INDIVIDUAL INCOME: SUMMARY OF DIFFERENCES

The difference between the executive and LFD revenue estimates for individual income tax is shown below:

Individual Income Tax Revenue Estimate Differences ($ Millions)								
FY	HJ 2	January Executive	January LFD	January $ Diff.	Adjusted Executive	Adjusted LFD	Adjusted $ Diff.	Comments
2015	$1,108.3	$1,160.1	$1,088.6	$71.5			$0.0	
2016	1,212.5	1,229.6	1,160.9	68.7			-	
2017	1,295.8	1,313.0	1,221.7	91.3			-	
Total	$3,616.7	$3,702.7	$3,471.1	$231.5	$0.0	$0.0	$0.0	

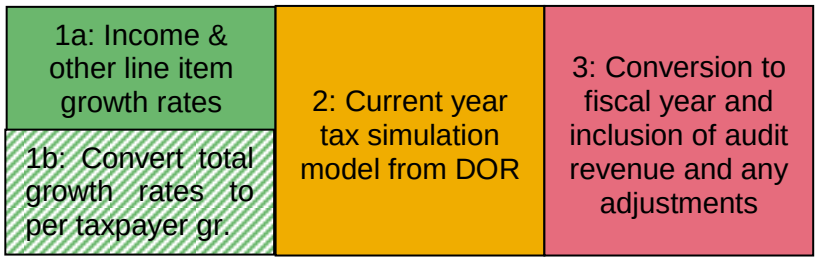
Total Difference Primarily Explained by Two Executive Adjustments: CY 2014 Wage Growth & Double Counting the Growth in Taxpayer Base

The total difference of $231.5 million between the two estimates is primarily explained by the executive adjustment to CY 2014 wage income growth that appears to be unsubstantiated by available wage data, and effectively double counting the growth in taxpayer base. The CY 2014 wage income growth adjustment accounts for a three-year total difference around $130 million, while the sum of the three fiscal year adjustments is around $120-$140 million, depending on what conversion process is used. The total of these two adjustments is somewhat mitigated by the LFD conversion process, which for a given tax simulation model output, results in higher fiscal year collections.

Individual Income Revenue Estimate Process

The individual income tax estimating process contains three broad steps, which are illustrated in the diagram below. First, growth rates for each income type and other line items are developed—income streams are generally modeled on various IHS predictors, while many of the smaller addition, reduction or deduction items are forecast based on historical trend or an assumption of no growth. These growth rates are converted to per-taxpayer growth rates by removing the assumed growth in new taxpayers.

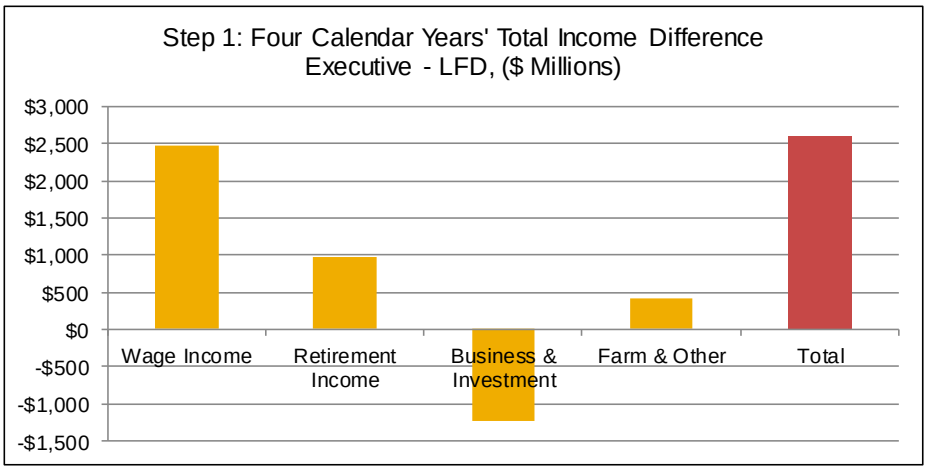
Second, the tax simulation model produces a calendar year state tax liability forecast by applying the per-taxpayer modeled growth rates to each resident taxpayer's income and deduction items. The model is updated each year by the Department of Revenue (DOR) to incorporate the changes in federal and state tax law. Finally, fiscal year collections before audit, penalty, and interest income are modeled on total calendar year liability, and forecast fiscal year collections are then augmented by expected future audit, penalty and interest collections to produce the total individual income tax revenue estimate.

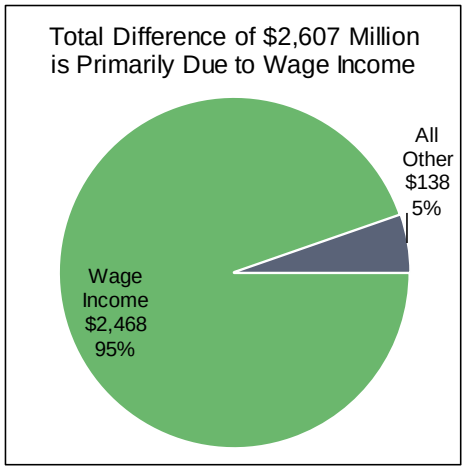


The difference between the executive and LFD estimates appears to be generated at steps 1 and 3, which are addressed in more detail in the following sections.

Step 1a: Income & Other Line Item Growth Rates

The charts below illustrate the aggregate income difference between the executive and LFD estimates over the calendar year forecast period of 2014-2017 by broad income categories.

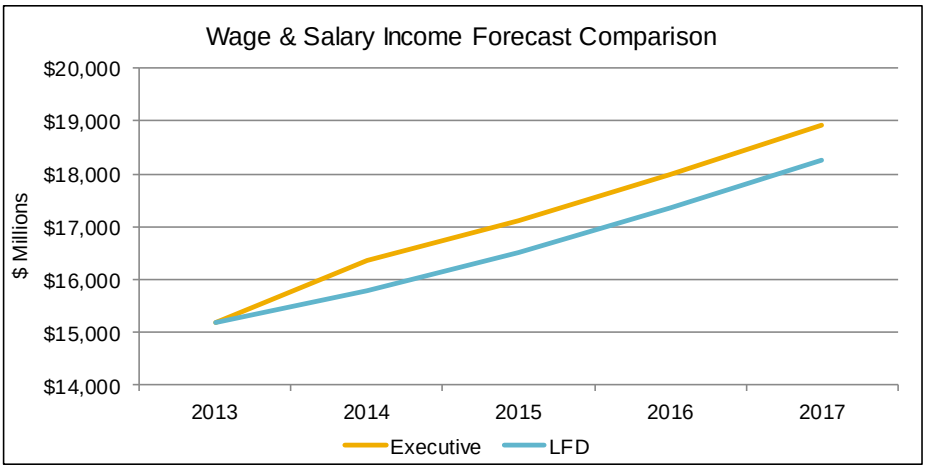


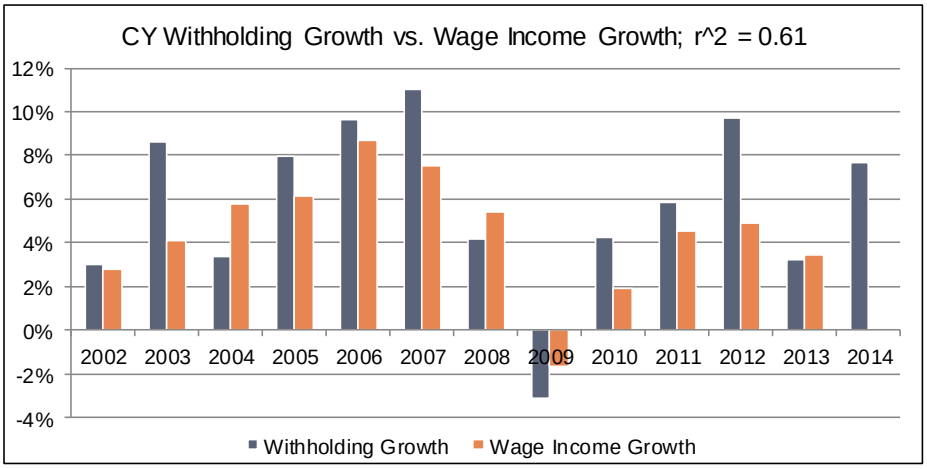


Wage Income Growth Difference Due to CY 2014 Assumption

The difference in anticipated wage income over the four-year period is due to a difference in the forecast wage growth in CY 2014. Although growth rates in subsequent years are identical, the elevated level of income in CY 2014 in the executive model is carried though to each year, as shown in the graph below:

The executive and LFD wage income sub-models both rely on the IHS forecast of Montana wage and salary disbursements. The LFD wage income sub-model includes no adjustments to the IHS forecast, while the executive forecast was adjusted for CY 2014 based on calendar year individual income withholding growth. For comparison purposes, the LFD CY 2014 wage income growth rate is 3.9%, while the executive growth rate is 7.7%.

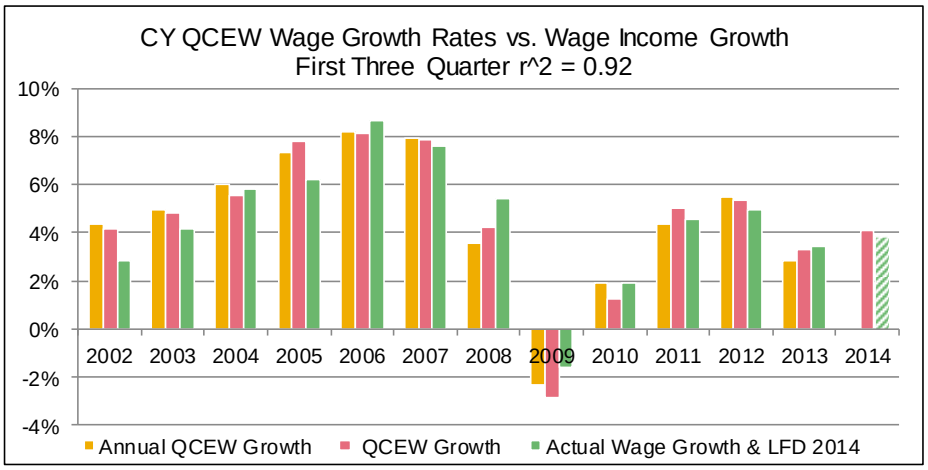




The chart to the left shows calendar year individual income tax withholding growth compared to wage growth since 2002. While withholding in CY 2014 did grow 7.7% over CY 2013, the historical differences between these two growth rates suggest that assuming CY 2014 wage growth will attain the level of CY 2014 withholding growth has inherent risk. Note that these two series have a fit of r^2=0.61 for 2002 through 2013.

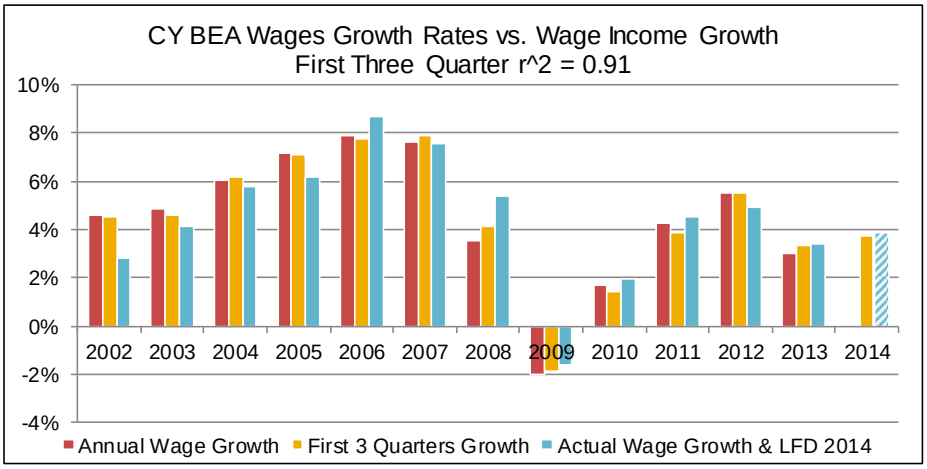
Current Bureau of Labor Statistics and Bureau of Economic Analysis Data

While there has been much speculation regarding the implications of withholding growth, the growth in wages as measured by two data series, Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW) and Bureau of Economic Analysis (BEA) wages and salaries by place of work, does not provide compelling evidence that the CY 2014 LFD wage income forecast growth based on the IHS outlook is too low.



The adjacent chart compares annual and the first three-quarter QCEW growth with actual wage growth as reported on full year resident tax returns. The January LFD growth assumption is included in 2014.

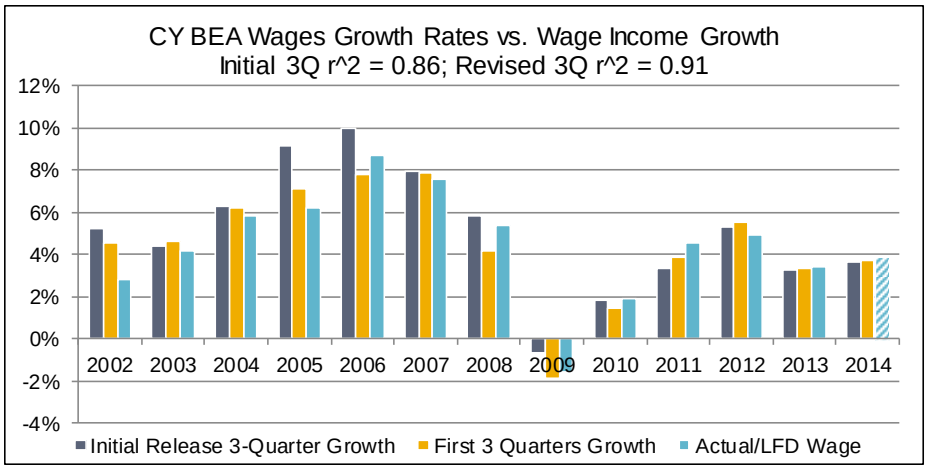
The three-quarter QCEW growth has been higher and lower than annual QCEW growth, but the two growth rates have generally been close. Similarly, actual wage growth has been both above and below first-half and annual QCEW growth, but usually fairly close. Actual wage growth and the first-half growth of the QCEW series has an r^2 of 0.93 for 2002 through 2013. The January LFD CY 2014 wage growth assumption of 3.9% is slightly below the first three quarter growth of 4.1% for the QCEW series.



The first three quarters of CY 2014 data are also available for the BEA wages and salaries by place of work series. The chart to the left compares annual and three-quarter growth of this series with actual wage growth as reported on full year resident tax returns, as well as the January LFD growth assumption in 2014.

As above, the three-quarter growth has been higher and lower than the annual growth, but the two rates have been relatively close. Similarly, actual wage growth has been both above and below the three-quarter and annual BEA growth, but again fairly close. Actual wage growth and the three-quarter growth of the BEA series has an r^2 of 0.91 for 2002 through 2013. The January LFD CY 2014 wage growth assumption of 3.9% is slightly above the three-quarter growth of 3.7% for the BEA series.

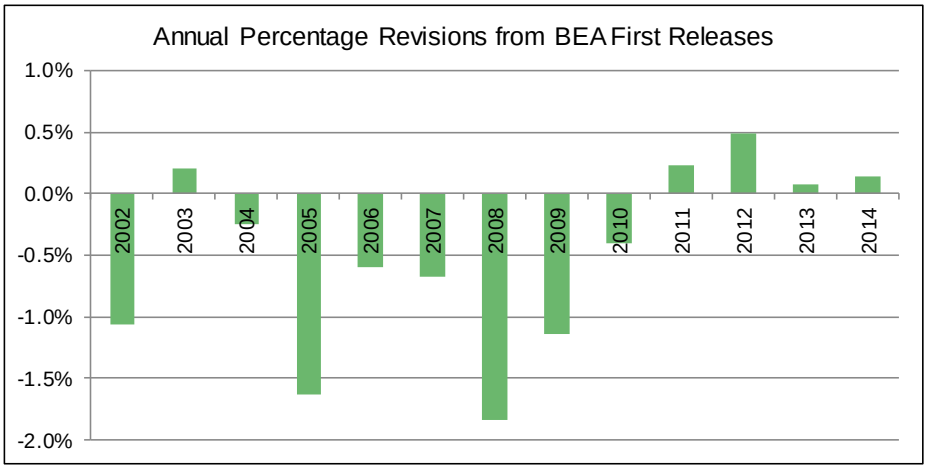
The BEA revisions in the historical data series could have the impact of creating a better historical fit than if the “preliminary release” data were compared to the actual wage growth. To investigate this possibility, archived quarterly BEA releases since 2002 (which are available online) were used to develop a historical series of “preliminary release” data. The preliminary three-quarter growth rate is compared with the revised three-quarter growth of this series and actual wage growth as reported on full year resident tax returns in the following chart.



Over the period depicted in the chart to the left, initial releases have been revised both upward and downward; the revisions produced relative changes in the three-quarter growth of about two percentage points in 2005 and 2006, but have otherwise been on average less than one-half of a percentage point.

The impact of annual average revisions to date as a percentage of the revised historical series is shown in the chart to the right. The maximum upward revision of 0.5% occurred in 2012; the average of the past four years of upward revisions is 0.2%.

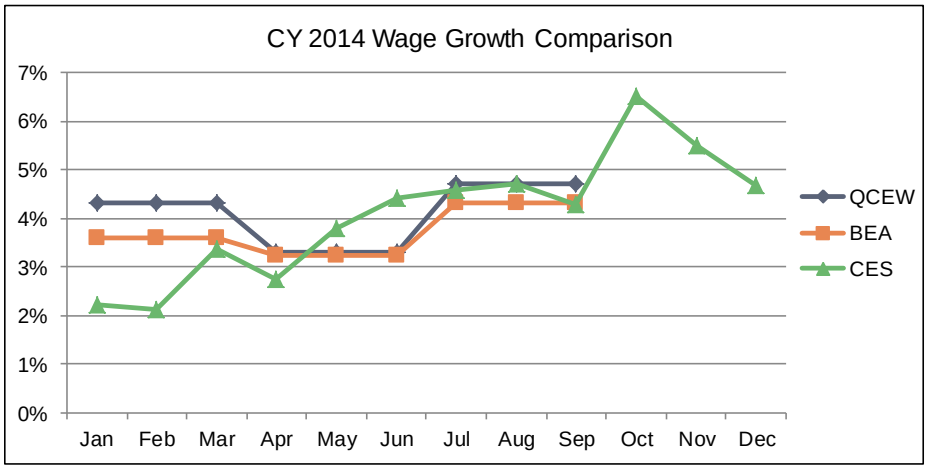
Note that years 2010 through 2014 are likely to continue to be revised as more data becomes available.



CY 2014 Fourth Quarter Wage Growth Acceleration

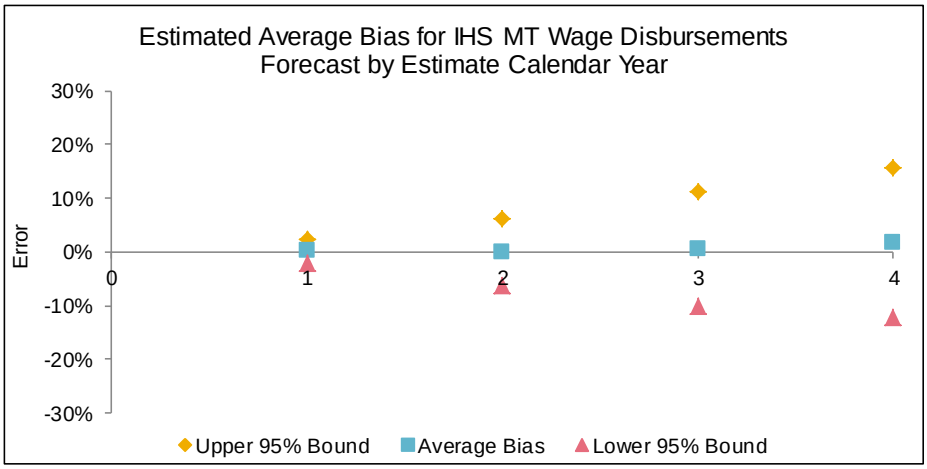
Both the QCEW and BEA wage series show accelerated growth in the third quarter of CY 2014. Although fourth quarter data is not available for either of these series, the monthly employment data from the BLS Current Employment Statistics (CES) coupled with the CES average private sector hourly wage series may give a sense of continued fourth quarter growth.

As depicted in the adjacent chart, the wage growth proxy from the CES data suggests continued wage acceleration in the last quarter of CY 2014. The average fourth quarter growth for the CES series is 5.6%; if this level of growth is applied to the fourth quarter of the QCEW and BEA series, the resulting annual average wage growth for those series will be 4.5% and 4.2%, respectively.

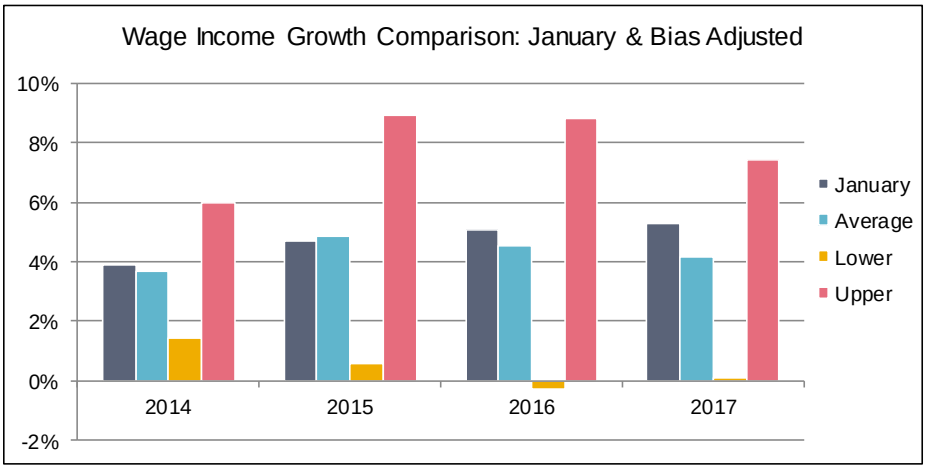


IHS Forecast Bias Investigation

If the underlying data used for developing the wage income growth rates is biased, the wage income growth rates would also be biased. To investigate this possibility, the archived IHS forecast data for the Montana wage disbursements series since 2004 was compared to actual values through 2013. This analysis suggests that there is on average a slight positive bias to the IHS wage disbursement estimate; i.e., that the forecast is on average a bit too high. An estimate of the average bias, along with the 95% confidence interval is shown in the chart below:



Accounting for the average upward bias in the January forecast leads to a slightly lower growth in CY 2014, and small changes thereafter. Adjusting for the 95% upper and lower bounds on the average bias has broader implications on the growth rates, as shown in the adjacent chart. Note that the bar colors correspond to the adjustment of bias shown in the previous chart.



FY Revenue Estimate Impact of CY 2014 Wage Income Growth Difference

Using the LFD January tax simulation model and all the same growth rates with the exception of replacing the CY 2014 wage income sub-model growth rate of 3.9% with 7.7% results in an additional $162.0 million of calendar year total tax liability over the four year period. Applying the January LFD conversion to fiscal year produces a total three-year fiscal liability that is above the LFD January estimate by $130.3 million.

Step 1b: Convert Line Item Growth Rates to Per-Taxpayer Growth Rates

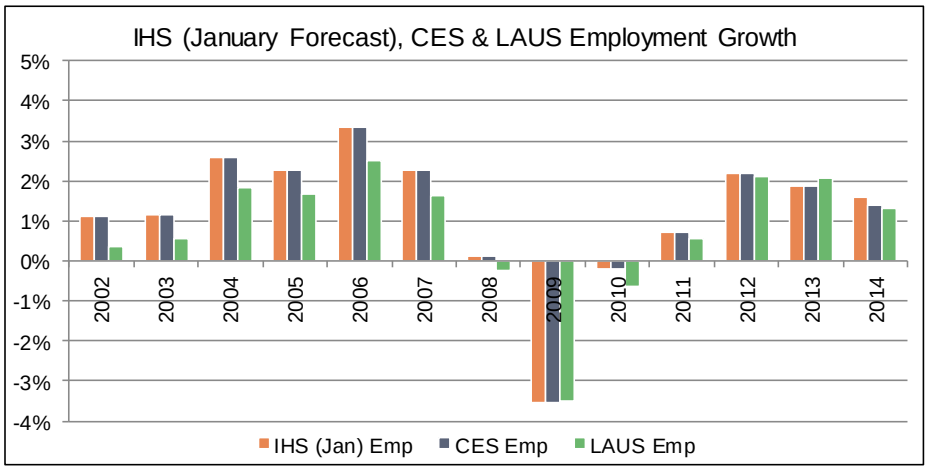
Each of the line item (sub-model) growth rates are deflated by the anticipated growth in taxpayers by year. The reason for deflating the line item growth rates by the growth in taxpayers is that the line item growth rates implicitly include a growth in the taxpayer base. For example, the total wage income of $15,190 million reported in 2013 was much higher than the wage income of $9,484 million reported in 1990; the growth in total wages between these two years includes higher per taxpayer wages as well as a larger taxpayer base.

The result of deflating the line item growth rates by the growth in the taxpayer base is the anticipated per-taxpayer growth rate for each of the income and deduction line items. The tax simulation model produces a calendar year state tax liability forecast by applying the per-taxpayer modeled growth rates to each resident taxpayer's income and deduction items; applying the appropriate tax laws, rates, and brackets to each of the taxpayers' future returns; and summing all taxpayer liabilities by forecast year.

Then in the conversion process, the simulation model output of full year resident liability for each calendar year is augmented by the associated cumulative taxpayer growth for that year.

Taxpayer Base

The executive and LFD estimates have difference in the anticipated growth of full year resident taxpayers. The LFD sub-model of full year resident taxpayers is based on the IHS forecast of Montana total non-farm employment. The IHS non-farm employment model is in turn based on the historical data from the Current Employment Statistics (CES) series from BLS. The executive sub-model includes an adjustment for CY 2014 that is based on the current higher growth suggested by the Local Area Unemployment Statistics (LAUS) series. The upshot of the difference is that the executive increased the modeled taxpayer base by 7,000 taxpayers.

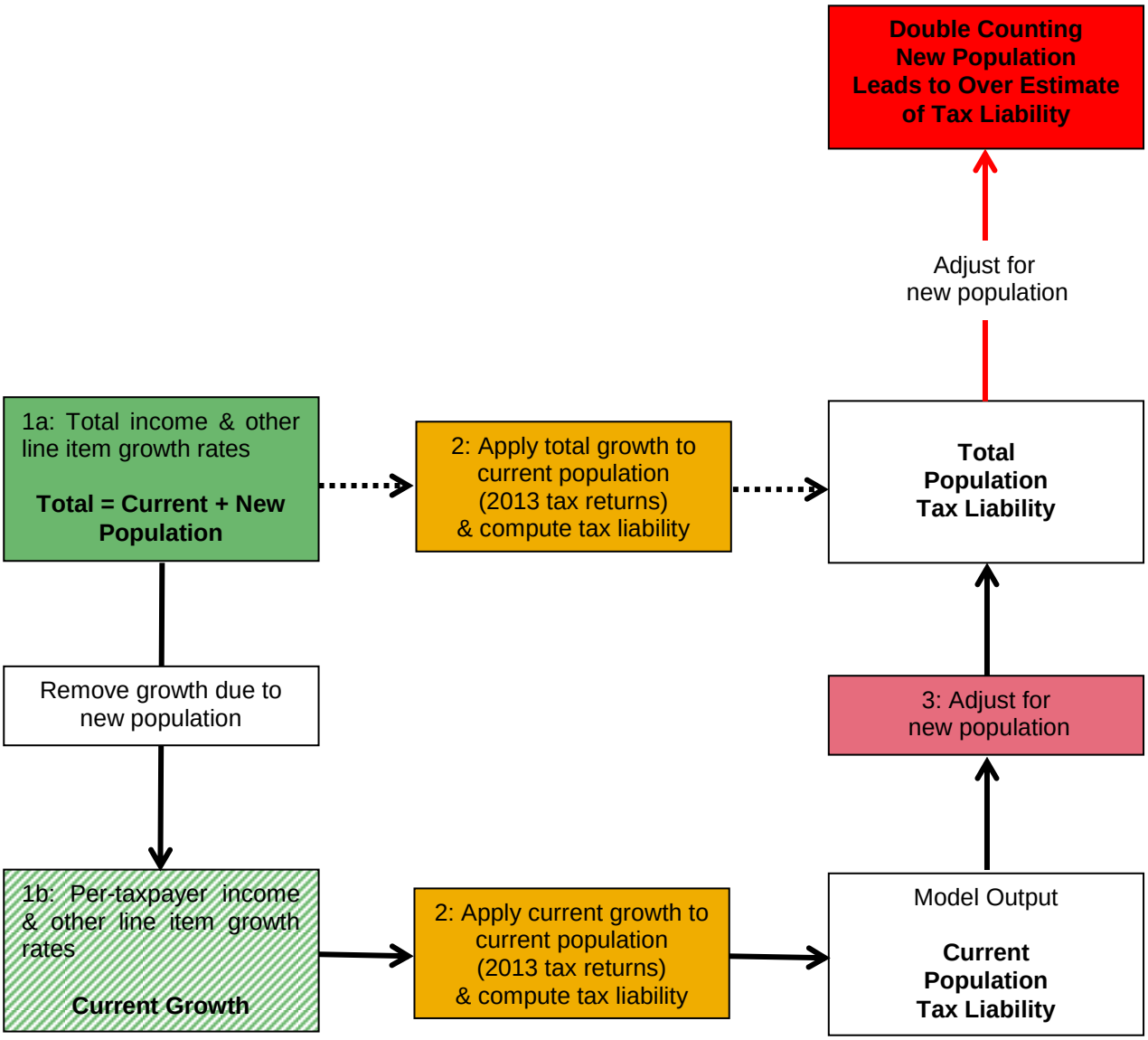


As it turns out, it should not matter whether the taxpayer sub-model is artificially adjusted. All sub-model growth items are deflated by the anticipated cumulative taxpayer growth rate by year. Then in the conversion process, the simulation model output of full year resident liability for each calendar year is augmented by the associated cumulative taxpayer growth for that year.

Executive Difference Arises Due to Inconsistent Application of Growth in Taxpayer Base

The executive line item growth rates are not deflated to produce per-taxpayer growth rates for the simulation model—thereby implicitly including taxpayer growth within the simulation model. As described above, this would produce very little difference if the model output were then not inflated to for growth in the taxpayer base. However, the executive did inflate the model output, essentially doubling the anticipated taxpayer growth. The impact of the double counting is $120-$140 million, depending on what conversion process is used.

The figure below illustrates the paths from total line item growth rates to total tax liability, as well as steps where the computation would be left incomplete or over-adjusted.



Step 2: Current Year Tax Simulation Model from Department of Revenue

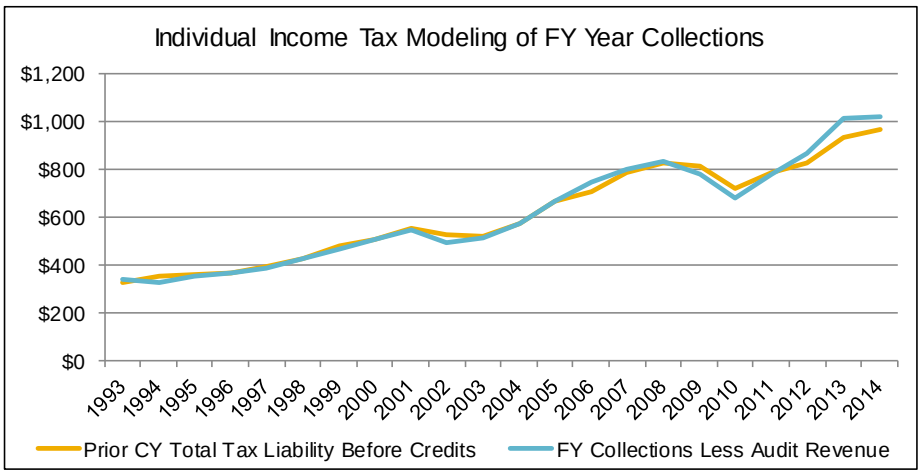
Each year DOR updates the tax simulation model to reflect changes in state and federal tax laws, and individualize it to a given tax year's taxpayer data. Identical models were used, so no difference arises from this step.

Step 3: Conversion to Fiscal Year and Inclusion of Audit Revenue

Although the executive and LFD use slightly different methodologies to convert the calendar year tax liability output of the model to fiscal year collections, and project future audit revenues, the differences in this step are largely offsetting.

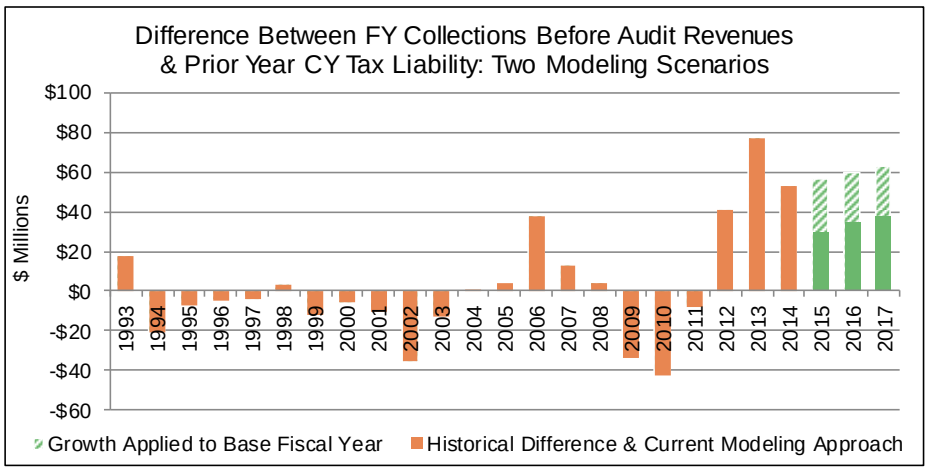
The executive conversion produces FY liability by averaging CY total liability after credits; this implicitly assumes that all credits are refundable and leads to a calculated FY liability that is biased on the low side. To adjust for the downward bias, the executive includes a $90 million over the three-year period, with adjustments of $40 million in FY 2015, $30 million in FY 2016, and $20 million in FY 2017.

The LFD conversion process models FY collections before audit revenues against prior calendar year total tax liability before credits since FY 1993, and projects future collections based on the anticipated future total tax liability before credits. The historical fit between these two series is shown in the chart to the right.

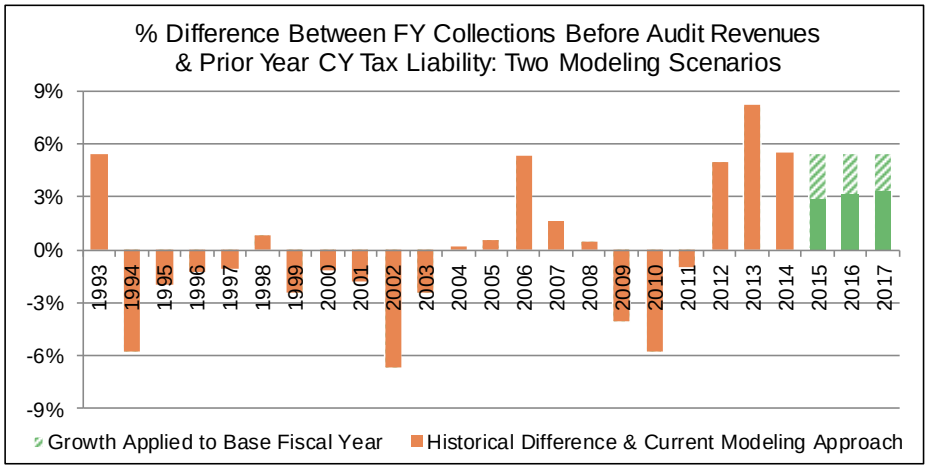


The current conversion method attempts to account for taxpayer behavior by comparing what has been collected to liability. In previous biennia, the growth of taxpayer liability would have been applied the last year of fiscal collections. In the case of FY 2013 or FY 2014, where collections appear to have been higher than the actual liability, applying the growth rate to the last year would result in a potential overestimate of future collections. Similarly, applying growth rates to an unusually low base fiscal year—such as FY 2010—could underestimate future collections.

The impact of the two different methodologies described above when applied to the LFD January forecast is illustrated in the chart s to the right, in dollar and percentage terms. Note that the total three-year difference between the previous base year method and the current regression method is $76.0 million.

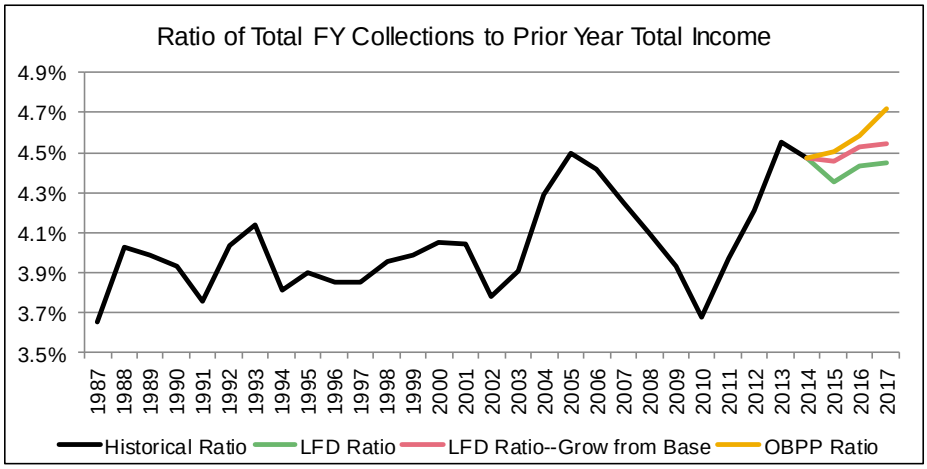


The positive difference between collections and liability in the past several years suggests that taxpayers have been overpaying and applying the overpayment to next year's returns. The current LFD conversion and the previous base year method assume this behavior will continue, although to different extents. The risk is, if taxpayers stop overpaying and request refunds en masse, the revenue estimate based on either methodology may be too high. The total FY 2015 – FY 2017 difference ranges from $102 million to $178 million.



Conversion Reasonableness Check

A quick method for checking the reasonableness of the tax simulation model and conversion process is to compare total fiscal year collections with prior year total income. The average of this ratio since FY 1987 is 4.04%, although the volatility has increased in recent years, as shown in the chart below:



The chart above shows the historical ratio from FY 1987 through FY 2014, and compares the current LFD January ratio, the LFD ratio if the past conversion method were used, and the OBPP January ratio.

Year-to-Date Collections: Withholding & Refunds

Individual income tax collections are $60.2 million or 8.1% above last year, and above the anticipated growth of 4.2% contained in HJ 2. There was a payment of $9.3 million that was mistakenly posted to the mineral royalties withholding account that should have been posted to the oil and natural gas clearing account; this correction will be shown in the April year-to-date report. Account for this correction in the table below would result in a mineral royalties decline of 12.8%, and total growth of $50.9 million or 6.8% above this time last year.

Individual Income Tax ($ Millions)				
	YTD 2015	YTD 2014	$ Difference	% Difference
Withholding	$558.9	$517.2	$41.8	8.1%
Estimated Payments	171.7	157.6	14.1	9.0%
Current Year Payments	21.3	23.8	(2.5)	-10.6%
Audit, P&I, Amended	22.9	21.1	1.7	8.3%
Refunds	(124.1)	(118.0)	(6.0)	5.1%
Refund Accrual Reversal	132.6	129.1	3.5	2.7%
Partnership Income Tax	4.7	5.0	(0.3)	-5.5%
Mineral Royalties	18.9	10.9	7.9	72.9%
Total	$806.9	$746.7	$60.2	8.1%

According to the Department of Revenue, as of the end of February, the total number of individual income tax returns processed in FY 2015 is 0.7% below the level of FY 2014, the number of refunds issued is about 3.6% below the FY 2014 level, and the average refund is 0.8% below that of FY 2014.

The department is continuing a thorough review of returns that have been stopped for potential fraud. As of the end of February, there were roughly 5,100 returns with a total amount of $3.2 million; according to the department, some of this amount would also have been stopped—both this year and last year—for routine edits, and in total shouldn't have much of an impact on year-to-date comparisons.