Profiting from prediction bias

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While nobody expects all forecasts to be perfectly accurate, could we learn more from paying closer attention to how and why they go wrong?

Financial forecasting is critical to the success of any business. In addition to providing a view of the future, forecasting also helps guide present day-to-day operations, shaping strategy, defining financing alternatives and determining earnings guidance. Ultimately, these factors exert considerable influence on a company's stock price, both directly and indirectly.

As such, managers have a strong incentive to develop multi-year forecasts as accurately as possible. However, could a company benefit even more by deliberately biasing their best-estimate projections, to make them less accurate?

Christopher S. Armstrong (Stanford Graduate School of Business), George Foster (Stanford Graduate School of Business), John R. M. Hand (Kenan-Flagler Business School of the University of North Carolina) and IESE's Antonio Dávila, professor of accounting and control and entrepreneurship, examined short- and long-range forecasts from firms across a range of industries, looking for predictable patterns of forecast bias. Their study, "Biases in Multi-Year Management Financial Forecasts: Evidence from Private Venture-Backed U.S. Companies," revealed that firms can, and often do, bias forecasts; moreover, firms use negative biases strategically as well as positive ones.

Forecasting bias was found to be strongest when accompanied by two factors: forecast time horizon and the nature of a firm's assets.

Breakthrough: Measuring time horizon

Previous research on forecasting has been limited to short-term forecasts, since long-term financial projections are not widely available. Even though exchange-listed companies typically have long-range forecasts, this information is kept for internal use, and rarely made public for more than one or two years into the future.

The breakthrough in this research is partially due to an innovative approach examining this problem. By focusing exclusively on privately held companies, it was possible to gain access to longer financial forecasts from a range of industries, using data from VentureOne, a database of information on companies seeking venture capital funding.

Conventional wisdom suggests that entrepreneurs are hard-wired to be highly optimistic and risk seeking. Previous research confirmed this characterization but stopped short of observing whether the degree and outcome differed by time horizon, and the impact on performance forecasts.

Not surprisingly, this study arrived at the same conclusion, but drew different implications from the details as to how this occurs.

Overall, profit expectations are typically optimistic and increasingly more positively biased as time horizons extend forward. One-year forecasts were found to overstate profits by an average of 35 percent, while three- and five-year projections were 67 percent and 122 percent too high, respectively.

At first glance, this would seem to indicate a simple linear trend. However, a more detailed examination of revenues and expenses reveals a more complex story, and provides hints at motivations underlying this bias.

Why project lower revenues?

In one-year projections, revenues and expenses are both understated, with expenses lowered significantly, more to create an upward bias in profit expectations. However, in three- and five-year forecasts, revenue and expenses are both overstated. Profits remain inflated in all time horizons, but are driven by revenues in the long term, creating a much stronger bias relative to expenses.

While overstating profits provides a firm with obvious benefits, understanding why a company would project lower revenues in one-year forecasts, and higher expenses looking

further ahead, is not as easy to understand. These curious patterns raise questions about why this occurs, and whether these recurring biases could be the result of strategic behavior. A strong argument can be made that each of th
ese biases is opportunistic and deliberate, to benefit the firm optimally at each stage.

In the short-run, understated expenses help provide prospective investors with a favorable view of a firm's current cash burn. In addition to telling a conservative story by minimizing risk, this also creates the additional benefit of emphasizing a need for new capital injections to increase revenues from modest projections.

In longer time horizons, a different motivation takes over: the need to secure additional rounds of venture financing. The higher a firm's net income, over a long-time horizon, the more attractive a firm will be to prospective venture capital investors. This also creates a compelling story, opening opportunities for raising capital through equity markets as well.

Bias depends on assets

A second factor corresponding with bias in financial forecasts is the nature of a firm's assets. Irrespective of time horizon, financial forecasts are far more likely to be biased upward when a firm's assets are difficult to value objectively. This occurs most often when a firm's value is largely derived from intangible assets, such as brand names, technology patents, an unusual business model or cutting-edge intellectual capital.

In this situation, investors will have greater difficulty valuing these intangible assets, since they typically lack physical substance and do not have liquid secondary markets. This bias takes place most often in certain sectors, such as pharmaceuticals and media, where revenues are driven by complex licensing arrangements, and future levels of success are more difficult to model with limited information available to those outside the firm.

To test this effect, this study compared forecasting accuracy between firms from the retail industry, which sells commodity-type products that are easily valued and benchmarked, and biotechnology firms, which are characterized by large amounts of intangible assets, intellectual property and patents.

Predictably, profit forecast bias in biotechnology firms was eight times larger than in retail firms. Here, bias in profits was driven almost exclusively by differences in projected revenues, with significant differences between intangible-intensive and commodity-based sectors.

One- and five-year revenue forecasts for biotechnology firms were found to be 49 percent and 305 percent optimistic, in dramatic contrast with the figures for retail companies, which had far more conservative forecasts of 41 percent lower in a one-year horizon, and only 3 percent higher looking five years ahead.

Thus, upward bias is common in intangible-intensive firms, where it is more costly and difficult to value assets accurately. This suggests that managers are more likely to bias forecasts when investors cannot detect when information has been misrepresented.

However, even if these patterns are not strategic, the fact that they are predictable is instructive. By understanding these patterns, and the mechanics behind hockey-stick-shaped performance forecasts, venture capital investors can adjust expectations accordingly to bring these biases more in line with reality.