Socioeconomic Indicators for Massachusetts

August 2022

UMassAmherst
Donahue Institute
Economic and
Public Policy Research

Prepared by the UMass Donahue Institute's
Economic & Public Policy Research Group

This report was prepared by the UMass Donahue Institute and the information in text, tables, charts and graphs are the most recently available information as of August 17, 2022.

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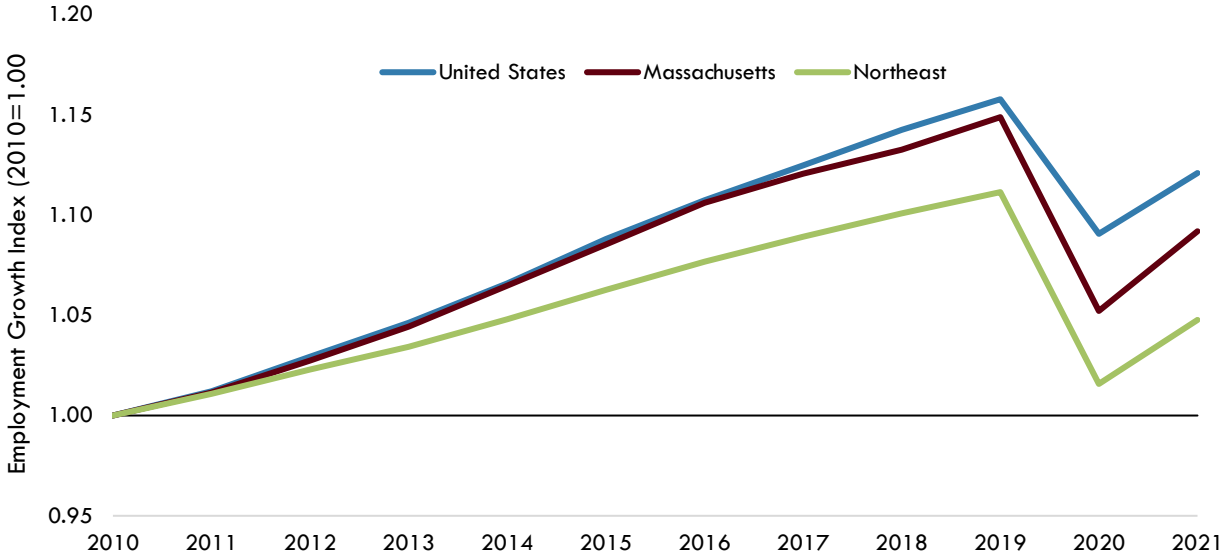
Economy

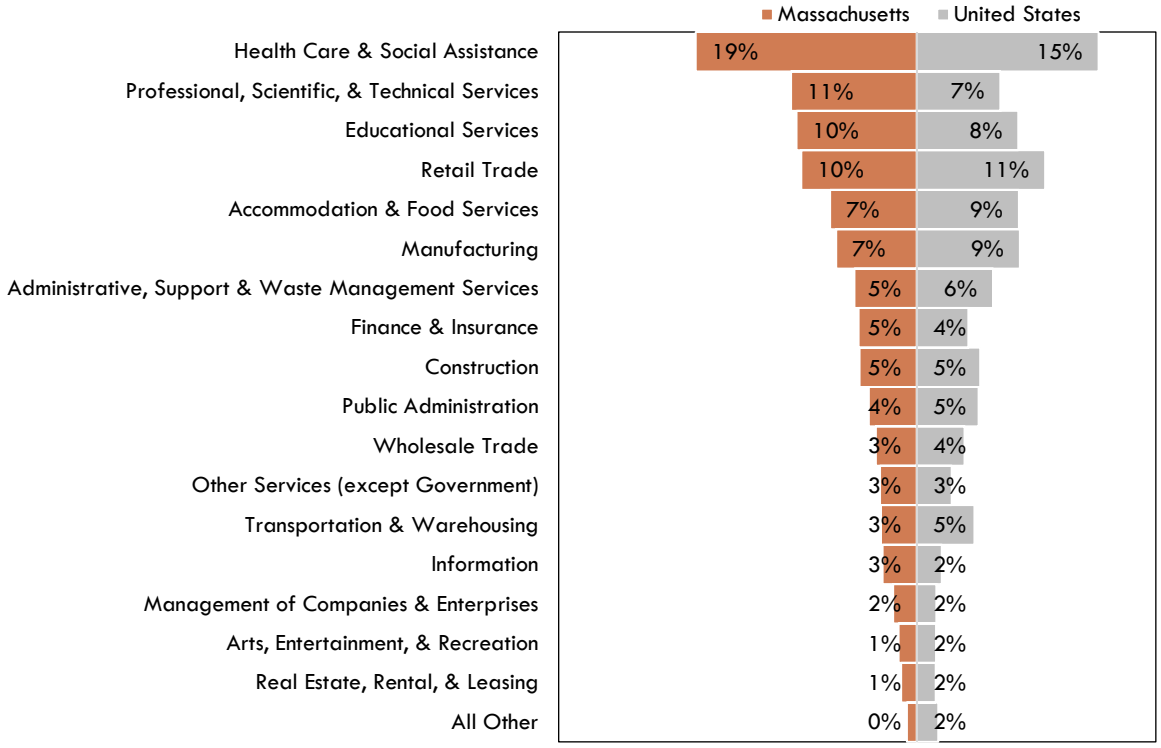
Over the past decade, Massachusetts has been a leader in job growth in the Northeast (Figure1), driven largely by the state's highly-educated workforce, the overall diversity of industries, and strengths in knowledge-based industries, such as health care, education, and professional services (Figure 2). Professional and technical services have been increasingly important in the state, both as a share of employment and in terms of its contribution to state gross domestic product (GDP). During the pandemic, professional and technical services moved from being fourth in the state in terms of employment, to second. In 2021, the industry accounted for 11 percent of jobs; the sector is first in the state as a share of GDP, making up 14 percent of the state GDP. While the sector includes everything from legal services to veterinary services, in Massachusetts the two leading subsectors in terms of employees are computer systems design and related services, and scientific research and development services. These subsectors benefit from the Commonwealth's well-established higher education and health care sectors.

Figure 1. Employment Growth Index in Massachusetts, the Northeast, and the United States, 2010-2021 (2010=1.00)



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW); UMDI analysis

Figure 2. Industry Mix in Massachusetts and the United States, 2021 (Percent of Total Jobs)

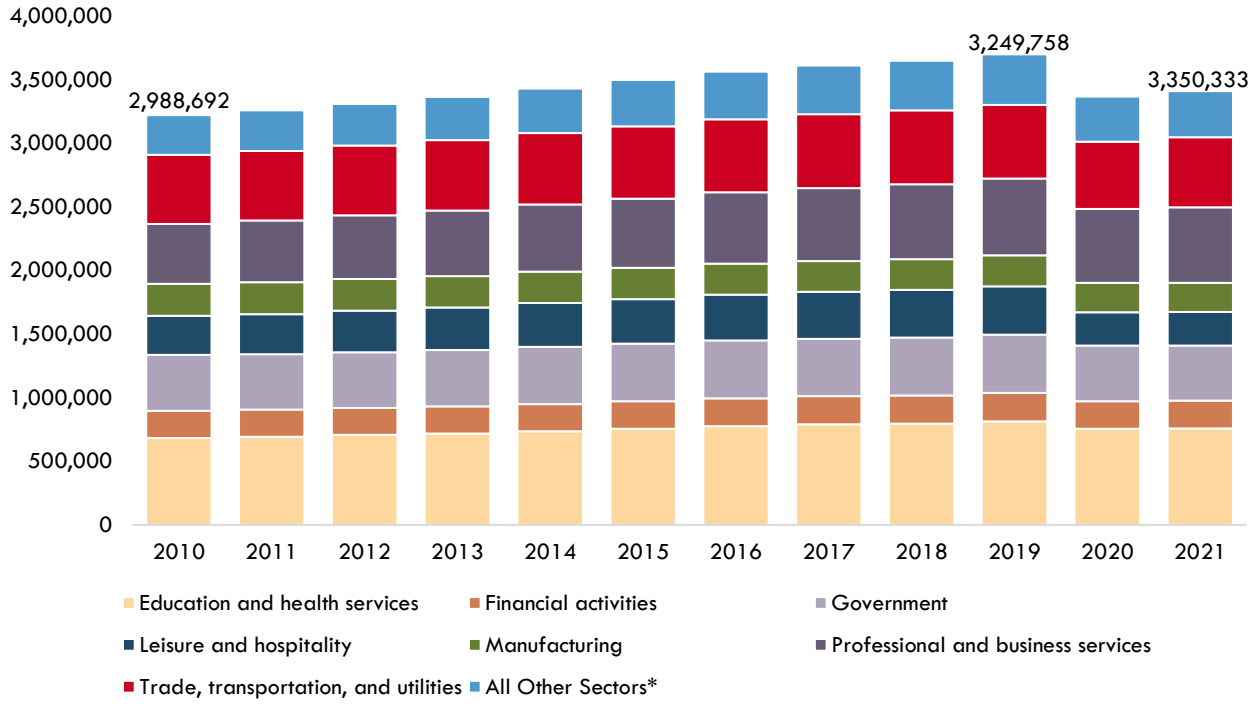


Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW), UMDI analysis.
Note: All Other includes: Utilities; Agriculture, Forestry, Fishing, & Hunting; and Mining, Quarrying, and Oil & Gas Extraction.

While sixth in terms of employment in 2021, manufacturing has historically experienced declines. In recent years the decline has slowed considerably, but the Commonwealth's share of manufacturing employment has remained lower than the share of employment in the United States as a whole. Since 1990, the earliest year for which NAICS data are available, manufacturing in Massachusetts went from 16 percent of the nonfarm payroll to 7 percent in 2021.

Several NAICS service sectors, education and health services, professional services, and leisure and hospitality have grown to take the place of manufacturing in driving the Massachusetts economy and now account for almost half of total payroll employment, while financial activities, government, information, and trade, transportation and utilities have remained relatively level or declined in share (Figure 3).

Figure 3. Annual Average Employment in Massachusetts, 2010-2021 by NAICS Supersector



Source: U.S. Bureau of Labor Statistics, Current Employment Statistics (CES); UMDI analysis. *Includes Mining & Natural Resources, Construction, Information, and Other Services.

The COVID-19 pandemic interrupted the trajectory of the state's economic growth and continues to have tremendous short- and long-term ramifications for the state's economy. Over 690,000 jobs were lost in spring 2020. The pandemic recovery continues, but as of July 2022, the state still has 60,000 fewer jobs than the peak in February 2020 (Figure 4). The growth of professional and technical services during the pandemic has occurred during a period when educational services, retail trade, and accommodations and food services all suffered losses in terms of jobs. Accommodation and food services is the slowest sector to recover both in terms of absolute number of jobs lost and as a share of jobs lost compared to levels prior to the pandemic (Figure 4).

Figure 4. Jobs Deficit in Massachusetts Relative to February 2020 Peak by 2-Digit NAICS Industry

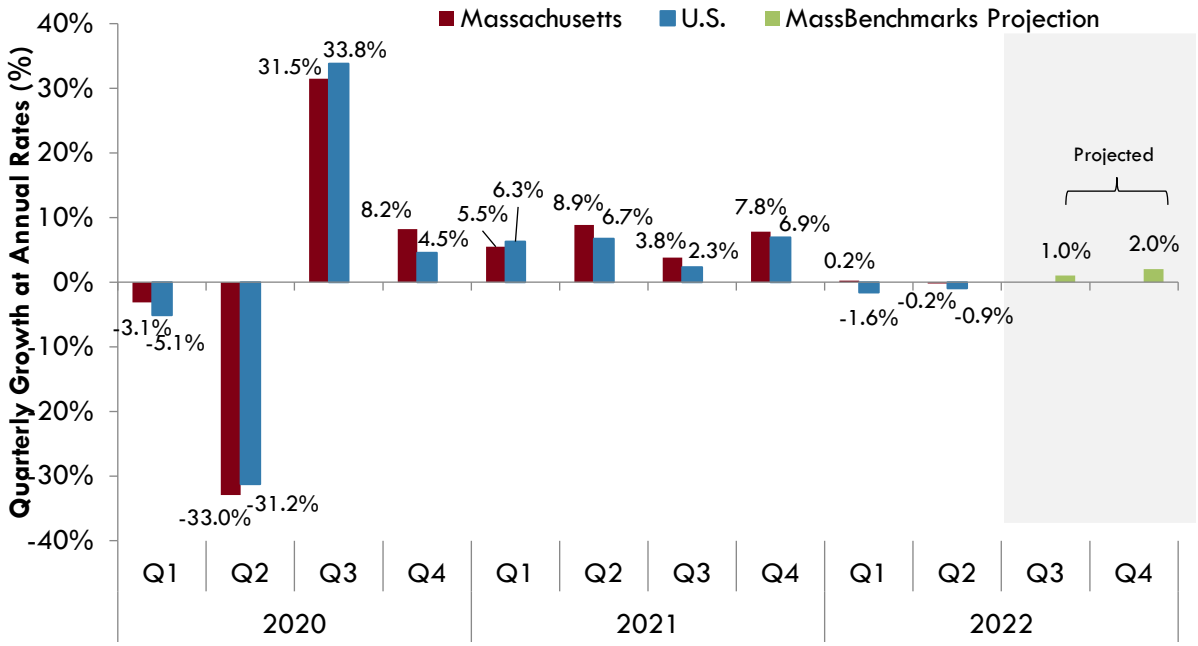
Industry	Feb-20	Jul-22	Change (N)	Change (%)
Accommodation and food services	322,500	275,300	(47,200)	(14.6%)
Retail trade	351,300	333,700	(17,600)	(5.0%)
Other services	139,000	128,800	(10,200)	(7.3%)
Government	460,300	450,500	(9,800)	(2.1%)
Health care and social assistance	646,600	637,300	(9,300)	(1.4%)
Finance and insurance	176,700	170,400	(6,300)	(3.6%)
Educational services	186,000	183,500	(2,500)	(1.3%)
Management of companies and enterprises	73,400	71,100	(2,300)	(3.1%)
Manufacturing	243,000	241,400	(1,600)	(0.7%)
Real estate and rental and leasing	48,800	47,400	(1,400)	(2.9%)
Administrative and waste services	186,500	185,800	(700)	(0.4%)
Arts, entertainment, and recreation	63,200	62,800	(400)	(0.6%)
Mining and logging	1,000	900	(100)	(10.0%)
Wholesale Trade	123,300	125,200	1,900	1.5%
Transportation, warehousing and utilities	105,600	110,000	4,400	4.2%
Information	95,500	100,600	5,100	5.3%
Construction	166,300	173,400	7,100	4.3%
Professional and technical services	351,100	382,000	30,900	8.8%
Total nonfarm	**3,740,100**	**3,680,100**	**(60,000)**	**(1.6%)**

Source: Massachusetts Executive Office of Labor and Workforce Development, Current Employment Statistics (CES-790); UMDI analysis

Over the course of 2021, the state demonstrated continued economic recovery. However, the economy contracted at the first half of 2022 in the US and was largely stagnant in Massachusetts. According to MassBenchmarks, the journal of the Massachusetts economy produced by the University of Massachusetts Donahue Institute (UMDI) and Federal Reserve Bank of Boston, in the second quarter of 2022, Massachusetts real gross domestic product decreased at a 0.2 percent annualized rate while U.S. GDP decreased at a 0.9 percent rate according to the U.S. Bureau of Economic Analysis (BEA). In the first quarter of this year, according to the BEA, Massachusetts GDP grew at an annual rate of 0.2 percent while U.S. GDP declined at an annual rate of 1.6 percent. (Figure 5).

According to MassBenchmarks, the apparent paradox of slowed economic growth, a strong labor market, and a low unemployment rate can be explained by several conditions that are shared by both the nation and the state that have resulted in lower productivity per worker. First, job growth has been concentrated in relatively lower paid sectors, such as leisure and hospitality, that tend to employ lower-skilled workers. Second, as a response to the scarcity of labor in high demand fields, employers have been "labor hoarding" or holding on to workers despite slowdowns in demand and lower utilization of employees. As a third factor, COVID-19 has increased absences from work, whether for illness or care of a sick family member.

Figure 5. Growth in Real Product, Massachusetts and the United States, 2022 Q2



Source: U.S. Bureau of Economic Analysis, MassBenchmarks calculations by Dr. Alan Clayton-Matthews

Inflation is also playing a role. Per-worker wages and salaries are not keeping up with inflation, and on average are falling in real terms. Total personal incomes, though rising, are just barely keeping up with inflation. This limits real consumer spending, which accounts for approximately two-thirds of all economic activity. Finally, rising interest rates are slowing the economy, reducing the demand for residential construction, and lowering asset prices, with predictable indirect effects on consumer and business confidence which can be expected to dampen current and future spending.

Wage and salary income continued to grow robustly in the second quarter of 2022. In Massachusetts, MassBenchmarks estimates that wage and salary income grew at a 12.9 percent annual rate, while wage and salary income in the U.S. grew at an 8.8 percent rate. These far exceed the growth in jobs and represents strong growth in average nominal per-worker wages and salaries. Year over year, MassBenchmarks estimates that wage and salary income grew 10.9 percent in Massachusetts and 11.2 percent in the U.S.

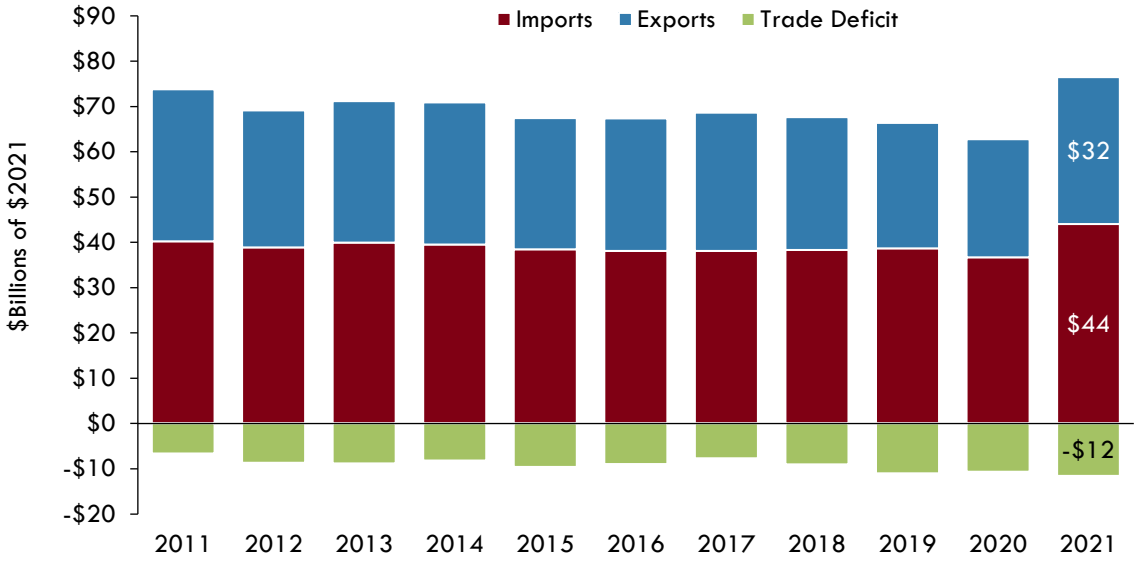
Although wage and salary income per worker has been growing briskly over the past year – 6.0 percent in Massachusetts and 6.8 percent in the U.S. from Q2 2021 through Q2 2022 – these incomes have not kept up with inflation. The Bureau of Labor Statistics' measure of CPI inflation was 7.5 percent in the Boston Metropolitan Area and 8.6 percent in the U.S. from the second quarter of last year (the Boston measure was May 2021 to May 2022 – the survey is every other month in Boston). Thus, despite robust wage growth, real wage and salary income per worker in Q2 2022 was less than it was in Q1 2022.

The outlook for the rest of the year is for slow growth, but the level of uncertainty remains high. MassBenchmarks estimates the annualized rate of real GDP growth for Massachusetts will be 1.0 percent in the third quarter and 2.0 percent in the fourth quarter. The mean forecast from the July Wall Street Journal survey of economists for the U.S. is 1.5 percent in the third quarter and 1.1 percent in the fourth quarter. Measures of consumer confidence and business confidence, for example, from the Conference Board for the U.S.[1] and from the Associated Industries of Massachusetts for Massachusetts businesses, are falling, and various surveys of economists put the probability of a U.S. recession in the next 12 months at roughly 50 percent. Furthermore, most analysts see risks to growth as skewed towards the downside.

Massachusetts trade has rebounded since the pandemic declines. The Commonwealth's total trade volume (exports and imports) increased 21.9 percent from 2020, the total trade volume was $76.5 billion in 2021(Figure 6). Canada was by far our most valuable trading partner, with a trade volume of $15.1 billion, 19.7 percent of the total state trade (Figure 7). The Massachusetts' trade deficit, $11.6 billion, increased 9.0 percent in 2021. Massachusetts ranked 17th in the U.S. in 2021 and first in New England with $32.5 billion in exports. This was a 24.5 percent increase from the previous year's export value, while national exports increased by 17.6 percent and total exports from New England increased by 15.6 percent (Figure 8). Canada was again our top export destination in 2021 with $3.6 billion. Imports increased 20.0 percent to $44.0 billion in 2020. Canada was also the largest source for Massachusetts imports in 2020, from which we imported $11.4 billion, or 25.9 percent, of our total. Russia's invasion of Ukraine and the ensuing war and economic sanctions against Russia will undoubtedly affect Massachusetts trade but the scale is unknown. In 2021, Russia was ranked Massachusetts 29th trading partner and Ukraine was 75th. Another development that may have an impact on Massachusetts trade are the COVID-related restrictions and lockdowns in China. As our second largest export partner after Canada (Figure 7), China was the destination of 11 percent of Massachusetts' exports and the source of 10 percent of our imports in 2021.

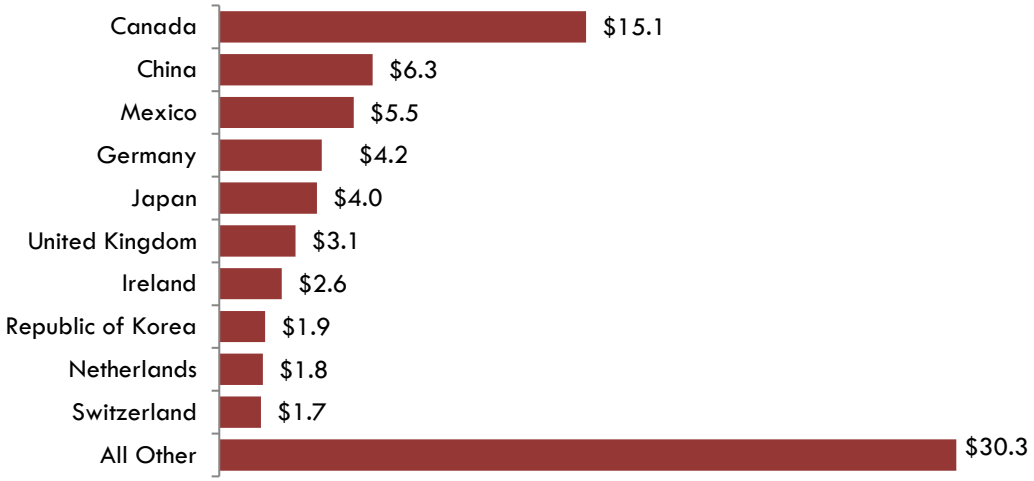
[1] The Conference Board is a non-profit, business membership and research group that publishes several economic indicators, including consumer confidence.

Figure 6. Massachusetts Imports, Exports, and Trade Deficit, 2011-2021(in Billions of $2021)



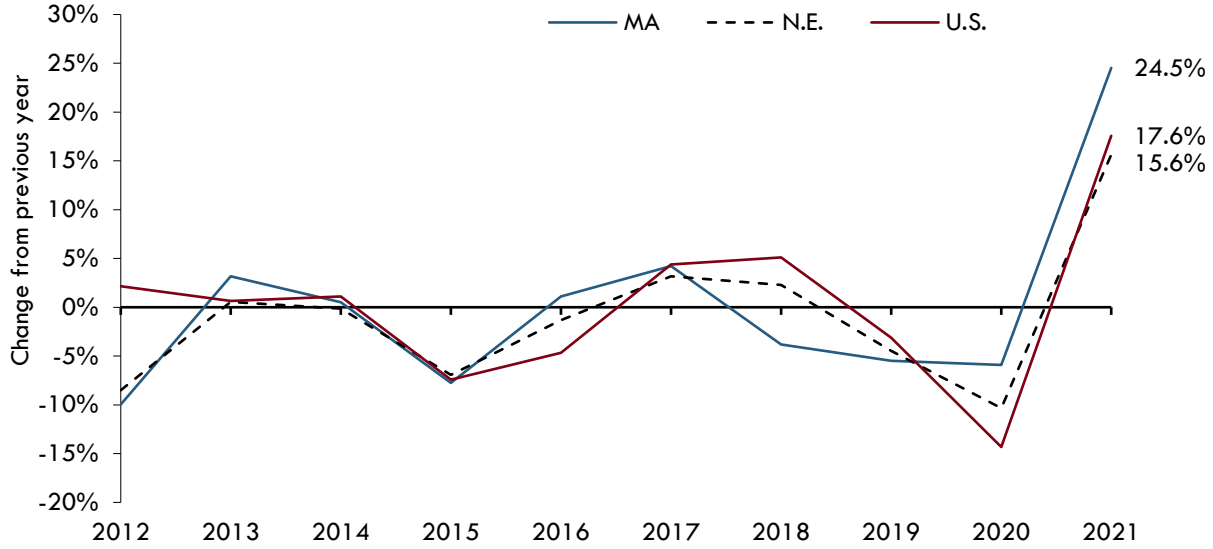
Source: WISERTrade.org; UMDI analysis

Figure 7. Massachusetts Top 10 Trade Partners in 2021 (in Billions of $2021)



Source: WISERTrade.org; UMDI analysis

Figure 8. Export Growth for Massachusetts, the United States, and New England, 2012-2021

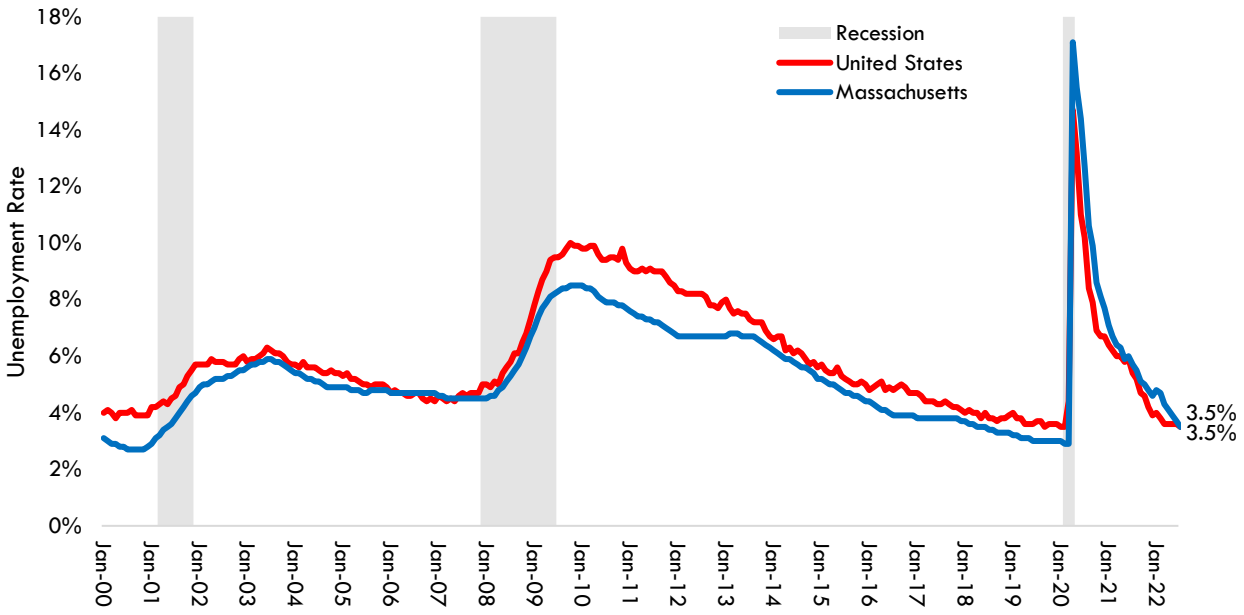


Source: WISERTrade.org; UMDI analysis

Workforce

In recent history, the Massachusetts economy has generally performed better than the U.S., with the state unemployment rate typically below the nation. This was especially the case during and the period following the Great Recession. The Commonwealth's mix of knowledge-based industries and well-educated workforce led to high levels of labor force participation and low levels of unemployment in the state overall. That said, the early outbreak of COVID-19 in the northeastern part of the U.S. coupled with proactive social distancing efforts by the Commonwealth in the spring and summer of 2020 led to significant job losses throughout the state. Massachusetts unemployment peaked at 17.1 percent in April 2020, while the U.S. peaked at 14.7 percent in the same month (Figure 9). As of July 2022, Massachusetts unemployment had fallen to match the national rate at 3.5 percent.

Figure 9. Unemployment Rates in Massachusetts and the United States as of July 2022 (Seasonally Adjusted)



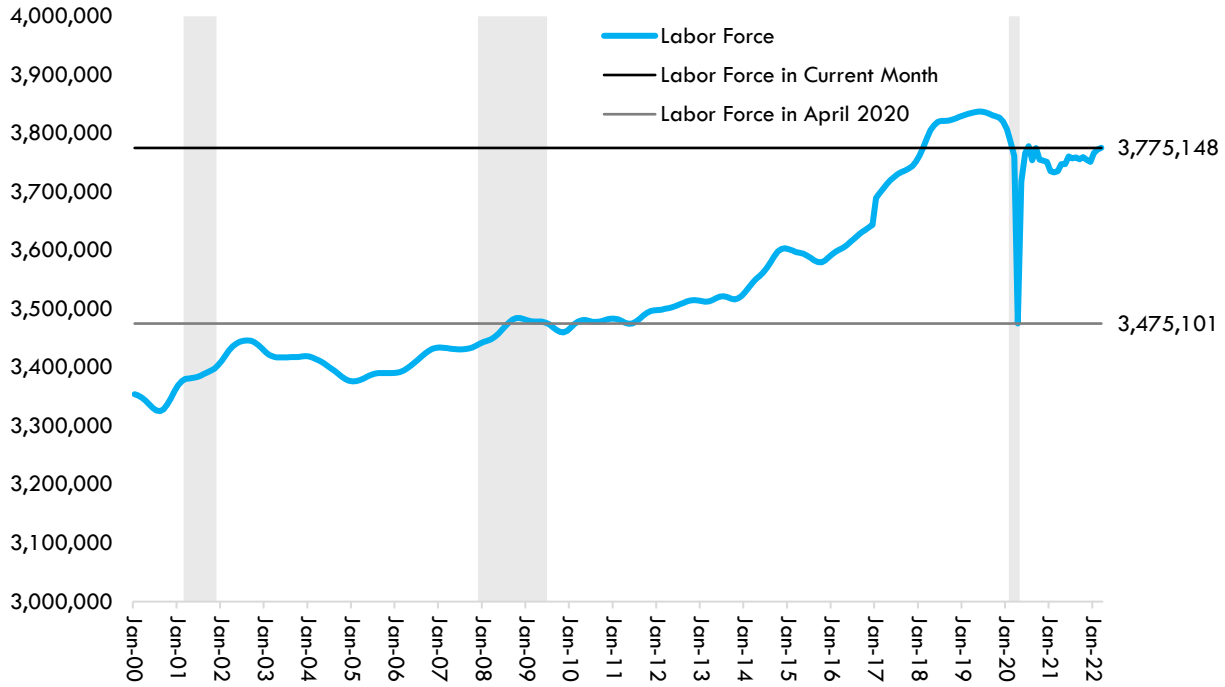
Source: Massachusetts Executive Office of Labor and Workforce Development, Local Area Unemployment (LAU) Statistics; UMDI analysis

Both the public health and the economic crises caused by COVID-19 have disproportionately harmed historically marginalized groups. In part this is due to the concentration of marginalized populations in certain sectors of the economy that meant they were more likely to be working in essential services or losing their jobs as shut-down orders shuttered restaurants and retail establishments. For example, the leisure and hospitality sector, which has a younger and less educated workforce, experienced the greatest loss of jobs and has been the slowest to recover. In contrast, highly-educated workers in knowledge-based industries were more likely to be able to work from the home during the COVID-19 pandemic and less likely to lose their jobs. Massachusetts ranked fourth in the U.S. for teleworking during the pandemic. In

Massachusetts, workers with previous well-established capacity to work from home were clustered in the Greater Boston area.

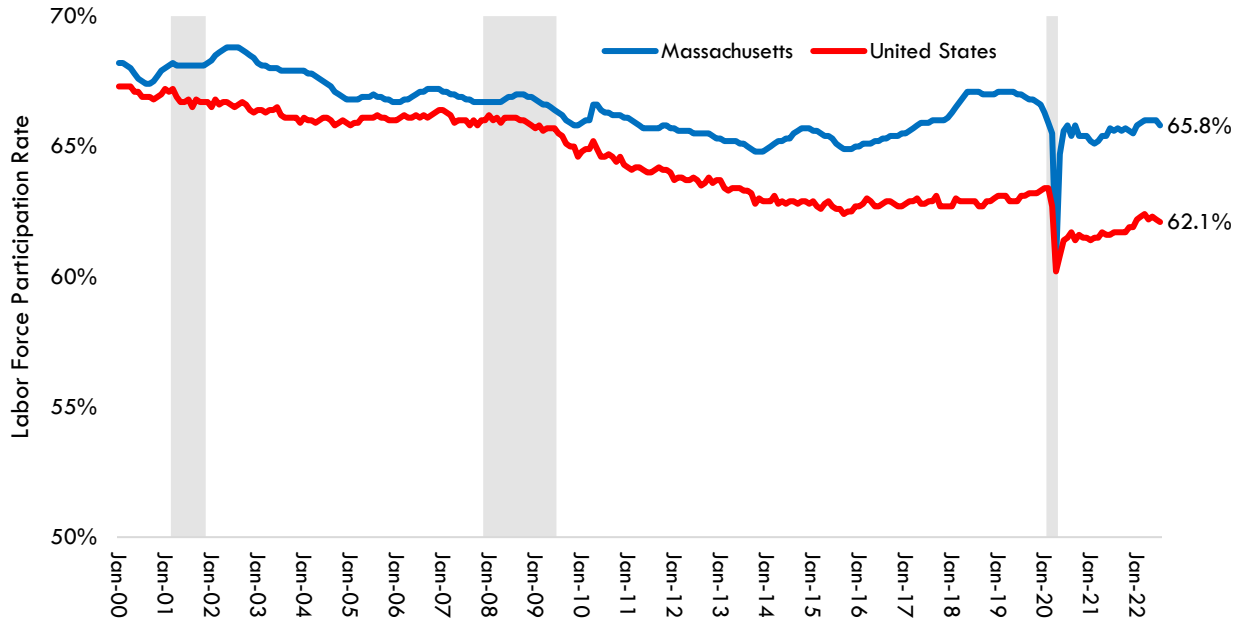
The size of the labor force in the state has largely recovered since the initial collapse at the start of the pandemic (Figure 10). Massachusetts has consistently maintained higher rates of labor force participation than the U.S. on a whole. As of July 2022, 65.8 percent of Massachusetts working-age residents were in the workforce (Figure 11). This is almost at the pre-pandemic level of 66.3 percent in January 2020. Labor force participation rates and unemployment rates vary across race, gender, age and education levels. With higher peak unemployment rates during the pandemic being experienced by people of color, women, and younger workers, with lower levels of education who were more likely to be working in sectors impacted by the pandemic. While all groups have benefited from the economic recovery, rates of recovery have varied across demographics. The fact that educational attainment, age, race, and gender are all interconnected with access to job opportunities in the more resilient sectors of the economy has meant that historically marginalized populations have faced greater challenges during all stages of the pandemic. For example, in the spring of 2020, Massachusetts' residents of color experienced the highest levels unemployment in decades with unemployment rates exceeding 26 percent in April 2020—nearly 12 percentage points higher than their white counterparts. For women, unemployment peaked in June 2020 at 20.3 percent.

Figure 10. Massachusetts Labor Force, January 2000-July 2022 (Seasonally Adjusted)



Source: Massachusetts Executive Office of Labor and Workforce Development, Local Area Unemployment (LAU) Statistics; UMDI analysis

Figure 11. Labor Force Participation Rates in Massachusetts and the United States, January 2000-July 2022 (Seasonally Adjusted)

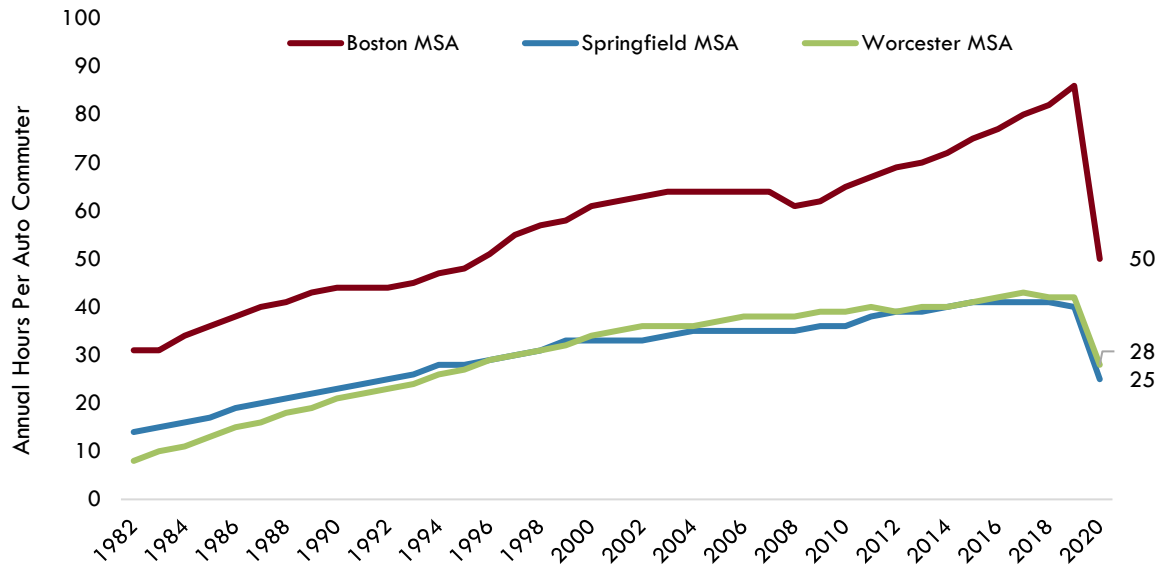


Source: Massachusetts Executive Office of Labor and Workforce Development, Local Area Unemployment (LAU) Statistics; UMDI analysis

Even as the pandemic has shifted many jobs to remote or hybrid environments, transportation and mobility are essential to Massachusetts economy and workforce. On one side, the industry sectors – transportation, warehousing, and wholesale trade – are indicative of the activities related to the movement of people and freight in Massachusetts and can be measured by jobs and contribution to the state's GDP. On the other side, indicators like congestion levels, vehicle miles traveled (VMT), public transit ridership, and air passengers have traditionally served as proxy measures of how the economy is performing. It remains to be seen to what extent employees will resume commuting to work and how the relationship between mobility and employment will evolve.

For many workers the transition to remote or hybrid work has been beneficial as it reduced or eliminated commuting. Prior to the pandemic, the delays that Massachusetts drivers faced for their commutes had risen dramatically (Figure 12). For example, the typical driver in Boston, sat in traffic for nearly 90 hours per year as compared to just over 30 in the early 1980s. Nationally, the Boston urban area ranked fifth in annual hours of delay in 2019 and Boston's traffic congestion has outpaced other areas of the Commonwealth for this time period, at times more than doubling the hours of delay incurred by Worcester or Springfield area drivers. All areas of the state saw unprecedented declines in 2020 as overall travel declined due to the COVID-19 pandemic.

Figure 12. Annual Hours of Delay per Auto Commuter for Boston, Springfield, and Worcester



Source: Texas A&M Transportation Institute
Note: Urban Area boundaries are decided by the Texas A&M Transportation Institute and are not equivalent to Metropolitan Statistical Area (MSA).

Freeway daily vehicle miles traveled (VMT) throughout the three most populous regions of the state thoroughly outpaced population growth for the time period of 1982-2019. Daily freeway VMT increased by roughly the same percentage (approximately 120 percent) for the Boston, Springfield, and Worcester urban areas (Figure 13), regardless of the varying changes in population growth that each area experienced. This points potentially to statewide changes in driving behavior (e.g., more cars taking more and longer-distance trips) independent of population growth as well as land use patterns potentially favoring vehicle-focused types of development.

Figure 13: Change in Population Growth and Freeway Daily Vehicle Miles Traveled, 1982-2019

	Boston Urban Area	Springfield Urban Area	Worcester Urban Area
% Population Change (1982-2019)	32%	19%	49%
% Change in Freeway Daily VMT (1982-2019)	119%	123%	118%

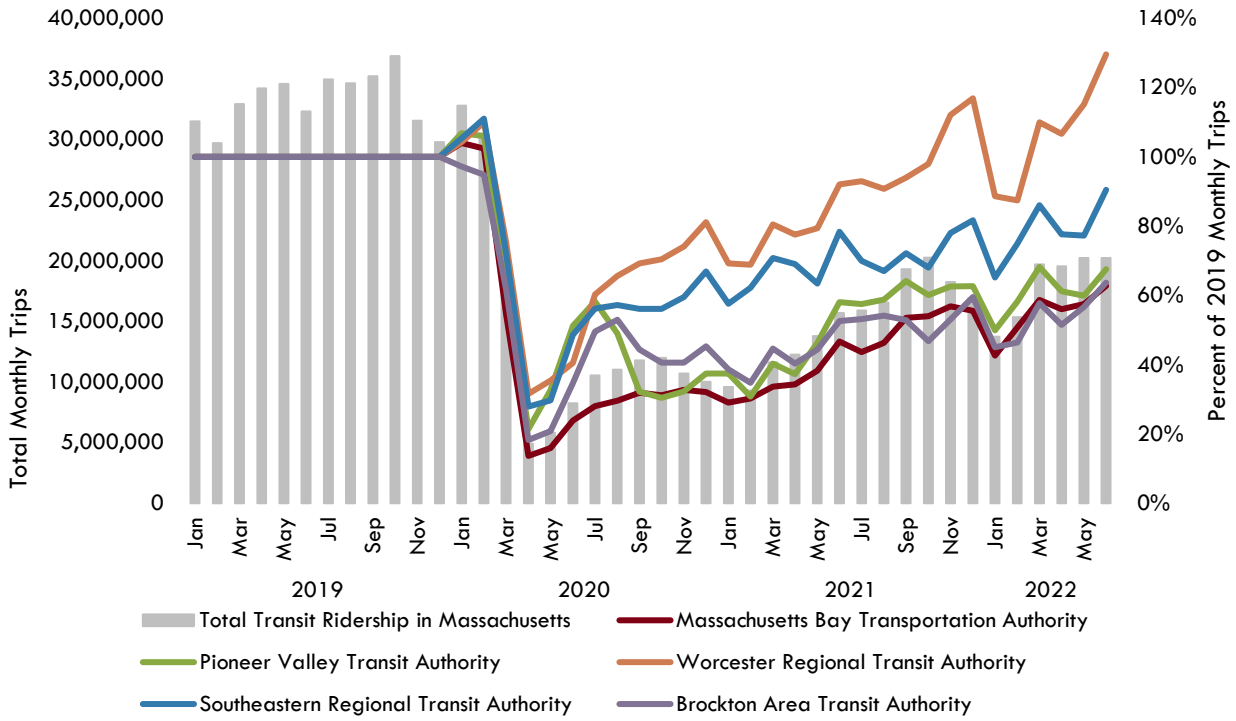
Source: Texas A&M Transportation Institute.
Note: Urban Area boundaries are decided by the Texas A&M Transportation Institute and are not equivalent to Metropolitan Statistical Area (MSA).

Vehicle miles traveled throughout the state dipped significantly in 2020 according to the Massachusetts Department of Transportation. Following the beginning of the COVID-19 pandemic in spring 2020, both weekday and weekend VMT plummeted only to bounce back relatively quickly through summer 2021. By November 2021, average weekday and weekend VMT hovered between 75-90 percent of their pre-pandemic March 2020 peaks.

In contrast to daily VMT, public transit ridership has largely lagged the economic recovery in Massachusetts following the beginning of the COVID-19 pandemic in spring 2020 (Figure 14). Immediately following the emergence of COVID-19 and subsequent "stay at home" orders, transit authorities uniformly experienced a sharp decline in ridership. Total public transit ridership across the state has since started recovering, showing signs of seasonal variation with dips in the winters of 2020-21 and 2021-22 and relative peaks in summers.

The MBTA and the Commonwealth's regional transit authorities (RTAs) have seen highly variable rates of recovery. Among the top five largest transit authorities in the state measured by February 2020 ridership, one has surpassed its pre-pandemic ridership (the Worcester RTA), one is approaching its pre-pandemic ridership (Southeastern RTA), and the remaining three are around two thirds of 2019 ridership (Pioneer Valley Transit Authority, Brockton Area Transit Authority and the MBTA).

Figure 14. Monthly Transit Ridership, 2019-2022

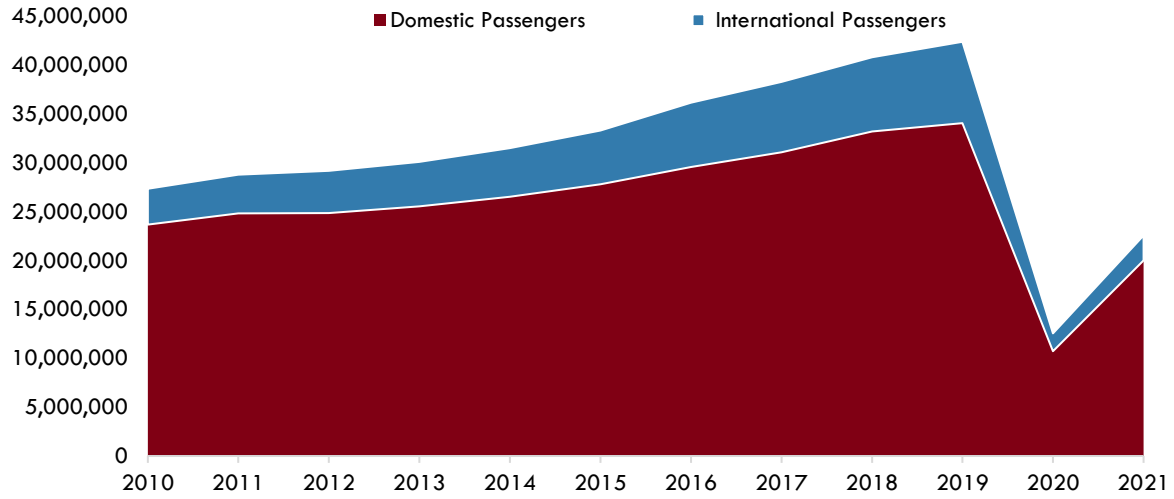


Source: National Transit Database. Note: total ridership is the sum of MBTA and Regional Transit Authority ridership per month. Top five transit authority by February 2020 ridership are shown as a share of their monthly ridership relative to the comparable month in 2019, e.g. September 2020 / September 2019.

There are several MBTA expansion and redesign plans under construction or consideration that have potential to benefit tens of thousands of current and new riders. The Green Line Subway Extension is opening this year in phases; the Union Square Branch in Somerville opened in March 2022 and the Medford Branch is expected to follow in fall 2022. The Gateway Cities New Bedford and Fall River will gain a Commuter Rail connection to Boston in 2023 through the South Coast Rail project. The MBTA's Bus Network Redesign project released a draft of its complete reconfiguration of Greater Boston region bus routes in May 2022; the review process for this project is underway and is expected to be phased in over the course of several years. This spring, the Commonwealth also pledged to create a new rail authority in the state to advance East-West Rail, a plan to connect Boston, Worcester, Springfield, and Pittsfield by passenger rail. The effects of these expansion and redesign plans remain to be seen considering the uncertainty of future travel patterns from the pandemic.

Logan International Airport, like the state's transit agencies, also logged a significant decline in passenger volume in 2020 and as of 2021 has not achieved the record passenger volumes seen in 2019 (Figure 15). After reaching over 42 million domestic and international passengers, following years of service expansions, passenger volumes collapsed to only about 13 million in 2020. Logan saw a strong recovery in 2021 with about 23 million passengers served, but this still only represented about half of the airport's 2019 peak. Notably, international passenger volume shrank from 8.3 million in 2019 to 1.8 million in 2020. This number recovered slightly to 2.5 million in 2021, and lags behind the recent growth in domestic passengers (which fell from 34 million in 2019 to 10.7 million in 2020, then recovered to 20 million for 2021). A large number of air carriers expanded service to Asian, European, Middle Eastern, South American, and African destinations from Logan during the 2010s, but with the onset of COVID-19 and its travel restrictions, international passenger volumes are still only a fraction of the 2019 peak. Going into 2022, there has been a resumption in some overseas service and passenger levels should continue their recovery. As a global hub of education, technology, finance, medicine, and tourism, Massachusetts benefits from higher service levels and the passengers they bring into the state via Logan Airport.

Figure 15. Logan International Airport Passenger Volume



Source: MassPort.

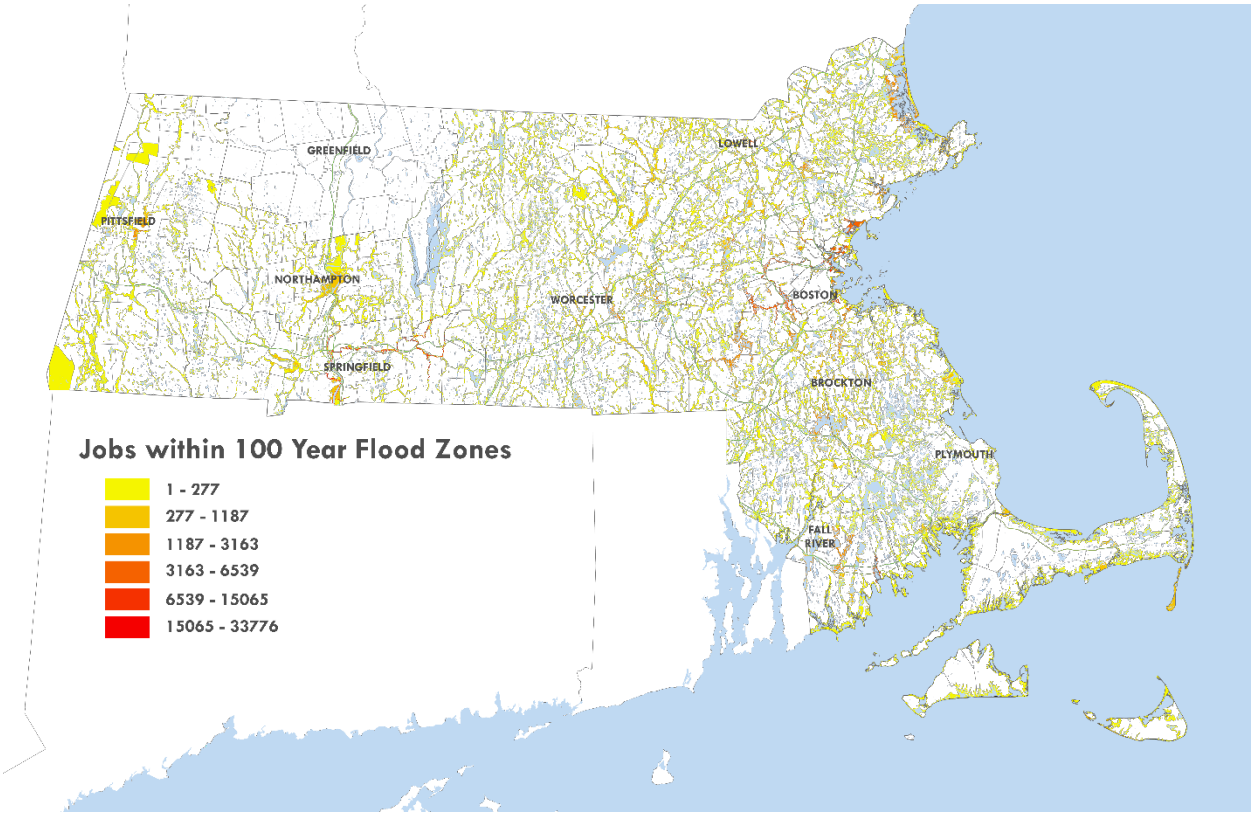
Environment

Massachusetts faces diverse risks related to climate change that will have broad economic impacts, depending on the extent to which adaptive measures are taken, at the state, national, and global levels. The threat posed by sea-level rise is of particular concern in Massachusetts because so much of the state's economic activity is concentrated along the coast, where the effects of climate change are already being felt. For example, in Boston the average number of flood days per a year has increased from 2.8 days during the 1950s and 1960s to 13.8 days from 2010 through 2020. Furthermore, the 2022 Sea Level Rise Technical Report released by the National Oceanic and Atmospheric Administration, estimated that sea levels along the East Coast will rise by 10-14 inches by 2050. The impact of coastal alteration, larger storm surges, and greater storm damage may be acutely felt where economic activity and residents are clustered. In 2019, approximately 500,000 jobs in Massachusetts were located in 100-year flood plains (Figure 16).[2] With rising sea levels, flooding in these areas is likely to be more frequent and intense. Hurricanes are expected to threaten the East Coast more frequently.[3] The number of jobs potentially effected by hurricanes is significant in Massachusetts. There are almost 800,000 jobs in areas designated by the Army Corps of engineers as being in hurricane inundation zones (Figure 17).

[2] This estimate excludes jobs located in Franklin County because flood maps for Franklin County were not available.

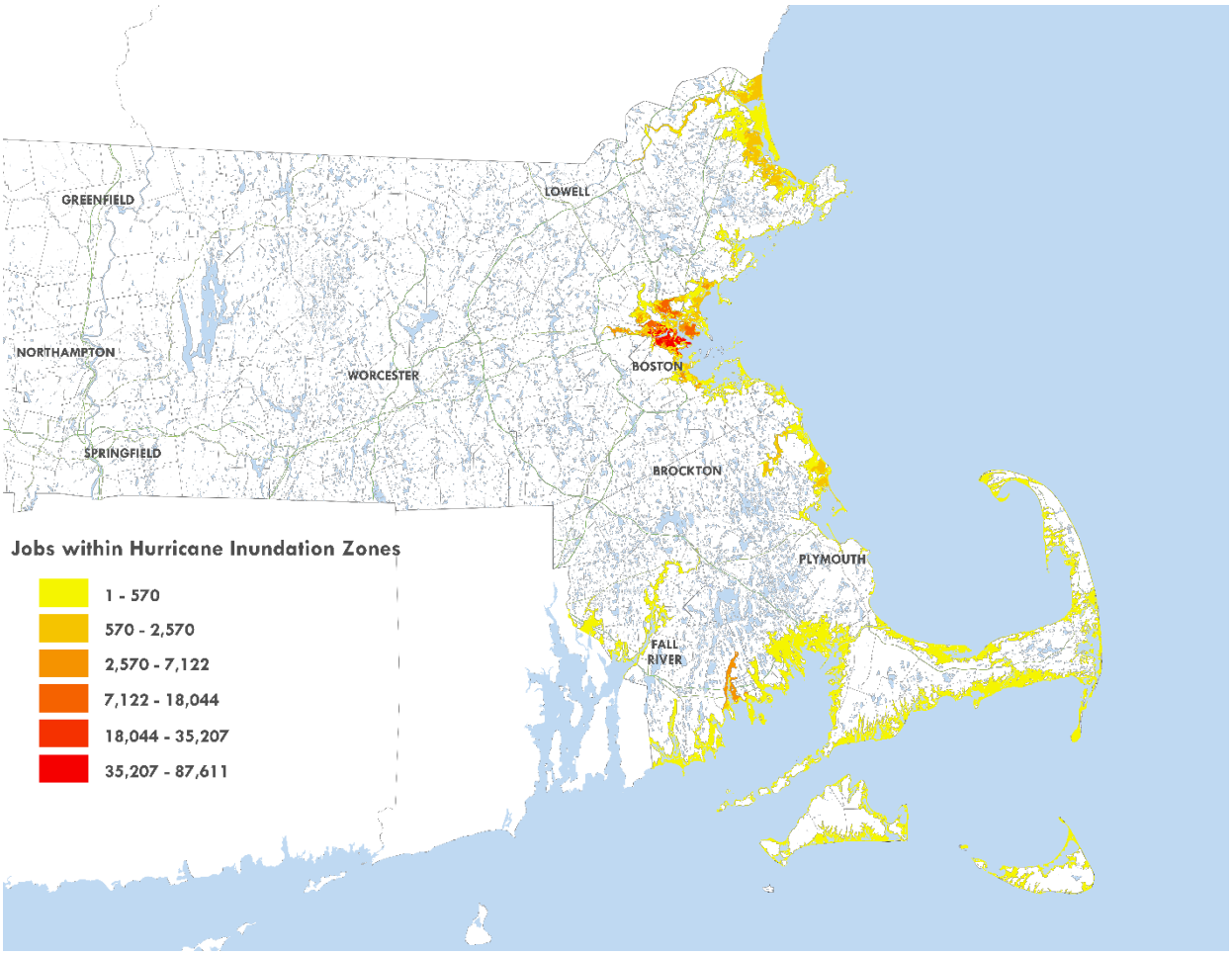
[3] Gori, A., Lin, N., Xi, D. *et al.* Tropical cyclone climatology change greatly exacerbates US extreme rainfall–surge hazard. *Nat. Clim. Chang.* 12, 171–178 (2022). https://doi.org/10.1038/s41558-021-01272-7

Figure 16. Jobs Located in 100-Year Flood Zones



Source: FEMA National Flood Hazard Layer via MA GIS, U.S. Census Bureau 2019 LODES data on Total Jobs; UMDI analysis
Note: Counts of jobs in this table represent jobs in Census Blocks or parts of blocks that intersect or are fully contained within areas designated as 100 Year Flood Zones by FEMA and assumes an even distribution of jobs in those blocks. FEMA's current national flood hazard layer does not contain finalized flood data for Berkshire, Franklin or Hampshire counties; data from the previous flood map was used for Berkshire and Hampshire counties. Data for Franklin County was not available.

Figure 17. Jobs Located in Hurricane Inundation Zones



Source: U.S. Army Corps of Engineers Hurricane Surge Inundation Zones via MA GIS, U.S. Census Bureau 2019 LODES data on Total Jobs, Analysis by the Donahue Institute

There are also risks associated with rising temperatures. According to the 2022 National Oceanic and Atmospheric Administration National Centers for Environmental Information State Climate Summaries temperatures in Massachusetts have risen by 3.5 degrees Fahrenheit since the beginning of the 20th century and are predicted to continue to rise to historically unprecedented levels.

While the full effects of climate change are hard to predict at this time, it is certain that some industries will bear more of the burden than others. For example, the tourism industry will likely be affected as there are more than a dozen ski areas in the Commonwealth that will face challenges as precipitation is expected to shift from snow to rain with warmer winter temperatures. Agriculture will be impacted by changes to the growing season and increased risk of drought. Fisheries will be impacted as increasing temperatures change the habitats of ocean species. The health of residents may be impacted by climate change. For example, changes in temperature will likely increase the risk or incidence of acute respiratory diseases,

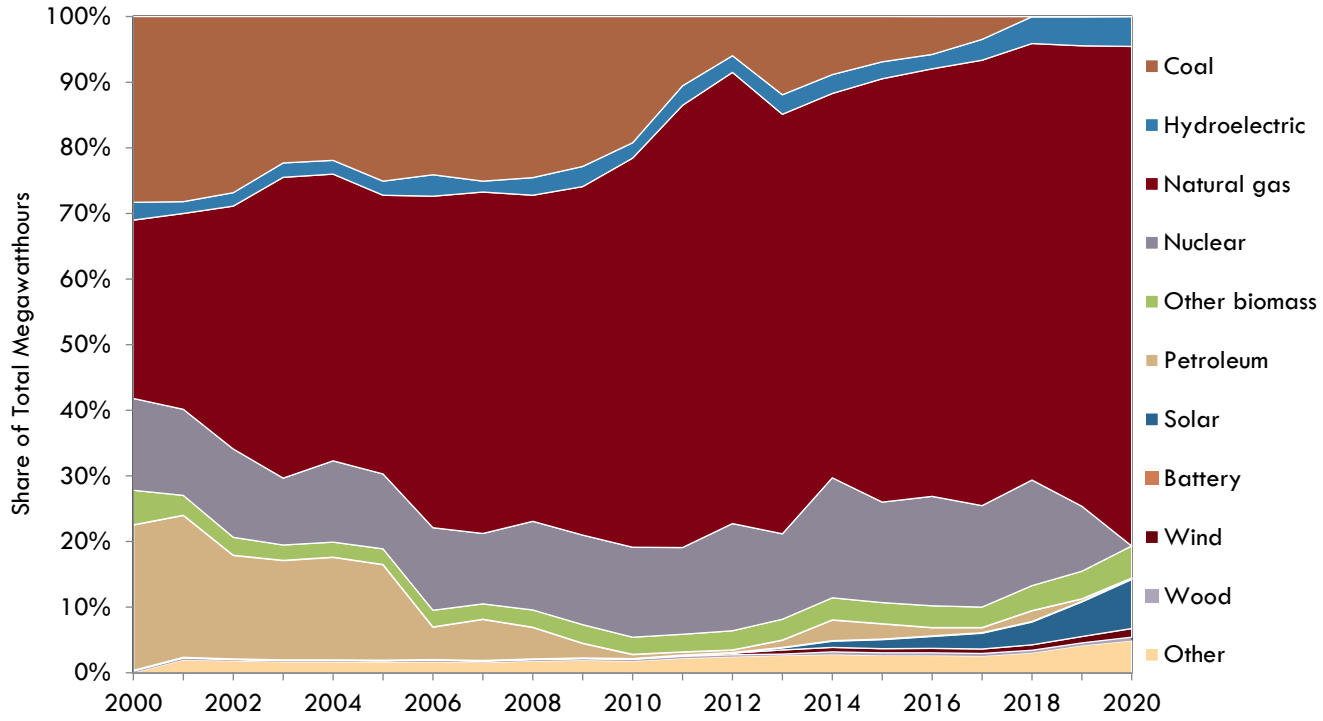
such as Asthma, and increase the presence of ticks that carry Lyme disease and mosquitoes carrying West Nile Virus. The risks vary across the state, within communities, and from resident to resident. Vulnerability to climate change is a function of exposure, sensitivity, and adaptive capacity. The most vulnerable are often the young, old, and medically vulnerable, those who live in areas with higher risk of extreme events and those without the resources to adapt.

Changes to the environment, such as extreme weather events, do not respect political boundaries, therefore, policy makers have limited ability to mitigate the course of environmental change. However, local officials can prepare for natural disasters and plan for predicted changes in the environment, such as rising temperatures and sea-levels. To this end Massachusetts established the Municipal Vulnerability Preparedness grant program that supports city and towns through grants and technical assistance that fund and support local assessments of vulnerability to climate change and adaptation projects. The grants have funded a wide-variety of projects that support different stages of adaptation, from the development of local climate action plans to construction projects related to river restoration Over 90 percent of municipalities in the state have enrolled in the program.

Citing the environmental risks of climate change, in March 2021, Governor Baker signed a net-zero emissions law setting the goal of Massachusetts achieving net-zero emissions by 2050. The law sets interim emission targets and sets targets for six sectors: electricity, transportation, commercial and industrial buildings, residential buildings, industrial processes, and natural gas distribution. Currently, Massachusetts consumes about 15 times more energy than it produces and relies on the regional grid to meet demand. However, Massachusetts uses less energy to produce a dollar of GDP than all but two other states, New York and California. Furthermore, according to the US Energy Information Administration, Massachusetts used less energy per capita than all but six other states in 2019.

Over the past 20 years, Massachusetts has increasingly been reliant on natural gas for electric power generation, with the share of electric power from natural gas more than doubling from to 2001 to 2020; (Figure 18). The state receives the majority of its natural gas through pipelines that bring in natural gas from sources in Appalachia and offshore Nova Scotia in Canada. In addition, natural gas arrives in the state through liquefied natural gas import terminals in Everett and offshore in Massachusetts Bay. The Commonwealth is generating less energy from coal, petroleum, and nuclear; the last nuclear power plant in the state closed in 2019. Solar energy has steadily increased. Furthermore, Massachusetts ranked ninth in the U.S. in net generation from all solar in 2020. Electricity prices in Massachusetts are higher than in the nation as a whole. In December 2021, Massachusetts consumers faced the third highest electricity prices in the nation. Nationwide, energy prices rose in the first half of 2022 when the onset of the war in Ukraine and sanctions on Russia limited the supply of oil. While oil and gasoline prices have begun to decline, there is continued uncertainty and the U. S. Energy Information Administration forecasts continued growth in nominal residential electricity prices.

Figure 18. Electric Power Generation by Primary Energy Source, 2000-2020

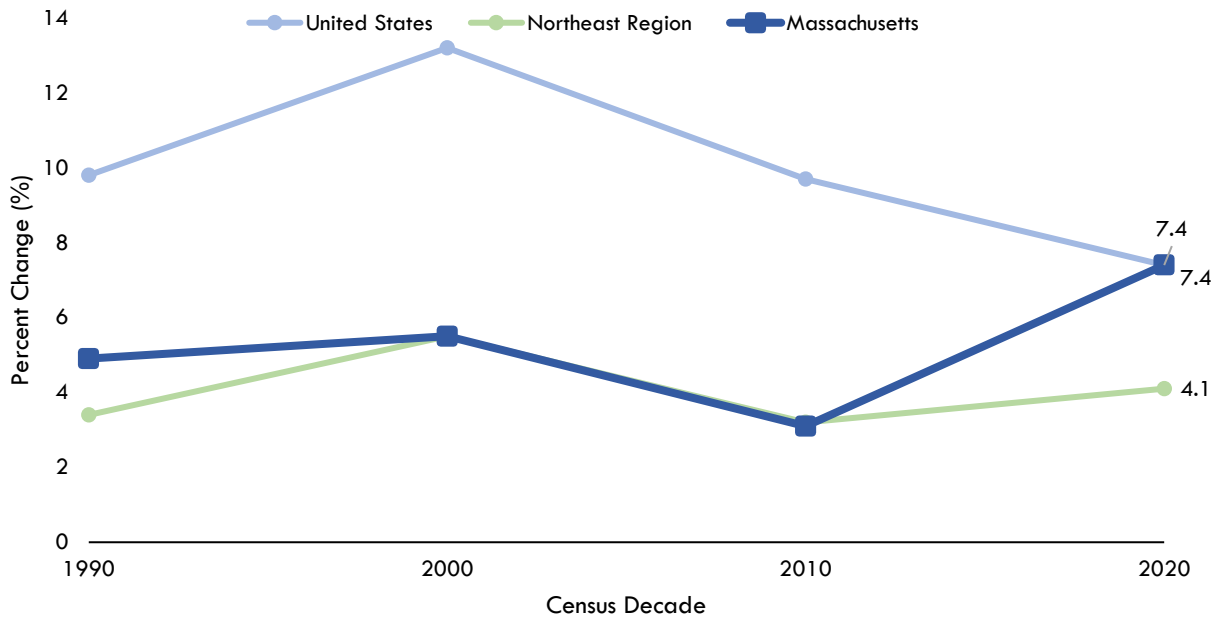


Source: U.S. Dept. of Energy, http://www.eia.doe.gov/; state electricity profiles.
Note: Other includes batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, tire-derived fuels and misc. technologies. Pumped storage is omitted from the graph because it represents the storage of power generated elsewhere rather than newly generated power.

Residents

Just over seven million residents called Massachusetts home in 2020, an increase of 7.4 percent since 2010, making it the fastest-growing state in the Northeast. The 2020 Decennial Census P.L. 94-171 Redistricting dataset, which was released in August 2021, provides a snapshot of Massachusetts' population and how it has changed over the past decade. From 2010-2020 the population increased by 482,288 people, from 6,547,629 to 7,029,917 (7.4%). In contrast, the average population growth in the Northeast was 4.1 percent (Figure 19).[4]

Figure 19. Change in Resident Population by Decade



Source: U.S. Census Bureau; UMDI analysis

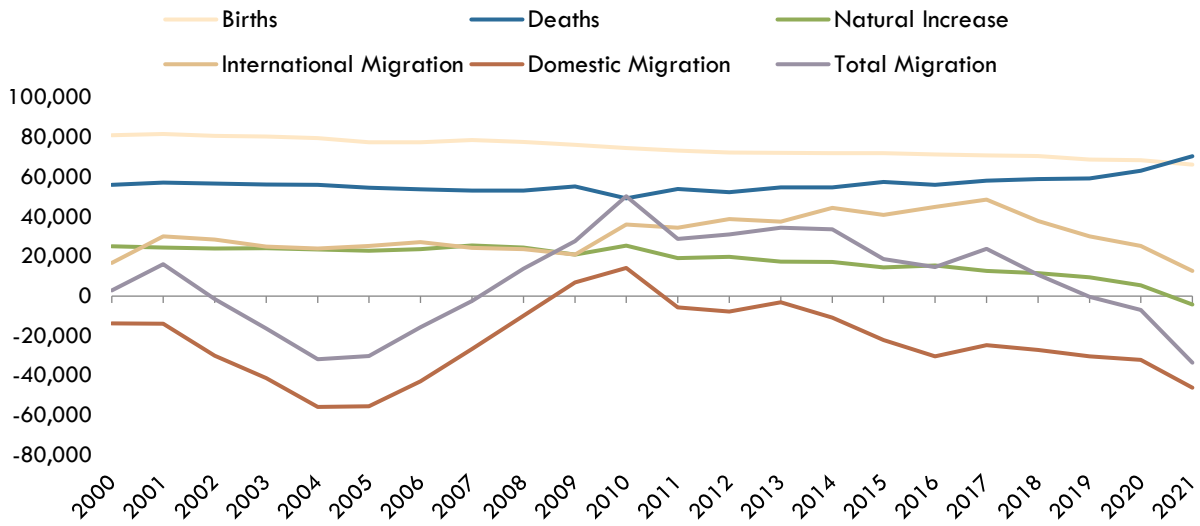
Increasing levels of international migration have driven population growth in Massachusetts over the last couple of decades. Conversely, migration from Massachusetts to other states has increased. Natural increases in the population have slowly declined largely due to an aging population and declining birth rates (Figure 20). Massachusetts' combination of higher education institutions and knowledge-based industries appears to be an important factor in attracting and retaining foreign-born residents. The foreign-born in Massachusetts has a bimodal education distribution with a high concentration with less than a high school education (20% in 2019) and a significant concentration with college degree (18%).

[4] The Northeast includes: Maine, New Hampshire, Vermont, Massachusetts, New York, Connecticut, Rhode Island, Pennsylvania, and New Jersey.

Interestingly, a higher proportion of immigrants in the state hold a graduate degree (22%) than native-born residents (20%) (Figure 21).

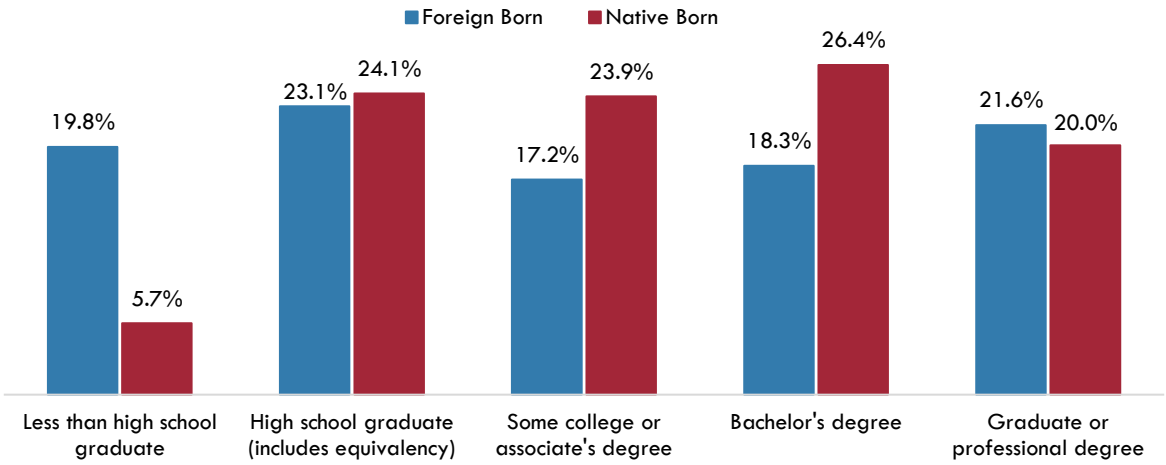
While the population in Massachusetts has grown strongly over the past decade, the latest population estimates showed a 0.6 percent decline in the state's population from April 2020 to July 2021. This cumulative decrease is more substantial than other Northeast states, with the exception of New York, which decreased by 1.8 percent. Massachusetts is not unique in experiencing a pandemic slowdown in population growth. The U.S. grew at the slowest rate since the nation's founding during this past year (0.1%). The pandemic has halted migration to the state, and contributed to higher death rates and lower birth rates. For the first time, deaths exceeded births in the state leading to negative growth attributable to natural causes. Furthermore, domestic migration out of the state increased. Again, this trend was not unique to Massachusetts, as the Southern Region of the U.S. was the only region to experience positive net domestic migration. As the pandemic recedes, a return to international migration will be essential for resuming growth in the population.

Figure 20. Massachusetts Estimated Components of Population Change, 2000-2021



UMass Donahue Institute. Source Data: ST-2000-7; CO-EST2010-ALLDATA; and NST-EST2018-ALLDATA, U.S. Census Bureau Population Division.

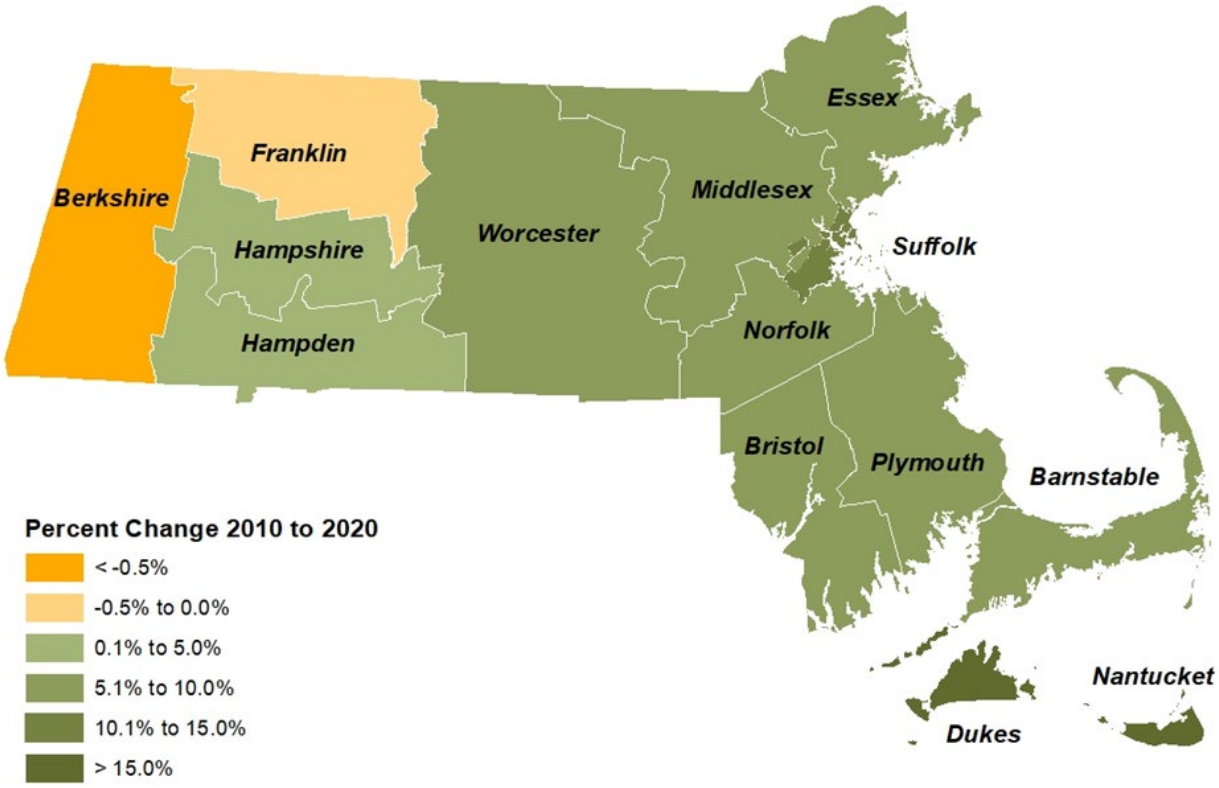
Figure 21. Educational Attainment of the Foreign Born in Massachusetts, 2019



Source: U.S. Census Bureau, 2019 1-Year American Community Survey; UMDI analysis. Note: Instead of providing the standard 1-year data products, the Census Bureau released experimental estimates from the 1-year data for 2020, thus we present 2019 estimates.

Overall, population growth in the state between 2010 and 2020 was uneven. Population growth, much like the previous decade, was strongest in the eastern part of the state, particularly in the Greater Boston region. Middlesex County saw the largest growth in absolute terms and grew at a rate of 8.6 percent. It was followed by Essex and Worcester Counties, which grew at rates of 9 and 8 percent respectively, all faster than the state as whole. In terms of percentage change, the fastest population growth since Census 2010 was observed in the small island counties of Nantucket and Dukes, at 40.1 percent and 24.6 percent respectively. The two western-most counties, Franklin and Berkshire, saw small population declines over the last decade (Figure 22).

Figure 22. Percent Change in Massachusetts County Population, Census 2010 to Census 2020



Source: UMDI, U.S. Census Bureau

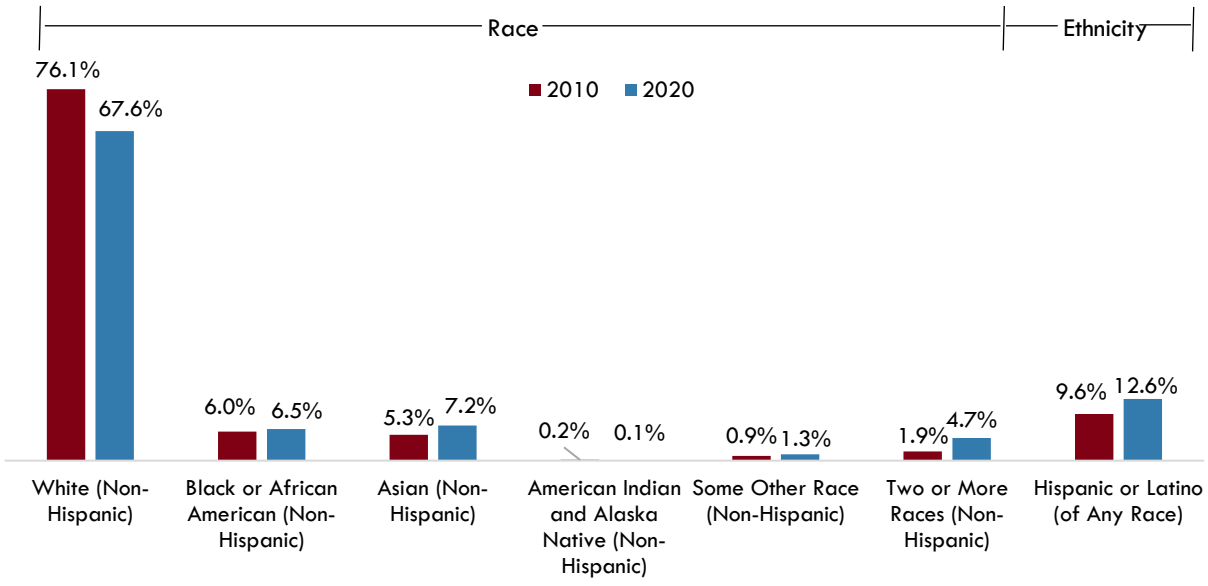
The population growth trends in Massachusetts reflect trends in the U.S. over the past decade. Metropolitan areas and urban and suburban counties grew much more rapidly than small places and rural counties. Similarly, in Massachusetts, population growth has been clustered around the Greater Boston area and Gateway Cities. The cities that grew the most in absolute terms were Boston, Worcester, Cambridge, Lawrence, and Brockton. In addition, all but two of Massachusetts' 26 "Gateway Cities" showed Census 2020 population counts greater than the Vintage 2020 evaluation estimates[5], which are based on the 2010 Census, suggesting that growth in these cities out-performed the Census Bureau's estimates. The Gateway Cities account for 15 out of the 25 most populous places in Massachusetts, and 25 out of the top 40.

[5] The UMass Donahue Institute Population Estimates Program produces population projections for the Commonwealth of Massachusetts, the most recent of which were developed in 2018 (referred to as Vintage estimates) and included estimates for 2020, for which we now have Decennial Census data. UMDI is currently producing new estimates, set for release later this year.

The four slowest growing Gateway Cities were all in Hampden County. Hampden County, along with Berkshire, Franklin, and Hampshire counties, is located in the Western Massachusetts region, which had a much slower rate of growth than Massachusetts as a whole, 0.5 percent. Furthermore, the region grew at a slower rate from 2010 to 2020 than it had from 2000 to 2010 (1.1% from 2000 to 2010; 0.5% from 2010 to 2020). Both Berkshire and Franklin counties have been declining in population since 2000, while Hampden and Hampshire counties have seen modest growth. In contrast the Cape and the Islands region has experienced a dramatic increase in population. The Island of Nantucket was the fastest growing place in Massachusetts followed by Martha's Vineyard. Cape Cod also experienced increased growth compared to the prior decade, growing at a rate of 6.1 percent. The strong growth in these areas that had seen declines from 2000 to 2010 may be attributable to the pandemic, as more individuals could choose where to live untethered from where their employer was located. It is unclear whether this trend will continue.

As with the nation, Massachusetts is becoming more racially and ethnically diverse. The share of the population that identifies as non-Hispanic, white decreased from 76 percent to 68 percent from 2010 to 2020, while the shares that identify as Black non-Hispanic, Asian non-Hispanic, and Hispanic increased to 6.5 percent, 7.2 percent, and 12.6 percent respectively. The share that identifies as two or more races (non-Hispanic) more than doubled to 4.7 percent (Figure 23). The state's population is older than the nation as a whole—the median age is 39.6 compared to 38.2 for the nation. The Commonwealth has the lowest median age in New England and, due to the presence of higher education institutions, young adults are somewhat overrepresented in the Commonwealth, 21 percent of residents are between the ages of 20-34 compared to 20 percent in the U.S.

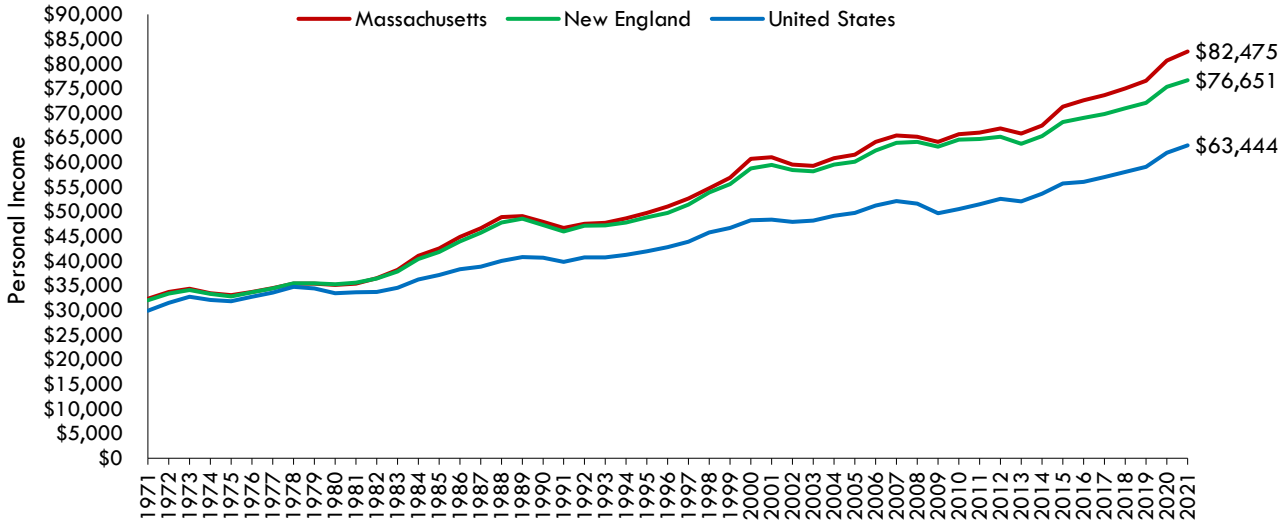
Figure 23. Share of Total Massachusetts Population by Race and Ethnicity in 2010 and 2020



Source: 2010 Source Data: Census 2010 Summary File 1; 2020 Source Data: Census 2020 PL-91-171; UMDI analysis

Massachusetts' residents earn some of the highest incomes in the nation. Real per capita income has consistently exceeded incomes in the New England and the U.S. and in 2021, Massachusetts had the highest real per capita personal income in the nation, excluding the District of Columbia. The Commonwealth's real per capita income was nearly $82,500 compared to approximately $77,000 in New England and just under $63,000 in the U.S. (Figure 24). The relatively high-income levels reflect the high level of education and the concentration of high-wage industries such as, health care, professional services, and finance and insurance. The poverty rate is lower in Massachusetts than in the nation as a whole at 9.4 percent compared to 12.3 percent. However, in several cities the poverty rate exceeds the state average: Holyoke, Springfield, and Worcester, all Gateway cities, have poverty rates of 15.2 percent, 10.9 percent and 10.7 percent, respectively. Boston is slightly above the state average with a rate of 9.6 percent. Higher rates of poverty in these Gateway Cities and Boston are particularly concerning because Gateway Cities are home to a large share of the state's communities of color and immigrant communities. Forty-one percent of all people of color in Massachusetts live in Gateway Cities and 18 percent live in Boston. Furthermore, 36 percent of Massachusetts immigrants live in Gateway Cities and 17 percent live in Boston. The concentration of poverty in these cities raises concerns about equity and quality of life.

Figure 24. Real Per Capita Personal Income in Massachusetts, the United States, and New England, 1971-2021 (in $2021)

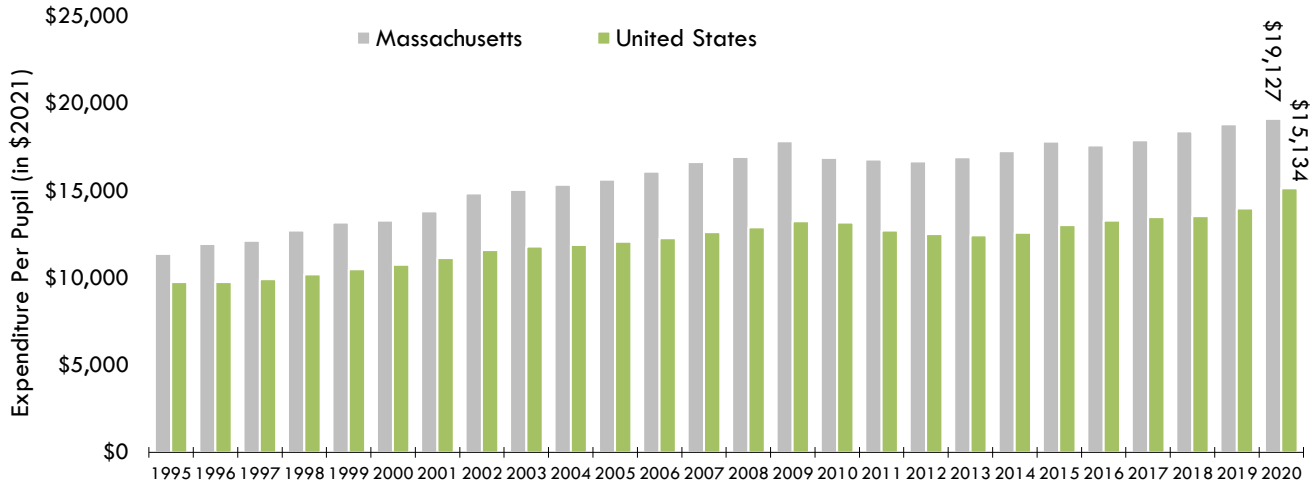


Source: U.S. Department of Commerce, Bureau of Economic Analysis

The presence of a skilled and well-educated population is an important resource for the Commonwealth. At the primary and secondary level, the state invests more than the national average in its public schools (Figure 25). Furthermore, students in Massachusetts' K-12 public schools consistently outperform their peers in the U.S. on national assessments. The state has the most well-educated population in the country, with 45 percent of all residents 25 years of age or older earning a bachelor's degree or more. However, educational attainment varies significantly across racial groups: Black and Hispanic residents are less likely to have a bachelor's degree than the state average, at 28 percent and 21 percent respectively. Forty-

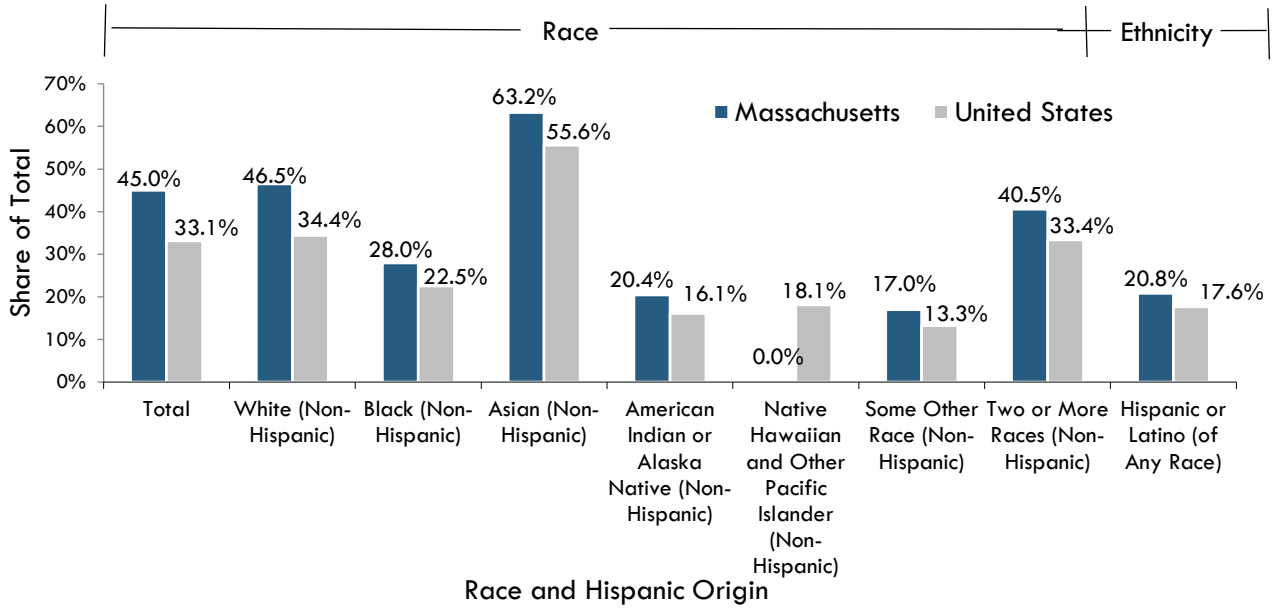
seven percent of white residents and 63 percent of Asian residents hold a bachelor's degree or higher. That said, across all racial groups, educational attainment rates are higher than the national average (Figure 26). The well-educated population supports and is a product of the concentration of elite public and private colleges and universities in the state. Educational services is the third largest industry in Massachusetts in terms of jobs. Nearly half a million students are enrolled in higher education in the state. The number of international students is down from nearly 74,000 in the 2019/2020 academic year to 66,200 students in the 2020/2021 academic year. This marks the first time since 2003 that enrollment of international students declined, this was likely due to pandemic-related travel restrictions and the temporary transition to remote learning in many higher education institutions.

Figure 25. Per Pupil Expenditure in Public Elementary and Secondary Schools (in $2021)



Source: U.S. Census Bureau, Public Elementary–Secondary Education Finance Data.

Figure 26. Persons in Massachusetts and the United States 25 Years and Older with a Bachelor's Degree or Higher by Race and Ethnicity in 2019

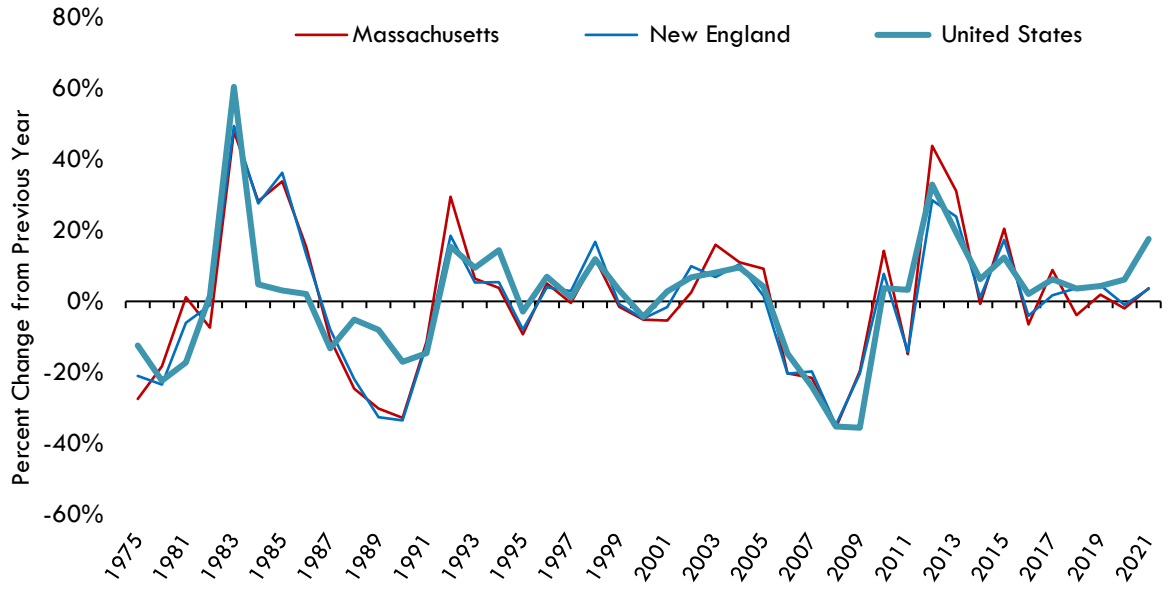


Source: U.S. Census Bureau, 2019 1-Year American Community Survey; UMDI analysis. Note: Instead of providing the standard 1-year data products, the Census Bureau released experimental estimates from the 1-year data for 2020, thus we present 2019 estimates.

While residents enjoy higher incomes than most other states, the cost of housing in Massachusetts is a burden for many, especially for Black and Hispanic households. Housing costs are rising across the Commonwealth, driven in part by population and economic growth and inadequate housing production over the last couple of decades. Median sales price of existing homes increased to $530,000 from

$460,000 in 2020, a 15.2 percent increase. Prices have remained well above the national median of $347,100. Construction is not keeping up with demand. Preliminary data shows that nationally, the number of building permits increased 17.6 percent from 2020 to 2021, but in Massachusetts permits only increased a modest 3.7 percent over the same period (Figure 27).

Figure 27. Housing Units Authorized by Building Permit, Percent Change from Previous Year

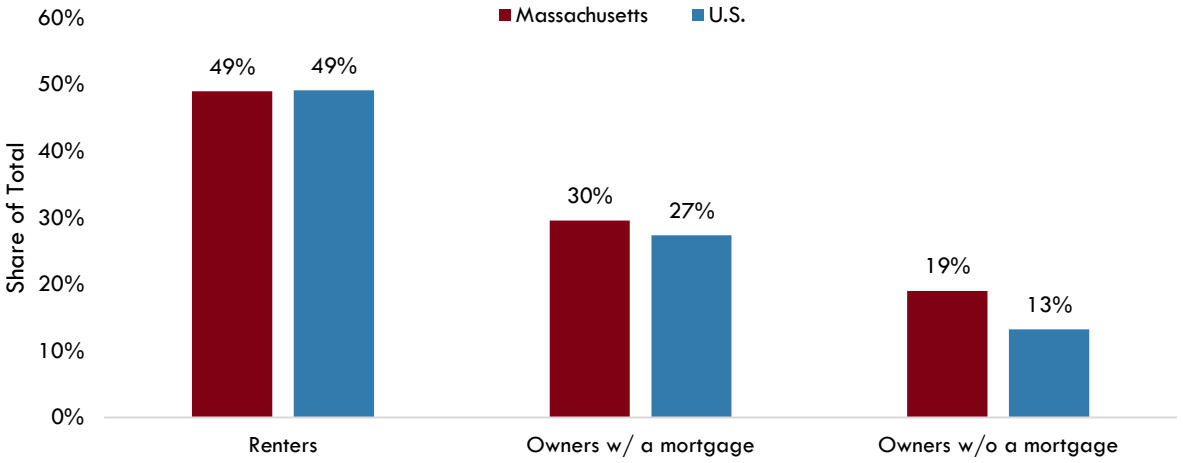


Source: U.S. Census Bureau; UMDI analysis
Note: Reported data plus data imputed for non-reporters & partial reporters.

The increase in sale prices and the low supply of homes for sale has translated into high rental costs as well. In addition, low vacancy rates have contributed to higher costs; rental vacancy rates in the state were at 3.3 percent in 2020 compared to 5.8 percent nationally. Mirroring rates in the U.S., nearly half or renters are cost burdened, meaning they spend over 30 percent of their income on housing costs, and a quarter (24%) of Massachusetts renters are severely cost burdened, meaning they spend 50 percent or more of their income on housing (Figure 28). In contrast, 30 percent of owners with a mortgage are cost burdened and less than 10 percent are severely cost burdened. The rates of cost burden are highest among low-income residents, as well as Black and Hispanic households. It is important to note that rates of housing cost burden depend on both the income of residents and housing costs. For example, in the Boston Metro Area 48 percent of renters were cost burdened in 2020, compared to 53 percent in Springfield Metro, where rents are relatively lower than the Boston Metro Area, but out-of-reach for many lower income families. Due to a history of discriminatory housing policies, rates of homeownership vary by race and ethnicity. Among the most detrimental federal policies that originated in the 1930's was "redlining," which meant that racial and ethnic identity were a primary factor in the determination of loan risk, leading to the racist assignment of lower ratings to communities or color than neighboring and similar white communities. This system kept people of color from buying their own homes, one of the most important forms of intergenerational wealth. The harmful impact of this system is still felt today in the

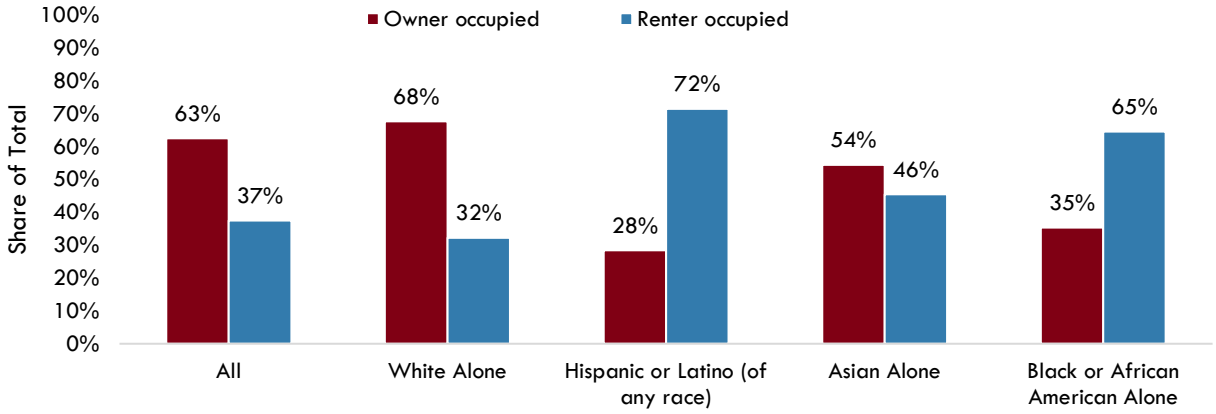
disproportionate rate that people of color rent, where they live, and their substantially lower levels of wealth than their white peers.

Figure 28. Housing-Cost-Burdened Households by Housing Tenure in Massachusetts and the United States (Spending 30 Percent or More of Income on Housing Costs)



Source: ACS 2016-2020 5-Year Estimates, Table DP04, A through I.

Figure 29. Housing Tenure in Massachusetts in 2020 by Race and Ethnicity



Source: ACS 2016-2020 5-Year Estimates, Table B25003, A through I.

Overall, 63 percent of households in Massachusetts are owner-occupied and 37 percent are renter occupied. The majority of white and Asian households own their homes and Black and Latino households are more likely to rent (Figure 29). The disparity in homeownership rates matters because homeownership is a fundamental mechanism for building wealth in the U.S. and homeowners are far less likely to experience severe housing cost burden.

With the goal of increasing housing production, particularly near transit hubs, the Commonwealth has passed legislation to amend the state Zoning Act. Known as the "Housing Choice" Act it included several

provisions to remove zoning-related barriers to production. The Act changed voting standards for local city councils or town meetings to adopt or change zoning ordinances and bylaws from two-thirds to a simple majority. Among other measures, the Act also requires "by right", multi-family zoning in "MBTA" communities, 176 communities that are served by the Massachusetts Bay Transportation Authority. Renters and owners, who struggled to afford housing during the pandemic, benefited from targeted federal American Rescue Plan Act (ARPA) funds that have flowed into the Commonwealth. In particular, the Emergency Rental Assistance Program and Homeowner Assistance Fund helped keep residents housed during the COVID-19 pandemic. In addition, the State has also received flexible funds through ARPA that it intends to use to address the housing need. Governor Baker has proposed directing $270 million in funds support housing production; however, the legislation remains under consideration by the legislature.