To: Eric Rosengren **Date:** January 13, 2017
From: Giovanni Olivei, Bob Triest, and Geoff Tootell[1]
Subject: Why has Massachusetts state tax revenue growth failed to keep up with the recovery?

Summary

- Personal income in Massachusetts has grown at a relatively modest pace in the current recovery despite fairly robust employment growth.

- When taking into account the modest pace of growth in personal income, Massachusetts tax revenue growth has actually fared *better* than in previous recovery episodes.

- The disappointment in state revenues, therefore, is rooted in how employment growth has translated into personal income growth, not in how personal income growth has translated into tax revenue growth.

- In previous recoveries, employment growth was associated with somewhat stronger personal income growth compared to the current recovery. At present, the improvement in payrolls has not delivered the expected increase in real wage income.

- The sluggishness in real wage income may be attributable to slow wage growth, due in part to slower productivity growth, and to a relatively muted rebound of hours worked.

- As labor markets continue to tighten, it is reasonable to expect a more solid pickup in hourly wage growth and in hours worked, which should increase personal income and tax revenues. A rebound in productivity is more uncertain, but it would also contribute to a more positive outlook for state revenues.

Analysis

To put the recent history in perspective, Table 1 below presents the evolution of real tax revenue growth, real personal income growth, and labor market outcomes in Massachusetts for the past three economic expansions and the two recessions that fell between them (shaded columns).[2] The last column of the table shows that the Massachusetts labor market has performed relatively well since the end of the Great Recession, with a large decrease in the unemployment rate and fairly robust employment growth. Based solely on these two labor market indicators, history would have suggested somewhat stronger tax revenue growth than actually occurred. In fact, revenue growth in the 1990s, the period most comparable to the recent recovery, was much stronger than it has been in this expansion.

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[1] Vice President and Economist at the Federal Reserve Bank of Boston, Vice President and Economist at the Federal Reserve Bank of Boston, and EVP and Director of Research at the Federal Reserve Bank of Boston.

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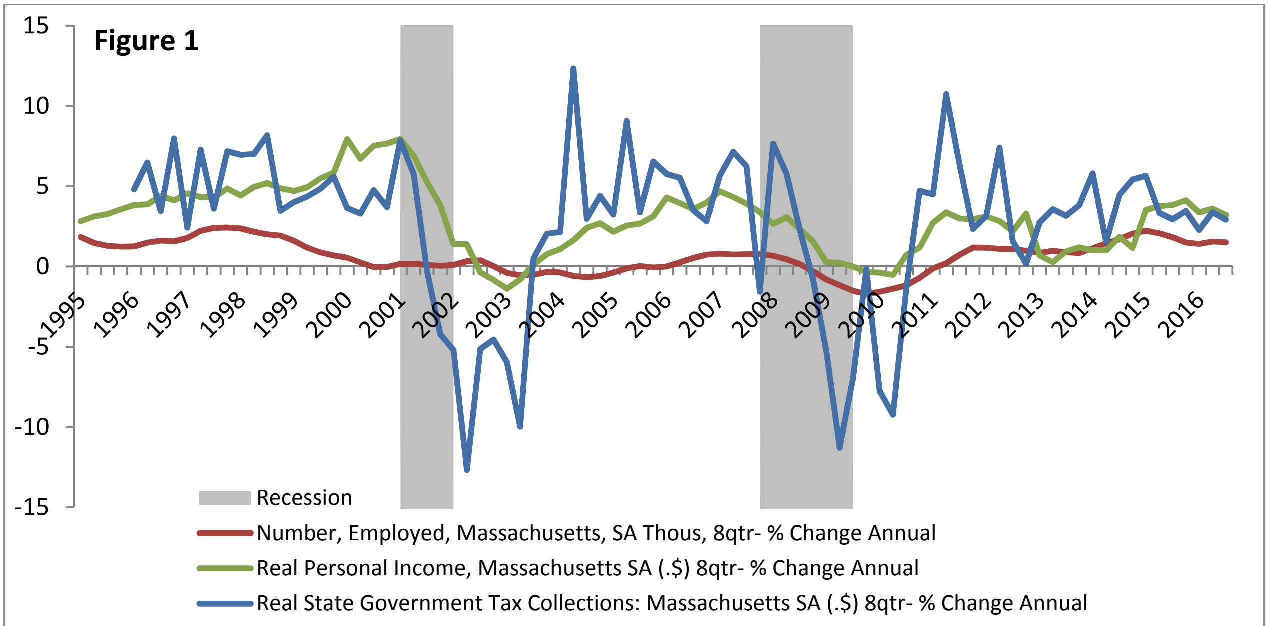
[2] Real variables are included to ensure that revenue growth doesn't look higher relative to employment growth just because of higher inflation.

Table 1

Annualized percentage growth rate in:	1994Q1 - 2001Q1	2001Q1 - 2002Q1	2002Q1 - 2007Q4	2007Q4 - 2009Q3	2009Q3 - 2016Q3
Massachusetts payroll employment	2.7%	-3.0%	0.1%	-2.1%	1.7%
Massachusetts real personal income	5.4%	-1.8%	2.0%	-0.1%	2.7%
Total Massachusetts state tax revenue	5.6%	-15.0%	2.3%	-2.6%	3.9%
Massachusetts civilian unemployment rate (percentage point change)	-2.7	1.8	-0.2	4.1	-4.8

Source: author's calculations from Haver/BEA and BLS. Shaded columns are recession periods. Note, the last 7 years of the 1990s recovery are shown since total tax revenue only goes back to 1994.

Given that tax revenues derive in large part from income and sales taxes, state tax revenues should be more closely linked to personal income growth than either employment growth or the change in the unemployment rate. In fact, Figure 1 shows that the evolution of state revenues, the blue line, is more closely related to personal income growth, the green line, than to employment growth, the red line. Revenue growth should be even less related to the change in the unemployment rate as that measure ignores the effect on labor input of the decline in labor force participation due to the retirement of the baby boomers. Hence two key points about the recent recovery emerge from Table 1. First, given the fairly strong growth in employment, real personal income has increased ***less***



Source: Bureau of Labor Statistics/Census Bureau/ Haver Analytics
Notes: Core PCE was subtracted from Personal Income and State Tax Collections to create a real series.

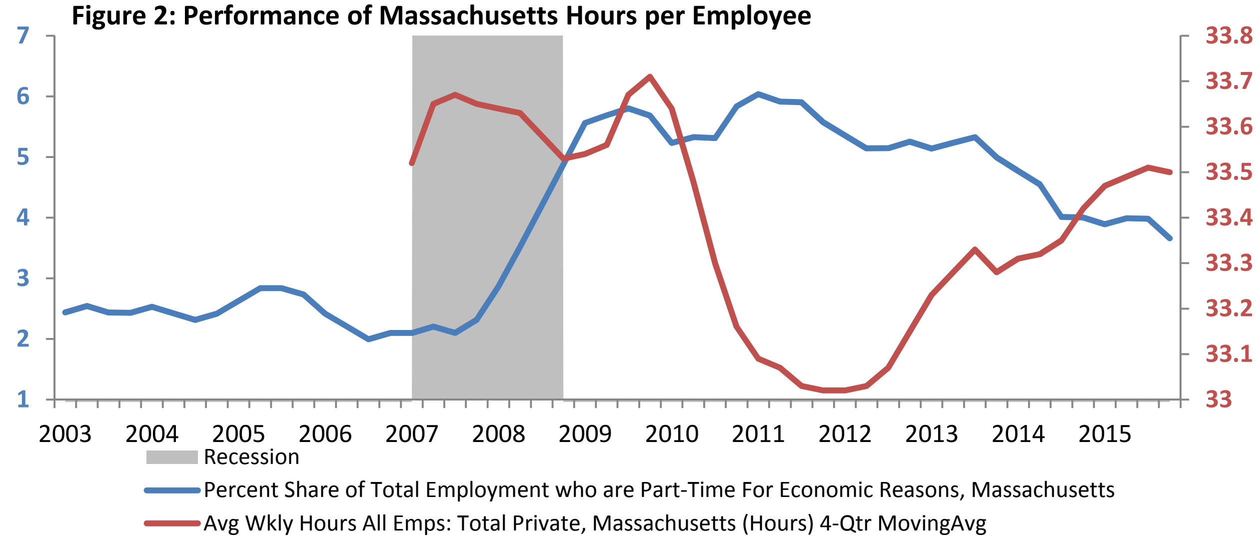
than in the previous two expansions. Second, given the growth in real personal income, tax revenue growth has actually fared ***better*** than in the previous two expansions. While personal income and tax revenues increased at roughly the same pace in the earlier two recoveries, in the current expansion tax revenue growth has noticeably outpaced the growth in personal income. Table 1 highlights that given the growth in personal income, there is really no puzzle in the evolution of tax revenues; in fact, given the growth in personal income, tax revenues have actually exceeded expectations. The mystery is why personal income has grown so poorly given the increase in employment. The remainder of the memo examines this latter puzzle.

Why has income growth been slow given employment growth?

There are several potential explanations for the slow growth in personal income given the growth in employment. Labor income is the most important part of personal income. And although employment growth is an essential part of the increase in labor income, it is not the only component. The expansion in labor income also depends on the growth in average hours, and wages, as well as employment. If these first two components lag employment growth, then labor income growth – and thus the increase in personal income – will also lag. Indeed, the data appear to support such an interpretation for the sluggishness in personal income growth.

Employment growth over this recovery has been slightly slower than that experienced in the second half of the 1990s but greater than that seen in the expansion of the mid-2000s. Figure 2 examines whether hours growth has been low. Although the data are limited, the red line in Figure 2

Figure 2: Performance of Massachusetts Hours per Employee

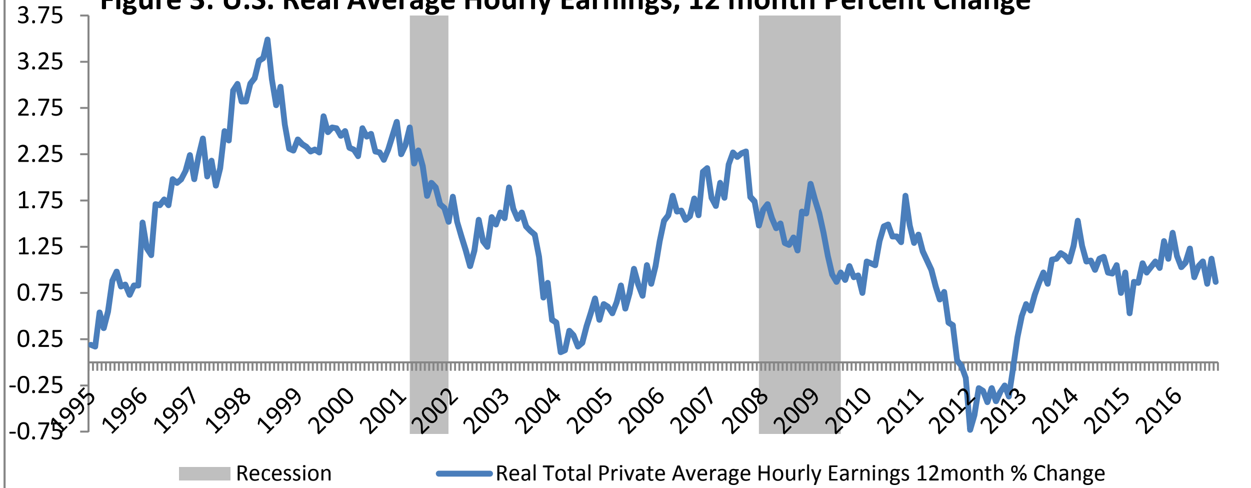


Source: Bureau of Labor Statistics/ Haver Analytics

shows that the average weekly hours for workers in Massachusetts has been weak in this recovery. The average workweek fell precipitously in the beginning of the recovery and still remains below the level seen during even the Great Recession. The weakness in the workweek is probably due, in part, to the rise in the fraction of the employed workers working part-time, the blue line in Figure 2. The increase in part-time jobs means that for a given growth rate in employment, both total hours worked and income will be smaller.

Hours are not the only element of labor income growth that has underperformed this recovery, wages have too. Wage series at the state level tend to be noisy and often cover a limited time period, but recent data conform well to national trends. These national trends are included in Figure 3. The figure shows that the recent growth rate of average hourly earnings, expressed in real terms,[3] has been modest when compared to the growth rates experienced in the second half of the 1990s and the mid-2000s.

Figure 3: U.S. Real Average Hourly Earnings, 12 month Percent Change



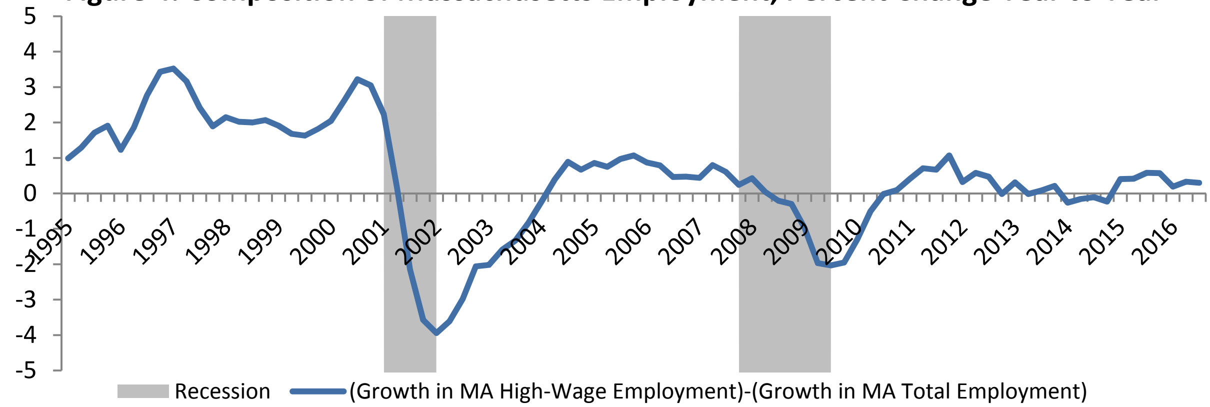
Source: Bureau of Labor Statistics / Haver Analytics

Notes: Core PCE was subtracted from U.S. Average Hourly Earnings to create a real series.

There are several possible explanations for why wage growth has been somewhat weak. During the Great Recession and the early stages of the recovery, the slowdown in national average hourly earnings was less than expected, possibly because of the reluctance of firms to cut nominal wages. This lack of major wage cuts at that time may have contributed to the ensuing slow pickup in hourly earnings as the market heated up. Another reason wage growth may have been weaker than normal this time is that Massachusetts employment has grown much more slowly in the high wage, presumably high productivity, sectors. The blue line in Figure 4 shows that unlike the previous two recoveries, less of the state's job growth occurred in sectors experiencing faster wage growth. Disproportionate growth of employment in the low wage sectors explains some of the shortfall in personal income growth relative to employment, and the slowdown in productivity growth is likely to have played a role in the modest increase in compensation.

[3] We use the personal consumption expenditures ex-food and energy deflator to construct a real wage measure.

Figure 4: Composition of Massachusetts Employment, Percent Change Year to Year

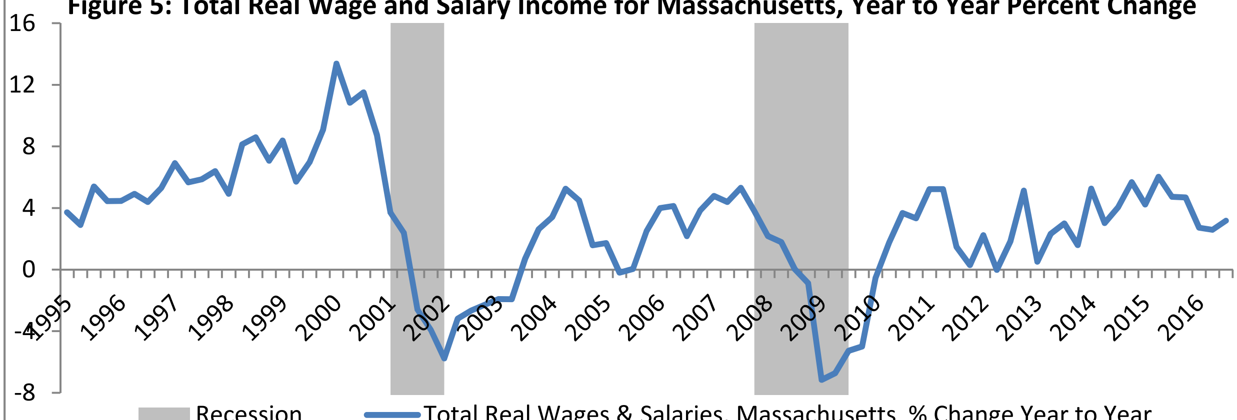


Source: Bureau of Labor Statistics/Census Bureau/ Haver Analytics

Notes: The series above is (Massachusetts High-Wage Supersectors Employment, % Chng - Yr to Yr)-(Massachusetts Total Non-Farm Payroll Employment, % Chng - Yr to Yr).

In sum, while employment growth has been fairly robust, wage and hours growth have been on the soft side of the historical averages. Figure 5 shows that when the evolution of employment, hours, and wages is considered altogether, the real wages and salaries part of income in Massachusetts has been growing at a relatively subdued pace, slightly offsetting some of the solid increase in payroll employment. Figure 5 also illustrates that the growth rate in wages and salaries income has been comparable to the experience of the mid-2000s, despite the fact that employment growth has been noticeably stronger in the current recovery, and is much weaker than in the 1990s.

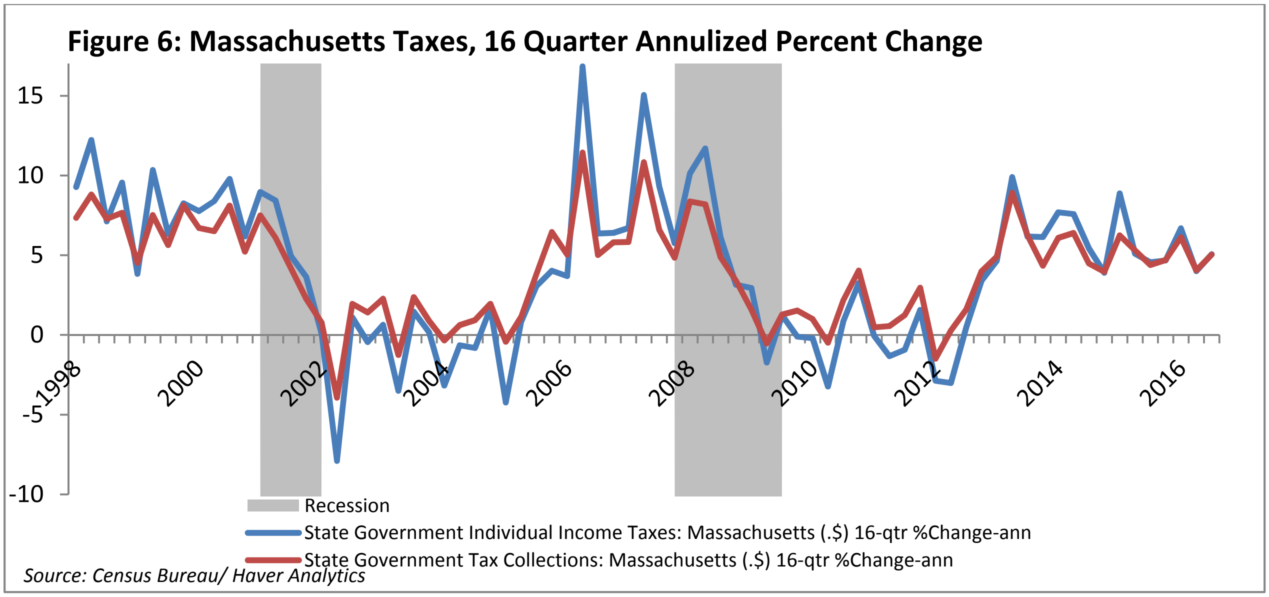
Figure 5: Total Real Wage and Salary Income for Massachusetts, Year to Year Percent Change



Source: Bureau of Economic Analysis/ Haver Analytics

Notes: Core PCE was subtracted from Total Real Wages and Salaries, Massachusetts.

The relative weakness in labor income has meant that the growth in income taxes has been relatively muted in the present recovery. This is shown in Figure 6, which plots the growth rate in income taxes and in total taxes for Massachusetts. To smooth out the volatility in the series, we take growth rates over 16 quarters (that is, 4 years). The figure also shows how changes in the growth rate of total revenues tend to be highly correlated with changes in the growth rate of income taxes.



The recent slowdown of tax revenues growth

Figure 7 shows the noticeable recent slowdown in the growth of Massachusetts tax revenues. This slowdown is largely due to individual income taxes. Again, individual income taxes may have been negatively affected by a slowdown in the pace of hiring that occurred in the second half of 2015, as well as a recent decline in workweek hours and less growth in compensation per hour. The slowdowns in these variables help explain the disappointing growth in state revenues, which may have been exacerbated by cautious consumer spending. We view these developments as largely transitory. If the economy continues to improve, hourly earnings are expected to accelerate, with possibly some progress also in the average workweek as more part-time workers find full-time employment. Consumer sentiment has been increasing recently, and this bodes well for consumption, and sales taxe revenues, going forward.