# Minnesota Revenue Volatility and Budget Reserve Target

Presented by Dr. Laura Kalambokidis, State Economist

Minnesota Senate Finance Committee

January 24, 2019

Minnesota Management and Budget | mn.gov/mmb

# Minnesota's Revenue Volatility Study

**Subd. 8.Report on budget reserve percentage.**

(a) The commissioner of management and budget shall **develop and annually review a methodology for evaluating the adequacy of the budget reserve based on the volatility of Minnesota's general fund tax structure**. The review must take into consideration relevant statistical and economic literature. After completing the review, the commissioner may revise the methodology if necessary. The commissioner must use the methodology to **annually estimate the percentage of the current biennium's general fund nondedicated revenues recommended as a budget reserve**.

(b) By September 30 of each year, the commissioner shall **report the percentage of the current biennium's general fund nondedicated revenue that is recommended as a budget reserve** to the chairs and ranking minority members of the senate Committee on Finance, the house of representatives Committee on Ways and Means, and the senate and house of representatives Committees on Taxes. The report must also specify:

(1) whether the commissioner revised the recommendation as a result of significant changes in the mix of general fund taxes or the base of one or more general fund taxes;

(2) whether the commissioner revised the recommendation as a result of a revision to the methodology; and

(3) any additional appropriate information.

**September 2018 report**: Recommended reserve level = 5.0 percent of FY 2018-19 revenues, $2.222 billion.
**November 2018 forecast (updated FY 2018-19 revenues)**:
Recommended reserve level = $2.250 billion

# Minnesota's Revenue Volatility Study

1. Using U.S. historical data, we estimate **the volatility of major components <u>within</u> each tax**, e.g., the volatility of income sources included in the income tax base.

2. Combining components, we estimate **the volatility of each major tax type:** individual income, sales, corporate, statewide property, other.

3. To understand how the tax types interact with one another in the state's revenue system, we estimate **the volatility <u>between</u> the tax types**, e.g., sales tax interacted with individual income tax, sales tax interacted with corporate income tax.

4. Looking at the tax system like a financial portfolio, we combine the volatilities of the tax types and their interactions with one another to measure **the volatility of the tax base system**.

5. Using the current share of revenues that each tax type contributes to Minnesota's total revenues, we **convert estimated tax base volatility to revenue volatility**.

6. Given this level of volatility and the size of current net non-dedicated revenues, we **compute the size of the budget reserve**—as a share of revenues—that would ensure that a biennial deficit generated by revenue volatility will not exceed the reserve 95 times out of 100 (19 out of 20 biennial deficits).

# Minnesota's Revenue Volatility Study

**We examine the tax base (not revenues).**

- Difficult to obtain a state revenue data series independent of tax law changes.

- Data on tax bases, as opposed to actual collections, is a reasonable substitute.

**We examine national tax base and income data.**

- Availability of detailed state-level economic data is limited.

- National data serve as an appropriate proxy for Minnesota activity.

- Most recent data are from 2016.

**Values are in nominal dollars (i.e., not deflated).**

- Budget policy is concerned with current dollars.

# Composition of Minnesota Revenues Over Time



MN Revenues Over Time

Legend: Ind Income Tax, Sales Tax, Corp Tax, Prop Tax, Other Revenue
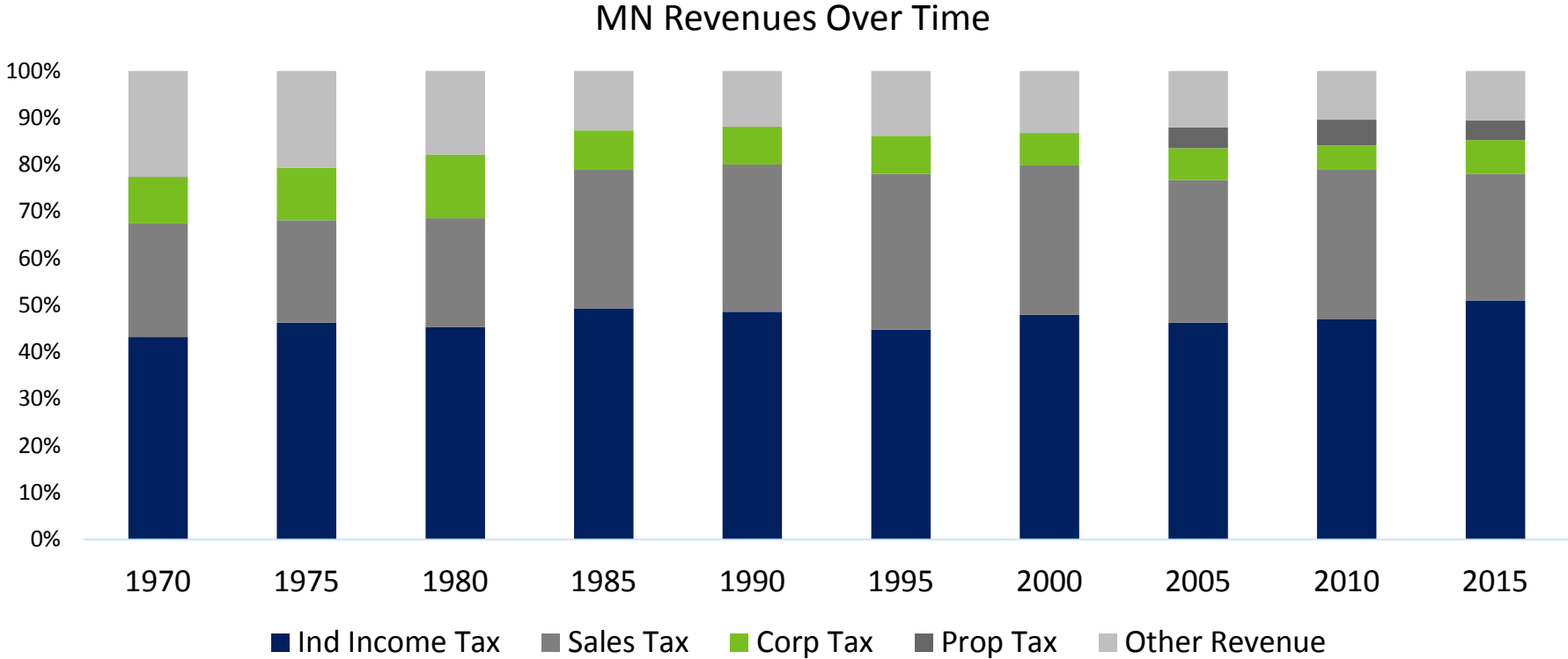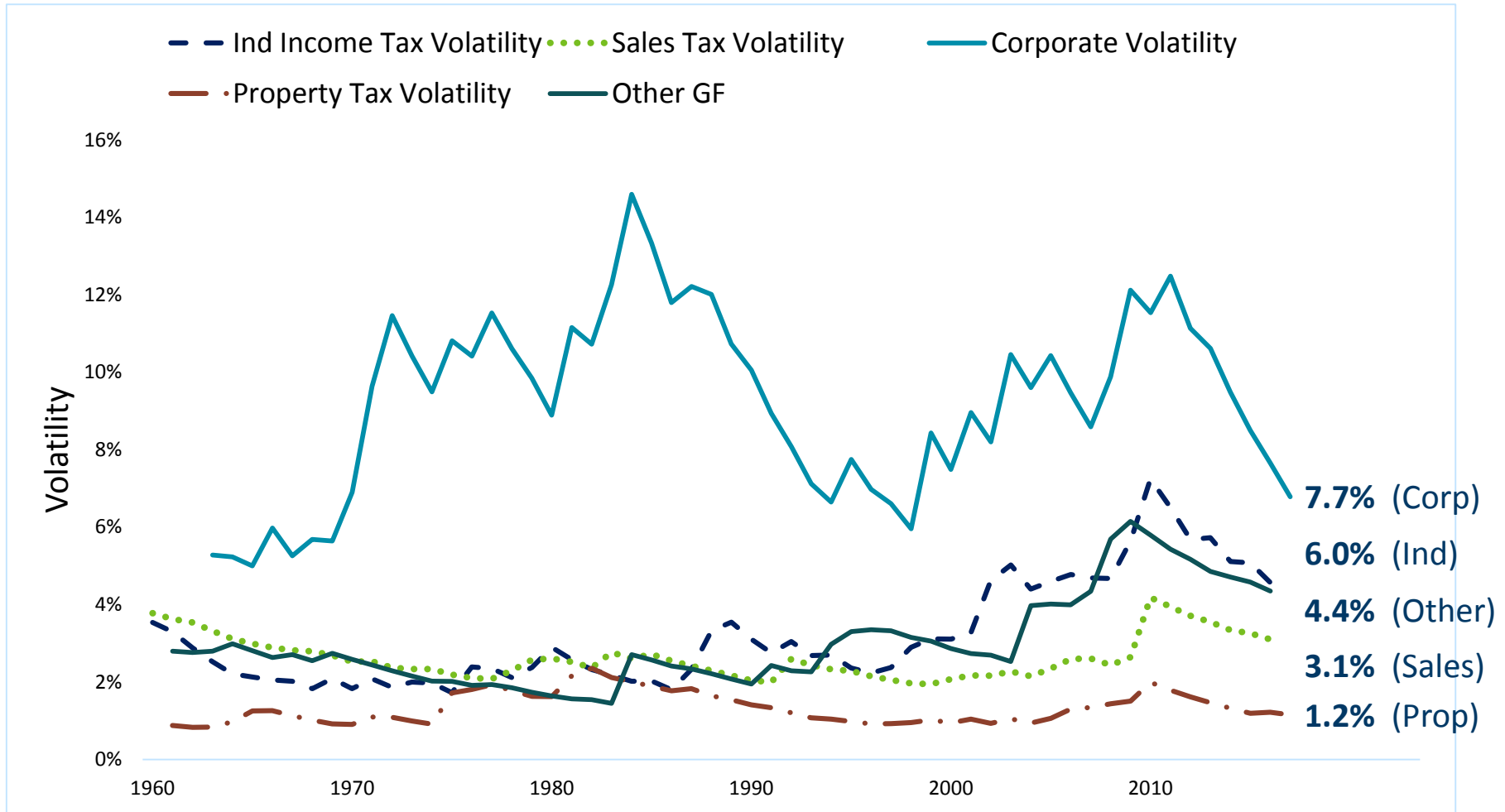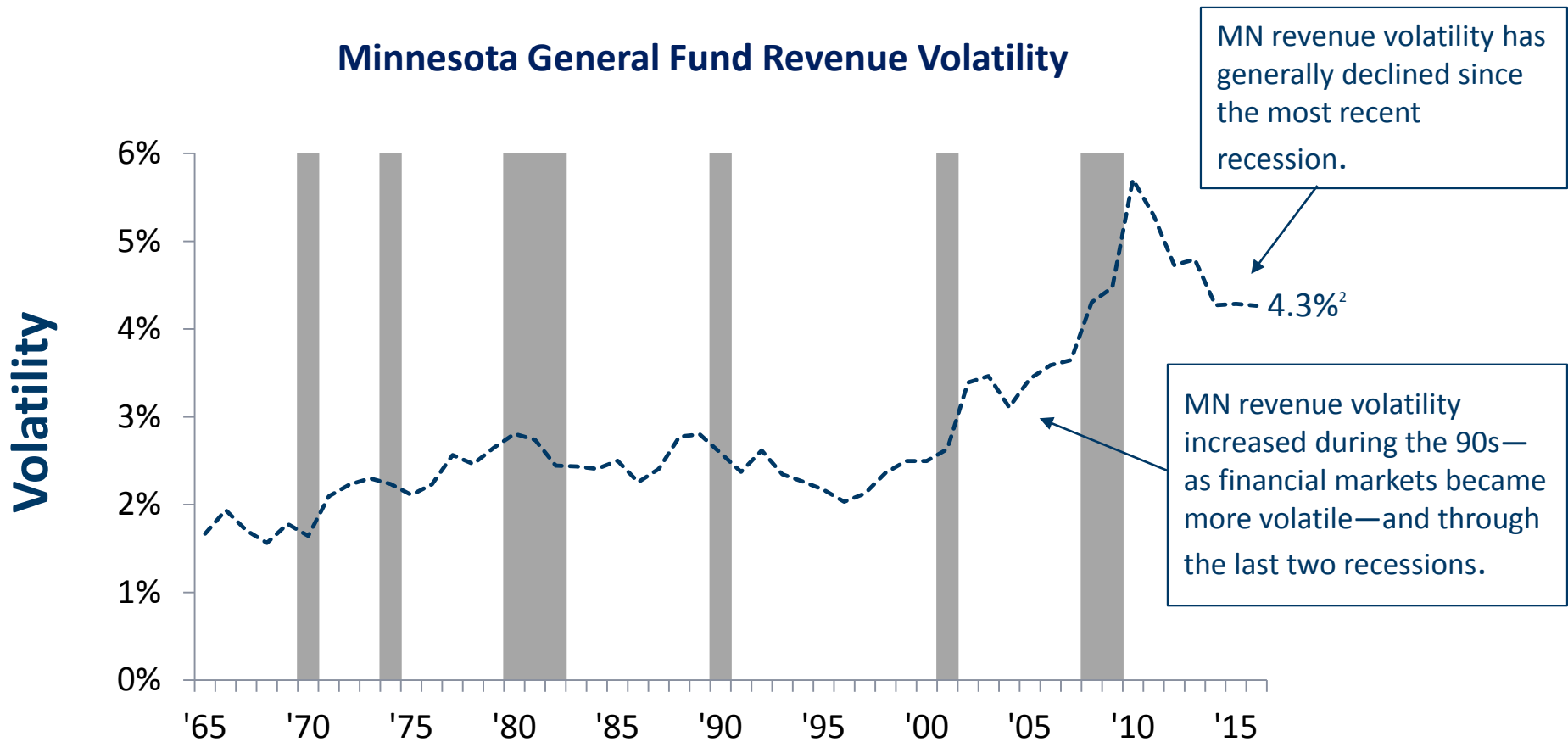
Range of shares for each tax type
Individual income tax: 43.2-51.0 percent
Sales tax: 21.9-33.3 percent
Corporate tax: 5.2-13.6 percent
Statewide property tax: 4.1-5.5 percent
Other taxes: 10.6-22.6 percent

# Volatility of Tax Bases in Minnesota's Tax System



Time Varying Volatility of Major Components in Minnesota's Tax Base: 1963 to 2016

# Minnesota's General Fund Revenue Volatility



**Minnesota General Fund Revenue Volatility**

MN revenue volatility has generally declined since the most recent recession.

4.3%[2]

MN revenue volatility increased during the 90s—as financial markets became more volatile—and through the last two recessions.

1. Based on current law tax base.
2. 2018 estimated conditional standard deviation of Minnesota's General Fund revenue.

# Revenue Volatility and Budget Reserve Recommendation, 2014-2018

| Study Year | General Fund Net Non-Dedicated Revenue | Recommended Budget Reserve (based on current biennium) | | Total Volatility | Tax Base | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | General Sales Tax Volatility | Corporate Tax Volatility | Ind Income Tax Volatility | Property Tax Volatility | Other Revenue Volatility |
| 2014 | $ 38,762,429 | 5.1 | $ 1,960,000 | 4.3 | 3.4 | 15.9 | 6.8 | 1.6 | 5.9 |
| 2015 | $ 39,014,638 | 4.8 | $ 1,912,000 | 4.2 | 3.3 | 10.9 | 6.0 | 1.5 | 5.0 |
| 2016 | $ 41,882,558 | 4.9 | $ 2,072,000 | 4.2 | 3.0 | 9.7 | 6.4 | 1.3 | 4.8 |
| 2017 | $ 44,642,833 | 4.9 | $ 2,187,000 | 4.2 | 2.9 | 8.8 | 6.2 | 1.2 | 4.6 |
| 2018 | $ 44,438,921 | 5.0 | $ 2,222,000 | 4.3 | 3.1 | 7.7 | 6.0 | 1.2 | 4.4 |

Our measure of system volatility and the recommended percentage of revenues have remained fairly stable in recent years.

# Revenue Volatility and Budget Reserve Recommendation, 2014-2018

| Study Year | General Fund Net Non-Dedicated Revenue | Recommended Budget Reserve (based on current biennium) | | Total Volatility | Tax Base | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | General Sales Tax Volatility | Corporate Tax Volatility | Ind Income Tax Volatility | Property Tax Volatility | Other Revenue Volatility |
| 2014 | $ 38,762,429 | 5.1 | $ 1,960,000 | 4.3 | 3.4 | 15.9 | 6.8 | 1.6 | 5.9 |
| 2015 | $ 39,014,638 | 4.8 | $ 1,912,000 | 4.2 | 3.3 | 10.9 | 6.0 | 1.5 | 5.0 |
| 2016 | $ 41,882,558 | 4.9 | $ 2,072,000 | 4.2 | 3.0 | 9.7 | 6.4 | 1.3 | 4.8 |
| 2017 | $ 44,642,833 | 4.9 | $ 2,187,000 | 4.2 | 2.9 | 8.8 | 6.2 | 1.2 | 4.6 |
| 2018 | $ 44,438,921 | 5.0 | $ 2,222,000 | 4.3 | 3.1 | 7.7 | 6.0 | 1.2 | 4.4 |

Even when the recommended percentage stays the same, the target budget reserve level will grow (shrink) as revenues grow (shrink).

# Revenue Volatility and Budget Reserve Recommendation, 2014-2018

| Study Year | General Fund Net Non-Dedicated Revenue | Recommended Budget Reserve (based on current biennium) | | Total Volatility | Tax Base | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | General Sales Tax Volatility | Corporate Tax Volatility | Ind Income Tax Volatility | Property Tax Volatility | Other Revenue Volatility |
| 2014 | $ 38,762,429 | 5.1 | $ 1,960,000 | 4.3 | 3.4 | 15.9 | 6.8 | 1.6 | 5.9 |
| 2015 | $ 39,014,638 | 4.8 | $ 1,912,000 | 4.2 | 3.3 | 10.9 | 6.0 | 1.5 | 5.0 |
| 2016 | $ 41,882,558 | 4.9 | $ 2,072,000 | 4.2 | 3.0 | 9.7 | 6.4 | 1.3 | 4.8 |
| 2017 | $ 44,642,833 | 4.9 | $ 2,187,000 | 4.2 | 2.9 | 8.8 | 6.2 | 1.2 | 4.6 |
| 2018 | $ 44,438,921 | 5.0 | $ 2,222,000 | 4.3 | 3.1 | 7.7 | 6.0 | 1.2 | 4.4 |

The total volatility could change if (1) the volatility of any tax base changes, (2) an interaction between tax bases changes, or (3) the composition of revenues changes. Changing the composition of revenues will also have other effects, such as changing revenue growth and the distribution of tax burden.

# Revenue Volatility and Budget Reserve Recommendation, 2014-2018

| Study Year | General Fund Net Non-Dedicated Revenue | Recommended Budget Reserve (based on current biennium) | | Total Volatility | Tax Base | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | | General Sales Tax Volatility | Corporate Tax Volatility | Ind Income Tax Volatility | Property Tax Volatility | Other Revenue Volatility |
| 2014 | $ 38,762,429 | 5.1 | $ 1,960,000 | 4.3 | 3.4 | 15.9 | 6.8 | 1.6 | 5.9 |
| 2015 | $ 39,014,638 | 4.8 | $ 1,912,000 | 4.2 | 3.3 | 10.9 | 6.0 | 1.5 | 5.0 |
| 2016 | $ 41,882,558 | 4.9 | $ 2,072,000 | 4.2 | 3.0 | 9.7 | 6.4 | 1.3 | 4.8 |
| 2017 | $ 44,642,833 | 4.9 | $ 2,187,000 | 4.2 | 2.9 | 8.8 | 6.2 | 1.2 | 4.6 |
| 2018 | $ 44,438,921 | 5.0 | $ 2,222,000 | 4.3 | 3.1 | 7.7 | 6.0 | 1.2 | 4.4 |

The confidence level determines the recommended budget reserve percentage. A lower confidence level (e.g., 90 percent) would imply a smaller reserve and greater risk that a deficit will exceed the reserve. A higher confidence level (e.g., 99 percent), would imply a larger reserve and lower risk that a deficit will exceed the reserve.

# Revenue Volatility and Budget Reserve Recommendation, 2014-2018

| Study Year | General Fund Net Non-Dedicated Revenue | Recommended Budget Reserve (based on current biennium) | | Total Volatility | Tax Base | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | General Sales Tax Volatility | Corporate Tax Volatility | Ind Income Tax Volatility | Property Tax Volatility | Other Revenue Volatility |
| 2014 | $ 38,762,429 | 5.1 | $ 1,960,000 | 4.3 | 3.4 | 15.9 | 6.8 | 1.6 | 5.9 |
| 2015 | $ 39,014,638 | 4.8 | $ 1,912,000 | 4.2 | 3.3 | 10.9 | 6.0 | 1.5 | 5.0 |
| 2016 | $ 41,882,558 | 4.9 | $ 2,072,000 | 4.2 | 3.0 | 9.7 | 6.4 | 1.3 | 4.8 |
| 2017 | $ 44,642,833 | 4.9 | $ 2,187,000 | 4.2 | 2.9 | 8.8 | 6.2 | 1.2 | 4.6 |
| 2018 | $ 44,438,921 | 5.0 | $ 2,222,000 | 4.3 | 3.1 | 7.7 | 6.0 | 1.2 | 4.4 |

The most recent change in the recommended percentage was primarily due to BEA's historical data revision, done every five years. The revised consumer spending data were more variable than the historical data we used for prior studies, and increased the measured volatility of the sales tax.

# Limitations of Minnesota's Revenue Volatility Analysis

- Our methodology only measures revenue volatility. Any budget forecast risk introduced by **expenditure volatility** is not accounted for here.

- Our analysis does not include revenue forecast risk from factors **other than tax base volatility.**

  - **Economic data** from time periods preceding a forecast (such as employment or consumer spending data) are not perfectly measured and are frequently revised after we have used them to construct a forecast.

  - Even if past U.S. economic data *were* perfectly measured, modeling imperfections and the inability to foresee all future impacts on the economy would prevent our macroeconomic consultant from perfectly **forecasting the U.S. economy**.

  - Uncertainty in the U.S. forecast and in Minnesota's data history and our own imperfect modeling introduce inaccuracies into our **forecast of the state's economy**.

  - Even if the Minnesota economy *were* forecast with perfect accuracy, our **forecasts of Minnesota tax revenues** would still contain some uncertainty. This is because of imperfections in our revenue forecasting models, mismatches between the economic and tax definitions of income and spending items, inconsistencies in the timing of receipts from a given year's tax liability, and uncertainty about the revenue impacts of changes in state tax laws.