

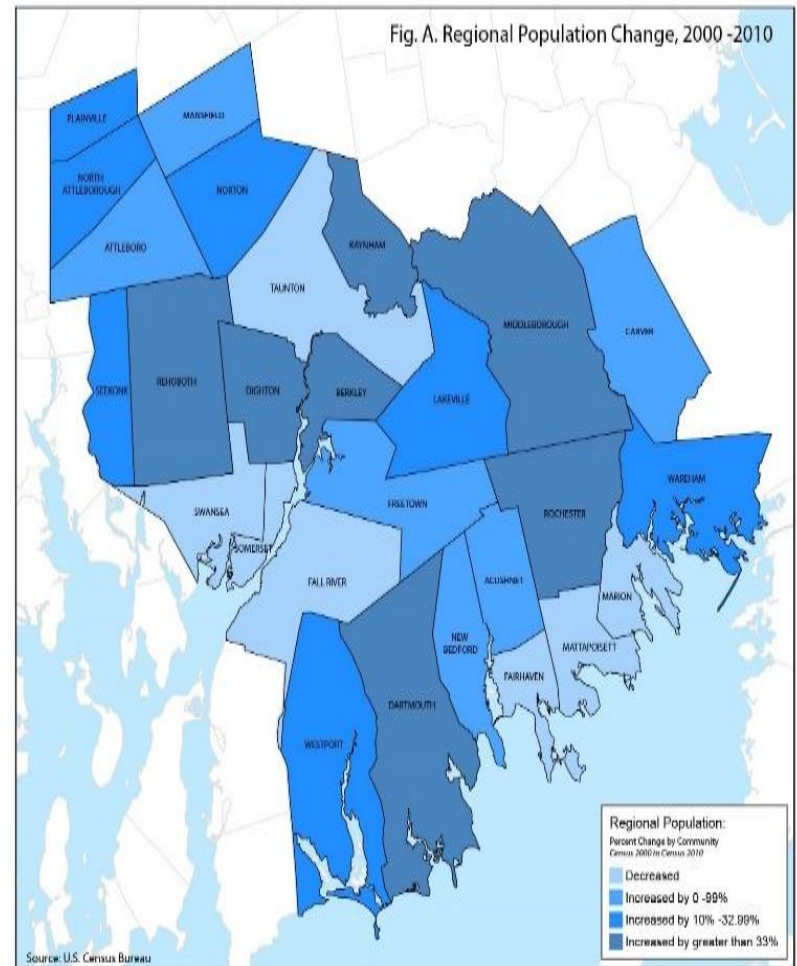
II. ANALYSIS - STATE OF THE REGION

Southeastern Massachusetts is a microcosm of the state as a whole. Despite the current economic climate, the region maintains a healthy mix of cities, suburbs, and rural areas. Our economy ranges from agriculture and fishing to high tech manufacturing and service businesses. Our geography includes hundreds of miles of coastline, the state's largest natural lakes, and thousands of acres of wetlands and forests.

For decades, the region has been one of the fast growing areas in the state. With the larger metropolitan areas of Boston and Providence to the north and west, respectively, and the enormously popular tourist destination of Cape Cod immediately to the southeast, southeastern Massachusetts is nestled among three generators of growth and economic activity.

Despite having our identity often submerged by three better-known neighbors, southeastern Massachusetts is a unique and special place. Our heritage, people and livability are unmatched anywhere and yet, parts of the region have remained the economic stepchildren of the state - always lagging behind in indicators of economic strength such as employment and educational attainment.

This wonderful region, with cities on the bay and its quaint small towns has some serious economic problems. But the quality of life and the character of its residents are unsurpassed.



A. POPULATION AND LABOR FORCE

1. Population

Massachusetts, along with most of the New England states, has not seen significant increase in population for decades. A closer examination of the various regions of the state however, different patterns of population growth emerge. In the past several decades, Southeastern Massachusetts has experienced a more rapid population growth than the rest of the state.

The regional population increase from 2000 to 2010 in the communities comprising the SRPEDD region is illustrated in Fig. A.

Within the SRPEDD region, seven inland towns had the most rapid population growth from 2000 to 2010: Berkley, where the population increased by 51%, Mansfield by 40%, Lakeville by 36%, Raynham by 36%, Rehoboth by 34%, Norton and Rochester by 33.4%. Some of this population increase in these communities may be attributed to the towns' accessibility to highways and transportation hence easy commute to the metropolitan areas of Boston and Providence, proximity to business centers and job locations, as well as the movement and preference for a suburban lifestyle.

Of the four cities in the region, Attleboro, New Bedford and Taunton maintained stable population growth while only one (Fall River) lost population from 2000 to 2010.

2. Population Racial/Ethnic Composition

Overall, the region is still predominantly White, although dramatic increases have been identified among minority populations in the region (Blacks, Asian, Other multi-race combinations, as well as Hispanics) based upon a 15-year interval (2000 Census and 2015 ACS estimates) as shown in Table 1.

From 2000 to 2015, the increase in Non-White populations and the high increase among the Hispanic population in the region parallels national and statewide trends. In particular, this change is most notable in New Bedford where Hispanics increased by 17%, compared to 11% for the state.

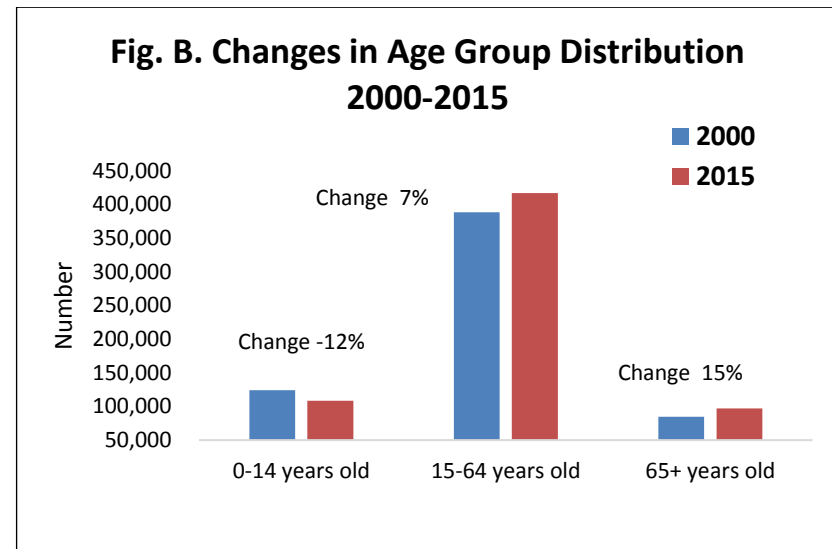
Table 1. REGIONAL POPULATION RACIAL/ETHNIC COMPOSITION, 2000 & 2015						
	Total Population	% White	% Black	% Asian	% Other Races	% Hispanic
Attleboro						
2000	42,068	91.3	1.6	3.2	3.9	4.3
2015	45,593	87.1	3.0	4.5	5.4	6.3
Fall River						
2000	91,938	91.2	2.5	2.2	3.8	3.3
2015	88,857	87.0	3.9	2.6	6.5	7.4
New Bedford						
2000	93,768	78.9	4.4	0.7	16.0	10.2
2015	95,072	74.5	6.4	0.9	18.2	16.7
Taunton						
2000	55,976	91.7	2.7	0.6	5.0	3.9
2015	55,874	87.2	5.0	1.0	6.8	5.5
SRPEDD						
2000	597,294	91.4	2.0	1.2	5.4	3.3
2015	623,183	90.3	3.4	2.0	4.3	6.1
MA						
2000	6,349,097	84.5	5.4	3.8	6.3	6.8
2015	6,705,586	79.9	7.1	6.0	7.0	10.6

Source: U.S. Census Bureau

Table 1 also reveals the significant increases in Other Races in all of the region’s cities based upon the 2000 Census counts and 2015 estimates. Undoubtedly, the SRPEDD region has steadily become increasingly multi-racial, following the statewide pattern of population diversity.

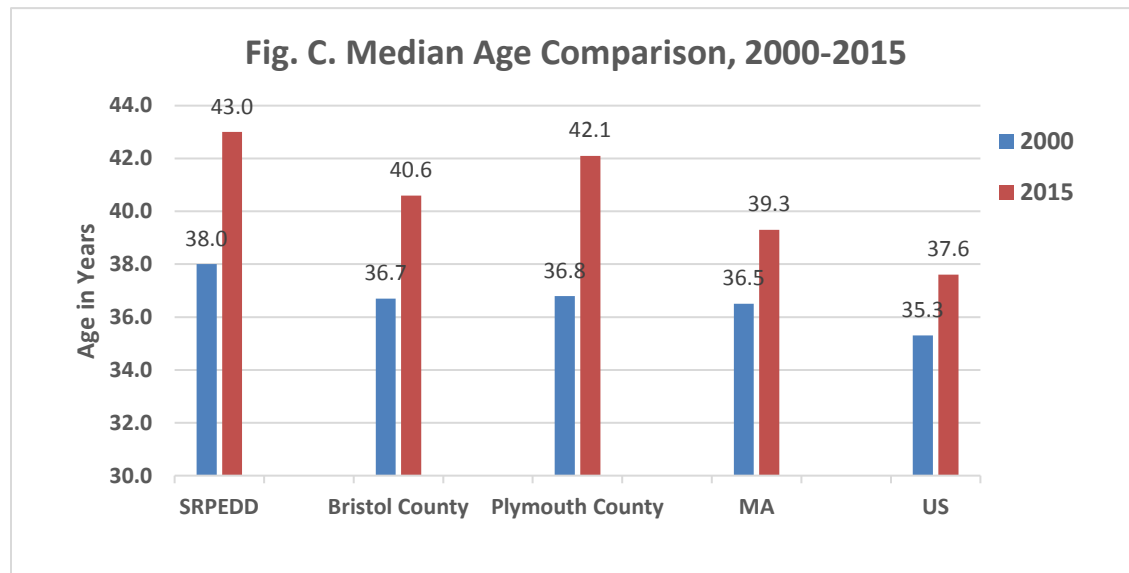
3. Regional Age Profile

Fig. B identifies changes in the major age cohorts of the SRPEDD population from 2000 to 2015.



In the span of 15 years, the youngest age group in the region’s population, i.e., age 14 years and under had decreased by 12%. To date, age cohorts that comprise the region’s labor force (ages 20-64) remain robust, but the older cohorts, especially those 65 years and over have risen twice as high in percentage (15% vs. 7%) as the working-age group.

To date, the SRPEDD region had retained a large portion of working age population, which supports the region’s youngest and oldest members’ economic needs adequately. However, in future decades, those cohorts are projected to shrink, which may be a cause for concern, given that the younger and middle-aged cohorts will join the ranks of the retired and dependent groups, thereby relying on the now-decreasing younger cohorts for economic support.



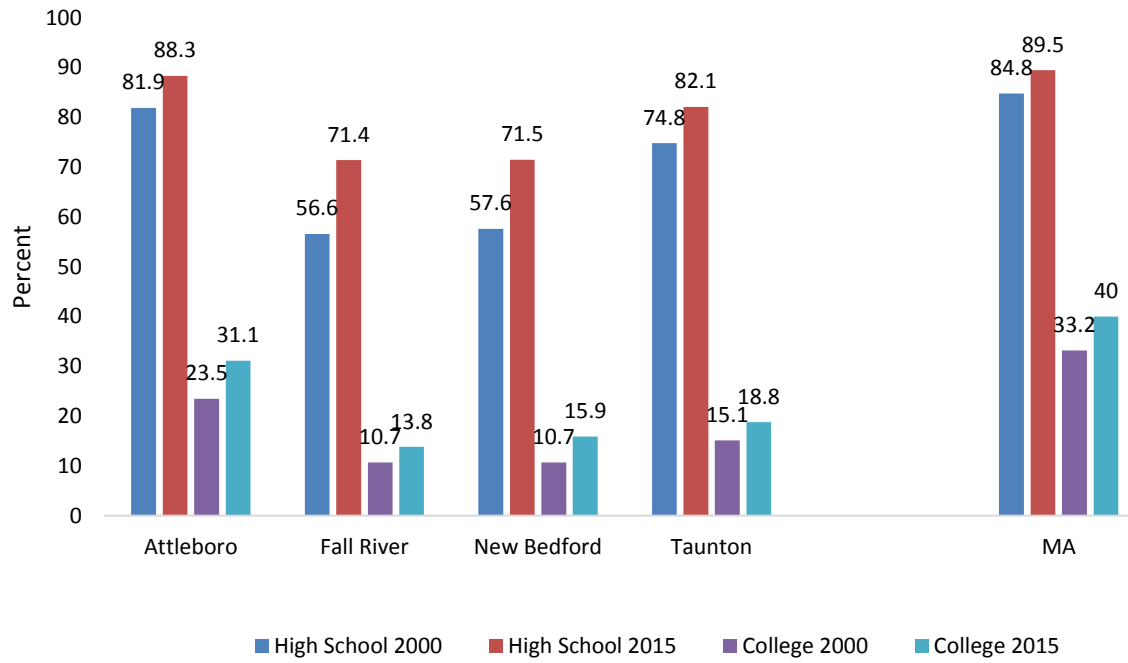
Furthermore, as presented in Fig C. Median Age Comparison, 2000 – 2015, Southeastern Massachusetts is aging faster than the state with a median age of 43 years compared to 39.3 years for the state. The population aging may be an early warning sign to accelerate the need for various types of services in the region in addition to grow an educated and higher skilled workforce.

4. Education

The educational attainment rates of the region’s adult population (25 years and over) in cities for 2000 and 2015 are examined along with the state and national rates in Fig. D.

The data revealed that the two cities (Fall River and New Bedford) in the region showed significant improvement in high school completion and beyond from 2000 to 2015. Fall River had the lowest high school completion rate in the 2000s, but made considerable progress in 2015. New Bedford had similar success, following slightly behind Fall River.

Fig. D. Educational Attainment in SRPEDD Cities, 2000 and 2015



Source: U.S. Census Bureau

The largest two cities in the region, Fall River and New Bedford had the lowest educational attainment levels in 2000, however both cities achieved significant strides as of 2015. This signals an increased level of expectation for the area’s workforce as it improve competitiveness and attracts higher-skilled, higher wage employment opportunities through innovation, life sciences and other emerging industry sectors.

5. Income

The SRPEDD region has pockets of economically distressed areas as well as affluent communities. Table 2 identifies the median household and per capita incomes of the cities in the region, including the income levels of the counties, state and nation.

In both 2000 and 2015, the cities in the region with the exception of Attleboro had median household incomes significantly below that of the state.

Attleboro's higher income level can be attributed to the city's proximity to jobs in the metro areas of Providence and Boston, as well as the workforce accessibility to the commuter rail service.

Additionally, the city offers a specialized, higher-paid, higher skilled manufacturing labor force (jewelry, surgical instruments, etc.), which correlates to higher-than-average salaries compared to other manufacturing sectors in the region.

	Median HH Income		% Change	Per Capita Income		% Change
	2000	2015		2000	2015	
Attleboro	\$50,807	\$67,736	33%	\$22,660	\$31,498	39%
Fall River	\$29,014	\$35,213	21%	\$16,118	\$21,718	35%
New Bedford	\$27,569	\$37,574	36%	\$15,602	\$21,665	39%
Taunton	\$42,932	\$53,058	24%	\$19,899	\$26,816	35%
Bristol County	\$43,496	\$55,992	29%	\$20,978	\$27,005	29%
Plymouth County	\$56,615	\$75,459	28%	\$24,789	\$36,163	45%
Massachusetts	\$50,502	\$65,011	29%	\$25,952	\$33,408	29%
U.S.	\$41,194	\$54,058	31%	\$21,587	\$27,789	29%

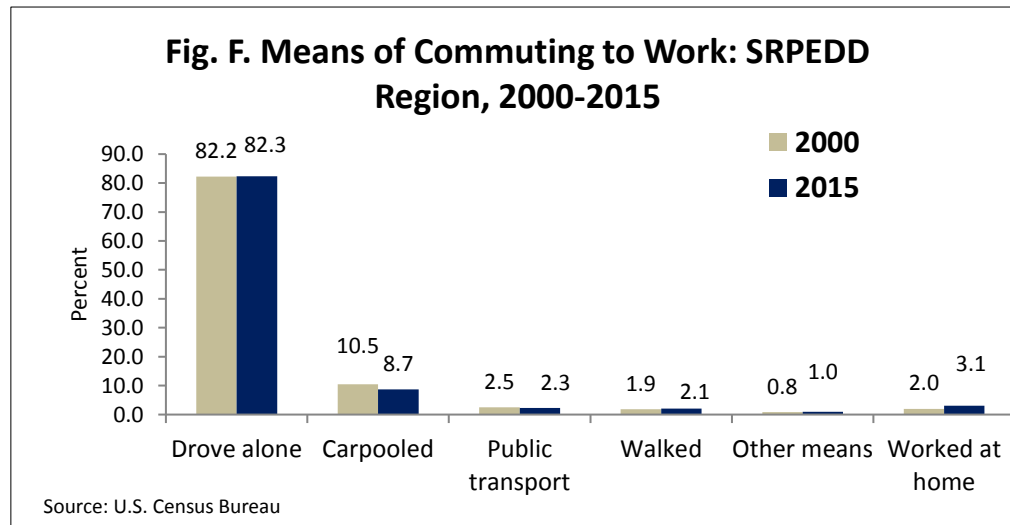
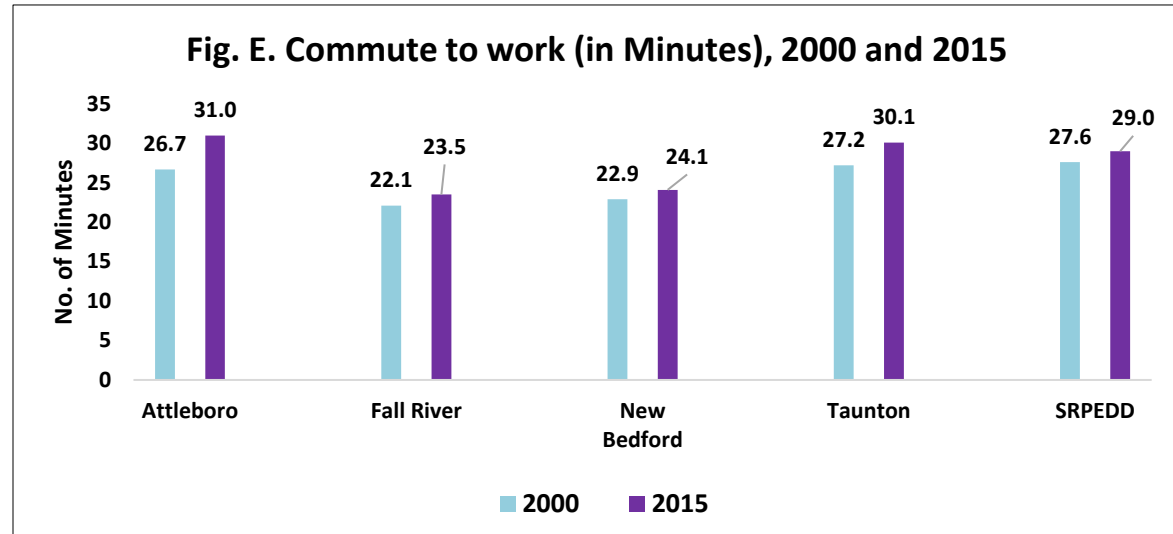
Source: US Census 2000 and ACS 2015

Per capita income levels for all of the region's cities were lower than the state median. In comparing regional and state income levels with the nation, state and Plymouth County, incomes were higher; however, Bristol County was slightly lower than the nation in 2015.

As technology and automation continues to evolve in the manufacturing sectors of the cities, particularly Fall River, New Bedford, and Taunton, other industry sectors (i.e. medical, healthcare, life science, electronics and, instruments) have emerged to broaden the regions diversity, increase the employment base and improve competitiveness.

6. Commute to Work

Figure E shows that overall, the region’s workers had an average commute time of 27.6 minutes in 2000, and by 2015, their commute increased to 29 minutes. Attleboro workers had the largest increase of an additional 4 minutes more from 2000 to 2015. This could be attributed to commuter rail delays as well as congestion on highways and interstate corridors. Fall River and New Bedford workers had no significant increase in their commute to work over the 15-year period.



The distribution of how workers around the region commuted to work from 2000 to 2015 is shown in Fig. F. The data demonstrates that between 2000 and 2015 the majority of regional workers who drove alone to work remained constant, and those who carpoled and used public transit decreased. Meanwhile, those who walked, used other means or worked at home increased.

Telecommuting has become popular with accessible technology and the availability of high-speed broadband connectivity enabling increased opportunities to work from home.

B. ECONOMY

1. Employment by Sector

Since 2000, employment by industry data has been compiled under the North American Industry Classification System (NAICS) categories. The recent advances in technology (such as computerization) and telecommunication (i.e., internet, cable, broadband, satellite, and cloud technology) expanded the range of industries and created new types of employment which the former standard industrial classification (SIC) system was not designed to address.

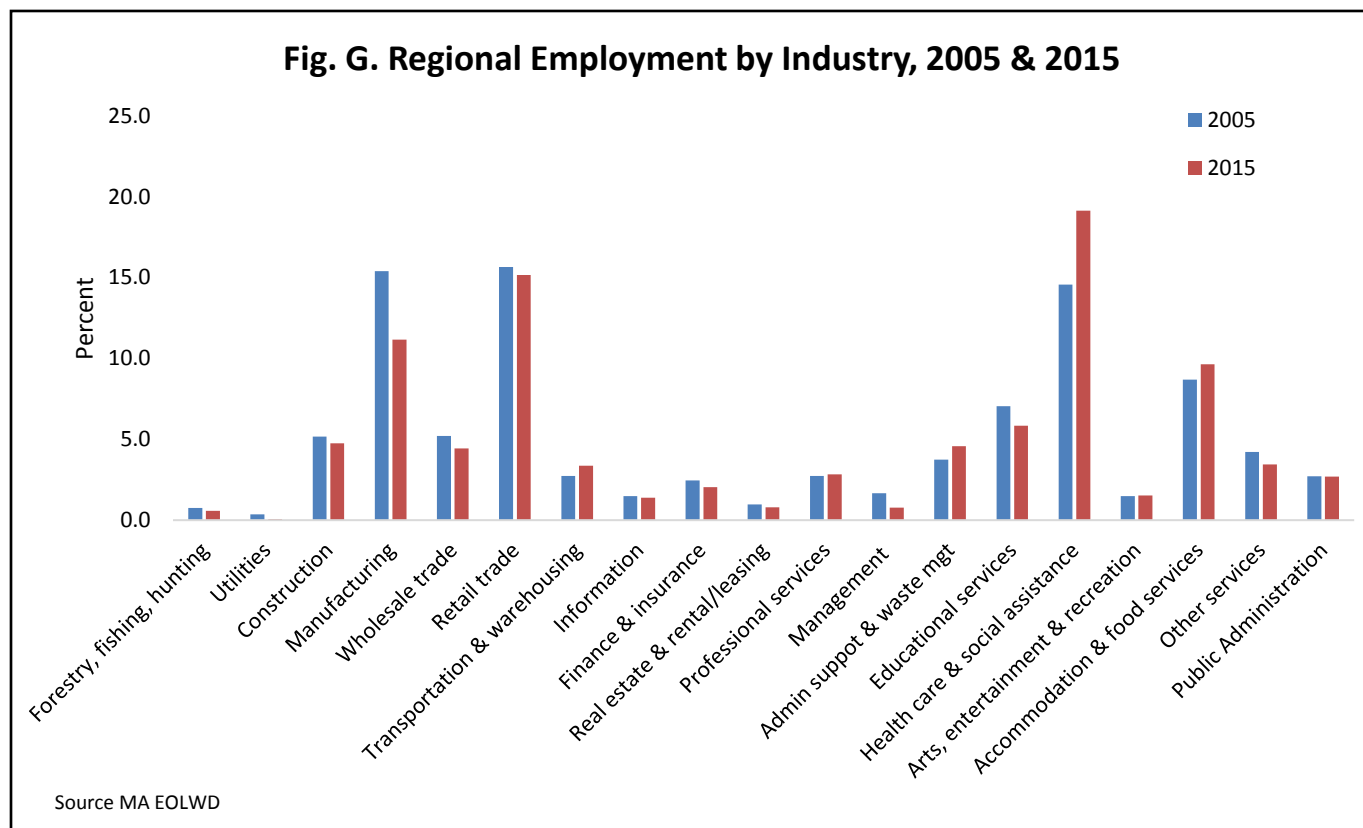
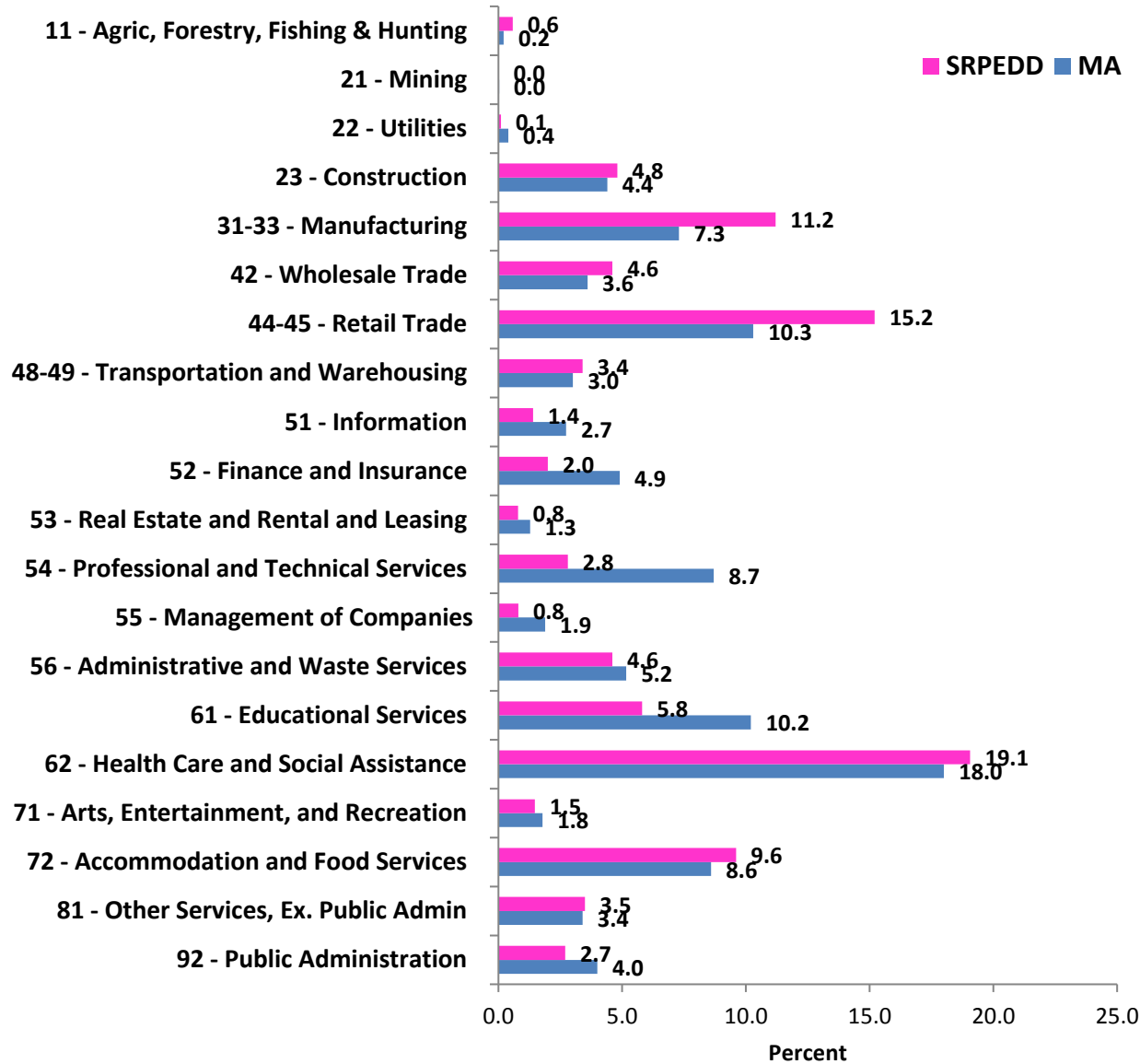


Fig. G depicts a breakdown of regional employment by industry in 2005 and 2015.

The regions employment by industry suffered in the late 2000s, as a result of the global economic crisis and has not fully rebounded as of this date. However, in 2015 the leading sectors that continue to increase employment are Health Care and Social Assistance, Transportation & Warehousing, Administrative Support, and Accommodation and Food Services.

Fig. H. Region vs. State Employment by Industry, 2015



Source: MA EOLWD

Fig. H compares regional and state employment by industry in 2015.

The data demonstrate that the region led the state in employment in the following industry sectors: Agriculture/ Fishing, Construction, Manufacturing, Wholesale and Retail Trade, Health Care, and Accommodation and Food Services in 2015. Sectors where the region fell short included Information, Professional Services, Educational Services, Management, Services, Administrative Support, and Finance & Insurance.

In the long term, SRPEDD regional workforce maybe be face with a future

challenge where innovation technology is incorporated across all industries sectors, requiring a more highly educated workforce, including those emerging innovation industries that will need access to available financial and venture capital resources to innovative and remain competitive. Both elements where SRPEDD lags behind the state and nation.

A. Agriculture

Agricultural Census are prepared every five years. In Table 3, figures for the latest available years covering two decades (1992-2012) for the region and the state are presented.

Table 3. Agriculture: Bristol County vs. State. 1992-2012					
		1992	2002	2012	% change 1992- 2012
Farms					
	MA	5,258	6,075	7,755	47.5
	Bristol County	523	624	717	37.1
Land in Farms (acres)					
	MA	526,440	518,570	52,517	-0.6
	Bristol County	34,235	36,085	34,869	1.9
Average Size of Farms					
	MA	100	85	68	-32.0
	Bristol County	65	58	49	-24.6
Total Cropland (farms)					
	MA	4,853	4,898	5,249	8.2
	Bristol County	482	477	477	-1.0
Average market value of products sold per farm (\$1,000)					
	MA	\$66,687	\$63,262	\$63,470	-4.8
	Bristol County	\$56,624	\$47,053	\$52,522	-7.2
Source: USDA Census of Agriculture					

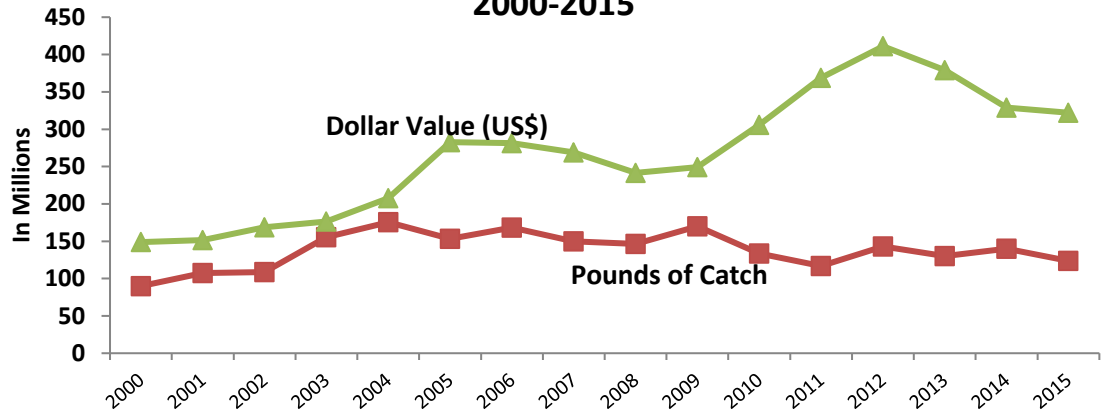
Agriculture in the SRPEDD region remains a major industry. Table 3 identifies changes in the past two decades, which has resulted in a higher number of farms but a reduction in the average size of farms. Cranberry production is a major agricultural activity in the region in addition to dairy and produce operations and account for the farm numbers.

Bristol County is the third leading cranberry-growing area in the state, which in turn ranked second among states producing this crop in 2012. Total croplands has remained stable from 2002 to 2012.

B. Fishing

The port of New Bedford continues to lead the nation's ports in volume and dollar value of fish landings, mainly due to the high price of scallops (Fig. 1).

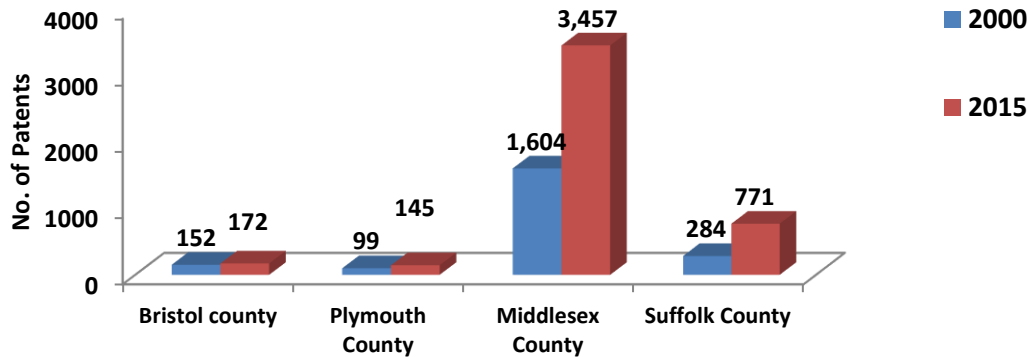
Fig. I. Commercial Fish landings in New Bedford, 2000-2015



Source: NMFS

Although New Bedford is a leader in the fishing industry, the sector does not necessarily translate to high skilled labor, nor to high employment numbers, inasmuch as the processing and distribution system involved in seafood production and distribution do not require highly educated or very skilled work force. Additionally, there is always a looming threat of imposed catch restrictions based upon depleted fish supplies and threatened or endangered species in the nation’s waters.

Fig. J. Number of Patents Granted: Selected MA Counties, 2000 and 2015



Source: USPTO

C. Patents Granted For Inventions

Fig. J shows the number of total utility patents granted by the U.S. Patent office to selected counties in Massachusetts for 2000 and 2015.

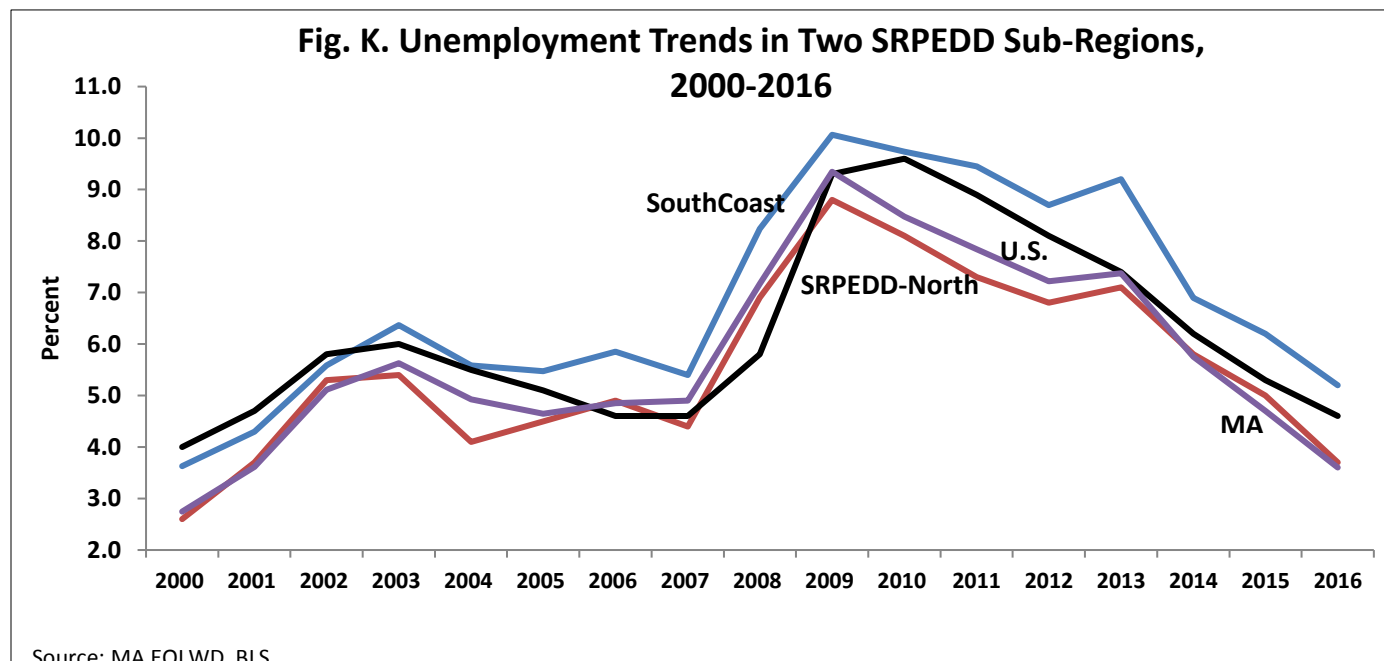
Despite the lack the resources in the area’s state-run colleges and universities, and research-oriented institutions, the region manages an annual modest number of patents for technological innovations, even if they do not generate as many patents from institutions in the metropolitan counties.

2. Unemployment

Unemployment rates over time are better examined when the SRPEDD area is divided into two sub-regions: with Northern Region covering, the cities of Attleboro and Taunton including inland communities, and with the Southern Region (SouthCoast) encompassing all the coastal towns including the two larger cities of Fall River and New Bedford.

Fig. K compares the unemployment rates of the two sub-regions in the SRPEDD area with the state and national rates.

It is clear from the data that from 2000 to 2015, SRPEDD's Northern sub region (Attleboro, Berkley, Carver, Dighton, Lakeville, Mansfield, Middleborough, North Attleborough,

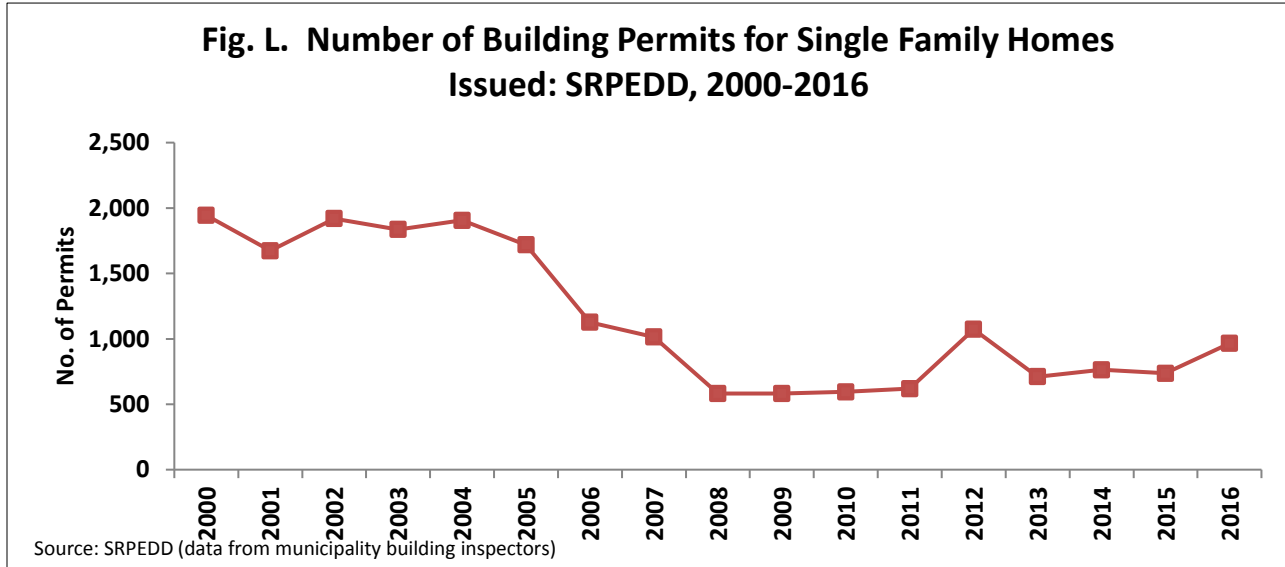


Norton, Plainville, Raynham, Rehoboth, and Taunton) maintained unemployment rates that were lower than the state level, especially soon after 2005 and in 2015. On the other hand, the SouthCoast (Acushnet, Dartmouth, Fairhaven, Fall River, Freetown, Marion, Mattapoisett, New Bedford, Rochester, Seekonk, Somerset, Swansea, Wareham, and Westport) had consistent higher unemployment rates than the state and nation over the same period.

This variation in unemployment conditions between the two SRPEDD regions is mostly attributable to the type of companies and businesses found in the two sub-areas. The northern inland communities of SRPEDD have more high-skilled labor and stable manufacturing jobs, while the SouthCoast have been hit by factory closings in the last decades.

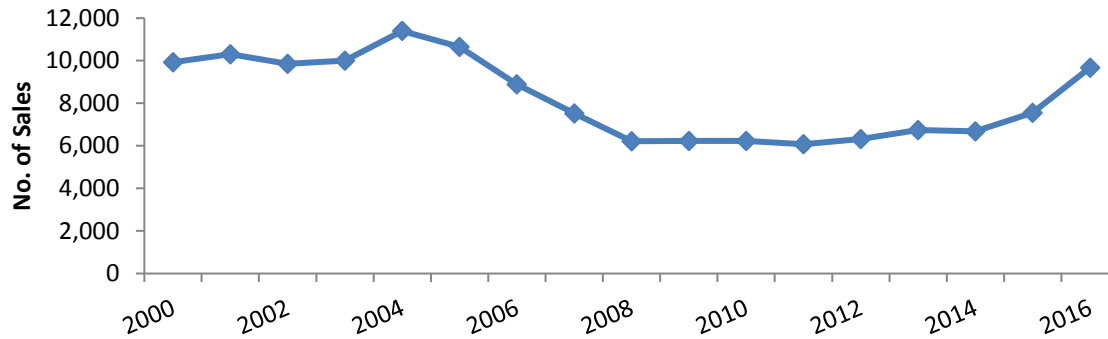
C. Housing

The response of the region’s municipalities to the economic recession is evident in the slowdown of construction and sales of residential housing. Fig. L illustrates the number of building permits issued by the communities in the region from 2000 to 2015.



As the data show, the economic slump and housing market downturn in the mid-2000s drastically restrained the issuance of building permits in the region. The latest figures for 2016 seem to indicate a slight recovery nearing the 2012 numbers for single residential permits issued in the region, which might have some impact on the real estate and construction sectors in the region.

**Fig. M. Trend in Sales of New Homes (All Types):
SRPEDD, 2000-2016**

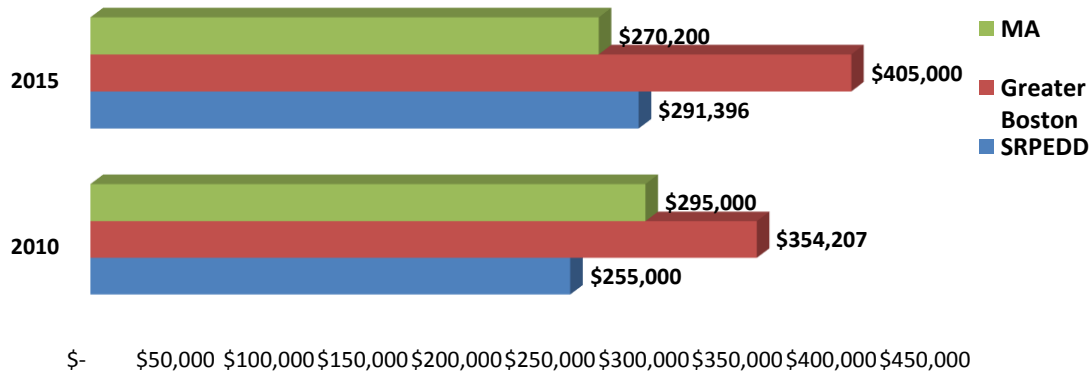


Source: Banker & Tradesman

The trend in regional housing sales from 2000 to 2016 is illustrated in Fig. M.

Consistent with housing market conditions, sales of single residential homes in the region have been decreasing since the mid-2000s and fell to its lowest level in 2008. Following 2014, home sales have been steadily increasing as identified in the Fig. M.

Fig. N. Costs of Single Family Homes, 2010 and 2015



Sources: The Warren Group and, *The Greater Boston Housing Report Card 2015* (For the Boston Foundation by the Dukakis Center for Urban and Regional Policy, Northeastern University)

Fig. N compares the average costs of new single-family homes for the years 2010 and 2015, for SRPEDD area, Greater Boston, and statewide.

The price of housing in the region is considerably lower than the Metro Boston prices but over this period, prices for the region have increased more than the state, as the data reveals.

Although housing costs have been a factor contributing to the region's growth, families are struggling to find more affordable housing costs.

D. KNOWLEDGE-BASED INNOVATION ECONOMY

The ability to create new ideas, products, and services continuously is a critical element in economic development. In today's economy, it's not just goods or services that drive prosperity but the ability, both individually and collectively, to generate and apply knowledge.

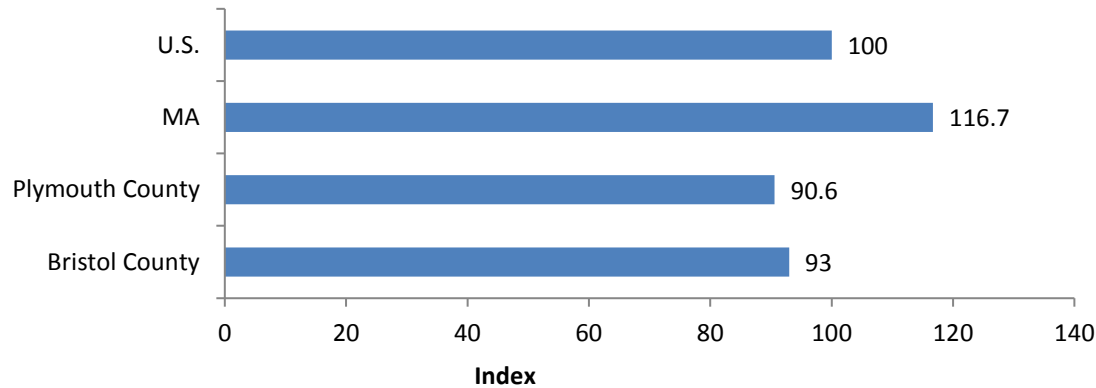
The 2015 EDA-sponsored project called "*Crossing the Next Regional Frontier*" served as the guide for information and analytics linking regional competitiveness to investment in a knowledge-based economy. The program guides regions on how to bridge the gap between workforce and economic development in their planning strategies through some innovative tools for data analysis.

One of these "tools" is the **Innovation Index** which takes a broad look at innovation-related indicators that determine a region's **input** elements that characterize the place and its people, and **output** measures that describe its economic success and performance. The Index takes into account various characteristics of the labor force (education, population growth rate, occupational mix, high-tech employment, patent activity), venture capital, broadband density, as well as an area's unemployment rates, poverty, migration, and personal income.

1. INNOVATION INDEX

The pre-calculated 2014 Innovation Index is available for counties throughout the nation. Inasmuch as Bristol County encompasses 90 percent of the SRPEDD's population and Plymouth County covers 7 of the region's 27 municipalities, the Innovation Index for these counties are used to represent the region's, and are compared with Massachusetts' and the U.S. in Fig. O.

Fig. O. Innovation Index, 2014



Innovations in American Regions (www.statsamerica.org). A project partly funded by US EDA at the Purdue Center for Regional Development and Indiana University Kelley School of Business.

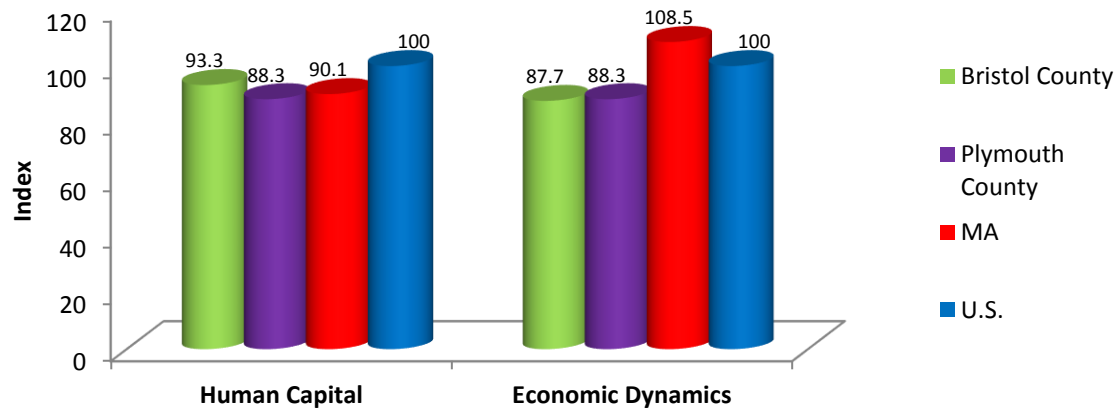
Fig. O illustrates that in 2014, with US serving as the standard level for the Overall Innovation Index, Massachusetts scored higher than the nation, while Bristol County and Plymouth Counties fell short of the state and national levels.

Two dimensions are used to look at the four sub-indices that comprise the Innovation Index, namely 1) *Inputs and Capacity*, and 2) *Outputs*. Using GDP per capita at the county level as the dependent variable, regression models came up with estimates of weights for four components of the Index: Human capital (30%), Economic Dynamics (30%), Productivity and Employment (30%), and Economic Well-Being (10%).

A. INPUT AND CAPACITY COMPONENT OF THE INNOVATION INDEX

This dimension consists of two sub-indices, namely, *Human Capital*, and *Economic Dynamics*, both accounting for over half (60%) of the overall index. The *Human Capital* sub-index measures population growth rate, college education, and high-tech employment. Meanwhile, *Economic Dynamics* covers R&D investments, venture capital investment, broadband density, and business churn (defined as the birth and contraction of firms).

**Fig. P. Inputs & Capacity Components of the Innovation Index
2016**



Innovations in American Regions (www.statsamerica.org). A project partly funded by US EDA at the Purdue Center for Regional Development and Indiana University Kelley School of Business.

The index scores for Bristol and Plymouth Counties in 2016 are compared with the state and national levels in Fig. P.

Focusing on the *Human Capital* sub-index (Fig. P), Bristol County scored higher than Plymouth County and the state but was below the nation for 2016. This underlines the need for higher rates of college education and high-tech employment at the county and state levels.

The second sub-index for Input and Capacity is *Economic Dynamics* identifies Massachusetts with a higher score compared to the nation in 2016 and both counties had

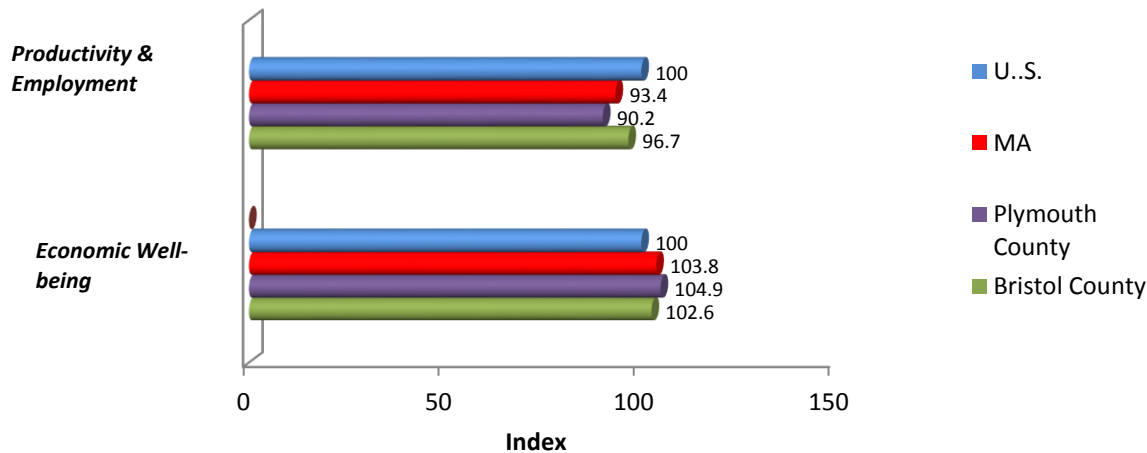
scores lower than the state and nation but Plymouth County has higher than Bristol.

These findings suggest that more intense research activity, venture capital investment, more high-powered internet capability, and active business transactions are going on in the state compared to the country. The need for some activities and capital infusion are also requisites for both Bristol County and Plymouth County in order for the counties' indices to rise.

B. OUTPUT MEASURES OF THE INNOVATION INDEX

This second dimension of the Innovation Index also includes two sub-indices: Employment and *Productivity* (30%), and *Economic Well-Being* (10%). The *Employment and Productivity* sub-index covers growth in high-tech employment share, job-to-population growth ratio, patent activity, and Gross Domestic Product. The *Economic Well-being* sub-index on the other hand, reflects unemployment and poverty rates, net migration, and growth in per capita personal income.

Fig. Q. Output Components of the Innovation Index 2016



Innovations in American Regions (www.statsamerica.org). A project partly funded by US EDA at the Purdue Center for Regional Development and Indiana University Kelley School of Business.

Fig. Q compares the scores in Output Components sub-indices for Bristol and Plymouth Counties, Massachusetts and the U.S. in 2016.

The data illustrates that under Productivity and Employment Massachusetts and the two counties (Bristol and Plymouth) were below the National index level in 2016. Although, Bristol County’s level was higher than the state and Plymouth County.

Considering Bristol County’s traditional production of apparel products from its old

textile mills had recently shifted to factory automation and manufacture of advanced materials, subassemblies and components, and energy-related products. Furthermore, primary metal and jewelry manufacture in the area have diversified into surgical and medical instruments, and electronics parts, thereby generating patents for inventions around 2000. Hence, the data registers a somewhat higher score in *Employment and Productivity* for Bristol County than Plymouth County.

Additionally, the data show that the state as well as both counties in the region enjoyed higher index scores for *Economic Well-Being* index when compared to the nation in 2016.

2. KNOWLEDGE AND TECHNOLOGY-INTENSIVE INDUSTRY CLUSTER ANALYSIS

Table 4. Innovation-Related Industry Clusters Employment, 2016			
	MA	Bristol	Plymouth
		County	County
Total All Industries	3,242,273	210,262	175,883
Advanced Materials	4.9	4.6	2.6
Agribusiness, Food Processing & Technology	0.9	1.0	1.5
Apparel & Textiles	0.4	0.6	0.6
Arts, Entertainment, Recreation & Visitor Industries	3.4	3.1	2.9
Biomedical/Biotechnical (Life Sciences)	15.1	14.5	13.3
Business & Financial Services	10.7	3.4	6.2
Chemicals & Chemical Based Products	1.1	0.9	0.8
Defense & Security	6.3	3.9	4.2
Education & Knowledge Creation	5.4	1.8	2.3
Energy (Fossil & Renewable)	3.8	3.5	3.2
Forest & Wood Products	0.5	6.7	0.3
Glass & Ceramics	0.2	0.2	0.3
Information Technology & Telecommunications	7.0	3.5	2.1
Transportation & Logistics	1.8	2.1	1.3
Manufacturing Supercluster	3.6	3.9	2.5
Mining	0.1	0.0	0.1
Printing & Publishing	1.8	1.2	1.1
Total Employment in Clusters (%)	67.0	54.9	45.3
Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment & Wages (QCEW) and Purdue Center for Regional Development (cluster definitions).			

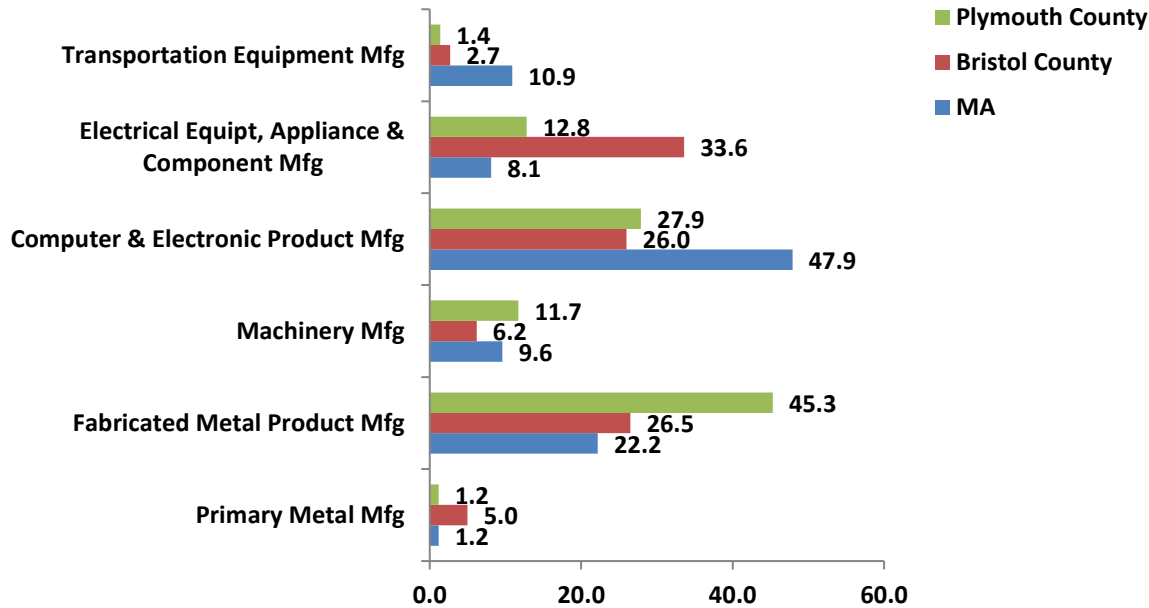
Collaboration in planning for a global economy requires bringing public, private, and non-profit economic agents to capitalize on new ideas quickly – a “knowledge and technology intensive economy”. A region’s structural economic analysis provides an insight into the dynamics of the region strengths and weaknesses, and its potential for short and long-term growth.

Employment data by industry cluster in 2012 using NAICS 3-digit categories from the Bureau of Labor Statistics and Purdue Research Center presents the percent distribution of clusters for Bristol and Plymouth Counties’ and Massachusetts in Table 4.

The data show that 67% of the states, nearly 55.0% of Bristol County’s, and about 45% over of Plymouth County’s total employment in 2016 were classified into the innovation-related industry clusters.

Fig. R provides a breakdown of employment shares in the Manufacturing Supercluster components in 2013 and compares the regions counties and the state.

Fig. R. Percent Share in Manufacturing Supercluster, 2013



Note: Pre-calculated employment numbers are based on 3-digit NAICS classification levels.

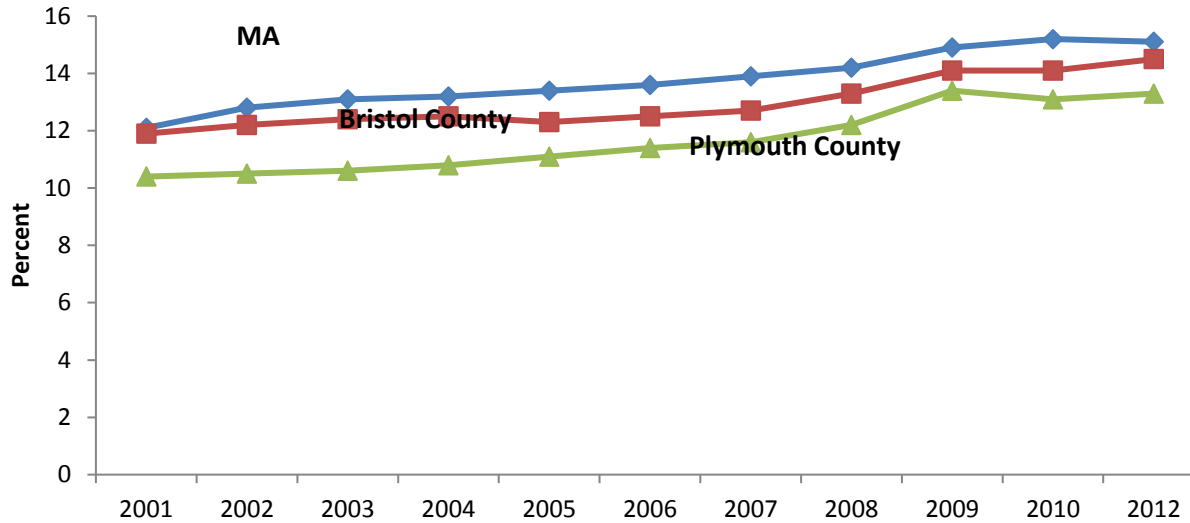
It is evident from the data that in 2013, the manufacture of Computer and Electronic Products Manufacturing leads with the most employment in the state.

Electrical Equipment and Appliance and Component manufacture employed the most jobs in Bristol County, while the lead-employment cluster in Plymouth County in 2013 was Fabricated Metal Manufacturing.

Another innovation-related cluster deserving a closer examination is the Biomedical/ Biotechnical (Life Sciences) Industry in the region and the state. This cluster includes the manufacture of the following: 1)

Pharmaceutical and medicine, 2) Optical instruments and lenses, 3) Electromedical and electrotherapeutic apparatus, 4) Analytical laboratory instruments, 5) Irradiation apparatus, 6) Medical, dental, and hospital equipment and supplies, 7) hazardous waste treatment and collection, and other scientific, health and development services.

Fig. S. BioMedical/Biotechnical Industry Cluster Percent Share of Total Employment, 2001-2012



Source: BLS QCEW and Purdue Center for Regional Development

Fig. S illustrates a growing industry across the state, as well as in the two counties. The increasing employment in Bio-medical/Bio-technical and life sciences products and services in the state might be traceable to the presence of various research and laboratory institutions in the area.

Furthermore, the manufacture of highly-specialized surgical and medical instruments and imaging apparatus in Bristol County complement this trend. Thus, the analysis of clusters provides a lens by which to view the region's economic advantages and its heads in positive direction for the region to build its competitiveness in the future.