

## Adjusting for Personal Income: When, Why, and How

The things we do together through our government can help strengthen our communities and ensure the continuing vibrancy of the Commonwealth. Public education supports our children; roads and subways connect us to work and family; police and fire departments protect us from harm.

When we commit to doing these things (and others) through our government, we also commit to paying for them together through taxes. Discussions of budgets and taxes are ultimately about what we want to accomplish and what share of our resources we believe it is appropriate to spend to achieve those goals.

At the national level, when we measure whether we have been spending more or less of our resources over time – or whether the share of our income paid in taxes is going up or down – we regularly compare these things to GDP. We ask what share of our economy (GDP) we spend on Medicare and Medicaid, on paying the national debt, on the military, or on non-defense discretionary spending.

This same principle applies at the state level. For technical reasons, we measure the size of the state economy in terms of Total Personal Income (all of the income earned across the state) rather than via GDP, but the basic idea is identical.<sup>1</sup> We can measure spending levels and tax receipts in Massachusetts as a share of the statewide economy. Just as an example, the recently-passed Massachusetts health care cost control initiative essentially says that health care spending must remain flat – not in terms of dollars but as a percentage of our total economic resources.

### COMPARING SPENDING OVER TIME

Tracking spending as a percentage of personal income is particularly helpful when comparing spending levels over time.<sup>2</sup>

Imagine that Massachusetts spent \$100 on public education in 2012. And imagine, further, that we are trying to find out if that's more or less of our resources than we spent on education thirty years ago.

One way to begin would be to simply look up the spending level from 1982 – let's say it was \$20. At first glance, that would seem like a substantial increase: \$20 in 1982 versus \$100 in 2012. Except that these numbers really aren't comparable. Too much has changed in the intervening thirty years: the student population has grown, inflation has altered the value of each dollar, and thanks to economic growth we have more money to spend on things like education.

---

<sup>1</sup> A brief discussion of some of the technical issues can be found in [this memo from the Boston Fed](http://www.bos.frb.org/economic/neppc/memos/2008/weinerpopov073008.pdf) (http://www.bos.frb.org/economic/neppc/memos/2008/weinerpopov073008.pdf).

<sup>2</sup> For a working example, see MassBudget's [The Rise and Fall of Local Aid in Massachusetts](http://massbudget.org/report_window.php?loc=local_aid_long_term.html) (http://massbudget.org/report\_window.php?loc=local\_aid\_long\_term.html).

That's why we ask directly: "what share of our total resources did we devote to education in 1982, and what share did we devote in 2012?"

To answer that question, we need to know how much incomes have grown in the intervening years. If you add up all the income people earned across the state in 1982 and then compare that with income people earn across the state today, you find that personal income in Massachusetts increased by roughly 400 percent (not adjusting for inflation). To keep the numbers simple, that's like saying that while in 1982 people around the state earned a total of \$500, in 2012 they earned \$2500.

And using those numbers, we can calculate that in 1982, Massachusetts spent 4 percent of its total resources on education.

**1982**

Total Resources = \$500

Education Spending = \$20

Share of resources spent on education:  $20/500 = 4\%$

Using the same calculation, we see that in 2012, Massachusetts again spent 4 percent of its resources on education.

**2012**

Total Resources = \$2500

Education Spending = \$100

Share of resources spent on education:  $\$100/\$2500 = 4\%$

Clearly, these numbers are made up (in reality, Massachusetts spent billions of dollars on education in 2012, not hundreds). But they give a sense for why we need to be careful when comparing spending over time.

## ADJUSTING FOR ECONOMIC GROWTH

Another way to account for economic growth is to go back to earlier years and adjust each spending number, just as you might adjust these numbers for inflation.

We calculated that in 1982, the \$20 that Massachusetts spent on education represented 4 percent of its total resources. We could then adjust this spending amount to reflect economic growth by asking what 4 percent of our total resources amounts to, in 2012. And, as it happens, we already know the answer is \$100—since we just calculated that \$100 was 4 percent of our total resources in 2012.

At MassBudget, when we adjust spending numbers in this way we say that spending on education was \$100 in 1982, *adjusted for economic growth*.

## COMPARING SPENDING ACROSS STATES

Using personal income to adjust spending numbers can be useful in other ways too. Not only does it allow us to compare funding levels over time, but it also lets us compare funding among different regions of the country – or across the fifty states.<sup>3</sup>

Let's say we wanted to compare education spending in Massachusetts with education spending in California. To build on our example, it might be that while Massachusetts spent \$100 on education in 2012, California spent \$400. That seems like a lot more, but is it? After all, California is a much bigger state, with many more students and a much larger economy.

To make a more "apples-to-apples" comparison, we can adjust these spending numbers to reflect the size of the economy in each state. As before, we set aside the question, "which state spent more dollars?" and ask instead, "what share of its total resources did Massachusetts devote to education in 2012, and how does that compare to California?"

We already know that in our example Massachusetts spent 4 percent of its total resources on education in 2012 (or \$100 out of \$2500). So what about California?

In California, total personal income is much bigger than \$2500; relatively speaking, it is more like \$12,500. And that means that they are actually spending less of their available income on education, just 3.2 percent.

### California

Total Resources = \$12,500

Education Spending = \$400

Share of resources spent on education:  $\$400/\$12,500 = 3.2\%$

So even though California spent four times as many dollars on education in 2012, it actually devoted less of its available resources to education than did Massachusetts. In many contexts, that is the more relevant comparison, and it is only possible when we adjust for the size of the economy.

## TAXES

Adjusting for personal income also allows us to measure the overall tax rate in Massachusetts – or other states.<sup>4</sup> At the federal level, too, when tax policy experts talk about the overall level of taxes, they don't generally look at total tax receipts or tax receipts per person. Instead, they look at the relation between total taxes and *the size of the overall economy*.

Figuring out the overall tax rate in Massachusetts is actually fairly straightforward. You take the total amount of money collected through all state and local taxes (income taxes, sales tax, corporate taxes, and excise taxes), and then you compare that against the total income earned in the state. In Massachusetts, that gives us an overall tax rate of roughly 10.2 percent.

<sup>3</sup> A full, fifty state comparison is included in MassBudget's report: [Public School Funding in Massachusetts](http://massbudget.org/report_window.php?loc=ed_census_2012.html) ([http://massbudget.org/report\\_window.php?loc=ed\\_census\\_2012.html](http://massbudget.org/report_window.php?loc=ed_census_2012.html)).

<sup>4</sup> See [Massachusetts Ranks 25th in Taxes in FY 2010](http://massbudget.org/846) (<http://massbudget.org/846>).

**2010**

Money Collected in State and Local Taxes = \$33.5 billion.

Total Personal Income across the State = \$327 billion.

Overall Tax Rate =  $33.5/327 = 10.2\%$

If we want, we can then use this number to compare the overall tax rate in Massachusetts with earlier years – or with other states. When we do, we find that the overall tax rate in Massachusetts is slightly below the national average (10.6 percent), and significantly below what it was in the late 1970s (13.8 percent).

**CAUTION!**

There is one major caveat to using the personal income adjustment: When comparing spending over time, you have to be sure that the years you are comparing fall in roughly the same place in the broader economic cycle.

The problem, simply put, is that the economy doesn't grow smoothly. In some years, it grows quickly while in others it slows down or even shrinks. When you adjust spending numbers to reflect the size of the economy, you run the risk of capturing these economic cycles – rather than any underlying changes in funding.

A simplified example should help clarify the problem.

Let's imagine that we were comparing education spending across just two years, 1991 and 1992. And for simplicity, let's say that in 1991, total personal income was \$2500 and that Massachusetts spent \$100 on education. Those are the same numbers we used earlier, so we know that amounts to 4 percent of our total economic resources.

Between 1991 and 1992, there was very little change in the educational needs of Massachusetts and its citizens; we had roughly the same number of pupils, the same schools, and the same commitment to classroom excellence. So it's fair to think that in 1992 Massachusetts would again spend something like \$100 on education – maybe \$102, to account for inflation.

But something pretty dramatic happened to the economy between 1991 and 1992: the economy came out of a recession and started growing again, which among other things increased personal income in Massachusetts. As a consequence, total personal income in the state would have been *more than* \$2500 – perhaps \$2750.

What that means, however, is that when we measure education spending in 1992 as a share of the economy, we find that it had fallen to 3.7 percent ( $\$102 \text{ on education} / \$2750 \text{ in personal income} = 3.7 \text{ percent}$ )

Clearly, it would be misleading to think of this as a cut to education funding. Yes, Massachusetts spent 4 percent of its resources on education in 1991 and 3.7 percent in 1992 – but the reason has nothing to do with decreased education funding. It is, rather, a side-effect of adjusting for economic growth in two years which are not really comparable.

This is the reason that you need to be careful when adjusting for economic growth. To make useful comparisons you need to ensure that you are working with similar years. Boom years need to be compared with earlier boom years, and recessionary periods with earlier recessions.

Once that requirement is met, adjusting for economic growth can provide a more complete picture of spending (and tax) changes over time.