This is the last author version. See the final version in Robert W. Kolb's (ed.), *The SAGE Encyclopedia of Business Ethics and Society: 2nd edition*. Sage.

Prediction Markets

Dan Weijers

danweijers@gmail.com

www.danweijers.com

University of Waikato

Prediction markets (also known as information markets, event derivatives, and idea futures) are markets in which shares in predictions about the future are traded. Prediction markets should not be confused with commodities futures markets, in which fixed prices for commodities are locked in now for future purchases on specific dates. While many attributes of prediction markets vary, all prediction markets share the feature that each individual prediction (or market) is binary – upon maturation, every prediction is either true or false – and the price of a share in a prediction tends to be a fairly accurate prediction of the likelihood of the event occurring. Not all prediction markets are businesses, and not all prediction markets include predictions relevant to business, but most prediction markets raise general ethical issues, and some raise specific ethical issues. Of these general and specific ethical issues, those which are relevant to business will be discussed below.

The forms, functions, and general benefits of prediction markets

Prediction markets present traders with a range of predictions (or markets). Traders usually take a position in a market by buying or selling (shorting) shares at the listed prices in a specific prediction. In highly liquid markets, there are many traders, and many positions (offers to sell

and buy shares in the prediction at various prices), so, in successful prediction markets, the buy and sell prices are usually nearly identical. For example, predictit.org is currently running a market on the prediction Hillary Clinton will win the 2016 United States presidential election. In PredictIt's prediction markets, the payout for one share in the correct prediction is $1. Shares agreeing with the prediction are currently selling for $0.62. Traders who believe that the chance of Hillary Clinton being elected president of the United States in 2016 are higher than 62% ($0.62/$1) would consider shares in the prediction to be underpriced, and would likely purchase shares. If a trader purchased 100 shares at $0.62 each ($62), and Hillary Clinton is elected president of the United States, then those shares automatically cash out, providing the trader with $1 per share ($100 in total, a $38 profit). However, if Hillary Clinton is not elected president of the United States in the 2016 presidential election, then the trader will receive a payout of $0 (100 x $0), and the traders with shares in the prediction turning out false would receive $1 per share. At any time, the price of a share in a prediction can also be used as an indicator of how likely the predicted event is to occur. So, according to PredictIt, Hillary Clinton will likely be elected president of the United States in 2016 (62% chance).

While some prediction markets specialize in one kind of prediction (e.g., nadex.com focusses on economic predictions), many run markets on a range of issues, including economics, national politics, international relations, and even science and technology. Individual predictions range from very short-term predictions about the price of gold, to predictions about the likelihood of nuclear attacks in the next year, to long-term predictions about finding extra-terrestrial life. Shares in most prediction markets are traded with money, but some use status points, which, for certain prediction markets, may be used to purchase items or make donations to charities. Early

prediction markets, such as the New York presidential prediction markets in the late 19th and early 20th Centuries, were paper-based, but now, all are electronic. While the most well-known prediction markets are public, most prediction markets are probably internal markets, used by businesses or divisions of businesses for sales forecasting (e.g., Hewlett Packard), ready for market deadline meeting (e.g., Google), or other useful predictions.

From a business's perspective, prediction markets have two functions that might be of great use: offering a form of insurance, and providing accurate information. Given the option of directly lobbying the main candidates, businesses do not need to hedge against (i.e., protect themselves from the financial risk of) Hillary Clinton becoming president of the United States. However, if a change in the relevant laws prevented businesses lobbying politicians, then it might be worth businesses buying shares in predictions of politicians unfriendly to their industry gaining a position of power because it spreads the risk in a way that the worst possible outcome is improved. If the unfriendly politician gets into power, the business will receive a large payout for their shares in the unfriendly politician being elected, helping them compensate for any relevant changes in policy with negative effects on them or their industry. However, if the unfriendly politician is not elected, the money invested in shares is lost, but the legal climate is likely to remain favorable. A more likely use of prediction markets as risk-spreading insurance would be buying shares in the future price of certain commodities, and future values of certain currencies, through a high-volume prediction market like nadex.com. Using a prediction market in this way might be preferable to using a futures market because the commodity or currency that volatility of which is what the business wants to insure against might not be something that the business actually wants to end up owning. Furthermore, the use of futures markets as insurance has been

accused of artificially moving the price of important goods, including foodstuffs, causing market inefficiencies and even failure. However likely it is that using futures markets for insurance negatively affects important primary markets, using prediction markets is likely to have much less of an effect because they are less directly linked to primary markets.

Perhaps even more useful to businesses than insurance, prediction markets also provide information about the likely future price of various commodities, and about other important political, economic, and technology-related events, such as changes in interest rates, laws, and the technological capabilities. Many long-running prediction markets have demonstrated that they are well-calibrated, i.e., they make accurate predictions, e.g., out of every 100 events with a share price of $0.62 and a payout of $1 per share, the predicted events occur about 62 times). The Iowa Electronic Market, a long-running political prediction market in the United States, have been outperforming traditional polls for nearly every year since 1988. Prediction markets tend to produce such accurate predictions because traders are incentivized to trade on their perception of the quality of their opinion, not just whether they have one. The extreme version of this is when a trader knows whether the predicted event will occur because they control whether the event will occur. For example, the governor of a reserve bank will know whether interest rates will go up at a certain time because she has already planned to increase interest rates at that time. This reserve bank governor could buy up all of the available positions in a prediction market without any risk. Other traders with less knowledge about and control over the event might trade with the governor for a short time, but they will soon get the feeling that someone knows more than they do, and doubt the quality of their opinion.

These two general benefits of prediction markets for business, combined with ethical principles in favor of risk-aversion, efficient markets, and freedom of contract, provide the moral background against which specific and general ethical issues with prediction markets should be assessed. Indeed, it seems to be the case that certain kinds of prediction markets or specific predictions are unethical for other reasons.

Some moral issues with prediction markets

The most notable potential general ethical problem with prediction markets is that most of them involve gambling. Online gambling is currently illegal in the United States, and the Commodity Futures Trading Commission has been known to actively pursue overseas prediction markets that attempt to attract custom from the United States. After 12 years in business, and a period of high trading and broad publicity during the 2012 United States presidential election, the Irish prediction market, Intrade.com, ceased operations after receiving threat from the Commodity Futures Trading Commission. However, it is unlikely that Intrade.com, or any other prediction markets, have caused anywhere near the damage that the many state-sanctioned forms of gambling have because the complex nature of prediction markets, and their lack of flashing lights, seems likely to attract a more cautious and wealthy kind of gambler.

Nevertheless, the gambling nature of trades on prediction markets can lead to more troubling ethical issues for specific kinds of predictions. Consider prediction markets with predictions on whether celebrities will be diagnosed with cancer this year, whether a leader of state will be assassinated during her current term in office, or whether there will be famine in a particular country. All of these markets could provide useful information to certain businesses, e.g., movie

producers, arms manufacturers, and aid organizations (respectively). However, all of these markets involve betting on death or other morbid events. The offense and moral outrage caused by prediction markets encouraging traders to bet on death and other morbid events was evident in 2003, when Policy Analysis Market, a planned project to use prediction markets to gather intelligence for guiding United States' foreign policy, including anti-terrorism activities, was brought to the attention of politicians and the public. The predictions on a Policy Analysis Market slide during a press conference, included the assassination of foreign leader Yasser Arafat, and a nuclear attack, and were the target of widespread scorn, being labelled disgusting and morally repugnant. The Policy Analysis Market project was funded by a government agency, until the moral controversy broke, and it was cancelled just days later.

Most prediction markets also allow insider trading. As in the reserve bank governor example above, traders with near-perfect knowledge of or control over various events can easily profit from prediction markets. This might be seen as unfair by the traders with much-less-than-perfect knowledge of the likelihood of the event, and it might violate the rules of the insider-trading traders' workplaces, but it also has great benefits. Prediction markets with insider trading are likely to be much more accurate, perhaps even near-perfectly accurate. Assuming the information generated by the predictions is useful, and very useful when very accurate, any consumers of that information stand to benefit considerably.

However, there is a much more worrying kind of insider trading that can occur in the context of prediction markets – perverse incentives. Specifically, an instance of the endogeneity problem, when some traders have the power to control whether the prediction is satisfied, they might

invest heavily in the market, and then make a different choice about whether the event will occur than they would have if there were not a prediction market on that event. The potential implications of such behavior could be immense. In order to make a few thousand dollars for herself, the reserve bank governor might wait for a quarter longer than was in the country's best interests to change the interest rate. The damage to homeowners, businesses, and others could be widespread enough to weaken the economy for a long time. Consider also a prediction from ipredict.co.nz about what length of sentence a well-known finance company CEO would get for wrongdoings in the buildup to the 2008 financial crisis. If the judge in that case saw the opportunity to make a lot of money from giving an unexpectedly long sentence to the finance company CEO, then the course of justice itself may have been perverted.

Dan Weijers

See also: Commodity Futures Trading Commission (CFTC); Futures and Forward Contracts and Markets; Gambling; Incentives, Perverse; Insider Trading; Insurance; Risk Management;

Further Readings and References

Cowgill, B., Wolfers, J., & Zitzewitz, E. (2009). Using prediction markets to track information flows: Evidence from Google. *Auctions, Market Mechanisms and Their Applications*, Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, Volume 14, 2009, p. 3.

Hanson, R. (2007). The Policy Analysis Market (a thwarted experiment in the use of prediction markets for public policy). *Innovations: Technology, Governance, Globalization*, 2(3), 73-88.

Rhode, P. W., & Strumpf, K. S. (2004). Historical presidential betting markets. *The Journal of Economic Perspectives*, 18(2), 127-141.

Surowiecki, J. (2004). *The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations*. Little and Brown.

Weijers, D. (2013). *Prediction Markets*, Observatory for Responsible Research and Innovation in ICT. Retrieved October 30, 2015, from http://responsible-innovation.org.uk/resource-detail/1181

Wolfers, J., & Zitzewitz, E. (2004). *Prediction markets* (No. w10504). National Bureau of Economic Research. Retrieved October 30, 2015, from http://www.nber.org/papers/w10504