



Mass Benchmarks

A JOURNAL OF THE MASSACHUSETTS ECONOMY

Massachusetts Economy
Expansion Strongest Since 2000:
Rising Tide Is Beginning to Lift
More Boats but Challenges Remain

Massachusetts Tech Sector
Gaining Momentum in the Wake
of the Great Recession

Small Cities, Big Ideas: Lessons
from the First Year of the
Working Cities Challenge

Targeted Redevelopment
Assistance to Strengthen
Massachusetts Gateway Cities

MassBenchmarks

2015 | volume 17 issue 1

MassBenchmarks, published by the University of Massachusetts in cooperation with the Federal Reserve Bank of Boston, provides timely information about the Massachusetts economy, including reports, commentary, and key data about the state's regions and industry sectors that comprise them.

The editors invite queries and articles on current topics involving the Massachusetts economy, regional economic development, and key growth industries from researchers, academic or professional economists, and others. A topical outline and brief biography of the author should be sent to info@donahue.umassp.edu.

A complete list of past issues, latest news, updates, and additional research on the Massachusetts economy can be found at www.massbenchmarks.org.

Editorial Transitions

Two key contributors are stepping down from their editorial responsibilities at *MassBenchmarks*. **Yolanda Kodrzycki**, who has brought insight and integrity to the journal, is stepping down as its co-editor. She is also retiring from her role as director of the New England Public Policy Research Center at the Federal Reserve Bank of Boston. **Andrew Sum**, recently retired from Northeastern University, is leaving the journal's Board of Editors. A compelling presence on the Board, Andy and his vision will be missed.

At the same time, *MassBenchmarks* welcomes three editors. **Katherine Bradbury** of the Federal Reserve Bank of Boston and a member of the journal's Board of Editors becomes the journal's co-editor. **Alicia Sasser Modestino** of Northeastern University and **James Stock** of Harvard University have joined the Board of Editors. Professor Stock's appointment marks his return to the Board following his tenure on the President's Council of Economic Advisors.



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FROM THE PRESIDENT



This issue of *MassBenchmarks* focuses our attention on the challenges facing the Commonwealth's urban communities, highlights some innovative and promising efforts to improve social and economic conditions in some of our most disadvantaged cities, and reminds us of the importance of innovation and technology to our economy.

The issue opens with an assessment of the state of the state's economy, authored by the UMass Donahue Institute's Daniel Hodge and UMass Amherst Professor Robert Nakosteen. Hodge and Nakosteen document the continued expansion of the state economy and offer some encouraging insights into what they describe as a rising economic tide, which is now lifting more but still not close to all boats. While conditions are clearly improving, they identify three issues that weigh on the state's economic outlook: the Commonwealth's uncertain fiscal condition, rising income inequality, and the manageable but very real impact of this past winter's record snowfall.

This issue's two feature articles explore current conditions in our dynamic tech sector, which has been a growth driver for the state in recent years, and identify some important lessons that policymakers can glean from the Federal Reserve Bank of Boston's groundbreaking Working Cities Challenge.

In the first feature, the UMass Donahue Institute's Branner Stewart and Rebecca Loveland examine the recent performance of the state's broadly defined tech sector. They find that in the years since the Great Recession this industry has, "strengthened its position as a leading engine for growth in Massachusetts as a significant driver of employment and economic output."

In the second feature article, the Fed's Senior Community Development Analyst and UMass Dartmouth alumna Colleen Dawicki and Tamar Kotelchuk, who directs the Working Cities Challenge, share important insights that are emerging from their work in six Massachusetts cities. They identify several key lessons that deserve the careful attention of state and regional policymakers and highlight the important role that collaboration, community engagement, and evidence-based decision-making play in achieving positive change in some of the state's most disadvantaged communities.

And finally, in this issue's Endnotes, Jay Ash, Secretary of Housing and Economic Development, and MassDevelopment President and CEO Marty Jones describe the Transformative Development Initiative (TDI) for Gateway Cities. Notably, this approach builds on successful previous efforts and has been designed to align with the Working Cities Challenge. This exciting initiative promises to provide the Commonwealth's Gateway Cities with much-needed technical assistance and investment capital.

The insights in this issue of *MassBenchmarks* remind us of the perennial challenge we face in extending the opportunity to fully participate in the success of our Commonwealth to every corner of our great state. As we have since our founding, the University of Massachusetts stands ready to do its part in helping us get there.

A handwritten signature in black ink that reads "Robert L. Caret". The signature is written in a cursive, slightly stylized font.

Robert L. Caret, President

EXCERPTS FROM THE BOARD

While February's severe snowstorms may have temporarily slowed the Massachusetts economy, they do not appear to have derailed the healthy expansion that the Commonwealth has been experiencing in recent quarters. However, it is clear that selected sectors of the economy have been hurt by the storms, particularly in those cases where economic activity has been permanently lost rather than postponed. For example, dinner reservations that were cancelled on Valentine's Day will probably not be made up later, though automobile purchases postponed on President's Day will likely be made up when the weather permits. And some sectors of the economy benefited from the storms, including snow removal services, roofing contractors, plumbers, and even some Boston hotels that registered high occupancy rates when critical health care workers felt compelled to stay overnight in Boston in the absence of reliable public transportation.

The Board expects that the overall negative effects on the state economy will be relatively small and transient, but with a disproportionate impact on low-income workers who are paid by the hour and who do not get paid when they do not work. While the precise scale of the economic losses is difficult to estimate reliably, widely cited estimates of over a billion dollars represent a modest fraction of annual economic activity in the state.

The prospects for a continuing expansion are good. In 2014, the U.S. economy had its best year since before the financial crisis and national forecasters are generally expecting steady growth in 2015. The state's high technology sector, which helped protect the state from the worst of the recession, continues to do well and has been steadily adding high-paying jobs.

Nationally, though employment has been growing strongly and unemployment declining steadily, internationally growth prospects remain subdued. Continuing lackluster economic performance is expected in Japan and Europe, and the Chinese economy is slowing. This sluggish global growth and the strengthening dollar both put downward pressure on state export activity. But while these developments bear watching, the outlook for both the state and national economy remains strong.

The state clearly faces a number of serious long-term challenges. Our historic winter weather has highlighted the vulnerability of the state's public transportation system, especially in and around Boston. It has long been acknowledged that outdated equipment and deferred maintenance have weakened the T and its bus, rapid transit and commuter rail systems, but record snowfall revealed a degree of fragility in the state's largest transit system that came as a surprise to employers and commuters alike. The scale of the Commonwealth's transportation challenges extends well beyond the MBTA and includes roads, bridges, and regional transit systems in every corner of the state.

The state's electric power system also faces long-term challenges. The transition from coal-fired to gas-fired electric generation has created severe bottlenecks in gas supplies. Increased gas pipeline capacity is needed, but is strongly resisted in areas that would be affected. Electricity prices have increased sharply this year, largely as the result of these natural gas supply constraints. Should energy costs remain high, the state economy will pay a high price both in terms of reduced levels of consumer spending and business activity.

Another long-term challenge concerns the loss of skills and experience in the state labor force as baby boomer retirements accelerate. The state's knowledge economy requires a highly educated work force, and ensuring the availability of qualified replacements for our retiring workers will be essential to preserving one of the major competitive advantages of Massachusetts.

Bottom line, the prospects for continued economic expansion in the state are very good. However, several long-term challenges weigh on our future growth prospects and deserve the serious attention of state leaders.

*Prepared by Executive Editor Robert Nakosteen
March 24, 2015*

THE STATE OF THE STATE ECONOMY
ECONOMIC CURRENTS



Massachusetts Economy Expansion Strongest Since 2000: Rising Tide is Beginning to Lift More Boats but Challenges Remain

THE MASSACHUSETTS ECONOMY IS POISED FOR STRONG AND STEADY ECONOMIC GROWTH. ECONOMIC DATA POINTING TO THIS TREND INCLUDE STRONG GAINS IN STATE AND NATIONAL GDP AND RISING EMPLOYMENT, INCLUDING THE HIGHEST ANNUAL JOB GROWTH — IN 2014 — SINCE 2000.

DANIEL HODGE AND ROBERT NAKOSTEEN

INTRODUCTION

Following the Great Recession, the state has experienced steady, if at times modest, economic expansion. Last year started inauspiciously, as first quarter economic performance was negatively influenced by severe weather. Since that slow start, however, growth in 2014 was steady and strong and indications are positive for continued growth into 2015. This strength is reflected in a variety of economic data. Gross domestic product, both for the nation and the state, has experienced strong growth from the second quarter of 2014 to the first of the year. Employment has been rising consistently since late 2009 and Massachusetts recorded the highest level of annual job growth in 2014 (over 60,000) since 2000. The state unemployment rate, after rising briefly last summer, has resumed its downward trend and is comfortably below six percent. The state's exports have continued to grow, steadily if not dramatically. The recent growth trends are more akin to what we've been hoping for ever since the recovery started in 2010, and this is reinforced by the favorable macroeconomic trends for the nation.

Detracting somewhat from the generally positive picture is the stagnation of housing construction. Reflected in both permitting and starts, there has been inconsistent growth in this sector for the past two years. And there are other reasons to constrain our optimism for future growth. The European Union, the state's largest trading bloc of countries, continues to stagnate, and the Euro Zone is threatened with the prospect of a deflationary episode. Asian growth has slowed considerably. Both of these developments are reflected in flat export numbers for both the European Union and Asia for the past five years. Also clouding our optimism is the state's current and

upcoming fiscal challenges with a \$768 million budget deficit for the current fiscal year ending June 30 (actions have been taken by the governor and legislature to close that deficit), and the upcoming year with a deficit estimated to be approximately \$1.8 billion.¹ Finally, there is growing awareness nationally and in Massachusetts about rising income inequality between our most wealthy and very highest earners compared with the majority of workers and households that have experienced fairly flat wage and income growth over the past few decades.

Despite these cautionary notes, the economic news at the moment is as positive as it has been since the expansion of the 1990s. Now on firm footing, the state's economy seems poised for continued, steady and strong economic growth.

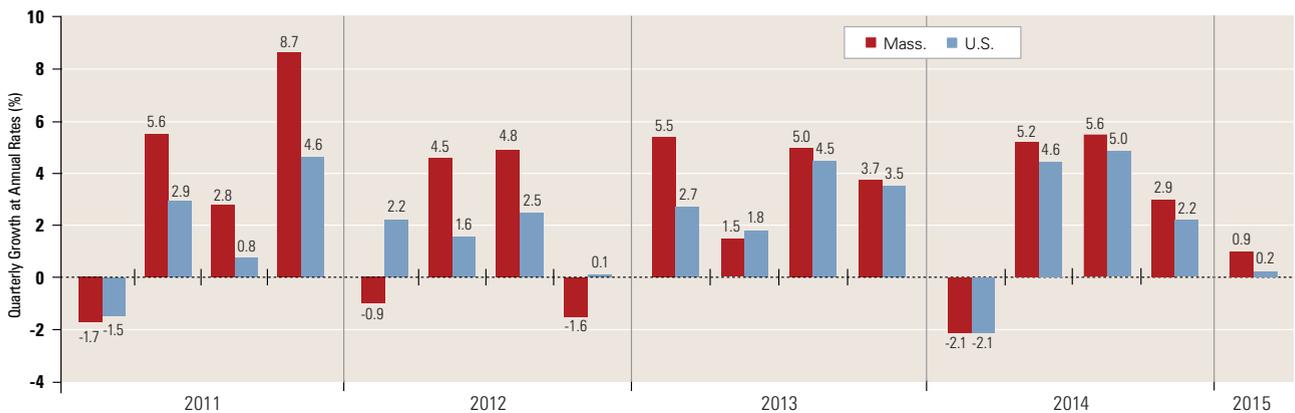
STATE OF THE STATE ECONOMY

Output, Employment, and Unemployment

As measured by the *MassBenchmarks* Current Economic Index, a proxy for gross state product (GSP), the state expanded robustly in 2014 after negative growth in the first quarter of 2014. The weak performances in the first quarters of 2014 and 2015 are somewhat misleading, based not so much on economic weakness as on severe weather that greatly impeded economic activity nationally and in Massachusetts. Even so, the bounce back from the first quarter of 2014 is impressive. Since the first quarter of last year, the state's economy has grown at an annualized rate exceeding the nation's generally positive economic performance.

Since its low point in October of 2009, total state employment has grown virtually uninterrupted up to the present. Since that low point, employment has grown

Figure 1. Growth in Real Product, Massachusetts and U.S.



Source: U.S. data from the U.S. Bureau of Economic Analysis (BEA); Massachusetts data from *MassBenchmarks*; Calculations by Alan Clayton Matthews

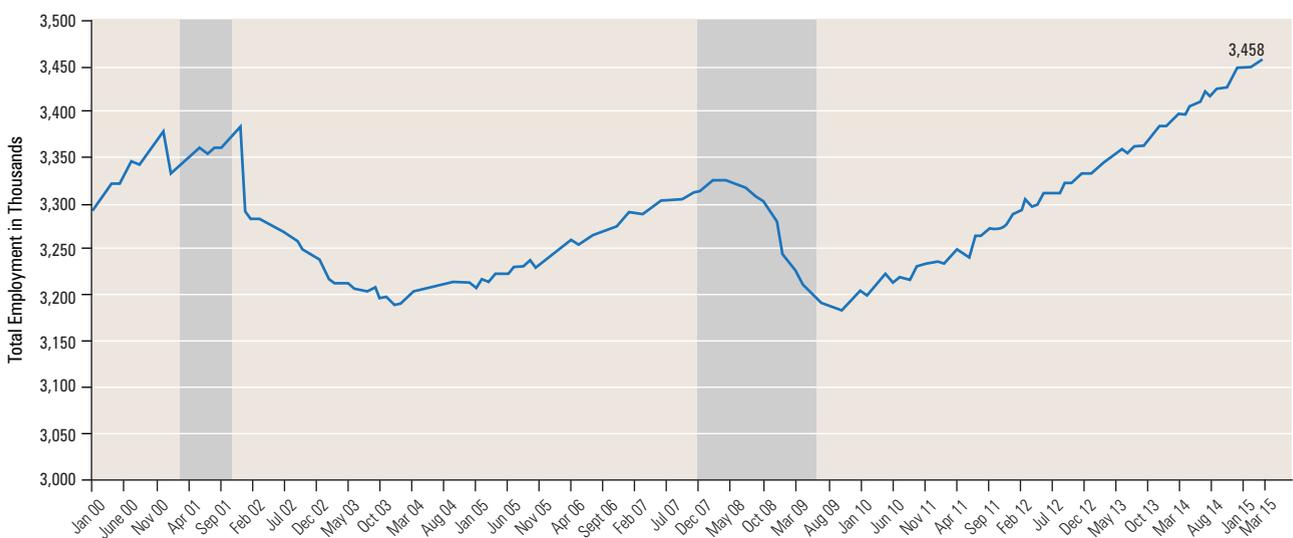
by 264,000 and by 66,000 since the beginning of 2014. This steady job growth has propelled Massachusetts to its highest employment level ever, surpassing the previous high watermark for total jobs in 2001. And in May 2014, total jobs exceeded 3.4 million for the first time ever. Job growth has put downward pressure on the state unemployment rate, though the downward trend has been interrupted with occasional modest upturns. The unemployment rate in the state peaked at 8.8 percent during the recession in 2009. At the time, the national unemployment rate reached 10 percent. Since then, the seasonally adjusted state unemployment rate has fallen even further to 4.8 percent with the national rate at 5.5 percent as of March 2015. Related to this, the employment rate measuring the share of adults with jobs is now at 63 percent, almost matching prerecession rates and recovered from the dip to 60 percent experienced in late 2009.

Of note, while the state’s unemployment rate remains relatively high for the young and the less well-educated, labor market opportunities for these groups improved more rapidly in 2014 than for the overall labor force.² The annual average unemployment rate for Massachusetts residents under 25 years old fell from 15.8 percent in 2013 to 13.5 percent in 2014. For those without a high school diploma, unemployment rates fell from 20.1 percent in 2013 to 14.1 percent in 2014, and for those with a high school diploma, it fell from 9.3 percent in 2013 to 6.9 percent in 2014. The state’s “U-6” unemployment rate,

which includes workers who want to work full-time but can only find part-time work, and persons who want a job but have not looked recently, also improved from an annual average of 13.2 percent in 2013 to 11.5 percent in 2014. These are positive signs that the general economic recovery is finally beginning to spread widely throughout the economy and workforce.

As always, the state unemployment rate masks considerable variation within the state. While in Boston the seasonally unadjusted unemployment rate in March 2015 was below the state rate (4.2 percent vs. 5.0 percent), in Massachusetts mid-size cities outside the core Boston area, unemployment rates were generally higher, some considerably so. For example, Fall River (10.1 percent unemployment rate in March 2015), New Bedford (9.6 percent), Lawrence (9.6 percent), and Springfield (9.0 percent) all have unemployment rates reflecting high levels of labor market stress. Of note, these rates improved over the previous year and the rate of job growth in metro areas across Massachusetts exceeded Greater Boston in 2014,³ an important indicator of the economic expansion starting to reach most parts of the Commonwealth. Still, despite the attention and investments spurred by the Gateway City and Working Cities initiatives (see other articles in this issue of *MassBenchmarks*), the sharp economic divide between the metropolitan Boston region and the remainder of the state continues to be a serious economic challenge with true success thus far fairly elusive.

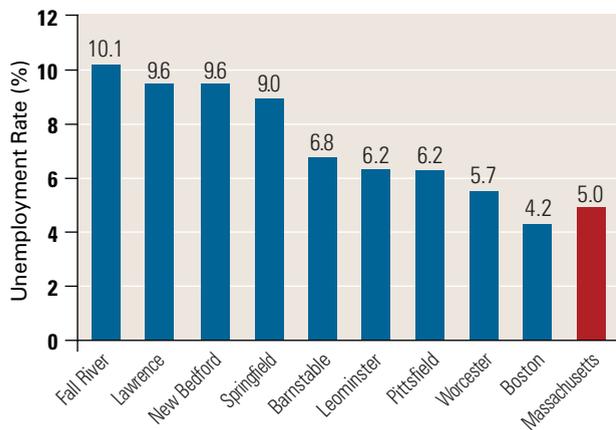
Figure 2. Employment, Total Nonfarm, Massachusetts
January 2000 – March 2015
Seasonally adjusted



Source: Massachusetts Dept. of Labor and Workforce Development (MADLWD), Current Employment Statistics (CES-790) data. Recession dates were obtained from the National Bureau of Economic Research (NBER); shaded areas indicate periods of recession.

**Figure 3. Unemployment Rate by City
March 2015**

Not seasonally adjusted



Source: Massachusetts Labor and Workforce Development, Labor Market Information, Local Area Unemployment Statistics

Economic Performance by Industry Sector

The success of the Massachusetts economy since the Great Recession has largely been led by its education and health care sectors as well as professional and business services, accounting for 57 percent of job growth since October 2009. These sectors represent a mix of the “eds and meds” industry concentration found throughout the state as well as various innovative, technology, and research driven

sectors. In fact, the Education and Health Services sector has consistently led the state in total job growth, through good times and bad with over 76,000 health and education jobs added since the beginning of the recovery. Close behind is the Professional and Business Services sector, which has added 74,600 jobs. Much of the state’s high-technology, and research and development (R&D) industries are lodged here; these sectors (including R&D in life sciences) are a significant driver of job and high-wage growth. Other contributors to the job recovery over the past five years have been Leisure and Hospitality; Trade, Transportation, and Utilities; and Construction (with the highest rate of job growth among the major sectors at almost 17 percent).

The Manufacturing sector is a complex set of sub-industries and it is difficult to tell a simple story. On the one hand, despite significant efforts to support and expand the state’s advanced manufacturing sector, manufacturing lost 5,000 jobs during the overall economic recovery and expansion starting in October 2009, but this job loss is fairly minor (just 2 percent of jobs) and more closely resembles a stabilization of this sector, which had experienced more significant decreases in previous decades. The manufacturing sector continues to provide approximately 250,000 jobs statewide and accounts for 10.5 percent of total gross state product,⁴ one of the largest industries in the state in terms of value added and a key driver of state exports. While many dynamic, leading-edge

**Table 1. Employment in Massachusetts by Industry
Beginning of Economic Recovery through December 2014**
Seasonally adjusted

Industry Super-Sectors	Employment at Beginning of Recovery (October 2009)	Employment in December 2014	Employment Change	Employment Percentage Change
Natural Resources and Mining	1,300	1,000	-300	-23.1%
Construction	106,700	124,700	18,000	16.9%
Manufacturing	253,300	248,300	-5,000	-2.0%
Trade, Transportation & Utilities	539,300	569,900	30,600	5.7%
Information	86,100	94,100	8,000	9.3%
Financial Activities	210,300	210,200	-100	0.0%
Professional and Business Services	452,100	526,700	74,600	16.5%
Education and Health Services	679,900	756,100	76,200	11.2%
Leisure and Hospitality	299,400	345,200	45,800	15.3%
Other Services, Excluding Public Administration	118,500	128,300	9,800	8.3%
Public Administration	437,300	443,100	5,800	1.3%
Total, All Industries	3,184,200	3,447,600	263,400	8.3%

Source: Massachusetts Dept. of Labor and Workforce Development (MADLWD), Current Employment Statistics (CES-790) data; Calculations by authors www.mass.gov/lwd/economic-data

manufacturers remain, the industry faces a series of challenges such as an aging workforce, high costs of doing business (notably in energy and health insurance) and global competitiveness pressures.

In 2014, when Massachusetts added just under 61,000 jobs, education and health care services continued to lead the way in job growth by contributing almost one in every three jobs added (19,300). The next largest job contributor was professional and business services, followed by leisure and hospitality, and trade and transportation. The fastest-growing industry was information, which increased by 6.6 percent in one year (5,800 additional jobs) — a sector closely associated with technology and software firms, a topic highlighted in a separate article in this issue of *MassBenchmarks*.

State International Exports

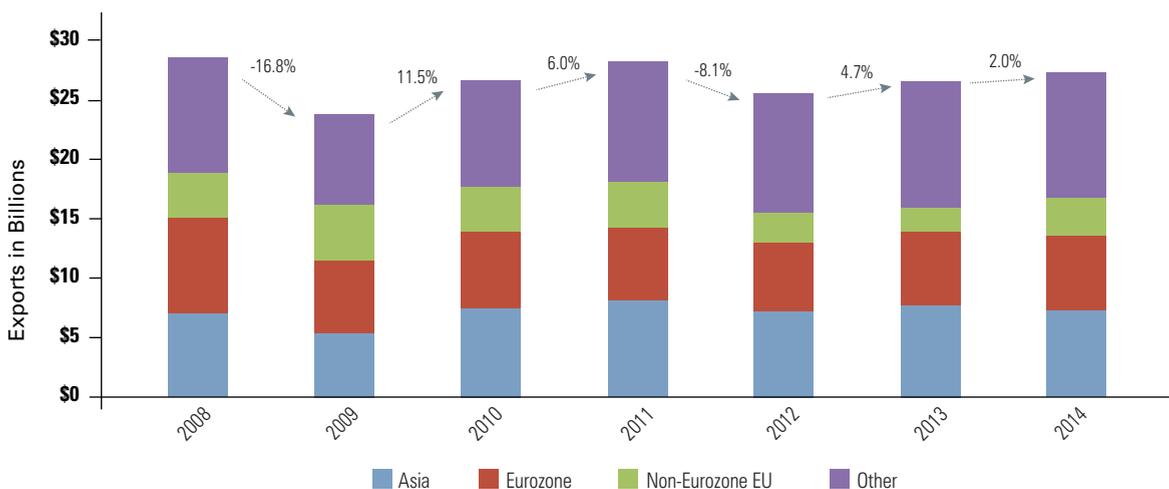
In 2014, the state exported over \$27 billion worth of merchandise to international destinations, an increase of two percent compared with 2013. While a large volume, this is in a state economy with an annual gross product worth over \$420 billion, and it represents about six percent of the economy (compared with 9.5 percent nationally).⁵ Even this overstates the importance to the state of merchandise exports, as the dollar value includes inputs shipped into the state to produce those exports, and therefore is not a net figure. (It represents sales rather than value added.)

Still, exports have long been seen as important to the state’s technology and life sciences sectors, and their growth is closely tracked. The most recent annual change in exports indicates a growth rate of 2.0 percent in 2014 following growth of 4.7 percent in the prior year. The

Massachusetts has globally recognized experts and firms in finance, research, legal, information, consulting, educational, medical and engineering services with international services estimated to account for 4.5 percent of GSP (compared with 3.9 of GDP at the U.S. level).

troubling aspect of the state’s export destinations is that trade to the two most important trading blocs, the European Union and Asia, have stagnated over the past five years. Europe has been dealing with an ongoing economic malaise following the recession and is currently working to avoid deflationary conditions. The European Central Bank has recently engaged in an asset purchase program much like the U.S. Federal Reserve’s quantitative easing. The immediate outcome of this program, even before it is fully implemented, has been the sharp decline in the exchange value of the Euro currency. The resulting appreciation of the value of the dollar, places state and national international exports at an increased disadvantage. The effects of changes in currency values can play out over fairly long time periods, and may already be reducing the competitiveness of Bay State exports as

Figure 4. Massachusetts Annual Exports by Trading Partner 2008–2014



Source: WiserTrade; Calculations by the authors

exports dropped 12.8 percent in early 2015 compared to 2014. Meanwhile, China is attempting to recalibrate its economy, with slower growth one of the side effects of the effort, and Japan’s economy is still struggling to find a path to sustained expansion.

Note that the magnitude of merchandise exports does not accurately reflect the entire importance of international trade to Massachusetts. Service exports from the state are estimated to account for \$18.6 billion of additional international activity, according to the Brookings Institution.⁶ Massachusetts has globally recognized experts and firms in finance, research, legal, information, consulting, educational, medical and engineering services with international services estimated to account for 4.5 percent of GSP (compared with 3.9 percent of GDP at the U.S. level).

Since the bottom of the recession in 2009, the rate of growth of Massachusetts exports has been lagging significantly behind the nation as a whole with U.S. exports increasing by 53.7 percent versus 16 percent in the Bay State. This growth deficit is true even when the fast-growing components of national export growth, such as energy and auto sales, are removed from both state and national data. This finding underscores the conclusion that exports, while symbolically important to the state and especially the high-technology sector, are not the driving force in the state’s economy. Domestic trade plus federal government grants and contracts awarded to Massachusetts firms and institutions are far more important to the Bay State than international trade. The economic (and fiscal) health of the U.S. economy is thus far more important to Massachusetts than the health of even our most important trading partner.

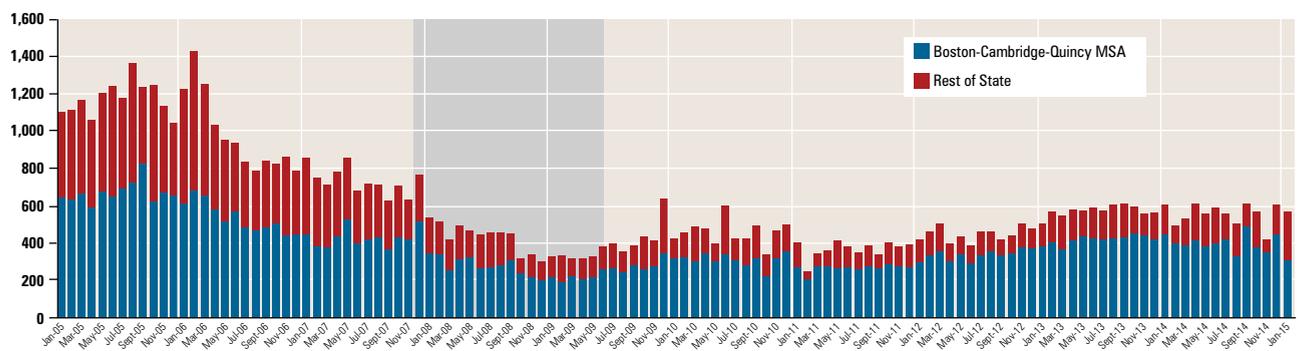
Housing

House prices in the Boston metro area have turned around since their sharp drop in early 2006, according to the Case Shiller Index. While this has affordability implications, it is good news for home owners, who have now partially recovered the home equity lost when the house-price bubble burst, and for home builders, as price increases reflect an increase in the demand for housing. However, there has been no sustained recovery in house building, as reflected in either house building permitting or housing starts, which remain significantly below housing production activity from a decade ago.

While housing market conditions do vary across the Commonwealth, with some pockets of higher housing prices in areas outside of Greater Boston (in towns such as Longmeadow, Amherst, and Williamstown), Massachusetts housing production is now dominated by two trends. First, the share of housing starts in the Boston metropolitan area compared with the rest of the state is substantially higher than it was ten years ago. For example, from 2005 to 2007, the share of housing starts in the Boston-Cambridge-Quincy metropolitan statistical area (MSA) ranged from 54.8 percent to 58.5 percent. But from 2012 to 2014, that share has increased to 72.6 percent to 75.3 percent, with the core Boston metro area comprising about 3 out of every 4 housing starts in the Commonwealth.

The second trend is a measurable uptick in the share of housing permits for multi-family housing structures. From 2001 to 2003, single family housing structures represented 71.5 percent of all residential permits compared with 28.5 percent for multi-family structures. The mix of housing permits has changed significantly in recent years as multi-family housing permits averaged 53.3

**Figure 5. Housing Starts for Single-Unit Structures
Boston MSA and Rest of Massachusetts
January 2005– January 2015**
Seasonally adjusted



Source: Federal Reserve Bank of St. Louis - Federal Reserve Economic Data (FRED); Recession dates were obtained from the National Bureau of Economic Research (NBER); shaded areas indicate periods of recession.

percent from 2012 to 2014 and single-family structures accounted for only 46.7 percent of the total. These two dynamics are obviously closely related as they reflect the further concentration of residential and economic growth in the Boston area.

THREE AREAS OF CONCERN

Despite the generally positive economic news in Massachusetts, that has been closely aligned with and driven by the strong national economic expansion over the past year, some areas of potential economic concern merit discussion. While Massachusetts faces current challenges related to energy, transportation, and health care costs that will require long-term solutions, we are focusing on the three areas with direct implications for our near-term outlook and assessment of the state economy.

State Fiscal Conditions

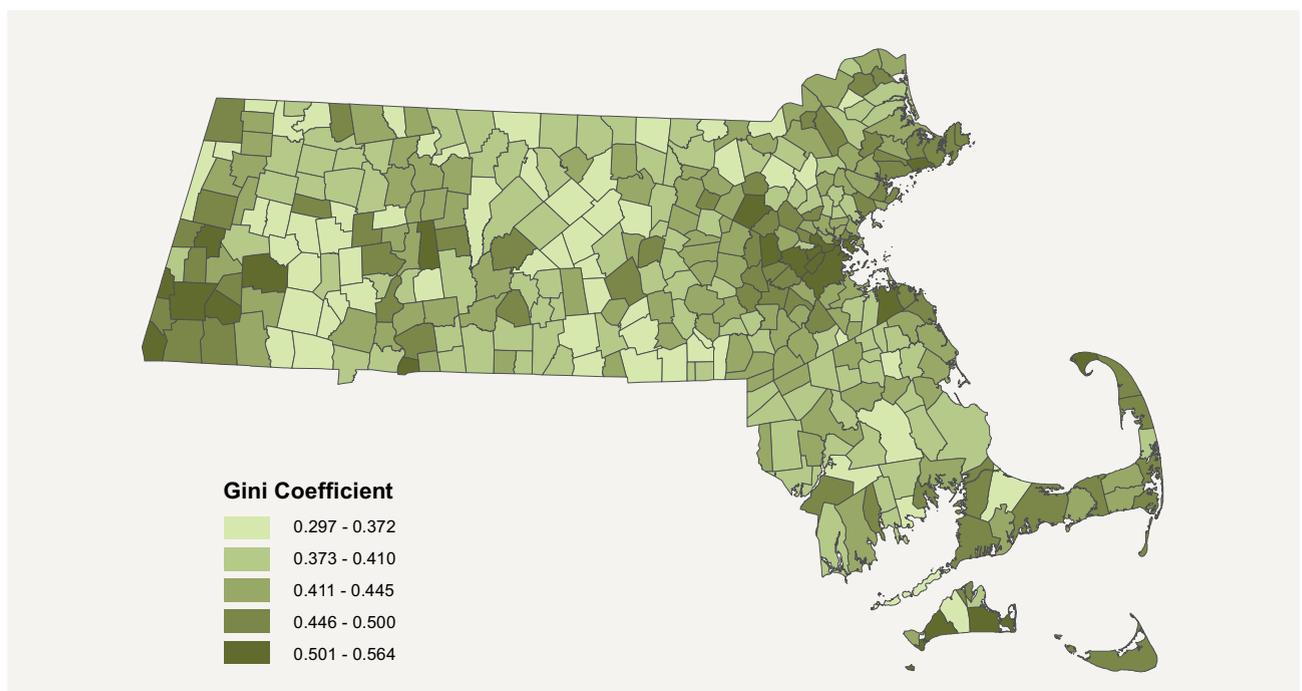
In the midst of relatively robust state economic growth, it is perhaps surprising that the state government fiscal situation had deteriorated. In fact, the Baker administration has estimated that the state faced a \$768 billion deficit before action was taken to close the budget gap. The deficit is the result of lower-than-expected tax revenues, approximately 30 percent of the total deficit, with expenditure overruns accounting for the remainder. Health-care-related expenditures accounted for nearly 60 percent of the expenditure exposure. A large share of the

health-care-related expenditures were the result of the problems with the Connector Health Exchange web site, including the development cost of the site, and forgone federal government reimbursements for insurance enrollees who could not enroll through the Connector and had to be supported by the state's Commonwealth Care program. In response, the governor and the legislature have enacted a series of budget cuts, as well as diverting a tax revenue stream from the state's rainy-day fund. Moving forward, looming issues await as the latest projections estimate further budget deficits in the next fiscal year as well as potentially hard choices related to how to fund the maintenance and necessary upgrades to the state's transit infrastructure.

Income Inequality

A second concern is that despite the steady upward trend of job growth since the depths of the recession, income inequality has gotten worse, with real (inflation-adjusted) income and wage levels stagnant for much of the population, with rising income gains ever more concentrated at the top. The most widely used and accepted measure of income inequality is the Gini coefficient, and the American Community Survey (through the U.S. Census) provides data to measure inequality. Both the U.S. and Massachusetts have seen an increase in inequality from approximately 0.46 in 2006 to 0.48 in 2013 (with higher values indicating more inequality). These data can also be

Figure 6. Gini Coefficient, Massachusetts Cities and Towns



Source: U.S. Census Bureau, American FactFinder, ACS 5-year Series, Gini Index of Income Inequality.

viewed by municipality, as shown in the map in this article. As demonstrated, inequality can vary quite a bit between municipalities; some of the highest inequality is found in Boston, Cambridge, Brookline, Newton, Weston, Concord, Amherst, and Longmeadow.

Winter Storms of 2015

As noted near the beginning of this article, severe weather in early 2014 resulted in negative real gross product growth for both Massachusetts and the U.S. The preliminary data for 2015 indicate a slowdown in job growth with an estimated uptick in hiring in March 2015. Thus, the impact will likely be transitory, and not derail the ongoing healthy economic expansion. Still, it is clear that economic activity was disrupted as the Current Index estimate dipped to 0.9% in the first quarter of 2015. Some activity was merely postponed, while some was permanently lost. Much of the lost activity was in services, such as restaurants and transportation, and may have had a disproportionate impact on low-wage hourly workers. At the same time, benefits accrued to some parts of the state economy. Snow plowing experienced a boom year, and construction activity will benefit from required structural repairs for some time to come. Boston area hotels experienced high load factors, as many workers chose to remain near their places of work, or were stranded.

The most dramatic effect of these storms was the extent to which they revealed deficiencies in the state's transportation infrastructure. This was especially the case for the Boston area MBTA and its public transportation system. Much of the system was fully shut down for long periods, and has come back to full service over time. Old and outdated equipment and deferred maintenance were clearly implicated by this winter's extreme weather events.

CONCLUSION

The state is in the midst of an impressive economic expansion which is supported by strong national economic growth (the largest U.S. employment increase since 1999). Gross state product and employment have been growing steadily, with total jobs recently surpassing the previous high set over a decade ago. The unemployment rate has been somewhat variable, but over time has declined considerably. Perhaps most indicative of the health of the economic expansion is the declining U-6 unemployment rate, which includes discouraged workers who technically have dropped out of the labor force, as well as those working part-time who would prefer to work full-time. While areas outside of metropolitan Boston continue to lag, there are signs that job growth and declining unemployment in these parts of the state are speeding up.

After an anticipated downward dip due to the massive February snow storms, we expect the positive news on

the state economy to continue for the remainder of 2015. This is in spite of the fiscal condition of state government, which is sure to lead to cuts in state spending. While the drop in aggregate demand will slow economic growth, the magnitude of the prospective budget cuts is small relative to the Massachusetts economy. It is the private sector of the state economy that is currently driving growth. Three development trends to track in 2015 are: 1) the real estate development and construction boom in Boston for office and residential projects; 2) the continuing success of the state's life sciences and high-technology industries, which each can boast impressive expansion projects and new companies locating in Massachusetts; and 3) the implementation of casino facility projects, with the Plainridge slots parlor scheduled to open in the summer of 2015, and the Everett and Springfield casino projects breaking ground in 2015 as part of \$2 billion in new private construction. 

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ROBERT NAKOSTEEN is a professor of economics at the Isenberg School of Management at UMass Amherst and is Executive Editor of this journal.

The authors wish to thank ANDREW HALL of the UMass Donahue Institute for his research assistance and contributions to this article.

Endnotes

- 1.) <http://www.bostonglobe.com/metro/2015/04/15/here-what-house-budget/0q0ZXukRtFhWyPmFLOz5uN/story.html>
- 2.) This analysis is largely based on the January 2015 Current and Leading Index report: http://www.massbenchmarks.org/publications/bulletin/48_bulletin_013015/index.htm and more information on this topic was discussed in a recent *MassBenchmarks* End Notes by Dr. Alan Clayton-Matthews: "Benchmarking the Massachusetts Unemployment Rate," *MassBenchmarks*, Vol. 16, Issue 1, pp 25-28.
- 3.) See: <http://blog.aimnet.org/aim-issueconnect/job-growth-accelerates-statewide>
- 4.) See Exhibit A-36 from the Massachusetts Economic Due Diligence Report: <http://www.massbenchmarks.org/statedata/data/DueDiligence.pdf>
- 5.) The UMass Donahue Institute completed an in-depth study on Massachusetts export trends in late 2014 that can be found at http://www.donahue.umassp.edu/docs/MA_export_analysis
- 6.) <http://www.brookings.edu/research/interactives/export-nation>
- 7.) <http://www.highways.org/wp-content/uploads/2014/02/economic-costs-of-snowstorms.pdf>
- 8.) For example, see <http://www.wbjournal.com/article/20150219/NEWS01/150219940> and http://www.nytimes.com/2015/02/20/opinion/bostons-winter-from-hell.html?_r=0



Massachusetts Tech Sector Gaining Momentum in the Wake of the Great Recession

MASSACHUSETTS' TECHNOLOGY SECTOR REMAINS A LEADING ENGINE IN THE STATE'S ECONOMY — A SIGNIFICANT DRIVER FOR JOBS, WAGES, AND ECONOMIC OUTPUT. A HIGH SHARE OF DIRECT EMPLOYMENT COMBINED WITH ITS SIGNIFICANT IMPACT ON OTHER SECTORS ACCOUNT FOR 25 PERCENT OF TOTAL ANNUAL PAYROLL IN THE STATE.

BRANNER STEWART AND REBECCA LOVELAND

INTRODUCTION

Massachusetts is renowned for its innovation-based economy, fueled by world-class universities, research centers, hospitals, and private companies at the forefront of their fields. The recent emergence of the world's strongest life sciences industry in Massachusetts, however, can at times overshadow the technology sector, which has been at the core of the state's economic success for decades. Today, the state's tech sector continues to evolve and grow as a center of global innovation.¹ We use the term tech sector in this article to represent a large, interrelated cluster of several key technology industries in the state.² Involving large corporations and small firms alike, the sector includes two major types of activity: *advanced manufacturing businesses* that design, build, and market a wide variety of equipment, instruments, devices and components, and *technology services firms* that provide products ranging from software development and computer systems design to telecommunications services and repairs and servicing of technical equipment.³

Massachusetts' strengths as a technology leader are evident in the continued growth of the state's tech sector, including a fairly robust recovery following the Great Recession of 2009. In 2013, the state was home to nearly 13,800 tech firms employing more than 214,600 workers or 6.5 percent of the workforce in the Commonwealth and 12.3 percent of all wages. With an ecosystem of dynamic linkages between tech firms and research institutions and driven by advanced engineering and computer science talent, the Commonwealth has long been a national leader in technology development. Building on traditional strengths in defense technologies and computer hardware production, the state's tech sector is leveraging high concentrations of advanced manufacturing firms to design, develop and produce physical technology products. And capitalizing on the talent of its workforce, the state has grown to become a world leader in tech services activities which further support technology development, innovation and efficiency across industries. The Massachusetts tech sector and its expertise are vital to many of the state's key industries.

Healthcare, finance, and a range of manufacturing industries capitalize on highly specialized in-state tech-driven resources, including advanced information technology products and services, software production and computer, and device and components manufacturing.

The state’s successful tech sector has shown resilience for its ability to bounce back after dramatic and repeated volatility in the economy. Reflecting cycles and dramatic shifts in the U.S. and global economies, periods of boom and bust have marked the Massachusetts tech sector over the past thirty years. The minicomputer boom of the 1980s ended with a bust in the late 1980s and early 1990s as offices migrated to less expensive PC networks. The

dot-com boom of the 1990s was followed by another tech bust in the early 2000s that brought a damaging recession to the Massachusetts economy. Recovery and development of the tech sector during the 2000s hit an additional wall in the Great Recession of 2009. But through its inherent strengths and adaptable, skilled workforce, the state’s tech sector has shown resilience in emerging from these crises. Massachusetts growth since the 2009 recession has generally outperformed the nation; in recent years more dramatically so.⁴ Technology sector growth has played an important role in this recovery with the sector growing at a faster rate than the average across major employment sectors in Massachusetts.

Table 1. Key Manufacturing and Services Subsectors in the Tech Sector

North American Industry Classification System Description	NAICS Code	Tech Manufacturing/Services
Semiconductor Machinery Manufacturing	333242	Manufacturing
Optical Instrument and Lens Manufacturing	333314	Manufacturing
Photographic and Photocopying Equipment Manufacturing	333316	Manufacturing
Computer and Peripheral Equipment Manufacturing	3341	Manufacturing
Communications Equipment Manufacturing	3342	Manufacturing
Audio and Video Equipment Manufacturing	3343	Manufacturing
Semiconductor and Other Electronic Component Manufacturing	3344	Manufacturing
Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	3345	Manufacturing
Manufacturing and Reproducing Magnetic and Optical Media	3346	Manufacturing
Other Electrical Equipment and Component Manufacturing	3359	Manufacturing
Computer and Computer Peripheral Equipment and Software Merchant Wholesalers	423430	Services
Business to Business Electronic Markets	425110	Services
Electronic Shopping	454111	Services
Electronic Auctions	454112	Services
Software Publishers	5112	Services
Wired Telecommunications Carriers	5171	Services
Wireless Telecommunications Carriers (except Satellite)	5172	Services
Satellite Telecommunications	5174	Services
Other Telecommunications	5179	Services
Data Processing, Hosting, and Related Services	518	Services
Internet Publishing and Broadcasting and Web Search Portals	519130	Services
All Other Information Services	519190	Services
Industrial Design Services	541420	Services
Graphic Design Services	541430	Services
Computer Systems Design and Related Services	5415	Services
Translation and Interpretation Services	541930	Services
All Other Professional, Scientific, and Technical Services	541990	Services
Computer Training	611420	Services
Electronic and Precision Equipment Repair and Maintenance	8112	Services

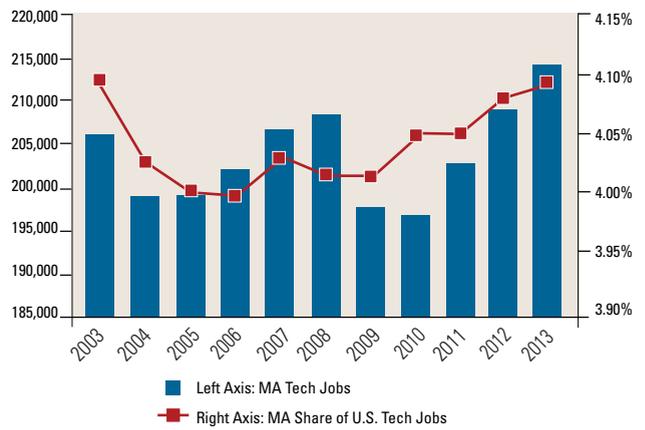
Source: UMass Donahue Institute

MASSACHUSETTS TECH SECTOR GROWTH TRENDS

Surmounting the ups and downs of the 2000s, the tech sector has further strengthened its position as a leading engine for growth in Massachusetts as a significant driver of jobs, wages and economic output. The tech sector recovered steadily from the recession after 2010, with employment growing 8.4 percent since that time (a total increase of 16,581 jobs) compared with 5.1 percent growth in employment across the economy as a whole. In 2013 alone, about 5,500 tech sector jobs were created, accounting for over 10 percent of Massachusetts employment growth that year (+53,300). The tech sector continues to be an employment leader among major industry groups in Massachusetts — for example, it has 30 percent more workers than Finance & Insurance, which employs approximately 164,900. Recent estimates show that the significant levels of spending by businesses in the sector along with the household spending of its well-paid employees generate a generous jobs multiplier of 2.95. In other words, the tech sector creates nearly two additional jobs for each one of its direct employees.⁵ Considering these secondary employment effects along with its direct employment, the tech sector ultimately supports nearly 633,000 jobs with a related payroll of \$51.7 billion or about 25 percent of the total annual payroll in Massachusetts.

Massachusetts has maintained its position among top-ranked states for technology sector jobs and growth. Since 2010, both Massachusetts and California have outperformed the average growth of tech sector employment in all other U.S. states. By 2013, the Massachusetts

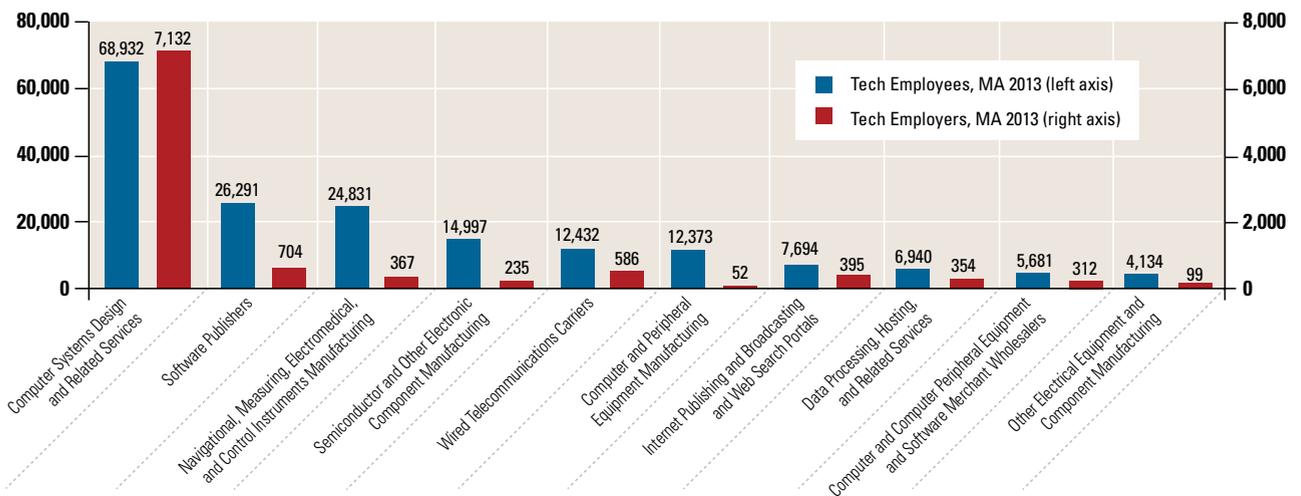
Figure 1. Massachusetts Tech Has Entered a New Phase of Growth after Losing Ground in the 2000s



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

tech sector had almost completely regained its early 2000s share of U.S. tech sector employment. Tech sector employment in Massachusetts now represents approximately 4.0 percent of all U.S. jobs in the sector compared with the state’s just over two percent share of the nation’s population. In fact, the Massachusetts economy has the highest concentration of tech sector jobs within an identified group of competitor states⁶ — including Virginia, Washington, California, Maryland, Texas, North Carolina and New York. Among those states, Massachusetts overtook Virginia in 2013 as the state with the highest concentration of tech sector jobs across its economy. That was attributable mainly to Virginia’s greater exposure to recent

Figure 2. Top Ten Tech Subsectors, Massachusetts, 2013



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

federal budget cuts, including sequestration. In addition, technology occupations are important across all sectors of the Massachusetts economy, not just within the tech sector itself. Approximately 4.6 percent of Massachusetts workers across the economy are in computer and mathematical occupations. Massachusetts, in fact, ranks fourth among its competitor states in the share of workers in these types of occupations across all industries (after Virginia, Washington and Maryland).

Tech sector wages in Massachusetts are also very high. Offering an average annual wage of \$115,700 across all tech jobs, salaries are significantly higher relative to the average Massachusetts wage of \$61,800. The sector's much higher relative wage levels are an indicator of how advanced the Massachusetts tech cluster is as higher concentrations of specialization coincide with higher industry wage levels. The Commonwealth's average annual wage per tech sector job is nearly 20 percent higher than the national average salary for tech jobs. Relative to competitor states, Massachusetts ranks third after California and Washington in average wages per tech sector job. The success of the tech sector has huge implications for the Commonwealth as a whole. Tech businesses, in fact, paid 12.3 percent of all Massachusetts wages and salaries in 2013.

Figure 3. Average Wages in the Tech Sector, 2013
Massachusetts Tech Workers Are Highly Paid



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

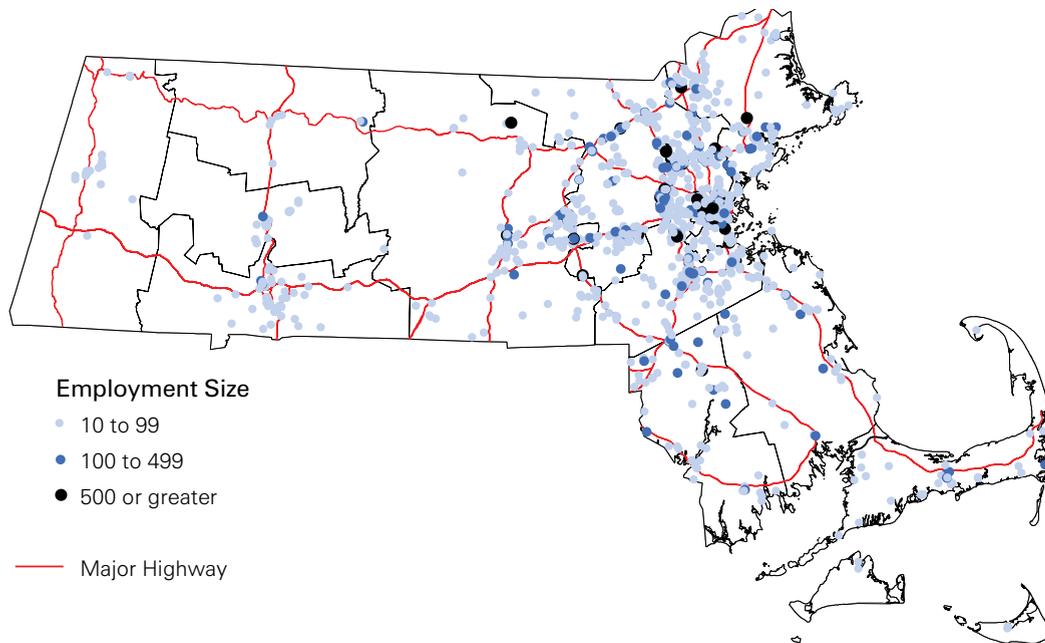
TECH SERVICES ARE DRIVING GROWTH IN JOBS AND ESTABLISHMENTS

As has been true for more than a decade, growth in the Massachusetts tech sector continues to be driven by technology services firms. Firms in this segment provide a range of service-based products, including software development; computer systems design; telecommunications providers; and repairs, training and maintenance. Now employing 148,895, this large segment of activity

Over time, some of the nation's largest tech services firms — including Microsoft, Facebook and Google — have located and grown in the Boston/Cambridge area. The locale has become a magnet for top technology firms that want access to talented graduates and workers.

involved nearly 12,900 firms in 2013, with a growth in establishments since 2009 of nearly 20 percent. Employment growth in this segment has also been very strong. Since 2009 nearly 21,700 tech services jobs were created, an employment growth rate of 17.0 percent, compared with a 5.1 percent growth rate in the state overall and a 10.6 percent growth of tech services employment nationally.

Over time, some of the nation's largest tech services firms — including Microsoft, Facebook and Google — have located and grown in the Boston/Cambridge area. The locale has become a magnet for top technology firms that want access to talented graduates and workers. Currently, the largest tech services activity in Massachusetts, and also its leading growth engine, is computer systems design and related services — business activities which include writing software to meet customer needs; integrating hardware, software, and communications technologies; and managing clients' computer systems on site. Computer systems design employment, more than 68,900 jobs in 2013, has grown by more than 13,700 jobs, or nearly 25 percent since 2009. The next largest business activity in the state is software publishing, which employed 26,291 in 2013. While smaller overall, the software industry also is an important generator of growth. Software firms have grown strongly since 2009, adding nearly 4,300 jobs for a growth rate of nearly 20 percent. The next largest tech services subsector, in terms of employment, is telecommunications providers. They include wired, wireless and satellite carriers — firms that employed more than 17,900 in 2013. Employment in this sector declined by slightly more than 3,200 jobs (15 percent) between 2009 and 2013. The remaining tech services business types in the state are smaller when it comes to employment, but together employ another 35,740 workers. Those firms have grown by a healthy 24 percent since 2009.

Figure 4. Tech Services — Massachusetts Business Locations

Source: infogroup, InfoUSA; Includes establishments with 10 or more employees

Tech services businesses are typically smaller in scale; their average size has decreased from 17 employees per firm in 2009 to 16 per firm after the recession. The state's dramatic 2,100 increase in the number of smaller tech services firms since 2009 suggests that restructuring and layoffs — along with a strong business start-up and entrepreneurial eco-system — may have spurred new business ventures in the state. Business growth was strongest between 2008 and 2009 and slowed in subsequent years, suggesting that many were entrepreneurs by necessity.

The availability of IT infrastructure and broadband services and access to major transportation routes appear to be important factors in the location of tech services firms. Their smaller scale may also increase their ability to locate throughout the state as opposed to concentrating solely in Greater Boston. As Figure 4 illustrates, tech services companies can be found throughout the state but do tend to gravitate toward Boston, with a huge clustering of firms within the Rt. 128 corridor that extends to the I-495 belt as well as to Worcester. The state's third largest city, Springfield, also has a concentration of tech services activities in its metropolitan area. Tech services firms in western Massachusetts tend to be small and employment skews towards computer and office machine repair and maintenance, custom computer services, and data processing and related services.

TECH MANUFACTURING STILL A MAJOR SECTOR BUT DECLINING IN JOBS

Tech manufacturing firms produce a wide variety of electronic products, devices and components, including computer and information systems; computers, devices and equipment; navigational, measuring and control instruments; network hardware systems; and semiconductors. All are core components of communications equipment and systems. In Massachusetts, many tech manufacturing firms also play a critical role in prototyping and small batch production of parts, components and prototypes. The capacity of this cluster confers a clear locational advantage for specialized, technology-based industries clustered in Massachusetts. Recent work shows that this is true for defense, medical devices and marine technologies — especially, for example, in the provision of design, development and customized smaller-scale production services.⁷

When it comes to tech manufacturing, there has been some stabilization in employment since the trough of the recent recession. In 2013, this segment of the tech sector comprised more than 900 firms providing more than 65,700 jobs. The number of tech manufacturing firms in the state has declined slightly since 2009 (by 4.1 percent). Although approximately 5,080 tech manufacturing jobs have been lost since that time (a decline of 7.2 percent), the rate of employment decline has slowed since the recession.

The largest Massachusetts tech manufacturing subsector is navigational, measurement, electro-medical, and control instruments manufacturing, a business segment accounting for 24,831 jobs in 2013. Employment in Massachusetts ranks a far second behind California's massive subsector, but measures on a similar scale to employment in New York. Since 2009, the number of businesses in this segment has stayed stable although more than 1,600 jobs were lost. Semiconductor and other electronic component manufacturing is the second largest tech manufacturing subsector in Massachusetts, employing 14,997 in 2013. While Massachusetts retains strength in this industry and continues to supply sophisticated electronics components for a host of industries (e.g., radar, avionics, consumer electronics, machinery), it confronts intense global competition for larger-scale commodity production. The third largest segment is computer and peripheral equipment manufacturing, which employed 12,373 in 2013. This group of businesses includes producers of such items as storage hardware, specialized keyboards, tablet computers for police cruisers, and equipment that can withstand work in military operations. It has lost 574 jobs and may have undergone restructuring since 2009 as it had fewer but larger companies in 2013.

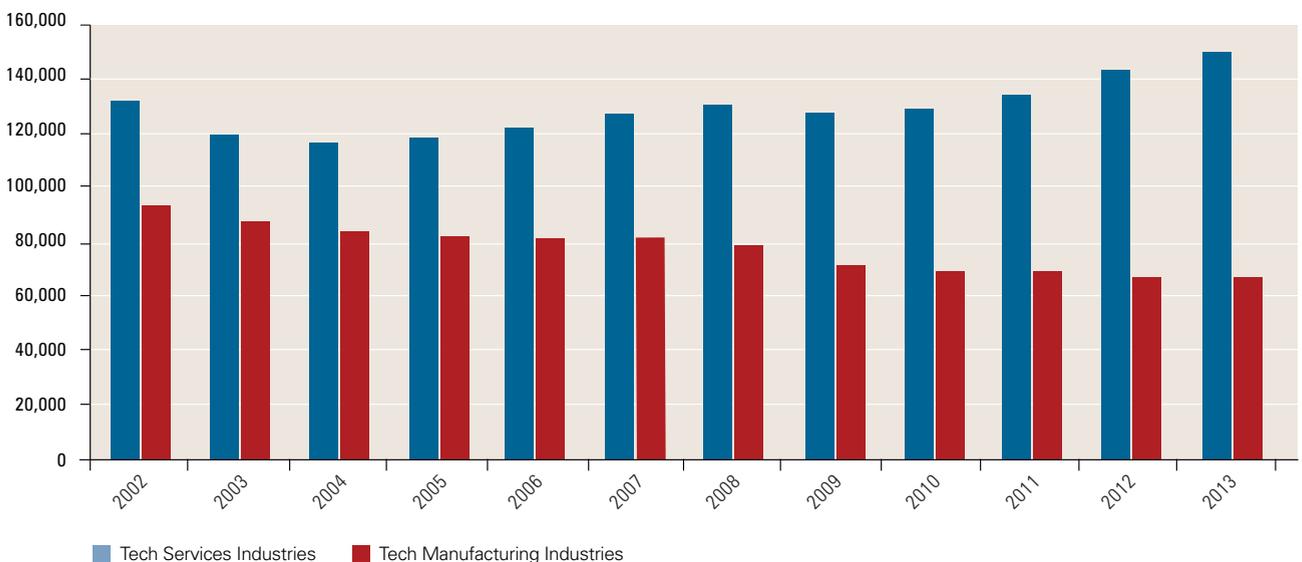
Even as tech manufacturing job numbers have declined in Massachusetts, the state still leads as a location for tech manufacturing work. Massachusetts ranks a strong first among competitor states (followed by California

and North Carolina) as a concentrated location for tech manufacturing jobs. The state's manufacturing-intensive tech sector reflects its long-term strengths in precision and advanced manufacturing and its skilled manufacturing labor force. According to some tech sector leaders, the state's ability to support the physical development of precision machined parts, printed circuit boards and other components provides unique levels of support for physical technology-oriented business.⁸ Massachusetts' tech manufacturers have largely clustered near major highways, notably I-495 and Rt. 128, where land and larger development sites tend to be more readily available. While concentrations tend to radiate from metropolitan Boston, tech manufacturers are dispersed throughout most regions of the state.

CONCLUDING THOUGHTS

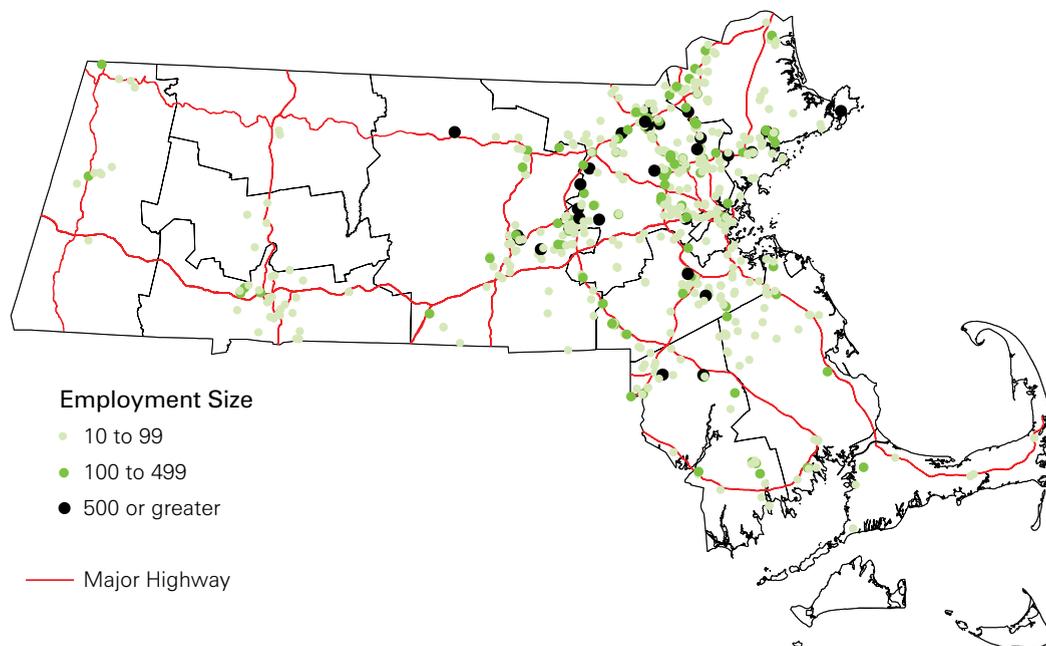
The enduring strength of the Bay State's tech sector, including its competitiveness as a leader among competitor states and its steady recovery after 2009, underscores the sector's importance. As one of the Commonwealth's largest sectors, it has registered strong growth, accounting for twelve percent of all wages in the state. As with many other segments of our economy, job growth opportunities have been concentrated in services, even while tech manufacturing remains critical. The state appears to be well-positioned in a number of emerging tech fields like big data, robotics, and healthcare data management/

Figure 5. Tech Services Industries Are Leading Job Growth as Manufacturing Tech Jobs Erode



Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Figure 6. Tech Manufacturing — Massachusetts Business Locations



Source: InfoUSA; Includes establishments with 10 or more employees

software. National reports point to continued growth in this sector, driving the need to train more Massachusetts workers in these areas. Many, in fact, would like STEM to include a C for computer science. Fortunately, Massachusetts has numerous education and workforce programs for STEM as well as organizations focused on the evaluation and transfer of technologies from research institutions to the marketplace. And the state is on target with expanding manufacturing workforce programs and advanced technology initiatives that energize tech manufacturing across the Commonwealth. 

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The authors wish to thank ANDREW HALL of the UMass Donahue Institute for his research assistance and contributions to this article

Endnotes

- 1.) The core data work used in this article was funded by the Mass Technology Leadership Council (MassTLC) for its annual state of technology report which can be found online at its website: <http://www.masstlc.org/?page=2014StateofTech>
- 2.) The NAICS code definition for the tech sector expands upon the industry definition used for the Information technology cluster

in an earlier study, *The IT Industry: Hub of the Massachusetts Technology Economy*, published by UMDI in November 2009. Since the 2009 publication, the MassTLC has emphasized an expanded set of activities — called the tech sector — including, most importantly, an expanded set of manufacturing activities interfacing and overlapping with more traditionally recognizable IT manufacturing. The tech sector definition includes the entire industry code 3345 *Navigational, Measuring, Electromedical, and Control Instruments Manufacturing*. This definition parallels national descriptions of the tech industry and acknowledges a wider range of production activities taking place beyond traditional IT products and services.

- 3.) Major subsectors of activity include *tech manufacturing* activities (computer hardware; communications equipment; semiconductors; electronics; instruments and devices, etc.) and *tech services* activities (software, computer systems design, repairs, training and maintenance, etc.).
- 4.) See the work of Alan Clayton-Matthews, including *Index Bulletins*, MassBenchmarks.org. <http://www.massbenchmarks.org/indices/indices.htm>
- 5.) For more information see Enrico Moretti’s book *The New Economic Geography of Jobs*, Houghton Mifflin Harcourt, 2012, which discusses the strong multiplier effect of innovation-based jobs.
- 6.) MassTLC helped to define these tech sector competitor states for Massachusetts.
- 7.) For information on advanced manufacturing industry strengths by Massachusetts region see *A Profile of Advanced Manufacturing in the Commonwealth: Key Industry and Occupational Trends, July 2014*. <https://amrpa.wordpress.com/research/regional-manufacturing-profiles/>
- 8.) See *A Unique Capacity for Advanced Manufacturing, 2014 State of Technology: Benchmarking the Tech Sector’s Impact on the Massachusetts Economy*, January 2014.

Demographics of Massachusetts Workers in Computer and Mathematical Occupations

Recent data from the American Community Survey provide insights into demographic trends in Massachusetts in the core technical positions that drive the tech sector. Embedded within a broader category called ‘computer & mathematical occupations,’ these occupations include computer systems analysts, information security analysts, web developers, computer programmers, software developers, database administrators and several others. A current look at computer and mathematical occupations shows that this workforce in Massachusetts is, not surprisingly, predominantly male and white. However, relatively speaking, women and other ethnic groups have been making some gains in Massachusetts in recent years.

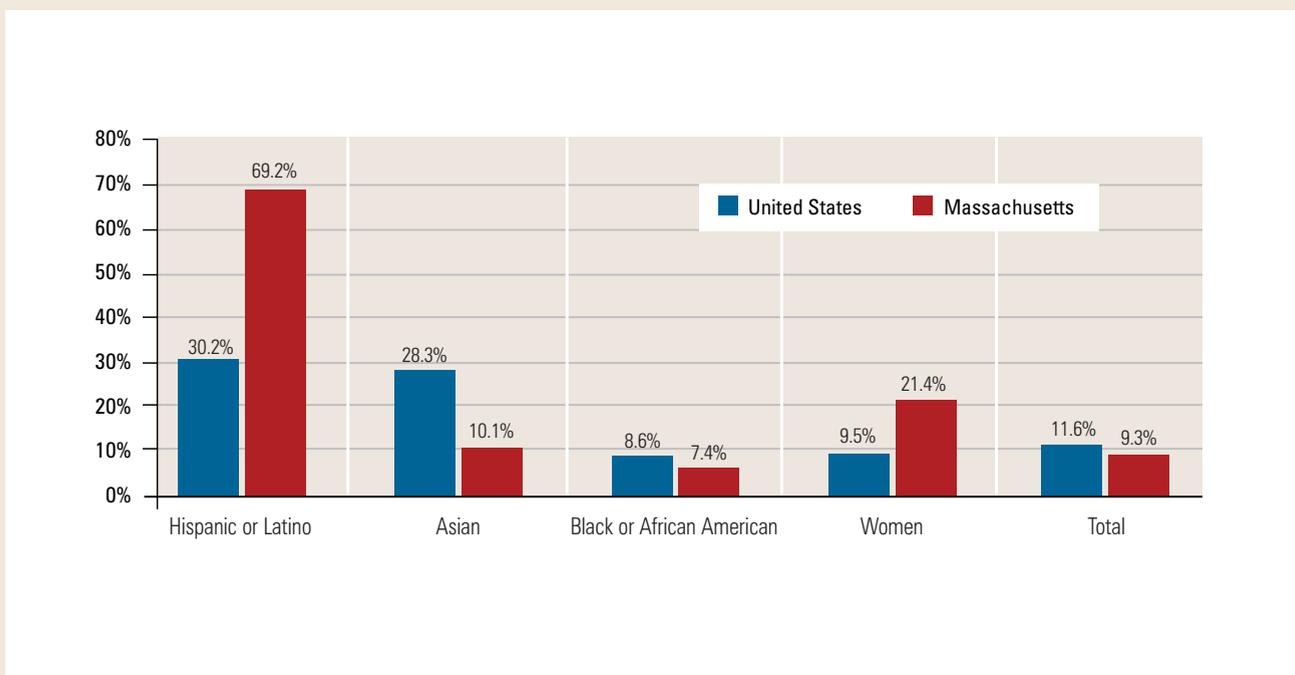
In computer and mathematical occupations, men represent 71 percent of workers (91,200). The remaining 29 percent (37,500) are women. Compared with other states, this proportion of women is high, with Massachusetts ranking third after Maryland and North Carolina. In contrast, women make up only 25 percent of California’s workers in computer and mathematical occupations. Recent data suggest that Massachusetts women are making progress in entering these core

tech occupations, especially relative to the U.S. as a whole. Between 2009 and 2013, the percentage of women in computer and mathematical jobs in Massachusetts grew by 21.4 percent compared with a growth rate of 9.3 percent in these occupations in Massachusetts as a whole.

When considering racial and ethnic representation, white and Asian workers make up the bulk of Massachusetts workers in computer and mathematical occupations (representing roughly 70 percent and 19 percent of workers, respectively). Proportions of Hispanic/Latino and African American workers are still relatively low (5 percent and 4 percent). However, the number of Latino workers in computer and mathematical occupations in Massachusetts increased strongly between 2009 and 2013, growing by 69 percent compared with a growth rate of 30 percent in the U.S. as a whole. The Massachusetts growth rate for this set of occupations is slower for Asian workers than it has been for the U.S. as a whole. In these occupations, their numbers grew by 10 percent in Massachusetts since 2009 versus 28 percent in the U.S. as a whole.

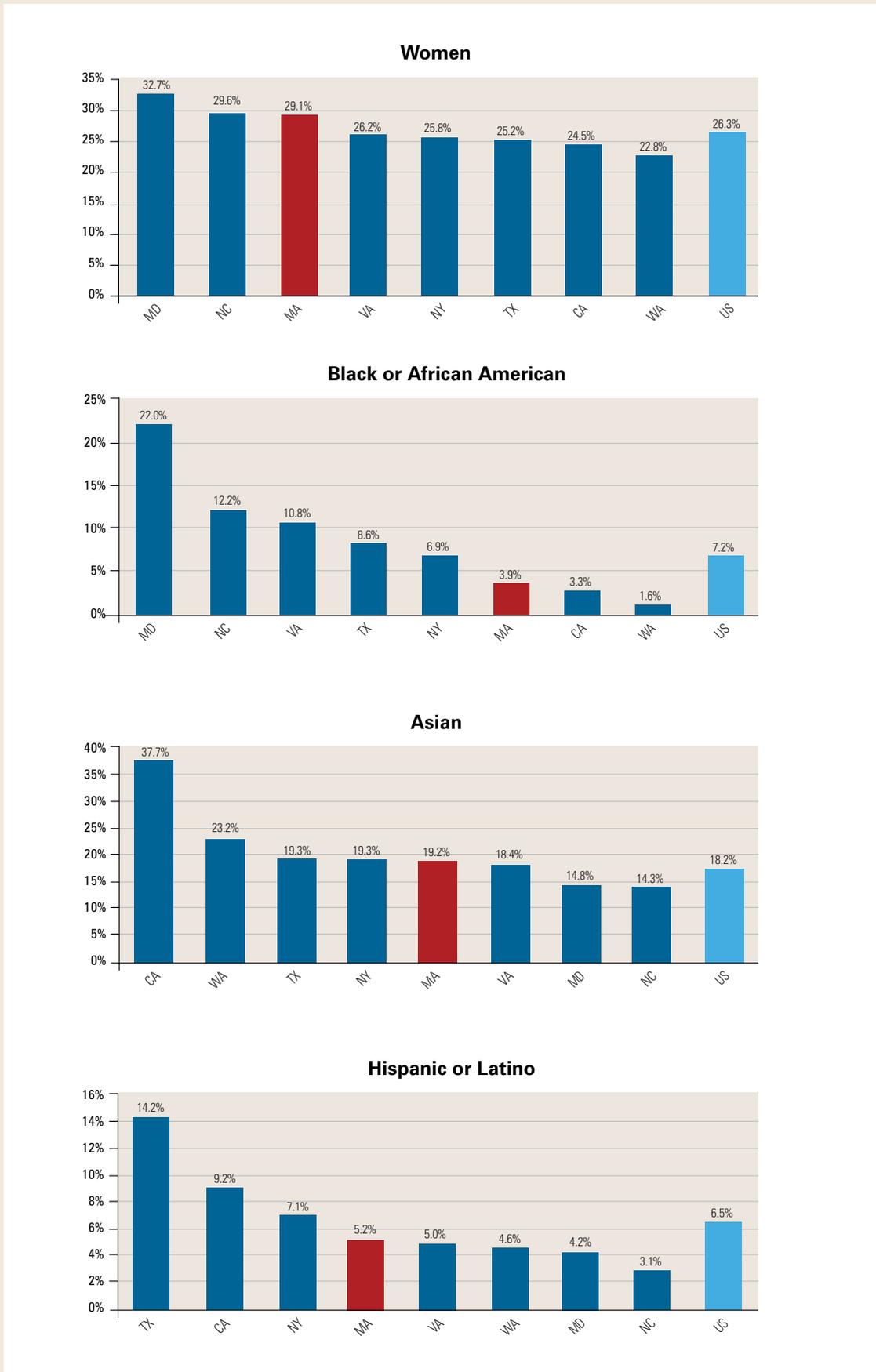
Figure A. Massachusetts Has Seen Growth of Hispanics and Women in Computer and Mathematical Occupations

Percentage change, 2009–2013



Source: U.S. Census Bureau, American Community Survey

Figure B. Share of Workers by Gender and Race/Ethnicity in Computer & Mathematical Occupations by State, 2013



Source: U.S. Census Bureau, American Community Survey

Massachusetts Gateway and Working Cities: Economic Conditions and Initiatives to Boost the Commonwealth's Small- to Mid-Size Cities

This issue of *MassBenchmarks* presents two feature articles on current initiatives to boost economic opportunities in the state's small- to mid-size cities, which have long lagged behind Greater Boston in economic performance (i.e., in job growth, income levels, poverty rates, education levels). Differences in economic trends and growth between Greater Boston and the rest of the state are the crux of an issue that *MassBenchmarks* has tracked and reported for many years. This issue affords the opportunity to learn more about innovative, ground-breaking programs led by the Boston Federal Reserve and the state's economic development agencies.

For context, these current efforts are largely the result of parallel economic research efforts to highlight the long-standing economic challenges of these cities, and to better understand the factors and policy initiatives that can help move the needle for meaningful economic improvement. One undertaking was the 2007 MassINC and Brookings Institute study "Reconnecting Massachusetts Gateway Cities: Lessons Learned and An Agenda for Renewal."¹ This work was extended to create the Gateway Cities Innovation Institute at MassINC and the formal state-level designation of Gateway Cities with associated programs, incentives, and investments. MassINC continues to produce research and strategic policy recommendations in the areas of education, public transit, and transformative redevelopment.³ The second effort was a multi-pronged applied research initiative by the Boston Federal Reserve to support revitalization efforts in Springfield, including the paper published by Yolanda Kodrzycki and

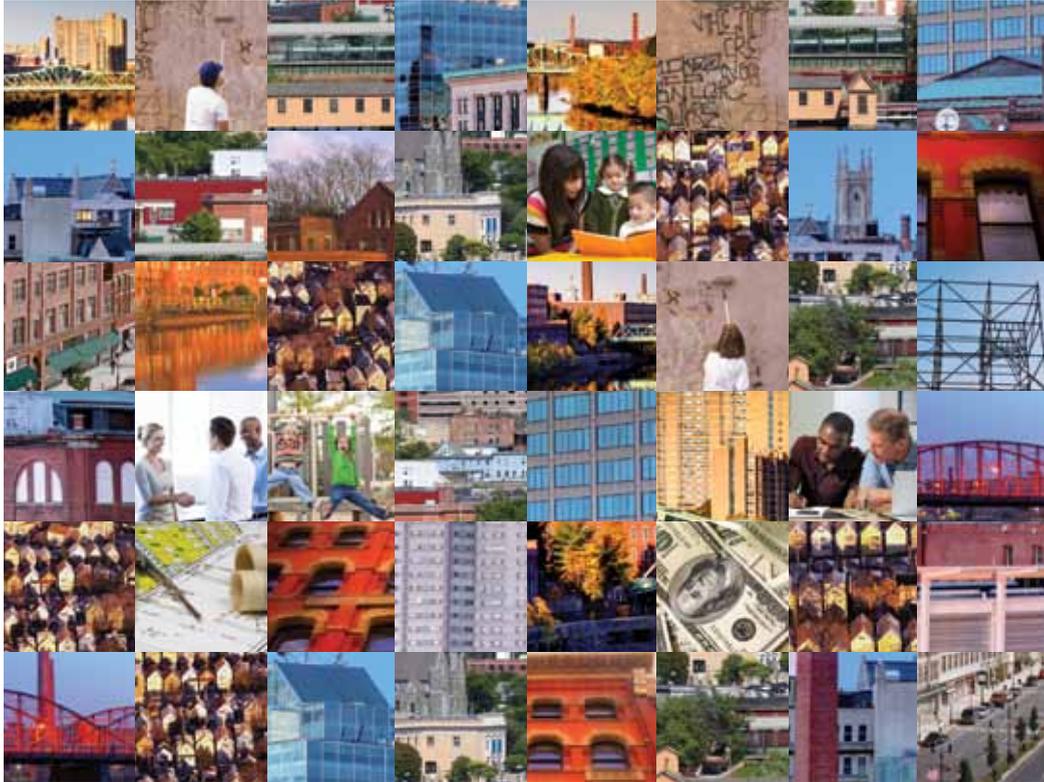
Ana Patricia Munoz entitled "Reinvigorating Springfield's Economy: Lessons from Resurgent Cities."⁴

The article that follows focuses on the Boston Fed's Working Cities Challenge, which requested applications and awarded grants to cities in Massachusetts to enhance specific economic development and educational collaborative, multiorganizational initiatives. Readers should note great similarity but slight differences in the cities designated as Working Cities compared with the state's Gateway Cities. The Endnotes article that concludes this issue profiles the state's current program, the Transformative Development Initiative for Gateway Cities, an effort with complementary policies, tactics and ultimate objectives to strengthen the entire state economy.

Endnotes

- 1.) <http://www.brookings.edu/research/reports/2007/02/regionsandstates-muro>
- 2.) <http://www.mass.gov/hed/community/planning/gateway-cities-and-program-information.html>
- 3.) <http://www.massinc.org/Programs/Gateway-Cities/Research.aspx>
- 4.) <http://www.bostonfed.org/economic/ppdp/2009/ppdp0906.htm>





Small Cities, Big Ideas: Lessons from the First Year of the Working Cities Challenge

COLLEEN DAWICKI AND TAMAR KOTELCHUCK

AFTER ITS FIRST YEAR, THE WORKING CITIES CHALLENGE — THREE-YEAR GRANT-BASED INITIATIVES TO TRANSFORM LOCAL ECONOMIES AND ENHANCE COLLABORATION IN SIX SMALLER MASSACHUSETTS CITIES — HAS YIELDED VALUABLE LESSONS. THESE INCLUDE INVESTING IN CROSS-SECTOR TEAMS TO INTERACT WITH A PROJECT MANAGER WHO DRIVES IMPLEMENTATION AND ENGAGES RESIDENTS EARLY ON IN THE PROCESS.

BACKGROUND

Like our eleven counterpart banks in the Federal Reserve System, the Boston Fed advances the needs of underserved populations and communities by conducting research and outreach through our community development department. In 2013, the Boston Fed decided to take its role a step further by translating research into action with the launch of the Working Cities Challenge. This

article provides an overview of the objectives, key components, and lessons learned thus far from this innovative initiative to support smaller cities for the benefit of their residents.

Foundational Research

The Boston Fed's mission to promote economic health and full employment across New England cannot be fully realized unless

prosperity returns to the many smaller cities whose industry once fueled the region's economy. The challenges and promise of these cities were underscored during the four years (2008-11) that Boston Fed economists and community development staff spent analyzing a host of policy issues in Springfield. As the list of obstacles piled up, we began to ask ourselves: can a city like Springfield bounce back from decades of manufacturing and population contraction, and if so, what will that take?

Our examination of 25 peer cities revealed that resurgence is possible, even after years of decline. Among places that looked very much like Springfield in 1960 — centers of metropolitan areas with historically strong manufacturing bases and populations of 100,000-250,000 — ten cities were deemed resurgent because they performed better than Springfield in the areas of poverty and median family income. But the critical factor for revitalization was not among our traditional assumptions: quantifiable factors like geographic location, industry mix, and demographics had minimal influence on the ten cities.

Together, we developed an approach to achieve a set of goals, adapted from those established by our colleagues at Living Cities, which is doing similar work to foster collaborative leadership in a set of larger cities across the country.

Instead, the ability to transform local economies through leadership and cross-sector collaboration is what made the difference for places like New Haven, Grand Rapids, and Winston-Salem.¹ By interviewing local stakeholders and reviewing periodicals dating back to 1960, we found that resurgent cities shared characteristics like strong leaders who shared a long-term vision; the ability to promote themselves; engagement of higher education in economic development; an orientation toward reinvention based on existing assets; adaptability to changing circumstances; and a focus on the development of human capital to strengthen the city's position in a knowledge economy. Perhaps most importantly, sustained collaboration across sectors was responsible for the ability to maintain focus and momentum, because resurgence in these cities played out over many decades. Extending gains in prosperity to the most impoverished residents and neighborhoods of these cities proved challenging in even the most collaboratively led places, but another key ingredient in many communities' resurgence was the ability to leverage educational institutions and philanthropy to ensure that the hardest hit were not left out.²

Table 1. Urban Communities Identified as Massachusetts Working Cities

Brockton	Lynn
Chelsea	Malden
Chicopee	New Bedford
Everett	Pittsfield
Fall River	Revere
Fitchburg	Salem
Haverhill	Springfield
Holyoke	Somerville
Lawrence	Taunton
Lowell	Worcester

Source: Federal Reserve Bank of Boston, Working Cities Challenge

Designing the Working Cities Challenge

Eager to go beyond disseminating these findings, the Boston Fed developed a cross-sector collaboration of its own to design a strategy for helping cities build the capacities necessary for resurgence. We convened what would become our Working Cities Challenge Steering Committee³ by enlisting partners doing complementary work to promote collaborative leadership or to invest in smaller industrial cities in Massachusetts where we chose to focus our initial efforts.

Together, we developed an approach to achieve a set of goals, adapted from those established by our colleagues at Living Cities, which is doing similar work to foster collaborative leadership in a set of larger cities across the country: 1) support bold, promising approaches that have the potential to transform the lives of low-income people and the communities in which they live; 2) build resilient, cross-sector civic infrastructure that can tackle the complex challenges facing smaller industrial cities and achieve population-level results; and 3) move beyond programs and projects to focus on transforming systems and promoting integration across multiple systems and issues.

To achieve these goals, the design of the Working Cities Challenge started with — but necessarily extended beyond — the provision of grants. Twenty cities were eligible to compete for three-year awards⁴ that included a grand prize of \$700,000 and three awards of \$225,000 to \$400,000. Seed awards, initially intended to support cities in further planning their initiatives, were used for scaled-down implementation in the recipient cities.

A set of criteria was established to help an expert jury⁵ evaluate and score applications in accordance with Challenge goals. Threshold criteria included having an applicant team that included each sector (public, private, and nonprofit), a local match of at least 20 percent of requested funds, a budget and staffing plan sufficient to manage the collaborative and the initiative, and a lead applicant serving as the backbone of their city's effort. Teams were scored on the strength, depth, and inclusivity of their collaboratives; their ability to analyze and change systems

for the benefit of low-income residents; and their likelihood of achieving collective impact through a sustained effort to share goals and accountability. As an initial indicator of collaborative capacity, cities were allowed to submit just one application on behalf of their community. However, they weren't restricted in their choice of problem or solution; instead, they were encouraged to take on initiatives that already had momentum and were thus more likely to succeed in the long term.

Applicants received guidance from Boston Fed staff throughout the application process (from May through July 2013) which took the form of information sessions across the state and a mandatory applicant workshop. Site visits to 14 of the 20 cities provided Boston Fed staff with the opportunity to ask questions and explore the intangible aspects of teams' applications, such as the degree to which collaborations were authentic and the level at which key stakeholders were engaged. Our jury selected and interviewed finalists, announcing award decisions in January 2014.

ONE YEAR LATER: WHAT ARE WE LEARNING?

The Fed is pleased with the tangible progress winning cities have made since grants were awarded in March 2014. Lawrence opened the doors of its Family Resource Center, which is the embodiment of an effort to link parents to jobs and economic stability through the city's public schools, and Fitchburg has recently released its scorecard to track and improve neighborhood quality. Holyoke and Chelsea have tested municipal processes to gauge their influence on each city's initiative: Holyoke is revising its permitting process to minimize barriers to entrepreneurship, while Chelsea is reconsidering the role of code enforcement in its neighborhood-based approach after conducting targeted building inspections. Salem and Somerville, whose one-year seed grants ended in March, are now looking to build on their pilot efforts by adapting to lessons learned and seeking new sources of funding to bring their initiatives to scale.

The experiences of these six cities have been followed closely by Fed staff, our evaluators, our steering committee, and our

Table 2. Working Cities Challenge Winners

City	Initiative	Award	Goal	Strategy
Lawrence	The Lawrence Working Families Initiative	\$700,000	Increase parent income by 15 percent in the Lawrence Public School system over 10 years.	Provide families with access to resources and opportunities for employment and economic security.
Fitchburg	Re-Imagine the North of Main	\$400,000	Transform the North of Main neighborhood into a place where residents live, work, and invest over the next 10 years.	Use data to prioritize investments and track effectiveness in the areas of community engagement, housing, public safety, health, economic development, and education.
Holyoke	SPARK (Stimulating Potential, Accessing Resource Knowledge)	\$250,000	Increase the percentage of Latino-owned businesses from 9 to 25 percent in 10 years.	Coordinate entrepreneurship services and opportunities across organizations and sectors.
Chelsea	Chelsea Thrives	\$225,000	Reduce poverty and mobility in the Shurtleff-Bellingham neighborhood by 30 percent over 10 years.	Use a data-driven approach to integrating services that improve housing conditions, civic engagement, health, and quality of life.
Salem	Breaking Down Barriers Initiative	\$100,000 seed grant	Eliminate the disparities in income, employment, and civic participation between the city and the Point Neighborhood.	Leverage cross-sector partners and public resources to link residents to employment and public service opportunities.
Somerville	Pocket Change: Creating a Somerville that Works for All	\$100,000 seed grant	Reduce unemployment for low-income youth by 10 percent over 10 years.	Craft a youth-oriented system for providing training, building work experience, and placing youth in jobs.

Source: Working Cities Challenge

The Commonwealth's Working Cities: A Statistical Snapshot

DANIEL HODGE AND ROBERT NAKOSTEEN

The urban communities identified as the Working Cities in the Boston Fed's Working Cities Challenge vary in their demographic and economic characteristics. For example, the most populous city in 2013 was Worcester, with over 180,000 residents, and the smallest was Chelsea, which is home to just under 37,000 people. But they also share common traits with unemployment rates above the state average (in all but two of the cities), and median family incomes below the state average in all cases.

Since the Commonwealth's emergence from the Great Recession, most but not all Working Communities have experienced population growth. The U.S. Census Bureau estimates that between 2009 and 2013 the fastest population growth occurred in Everett (12.5%) and Lawrence (10.0%), which both grew robustly. In contrast, several cities were estimated to have lost residents, including Fitchburg (-2.9%), Fall River (-2.3%), Holyoke (-0.9%), Chicopee (-0.5%), and Springfield (-0.4%).

In 2014, the strongest year for the Massachusetts labor market since 2000, average annual unemployment rates in the Commonwealth's Working Cities ranged from a high of 12.0% in Lawrence to 3.9% in Somerville, compared with the state unemployment rate of 5.7%. But in every case since 2009, labor market conditions have improved, in some cases considerably. In spite of this progress, Lawrence, Fall River, and New Bedford continued to experience average annual unemployment rates in the double digits in 2014.

Poverty remains a universal challenge in the Working Cities, all of which were home to higher-than-state-average shares of residents living below the poverty line in 2013. Median family income and the poverty rate measure different aspects of the same phenomenon, and there is a high negative correlation between the two measures (-0.85). Not surprisingly, the city with the highest median family income, Haverhill, also had the lowest poverty rate. And Lawrence, with the lowest median family income, had nearly the highest rate of

Selected Socioeconomic Measures for Massachusetts Working Cities¹

Working City	Population	Unemployment Rate (Annual)	Median Family Income	Poverty Rate
Brockton	93,971	7.9%	\$60,504	17.7%
Chelsea	36,905	7.4%	\$52,104	20.8%
Chicopee	55,615	7.5%	\$57,285	13.1%
Everett	42,504	6.0%	\$52,475	13.9%
Fall River	88,714	10.9%	\$41,814	24.0%
Fitchburg	40,351	8.6%	\$53,272	20.4%
Haverhill	61,732	6.2%	\$70,405	12.2%
Holyoke	40,145	9.1%	\$36,262	30.8%
Lawrence	77,267	12.0%	\$34,416	30.4%
Lowell	108,210	7.1%	\$55,875	19.6%
Lynn	91,171	6.9%	\$54,009	21.8%
Malden	60,213	5.2%	\$61,103	18.1%
New Bedford	94,899	10.8%	\$44,644	23.6%
Pittsfield	44,235	6.5%	\$60,163	17.8%
Revere	53,235	6.3%	\$57,251	14.6%
Salem	42,239	5.8%	\$66,549	14.7%
Somerville	77,739	3.9%	\$68,076	16.6%
Springfield	153,593	9.5%	\$37,291	31.0%
Taunton	55,975	6.6%	\$65,150	13.8%
Worcester	182,386	7.3%	\$54,035	23.3%
Massachusetts	6,648,138	5.7%	\$83,867	11.8%

Sources: Massachusetts Labor and Workforce Development, Labor Market Information, Local Area Unemployment Statistics; U.S. Bureau of the Census, American Community Survey (2011–2013, Three-Year Estimates)

poverty after Springfield and Holyoke. In these three cities with the highest poverty rates, nearly one in three residents lived below the federal poverty line.

How did we get here and were these cities always trailing state and U.S. economic conditions? To portray the condition of some of the most stressed Working Cities, we have included two graphic displays which vividly illustrate what has happened to these cities over time. The first of these graphs shows the time path of median family income as a percentage of the same measure for the U.S. In the 1960s, each of the seven selected cities had income levels within hailing distance of the national figure. Some cities were even above the national income level. From that point forward to the present, there has been a virtually uninterrupted downward trend in this figure for all of these cities. Though the reasons and time path of this development is a complicated story, one of its aspects is the loss of the manufacturing base, which to some extent affected all of Massachusetts. The second graph exhibits the percent of employment in

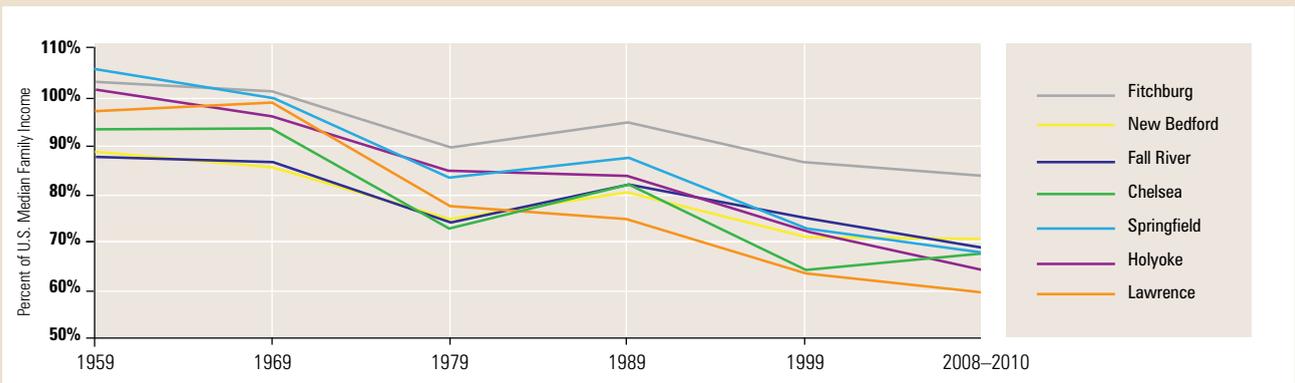
manufacturing over time for five of the Working Cities. It depicts how important this sector once was to these cities (with 33 to 52 percent of all jobs in manufacturing in 1960). While the rate of descent varies over these cities, it clearly depicts the dramatic loss of reasonably high-paying jobs in some of the most economically stressed areas of the state.

Endnotes

1.) The socioeconomic measures table shows the most current data available. Population, median family income and poverty rates are made up of aggregated ACS estimates from 2011, 2012 and 2013. Unemployment rates are 2014 annual rates. An explanation of how the U.S. Census measures poverty, poverty thresholds and poverty rates can be found here: <http://www.census.gov/hhes/www/poverty/about/overview/measure.html>

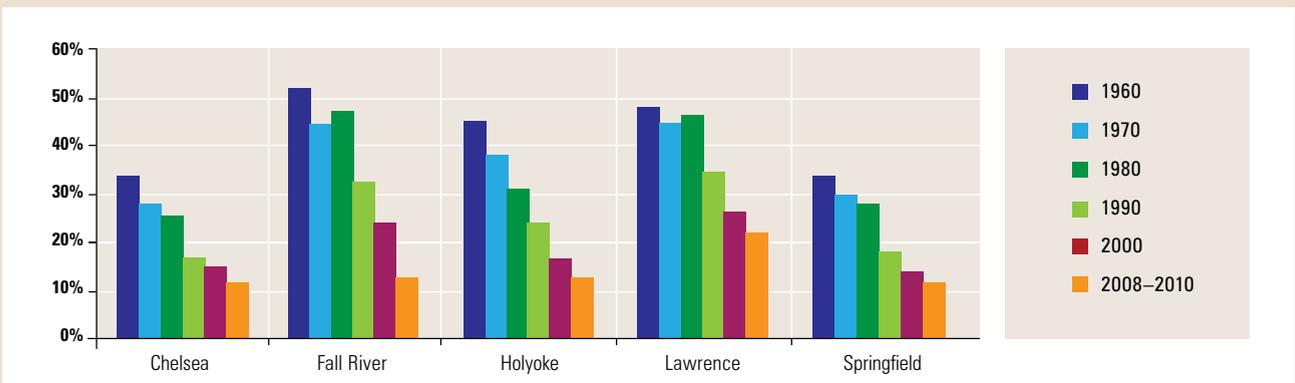
2.) The two figures appeared in a presentation by Eric S. Rosengren, President & CEO Federal Reserve Bank of Boston, *Can Economic Opportunity Flourish When Communities Do Not?* October 18, 2014 Federal Reserve Bank of Boston, 58th Economic Conference Inequality of Economic Opportunity, Boston, Massachusetts.

Median Family Income for Massachusetts Mid-Sized Cities Relative to U.S. Median Family Income for Cities with the Lowest Median Family Income²



Source: U.S. Bureau of the Census, Decennial Census (1960, 1970, 1980, 1990, and 2000), American Community Survey (2008 - 2010, Three-Year Estimates)

Share of Employed Residents Working in Manufacturing Industries in Massachusetts Mid-Sized Cities with the Lowest Median Family Income



Note: Based on the civilian employed population 16 years and over in all years except 1960, which is based on the civilian employed population 14 years and over.

Source: U.S. Bureau of the Census, Decennial Census (1960, 1970, 1980, 1990, and 2000), American Community Survey (2008-2010, Three-Year Estimates)

partners at Living Cities. We are collectively learning a great deal about what it takes to strengthen civic infrastructure — that is, the network of organizations, resources, leaders, and engaged citizens that can be mobilized in response to crisis or opportunity — in smaller industrial cities. Because we hope to see further investment in these cities and in cross-sector efforts to change the systems that affect outcomes for low-income residents, the Boston Fed is eager to share our experiences and lessons with the field.

Not surprising, cities that do have the capacity to meaningfully engage city residents emerged victorious in the Challenge.

Collaborative Leadership

A core element of the Working Cities Challenge is that initiatives are led by cross-sector teams that adopt a shared vision and definition of success. While all cities met this threshold on paper when competing in the Challenge, our jurors and evaluators found wide variation in the authenticity of these collaborations. Winning teams were generally further along in bringing leaders from the public, private, and nonprofit sectors together in the service of their initiatives from the outset. Nevertheless, their experiences demonstrate that assembling, governing, and sustaining authentically collaborative teams is hard work.

One year in, we find that the composition of teams leading the work has tightened to a smaller set of core partners with key responsibilities. In many cases, the private sector's role has been limited to providing input when engaged but not necessarily playing a key role in decision making or strategy. But as teams refine their strategies to better understand what roles the private sector might play, they are able to record incremental but meaningful progress. Holyoke has expanded its leadership team to include two immigrant entrepreneurs who can compellingly speak to both the needs of their peers as well as the ways that small businesses can provide support, while Somerville has enlisted businesses in the food industry that serve as potential employers for city youth.

Strong and engaged municipal leaders made a difference in helping winning teams put forth competitive applications that demonstrated alignment with cities' visions and complementary investments. But in some ways, this is a double-edged sword: mayors and city managers are necessarily limited in their ability to participate in the day-to-day work of their teams, and their enthusiasm does not always mean that their front-line staff are informed about, invested in, or delegated to support their cities' Working Cities Challenge efforts.

Building and sustaining a goal-oriented, cross-sector team while managing the ongoing work of a complex initiative is a tall order. Each city's backbone organization has recently hired a project director whose chief responsibilities revolve around initiative implementation. This is already making a significant difference: project directors are reinvigorating their collaboratives through both operational strategies — like scheduling biweekly check-ins and sending weekly emails to remind partners of their tasks — as well as strategies to refocus initiatives on their shared vision, goals, and values to ensure that all partners are speaking the same language.

Community Engagement

The Working Cities Challenge was designed to ultimately improve outcomes for low-income residents in smaller industrial cities. Not only were applicants required to frame their goals around this population, but they were also asked to demonstrate the degree to which people impacted by their interventions would be engaged in the application and implementation processes.

Few Working Cities have significant depth in this area. One key lesson from both the application phase and the first year of the Challenge is that municipalities are generally weak in this area, tending to seek out the same stakeholder groups time and again for feedback and participation.

Not surprising, cities that do have the capacity to meaningfully engage city residents emerged victorious in the Challenge. This capacity came largely from community development corporations (CDCs) in the winning cities: Lawrence Community Works (which stood out for engaging residents in the development of their application), The Neighborhood Developers in Chelsea, Twin Cities CDC in Fitchburg, North Shore CDC in Salem, and the Somerville Community Corporation all played key roles in their cities' applications and have taken the lead in engaging residents.

These lessons are particularly important for the Fed as we explore prospects for a second round of the Challenge in Massachusetts. Non-winning cities struggled with community engagement in the first round. Many of them lack CDCs or other community-based organizations that can play convening roles. Any strategy to build capacity in these cities would thus require technical assistance around why and how to engage residents in the design and implementation of their initiatives.

Data-driven Decision Making

An essential component of any collaboratively led initiative is that teams have metrics with which to hold themselves accountable in progress toward a shared goal. And while the current push toward collective impact work has encouraged many organizations to get on board with using data to mark progress and inform decisions, doing this proves much more challenging.

Many of our teams initially struggled with or deferred in taking on the data-oriented dimension of their initiatives, and understandably so: the term "data" typically connotes expensive,

specialized software and the technical and statistical skills required to use it. Though some teams will eventually need such tools — Chelsea in particular, as it looks to integrate services for neighborhood residents across an array of partners and sectors — a number of winning cities are finding success through smaller-scale, targeted efforts to collect and respond to evidence. Fitchburg, whose approach to data has been buoyed by its partnership with Fitchburg State University, recently surveyed residents of the North of Main neighborhood to learn about conditions and the degree to which improving them should be prioritized. These findings will be used to guide investments in that neighborhood and gauge progress in the team’s focus areas.

Another hurdle involves the selection of measures. Traditionally engaged in program-oriented work, members of Working Cities Challenge teams are generally most comfortable using output measures to determine whether and to what extent services were delivered. Determining how to measure short-term, collective progress toward an ambitious, long-term goal—like reducing by 30 percent the poverty rate in Chelsea’s Shurtleff-Bellingham neighborhood — proves much trickier, yet interim measures are essential to sustaining teams’ focus and momentum. Even where interim measures may be easily defined, accessing accurate and timely data to track them proves more complicated. This is particularly true for smaller cities where targeted neighborhood and subgroup populations may be too small to accurately depict with available secondary data.

One way the Fed is helping to address this challenge is by deploying our researchers to Lawrence to conduct a randomized controlled trial to gauge the influence of this city’s initiative on city families. We expect that this study will give the team important feedback about not only how to adapt their work to enhance the likelihood of achieving their long-term goal, but how to continue tracking progress with more readily available data.

Investing in Residents

While winning cities have taken on an ever-broadening range of issues in their initiatives, all are increasingly reframing their approach to economic development by focusing on a critical asset: city residents. In the winning cities, we are seeing teams — and public sector members in particular — shift increasingly toward ensuring that economic growth is connected to the people who live there. The independent jury noted that selected winners responded well to applicants whose initiatives embodied this shift: Lawrence, which brought workforce development to the school system, and Chelsea, which proposed developing a model to integrate and align services for neighborhood residents.

The heightened orientation toward strategies that invest in human capital has also encouraged teams to engage new actors and sectors outside of traditionally human capital-oriented domains like education and workforce development. For example, Chelsea’s efforts to comprehensively address the needs of Shurtleff-Bellingham neighborhood residents has led to a

**Table 3. Winning Cities’ Approaches to Systems Change
(At Baseline – March 2014)**

What are the key systems changes that your WCC collaborative should tackle in order to effectively address the core problem? (Select up to three.)	Total (all cities)
Changes in policies/procedures of city departments	7.9%
Changes in policies/procedures of employers	7.0%
Changes in policies/procedures of nonprofits	2.2%
New mechanisms for consulting/engaging those directly affected by the initiative’s core problem	23.2%
Greater accountability and outcome by the partners at the table	8.8%
New uses of data to refine/develop effective programs	18.9%
Resources reallocated to the more effective service providers	6.1%
New referral processes	7.9%
New systems for information sharing	14.5%

Source: Working Cities Challenge survey, March 2014

We are collectively learning a great deal about what it takes to strengthen civic infrastructure — that is, the network of organizations, resources, leaders, and engaged citizens that can be mobilized in response to crisis or opportunity — in smaller industrial cities.

partnership with Mass General Hospital, which is sharing information on asthma incidence to inform the degree to which the physical environment is affecting health and, in turn, students' attendance and performance.

Systems change

Efforts by teams to broaden their approaches to economic and human capital development reflect an increasing orientation toward systems change — that is, rethinking policies, procedures, resource flows, and decision-making — and away from programmatic interventions. By taking on ambitious, needle-moving goals that focus on low-income populations, teams have acknowledged that they will fall short if they try to achieve their goals through programmatic interventions. Community development practitioners in these communities have long agreed with research pointing to the need for comprehensive, silo-busting solutions to intractable challenges like urban poverty, but many funding sources continue to reward approaches that focus on a single issue area through a programmatic lens. Through the Working Cities Challenge, cities like Chelsea now have the flexibility to expand their approach to code enforcement to include public health. Fitchburg, moreover, has enlisted the school district and early education providers to ensure that education is integrated in their neighborhood revitalization strategy.

ADAPTING TO LESSONS LEARNED

Just as we ask teams to be flexible and learning-oriented, the Fed has been continually adapting our approach in response to feedback and ideas from our winning teams, our evaluator, our steering committee, and our peers engaged in similar work.

A key way that we are accomplishing this is through the design of our learning communities, which are bimonthly events for winning teams (as well as non-winning teams and other interested parties) to hear from experts and each other about topics that are either core elements of the Working Cities Challenge or that have been identified as issue areas that teams want to

explore in depth. While the initial set of Learning Communities was designed by the Fed to build capacities in collaborative leadership and systems change, recent sessions have been designed to meet needs expressed by winning teams: understanding workforce development systems, engaging community members and the private sector, and linking neighborhood and human capital development. We also added a session exclusively for cities' project directors to share challenges and ideas that explore how to successfully quarterback their teams' efforts.

The Fed has also provided one-on-one coaching, assigning a staff liaison to each team who checks in regularly to help them address obstacles, identify resources, and connect with experts and peers. For example, we linked Chelsea's team with Magnolia Place, a collective impact effort based in a Los Angeles neighborhood seeking to improve outcomes for families in ways that parallel Chelsea's own approach.

As winning teams have advanced their learning and refined their approaches, they have quickly found that sustaining bold efforts to change systems will cost more than they can afford with three-year grants alone — especially when all cities but Lawrence received less than requested. Yet for all of the Working Cities, particularly those outside of greater Boston, philanthropic resources are scarce and don't always align with cities' priorities or cross-sector approaches. The Boston Fed is in a unique position to advance the conversation about investing for impact in these smaller cities because of its strength as a convener and researcher and its growing network across Massachusetts cities. Our first effort to introduce funders to the Working Cities was a pitch contest in June 2014. City teams — winners and non-winners alike — were invited to pitch their initiatives to representatives from nine foundations. The contest introduced funders to talented leaders and the ways in which their grant dollars could support creative joint solutions rather than individual agencies alone. Based on the success of this event, we followed up with a Funders' Plenary in February 2015, which engaged a broader set of funders and focused on ways to grow philanthropic interest in the Working Cities.

Finally, we are leveraging lessons from the first round of the Working Cities Challenge in determining whether and how to implement future efforts in Massachusetts and elsewhere in New England. One response is the consideration of whether and how a regional approach to this model might work, particularly in states with fewer urban centers. Because limited resources have constrained the scope of some cities' interventions, we are looking at how prize awards can make planning and implementation more predictable and feasible. Finally, the first round illuminated a number of interventions that made a difference in building team members' capacities as leaders and problem solvers. These included limiting each city to just one application, providing technical assistance during the application process, connecting teams to best practices from across the country, and investing in much-needed backbone capacity.

NEXT STEPS: STUDYING AND EXPANDING THE MODEL

There is fast-growing interest in approaches to promote collaborative leadership and collective impact, but the research behind these approaches is not keeping pace with implementation. Civic infrastructure is one key area in which the Boston Fed can add value. Because our staff includes both community development practitioners and researchers, we are committed to shaping the ways in which civic infrastructure is both fostered and studied. Accordingly, we have built relationships with networks focused on both aspects of this work: those oriented toward laying the groundwork through the research, and those focused on translating research into ground-level action.

While the Working Cities Challenge was developed in response to the Boston Fed's research, this research was novel in many ways for its unique focus on collaborative leadership. Collaborative leadership goes beyond traditional measures of social capital — person-to-person connections within neighborhoods and cities — to look at connections between leaders and residents and their shared efficacy in upholding a vision for city rebirth. While some have explored the impact of social capital, researchers cannot yet answer the question: can collaboration and leadership result from intentional interventions?

So while we feel confident in our approach to supporting these cities, we recognize the need to back it up with further study. Central to our approach to the research around the Challenge is to improve our understanding and articulation of civic infrastructure, which comprises but necessarily extends beyond collaborative leadership to include organizational and institutional strength and efficacy, resources, and an engaged citizenry. In addition to this definition, we are seeking to measure whether and how the Working Cities Challenge builds civic infrastructure in participating cities, and whether this in turn influences outcomes for the cities and their low-income populations.

At present, our researchers are working to measure a core aspect of civic infrastructure by determining baseline levels of trust across sectors in a winning city to gauge institutional social capital: the connections between leaders, across sectors, within a city. This work seeks first to determine whether it is possible to measure change over time in the cross-sector collaboration exhibited by a set of Working Cities. By doing so, they hope to then determine whether such change is linked to better outcomes for low-income residents. Doing this in a set of winning cities and peer cities should indicate whether the Challenge can help to grow civic infrastructure and improve cities' economic outcomes.

Just as the Boston Fed borrowed many aspects of its model from Living Cities, we are supporting the efforts of others to borrow aspects of the Working Cities Challenge. The philanthropic public health initiative HICcup framed its approach as a challenge to communities of 100,000 residents or less; like the Challenge, teams were scored on their ability to lead collaboratively, engage stakeholders, and track outcomes. New Hampshire's Endowment for Health launched the Immigrant Integration

Initiative, which is funding efforts that engage immigrants in community life. The initiative integrated Challenge elements like limiting cities to just one application and asking for applicants to adopt collaboratively led, multi-sector approaches. Particularly exciting is the energy this approach is generating in the Federal Reserve System, evidenced by the San Francisco Fed's participation in an initiative inspired by the Working Cities Challenge that fosters collaborative leadership and links disparate sectors like public health and transit with community development to improve well-being for lower-income populations.

We are eager to translate this momentum into more significant opportunities to refine and deploy this model in Massachusetts again as well as elsewhere in New England. These next steps will not only fulfill our mission of strengthening the prospects of smaller cities in the region, but will further hone what we know about how to invest in resurgence. 

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Endnotes

- 1.) The full list of resurgent cities includes: Evansville, IN; Fort Wayne, IN; Grand Rapids, MI; Greensboro, NC; Jersey City, NJ; New Haven, CT; Peoria, IL; Providence, RI; Winston-Salem, NC; and Worcester, MA.
- 2.) The full report, "Reinvigorating Springfield's Economy: Lessons from Resurgent Cities," was written by Yolanda K. Kodrzycki and Ana Patricia Muñoz and published in October 2009. It is available at: <http://www.bostonfed.org/commdev/pcadp/2009/pcadp0903.pdf>
- 3.) Members include representatives from Living Cities, MassINC, the Commonwealth of Massachusetts (via the Executive Office of Housing and Economic Development and MassDevelopment), Boston Community Capital, Clark University's Mosakowski Institute, the Massachusetts Competitive Partnership, the Life Initiative, and the Alliance for Business Leadership.
- 4.) The Boston Fed does not originate, receive, or distribute Working Cities Challenge prize money. Boston Community Capital served as the fiscal agent for the first round of the Challenge, and contributions toward grant awards came from public, private, and philanthropic partners.
- 5.) The jury members were selected for their expertise and ability to be unbiased. No Federal Reserve Bank of Boston officer or employee served on the jury.

The views expressed in this publication do not necessarily reflect official positions of the Federal Reserve Bank of Boston or the Federal Reserve System.



ENDNOTES

Targeted Redevelopment Assistance to Strengthen Massachusetts Gateway Cities

JAY ASH AND MARTY JONES

THE TRANSFORMATIVE DEVELOPMENT INITIATIVE (TDI) — A NEW APPROACH TO GROWING THE ECONOMIES OF THE COMMONWEALTH'S 26 GATEWAY CITIES — EMPHASIZES INCREASED INTERAGENCY AND MUNICIPAL COLLABORATION BY BRINGING TOGETHER DIVERSE CIVIC INTEREST GROUPS AND CITY LEADERS, FORGING NEW CONNECTIONS, AND SPARKING STRATEGIC CONVERSATIONS. THE PROGRAM INCLUDES TECHNICAL ASSISTANCE AND GRANTS, INVESTMENTS BY MASSDEVELOPMENT THAT FACILITATE EQUITY REAL ESTATE INVESTMENTS, AND APPOINTMENT OF TDI FELLOWS.

Can the revitalization of a neighborhood be achieved by leveraging a deep understanding of its character and vision; strengthening local partnerships and local entrepreneurs; providing targeted financial and technical assistance for redevelopment projects within that neighborhood; and engaging the community — and if so, can this newly vibrant neighborhood have far-reaching positive impacts on its city?

This question is at the heart of a *new* approach to growing the economies of the Commonwealth's 26 Gateway Cities. Building on previous Gateway City initiatives and aligned with the Boston Fed's Working Cities Challenges, the launch of the Transformative Development Initiative (TDI) has resulted in increased interagency and municipal collaboration, bringing together different groups and city leaders, forging new connections, and sparking conversations about the future of economic and community development in Gateway Cities.

These cities face significant challenges that require creative, individually tailored economic development and real estate solutions that take into account each city's unique character and needs. But we believe strengthening Gateway Cities through economic and real estate development benefits the entire Commonwealth. And, therefore, working on targeted initiatives — supported by research, data, and community input — to overcome the long-standing challenges in Gateway Cities is an important part

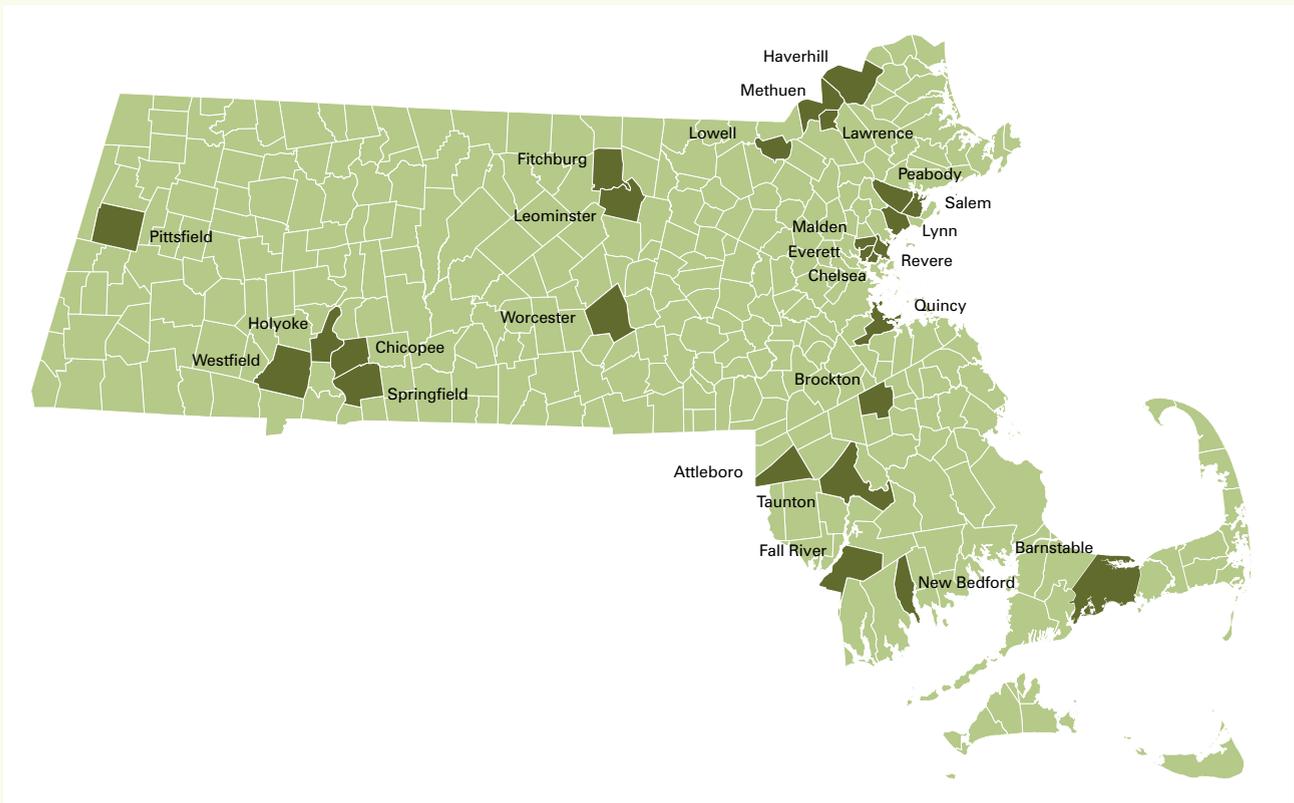
of a whole-state strategy for making Massachusetts a great place to live, work, and play for its businesses, residents, and visitors.

The Commonwealth defines Gateway Cities as municipalities outside Boston that have populations greater than 35,000, below-state-average household incomes, and below-average rates of educational attainment.¹ With combined populations totaling 1.77 million and a total labor force of more than 850,000 people,² the Gateway Cities host a diverse range of industries, but their economic growth has lagged behind that of the rest of the Commonwealth.

Gateway Cities have a number of vital but often underappreciated strengths such as vibrant cultural offerings, historic buildings, parks, and communities of immigrant entrepreneurs; most also have strong public transportation services and highway access. Each Gateway City has a unique story to tell and a unique neighborhood makeup. The approach taken by the Commonwealth seeks to leverage that history and character to achieve each city's potential.

The Baker Administration is committed to investing in Gateway Cities. We are connecting the Gateways with the resources and partners that will help them flourish as vibrant communities, and as engines of regional economic growth. The Governor plans to develop contracts with each city to specify key priorities for state-local

Figure 1. Massachusetts Gateway Cities³



collaboration, identify redevelopment opportunities for each city, and facilitate communication and coordination among city and state leaders.

The Baker Administration is particularly enthusiastic about driving the Transformative Development Initiative forward. TDI emerged from many discussions among state, municipal, and business leaders, and was established in an economic development bill signed in 2014.⁴ Housed within and managed by MassDevelopment, the Commonwealth's quasi-governmental development and finance agency, with guidance from the Massachusetts Executive Office of Housing and Economic Development, TDI seeks "to encourage redevelopment on a scale and character capable of catalyzing significant follow-on private investment, leading over time to transformation of an entire downtown or urban neighborhood in a way consistent with local plans."⁵

TDI uses a neighborhood-level, multi-faceted urban development approach to maximize community-building opportunities in conjunction with interconnected real-estate projects. Additionally, the process is applying a unique data-driven approach to tailoring services to the specific needs of the cities while supporting redevelopments that link state policies with local needs.

Municipal leaders in some Gateway Cities have already had positive experiences with targeted redevelopment

strategies, such as Haverhill's new apartment developments near the train station that have also brought new restaurants and retail to the area, and Springfield's redevelopment of 1550 Main Street, which has attracted important regional employers and led to investors purchasing, redeveloping, and leasing other neighborhood properties.⁶ Other municipal leaders have been exploring the idea of district-focused development, and being able to point to TDI as an example of this approach in practice will make getting buy-in from local decision-makers and boards easier.

Since the launch of TDI, MassDevelopment has conducted multiple site visits to all 26 Gateway Cities to get a baseline understanding of each community's development needs. These visits have revealed a common thread: the cities all have areas in tremendous need of redevelopment and market-based activities; all have municipal and business leaders who are enthusiastic advocates for making their communities desirable places to live and work; and all of the Gateway Cities have tremendous economic development potential. At the same time, much of this potential and enthusiasm is held in check by the lack of personnel capacity and financial resources in these cities. Most critically, Gateway Cities need additional expertise and ability to spend focused time to execute their visions and strategic plans.

TRANSFORMATIVE DEVELOPMENT INITIATIVE: PRINCIPLES AND KEY COMPONENTS⁷

Recently, MassDevelopment and a review committee selected ten TDI Districts in Development in Brockton, Haverhill, Holyoke, Lynn, New Bedford, Peabody, Pittsfield, Revere, Springfield, and Worcester.⁸ These ten districts include both downtown and residential districts. Two additional industrial districts in Everett and Malden will receive specialized regional planning and development implementation assistance. The ten TDI Districts in Development will receive enhanced technical assistance, real estate services, and equity investments in real estate to support local visions for redevelopment, and to catalyze and leverage private investments and economic activities. MassDevelopment recently announced that it has hired TDI Fellows in Haverhill, Lynn, and Springfield to advance redevelopment visions by working in their host districts for three years to add needed capacity and focus on collaboration with local partnerships.

Several projects have already benefitted from funding through TDI Cowork, including a grant of up to \$150,000 for the City of New Bedford, New Bedford Economic

Development Council, and Groundworks Coworking Space to develop a collaborative workspace for entrepreneurs. TDI Cowork has also awarded five seed grants to projects in Holyoke, Springfield, Lawrence, and Quincy.⁹

Over the next six months of 2015, the three new TDI Fellows will begin work in their host cities with municipal, business, and community leaders to strengthen their local partnerships, refine the District revitalization strategy, and prioritize redevelopment activities. MassDevelopment will start the first technical assistance projects in the TDI Districts, which may include strategic market implementation plans; focused master planning; test fit scenarios to determine possible and realistic uses of properties; active use and place-making strategies; and other assistance to help to build local markets and to catalyze follow-on investments.

Additionally, the Fellows and MassDevelopment will help to increase the visibility of the opportunities in these districts, and to coordinate with other governmental partners to find additional finance tools. In June, the Urban Land Institute will hold a one-week intensive charrette for the Everett and Malden projects to explore future growth opportunities. MassDevelopment will also make

Table 1. Transformative Development Initiative: Principles and Key Components

TDI is guided by three core principles for assistance and investment:
<ul style="list-style-type: none"> • Local collaborative partnerships: Development success comes from strong partnerships and people, as the connective tissue that establishes a vision, links resources to ideas, and moves projects forward over sustained periods.
<ul style="list-style-type: none"> • Strategic district focus: TDI is a place-based redevelopment initiative focused on locally identified, strategically located districts. Isolated investments do not automatically spur additional growth.
<ul style="list-style-type: none"> • Community engagement: TDI seeks to support capacity and provide funding tools that will reinforce and support local community engagement to ultimately stimulate internal and external investments that benefit those communities.
Key components of the program include:
<ul style="list-style-type: none"> • TDI Assistance to provide technical assistance and grants to pay for third-party professional services managed by MassDevelopment, such as market analysis and strategic implementation; retail or commercial development strategies; and technology integration.
<ul style="list-style-type: none"> • TDI Fellows who will work in Gateway Cities to implement strategic efforts in the TDI Districts.
<ul style="list-style-type: none"> • TDI Investments by MassDevelopment that will make equity investments in real estate within TDI Districts.
<ul style="list-style-type: none"> • TDI Cowork to provide matching grants to support collaborative workspaces to foster entrepreneurship, interaction, and economic development.
<ul style="list-style-type: none"> • TDI Places to provide small-scale grants for community-building.

equity investments within the TDI Districts, and will continue working with all 26 Gateway Cities to assist in their redevelopment efforts and position those that were not selected for the pilot round for future TDI District designation. Finally, MassDevelopment is compiling a robust pipeline of potential TDI Investments and considering real estate mechanisms (master leases, site acquisitions, and/or joint ventures for redevelopment) that would catalyze additional district activities.

Ultimately, TDI's objective is to live up to its name and become a transformative program by achieving meaningful and measurable positive impacts on economic development and the well-being of Gateway City residents. We believe that TDI has the potential to attract new businesses and enable others to grow; help communities tackle issues of blight and public safety; and bring about long-term positive change for Gateway Cities' economies. 

JAY ASH is Secretary of the Massachusetts Executive Office of Housing and Economic Development.

MARTY JONES is President and CEO of MassDevelopment.

Endnotes

- 1.) "General Laws, Part I, Title II, Chapter 23A, Section 3A," The 189th General Court of Massachusetts Website. <https://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter23A/Section3A> (accessed February 2, 2015).
- 2.) "Municipal Employment Data," Massachusetts Executive Office of Labor and Workforce Development Website. http://lmi2.detma.org/lmi/lmi_town.asp (accessed February 13, 2015).
- 3.) "Gateway Cities and Program Information," Massachusetts Executive Office of Housing and Economic Development Website. <http://www.mass.gov/hed/community/planning/gateway-cities-and-program-information.html> (accessed February 2, 2015).
- 4.) Ibid.
- 5.) "Transformative Development Initiative (TDI)," <http://www.massdevelopment.com/financing/specialty-loan-programs/tdi/> (accessed February 2, 2015).
- 6.) "Project with a Purpose," *BusinessWest*, February 24, 2015. <http://businesswest.com/blog/project-with-a-purpose/> (accessed March 3, 2015).
- 7.) Ibid.
- 8.) "Ten Gateway Cities Districts Identified for Enhanced Assistance through MassDevelopment's Transformative Development Initiative" (press release), MassDevelopment Website. <http://www.massdevelopment.com/press-room/press/releases/ten-gateway-city-districts-identified-for-enhanced-assistance-through-massdevelopments-transformative-development-initiative/> (accessed February 2, 2015).
- 9.) *2014 Transformative Development Initiative Annual Report*, December 31, 2014: 2-4. http://www.massdevelopment.com/wp-content/uploads/2015/01/TDI_annualreport_14.pdf (accessed February 2, 2015).

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