy quite a bit of industrial and commercial output generated by the economic activity of ESE. The exposition supports \$437.90 million in private non-farm output and \$41.32 million in government output. Table 11 details the output in primary industries within the region generated by ESE.

Industry	Output Impact (Millions of Fixed [2012] Dollars)
Food Services and Drinking Places	\$68.61
Amusement, Gambling, and Recreation	\$65.81
Retail Trade	\$55.18
State and Local Government	\$41.32
Accommodation	\$32.88
Real Estate	\$29.89
Total	\$479.23

Economic migrants choose to locate in New England and New York to take advantage of the employment opportunity and compensation caused by ESE. The jobs and overall economic activity of ESE increases the employment opportunity and bids up the demand for labor. In turn, these variables put positive pressure on population within the region as individuals choose to locate close to centers of economic opportunity. ESE induces approximately 3,600 people to live in New England and New York. This figure includes all of the economic migrants that choose to locate themselves in areas of potential advancement as well as their dependents. Table 12 summarizes the overall macroeconomic impact of ESE on New England and New York.

Table 12: Summary of macroeconomic impacts of the Eastern States Exposition on New England and New York

Category	Impact Amount	Units
Total Employment	4,977	Jobs
Gross Regional Product	\$299.76	Millions of Fixed (2012) Dollars
Output	\$479.23	Millions of Fixed (2012) Dollars
Personal Income	\$225.91	Millions of Fixed (2012) Dollars
Disposable Personal Income	\$176.01	Millions of Fixed (2012) Dollars
Population	3,614	People

EASTERN STATES EXPOSITION CONTRIBUTIONS

On top of typical exposition payments to the town of West Springfield, ESE also donates a sizable portion of their annual revenue to The Big E/West Springfield Trust Fund. In 2012, ESE donated \$200,431 to the fund, which represents its largest contribution to date. This figure totals 1% of the organization's gross revenues for 2012.

Including 2012's gift, ESE contributions since the fund's inception in 1994 now total \$2,882,365. West Springfield Mayor Gregory C. Neffinger, ESE Chairman of the Board Donald R. Chase, and Attorney Mary Paier Powers comprise the trustees of the fund. Each year, the trustees appropriate a portion of the donation to agencies benefiting education and aiding youth and elderly members of the community, while leaving the remainder to accrue.

Funds donated to The Big E/West Springfield Trust resulted in the allocation of \$42,521.78 in grants in 2012. Recipients included:

- Grateful Citizens for the Appreciation of Veterans—Annual Veterans' Appreciation Luncheon
- Memorial School—Lego Robotics Construction/Software
- Mittineague Elementary School—Purchase of a New Slide
- St. Thomas School—Apple iPad Learning Lab and 20 iPads
- Springfield Symphony Orchestra Music Education Program
- West Springfield High School—Girls Basketball Uniforms
- West Springfield High School Science Department—Waders, Soil Test Kit, and Lab Supplies
- West Springfield High School—GED Assistance
- West Springfield Park & Rec—Garden Club for a 12' by 16' Shed
- West Springfield Park & Rec—Sponsoring/Reimbursing Youth Sports
- West Springfield Youth—Cheerleading Uniforms
- West Springfield Youth—Lacrosse Association Team Bags, First Aid Supplies, Painting Machine, and 12 Cases of Paint

Exposition payments to West Springfield in 2012 exceeded \$1.3 million including taxes, fire and police protection, and licenses and fees.

2012	
Real Estate Taxes	\$410,229
Police Protection and Training	\$346,346
Fire Protection and Ambulance Service	\$261,643
Water and Sewer Fees	\$103,077
Licenses and Fees	\$37,953
Inspectors	\$21,214
Excise Taxes	\$840
2012 Big E/W. Springfield Trust Fund Donation	\$184,089
Total Payments to West Springfield	\$1,365,392

In 2012, the exposition waived rental and parking fees for agricultural shows as well as special events, such as West Springfield High School's graduation and the town's Summer Concert Series on Storowton Village Green. Town residents also receive free parking for year-round events.

In-kind services and donations include providing Big E admission for all town students on West Springfield Day, which amounts to a value of \$51,000. Additionally, ESE loans and transports its ticket booths to the town for use by the Rotary Club and Town of West Springfield at West Side's Taste of the Valley each June and provides sponsorship and marketing support.

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APPENDIX A

The PI⁺ Regional Model

REMI used a 70-sector PI⁺ model of two regions—Hampden County and the Rest of New England plus New York—for this study. PI⁺ includes four different quantitative measures in its framework, and this allows them to highlight each other's strengths and compliment their weaknesses. The four methodologies in the model include the following:

1. **Input/output tabulation** – Sometimes referred to as I/O modeling, input-output looks for the transactions between industries and households in the economy. This includes the flow of goods from firm-to-firm through their supply chains, to final sales to households, and then wages paid and spent by individuals and families. The data for the table comes from the Bureau of Labor Statistics,ⁱⁱ and the theoretical foundation comes from work by Nobel laureate Wassily Leontief.
2. **Econometrics** – The REMI model includes statistical parameters for behavioral patterns and responses inside of the economy. These includes elasticity to price and wealth, the response of households and businesses to changes in prices and wages, and the “rate of adjustment” from a shock to a new stability inside of the economy.ⁱⁱⁱ Markets take time to “clear,” returning to relative stability of prices and quantity and a balance between supply and demand, after a shock, which we include in the model's adjustments from year-to-year before an eventual result in the model's structure.
3. **Computable General Equilibrium** – Known as a CGE model, REMI PI⁺ is unique for including the characteristics of I/O and CGE models together. CGE modeling adds market-level concepts and the principles of equilibrium economics. These include markets for labor, as well as housing and consumer goods, composite inputs for firms, and market shares for local industry.
4. **New Economic Geography** – This includes concepts of agglomeration, labor pooling, and economies of scale to the model. Labor-intensive industries, such as healthcare or professional services, tend to cluster in urban centers with an educated labor force with specializations in their exact areas. The same is true on goods-producing industries, which tend to locate themselves near customers, input suppliers, transport hubs, and other “environmental” factors that help them lower their costs or increase productivity. Our model includes these concepts endogenously, adjusting for clusters by region.

The research behind PI⁺ is public and often appeared in peer-reviewed journals. These publications include the *Journal of Regional Science*, the *American Economic Review*, and the *Review of Economics and Statistics*.^{iv} Save small exception, REMI only uses data from public data sources when populating the data and parameters in the model. Baseline data comes from the Bureau of Labor Statistics (BEA), BLS, U.S. Census Bureau, and the Energy Information Administration (EIA) at the United States Departments of Commerce and Energy.^v The one exception to the federal sources is a short-term, business cycle forecast incorporated from the University of Michigan's Research Seminar in Quantitative Economics (RSQE).^{vi} This, combined with a decade out industry-level outlook from the BLS, drives national growth in industries and the labor force. This works with county-level data on local industry mixes, wages, and demography to give the models a customized-sub-national geography with unique responses for different regions to outside shocks, including in Florida.

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 1 and 2.

Figure 1: REMI Model Linkages

REMI Model Linkages (Excluding Economic Geography Linkages)

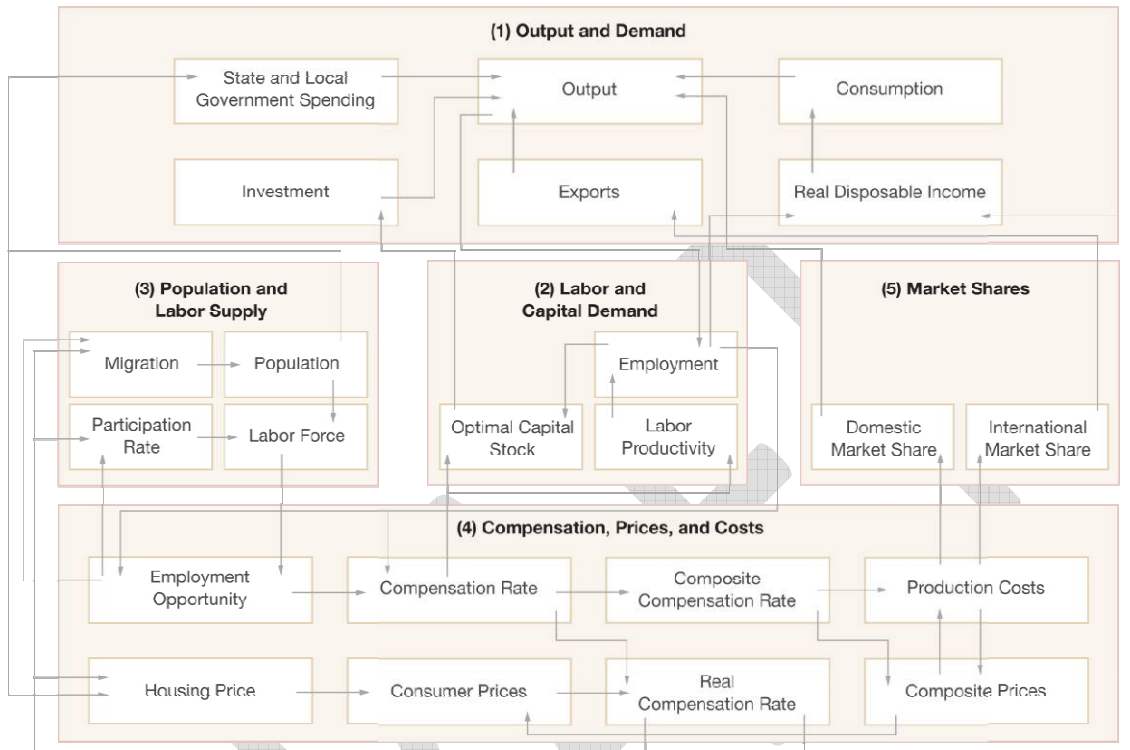
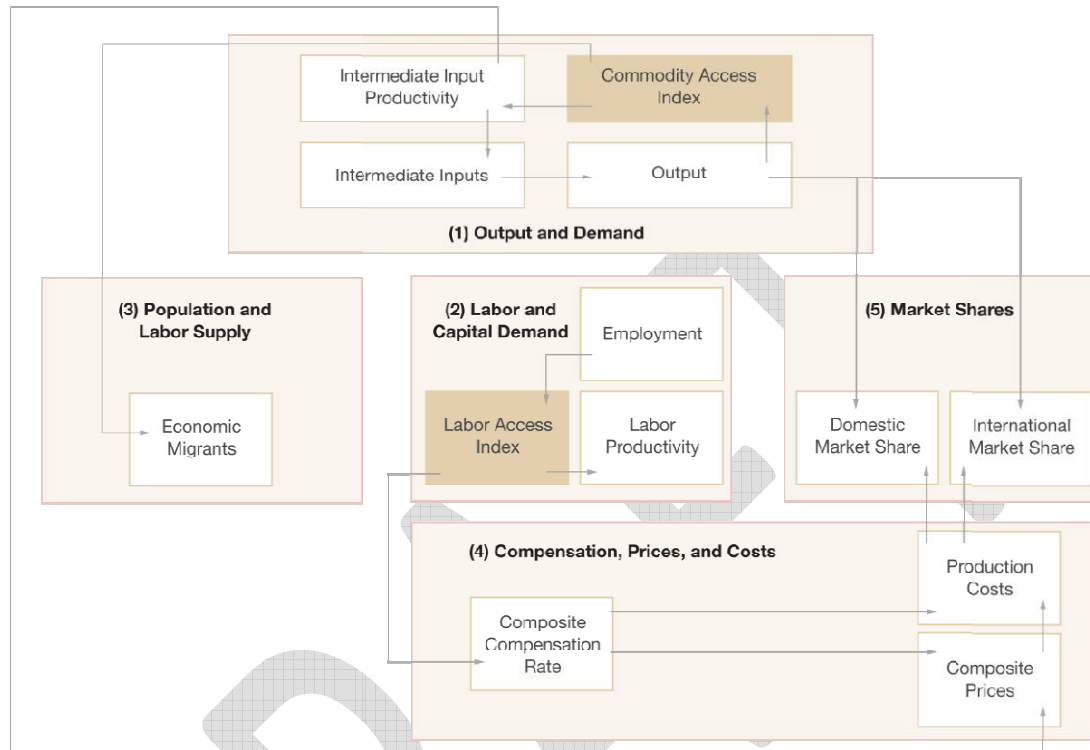


Figure 2: Economic Geography Linkages

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.

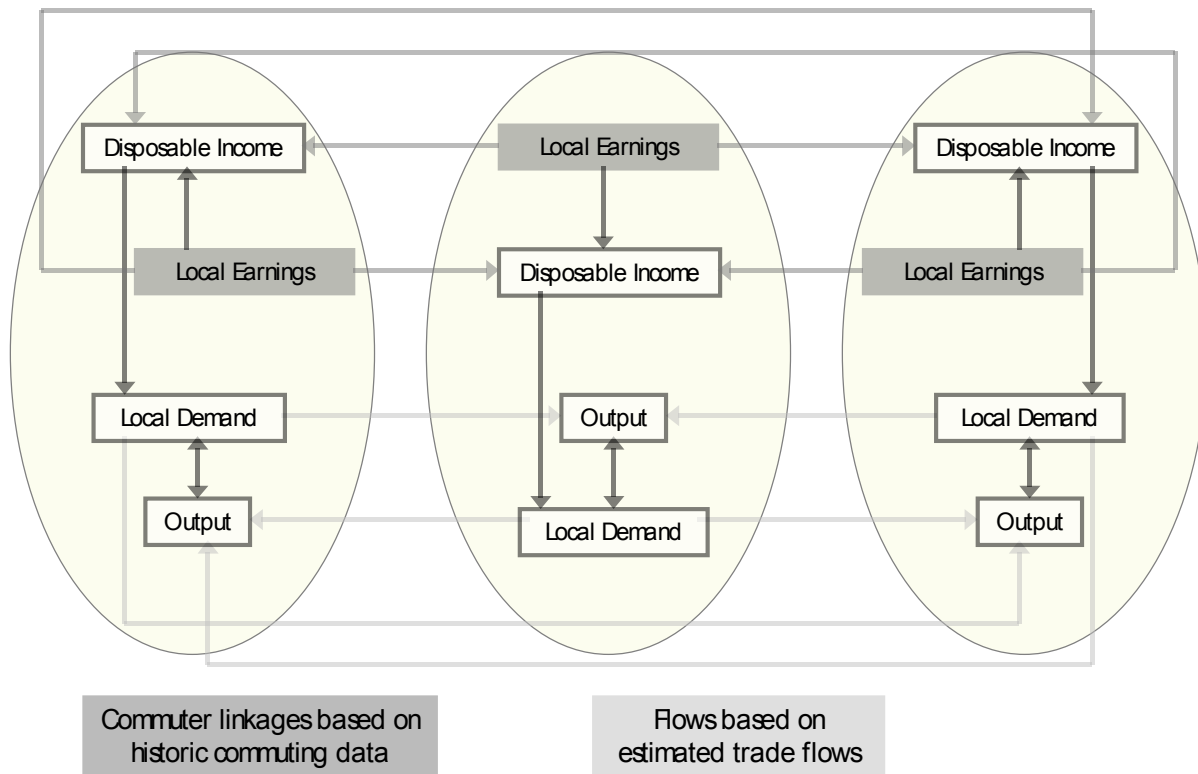
Models can be built as single region, multi-region, or multi-region national models. A region is defined broadly as a sub-national area, and could consist of a state, province, county, or city, or any combination of sub-national areas.

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 3.

Figure 3: 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.

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APPENDIX B: ESE'S EMPLOYMENT IMPACT ON HAMPDEN COUNTY

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Food services and drinking places	Thousands (Jobs)	0.953	0.942	0.929	0.915	0.900	0.884	0.868	0.853	0.836	0.820	0.890
Amusement, gambling, and recreation	Thousands (Jobs)	0.751	0.747	0.744	0.741	0.737	0.732	0.728	0.724	0.719	0.713	0.734
Retail trade	Thousands (Jobs)	0.491	0.485	0.474	0.461	0.448	0.434	0.420	0.407	0.394	0.382	0.440
Administrative and support services	Thousands (Jobs)	0.272	0.266	0.259	0.251	0.244	0.236	0.229	0.223	0.217	0.212	0.241
Performing arts and spectator sports	Thousands (Jobs)	0.158	0.155	0.153	0.150	0.147	0.144	0.141	0.139	0.136	0.133	0.146
Construction	Thousands (Jobs)	0.099	0.132	0.145	0.147	0.142	0.134	0.124	0.115	0.106	0.098	0.124
Repair and maintenance	Thousands (Jobs)	0.071	0.070	0.070	0.068	0.067	0.066	0.065	0.063	0.062	0.061	0.066
Accommodation	Thousands (Jobs)	0.069	0.067	0.066	0.064	0.062	0.060	0.059	0.057	0.056	0.054	0.061
Transit and ground passenger transportation	Thousands (Jobs)	0.033	0.032	0.031	0.030	0.028	0.027	0.026	0.025	0.025	0.024	0.028
Ambulatory health care services	Thousands (Jobs)	0.022	0.016	0.010	0.004	-0.001	-0.005	-0.008	-0.011	-0.012	-0.012	0.000
Professional, scientific, and technical services	Thousands (Jobs)	0.020	0.019	0.016	0.013	0.009	0.006	0.004	0.002	0.000	0.000	0.009
Wholesale trade	Thousands (Jobs)	0.020	0.021	0.021	0.020	0.019	0.019	0.018	0.017	0.016	0.016	0.019
Real estate	Thousands (Jobs)	0.019	0.019	0.017	0.014	0.010	0.007	0.003	0.000	-0.002	-0.005	0.008
Rental and leasing services	Thousands (Jobs)	0.013	0.013	0.012	0.012	0.011	0.011	0.011	0.010	0.010	0.010	0.011
Personal and laundry services	Thousands (Jobs)	0.010	0.008	0.006	0.005	0.003	0.002	0.001	0.000	0.000	-0.001	0.003
Hospitals	Thousands (Jobs)	0.007	0.007	0.006	0.004	0.003	0.002	0.002	0.002	0.002	0.003	0.004
Nursing and residential care facilities	Thousands (Jobs)	0.005	0.005	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.003	0.004
Membership associations and organizations	Thousands (Jobs)	0.005	0.005	0.004	0.004	0.003	0.002	0.001	0.001	0.001	0.001	0.003
Educational services	Thousands (Jobs)	0.004	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Utilities	Thousands (Jobs)	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.003
Waste management and remediation services	Thousands (Jobs)	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Printing and related support activities	Thousands (Jobs)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.002
Fabricated metal product manufacturing	Thousands (Jobs)	0.002	0.002	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.001
Private households	Thousands (Jobs)	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	-0.001	0.001
Financial Services	Thousands (Jobs)	0.002	0.001	0.001	0.000	0.000	-0.001	-0.001	-0.001	-0.002	-0.002	0.000
Social assistance	Thousands (Jobs)	0.001	0.002	0.002	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.003
Insurance carriers and related activities	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001

Scenic and sightseeing transportation	Thousands (Jobs)	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	-0.001	0.000
Paper manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Publishing industries, except Internet	Thousands (Jobs)	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Truck transportation	Thousands (Jobs)	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	-0.001	-0.001	0.000
Plastics and rubber product manufacturing	Thousands (Jobs)	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Telecommunications	Thousands (Jobs)	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Management of companies and enterprises	Thousands (Jobs)	0.001	0.000	-0.001	-0.003	-0.003	-0.004	-0.005	-0.005	-0.005	-0.005	-0.006	-0.003
Broadcasting, except Internet	Thousands (Jobs)	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nonmetallic mineral product manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Couriers and messengers	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Wood product manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Museums, historical sites, zoos, and parks	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Food manufacturing	Thousands (Jobs)	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002	-0.002	-0.001
Internet publishing and other information services	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Miscellaneous manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Machinery manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Forestry and logging; Fishing, hunting, and trapping	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Motor vehicles, bodies and trailers, and parts manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Agriculture and forestry support activities	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Chemical manufacturing	Thousands (Jobs)	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
Computer and electronic product manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Electrical equipment and appliance manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Apparel, Leather and allied product manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Furniture and related product manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Petroleum and coal products manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Rail transportation	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Support activities for mining	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Beverage and tobacco product manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mining (except oil and gas)	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Air transportation	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Oil and gas extraction	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water transportation	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pipeline transportation	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Motion picture and sound recording industries	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.001	0.000	0.000
Primary metal manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Textile mills; Textile product mills	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other transportation equipment manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Warehousing and storage	Thousands (Jobs)	0.000	0.000	-0.001	-0.001	-0.001	-0.001	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001
Securities, commodity contracts, investments	Thousands (Jobs)	0.000	-0.002	-0.004	-0.007	-0.009	-0.011	-0.012	-0.014	-0.015	-0.015	-0.009	-0.009

APPENDIX C: ESE'S WAGE AND SALARY IMPACT ON HAMPDEN COUNTY

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Amusement, gambling, and recreation	Millions of Fixed (2012) Dollars	16.923	16.878	16.817	16.749	16.678	16.606	16.538	16.475	16.535	16.591	16.679
Food services and drinking places	Millions of Fixed (2012) Dollars	16.286	16.702	16.953	17.089	17.146	17.148	17.118	17.065	17.123	17.167	16.980
Retail trade	Millions of Fixed (2012) Dollars	12.915	13.563	13.905	14.039	14.045	13.967	13.845	13.702	13.667	13.631	13.728
Administrative and support services	Millions of Fixed (2012) Dollars	5.965	6.060	6.071	6.029	5.958	5.872	5.783	5.697	5.661	5.630	5.873
Construction	Millions of Fixed (2012) Dollars	3.995	5.507	6.210	6.418	6.339	6.093	5.765	5.406	5.097	4.808	5.564
Accommodation	Millions of Fixed (2012) Dollars	1.915	1.923	1.915	1.900	1.880	1.858	1.837	1.817	1.811	1.806	1.866
Ambulatory health care services	Millions of Fixed (2012) Dollars	1.810	1.985	1.972	1.835	1.644	1.429	1.215	1.021	0.871	0.748	1.453
Repair and maintenance	Millions of Fixed (2012) Dollars	1.806	1.860	1.885	1.890	1.884	1.871	1.855	1.838	1.836	1.834	1.856
Wholesale trade	Millions of Fixed (2012) Dollars	1.543	1.864	2.042	2.120	2.133	2.104	2.050	1.983	1.928	1.876	1.964
Professional, scientific, and technical services	Millions of Fixed (2012) Dollars	1.235	1.450	1.500	1.448	1.340	1.207	1.069	0.940	0.833	0.744	1.177
Performing arts and spectator sports	Millions of Fixed (2012) Dollars	1.210	1.237	1.253	1.262	1.266	1.267	1.268	1.267	1.274	1.281	1.259
Hospitals	Millions of Fixed (2012) Dollars	1.016	1.372	1.512	1.523	1.468	1.380	1.286	1.197	1.136	1.089	1.298
Transit and ground passenger transportation	Millions of Fixed (2012) Dollars	0.876	0.899	0.900	0.888	0.868	0.844	0.819	0.795	0.779	0.764	0.843
Rental and leasing services	Millions of Fixed (2012) Dollars	0.588	0.609	0.620	0.623	0.621	0.615	0.608	0.599	0.596	0.592	0.607
Insurance carriers and related activities	Millions of Fixed (2012) Dollars	0.546	0.835	0.998	1.071	1.082	1.053	1.001	0.937	0.875	0.811	0.921
Nursing and residential care facilities	Millions of Fixed (2012) Dollars	0.420	0.601	0.703	0.752	0.770	0.767	0.755	0.738	0.729	0.722	0.696
Fabricated metal product manufacturing	Millions of Fixed (2012) Dollars	0.403	0.561	0.636	0.654	0.637	0.598	0.549	0.495	0.444	0.396	0.537
Educational services	Millions of Fixed (2012) Dollars	0.392	0.582	0.685	0.730	0.738	0.724	0.698	0.667	0.640	0.614	0.647
Utilities	Millions of Fixed (2012) Dollars	0.376	0.454	0.499	0.518	0.520	0.511	0.495	0.476	0.458	0.440	0.475
Membership associations and organizations	Millions of Fixed (2012) Dollars	0.328	0.455	0.521	0.546	0.546	0.532	0.511	0.487	0.470	0.454	0.485
Management of companies and enterprises	Millions of Fixed (2012) Dollars	0.301	0.384	0.391	0.350	0.281	0.199	0.113	0.029	-0.046	-0.113	0.189
Real estate	Millions of Fixed (2012) Dollars	0.278	0.336	0.354	0.345	0.321	0.288	0.251	0.214	0.182	0.151	0.272
Financial Services	Millions of Fixed (2012) Dollars	0.244	0.301	0.316	0.304	0.277	0.242	0.204	0.167	0.135	0.105	0.230
Personal and laundry services	Millions of Fixed (2012) Dollars	0.233	0.244	0.240	0.224	0.204	0.183	0.161	0.141	0.126	0.113	0.187
Social assistance	Millions of Fixed (2012) Dollars	0.212	0.350	0.443	0.502	0.536	0.553	0.557	0.554	0.549	0.542	0.480
Securities, commodity contracts, investments	Millions of Fixed (2012) Dollars	0.184	0.237	0.225	0.172	0.096	0.010	-0.080	-0.165	-0.245	-0.315	0.012
Printing and related support activities	Millions of Fixed (2012) Dollars	0.169	0.207	0.226	0.232	0.229	0.220	0.209	0.197	0.186	0.176	0.205

Waste management and remediation services	Millions of Fixed (2012) Dollars	0.165	0.183	0.191	0.192	0.190	0.185	0.178	0.172	0.167	0.162	0.179
Paper manufacturing	Millions of Fixed (2012) Dollars	0.155	0.217	0.248	0.259	0.256	0.245	0.229	0.211	0.193	0.175	0.219
Machinery manufacturing	Millions of Fixed (2012) Dollars	0.127	0.197	0.234	0.248	0.246	0.235	0.218	0.200	0.182	0.164	0.205
Publishing industries, except Internet	Millions of Fixed (2012) Dollars	0.119	0.158	0.174	0.177	0.172	0.161	0.149	0.137	0.127	0.118	0.149
Truck transportation	Millions of Fixed (2012) Dollars	0.118	0.175	0.206	0.220	0.221	0.215	0.204	0.190	0.177	0.164	0.189
Food manufacturing	Millions of Fixed (2012) Dollars	0.108	0.161	0.188	0.195	0.191	0.181	0.166	0.150	0.135	0.121	0.160
Telecommunications	Millions of Fixed (2012) Dollars	0.100	0.141	0.164	0.173	0.173	0.167	0.157	0.146	0.135	0.125	0.148
Miscellaneous manufacturing	Millions of Fixed (2012) Dollars	0.097	0.146	0.171	0.179	0.176	0.166	0.153	0.139	0.126	0.114	0.147
Plastics and rubber product manufacturing	Millions of Fixed (2012) Dollars	0.089	0.118	0.131	0.133	0.128	0.119	0.108	0.096	0.084	0.073	0.108
Scenic and sightseeing transportation	Millions of Fixed (2012) Dollars	0.071	0.085	0.090	0.090	0.086	0.079	0.071	0.063	0.055	0.048	0.074
Computer and electronic product manufacturing	Millions of Fixed (2012) Dollars	0.065	0.096	0.108	0.108	0.099	0.086	0.071	0.055	0.040	0.026	0.075
Chemical manufacturing	Millions of Fixed (2012) Dollars	0.058	0.080	0.085	0.079	0.068	0.055	0.040	0.026	0.014	0.002	0.051
Broadcasting, except Internet	Millions of Fixed (2012) Dollars	0.054	0.069	0.077	0.078	0.077	0.073	0.068	0.063	0.057	0.052	0.067
Couriers and messengers	Millions of Fixed (2012) Dollars	0.046	0.069	0.082	0.089	0.091	0.090	0.087	0.083	0.078	0.073	0.079
Nonmetallic mineral product manufacturing	Millions of Fixed (2012) Dollars	0.040	0.053	0.059	0.061	0.060	0.058	0.054	0.050	0.046	0.042	0.052
Warehousing and storage	Millions of Fixed (2012) Dollars	0.027	0.037	0.037	0.032	0.023	0.014	0.003	-0.007	-0.016	-0.024	0.013
Other transportation equipment manufacturing	Millions of Fixed (2012) Dollars	0.026	0.041	0.049	0.051	0.050	0.046	0.042	0.037	0.032	0.027	0.040
Wood product manufacturing	Millions of Fixed (2012) Dollars	0.020	0.027	0.030	0.031	0.030	0.028	0.026	0.024	0.022	0.020	0.026
Internet publishing and other information services	Millions of Fixed (2012) Dollars	0.018	0.022	0.024	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.024
Motion picture and sound recording industries	Millions of Fixed (2012) Dollars	0.017	0.026	0.031	0.033	0.034	0.033	0.032	0.030	0.028	0.027	0.029
Private households	Millions of Fixed (2012) Dollars	0.017	0.016	0.014	0.011	0.009	0.006	0.004	0.002	0.001	-0.001	0.008
Furniture and related product manufacturing	Millions of Fixed (2012) Dollars	0.016	0.022	0.024	0.023	0.020	0.016	0.013	0.009	0.006	0.003	0.015
Primary metal manufacturing	Millions of Fixed (2012) Dollars	0.016	0.023	0.026	0.026	0.024	0.021	0.018	0.014	0.010	0.007	0.019
Rail transportation	Millions of Fixed (2012) Dollars	0.015	0.023	0.027	0.029	0.028	0.027	0.025	0.022	0.020	0.018	0.023
Electrical equipment and appliance manufacturing	Millions of Fixed (2012) Dollars	0.012	0.018	0.019	0.019	0.017	0.015	0.013	0.010	0.008	0.005	0.014
Museums, historical sites, zoos, and parks	Millions of Fixed (2012) Dollars	0.012	0.017	0.020	0.022	0.024	0.024	0.025	0.025	0.026	0.026	0.022
Motor vehicles, bodies and trailers, and parts manufacturing	Millions of Fixed (2012) Dollars	0.012	0.017	0.019	0.020	0.019	0.019	0.018	0.016	0.015	0.015	0.017
Textile mills; Textile product mills	Millions of Fixed (2012) Dollars	0.011	0.016	0.019	0.019	0.018	0.017	0.015	0.013	0.011	0.009	0.015
Mining (except oil and gas)	Millions of Fixed (2012) Dollars	0.006	0.010	0.012	0.014	0.015	0.015	0.015	0.014	0.013	0.013	0.013
Forestry and logging; Fishing, hunting, and trapping	Millions of Fixed (2012) Dollars	0.004	0.005	0.005	0.005	0.004	0.003	0.002	0.002	0.001	0.000	0.003

Agriculture and forestry support activities	Millions of Fixed (2012) Dollars	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.004
Petroleum and coal products manufacturing	Millions of Fixed (2012) Dollars	0.002	0.003	0.004	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.005
Apparel, Leather and allied product manufacturing	Millions of Fixed (2012) Dollars	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Pipeline transportation	Millions of Fixed (2012) Dollars	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Air transportation	Millions of Fixed (2012) Dollars	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.001
Beverage and tobacco product manufacturing	Millions of Fixed (2012) Dollars	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.001
Support activities for mining	Millions of Fixed (2012) Dollars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oil and gas extraction	Millions of Fixed (2012) Dollars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water transportation	Millions of Fixed (2012) Dollars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

APPENDIX D: ESE'S OUTPUT IMPACT ON HAMPDEN COUNTY

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Food services and drinking places	Millions of Fixed (2012) Dollars	53.250	53.405	53.438	53.398	53.322	53.228	53.125	53.023	52.935	52.859	53.198
Amusement, gambling, and recreation	Millions of Fixed (2012) Dollars	42.629	42.618	42.593	42.561	42.528	42.497	42.468	42.442	42.421	42.402	42.516
Retail trade	Millions of Fixed (2012) Dollars	35.491	35.884	35.958	35.838	35.641	35.408	35.171	34.960	34.804	34.691	35.385
Administrative and support services	Millions of Fixed (2012) Dollars	14.506	14.375	14.174	13.944	13.714	13.501	13.310	13.149	13.023	12.926	13.662
Construction	Millions of Fixed (2012) Dollars	11.420	15.395	17.115	17.498	17.132	16.363	15.409	14.410	13.485	12.657	15.088
Accommodation	Millions of Fixed (2012) Dollars	7.829	7.771	7.692	7.604	7.518	7.438	7.368	7.308	7.256	7.211	7.500
Repair and maintenance	Millions of Fixed (2012) Dollars	7.810	7.838	7.817	7.768	7.710	7.652	7.599	7.554	7.518	7.494	7.676
Rental and leasing services	Millions of Fixed (2012) Dollars	7.676	7.713	7.700	7.658	7.603	7.543	7.482	7.425	7.395	7.374	7.557
Real estate	Millions of Fixed (2012) Dollars	7.248	7.426	6.853	5.820	4.579	3.273	1.988	0.792	-0.272	-1.209	3.650
Performing arts and spectator sports	Millions of Fixed (2012) Dollars	4.480	4.508	4.525	4.534	4.540	4.543	4.545	4.546	4.545	4.545	4.531
Wholesale trade	Millions of Fixed (2012) Dollars	3.986	4.220	4.310	4.311	4.274	4.216	4.150	4.091	4.043	4.016	4.162
Utilities	Millions of Fixed (2012) Dollars	2.556	2.602	2.558	2.463	2.346	2.225	2.108	2.001	1.914	1.842	2.262
Ambulatory health care services	Millions of Fixed (2012) Dollars	2.511	1.835	1.166	0.531	-0.009	-0.454	-0.804	-1.054	-1.204	-1.280	0.124
Professional, scientific, and technical services	Millions of Fixed (2012) Dollars	2.344	2.222	1.930	1.565	1.194	0.854	0.565	0.336	0.172	0.068	1.125
Transit and ground passenger transportation	Millions of Fixed (2012) Dollars	2.327	2.283	2.223	2.157	2.091	2.031	1.978	1.932	1.895	1.866	2.078
Hospitals	Millions of Fixed (2012) Dollars	0.996	0.972	0.823	0.640	0.480	0.364	0.299	0.284	0.326	0.407	0.559
Fabricated metal product manufacturing	Millions of Fixed (2012) Dollars	0.751	0.778	0.737	0.660	0.571	0.482	0.399	0.327	0.273	0.234	0.521
Financial Services	Millions of Fixed (2012) Dollars	0.750	0.675	0.554	0.410	0.263	0.122	-0.008	-0.124	-0.217	-0.295	0.213
Personal and laundry services	Millions of Fixed (2012) Dollars	0.655	0.551	0.447	0.344	0.253	0.173	0.106	0.053	0.012	-0.017	0.258
Waste management and remediation services	Millions of Fixed (2012) Dollars	0.607	0.613	0.603	0.585	0.565	0.544	0.525	0.509	0.494	0.482	0.553
Printing and related support activities	Millions of Fixed (2012) Dollars	0.434	0.432	0.422	0.409	0.394	0.381	0.369	0.360	0.352	0.345	0.390
Nursing and residential care facilities	Millions of Fixed (2012) Dollars	0.379	0.401	0.385	0.352	0.319	0.291	0.271	0.262	0.268	0.284	0.321
Insurance carriers and related activities	Millions of Fixed (2012) Dollars	0.357	0.304	0.231	0.150	0.074	0.005	-0.053	-0.099	-0.132	-0.154	0.068
Paper manufacturing	Millions of Fixed (2012) Dollars	0.355	0.347	0.326	0.301	0.274	0.249	0.227	0.208	0.193	0.181	0.266
Telecommunications	Millions of Fixed (2012) Dollars	0.330	0.283	0.203	0.107	0.009	-0.086	-0.172	-0.248	-0.311	-0.363	-0.025
Membership associations and organizations	Millions of Fixed (2012) Dollars	0.312	0.324	0.299	0.256	0.208	0.163	0.123	0.091	0.072	0.062	0.191
Educational services	Millions of Fixed (2012) Dollars	0.294	0.363	0.396	0.409	0.413	0.412	0.412	0.413	0.419	0.428	0.396

Publishing industries, except Internet	Millions of Fixed (2012) Dollars	0.283	0.278	0.256	0.226	0.196	0.168	0.145	0.129	0.120	0.119	0.192
Plastics and rubber product manufacturing	Millions of Fixed (2012) Dollars	0.235	0.222	0.194	0.159	0.122	0.087	0.055	0.028	0.005	-0.013	0.109
Truck transportation	Millions of Fixed (2012) Dollars	0.141	0.133	0.114	0.090	0.067	0.044	0.025	0.008	-0.003	-0.011	0.061
Broadcasting, except Internet	Millions of Fixed (2012) Dollars	0.139	0.115	0.085	0.052	0.020	-0.010	-0.037	-0.060	-0.081	-0.099	0.012
Nonmetallic mineral product manufacturing	Millions of Fixed (2012) Dollars	0.126	0.139	0.139	0.131	0.120	0.107	0.095	0.084	0.073	0.065	0.108
Scenic and sightseeing transportation	Millions of Fixed (2012) Dollars	0.121	0.103	0.081	0.056	0.032	0.007	-0.015	-0.036	-0.054	-0.069	0.023
Food manufacturing	Millions of Fixed (2012) Dollars	0.119	0.046	-0.042	-0.131	-0.214	-0.287	-0.347	-0.397	-0.434	-0.462	-0.215
Management of companies and enterprises	Millions of Fixed (2012) Dollars	0.105	-0.071	-0.280	-0.497	-0.704	-0.892	-1.055	-1.194	-1.297	-1.374	-0.726
Wood product manufacturing	Millions of Fixed (2012) Dollars	0.079	0.087	0.086	0.080	0.072	0.063	0.054	0.046	0.039	0.033	0.064
Internet publishing and other information services	Millions of Fixed (2012) Dollars	0.072	0.080	0.086	0.090	0.093	0.095	0.098	0.101	0.104	0.107	0.093
Social assistance	Millions of Fixed (2012) Dollars	0.069	0.093	0.112	0.127	0.141	0.153	0.164	0.174	0.184	0.194	0.141
Miscellaneous manufacturing	Millions of Fixed (2012) Dollars	0.064	0.042	0.012	-0.020	-0.051	-0.079	-0.103	-0.123	-0.138	-0.148	-0.054
Motor vehicles, bodies and trailers, and parts manufacturing	Millions of Fixed (2012) Dollars	0.061	0.067	0.071	0.072	0.072	0.071	0.070	0.068	0.069	0.070	0.069
Machinery manufacturing	Millions of Fixed (2012) Dollars	0.059	0.062	0.052	0.038	0.021	0.005	-0.010	-0.022	-0.028	-0.031	0.015
Petroleum and coal products manufacturing	Millions of Fixed (2012) Dollars	0.050	0.051	0.048	0.044	0.038	0.033	0.029	0.025	0.022	0.019	0.036
Chemical manufacturing	Millions of Fixed (2012) Dollars	0.044	-0.061	-0.186	-0.313	-0.432	-0.537	-0.625	-0.695	-0.747	-0.783	-0.434
Couriers and messengers	Millions of Fixed (2012) Dollars	0.044	0.036	0.025	0.013	0.002	-0.009	-0.019	-0.027	-0.034	-0.039	-0.001
Museums, historical sites, zoos, and parks	Millions of Fixed (2012) Dollars	0.032	0.039	0.043	0.046	0.048	0.050	0.051	0.052	0.054	0.056	0.047
Forestry and logging; Fishing, hunting, and trapping	Millions of Fixed (2012) Dollars	0.020	0.014	0.008	0.001	-0.006	-0.013	-0.019	-0.024	-0.028	-0.031	-0.008
Computer and electronic product manufacturing	Millions of Fixed (2012) Dollars	0.019	-0.016	-0.062	-0.112	-0.160	-0.205	-0.244	-0.276	-0.301	-0.320	-0.168
Private households	Millions of Fixed (2012) Dollars	0.015	0.012	0.009	0.005	0.003	0.000	-0.001	-0.003	-0.004	-0.005	0.003
Electrical equipment and appliance manufacturing	Millions of Fixed (2012) Dollars	0.014	0.007	-0.004	-0.015	-0.027	-0.038	-0.047	-0.054	-0.059	-0.062	-0.029
Furniture and related product manufacturing	Millions of Fixed (2012) Dollars	0.006	-0.008	-0.024	-0.040	-0.055	-0.067	-0.077	-0.085	-0.090	-0.092	-0.053
Rail transportation	Millions of Fixed (2012) Dollars	0.004	-0.001	-0.006	-0.013	-0.019	-0.024	-0.029	-0.034	-0.037	-0.040	-0.020
Beverage and tobacco product manufacturing	Millions of Fixed (2012) Dollars	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.003
Apparel, Leather and allied product manufacturing	Millions of Fixed (2012) Dollars	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003
Mining (except oil and gas)	Millions of Fixed (2012) Dollars	0.001	0.000	-0.002	-0.005	-0.008	-0.011	-0.013	-0.015	-0.017	-0.018	-0.009
Agriculture and forestry support activities	Millions of Fixed (2012) Dollars	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001
Support activities for mining	Millions of Fixed (2012) Dollars	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.001
Motion picture and sound recording industries	Millions of Fixed (2012) Dollars	0.001	-0.001	-0.003	-0.005	-0.007	-0.009	-0.011	-0.012	-0.013	-0.014	-0.007

Air transportation	Millions of Fixed (2012) Dollars	0.000	0.000	-0.001	-0.002	-0.003	-0.003	-0.004	-0.005	-0.005	-0.006	-0.003
Oil and gas extraction	Millions of Fixed (2012) Dollars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water transportation	Millions of Fixed (2012) Dollars	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pipeline transportation	Millions of Fixed (2012) Dollars	0.000	-0.001	-0.001	-0.002	-0.003	-0.003	-0.004	-0.004	-0.004	-0.005	-0.003
Textile mills; Textile product mills	Millions of Fixed (2012) Dollars	-0.001	-0.005	-0.010	-0.014	-0.017	-0.020	-0.022	-0.024	-0.024	-0.024	-0.016
Primary metal manufacturing	Millions of Fixed (2012) Dollars	-0.002	-0.027	-0.057	-0.087	-0.115	-0.139	-0.160	-0.176	-0.184	-0.188	-0.114
Other transportation equipment manufacturing	Millions of Fixed (2012) Dollars	-0.003	-0.018	-0.036	-0.054	-0.072	-0.087	-0.099	-0.110	-0.116	-0.121	-0.072
Warehousing and storage	Millions of Fixed (2012) Dollars	-0.006	-0.029	-0.057	-0.085	-0.113	-0.138	-0.159	-0.178	-0.193	-0.204	-0.116
Securities, commodity contracts, investments	Millions of Fixed (2012) Dollars	-0.021	-0.206	-0.435	-0.679	-0.920	-1.146	-1.349	-1.527	-1.670	-1.784	-0.974

APPENDIX E: SUMMARY OF ESE'S ECONOMIC IMPACT ON HAMPDEN COUNTY

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Total Employment	Thousands (Jobs)	3.223	3.217	3.171	3.1	3.022	2.94	2.862	2.79	2.722	2.66	2.9707
Total Employment as % of Nation	Percent	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.0015
Private Non-Farm Employment	Thousands (Jobs)	3.046	3.034	2.986	2.916	2.84	2.761	2.687	2.618	2.553	2.494	2.7935
Private Non-Farm Employment as % of Nation	Percent	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.0017
Gross Domestic Product	Millions of Fixed (2012) Dollars	145.93	148.01	147.13	144.63	141.5	138.27	135.23	132.63	130.6	129.05	139.2978
Gross Domestic Product (GDP) as % of Nation	Percent	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Output	Millions of Fixed (2012) Dollars	233.97	237.98	236.74	232.57	227.2	221.52	216.06	211.19	207.29	204.21	222.8731
Value Added	Millions of Fixed (2012) Dollars	147.87	149.99	149.1	146.56	143.4	140.14	137.07	134.43	132.38	130.81	141.1748
Personal Income	Millions of Fixed (2012) Dollars	63.775	76.98	85.768	91.551	95.553	98.15	99.945	101.29	102.59	103.74	91.9339
Personal Income as % of Nation	Percent	0	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0009
Disposable Personal Income	Millions of Fixed (2012) Dollars	47.182	58.17	65.486	70.309	73.629	75.775	77.227	78.268	79.721	81.014	70.6781
Disposable Personal Income as % of Nation	Percent	0	0	0	0.001	0.001	0.001	0.001	0.001	0.001	0	0.0006
PCE-Price Index	2005=100 (Nation)	0.028	0.055	0.073	0.085	0.093	0.098	0.101	0.103	0.104	0.104	0.0844
Real Disposable Personal Income	Millions of Fixed (2012) Dollars	43.158	50.174	54.93	57.986	60.129	61.498	62.428	63.18	64.416	65.523	58.3422
Real Disposable Personal Income as % of Nation	Percent	0	0	0	0	0	0	0	0	0	0	0
Population	Thousands	0.695	1.245	1.687	2.041	2.321	2.541	2.712	2.842	2.94	3.013	2.2037
Population as % of Nation	Percent	0	0	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0008

APPENDIX F: ESE'S EMPLOYMENT IMPACT ON THE REST OF NEW ENGLAND AND NEW YORK

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Amusement, gambling, and recreation	Thousands (Jobs)	0.419	0.415	0.411	0.408	0.405	0.402	0.400	0.397	0.394	0.391	0.404
Retail trade	Thousands (Jobs)	0.227	0.227	0.228	0.226	0.221	0.217	0.213	0.210	0.207	0.203	0.218
Food services and drinking places	Thousands (Jobs)	0.199	0.196	0.195	0.193	0.192	0.190	0.189	0.188	0.186	0.185	0.191
Accommodation	Thousands (Jobs)	0.187	0.183	0.181	0.178	0.175	0.172	0.169	0.166	0.164	0.161	0.174
Administrative and support services	Thousands (Jobs)	0.179	0.176	0.173	0.169	0.165	0.161	0.158	0.154	0.152	0.149	0.164
Performing arts and spectator sports	Thousands (Jobs)	0.105	0.103	0.100	0.097	0.095	0.092	0.089	0.087	0.085	0.083	0.094
Professional, scientific, and technical services	Thousands (Jobs)	0.090	0.095	0.098	0.098	0.097	0.095	0.095	0.093	0.094	0.094	0.095
Construction	Thousands (Jobs)	0.083	0.107	0.116	0.118	0.113	0.107	0.101	0.094	0.088	0.083	0.101
Ambulatory health care services	Thousands (Jobs)	0.057	0.052	0.049	0.046	0.043	0.041	0.039	0.037	0.038	0.038	0.044
Transit and ground passenger transportation	Thousands (Jobs)	0.045	0.045	0.045	0.045	0.044	0.044	0.044	0.044	0.044	0.044	0.044
Real estate	Thousands (Jobs)	0.040	0.044	0.047	0.049	0.051	0.051	0.052	0.052	0.052	0.053	0.049
Wholesale trade	Thousands (Jobs)	0.035	0.036	0.036	0.035	0.034	0.033	0.031	0.031	0.029	0.029	0.033
Repair and maintenance	Thousands (Jobs)	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Personal and laundry services	Thousands (Jobs)	0.023	0.020	0.019	0.017	0.016	0.014	0.013	0.013	0.012	0.011	0.016
Financial Services	Thousands (Jobs)	0.021	0.020	0.018	0.016	0.015	0.013	0.012	0.010	0.009	0.009	0.014
Educational services	Thousands (Jobs)	0.021	0.026	0.030	0.033	0.035	0.037	0.039	0.040	0.041	0.043	0.035
Private households	Thousands (Jobs)	0.020	0.018	0.016	0.013	0.012	0.010	0.008	0.007	0.006	0.005	0.012
Hospitals	Thousands (Jobs)	0.013	0.014	0.015	0.016	0.016	0.017	0.017	0.018	0.019	0.019	0.016
Membership associations and organizations	Thousands (Jobs)	0.012	0.014	0.015	0.016	0.017	0.018	0.018	0.019	0.019	0.020	0.017
Insurance carriers and related activities	Thousands (Jobs)	0.011	0.011	0.011	0.011	0.010	0.010	0.010	0.009	0.009	0.009	0.010
Social assistance	Thousands (Jobs)	0.010	0.012	0.014	0.016	0.017	0.019	0.020	0.022	0.023	0.025	0.018
Management of companies and enterprises	Thousands (Jobs)	0.010	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.002	0.001	0.005
Nursing and residential care facilities	Thousands (Jobs)	0.009	0.010	0.011	0.011	0.012	0.013	0.014	0.014	0.015	0.016	0.013
Securities, commodity contracts, investments	Thousands (Jobs)	0.007	0.005	0.003	0.001	-0.001	-0.003	-0.005	-0.007	-0.008	-0.009	-0.002
Rental and leasing services	Thousands (Jobs)	0.006	0.006	0.006	0.006	0.006	0.005	0.005	0.005	0.005	0.004	0.005
Publishing industries, except Internet	Thousands (Jobs)	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Fabricated metal product manufacturing	Thousands (Jobs)	0.005	0.006	0.006	0.006	0.005	0.005	0.005	0.005	0.004	0.004	0.005

Telecommunications	Thousands (Jobs)	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.005
Scenic and sightseeing transportation	Thousands (Jobs)	0.005	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.004
Internet publishing and other information services	Thousands (Jobs)	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.005
Waste management and remediation services	Thousands (Jobs)	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Truck transportation	Thousands (Jobs)	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.003	0.004
Broadcasting, except Internet	Thousands (Jobs)	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.003
Utilities	Thousands (Jobs)	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Couriers and messengers	Thousands (Jobs)	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.003
Printing and related support activities	Thousands (Jobs)	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.003
Computer and electronic product manufacturing	Thousands (Jobs)	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.001
Food manufacturing	Thousands (Jobs)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Plastics and rubber product manufacturing	Thousands (Jobs)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.002
Nonmetallic mineral product manufacturing	Thousands (Jobs)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.002
Wood product manufacturing	Thousands (Jobs)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.002
Miscellaneous manufacturing	Thousands (Jobs)	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001
Chemical manufacturing	Thousands (Jobs)	0.002	0.001	0.001	0.001	0.000	0.000	0.000	-0.001	-0.001	-0.001	0.000
Water transportation	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Warehousing and storage	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Paper manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Forestry and logging; Fishing, hunting, and trapping	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001
Motion picture and sound recording industries	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Machinery manufacturing	Thousands (Jobs)	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Furniture and related product manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.001
Electrical equipment and appliance manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001
Motor vehicles, bodies and trailers, and parts manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Air transportation	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001
Apparel, Leather and allied product manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Beverage and tobacco product manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Museums, historical sites, zoos, and parks	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Other transportation equipment manufacturing	Thousands (Jobs)	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Agriculture and forestry support activities	Thousands (Jobs)	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Support activities for mining	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mining (except oil and gas)	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Primary metal manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Rail transportation	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Textile mills; Textile product mills	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Petroleum and coal products manufacturing	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oil and gas extraction	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pipeline transportation	Thousands (Jobs)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

APPENDIX G: ESE'S WAGE AND SALARY IMPACT ON THE REST OF NEW ENGLAND AND NEW YORK

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Amusement, gambling, and recreation	Millions of Fixed (2012) Dollars	9.256	9.195	9.14	9.082	9.027	8.974	8.928	8.884	8.913	8.941	9.034
Retail trade	Millions of Fixed (2012) Dollars	6.527	7.074	7.512	7.758	7.867	7.918	7.945	7.961	8.039	8.07	7.6671
Accommodation	Millions of Fixed (2012) Dollars	6.423	6.446	6.457	6.45	6.434	6.41	6.389	6.36	6.386	6.409	6.4164
Professional, scientific, and technical services	Millions of Fixed (2012) Dollars	6.406	7.414	8.063	8.398	8.523	8.547	8.547	8.438	8.492	8.531	8.1359
Administrative and support services	Millions of Fixed (2012) Dollars	5.465	5.676	5.805	5.861	5.869	5.84	5.816	5.77	5.777	5.781	5.766
Food services and drinking places	Millions of Fixed (2012) Dollars	4.262	4.482	4.67	4.781	4.857	4.91	4.943	4.975	5.025	5.088	4.7993
Construction	Millions of Fixed (2012) Dollars	3.555	4.762	5.34	5.566	5.504	5.336	5.129	4.859	4.68	4.516	4.9247
Ambulatory health care services	Millions of Fixed (2012) Dollars	3.191	3.246	3.313	3.297	3.219	3.145	3.055	2.941	2.961	2.953	3.1321
Wholesale trade	Millions of Fixed (2012) Dollars	2.914	3.348	3.629	3.77	3.805	3.797	3.746	3.684	3.648	3.594	3.5935
Performing arts and spectator sports	Millions of Fixed (2012) Dollars	2.022	2.068	2.095	2.101	2.099	2.087	2.071	2.057	2.057	2.062	2.0719
Financial Services	Millions of Fixed (2012) Dollars	1.725	1.848	1.896	1.877	1.807	1.721	1.633	1.527	1.477	1.422	1.6933
Management of companies and enterprises	Millions of Fixed (2012) Dollars	1.43	1.555	1.617	1.602	1.555	1.477	1.375	1.281	1.215	1.141	1.4248
Hospitals	Millions of Fixed (2012) Dollars	1.336	1.715	1.988	2.133	2.25	2.273	2.297	2.305	2.305	2.32	2.0922
Securities, commodity contracts, investments	Millions of Fixed (2012) Dollars	1.305	1.555	1.664	1.625	1.516	1.359	1.172	0.969	0.836	0.672	1.2673
Insurance carriers and related activities	Millions of Fixed (2012) Dollars	1.068	1.238	1.354	1.4	1.424	1.424	1.395	1.365	1.352	1.336	1.3356
Transit and ground passenger transportation	Millions of Fixed (2012) Dollars	1.063	1.093	1.112	1.124	1.133	1.137	1.138	1.135	1.144	1.152	1.1231
Educational services	Millions of Fixed (2012) Dollars	1.029	1.395	1.66	1.824	1.932	1.992	2.02	2.047	2.063	2.09	1.8052
Membership associations and organizations	Millions of Fixed (2012) Dollars	0.672	0.851	0.978	1.065	1.127	1.167	1.195	1.218	1.246	1.273	1.0792
Real estate	Millions of Fixed (2012) Dollars	0.669	0.828	0.946	1.029	1.084	1.118	1.141	1.147	1.172	1.194	1.0328
Publishing industries, except Internet	Millions of Fixed (2012) Dollars	0.661	0.806	0.917	0.993	1.051	1.082	1.115	1.139	1.17	1.199	1.0133
Repair and maintenance	Millions of Fixed (2012) Dollars	0.624	0.668	0.703	0.723	0.736	0.746	0.752	0.756	0.771	0.781	0.726
Computer and electronic product manufacturing	Millions of Fixed (2012) Dollars	0.512	0.611	0.662	0.662	0.635	0.598	0.572	0.516	0.482	0.457	0.5707
Personal and laundry services	Millions of Fixed (2012) Dollars	0.481	0.476	0.483	0.471	0.455	0.435	0.417	0.4	0.389	0.378	0.4385
Nursing and residential care facilities	Millions of Fixed (2012) Dollars	0.451	0.59	0.704	0.775	0.828	0.859	0.893	0.908	0.936	0.969	0.7913
Internet publishing and other information services	Millions of Fixed (2012) Dollars	0.449	0.536	0.596	0.637	0.668	0.688	0.7	0.712	0.727	0.742	0.6455
Telecommunications	Millions of Fixed (2012) Dollars	0.449	0.522	0.57	0.589	0.601	0.6	0.592	0.583	0.583	0.581	0.567
Broadcasting, except Internet	Millions of Fixed (2012) Dollars	0.415	0.452	0.47	0.475	0.472	0.463	0.451	0.438	0.432	0.423	0.4491

Utilities	Millions of Fixed (2012) Dollars	0.397	0.464	0.518	0.551	0.577	0.59	0.6	0.606	0.613	0.619	0.5535
Social assistance	Millions of Fixed (2012) Dollars	0.377	0.531	0.653	0.739	0.796	0.838	0.869	0.896	0.92	0.951	0.757
Fabricated metal product manufacturing	Millions of Fixed (2012) Dollars	0.371	0.447	0.487	0.502	0.503	0.49	0.476	0.454	0.438	0.425	0.4593
Rental and leasing services	Millions of Fixed (2012) Dollars	0.283	0.305	0.319	0.324	0.325	0.322	0.317	0.31	0.309	0.305	0.3119
Waste management and remediation services	Millions of Fixed (2012) Dollars	0.247	0.275	0.295	0.307	0.314	0.318	0.319	0.32	0.322	0.323	0.304
Scenic and sightseeing transportation	Millions of Fixed (2012) Dollars	0.239	0.255	0.262	0.266	0.265	0.263	0.259	0.254	0.251	0.248	0.2562
Chemical manufacturing	Millions of Fixed (2012) Dollars	0.207	0.233	0.239	0.229	0.211	0.189	0.16	0.139	0.118	0.099	0.1824
Motion picture and sound recording industries	Millions of Fixed (2012) Dollars	0.182	0.226	0.251	0.258	0.258	0.25	0.242	0.229	0.215	0.202	0.2313
Printing and related support activities	Millions of Fixed (2012) Dollars	0.172	0.19	0.2	0.205	0.206	0.204	0.2	0.195	0.193	0.189	0.1954
Truck transportation	Millions of Fixed (2012) Dollars	0.17	0.202	0.222	0.232	0.236	0.235	0.231	0.227	0.225	0.221	0.2201
Private households	Millions of Fixed (2012) Dollars	0.154	0.144	0.135	0.123	0.11	0.098	0.085	0.075	0.07	0.062	0.1056
Plastics and rubber product manufacturing	Millions of Fixed (2012) Dollars	0.148	0.167	0.177	0.178	0.175	0.17	0.162	0.155	0.148	0.141	0.1621
Food manufacturing	Millions of Fixed (2012) Dollars	0.147	0.176	0.192	0.199	0.199	0.196	0.191	0.186	0.181	0.178	0.1845
Machinery manufacturing	Millions of Fixed (2012) Dollars	0.145	0.209	0.251	0.276	0.289	0.295	0.295	0.292	0.288	0.285	0.2625
Couriers and messengers	Millions of Fixed (2012) Dollars	0.141	0.163	0.177	0.185	0.189	0.189	0.189	0.186	0.185	0.182	0.1786
Miscellaneous manufacturing	Millions of Fixed (2012) Dollars	0.135	0.157	0.167	0.169	0.165	0.159	0.148	0.139	0.134	0.128	0.1501
Water transportation	Millions of Fixed (2012) Dollars	0.122	0.125	0.126	0.127	0.127	0.126	0.125	0.123	0.123	0.122	0.1246
Nonmetallic mineral product manufacturing	Millions of Fixed (2012) Dollars	0.119	0.141	0.152	0.153	0.15	0.144	0.137	0.129	0.123	0.118	0.1366
Other transportation equipment manufacturing	Millions of Fixed (2012) Dollars	0.117	0.157	0.181	0.19	0.192	0.186	0.179	0.168	0.162	0.154	0.1686
Paper manufacturing	Millions of Fixed (2012) Dollars	0.108	0.124	0.132	0.136	0.136	0.134	0.13	0.125	0.121	0.118	0.1264
Electrical equipment and appliance manufacturing	Millions of Fixed (2012) Dollars	0.089	0.108	0.115	0.114	0.109	0.101	0.092	0.082	0.073	0.063	0.0946
Warehousing and storage	Millions of Fixed (2012) Dollars	0.081	0.089	0.092	0.09	0.085	0.079	0.072	0.065	0.059	0.054	0.0766
Air transportation	Millions of Fixed (2012) Dollars	0.079	0.098	0.107	0.109	0.108	0.104	0.101	0.094	0.087	0.082	0.0969
Wood product manufacturing	Millions of Fixed (2012) Dollars	0.065	0.078	0.084	0.084	0.082	0.079	0.075	0.071	0.068	0.065	0.0751
Motor vehicles, bodies and trailers, and parts manufacturing	Millions of Fixed (2012) Dollars	0.059	0.068	0.074	0.077	0.076	0.075	0.073	0.07	0.069	0.068	0.0709
Beverage and tobacco product manufacturing	Millions of Fixed (2012) Dollars	0.059	0.068	0.075	0.078	0.079	0.079	0.079	0.078	0.077	0.076	0.0748
Furniture and related product manufacturing	Millions of Fixed (2012) Dollars	0.047	0.053	0.056	0.055	0.052	0.049	0.045	0.042	0.039	0.037	0.0475
Apparel, Leather and allied product manufacturing	Millions of Fixed (2012) Dollars	0.045	0.055	0.062	0.065	0.066	0.065	0.064	0.063	0.063	0.063	0.0611
Museums, historical sites, zoos, and parks	Millions of Fixed (2012) Dollars	0.04	0.052	0.06	0.066	0.07	0.072	0.073	0.074	0.076	0.078	0.0661
Primary metal manufacturing	Millions of Fixed (2012) Dollars	0.027	0.033	0.034	0.032	0.029	0.025	0.021	0.016	0.014	0.01	0.0241

Rail transportation	Millions of Fixed (2012) Dollars	0.024	0.029	0.032	0.033	0.033	0.033	0.032	0.03	0.029	0.028	0.0303
Forestry and logging; Fishing, hunting, and trapping	Millions of Fixed (2012) Dollars	0.022	0.023	0.023	0.022	0.021	0.019	0.018	0.016	0.014	0.013	0.0191
Textile mills; Textile product mills	Millions of Fixed (2012) Dollars	0.016	0.021	0.023	0.024	0.023	0.022	0.02	0.018	0.016	0.015	0.0198
Mining (except oil and gas)	Millions of Fixed (2012) Dollars	0.012	0.017	0.02	0.021	0.022	0.022	0.021	0.021	0.02	0.02	0.0196
Agriculture and forestry support activities	Millions of Fixed (2012) Dollars	0.011	0.012	0.012	0.012	0.012	0.012	0.011	0.01	0.009	0.009	0.011
Petroleum and coal products manufacturing	Millions of Fixed (2012) Dollars	0.01	0.013	0.015	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.0155
Support activities for mining	Millions of Fixed (2012) Dollars	0.007	0.009	0.01	0.01	0.01	0.01	0.009	0.008	0.008	0.007	0.0088
Oil and gas extraction	Millions of Fixed (2012) Dollars	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.0025
Pipeline transportation	Millions of Fixed (2012) Dollars	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002

APPENDIX H: ESE'S OUTPUT IMPACT ON THE REST OF NEW ENGLAND AND NEW YORK

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Accommodation	Millions of Fixed (2012) Dollars	24.963	25.1	25.227	25.316	25.387	25.449	25.51	25.545	25.605	25.658	25.376
Amusement, gambling, and recreation	Millions of Fixed (2012) Dollars	23.064	23.126	23.196	23.248	23.294	23.334	23.375	23.406	23.445	23.482	23.297
Real estate	Millions of Fixed (2012) Dollars	19.125	21.688	23.906	25.469	26.719	27.656	28.438	29.031	29.813	30.625	26.247
Retail trade	Millions of Fixed (2012) Dollars	17.281	18.141	19.031	19.594	19.891	20.203	20.547	20.797	21.141	21.297	19.7923
Professional, scientific, and technical services	Millions of Fixed (2012) Dollars	14.25	15.375	16.094	16.469	16.656	16.688	16.844	16.813	17.188	17.406	16.3783
Food services and drinking places	Millions of Fixed (2012) Dollars	13.391	13.953	14.547	15	15.398	15.758	16.086	16.383	16.648	16.938	15.4102
Administrative and support services	Millions of Fixed (2012) Dollars	12.055	12.273	12.422	12.484	12.516	12.523	12.547	12.57	12.602	12.656	12.4648
Construction	Millions of Fixed (2012) Dollars	9.953	13.148	14.695	15.25	15.063	14.656	14.109	13.422	12.938	12.516	13.575
Financial Services	Millions of Fixed (2012) Dollars	9.469	9.344	9.156	8.797	8.344	7.875	7.469	7.016	6.828	6.625	8.0923
Wholesale trade	Millions of Fixed (2012) Dollars	8	8.5	8.875	9.016	9.047	9.063	9.031	9.047	9.063	9.031	8.8673
Performing arts and spectator sports	Millions of Fixed (2012) Dollars	6.602	6.668	6.719	6.744	6.758	6.76	6.752	6.756	6.764	6.783	6.7306
Ambulatory health care services	Millions of Fixed (2012) Dollars	6.18	5.688	5.453	5.18	4.891	4.664	4.516	4.313	4.391	4.422	4.9698
Insurance carriers and related activities	Millions of Fixed (2012) Dollars	3.477	3.531	3.609	3.578	3.563	3.563	3.484	3.461	3.469	3.492	3.5227
Rental and leasing services	Millions of Fixed (2012) Dollars	3.383	3.441	3.477	3.445	3.418	3.367	3.324	3.254	3.254	3.238	3.3601
Utilities	Millions of Fixed (2012) Dollars	3.027	3.301	3.563	3.758	3.945	4.07	4.188	4.309	4.398	4.508	3.9067
Telecommunications	Millions of Fixed (2012) Dollars	3.012	3.191	3.313	3.313	3.352	3.305	3.289	3.258	3.266	3.297	3.2596
Transit and ground passenger transportation	Millions of Fixed (2012) Dollars	2.759	2.792	2.818	2.843	2.868	2.889	2.909	2.926	2.946	2.963	2.8713
Publishing industries, except Internet	Millions of Fixed (2012) Dollars	2.664	2.938	3.188	3.375	3.539	3.68	3.828	3.977	4.133	4.305	3.5627
Repair and maintenance	Millions of Fixed (2012) Dollars	2.65	2.76	2.863	2.934	2.996	3.055	3.111	3.158	3.227	3.277	3.0031
Securities, commodity contracts, investments	Millions of Fixed (2012) Dollars	2.156	1.641	1	0.203	-0.547	-1.266	-1.984	-2.641	-3.031	-3.438	-0.7907
Management of companies and enterprises	Millions of Fixed (2012) Dollars	2.086	1.977	1.828	1.648	1.461	1.289	1.094	0.938	0.836	0.742	1.3899
Hospitals	Millions of Fixed (2012) Dollars	2.039	2.297	2.539	2.68	2.867	2.969	3.125	3.227	3.328	3.477	2.8548
Internet publishing and other information services	Millions of Fixed (2012) Dollars	1.791	2	2.164	2.289	2.406	2.508	2.59	2.68	2.77	2.871	2.4069
Broadcasting, except Internet	Millions of Fixed (2012) Dollars	1.713	1.713	1.695	1.65	1.611	1.564	1.516	1.48	1.457	1.434	1.5833
Educational services	Millions of Fixed (2012) Dollars	1.617	2.023	2.367	2.602	2.813	2.969	3.078	3.195	3.289	3.406	2.7359
Fabricated metal product manufacturing	Millions of Fixed (2012) Dollars	1.566	1.754	1.844	1.844	1.84	1.781	1.746	1.68	1.633	1.598	1.7286
Personal and laundry services	Millions of Fixed (2012) Dollars	1.543	1.41	1.363	1.279	1.205	1.135	1.082	1.031	1.004	0.973	1.2025

Chemical manufacturing	Millions of Fixed (2012) Dollars	1.414	1.25	1.023	0.758	0.492	0.258	0	-0.172	-0.32	-0.43	0.4273
Computer and electronic product manufacturing	Millions of Fixed (2012) Dollars	1.305	1.242	1.141	0.977	0.766	0.594	0.469	0.289	0.211	0.148	0.7142
Food manufacturing	Millions of Fixed (2012) Dollars	1.141	1.191	1.219	1.203	1.191	1.172	1.152	1.141	1.133	1.148	1.1691
Membership associations and organizations	Millions of Fixed (2012) Dollars	1.068	1.256	1.416	1.545	1.654	1.738	1.818	1.895	1.965	2.051	1.6406
Waste management and remediation services	Millions of Fixed (2012) Dollars	0.954	1.016	1.061	1.091	1.114	1.133	1.146	1.158	1.171	1.185	1.1029
Water transportation	Millions of Fixed (2012) Dollars	0.85	0.849	0.847	0.845	0.842	0.839	0.837	0.835	0.834	0.833	0.8411
Beverage and tobacco product manufacturing	Millions of Fixed (2012) Dollars	0.806	0.872	0.925	0.945	0.969	0.975	0.983	0.99	0.99	0.992	0.9447
Plastics and rubber product manufacturing	Millions of Fixed (2012) Dollars	0.771	0.799	0.797	0.773	0.74	0.707	0.674	0.643	0.617	0.594	0.7115
Nursing and residential care facilities	Millions of Fixed (2012) Dollars	0.699	0.793	0.91	0.984	1.07	1.145	1.234	1.305	1.379	1.477	1.0996
Truck transportation	Millions of Fixed (2012) Dollars	0.654	0.705	0.738	0.752	0.756	0.746	0.744	0.738	0.742	0.74	0.7315
Petroleum and coal products manufacturing	Millions of Fixed (2012) Dollars	0.651	0.718	0.757	0.77	0.768	0.762	0.752	0.738	0.725	0.73	0.7371
Paper manufacturing	Millions of Fixed (2012) Dollars	0.631	0.652	0.664	0.664	0.662	0.65	0.633	0.623	0.605	0.605	0.6389
Printing and related support activities	Millions of Fixed (2012) Dollars	0.601	0.621	0.635	0.641	0.642	0.638	0.635	0.625	0.625	0.621	0.6284
Nonmetallic mineral product manufacturing	Millions of Fixed (2012) Dollars	0.593	0.668	0.703	0.696	0.676	0.645	0.612	0.579	0.55	0.53	0.6252
Social assistance	Millions of Fixed (2012) Dollars	0.582	0.723	0.855	0.973	1.059	1.148	1.234	1.316	1.391	1.488	1.0769
Scenic and sightseeing transportation	Millions of Fixed (2012) Dollars	0.552	0.552	0.545	0.536	0.525	0.516	0.507	0.496	0.487	0.48	0.5196
Motor vehicles, bodies and trailers, and parts manufacturing	Millions of Fixed (2012) Dollars	0.501	0.537	0.564	0.573	0.566	0.56	0.555	0.54	0.537	0.544	0.5477
Miscellaneous manufacturing	Millions of Fixed (2012) Dollars	0.482	0.471	0.445	0.408	0.371	0.334	0.291	0.262	0.25	0.242	0.3556
Motion picture and sound recording industries	Millions of Fixed (2012) Dollars	0.461	0.439	0.416	0.375	0.346	0.307	0.287	0.264	0.23	0.211	0.3336
Machinery manufacturing	Millions of Fixed (2012) Dollars	0.418	0.545	0.631	0.695	0.73	0.77	0.781	0.801	0.809	0.832	0.7012
Couriers and messengers	Millions of Fixed (2012) Dollars	0.41	0.417	0.419	0.411	0.407	0.397	0.39	0.381	0.379	0.377	0.3988
Wood product manufacturing	Millions of Fixed (2012) Dollars	0.401	0.459	0.484	0.482	0.466	0.447	0.423	0.398	0.378	0.363	0.4301
Electrical equipment and appliance manufacturing	Millions of Fixed (2012) Dollars	0.361	0.385	0.378	0.342	0.305	0.258	0.213	0.172	0.137	0.1	0.2651
Other transportation equipment manufacturing	Millions of Fixed (2012) Dollars	0.297	0.297	0.293	0.258	0.219	0.195	0.168	0.133	0.129	0.117	0.2106
Air transportation	Millions of Fixed (2012) Dollars	0.275	0.286	0.276	0.255	0.235	0.209	0.199	0.176	0.156	0.145	0.2212
Forestry and logging; Fishing, hunting, and trapping	Millions of Fixed (2012) Dollars	0.195	0.188	0.173	0.154	0.137	0.12	0.102	0.088	0.074	0.062	0.1293
Furniture and related product manufacturing	Millions of Fixed (2012) Dollars	0.182	0.182	0.178	0.164	0.147	0.134	0.12	0.107	0.101	0.096	0.1411
Primary metal manufacturing	Millions of Fixed (2012) Dollars	0.158	0.143	0.11	0.066	0.019	-0.02	-0.062	-0.095	-0.111	-0.131	0.0077
Private households	Millions of Fixed (2012) Dollars	0.143	0.129	0.118	0.104	0.092	0.08	0.069	0.06	0.055	0.049	0.0899
Warehousing and storage	Millions of Fixed (2012) Dollars	0.132	0.122	0.106	0.089	0.071	0.057	0.04	0.026	0.017	0.007	0.0667

Museums, historical sites, zoos, and parks	Millions of Fixed (2012) Dollars	0.109	0.125	0.138	0.147	0.157	0.165	0.17	0.175	0.185	0.195	0.1566
Apparel, Leather and allied product manufacturing	Millions of Fixed (2012) Dollars	0.089	0.094	0.099	0.099	0.098	0.095	0.093	0.094	0.096	0.1	0.0957
Rail transportation	Millions of Fixed (2012) Dollars	0.081	0.084	0.083	0.081	0.076	0.071	0.067	0.063	0.06	0.058	0.0724
Mining (except oil and gas)	Millions of Fixed (2012) Dollars	0.046	0.052	0.053	0.052	0.049	0.046	0.042	0.039	0.035	0.034	0.0448
Textile mills; Textile product mills	Millions of Fixed (2012) Dollars	0.044	0.04	0.035	0.029	0.022	0.017	0.013	0.008	0.004	0.001	0.0213
Support activities for mining	Millions of Fixed (2012) Dollars	0.035	0.048	0.053	0.054	0.052	0.049	0.045	0.042	0.038	0.036	0.0452
Oil and gas extraction	Millions of Fixed (2012) Dollars	0.016	0.016	0.016	0.015	0.014	0.013	0.011	0.01	0.009	0.008	0.0128
Agriculture and forestry support activities	Millions of Fixed (2012) Dollars	0.011	0.011	0.01	0.009	0.009	0.009	0.008	0.007	0.006	0.006	0.0086
Pipeline transportation	Millions of Fixed (2012) Dollars	0.005	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.001	0.0031

APPENDIX I: SUMMARY OF ESE'S ECONOMIC IMPACT ON THE REST OF NEW ENGLAND AND NEW YORK

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Total Employment	Thousands (Jobs)	2.063	2.080	2.094	2.070	2.035	2.000	1.971	1.936	1.912	1.895	2.006
Total Employment as % of Nation	Percent	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Private Non-Farm Employment	Thousands (Jobs)	1.934	1.947	1.945	1.924	1.889	1.852	1.820	1.785	1.764	1.744	1.860
Private Non-Farm Employment as % of Nation	Percent	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Gross Domestic Product	Millions of Fixed (2012) Dollars	147.250	153.500	159.000	161.250	162.250	163.000	164.000	162.750	164.750	167.500	160.525
Gross Domestic Product (GDP) as % of Nation	Percent	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Output	Millions of Fixed (2012) Dollars	235.500	247.500	256.000	259.500	260.750	260.750	260.500	259.500	261.000	262.500	256.350
Value Added	Millions of Fixed (2012) Dollars	147.375	154.750	160.000	162.500	163.750	164.250	165.000	165.000	166.500	168.250	161.738
Personal Income	Millions of Fixed (2012) Dollars	103.750	118.250	128.875	134.625	138.875	140.625	141.750	143.000	144.000	145.750	133.950
Personal Income as % of Nation	Percent	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Disposable Personal Income	Millions of Fixed (2012) Dollars	82.250	93.875	102.000	106.250	109.375	110.500	110.875	111.375	112.625	114.125	105.325
Disposable Personal Income as % of Nation	Percent	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
PCE-Price Index	2005=100 (Nation)	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Real Disposable Personal Income	Millions of Fixed (2012) Dollars	75.125	78.000	81.500	83.125	82.875	84.375	84.250	84.625	86.250	87.250	82.738
Real Disposable Personal Income as % of Nation	Percent	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Population	Thousands	0.395	0.723	1.004	1.250	1.445	1.613	1.754	1.875	1.973	2.066	1.410
Population as % of Nation	Percent	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000

APPENDIX J: ESE'S EMPLOYMENT IMPACT ON ALL OF NEW ENGLAND AND NEW YORK (ALL REGIONS)

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Forestry and logging; Fishing, hunting, and trapping	Thousands (Jobs)	0.002	0.001	0.001	0.001	0.001	0.001	0	0	0	0	0.0007
Agriculture and forestry support activities	Thousands (Jobs)	0.001	0.001	0	0	0	0	0	0	0	0	0.0002
Oil and gas extraction	Thousands (Jobs)	0	0	0	0	0	0	0	0	0	0	0
Mining (except oil and gas)	Thousands (Jobs)	0	0	0	0	0	0	0	0	0	0	0
Support activities for mining	Thousands (Jobs)	0	0	0	0	0	0	0	0	0	0	0
Utilities	Thousands (Jobs)	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.006	0.006	0.0068
Construction	Thousands (Jobs)	0.183	0.239	0.262	0.265	0.255	0.241	0.225	0.208	0.194	0.181	0.2253
Wood product manufacturing	Thousands (Jobs)	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.0021
Nonmetallic mineral product manufacturing	Thousands (Jobs)	0.002	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.0023
Primary metal manufacturing	Thousands (Jobs)	0	0	0	0	0	0	0	0.001	0.001	0.001	-0.0003
Fabricated metal product manufacturing	Thousands (Jobs)	0.008	0.008	0.008	0.007	0.007	0.006	0.005	0.005	0.004	0.004	0.0062
Machinery manufacturing	Thousands (Jobs)	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.0015
Computer and electronic product manufacturing	Thousands (Jobs)	0.003	0.003	0.002	0.001	0.001	0	0	0	0.001	0.001	0.0008
Electrical equipment and appliance manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0	0	0	0	0	0.0005
Motor vehicles, bodies and trailers, and parts manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Other transportation equipment manufacturing	Thousands (Jobs)	0.001	0	0	0	0	0	0	0	0	0	0.0001
Furniture and related product manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0	0	0	0	0	0	0.0004
Miscellaneous manufacturing	Thousands (Jobs)	0.002	0.002	0.001	0.001	0.001	0	0	0	0	0	0.0007
Food manufacturing	Thousands (Jobs)	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0	0	0	0.0012
Beverage and tobacco product manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Textile mills; Textile product mills	Thousands (Jobs)	0	0	0	0	0	0	0	0	0	0	0
Apparel, Leather and allied product manufacturing	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Paper manufacturing	Thousands (Jobs)	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.0015
Printing and related support activities	Thousands (Jobs)	0.006	0.006	0.005	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.0047
Petroleum and coal products manufacturing	Thousands (Jobs)	0	0	0	0	0	0	0	0	0	0	0
Chemical manufacturing	Thousands (Jobs)	0.002	0.001	0.001	0	0	0.001	0.001	0.001	0.002	0.002	-0.0003

Plastics and rubber product manufacturing	Thousands (Jobs)	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.0021
Wholesale trade	Thousands (Jobs)	0.055	0.056	0.056	0.055	0.053	0.051	0.049	0.048	0.046	0.044	0.0513
Retail trade	Thousands (Jobs)	0.718	0.712	0.703	0.688	0.669	0.651	0.634	0.616	0.601	0.585	0.6577
Air transportation	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0	0	0	0	0	0.0005
Rail transportation	Thousands (Jobs)	0	0	0	0	0	0	0	0	0	0	0
Water transportation	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Truck transportation	Thousands (Jobs)	0.005	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.003	0.002	0.0037
Couriers and messengers	Thousands (Jobs)	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.003
Transit and ground passenger transportation	Thousands (Jobs)	0.078	0.077	0.076	0.074	0.073	0.072	0.07	0.069	0.068	0.068	0.0725
Pipeline transportation	Thousands (Jobs)	0	0	0	0	0	0	0	0	0	0	0
Scenic and sightseeing transportation	Thousands (Jobs)	0.006	0.005	0.005	0.004	0.004	0.004	0.003	0.003	0.003	0.002	0.0039
Warehousing and storage	Thousands (Jobs)	0.001	0.001	0	0	0.001	0.001	0.002	0.002	0.002	0.002	-0.0008
Publishing industries, except Internet	Thousands (Jobs)	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005	0.005	0.0058
Motion picture and sound recording industries	Thousands (Jobs)	0.001	0.001	0.001	0	0	0	0.001	0.001	0.001	0.001	-0.0001
Internet publishing other information services	Thousands (Jobs)	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Broadcasting, except Internet	Thousands (Jobs)	0.004	0.004	0.004	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.0029
Telecommunications	Thousands (Jobs)	0.006	0.006	0.005	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.0047
Financial Services	Thousands (Jobs)	0.023	0.021	0.019	0.017	0.014	0.012	0.01	0.009	0.008	0.007	0.014
Securities, commodity contracts, investments	Thousands (Jobs)	0.007	0.003	-0.001	0.006	-0.01	0.014	0.018	0.021	0.023	0.024	-0.0107
Insurance carriers and related activities	Thousands (Jobs)	0.012	0.012	0.012	0.011	0.011	0.01	0.01	0.01	0.009	0.009	0.0106
Real estate	Thousands (Jobs)	0.059	0.063	0.064	0.063	0.061	0.058	0.055	0.052	0.05	0.048	0.0573
Rental and leasing services	Thousands (Jobs)	0.019	0.019	0.018	0.018	0.017	0.016	0.016	0.015	0.015	0.014	0.0167
Professional, scientific, and technical services	Thousands (Jobs)	0.111	0.114	0.114	0.111	0.106	0.102	0.099	0.095	0.094	0.093	0.1039
Management of companies and enterprises	Thousands (Jobs)	0.01	0.008	0.006	0.004	0.001	0	0.002	0.003	0.004	0.004	0.0016
Administrative and support services	Thousands (Jobs)	0.451	0.442	0.432	0.42	0.409	0.397	0.387	0.378	0.369	0.361	0.4046
Waste management and remediation services	Thousands (Jobs)	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Educational services	Thousands (Jobs)	0.025	0.031	0.036	0.039	0.041	0.043	0.044	0.046	0.047	0.049	0.0401
Ambulatory health care services	Thousands (Jobs)	0.078	0.067	0.059	0.05	0.042	0.036	0.031	0.027	0.026	0.026	0.0442

Hospitals	Thousands (Jobs)	0.02	0.021	0.021	0.02	0.02	0.019	0.019	0.02	0.021	0.022	0.0203
Nursing and residential care facilities	Thousands (Jobs)	0.014	0.015	0.016	0.016	0.016	0.016	0.017	0.017	0.018	0.019	0.0164
Social assistance	Thousands (Jobs)	0.012	0.014	0.016	0.019	0.02	0.022	0.023	0.025	0.027	0.029	0.0207
Performing arts and spectator sports	Thousands (Jobs)	0.263	0.258	0.253	0.247	0.242	0.236	0.231	0.226	0.221	0.216	0.2393
Museums, historical sites, zoos, and parks	Thousands (Jobs)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Amusement, gambling, and recreation	Thousands (Jobs)	1.17	1.162	1.156	1.149	1.142	1.134	1.128	1.121	1.113	1.105	1.138
Accommodation	Thousands (Jobs)	0.255	0.251	0.246	0.242	0.237	0.232	0.228	0.224	0.219	0.215	0.2349
Food services and drinking places	Thousands (Jobs)	1.152	1.138	1.124	1.108	1.091	1.074	1.057	1.04	1.022	1.005	1.0811
Repair and maintenance	Thousands (Jobs)	0.096	0.095	0.095	0.094	0.092	0.091	0.09	0.089	0.088	0.087	0.0917
Personal and laundry services	Thousands (Jobs)	0.032	0.028	0.025	0.022	0.019	0.017	0.015	0.013	0.012	0.011	0.0194
Membership associations and organizations	Thousands (Jobs)	0.017	0.018	0.019	0.02	0.02	0.02	0.02	0.02	0.02	0.021	0.0195
Private households	Thousands (Jobs)	0.022	0.019	0.017	0.014	0.012	0.01	0.008	0.007	0.006	0.005	0.012

APPENDIX K: ESE'S WAGE AND SALARY IMPACT ON ALL OF NEW ENGLAND AND NEW YORK (ALL REGIONS)

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Amusement, gambling, and recreation	Millions of Fixed (2012) Dollars	26.179	26.073	25.958	25.831	25.706	25.58	25.466	25.359	25.448	25.532	25.7132
Food services and drinking places	Millions of Fixed (2012) Dollars	20.549	21.186	21.623	21.871	22.004	22.059	22.063	22.041	22.148	22.256	21.78
Retail trade	Millions of Fixed (2012) Dollars	19.441	20.637	21.418	21.801	21.91	21.883	21.793	21.66	21.707	21.699	21.3949
Administrative and support services	Millions of Fixed (2012) Dollars	11.43	11.736	11.877	11.891	11.828	11.715	11.598	11.469	11.438	11.41	11.6392
Accommodation	Millions of Fixed (2012) Dollars	8.337	8.369	8.372	8.35	8.314	8.268	8.225	8.178	8.197	8.215	8.2825
Professional, scientific, and technical services	Millions of Fixed (2012) Dollars	7.648	8.867	9.563	9.852	9.859	9.758	9.617	9.383	9.328	9.281	9.3156
Construction	Millions of Fixed (2012) Dollars	7.547	10.273	11.547	11.984	11.84	11.43	10.895	10.262	9.777	9.32	10.4875
Ambulatory health care services	Millions of Fixed (2012) Dollars	5	5.23	5.285	5.133	4.863	4.57	4.27	3.965	3.828	3.703	4.5847
Wholesale trade	Millions of Fixed (2012) Dollars	4.457	5.215	5.668	5.891	5.938	5.898	5.797	5.672	5.574	5.469	5.5579
Performing arts and spectator sports	Millions of Fixed (2012) Dollars	3.232	3.306	3.348	3.362	3.365	3.355	3.338	3.324	3.331	3.343	3.3304
Repair and maintenance	Millions of Fixed (2012) Dollars	2.431	2.528	2.588	2.613	2.62	2.617	2.607	2.595	2.606	2.615	2.582
Hospitals	Millions of Fixed (2012) Dollars	2.348	3.09	3.5	3.656	3.715	3.652	3.582	3.504	3.441	3.406	3.3894
Financial Services	Millions of Fixed (2012) Dollars	1.969	2.148	2.213	2.18	2.084	1.963	1.836	1.695	1.609	1.527	1.9224
Transit and ground passenger transportation	Millions of Fixed (2012) Dollars	1.94	1.992	2.012	2.012	2	1.98	1.957	1.931	1.923	1.917	1.9664
Management of companies and enterprises	Millions of Fixed (2012) Dollars	1.73	1.938	2.008	1.949	1.832	1.676	1.488	1.313	1.172	1.031	1.6137
Insurance carriers and related activities	Millions of Fixed (2012) Dollars	1.613	2.072	2.354	2.473	2.508	2.477	2.396	2.305	2.227	2.148	2.2573
Securities, commodity contracts, investments	Millions of Fixed (2012) Dollars	1.484	1.793	1.891	1.797	1.617	1.367	1.102	0.805	0.586	0.359	1.2801
Educational services	Millions of Fixed (2012) Dollars	1.422	1.977	2.346	2.555	2.67	2.719	2.723	2.711	2.703	2.707	2.4533
Membership associations and organizations	Millions of Fixed (2012) Dollars	0.999	1.306	1.498	1.612	1.673	1.7	1.707	1.705	1.715	1.727	1.5642
Real estate	Millions of Fixed (2012) Dollars	0.947	1.165	1.301	1.374	1.404	1.406	1.392	1.363	1.354	1.346	1.3052
Nursing and residential care facilities	Millions of Fixed (2012) Dollars	0.872	1.189	1.406	1.527	1.598	1.627	1.646	1.648	1.664	1.689	1.4866
Rental and leasing services	Millions of Fixed (2012) Dollars	0.871	0.915	0.939	0.948	0.946	0.937	0.925	0.909	0.904	0.897	0.9191
Publishing industries, except Internet	Millions of Fixed (2012) Dollars	0.779	0.962	1.091	1.171	1.221	1.244	1.266	1.275	1.297	1.316	1.1622
Utilities	Millions of Fixed (2012) Dollars	0.774	0.918	1.017	1.07	1.097	1.101	1.095	1.082	1.071	1.059	1.0284
Fabricated metal product manufacturing	Millions of Fixed (2012) Dollars	0.774	1.008	1.123	1.156	1.14	1.089	1.023	0.948	0.882	0.819	0.9962
Personal and laundry services	Millions of Fixed (2012) Dollars	0.715	0.721	0.723	0.696	0.659	0.618	0.578	0.541	0.515	0.491	0.6257
Social assistance	Millions of Fixed (2012) Dollars	0.589	0.882	1.097	1.242	1.332	1.389	1.428	1.447	1.471	1.494	1.2371

Computer and electronic product manufacturing	Millions of Fixed (2012) Dollars	0.578	0.709	0.768	0.77	0.732	0.686	0.643	0.568	0.525	0.482	0.6461
Telecommunications	Millions of Fixed (2012) Dollars	0.55	0.664	0.734	0.762	0.773	0.767	0.75	0.729	0.718	0.706	0.7153
Broadcasting, except Internet	Millions of Fixed (2012) Dollars	0.469	0.521	0.547	0.553	0.549	0.537	0.519	0.5	0.489	0.476	0.516
Internet publishing and other information services	Millions of Fixed (2012) Dollars	0.468	0.558	0.621	0.662	0.693	0.713	0.726	0.736	0.751	0.767	0.6695
Waste management and remediation services	Millions of Fixed (2012) Dollars	0.412	0.458	0.486	0.5	0.503	0.502	0.497	0.491	0.489	0.485	0.4823
Printing and related support activities	Millions of Fixed (2012) Dollars	0.341	0.397	0.426	0.437	0.435	0.424	0.41	0.392	0.379	0.365	0.4006
Scenic and sightseeing transportation	Millions of Fixed (2012) Dollars	0.31	0.339	0.353	0.355	0.351	0.343	0.331	0.317	0.306	0.295	0.33
Truck transportation	Millions of Fixed (2012) Dollars	0.288	0.376	0.428	0.452	0.457	0.449	0.435	0.417	0.401	0.384	0.4087
Machinery manufacturing	Millions of Fixed (2012) Dollars	0.272	0.406	0.485	0.524	0.534	0.53	0.513	0.491	0.469	0.45	0.4674
Chemical manufacturing	Millions of Fixed (2012) Dollars	0.265	0.313	0.324	0.308	0.279	0.244	0.201	0.165	0.131	0.102	0.2332
Paper manufacturing	Millions of Fixed (2012) Dollars	0.263	0.34	0.38	0.395	0.392	0.379	0.358	0.336	0.314	0.293	0.345
Food manufacturing	Millions of Fixed (2012) Dollars	0.255	0.337	0.379	0.394	0.391	0.377	0.357	0.336	0.316	0.299	0.3441
Plastics and rubber product manufacturing	Millions of Fixed (2012) Dollars	0.237	0.285	0.308	0.312	0.303	0.289	0.271	0.25	0.232	0.214	0.2701
Miscellaneous manufacturing	Millions of Fixed (2012) Dollars	0.232	0.304	0.338	0.348	0.34	0.325	0.302	0.278	0.261	0.243	0.2971
Motion picture and sound recording industries	Millions of Fixed (2012) Dollars	0.199	0.252	0.283	0.291	0.292	0.283	0.273	0.26	0.244	0.229	0.2606
Couriers and messengers	Millions of Fixed (2012) Dollars	0.187	0.231	0.26	0.274	0.281	0.28	0.276	0.268	0.262	0.255	0.2574
Private households	Millions of Fixed (2012) Dollars	0.171	0.16	0.149	0.134	0.119	0.104	0.089	0.077	0.07	0.061	0.1134
Nonmetallic mineral product manufacturing	Millions of Fixed (2012) Dollars	0.158	0.193	0.211	0.214	0.21	0.201	0.191	0.179	0.169	0.16	0.1886
Other transportation equipment manufacturing	Millions of Fixed (2012) Dollars	0.144	0.198	0.229	0.242	0.241	0.232	0.222	0.205	0.194	0.182	0.2089
Water transportation	Millions of Fixed (2012) Dollars	0.122	0.125	0.126	0.127	0.127	0.126	0.125	0.123	0.123	0.122	0.1246
Warehousing and storage	Millions of Fixed (2012) Dollars	0.108	0.126	0.129	0.122	0.108	0.093	0.075	0.059	0.043	0.03	0.0893
Electrical equipment and appliance manufacturing	Millions of Fixed (2012) Dollars	0.101	0.126	0.135	0.133	0.127	0.116	0.104	0.092	0.08	0.068	0.1082
Wood product manufacturing	Millions of Fixed (2012) Dollars	0.085	0.104	0.113	0.115	0.112	0.108	0.101	0.095	0.09	0.085	0.1008
Air transportation	Millions of Fixed (2012) Dollars	0.079	0.099	0.108	0.111	0.11	0.105	0.102	0.095	0.088	0.082	0.0979
Motor vehicles, bodies and trailers, and parts manufacturing	Millions of Fixed (2012) Dollars	0.071	0.085	0.093	0.096	0.096	0.094	0.091	0.087	0.084	0.083	0.088
Furniture and related product manufacturing	Millions of Fixed (2012) Dollars	0.063	0.075	0.08	0.077	0.072	0.065	0.058	0.051	0.045	0.04	0.0626
Beverage and tobacco product manufacturing	Millions of Fixed (2012) Dollars	0.059	0.069	0.076	0.078	0.08	0.08	0.079	0.078	0.078	0.077	0.0754
Museums, historical sites, zoos, and parks	Millions of Fixed (2012) Dollars	0.052	0.069	0.081	0.088	0.093	0.096	0.098	0.099	0.102	0.104	0.0882
Apparel, Leather and allied product manufacturing	Millions of Fixed (2012) Dollars	0.046	0.057	0.064	0.067	0.068	0.067	0.066	0.064	0.065	0.065	0.0629
Primary metal manufacturing	Millions of Fixed (2012) Dollars	0.042	0.056	0.06	0.058	0.053	0.046	0.038	0.03	0.024	0.017	0.0424

Rail transportation	Millions of Fixed (2012) Dollars	0.039	0.053	0.06	0.062	0.062	0.06	0.056	0.052	0.049	0.045	0.0538
Textile mills; Textile product mills	Millions of Fixed (2012) Dollars	0.027	0.037	0.042	0.043	0.041	0.038	0.035	0.031	0.027	0.024	0.0345
Forestry and logging; Fishing, hunting, and trapping	Millions of Fixed (2012) Dollars	0.025	0.028	0.028	0.027	0.025	0.023	0.02	0.018	0.015	0.013	0.0222
Mining (except oil and gas)	Millions of Fixed (2012) Dollars	0.018	0.026	0.032	0.035	0.037	0.037	0.036	0.035	0.034	0.032	0.0322
Agriculture and forestry support activities	Millions of Fixed (2012) Dollars	0.013	0.015	0.016	0.016	0.016	0.016	0.015	0.014	0.013	0.012	0.0146
Petroleum and coal products manufacturing	Millions of Fixed (2012) Dollars	0.012	0.016	0.019	0.021	0.022	0.023	0.023	0.023	0.023	0.023	0.0205
Support activities for mining	Millions of Fixed (2012) Dollars	0.007	0.01	0.011	0.011	0.011	0.01	0.009	0.009	0.008	0.007	0.0093
Pipeline transportation	Millions of Fixed (2012) Dollars	0.002	0.003	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.002	0.0031
Oil and gas extraction	Millions of Fixed (2012) Dollars	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.0025

APPENDIX L: ESE'S OUTPUT IMPACT ON ALL OF NEW ENGLAND AND NEW YORK (ALL REGIONS)

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Food services and drinking places	Millions of Fixed (2012) Dollars	66.641	67.359	67.984	68.398	68.719	68.992	69.219	69.406	69.578	69.797	68.6093
Amusement, gambling, and recreation	Millions of Fixed (2012) Dollars	65.694	65.744	65.788	65.81	65.823	65.831	65.843	65.85	65.866	65.885	65.8134
Retail trade	Millions of Fixed (2012) Dollars	52.781	54.031	55	55.422	55.531	55.625	55.719	55.75	55.938	55.984	55.1781
Accommodation	Millions of Fixed (2012) Dollars	32.793	32.871	32.918	32.92	32.906	32.887	32.877	32.854	32.861	32.871	32.8758
Administrative and support services	Millions of Fixed (2012) Dollars	26.57	26.641	26.594	26.438	26.227	26.023	25.859	25.719	25.625	25.578	26.1274
Real estate	Millions of Fixed (2012) Dollars	26.344	29.094	30.75	31.281	31.313	30.938	30.406	29.813	29.531	29.438	29.8908
Construction	Millions of Fixed (2012) Dollars	21.375	28.547	31.805	32.75	32.203	31	29.516	27.844	26.422	25.172	28.6634
Professional, scientific, and technical services	Millions of Fixed (2012) Dollars	16.609	17.563	18.031	18.031	17.844	17.531	17.406	17.125	17.313	17.469	17.4922
Wholesale trade	Millions of Fixed (2012) Dollars	11.984	12.719	13.188	13.344	13.313	13.281	13.188	13.141	13.094	13.063	13.0315
Performing arts and spectator sports	Millions of Fixed (2012) Dollars	11.08	11.176	11.242	11.277	11.299	11.303	11.297	11.303	11.311	11.33	11.2618
Rental and leasing services	Millions of Fixed (2012) Dollars	11.059	11.156	11.176	11.109	11.023	10.91	10.805	10.676	10.652	10.617	10.9183
Repair and maintenance	Millions of Fixed (2012) Dollars	10.459	10.596	10.68	10.703	10.703	10.707	10.709	10.711	10.744	10.77	10.6782
Financial Services	Millions of Fixed (2012) Dollars	10.203	10.016	9.703	9.203	8.594	8	7.453	6.891	6.625	6.328	8.3016
Ambulatory health care services	Millions of Fixed (2012) Dollars	8.695	7.523	6.617	5.703	4.883	4.211	3.711	3.25	3.172	3.141	5.0906
Utilities	Millions of Fixed (2012) Dollars	5.586	5.902	6.125	6.223	6.293	6.293	6.293	6.309	6.313	6.348	6.1685
Transit and ground passenger transportation	Millions of Fixed (2012) Dollars	5.087	5.075	5.042	4.999	4.96	4.92	4.887	4.858	4.842	4.829	4.9499
Insurance carriers and related activities	Millions of Fixed (2012) Dollars	3.836	3.836	3.836	3.734	3.633	3.563	3.438	3.359	3.344	3.344	3.5923
Telecommunications	Millions of Fixed (2012) Dollars	3.344	3.473	3.508	3.43	3.359	3.219	3.117	3.008	2.961	2.93	3.2349
Hospitals	Millions of Fixed (2012) Dollars	3.031	3.266	3.375	3.32	3.344	3.336	3.422	3.508	3.648	3.883	3.4133
Publishing industries, except Internet	Millions of Fixed (2012) Dollars	2.945	3.219	3.438	3.602	3.734	3.844	3.969	4.109	4.25	4.422	3.7532
Fabricated metal product manufacturing	Millions of Fixed (2012) Dollars	2.316	2.531	2.578	2.508	2.41	2.262	2.145	2.008	1.906	1.828	2.2492
Personal and laundry services	Millions of Fixed (2012) Dollars	2.199	1.961	1.811	1.623	1.459	1.309	1.188	1.084	1.018	0.955	1.4607
Management of companies and enterprises	Millions of Fixed (2012) Dollars	2.191	1.902	1.551	1.156	0.758	0.391	0.039	-0.25	-0.461	-0.633	0.6644
Securities, commodity contracts, investments	Millions of Fixed (2012) Dollars	2.141	1.438	0.578	-0.469	-1.469	-2.422	-3.328	-4.156	-4.703	-5.234	-1.7624
Educational services	Millions of Fixed (2012) Dollars	1.914	2.391	2.766	3.016	3.219	3.375	3.492	3.609	3.711	3.836	3.1329
Internet publishing and other information services	Millions of Fixed (2012) Dollars	1.861	2.082	2.254	2.379	2.5	2.605	2.688	2.777	2.879	2.977	2.5002
Broadcasting, except Internet	Millions of Fixed (2012) Dollars	1.852	1.828	1.779	1.703	1.631	1.555	1.48	1.422	1.379	1.34	1.5969

Waste management and remediation services	Millions of Fixed (2012) Dollars	1.561	1.629	1.665	1.676	1.679	1.677	1.67	1.667	1.665	1.666	1.6555
Chemical manufacturing	Millions of Fixed (2012) Dollars	1.453	1.188	0.836	0.445	0.063	-0.281	-0.625	-0.867	-1.07	-1.203	-0.0061
Membership associations and organizations	Millions of Fixed (2012) Dollars	1.379	1.582	1.717	1.801	1.863	1.902	1.941	1.984	2.035	2.109	1.8313
Computer and electronic product manufacturing	Millions of Fixed (2012) Dollars	1.32	1.227	1.086	0.867	0.609	0.383	0.234	0.016	-0.094	-0.172	0.5476
Food manufacturing	Millions of Fixed (2012) Dollars	1.254	1.238	1.172	1.07	0.98	0.887	0.805	0.75	0.699	0.684	0.9539
Nursing and residential care facilities	Millions of Fixed (2012) Dollars	1.078	1.195	1.297	1.34	1.387	1.434	1.504	1.566	1.648	1.758	1.4207
Printing and related support activities	Millions of Fixed (2012) Dollars	1.034	1.053	1.058	1.049	1.035	1.019	1.004	0.984	0.977	0.966	1.0179
Plastics and rubber product manufacturing	Millions of Fixed (2012) Dollars	1.006	1.02	0.992	0.932	0.861	0.795	0.729	0.67	0.621	0.58	0.8206
Paper manufacturing	Millions of Fixed (2012) Dollars	0.986	1	0.988	0.965	0.936	0.9	0.859	0.83	0.799	0.787	0.905
Water transportation	Millions of Fixed (2012) Dollars	0.85	0.849	0.847	0.845	0.842	0.839	0.837	0.835	0.834	0.833	0.8411
Beverage and tobacco product manufacturing	Millions of Fixed (2012) Dollars	0.81	0.875	0.928	0.948	0.972	0.979	0.986	0.992	0.992	0.994	0.9476
Truck transportation	Millions of Fixed (2012) Dollars	0.797	0.838	0.852	0.842	0.822	0.789	0.768	0.748	0.738	0.73	0.7924
Nonmetallic mineral product manufacturing	Millions of Fixed (2012) Dollars	0.719	0.808	0.842	0.827	0.795	0.752	0.707	0.663	0.624	0.596	0.7333
Petroleum and coal products manufacturing	Millions of Fixed (2012) Dollars	0.702	0.77	0.806	0.813	0.807	0.797	0.781	0.762	0.746	0.75	0.7734
Scenic and sightseeing transportation	Millions of Fixed (2012) Dollars	0.673	0.656	0.626	0.592	0.557	0.524	0.491	0.46	0.435	0.412	0.5426
Social assistance	Millions of Fixed (2012) Dollars	0.652	0.813	0.969	1.098	1.203	1.305	1.398	1.488	1.574	1.684	1.2184
Motor vehicles, bodies and trailers, and parts manufacturing	Millions of Fixed (2012) Dollars	0.562	0.604	0.635	0.646	0.64	0.63	0.624	0.608	0.606	0.614	0.6169
Miscellaneous manufacturing	Millions of Fixed (2012) Dollars	0.547	0.514	0.457	0.389	0.318	0.254	0.188	0.141	0.111	0.096	0.3015
Wood product manufacturing	Millions of Fixed (2012) Dollars	0.48	0.547	0.57	0.563	0.538	0.51	0.477	0.444	0.417	0.396	0.4942
Machinery manufacturing	Millions of Fixed (2012) Dollars	0.477	0.605	0.684	0.732	0.754	0.773	0.773	0.781	0.781	0.805	0.7165
Motion picture and sound recording industries	Millions of Fixed (2012) Dollars	0.463	0.439	0.412	0.367	0.336	0.299	0.275	0.25	0.217	0.195	0.3253
Couriers and messengers	Millions of Fixed (2012) Dollars	0.454	0.453	0.444	0.425	0.409	0.389	0.371	0.354	0.345	0.338	0.3982
Electrical equipment and appliance manufacturing	Millions of Fixed (2012) Dollars	0.376	0.392	0.374	0.326	0.278	0.221	0.168	0.117	0.078	0.039	0.2369
Other transportation equipment manufacturing	Millions of Fixed (2012) Dollars	0.293	0.281	0.258	0.203	0.152	0.109	0.066	0.023	0.016	-0.008	0.1393
Air transportation	Millions of Fixed (2012) Dollars	0.276	0.286	0.275	0.253	0.232	0.207	0.195	0.174	0.15	0.137	0.2185
Forestry and logging; Fishing, hunting, and trapping	Millions of Fixed (2012) Dollars	0.215	0.202	0.18	0.154	0.131	0.107	0.083	0.064	0.046	0.031	0.1213
Furniture and related product manufacturing	Millions of Fixed (2012) Dollars	0.188	0.174	0.154	0.124	0.093	0.067	0.042	0.021	0.011	0.004	0.0878
Private households	Millions of Fixed (2012) Dollars	0.159	0.141	0.126	0.109	0.095	0.08	0.067	0.057	0.051	0.044	0.0929
Primary metal manufacturing	Millions of Fixed (2012) Dollars	0.155	0.115	0.054	-0.02	-0.097	-0.158	-0.22	-0.271	-0.295	-0.316	-0.1053
Museums, historical sites, zoos, and parks	Millions of Fixed (2012) Dollars	0.141	0.164	0.181	0.193	0.205	0.214	0.221	0.228	0.239	0.251	0.2037

Warehousing and storage	Millions of Fixed (2012) Dollars	0.126	0.093	0.049	0.004	-0.042	-0.081	-0.12	-0.151	-0.176	-0.197	-0.0495
Apparel, Leather and allied product manufacturing	Millions of Fixed (2012) Dollars	0.091	0.097	0.102	0.102	0.1	0.098	0.096	0.097	0.099	0.103	0.0985
Rail transportation	Millions of Fixed (2012) Dollars	0.085	0.083	0.076	0.068	0.057	0.047	0.038	0.029	0.022	0.018	0.0523
Mining (except oil and gas)	Millions of Fixed (2012) Dollars	0.047	0.052	0.051	0.047	0.041	0.035	0.03	0.024	0.019	0.016	0.0362
Textile mills; Textile product mills	Millions of Fixed (2012) Dollars	0.043	0.035	0.026	0.016	0.005	-0.003	-0.01	-0.016	-0.02	-0.023	0.0053
Support activities for mining	Millions of Fixed (2012) Dollars	0.036	0.05	0.055	0.055	0.053	0.049	0.046	0.042	0.038	0.035	0.0459
Oil and gas extraction	Millions of Fixed (2012) Dollars	0.016	0.016	0.016	0.015	0.014	0.013	0.011	0.01	0.009	0.008	0.0128
Agriculture and forestry support activities	Millions of Fixed (2012) Dollars	0.013	0.012	0.011	0.01	0.01	0.009	0.008	0.008	0.007	0.006	0.0094
Pipeline transportation	Millions of Fixed (2012) Dollars	0.005	0.004	0.003	0.002	0.001	0	-0.001	-0.002	-0.003	-0.004	0.0005

APPENDIX M: SUMMARY OF ESE'S ECONOMIC IMPACT ON ALL OF NEW ENGLAND AND NEW YORK (ALL REGIONS)

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Total Employment as % of Nation	Percent	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.0025
Private Non-Farm Employment	Thousands (Jobs)	4.98	4.98	4.932	4.84	4.729	4.613	4.508	4.404	4.316	4.238	4.654
Private Non-Farm Employment as % of Nation	Percent	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.0028
Gross Domestic Product	Millions of Fixed (2012) Dollars	293.125	301.5	306.25	305.75	303.75	301	299	295.25	295.25	296.75	299.7625
Gross Domestic Product (GDP) as % of Nation	Percent	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.0017
Output	Millions of Fixed (2012) Dollars	469.25	485.25	492.75	492.25	488	482.25	476.5	471	468	467	479.225
Value Added	Millions of Fixed (2012) Dollars	295.25	304.625	309.25	309	307.25	304.5	302	299.5	299	299	302.9375
Personal Income	Millions of Fixed (2012) Dollars	167.625	195.375	214.5	226.25	234.375	238.75	241.75	244.25	246.75	249.5	225.9125
Personal Income as % of Nation	Percent	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.0011
Disposable Personal Income	Millions of Fixed (2012) Dollars	129.5	152.125	167.5	176.5	183	186.25	188.125	189.75	192.375	195	176.0125
Disposable Personal Income as % of Nation	Percent	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
PCE-Price Index	2005=100 (Nation)	0.001	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.0026
Real Disposable Personal Income	Millions of Fixed (2012) Dollars	118.25	128.125	136.25	141.125	143	145.875	146.625	147.75	150.625	152.75	141.0375
Real Disposable Personal Income as % of Nation	Percent	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Population	Thousands	1.09	1.969	2.691	3.293	3.77	4.156	4.465	4.719	4.914	5.078	3.6145
Population as % of Nation	Percent	0	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0009

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ⁱⁱ Richard Graham, “Inter-industry relationships (Input/output matrix),” *Bureau of Labor Statistics*, February 1, 2012, http://www.bls.gov/emp/ep_data_input_output_matrix.htm

ⁱⁱⁱ “REMI Documentation,” *REMI*, March 8, 2013, <http://www.remi.com/resources/documentation>

^{iv} For journalistic citations, please see p. 46 of the PDF online, “PI⁺ v. 1.4 Model Equations,” *REMI*, March 8, 2013, <[www.remi.com/download/documentation/pi+/pi+_version_1.4/PI+_v1.4_Model_Equations\(2\).pdf](http://www.remi.com/download/documentation/pi+/pi+_version_1.4/PI+_v1.4_Model_Equations(2).pdf)>

^v For full listing of data sources and types, see, “Data Sources and Estimation Procedures,” *REMI*, March 8, 2013, www.remi.com/download/documentation/pi+/pi+_version_1.4/Data_Sources_and_Estimation_Procedures.pdf

^{vi} George Fulton, “RSQE specializes in economic forecasting of the U.S. and Michigan economies,” *University of Michigan*, <<http://rsqe.econ.lsa.umich.edu/>>