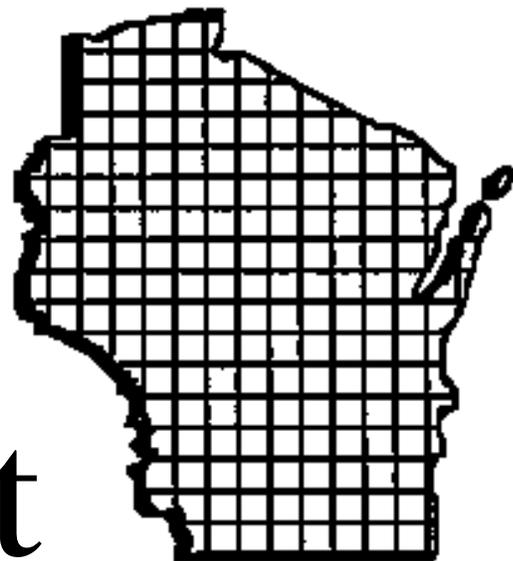


Wisconsin

Policy
Research
Institute

Report



May 2004

Volume 17, Number 3

**State Revenue
Forecasting in
Wisconsin**

A Critical Examination

REPORT FROM THE PRESIDENT:

A major question asked at the height of last year's budget meltdown in Wisconsin was, "How did the state get into this mess?" We have begun a number of studies dealing with Wisconsin's budget and economic problems to make sure our state never faces a budget crisis this serious again.

We commissioned Dr. Scott Niederjohn to examine how our state does revenue forecasting. Dr. Niederjohn has a Ph.D. in Economics from the University of Wisconsin-Milwaukee and an MBA in Applied Business Economics from Marquette University. He has lectured both at UWM and Marquette and currently teaches in the Department of Economics at the University of Wisconsin-Whitewater and is a visiting Fellow at the Wisconsin Policy Research Institute.

His research gives us a startling description of how Wisconsin develops a budget based on revenue forecasts that are at the very least faulty and at the worst cause one to wonder if we can ever truly balance our budget. A major cause of our troubles is the inability to accurately forecast incoming revenue. The fact that Wisconsin, on average, has a 41% inaccurate forecast rate per year over the last 15 years is amazing.

Worse yet, Wisconsin ranks last among the fifty states in how frequently they forecast for their budget. By law we are only required to do it every two years while many other states do it on a monthly basis. What that means with a biennial budget is that your second year is almost guaranteed to be inaccurate because economies are so dynamic and fluid. To believe that financial predictions could be absolutely accurate for two years down the road indicates a need for high school level remedial economics.

The author makes sensible recommendations, which would not require any additional spending, to correct this situation. The problem in Wisconsin today is neither Democrat nor Republican, conservative or liberal. We have allowed bureaucrats to create a system at the state level that makes no sense in a twenty first century economy. Before we can reform the state's economy and budget, we must examine how financial institutions, whether they are government or the private sector, do their budgets. There is no private corporation in the country that would ever put a budget together based on the kinds of revenue projections used by Wisconsin state government. Neither would any of the other 49 states. It is time for reforms that will begin to get our financial house in order.



James H. Miller

WISCONSIN POLICY RESEARCH INSTITUTE, INC.

P.O. Box 487 • Thiensville, WI 53092
(262) 241-0514 • Fax: (262) 241-0774

E-mail: wpri@execpc.com • Internet: www.wpri.org

STATE REVENUE FORECASTING IN WISCONSIN

A Critical Examination

SCOTT NIEDERJOHN, PH.D.

	PAGE
Executive Summary	1
Introduction and Background	2
Wisconsin's Fiscal Cycles	2
Recent History	2
What is a "Good" Revenue Forecast?	4
The Process of Revenue Forecasting in Wisconsin	4
National Economic Forecasting	6
The Accuracy of Wisconsin Revenue Forecasting	13
The Process in Other States	16
Suggestions for Improvement	17
Summary and Conclusions	18
Notes	19

BOARD OF DIRECTORS

Robert Buchanan, *Chairman*
Catherine C. Dellin
Roger Hauck
Dennis Kuester
James Klauser
San Orr, Jr.
Robert O'Toole
Paul Schierl
Timothy Sheehy
Edward Zore
James Miller, *President*

EXECUTIVE SUMMARY

Reasonably accurate forecasting of tax revenue in Wisconsin is a critical function of state government. Yet, since 1989, the average yearly error in state revenue growth estimation is almost 200 percent. Recent forecasts have been particularly inaccurate and are a major cause of the recent deficits experienced in the state.

“The only thing we know for sure is that this forecast will be wrong. We don’t know how much or in what direction, but it will be wrong.” These are the words of the former director of the Ohio Legislative Budget Office in an address to the Ohio State Legislature speaking about a state revenue forecast.¹ The same sort of remark could be made about any revenue forecast prepared in the state of Wisconsin. Revenue forecasts are inherently difficult to make. There are simply too many assumptions that must be made and risks to be considered. These risks take the form of the intrinsically volatile and unpredictable nature of the economy, political decisions, policy changes, terrorist acts or a litany of other international events.

While some error in the budget is to be expected, reasonably accurate forecasting of tax revenue in Wisconsin is vital for efficient functioning of state government. Because of the proclivity of the state to spend every dollar in the budget process, even small forecasting errors can have sizeable effects. The importance of this revenue estimation process is exacerbated by the lack of reserve funds that Wisconsin state government maintains. Without a reserve fund, there is no margin for error in these revenue estimations.

When forecasters have erred on the side of underestimating revenue, the state has reaped discretionary funds that have been allocated to new spending programs.² However, when forecasts overestimated revenue, tough decisions have been forced, as was the case with recent budgets in Wisconsin. For example, the revenue forecast prepared by the state in November of 2000 contributed to the more than \$3.2 billion deficit dealt with in the 2003-2005 budget. Underestimations of revenue may cause programs to be cut, employees to be laid off, and/or taxes to be raised on the citizenry. Severe underestimation of available revenues can also force the entire state budget to be recast in mid-year.

This somewhat obscure, and often overlooked, step in the development of the budget for the state of Wisconsin is of considerable importance. Inaccurate forecasting has contributed to the deficits that state government has experienced in recent budgets and, without improvement, will surely lead to future gaps between state revenue collections and spending. This report is quite timely as, once again, there are reports in the media that state tax collections are likely to fall below expectation by mid-2005 causing a budget deficit of nearly \$32.2 million.³

This report examines the revenue forecasting process in the state of Wisconsin. Past estimates of revenue, in addition to economic forecasts used as inputs into the revenue estimation process, are examined empirically. Techniques used in other states to perform revenue estimation are also reviewed. Lastly, constructive suggestions are made on changes that may improve this process. While there is little evidence that the Wisconsin revenue estimates have been subject to political manipulation, the secretive nature of this process leads to the perception that these numbers can somehow be “fudged” or developed through some kind of “black magic” ritual. For this reason, illumination of the particulars of this process is of great importance.

Specifically, this report finds the following:

- Wisconsin updates revenue estimations the least frequently of all of the states. The state pays over \$33,000 per year for monthly national economic forecast data from an independent consulting firm, yet is only required to produce revenue estimates on a bi-yearly schedule per state statute.
- Substantial inaccuracies in this purchased national economic forecast data has directly led to errors in state revenue estimations in Wisconsin and in the other states that subscribe to this service.
- Since 1989, the average yearly error in state revenue growth estimation is almost 200 percent. Recent forecasts have been particularly inaccurate and are a major cause of the recent deficits experienced in the state. If the 2002 forecast is excluded, this average error rate is about 41 percent over this time period.
- Wisconsin is one of the few states that does not involve groups outside of state government in the revenue forecasting process. Wisconsin would benefit greatly from the establishment of a forecast advisory council made up of prominent state business leaders and academics.
- Wisconsin must create a budget reserve fund. This is the only solution to the feast or famine budget cycle problem that has afflicted the state for many years. This problem will surely continue during future economic downturns if short-term revenue estimates persist in being the fiscal basis for each budget.

INTRODUCTION AND BACKGROUND

In the fiefdom of the Wisconsin state budget, revenue forecasting is the king. Because of the state's penchant for spending every dollar that is available, this mundane process takes center stage during the every-other-year ritual that is the preparation of a new biennial state budget for Wisconsin. State senators and representatives, both Republican and Democrat, wait with anticipation while the final determination of available tax revenues for the upcoming two-year period is calculated. It is these estimates that will establish what new spending programs can be embarked upon or whether current services need to be cut.

The lives of millions of Wisconsinites are affected by the decisions made during this budget process — and it all starts, and in many ways ends — with the revenue forecast. Will senior citizen prescription drug costs be partially subsidized by the state? Can those who require medical assistance from the state continue to receive it? Will municipalities continue to receive the portion of shared state revenue they have become accustomed to? Are economic development ventures affordable? The answers, which to a great extent determine the quality of life in this state, are all found in the estimation of revenue made during each budget cycle.

While every budget prepared in Wisconsin has long-term implications for the future of the state, it is developed using short-term fiscal tools. No long-range strategy, essential to the fiscal planning of any private business, is undertaken at the state level. Instead, intrinsically volatile revenue forecasts are used to cast short-term budgets often finessed to meet the state's statutory requirement of a balanced budget. It will be shown that this reliance on unpredictable revenues has been a major cause of recent state budget shortfalls and deficits. In addition, Wisconsin's lack of fiscal discipline in the creation of a budget reserve fund places still more pressure on the outcome of this innately flawed planning process. Wisconsin is doomed to repeat this predicament during the valleys of every business cycle unless this fundamentally flawed process is addressed.

WISCONSIN'S FISCAL CYCLES

The state of Wisconsin's fiscal condition has followed a regular cycle over the past thirty years. This cycle, whose frequency is determined by the state economy, includes four distinct and identifiable modes.⁴ This cycle is depicted in Exhibit 1.

Mode 1 represents a time of strong economic growth, such as during the late 1970s or 1990s, in the U.S. and Wisconsin. During this period state tax collections rise quickly and state government enjoys surplus revenue. Governors and state legislatures have debated how to spend this excess revenue; typically allocating some to tax cuts as well as a portion to new programs.

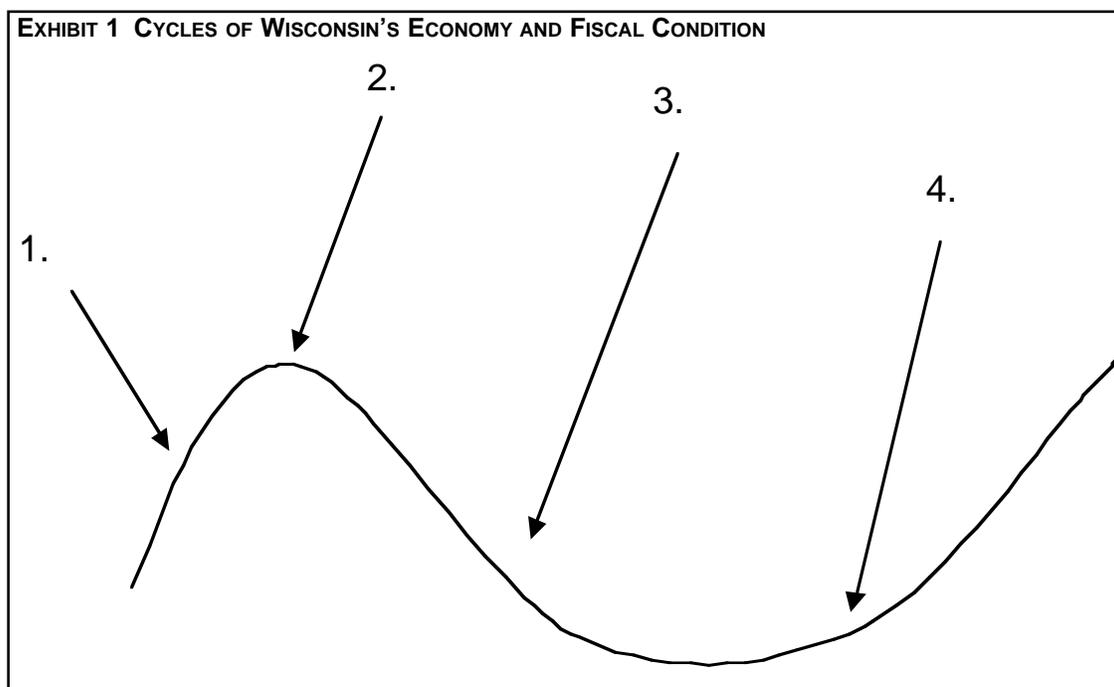
Following the business cycle, there is an eventual slowdown in job and profit growth. This situation is represented by mode 2 in Exhibit 1, and was experienced in Wisconsin in 1980 and 2000. State policymakers, accustomed to economic growth, fail to take note of the leading indicators of a recession and continue allocating expected new revenues. Further, as will be shown, forecasters tend to see recessionary signs too late. Eventually, a recession commences and state spending exceeds tax collections. This deficit situation took place in the 1981-1983 and 2001-2003 biennial budgets and is represented by mode 3 on the exhibit. Taxes must then be raised and/or spending must be cut to bring the budget back into balance.

Lastly, mode 4 represents the portion of the cycle we are currently experiencing. The economy begins to recover, unemployment lags this recovery and stays relatively high, and state policy makers discuss the future of economic growth in the state.

RECENT HISTORY

A short review of Wisconsin budgets over the last five years provides ample evidence of both the criticality and instability of the revenue forecasting process. Let us begin this tale in July of 1999 when economic conditions were much different than they are today.

In that month, the director of the Legislative Fiscal Bureau issued a memo, which indicated a budget surplus of \$568.1 million through the end of the upcoming 1999-2001 biennium.⁵ In effect, this update of the previous forecast,



made in January of 1999, gave the state legislature a huge sum of cash to appropriate in the form of new spending programs and/or tax cuts. By May of 1999 this surplus had ballooned to \$1 billion and plans were made to return much of it to the taxpayers.⁶ About \$700 million was sent to taxpayers in January of 2000 as part of a tax rebate program passed in 1999. In addition to this, the popular property tax rent credit was reenacted in 1999 to begin in the 2001 fiscal year. Personal income tax rates were also cut in 1999 and became active in the 2001 fiscal year.

In short, everything was going great for Wisconsin's citizens and the state government. Everyone had a job and incomes were rising fast. There was plenty of money to satisfy both spenders and tax-cutters. During early 2000, the Wisconsin economy continued to generate a surplus. This time the dollar amount was about \$154 million.⁷ Unlike with the previous surpluses, some administration leaders argued that this money should be saved in order to handle looming structural deficits the state expected in the near future.⁸ These leaders were concerned about the possibility of deficits in the 2001-2003 budget due to the rising cost of spending commitments the state had made that had previously been dealt with through the huge budget surpluses that resulted from the economic boom.

By November of 2000, the Department of Revenue (DOR) was beginning to see a drop in tax collections, especially sales tax receipts. This situation led to the projection of a \$574 million deficit for the 2001-2003 budget. It turns out that what the DOR was actually seeing in its forecast was the leading edge of a recession that was to begin in the Wisconsin economy within a few months.

New spending and the tax cuts of the late 1990s, while popular and seemingly prudent at the time, eventually helped lead to a nearly \$3.23 billion shortfall facing the 2003-2005 biennial budget. How could the state's prospects change so quickly? It almost seemed as though the Wisconsin state finances went directly from surplus to deficit. And, in many ways, they actually did. The predisposition of the state to use short-term fiscal planning tools breeds this type of feast or famine budgeting. Tax collections are inherently volatile — directly linked to the current state of the economy. Because of the difficulty in predicting changes in the economy, and therefore in revenue collections, Wisconsin will continue to go through these boom and bust cycles until a more reasonable long-term approach is applied to the budget process. The moral of this sordid tale is that it is okay to blow all of the money when you have it but you must be prepared for the inevitable crisis when you don't.

WHAT IS A “GOOD” REVENUE FORECAST?

Considering that the only certainty in a revenue forecast is that it will be wrong, how do we determine whether a state is doing a good job estimating revenue? While precise estimates cannot be expected, there are some well-established characteristics of a good forecast that can be used for evaluation purposes.

The National Association of State Budget Officers and the Federation of Tax Administrators has published a list of desirable qualities in a good state revenue estimating process.⁹ These qualities are shown below in Table 1.

TABLE 1 CRITERIA FOR A GOOD REVENUE FORECASTING PROCESS

1	Governors should understand and participate directly in the development of a state economic forecast that has broad acceptance.
2	The estimating process should utilize the experience of academic and business economists in developing the state economic forecast.
3	As part of the revenue estimating process and to the extent possible, the legislative branch should be included in the development of the economic forecast.
4	When presented with a revenue estimate, the Governor should understand the degree of uncertainty associated with it.
5	Establish an organizational structure that aids the development of a single executive forecast.
6	Insure that the agency responsible for the revenue estimate has the data and personnel required to generate a good estimate.
7	Require a monthly report on revenue collections and an annual report on the variance between revenue collections and revenue estimates.
8	Monthly collections are a snapshot. Understand the difficulty of drawing conclusions based on short-term revenue collections.
9	The revenue estimate is based on a certain set of economic assumptions. Maintain the flexibility to respond to dramatic economic changes by revising the revenue estimates.
10	Consider the need to share revenue-related information with the public throughout the fiscal year and be consistent in the practice you choose.

These tenets of a good forecast serve as a sensible starting point for evaluating this process in Wisconsin. This report provides an opportunity to evaluate where Wisconsin stands on achieving the goals set out in this list. The first step in evaluating Wisconsin’s revenue forecasting ability is an understanding of the process used to develop such forecasts in this state.

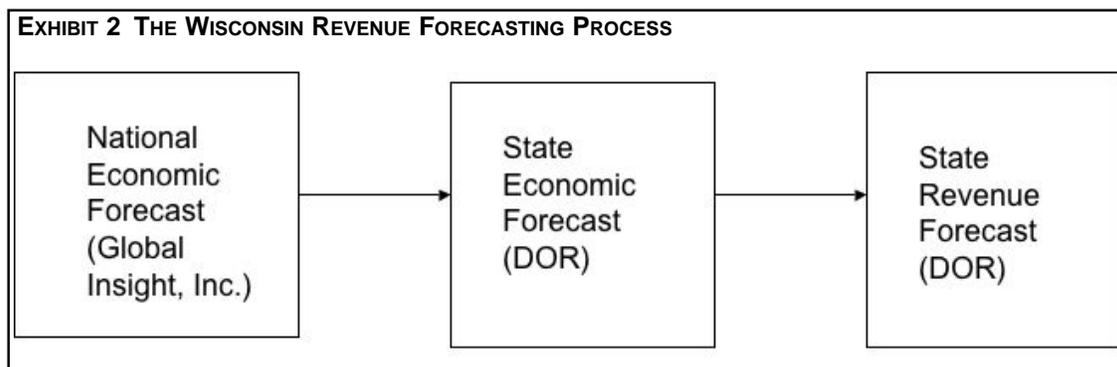
THE PROCESS OF REVENUE FORECASTING IN WISCONSIN

The Process

The Wisconsin Department of Revenue (DOR) is the state agency statutorily responsible for the revenue forecasting process at the executive level. By statute, revenue estimates are required by November 20th of each even numbered year as an input into the biennial budget process. On this date in November, the DOR is responsible for forecasting revenue collections over the next biennium, which begins in July of the following year. In other words, analysts in the Division of Research and Policy at the Department of Revenue must forecast revenue collections over a time horizon that extends approximately thirty-one and a half months into the future.

These revenue estimates by the DOR also set the stage for subsequent estimates by the Legislative Fiscal Bureau (LFB) in January.¹⁰ The LFB estimates are used by the Joint Committee on Finance while they are debating and marking up the budget submitted by the Governor, which is developed using the DOR forecasts. The estimates prepared by the Legislative Fiscal Bureau, while developed independently, infrequently differ materially from those prepared by the Department of Revenue.¹¹

General Fund tax estimates are developed by the DOR analysts according to a three-step process.¹² This process includes a national economic forecast and a state economic forecast, which then leads to a state revenue forecast.



The national economic forecast is prepared for the Department of Revenue by the national economic forecasting firm Global Insight.¹³ Wisconsin has used Global Insight as a national economic forecasting consultant since 1976. These national forecasts are used by many of the states. The DOR subscribes to a monthly forecast by Global Insight that contains estimates of many economic variables for up to five years into the future. Global Insight prepares their forecast using a large-scale econometric model¹⁴ of the national economy. This model includes over one thousand equations, and yields estimates of national economic variables such as Gross Domestic Product, Consumer Price Index, Employment, Unemployment, Income, Money Supply, Corporate Profits, etc. These variables are then used as inputs into a Wisconsin econometric forecasting model. Global Insight's forecasting will be discussed further in the next section of this report.

The Department of Revenue keeps an econometric model of the Wisconsin economy. This model is used to forecast employment and income in Wisconsin using approximately two hundred equations. This model relies heavily on the national economic forecasts, on a number of variables from Global Insight as inputs, in order to forecast employment and income growth in Wisconsin. Clearly, the accuracy of the Wisconsin model is highly dependent on the accuracy of the forecasts that the DOR purchases from Global Insight.

The DOR uses the econometric forecasts of employment and income from the state models to then produce actual tax revenue estimates for the upcoming budget period. This is the end that the state endeavored to achieve through the execution of these complicated analytical steps, and is the piece of the puzzle that is required to actually develop a state budget.

Finally, the specific sales, individual income, corporate, and excise taxes are again forecast using econometric techniques. The sales tax estimate is calculated using a forecast of relative prices of products subject to Wisconsin sales taxes and the previous econometric forecast of income. The individual income tax is forecast based on the estimate of personal income and employment. The corporate income tax is forecast based on the national estimates of corporate profits. The excise taxes (cigarettes, liquor, etc.) are estimated using information on the individual excise tax rate and a forecast of the tax base.

Summary and Questions

This comprehensive summary of the state revenue forecasting process by the Department of Revenue motivates a number of salient questions that necessitate further analysis.

- It is quite clear that all of the revenue forecasts that the DOR makes for the state of Wisconsin are highly dependent upon the information they receive on the national economy from Global Insight. How accurate are Global Insight's forecasts?

- How useful are these national forecasts for making predictions about Wisconsin's economy? In other words, how accurate have the state revenue predictions been historically?
- Is a biennial forecast adequate? Economic conditions change rapidly. Might this necessitate more frequent updates of the revenue estimates?
- How do other states forecast revenue? Do they use the same process? Are there any "lessons learned" by other states that may improve this process in Wisconsin?

NATIONAL ECONOMIC FORECASTING

Introduction

Considering the importance of the Global Insight national economic forecast data to all subsequent steps of the Wisconsin revenue estimating process, let us begin by studying these estimates in detail. As mentioned earlier, the Wisconsin Department of Revenue purchases monthly forecasts from Global Insight. These estimates were obtained from the Department of Revenue, for all months from January of 1995 through the end of 2003. The analysis presented here will concentrate on the Global Insight monthly estimates of the annual real percentage change in U.S. Gross Domestic Product (GDP), annual percentage change in U.S. Personal Income and the annual Unemployment Rate in the U.S. Each of these three data series is an important variable used by the Wisconsin DOR analysts as inputs into the models on the Wisconsin economy.

Accuracy of Global Insight Economic Forecasting

The first question a discriminating reader of an economic forecast might ask is, "how accurate is it?" An analysis was done on the Global Insight monthly forecasts of U.S. GDP, Personal Income and the Unemployment Rate to try and provide an answer to this basic question.

In order to compare the forecast performance of Global Insight for the three different data series, forecast errors are converted to percentages by subtracting the actual value of the data series from the forecasted value, dividing by the actual value and then multiplying by 100.¹⁵ To eliminate the effect of negative and positive errors canceling each other out, absolute percentage errors are calculated by making each error percentage positive. The results of this analysis for each of the three data series are displayed in Tables 2, 3 and 4 below.

TABLE 2 ERROR RATE OF GDP FORECASTS MADE BY GLOBAL INSIGHT

Year	Current Year	Year Prior	Two Years Prior
2000	24.56%	37.06%	34.21%
2001	436.11%	955.56%	719.44%
2002	15.97%	35.76%	50.00%
2003	16.59%	14.25%	29.57%

Each of these tables calculates the average forecast error made by Global Insight over different time horizons. For example, the first entry in the "current year" column in Table 2 shows that the average forecast error of 2000 GDP, made by Global Insight during the year 2000, was 24.56 percent. Further, it can be shown that this error grows to over 37 percent for estimates made by Global Insight of 2000 GDP during 1999 ("Year Prior"). Lastly, this forecast error falls to 34.21 percent for estimations made of 2000 GDP during 1998 ("Two Years Prior").

While these three tables display a great deal of specific technical information, let us concentrate our analysis on the most relevant points. First, it can be seen that the Global Insight forecasts tend to lose accuracy the longer the time period between when the forecast is made and the date being forecast. This is not surprising, and will be dis-

TABLE 3 ERROR RATE OF PERSONAL INCOME FORECASTS MADE BY GLOBAL INSIGHT

Year	Current Year	Year Prior	Two Years Prior
2000	22.08%	42.40%	45.00%
2001	47.73%	70.20%	31.31%
2002	18.83%	58.64%	95.99%
2003	34.83%	61.72%	80.47%

TABLE 4 ERROR RATE OF UNEMPLOYMENT RATE FORECASTS MADE BY GLOBAL INSIGHT

Year	Current Year	Year Prior	Two Years Prior
2000	1.67%	7.29%	27.08%
2001	2.26%	11.81%	6.94%
2002	2.16%	7.61%	23.85%
2003	1.43%	3.33%	12.08%

cussed in more detail in the next section. As expected, the most accurate forecast typically occurs during the year being forecast. In general, forecasts made one year before the forecast year are more accurate than those made two years prior.

It is interesting to note that whereas the GDP series errors are quite high, Global Insight is more adept at accurately predicting the Unemployment Rate. Part of this can be explained by the magnitude of the data values being predicted. For example, the actual yearly percentage change in GDP was 3.8 percent in 2000, 0.3 percent in 2001, 2.4 percent in 2002 and 3.1 percent in 2003.¹⁶ Given the relatively small size of these numbers, minute inaccuracies in forecasting can create extremely large percentage errors. For example, the percentage errors made by Global Insight on their prediction of 2001 GDP, shown in Table 2, were extremely high. The 436 percent error for 2001 GDP resulted from the fact that during most of that year, Global Insight was predicting the real growth in GDP to be between 1 percent and 2.5 percent. As a result of the recession that occurred at this time, as well as the terrorist attacks in September of 2001, actual GDP was well below these predictions. While actual 2001 GDP growth of 0.3 percent may not seem that far from 1 percent, it actually represents an error of more than 200 percent.

As can be seen in the tables above, economic forecasting is inexact. Given how dependent the state of Wisconsin is on the forecast data produced by Global Insight, it is easy to see how errors in forecasts of Wisconsin tax revenue collections may occur. Because forecasts have to be made over a two year budget cycle, these Global Insight “year prior” and “two years prior” predictions are continually used as inputs into the Wisconsin models. Later, we will investigate the impact these errors have on the actual tax collection predictions.

Forecasting Over the Business Cycle

As shown by the previous analysis, economic forecasting is a challenging endeavor. Attempting to make predictions about future economic activity really equates to making statements about the choices and transactions that individuals and firms will make over this time period. The risks, both economic and political, are so immense that the definition of a “good” forecast is difficult to quantify.

With this said, economic forecasting is a requirement for both firms and governments in order to develop future budget plans. The most difficult task of the forecaster is to pick up on “turning points” or changes in the direction of the economy. Forecasting based on the current trend of the economy is the norm. This allows forecasters to not deviate too far from the consensus. There are also technical reasons that these economic turns are difficult to capture. Recall that these estimates are the results of running econometric models. Econometric models, in the simplest of terms, use observations of past data to try to make predictions about the future course of another statistically correlated data series. Because of this, until the input data series begins to turn, there is likely to be no prediction of the forecast data series turning either. Frequently, the model will not predict the change in the economy until it has actually taken place. This effect can be clearly illustrated using the Global Insight data.

How well does Global Insight forecast growth? Let's first examine how accurately they pegged 1999 economic growth starting with their forecast in January of 1997. Figure 1 below documents the difference between the Global Insight monthly predictions of real U.S. GDP for 1999 (from January of 1997 through the end of 1999¹⁷) from the actual change in real 1999 GDP. In other words, each of the monthly bars represents the error in the Global Insight forecast.¹⁸ Bars that extend below the axis represent months when the value of GDP forecasted by Global Insight was less than the actual value. Bars that extend above the axis represent errors in the opposite direction.

There are a number of interesting observations that can be made by studying this chart. First, as one would expect, the forecasts tend to become more accurate the closer the forecast date is to the date being predicted. For example, in January of 1997, two years prior to the end of the year being forecast, Global Insight was predicting that the 1999 annual change in real GDP would be 2 percent less than the actual value of 4.1 percent that it ended up being. However, by December of 1999, Global Insight was predicting 4 percent growth in GDP, much closer to the actual 4.1 percent.

Figures 1, 2 and 3 reveal the vagaries of economic forecasting. Forecasters do their best not to deviate too far from the consensus and have difficulty in picking up major turns in the economy. Because of this, estimates typically underestimate the strength of an economic downturn while it is occurring and conversely underestimate a recovery once it begins. Figure 1 shows that during the economic boom times of the late 1990s, Global Insight was low on their prediction of actual 1999 U.S. GDP change in thirty-five of the thirty-six months sampled for this analysis. However, as Figure 3 shows, once the economy had softened in 2001, the Global Insight prediction of U.S. GDP change was too high in every month. It could be shown that these same phenomena are true for the Personal Income and Unemployment Rate data series as well.

Finally, Figure 2 provides the best evidence of the difficulty of economic forecasting during a volatile economy. Late in 2000, the U.S. (and state of Wisconsin) economy began a decline toward the recession of early 2001. For our purposes, we might define 2000 as the year the economy changed direction. And, as might be expected, the Global Insight forecasters had a very difficult time picking up on this. From January of 1998 through February of 2000 Global Insight followed the tendency of the 1990s by continuing to forecast a lower GDP than actual. Throughout 2000, not recognizing a slowing economy, they followed the more recent history of growth and continued to revise their GDP forecast up and up while the economy went down and down. Finally, in March of 2000, the forecast and actual data series crossed and then began to diverge in the opposite direction.

During the year 2000, Global Insight predicted the 2000 change in U.S. GDP to be as high as 5.3 percent yet it actually ended up being 3.8 percent. In other words, this is the forecast error made during the time period being predicted. They simply missed the turning point in the economy. If you look carefully at Figure 2 and follow the bars from left to right it becomes quite apparent how difficult economic forecasting can be. Knowing that actual U.S. GDP growth in 2000 was 3.8 percent, we can see that for all of the months in 1998 and 1999 Global Insight was predicting something lower than this for GDP in 2000. While the economy began to slow during the late stages of 2000, Global Insight continued to ratchet up their forecast of 2000 GDP up as evidenced by the bars on the right side of this graph that extend above the axis. Hindsight indicates that the economy was slowing and Global Insight would have been better served to have stopped revising their GDP estimates up. It is easy to see how the estimates used in November of 2000, produced by Global Insight, played a role in the huge deficits that afflicted the 2001-2003 biennial budget.

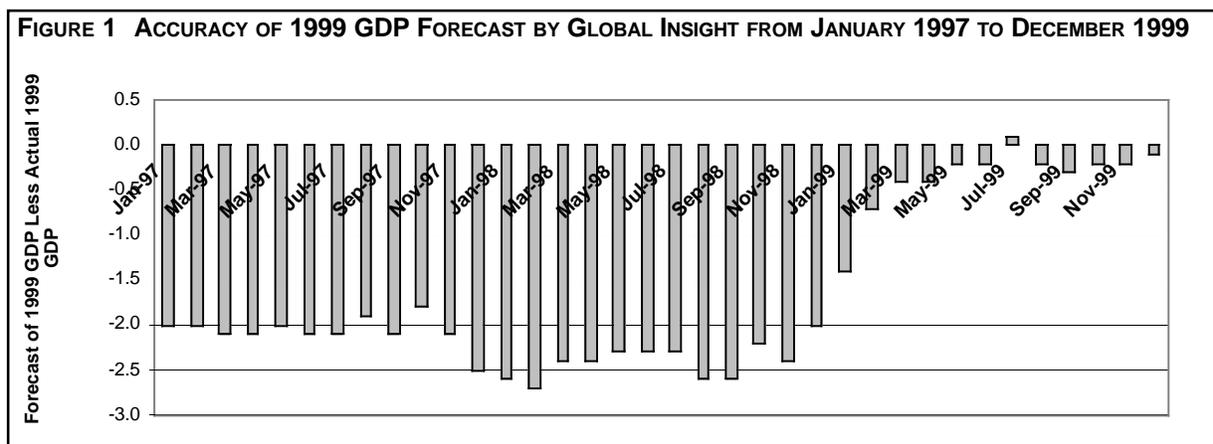
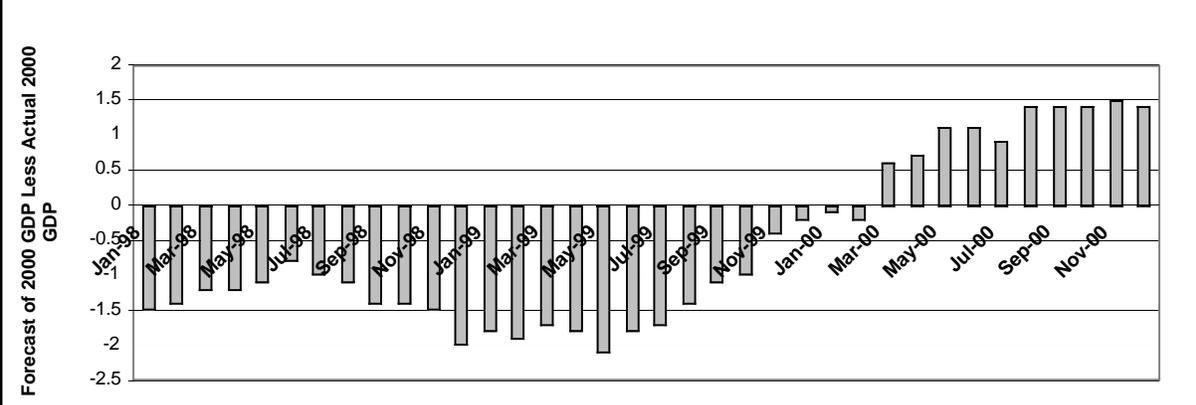
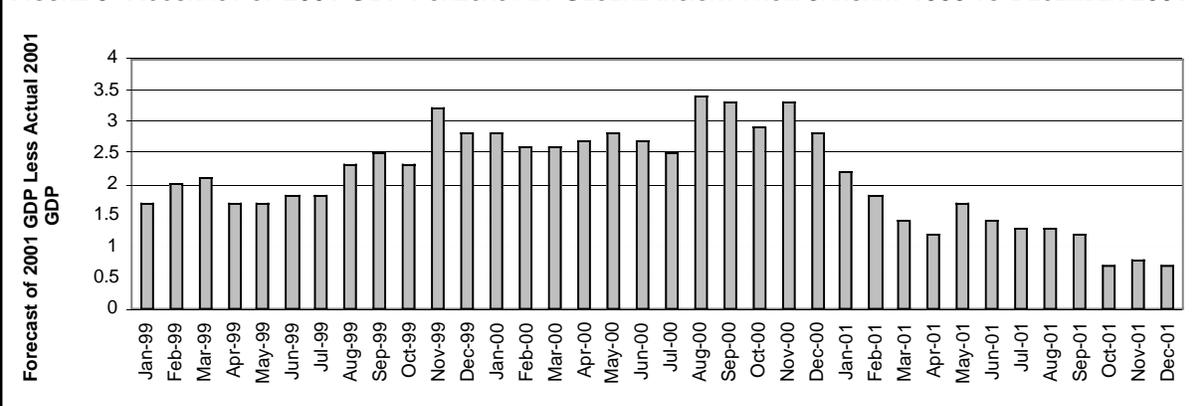


FIGURE 2 ACCURACY OF 2000 GDP FORECAST BY GLOBAL INSIGHT FROM JANUARY 1998 TO DECEMBER 2000**FIGURE 3 ACCURACY OF 2001 GDP FORECAST BY GLOBAL INSIGHT FROM JANUARY 1999 TO DECEMBER 2001**

The November 2000 Forecast

Now that some of the shortcomings with the Global Insight forecasts have been revealed, it is useful to look specifically at how these national forecast errors can have tremendous implications on the estimates made at the state level. For example, in November of 2000, sitting on the cusp of an economic downturn, the DOR analysts were preparing estimates of tax revenue data for the 2001-2003 biennial budget. Of course, the best information available to them at this time was contained in the November 2000 report on the nation's economy from Global Insight. So, as always, they took this data and entered it into their economic models for the state of Wisconsin, and produced estimates of tax collections for the 2001 and 2002 fiscal years.

Table 5 compares the forecasts made in November of 2000 by Global Insight on GDP, Personal Income and the Unemployment Rate for 2001 and 2002 with actual values for these data points. It can be seen that for both years of the then upcoming budget, Global Insight was predicting GDP and Personal Income levels that were significantly higher than what actually occurred. They were also forecasting Unemployment Rates that were lower than actual.

One might expect that this would lead to a considerable overestimation of revenue for this biennium. This is a crucial hypothesis that will be tested later in this report.

TABLE 5 THE NOVEMBER 2000 GLOBAL INSIGHT FORECAST

Data Series	2001 Forecast	2001 Actual	2002 Forecast	2002 Actual
GDP	3.6%	0.3%	4.3%	2.4%
Personal Income	5.8%	3.3%	5.6%	2.7%
Unemployment Rate	4.4%	4.8%	4.6%	5.8%

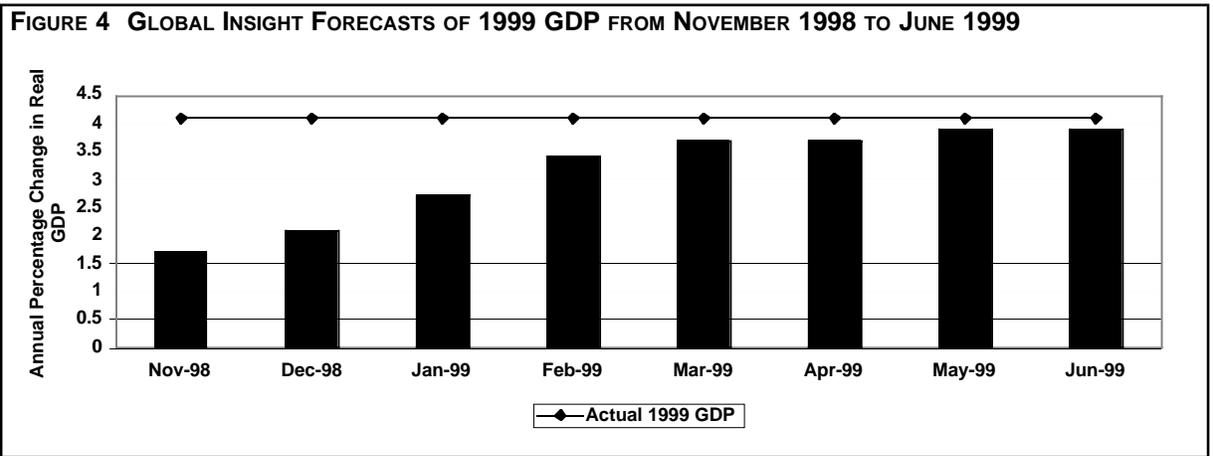
November to June

As shown above, it is difficult to make accurate forecasts of key national economic data far in advance of a new state budget. The DOR is required to make revenue estimates in mid November of each even numbered year for the next biennial budget, which begins in July of the following year. Obviously, the best information that the DOR analysts have about the economy at that time comes from the November Global Insight predictions about the national economy, as shown above. Interviews with the DOR staff confirmed that these revenue predictions made in November are very rarely changed during the time leading up the new biennium, or during the biennium.¹⁹

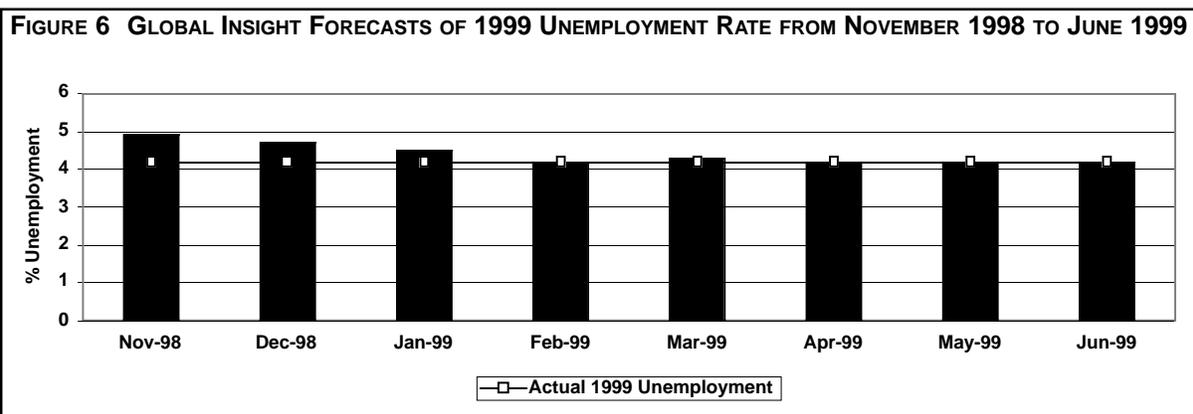
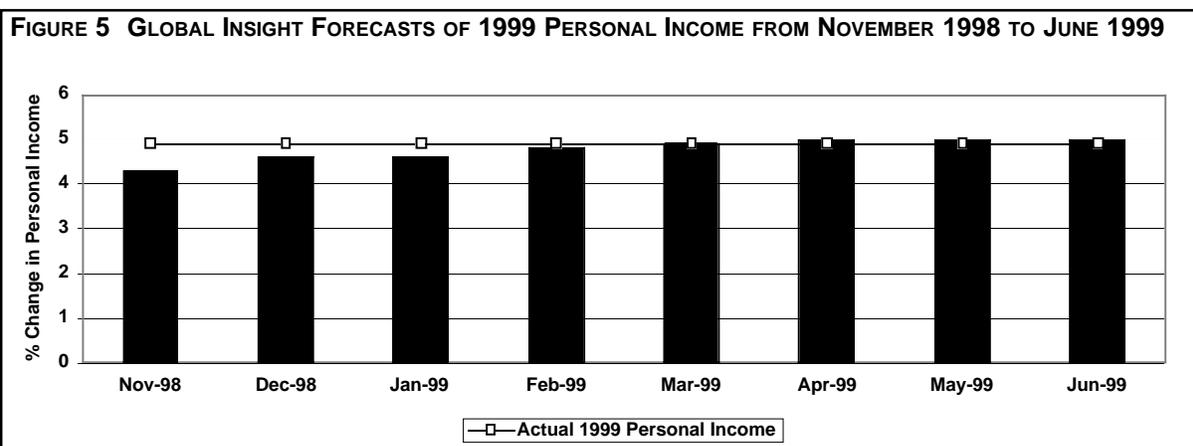
Given the relatively long time period between the preparation of the revenue estimates in November and the actual beginning of the new budget in July of the following year, it seems reasonable to ponder how the Global Insight forecasts of the U.S. economy change over this time period. While the diligent analysts at the DOR continue to monitor the economy, this new information is essentially ignored for the purposes of forecasting Wisconsin state revenue over the next biennium.²⁰

As one would expect, forecasts tend to change over time. As more information is learned about the economy, and the actual date being predicted approaches, the forecasts should become more accurate. Let us first consider the preparation of the 1999-2001 biennial budget, which began in July of 1999. Per statutory requirements, the Department of Revenue was required to develop a forecast of tax revenues commencing in the summer of 1999 through July of 2001. Again, per state law, this estimate was due in November of 1998.

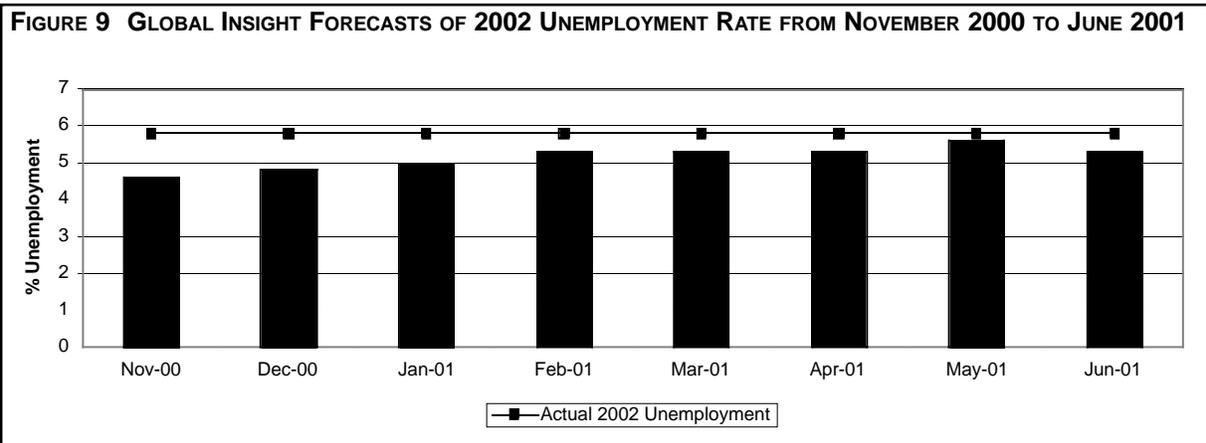
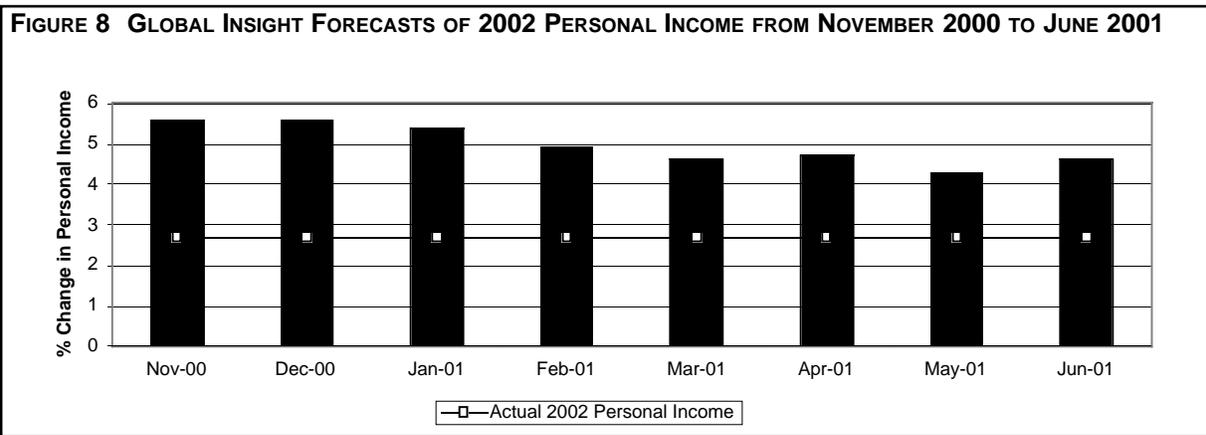
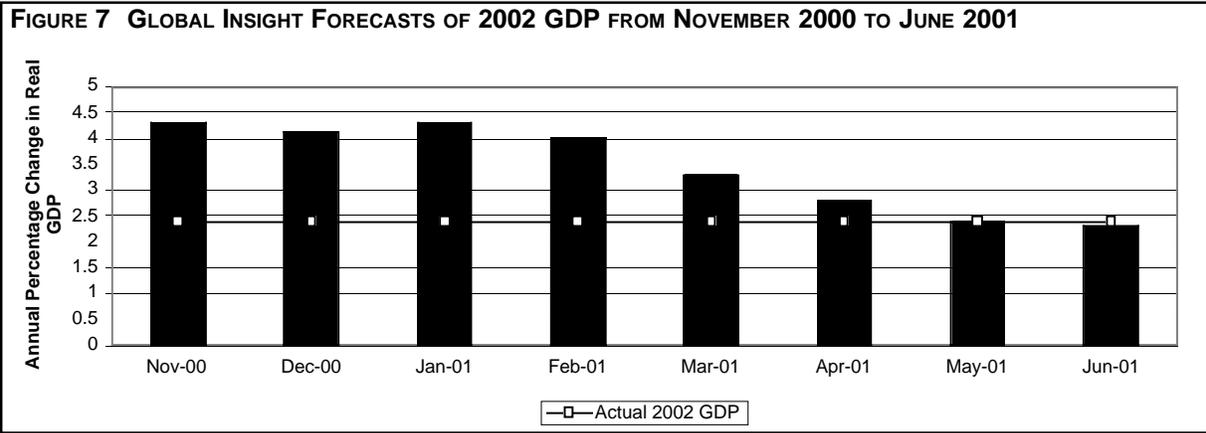
Figures 4, 5 and 6 below illuminate how volatile economic forecasts can be. Figure 4 displays the Global Insight forecasts of the annual percentage change in U.S. Gross Domestic Product for 1999 that were made, and sent to the Wisconsin DOR, monthly from November 1998 through June of 1999. Try putting yourself in the DOR analyst's shoes in November of 1998 — they are trying to predict Wisconsin tax revenue collections beginning in July of 1999, but only have access to the first bar on this graph. Because there is a clear linkage between the strength of Wisconsin's economy and tax collections, as well as a clear correlation between U.S. economic vitality and the health of Wisconsin's economy, these analysts are very interested in how fast U.S. GDP is likely to grow over the next budget. Because of this relationship, an obvious input into the econometric model of the Wisconsin economy in November of 1998 would be the Global Insight estimate of 1.7 percent growth in real U.S. GDP in 1999. If we follow this chart to the right, it can be seen that by June of 1999 Global Insight had dramatically changed their opinion of U.S. economic growth. By this date — still a month before the new Wisconsin budget was to take effect — they were predicting GDP growth of 3.9 percent. While this may not seem like a huge discrepancy, it is an increase of over 129 percent, and in a 10 trillion dollar economy, it makes a substantial difference. Actual growth in real U.S. GDP turned out to be 4.1 percent in 1999, much closer to the June of 1999 forecast than that made in November of 1998, as shown by Figure 4.



A similar story can be seen when reviewing the Global Insight predictions on the U.S. percentage change in Personal Income or the U.S. Unemployment Rate for 1999, shown in Figures 5 and 6. Again, both of these series are indicators of the health of the U.S. economy and reasonable inputs into a Wisconsin state economic forecasting model. In November of 1998, Global Insight was predicting 4.3 percent growth in Personal Income and an Unemployment Rate of 4.9 percent in 1999. These numbers represent the best information available at the time that the forecast for the next budget was due. By June of 1999, a month before this budget would initiate, Global Insight was predicting Personal Income growth of 5 percent and an Unemployment Rate for 1999 of only 4.2 percent. The 1999 Personal Income growth ended up at 4.9 percent while the unemployment rate in that year was 4.2 percent, exactly as forecast in June.



Figures 7, 8 and 9 show that the economy can also swing in the other direction, rather abruptly, during this time between when the revenue forecast is due and the actual budget begins. In November of 2000, the DOR was required to present revenue estimates for the biennial budget, which began in July of 2001 and extended until July of 2003. At this time, Global Insight was predicting 2002 real GDP growth of 4.3 percent, Personal Income growth of 5.6 percent and a U.S. Unemployment Rate of 4.6 percent as indicated by the figures. By the time the actual budget period began, these estimates had changed to 2.3 percent, 4.6 percent and 5.3 percent respectively. While none of the Global Insight predictions precisely hit their mark, the June of 2001 numbers were substantially closer to actual than those prepared in November of the previous year, as would be expected. Again, it will be interesting to see whether these intricacies in the process lead to problems with the actual 2001-2003 biennial budget numbers developed by the DOR analysts.



Summary

Given the questionable track record of the Global Insight forecast data, one might question its value. This question is even more important when the \$33,335 price tag for a one-year contract for subscriptions and services from Global Insight is considered. Because hindsight is twenty-twenty, it is easy to pick apart these forecasts and cavalierly discuss the errors that were made. Global Insight is a very reputable forecasting firm staffed by well-trained and respected economists. It should be noted that each of the forecasts they supply to the Wisconsin Department of Revenue are filled with well-documented sources of risk in their numbers and predictions. Because of this strong reputation, they are used by most of the states for national economic forecasts.

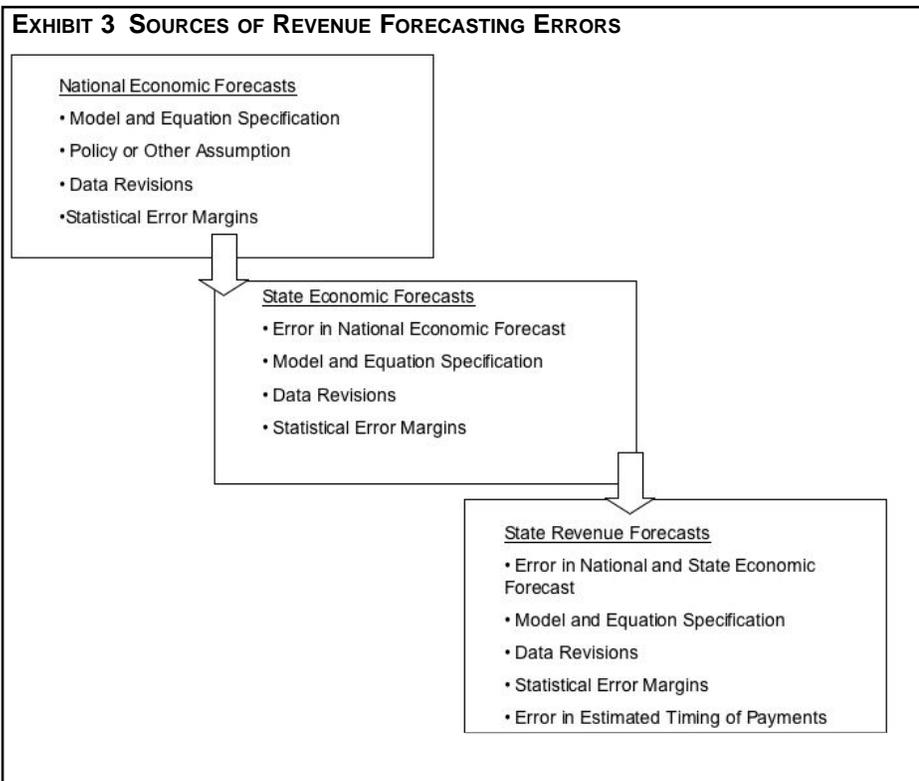
Are there other sources of national forecasts that might be better?²¹ The definitive answer to this question is not known, but is a worthwhile query for the Department of Revenue analysts to investigate in light of the forecast errors documented in this section and their likely impact on revenue estimations made in Wisconsin. Because the contract with Global Insight can be renewed each year, it makes practical sense to evaluate the performance of the forecasts each year as well. A number of studies on the accuracy of economic forecasters put Global Insight anywhere from the middle of the pack to among the best.²² What should be understood is the inherent error that is to be expected in the forecast and the need to continually update estimates because of the dynamic nature of both the economy and the forecasts of the economy.

THE ACCURACY OF WISCONSIN REVENUE FORECASTING

What is the Department of Revenue's track record in accurately forecasting Wisconsin tax collections? Given the time frame articulated earlier, and the capricious nature of the economy, trends are much more important than exact point estimates. One could argue that simply being able to predict growth or contraction would be a noble goal; however, because this revenue forecasting procedure is the only tool used by the state of Wisconsin to develop a budget, and the budget is likely to appropriate every dollar that is collected by the state, the veracity of the forecast becomes quite important.

The previous description of the revenue estimating process in the state of Wisconsin makes it clear that there are a handful of potential sources of error in the final revenue numbers developed by the Department of Revenue. Earlier researchers have documented these sources as shown in Exhibit 3.²³ Because the process begins with the use of a national economic forecast that is then fed into each subsequent step in this progression toward state tax collection estimates, this is the first area to be discussed. Errors can be made in the development of the national model or in assumptions about national policies or proposed policy changes. Data revisions or errors are also frequent when dealing with macro-level federal government data sets that can lead to inaccuracies. Lastly, some error is expected, as these are statistical models, which include a margin of error.

Errors made in these national estimates, once used as inputs in the state-level models, then manifest themselves again in the state estimates. As the previous section illustrated for the Global Insight national forecast data, this is clearly a problem in Wisconsin. In addition to the sources of inaccuracy associated with the national data estimates, the same types of problems with policy assumptions or statistical margins of error are also applicable to state models. Lastly, the deviations in the state and national estimates compound themselves further once used in the actual state revenue estimating models. For all of these reasons, perfect estimates of state revenue cannot be expected.



Given these sources of error, an examination is in order of how close the estimates of revenue collections made in November of even numbered years have been to actual revenue collections over the following biennial budget. Forecasting the growth in revenue collections over the current year is the goal of most importance. It is this forecast that tells decision makers how much additional revenue they can spend. The idea of a structural deficit — the difference between ongoing spending commitments and ongoing revenues — makes this even more important because the state budget is full of items with automatic spending increases, like school aid and medical assistance. It is this growth in revenue collections that will truly indicate how good the fit is between revenue collections and expenditures.

Table 6 displays actual and forecasted state budget information for the fiscal years 1989 through 2003. The error in growth forecasts are calculated as the percentage difference between forecasted revenue growth and actual revenue growth, from the previous year's actual. A positive forecast error reflects a revenue growth forecast made by the DOR that was greater than actual revenue collections growth turned out to be. A negative forecast error suggests that the DOR growth forecast was lower than actual collections growth.

These data provide some interesting results. The mean absolute error in revenue growth forecasts is about 200 percent over the 1989 to 2003 time frame.²⁴ When the exceptionally inaccurate forecast made for 2002 is removed this mean error is calculated to be about 41 percent. While this result is certainly better, it still represents a significant deviation from actual collections growth. This finding begins to show how, in a tight budget year, these forecast errors can play a major role in the accumulation of a significant deficit.

It can be seen from the data in Table 6 that during the 1990s, when the economy was generally strong both nationally and in Wisconsin, the revenue predictions were always below the actual level.²⁵ Just like the Global Insight data presented earlier, the DOR estimates erred on the low side in almost every year throughout the 1990s, culminating with a significantly low estimation in 2000, which turned out to be the strongest year for state revenue collections in history. This is clearly what led to the frequent revenue surpluses enjoyed in Wisconsin over this time frame.

The most important revelation made in Table 6 can be found in the error column for 2001 and 2002. These two fiscal years cover the 2001-2003 biennium in which Wisconsin suffered the worst budget shortfall in the history of the state. The data presented in this table clearly lay a major portion of the blame for this colossal deficit on the forecasts of state revenue made in November of 2000.

With a national and state economy weakening in the late stages of 2000, the analysts at the DOR correctly predicted a decline in tax revenues from the all-time peak reached in 2000, for fiscal year 2001. Unfortunately, the decline they predicted was not deep enough. However, the forecast that was particularly damaging to the state's finances was that made for fiscal year 2002. Analysts at the DOR predicted revenue growth for 2002 to a level even higher than 2000, yet actual collections continued to decline. The margin of error, calculated on growth, for this fiscal year was over 2200 percent. Certainly some of the blame for this inaccurate forecast can be explained by the obviously unanticipated terrorist attacks of 2001 that had a profound impact on the economy nationally. If one recalls the previous analysis of the Global Insight forecast data over this time period, this result is not particularly surprising. In November of 2000 Global Insight was significantly over estimating the strength of the U.S. economy in 2002. There is no denying that a link exists between the most inaccurate forecast made by the DOR and the largest budget deficit ever experienced by the state of Wisconsin.

It is also interesting to note that, in every case, it is more difficult to estimate revenue in the second year of the biennial budget than in the first. For example, the forecasts prepared in November of 1990 were within 15 percent of actual collections growth in 1991 but off by over 51 percent in 1992. This tendency plays out in the estimates prepared in each budget cycle studied. This result is not surprising given the discussion presented earlier on economic forecasting and the length of time that is involved in the preparation of these estimates.

The Link between Global Insight Forecasts and Wisconsin Revenue Estimates

The previous description of the Global Insight and Wisconsin revenue estimation errors provides some evidence of a causal relationship between the two. Considering the use of the Global Insight data as an input into the Wisconsin revenue estimating process, established earlier, this link is not surprising. It is to be expected that when Global Insight provides a forecast of U.S. Gross Domestic Product or U.S. Personal Income that is higher than actual, this will lead

TABLE 6 WISCONSIN REVENUE FORECASTS AND ACTUAL REVENUE COLLECTIONS

Fiscal Year	Actual Revenue Collections (millions of dollars)	Actual Growth in Revenue Collections from Previous Year (millions of dollars)	Forecasted Growth in Revenue Collections from Previous Year Actual (millions of dollars)	Error in Growth Forecasts
1989	5535.4	NA	NA	NA
1990	5649.6	114.2	109.9	-3.77%
1991	6072.9	423.3	360.2	-14.91%
1992	6339.4	266.5	130.4	-51.07%
1993	6871.0	531.6	433.6	-18.43%
1994	7287.5	416.5	264.5	-36.49%
1995	7806.9	519.4	483.3	-6.95%
1996	8209.5	402.6	361.4	-10.23%
1997	8804.0	594.5	421.1	-29.17%
1998	9528.3	724.3	240.3	-66.82%
1999	9948.3	420.0	143.1	-65.93%
2000	10946.0	997.7	-15.4	-101.54%
2001	10063.4	-882.6	-764.0	13.44%
2002	10020.1	-43.3	937.4	2264.90%
2003	10199.7	179.6	380.8	112.03%

Source: Wisconsin Department of Administration

to a Wisconsin revenue estimation that is higher than actual as well. Conversely, when Global Insight predicts a U.S. Unemployment Rate larger than what is actually experienced, this will lead to an underestimation of revenue collections.

The results of a correlation analysis between errors made by Global Insight while forecasting U.S. GDP, Personal Income and Unemployment and the error in Wisconsin revenue forecast made by the Department of Revenue are presented in Table 7. As expected, the results indicate a significant and positive relationship between GDP and Personal Income forecast errors and Wisconsin revenue forecast errors. An overestimation, by Global Insight, of one of these variables leads to an overestimation of revenue in Wisconsin. On the contrary, there is also a statistically significant negative relationship between Global Insight errors of the unemployment series and Wisconsin revenue forecasts. This simple analysis gives a clear indication of how reliant the Wisconsin DOR estimates are on the frequently inaccurate data they purchase from Global Insight.

TABLE 7 CORRELATION ANALYSIS

Wisconsin Revenue Forecast Error	
Global Insight GDP Forecast Error	0.701*
Global Insight Personal Income Error	0.924**
Global Insight Unemployment Error	-0.966**

Table Notes: ** = significant at the 1% level, * = significant at the 5% level.
Global Insight forecast errors are calculated for the forecast made in the November prior to the beginning of a new biennial budget.

THE PROCESS IN OTHER STATES

The majority of states use a process quite similar to that of Wisconsin for forecasting state revenue. As mentioned earlier, most states purchase national economic forecasts from Global Insight as an input to their state economic models. This revelation may have contributed to the well-documented revenue shortfalls of 46 states in 2002. The basic process of generating a national economic forecast, tailoring it to the individual state’s economy and then using this state economic forecast to estimate revenue collections is the standard.²⁶ How effective each state is at executing this process is really the key, and subtle differences between the states may make a large difference in this regard.

One major distinction between state revenue forecasting processes is the frequency of the estimate updates. In Wisconsin, a single estimate is required by statute every two years (in preparation for the biennial budget process).²⁷ This is the least frequent updating of revenue projections of all fifty states. In fact, no other state allows more than one year between re-estimations. The Wisconsin Department of Revenue does issue a quarterly economic outlook, which assesses the general trends in the Wisconsin and national economies; however, the actual revenue estimating process is typically only run once every two years. Given the fluctuations in the model input data described earlier, the potential for bias appears likely given this schedule.

TABLE 8 FREQUENCY OF REVENUE ESTIMATION UPDATES

Frequency	Number of States	Percentage of States
Every two years	1	2%
Annual	1	2%
Semi-Annual	24	48%
Quarterly	14	28%
3 times per year	4	8%
Bi-Monthly	1	2%
Monthly	1	2%
As necessary	4	8%

Table 8 shows the distribution of revenue update frequencies for the fifty states.²⁸ It can be seen that Wisconsin is the only state that updates their revenue estimations every two years and only one other state does this as infrequently as annually. The majority of states, 48 percent of them, make revenue updates on a semi-annual basis. 28 percent choose to update their models quarterly. There is even one state, Connecticut, which makes revenue updates on a monthly basis.

A second area of dissimilarity between state revenue forecasting processes is the use of a forecast advisory council by many of the states.²⁹ The purpose of the forecast advisory council is to provide a wider range of inputs into the forecasting process. Instead of a forecast being prepared exclusively by government analysts and an econometric model, a formal and independent body, potentially made up of academic economists, business leaders, members of the local Federal Reserve Bank, staff from national forecasting firms or others with expertise on the local economy are drawn upon during the preparation of the revenue estimate. This type of group provides a range of advantages including an outside check on the rationality of the model estimates, a wider range of opinions and greater consensus among stakeholders in the estimating process. It is also likely that the public would have more confidence if a diverse group of experts are used in the forecasting process in addition to a com-

puter model that few understand. Research shows that 29 of the 50 states use some type of forecast advisory council in their revenue estimating practices.³⁰ These councils range from a Governor's Council of Economic Advisors to a Business Advisory Panel.

SUGGESTIONS FOR IMPROVEMENT

Forecasting state revenues is a very tricky venture. The sources of error in the process are numerous and the risks are immeasurable. The analysis in this paper shows that while Wisconsin follows a reasonable process in this task, there is much room for improvement in the results. Clearly, mistakes made estimating state revenue collections in the 2001-2003 and 2003-2005 budgets have contributed to significant state deficits and much hardship for state government and Wisconsin residents. The following suggestions are submitted in an effort to make substantive improvements in the process:

Make Revenue Estimates More Frequently

Given how quickly both the national and state economy can fluctuate, updating revenue forecasts every two years is simply not enough. Every other state in the nation recognizes this, with the bulk of them preparing estimates semi-annually. Wisconsin should immediately adopt a system of updating state revenue estimates on either a semi-annual basis or, more preferably, a quarterly basis. Given that the state receives forecast data from Global Insight each month on the state of the national economy, it makes sense to make more frequent use of it by preparing estimates more regularly for state revenue collections.

Implement an Economic Advisory Council

The forecasts made by the state of Wisconsin would benefit greatly from input by a more diverse group of economists and business leaders. It only makes sense to utilize the nationally known academic economists in the University of Wisconsin system, or other state institutions of higher education, in addition to financial experts from industry. The forecasts would also gain some credibility in the mind of the public if members of the local Federal Reserve Bank were on this panel. While computer generated statistical models are a reliable way to create the estimates, a thoughtful check that could be provided by others with first hand experience in the Wisconsin economy would be beneficial. A council was used in 2001 and 2002 but discontinued by the Doyle administration. This council should be brought back immediately.

Create a Budget Reserve Fund

The 2001-2002 budget established a statutory requirement that mandates 50 percent of unanticipated revenue growth to be allocated to a budget reserve fund. This provision is only as enduring as the current legislature, since a simple statutory change would eliminate it. Nevertheless, an adequate reserve fund is needed. Without this fund, Wisconsin will continue to be beholden to the inherently inaccurate revenue estimating process. The feast or famine pattern of budgeting prevalent in the state will continue into the future as business cycles oscillate from growth to contraction.

Evaluate National and State Forecast Data on a Regular Basis

The Wisconsin Department of Revenue should be monitoring tax collections data on a monthly basis and publishing this data to the public.³¹ In addition to this, an analysis of the difference between revenue collections estimated and actually collected should also be published on a quarterly basis. Also, DOR analysts should compare Global Insight forecast data to actual levels at the end of each year. An evaluation of other sources of national economic data should be done on a bi-yearly basis. A number of competitors to Global Insight exist, and if they are able to provide a more accurate picture of the U.S. economy, the citizens of Wisconsin would benefit greatly.

Articulate Revenue Estimation Process Better to Public and Media:

There is no reason to believe any partisan agenda has been at work in the preparation of state revenue estimates in the recent past. However, given how secretive this process is, state residents might question this fact. It would benefit the state greatly to better articulate the revenue estimation process to the media and the citizenry. The use of a forecast advisory council and more frequent updates of estimations would go a long way to this end. In addition, more comprehensive reporting would be of great value. The states of Washington and Idaho would both serve as excellent models.³²

SUMMARY AND CONCLUSIONS

Accurately forecasting state revenue collections is a critical function of state government not clearly understood by the public. The disastrous ramifications of inaccurate forecasts have been clearly demonstrated in recent Wisconsin budgets through huge spending deficits. This paper outlined the process by which tax revenue is estimated in Wisconsin.

An analysis of the performance of the economic consulting firm used for national economic forecast data in Wisconsin showed significant inaccuracies. The impact of these forecast errors on Wisconsin tax revenue estimates are also shown. Suggestions are offered for improvement including the use of a forecast advisory council, more frequent revenue estimation updates, better monitoring of the differences between forecast and actual for both the national and state data as well as better communication with the public. Quick adoption of these policies is likely to help the state avoid some of the difficult times experienced in the recent past with future budgets. It is unlikely that Wisconsin would ever have experienced the nearly \$3.2 billion deficit that it did in 2002 had these suggestions been implemented earlier. While Wisconsin currently follows many of the practices outlined by the Association of State Budget Officers and the Federation of Tax Administrators presented earlier in this paper, adoption of the suggestions made in this report would assure that all of these practices are adhered to. Improving the budgeting process in Wisconsin is critical to the future of this state and the quality of life of its citizens.

NOTES

1. From Shkurti, William J. "A User's Guide to State Revenue Forecasting" *Public Budgeting and Finance*, Spring 1990.
2. In the 2001-2003 Wisconsin budget a statutory requirement was enacted that requires 50 percent of unanticipated revenue growth be allocated to a budget reserve fund.
3. "State's tax collections falling short of forecast" Steven Walters, *Milwaukee Journal Sentinel*, February 10, 2004. Based on memo from Legislative Fiscal Bureau issued on February 10, 2004 and available at: <http://www.legis.state.wi.us/lfb/index.html>.
4. Wisconsin Taxpayers Alliance, "Boom-surplus-spend-cut ... Grow?" September 29, 2003, Number 21.
5. This memo was issued by Robert Lang on July 12, 1999 to the members of the Wisconsin Joint Committee on Finance.
6. "Chvala plan discards income tax cuts" Dennis Chaptman, *Milwaukee Journal Sentinel*, November 6, 1999.
7. "Wisconsin economy generate \$154 million surplus" Dennis Chaptman, *Milwaukee Journal Sentinel*, September 1, 2000.
8. Former Secretary of Administration George Lightbourn and Revenue Secretary Cate Zeuske argued for this in a memo sent to Governor Tommy G. Thompson.
9. Howard, Marcia, "Good Practices in Revenue Estimating" Washington D.C., National Association of State Budget Officers and The Federation of Tax Administrators, 1989.
10. The Legislative Fiscal Bureau (LFB) is not bound by any statutory requirement to issue revenue estimations; however, they typically issue such estimations each January. During the odd numbered years these estimations are used in preparation of the upcoming biennial budget and are frequently re-estimated in May as the Joint Committee on Finance is concluding work on the next budget. In even numbered years, these estimates are used as a check on the current status of the forecast and to determine whether a budget adjustment bill is required. While it could be argued that the LFB estimations are of more practical importance in the overall state budget process, this paper will concentrate on the estimations made by the Department of Revenue (DOR). The DOR estimates are the official state revenue estimations as written in Wisconsin statute. Because these two sources of revenue estimations use similar processes and the same economic assumptions, the majority of the discussion is germane to both sets of estimations.
11. This statement is made by the DOR analysts in an internal document titled: "The Wisconsin Revenue Estimating Process." This is not surprising given that these two agencies, while developing forecasts independently, share economic forecast data, economic assumptions and methods in addition to collection statistics.
12. Much of the information related to this revenue forecasting process is summarized from a document available from the DOR titled "The Wisconsin Revenue Estimating Process."
13. Global Insight has made a number of name changes in the recent past. Prior to November of 2001 they were called DRI-WEFA.
14. Econometrics refers to the branch of economics that is concerned with applying statistical theories to the empirical testing of economic relationships. Models are created of the economy, using historical data, which are used to forecast future levels of these economic variables.
15. Actual data for the GDP and Personal Income series was obtained from the Bureau of Economic Analysis (www.BEA.gov). The Unemployment Rate actual data came from the Bureau of Labor Statistics (www.BLS.gov). Because the percentage annual change in U.S. GDP is a "real" variable, and is measured in constant dollars of purchasing power, actual values had to be found in chained 1987 dollars, chained 1992 dollars and chained 1996 dollars for certain months. The current base being used by the BLS is chained 2000 dollars, which began in December of 2003, and did not affect this report.
16. Each of these measures of real percentage change in U.S. GDP are in chained 1996 dollars available from the Bureau of Economic Analysis.
17. While it may seem counterintuitive to be "forecasting" the percentage change in 1998 GDP in December of 1998, in reality the actual value of GDP for 1998 was not fully calculated by the federal government until the end of February 1999.
18. It must be noted that because the Bureau of Economic Analysis changed the base year used for GDP calculations from 1992 chained dollars to 1996 chained dollars in November of 1999, slight inaccuracies may result in the measurement of these actual values. There is no solution to this problem as once the change is made, GDP is no longer calculated using the previous base year.

19. The DOR analysts noted that they monitor the economy during this time period and prepare new forecasts if there are abrupt turns in the economy that warrant such a new forecast. It should be noted once again that the Legislative Fiscal Bureau does make subsequent re-estimations of revenue collections leading up to the passing of the actual state budget.
20. This statement applies to the Department of Revenue. The Legislative Fiscal Bureau does make estimations of revenue during later steps in the budget process utilizing more current Global Insight forecasts.
21. Global Insight has a number of competitors that are used by other states including Economy.com. Because of the substantial fee to subscribe to these forecasts services a comparison cannot be made in this study.
22. These evaluations include: Eisenbeis, Robert, Waggoner, Daniel and Zha, Tao, "Evaluating Wall Street Journal Forecasters: A Multivariate Approach" *Business Economics*, July 2002. and *The Wall Street Journal*, "Economic Forecasting Survey" June 2003.
23. Adapted from: Shkurti, William J. "A User's Guide to State Revenue Forecasting" *Public Budgeting and Finance*, Spring 1990.
24. The mean absolute forecast error is calculated by converting the negative errors to positive errors and then finding the mean of the data series. This is done to avoid the problem of negative and positive errors canceling themselves out.
25. Revenue collections are affected by both the strength of the economy and changes in tax codes.
26. Shkurti, William J. "A User's Guide to State Revenue Forecasting" *Public Budgeting and Finance*, Spring 1990.
27. The Legislative Fiscal Bureau does prepare annual expenditure and revenue projections for the legislature. While not required by Wisconsin statute, these estimations help determine whether a mid-budget adjustment bill is required.
28. *The Book of the States*, 1999-2000.
29. Wisconsin implemented a forecast advisory council in 2001 and 2002. The Doyle administration elected to discontinue the use of this council.
30. *The Book of the States*, 1999-2000.
31. This is currently done on a quarterly basis.
32. Reports on economic forecasting for these states can be found on the web through the Washington State Office of the Forecast Council and the Idaho Division of Financial Management.

ABOUT THE INSTITUTE

The **Wisconsin Policy Research Institute** is a not-for-profit institute established to study public-policy issues affecting the state of Wisconsin.

Under the new federalism, government policy increasingly is made at the state and local levels. These public-policy decisions affect the life of every citizen in the state. Our goal is to provide nonpartisan research on key issues affecting Wisconsinites, so that their elected representatives can make informed decisions to improve the quality of life and future of the state.

Our major priority is to increase the accountability of Wisconsin's government. State and local governments must be responsive to the citizenry, both in terms of the programs they devise and the tax money they spend. Accountability should apply in every area to which the state devotes the public's funds.

The Institute's agenda encompasses the following issues: education, welfare and social services, criminal justice, taxes and spending, and economic development.

We believe that the views of the citizens of Wisconsin should guide the decisions of government officials. To help accomplish this, we also conduct regular public-opinion polls that are designed to inform public officials about how the citizenry views major statewide issues. These polls are disseminated through the media and are made available to the general public and the legislative and executive branches of state government. It is essential that elected officials remember that all of the programs they create and all of the money they spend comes from the citizens of Wisconsin and is made available through their taxes. Public policy should reflect the real needs and concerns of all of the citizens of the state and not those of specific special-interest groups.