Welcome
Welcome to Trends, the e-newsletter from Business Forecast Systems. Trends puts more than two decades worth of forecasting knowledge, experience and expertise at your fingertips every other month. Watch this space for tips & techniques, information & insight, observations & opinions and more. Thanks for reading!

Forecasting 101: Dynamic Regression: What Is It and When Should I Use It?
Dynamic regression models allow you to incorporate causal factors such as prices, promotions and economic indicators into your forecasts. A well-specified model offers insights into your data and may yield more accurate forecasts than alternative forecasting methods. This article overviews how dynamic regression works, describes how the models are constructed and discusses when the models should and should not be applied.

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You Can Forecast New Products
Knowing that on average new product forecast accuracy hovers at only 50%, many forecasters shy away from putting significant effort into forecasting new products. In this article, Professor Ken Kahn of the University of Tennessee explains that these challenges can be overcome by deploying a systematic approach that addresses the issues specific to new product forecasting.

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Forecast Accuracy: Trends 30-Second Survey Results
The last issue of Trends featured the debut of the 30-Second Survey with a survey on forecast accuracy. This quick and easy survey delivers practical and interesting insights into important forecasting topics. In this issue we report the results on how forecast accuracy goals are set and which metrics are used for tracking accuracy. Downloadable slides, including a listing of additional resources, are also provided.

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Forecast Pro Tips & Tricks: Establishing a Collaborative Process Using Forecast Pro Unlimited and Forecast Pro Unlimited Collaborator

In many cases, better forecasts result when the forecasting process combines statistical forecasts and judgmental adjustments (or overrides). The underlying assumption is that all of future demand cannot be captured by looking at history alone. Forecast Pro Unlimited and Forecast Pro Unlimited Collaborator are companion products designed to support structured collaborative forecasting. This article details how the two support collaborative forecasting processes and presents some of the risks inherent when spreadsheets are instead used.

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Lighter Side

It is far better to foresee even without certainty than not to foresee at all.
-Henri Poincare

I recommend that our “super awesome” forecast be revised to just plain “awesome”

The Forecasting Summit
Forecasting Summit offers a unique combination of education, discussion, instruction and perspectives on business forecasting for practitioners.

Forecasting Summit 2007
February 12-14, 2007
Orlando, Florida USA

Forecast Pro Appearances
Look for Forecast Pro at the following events.

Engage 2007
Exact Software User Conference
March 11-14, 2007
Dallas, TX

International Symposium on Forecasting
June 24-27, 2007
New York City, NY

Feedback
We at Trends value your feedback. Please feel free to send us your comments, questions or requests at newsletter@forecastpro.com.
I do not wish to be contacted by BFS for any future emailing. Please update my email address.
Forecasting 101: Dynamic Regression: What Is It and When Should I Use It?

Dynamic regression models allow you to incorporate causal factors such as prices, promotions and economic indicators into your forecasts. The models combine standard OLS regression (as offered in Excel) with the ability to use dynamic terms to capture trend, seasonality and time-phased relationships between variables. The result is a model that will forecast more accurately than straight time series approaches when explanatory variables are driving the demand for your products or services and certain other conditions are met.

A well-specified dynamic regression model lends considerable insight into relationships between variables and allows for “what if” scenarios. For instance, let’s say that your dynamic regression model includes price as an explanatory variable. By quantifying the relationship between sales and price, the model allows you to create forecasts under varying price scenarios. “What if we raise the price?” “What if we lower it?” Generating these alternative forecasts can help you to determine an effective pricing strategy.

The “what if” analysis described above hints at the biggest drawback to using dynamic regression. A well-specified dynamic regression model captures the relationship between the dependent variable (the one you wish to forecast) and one or more independent variables. In order to generate a forecast, you must supply forecasts for your independent variables. If these independent variables are under your control (e.g., prices, promotions, etc.) or if they are leading indicators, this may not be a big issue. If, however, your independent variables are not under your control (e.g., weather, interest rates, price of materials, competitive offerings, etc.) then you need to keep in mind that poor forecasts for the independent variables will lead to poor forecasts for the dependent variable.
Forecast Pro offers dynamic regression, where explanatory variables and dynamic terms that capture trend, seasonality and time-phased relationships between variables are combined. The Forecast Pro expert system’s self-interpreting hypothesis tests and other diagnostics help guide you through the model building process.

The Model Building Process
Most of the forecasting methods in Forecast Pro can be highly automated, where the Forecast Pro expert system performs various statistical tests and then selects and builds the final model. Regression is a bit different. It is the one method in Forecast Pro where knowledge of the technique and experience building the models is quite useful. (BFS offers several excellent opportunities to learn more about the theory and application of dynamic regression. Please see the links at the end of this article.) Building a dynamic regression model is generally an iterative procedure, whereby you begin with an initial model and experiment with adding or removing independent variables and dynamic terms until you arrive upon an acceptable model. Forecast Pro provides a complete range of self-interpreting hypothesis tests and other diagnostics to help guide you through the process.

Conclusion
Dynamic regression is a powerful forecasting technique that allows you to incorporate the impact of explanatory variables into your forecasts. In addition to generating a forecast, a well-specified model can provide considerable insight into relationships between variables and allow for “what if” modeling. If demand for your products or services is driven by causal variables and you can obtain historical data and reliable forecasts for these variables, you should consider using dynamic regression.

Additional Resources
The one-day pre-conference workshop, An Introduction to Regression-Based Forecasting, will be presented prior to the Forecasting Summit on February 12, 2007 in Orlando, Florida. Click here to learn more.

The Forecasting Seminar track at Forecasting Summit offers instruction in business forecasting methods, including time series and regression modeling. Click here to learn more.

About the author:
Eric Stellwagen is Vice President and co-founder of Business Forecast Systems, Inc. (BFS) and co-author of the Forecast Pro software product line. He咨询s widely in the area of practical business forecasting—spending 20-30 days a year presenting workshops on the subject—and frequently addresses professional groups such as the University of Tennessee’s Sales
Forecasting Management Forum, APICS and the Institute for Business Forecasting. Recognized as a leading expert in the field, he has worked with numerous firms including Coca-Cola, Procter & Gamble, Merck, Blue Cross Blue Shield, Nabisco, Owens-Corning and Verizon, and is currently serving on the board of directors of the International Institute of Forecasters (IIF).
Compared to the forecasting of ongoing product demand and sales, new product forecasting receives considerably less attention, as is reflected in the number of publications found on the respective topics. Those publications that do address new product forecasting predominantly focus on statistically sophisticated techniques. This portrays new product forecasting as a potentially mysterious endeavor—which it is not.

New product forecasting is certainly difficult due to the unique challenges connected to the new product forecasting endeavor. For example, new product forecasts contend with high degrees of uncertainty that result in new product forecast accuracy being, on average, slightly above 50%. Compare this to research that suggests forecast accuracy of current products to be between 70% and 85% on average at the product level.

Time management is a second major challenge. When forecasting existing products, one can usually run a forecasting engine embedded within a company’s production planning software. In contrast, forecasting a new product requires more manual attention, and thus, considerable time and resources. The additional time required to develop a new product forecast may be prohibitive, particularly if a forecaster is responsible for a product mix of thousand of items. Less available time means less thinking on inherent new product forecasting issues such as:

- **draw** (the percent of a new product’s volume coming from products within a product category);
- **cannibalization** (the percent of a new product’s volume coming from the company’s own existing products);
- **category growth** (the percent of a new product’s volume coming from new category buyers who enter the category to purchase the new product); and
- **category expansion** (the percent of a new product’s volume coming from increased category consumption among current category buyers where the purchase of the new product is incremental volume for the buyer).

A third challenge is the amalgamation of assumptions on which new product forecasts are based. This mandates that managers recognize new product forecasting as a process of assumptions management, where assumptions are systematically generated, translated and tracked. Failure to approach new product forecasting with a mindset towards new product forecasting as assumptions management results in a greater tendency for erroneous new product forecasts. Assumptions which are not regularly documented and tracked for consistency can meander, can be easily manipulated and are more susceptible to company politics.

While the challenges may appear to be daunting—high forecast accuracy is never assured, time is a limited resource and a myriad of assumptions may persist—employing a systematic new product forecasting approach can “demystify” the new product forecasting endeavor and force focus on those new products and issues deserving of attention. A systematic new product forecasting approach includes the establishment of a new product forecasting process that dovetails with the existing sales forecasting process and the Sales and Operations Planning (S&OP) process; the assignment of specific roles and responsibilities for new product forecasting-related tasks; and the delineation, revisiting, and tracking of new product forecasting assumptions that underlie the new product forecast. By systematically approaching new product forecasting as a process, a company will attend to the right issues initially, manifest more accurate new product forecasts, and optimize one’s time in generating this forecast.

These benefits highlight the need to take a practical, systematic approach to new product forecasting and acknowledge a process approach for proper new product forecasting. In short, careful consideration, understanding and systematic persistence will create a new product forecasting endeavor that is laudable and meaningful for the business.
Additional Resources
Dr. Kahn’s one-day pre-conference workshop, *New Product Forecasting Tips and Tools*, will be presented on February 12, 2007 at the Forecasting Summit in Orlando, FL. [click here](#) to learn more.

Click here to download the overview slides from Dr. Kahn’s upcoming workshop.

About the Author
Kenneth B. Kahn, Ph.D. is a Stokely Scholar and an Associate Professor of Marketing in the Department of Marketing and Logistics at the University of Tennessee. His teaching and research interests concern product development, product management, and new product forecasting. He has published numerous articles, authored the books *Product Planning Essentials* (Sage Publications 2000) and *New Product Forecasting: An Applied Approach* (M.E. Sharpe 2006), and is editor of the *Product Development and Management Association (PDMA) Handbook on New Product Development* (2nd Edition) (Wiley and Sons 2004).

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Forecast Accuracy: *Trends* 30-Second Survey Results

Many thanks to those of you who took the time to fill out the survey. For those who did not fill out the survey but find value in the results, please consider adding your input to future surveys.

Based on reader response we intend to make the 30-Second Survey an ongoing feature in *Trends*. The forecast accuracy survey asked four questions; seventy-seven surveys were completed. The questions were:

- Does your organization formally track forecast accuracy?
- If yes, do you have a target/goal for forecast accuracy?
- If you have a target/goal for forecast accuracy, how is it set?
- What accuracy measure do you use?

83% of those who responded do formally track forecast accuracy. However, of those who formally track forecast accuracy, only 79% had an accuracy target or goal. Further insights into this result are reflected in comments, which suggest that for some, the forecast is the “plan” and is part of the budgeting process as opposed to demand or supply chain planning. As one respondent noted, “We track our sales revenue against forecast, but I don’t know that we have a goal for accuracy other than 100%.”

The ways that forecast accuracy targets are set prove to be diverse, although the single most prevalent way is a management-dictated target. The breakdown of responses is as follows:

**How is your target/goal for forecast accuracy set?**

Management dictates target: 41%
Many of the comments by those selecting “Other” indicated that they placed focus on improvement. For instance, one responded, “better than last year,” another said, “continuous improvement.” A third wrote, “Based on improvement over prior year,” noting that they were, “working on forecastability measures.” These comments indicate that perhaps a good place to begin when tackling the issue of forecast accuracy goals is to answer the simple question: *Did I do better this forecast cycle than last forecast cycle?*

A couple of responses included improvement as an element along with a quantitative target. One indicated, “Industry benchmarks with stretch goals,” while another wrote, “combination of forecastability and analyst's performance goals.”

With respect to accuracy measures used, an overwhelming majority of those who responded use some form of percentage measure as opposed to a unit measure. 89% used either MAPE (Mean Absolute Percent Error), WMAPE (Weighted Mean Absolute Percent Error) or Acceptability Range (+/- X%). One respondent also noted that measures such as MAPE and WMAPE are actually error measures, stating, “We use (1-MAPE) to report an ‘accuracy’ percentage.”

The comments from the open-ended response section at the end of the survey seemed to further underscore that forecasters need to look at forecasting accuracy measurement and evaluation as an ongoing process with room for continuous improvement. Several respondents brought up the topic of bias, noting that they were either already tracking bias or that their focus and efforts had led them to conclude that additional accuracy improvement opportunities exist around forecast bias measurement and tracking.

One respondent also asked about where to find additional resources. A list of resources (including where you can find some great PDF articles and research) is included at the end of the downloadable 30-Second Survey slide set.

Click here to download the survey slides as a PowerPoint slideshow.
Click here to download the survey slides as a PDF document.

In addition, BFS offers excellent forecasting education events like the Forecasting Summit and our Forecasting Seminar where topics such as forecast accuracy and much more are addressed.
Forecast Pro Tips & Tricks: Establishing a Collaborative Forecasting Process Using Forecast Pro Unlimited and Forecast Pro Unlimited Collaborator

In many cases, better forecasts result when the forecasting process combines statistical forecasts and judgmental adjustments (or overrides) from multiple sources. The underlying assumption is that all of future demand cannot be captured by looking at history alone, and that quantitative analysis and qualitative analysis each add value to the final forecast.

From a Spreadsheet World

Forecasters who use Excel often describe a forecasting approach where simplistic analysis of historical data is the first step. When asked to describe their “models”, a common response goes something like: “my spreadsheet contains historical data (e.g., most recent 12 months, most recent 52 weeks) and I have a formula that establishes the initial forecast by looking at demand in the last few periods and at demand last-year-same-period.” Often, the description continues with qualifying statements such as “then I massage the numbers,” or “after that, I create a report for management review,” or “then a spreadsheet with my numbers goes to sales and marketing for their input.”

Excel is a powerful, flexible tool that is certainly appropriate for many types of analysis. However, when applied to forecasting, it often fosters ad hoc processes that rely on widely varying formulas and large, unwieldy spreadsheets full of potential shortcomings and risks. Indeed, many corporations who forecast using Excel are quick to lament that their spreadsheet-based forecasting process is extremely complex and has become the sole domain of the individuals who developed it, making it difficult or even impossible to maintain, understand and transfer as the business (and its forecasting staff) changes.

Standardized Approaches and Tools
Forecast Pro Unlimited and Forecast Pro Unlimited Collaborator provide a backbone for forecasting processes where: a) all members of the forecasting team use the same objective, explainable and replicable set of methods and models for analyzing historical data and establishing the “baseline” forecast, b) all those involved in the process, regardless of their roles, work within a common framework and user interface and c) judgmental adjustments are made transparently with underlying assumptions clearly documented.

Typically, the forecasting team is organized such that certain individuals have hands-on responsibility for generating the statistical forecasts and others have hands-on responsibility for forecast review, adjustments and overrides. When Forecast Pro Unlimited and Forecast Pro Unlimited Collaborator are used together in a workgroup, the “forecasters” use Forecast Pro Unlimited and the “reviewers” use Forecast Pro Unlimited Collaborator. The only real difference between the two products is that the Collaborator cannot generate the statistical forecasts.
Typically, the forecasting process operates as follows:

Step 1: **Generate a statistical forecast in **Forecast Pro Unlimited, using the most up-to-date historical demand data as the input. This initial forecast is sometimes referred to as the “baseline forecast.” The statistical forecast captures important demand patterns like *level, trend and seasonality*. This forecast can be generated completely automatically, where the Forecast Pro Unlimited Expert System makes all of the decisions on the forecast model, or alternatively, the forecast analyst can take a more hands-on approach, opting for top-down forecasting, promotional modeling, indexing, etc.

Step 2: **Pass the baseline forecast to those in your organization whose role is to review the forecast and add their domain knowledge. These individuals use Forecast Pro Unlimited Collaborator.**

Collaborator users don’t develop the baseline forecast. They receive it from the forecaster in the form of a “Forecast Document”. The Collaborator user reviews the statistical forecast and answers the question: “Where should we deviate from the statistical forecast and why?” Perhaps sales knows that a major customer is expanding rapidly. Maybe marketing is significantly stepping-up promotional activities in specific product lines. Upper management could be pursuing an aggressive acquisition strategy. Operations may know about key raw material shortages, etc.

Step 3: **Submit the (agreed upon) “Final Forecast”, which is the combined statistical forecast plus overrides.**
The above screen shots show a primary view found in both Forecast Pro Unlimited and Forecast Pro Unlimited Collaborator. A graph window displays historical data and forecasts. A text window displays pertinent information about models and forecasts. A “Navigator” window provides drill-down through various levels of a data hierarchy.

Although it may seem convenient to use Excel for forecasting—it’s on everybody’s desktop, users are already comfortable with it, most can move data back and forth between Excel and their corporate ERP with relative ease—it’s extremely important that managers also understand and recognize the limitations and downside inherent in spreadsheet forecasting. In the spreadsheet environment, forecasters too often end up working in relative isolation, using complex spreadsheets and ad hoc “models” to analyze history and generate forecasts which are then “tweaked” with by various stakeholders with little or no documentation of underlying assumptions.

One solution is to jump to large-scale demand planning or supply chain planning systems. However, this is a major corporate undertaking where $100K+ price tags and six to twelve month implementations are the norm. Forecast Pro Unlimited and Forecast Pro Unlimited Collaborator offer a measured next step from the spreadsheet forecasting world. For modest sized workgroups looking to improve and standardize the way they analyze history and generate a baseline forecast, and to formalize and document how domain knowledge and judgment are incorporated into the forecast, the Forecast Pro Unlimited-Forecast Pro Unlimited Collaborator solution is the right choice.

Click here to download the Forecast Pro demo, which includes a demo of Forecast Pro Unlimited and Forecast Pro Unlimited Collaborator.
Make the choice: Standardized and transferable forecasting methods and tools with visibility into assumptions vs. ad hoc, difficult to maintain spreadsheet approaches.

It should be noted that those who are not working in a team environment, and who are solely responsible for creating the statistical forecasts plus overrides/adjustments, can do so in Forecast Pro Unlimited. In addition to a full range of statistical modeling capabilities, Forecast Pro Unlimited contains all of the override functionality contained in Collaborator.