State of Indiana

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DECEMBER 2023 REVENUE FORECAST

Methodology and Technical Documentation

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Introduction

This document provides an overview of the December 2023 state revenue forecast. The calculation instructions, model specifications, summary statistics, and forecasts are included.

For further information and assistance in the calculation of models, please contact the State Budget Agency's Office of the Chief Economist and Tax Analysis at 317-232-5610.

Revenue Forecast Committee

The revenue forecast technical committee is comprised of members from both the executive and legislative branches. Staff from both the State Budget Agency and Legislative Services Agency have a vital role in the process by assisting with data analysis and modeling. Each forecast model and revenue estimate are agreed to by the technical committee on a consensus basis.

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Economic Forecast

The forecast committee uses economic forecasts from S&P Global Market Intelligence (formerly IHS Markit). Forecasts cited in this document are provided by S&P Global Market Intelligence, a leading economic consulting firm. S&P Global Market Intelligence is routinely ranked among the leading economic forecasters in studies by The Wall Street Journal and Bloomberg Markets.

Section I: Commentary on the Economic Forecast

S&P Global Market Intelligence (formerly IHS Markit) projects U.S. real gross domestic product growth of 2.5% in FY 2024 and 1.1% in FY 2025. During the same period, Indiana's real gross state product is projected to grow 2.1% in FY 2024 and 0.4% in FY 2025. Additionally, Indiana nominal wages and salaries are projected to grow by 5.9% in FY 2024 and 3.4% in FY 2025.

Economic and State General Fund revenue trends should be interpreted within historical perspective and in the context of macroeconomic dynamics and evolving policy actions at the federal and state level. Following temporary federal stimulus and other idiosyncratic dynamics (pandemic related etc.) that pushed revenues from $18.5B in FY 2021 (excl. deferred payments from FY 2020 to FY 2021 due to deferral of the tax year 2020 federal tax deadline) to $21.2B in FY 2022 (14.4% growth), the FY 2024-2025 period is projected to see continued rebalancing in the economy from the deceleration seen in FY 2023. In the context of the changing macroeconomic landscape, and differences between nominal and real (adjusted for inflation) growth, revenues will be impacted by diverging factors. For instance, while a period of higher inflation and interest rates may limit the growth in the quantity of demand, higher income and wealth effects provide support to growth going forward. Particular indicators that are rebalancing include employment, consumer prices, excess savings, financial markets, spending on goods relative to services, and supply and demand dynamics with durable goods, household financial obligations, and more.

Overall, (1) FY 2024 State General Fund revenues are projected to be 2.1% below FY 2023 and FY 2025 State General Fund revenues are projected to grow at an annual rate of approximately 3.8%.

Recent and scheduled legislative changes (individual income tax rate reduction, repeal of taxes on utility receipts and utility services use, gasoline use tax no longer distributed to the State General Fund, and more), also impact revenue trends. While economic indicators are projected to decelerate and remain above pre-pandemic growth trend, the combined impact of legislative changes and economic factors is projected to drive core tax revenues (sales and income taxes) -2.2% in FY 2024 and -1.5% in FY 2025. Revenues from other sources will be driven by strength in General Fund interest revenues.

Below are some notes on the December 2023 economic forecast from S&P Global Market Intelligence.

Easing inflation and labor markets supporting growth despite headwinds from Fed rate hikes

- Inflation has eased considerably, but still above the Fed's target level.
  - Goods inflation generally under control; shelter costs heading in the right direction but need to come down more.
  - Federal Reserve rate hikes might be over, but reversal may not be imminent.
- Similarly, labor market moving toward balance but still too tight.
  - Monthly job gains have steadily moderated.
  - Labor force growth has helped on the supply side.
- Resilient consumer spending has been a major feature of recent strength of the economy.
  - Gains should weaken soon as pent-up demand mostly exhausted, while excess savings have been drawn down.
  - Student loan payments resumed, SNAP payments reduced while Medicaid enrollment decreased
- Infrastructure projects and construction boom in factories (computer equipment, electronics) saw unprecedented growth in mid-2023 on funding from Infrastructure Investment and Jobs Act, CHIPS Act, and Inflation Reduction Act.
  - Recent level of growth can't be sustained; question is whether spending will level off or drop
  - Money is part of the equation, but capacity issues also may be a factor.

Economic output moderates, while risks to the forecast are still in play

- Our baseline forecast resembles the elusive "soft landing" as growth slows in order to ease inflation but doesn't drop into a recession.
- After 2.4% growth in real GDP in 2023, growth drops to 1.5% in 2024 and 1.3% in 2025.
  - Reduced contributions from consumer spending, Federal government spending, and business fixed investment.
  - Unemployment rate rises gradually, from 3.6% in 2023 to 4.5% by 2026.
- Key risks include:
  - Commercial real estate slump.
  - Credit pullback, partly in response to the above, that impacts consumers as well as business.
  - Conflicts in Ukraine and the Middle East intensify, disrupting commerce.
- Federal government shutdown an ongoing possibility
  - Amount of economic disruption depends on the extent of shutdown.
  - In full shutdown, roughly 850,000 of 2.1 million civilian employees could be furloughed.

Indiana outlook features slowing growth in output and payrolls, with continued gains in wages and income

- Indiana's economic growth outlook follows a similar path to the US.
  - Indiana employment growth was a bit higher than expected in 2023, boosted by labor force expansion and sustained demand.
  - Wage gains have slowed as labor market gained some slack, but still especially strong at lower end of wage range.
- Auto manufacturers have made substantial progress in rebuilding inventories.
  - UAW strike caused short-term disruptions across the automotive supply chain, but industry is getting caught up after multi-year inventory shortfalls
  - Transition to electric vehicles in flux; creating plenty of opportunities along with uncertainties.
- Homebuilding pulled back in response to higher mortgage rates but has leveled off.
  - Record-low inventory and high home prices encouraging building despite higher costs.
  - Volume of home sales remains historically low as homeowners hang on to their existing homes (and mortgage rates).
- The state is slated to add big industry projects over the next few years, notably in electric vehicle batteries and drivetrain components along with semiconductors.

Bottom line for Indiana

- The state economy remains on solid footing
  - Labor force gains have been helped meet demand for more workers.
  - The state's research and development resources, along with its manufacturing experience, are generating and attracting cutting-edge industry opportunities.
- Manufacturing output growth will weaken and employment will pull back as demand for goods levels off.
  - Automakers have mostly rebuilt inventories after years of supply chain disruptions.
  - Recreational vehicle shipments slowed from the torrid pace of 2021 and 2022 (especially in trailers).
- The pace of homebuilding slowed but has leveled off, as persistent high home prices provide support.
  - Supply of homes still generally well below potential demand, especially from younger age groups.
  - Multi-family segment has been especially strong, but single-family building also active.
- Risks to the state's economy mirror issues at the national level.
  - On the downside, persistent inflation, banking issues, global turmoil could pull down growth by more than expected.
  - On the upside, consumer spending could remain robust, boosting manufactured goods, travel and tourism, etc.
- Longer-term issues remain the same – labor force must continue to grow in size and skill level to allow existing business to expand and to attract new business.

Section II: Economic Indicators for Indiana

Fiscal Year Amounts

Indiana Economic Indicators	FY 2022 Actual	FY 2023 Actual	*FY 2024 Forecast*	*FY 2025 Forecast*
Personal Income (Millions $)	388,945.75	405,954.60	423,436.98	443,939.28
Adjusted Personal Income (Less transfer payments) per Household (Thousands $)	112.31	117.19	122.24	127.27
Household net worth per household (Thousands $)	979.55	962.99	1015.59	1,036.93
Prior FY Home Sales	126.74	123.18	97.45	91.71
Personal Savings (Millions $)	18,545.78	14,794.35	16,425.02	23,698.07
Nominal Wages and Salaries (Millions $)	186,990.33	198,917.08	210,561.50	217,639.45
Real GSP, Retail Trade (Millions 2012 $)	20,995.00	22,192.70	22,412.63	21,939.52
Gross State Product (Millions $)	448,606.75	484,107.70	507,800.01	521,915.98

US Economy				
Household Financial obligations ratio	14.30	14.56	15.10	15.51
Retail Price on All Grades of Gasoline (cents $)	386.54	390.01	361.46	345.54
GSP / GDP, Two-Year Moving Average	0.0180	0.0182	0.0182	0.0181
Dividend Payments to individuals and Personal Interest Income (Billions $)	3,332.62	3,539.59	3,746.11	4,160.28
S&P 500 Index	4,399.83	4,008.22	4,541.23	4,651.07
Change in Prior CY S&P 500 Index	1,048.29	-166.09	175.28	368.75

Year-Over-Year Percentage Change

Indiana Economic Indicators	FY 2022 Actual	*FY 2023 Forecast*	*FY 2024 Forecast*	*FY 2025 Forecast*
Personal Income (Millions $)	4.29%	4.37%	4.31%	4.84%
Adjusted Personal Income (Less transfer payments) per Household (Thousands $)	7.35%	4.35%	4.31%	4.12%
Household net worth per household (Thousands $)	11.05%	-1.69%	5.46%	2.10%
Prior FY Home Sales	13.91%	-2.81%	-20.89%	-5.90%
Personal Savings (Millions $)	-61.89%	-20.23%	11.02%	44.28%
Nominal Wages and Salaries (Millions $)	10.15%	6.38%	5.85%	3.36%
Real GSP, Retail Trade (Millions 2012 $)	-7.28%	5.70%	0.99%	-2.11%
Gross State Product (Millions $)	12.06%	7.91%	4.89%	2.78%

US Economy				
Household Financial obligations ratio	5.83%	1.84%	3.70%	2.71%
Retail Price on All Grades of Gasoline (cents $)	52.74%	0.90%	-7.32%	-4.40%
GSP / GDP, Two-Year Moving Average	1.12%	0.93%	0.09%	-0.48%
Dividend Payments to individuals and Personal Interest Income (Billions $)	9.84%	6.21%	5.83%	11.06%
S&P 500 Index	17.95%	-8.90%	13.30%	2.42%
Change in Prior CY S&P 500 Index	242.58%	-115.84%	205.53%	110.38%

Section III: Models Used in the Forecast

Sales & Use Taxes

The implied tax base for sales tax net of GUT is calculated by (1) subtracting gasoline use tax revenues; (2) subtracting remote sales revenues attributable to recent Wayfair decisions and marketplace facilitator legislative changes (“remote sales"); and (3) dividing the result by the prevailing sales tax rate for that fiscal year. This methodology allows for specific methodologies that capture distinctive dynamics impacting overall sales and use tax collections. Gasoline use tax collections and sales tax collections attributable to remote sales are forecasted separately.

The sales and use tax forecast until FY 2023 consisted of two parts: (1) a sales net of gasoline use tax model (“sales net of GUT") and (2) a gasoline use tax model (“GUT”). The reason for developing the two models was to better account for the impact that volatile gasoline prices have on total sales and use taxes. The distribution of the gasoline use tax was amended during the 2023 legislative session (HEA 1001-2023). It diverted gasoline use tax revenue that would have been deposited in the state general fund FY 2024 onward to the state highway fund. Therefore, the gasoline use tax is no longer deposited in the General Fund.

The general fund share of total gasoline use tax collections has been decreasing every fiscal year and was set to decrease from 21.445% in FY 2023 to 0.0% in FY 2025.

The sales net of the GUT model has been adjusted, as part of the December 2023 forecast, to better address evolving dynamics that are affecting sales tax revenues, and the GUT model is eliminated. Data used for sales net of GUT model is also adjusted to account for legislative changes, payment timing and other specific aspects that have altered tax collections trends over time.

Notably, the sales net of GUT model uses (1) Indiana adjusted personal income (less transfers payments) per household to potentially capture a measure of income that would better reflect the ability to spend, (2) U.S household obligations ratio as a percent of disposable income to potentially capture the impact of credit on the ability and willingness to spend, (3) MA (2) Prior FY Personal Savings to capture the potential impact on current year spending from recent changes in savings (4) Prior FY Home Sales to capture the taxable share of consumer spending in Indiana (5) Household Net Worth per Household to capture the impact of wealth effects and household balance sheets on the willingness and ability to spend on taxable purchases.

Sales & Use Taxes: Sales Net of Gasoline Use Tax

Log (Sales Net of GUT Tax Base) = β0 + (β1 * Log (Indiana Adjusted Personal Income (Less Transfer Payments) Per Household)) + (β2 * U.S. Household financial obligations ratio) + (β3 * Log (MA (2) Prior FY Personal Savings)) + (β4 * Log (Prior FY Home Sales)) + (β5*Log (Household Net Worth per Household))

Coefficient Statistics:

Coefficient	Estimated Coefficient
β_0	6.037***
β_1	0.769***
β_2	0.029***
β_3	0.046***
B_4	0.052**
B_5	0.138**

Model Statistics:

Adjusted R^2	0.997
Predicted R^2	0.996
DW Statistic	2.729
Sample Size (n)	27

*Significance: *p < 0.1, **p < 0.05, ***p < 0.01*

Historical Revenue Data				
Fiscal Year	Adjusted General Fund Revenue (Millions $)	Growth Rate	Commuter Rail Service Fund	Industrial Rail Service Fund
2019	7,626.14	3.6%	10.01	2.37
2020	7,835.81	2.7%	10.28	2.43
2021	8,925.60	13.9%	11.69	2.77
2022	9,809.99	9.9%	12.89	3.05
2023	10,322.16	5.2%	13.57	3.21

Forecast Revenue Data				
Fiscal Year	Adjusted General Fund Revenue (Millions $)	Growth Rate	Commuter Rail Service Fund	Industrial Rail Service Fund
2024	10,455.3	1.3%	13.72	3.25
2025	10,916.9	4.4%	14.32	3.39

Forecasted revenue shown above also includes adjustments related to legislative acts and remote sales as a result of the Wayfair ruling in 2018 and other changes related to marketplace facilitators.

Individual Income Tax

The individual income tax forecast is based on (1) a model of state and local withholding payment activity, (2) a model of state and local estimated payments and other non-withholding payment activity combined with a separate estimate of individual income tax refunds, and (3) a separate estimate of local income tax revenues. The selected equations use fiscal year data rather than quarterly data. A fiscal year methodology reduces the risk of factors involving atypical timing delays affecting the model output.

The withholding payments model seeks to capture payments received for both state and local withholding on income tax, excluding non-resident partnership withholdings. The non-resident partnership withholdings attributable to individual income taxpayers are estimated separately, based on historical data.

The estimated payments & other non-withholding model seeks to capture non-withholding individual income tax payment activity. Refunds are estimated separately to arrive to the net forecast.

Lastly, an estimate for local income tax revenues is generated and subtracted from the sum of state and local individual income tax collections to arrive at the net state individual income tax revenue forecast. The local income tax forecast is based on a calculation of the statewide weighted average local income tax rate relative to the state rate. In essence, it seeks to capture the share of payments that is attributable to local income taxes.

In FY19 and thereafter, a notable adjustment to the forecast is the estimated impact of Indiana's tax changes relative to the state's conformity to the 2017 Federal Tax Cuts & Jobs Act.

The most recent tax cut, enacted in 2022 and accelerated in 2023, will bring the income tax rate from 3.23 percent to 2.9 percent over the next four years.

Total State Income Tax Forecast = Total State and Local Withholding Payments + Total State and Local Estimated Payments & Other Non-Withholding Payments Net of Refunds – Local Income Tax Payments

Individual Income Tax: Withholdings

The withholding forecast is based on a methodology that seeks to capture the overall state and local withholding tax payment liability. This methodology reflects the actual cash flow process as both state and local withholding income tax payments initially come in together at the Department of Revenue level as withholding tax collections. The model is therefore able to use actual data of withholding tax payments for its forecast.

While Indiana's salary and wage disbursements is the major driver of withholding, adjustments relative to personal contribution to social insurance and residence adjustment add value by accounting for factors that impact the taxable income based on which the Indiana withholding tax is applied. On the same note, a variable for Indiana prior year births is added to address significant events (newborn children etc.) that would affect a taxpayer's withholding. The 'prior year' nature of the Indiana births variable also seeks to address the timing of when taxpayers would change their withholding details.

The forecast generated by the model is adjusted to account for (1) the combined state income tax rate and statewide average local income tax rate applicable to tax payments due during that period; (2) payment delays; and (3) corporate tax payments transferred to individual income taxes (nonresident shareholders' withholdings).

Log (Withholdings Payment Liability) = β0 + (β1 * Log (Indiana Wage Disbursements Less Personal Contribution to Social Insurance + Residence Adjustment)) + (β2 * AR (1)) + (β3 * Log (Indiana Prior Year Births))

Coefficient Statistics:

Coefficient	Estimated Coefficient
β_0	0.184
β_1	0.855***
β_2	0.171***
β_3	-0.128*

Model Statistics:

Adjusted R^2	0.999
Predicted R^2	0.999
DW Statistic	1.869
Sample Size (n)	26

*Significance: *p < 0.1, **p < 0.05, ***p < 0.01*

Historical Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2019	7,786.06	3.85%
2020	7,827.57	0.53%
2021	8,555.06	9.29%
2022	9,468.10	10.67%
2023	10,167.06	7.38%

Forecast Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2024	11,043.59	8.62%
2025	11,367.08	2.93%

Individual Income Tax: Estimated Payments and Other Non-Withholding

Similarly, to the withholding forecast, the estimated payments & other non-withholding payment forecast is based on a methodology that seeks to capture the overall state and local non-withholding tax payment liability.

In terms of variables, the model uses (1) the combination of U.S personal interest income, U.S dividend payments to individuals; (2) the change in Prior CY S&P 500 index of common stocks, and (3) the prior year level of estimated payments & other non-withholding payments. These variables seek to capture income from investments, businesses, reconciliations, and other sources that are not captured in withholdings but affect the estimated payment and final payment liability.

The forecast generated by the model is adjusted to account for (1) payment delays; (2) impacts of legislative changes; and (3) refunds (based on average proportion of refunds relative to total individual income tax payments).

Log (Estimated Payments & Other Non-Withholding Payment Liability) = β0 + (β1 * Dividend payments to Individuals + Personal Interest Income) + (β2 *Change in Prior CY S&P 500 index of common stocks) + (β3 * AR (1))

Coefficient Statistics:

Coefficient	Estimated Coefficient
β_0	6.716***
β_1	0.000***
β_2	0.000***
B_3	0.313***

Model Statistics:

Adjusted R^2	0.988
Predicted R^2	0.986
DW Statistic	2.145
Sample Size (n)	26

*Significance: *p < 0.1, **p < 0.05, ***p < 0.01*

Historical Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2019	1,114.15	13.99%
2020	475.71	-57.30%
2021	2,023.87	325.44%
2022	2,280.93	12.70%
2023	1,534.51	-32.72%

Forecast Data		
Fiscal Year	Adjusted Revenue	Growth
2024	1,248.12	-18.66%
2025	1,481.57	18.70%

Individual Income Tax: Local Income Tax

The estimate for local income tax revenues is based on a calculation of the statewide weighted average local income tax rate relative to the state rate. In essence, it seeks to capture the share of payments that is attributable to local income taxes.

Historical Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2019	2,843.25	6.94%
2020	3,031.46	6.62%
2021	3,047.40	0.53%
2022	3,567.88	17.08%
2023	4,125.85	15.64%

Forecast Data		
Fiscal Year	Adjusted Revenue	Growth
2024	4,279.72	3.73%
2025	4,565.04	6.67%

Corporate Taxes: Corporate AGI

The corporate adjusted gross income ("AGI") model is based on a methodology that seeks to capture the corporate AGI tax payment liability. Notably, the model looks to address (1) overall trend in corporate profitability and size of the corporate sector but also (2) the specific dynamics that Indiana's corporate tax base is exposed to relative to its industry composition, (3) recognition of income attributable to Indiana.

The model uses variables such as the Indiana gross state product, Indiana GSP/US GDP, and the S&P 500 index of common stocks.

The forecast generated by the model is combined with specific adjustments to account for (1) the blended corporate tax rate potentially applicable to tax payments due during that period; (2) payment delays; (3) material changes in corporate tax credits and impacts of legislative changes; (4) refunds; (5) corporate payments transferred to individual income taxes (nonresident shareholders' withholdings).

Log (Corporate Payments Liability) = β0 + (β1 * Log (Indiana Gross State Product)) + (β2 * (Indiana GSP/US GDP) + (β3 * S&P 500 Index of Common Stocks)

Coefficient Statistics:

Coefficient	Estimated Coefficient
β_0	-14.344***
β_1	1.340***
β_2	334.456***
β_3	0.000***

Model Statistics:

Adjusted R^2	0.986
Predicted R^2	0.979
DW Statistic	2.306
Sample Size (n)	18

*Significance: *p < 0.1, **p < 0.05, ***p < 0.01*

Historical Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2019	603.02	54.37%
2020	437.55	-27.44%
2021	994.94	127.39%
2022	1,235.65	24.19%
2023	1,127.94	-8.72%

Forecast Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2024	1,033.79	-8.35%
2025	1,083.60	4.82%

Corporate Taxes: Other Corporate Taxes

In addition to the corporate AGI forecast, revenues from the financial institution tax are estimated separately using historical compounded annual growth rates.

HEA-1002 (2022) repealed the Utility Receipts Tax (URT) and Utility Services Use Tax (USUT) starting July 1, 2022. These forecasts are then added together to get the total corporate tax forecast.

Financial Institutions Tax

Forecast Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2024	112.87	7.17%
2025	118.87	5.32%

Cigarette & Other Tobacco Products Tax

The committee estimates cigarette tax and tobacco products tax separately. Cigarette sales, measured in packs of 20, depend upon prior year cigarette pack sales, an estimate of the sum of the four surrounding states' nominal prices, the nominal Indiana price, and a dummy for the smoking age population. Other tobacco product sales are estimated based on an annual fiscal year trend.

Log (Packets Sold) = β_0 + (β_1 * Log (Prior Year Cigarette Pack Sales)) + (β_2 * Log (Nominal Indiana Cigarette Price)) + (β_3 * Log (All Neighbors' Nominal Price)) + (β_4 * Dummy for Smoking Age Population)

Coefficient Statistics:

Coefficient	Estimated Coefficient
β_0	1.667***
β_1	0.822***
β_2	-0.725***
β_3	0.616***
β_4	-0.074**

Model Statistics:

Adjusted R^2	0.980
Sample Size (n)	38

*Significance: *p < 0.1, **p < 0.05, ***p < 0.01*

Historical Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2019	368.67	-3.9%
2020	373.65	1.4%
2021	368.70	-1.3%
2022	346.55	-6.0%
2023	317.09	-8.5%

Forecast Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2024	$301.26	-5.0%
2025	$288.95	-4.1%

Note: The state General Fund receives 56.24% of the cigarette and tobacco products taxes. The historical and forecasted revenues reflect cigarette tax (net of collection allowance) to state funds.

Alcoholic Beverage Taxes

The alcoholic beverage tax model includes three equations: one for beer, one for liquor, and one for wine. The beer and liquor include fiscal year real Indiana personal income and the real beverage price. The beer equation includes dummy variables for 1979 and after, 1993 and after, and 2012 and after. In the beer equation, the price and income variables are expressed in terms of natural logarithms, and in the liquor equation the income variable is expressed in terms of a natural logarithm.

Alcoholic Beverage Taxes: Beer

Log (Thousands of Gallons of Beer Sold in Indiana) = β_0 + (β_1 * Log (Prior Year Beer Sales)) + (β_2 * Log (Real Indiana Personal Income)) + (β_3 * Log (Real Price of Beer))

Coefficient Statistics:

Coefficient	Estimated Coefficient
β_0	2.427***
β_1	0.810***
β_2	0.033*
β_3	-0.262***

Model Statistics:

Adjusted R^2	0.980
Sample Size (n)	58

*Significance: *p < 0.1, **p < 0.05, ***p < 0.01*

BEER	**Actual* FY 2022**	**Actual* FY 2023**	**Forecast FY 2024**	**Forecast FY 2025**
GENERAL FUND	4.7	4.8	4.8	4.8
STATE CONSTRUCTION FUND	4.4	4.5	4.5	4.5
ENFORCEMENT & ADMIN	2.1	2.1	2.1	2.1
ADDICTION SERVICES	2.4	2.4	2.4	2.4
TOTAL	**13.5**	**13.7**	**13.7**	**13.8**

*Actuals are calculated based on reported gallons sold, not actual revenue.

Alcoholic Beverage Taxes: Liquor

Log (Thousands of Gallons of Liquor Sold in Indiana) = β_0 + (β_1 * Log (Real Indiana Personal Income)) + (β_2 * Real Price of Liquor)

Coefficient Statistics:

Coefficient	Estimated Coefficient
β_0	-4.924
β_1	1.198***
β_2	-0.076**

Model Statistics:

Adjusted R^2	0.979
Sample Size (n)	25

*Significance: *p < 0.1, **p < 0.05, ***p < 0.01*

LIQUOR	**Actual* FY 2022**	**Actual* FY 2023**	**Forecast FY 2024**	**Forecast FY 2025**
GENERAL FUND	13.8	13.1	13.3	13.7
STATE CONSTRUCTION FUND	16.2	15.4	15.5	16.0
ENFORCEMENT & ADMIN	1.5	1.4	1.5	1.5
ADDICTION SERVICES	0.8	0.8	0.8	0.8
PENSION RELIEF FUND	4.7	4.5	4.5	4.7
TOTAL	**37.0**	**35.2**	**35.6**	**36.7**

*Actuals are calculated based on reported gallons sold, not actual revenue.

Alcoholic Beverage Taxes: Wine

Compound Annual Growth Rate from 2011-2022 to trend wine consumption.

WINE	Actual* FY 2022	Actual* FY 2023	Forecast FY 2024	Forecast FY 2025
GENERAL FUND	3.5	3.5	3.6	3.7
STATE CONSTRUCTION FUND	2.2	2.3	2.3	2.4
ENFORCEMENT & ADMIN	0.6	0.6	0.6	0.6
ADDICTION SERVICES	0.3	0.3	0.3	0.3
WINE GRAPE	0.0	0.0	0.0	0.0
TOTAL	**6.5**	**6.7**	**6.8**	**7.0**

*Actuals are calculated based on reported gallons sold, not actual revenue.

Riverboat and Racino Wagering

The committee uses an equation to estimate the total adjusted gross wagering receipts of the state's eleven riverboat casinos and two racinos. Adjusted gross wagering receipts serve as the tax base for both wagering taxes. These estimates are then adjusted to compute the estimated fiscal year riverboat wagering tax collections and racino slot machine wagering tax collections. The equation estimates the quarterly total adjusted gross wagering receipts with nominal Indiana personal income, a set of dummy variables for market and seasonal changes, and an interaction variable that accounts for other economic and market circumstances.

The baseline adjusted gross wagering receipts forecast is then adjusted to account for: (1) potential competitive impacts from new casino operations in neighboring states, (2) changes in Indiana laws, (3) court decisions impacting taxation of gaming revenues, and (4) the competitive effects of a new casino in South Bend, Indiana.

Total Adjusted Gross Wagering Receipts = β_0+ (β_1 * Indiana Personal Income) + (β_2 * CY Q4 Dummy) + (β_3 * Four Winds Dummy) + (β_4 * Racinos Dummy) + (β_5* Ohio Dummy) + (β_6 * Indiana Personal Income * Four Winds Dummy)

Coefficient Statistics:

Coefficient	Estimated Coefficient
β_0	-58,975,625
β_1	3,417***
β_2	-30,383,439 ***
β_3	631,570,667***
β_4	58,170,725***
β_5	-0.58***
β_6	-3,110***

Model Statistics:

Adjusted R^2	0.942
Sample Size (n)	70

*Significance: *p < 0.1, **p < 0.05, ***p < 0.01*

Riverboat and Racino Wagering

Riverboat Wagering Historical Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2019	311.60	-1.8%
2020	200.28	-35.7%
2021	282.55	41.1%
2022	311.25	10.2%
2023	348.85	12.1%

Riverboat Wagering Forecast Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2024	315.59	-9.5%
2025	308.99	-2.1%

Racino Wagering Historical Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2019	119.38	3.9%
2020	90.42	-24.3%
2021	126.22	39.6%
2022	141.12	11.8%
2023	139.77	-1.0%

Racino Wagering Forecast Data		
Fiscal Year	Adjusted Revenue (Millions $)	Growth
2024	135.75	-2.9%
2025	138.15	1.8%

Section IV: Technical Explanations

General Note on the Statistical Forecast Methodology

Models from this forecast are estimated using ordinary least squares regression ("OLS"). The OLS equation estimates the relationship between the explanatory variables (*x*) and the response variable (*y*). The multiple regression function is described by the equation below:

$$y = \hat{\beta}_0 + \hat{\beta}_1 x_1 + \ldots + \hat{\beta}_n x_n$$

In this equation $\hat{\beta}_1$ represents the relationship between the explanatory variable x_1 and the response variable *y,* while $\hat{\beta}_0$ equals the point at which the regression line intercepts with the y axis. The models used to estimate the state revenue forecast use this functional form. Certain models use the natural logarithmic form of the explanatory and response variables.

In order to calculate the forecast values of state revenue (*y* in the equation above) the committee uses forecast values of the explanatory variables (*x*) from S&P Global Market Intelligence (formerly IHS Markit). By substituting the forecast values of *x* in the equation, a future value of *y* can be estimated.

Explanations of summary statistics

Standard summary statistics for each model are included with the model specifications.

The Adjusted R^2 listed in the model summaries describes the total variation in the response variable (*y*) explained by the explanatory variables (*x*). An Adjusted R^2 equal to 0.90 means that 90% of the change in the dependent variable was explained by the change in the explanatory variables.

Predicted R^2 is calculated by systematically removing each observation from the data set, estimating the regression equation, and determining how well the model predicts the removed observation. It describes the total variation found in this way and determines how well the model explains new data.

The number of observations, or sample size, used to estimate the model is also listed as "n". Most of the forecast models are based on annual data, meaning that a model with an "n" equal to thirty is using thirty years of data. Certain models are based on quarterly data and in this case the statistic refers to the number of quarters used to estimate the model.

The Durbin Watson Statistic (DW Statistic) is a statistic that tests for first order autocorrelation in the residuals of a model. The presence of first order autocorrelation violates assumptions in regression theory thus harming model integrity.

The p-value measures the significance of the relationship between a particular explanatory variable and the response variable in the model. These p-values examine each explanatory variable's relationship with the response variable independently.