

Building a Strong Economy: The Roles of Education, Transportation, and Tax Policy

By Phineas Baxandall, Colin Jones, and Kurt Wise

Effective economic policies can expand opportunity and improve the economic security of working families. When everyone in the workforce has access to the education and training needed to reach their full potential, the productivity of those workers and the overall economy improves. When a state has high-quality transportation infrastructure, the economy is also more productive because goods can more easily get to market, employees can get to work more quickly, consumers can more easily reach vendors, and less money is wasted by overdue repairs.

Improving the quality of the education our children receive and the transportation infrastructure our economy relies on requires up-front investments for long term pay-offs. Determining whether and how to raise revenue for these long term investments is a critical challenge for state policy makers. This paper analyses the evidence on the short and long term effects of investments in the education of our people and in improving our roads, bridges, and public transit systems. It also examines the effects of tax policies that could fund these investments. Currently in Massachusetts the highest-income households pay the smallest share of their income in state and local taxes. We examine the evidence on the likely economic effects of tax reforms that would bring the overall level of state and local taxation for very high-income households close to that of other residents.

INVESTING IN EDUCATION

One of the most important things we do together through state and local government is educate our kids. With strong schools in every community, we can provide all kids the education necessary to be successful in their lives and careers, and to be actively engaged in civic life.

The immediate gains of education benefit the kids themselves: learning key academic concepts, developing social skills, building self-confidence, and establishing positive relationships with peers and mentors. These individual benefits accumulate over the long-term to serve as a core foundation for strengthening our state economy. In general, states with better educated workforces have stronger economies with higher living standards.¹

The Connection Between School Funding and Achievement

In order to improve the education of all kids, but especially those in high-poverty districts, Massachusetts in the early 1990s overhauled the state role in funding local schools. The Education Reform Act of 1993 increased state aid for local school districts and created a new funding formula for

distributing this aid more equitably (for detailed background, see [Demystifying the Chapter 70 Formula](#)).

After these funding reforms were phased-in starting in 1993, Massachusetts schools reached the highest level of performance in the U.S. and became increasingly competitive internationally.² For example, the Commonwealth ranked at or near the top on the most recent National Assessment of Education Progress (NAEP) in math and reading, and these results also held for Massachusetts low-income and African-American students relative to peers in other states.³ Compared to advanced industrial nations, Massachusetts ranks 6th in literacy, 9th in science, and 15th in math.⁴

Despite this positive trend in Massachusetts schools, some economic research has raised doubts about the effectiveness of increased school funding. Several studies in past decades argued that there is no clear link between school funding in general and better results.⁵

More recent and advanced analyses, in contrast, have documented that additional school spending from specific reforms across the country did improve academic performance, reductions in poverty rates, and increases to the income earned by students as adults.⁶ Economists from the National Bureau of Economic Research showed that spending increases of 20 percent over the course of the K-12 education of low-income students increases high school graduation rates by 23 percentage points, increases annual earnings by 25 percent, and similarly reduces poverty by 20 percentage points.⁷ These results are large enough to close between two-thirds and all of the achievement gap on these measures between low-income kids and those with higher income.⁸ This analysis also found that some of the prior research doubting the link between funding and performance may have been designed in ways that produced inaccurate results.⁹ This critique of prior studies confirms the conclusions of more updated school finance research. These reviews have explained that earlier studies on this question used flawed methods, making them unreliable for capturing the relationship between funding and positive outcomes.¹⁰

Better Education Can Build a Stronger Economic Future

The economic benefits of education to society at large are driven largely by the impact of education on the skills and productivity of workers. Many researchers have established the connection between the knowledge, skills, and work habits gained by students in school and economic growth.¹¹ One specific estimate suggests that an increase of 100 points on the international PISA literacy, math, and science tests (which would be a roughly 20 percent increase in recent U.S. scores) provides close to 2 percent greater annual growth to a national economy.¹² This data can be used to project the potential economic impact of raising academic achievement.

The Washington Center for Equitable Growth recently provided detailed estimates of the economic benefit of raising academic achievement in the United States. The 2012 PISA test showed that the United States ranked 24th out of 34 advanced industrial countries in math and science.¹³ However, if the performance of U.S. lower- and middle-income students were raised to the level of upper-income students, the United States would be the third highest performing country, slightly behind South Korea and Japan.¹⁴

Completely closing all achievement gaps based on income is a very ambitious target, especially for the short-term. Under a more modest scenario where achievement gaps were closed by 30 percent, the U.S. could expect additional economic growth of \$956 billion per-year through the year 2075.¹⁵

There is also clear evidence that the level of education of a state workforce plays a major role in determining the strength of the state economy. States with well-educated workforces consistently have strong, high-wage economies, while states with poorly educated workers rarely have high-wage economies.¹⁶

Examining education and wage data across the country, a recent study found:

In the 22 states with the least-educated workforces (30 percent or less with a bachelor's degree or more education), median wages hover around \$15 an hour, the only exceptions being Alaska and Wyoming. In the three states where more than 40 percent of the population has a bachelor's or more education, median wages are \$19 to \$20 an hour, nearly a third higher. For a full-time, full-year worker, a median wage of \$15 versus \$20 an hour means the difference between making \$30,000 a year and making \$40,000 a year. For a household with one person working full time and one person working half time, it is the difference between making \$45,000 a year and making \$60,000 a year.¹⁷

Options for Making a Difference

A growing body of research provides useful guidance on which education investments, under which circumstances, lead to the best long-term improvements for kids and for our communities. Below are some examples. For additional detailed information on these initiatives, see the [Roadmap to Expanding Opportunity](#) project.

- **Early Education and Care** – Early education helps create a foundation of social and academic skills, helping young people to succeed in school and life. Not all families, however, have the means to afford early education for their kids. Increased access could greatly benefit these kids, as quality early education and care programs have been shown to provide roughly seven dollars of long-term benefits to individuals and society for each dollar invested, when targeted to young people with the greatest need.¹⁸ These benefits arise from better social and academic outcomes, higher earnings, and greater wealth built by individuals over time. The most effective early education programs feature small class sizes, strong curriculum, safe and appropriate learning spaces, and intensive family engagement.¹⁹ Early education and care programs without these quality features may not be similarly effective.
- **Smaller Class Sizes in the Early Grades** – Providing individualized support in the early grades through small class sizes can boost achievement during a key developmental stage for young people. A strong start in elementary school helps set students up for future success. However, not all schools have the staff resources to provide these personalized small classes. Initiatives creating class sizes of roughly 15 students in kindergarten through third grade have increased the academic performance of young people. One well designed and rigorously evaluated class size program in Tennessee boosted student achievement in the early years, gains which persisted through the later grades and into college preparation.²⁰ This specific small class size program yielded roughly two dollars in economic benefit per dollar invested.²¹ It is important to note that class size reductions have not always been well implemented, particularly when they have been undertaken too quickly and staffed with under-qualified teachers.²²

- **Wraparound Social Services** – Due to challenges that arise outside of school, such as hunger and homelessness, many kids come to school unprepared to learn. In response, some schools have implemented wraparound social service programs, designed to address these non-academic barriers to success. Key program elements include health clinics, wellness programs teaching skills like healthy relationship building, and family resource centers. A cost benefit study of a high-performing wraparound services program in New York City found roughly twelve dollars in benefits for each dollar invested.²³ However, some of this came by integrating other interventions discussed here, including early education and after-school opportunities, that provided strong academic support.²⁴ Benefits arose from better health, greater academic achievement, and reduced teacher turnover.
- **After-School and Expanded Time** – All students can benefit from a rich array of learning opportunities in and beyond the school day. However, not all communities have the capacity to provide these opportunities to their children after school each day or over the summer. Increasing learning time through quality programs like after-school has improved grades, test scores, and attendance.²⁵ A cost-benefit study of such programs demonstrated that quality after-school delivered \$2.5 dollars in return on each dollar invested based on their preventing youth from getting off track as teenagers.²⁶ However, lower-quality after-school programs that suffered from poor staff training, lack of coordination with the school day, and poor attendance produced negligible gains for kids.²⁷

EXPLORING THE ROLE OF TRANSPORTATION INVESTMENT ON ECONOMIC GROWTH IN MASSACHUSETTS

Since Colonial times, the economy of the Commonwealth has been shaped by changing transportation opportunities. People and production have located along ports and waterways, at the crossroads of rail lines and other travel routes. Massachusetts built the nation's first bridge, first divided highway, first canal, first subway, and first lighthouse – each of which opened new markets for goods or economic development.²⁸ Growth was propelled forward by investment in projects such as the Middlesex Canal, rail routes that helped make Massachusetts a hub for New England, and the creation of interstate highways and the Massachusetts Turnpike that made travel to anywhere in the Commonwealth only a few hours away.

Transportation continues to be very important for the Massachusetts economy. For most American households, transportation is the second largest expense, surpassed only by housing, and exceeding health care, entertainment and clothing costs combined.²⁹ Government investment in transportation also influences economic productivity, access to markets and Massachusetts' comparative advantage with other states and countries. Since building and maintaining transportation infrastructure requires considerable resources, it is worth examining factors that influence how additional public investment in transportation affects economic growth.

How Transportation Investment Affects the Economy

The most direct ways that transportation improvements can increase economic growth is by reducing the costs and increasing the reliability of travel for goods and people, thereby increasing productivity. Better transportation can also expand access to new markets for goods and services, as well as access to productive inputs, including a wider pool of workers. Enhanced transportation may moreover provide easier opportunities for collaboration and exploration of ideas that promote innovation.³⁰ As the U.S. Business Roundtable asserts, “strengthening America’s transportation infrastructure presents a crucial opportunity for policymakers to prioritize and reinvest in the critical drivers of future economic growth and competitiveness.”³¹

Many economists have studied how the level of infrastructure investment affects productivity growth. A path-breaking 1989 study that examined the period from 1949 to 1985 suggested that an increase in public sector capital stock such as trains, highways, school buildings and energy grids could increase productivity growth dramatically.³² Alicia Munnell, then Senior Vice President and Director of Research at the Federal Reserve Bank of Boston made clear the importance of differences in productivity growth in a 1990 paper on infrastructure. She noted,

[P]roductivity growth is the major determinant of the future standard of living. If the efficiency with which resources can be used rises at 2.5 percent per year, people can expect their real wages and their living standards to double every 28 years, or roughly once a generation. In contrast, productivity growth of 0.5 percent means that children can expect living standards only 15 percent higher than those of their parents.³³

Her concern was that a declining rate of public capital investment was dragging down labor productivity growth, and would depress living standards in the long term without renewed investment in public infrastructure. Subsequent econometric studies questioned whether such huge increases in productivity could be attributed to additional investment in public capital, and suggested smaller returns.³⁴ Contending estimates have shown the difficulty of precise calculations, especially because the level of public capital investment may itself be a byproduct of economic growth, making the direction of causation difficult to determine.³⁵ Studies have estimated differing magnitudes of effects, depending on which nations, infrastructure types, levels of government, and statistical techniques are included in the analysis.

Overall, economic surveys of dozens of studies suggest some general consensus that infrastructure investment does increase productivity, perhaps at a less rapid rate than the earliest studies indicated.³⁶ This makes sense also for some kinds of transportation investments: initially connecting American cities with paved highways yielded productivity gains that were likely larger than subsequent benefits from ring highways to new sprawling suburbs.³⁷

Because the effects of enhanced productivity growth compound over time, even a seemingly modest increment like an additional 0.5 percent increase in annual productivity growth yields large returns over time. If productivity growth in Massachusetts had grown 0.5 percent faster than observed rates since 1979, then output per worker in 2014 would be \$26,000 higher – enabling large increases in living standards. This large difference in productivity is equivalent to the advantage Massachusetts currently holds over the less-productive states of New Hampshire, Oklahoma and Tennessee.³⁸

There is reason to believe that when it comes to Massachusetts today, increased transportation investments would improve productivity. In Massachusetts there is no unincorporated land and transportation planners are not focused on building new highways to sparsely inhabited places. Most additional transportation resources today would focus on preserving, repairing, and modernizing

existing infrastructure, which is far more cost-effective than waiting to rehabilitate or replace roadways, rails or other assets that have been allowed to deteriorate. According to a study by the American Association of State Highway and Transportation Officials, every \$1 spent to keep a road in good condition avoids \$6 or more in future costs to rebuild the same road once it significantly deteriorates.³⁹ Investments in road repair and in transit have also been shown to produce relatively higher numbers of jobs per dollar of investment than creating brand new highway routes and lanes.⁴⁰ Massachusetts has meanwhile been a leading state for successful public transit,⁴¹ and federal transit dollars for new transit capacity are chiefly awarded in competition with other states based on exceptional potential for spurring economic growth and advancing other goals such as energy efficiency and reducing pollution.

Investments in transportation infrastructure can also build competitive advantage compared to other states and regions. In a major survey of corporations around the country in 2014 and 2015 about what factors they consider when deciding where to locate their business, “transportation infrastructure” was listed first and third place respectively, exchanging places with “existing workforce skills.”⁴² Investors and employers need to know that workers will get to work on time, that goods will reliably get to market, and that dependable supply chains will avert the need to maintain large inventories. Improved transportation can also help communities that are isolated in poverty by connecting them to jobs and other opportunities.

Likewise, transportation may also be particularly important for recruiting and retaining people to work and live in Massachusetts. Policy makers and business leaders often express concern about whether Massachusetts is an attractive place for young adults to live.⁴³ Studies suggest that Millennials’ choices about where to locate are strongly influenced by the availability of multiple transportation options. An Urban Land Institute survey of 660 Boston area young professionals conducted by the MassInc Polling Group found that 80 percent of those polled said access to public transportation was very important in choosing where to live, and 78 percent said having their work place near transit was important, much more so than office amenities like a gym, cafeteria, coffee bar, or proximity to restaurants and nightlife options.⁴⁴

How do existing transportation resources measure up to preservation and modernization needs?

Deteriorated transportation infrastructure can hinder economic growth by wasting time and money, and by discouraging those who would locate or invest in Massachusetts from doing so. Poor roads and undependable public transit hinder businesses from collaborating, make supply chains less reliable, reduce the talent pool that employers can draw on, and reduce access to economic opportunity by limiting where people can conveniently travel. Therefore, a key question is: do the resources available to transportation investment in coming years measure up to the challenges?

There is no more pressing transportation need in Massachusetts than ensuring a state of good repair. Much of Massachusetts’ transportation infrastructure was built in the years after World War II, when the country invested aggressively in improving infrastructure. As anyone who has owned an old car knows well, older assets become more expensive to maintain as they age. Cold winters and road salt make it even more difficult to preserve transportation assets in a state of good repair. A majority (53 percent) of the 5,000 bridges in the state’s inventory are over 40 years old, at or approaching their expected useful life (defined as the time at which an asset is considered fully depreciated and replacement or rehabilitation may be recommended). Almost 400 of these bridges have reached over

100 years old, without replacement.⁴⁵ Likewise, many Red Line subway cars on the MBTA were first put into service in the 1970s and many Orange Line vehicles have been in service since the late 1960s.⁴⁶ A few trolleys have been in service since 1945, and MBTA officials must ask for spare parts at museums.⁴⁷

Thirty-six percent of state roads are rated in poor or fair condition by the official Pavement Serviceability Index, a designation based on mechanical measures of road surface roughness.⁴⁸ By one unofficial measure, the additional average operating costs to each motorists in Massachusetts as a result of deteriorated roads is estimated at \$483 annually on average, a total of \$2.3 billion annually for the entire state in additional vehicle repair costs, accelerated vehicle depreciation, increased fuel consumption and increased tire wear.⁴⁹ MassDOT estimates that current spending on pavement surfacing of state roads averages only \$48 million annually. At this rate, MassDOT calculates the portion of state roads in poor or fair condition will rise steeply to 62 percent of roads by 2020.⁵⁰ If investment in road surfacing increased to \$300 million annually, only 14 percent of road surfaces would be in poor or fair condition by 2020.⁵¹

Recent efforts to improve bridges in the Commonwealth demonstrate the impact of increased investment. Back in 2008, the former MassHighway Department and the Department of Conservation and Recreation together oversaw 543 bridges that were “structurally deficient,” meaning that state engineers had identified a major defect with a weight-bearing component of these bridges.⁵² At earlier levels of investment, this number was expected to rise to 697 structurally deficient bridges by October 2016.⁵³ But in the wake of a tragic bridge collapse in Minnesota, the Commonwealth launched a \$3 billion Accelerated Bridge Program that wraps up this year to repair, replace, maintain and preserve bridge spans around the state. As of September 2015, the number of these structurally-deficient bridges had declined to 408, with many more bridges already under contract or reconstruction, according to MassDOT.⁵⁴

There are no current plans to renew the Accelerated Bridge Program or replace it with a similar initiative. On the contrary, based on existing levels of capital and preservation spending (about \$173 million annually), MassDOT projected that the number of structurally deficient bridges would increase from 444 earlier in 2015 to 702 in 2025. The agency estimates that bringing the number of structurally deficient bridges down to zero in five years would require more than tripling investment levels up to \$450 million annually.⁵⁵

Without well-maintained roadways and improved public transit that can relieve growing number of drivers, an expanding economy will increasingly be slowed by traffic congestion. The 2015 Urban Mobility report, an annual congestion report card, studied congestion in the Boston, Springfield and Worcester metropolitan areas and found that traffic congestion in these areas together cost 186 million annual hours of auto traveler delay, 87 million gallons of excess fuel consumption, and \$4.1 billion in total congestion costs, including lost worker productivity.⁵⁶

Public transit problems at the MBTA and Regional Transit Authorities (RTAs) are largely also a story about deferred maintenance and aged vehicles. When vehicles are overdue for replacement, signaling systems are obsolete, and stations are dilapidated, then transit agencies must contend with breakdowns and must take extra time-consuming measures to ensure safety. An annual investment of \$765 million invested in achieving a state of good repair at the MBTA, adjusted annually for inflation, would bring the repair backlog down to zero in 2040, according to the MBTA’s Fiscal and Management Control Board. This figure includes the additional cost of addressing new and ongoing repair issues over that

time, but does not include other important investments such as federally-mandated positive train control technology, accessibility improvements, and strategic expansions of the system. Meanwhile, in recent years investment to achieve state of good repair at the MBTA has averaged only \$376 million annually, little more than half the amount needed to eliminate the backlog. That sum also falls far short of the estimated \$472 million needed annually just to prevent the current repair backlog from getting worse.⁵⁷

Across the state's transportation system there are strong unmet needs for repair and modernization that could improve economic growth, but will largely remain unmet without additional revenue sources.

ECONOMIC EFFECTS OF TAXES ON VERY HIGH INCOMES

The benefits of increased investment in public education and transportation are clear. If tax increases are necessary to fund those investments, what are the likely effects of such tax increases?

Since the late 1970s, most Massachusetts households have seen very weak income growth, as is true for the nation as a whole (for more details, see MassBudget's [report](#) covering this topic). The top one percent of households in Massachusetts (those with incomes now over \$860,000/year), however, have seen very large income gains over this period.⁵⁸ At the same time, these highest income households pay the smallest share of their income in state and local taxes – 6.5 percent of household income, compared to the 9.4 percent paid, on average, by other Massachusetts households (for more details, see MassBudget's [report](#)). Asking these fortunate households – the same ones that have seen their incomes rise so much over the last several decades – to pay something closer to the tax levels paid by other Massachusetts households is one option for raising revenue to invest in education and transportation.

There is a large body of economic research on the effects of raising taxes on very high income taxpayers. This research has found that tax increases that affect very high income taxpayers do not produce significant “tax flight”, that they are an efficient and effective way to raise revenue, and that they have little or no discernible impact on state economic performance.

Migration Effects

For the overwhelming majority of households, both rich and poor, state tax levels are not a significant factor in deciding where they will live.⁵⁹ U.S. Census surveys reveal that most people who move do so for job or family reasons; few do so to reduce their state tax obligations.⁶⁰ For the small number of people (relative to the total population) who do relocate from one state to another each year, nearly as many people move from low-tax to high-tax states as move in the opposite direction.⁶¹ Additionally, relative levels of state-to-state migration differ little among income groups – in other words, people with higher incomes (above \$100,000) are not much more likely to move from one state to another than are people in middle-income groups (\$50,000 - \$75,000).⁶² Moreover, households with higher incomes are not more likely to be among those movers that migrate from a high tax to a no-tax state, suggesting that top tax rates are not a principal driver for these moves.⁶³ As one recent, in-depth report on tax-induced migration concludes, “State tax levels have little to no effect on whether and where people move, contrary to claims by some conservative economists and elected officials.”⁶⁴

Econometric studies that look specifically at the migration decisions of very high-income households in response to higher tax rates on high-incomes reveal similarly little sensitivity to tax levels among this subset of filers. While some high-income filers do migrate out of state in response to higher top income tax rates, the numbers are so small that they hover “at the margins of statistical and socio-economic significance.”⁶⁵

The case of New Jersey, for example, is both a relevant and instructive one. In 2004, New Jersey instituted a new income tax bracket for income over \$500,000, taxing this income at a new, higher rate of 8.97 percent, a single-year rate increase on this income of 2.6 percentage points.⁶⁶ Meanwhile, neighboring and nearby states maintained their significantly lower rates in affect at that time: New York at 6.85 percent, Connecticut at 5.0 percent, and Pennsylvania at 3.07 percent.⁶⁷ Studying the migration effects of this “natural experiment”, a highly-regarded team of researchers found little out-migration of affected filers over the next four years (the period for which data was available to them). Using regression analysis, they estimated that each one percentage point increase in the top-bracket rate resulted in a corresponding decrease in New Jersey’s overall millionaire population of less than one tenth of one percent.⁶⁸

In a later, 2015 study of millionaires in the U.S. as a whole, this same team confirm their earlier findings, namely that high-income state tax rates have only marginal effects on the residence decisions of millionaires as a group (though there are small subsets of millionaires who are more mobile). Notably, they find that most millionaires (80 percent) are below age 65, that 90 percent are married, that 50 percent have children, and that one-quarter are business owners.⁶⁹ These findings help to explain the relative insensitivity to high-income tax rates among millionaires; most are what the researchers termed “embedded elites”, for whom interstate migration would come at a high cost, both in terms of family considerations and the place-based economic opportunities on which their elite income depends.⁷⁰

Another reason why high income filers are notably unresponsive to state tax increases is likely because the federal government – through a tax deduction known as the “federal offset” – essentially pays for a sizeable share of many taxpayers’ state income taxes. Under the “federal offset” rules, state income taxes are deductible from a filer’s federal taxable income. If a filer pays \$100 in state income tax, for example, this \$100 can be deducted from the income on which the filer pays federal tax. For high-income filers, the top marginal federal income tax rate is 39.6 percent, though the *average* top marginal federal rate against which these filers’ state income taxes are deductible is about 33 percent (when one takes into account the lower tax rates applied to capital gains income and other income taxed at lower-than-top -rates).⁷¹ This means that a \$100 *state* income tax increase will reduce a filer’s *federal* taxes by about \$33, resulting in a *net* cost to the filer of \$67 (i.e., the filer does not bear the full \$100 cost of her/his state tax increase). Though a high percentage of filers (over 75 percent) with incomes between \$200,000 and \$1 million are subject to the federal Alternative Minimum Tax (which reduces the benefits of the federal offset for these filers), the AMT affects a far smaller share of filers with income above \$1 million (some 30 percent).⁷² The large majority of very high income filers (those with income above \$1 million) therefore derive the full tax benefit of the federal offset, while many of those subject to the AMT can still enjoy significant federal tax reductions through the federal offset.⁷³

Revenue Effects

The net revenue effects of state tax increases on very high-income taxpayers is equally clear and exactly what one would expect: higher tax rates on these filers generate significant net new tax revenue. The

most obvious reason for this result is that, as discussed above, the overwhelming majority of very high-income filers do not relocate out-of-state. Instead, they remain in-state and pay the additional taxes due.

The most careful studies do show, however, that a small number of millionaires will depart in response to higher taxes being levied on very high incomes (in addition, other millionaires may “shun” a higher tax state, choosing not to move there in the first place). Though the numbers of millionaires responsive to state tax rates is small (see above), there is, nevertheless, a loss of state tax revenue associated with their absence from the tax rolls.

This revenue loss, however, is small.⁷⁴ Drawing on existing studies, Robert Tannenwald (a nationally-recognized expert on state tax issues) brackets the range of expected revenue loss at between 2 and 10 cents on the dollar, though he calls the 10 percent estimate “improbably high”.⁷⁵ Phrased another way, tax increases on high-income filers will deliver, on net, 90-98 percent of the expected revenue gain – not quite 100 percent (because of tax-induced migration and “shunning”), but very close.

Economic Effects

As outlined above, with regard to both migration and revenue-loss, the best research concludes that higher tax rates on high incomes have only very small effects. The same holds true for economic effects: the research strongly supports the conclusion that negative economic effects from such taxes are small to non-existent.⁷⁶ The large majority of sophisticated, peer-reviewed studies repeatedly find that state personal income tax levels do not affect state economic performance.⁷⁷ These studies look at measures of economic performance such as growth in state GDP, state personal income levels, and state employment levels.⁷⁸

While state tax rates have little or no discernible negative impact on state economic performance, wise investments in key drivers of state economic success (such as a well-educated workforce and a high-quality transportation system) can make a difference over the long term, as discussed above. Notably, however, one *near-term* benefit of raising taxes on very high-income filers derives from the resulting flow of new federal dollars into the state, which is a direct consequence of the aforementioned federal offset. When state income taxes are increased on very high-income households, roughly one-third of the new revenue generated effectively will come from the federal government (see above). This influx of revenue from an outside source can deliver a boost to the state’s economy. For example, if a new high-income tax raised \$1 billion in new state revenue, the federal offset would deliver, in effect, roughly \$300 million of this total from the federal government. When invested wisely, these federal dollars can boost state employment in the near-term (think teachers, construction workers, etc.) and improve a state’s economic potential and performance in the decades to follow.

¹Noah Berger and Peter Fisher. “A Well-Educated Workforce is Key to State Prosperity” MassBudget and Economic Policy Institute. 2013. Pgs. 1-2

http://massbudget.org/report_window.php?loc=education_wages_epi.html

² *Massachusetts performance relative to international peers:*

Dana Kelly. “Performance of US 15-Year-Old Students in Mathematics, Science, and Reading Literacy in an International Context. First Look at PISA 2012.” National Center for Education Statistics. 2013. Pgs. 15, 17, 19
Massachusetts performance relative to other U.S. states:

“The Nation’s Report Card. “2015 Math & Reading Assessment. State Score Comparison”

http://www.nationsreportcard.gov/reading_math_2015/#mathematics/state/comparisons/NP?grade=4

http://www.nationsreportcard.gov/reading_math_2015/#reading/state/comparisons/NP?grade&grade=4
Massachusetts performance gains over time:

U.S Department of Education National Center for Education Statistics. "NAEP State Profiles: Massachusetts"
<http://nces.ed.gov/nationsreportcard/states/>

³ "The Nation's Report Card. "2015 Math & Reading Assessment. State Score Comparison"

http://www.nationsreportcard.gov/reading_math_2015/#mathematics/state/comparisons/NP?grade=4
http://www.nationsreportcard.gov/reading_math_2015/#reading/state/comparisons/NP?grade&grade=4

U.S Department of Education National Center for Education Statistics. "[NAEP Data Explorer](#)"

⁴ Dana Kelly. "Performance of US 15-Year-Old Students in Mathematics, Science, and Reading Literacy in an International Context. First Look at PISA 2012." National Center for Education Statistics. 2013. Pgs. 15, 17, 19

⁵ Eric A. Hanushek. "The Economics of Schooling : Production and Efficiency in the Public Schools." *Journal of Economic Literature*. 1986. Pg. 1167

⁶ C. Kirabo Jackson, Rucker Johnson, and Claudia Persico. "The Effect of School Finance Reforms on the Distribution of Spending, Academic Achievement, and Adult Outcomes." National Bureau of Economic Research, 2014. Pg. 44. <http://www.nber.org/papers/w20118>

⁷ C. Kirabo Jackson, Rucker Johnson, and Claudia Persico. "The Effect of School Finance Reforms on the Distribution of Spending, Academic Achievement, and Adult Outcomes." National Bureau of Economic Research, 2014. Pg. 44. <http://www.nber.org/papers/w20118>

⁸ C. Kirabo Jackson, Rucker Johnson, and Claudia Persico. "The Effect of School Finance Reforms on the Distribution of Spending, Academic Achievement, and Adult Outcomes." National Bureau of Economic Research, 2014. Pg. 44 <http://www.nber.org/papers/w20118>

⁹ C. Kirabo Jackson, Rucker Johnson, and Claudia Persico. "The Effect of School Finance Reforms on the Distribution of Spending, Academic Achievement, and Adult Outcomes." National Bureau of Economic Research, 2014. Pg. 41 <http://www.nber.org/papers/w20118>

¹⁰ Bruce Baker. "Does Money Matter In Education?" Albert Shanker Institute. 2012. Pg. 5
http://www.shankerinstitute.org/sites/shanker/files/doesmoneymatter_final.pdf

¹¹ Eric A. Hanushek and Ludger Woessmann. "How Much Do Educational Outcomes Matter In OECD Countries?" National Bureau of Economic Research. 2010. Pg. 23 <http://www.nber.org/papers/w16515>

¹² Eric A. Hanushek and Ludger Woessmann. "How Much Do Educational Outcomes Matter In OECD Countries?" National Bureau of Economic Research. 2010. Pgs. 23, 56 <http://www.nber.org/papers/w16515>

Dana Kelly. "Performance of US 15-Year-Old Students in Mathematics, Science, and Reading Literacy in an International Context. First Look at PISA 2012." National Center for Education Statistics. 2013. Pgs. 15, 17

¹³ Robert G. Lynch. "The Economic and Fiscal Consequences of Improving U.S. Educational Outcomes." Washington Center on Equitable Growth. 2015. Pgs. 29-30 <http://equitablegrowth.org/achievement-gap/>

¹⁴ Robert G. Lynch. "The Economic and Fiscal Consequences of Improving U.S. Educational Outcomes." Washington Center on Equitable Growth. 2015. Pgs. 28 <http://equitablegrowth.org/achievement-gap/>

¹⁵ Robert G. Lynch. "The Economic and Fiscal Consequences of Improving U.S. Educational Outcomes." Washington Center on Equitable Growth. 2015. Pgs. 30-31, 7 <http://equitablegrowth.org/achievement-gap/>

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- ³⁰ Improved transportation can have similar benefits as what some economists call "agglomeration economies... when firms and people locate near one another together in cities and industrial clusters.... easing difficulties in exchanging goods, people, and ideas," a relationship exhibited by the strong relationship found between higher population density on one side, and higher wages and productivity on the other. See Edward L. Glaeser, "Introduction," p. 1, in *Agglomeration Economies*, University of Chicago Press (2010). See also, A. Nelson, R. Ewing, P. Perlich, T. Sanchez and K. Bartholomew, "Economic Stimulus through Transportation Investments that Facilitate Agglomeration Economies," Briefing Paper 6, *The Best Stimulus for the Money: Briefing Papers on the Economics of Transportation Spending* (Smart Growth America, April 2009).
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³⁷ On smaller advances in inventory-management related productivity gains in the 1980s and 1990s compared to the 1970s, see Chad Shirley and Clifford Winston, "Firm Inventory Behavior and the Returns from Highway Infrastructure Investments," *Journal of Urban Economics* 55 (2004), pp. 298-425. M. I. Nadiri and T. P. Mamuneas come to near identical conclusions with different methodology in "Contribution of Highway Capital to Industry and National Productivity Growth," report prepared for the Federal Highway Administration Office of Policy Development, 1998-9, accessed at <http://www.fhwa.dot.gov/reports/growth.pdf>

³⁸ Output per worker, adjusted for hours (chained \$2009 GSP/adjusted total employment). Data provided by Economic Policy Institute analysis of data from the U.S. Bureau of Economic Analysis (BEA) Regional GDP & Personal Income, Bureau of Labor Statistics (BLS) Current Employment Statistics public data series, and unpublished data from the BLS Labor Productivity and Costs program.

³⁹ American Association of State Highway and Transportation Officials (AASHTO) and the Road Information Project. (2009). "Rough Roads Ahead: Fix Them Now or Pay for It Later," p. 28. Available at <http://www.ceacounties.org/resources/1/Policy%20Areas/Transportation/Resources/AASHTO%20Rough%20Roads%205-6.pdf>.

⁴⁰ Robert Pollin, James Heintz and Heidi Garrett-Peltier, "How Infrastructure Investments Support the U.S. Economy" (Jan 2009), Political Economy Research Institute (PERI); Scott Bernstein, Phineas Baxandall, and William Schroer, "What We Learned from the Stimulus" Smart Growth America (2010).

⁴¹ Only New York, California, Illinois and Pennsylvania had more transit trips in 2012, the most recent year of state-by-state transit trips posted on the U.S. Department of Transportation's Bureau of Transportation Statistics 2014, Chapter 4, Table 4-4, accessed at http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/state_transportation_statistics/state_transportation_statistics_2014/index.html/chapter4/table4-04.

⁴² Site Selection magazine Business Climate rankings 2014 and 2015, based on the annual survey of corporate site selectors. See http://siterelection.com/press/releases/141103_Business-Climate.html and <http://siterelection.com/press/releases/151102%20Business%20Climate.html>. For a critique of the methodology and predictive power of "business climate" rankings, see Good Jobs First, "Grading Places: What Do the Business Climate Rankings Really Tell Us?" (2013), accessed at <http://www.goodjobsfirst.org/publications/grading-places-what-do-business-climate-rankings-really-tell-us>.

⁴³ Colin A. Young, "Massachusetts Seeing Population Growth: But pace slowing; outmigration is a problem," State House News Service, Dec 21, 2015, accessed at Commonwealth magazine <http://commonwealthmagazine.org/economy/massachusetts-seeing-population-growth/>. Population growth rates are projected to remain significantly below national averages, if faster than New England averages. See Donahue Institute, "Long-Term Projections for Massachusetts Regions and Municipalities," (2013) http://pep.donahue-institute.org/UMDI_LongTermPopulationProjectionsReport_2013.11.pdf

⁴⁴ Urban Land Institute Boston/New England & MassINC Polling Center, "What Millennials Want," November 9th, 2015, accessed at <http://boston.uli.org/wp-content/uploads/sites/12/2015/11/Topline-2015-10-ULI-Boston.pdf>, pp. 5 and 10.

⁴⁵ Presentation by Secretary Stephanie Pollack, testimony before the Joint Committee on Transportation, November 18, 2015, slide 9, "Bridges of the Commonwealth," and 10, "Age of Bridge Inventory." The inventory of MassDOT, former Turnpike, Metropolitan Highway System, and municipal bridges total 5,062 bridges in this inventory, 398 of which are at least 100 years old.

⁴⁶ Boston Globe, "Outmoded T Trains No Match for Winter's Fury," February 7, 2015, accessed at <https://www.bostonglobe.com/metro/2015/02/07/snow-obsolete-motors-disable-red-and-orange-line-cars/9xYNpbPEqsHT38Kv6laWOM/story.html>. See also Transportation for Massachusetts, "Keeping on Track: Our Progress in Reforming and Funding Transportation since Passage of the Massachusetts Transportation Finance Act of 2013," March 2014, p. 23, accessed at <https://d3n8a8pro7vhmx.cloudfront.net/t4ma/pages/37/attachments/original/1426764409/Keeping-On-Track-Mar-2014.pdf?1426764409>.

⁴⁷ State House News Service, "MBTA Considers Complete Replacement of Green Line Fleet" January 11, 2016.

⁴⁸ Presentation by Secretary Stephanie Pollack, testimony before the Joint Committee on Transportation, November 18, 2015, slide 5, "Pavement Condition." Figure includes only MassDOT non-interstate roads. 19

percent of Interstates are in poor or fair condition. Condition defined by five-point scale Pavement Serviceability Index (PSI) with Fair or Poor roads receiving score of 3 or below (or 2.8 or below for Interstates). See slide 4, "Pavement Inspection."

⁴⁹ Estimates are based on 2013 estimates of the number of motorists, and estimated using current vehicle operating costs in Massachusetts based on AAA estimates and applying the Highway Development Management model (HDM-4), supplemented with estimates from the Texas Transportation Institute on the impact of road conditions on fuel consumption TRIP, "[Massachusetts Transportation by the Numbers: Meeting the State's Need for Safe and Efficient Mobility](#)" Dividing TRIP's \$2.3 billion total figure for additional vehicle operating costs by the 4,765,586 licensed drivers in the state listed by [Federal Highway Statistics 2013](#) yields \$483 per licensed driver. TRIP is a nonprofit, founded in 1971, sponsored by road building companies, insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in transit engineering and construction; and labor unions.

⁵⁰ Presentation by Secretary Stephanie Pollack, testimony before the Joint Committee on Transportation, November 18, 2015, slide 7, "'State Owned- Non-Interstate Network Pavement Modeling.'" Approximately 27 percent of state roads will be in poor condition, with the remainder in fair condition. Average spending based on a five year average anticipated for FY14-FY18, and do not include interstate highways.

⁵¹ Presentation by Secretary Stephanie Pollack, testimony before the Joint Committee on Transportation, November 18, 2015, slide 8, "State Owned Non-Interstate Network Pavement Modeling," slide 8, "State Owned Non-Interstate Network Pavement Modeling."

⁵² Structurally deficient bridge figure and program description available at Mass.gov website for Accelerated Bridge Program: <https://www.massdot.state.ma.us/highway/AcceleratedBridgeProgram.aspx>. For a more precise and technical definition of a structurally deficient bridge, see Federal Highway Administration, "Additional Guidance on 23 CFR 650 D," item 9, accessed at <https://www.fhwa.dot.gov/bridge/0650dsup.cfm>.

⁵³ Mass.gov website "Program Measures" for Accelerated Bridge Program (ABP), accessed at <https://www.massdot.state.ma.us/highway/AcceleratedBridgeProgram/ProgramMeasures.aspx>

⁵⁴ Mass.gov website for Accelerated Bridge Program: <https://www.massdot.state.ma.us/highway/AcceleratedBridgeProgram.aspx>. The legislation was [Chapter 233 of the Acts of 2008](#), "An act financing an accelerated structurally-deficient bridge improvement program."

⁵⁵ Presentation by Secretary Stephanie Pollack, testimony before the Joint Committee on Transportation, November 18, 2015, slide 11, "Bridge Network Modeling (SDI)."

⁵⁶ Texas A&M Transportation Institute, 2015 Urban Mobility Scorecard (August 2015)

<http://d2dtl5nnlpr0r.cloudfront.net/tti.tamu.edu/documents/mobility-scorecard-2015.pdf>, Table 2.

Metropolitan areas represent Census-defined commuting sheds. The Boston metropolitan area, for example, includes edges of New Hampshire and Rhode Island. The Springfield and Worcester metro areas include portions of Connecticut. According to Table 2, metro Boston incurred 153.994 million hours of yearly commuting delay, 71.602 million gallons of excess fuel consumed, and \$3.363 billion dollars of total congestion cost, including from lost productivity. Metro Springfield incurred 18.431 million hours of travel delay, 9.335 million gallons of excess fuel consumption, and \$408 million dollars of total congestion cost. Worcester incurred 13.143 million hours of travel delay, 6.432 million gallons of excess fuel consumption, and \$302 million of total congestion cost.

⁵⁷ MBTA Fiscal Management and Control Board, Baseline Analysis and Progress to Date, September 22, 2015, p. 29:.

⁵⁸ MassBudget, "Funding Improvements for Schools, Roads and Public Transit", December 2015:

http://www.massbudget.org/report_window.php?loc=Education_and_Transportation_Amendment_UPDATE_D.html

High growth rates for very high income households since the late 1970s is a trend that holds true not just in Massachusetts, but for the nation as a whole.

⁵⁹ Center on Budget and Policy Priorities, "State Taxes Have Negligible Impact on Americans' Interstate Moves", May 2014 (see pgs. 2-3 and 25-27): <http://www.cbpp.org/research/state-budget-and-tax/state-taxes-have-a-negligible-impact-on-americans-interstate-moves>

⁶⁰ Center on Budget and Policy Priorities, "State Taxes Have Negligible Impact on Americans' Interstate Moves", May 2014 (see pg. 5-6): <http://www.cbpp.org/research/state-budget-and-tax/state-taxes-have-a-negligible-impact-on-americans-interstate-moves>

⁶¹ Center on Budget and Policy Priorities, “State Taxes Have Negligible Impact on Americans’ Interstate Moves”, May 2014 (see pgs. 2 and 8-10): <http://www.cbpp.org/research/state-budget-and-tax/state-taxes-have-a-negligible-impact-on-americans-interstate-moves>

⁶² Center on Budget and Policy Priorities, “State Taxes Have Negligible Impact on Americans’ Interstate Moves”, May 2014 (see pg. 13): <http://www.cbpp.org/research/state-budget-and-tax/state-taxes-have-a-negligible-impact-on-americans-interstate-moves>

Young and Varner, et al., “Millionaire Migration and the Taxation of the Elite: Evidence from Administrative Data”, October 2015 (see pgs. 14-15): http://web.stanford.edu/~cy10/public/Millionaire_Migration.pdf

⁶³ Center on Budget and Policy Priorities, “State Taxes Have Negligible Impact on Americans’ Interstate Moves”, May 2014 (see pgs. 14-15): <http://www.cbpp.org/research/state-budget-and-tax/state-taxes-have-a-negligible-impact-on-americans-interstate-moves>

⁶⁴ Center on Budget and Policy Priorities, “State Taxes Have Negligible Impact on Americans’ Interstate Moves”, May 2014 (see pg. 1): <http://www.cbpp.org/research/state-budget-and-tax/state-taxes-have-a-negligible-impact-on-americans-interstate-moves>

⁶⁵ Young and Varner, et al., “Millionaire Migration and the Taxation of the Elite: Evidence from Administrative Data”, October 2015 (see Abstract and pg. 6): http://web.stanford.edu/~cy10/public/Millionaire_Migration.pdf

⁶⁶ Young and Varner, “Millionaire Migration and State Taxation of Top Incomes: Evidence from A Natural Experiment”, National Tax Journal, June 2011 (see page 259-260): <http://www.ntanet.org/NTJ/64/2/ntj-v64n02p255-83-millionaire-migration-state-taxation.pdf>

⁶⁷ Young and Varner, “Millionaire Migration and State Taxation of Top Incomes: Evidence from A Natural Experiment”, National Tax Journal, June 2011 (see Figure 3, page 262): <http://www.ntanet.org/NTJ/64/2/ntj-v64n02p255-83-millionaire-migration-state-taxation.pdf>

⁶⁸ Young and Varner, “Millionaire Migration and State Taxation of Top Incomes: Evidence from A Natural Experiment”, National Tax Journal, June 2011 (see page 272): <http://www.ntanet.org/NTJ/64/2/ntj-v64n02p255-83-millionaire-migration-state-taxation.pdf>

⁶⁹ Young and Varner, et al., “Millionaire Migration and the Taxation of the Elite: Evidence from Administrative Data”, October 2015 (see Tables 1 and 3): http://web.stanford.edu/~cy10/public/Millionaire_Migration.pdf

⁷⁰ Young and Varner, et al., “Millionaire Migration and the Taxation of the Elite: Evidence from Administrative Data”, October 2015 (see pg. 37): http://web.stanford.edu/~cy10/public/Millionaire_Migration.pdf

⁷¹ The estimate of a 33 percent average for the tax rate/federal offset value is derived both from analysis performed by the Institute on Taxation and Economic Policy and from analysis performed by the Massachusetts Department of Revenue. See also ITEP’s “Who Pays? 5th Edition” (pg. 11):

http://www.itep.org/whopays/full_report.php

A link to DOR’s conclusions can be found in Endnote #2 of this MassBudget factsheet:

http://www.massbudget.org/report_window.php?loc=Education_and_Transportation_Amendment_UPDATE_D.html

⁷² Analysis of IRS *Statistics of Income 2012*, performed by the Institute on Taxation and Economic Policy upon request from MassBudget. An analysis performed by the Massachusetts Department of Revenue of a 4 percent additional tax on taxable income over \$1 million, for example, produced a similar estimate of the effect of the federal offset on high income filers. DOR estimated that filers with millionaire incomes would receive federal offset credits equal to 31.6 percent of the cost of their increased taxes. The calculation is as follows: \$0.6 B (federal offset) divided by \$1.9 B (new tax revenue) yields the result of 31.6 percent. A link to highlights from DOR’s analysis can be found in Endnote #2 of this MassBudget factsheet:

http://www.massbudget.org/report_window.php?loc=Education_and_Transportation_Amendment_UPDATE_D.html

⁷³ MassBudget communication with the Institute of Taxation and Economic Policy, 1-12-2016.

⁷⁴ In their 2015 study, Young and Varner find that very high income filers – those with more than \$10 million a year in income – are not significantly more likely to migrate due to higher taxes than are millionaires on average. Thus, the small number of millionaire tax migrants will not be disproportionately higher income than the average millionaires and therefore will not produce unexpectedly high revenue losses upon departure. (See Table 3: http://web.stanford.edu/~cy10/public/Millionaire_Migration.pdf)

⁷⁵ Robert Tannenwald is a nationally recognized expert on state taxation and is the former director of the policy research wing of the Federal Reserve Bank of Boston. *State Tax Notes*, April 8, 2013, “Adieu Depardieu: The Tax Flight Debate” (see pgs. 138-139)

⁷⁶ Center on Budget and Policy Priorities, “State Personal Income Tax Cuts: Still a Poor Strategy for Economic Growth”, May 2015 (see introduction): <http://www.cbpp.org/research/state-budget-and-tax/state-personal-income-tax-cuts-still-a-poor-strategy-for-economic>

⁷⁷ Center on Budget and Policy Priorities, “State Personal Income Tax Cuts: Still a Poor Strategy for Economic Growth”, May 2015 (see introduction and Table 1): <http://www.cbpp.org/research/state-budget-and-tax/state-personal-income-tax-cuts-still-a-poor-strategy-for-economic>

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