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To: Dr. Anya Rader Wallack, Executive Director, Massachusetts Medicaid Policy Institute, and
Noah Berger, Executive Director, Massachusetts Budget and Policy Center
From: Igor Popov and Jennifer Weiner
Date: July 30, 2008
Re: Assessing Alternative Measures of State Income

Summary

This memo is in response to your inquiry regarding measuring income in Massachusetts. In particular, you asked about the appropriateness of using state personal income, as measured by the Bureau of Economic Analysis (BEA), as a benchmark against which to compare the growth in costs of the state's Medicaid program. Although personal income is widely used by analysts to assess a state's ability to pay for spending programs, it is not without flaws.

To best capture ability to pay, an income measure should ideally reflect all types of income that generate revenue for the state government. Personal income excludes certain items that are important sources of revenue, while including others that may be less feasible revenue sources.

Two relatively simple adjustments—the addition of realized capital gains, and an adjustment to reflect labor earnings by geographic source rather than state of residence—can correct for some of these problems, providing a more comprehensive, albeit still imperfect, measure of income.

While alternative measures of income do exist, such as the Internal Revenue Service's adjusted gross income, or the U.S. Census Bureau's money income, these tend to carry even greater limitations than personal income in either completeness or availability. On the other hand, two production-based measures—the BEA's gross domestic product by state (GDP), and the U.S. Treasury Department's total taxable resources (TTR)—are worth considering as proxies for a state's ability to pay, but have limitations related to their comprehensiveness, transparency, and availability.

During the calendar years 1997 to 2005, the average annual growth rate in personal income, adjusted personal income (as defined above), GDP, and TTR in Massachusetts ranged from 4.6 percent for GDP to 5.2 percent for adjusted personal income. The two measures that incorporate capital gains—adjusted personal income and TTR—both show more volatile growth. Given various challenges such as comprehensiveness, feasibility as a revenue source, availability, and transparency, adjusted personal income appears to be the most appropriate measure among these four for assessing Massachusetts' capacity to support Medicaid spending.

Income and ability to pay

The most widely accepted theoretical definition of income is referred to as Haig-Simons income. Developed independently by Robert Haig and Henry Simons in the 1920s and 1930s, respectively, Haig-Simons income is defined as consumption plus the change in net worth of an individual over a given period of time.^{i,ii}

Beyond being difficult, if not impossible, to measure, the aggregate income of a state's residents as defined by Haig-Simons would not accurately reflect the sum of income items that a state can feasibly tap for generating revenue. For example, Haig-Simons income would include unrealized capital gains, which—though certainly a driver of changes in individual net worth—are generally not a source of tax revenue for state governments. Feasibility as a revenue source is an important criterion to consider when selecting an income measure to best capture a state's ability to pay for a particular program. If the government is unable to feasibly generate revenue from a particular type of income—whether for practical, legal, or political reasons—then that income has less of an impact on the state's ability to fund its various spending priorities.

Personal income

Perhaps the most widely used practical measure of income is personal income, as computed and published by the BEA. Personal income—summarized along with other income measures in Table 1—is defined as the “income received by persons from participation in production, from government and business transfer payments, and from government interest.”ⁱⁱⁱ

Personal income is composed of salaries and wages, employer contributions to pension and insurance plans, dividends, interest, rent (including imputed rental income), and transfer receipts (both in-kind and cash) received by all residents in a state, less employee contributions to social insurance. Personal income also includes income received on behalf of residents by certain nonprofits, welfare funds, and trust funds.

The personal income data are timely—each quarter the BEA derives personal income from administrative data for purposes of national and regional income accounting—and are freely and publicly available on the agency's website. Personal income also has the benefit of being relatively transparent: it can easily be broken down into subcomponents that can be assessed for their feasibility as a revenue source for state governments.

Despite these advantages, there are several things to keep in mind when using personal income to represent a state's ability to fund programs. Specifically, personal income:

- excludes capital gains income;
- captures labor income of state residents regardless of where they earn it, rather than capturing all labor income earned in the state;
- excludes corporate profits;
- captures contributions to pension funds rather than disbursements;
- includes certain types of non-cash income.

Exclusion of capital gains

Capital gains are not included in personal income. Although unrealized capital gains are difficult to measure and not generally taxed, realized capital gains can be an important source of residents' income, and are commonly taxed by state governments. Exclusion of realized capital gains from personal income may be especially problematic in Massachusetts. State-level data from the IRS's Statistics of Income (SOI) Division show that Massachusetts has a high ratio of net realized capital gains to personal income relative to the United States as a whole, and relative to other states with similar levels of personal income (see Figure 1).

Adjusting the BEA's data on personal income to include a measure of net realized capital gains, such as that as estimated in the SOI data, would lead to a more comprehensive—but also somewhat more volatile—measure of personal income (Figure 2).¹ Net realized capital gains are volatile not only because of the underlying volatility in asset prices, but also because investors may time realizations to take advantage of changes in the tax code. For these reasons, adjusting personal income to include capital gains may make it more difficult to predict future income growth.

An adjustment for capital gains using data from tax returns may upwardly bias the true augmentation of income as defined by Haig-Simons, because such an adjustment does not account for inflation. When an investor realizes a capital gain, he or she realizes income equal to the proceeds of the sale minus the purchase price of the asset. Because the purchase of the asset in most cases took place in an earlier period than the sale, some portion of this gain is actually due to inflation rather than real appreciation in the asset's value. Put another way, the purchasing power of the funds used to acquire the asset was greater at the time of purchase than at the time of the sale. Therefore the real net gain from buying and selling the asset is less than the nominal gain.² To properly account for inflation, one would need to know when assets were purchased, but such data are not readily available at the state level.³

Income earned in-state by nonresident workers

The way that state personal income treats income earned in-state by nonresidents can also pose a problem if one is attempting to capture accessible revenue sources. State personal income seeks to measure the income of residents living in a given state regardless of where they work. Because the data the BEA uses to estimate labor earnings is based on people's state of employment, rather than their state of residence, the calculation of personal income incorporates a residence adjustment for each state that is equal to the net inflow of income to that state associated with interstate commuters.⁴

¹ Net realized capital gains estimated in the SOI data exclude certain gains that are not reportable as taxable income. For example, individual taxpayers meeting certain criteria are allowed to exclude up to \$250,000 (\$500,000 for couples filing jointly) of a gain associated with the sale of the taxpayer's main home. This memo does not attempt to adjust for gains not subject to reporting.

² For example, consider an investor who purchased an asset for \$1,000 in 2005, and sold that same asset for \$2,000 in 2008. Given an annual inflation rate of 3 percent, the \$1,000 is equivalent to \$1,093 ($\$1,000 \times 1.03^3$). While the nominal gain from the sale of the asset would be \$1,000, the real gain—and thus the real change in the investor's net worth—would be $\$2,000 - \$1,093$, or \$907.

³ For practical reasons, nominal rather than real capital gains are taxed. However, long-term capital gains are generally taxed at a preferential rate, partly to offset the difference between real and nominal gains.

⁴ The net inflow of income equals income earned out-of-state by residents ("inflows") minus income earned in-state by nonresidents ("outflows").

From the viewpoint of raising revenue through state-level income taxes, income earned in-state, whether by residents or nonresidents, is likely to be more relevant than income earned by state residents, regardless of state of employment.⁵ Individual income is typically taxed at the geographic source, meaning that a state government usually taxes income earned within its own borders, while allowing for tax credits for income taxes paid by residents to other states.

In Massachusetts, the residence adjustment reported by the BEA is negative. This means that income earned outside the state by Massachusetts residents is less than income earned in-state by nonresidents. For this reason, personal income as published by the BEA may slightly understate the state's ability to pay. Subtracting out the residence adjustment (which is equivalent to *adding* net outflows of income) would correct for this, producing an adjusted measure of personal income that captures labor income where it is earned, and where it is most likely to generate income tax revenue (Figure 2).⁶

Exclusion of corporate profits

Another limitation of personal income is that it does not include profits earned in-state by businesses organized as corporations, except to the extent that they are paid out to state residents as dividends. Corporate profits represent a flow of income generated within a state's borders, regardless of where the owners live, and are an important source of revenue for state governments. In fiscal year 2006, revenue from Massachusetts' corporate income tax represented 9.6 percent of state tax revenue (5.1 percent of own-source revenue).^{iv}

Because of the complexity of allocating profits of large multistate corporations on a state-by-state basis, corporate profits are not routinely reported at the state level, though some have prepared state-specific estimates for selected years.^v As with capital gains, adjusting personal income to include corporate profits, if a viable option, would likely reduce the stability of the measure.⁷ However, given the absence of a consistent, publicly available source of data on corporate profits within the state, such an adjustment would be difficult.⁸

⁵ However, the state of residence is likely to be more relevant to considerations of revenue that could potentially be generated by sales or excise taxes, though these taxes can also be shifted or exported to nonresidents in some cases.

⁶ While this adjustment may provide for a better approximation of labor income that is taxable in Massachusetts, it is not perfect. For example, Massachusetts residents who work in income-tax-free New Hampshire do pay income taxes in Massachusetts on their full labor earnings, though the adjusted version of personal income would not count those earnings. However, journey-to-work data from the U.S. Census Bureau show that the net flow of workers—and thus presumably income—between New Hampshire and Massachusetts is overwhelmingly from the former to the latter (a ratio of more than 3 to 1 in 2000), suggesting that this is probably not a large bias.

⁷ Inclusion of both full corporate profits—rather than just retained earnings—and dividends received by state residents would also lead to some double counting of income. However, because it is general practice for states to double-tax distributed earnings by taxing both profits and dividends, failure to include both would lead to an understatement of income accessible to the state for generating revenue.

⁸ As a crude measure, one could estimate state-level corporate profits by dividing the income portion of the state's corporate tax receipts by the statutory tax rate. Complications arise when different types of firms face different statutory rates, such as financial versus non-financial corporations in Massachusetts.

Treatment of pension income

Employer contributions to employee pensions are included in personal income estimates to capture all income earned in a given period. The convention of capturing pension income when earned rather than when it is paid out is inconsistent with the goal of measuring a state's ability pay, because pension benefits are typically taxed when they are distributed.

A recent paper by Lenze attempted to modify state personal income to include pension distributions rather than contributions from 1997 through 2002.^{vi} For those years, Lenze's modified version of personal income—referred to as cash income—was lower than personal income in Massachusetts, suggesting that contributions exceed distributions. However, the two grew at a similar rate, with average annual growth rates of 5.6 and 5.7 percent, respectively (see Figure 3). As baby boomers age and begin to reap the benefits of prior contributions, growth rates of the two measures could begin to diverge.

Inclusion of non-cash income

In addition to employer contributions to pensions, the BEA's measure of personal income includes some other non-cash components that are not plausible sources of revenue. For example, employer contributions to insurance plans, in-kind government transfers such as food stamps, and imputed rental income associated with owner-occupied housing are components of personal income. While these items may enhance an individual's or a household's well-being, they are generally not taxed.⁹ Data reported by the BEA are generally not detailed enough to specifically exclude these non-cash forms of income.

Adjusted personal income

Of the issues noted above, two are relatively easy to adjust for using publicly available data: addition of net realized capital gains, and subtraction of the BEA's residence adjustment. (See Table 2 for the data underlying these adjustments.)

Alternative measures of income

Several other government agencies produce their own measures of income. Table 1 summarizes these, along with personal income. Because of the limitations of these alternative data series, including the ways they are collected or reported, they would be less appropriate than personal income (unadjusted or adjusted) for assessing Massachusetts' ability to fund Medicaid.

Adjusted gross income (AGI) is the measure used to define individual income by the SOI Division of the IRS.^{vii} State-level data through 2006 are now publicly available. AGI is based on a sample of federal income tax returns and consists of gross income adjusted for certain allowable deductions. While AGI does include net realized capital gains—addressing one of the limitations of BEA personal income—it is not without flaws. One of the largest drawbacks is that AGI does not capture the income data of non-filers, or certain types of income not subject to reporting. Its growth is also heavily

⁹ These types of income, though not taxed directly by state governments, may account for greater revenue through other taxes. For example, receipt of food stamps may allow individuals or households to increase their consumption of non-food goods that are subject to sales or excise taxes.

dependent on the federal government's tax treatment of different types of income, which could change from year to year.

Money income, published by the U.S. Census Bureau using data from its Current Population Survey (CPS), is defined as total pre-tax *cash* income earned by persons.^{viii} Money income is the official source of poverty estimates in the United States. It includes items such as wages and salaries, self-employment income, property income (dividends, interest, and rent), cash transfers (governmental and interpersonal), and retirement distributions.

Unlike personal income, money income does not include employer contributions to pension and insurance plans, in-kind transfers, imputed income, or income earned on behalf of households by other entities. Like personal income, the definition of money income focuses on where income is received rather than where it is earned, and the definition excludes certain taxable items, such as net realized capital gains and corporate profits. One relative limitation of money income is that, as a survey measure, it is subject to underreporting.

The U.S. Census Bureau publishes median household money income at the state level, with the most recent data available for 2006. The Census Bureau has also developed modifications of money income that attempt to better capture a household's economic well-being.^{ix,x} These modified versions—which are not published as a consistent time series, or on a state-by-state basis—expand the traditional definition of money income to include items such as net realized capital gains, the value of in-kind transfers, and the imputed return on home equity.

The U.S. Treasury Department,^{xi} the Congressional Budget Office,^{xii} and the Joint Committee on Taxation,^{xiii} as well as certain nongovernmental organizations,^{xiv} have also produced their own income measures, generally for analyzing the distributional effects of tax changes. Like the modified versions of money income, these measures are not available on a state-by-state basis, limiting their usefulness in assessing a specific state's ability to pay.

Production-based measures of ability to pay

Also worth consideration are two production-based measures. The BEA's GDP by state, and the Treasury Department's TTR, are rooted in the production side of the BEA's Regional Economic Accounts, but both are still legitimate options for assessing a state's ability to pay for spending programs. That being said, because of their various limitations, neither possesses a definitive advantage over adjusted or unadjusted personal income for comparisons with Medicaid spending.

GDP by state (formerly referred to as gross state product, or GSP) is defined as the sum of the factor incomes that are incurred in production within a state. This measure is produced by the BEA, primarily using U.S. Census Bureau and state personal income data to arrive at the final estimates.^{xv}

Like personal income, GDP by state is made publicly available by the BEA in a timely manner. The measure's relatively low volatility makes it a prime candidate for measuring a state's capacity to support spending and bear taxes over time. Unlike personal income, GDP by state accounts for all value added during production within a state's borders. This includes taxable income earned in-state by nonresidents, as well as corporate earnings. GDP by state does not, however, include taxable

income of residents earned out-of-state, taxable government transfers, or capital gains. GDP by state is also, in some sense, a less transparent measure than personal income (adjusted or unadjusted), as it cannot readily be broken down into subcomponents that can be assessed for their feasibility as revenue sources.

TTR is estimated by the U.S. Treasury Department, which attempts to provide a more comprehensive measure of a state's taxable income base than either personal income or GDP by state.^{xvi} The current formula used to calculate TTR begins with GDP by state. It then subtracts employer and employee contributions to social insurance, federal indirect business taxes, and the surplus or deficit of federal civilian enterprises (such as the U.S. Postal Service). The formula then adds dividends, monetary interest, select social insurance transfers, net realized capital gains, and income of residents earned outside state borders.

Because it begins with GDP by state as its base, TTR also suffers from transparency issues. While the inclusion of the additional income items does improve transparency slightly and make for a more comprehensive measure than GDP by state, it also adds volatility (see Figure 4).

Another potential problem with TTR is its inclusion of both income earned in-state by nonresidents and income earned by state residents elsewhere. As Tannenwald has pointed out, this methodology assumes that any state could legally do away with tax credits granted on income taxed in other states.^{xvii} Under this scenario, commuter income would consistently be double-taxed, which could lead to constitutional challenges. To alleviate this problem, TTR could potentially be adjusted to remove income earned out-of-state by state residents, though data to perform such a calculation precisely are not readily available.¹⁰

Finally, TTR estimates are published with a lag, making the measure less timely than either personal income or GDP by state.

Other sources of revenue

The preceding discussion focuses on measures to gauge a state's ability to pay for spending programs based on revenue generated through income taxes (either personal or corporate). With the personal income tax representing the largest source of state tax revenue in Massachusetts, the income tax base is perhaps the most important indicator for assessing the state's capacity to support Medicaid and other programs.

In reality, states have other means of generating revenue, including taxes on sales and property. Though the measures described above may not directly account for these tax bases, taxpayers ultimately pay these other taxes out of their incomes. Aggregate income can therefore be viewed not only as a measure of a state's income tax base, but also as an approximation of the funds available for payment of all taxes levied.¹¹

¹⁰ Such a calculation would require estimates of *gross* inflows of income. The residence adjustment used by the BEA captures *net* inflows of income. The BEA does not publish the estimates of gross income underlying its calculation of the residence adjustment (see footnote 4).

¹¹ To improve this approximation, one would ideally wish to take into account the incomes of nonresidents who pay Massachusetts taxes other than the income tax, such as tourists who pay sales taxes, and nonresident property owners who

Comparison of selected measures

Table 3 presents growth rates in Massachusetts of personal income, adjusted personal income (as defined above), GDP, and TTR. During the calendar years 1997 to 2005 (the period for which estimates of all four measures are available), the average annual growth among the four measures ranged from 4.6 percent for GDP to 5.2 percent for adjusted personal income. While average growth over this period was relatively similar for the four measures, the two measures incorporating capital gains—adjusted personal income and TTR—showed greater volatility from year to year.

Though each has its drawbacks, any of these four measures could be used to track Massachusetts' capacity to support Medicaid. However, given the various issues noted here, adjusted personal income appears to be the most appropriate measure in this context. Adjusted personal income is slightly more comprehensive than personal income, and better captures income from which the state government can feasibly generate revenue. It also has the advantage of more current availability than TTR, and greater transparency than either production-based measure.

pay property taxes. These taxes are considered *exported*, while taxes paid by Massachusetts residents to other jurisdictions are considered *imported*.

Tax exportation may also occur through the federal deductibility of state and local income and property taxes. In that case, some of the burden of these taxes is passed on to taxpayers across the United States. GDP by state does indirectly account for some tax exportation, in that it measures the production of goods and services independently of the residence of those who purchase them. In practice, however, it is difficult to measure the extent of tax exportation, and it would be equally challenging to quantify the income of nonresident taxpayers.

Phares conducted the last-known comprehensive attempt to quantify tax importation and exportation in 1980. He found that Massachusetts was a slight importer of taxes, with net imports representing 0.9 percent of total taxes. See Donald Phares, *Who Pays State and Local Taxes?* Cambridge, MA: Oelgeschlager, Gunn & Hain, 1980.

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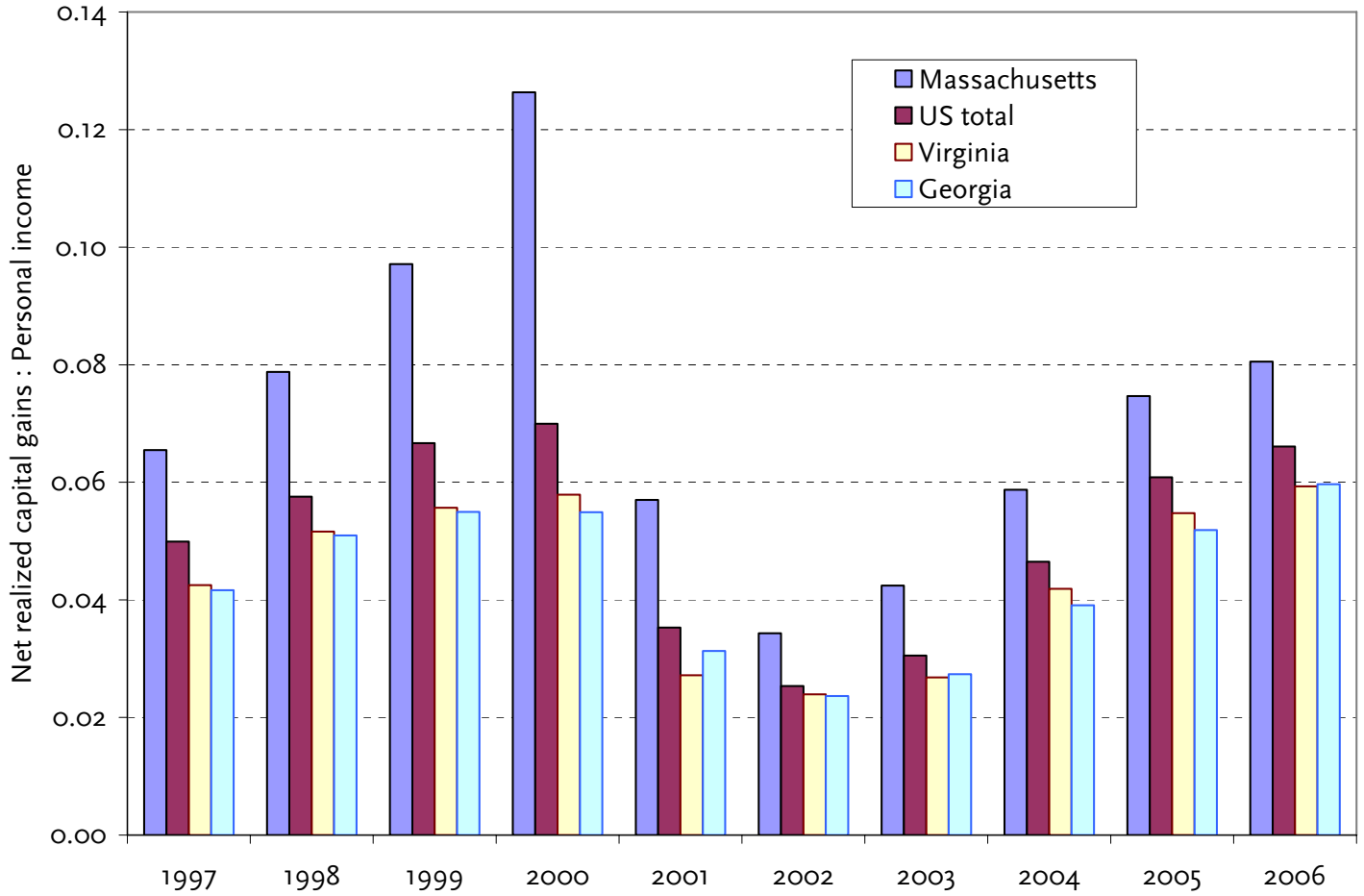
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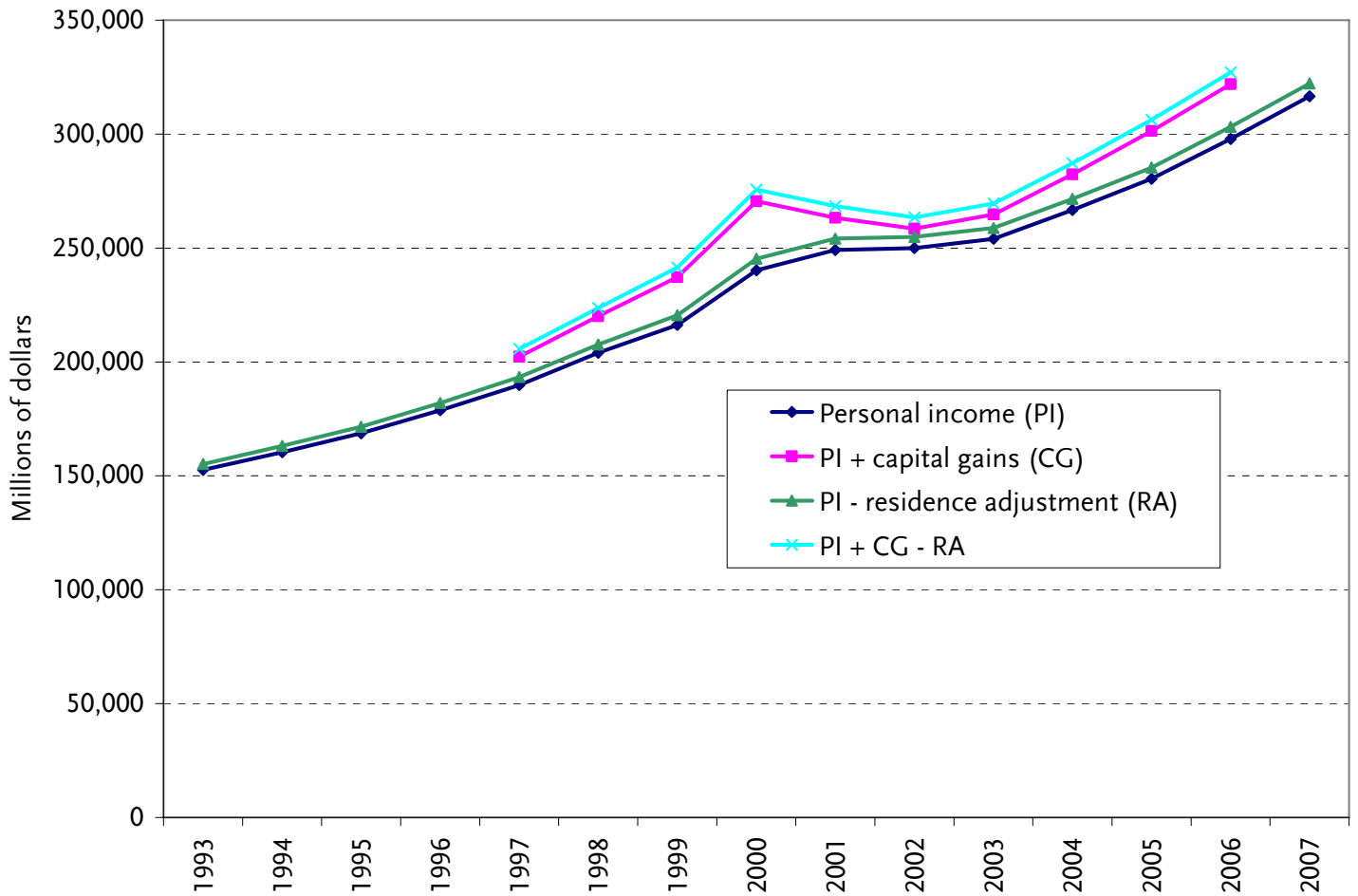
Figures and Tables

Figure 1: Ratio of net realized capital gains to personal income



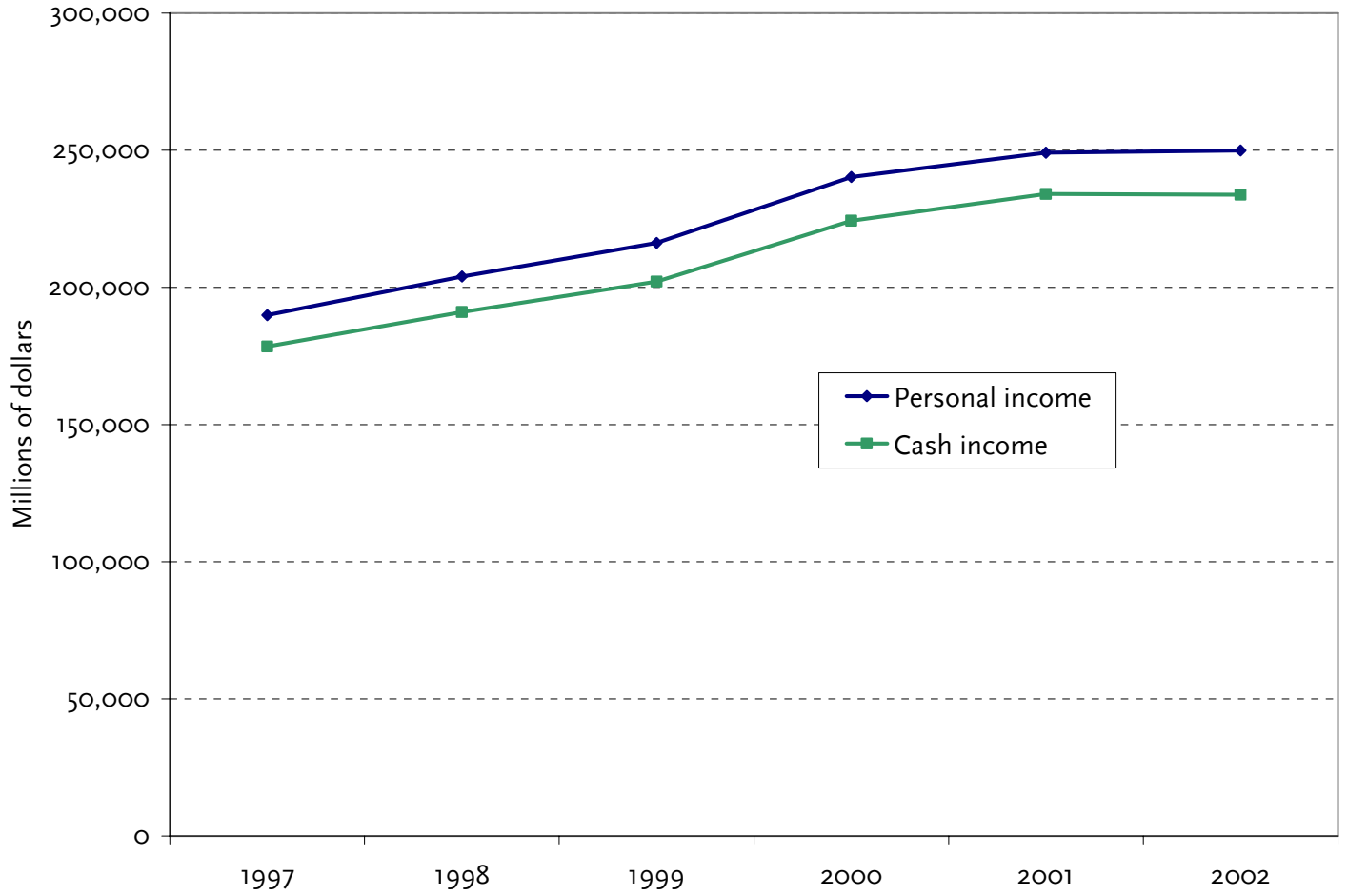
Source: U.S. Bureau of Economic Analysis, Regional Economic Accounts; Internal Revenue Service, Statistics of Income.
 Note: Virginia and Georgia were selected as two states with personal income most similar to that of Massachusetts in recent years.

Figure 2: Massachusetts personal income:
Unadjusted and adjusted for capital gains and residence



Source: U.S. Bureau of Economic Analysis, Regional Economic Accounts; Internal Revenue Service, Statistics of Income.

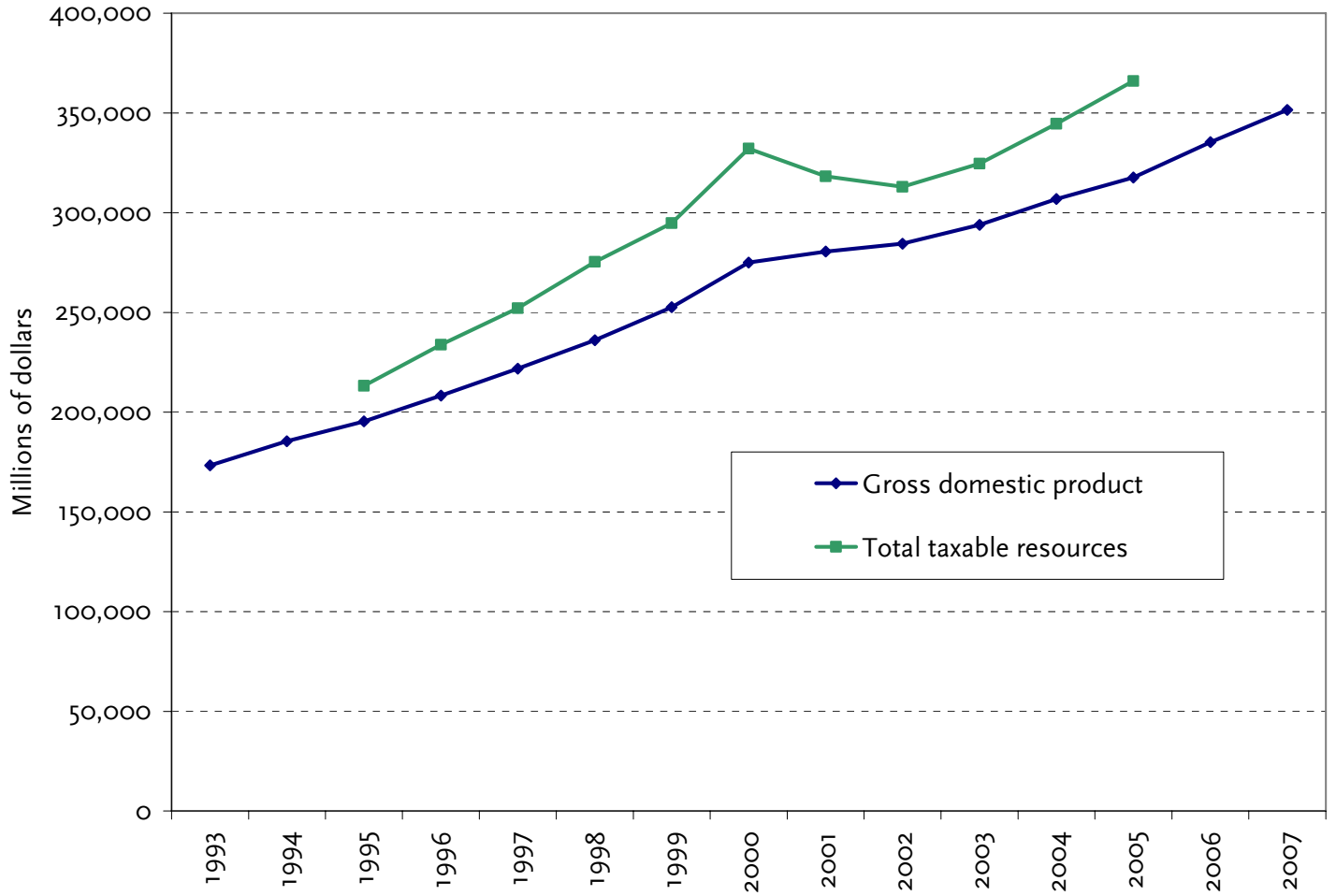
Figure 3: Massachusetts personal income and "cash" income



Source: U.S. Bureau of Economic Analysis, Regional Economic Accounts; Lenze, 2008.

Note: Cash income includes pension distributions, while personal income includes pension contributions.

Figure 4: Production-based measures of income in Massachusetts



Sources: U.S. Bureau of Economic Analysis, Regional Economic Accounts; U.S. Treasury Department, Office of Economic Policy.

Table 1: Summary of selected income measures

Income measure	Personal income (PI)	Adjusted gross income (AGI)	CPS* money income (MI)
Government agency	Bureau of Economic Analysis	Internal Revenue Service	U.S. Census Bureau
Are state-level data available?	Yes	Yes	Yes (median household income only)
Most recent year state data available	2007 (calendar)	2006 (tax year)	2006 (calendar)
Are selected components included?			
Salaries and wages	Yes	Yes	Yes
Proprietor's income	Yes	Yes	Yes
Interest, dividend, and rental income	Yes	Yes (taxable only)	Yes
Employer pension/insurance contributions	Yes	No	No
Pension/retirement income distributions	No	Yes	Yes
Governmental cash transfers	Yes	Some	Yes
Governmental non-cash transfers	Yes	No	No
Interpersonal cash transfers	No	Some	Yes
Imputed rental income	Yes	No	No
Realized capital gains (net)	No	Yes	No
Unrealized capital gains	No	No	No
Corporate profits	No	No	No
Notes	Based on administrative data sources. Also deducts contributions to government social insurance.	Based on a sample of filed tax returns. Various items are also deducted.	The U.S. Census Bureau has also published national estimates using alternative measures of money income. * Current Population Survey.

Table 1 (continued)

Income measure	Comprehensive household income (CHI)	JCT income concept (JCT)	Family economic income (FEI)
Government agency	Congressional Budget Office	Joint Committee on Taxation	U.S. Treasury Department
Are state-level data available?	No	No	No
Most recent year state data available	n/a	n/a	n/a
Are selected components included?			
Salaries and wages	Yes	Yes	Yes
Proprietor's income	Yes	Yes	Yes
Interest, dividend, and rental income	Yes	Yes	Yes
Employer pension/insurance contributions	Some	Yes	Yes
Pension/retirement income distributions	Yes	Yes	Yes
Governmental cash transfers	Yes	Yes	Yes
Governmental non-cash transfers	Yes	Medicare	Food stamps
Interpersonal cash transfers	No	Some	No
Imputed rental income	No	No	Yes
Realized capital gains (net)	Yes	Yes	Yes
Unrealized capital gains	No	No	Yes
Corporate profits	No	No	No
Notes	Based on a statistical matching of CPS and IRS data. Used for distributional analyses.	Used for distributional analyses.	Used for distributional analyses. U.S. Treasury Department discontinued use of this income concept in 2001.

Table 1 (continued)

Source: Ruser, et al., 2004; U.S. Bureau of Economic Analysis, Regional Economic Accounts; Henry and Day, 2005; U.S. Census Bureau, Historical Income Tables; Congressional Budget Office 2007; Joint Committee on Taxation 2005; Cronin, 1999.

Table 2: Calculation of adjusted personal income

Calendar Year	Personal income (PI)	Net realized capital gains (CG)	Residence adjustment (RA)	Adjusted personal income (API = PI + CG - RA)
1997	189,885	12,434	-3,428	205,747
1998	203,987	16,066	-3,656	223,708
1999	216,221	20,998	-4,247	241,466
2000	240,209	30,344	-5,116	275,668
2001	249,095	14,205	-5,074	268,374
2002	249,954	8,578	-4,871	263,404
2003	253,993	10,773	-4,776	269,542
2004	266,635	15,652	-4,964	287,251
2005	280,388	20,940	-4,938	306,265
2006	297,905	23,993	-5,235	327,133
2007	316,568	NA	-5,640	NA

Source: U.S. Bureau of Economic Analysis, Regional Economic Accounts; Internal Revenue Service, Statistics of Income.

Note: Figures represent millions of dollars.

Table 3: Selected income and production-based measures for Massachusetts

Calendar year	Personal income (PI)		Adjusted personal income (API)		Gross domestic product by state (GDP)		Total taxable resources (TTR)	
	\$ millions	% change	\$ millions	% change	\$ millions	% change	\$ millions	% change
1997	189,885	6.2%	205,747	NA	221,827	6.5%	252,103	7.8%
1998	203,987	7.4%	223,708	8.7%	236,079	6.4%	275,318	9.2%
1999	216,221	6.0%	241,466	7.9%	252,617	7.0%	294,756	7.1%
2000	240,209	11.1%	275,668	14.2%	274,949	8.8%	332,130	12.7%
2001	249,095	3.7%	268,374	-2.6%	280,509	2.0%	318,220	-4.2%
2002	249,954	0.3%	263,404	-1.9%	284,386	1.4%	312,944	-1.7%
2003	253,993	1.6%	269,542	2.3%	293,840	3.3%	324,592	3.7%
2004	266,635	5.0%	287,251	6.6%	306,827	4.4%	344,543	6.1%
2005	280,388	5.2%	306,265	6.6%	317,626	3.5%	365,995	6.2%
2006	297,905	6.2%	327,133	6.8%	335,313	5.6%	NA	NA
2007	316,568	6.3%	NA	NA	351,514	4.8%	NA	NA
Average annual growth (all years)		5.3%	5.4%		4.7%		4.9%	
Average annual growth (1997 through 2005)		5.0%	5.2%		4.6%		4.9%	

Source: U.S. Bureau of Economic Analysis, Regional Economic Accounts; Internal Revenue Service, Statistics of Income; U.S. Treasury Department, Office of Economic Policy.