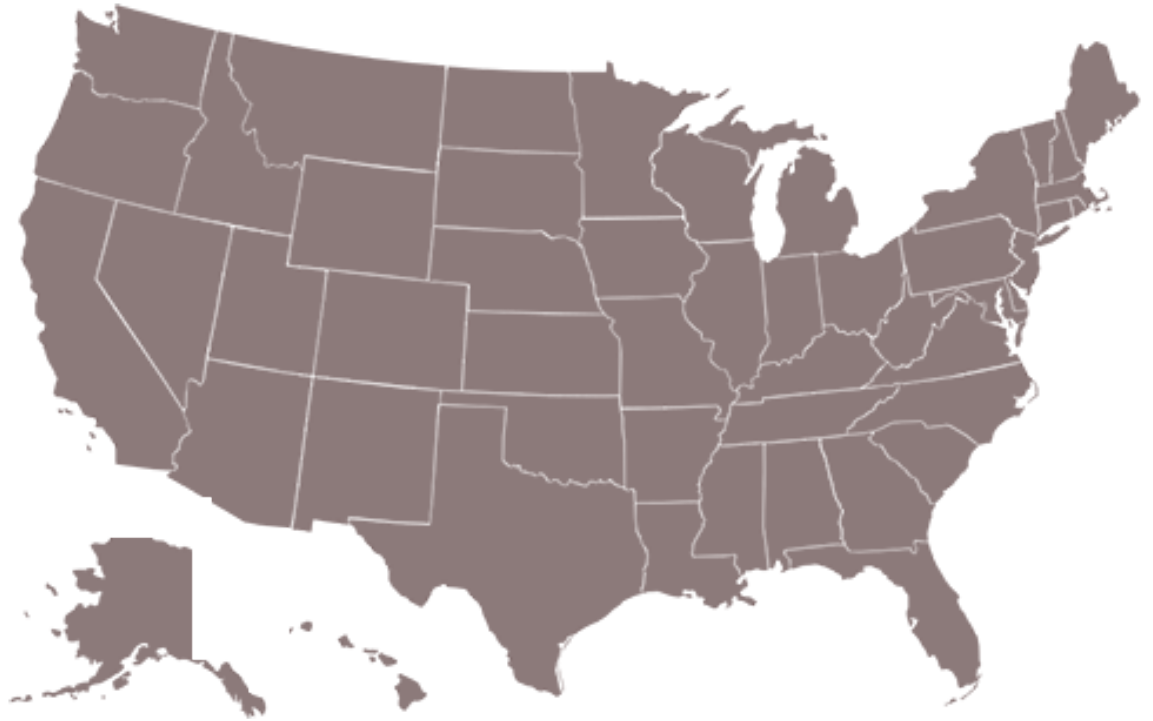


*Beacon Hill Institute*



**16<sup>th</sup> Annual  
State  
Competitiveness  
Report**

The Beacon Hill Institute is pleased to release its 16<sup>th</sup> Annual State Competitiveness Report. Published since 2001, the report is centered on a comprehensive index that has increasingly drawn the attention of policymakers, economists, and public officials who are seeking to identify the strengths and weaknesses in their state's ability to promote economic growth.

The BHI Index is different from most state business climate indices. It goes beyond tax policy and regulatory analyses to establish more comprehensive ranking categories. The BHI Index identifies how well a state performs in its ability to cultivate, for example, a solid base of scientists and engineers, a groundswell of patents, or a positive savings rate while keeping business costs to a minimum. It also underscores the importance of human capital, suggesting that the overall health and educational attainment of its workers is as important as fiscal rectitude or natural endowments. Thus, states that are rich in natural resources have no guaranteed advantage over states that are rich in human capital. On the other hand, states that are rich in educational resources are not necessarily more competitive than states that are rich in fossil fuels.

This edition of the Competitiveness Report is the product of months of collaboration between Suffolk University students and recent graduates who assisted in various aspects of data collection, production, and promotion. While learning the art of number-crunching, fact-checking, and Microsoft Excel programming along the way, these students improved their research and media skills. It's always an immense pleasure to work with tomorrow's economists on real-world analysis.

This year's contribution has been made possible by the work of student summer interns Maria Aldalati, Tunisha Kansra, Mitchell Lockwood, Michael H. Mailloux, Alexander Minelli, and Marina Riad. We thank them for their hard work and for their suggestions for updating and replacing some of the indicators that had become obsolete. We also wish to thank Frank Conte, former Director of Communications for BHI, for his advice and assistance.

We believe that the variety of experience each team member brings to the project is an example of human capital put to its best use. The soft skills of our team make the hard data easier to understand. We can't say it enough: for competitiveness, the deepening of human capital is essential for highly-motivated entities; whether they are states, metropolitan areas, or research organizations – like our own Beacon Hill Institute.



	Subindices, Results (Alpha) in 2016																	
	Overall		Fiscal Policy		Security		Infrastructure		Human resources		Technology		Biz. Incub.		Openness		Environment	
	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank
Massachusetts	7.34	1	4.60	37	6.09	7	3.51	45	7.19	1	8.27	1	5.85	11	6.39	5	4.62	34
North Dakota	7.09	2	5.49	20	5.94	11	5.91	8	5.95	8	4.78	28	7.27	1	4.40	35	6.07	7
Utah	6.51	3	7.25	1	4.52	36	6.26	5	5.92	9	5.44	12	6.23	6	4.34	37	4.25	42
Nebraska	6.19	4	5.43	22	6.46	4	5.37	22	5.98	6	4.51	36	5.05	28	4.28	38	6.23	3
Minnesota	6.14	5	4.83	30	5.52	15	5.22	25	6.81	3	6.33	6	3.89	40	4.66	32	5.94	9
Idaho	6.14	6	5.51	19	6.01	8	5.68	15	5.12	25	4.62	34	6.32	5	3.67	46	6.23	4
Texas	6.10	7	5.59	16	4.91	24	6.43	2	3.98	42	4.81	27	5.07	27	6.84	1	5.42	18
New Hampshire	6.08	8	4.94	29	6.77	3	3.08	47	7.00	2	5.34	15	4.90	30	5.46	18	5.50	15
Vermont	5.96	9	4.52	39	7.25	2	4.13	42	6.59	4	5.17	20	4.75	34	4.54	33	5.72	13
Virginia	5.89	10	5.85	8	5.53	14	4.80	34	5.47	15	5.39	14	5.51	17	4.93	25	5.01	26
Iowa	5.81	11	5.09	26	5.86	13	5.74	12	6.48	5	4.66	32	4.78	33	4.36	36	5.28	21
Washington	5.78	12	4.66	34	4.73	28	4.66	35	5.32	19	5.84	7	3.86	41	6.77	2	6.32	1
North Carolina	5.76	13	5.62	14	4.84	26	5.83	10	4.33	37	5.17	21	6.11	8	5.23	21	4.98	27
South Dakota	5.73	14	5.28	24	4.80	27	5.41	20	5.39	18	5.43	13	6.17	7	3.33	49	6.22	5
Colorado	5.60	15	4.49	40	4.53	35	4.83	31	5.96	7	6.79	4	5.47	19	4.09	40	5.50	16
Oregon	5.45	16	5.70	10	5.00	22	4.83	32	5.23	24	4.93	25	4.35	36	4.91	28	6.31	2
Wyoming	5.44	17	4.62	36	7.36	1	5.61	17	5.23	23	3.91	45	5.80	13	3.43	48	5.25	22
Kansas	5.38	18	4.18	42	5.32	18	4.93	29	5.41	16	5.29	18	5.08	25	4.97	24	5.89	12
Georgia	5.38	19	5.73	9	4.71	30	6.33	3	3.54	47	4.74	30	5.81	12	5.27	20	4.93	29
California	5.32	20	3.84	44	3.61	47	4.58	38	4.38	36	7.24	2	6.34	4	6.48	4	4.43	37
South Carolina	5.13	21	5.63	12	3.84	44	5.30	23	3.99	41	4.06	41	6.38	3	6.22	7	4.94	28
Indiana	5.13	22	6.67	2	4.32	39	6.06	6	4.97	29	4.65	33	4.28	37	5.66	15	3.75	48
Florida	5.10	23	6.35	3	4.14	41	6.32	4	4.41	34	3.88	46	5.16	21	5.16	22	4.84	32
Arizona	4.98	24	6.00	6	4.13	42	5.25	24	4.90	30	5.04	23	5.14	22	4.82	29	4.67	33
Wisconsin	4.96	25	4.96	28	5.27	19	4.55	39	5.85	10	4.89	26	4.86	31	4.18	39	5.33	20
Nevada	4.95	26	6.08	4	3.14	50	6.85	1	3.69	46	3.28	49	6.40	2	5.49	17	4.93	30
Tennessee	4.92	27	6.07	5	4.10	43	5.50	19	4.22	38	3.96	42	5.94	10	5.09	23	4.91	31
Ohio	4.88	28	5.48	21	5.10	20	5.69	14	5.10	26	5.07	22	4.22	38	4.92	26	4.08	44
Delaware	4.83	29	5.61	15	4.71	29	4.15	41	4.76	33	5.52	9	5.08	26	6.16	8	3.53	49
Alabama	4.83	30	5.31	23	4.71	31	5.68	16	3.21	49	5.64	8	5.57	16	4.80	30	4.61	35
New York	4.76	31	3.80	45	6.28	6	3.83	43	5.29	20	5.30	16	3.32	48	6.31	6	5.21	23
Kentucky	4.71	32	4.76	32	5.35	17	5.89	9	4.39	35	3.81	47	4.81	32	5.80	12	4.37	40
Michigan	4.63	33	3.71	46	4.94	23	5.52	18	4.87	31	5.47	11	3.50	47	5.57	16	5.40	19
Missouri	4.52	34	5.63	13	3.69	45	5.95	7	4.98	28	4.69	31	4.71	35	3.98	42	5.03	25
Rhode Island	4.46	35	4.72	33	6.00	9	3.21	46	5.58	13	5.48	10	3.73	45	5.76	13	4.03	47
Maryland	4.41	36	5.66	11	4.40	37	3.01	48	5.64	12	6.98	3	3.85	42	4.76	31	4.07	46
Montana	4.39	37	4.97	27	4.58	33	5.69	13	5.01	27	4.42	38	4.94	29	2.61	50	6.08	6
Alaska	4.34	38	5.55	18	4.35	38	4.65	36	4.02	40	4.21	40	3.82	43	5.67	14	5.91	10
Maine	4.30	39	2.76	49	6.41	5	4.30	40	5.39	17	3.24	50	5.59	15	4.47	34	5.89	11
Arkansas	4.22	40	5.57	17	4.19	40	5.76	11	3.89	43	3.64	48	5.23	20	3.96	43	5.58	14
Pennsylvania	4.21	41	4.53	38	5.07	21	4.88	30	5.28	21	5.30	17	3.70	46	4.92	27	4.14	43
West Virginia	4.02	42	5.97	7	5.44	16	4.94	28	4.22	39	3.93	43	4.21	39	4.05	41	4.51	36
Connecticut	4.00	43	3.16	47	5.98	10	2.57	50	5.53	14	6.65	5	2.88	50	6.07	9	4.39	38
New Mexico	3.98	44	4.63	35	3.61	46	5.40	21	3.77	45	4.76	29	5.08	24	3.87	44	6.05	8
Mississippi	3.77	45	5.13	25	4.54	34	4.97	27	2.72	50	4.56	35	5.79	14	3.78	45	5.08	24
Oklahoma	3.71	46	4.05	43	4.60	32	5.05	26	3.86	44	4.42	37	5.48	18	3.53	47	5.43	17
Illinois	3.70	47	2.77	48	4.89	25	4.62	37	4.84	32	5.23	19	3.74	44	5.92	11	4.38	39
Louisiana	3.62	48	4.81	31	3.37	48	4.82	33	3.31	48	3.92	44	5.94	9	5.93	10	4.07	45
Hawaii	3.55	49	4.24	41	3.21	49	3.52	44	5.75	11	4.39	39	5.12	23	5.46	19	4.26	41
New Jersey	1.90	50	2.21	50	5.86	12	2.97	49	5.27	22	4.93	24	2.94	49	6.74	3	0.43	50

## ***About the BHI's State Competitiveness Index***

How does one state create more economic activity, and hence more income for its citizens than another state? What special characteristics or attributes lead to generating this higher income? Since 2001, BHI's State Competitiveness Report has identified the qualities that allow some states to excel in income generation, and the qualities that inhibit other states from attaining the same level of competitiveness. This question quickly leads on to others:

- How are these qualities measured?
- What standard should be used to determine whether a state is competitive or not?
- Indeed, why is it even interesting to measure competitiveness?
- How does economic competitiveness differ from interstate competition for workers, firms, and capital?

These questions have consumed economists since the time of Adam Smith. This State Competitiveness Report uses these questions as a starting point. The indices are designed to measure the long-term competitiveness of an area, and use a similar approach to the one taken in BHI's earlier studies of state competitiveness.

In this most recent report, Massachusetts once again retained the top spot. North Dakota once again finished second, followed by Utah, Nebraska, Minnesota, Idaho, Texas, New Hampshire, Vermont, and Virginia.

### ***What is competitiveness?***

We consider a state to be competitive if it has in place the policies and conditions that ensure and sustain a high level of per capita income and its continued growth. To achieve this, a state should be able both to attract and incubate new businesses and provide an environment that is conducive to the growth of existing firms. Competitiveness may be thought of as a catch-all term that covers what Michael Porter calls "the microeconomic foundations of prosperity." The states of the United States all face the same macroeconomic conditions set at the top – national fiscal, monetary, and trade policy.

Where they differ from one another is in their microeconomic policies such as tax and regulatory regimes, their provision and emphasis on education, and their attractiveness to business. These policies matter. As Porter puts it, "Wealth is actually created at the microeconomic level ... in the ability of firms to create valuable goods and services using productive methods."<sup>1</sup>

It follows that the outcome of competitiveness is greater affluence, measured by higher levels of per capita real Gross State Product (GSP) or personal income.

## ***Quantifying competitiveness***

To be useful as a concept, it is essential to have an operational measure of competitiveness, a measure that aggregates the key microeconomic variables into a single index. In its influential annual Global Competitiveness Report, the World Economic Forum does this for the countries of the world, but until BHI's index there has not been an equivalent at the level of the states of the U.S. There are some more specialized rankings of the states, but none meets the criteria for measuring competitiveness as defined above, or has an equivalent breadth of coverage. We believe the Institute's index meets the challenge of providing a useful guide.

Using his celebrated "Diamond," Porter finds it helpful to group the factors determining competitiveness into four components: the quality of available inputs, the sophistication of local demand, the nature of local suppliers and the extent to which they form clusters, and the rules and institutions that govern the market.<sup>2</sup>

These are still very broad categories and so, following the Porter-inspired Global Competitiveness Report, we classify our indicators into eight groups. The breakdown is as follows:

**Government and Fiscal Policy:** Businesses are more likely to be attracted to areas with moderate tax rates and clear evidence of financial discipline (as evidenced, for instance, by high state and municipal bond ratings, and budgetary balance). This sub-index is designed to pick up these effects.

**Security:** A state will be more attractive to business if public officials are trusted and crime is low. The security sub-index addresses these dimensions of competitiveness, with particular emphasis on the importance of public safety.

**Infrastructure:** How easy is commuting? Are roads in an acceptable condition? Do most households have access to high-speed broadband and telephone services? Is housing affordable? How expensive is energy? These are the elements of competitiveness that are included in the infrastructure sub-index for each state.

**Human Resources:** A high level of labor force participation, and skilled labor that is readily available and not too expensive, combined with a widespread commitment to education, training, and health care, make a state attractive for business. These factors are captured in the human resources sub-index.

**Technology:** Since the arrival of the industrial revolution, the development and application of technology has been central to economic development. The technology sub-index measures this by taking into account research funding, the number of patents issued, the proportion of scientists and engineers in the labor force, and the importance of high tech companies.

**Business Incubation:** A good idea is not enough. Business also needs to be able to mobilize financing for investment, both internally and from the financial system. A higher rate of business births is a particularly clear sign of a competitive environment, and is an important component of the business incubation sub-index. Over the past few years, we have added two other variables: an index that tracks the potential costs of tort liability and a measure of the education-adjusted cost of labor.

**Openness:** Open economies tend to be more competitive and hence more productive, in addition to specializing more thoroughly in their areas of comparative advantage. The openness sub-index measures how connected the firms and people in a state are with the rest of the world. It is based on the level of exports and the percent of the population born abroad.

**Environmental Policy:** States that are faced with environmental problems or that have a heavy-handed policy of environmental regulation are likely to be less attractive to businesses, workers, and managers. We measured this effect with the environmental policy sub-index, which among other things reflects the levels of air pollution and toxic releases. Decent air quality is a measure that states are pursuing to improve the environment and attract workers and investors.

The eight categories are coherent, but there is inevitably some degree of arbitrariness in the way that each individual data series is assigned to the sub-indices. For instance, the amount of air travel could be included in the infrastructure sub-index or the measure of openness and electricity prices could be included in the infrastructure sub-index or the environmental sub-index. In practice, the assignment of a data series is much less important than the fact that it is included at all. See Table 2 for a detailed breakdown.

A competitiveness index is simply a summary measure based on a large number of variables. One difficult and controversial part is choosing a weighting scheme. Our approach is the simplest and most transparent: within each sub-index, each variable carries an equal weight. Then each sub-index is given the same weight when constructing the overall index. This has been referred to as a “democratic” weighting structure, and is a reasonable artifact. At first sight, one might expect some series to move together, such as the level of taxation and the number of state employees. In practice, neither these series, nor the others that make up the building blocks of our index, are closely correlated, suggesting that they are indeed picking up different facets of competitiveness.

### ***Is the competitiveness index useful?***

Do the indices of state competitiveness explain affluence and growth? If the index is properly constructed, then it should help explain why some areas are affluent while others are not. In our experiment we estimate an equation with the following general form:

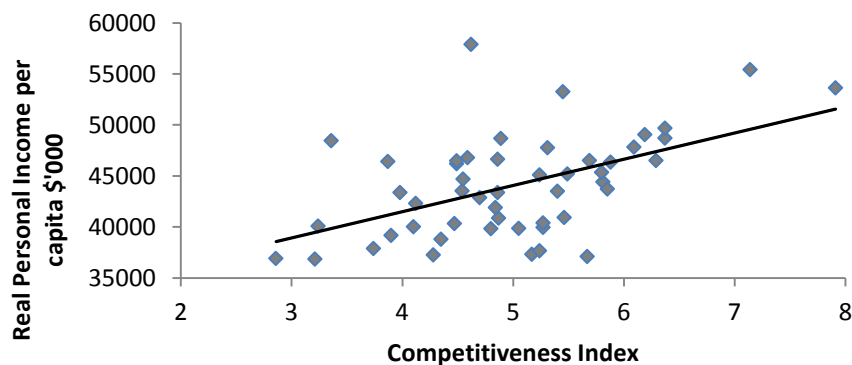
### Adjusted Personal Income per capita = a + b × Competitiveness Index

We use a measure of personal income per capita for 2015, which is the year that corresponds best to the timing of most of the component series that make up our most recent competitiveness index. Since the cost of living varies from state to state, we adjust the raw numbers to take account of these differences using regional price parities generated by the Bureau of Economic Analysis.<sup>3</sup> This gives us the following estimated equation:

$$\begin{aligned} \text{Real personal income per capita in 2015} &= 31,187 + 2,575 * \text{Index} \\ t &= 9.96 \quad t = 4.19 \\ p &= 0.000 \quad p = 0.000 \\ R^2 &= 0.253 \end{aligned}$$

Thus, a one-point rise in the index is associated with a \$2,575 per capita increase in real personal income. Note that personal income is adjusted for price differences across states. The coefficients are highly statistically significant (even using robust estimation, as done here). The mean value of real personal income per capita by this measure was \$44,062 in 2015, so an increase in the competitiveness index of one point is associated with a 5.8% increase in real per capita income. See Figure 1.

Figure 1



### Putting the competitiveness index to work

What do we learn from this exercise? Naturally it is interesting to look at the raw, but this may not be the most important use of the information. The detailed data, both in individual variables and the sub-indices, allow one to identify the determinants of competitiveness. This is of value to policy makers, who are then in a better position to identify what needs to be done, in order of priority, to improve the position of their states.

The logic behind this is that a higher competitiveness indicator index is associated with greater affluence. A reasonable inference is that if one were to improve competitiveness, then residents of the state would be better off. And the greatest upside potential is for the indicators whose performance is currently weak. For instance, a low-crime state may have trouble reducing the crime rate further, while for a high-crime state, efforts to reduce crime are likely to be an efficient way to boost competitiveness.

Let’s take the example of Indiana (see Table 1), which ranks 22<sup>nd</sup> overall in this report. If Indiana were to raise every sub-index that is below five up to five (e.g. security index goes from 4.32 to 5 and environment from 3.75 to 5) their overall index would rise from 5.13 to 6.18, and their ranking would jump from 22<sup>nd</sup> to 4<sup>th</sup>. This represents an increase in the index of 1.05, which would be associated with \$2,703 more personal income per capita (i.e. a rise of 8.3% relative to its current real income per capita of \$43,492).

Sub-Index	Value	Rank
Fiscal	6.67	2
Security	4.32	39
Infrastructure	6.06	6
Human Resources	4.97	29
Technology	4.65	33
Business	4.28	37
Openness	5.66	15
Environment	3.75	48

### **What next?**

Since 2001, when we began compiling these rankings, we have set out to invite the policymakers, citizens, and the media to pour over the detailed results contained here. We have also visited state houses from Massachusetts to Rhode Island and Arizona to Wisconsin, and hosted discussions with delegations from the Republic of Georgia, China, and other nations. Legislatures and planning agencies have sought ways to improve their rankings. Some of the suggestions such as adjusting the cost of labor for educational attainment have been incorporated.

Since then, we have received significant press attention and fielded very many questions about our methodology. In fact, the State of Washington’s Department of Commerce gave the BHI index “A” grades for its transparency, methodology, and variability. Some have compared our rankings to those of other studies that stress economic freedom or low tax criteria. We do agree that economic freedom and sound tax policy are important, and our index of competitiveness includes some indicators,



such as the share of state tax collections in Gross State Product, that measure the weight of government quite well.

However, we believe that other factors are also important to competitiveness, even if they are not easy to place on a scale as economic freedom or fit into the ideals of low tax regimes. These include such variables as the time that is required to travel to work, the availability of venture capital, the number of patents generated, and the importance of high-tech firms. For each state, we set out the main competitive strengths and weaknesses to give individuals a sense of where their home state has been and which direction it could be taking.

Recently several scholars have examined the efficacy of productivity indices such as the BHI index, questioning their ability to predict economic growth.<sup>4</sup> Our index does not claim to determine growth, but our strong regression results give us confidence that the index provides clear guidance on how states may achieve and maintain affluence. This is why it remains a useful guide for policymakers seeking to improve the policy environment.

We welcome the debate on how best to identify the determinants of economic well-being. The central goal of this report is to engage everyone in thinking about how best to improve long-term economic growth, while expanding and maintaining high levels of personal income. At the state level, even if it is essential to think global, we still have to act local.

1. Michael Porter, "The Current Competitiveness Index: Measuring the Microeconomic Foundations of Prosperity," in World Economic Forum, *The Global Competitiveness Report 2000*, Oxford University Press, New York, 2000. For more discussion of competitiveness applied to nations see "What is Competitiveness?" The Competitiveness Institute, (September 2007): <http://www.competitiveness.org/article/articleview/774/1/32/> (accessed November 1, 2008).
2. Michael E. Porter, *The Competitive Advantage of Nations*, Free Press, New York, 1990.
3. Bettina H. Aten, Eric B. Figueroa, and Bryan M. Vengelen, "Real Per Capita Personal Income and Regional Price Parities for 2013," (July 2015). [http://www.bea.gov/scb/pdf/2015/07%20July/0715\\_real\\_personal\\_income\\_and\\_regional\\_price\\_parities.pdf](http://www.bea.gov/scb/pdf/2015/07%20July/0715_real_personal_income_and_regional_price_parities.pdf).
4. Jed Kolko, David Neumark, Marisol Cuellar Mejia, "What do business climate indexes teach us about state policy and economic growth," *Journal of Regional Science* 53(2), May 2013, <http://dx.doi.org/10.1111/j.1467-9787.2012.00782.x>.

**Table 2**  
**2016 Components of Sub-indices for States**

<b>Sub-index</b>	<b>Competitiveness Indicators Index (“objective”)</b>
<b>Government &amp; Fiscal Policy</b>	State and local taxes per capita /income per capita(-) Workers’ compensation premium rates (-) Bond rating (composite of S&P’s and Moody’s, scale 1-25) (+) Budget surplus/deficit as % of Gross State Product (+) Average weekly payment to insured unemployed (-) Full-time-equivalent state and local government employees per 100 residents (-)
<b>Security</b>	Crime index per 100,000 inhabitants (-) % Change in crime index, YoY(-) Murders index per 100,000 inhabitants (-) The BGA Integrity Index (+)
<b>Infrastructure</b>	Quality of Infrastructure (ASCE’s “Infrastructure Report Card”) High-speed lines per 1000 (+) Air passengers per capita (+) Average travel time to work (-) Electricity Prices per kWh (-) Average rent of 2 bedroom apartment (-)
<b>Human Resources</b>	% of population without health insurance (-) % of population aged 25 and over that graduated from high school (+) Unemployment rate, not seasonally adjusted (-) % of students enrolled in degree-granting institutions per 1000 (+) % of adults in the labor force (+) Infant mortality rate in deaths per 1,000 live births (-) Total active physicians per 100,000 inhabitants (+) % of students at or above proficient in mathematics, Grade 4 public schools (+)
<b>Technology</b>	Academic Science and Engineering R&D per \$1,000 GSP (+) NIH support to institutions in the state, per capita (+) Patents per 100,000 inhabitants (+) Number of S&E graduate students per 100,000 residents (+) S&E degrees awarded per 100,000 residents (+) Individuals in science and engineering occupations as % of the labor force (+) Employment in high-tech industry as a % of total employment(+)
<b>Business Incubation</b>	Deposits in commercial banks and savings institutions, per capita (+) Venture capital investment dollars per worker (+) Employer firm births per 100,000 inhabitants (+) IPO volume, in \$ per capita (+) % of labor force that is represented by unions (-) Minimum wage (-) Pacific Research Institute’s Tort Liability Index (-) Cost of labor adjusted for educational attainment (-)
<b>Openness</b>	Exports per capita, \$ (+) Employment in majority-owned U.S. Affiliates in State/Total employment in State, (+) (proxy for Foreign Direct Investment) % of population born abroad (+)
<b>Environmental Policy</b>	Toxic release inventory, on-site and off-site, total (new and original industries), pounds/sq. miles (-) Greenhouse Gas Emissions (million metric tons of carbon equivalent (MTCE) per 1000 Sq. Miles) (-) Air quality (% good average days) (+)



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The Beacon Hill Institute (BHI) is an independent, nonpartisan economic research organization located Boston, Massachusetts. Articles and references to BHI's work have appeared in leading publications, including the *Boston Globe*, *Washington Post*, *New York Times*, *Wall Street Journal*, *Los Angeles Times Magazine*, *The New York Sun*, *U.S. News & World Report* and scholarly publications such as *Cato Journal*, *State Tax Notes* and the National Bureau of Economic Research's *Working Papers Series*.

For the last 26 years, BHI has been a leader in the development of econometric models for the analysis of state tax policy changes, interstate economic competitiveness and community economic impact studies. In addition, BHI has applied its customized economic models to public construction projects, public school performance, and alternative energy. The Institute also produces state revenue forecasts for the Massachusetts Joint Legislative Committee for Ways and Means.