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CFO insights:
Social analytics: Tapping prediction markets for foresight

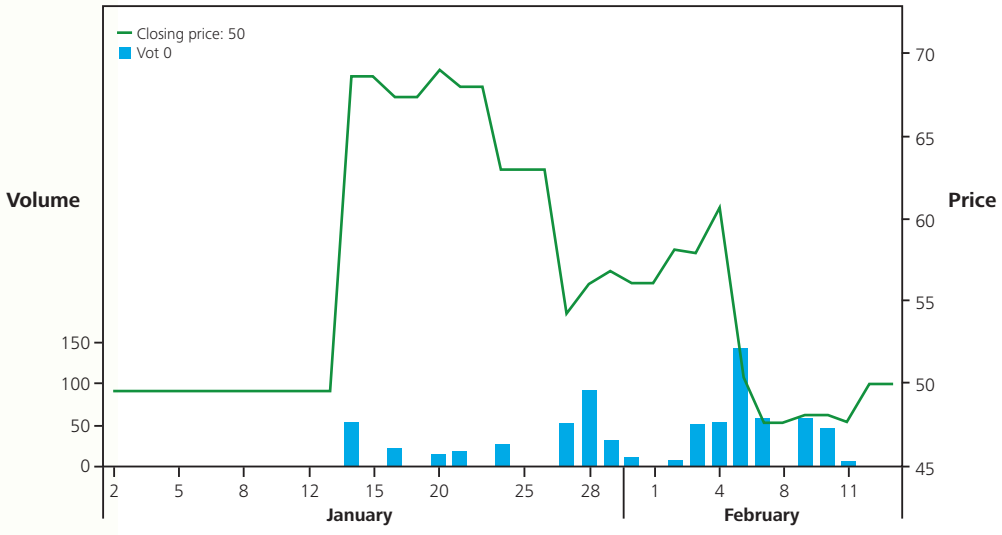
In the coming year, CFOs can be expected to hear a lot about the value of analytics – to convert corporate data and information from hindsight to insight and then, ideally, valuable and actionable foresight. Generally, the two most common approaches to generating foresights are the use of statistics and mathematical models, and the use of machine learning tools such as neural nets and genetic algorithms software to mine existing data and generate predictions. While we may explore these approaches and their business applications to finance in future articles, this paper features an emerging third approach to generating predictions: the use of "social analytics" through prediction markets. Instead of fancy statistics and software, prediction markets tap into the "wisdom of crowds" and the capacity of markets to aggregate beliefs to generate predictions. This article explores how CFOs can use prediction markets as part of their portfolio of decision support tools.

Prediction markets

Prediction markets are online markets that build on the principle that markets serve to aggregate the beliefs of multiple traders to generate a forecast. For example, at any given time, a stock price is the aggregate collective belief of the traders of the company's expected future earnings allocated to the share. Like the stock market serves to assign a price to the future estimated earnings of a stock, "prediction markets" assign a value to a belief about the future or a prediction.

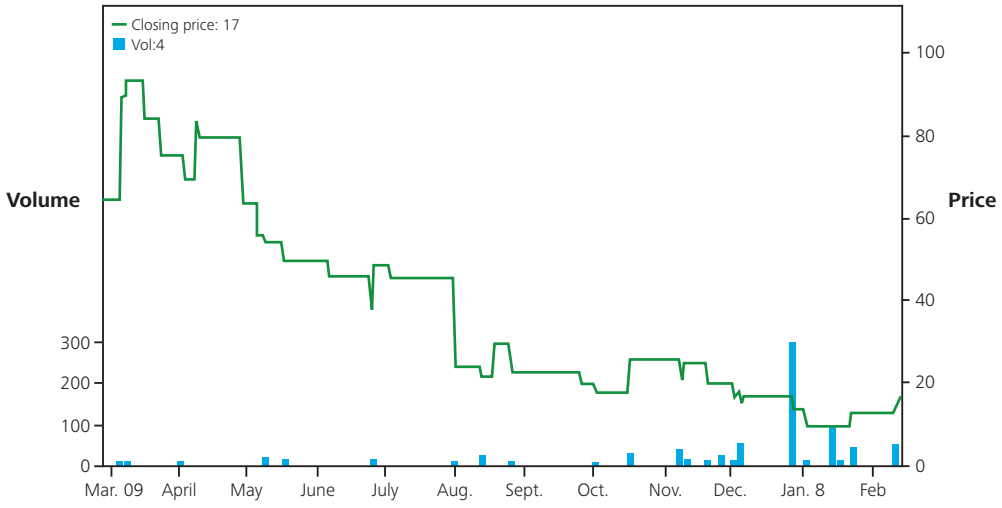
Figure 1 shows screens from Intrade.com, an online prediction market that makes markets in various types of news and other events. The chart illustrates stock futures that the DJIA will trade above 10,000 and shows a closing price of about $50. With a maximum payout of $100, this chart suggests that current traders believe there is approximately a 50% chance, as of February 12, that the

Figure 1. DJIA.DEC10>10,000
Jan. 2, 2010 – Feb. 12, 2010



Source: www.intrade.com

Figure 2. DOW.CLOSE.2010<6500
Feb. 26, 2009 – Feb. 13, 2010



Source: www.intrade.com

DJIA will end the year above 10,000. Similarly, Figure 2 illustrates a 17% probability expectation that the Dow will close below 6500. The direction of the latter chart suggests the markets fears of a melt down below 6500 have progressively declined in the last year.

These simple examples illustrate three valued characteristics of prediction markets versus many other forecasting approaches. First, the trading price of stocks on future events, which pay out a $100 when the event occurs or $0 otherwise, provides a reasonable estimate of what the traders in aggregate believe to be the probability of the event. Second, prediction markets allow dispersed sources of information and insight to be aggregated through the market process to generate a composite market forecast. Effectively, one is able to tap into a vast pool of intelligence and information dispersed amongst many diverse traders to generate a forecast. Third, market traders can continuously adjust the price and hence the probability of the event conditioned to the new market information. This creates a dynamic forecasting and near real-time application that attempts to incorporate all information amongst traders. Thus, dramatic shifts in price and volume can trigger decision makers to further investigate or respond to specific issues that seem to underlie price changes. For example, if the price and trading in a stock "New China Plant Begins Production in June" suddenly drops in value in April, it may be prudent to further investigate whether there are problems in meeting the scheduled start date of the plant. This may be followed by policy actions to remedy delays or to alert investors and analysts about expect delays.

How accurate are these markets? Academic studies show that the performance of prediction markets versus polling on election forecasts is as good as or better than polls.[1] Reviews of various prediction markets, by Justin Wolfers and Eric Zitzewitz, also show that prediction markets perform as well as or better than other forecasting techniques.[2] Prediction markets have also been used in diverse corporate settings and generate useful forecasts to motivate their continued use – but assessments compared to other methods are generally rarely publicly available. Nevertheless, the press to date suggests they are useful for sales forecasting and to forecast the completion times of various projects. Indeed these tools have been deployed at companies like Google, Best Buy, Motorola, and Corning for various forecasting applications.

While we want to tap into the "wisdom of crowds," the events of the Tulip mania to the South Seas Bubble sometimes illustrate the "madness of mobs" in markets. Therefore, market information and forecasts should always be critically reviewed and evaluated.

How can CFOs use prediction markets

CFOs can use prediction markets to reduce uncertainty. Begin by considering the greatest areas of uncertainty that affect your organization. Is it the sales forecasts in a particular business segment? Is it the differences in sales across regions? Is it the cost of a critical resource such as oil? Is it the timely completion of a particular project? Is it uncertainly about whether a project will be within budget; and the variance if it is not?

For each of these types of questions we can generate prediction markets within an organization where the employees trade on different "prediction stocks." The value of this trading is that it creates valuable signals for management that include the probability of different outcomes. It can alert management to take action to remedy potential problems such as a project potentially going off track from a timing and budget perspective.

Typically, the most important forecasts to analysts and investors are expected earnings per share. However, forecasting the next quarter or year's earnings per share may not necessarily be a good application of these markets. A predictive market on that indicator could risk a large group of insider participants having access to privileged information and beliefs before analysts and public investors. This course could create a risk of insider trading or possibly worse.

However, CFOs may use these markets to generate forecasts of variables that can potentially be utilized in other forecasting models. Thus, a prediction market generating sales forecasts in a region or business segment may provide useful input into broader earnings per share forecasting models. The other benefit CFOs can gain from these markets is a sense of uncertainty and volatility in specific variables that may motivate them to take steps to better manage or reduce the uncertainty. These may include entering into long term sales contracts to reduce sales or price variability in a specific region.

What should CFOs consider

The first issue CFOs should consider is the value of resolving a particular uncertainty. Can, for example, knowing the delay of a project enable cost savings or other benefits? Can having better sales forecasts enable the company to confidently pay down debt? Rank-ordering uncertainties that need to be resolved, based on the value of resolution, identifies a priority list of potential prediction market applications.

The second issue to consider is whether prediction markets are the right tool to address a particular uncertainty. If the item to be forecasted, or known drivers that impact the forecast, or both have a time series of historical data available, it may be easier to apply other forecasting techniques such as the use of statistics or machine learning. These techniques do not require the participation of many individuals in the process – unlike a prediction market which requires many traders. Prediction markets are especially suited to situations where there is sparse data otherwise available that may be used to define a forecasting model.

The third issue to consider is the "cost" of prediction markets given that it is a social analytic approach. Prediction markets require multiple participants, and the CFOs using them require multiple traders be recruited and incentivized to participate from within the firm. Fortunately, the traders do not have to trade with real money, and the trading of points that may then be converted to a reward, such as a vacation or an iPod, seems to generate forecasts on par with trading money. The true cost or benefit, in some cases, is the transparency of such a market forecasting system. It makes areas of uncertainty, and issues such as projects going off track, more visible to a wide variety of participants. Again, CFOs using these markets need to decide if the organization desires and benefits from the transparency that these markets drive.

The fourth issue to consider is the availability of the right expertise to design and deploy these markets. The technology is easy and widely available. The design of a program with incentives, recruitment of participants, good forecasting questions, and alignment to a company's culture may not be easy to achieve. While many prediction market vendors are probably too ready to sell you their market and technology as a solution, what is really important is their capacity to support the organizational acceptance of the technology.

Conclusions

Prediction markets are emerging as a valuable forecasting tool in diverse application areas from sales forecasts to project success. This social analytics strategy could potentially help resolve a number of business uncertainties – especially where prior data may be sparse or the situation is so unique that other forecasting tools are less useful. While there are a number of design considerations in these markets, the most critical is whether you want to engage in having multiple participants share in a market process to resolve the uncertainty. While the technology for markets is easy to implement, aggregating a number of traders and involving them in a market process to resolve uncertainty in an organization is more difficult. Thus, the application of these methods to forecasting requires broader leadership and an effective process for organizational buy-in.[3]

Endnotes

[1] *Prediction Market Accuracy in the Long Run*, by JE Berg, FD Nelson, and TA Rietz, International Journal of Forecasting, Volume 24, Issue 2, April-June 2008, Pages 285-300.

[2] Prediction Markets by Justin Wolfers and Eric Zitzewitz, Journal of Economic Perspectives, Volume 18, Number 2, Spring 2004 and *Interpreting Prediction Market Prices as Probabilities,* Justin Wolfers and Eric Zitzewitz, Working Paper, January 2007.

[3] *Making Markets: How firms can Design and Profit from Online Markets and Exchanges,* chapters 3 and 6, Ajit Kambil and Eric van Heck, Harvard Business School Press, June 2002, Winner 2004 Erasmus Research Institute in Management, Best Book Award.

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