A “dirty forecast,” which includes non-traditional measures that reflect the behavior of residents, is a simple and cost-efficient tool for improving the budget process.

Public officials can take a number of approaches to forecasting, usually relying on a mix of formalized models, established econometric techniques, and forecaster judgment. We know our forecasts will be wrong, since the conditions surrounding the future are unknown; the goal of a successful forecaster is not to develop a perfect estimate but rather to develop an estimate with as little error as possible. A key cause of estimate error is the reactionary nature of standard forecasting procedures — a forecast is unlikely to be adjusted unless there is a noticeable change in the environment, by which point it is often too late. Techniques and measures that are predictive in nature can improve accuracy, alerting public officials to a change in the environment that is likely to influence current and future financial positions. Including non-traditional measures that reflect the behavior of residents in what is called a “dirty forecast” is a technique that has been used within economic forecasting, but it is noticeably absent in the public arena. The intent of this article is to introduce readers to the notion of dirty forecasts and explain how they can be used by local governments.

**HOW IT WORKS**

The phrase “dirty forecast” refers to any forecast that includes non-traditional, coincident indicators, which tell us about the behavior within an environment in the here and now, rather than measuring the environment itself. By focusing on behavior, dirty forecasts are able to pick up changes in the environment well before the changes become measurable outcomes, allowing for easier adjustments when circumstances change. The theoretical link between the indicators and their predicted measure is often murky, but they exhibit a high degree of face validity.

The roots of dirty forecasting can be traced to applied economics. During his tenure as Chairman of the Federal Reserve, Alan Greenspan was known to look at a variety of dirty economic measures to get an idea about the behavior of the market and understand the direction that the economy was heading. The most prominent, and perhaps the most unusual, of these measures is the production of cardboard boxes. Most things we use are placed into a cardboard box at some point in time. Not only are they used for packaging individual items, but they are used in the sale and transport of large quantities of goods. Because the production of an item is related to its demand, Greenspan assumed there was more demand for the products being shipped when the demand for boxes increased. For Greenspan, this signaled a forthcoming boost to the economy.
A change in general production of the market can be observed through traditional measures such as imports, exports, and investment, but traditional measures often take months to calculate and are therefore of little use in the short term. Alternatively, monitoring the production of cardboard boxes gives a real-time look at the market and its direction. For example, see Exhibit 1, which provides the correlations for box production and investment against gross domestic product in the United States from 1977 to 1997. Nearly 99 percent of all changes in box production correlated with a change in the economy. The correlation with investment was 97.3 percent. This might seem like a small difference, but keep in mind that GDP investment measures are only calculated once a quarter, and are made public some time later.

A variety of other dirty measures exist within economics, including a lipstick indicator and a skirt length indicator, both of which portray the consumer confidence in the market. The lipstick indicator suggests that people indulge in less-expensive luxury items when they are nervous about their future. Increases in lipstick sales suggest a lack of certainty about the economy and employment in the near future. The skirt length indicator monitors the average length of hemlines in the new fashion lines; the shorter the hemline, the more confidence in the direction of the economy.

The measure that has gained the most fame relates to the *Sports Illustrated* swimsuit issue. According to the indicator, when the cover model of the swimsuit issue is from the United States, the S&P 500 index will outperform its historic rate. Alternatively, the S&P 500 is expected to underperform when the cover model is from another country. The belief underlying the indicator relates to faith in the U.S. economy. A U.S. cover model represents an expectation of a strong economy with growing purchasing power, and another choice suggests the editor’s belief that the purchasing power abroad will outpace our own. Silly though this may be, there is some evidence to support it. Since 1978, the S&P 500 has posted an average return of 9.2 percent. During the same timeframe, the S&P 500 posted an average return of 10.7 percent when the cover model was American (14.5 percent, if we exclude the economic decline of 2008 from the analysis). The average growth was 8.2 percent when a model from another country was selected for the cover.

**USING DIRTY FORECASTS IN GOVERNMENT**

Although the economic measures are interesting, lipstick sales and the cover of *Sports Illustrated* provide little help in the budgetary process. How, then, can dirty forecasts be used in the forecasting of government finances?

The behavioral focus of dirty indicators allows a forecast to be tailored to the population that the government represents, capturing what makes the city or county unique. For example, Chicago, Illinois, differs from Macon, Georgia, in many ways, but they are likely to use the same best practices — which means that both cities will likely use similar models to estimate their revenue and expenditure forecasts. Because dirty indicators capture relationships that are unique to an area, using them would allow public officials to account for effects related to tourism or the Cubs in Chicago and the Cherry Blossom Festival in Macon. This kind of tailored approach provides a better foundation for a forecast.

More important than tailoring a forecast is the way a dirty approach can transform financial management practices. For example, the Great Recession caused many local governments to overspend after tax revenues came in under the estimates. Including a dirty indicator could have changed this. Just as cardboard box production signals a change in the economy before it can be measured with traditional variables, a dirty indicator in a revenue or expenditure forecast can signal a change in revenue well before revenues are realized. This awareness allows public officials to make adjustments to the budget, avoiding problems, and transforming financial management practices from responsive to dynamic. Had local

---

**Exhibit 1: Box Production and GDP in the United States, 1977-1997**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folded Paper Board Boxes</td>
<td>0.9894</td>
</tr>
<tr>
<td>Corrugated and Solid Fiber Boxes</td>
<td>0.9829</td>
</tr>
<tr>
<td>Gross Private Domestic Investment</td>
<td>0.9729</td>
</tr>
</tbody>
</table>

*Source: Bureau of Economic Analysis’s Historical Industry Accounts Data and National Income and Product Account Tables.*
governments included dirty indicators such as the number of houses for sale by owner in 2007, their budgets could have been adjusted in anticipation of less revenue.

The greatest utility of dirty forecasting to governments comes in the form of increased efficiency. The more information we use in a forecast, the more likely the forecast is to provide an estimate with a high degree of accuracy. The Venn diagram in Exhibit 2 highlights this point. Although traditional forecasting measures such as income, population, and previously observed revenues do provide a degree of explanation (represented as $a$ in the figure), they do not explain revenue fully. The more variables we include, the more we are able to explain. This additional explanation is represented as $b$ in the figure. Ultimately, a more efficient financial process allows government officials to either reduce the tax burden placed on residents or to fund more programs and services.

**FINDING THE RIGHT MEASURES**

The newness of dirty forecasting does present a problem for governments that want to include such measures. There is little research on what indicators matter and which ones do not. But this does not mean the indicators are impossible, or even difficult, to find. Because dirty indicators are about behavior, they pick up the unique aspects of the local community. Thus, finding the right indicators for a governmental forecast begins with a review of the community. There are two key considerations in the community review: the unifying features of the community and the features that define its individuals.

Start with the unifying features of the community by asking what defines the community and what brings everyone together. Engagement with or change in these unifying features often coincides with a change in demand for government services. A great example of a unifying feature is often a professional or university sports team. For example, Leon County, Florida, is not only home to the state capital, the City of Tallahassee, but also Florida State University. Although the Florida State football team has experienced fluctuations in its success, the team is central to what it means to be from Leon County. The football team is so important to the community that the expenditures of the sheriff’s department are tied to the team’s success. When the Seminoles have performed well, expenditures have tended to increase, and when they have underperformed, expenditures have tended to decrease (with a correlation of 0.59).

The second stage of the community review is to consider the features or aspects that define the people within the community. A change in people’s behavior is often representative of a broader problem in the community or an expectation of a future economic change. Although indicators are about the individual communities, a number of examples are more widespread, including the frequency of garage sales and community fundraisers. Both are linked to the financial position of households. When the frequency of garage sales increases, the household’s position is weakening. Alternatively, when the household is in a strong position, citizens are more likely to contribute to community and non-profit organizations. A similar relationship is seen in the frequency
of visits to pawnshops. Although these are measures relating to the financial position of the household, they also provide insight into the expected tax revenue. Other examples include how individuals choose to sell their vehicles and houses, and the types of restaurants they frequent. Are they trading in the car or relying on a realtor, or is the item for sale by owner? Are people going to restaurants with fine dining, or have they changed to more casual atmospheres? These changes can represent expectations about future prospects. For governments, they can also mean future needs for social services and future declines in revenue.

CONCLUSIONS

Researchers and professional organizations have dedicated tremendous amounts of time and resources to improving the forecasting process. These efforts have not been in vain; the tools that are available to assist public officials in estimating future revenues and expenditures are better than ever, providing better and more accurate predictions. Dirty forecasting is one such effort. Although unconventional, this approach represents a simple and cost-efficient tool for improving the budget process. I

BRUCE D. MCDONALD III is an assistant professor of public administration at Indiana University - South Bend and a graduate of the London School of Economics and Florida State University’s Askew School of Public Administration and Policy.