



Grading Opportunity in Massachusetts:

The Data Behind the Report Card

Overview

Data pertaining to Massachusetts performance and economy come from a vast array of sources, which are available in various formats and are updated at different frequencies. The goal of the Mass Opportunity Report Card is to provide an accessible snapshot of many of the data available to provide a comprehensive look at how the Commonwealth performs on a variety of indicators.

The Mass Opportunity Report Card analyzes data in several key issue areas pertaining to economic performance, governance, and program outcomes, which will be detailed in this report. Within each issue area, researchers identified metrics that can be used to understand how Massachusetts is performing in that particular area.

This data is compiled for all U.S. states and the District of Columbia, out of which MOA researchers generated a score for Massachusetts based on its relative position in a ranked list for each chosen metric. Updates will be generated as new data become available on a monthly, quarterly, and yearly basis, and feature the latest available release.

These scores were compiled into overall letter grades for each issue area, and ultimately, for the state in total. Based on the widely recognized "A" through "F" grade system, these grades indicate Massachusetts' performance as a whole and in each specific issue area compared to other states. For example, an "A" grade means Massachusetts ranks above many other states, and an "F" grade means Massachusetts is behind many other states.

This grading system includes the most important metrics with data available, but is subject to expand with new data analyses and performance indicators.

Data Sources

Migration

To study **migration in and out** of Massachusetts, researchers used the U.S. Internal Revenue Service Statistics of Income¹ database to track incoming and outgoing residents and income. To calculate residents ("individuals") and income ("adjusted gross income" or "AGI") entering, we calculated the number of residents in another state in year 1 that were classified in Massachusetts in year 2. To calculate residents and income leaving, we calculated all the residents in another state in year 2 that had been classified in Massachusetts in year 1.

From there, we were able to calculate Massachusetts' total outflow: all residents and income leaving the state to either another U.S. state or to a foreign country (listed as "foreign"). Total inflow was calculated as all residents entering the U.S. from either another U.S. state or a foreign country.

1 <https://www.irs.gov/statistics/soi-tax-stats-migration-data>

We calculated net migration for each state by subtracting total outflow from total inflow. This number could be positive or negative: a negative value means that there were more residents leaving than entering in a given year. A positive value means that there were more residents entering than leaving in a given year.

To standardize these numbers based on state population size, we calculated net migration as a percentage of all non-migrating residents. This number could be positive or negative: a negative value means that there were more residents leaving than entering in a given year. A positive value means that there were more residents entering than leaving in a given year.

Business Dynamics

To study business dynamics in Massachusetts, we used data on business births and deaths, business age, and new business applications.

To pull business births and deaths, we utilized the U.S. Bureau of Labor Statistics Business Employment Dynamics database.² We compiled quarterly statistics on births and deaths.

From there, we calculated the **ratio of new business births to deaths** by dividing the number of births and deaths. Since the data for business deaths was several quarters behind, we calculated this ratio for the quarters in which deaths data was available.

We ranked each state and D.C. based on the latest available quarter ratio, as well as a four-quarter average.

To pull **business ages**, we utilized the U.S. Bureau of Labor Statistics Business Employment Dynamics database.³ This data is populated as the number of businesses that have existed for each year count. New businesses are classified as being “less than 1 year old,” and old businesses are classifying as being in existence “before March 1993,” which equates to roughly greater than 30 years old. Each individual age between 1 and 30 are given a specific count of the number of businesses in each state that are that age.

To calculate **business age**, we calculated a weighted average of each year category: creating a percentage of all state businesses in each age category multiplied by the age value.

To pull the number of **new business applications**, we used the U.S. Census Bureau Business Formation Statistics database, using seasonally adjusted data.⁴ We pulled monthly data by state and calculated a six-month average of application totals.

2 <https://www.bls.gov/bdm/data.htm>

3 <https://www.bls.gov/bdm/data.htm>

4 [https://www.census.gov/econ/currentdata/?programCode=BFS&startYear=2004&endYear=2024&categories\[\]=TOTAL&-dataType=BA_BA&geoLevel=MA&adjusted=1¬Adjusted=0&errorData=0](https://www.census.gov/econ/currentdata/?programCode=BFS&startYear=2004&endYear=2024&categories[]=TOTAL&-dataType=BA_BA&geoLevel=MA&adjusted=1¬Adjusted=0&errorData=0)

Production

To measure production, we used gross domestic product (“GDP”) data from the U.S. Bureau of Economic Analysis⁵ and population estimates from the U.S. Census Bureau.⁶

We pulled data on quarterly real GDP, and calculated a 3–quarter **average real GDP growth rate**.

We also created a **real GDP per capita** value by dividing the latest quarter real GDP by the latest annual population estimate.

Labor Force

To study Massachusetts’ labor force, we used data from the U.S. Bureau of Labor Statistics Local Area Unemployment Statistics database.⁷

To determine state **labor force participation rates** (“LFPR”), we collected monthly data on civilian non–institutional population and labor force. To calculate the LFPR, we divided labor force numbers by the civilian non–institutional population. We calculated the latest month and the 6–month average.

To determine state **unemployment rates**, we divided the number of unemployed in each state by the number in the labor force in each state. We calculated the latest month and the 6–month average.

Education

To estimate **public education spending per pupil**, we used the U.S. Census Bureau Public Elementary–Secondary Education Finance database, which features data from the Census of Governments: Finance – Survey of School System Finances.⁸ We ranked total spending amounts (which include salaries, benefits, and administration costs).

To calculate **student achievement outcomes**, we used the U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP) assessments on eighth grade **mathematics** and **reading** from 2022.⁹ The data are composite average scale scores for public schools.

5 <https://www.bea.gov/data/gdp/gdp-state>

6 <https://www.census.gov/data/datasets/time-series/demo/popest/2020s-state-total.html>

7 <https://www.bls.gov/lau/rdscnp16.htm>

8 <https://www.census.gov/data/tables/2022/econ/school-finances/secondary-education-finance.html>

9 <https://www.nationsreportcard.gov/ndecore/xplore/NDE>

The data comes as percentages of students achieving various levels of proficiency. We calculated the percentages of students at or above basic scores and proficient scores in both reading and mathematics, and ranked states on these figures.

Transportation

To study Massachusetts transportation systems, we used the U.S. Department of Transportation Federal Transit Administration's complete monthly ridership data, part of the National Transit Database.¹⁰

Here, we compared Massachusetts' systems with other states' systems (not all states have comparable public transit systems in this analysis).

We analyzed bus, ferry, and train systems (as classified by the simplified recode "3 Mode" variable) and compared cost to fare collection on average for Massachusetts' systems in each of the three modes.

We calculated the percentage of the cost collected in fares recouped for each system in every state by dividing the average fares collected per passenger trip of each system ("Avg Fares Per Trip FY") by the average cost per trip ("Avg Cost Per Trip FY").

We then calculated the **average fare/cost percentage of each mode** for Massachusetts, we averaged the ratios of each Massachusetts system to create a single Massachusetts average value for bus systems, ferry systems, and train systems.

For buses, we ranked the Massachusetts average system fare/cost ratio out of the 1,161 bus systems in the database. For ferries, we ranked the Massachusetts average system value out of the 26 ferry systems in the database. For trains, we ranked the Massachusetts average system value out of the 104 train systems in the database.

Taxes

To analyze Massachusetts' tax rates, we used the U.S. Census Bureau Annual Survey of State Government Tax Collections database.¹¹ For per capita calculations, we used estimates from the U.S. Census Bureau.¹²

From this database, we calculated **total state-collected taxes per capita, state property taxes per capita, sales taxes per capita, individual income taxes per capita, corporate income taxes per capita, and death taxes per capita.**

10 <https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release>

11 https://www.census.gov/programs-surveys/stc/data/tables.All.List_115355376.html#list-tab-List_115355376

12 <https://www.census.gov/data/datasets/time-series/demo/popest/2020s-state-total.html>

Cost of Living

To calculate various price and consumption metrics, we used the U.S. Bureau of Economic Analysis Regional Price Parities database.¹³ For per capita calculations, we used estimates from the U.S. Census Bureau.¹⁴

We calculated **real personal consumption expenditures per capita** from this database.

We also used **regional price parities for all items** listed by state to reflect relative price changes (instead of the Consumer Price Index, which only shows major urban inflation data).

To determine how much Massachusetts residents are spending on various categories, we used the U.S. Bureau of Economic Analysis Regional Economic Accounts data on consumer spending by state.¹⁵ To calculate as a percentage of personal income, we used annual income data from the U.S. Bureau of Economic Analysis Regional Economic Accounts “personal income” table.¹⁶

We calculated the ratio of annual total spending on food to total personal income, and presented **food spending as a share of total personal income**. We did the same calculation to find **housing spending as a share of total personal income**, and **healthcare spending as a share of total personal income**.

Housing

To understand the housing market in Massachusetts, we used the U.S. Census Bureau Current Population Survey Basic Monthly database to track share of homeownership and rentership (“HETENURE”).¹⁷

We calculated the **percentage of those owning a home** and the **percentage of those renting** in Massachusetts based on the total number of residents per the CPS Basic Monthly survey. This data was pulled from the Census Bureau’s data portal and weighted using the CPS household weight (“HWHHWGT”).

13 <https://www.bea.gov/data/prices-inflation/regional-price-parities-state-and-metro-area>

14 <https://www.census.gov/data/datasets/time-series/demo/popest/2020s-state-total.html>

15 https://apps.bea.gov/regional/downloadzip.htm?_gl=1*1xw6qfg*_ga*OTE2NTAyOTI2LjE3MjlyODA0MjE*_ga_J4698JNN-FT*MTcyNTU5Mzc2MS4xMS4xLjE3MjU1OTM3ODQuMzcuMC4w

16 https://apps.bea.gov/regional/downloadzip.htm?_gl=1*1xw6qfg*_ga*OTE2NTAyOTI2LjE3MjlyODA0MjE*_ga_J4698JNN-FT*MTcyNTU5Mzc2MS4xMS4xLjE3MjU1OTM3ODQuMzcuMC4w

17 <https://data.census.gov/mdat/#/search?ds=CPSBASIC202401&cv=HETENURE&rv=ucgid&wt=HWHHWGT&g=0400000US01,02,04,05,06,08,09,10,11,12,13,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,44,45,46,47,48,49,50,51,53,54,55,56>

Earnings

To study earnings of Massachusetts residents, we used the U.S. Census Bureau Current Population Survey Annual Social and Economic (March) Supplement (ASEC) database. This data was pulled from the Census Bureau's data portal and weighted using the CPS ASEC standard weight ("MARSUPWT").

We ranked **average adjusted gross income** ("AGI")¹⁸ and **average earnings** ("PEARNVAL")¹⁹.

We also analyzed **personal income per capita by state**, using the U.S. Bureau of Economic Analysis Regional Price Parities database²⁰ and population estimates from the U.S. Census Bureau.²¹

Innovation

To study the level of innovation in the Massachusetts economy, we used a variety of sources and metrics.

First, we studied the density of research and development industries in Massachusetts compared to other states. To do this, we used U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW) to measure annual **location quotient of employment density for the Scientific research and development services industry** (NAICS 5417).²²

The location quotient of the research industry in Massachusetts compares the share of employment in research in Massachusetts compared to the share of employment in research nationwide. The ratio, which divides the percentage of all Massachusetts employment that is in the research industry by the percentage of all U.S. employment that is in the research industry, can hold value of anything larger than zero. A location quotient ratio between 0 and 1 means state industry employment is a lower percentage of total state employment than the national average. A location quotient ratio larger than 1 means state industry employment is a higher percentage of total state employment than the national average.²³

18 https://data.census.gov/mdat/#/search?ds=CPSASEC2023&vv=*AGI&rv=ucgid&wt=MARSUPWT&g=0400000US01,02,04,05,06,08,09,10,11,12,13,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,44,45,46,47,48,49,50,51,53,54,55,56

19 https://data.census.gov/mdat/#/search?ds=CPSASEC2023&vv=*PEARNVAL&rv=ucgid&wt=MARSUPWT&g=0400000US01,02,04,05,06,08,09,10,11,12,13,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,44,45,46,47,48,49,50,51,53,54,55,56

20 <https://www.bea.gov/data/prices-inflation/regional-price-parities-state-and-metro-area>

21 <https://www.census.gov/data/datasets/time-series/demo/popest/2020s-state-total.html>

22 https://data.bls.gov/cew/apps/data_views/data_views.htm#tab=Tables

23 <https://www.bls.gov/cew/about-data/location-quotients-explained.htm>

We used the U.S. Patent Trademark Office (USPTO) PatentsView database to view annualized data on patents granted by state and country. We cleaned this dataset to include only patents granted to companies or individuals where the state was provided and within the United States.

We calculated the number of **patents per capita** using population estimates from the U.S. Census Bureau.²⁴

To study venture capital spending by state we also used a database compiled by the National Science Foundation's National Science Board.²⁵ This data comes from the Pitchbook Venture capital and private equity database as well as the U.S. Bureau of Economic Analysis.

We used the analysis on **venture capital disbursements** per GDP.

24 <https://www.census.gov/data/datasets/time-series/demo/popest/2020s-state-total.html>

25 <https://nces.nsf.gov/indicators/states/indicator/venture-capital-per-1-million-state-gdp>

Grading System

For all data and metrics detailed above, we collected information for all 50 U.S. states and the District of Columbia. We grade Massachusetts based on the latest available data release, whether monthly, quarterly, or annually.²⁶ After collecting and analyzing these data, we created lists of all the states' performances under each metric and ranked them based on their position in the list.²⁷ Rankings were calculated based on each state's value relative to the range of other values in the list – position was determined based on distance from the minimum and maximum values.²⁸

To gauge performance on each metric, each state was assigned points based on their ranking out of 50: zero points meant they were the lowest or worst outcome relative to other states, and 50 points meant they were the best outcome relative to other states.²⁹

For each issue area, we calculated the number of points received divided by the number of points possible. This percentage of points earned was translated into an issue area letter grade.

For Massachusetts as a whole, each of these issue area letter grades were averaged into a single score, which was converted to an overall letter grade for the state.

Letter grades were evenly distributed among scores between 0 and 100. See the rubric below:

Score is Greater Than	Letter Grade Assigned
0	F
7.7	D-
15.4	D
23.1	D+
30.8	C-
38.5	C
46.2	C+
53.9	B-
61.6	B
69.3	B+
77	A-
84.7	A
92.4	A+

26 Some data releases are delayed; this analysis tabulates the latest available release which will be documented on the Opportunity Report Card website. <https://massopportunity.org/opportunity-report-card/>

27 For Transportation metrics, since we compared systems instead of whole states, the number of rankings was much higher and the total possible point values were much larger. The highest possible point values for each metric are listed under the methodology for Transportation.

28 Calculation formula in Excel as follows: RANKING = ((state value - min(range))/(max(range)-min(range))*50, 0)

29 "Best" and "worst" outcomes differ for each metric. For example, tax burden per capita values that are lowest are the "best" outcomes for Massachusetts residents, so a state with the lowest taxes would have the highest point value (50). On the contrary, student achievement outcomes that are highest are the "best" outcomes for students, so a state with higher student achievement outcomes would have the highest point value (50).