

SEEING AROUND THE BEND

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IN BRIEF

Cash forecasting is a key corporate process, but one that many firms fail to carry out effectively. This article identifies some of the fundamental forecasting techniques that can be used singly or in combination to allow a firm to see not only 'down the road' but also 'round the bend'.

There are three principal methodologies which are explained in outline. One of the most common is forecasting receipts and disbursements, which requires detailed knowledge of all cash inflows and outflows. Statistical techniques – time series methods and regression models – are more complex but are powerful and accurate. The final method considered here is the balance sheet approach which is based on the fundamental accounting principle of 'assets = liabilities + shareholders' equity'.

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CASH forecasting is a process that most companies recognise as important, but far too many fail to embrace. The reasons for this are numerous. Some companies don't know how to develop an effective process. Others do not have sufficient (or capable) resources to manage the process. Sometimes obstacles to the forecasting process are the blame. These include complex cash management structures, decentralised domestic and/or global operations and disjointed information systems. These factors discourage companies from devoting the necessary time and effort to forecasting, or cause them to accept inferior processes that fall short of

their objectives. At best, these ineffective tools and processes may provide limited benefits – 'a view down the road, but not around the bend'.

A number of fundamental forecasting techniques are available that can be used with common computer software and minimal staffing, to create an effective, yet manageable cash forecasting process. These techniques can be used independently, or in combination to provide effective forecasting that will allow a firm to 'see around the bend'.

Before you select an approach and design the process, it is important to define how the forecast will be used. Some companies are only interested in projecting 'book'

cash balances at specific points in time, usually coinciding with financial statement dates. Other companies want to project 'bank' cash balances on a daily basis, so as to facilitate more effective liquidity management decisions (i.e. positioning of debt/investment maturities). An occasional firm may choose to forecast cash for both purposes. While a number of forecasting techniques would work under each of these scenarios, certain methodologies are better suited for daily forecasting, and others for predicting balance sheet cash levels. Accordingly, once the purpose of the forecast is defined, a decision can then be made as to the methodology.

Selecting the technique

Traditional cash forecasting techniques usually follow one of three broad methodologies: 1) the receipts and disbursements approach, 2) statistical techniques and 3) the balance sheet approach.

While each of the three methodologies has unique qualities, they all share a number of common characteristics. All rely on historical data as a key input to the forecasting process. They all utilise variables representing inflows and outflows as the basis for determining the 'predicted variable', cash. All require consistency and discipline in

how they are managed and executed. All require a rigorous process of review and assessment to ensure continuous improvement in forecast accuracy (through forecast-to-actual comparisons). All three methods rely on high-quality raw data. Regardless of the method, each technique is only as accurate as the least accurate raw data input used (many forecasting processes fail because of this – ‘garbage in, garbage out’). Finally, if applied properly and consistently, each method is capable of providing accurate results.

Receipts and disbursements approach

One of the most common methods used to forecast cash is the receipts and disbursements approach. The approach follows a simple process of constructing a timeline depicting known and estimated cash inflows and outflows. This can be easily maintained using common spreadsheet software (e.g. Excel). The timeline may represent any period – a week, a month, a year. Many firms produce a 12-month rolling forecast of daily activity, based on the receipts and disbursements approach.

This approach requires a detailed understanding of all the types of cash inflows and outflows, which in aggregate comprise an organisation’s bank cash balances. As this approach is intended to identify daily change in bank cash, we are only concerned with items that have cleared the bank (e.g. cheques paid vs. cheques issued). Common inflows consist of cash receipts/deposits, lockbox collections, electronic transfers, credit card activity, foreign exchange receipts, debt/investment interest and principal activity, refunds, etc. Cash outflows represent any

outgoing payments by currency, cheque or electronic transfer (payroll, accounts payable, debt/investment activity, etc.).

Once all of the cash flow categories are identified, they should be divided between known activity (scheduled to be paid or received on a specific date for a specific amount), and unknown in terms of timing and/or amount. The known activity is entered into the timeline spreadsheet. The unknown activity must be estimated.

There are a variety of methods that can be used to estimate the unknown activity, ranging from simple averaging to statistical estimation through regression or time series models (which will be discussed in depth under statistical techniques). The selection of a technique will be largely based on the degree of variability in the data. A simple way to measure variability in the data is to graph a comparative sample of the historical data points. If for example you are examining daily accounts payable disbursements, you should examine all payments made on a daily basis and graph the data to see if any patterns emerge. You may find that a specific day of the week represents a higher proportion of cash outflows than others. These variations may be present on a weekly basis, monthly basis, or may represent a seasonal pattern. As you look at the data over a multi-year period, you will be able to identify growth rates, as well as seasonal patterns. At a minimum, you should review enough historical data so that you are able to compare three recurring sample elements for each variable being projected. For example, if you are developing a 12-month daily forecast, you will need to compare three years of historical daily data (i.e., each year has 52 Mondays to compare, 52 Tuesdays, etc.). While seemingly excessive, this amount

of information will aid in the identification of data variability and meet the minimum historical data requirements of time series and statistical models.

If the data are found to be relatively stable, with minimal seasonality, they may be estimated through simple mean averaging. If the data are unstable or contain seasonality, they should be smoothed and/or seasonally adjusted before any attempt is made to forecast (see statistical techniques). Once the unknown variables are adjusted and projected, they too are dropped into the timeline spreadsheet and the forecast is completed.

The receipts and disbursement forecasting technique offers users the ability to project cash balances on a daily basis. This level of forecast detail aids the liquidity management process and helps basic cash management and planning. Better financial decisions can be made with regard to the timing of debt/investment maturities, cash transfers, cash repatriation, and other cash related activities. Depending upon the extent of variability in the data, the approach may require more work to establish and maintain than some other techniques. When first establishing the process, this approach relies more heavily on consistent, historical data. Actual-to-forecast review and comparisons require more time, given the higher number of variables involved. However, when set up and maintained properly, this technique is capable of producing very accurate results that can be continuously improved through ongoing forecast-to-actual comparisons.

Statistical techniques

There are numerous methods that could be classified as

‘statistical techniques for forecasting’. For purposes of this discussion, we will focus on two types: time series methods and regression models.

Time series techniques focus on predicting or measuring a response in a variable over some span of time. Time series data is often described as being a compilation of four primary component series: long-term trend, cyclical effect, seasonality and random variation (noise). The trend represents the general direction of the data. Cyclical effect is a wave-like upward or downward movement around the trend that is often the result of longer-term influences such as demand. Seasonality represents upward or downward shifts in the data at recurring points in time (e.g. increased sales of fans during the summer). Smaller, unexplained spikes in the data are defined as random variation or ‘noise’.

Time series adjustment techniques are valuable in forecasting as they provide a means to smooth or remove some of the effects that would otherwise cloud the direction or meaning of the data under review (e.g. seasonality or pronounced trends). The most common adjustment techniques rely on moving averages to accomplish the required smoothing.

Moving average techniques simply compute a mean average of a defined number of historical data elements in a time series. The averaging range shifts by one period each time the average calculation is performed, thus explaining why the technique is called ‘moving average’. A more elaborate technique, the ratio-to-moving average method, was developed by the National Bureau of Economic Research in 1922. This technique applies a two-step moving average process to smooth the data, and then produce seasonal indices for each recurring time element (e.g. a factor representing the

degree of seasonality for July data). Once seasonally adjusted (smoothed), the data is projected using simple mean averages or other basic forecasting techniques. The forecasted results are then multiplied by the respective seasonal index to re-introduce the seasonal component to the forecast. This technique is simple to use and is extremely effective in adjusting for seasonality.

Other smoothing techniques include exponential smoothing and first and second order differences. Exponential smoothing is a forecasting technique that allows the user to apply a smoothing factor or 'constant' to designate how much importance to place on past forecast versus actual results, in determining the next forecast value.

First and second order differences apply moving averages to the differences and 'differences of differences' in time series data to smooth pronounced trends. For example, June data would be compared to May data, and May to April, etc. to identify first order differences. These differences can then be compared to each other. Through a simple formula, second order differences are averaged and used in projecting forecast values (with the trend re-applied).

Finally, regression techniques are another tool used to aid the forecasting process. A variety of regression techniques are available to help define the relationship between independent variables and the dependent variable (cash). These techniques range from basic linear regression models to multiple regression techniques. Most can be performed using basic spreadsheet software (e.g. Excel). The value of these techniques comes from the statistical measures available to define confidence levels and to measure data correlation. These tools are powerful and accurate.

However, they require an understanding of statistics from both the party preparing the forecast and from their constituents.

Balance sheet approach

The balance sheet approach is a forecasting method based on the fundamental accounting principal 'assets = liabilities + shareholders' equity'. The technique followed is to construct a pro forma balance sheet using knowledge of past balance sheet line items (e.g. inventory, A/R, A/P, etc.), and future expectations. All line items in the pro forma balance sheet are populated except for cash. The cash figure represents the plug that is used to bring the pro forma template into 'balance' (i.e. assets = liabilities + shareholders' equity). As this represents 'book' cash on the financial statements, it does not reflect cash in the bank accounts, or 'investable' cash. Timing and reconciliation differences explain the variance between book and bank cash balances.

This method of forecasting has proved very effective for firms interested only in estimating cash balances at balance sheet dates. As a result of the consistency required by Generally Accepted Accounting Principles, a firm's balance sheet usually remains fairly constant from one period to the next, at least in terms of specific line item composition. To the extent that line items must be estimated, significant historical data exists on which to base projections. Because of the discipline required of the accounting process, past data is consistent and accurate. Furthermore, internal knowledge of balance sheet line item composition is typically very strong. While most line

items experience minimal change from one quarter to the next, some change is to be expected. The lines that usually vary the most are inventory, accounts receivable and accounts payable. These components are often forecasted using budgeted levels or ratio expectations (days sales outstanding, inventory turns, days payables outstanding) with such information coming from the departments responsible for achieving the targeted goals.

The balance sheet approach offers a mechanism for projecting cash at specific dates. The technique also makes variance analysis very simple, since a standardised format is used by both the forecast and the actual balance sheet. As most firms do not maintain 'perpetual' balance sheets, this technique is not feasible for companies wanting to project cash levels on a daily basis. Furthermore, new organisations, or those experiencing significant, material changes (e.g. mergers, acquisitions, divestitures) would have less success with this forecasting technique, as it requires consistency to be effective.

I have provided a high level overview of the forecasting options available today. While I realise that I have only scratched the surface on this topic, I am hopeful that I have demonstrated that forecasting is something that every firm can and should do. Whether your firm requires projections to enhance liquidity management decisions, or your need is to project a balance sheet position at a future date, forecasting techniques are available to help you. Using basic techniques and simple tools (already available at most companies), very effective forecasting models can be developed and maintained. Using these techniques it is possible to see 'down the road and around the bend'. □

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