



STATE BUDGET AGENCY

212 State House
Indianapolis, Indiana 46204-2796
317-232-5610

Charles E. Schalliol
Director

REVENUE FORECASTING METHODOLOGY

Technical Committee:

- Erik Gonzalez
- Bob Lain
- Prof. John Mikesell
- Dan Novreske
- Ryan Pastorius
- Jeff Spalding

December 14, 2006

Discussion of the forecast

Real Gross Domestic Product (GDP) is forecasted to grow by 2.6% in FY 2007, 2.7% in FY 2008, and 3.1% in FY 2009. In nominal terms, GDP is forecasted to increase by 5.2% in FY 2007, and 5.0% in FY 2008, and 5.2% in FY 2009. U.S. Personal Income is forecasted to increase by 5.6% in FY 2007, 5.5% in FY 2008, and 5.5% in FY 2009. Nonfarm Personal Income in Indiana is forecasted to increase by 5.0% in FY 2007, 4.6% in FY 2008, and 4.7% in FY 2009.

Discussion of the equations used in the forecast

Sales Tax

This equation uses fiscal year nominal Indiana Nonfarm Personal Income (FY_NFIPI) and a dummy variable (D1) to account for the rapid increase and destruction of wealth during the years of 1996 through 2002. The model used by the Committee is replicated as Equation (1) below. The Committee adjusted the results from this equation to account for the response of consumers to the increase in the sales tax rate in 2002 and the effect of subsequently enacted tax measures.

Equation (1) $Sales Tax = 162.648175 + 0.021097(FY_NFIPI) + 102.535743(D1) + Adjs.$

$$D1 = 1 \text{ if year } >1995 \text{ and } < 2003$$

Individual Income Tax

The Committee retained the equation it adopted in December, 2005 along with the methodology it first adopted in December, 2004 to remove the effects of capital gains and losses above long-

run trend in the late 1990s. In retaining this approach, the Committee is assuming that the realization of capital gains and losses has returned to its historical relationship to growth in the U.S. economy and will remain there throughout the period. The equation uses fiscal year nominal Indiana Nonfarm Personal Income and is replicated as Equation (2) below.

Income taxes imposed by counties in Indiana are collected by the State and distributed back to the imposing counties. The collection and distribution mechanisms result in a material lag between the time local income taxes are collected and the time the State is able to segregate those taxes for distribution to the appropriate counties. As a result, local income taxes collected in prior years are distributed from current income tax collections. The Committee found that the collection and distribution mechanisms in place will result in a material impact on current State income tax revenues reported during the forecast period. The results from Equation (2) were adjusted to account for this impact.

$$\text{Equation (2)} \quad \text{Individual Income Tax} = -95.202215 + 0.02329716 (\text{FY_NFPI}) + \text{Adjs.}$$

Corporate Income Tax

The Committee elected to retain the equation it used in December 2005 and to account separately for the effects of *Azta Indiana Gaming Corporation vs. the Indiana Department of State Revenue*, the Utilities Receipts Tax, the Financial Institutions Tax, and enacted tax measures. The equation employed by the Committee is replicated as equation (3) below.

$$\text{Equation (3)} \quad \text{Corporate Adjusted Gross Income} = 3,347.45192 + 0.707925797(\text{CY_RGDP}) - 25741.6091 (\text{Rate Differential}) - 2644.678221 (\text{D1}) + \text{Utility Receipts Tax} + \text{Financial Institutions Tax} + \text{Adj.}$$

Where D1 = 1 if year > 2001

Cigarette & Tobacco Products Tax

The Committee adopted two equations to estimate the Cigarette Tax and Tobacco Products Tax. Cigarette Sales, measured in packs of 20, depend upon fiscal year real Indiana Nonfarm Personal Income (RFY_NFPI), and estimate of the sum of the four surrounding states real prices (RALLPRICE), the real Indiana price (RINPRICE), a dummy variable for 1985 and years after (D85), a variable which takes the real Indiana price multiplied by D85 (PRICED85), the real cigarette excise tax rate (CIGRATE) and a trend variable equal to the fiscal year minus 1965 (TREND). Tobacco Product sales are estimated based on fiscal year real Indiana Nonfarm Personal Income (RFY_NFPI), a price index for tobacco products (PRICE), and the excise tax on tobacco products (TOBRATE). The sales, income, price, and tobacco product excise tax variables are expressed in natural logarithms.

$$\text{Equation (4)} \quad \text{Cigarette Sales} = 1.663 + 0.676 (\text{RFY_NFPI}) + 0.019 (\text{RALLPRICE}) - 0.666 (\text{RINPRICE}) - 1.849 (\text{D85}) + 0.373 (\text{PRICE } 85) - 0.142 (\text{CIGRATE}) - 0.011 (\text{TREND})$$

$$\text{Equation 4(a)} \quad \text{Cigarette Tax} = 0.555 (\text{Cigarette Sales})$$

Equation (5) Tobacco Product Sales = -27.396 + 2.761 (RFY_NFIPI)
- 0.182 (PRICE) – 0.084 (TOBRATE).

Equation (5a) Tobacco Products Tax = 0.18 (Tobacco Products Sales)

Alcoholic Beverage Taxes

The alcoholic beverage tax model includes three equations: one for beer, one for liquor, and one for wine. All three equations include fiscal year real Indiana Nonfarm Personal Income (RFY_NFIPI), the real beverage price (BPRICE, LPRICE, WPRICE) and the lagged sales of the beverage in gallons (BLAGSALE, LLAGSALE, WLAGSALE). The beer equation has a trend variable (TREND). The liquor equation includes a trend variable (TREND), a dummy variable for 1991 and years after (D91), and a variable which takes the trend variable multiplied by D91 (TRENDD91). The wine equation includes a dummy variable for 1987 and years after multiplied by the log of real Indiana Nonfarm Personal Income (D87_RFY_NFIPI). For all equations, the income and price variables were adjusted by the Gross Domestic Product price deflator. The sales, income and price variables are expressed in terms of natural logarithms.

Equation (6) Beer sales = -2.035 + 0.922(LAGSALE) +
0.291(RFY_NFIPI) – 0.162(BPRICE) - 0.008(TREND)

Equation (6a) Beer tax = 0.115(Beer sales)

Equation (7) Liquor sales = - 0.728 + 0.646(LAGSALE) +
0.460 (RFY_NFIPI) - 0.444(LPRICE) - 0.022(TREND) – 0.487
(D91) + 0.018 (TRENDD91)

Equation (7a) Liquor tax = 2.68(Liquor sales)

Equation (8) Wine sales = -0.541 + 0.840 (LAGSALE) +
0.209 (RFY_NFIPI) - 0.301 (WPRICE) –
0.009 (D87_RFY_NFIPI)

Equation (8a) Wine tax = 0.47(Wine sales)

Riverboat Wagering Tax

The Committee adopted a riverboat wagering receipts equation to estimate the riverboat wagering tax base in thousands of dollars from the state’s riverboat casinos, excluding the French Lick Casino. The tax base estimate is then used to compute estimated wagering tax collections from these riverboat casinos. The equation uses quarterly nominal Indiana Nonfarm Personal Income (Q_NFIPI) in thousands of dollars. The equation also contains the quarterly turnstile count at the riverboat casinos (Q_TURNSTILE) to account for the impact of market and capacity factors on the wagering tax base. It also contains dummy variables (DIN) to account for the impact of Indiana dockside gaming on wagering in Indiana and (DQ1_02) to account for facilities changes and other economic impacts on wagering during the 1st Quarter of 2002. The equation chosen is replicated as Equation (9) below.

Equation (9)
$$(\text{Total Wagering Receipts})^2 = -455,041,369,362.97 + (2,668.26 * Q_NFIPI) + (43,033.13 * Q_TURNSTILE) + (18,583,674,033.22 * DIN) + (28,623,804,538.89 * DQ1_02).$$

Where Q_TURNSTILE is the actual quarterly turnstile count through the 3rd Quarter of 2006 and thereafter is assumed to experience year-over-year growth equal to 1%.

Where DIN = 1 if calendar quarter = 3rd Quarter 2002 or after.

Where DQ1_02 = 1 if calendar quarter = 1st Quarter 2002.

SPECIFIC METHODOLOGY
(December 14, 2006)

GENERAL FUND

Sales Tax:

For Each Fiscal Year to be Forecasted

1. Multiply 0.021097 times fiscal year Indiana Nonfarm Personal Income.
2. Add 162.648175 to the results of Step 1.
3. Divide the results of Step 2 by 0.05 and multiply the results by 0.06 to account for the sales tax rate increase effective December 1, 2002 under HEA 1001-2002ss.
4. Subtract 113.5 in FY 2007, 124.4 in FY 2008, and 125.3 in FY 2009 from the result of step 3 to account for the response of consumer to the retail sales tax rate increase under HEA 1001-2002ss and tax measures enacted in 2004, 2005, and 2006.
5. Multiply the results of Step 4 by 0.49192 to account for the percentage of sales taxes deposited in the General Fund under HEA 1001-2002ss.

Individual Income Tax:

For Each Fiscal Year to be Forecasted

1. Multiply 0.023297 times fiscal year Indiana Nonfarm Personal Income.
2. Subtract 95.202215 from the results of Step 1.
3. Subtract 241.7 for FY 2007, 248.1 for FY 2008, and 255.3 for FY 2009 from the results of Step 2 to account for tax measures enacted in 1997, 1999, 2002, 2005, and 2006.

4. Subtract 71.4 for FY 2007, 48.3 for FY 2008, and 27.5 for FY 2009 from the results of Step 3 to account for the impacts of local income tax distributions as explained in the section of this document describing the individual income tax equation.
5. Multiply the results of Step 4 by 0.86 to account for the percentage of individual income tax deposited in the General Fund under HEA 1001-2002ss.

Corporate Income Tax:

For Each Fiscal Year to be Forecasted

1. Multiply 0.707925797 times calendar year U.S. Real Gross Domestic Product.
2. Add 3,347.45192 to the results of Step 1.
3. Multiply -25,741.6091 times 0.051 and add the result to the results of Step 2 to account for the impact of a differential between the corporate income tax rate and the individual income tax rate.
4. Subtract 2,644.678221 from the results of Step 3.
5. Multiply the results of Step 4 by the statutory corporate income tax rate of 0.085.
6. Subtract 31.5 for FY 2007 and 51.5 for FY 2008 and FY 2009 from the results of Step 5 to account for the impact of changes to the Research and Development Expense Credit contained in HEA 1001-2002ss.
7. Add 200.5 to the results of Step 6 to account for the revenues from the Utility Receipts Tax.
8. Add 20.0 to the results of Step 7 to account for General Fund revenues from the Financial Institutions Tax.
9. Add 18.6 for FY 2007, 45.7 for FY 2008, and 45.3 for FY 2009 to account for tax measures enacted in 2005.
10. Add 18.4 for FY 2007 to the result of step 9 to account for the one-time impact of *Aztar Indiana Gaming Corporation vs. the Indiana Department of State Revenue*.
11. Add 34.0 for FY 2007, 35.4 for FY 2008, and 36.8 for FY 2009 to the results of Step 10 to account for the ongoing impact of *Aztar Indiana Gaming Corporation vs. the Indiana Department of State Revenue*.

Cigarette Tax:

For Each Fiscal Year to be Forecasted

1. Multiply 0.676 by the logarithm of fiscal year real Nonfarm Indiana Personal Income.

2. Add 1.663 to the result of step 1.
3. Multiply 0.019 by the logarithm of the sum of the real cigarette prices in the four surrounding states.
4. Add the result of step 3 to the result of step 2.
5. Multiply -0.666 by the logarithm of the real cigarette price in Indiana.
6. Add the result of step 5 to the result of step 4.
7. Subtract -1.849 from the result of step 6 for years after 1985.
8. Multiply 0.373 by the logarithm of real Indiana prices for years after 1985.
9. Add the result of step 8 to the result of step 9.
10. Multiply -0.142 by the logarithm of the real cigarette excise tax rate.
11. Add the result of step 10 to the result of step 9.
12. Subtract 1965 from the fiscal year forecasted.
13. Multiply the result of step 12 by -0.011.
14. Add the result of step 13 to the result of step 11.
15. Take the exponential of step 14, to get sales.
16. Multiply the result of step 15 by 0.555 to get total revenue.
17. Multiply the result of step 16 by 0.8397 to get General Fund revenue.

Tobacco Products Tax:

1. Multiply 2.761 by the logarithm of fiscal year real Nonfarm Indiana Personal Income.
2. Add - 27.396 from the result of step 1.
3. Multiply 0.182 by the logarithm of the of the real tobacco product price.
4. Subtract the result of step 3 to the result of step 2.
5. Multiply 100 by the tobacco products excise tax rate.
6. Multiply -0.084 by the logarithm of the result of step 5.
7. Add the result of step 6 to the result of step 4.

8. Take the exponential of step 7, to get sales.
9. Multiply the result of step 8 by 0.18 to get total revenue.
10. Multiply the result of step 9 by 0.8397 to get General Fund revenue.

Alcoholic Beverage Tax - Beer:

For Each Fiscal Year to be Forecasted

1. Multiply 0.922 by the logarithm of beer sales, lagged one year.
2. Subtract 2.035 from the result of step 1.
3. Multiply 0.291 by the logarithm of fiscal year real Non-Farm Indiana Personal Income.
4. Add the result of step 3 to the result of step 2.
5. Multiply -0.162 by the logarithm of the real beer price.
6. Add the result of step 5 to the result of step 4.
7. Multiply -0.008 by a trend term.
8. Add the result of step 7 to the result of step 6.
9. Take the exponential of the result of step 8 to get sales.
10. Multiply the result of step 9 by 0.115, to get total revenue; multiply the result of step 9 by .04 to get General Fund revenue.

Alcoholic Beverage Tax - Liquor:

For Each Fiscal Year to be Forecasted

1. Multiply 0.646 by the logarithm of liquor sales, lagged one year.
2. Subtract 0.728 to the result of step 1.
3. Multiply 0.460 by the logarithm of fiscal year real Non-Farm Indiana Personal Income.
4. Add the result of step 3 to the result of step 2.
5. Multiply -0.444 by the logarithm of the real liquor price.
6. Add the result of step 5 to the result of step 4.
7. Multiply -0.022 by a trend term.
8. Add the result of step 7 to the result of step 6.

9. Multiply -0.487 by a dummy for 1991.
10. Add the result of step 9 to the result of step 8.
11. Multiply 0.018 by the trend term multiplied by the dummy for 1991.
12. Add the result of step 11 to the result of step 10.
13. Take the exponential of the result of step 12 to get sales.
14. Multiply the result of step 13 by 2.68, to get total revenue; multiply the result of step 13 by 1.00 to get General Fund revenue.

Alcoholic Beverage Tax - Wine:

For Each Fiscal Year to be Forecasted

1. Multiply 0.840 by the logarithm of wine sales, lagged one year.
2. Subtract 0.541 from the result of step 1.
3. Multiply 0.209 by the logarithm of fiscal year real Non-Farm Indiana Personal Income.
4. Add the result of step 3 to the result of step 2.
5. Multiply -0.301 by the logarithm of the real wine price.
6. Add the result of step 5 to the result of step 4.
7. Multiply -0.009 by the dummy for 1987 multiplied by the logarithm fiscal year Non-Farm Indiana Personal Income.
8. Add the result of step 7 to the result of step 6.
9. Take the exponential of the result of step 8 to get sales.
10. Multiply the result of step 9 by 0.47, to get total revenue; multiply the result of step 9 by 0.20 to get General Fund revenue.

PROPERTY TAX REPLACEMENT FUND

Sales Tax:

For Each Fiscal Year to be Forecasted

1. Multiply the results of Step 4 of the General Fund Sales Tax calculation by 0.5 to account for the percentage of sales tax deposited in the Property Tax Replacement Fund under HEA 1001-2002ss.

Individual Income Tax:

For Each Fiscal Year to be Forecasted

1. Multiply the results of Step 4 of the General Fund Individual Income Tax calculation by 0.14 to account for the percentage of sales tax deposited in the Property Tax Replacement Fund under HEA 1001-2002ss.

Riverboat Wagering Tax:

For Each Fiscal Year to be Forecasted

1. Multiply 2,668.26 by quarterly nominal Indiana Nonfarm Personal Income in thousands of dollars.
2. Subtract 455,041,369,362.97 from the result of Step 1
3. Multiply 43,033.13 by the appropriate quarterly turnstile count and add the result to the result of Step 2.
4. Add 18,583,674,033.22 to the result of Step 3 for the 3rd Quarter of 2002 and each calendar quarter thereafter.
5. Take the square root of the result of Step 4 to obtain quarterly total wagering receipts in thousands of dollars.
6. Sum the quarterly totals from Step 5 for the fiscal year to obtain fiscal year total wagering receipts.
7. Distribute fiscal year total wagering receipts from Step 6 among the state's riverboat casinos (excluding the French Lick Casino) based on the actual FY 2006 percentage distribution of wagering receipts among these 10 riverboat casinos.
8. Use the fiscal year wagering receipts distributed to each riverboat casino from Step 7 to compute the fiscal year wagering tax for each riverboat casino.
9. Sum the fiscal year wagering tax totals for each riverboat casino from Step 8 to obtain fiscal year total wagering tax collections.
10. Subtract from the Step 9 result, 2,446,687 each year to account for reimbursement to the Indiana Gaming Commission for administrative expenses; 33,000,000 each year to