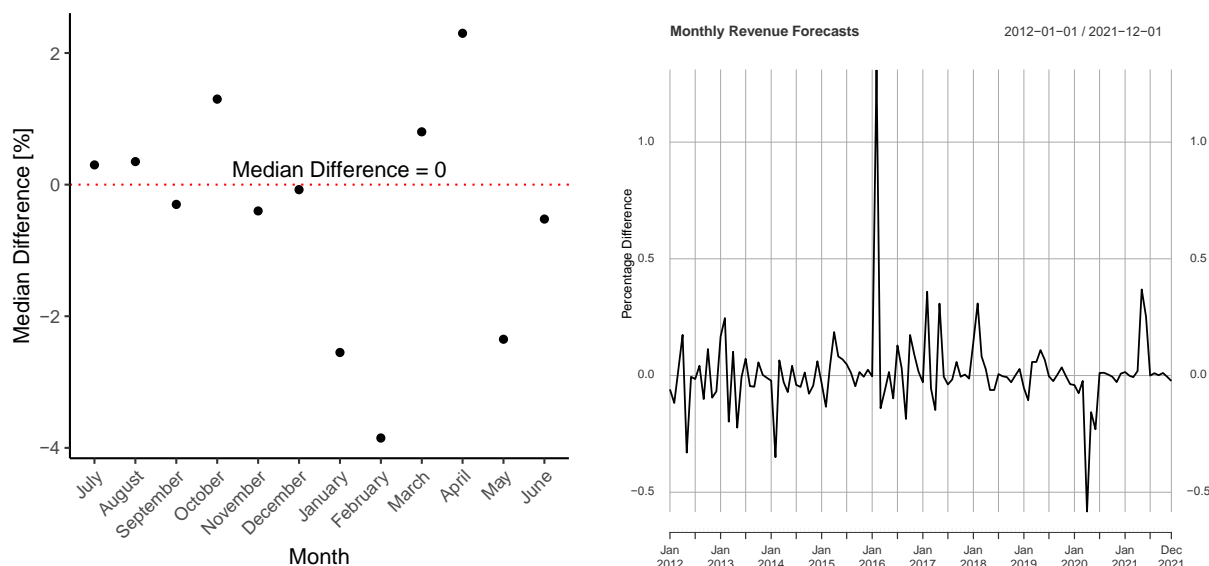


TO: INDIANA STATE BUDGET AGENCY
FROM: JACOB ALDER, REVENUE ANALYST
DATE: FEBRUARY 2, 2022 (UPDATED FEBRUARY 11, 2022)
RE: INDIANA FY 2023 REVENUE TARGETS

This memorandum provides an updated FY 2023 forecast of Indiana's personal income tax (PIT) revenue. To prepare this 12-month forecast, I used historic Indiana revenue data and compared it with actual revenue collection from 2012 to 2021. I present the results in Figures 1 and 2, showing the median of each month's forecast accuracy over time. I pursued this estimation to validate my forecast results, which are detailed at the end of the memo.

The red dotted line shows the mean of zero. The graph on the left shows the fiscal years from 2012 to 2022, each observation denoted by a circle. The graph on the right denotes the percentage difference for each month in the range. The historic data indicate that the State's revenue forecasts are consistent within a 3% range, with an anomalous February, which I interpret to be skewed slightly due to COVID-19.

FIGURES 1, 2. INDIANA REVENUE TARGET ACCURACY BY FISCAL YEAR AND MONTH; 2012 – 2021



Note: On the left, the scatterplot shows median deviation from Indiana revenue forecasts, displayed by month, over the time period 2012-2021. On the right, the scatterplot shows the full deviation of each year. Historic Indiana revenue forecast data obtained from the Indiana State Budget Agency indicate most target forecasts are close to actual revenue collections, but forecasts in some months, like February, appear to trend under. Other anomalies in the data, like January 2016 (on the right) were clear outliers. February, March 2020 forecasts reflect discrepancies from COVID-19.

The expected deviation from the mean of zero indicates that Indiana revenue forecasts are relatively accurate over time. A few deviations, such as in January 2016 (higher revenues than anticipated) and 2020 (lower revenues than anticipated), appear to fall within an average three

percent range of difference from the median, though the individual years and months may vary more.

The subsequent analysis portrays my adjusted revenue forecast for FY 2023, which begins in July, 2022. To obtain the forecast, I used a linear decomposition analysis by demeaning the data to eliminate the seasonal noise, apparent in Figure 3, to produce robust estimates, shown in Table 1.

FIGURE 3. IN FY 2023 REVENUE FORECAST—GRAPH

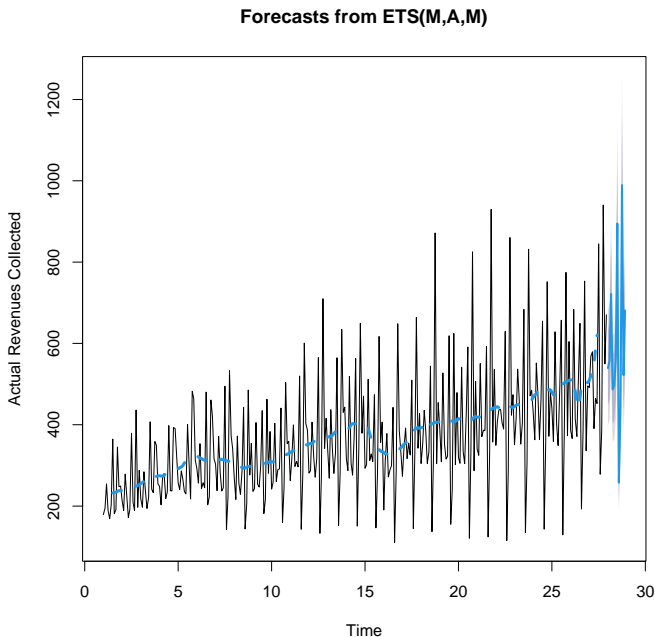


TABLE 1. REVENUE FORECAST—TABLE

FY 2023	Forecast (\$ Millions)
July '22	539.53
August '22	557.93
September '22	721.63
October '22	487.19
November '22	496.44
December '22	563.90
January '23	894.98
February '23	257.47
March '23	439.97
April '23	989.43
May '23	522.16
June '23	681.43
Total	7,152.08

Note: On the left, the black linear trend shows historical data from FY 1995–2021 as a training method to forecast FY2023, plotted from year zero. The blue dotted line shows a linear fit, adjusted for seasonality. The blue solid line between time 25 and 30 is the revenue forecast. For ease of interpretation, the tabular forecast is presented in Table 1, on the right.

The total personal income tax revenue forecast for FY 2023 is \$7,578.9 million; using my historical analysis adjusted for seasonality, I project a revenue shortfall of \$426.8 million. Given that this is a substantial shortfall, I examined various ranges to assess what would have produced the smallest average difference between actual and target. I determined that two years prior to 2015, generated the smallest average difference between actual and target revenues, because this range accommodates for the revenue shortfall Indiana experienced in January 2014.

Using this insight to inform my FY 2023 forecast, I used revenues from FY 2020–2021 to forecast 2023, but the revenue shortfall was erratic and less statistically significant than my inclusion of the full year range. Thus, I maintain my estimate of a nearly \$430 million revenue shortfall and recommend the State Budget Authority evaluate the consequences of a potential revenue shortfall in FY 2023.