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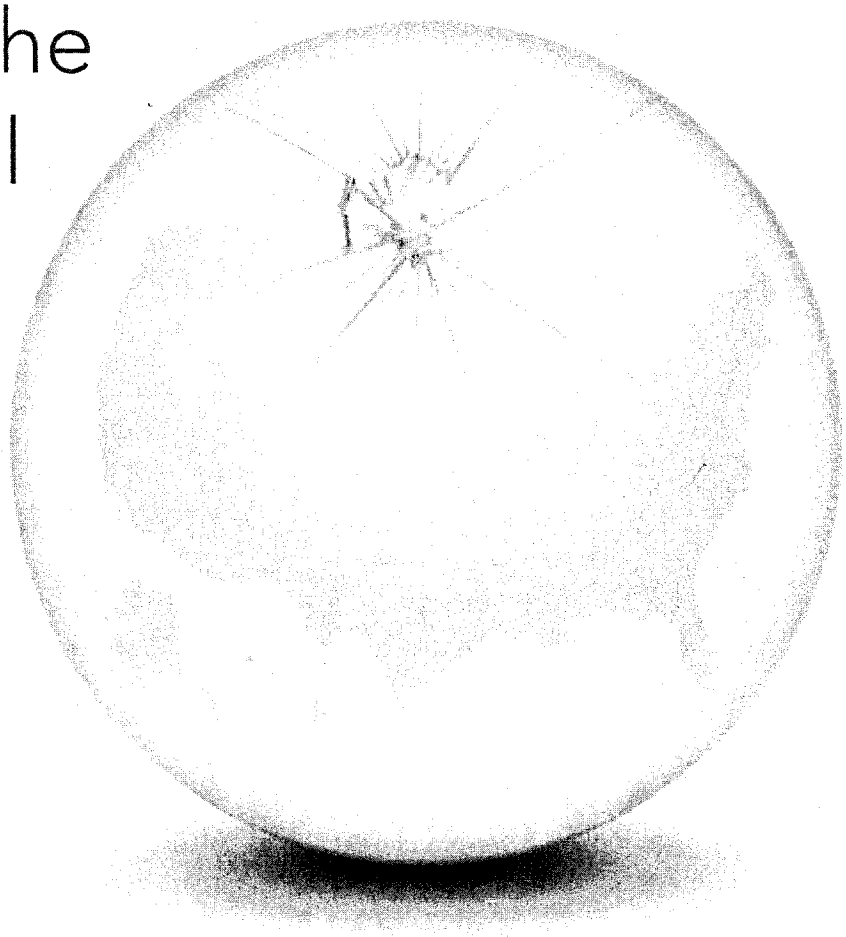
States' Revenue Estimating

Cracks in the Crystal Ball



PEW CENTER ON THE STATES | THE NELSON A. ROCKEFELLER INSTITUTE OF GOVERNMENT

MARCH 2011

This report is a joint project of the Pew Center on the States and The Nelson A. Rockefeller Institute of Government.

The Pew Center on the States is a division of The Pew Charitable Trusts that identifies and advances effective solutions to critical issues facing states. Pew is a nonprofit organization that applies a rigorous, analytical approach to improve public policy, inform the public and stimulate civic life.

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The Nelson A. Rockefeller Institute of Government, at the University at Albany, is the public policy research arm of the State University of New York. The Institute conducts fiscal and programmatic research on American state and local governments. For additional information please visit www.rockinst.org.

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Dear Reader:

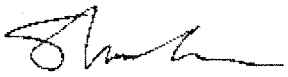
As state leaders enter the fourth year of the nation's fiscal crisis, it has never been more important for them to use the best information possible when crafting their budgets. The state revenue estimates that inform these spending plans help drive policy decisions about whether to raise or reduce taxes, how much to spend on programs, and—increasingly—where and how much to cut.

States' Revenue Estimating: Cracks in the Crystal Ball sheds new light on an understudied aspect of the budget gaps that nearly all states have faced during the Great Recession: revenue estimating errors. The Pew Center on the States and The Nelson A. Rockefeller Institute of Government partnered to undertake this analysis of 23 years of data on personal income, sales and corporate income tax estimates and collections. The results reveal that the states regularly misestimate revenue and that those errors are significantly greater in times of fiscal crisis. The troubling, long-term trend is that overestimates have gotten larger during each of the past three economic downturns, and more states have made them. This report discusses the causes of this trend and describes practices some states have adopted to achieve greater precision.

The report builds on the track records of both Pew and the Rockefeller Institute in providing state leaders with the vital information they need. The Pew Center on the States helps lawmakers, the media and other stakeholders better understand states' current fiscal conditions and future prospects. The Rockefeller Institute has long informed important policy decisions in New York State and across the country with its research and analysis of state fiscal conditions, tax policies and spending trends.

We hope this joint effort will inform and guide state leaders as they chart a path toward fiscal recovery today and sustainability tomorrow.

Sincerely,



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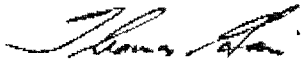

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Executive Summary

The ability to estimate how much money is coming in each year is critical for any individual, family, business and government to set spending priorities, plan for the future and cover day-to-day expenses. But when those estimates are substantially off—as they were for state governments during the Great Recession—the consequences can be significant.

Research by the Pew Center on the States and The Nelson A. Rockefeller Institute of Government shows that in fiscal year 2009, the errors by states in forecasting personal income, sales, and corporate income tax collections added up to a $49 billion unexpected revenue shortfall.[1] In a year in which state lawmakers faced $63 billion in midyear budget gaps—coming atop $47 billion they had already closed when crafting their budgets—the missed forecasts contributed to the need for tough and unexpected choices to cut spending, increase taxes, draw from reserves and borrow money.[2]

In 2009, the median error was a 10.2 percent overestimate. In other words, half the states overestimated taxes by more than 10.2 percent that year, starting a trend of unwelcome surprises. In New York, officials had to revise their fiscal year 2011 estimate five times in 2009. Even Indiana, whose estimates were off by less than 1 percent over the length of this study, erred in its forecasts for 17 straight months until the streak ended in March 2010. While one might expect revenue estimates for that year to be wrong, given the unprecedented deterioration of economic conditions across the United States, Pew and the Rockefeller Institute found the size of the median error rate continued a worrisome trend: During downturns—when it matters more than ever for states to get it right—more states are not only getting it wrong, but making larger errors.

There are a number of factors that contribute to a state's ability to predict revenues with accuracy—including a state's tax structure, its economic base, the budget processes in place and the national economic forecasts state officials rely on to estimate their revenues—and this study does not attempt to address them all or

compare states directly. Rather, this study examines the trends in revenue estimating errors over time—in particular, over the business cycle—and what steps states could take to manage the unexpected shortfalls or surpluses.

It should come as no surprise that complete precision in forecasting is virtually unachievable. In 16 years of the 23-year period covered by this study, officials underestimated tax collections, leading to surpluses. In the other seven years, officials overestimated revenue, leading to shortfalls. Either way, the median error over the period was 3.5 percent—or $25 billion in 2009 dollars, according to the Pew-Rockefeller Institute analysis.[3] This also means that over two decades, half of all revenue estimates were off by more than 3.5 percent. What is notable is that these larger errors typically occurred in the past 10 years.

Forecasters generally issue revenue estimates a few times a year, the last one usually in the fall so lawmakers can set an amount of money they believe the state will have to spend in the coming budget year.[4] No one expects perfection, even when the economy is stable and behaving in a predictable manner—partly because states use national economic forecasts as their starting point, which are based on historical trends and which tend to smooth over regional differences. As a result, forecasting revenue accurately becomes much more difficult when trying to account for the ups and downs of the economy and the effects of this volatility on individual states, as the surprising depth and breadth of the Great Recession has demonstrated. In the states with biennial budgets, the task of estimating revenues becomes even more difficult, as estimators attempt to forecast the performance of revenue streams over two or even three years.

Still, the Pew-Rockefeller Institute research turned up a striking pattern with potential implications for the future financial condition of state governments: Despite improvements in technology that forecasters say have made their jobs easier, errors in the annual revenue estimates have worsened. Revenues have become more difficult to predict accurately.

Consider what happened in Oregon. In 2009, the legislature overcame a two-thirds supermajority requirement to pass a $733 million income tax increase, which Governor Ted Kulongoski (D) signed into law. In January 2010, voters reaffirmed support for that measure to avoid cuts to K-12 education and other services. By May, however, a new unexpected shortfall of $577 million had materialized. Governor Kulongoski

responded by ordering across-the-board budget cuts of 9 percent, which included a once unthinkable $240 million cut to schools.[5]

It was that instability in revenue that inspired Pew and the Rockefeller Institute to examine revenue estimating. Our study examines state estimates for three major revenue sources—income taxes, sales taxes and corporate taxes—comprising 72 percent of states' total tax revenues.[6] The research covers a period from 1987 to 2009, a 23-year span that takes in three recessions and three stretches of economic growth. While other studies have examined errors in one type of tax in a select number of states, this study is the first to determine the size of misestimates using data for multiple taxes in all 50 states.

The revenue overestimates during the nation's past three recessions grew progressively larger as did the underestimates in the past two periods of economic growth. Moreover, in past recessions a single tax source was disproportionately responsible for the striking over- and under-estimates. For example, following the 2001 recession, revenue from the sales tax was unwavering, but many states had a difficult time forecasting the revenue from the personal income tax—particularly states with capital gains taxes. But in 2009, states were stunned when estimates for sales tax collections, which normally are more stable than income taxes, were off after consumers slowed their spending and increased savings. In fact, estimates for the sales tax were off by 7.6 percent that year, compared with an error rate of 0.3 percent over the 23-year study period. Whether that cautious consumer behavior is part of a lasting shift in the economy is of significant interest to state policy makers.

The Pew-Rockefeller Institute research also shines a light on a broader, long-term concern facing every state coming out of recession. When examining the potential causes of inaccurate estimates, we found there was something that mattered more than the states' processes, methods and techniques: the volatility of the revenue streams themselves. The main causes of the increase in volatility appear to be states' growing reliance on income taxes and the ways in which highly volatile capital gains affect income tax revenue. In addition, most states' tax structures are not in sync with a changing and dynamic economy, such as the shifts in consumer spending toward services and shifts in industrial composition away from manufacturing. State revenue streams have grown increasingly sensitive to economic cycles, which means that, going forward, revenue estimators will continue to have an even harder time predicting revenue performance through economic peaks and troughs.

Interviews with dozens of budget experts uncovered some promising practices from a number of states. Some approaches seek to improve the revenue estimating process itself—and how policy makers use the resulting numbers.

One strategy involves a willingness to refine economic assumptions, even during the budget year. Michigan, for instance, is in the process of adjusting its economic assumptions around a smaller auto industry. Another strategy is to remove politics from the estimating process as much as possible to limit lawmakers' attempts, especially in election years, to present a rosier view of revenues. For example, Connecticut recently passed a bill to settle political disputes in its revenue estimating process, giving the final say to the state comptroller when the executive and legislative branches cannot agree on a revenue forecast. A number of experts recommended increasing the frequency of estimates especially during downturns to respond quickly to sudden swings, and casting a wide net for expert economic analysis. Florida offers a good example; it revises its revenue forecasts three times a year. Several other states, including Vermont and West Virginia, added forecasts during the Great Recession.

Other practices are aimed at better managing the effects of the underlying volatility of state revenue streams. Fiscal tools such as rainy day funds, limiting reliance on certain highly volatile taxes and capping spending below expected revenues aim to make state budgets less vulnerable to economic downturns.

Key Findings

Among the major findings of the Pew-Rockefeller Institute revenue analysis:

- Errors in revenue estimates have worsened progressively during the fiscal crises that have followed the past three economic downturns. During the 1990–92 revenue crisis, 25 percent of all state forecasts fell short by 5 percent or more. During the 2001–03 revenue downturn, 45 percent of all state forecasts were off by 5 percent or more. And in 2009 fully 70 percent of all forecasts overestimated revenues by 5 percent or more.
- The first full fiscal year of the Great Recession—2009—ended with the largest overestimates in revenue forecasting of any year studied. During the 23-year study period, the median estimating error (whether high or low) was 3.5 percent. But in 2009, the median error was a 10.2 percent overestimate, which translated to a $49 billion shortfall that states had to cover. Arizona, New Hampshire, Oregon and North Carolina were among the states that had the most difficult time estimating revenues that year, with error rates greater than 25 percent.

- Unique among past downturns, the Great Recession also was notable because forecasters were confounded by major declines in—not just one, but—all three of the major state taxes. According to the research, states overestimated all three taxes in 2009: personal income taxes by 9.7 percent, corporate income taxes by 19 percent and sales taxes by 7.6 percent.
- State revenue estimates more often produce surpluses than shortfalls. In fact, in 16 of the 23 years covered by this study, the typical state underestimated revenue—leading to a median error of 1.5 percent, or $10 billion in surpluses in 2009 dollars. And in a handful of states, the underestimates were even more extreme: Connecticut, Massachusetts, Oregon and Vermont were among the six states with surpluses of more than twice the median, or 3 percent, over the study period.[7] Facing unexpected excess revenues, lawmakers may be tempted to spend the money by cutting taxes or starting new programs, but without the benefit of the planning time that would have been available with a more accurate forecast or the guarantee of recurring revenue. Neither practice is inherently wrong—but each may create challenges when the economy falters.
- The preferred practice in about half the states is a "consensus revenue estimate," in which a single forecast is put together with advice from the executive and legislative branches as well as academic and business advisers. The Pew-Rockefeller Institute data do not show a clear link between consensus forecasting and accuracy. For example, Maryland and Mississippi both use consensus forecasting, and both have error rates very close to the national median of 1.5 percent over the 23 years; Vermont and Massachusetts, on the other hand, also use consensus forecasting but their median estimating errors of 5 percent and 3.5 percent, respectively, are much greater than the national median.[8] Although consensus forecasting cannot guarantee improved accuracy, it can help insulate forecasting from the political process.

Conclusion

During the past several years, state leaders often have been startled to discover they have far less money to spend on services than they originally believed would be available. Such surprises fit into a pattern of increasingly larger errors in revenue estimates during recessions and their aftermath. There are many factors at play, but the biggest culprit is growing volatility in state revenue streams that are increasingly difficult to predict. Given this trend, forecasting revenue accurately will continue to be a challenge for those who prepare the estimates, at a time when policy makers need the best information possible for developing state budgets.

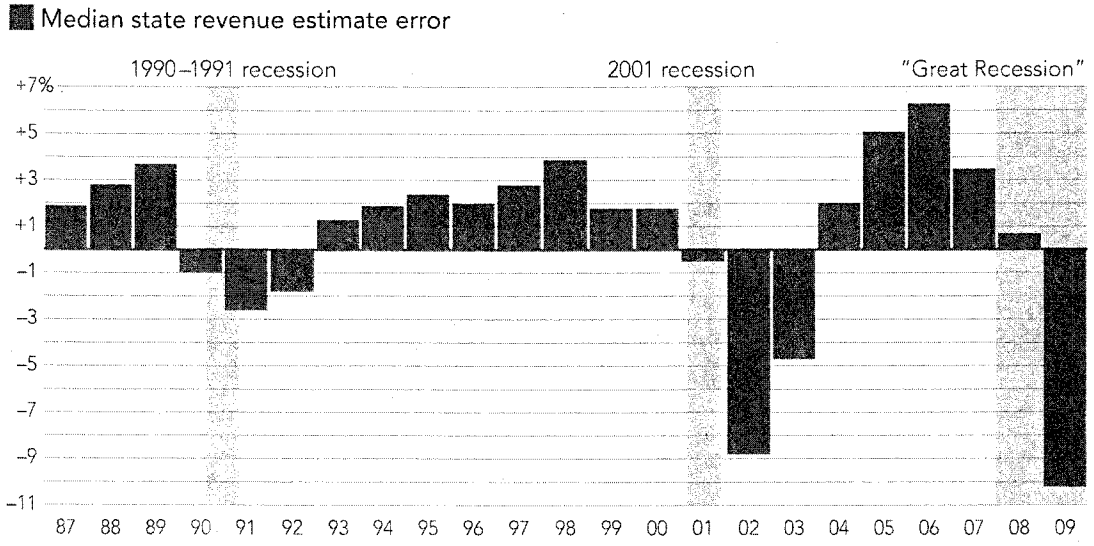
Revenue Estimates: The Growing Gap

For almost anyone involved in state budgeting, 2009 was a year of unwelcome surprises. As the economy took several turns for the worse, so did state revenues. The freefall occurred faster than most states were able to predict. In New York, for example, the official estimate of the state's budget shortfall for fiscal year 2011 worsened five times.[9] A budget gap that started at $4.6 billion in July 2009 eventually doubled to $9 billion by March 2010. Even Indiana, which over the length of our study saw an error rate of just 0.9 percent, had difficulty through the recent recession—erring in its forecasts for 17 straight months until the streak ended in March 2010.[10]

Exhibit 1

Errors over the business cycle

Between 1987 and 2009, the period studied for this report, the median revenue estimating error was 3.5 percent. In 2009, it was 10.2 percent. This chart shows the median percentage error for each of the 23 years, establishing a clear pattern of positive errors during expansions and negative errors during downturns.



SOURCE: Pew Center on the States and The Nelson A. Rockefeller Institute of Government, 2011, based on data from the National Bureau of Economic Research, Rockefeller Institute of Government, National Association of State Budget Officers and the National Governors Association.

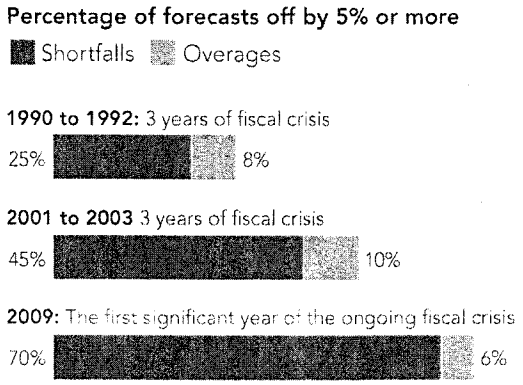
The wild ride that was 2009 inspired the Pew Center on the States and The Nelson A. Rockefeller Institute of Government to examine how states produce revenue estimates and how well those projections have performed over time.

The analysis points to a troubling trend. Overestimates have been growing in size and frequency with each recession (see Exhibit 1). And as forecasting revenue accurately becomes more difficult, states have a tougher time balancing their budgets to provide taxpayers the services they expect and ensuring the long-term fiscal health of the state.

Exhibit 2

Fewer states getting it right

Most states continue to overestimate revenue for a year or two after the end of a recession. The size of the errors and the number of states making them have progressively worsened during downturns. More than seven in 10 states wound up with large overestimates in 2009.



SOURCE: Pew Center on the States and The Nelson A. Rockefeller Institute of Government, 2011, based on data from the Rockefeller Institute of Government, National Association of State Budget Officers and the National Governors Association.

During the 23-year period studied, states overestimated revenue in some years and underestimated it in others, but the median error (whether high or low) was 3.5 percent.[11] While that may not sound significant, 3.5 percent represents a $25 billion misestimate of all state tax revenues in 2009 dollars—a number sufficiently large to cause trouble for state budgets.[12] And because that number is the median, it means that half the time, states have done worse.

The pattern of growing errors has been most striking during recessions and in their aftermath. During the revenue downturn from 1990 to 1992, some 25 percent of state forecasts proved high by 5 percent or more. The next down cycle, from 2001 to 2003, followed a less severe recession, but significantly more forecasts—45 percent—were high by more than 5 percent (see Exhibit 2).[13] Then, in the economic plunge of 2009, 70 percent of state projections overestimated revenues by more than 5 percent.[14]

In 2009, the median error among states was an overestimate of 10.2 percent. That equated to an unexpected revenue shortfall of nearly $50 billion in personal income, corporate income and sales tax revenues. In a year when state policy makers faced $63 billion in midyear budget gaps—coming atop $47 billion they had already closed when crafting their budgets—this misestimate posed a significant challenge (see Exhibit 1).[15]

"Those who are responsible for producing revenue estimates for their states have some of the most difficult—yet important—jobs in government," says Verenda Smith, interim executive director of the Federation of Tax Administrators. "What's more, from what I see, their task is growing increasingly difficult."[16]

The trend of growing inaccuracy is not isolated to recessionary times. During periods of growth, states underestimate revenues. The growth period from 1993 to 2000 saw states underestimate revenues by a median of 2 percent. But in the growth period of 2004 to 2008, states underestimated revenues by a median error of 5.1 percent.

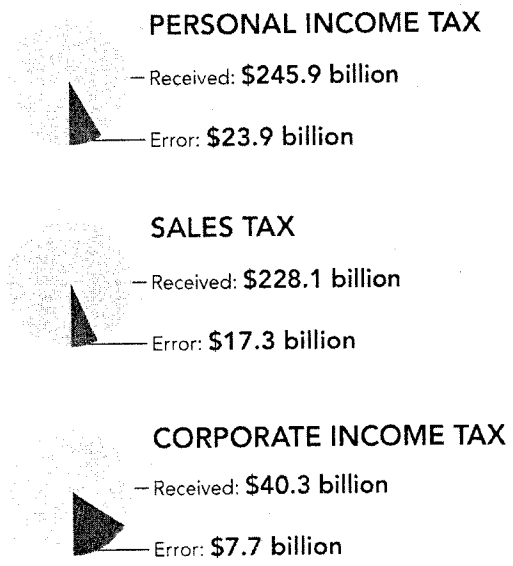
As estimating errors grow bigger, so do the stakes for policy makers. Revenues were so beaten down by the Great Recession that it may be several years before many states recover to levels seen before the 2008 fiscal year.[17] In the hardest-hit states, it may take even longer for revenues to climb back to what they once were.[18] Over the past three years, states already have had to fill over $400 billion worth of budget gaps with tax hikes and budget cuts, and they are running out of budgetary wiggle room to absorb big unanticipated revenue shortfalls.[19]

Maryland is one state that saw revenue surprises come in waves during 2009. Just three months after slashing spending to balance the budget, officials learned that the state would have a two-year $700 million shortfall. "It's been a constant challenge because no sooner do you make $200 million in tough and painful cuts than the guys in green eyeshades come into your office and tell you that revenues have eroded further and you need to find another couple of hundred," Governor Martin O'Malley (D) said in an interview. "It's like trying to keep your nose above the waves while the riptide is pulling you under from below."[20]

Exhibit 3

Scale of errors in 2009

The errors made by state budget officials in forecasting tax collections in 2009 were the largest in the 23-year period studied. Estimates were more than 10 percent off actual revenues.



SOURCE: Pew Center on the States and The Nelson A. Rockefeller Institute of Government, 2011, based on data from the Rockefeller Institute of Government, National Association of State Budget Officers and the National Governors Association.

THE DOWNS AND UPS OF REVENUE ESTIMATING

2009: HOW LOW CAN YOU GO?

Unlike some recessions, when one revenue source failed notably while others did not, during the Great Recession, all three of the major state taxes performed worse than expected. More detail on why that was the case appears later in this report (see "What Is Causing the Errors?").

In some states, the revenue surprises were staggering (see Exhibit 3). For example, Oregon overestimated its combined receipts from personal and corporate income taxes by 27 percent. That translated into more than $1.4 billion of expected revenues that never materialized.[21] Massachusetts, meanwhile, overestimated its three major taxes by 17.2 percent. That equated to $2.8 billion worth of revenue the governor and legislators had been counting on.[22]

Worse yet, the bad news continued to roll in throughout the year, forcing states to adjust their forecasts down repeatedly. Largely because of such revisions, the estimate of New York's budget shortfall for the 2010–11 fiscal year changed five times between July 2009 and March 2010, nearly doubling from $4.6 billion to $9 billion and contributing to a delay in lawmakers' approval of the state budget.[23] "The level of volatility we have seen over the last two years has been staggering and out of virtually any historic proportion," Robert L. Megna, New York's budget director, said in 2009.[24]

ARE THE CLOUDS LIFTING?

After several years of dire revenue news from state capitals, the fiscal situation seems to be improving in a number of states. As of October 2010, West Virginia had posted six straight months of revenue increases.[25] Kentucky's budget director says the state could end the current fiscal year with $58 million more than expected if current trends hold.[26] Minnesota collected $55 million more than predicted between July and September 2010, making a sizeable dent in the state's budget deficit.[27]

Pew analysis of data from the National Association of State Budget Officers (NASBO) and the National Governors Association (NGA) substantiates the anecdotal evidence of a return to modest revenue growth. Although states still overestimated the amount of revenue they would receive in 2010, the error of 3.8 percent was far less than the 2009 median overestimate of 10.2 percent. The fact that errors were substantially smaller even though 2010 was the trough of the revenue crisis suggests that state forecasters were more prepared for significant revenue declines to occur in 2010, having seen the magnitude of declines in 2009. Additionally, the task of forecasting revenues in 2010 was likely more straightforward than in 2009, when revenues turned more abruptly from the prior year.

Why Estimates Matter

Revenue estimating is a vital component of the budget process in every state. For governors and state legislators to make strategic decisions about how much money to put toward certain programs—or whether to increase or reduce taxes—they need to know how much revenue they have to work with.

Misestimates do not have to be large to add up to a significant amount of money. In Montana, a 1 percent error translates to a $36 million revenue swing in a two-year budget. That is roughly half of what Montana spends on its entire state court system.[28] In New York, a 1 percent error translates to $527 million in general fund revenues—nearly half of what the state spends on public assistance.[29]

The 3.5 percent error that was the states' median (whether high or low) during the past 23 years can create even more difficulty. Look at North Carolina. The three taxes our study examined generated $15 billion in revenue for North Carolina in 2009. A 3.5 percent error equates to $524 million. That is 15 percent of North Carolina's spending on higher education, 43 percent of what it spends on corrections, and nearly nine times what it spends on public assistance.[30]

In addition, errors follow errors, according to the Pew-Rockefeller Institute analysis.[31] For example, the median error in 2002 resulted in a shortfall of 8.8 percent, followed in 2003 by a shortfall of 4.7 percent—meaning states came in 4.7 percent below estimates in the year after estimates had already been lowered once due to the recession. Every downward revision to a revenue estimate means that lawmakers need to identify cuts or find new revenue in equal measure on the other side of the ledger (see Exhibit 4).

The Trouble with Overestimates

Of the two types of errors—underestimates and overestimates—revenue overestimates cause the greatest political pain, as almost any state policy maker who lived through 2009 can attest. Because they are required to balance their budgets, states must compensate for overestimates by raising taxes, reducing spending on programs

or by using spending reserves—all without the benefit of the planning time that would have been available with a more accurate forecast.

Missouri provides a case in point. On the eve of the 2010 legislative session, Governor Jay Nixon (D) and the state legislature had agreed that revenue for the 2011 fiscal year would be $7.2 billion. Eight weeks later, Governor Nixon announced that the revenue estimate was revised downward by about $200 million. Lawmakers thought they had resolved the crisis by cutting $484 million from Governor Nixon's budget before they adjourned in May. Weeks later, the revenue projection weakened again, and Governor Nixon said he would have to trim an additional $301 million. In all, the 2010 and 2011 budgets had to be slashed six times in a year, and officials predicted a shortfall of more than $600 million in fiscal year 2012.[32]

Nearly $2 billion in cuts over two years have impacted thousands of Missourians. College scholarships have been reduced for low- and middle-income families. School bus transportation has been eliminated on many routes. About 2,500 state workers have been laid off. Services for mental health, developmental disability and drug and alcohol addiction have been diminished. Fewer hot meals and rides to doctors and grocery stores are available for seniors trying to live at home. The list of budget cuts goes on and on.[33]

Of course, during the Great Recession, most states would have had to make deep budget cuts like these whether their estimates were right or wrong—a state can spend only as much money as it has on hand. Still, the accuracy of estimates matters. When an overestimate occurs, it can leave policy makers without much time to respond. It takes time to build political agreement around the difficult task of raising taxes or finding new sources of revenue. Likewise, budget-cutting ideally involves taking sufficient time to weigh the merit or harm of cutting one program versus another, as opposed to making quick across-the-board cuts.

But in the recent environment of revenue surprises, many states resorted to across-the-board cuts. In some cases, that is all they are allowed to do, according to state law. In Oklahoma, for example, the state constitution requires across-the-board cuts if revenue falls below the amount that the legislature has appropriated in the budget.[34] So in August 2009, when revenue estimates declined, finance director Michael Clingman authorized a 5 percent cut in agency spending. In December, when the estimates reflected an even deeper downturn, he increased the reduction to 10 percent for the rest of fiscal year 2010. Few programs and services were spared the pain of cuts.[35]

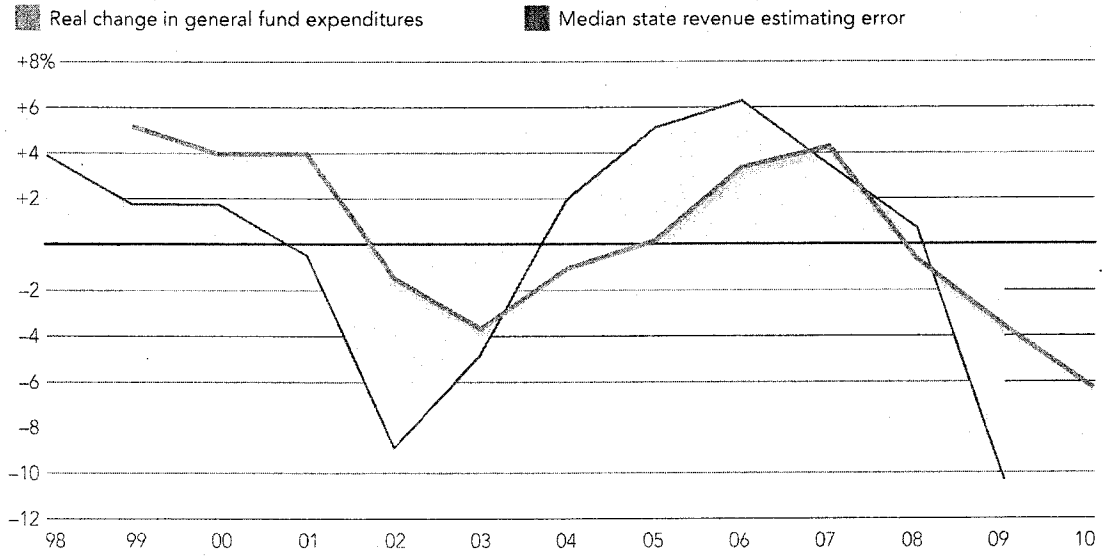
The Trouble with Underestimates

Our research found that outside of recession years, states tend to underestimate the amount of revenue they will have. During the 23-year span of the study, the typical state underestimated revenue in 16 of those years. In fact, states tended to underestimate revenues by 1.5 percent, or about $10 billion annually in 2009 dollars.[36] During the most recent period of economic growth, from 2004 to 2008, 36 percent of state forecasts underestimated revenues by 5 percent or more—a much larger percentage than in either of the two previous up-cycles. Underestimates can be challenging, depending on what states decide to do with the extra cash that comes in. When revenue estimates are low, and unexpected surpluses crop up at the end of the year, legislators may decide to put the money in a rainy day fund. However, they may also decide to cut taxes, thereby limiting revenue growth that may be necessary to keep the state from having to make unpleasant unanticipated cuts in the future. Or they may add programs that prove to be unaffordable in years to come.

Exhibit 4

Expenditure adjustments follow trends in estimating errors

When states overestimate revenue, as they did in 2002–2003, general fund spending contracts. But when states underestimate revenue, as they did in 2006–2007, general fund spending expands—sometimes unsustainably.



SOURCE: Pew Center on the States and The Nelson A. Rockefeller Institute of Government, 2011, based on data from the National Bureau of Economic Research, Rockefeller Institute of Government, National Association of State Budget Officers and the National Governors Association.

Neither tax cuts nor spending increases are inherently bad, but they can contribute to tougher choices when the economy turns downward. In Louisiana, for example, tax receipts surged following Hurricane Katrina as rebuilding created a construction boom. In fiscal years 2006, 2007 and 2008, projections for sales, income and corporate taxes were 11 percent below the amount of revenue that actually landed in state coffers.[37] Faced with large unanticipated surpluses, legislators decided to lower income tax rates in 2008.

The following year, Louisiana went from flush to broke. Collections for the three major taxes combined fell 2.8 percent under estimates. Federal funds, which flowed to the state following the hurricane, also fell off.[38] As of August 2010, the Louisiana budget office was looking at a potential $2 billion budget gap for 2011.[39]

Revenue underestimates also can lead to unsustainable spending. Arizona presents an interesting example. For fiscal year 2006, the revenue projection the legislature used was on the low side, and the state wound up with an unanticipated $530 million surplus.[40] But Arizona's phenomenal rates of revenue growth in 2005 and 2006, coupled with the surplus, "created an attitude that the sky's the limit," says state Senator Bob Burns (R).[41] The legislature reacted by cutting taxes and increasing ongoing spending.

One program on which lawmakers chose to increase spending was the 21st Century Research Fund, an effort designed to invigorate Arizona's energy and biotechnology initiatives. Then, as budget surpluses turned to deficits, the legislature killed the program.[42] The about-face led Science Foundation Arizona to sue the state. The nonprofit group had helped solicit matching funds for the state money and provided state-funded grants to startup companies and university researchers.[43] The foundation won its case, but a county court said there was no way to force the state to pay up. In the end, the state government made good on its commitment for 2008 but not beyond that.

To avoid these pitfalls, some fiscal experts recommend that states apply a portion of surplus revenues toward rainy day funds, as North Dakota does. (For more on rainy day funds, see "Promising Approaches.") But when revenue underestimates occur repeatedly, taxpayers may become convinced "that they're being overtaxed," explains John Petersen, professor of public policy and finance at the George Mason School of Public Policy. "They believe the government has too much money, and they have to spend it someplace."[44]

OREGON'S KICKER LAW

Oregon puts a unique twist on the problem of underestimating revenues. The state's so-called "kicker" law requires that extra money be returned to taxpayers when actual revenues come in more than 2 percent above what was forecast. With the personal income tax, people actually receive a check from the government. With the corporate income tax, businesses receive a credit.[45]

This has played out in challenging ways over the past few years. In the 2007–09 biennium, revenues were estimated at $13 billion, but came in at just $11.7 billion. However, during the previous biennium, state revenues came in well above expectations. Because there is a lag time in calculating and refunding the kicker checks, Oregon was required to send out $1.1 billion in refund checks at the same time that lawmakers were cutting the budget by $1.3 billion.[46]

What is Causing the Errors?

As important as revenue projections are to states' budget processes and fiscal health, estimates are just that—estimates. William Fox, who participates in Tennessee's revenue estimating process and directs the Center for Business and Economic Research at the University of Tennessee, says he constantly needs to remind policy makers that predicting how taxes will behave in an ever-changing economy is an inexact science. "Whenever I testify on this topic, I say I'm going to be wrong," Fox notes. "The only question is, how wrong am I going to be?"[47]

States employ a variety of governance structures to try to achieve the most precise estimates possible. Many use a board that includes lawmakers as well as academics, economists and business leaders. Some have the executive branch prepare the estimate and others involve the legislative branch. And some states rely on a third-party body that excludes lawmakers.

Although the mechanics of the estimating process vary greatly from state to state (see Exhibit 5), most rely on three steps, with information either developed in-house or purchased from a contractor:

1. a forecast of the national economy
2. a forecast of the state economy
3. modeling of how the underlying state tax base and payment rules and patterns will convert economic activity into tax collections.[48]

Our study used data from Pew's Government Performance Project to examine whether any one method of estimating revenue was more accurate than another.[49] In 2008, Pew asked states to identify the methods they use for estimating revenues for its *Grading the States* report card.[50] The choices included a variety of quantitative techniques such as linear regression models or time series/exponential smoothing models, both of which use mathematical functions to attempt to project future values based on observed trends (see Appendix C for a 50-state table of the methods and processes that states use to estimate revenues). Previously published academic studies do not point to any single technical method as superior to others; although they generally have found

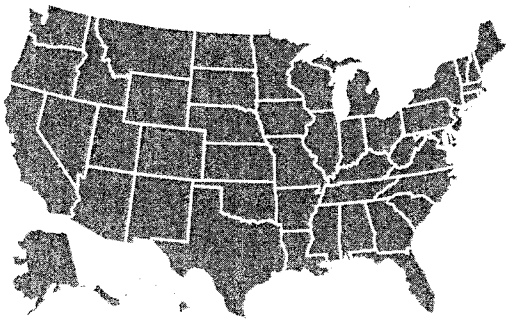
Exhibit 5

How states estimate revenue

Before state officials estimate tax collections for the coming budget year, they analyze national and state economic data. Here are steps states commonly follow before releasing the forecasts:

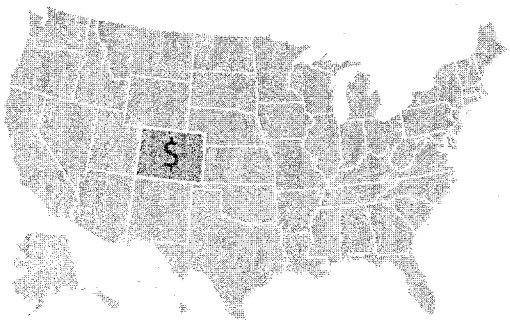
1 Obtain a national forecast of the U.S. economy

States typically pay economic forecasting services to provide them with forecasting of key data such as gross national product, income, unemployment, interest rates, financial market performance, foreign trade, consumer confidence levels and inflation. Some data also come from federal agencies.



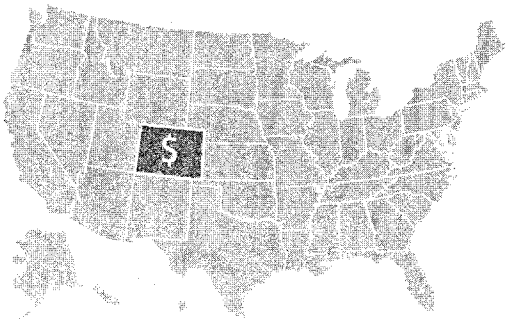
2 Prepare a forecast of the state economy

Officials buy forecasts of the state economy or more likely develop their own predictions, relying on private and public economists such as those at state colleges and universities. State forecasts take into account the key economic sectors that affect tax collections, such as the automobile industry in Michigan, tourism in Hawaii and financial and business services in New York.



3 Develop the revenue estimate

States generally feed the economic forecast data into computer models that predict the states' capacity to generate revenue. The models consider historical revenue data for similar economic conditions in past years, recently approved tax increases and other tax policy changes and behavioral influences such as consumer confidence.



SOURCE: Pew Center on the States and The Nelson A. Rockefeller Institute of Government, 2011, based on information from the New York State Division of the Budget.

that the use of quantitative techniques and formal statistical methods improve forecast accuracy, these studies tend to suffer from data limitations and difficulties in interpretation.[51] Our findings are in line with that view, revealing that the methods and systems states use to estimate revenue are not significantly linked to the size of errors.[52]

Our study also looked at "consensus forecasting," an increasingly popular method states are using to get the executive and legislative branches to agree on revenue estimates. While we found evidence that consensus forecasting can help mitigate the role of politics in the budget process, we did not find that the method produced more accurate estimates. (See sidebar on "Consensus Forecasting.")

If the estimating methods are not principally responsible for errors, then what is the cause? A number of factors can conspire to throw projections off. To start, most states use national economic data from firms such as Moody's Analytics Inc., IHS Global Insight or Macroeconomic Advisers. If those source numbers turn out to be wrong, the state-level forecasts derived from them will be wrong, too.[53] For example, IHS Global Insight offered a 30 percent risk of recession at a presentation in September 2007—just three months before December 2007, the month that economists later named as the official start of the Great Recession.[54]

Other factors, including such catastrophes as the Gulf of Mexico oil spill and the 9/11 terrorist attacks, have impacted the revenues of the affected states in difficult-to-predict ways. The same is true of such natural disasters as earthquakes, hurricanes, floods and tornadoes. Even mild turns in the weather can complicate matters in agricultural states. "Droughts or flooding in certain parts of the state… show up in our agricultural production numbers," says Alan Conroy, director of the Kansas Legislative Research Department. "Particularly with wheat and corn, if rain comes during the right time, it can make a big difference between a fantastic harvest and a fair harvest."[55]

The 20 states with biennial budgets—including Montana, Nevada, North Dakota, Oregon and Texas—can have an even tougher task. Montana, for example, must prepare its forecasts three years ahead, leading the legislature's fiscal staff to warn newly elected lawmakers that "revenue estimating is a complex process that depends upon a number of educated assumptions that must be made well in advance of actual events."[56]

Systems Out of Sync

But the biggest culprit driving forecasting errors seems to be the revenue streams themselves, which are growing increasingly reliant on volatile parts of the economy and are therefore less predictable.[57]

Part of the problem is how swings in economic activity affect state tax collections. Research has shown that state revenues have grown increasingly reactive to both state and national economic cycles since the late 1990s, largely because of an increased reliance on proceeds generated from personal income taxes (see Exhibit 6).[58] As discussed in more detail in later sections, income taxes are particularly volatile because to a significant degree they rely on the performance of the stock market.

But state tax structures themselves also contribute to tax revenue volatility.

LIMITS OF THE STUDY

For this report, we used the *Fall Fiscal Survey of the States* published by NASBO and NGA. We examined data on estimates for the "big three" tax collections—personal income, sales and corporate income taxes—from 1987 through 2009, a 23-year period.

In this survey, the states' "original estimates" are intended to be the revenue projection on which the budget is based, and the "current estimates" are the preliminary actual estimates for the fall after the year was closed (e.g., the estimate in fall 2009 for the fiscal year that ended in June 2009). Percentage error is the difference between the actual revenues and the projection as a percentage of the actual revenues (see Appendix B). Median absolute percentage error is the median of the absolute values of the median errors for each year of the time period.

As with any self-reported information, we experienced some anomalies with the data, which presented opportunities for error and limited our study; we were diligent in cleaning these anomalies (including extreme highs or lows, repeats and missing data). Other limitations we encountered resulted from inherent differences among the states, including the extent to which states do or do not rely on the three taxes, the timing of revenue forecasts, the relationship of the estimates reported to NASBO/NGA to the actual estimates used in preparing the budget, legislated changes made during the fiscal year, the fact that states vary greatly in their tax structures and budget processes (e.g., annual versus biennial, frequency of revenue estimate revision, etc.), and the volatility of states' revenue streams.

Given these limitations, which we explain more fully in the section on methodology (see Appendix A), we are unable to reliably compare or rank one state against another. Rather, this analysis is intended as an exploration of broad trends in revenue estimating.

That is because they have not kept pace with longer-term structural changes in the economy, leading to the erosion of the tax base over time and contributing to a heavier reliance on income taxes. "Part of the structural problem is caused by obsolete state tax systems, which were developed for the manufacturing economy of the 1950s, not the service-oriented, high-technology, global economy that has developed during the last two decades," said Ray Scheppach, the outgoing executive director of the National Governors Association. "What we see here is that the cyclical nature of the economy has an exaggerated effect on revenues."[59]

Every recession highlights a different part of the problem. In 2001, it was ups and downs in the capital gains portion of the income tax that threw off revenue estimates. At the time, states were coming off several years of surging revenue from capital gains taxes as stock investors cashed in on the dot-com bubble. When the bubble popped, the resulting crash in revenues took states by surprise.

During the Great Recession, capital gains again were a major culprit—but it was volatility with sales taxes that caught states off guard. Traditionally, the sales tax has been more stable than personal or corporate income taxes as a source of revenue for states. But this time, receipts took their steepest plunge in 50 years and dropped much further than most states anticipated.[60] Among the worst hit were Arizona, Connecticut and Rhode Island, all of which had declines in fiscal year 2009 of 15 percent or more.[61]

Another interesting story lies in five states that rely heavily on the sales tax and have little or no income tax revenue: Florida, South Dakota, Tennessee, Texas and Washington.[62] Each of these states skated through the 2001–03 fiscal crisis with revenue shortfalls that were smaller than those experienced in the typical state. That was because consumption and the sales tax were largely unscathed by that recession.[63] In 2009, however, Florida, Tennessee and Washington all did worse than the typical state, reflecting sharp declines in consumer spending and sales tax revenues.[64]

Tennessee, which relies on sales taxes for 57 percent of its total revenues, was particularly stung. In 2009, sales tax revenues declined for the first time ever.[65] "The experience was so outside the history of the data that we didn't forecast it," says Fox, a University of Tennessee economist. "We forecast essentially zero percent revenue growth in sales taxes and we got negative eight. You don't forecast something that's that far out of history. Now, we have to worry about a world in which there can be negative growth in sales taxes."[66]

Some states face industry-specific problems with eroding effectiveness of

their revenue systems. Consider Michigan's challenge with capturing revenue from its key industry, automaking. In the 1990s, 16 million light vehicles were sold annually nationwide, and the market share for the Big Three automakers based in Michigan was about 70 percent. More recently, the number of units sold annually has dropped to 10.3 million, and Michigan's share is down to 40 percent.[67] As a result of these and other economic trends, Michigan's revenues slid to an 18-year low in fiscal year 2009, and continued to fall in 2010.[68]

Essentially, states are having a hard time keeping their revenue systems current with the economy and stable through the ups and downs of the business cycle. States generally rely heavily on recent experience when making revenue estimates—until the economy is about to pivot. The trouble is predicting the pivot point. "Iowa's best guess for revenue estimates next year is often what is happening in the current year," says Tom Schenk Jr., an economics lecturer at Grand View University in Des Moines. "Statistical models will pick up some of the nuances in economic fluctuation, but will tend toward the status quo. As a result, the models will tend to overestimate growth when the economy begins to deteriorate and underestimate growth when the economy improves."[69]

Billy Hamilton, a former deputy state comptroller in Texas, puts it a different way. "One of our rules of revenue estimating is 'It's the turns that kill you,'" says Hamilton.[70] Since 1991, the national economy has made five turns—three for the better, two for the worse. Forecasting the performance of hypersensitive revenues through unpredictable turns in the economy is increasingly difficult.

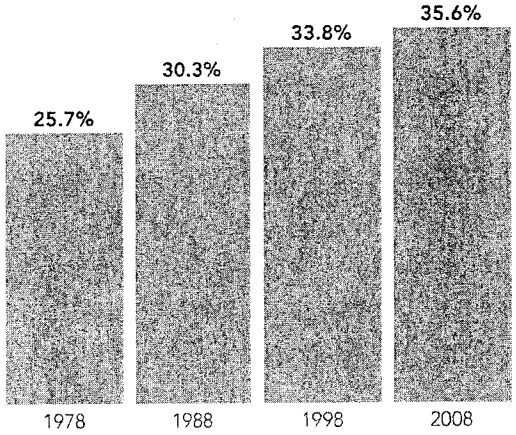
Three Legs of the Revenue Stool

All taxes, including the three our study examined, are sensitive to changes in the economy.[71] Historically, corporate income taxes are the most volatile, because company profits can rise and fall substantially with the business cycle.[72] Personal income taxes, while

Exhibit 6

States' reliance on income tax is growing

Personal income tax revenue as a share of total state revenue has grown almost 10 percentage points during the past 30 years.



SOURCE: Pew Center on the States and The Nelson A. Rockefeller Institute of Government, 2011, based on Tax Policy Center analysis of U.S. Bureau of the Census data.

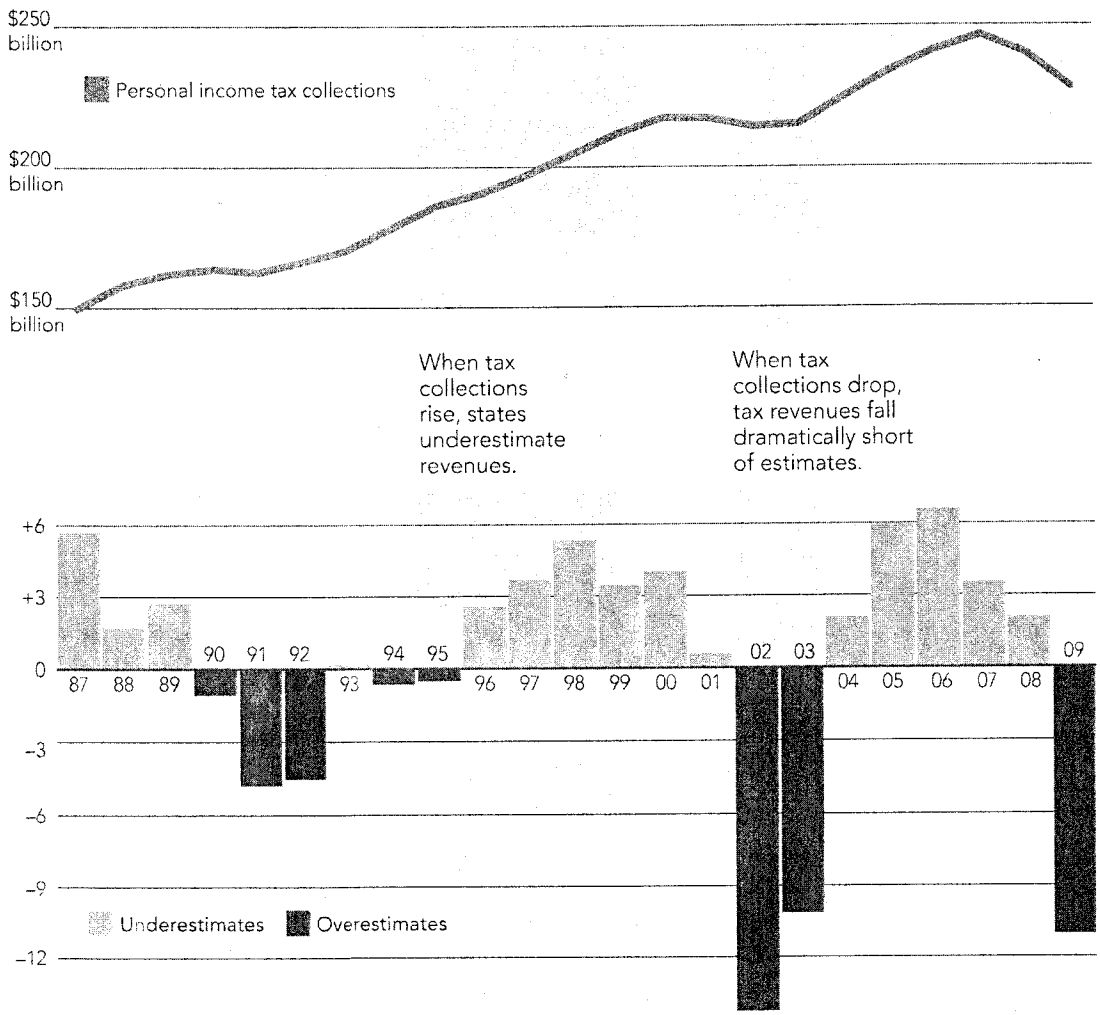
less volatile than corporate income taxes, also are sensitive to changes in the economy. Sales taxes traditionally have been the most stable of these three revenue sources. Lately, however, they, too, have been behaving erratically.

Over the 23-year study period, all three taxes demonstrated positive errors. In other words, states have tended to slightly underestimate them. But of course, during recessions, overestimates are far more common. Our research showed that the

Exhibit 7

Personal income tax revenue compared to estimating errors

The median percentage errors for estimating personal income taxes mirror the fluctuations in revenue growth. When growth slows, states overestimate revenue. When collections shrink, states see the largest negative errors.



SOURCE: Pew Center on the States and The Nelson A. Rockefeller Institute of Government, 2011, based on data from the Rockefeller Institute of Government, National Association of State Budget Officers and the National Governors Association.

more volatile the tax, the larger the error: The median error (whether positive or negative) for the corporate income tax was 11.6 percent; for the personal income tax, it was 4.3 percent; and for the sales tax, it was 2.3 percent.

Personal Income Tax

During the past three decades, states have increased their reliance on personal income taxes (see Exhibit 6). Traditionally, personal income taxes are a more volatile income stream than the sales tax. That is in large part because many states rely heavily on non-wage income such as dividends from investments, which can rise and fall with the performance of the stock market. Our study found that states' errors in estimating personal income tax revenues were closely linked to the rate of change in revenues, whether up or down (see Exhibit 7).

A major reason that income taxes are difficult to predict involves capital gains—that is, income from investments that are sold for a profit. Taxes on capital gains are inextricably tied to the ups and downs of the stock market. When the stock market falls, capital gains dry up, reducing tax payments. When the market rises, states get a windfall from investors taking profits. Stock market-driven booms may be particularly hazardous, as states get lulled into thinking the boom will go on and on.[73]

Recessionary periods create other problems for estimating income taxes. Not only do incomes decline—sharply so in times of high unemployment such as today—but also taxpayers struggle to pay the government what they owe. As a result, states do not necessarily receive the cash owed them.[74] The timeline of revenue estimates can play a role here: Income taxes, as everybody knows, are due in April. States may not fully know how their income tax has performed until after the April filing season. Given the lag needed to process these filings, it may not be known until May that the revenues are significantly off. Furthermore, during tough times states are more likely to cut back on their auditing capacity. When California furloughed 200,000 workers in 2009, some 5,300 employees of the Franchise Tax Board were told to take three days off work each month rather than spend that time auditing delinquent taxpayers.[75] The Board workers were later exempted from a second round of furloughs ordered by Governor Arnold Schwarzenegger (R) in July 2010.[76]

The aging population also is impacting income patterns. As the Baby Boom generation retires, more and more taxable income is being earned from investments and from pensions, Social Security and individual retirement account (IRA) withdrawals, rather than from traditional employment. While income from investments tends to be very volatile, pensions and similar income sources are quite stable. The mix of these income

streams can make it even more difficult to predict revenues. In Tennessee, for example, the tax on dividend income fell by 40 percent in 2009, from $300 million to under $180 million.[77]

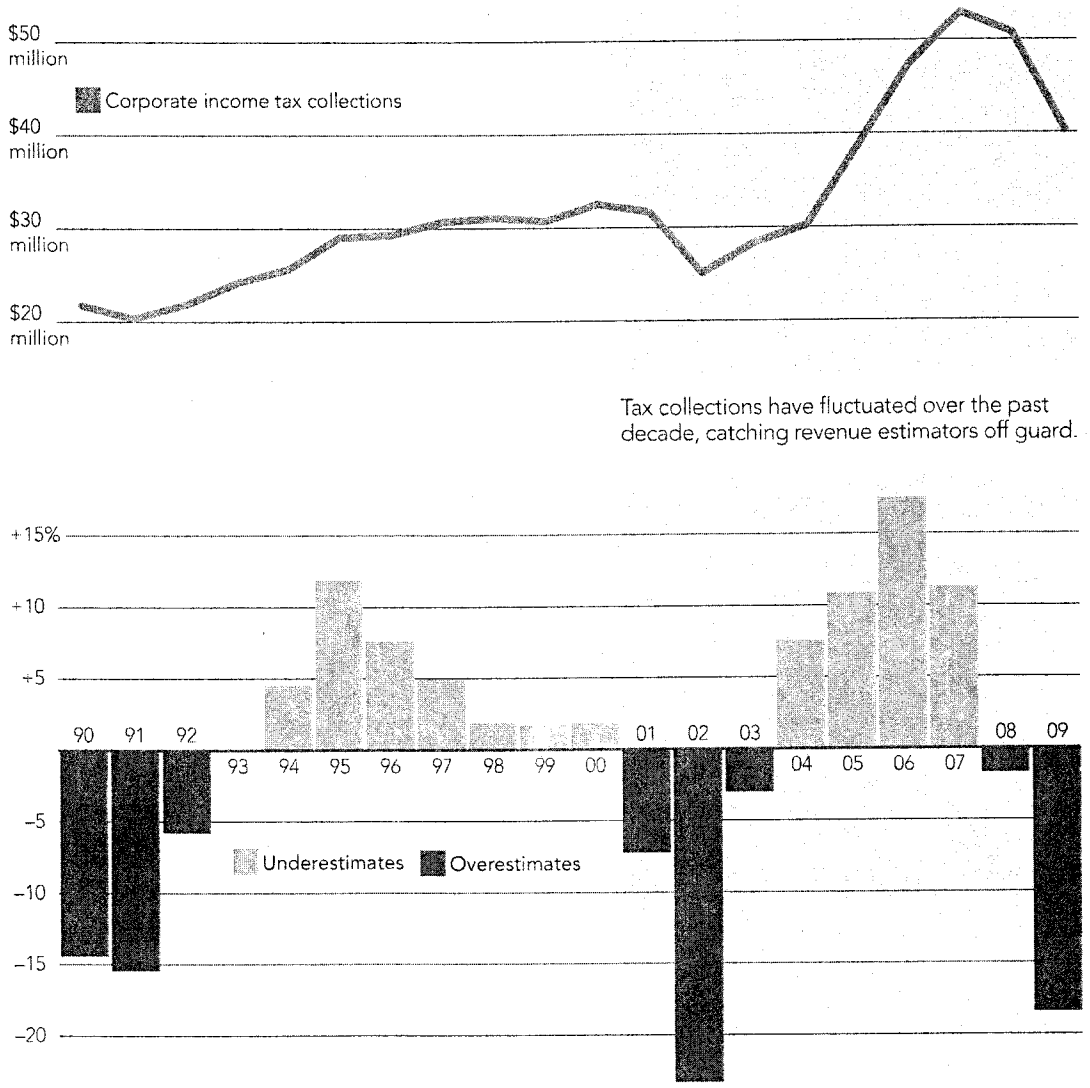
Sales Tax

Typically, sales taxes have been a more stable source of revenue for states than income taxes, and thus are easier for estimators to forecast: The median error

Exhibit 8

Corporate tax revenue compared to estimating errors

Revenue estimating errors for the corporate income tax, the most volatile revenue stream, fluctuate the most widely. When growth slows, states overestimate revenue. When collections shrink, as shown in the 2001 downturn, states see the largest negative errors.



SOURCE: Pew Center on the States and The Nelson A. Rockefeller Institute of Government, 2011, based on data from the Rockefeller Institute of Government, National Association of State Budget Officers and the National Governors Association.

THE NATURAL RESOURCE STATES

Comparing revenue estimating errors across states can be tricky. Every state has a unique revenue structure, and some are more dependent on outside forces than others. Nowhere is that more true than in states that rely heavily on revenue from the energy sector, where prices fluctuate throughout the year depending on global markets. Energy-rich states generally levy taxes on natural gas, oil and mineral production, but the industry impacts all tax collections because it generates jobs and economic activity. In Montana, for instance, energy prices determine the profits of the state's natural resource companies, which pay corporate taxes to the state based on those profits.[78]

Oklahoma offers a vivid example of how volatile energy prices can cripple a state's ability to project revenues during a recession. In July 2008, the price of oil reached a record-high $147 a barrel, and natural gas climbed to a record-high $11.32 per thousand cubic feet.[79] Despite the Wall Street financial crisis in September of that year, Oklahoma was one of the few states awash in surplus revenue. Thanks to the state's oil and gas reserves, state revenue exceeded estimates by nearly $200 million. But by late December 2008, the price of oil plunged to $37.82 per barrel and natural gas fell to $5.87 per thousand cubic feet, setting the stage for 18 months of the worst revenue shortfall in Oklahoma's history.[80]

Oklahoma and Montana were not alone. Six other states reported double-digit declines in severance or other energy-related tax collections in fiscal year 2010, according to the National Conference of State Legislatures: Alaska, Colorado, Louisiana, Texas, West Virginia and Wyoming.[81]

Recently, however, energy prices have begun to swing back upward, improving some states' fiscal fortunes. In October 2010, Wyoming's Consensus Revenue Estimating Group released a forecast showing that expected revenues for the 2011–12 biennium had improved by $92 million over a previous estimate. That increase was anchored by a 13 percent increase in expected severance tax revenues on the sale of natural gas, oil, coal and trona.[82] In November, the Alaska Department of Revenue noted that oil prices had stabilized and were predicted to increase slightly, resulting in higher than expected revenues.[83]

over the 23-year study period was a paltry 0.3 percent. But in 2009, as mentioned earlier, estimators were caught off guard by an unexpected decline in consumer sales, leading to a 7.6 percent median error in the sales tax.

One factor in the greater historical stability of the sales tax is that even during recessions, there are certain things people at all income levels simply have to buy. While some states choose to exempt essentials such as food or prescription

drugs because the tax burden falls disproportionately on low-income people, state sales taxes that include those items in the base tend to be more predictable than those without.[84] As Mark Muchow, deputy secretary of the West Virginia Department of Revenue, puts it: "The revenue estimator's favorite tax is the grocery tax. It adds stability to the base."[85]

One other factor complicating sales tax estimates is consumers' increasing use of the Internet for remote sales. Under a decision by the U.S. Supreme Court, states cannot mandate collection of taxes by sellers who do not have a sufficient presence in the state, unless Congress allows them to do so. Some states have persuaded a number of retailers doing business online to collect taxes for them voluntarily, while others have taken an aggressive legal stance over what constitutes "presence" in the state, and appear to have had some initial success.[86] In the meantime, Fox of the University of Tennessee has estimated that uncollected Internet sales taxes will cost state and local governments more than $11 billion a year by 2012.[87]

Corporate Income Tax

Corporate taxes make up a small share of total state revenues—only 5.6 percent in 2009. Nevertheless, corporate tax forecasting errors can be so large (particularly during recessions and recoveries) that they constitute a disproportionately large share of overall errors—nearly one-fifth of the total errors discovered during the course of this study.[88]

Why are corporate taxes so difficult to pin down? For one thing, corporate profits vary so widely from year to year that even the shrewdest stock-picker cannot predict them. The ups and downs of the business cycle make corporate income taxes the most cyclical of all state tax sources.[89] A look at corporate income tax revenues over time shows this cyclicality; states' median estimating errors fluctuate with the revenues (see Exhibit 8).

In addition, corporate tax planners are continually working on ways to lower their tax bills as much as possible. These efforts can have a noticeable impact on a state's total collections in a given year and cannot be anticipated easily. (Even the timing of when corporations make their tax payments is unpredictable.) Moreover, there are many special tax exemptions available to corporations, and it can be very difficult to predict how they will affect total taxes collected.

An important wrinkle is that in most states, key data on specific companies are available to revenue estimators only to analyze for patterns or trends, but not to publish or report. And in some states, estimators do not have access to this information at all, but

can see only aggregate figures for entire industries. But when a handful of companies dominate a state's economy, that missing detailed knowledge can be crucial. "Why are the tax payments of public corporations not public?" asks University of Kansas economics professor Joe Sicilian. "If we knew more about tax exemptions and so forth, that would give us better information."[90]

NEW TAXES

Estimating the fiscal impact of a new tax—which is not always done by the same agency that prepares the state's revenue estimate—is difficult. Whether it is an increase in cigarette taxes, a new sales tax, a hike in income tax rates or almost anything else, revenue projections can be unreliable. That is because so much of the estimating process is based on historical experience—and there is not much to go on with new taxes.

For example, estimates of the revenue impact of Oregon's Measure 66 are likely to be inaccurate, according to Paul Warner, Oregon's legislative revenue officer. The measure, approved by voters in January 2010, made several tax adjustments, including an increase to tax rates for high-income earners. But the state already has learned that its estimates on revenue from the income tax were too high. "If we missed the capital gains by 50 percent we're for sure under on Measure 66," says Warner.[91]

Timing is also an issue. If a fiscal impact statement is prepared in June (as in Oregon's case) but the tax change is not decided upon until the next spring, there is a good chance that new information has not been incorporated into the revenue estimate.[92]

The new business tax in Texas provides another example. This was a redesigned tax, approved in 2006, that was designed to shrink loopholes that allowed corporations to pay less than their fair share. Initial estimates suggested the tax would bring in $6.1 billion in fiscal year 2010; it actually brought in $4.8 billion. The state's comptroller's office spent months trying to figure out what went wrong.[93]

Promising Approaches

States will never do a perfect job estimating how much money they will have to use in their budgets. But they can find ways to better manage the inherent difficulties in revenue forecasting so that errors, when they do occur, are less disruptive to the budget process and less challenging to manage.

Interviews with dozens of budget experts uncovered some promising practices from a number of states. Some approaches seek to improve the revenue estimating process itself—and how policy makers use the resulting numbers. Other practices are aimed at managing the volatility of revenue sources.

Improving the Process

Analyzing Errors and Refining Assumptions

Although it appears no one method of revenue estimating works better than any other, that does not mean states cannot refine their techniques. Analyzing errors from the past is a best practice in forecasting—at the federal level, the Congressional Budget Office does this regularly. Wider use of the practice could help states achieve more accurate projections in the future.[94]

Indiana Governor Mitch Daniels (R), a former White House budget director, has been outspoken on this subject. In the wake of the big estimating errors in 2009, Governor Daniels suggested states consider adapting their methodologies to what may be new economic realities—particularly with the sales tax. "It is now very clear that the methods that have been used here, and in other states for that matter, are simply out of date," he said at a news briefing in October 2009. "My suspicion is a big part of the difference is that Americans, including Hoosiers, have shifted in their consumption patterns." With Americans saving more money than before, Governor Daniels said, "this sudden shift will mean that even in good economic times to come, consumers will likely spend less and therefore pay less in sales taxes than they did during bubble years."

In Indiana, Daniels asked a group of legislative, executive and academic revenue forecasters to review all formulas

used in the past to estimate revenue and adjust them to reflect the trends occurring in reduced consumer spending, falling home values and the decline in household wealth. "It was more of a real world check versus an academic exercise," says state budget director Chris Ruhl. "For the first time in a long time, we added an error analysis to identify issues and troubleshoot them." After underestimating revenue by 7.3 percent in fiscal year 2009 and the first half of fiscal year 2010, Indiana's error rate fell to less than 1 percent after the adjustments.[95]

Likewise, Michigan is beginning to calibrate its economic assumptions around a smaller auto industry. For years, Michigan's revenue estimators paid uniquely careful attention to auto manufacturing, gathering data from the University of Michigan's Automotive Research Center and others. While car companies are still critical to the state, the downsizing of that industry means other fields now represent a growing portion of Michigan's economy. So the state is sending analysts out to talk to experts in finance, retail, health care and other economic sectors to gain a better understanding of how those industries have fared during the past six months and where they are heading in the next six to 18 months.[96]

Oregon is embarking on a similar refining exercise. As mentioned earlier, Oregon depends heavily on an income tax, with rates that increase as the amount of the taxable base increases. The Oregon Office of Economic Analysis is working on developing more sophisticated techniques for understanding how various economic events impact the taxable income of people in different income groups.[97]

A recent effort in West Virginia suggests technology upgrades could help some states work toward more accurate estimates. Revenue estimators in West Virginia rely heavily on historical tax information to assist in projecting future tax receipts for a number of taxes. But in years past, the state did not have information that was as timely, detailed or accurate as estimators needed. Recently, the state Tax Department implemented an integrated tax information system, replacing outmoded systems that dated back as far as 1972. The new system, which won the Federation of Tax Administrators' 2010 Award for Outstanding Management and Organizational Initiative, is seen as a major step toward producing improved revenue estimates.[98]

Making Frequent Estimates

When the economy is full of surprises, the ability to adjust revenue estimates frequently can help policy makers crafting budgets.

Many states release a revenue estimate sometime before January to help the governor create an executive branch budget. For the states in which the fiscal year begins on July 1, a second estimate is issued in late spring.

The revised estimate is intended to take in more information about personal and corporate income tax receipts, and it is used in forming a final budget.

During the Great Recession, several states added forecasts. Vermont, which had been releasing forecasts twice a year, established quarterly estimates.[99] In 2009, West Virginia, which usually holds to an estimate done the previous November, took the unusual step of revising the estimate in March. And in 2010, because of the volatile economy, the state postponed its final revised revenue estimate until May.[100]

Florida revises its revenue forecast three times a year. One estimate in late spring closes out the fiscal year; another in the fall supports the governor's budget recommendations; and a third in the winter supports the legislature's budget-writing needs. "A professional process should be revised frequently," says Jim Zingale, the retired head of the state's Department of Revenue.[101]

Ensuring Independence from the Political Process

Many states have taken steps to depoliticize the process. As discussed earlier, consensus forecasting is one tool many states are using, but there are other ways. In Michigan, there was a conscious effort in the early 1990s to take revenue estimating responsibilities away from the governor's budget office. The job was given to the treasurer's office, which was not involved in the budget process, although it does fall under the governor's office.[102]

In 2009, Connecticut added a new feature to its estimating process to settle political disputes. The change was the result of a tussle between Governor M. Jodi Rell (R) and the Democratic-controlled legislature. In February, Governor Rell proposed a budget for the 2010 fiscal year that projected a much smaller budget gap than the legislature's fiscal office predicted. Democratic lawmakers accused Governor Rell of underestimating the budget gap to avoid having to consider painful spending cuts and tax increases. They passed a bill that said when the executive and legislative branches cannot agree on a revenue forecast, the final say lies with the state comptroller.

Governor Rell vetoed the bill; the legislature overrode her. At that point, the governor increased her estimate of the shortfall and conceded that tax increases could be a part of the state's long-term budget fix.[103] A year later, with the new forecasting process in place, Rell and the legislature came to a quick consensus on revenue estimates. "We'll all agree and we'll move forward," Rell said in an interview. "It'll work."[104]

Adding Expertise

In response to the big forecast errors of 2009, some states are looking to boost the expertise that goes into crafting their numbers. In Idaho, for example,

CONSENSUS FORECASTING

About half the states use some version of consensus forecasting, according to NASBO.[105]

The method attempts to keep the executive and legislative branches on the same page by generating a single number that both sides must use through the budget season.[106] Generally, the consensus estimate is generated by a panel that includes representatives of the executive and legislative branches, as well as outside researchers, private consultants or citizens.

Our research found no evidence that consensus forecasting produces more accurate estimates than other approaches.[107] However, interviews with legislators, executive branch officials, economists and academics in a number of states suggest some other benefits to the practice.

For example, consensus forecasting appears to ease the political process. Rather than arguing over competing projections of how much revenue is available, policy makers can focus on the more important work of writing the budget itself.

One of the deans of state revenue forecasting in the United States, John Mikesell of Indiana University, recalls one difficult legislative session in the late 1970s, before Indiana adopted the consensus approach. There were so many versions of revenue estimates that Republicans and Democrats spent the entire session arguing over how much money the state had to spend and, ultimately, they failed to pass a budget on time. Out of that breakdown came the current system in which a bipartisan group representing the legislature and governor's office issues an official forecast based on advice from technical experts including Mikesell. "The whole system is designed to be as transparent as it possibly can so you end up with a single consensus forecast," Mikesell says.[108]

The consensus technique appears to help smooth the budget process in Florida as well. The state applies a consensus approach to both revenues and expenditures so there is in-depth attention to both sides of the budget. Despite experiencing some painfully strained budgets in recent years, Florida's very consistent and carefully developed consensus system has helped the state pinpoint and respond quickly to fiscal problems, according to Florida experts. Jim Zingale, who was involved in Florida's estimating process for decades before retiring as head of the state's Department of Revenue in 2007, says consensus forecasting is one reason Florida has managed to maintain one of the highest bond ratings in the country.[109]

In some states, strenuous efforts are made to depoliticize the consensus process itself by carefully crafting the makeup of the participants. In Kansas, for example, no elected officials are allowed to serve on the estimating team.[110] A few years ago, when an elected state treasurer lobbied to join the group, he was denied his wish.[111] In Wisconsin, the final decision about the revenue estimate falls in the hands of a nonpolitical position, the director of the Legislative Fiscal Bureau.[112]

Governor C. L. "Butch" Otter (R) and legislative leaders have agreed to cast a wider net for additional experts beyond the state's own economists in the executive branch to develop tax collection estimates for the 2012 budget year.

In 2010, Governor Otter approved a law creating a nonpartisan, "executive economic council" consisting of five analysts who will meet three times a year to review the administration's revenue and economic data. Otter's budget chief, Wayne Hammon, wrote that the council will offer "a real world evaluation of the economic outlook and revenue forecasts."[113]

Many states seek outside experts, both from the business community and academia, to cast an independent eye over revenue estimates. Massachusetts seeks recommendations from a professor from the University of Massachusetts Boston, members of the state council of economic advisers and other experts.[114] Maine's Consensus Economic Forecasting Committee is made up of five private, academic economists, and its Revenue Forecasting Conference must include an economist from the University of Maine.[115]

The Revenue Estimating Conference in Louisiana has only four members, but one must be an external person who knows about forecasting and is affiliated with a public institution of higher education. Although the other three individuals—the governor, speaker of the House and president of the Senate—are politically powerful individuals, agreement on the numbers has to be unanimous. In the same way that a single juror in a criminal case can stop any verdict from going to the judge, the independent estimator in Louisiana must buy in to the estimate or it does not go forward.[116]

Managing the Effects of Revenue Volatility

Rainy Day Funds

One way states can manage volatility during hard economic times is to have enough cash on hand to compensate for estimating mistakes. A few years ago, states were in pretty good shape in this regard. According to NASBO, year-end balances peaked in fiscal year 2006 when states had $69 billion, or 11.5 percent of general fund expenditures, in reserve.[117]

The Great Recession has eaten up most of that cushion. At the end of fiscal year 2011, states are expected to have 5.8 percent of general fund expenditures in reserve—and if Alaska and Texas are removed from that calculation, it falls to 2.9 percent.[118] A key fiscal challenge for states in the coming years will be to replenish those reserves for the next rainy day.

States have a variety of ways to do this. Kansas, for example, does not have a rainy day fund set up as a discrete amount of cash in a separate account. But it does have a requirement to end

the fiscal year with a general fund balance equal to 7.5 percent of expenditures. Given budget challenges, the governor and legislature agreed to set that rule aside in fiscal year 2010.[119]

Oregon set up a rainy day fund in 2007 to manage its volatile revenue system and the difficulty of estimating revenues.[120] But hard times hit before the state was able to put much money into the fund. Budget officials hope having a fund will be helpful in future downturns, once there has been enough time to build up sufficient revenues.[121]

Fiscal Devices for Limiting Reliance on Volatile Taxes

Policy changes to a budgeting system can be a great help sometimes. Massachusetts, for example, addressed part of its volatility problem by making changes in the way revenues from the capital gains tax can be used. Capital gains are one of the most topsy-turvy revenue sources for states because they track the ups and downs of the stock market. Massachusetts relied heavily on capital gains-related revenues in its 2008 budget, to the tune of $2.1 billion. But the following year, capital gains brought in only $500 million, leaving a huge hole in the budget. The same phenomenon occurred in 2001 following the dot-com stock boom and bust.

Massachusetts does not want to ride that roller coaster again. In the summer of 2010, Governor Deval Patrick (D) signed a bill limiting to $1 billion the amount of capital gains revenues Massachusetts can use in its operating budget. Any amount above that must go to the state's rainy day fund.[122] The bond rating firm Fitch said it believes that "this change is a budgeting policy improvement as it will reduce the volatility of the Commonwealth's budget."[123]

Spending Rules

Some states have rules in place that prevent them from spending all the revenues they expect to collect in a given year. That way, if revenues come in lower than anticipated, the fiscal consequences are not as severe.

Some states have spending rules written in their constitutions.[124] For example, Delaware limits appropriations to 98 percent of the official revenue forecast; Rhode Island also sets the limit at 98 percent, and Oklahoma maintains its limit at 95 percent. Iowa (99 percent) and Mississippi (98 percent) have statutory rules in place.[125]

Conclusion

The findings presented here shed light on a disturbing trend: State revenues have become more difficult to predict accurately. While we found that states have incorrectly estimated revenues by 3.5 percent during the past 23 years, the major finding of this report is the extremity of errors in recent years. Particularly striking is the fact that during downturns—when it matters more than ever for states to get it right—more states are making larger errors. And the size of these errors is linked more than anything else to the growing sensitivity of revenue streams to underlying economic cycles. Although some states have adopted promising approaches that seem to increase the chances of producing accurate estimates, forecasting revenues correctly will continue to be a challenge to those who prepare the estimates, at a time when policy makers need the best information possible for writing budgets.

Appendix A: Methodology

Data Collection and Quality

We computerized data on revenue estimates and revenue collections for the personal income, sales and corporate income taxes from the National Association of State Budget Officers (NASBO) and National Governors Association's (NGA) *Fall Fiscal Survey of the States* for each year from 1987 through 2009, covering a total of 23 years. In the survey, the "original estimates" are intended to be the forecasts on which the adopted budget was based, and the "current estimates" are the preliminary actual estimates for the fall after the year was closed (e.g., the estimate in fall 2009 for the fiscal year that ended in June 2009). In 1987 and 1988 the survey covered personal income and sales taxes only; from 1989 forward it included personal income, sales and corporate income taxes. In December 2010, following the release of the *2010 Fiscal Survey*, we examined data for 2010; however, due to timing considerations we did not incorporate this year of data into our analysis. Because NASBO data do not include the District of Columbia, we did not incorporate the District in this analysis.

The NASBO/NGA data held several great advantages for the purposes of our analysis: They are self-reported by states; they are collected by a single source; they are intended to be collected under a common set of definitions; they are collected for all 50 states in most years; and they go back more than 20 years, covering all or part of three recessions (in 1990, 2001 and 2007). It would be impractical to assemble such a data set from scratch, collecting historical forecast and actual revenue data from individual states for a 20-year historical period; records disappear, memories fade and staff move on, making it difficult to reconstruct these data.

As with any self-reported numbers, there were some anomalies in the NASBO/NGA data, which we were diligent in cleaning. We eliminated data in the following situations: cases in which only the original estimate was reported but not the current, and vice versa; cases in which the original and current estimates were identical for two or more taxes; and cases in which the estimating errors were too large to be plausible (the top 1 percent of cases with the highest absolute value of forecast error).

In addition to the NASBO/NGA data, we used U.S. Census state tax collection figures in estimating the size of errors across years or across the type of tax. We also compared personal income tax revenue errors with the change in personal income using data from the U.S. Department of Commerce, Bureau of Economic Analysis.

For the nation as a whole, when discussing the dollar amounts of errors, we use the percentage error times the U.S. Census tax collections for the personal income, sales and corporate income taxes for fiscal year 2009. For each state, when discussing dollar amounts of errors, we use the percentage error times the tax collections for the three taxes as reported to NASBO/NGA.

Finally, we compared errors in states with biennial versus annual budgets and those that use consensus forecasting versus those that do not; these data were from NASBO's *Budget Processes in the States*.[126] We also analyzed data on state revenue forecasting methods from Pew's Government Performance Project's *Grading the States* surveys from 2005 and 2008.[127]

Scope of the Study

The study time period covers three recessions (1990, 2001 and 2007), allowing us to observe errors across business cycles.[128] The taxes examined in this study together comprise 72 percent of states' total tax revenues.[129] We chose to cover them because they make up nearly three-quarters of total state tax revenue, but also because there is relatively complete and consistent data available for these three tax types—both across the states and over a substantial period of years. These tax revenues tend to be more volatile than other taxes, on average, and therefore more difficult to predict, allowing for important statements about the relationship between errors and volatility.[130]

We approached this exploration expecting to illuminate some differences in effectiveness in terms of how states estimate revenue (i.e., the systems, methods and institutional processes). However, our analysis found that differences in accuracy among the various methods and processes were not statistically significant. This finding is consistent with our assessment of the most reliable prior research in the field. To examine the methods in greater detail, we would need more complete data on them, and we would need to control for the volatility of the revenue stream.[131] Our literature review also revealed other factors that we were able to address with differing degrees of success in conducting this analysis. These factors include the variation in the states' reliance on the three taxes we examined; the quality of the NASBO data, which are self-reported by the states (meaning there are opportunities for error); the relationship of the estimates reported to NASBO to the actual estimates used in preparing the budget; legislated changes made during the fiscal year; the fact that

states vary greatly in their tax structures and budget processes (e.g., annual versus biennial, frequency of revenue estimate revision, etc.); the capacity for financial managers to manage the consequences of estimating errors, including reserve funds, hedging and other tools; methods by which risk is analyzed and conveyed to managers and elected officials; and the lead time between forecast preparation and the start of the budget period (i.e., the further ahead the forecast, the less accurate it is likely to be). We were diligent in scrubbing the data for quality and comparability, but we recognize that the conclusions drawn from this analysis can go only so far.

After consulting with budget staff in several states, we understand states attempt to provide NASBO with data that represent the intended concepts—original estimates prepared at the time of budget adoption, and actual (or near actual) collections measured on a basis consistent with the forecasts—but that states are only partially successful at this. We believe the data used here are useful to discern broad patterns in estimating errors but are not trustworthy enough to make firm statements about individual states; state-specific inquiry would be required for that level of analysis. However, given that it would be a nearly impossible task to gather truly comparable data across states over multiple years, we are confident in the data we chose to examine in this study and in the conclusions we draw from the analysis.

Analysis

Our analysis focused on the size of the revenue estimating errors, taken as a percentage of actual revenue collections. For each of the three taxes, and for the sum of the three taxes, we calculated the percentage errors for each state and for the nation as a whole by subtracting the revenue estimate (original estimate) from the actual collection (current estimate), and taking the difference as a percentage of the actual collection.[132] A positive percent error is an under-forecast, or revenue overage; a negative percent error is an over-forecast, or revenue shortfall. This measure is helpful because state officials are likely to react very differently to positive and negative errors. We ran descriptive statistics of this measure across states, across fiscal years, across tax type and across economic cycles. When summarizing errors across states or fiscal years, we generally used the median of the percentage error or absolute value of percentage error, rather than the mean, because it is less influenced by a single large error in an individual state. We also examined the distribution of errors, usually focusing on the 25th and 75th percentiles, but believed that these results, though interesting, ultimately told us less than did the medians, which we present in the body of the report. When identifying errors across type of tax for a single year, as in the 2009 example that opens this report and in Exhibits 7 and 8, which show errors in personal income tax and corporate income tax, we took the difference between

the sum of all estimates and the sum of actual collections for that type of tax, as a percentage of the actual collections. Unlike the median, which we used when it was important to avoid weighting large states more heavily than small states, this figure is a national average that allows us to approximate the size of the error for all the states.

When looking across time periods and taxes we summarized the data in ways that did not put too much pressure on any single data point. Even if there were errors in the underlying data, or even if we chose different ways to summarize the data, we were likely to reach the same broad conclusions about state revenue estimating accuracy across the business cycle or across taxes. The analysis is robust. But when looking at individual states, we cut the data more finely, putting additional pressure on the data and measures we use to summarize the data. It is much more difficult to draw conclusions about specific states with confidence than it is to draw conclusions about broad trends. Thus, we limited discussion of specific states to those for which coverage in our study was above the median of 67.4 percent (defined as the percentage of the state's total taxes as defined by the U.S. Census that the NASBO data on personal income, corporate income and sales taxes comprise). (See Appendix B for a 50-state table of the states' revenue estimating errors and tax coverage.)

We also examined the median absolute percentage error for each state and for the nation as a whole. This is simply the median—the middle value—across all years in the sample, of the absolute value of each year's percentage error (e.g., a 10 percent positive error is treated the same as a 10 percent negative error). It is robust because it does not change much unless there are significant changes in the underlying data, and it is not very sensitive to any single number. This measure tells us how inaccurate revenue estimates are, without regard for whether the inaccuracy results in a surplus or a shortfall.

Finally, we conducted regression analyses to determine the relationship between the size of revenue estimating errors and the methods and systems that states use to estimate revenue, and found that these were not significantly linked to the size of errors. These methods include simple trend analysis, time series modeling, linear regression modeling, simulation, nominal group technique, Delphi or expert judgment and private consultation. We also looked at consensus forecasting, a process that requires a panel of experts (which may include officials from the executive and legislative branches of the state, as well as external researchers or officials from universities, private consultants or citizens) brought together for purposes of generating the requested forecast. In both of these cases, we found no significant relationship between use of consensus forecasting and the size of errors, due largely to limitations with the data.

Appendix B

States' Median Errors, 1987–2009

This table lists the states' median revenue estimating errors for the personal income, sales and corporate income taxes (the "Big 3" taxes). Across the 50 states, the median percentage error for this period was 1.5 percent. States vary in terms of their reliance on the taxes examined in this study. The states that are highlighted were above the median of 67.4 percent in terms of their reliance on the Big 3 taxes.

	Median percentage error	Big 3 taxes as a percentage of total revenue		**Median percentage error**	Big 3 taxes as a percentage of total revenue
ALABAMA	1.45	16.7	MONTANA	6.14	38.7
ALASKA	10.53	54.4	NEBRASKA	1.47	12.8
ARIZONA	**1.23**	70.6	NEVADA	**3.90**	72.4
ARKANSAS	2.19	63.1	NEW HAMPSHIRE	**2.23**	73.2
CALIFORNIA	**2.85**	76.0	NEW JERSEY	1.35	63.8
COLORADO	**1.61**	76.3	NEW MEXICO	**0.93**	74.9
CONNECTICUT	**3.05**	76.8	NEW YORK	(2.07)	52.5
DELAWARE	(0.09)	41.6	NORTH CAROLINA	**2.76**	71.4
FLORIDA	(0.43)	61.3	NORTH DAKOTA	2.69	16.3
GEORGIA	**1.48**	85.7	OHIO	**1.29**	69.8
HAWAII	**1.29**	80.6	OKLAHOMA	0.49	60.9
IDAHO	1.62	64.8	OREGON	**3.81**	74.0
ILLINOIS	**0.70**	79.2	PENNSYLVANIA	**0.36**	68.5
INDIANA	**0.88**	78.6	RHODE ISLAND	**(0.52)**	70.9
IOWA	**1.75**	68.7	SOUTH CAROLINA	0.72	67.1
KANSAS	**1.11**	72.4	SOUTH DAKOTA	0.72	46.7
KENTUCKY	(0.20)	65.2	TENNESSEE	**0.49**	70.1
LOUISIANA	1.99	61.6	TEXAS	2.62	50.2
MAINE	**1.10**	80.7	UTAH	**2.56**	80.8
MARYLAND	**1.60**	70.2	VERMONT	**5.01**	72.9
MASSACHUSETTS	**3.52**	71.6	VIRGINIA	1.34	52.7
MICHIGAN	(1.19)	61.8	WASHINGTON	1.34	45.9
MINNESOTA	**1.94**	73.6	WEST VIRGINIA	**1.55**	78.1
MISSISSIPPI	**1.61**	68.5	WISCONSIN	0.92	57.4
MISSOURI	0.41	56.1	WYOMING	2.39	22.7

SOURCE: Pew Center on the States and The Nelson A. Rockefeller Institute of Government, 2011, based on data from the National Association of State Budget Officers and National Governors Association.

Appendix C

Revenue Estimating Methods and Use of Consensus Forecasting

In 2008, the Pew Center on the States released a report that included a survey of states on the processes and methods used in forecasting; these responses are shared below. The data on use of consensus forecasting come from the National Association of State Budget Officers and National Governors Association *Budget Processes in the States* survey, also from 2008.

	Simple trend analysis	Time series modeling	Linear regression modeling	Simulation	Nominal group technique	Delphi or expert judgment	Private consultant	Consensus forecasting
ALABAMA	•		•	•			•	
ALASKA	NR	NR	NR	NR	NR	NR	NR	
ARIZONA	•					•	•	
ARKANSAS			•					
CALIFORNIA	NR	NR	NR	NR	NR	NR	NR	
COLORADO	•	•	•			•		
CONNECTICUT	•		•			•		
DELAWARE	•	•	•	•		•	•	•
FLORIDA	NR	NR	NR	NR	NR	NR	NR	•
GEORGIA	•	•	•					
HAWAII	NR	NR	NR	NR	NR	NR	NR	
IDAHO			•					
ILLINOIS	•	•	•			•	•	
INDIANA			•		•			•
IOWA	•	•	•		•			•
KANSAS	•	•	•			•	•	•
KENTUCKY	NR	NR	NR	NR	NR	NR	NR	•
LOUISIANA	•	•	•			•		•
MAINE				•				•
MARYLAND	•	•	•		•			•
MASSACHUSETTS		•	•	•			•	•
MICHIGAN	•			•				•
MINNESOTA	•	•	•	•		•	•	
MISSISSIPPI	•	•	•					•
MISSOURI	•	•	•				•	•

(continued)

NOTE: NR = not reported

Revenue Estimating Methods and Use of Consensus Forecasting

(continued)

	Simple trend analysis	Time series modeling	Linear regression modeling	Simulation	Nominal group technique	Delphi or expert judgment	Private consultant	Consensus forecasting
MONTANA	•	•	•	•		•		
NEBRASKA		•	•	•		•		NR
NEVADA		•	•				•	
NEW HAMPSHIRE	•				•			
NEW JERSEY	•	•	•	•		•		
NEW MEXICO	•	•		•				•
NEW YORK	NR	NR	NR	NR	NR	NR	NR	•
NORTH CAROLINA			•				•	•
NORTH DAKOTA	•	•	•	•	•	•	•	•
OHIO	•	•	•	•				
OKLAHOMA	•	•						
OREGON		•						
PENNSYLVANIA	NR	NR	NR	NR	NR	NR	NR	
RHODE ISLAND	NR	NR	NR	NR	NR	NR	NR	•
SOUTH CAROLINA	•	•	•	•				•
SOUTH DAKOTA	NR	NR	NR	NR	NR	NR	NR	
TENNESSEE	•	•	•	•		•	•	•
TEXAS	NR	NR	NR	NR	NR	NR	NR	
UTAH	•	•	•	•		•	•	•
VERMONT		•					•	•
VIRGINIA		•	•					•
WASHINGTON			•					•
WEST VIRGINIA	•		•	•		•		
WISCONSIN	•	•	•					
WYOMING			•					•

NOTE: NR = not reported

SOURCE: All data are self reported by states. Use of methods from the Pew Center on the States Government Performance Project *Grading the States* Survey 2008. Use of consensus forecasting as published by National Association of State Budget Officers/National Governors Association in *Budget Processes in the States* 2008.

Endnotes

1 This is the sum of the errors for each type of tax in Exhibit 3, which were calculated by multiplying the median percentage error for each type of tax in 2009 by U.S. Bureau of the Census data on tax collections for 2009.

2 Center on Budget and Policy Priorities, "States Continue to Feel Recession's Impact," accessed December 13, 2010, http://www.cbpp.org/cms/?fa=view&id=711.

3 The absolute median error of 3.5 percent translates into $25 billion when taken as a percentage of all state tax revenues in 2009, according to the U.S. Bureau of the Census' *State Government Tax Collections Survey*, which includes property tax, sales and gross receipts taxes, license taxes, income taxes and other taxes.

4 According to the National Association of State Budget Officers 2008 *Budget Processes in the States*, in most states the fiscal year begins in July and ends in June, except for Alabama, Michigan, New York and Texas. Twenty-seven states have annual budgets, 21 have biennial budgets and Kansas and Missouri have a combination of the two, a factor that also influences when official revenue estimates are released.

5 Michelle Cole, "Gov. Ted Kulongoski Orders Oregon Agencies to Cut Budgets by 9 Percent," *The Oregonian*, June 22, 2010, accessed December 13, 2010, http://www.oregonlive.com/politics/index.ssf/2010/06/governor_orders_agencies_to_en.html. It is important to note that in Oregon, as in some other states, the office that prepares fiscal impact statements for proposed tax changes is not the same office that prepares revenue estimates for the state budget. This example is used to show the impact that an error in forecasting or estimating revenue changes (as well as annual revenues) can have on a state's budget choices.

6 Data from U.S. Bureau of the Census, sum of individual income, corporation net income and general sales and gross receipts taxes as a percentage of states' total tax revenues over the period.

7 These states had median percentage errors of greater than 3 percent, compared with an overall median percentage error of 1.5 percent over the length of the study. Alaska and Montana also had errors of greater than 3 percent, but were excluded from mention here because the taxes studied comprise a small share of their tax revenues.

8 While the Pew-Rockefeller Institute analysis does not show a clear link between consensus forecasting and accuracy, there is considerable academic research establishing that forecasts are more accurate when multiple forecasts are combined. *See* Stuart Bretschneider, Wilpen Gorr, Gloria Grizzle, and Earle Klay, "Political and Organizational Influences on the Accuracy of Forecasting State Government Revenues," *International Journal of Forecasting* 5 (1989). *See also* Robert T. Clemen, "Combining Forecasts: A Review and Annotated Bibliography, *International Journal of Forecasting* 5 (1989).

9 In April 2009 New York announced a 2010–2011 budget gap of $2.2 billion; press release, "Division of the Budget Releases Enacted Budget Financial Plan," (State of New York Division of the Budget, April 28, 2009), http://www.budget.state.ny.us/pubs/press/2009/press_release09_enactedReport0428.html. In July 2009 the state announced a budget gap of $4.6 billion in 2010–2011; press release,"Governor

Paterson Will Deliver Economic and Fiscal Recovery Plan to Address $2.1 Billion Current-Year Budget Deficit, Governor Says Comprehensive Approach Needed to Restore Economic Prosperity, Reduce Costs, and Increase State and Local Government Efficiency," (State of New York Division of the Budget, July 30, 2009), http://www.budget.state.ny.us/pubs/press/2009/press_release09_FPQ1_update.html. In November 2010 the state estimated the 2010–2011 budget gap at $6.8 billion; *New York State 2009 Joint Report on Receipts and Disbursements* (State of New York Division of the Budget, Senate Finance Committee, Assembly Ways and Means Committee, November 13, 2009), http://www.budget.state.ny.us/pubs/press/2009/hearings/quickStart/2009QuickStartReport.pdf. In January 2010 the governor's budget proposal projected a $7.4 billion deficit; press release, "Governor Paterson's 2010–2011 Executive Budget Proposes Significant Spending Reductions, Key Long-Term Reforms to Eliminate $7.4 Billion Budget Gap," (State of New York Division of the Budget, January 19, 2010), http://www.budget.state.ny.us/pubs/press/2010/pressRelease10_eBudget01.html. In February 2010 the governor announced an additional $750 million deficit; press release, "Governor Paterson Announces State Must Address Additional $750 Million Projected Deficit in 2010–11 Budget," (State of New York Division of the Budget, February 3, 2010), http://www.budget.state.ny.us/pubs/press/2010/pressRelease10_deficitFeb03.html. Finally, in March 2010 the revenue forecast was revised downward $850 million; Robert L. Megna et al., "Memorandum: 2010–11 Consensus Economic and Revenue Forecast Report," (New York Consensus Forecasting Conference, March 1, 2010), http://www.budget.state.ny.us/pubs/press/2010/econRevForecastConf/2010-11ConsensusReport.pdf.

10 "State Revenue Beats Forecast after 17 Months of Losses," *Indianapolis Star*, April 6, 2010, accessed December 15, 2010, http://iphone.indystar.com/posts/show/19248?page=1.

11 This figure is the median of the absolute values of the median percentage errors for each year of the study. For more information, see Appendix A: Methodology.

12 The $25 billion figure is in 2009 dollars.

13 Gross domestic product (GDP) declined and unemployment rose more during the 1990–1991 recession than during the 2001 recession. Pew analysis of real GDP from the Bureau of Economic Analysis data and seasonal unemployment rates from the Bureau of Labor Statistics.

14 This analysis incorporated only a single year—fiscal year 2009—of the most recent state budget crisis, and one that was likely the most difficult to predict. If 2010 were incorporated into the longitudinal analysis, the increase in error would likely be less, because errors for that year were lower than for 2009 (according to data from the National Association of State Budget Officers and the National Governors Association's *Fiscal Survey of the States*, Fall 2010).

15 Center on Budget and Policy Priorities, "States Continue to Feel Recession's Impact," 2010.

16 Pew Center on the States interview with Verenda Smith, interim executive director of the Federation of Tax Administrators, November 23, 2010.

17 During the next 10 years, economic growth will be slower than the previous 30 years, according to the National Governors Association.

18 Ohio did not regain the jobs lost in the 2000–01 recession before the 2007–09 recession hit. Michigan's tax revenue was lower in fiscal year 2010 than it was in fiscal year 1997.

19 Center on Budget and Policy Priorities, "States Continue to Feel Recession's Impact," 2011.

20 Pew Center on the States interview with Maryland Governor Martin O'Malley, July 9, 2010.

21 National Governors Association and National Association of State Budget Officers, *The Fiscal Survey of States*, (December 2009): 48, http://nasbo.org/LinkClick.aspx?fileticket=dZSuPt3Slc8%3d&tabid=65.

22 Ibid.

23 Testimony of Robert L. Megna, New York budget director, New York State budget "quick start" meeting, November 9, 2009.

24 Ibid.

25 "State Revenues Up for Sixth Straight Month," *The Charleston Gazette*, November 10, 2010, accessed December 6, 2010, http://wvgazette.com/News/201011101212.

26 Commonwealth of Kentucky, "Quarterly Economic and Revenue Report," First Quarter, Fiscal Year 2011, first edition, Governor's Office for Economic Analysis and Office of State Budget Director, November 1, 2010, accessed December 6, 2010, http://www.osbd.ky.gov/NR/rdonlyres/185B171C-EAC6-4581-95CB-DC0817F71800/0/1011_1st_Qtr_Rpt_2011.pdf.

27 Minnesota Office of Management and Budget, "State Revenues Exceed Forecast by $55 Million in 1st Quarter, Biennial Shortfall Falls to $22 Million," October 2010 Economic Update, accessed December 15, 2010, http://www.mmb.state.mn.us/doc/fu/10/update-oct.pdf.

28 Pew Center on the States interview by e-mail with Terry Johnson, chief fiscal analyst, Montana Legislature, September 30, 2010.

29 National Association of State Budget Officers, *Fiscal Year 2008 State Expenditure Report* (fall 2009), http://www.nasbo.org/LinkClick.aspx?fileticket=%2fZWfTvJG8j0%3d&tabid=38.

30 Estimated expenditure data for fiscal year 2009 from NASBO's *Fiscal Year 2008 State Expenditures Report*.

31 There is some evidence that forecasting errors are "serially correlated"—that is, that a revenue shortfall in one year is more likely to be followed by a shortfall in the next year than followed by an overage, and vice versa. Rudolph Penner, a former director of the Congressional Budget Office (CBO), concluded this about federal government forecasts: "If CBO makes an error in an overly optimistic or pessimistic direction one year, it is highly probable that it will make an error in the same direction the following year." *See* Rudolph G. Penner, "Federal Revenue Forecasting," in *Government Budget Forecasting: Theory and Practice*, eds. Jinping Sun and Thomas D. Lynch (Auerbach Publications, 2008), http://www.urban.org/UploadedPDF/411442_Federal_Revenue.pdf. Inspection of NASBO/NGA data in time periods surrounding recessions shows that, at least for the states in aggregate, revenue overestimates tended to be followed by additional overestimates.

32 Press release, Governor Jay Nixon: "Gov. Nixon, Sen. Mayer and Rep. Icet announce FY 2011 Consensus Revenue Estimate, adjusted CRE for FY 2010," January 4, 2010, accessed December 15, 2010, http://governor.mo.gov/newsroom/2010/Consensus_Revenue_Estimate. *See also* news release, Missouri Department of Administration: "State Releases Updated Revenue Projections," March 11, 2010, accessed December 15, 2010, http://oa.mo.gov/co/releases/2010/Updated_Revenue_Projections. *See also* Associated Press, "Missouri Lawmakers Approve $23.3 Billion Spending Plan," *Joplin Globe*, April 30, 2010, accessed December 15, 2010, http://www.joplinglobe.com/local/x1901492291/Missouri-lawmakers-approve-23-3-billion-spending-plan. *See also* news release, Missouri Department of Administration: "State Releases 2011 Budget Shortfall Estimate," May 19, 2010; Associated Press, "Missouri Could Face $600 Million Shortfall in 2012," July 22, 2010, accessed December 15, 2010, http://www.semissourian.com/story/1651349.html.

33 Missouri Budget Project e-mail to Pew Center on the States, June 22, 2010.

34 Marie Price, "State of Oklahoma Fund Poised for Possible 'Rainy Day,'" *The Journal Record*, Oklahoma City, July 29, 2009.

35 News release, "Agency Funding Cuts Doubled as Revenue Shortfall Continues," Oklahoma treasurer Scott Meacham, December 15, 2010.

36 This is 1.5 percent of state total tax revenues of $715 billion in 2009.

37 National Governors Association and National Association of State Budget Officers, *The Fiscal Survey of States*, (December 2006, 2007, and 2008), http://www.nasbo.org/Publications/FiscalSurvey/FiscalSurveyArchives/tabid/106/Default.aspx.

38 Ibid.

39 Melinda Deslatte, "LA Gov Budget Chief Weighs Cuts, Faces Shortfall," *Bloomberg Businessweek*, August 11, 2010.

40 "Now You See It, Now You Don't: Arizona's Vanishing Budget Surplus," W.P. Carey School of Business, Arizona State University (August 14, 2007), http://knowledge.wpcarey.asu.edu/article.cfm?articleid=1449.

41 Katherine Barrett and Richard Greene, "Grading the States: The Mandate to Measure," *Governing Magazine*, March 2008, 30.

42 "Legislative Stake through 21st Century Fund's Heart," *Arizona Republic*, March 1, 2009.

43 A Maricopa County Superior Court Judge entered an $18.5 million judgment against the state, but said the court did not have the power to enforce the judgment.

44 Pew Center on the States interview with John Petersen, professor of public policy and finance, George Mason School of Public Policy, September 17, 2009.

45 Oregon Department of Revenue, "2 Percent Surplus Refund (Kicker) History," *Personal Income Tax Statistics 2008*, Appendix A, http://www.oregon.gov/DOR/NEWS/docs/kicker.pdf?ga=t.

46 Pew Center on the States interview with Paul Warner, Oregon legislative revenue officer, July 6, 2010.

47 Pew Center on the States interview with William Fox, professor of economics and director of the Center for Business and Economic Research, University of Tennessee, June 16, 2010.

48 These steps often are supplemented with a variety of satellite models and external adjustments to expand the database upon which forecasts will be built. They also often fit within an institutional and managerial framework that includes risk assessment and external review. The details and sophistication of these procedures in each state depend greatly on the taxes involved, the analytic resources available, and the institutional and political environment.

49 The Pew Center on the States' Government Performance Project was started in 1998 and produced four report cards on state management practices over the following 10 years. (It also produced reports on cities and counties.) The report cards were published in *Governing Magazine*, with additional website material available in 2005 and 2008. The most recent reports are available at: http://www.pewcenteronthestates.org/initiatives_detail.aspx?initiativeID=36072.

50 The survey included simple trend analysis, time series modeling, linear regression modeling, simulation, nominal group technique, Delphi or expert judgment and private consultation.

51 For example, it may be that states that use complicated methods may need to hire more experienced or more qualified staff. Also, it may be that states with highly volatile and difficult to predict revenues are more likely to hire staff with advanced forecasting skills, who use advanced forecasting techniques—but errors in those states still will be unusually large. So coefficients on these variables need to be interpreted carefully.

52 Stuart Bretschneider et al., "Political and Organizational Influences on the Accuracy of Forecasting State Government Revenues," *International Journal of Forecasting* 5 (1989). *See also* Naci H. Mocan and Sam Azad, "Accuracy and Rationality of State General Fund Revenue Forecasts: Evidence from Panel Data," *International Journal of Forecasting* 11 (1995): 417–427.

53 Wisconsin Policy Research Institute, *State Revenue Forecasting in Wisconsin: A Critical Examination*, Report 17, no. 3 (May 2004), accessed November 29, 2010, http://www.wpri.org/Reports/Volume17/Vol17no3.pdf. *See also* Rudolph G. Penner, "Federal Revenue Forecasting," in *Government Budget Forecasting* (2008), 3.

54 Nigel Gault, "The General Economic Outlook," presentation at the Federation of Tax Administrators Revenue Estimating Conference, Raleigh, North Carolina, September 17, 2010, accessed December 13, 2010, http://www.taxadmin.org/fta/meet/07rev_est/papers/gault.pdf.

55 Pew Center on the States interview with Alan Conroy, director of the Kansas Legislative Research Department, June 2, 2010.

56 Montana Legislative Fiscal Division, "Understanding State Finances and the Budgeting Process" (January 2009), http://www.leg.mt.gov/content/publications/fiscal/leg_reference/Understanding_State_Finances.pdf.

57 Richard Mattoon and Leslie McGranahan, *Revenue Bubbles and Structural Deficits: What's a State to Do?*, Federal Reserve Bank of Chicago, paper presented at National Tax Association Annual Conference, November 14, 2009. Further evidence of this increasing sensitivity is the fact that during the two most recent recessions, the disparity between tax revenue decline and economic decline was far greater than in past recessions (Rockefeller Institute analysis of percentage change in real state government taxes and real GDP).

58 Mattoon and McGranahan show that revenues have been increasingly sensitive to the economy since 1998, because states' reliance on income tax revenues (compared with the relatively stable sales tax) has grown. Income taxes rely on capital gains income, which itself is a function of the highly volatile stock market.

59 Raymond C. Scheppach, "Update on the State Fiscal Crisis," (National Governors Association, March 3, 2004).

60 Donald J. Boyd and Lucy Dadayan, "Sales Tax Decline in Late 2008 Was the Worst in 50 Years," (The Nelson A. Rockefeller Institute of Government, April 2009), 1.

61 Lucy Dadayan and Donald J. Boyd, "State Tax Revenues Show Record Drop, for Second Consecutive Quarter," (The Nelson A. Rockefeller Institute of Government, October 2009), 6.

62 The Federation of Tax Administrators website provides an easy-to-read table of state tax revenue by source at http://www.taxadmin.org/fta/rate/09taxdis.html.

63 Alice Rivlin writes that although there was a sharp decline in personal income tax revenue in 2002, dropping 22 percent from the previous year, "Sales tax revenues held up better, as consumers continued to spend." Alice M. Rivlin, *Another State Fiscal Crisis: Is There a Better Way?* Policy Brief no. 23 (Brookings Institution, December 2002), http://www.brookings.edu/es/wrb/publications/pb/pb23.pdf.

64 National Governors Association and National Association of State Budget Officers, *The Fiscal Survey of States*, (December 2009): 48.

65 Pew Center on the States interview with William Fox, professor of economics and director of the Center for Business and Economic Research, University of Tennessee, June 16, 2010.

66 Ibid.

67 Pew Center on the States interview with Mitchell Bean, director, Michigan House Fiscal Agency, February 17, 2010.

68 "Michigan's FY2010 Revenue to Fall Another $156 Million," *Reuters*, Chicago, January 11, 2010, http://www.reuters.com/article/idUSTRE60A4QM20100111. *See also* "Michigan's Revenues at Lowest Level in 18 Years," *Reuters*, Washington, May 15, 2009, http://www.reuters.com/article/idUSTRE54E50E20090515.

69 Pew Center on the States interview by e-mail with Tom Schenk, lecturer Grand View (Iowa) University, May 25, 2010.

70 Pew Center on the States interview with Billy Hamilton, consultant and former deputy state comptroller in Texas and former co-director of the California Performance Review, February 8, 2010.

71 Between 1980 and 2006, the standard deviation in annual percentage changes in state and local corporate income tax revenue was 9.2 percent; 4.6 percent for personal income taxes, and 2.7 percent for sales taxes, compared with 1.8 percent for property taxes and 1.6 percent for all other taxes. Data from a Rockefeller Institute presentation to the White House in 2009.

72 "State Budget and Finance: Trends and Challenges" presentation by Donald J. Boyd, The Nelson A. Rockefeller Institute of Government, at the Pew Charitable Trusts, September 25, 2009, http://www.rockinst.org/pdf/government_finance/2009-09-25-Boyd_Pew_presentation.pdf. Increasing the progressivity of income taxes also has contributed to their volatility. *See* R. Alison Felix, "The Growth and Volatility of State Tax Revenue Sources in the Tenth District" (Kansas City Federal Reserve, March 2008), accessed December 20, 2010, http://www.kansascityfed.org/Publicat/Econrev/PDF/3q08Felix.pdf.

73 In addition, changes in federal tax rates can have huge impacts on state revenue from capital gains.

74 Pew Center on the States interview with Josh Harwood, senior economist, Oregon Office of Economic Analysis, July 7, 2010.

75 "State Budget Cuts: Across-the-Board, and at Cross Purposes," *Stateline.org*, June 23, 2010.

76 Press release, Governor Arnold Schwarzenegger, "Gov. Schwarzenegger Declares State of Emergency, Issues Executive Order to Impose Furloughs Due to Cash Crisis Caused by Budget Impasse," July 28, 2010, accessed July 28, 2010.

77 Pew Center on the States interview with William Fox, June 16, 2010.

78 Montana Legislature, Legislative Fiscal Division, "Budget Analysis for the 2011 Biennium" (January 2009), accessed December 15, 2010, http://leg.mt.gov/content/Publications/fiscal/ba_2011/vol_2/business.pdf.

79 "Oil and Gasoline," *The New York Times*, December 13, 2010, http://topics.nytimes.com/top/news/business/energy-environment/oil-petroleum-and-gasoline/index.html?scp=3&sq=oil%20%24147%20a%20barrel&st=cse. *See also* "U.S. Natural Gas Wellhead Price," U.S. Energy Information Administration (EIA), http://www.eia.doe.gov/dnav/ng/hist/n9190us3m.htm.

80 Press release, "Fiscal Year with Worst Revenue Shortfall in History Ends" (Oklahoma Treasurer Scott Meacham, July 13, 2010).

81 National Conference of State Legislatures, "Projected Revenue Growth in FY2010" (October 2009), accessed December 21, 2010, http://www.ncsl.org/?tabid=18858.

82 "October 2010 CREG Revenue Forecast" (State of Wyoming Consensus Revenue Estimating Group, October 2010), accessed December 7, 2010, http://eadiv.state.wy.us/creg/Forecast_News_Oct10.pdf. According to the U.S. Department of the Interior, Bureau of Land Management, trona is a relatively rare sodium-rich mineral found in the United States, Africa, China, Turkey and Mexico. Sweetwater County, Wyoming is a major contributor to the total world production of the mineral, which is mined and then processed into soda ash.

83 Press release, "Department Releases Preliminary Fall 2010 Revenue Forecast" (State of Alaska Department of Revenue, November 26, 2010), accessed December 7, 2010, http://www.revenue.state.ak.us/Press%20Releases/10-007%20Press%20Release%20Prelim_Fall%202010.pdf.

84 Richard F. Dye and Therese McGuire, "Growth and Variability of State Individual Income and General Sales Taxes," *National Tax Journal* 44, no. 1, 55–66.

85 Pew Center on the States interview with Mark Muchow, deputy secretary and head forecaster, West Virginia Department of Revenue, May 26, 2010.

86 "The 'Amazon Tax' War Escalates," *Stateline.org*, April 26, 2010, http://www.stateline.org/live/details/story?contentId=479651.

87 Donald Bruce, William F. Fox, and LeAnn Luna, "State and Local Government Sales Tax Revenue Losses from Electronic Commerce," University of Tennessee Center for Business and Economic Research, September 2009, accessed December 20, 2010, http://cber.bus.utk.edu/ecomm/ecom0409.pdf.

88 The absolute median error of 3.5 percent yields a $25 billion error based on Census collections for all three taxes. The 11.6 percent error for the corporate income tax yields a $4.7 billion error. So even though the tax itself is only 5.6 percent of state revenues, it constitutes 18.5 percent of the total error.

89 Russell R. Sobel and Randall G. Holcombe, "Measuring the Growth and Variability of Taxes over the Business Cycle," *National Tax Journal* 49, no. 4 (1996): 544–545.

90 Pew Center on the States interview with Joseph Sicilian, professor and department chair of the Department of Economics, University of Kansas, May 25, 2010.

91 Pew Center on the States interview with Paul Warner, July 6, 2010.

92 "Revenue Impact of Proposed Legislation, Bill Number HB 2649 A," Legislative Revenue Office (75th Oregon Legislative Assembly, June 4, 2009), accessed December 20, 2010, http://www.leg.state.or.us/comm/sms/ris09/rhb2649a06-04-2009.pdf.

93 Pew Center on the States interview with Billy Hamilton, February 8, 2010.

94 Rudolph G. Penner, "Federal Revenue Forecasting," in *Government Budget Forecasting: Theory and Practice*, (2008), 3. Analysts at the Congressional Budget Office examine estimating errors regularly along several time horizons (e.g., within the fiscal year, into the next fiscal year, and five years into the future).

95 Pew Center on the States interview with Chris Ruhl, Indiana budget director, August 10, 2010.

96 Pew Center on the States interview with Rebecca Ross, senior economist, Michigan House Fiscal Agency, September 22, 2010.

97 Pew Center on the States interview with Josh Harwood, senior economist, Oregon Office of Economic Analysis, July 7, 2010.

98 E-mail to Pew Center on the States from Mark Muchow, September 22, 2010.

99 Yael Shavit, "Revenue Forecasting Processes in New England" (New England Public Policy Center, April 2009), accessed December 15, 2010, http://www.bos.frb.org/economic/neppc/briefs/2009/briefs904.pdf.

100 Pew Center on the States interview with Mark Muchow, May 26, 2010.

101 Pew Center on the States interview with Jim Zingale, July 7, 2010.

102 Pew Center on the States interview with Mark Haas, chief deputy treasurer, Michigan, February 16, 2010.

103 "Rell Said Tax Increase May Be Necessary," *The Day* [New London, CT], July 30, 2009.

104 Pew Center on the States interview with Connecticut Governor M. Jodi Rell, July 9, 2010.

105 National Association of State Budget Officers, "Budget Processes in the States," table 7 (Summer 2008), 22.

106 In its own definition of consensus revenue estimating, the National Association of State Budget Officers specifies that a consensus forecast is "A revenue projection developed in agreement through an official forecasting group representing both the executive and the legislative branches."

107 While the data do not show a clear link between consensus forecasting and accuracy, a long line of academic research makes it very clear that when multiple forecasts are combined, accuracy tends to improve.

108 Pew Center on the States interview with John Mikesell, Chancellor's professor, Indiana University, June 3, 2010.

109 Pew Center on the States interview with Jim Zingale, former director of the Florida Department of Revenue, July 7, 2010.

110 Pew Center on the States interview with Duane Goossen, secretary, Kansas Department of Administration, February 8, 2010.

111 Ibid.

112 Pew Center on the States interview with Bob Lang, director, Wisconsin Legislative Fiscal Bureau, May 25, 2010.

113 Betsy Z. Russell, "Eye on Boise: Crafting the State's Next Revenue Estimate," *The* [Spokane] *Spokesman Review*, July 22, 2010, http://www.spokesman.com/blogs/boise/2010/jul/22/crafting-next-state-revenue-forecast/.

114 Shavit, "Revenue Forecasting Processes" (April 2009).

115 Maine's Consensus Economic Forecasting Committee is made up of five private, academic economists; Pew Center on the States interview with Mike Allen, research director, Maine Revenue Services, June 14, 2010. Maine's Revenue Forecasting Conference must include an economist from the University of Maine; Shavit, "Revenue Forecasting Processes" (April 2009).

116 Pew Center on the States interview with James Richardson, director, Public Administration Institute, Louisiana State University, and a member of the Revenue Estimating Conference, May 20, 2010.

117 National Governors Association and National Association of State Budget Officers, *The Fiscal Survey of States*, (June 2010): ix.

118 Ibid.

119 Pew Center on the States interview with Alan Conroy, director, Kansas Legislative Research Department, June 2, 2010. *See also* Kansas Legislature, full text of bills, Sec. 146 (a), (b) and (c): 177, http://www.kslegislature.org/bills/2010/572.pdf.

120 "Government Finance: State Government," *Oregon Blue Book*; http://bluebook.state.or.us/state/govtfinance/govtfinance01.htm.

121 Pew Center on the States interview with Josh Harwood, July 7, 2010.

122 Pew Center on the States interview with Michael Widmer, president, Massachusetts Taxpayers Foundation, August 2, 2010.

123 "Fitch Rates Massachusetts' $350MM GO Bonds 'AA+'; Outlook Stable," *BusinessWire*, November 19, 2010, accessed December 13, 2010, http://www.businesswire.com/news/home/20101119006033/en/Fitch-Rates-Massachusetts-350MM-Bonds-AA-Outlook.

124 Bert Waisanen, "State Tax and Expenditure Limits—2008" (National Conference of State Legislatures, 2008), accessed November 29, 2010, http://www.ncsl.org/IssuesResearch/BudgetTax/StateTaxandExpenditureLimits2008/tabid/12633/Default.aspx#formulas.

125 State of Oregon Legislative Reference Office, "Measure 8: State Spending Limits," Research Report 8-00 (September 7, 2000).

126 National Association of State Budget Officers, *Budget Processes in the States*, Summer 2008.

127 Pew Center on the States, *Grading the States 2008*, http://www.pewcenteronthestates.org/report_detail.aspx?id=36228. *See also* Pew Center on the States, *Grading the States 2005*, http://www.pewcenteronthestates.org/report_detail.aspx?id=32742.

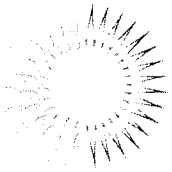
128 The recessions of 1990–1991, 2001 and the first two years of the most recent recession, which began in December 2007, are included in this study. Dates are from the National Bureau of Economic Research: http://www.nber.org/cycles/cyclesmain.html.

129 Data from U.S. Census Bureau, sum of personal income, corporate income, and general sales and gross services taxes, as a percentage of the states' total tax revenues during the period.

130 Richard Mattoon and Leslie McGranahan, *Revenue Bubbles and Structural Deficits: What's a State to Do?*, Federal Reserve Bank of Chicago, paper presented at National Tax Association Annual Conference, November 14, 2009.

131 The studies that attempt to discern the impact of state government institutional arrangements, such as consensus forecasting, and the impact of different forecasting techniques, all suffer from the difficulty of trying to uncover causality with the limited data available.

132 There are several common ways of measuring forecast error. Some of these measures do not distinguish positive from negative errors and are useful only for gauging magnitude of error. We came across all of the following methods in our review of the literature: the root-mean-squared error (RMSE), the root-mean-squared percent error (RMSPE), the absolute value of the error as a percentage of the actual result (known as absolute percentage error), and the mean or median of the absolute value of the percentage error (mean absolute percentage error is known as the MAPE). These measures, which treat positive and negative errors the same, were not appropriate for our purposes, in which we discuss the budgetary impact of errors. In particular, these measures would not allow an examination of whether forecasts are biased (e.g., more likely to underestimate revenue than to overestimate) or whether they are serially correlated. We also sought feedback from outside reviewers. One reviewer recommended measuring the percentage error in forecasted growth rather than in the level of tax collections. Under such a formulation, if actual revenue growth was 5 percent and forecasted growth was 6 percent, that would be a 20 percent error, because 6 is 20 percent larger than 5. We chose not to use this measure, because in some circumstances it can attribute great importance to errors that are relatively small in magnitude and can attribute small importance to errors that are quite large in magnitude. For example: (a) If tax revenue growth was 0.1 percent and the forecaster predicted 0.2 percent growth, then using the proposed alternative measure would yield a forecast error of 100 percent even though the amount of revenue collected was only off by 0.1 percent. (b) If tax revenue growth was 10 percent but forecasted growth was 11 percent, this measure would yield a forecast error of 10 percent (one-tenth as large as in example "a") even though the error in the amount of money collected was 10 times as large as in example "a."



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