Wisdom of the masses

Andrew Leigh and Justin Wolters look into the future of prediction markets

In 2006, Google decided that it wanted to obtain better forecasts of what it and its competitors were planning to do. As with most companies, better predictions of product launch dates, opening overnight prices and so on are of significant strategic importance to Google. But instead of using the standard approach — forecasting the future by asking designated experts — Google opted to set up a market, in which any Google staff member could bet on the chances of an event coming true, regardless of whether they thought it was likely or not. If they had strong information that an event would come true, then regardless of their personal views, they could bet on that outcome.

The results — based on the aggregated bets of thousands of Google staff members — were strong predictors of the actual outcomes. Where the trading volume was high, the forecasts were even more precise. And as closing time drew closer, the market became steadily more accurate.

This example describes an increasingly important information-aggregation tool, known as “prediction markets.” Analytically, these are markets where participants trade in contracts whose values depend on unknown future events — just as in any financial or betting market. The defining feature of a prediction market is that the price of these contracts can be directly interpreted as a measure of the market’s expectation of some unknown quantity.

Much of the enthusiasm for prediction markets derives from the efficient markets hypothesis: in a truly efficient market, the price of a financial security or prediction market contract reflects all available information. Thus, efficient prediction market prices hold the promise of yielding efficient and unbiased forecasts. Indeed, market price may be not only the single best predictor of the event but also the most efficient aggregators of available information, such that no combination of available polls or other information can be used to improve on the market-generated forecast.

This statement does not require that all individuals in a market be rational, as long as the marginal trade in the market is motivated by rational traders. Of course, it is unlikely that prediction markets are literally efficient, but a number of successes in these markets, both with regard to predicting public events and corporate outcomes, have generated substantial interest among social scientists, policymakers and the business community.

We begin by outlining the types of prediction markets and the constraints of the present legal regime. Finally, we conclude with our own observations on the future market on the future might hold.

Perhaps the best-known type of prediction market are the betting markets. The Iowa Electronic Market, established by political scientists at the University of Iowa in 1988, is perhaps the world’s best-known election market. These academics operate an electronic market in which traders can “purchase” futures contracts that consist of a promise to pay $1 if an event occurs or not if it does not, on a popular vote. Thus, the price of this contract reflects the probability of a candidate winning an election.

Assuming market efficiency, these prices should yield assessments that reflect all available information — including polls, the state of the economy and recent policy pronouncements.

For United States presidential elections, the Iowa Electronic Market has tended to be more accurate than opinion polls. Research has suggested that this is because the betting market focuses on the underlying dynamics of the race, and is therefore better able to parse out events that occur several months before the election, but will not change the outcome.

Conversely, the betting market responds rapidly to occurrences that affect the underlying dynamics of the race (such as the appointment of a new campaign manager), even if these events elicit relatively little response in the media or polls.

In America, loosely regulated sports betting in the ACT and the Northern Territory has led several bookmakers — including Betf, Centralbet, International All Sports, Sportsbet and SportsAcumen — to offer punters the ability to bet on election outcomes. True to national traditions, Australian gamblers wagered more than $1.5 million on the 2001 federal election, and more than $2.6 million on the 2004 federal election. While betting markets do not “look” like financial markets, the betting odds yield the same directly interpretable forecasts offered by the Iowa Electronic Market.

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Tradesports.com (also known as InTrade.com), Betfair.com, and pseudo-markets (in which participants trade virtual currency) such as the Virtual Markets.com and Ideosphere.com.

Some prediction markets focus on economic statistics. For instance, Goldman Sachs, Deutsche Bank, and the Chicago Mercantile Exchange have launched markets on the likely outcome of future readings of economic statistics, including employment, retail sales, industrial production, and business confidence.

Other markets also forecast private-sector returns. In several cases (such as the Google example described above), private companies have found innovative ways to use prediction markets as a business forecasting tool.

Arguably the most important issue with these markets is their use as performance as predictive tools. In the political domain, the Iowa Electronic Markets has both yielded very accurate predictions for US elections, and also outperformed the major pollsters. In a comparison of election-eve forecasts, the Iowa markets predicted candidates’ vote shares with an average absolute error of 1 percentage point, while the average forecast error for Gallup polls was 2.1 percentage points.

In Australia, election-eve betting markets correctly predicted that the coalition would win in the 2001 and 2004 federal elections. By contrast, a coalition win was predicted by the election-eve polls of only two out of three major pollsters in 2001, and only two out of four major pollsters in 2004.

Perhaps more interesting in terms of how well prediction markets can aggregate information is the performance of markets at the level of the individual district. Typically district results are sufficiently small that there is little interest (or funding) for local polling, yet when Australian bookmakers started betting on

district-level races, we found they were extremely accurate. In 2001, the Centredebte favourite won in 43 out of 47 marginal seats. In 2004, the Centredebte favourite won in 24 out of 32 marginals.

That said, comparing the performance of markets with a mechanistic application of poll-based forecasting may not provide a particularly compelling comparison. A more relevant starting point might be to compare the predictions of markets with those of independent analysts.

For example, a survey of 10 experts published on the Sunday before the 2004 federal election found that three thought Mark Latham would win, while seven thought John Howard would win, but with a smaller majority than in 2001. None forecast the true result — a Howard victory with an increased majority. By contrast, the betting market was more confident of a Howard victory in 2004 than in 2001.

In corporate context, the Hollywood Stock Exchange predicts opening weekend box-office success, and these predictions have been quite accurate. Further, this market has been shown to be as accurate as the forecasting Oscar winners as an expert panel. Some companies have also begun to experiment with internal prediction markets. An internal market at Hewlett-Packard produced more accurate forecasts of printer sales than the company’s internal process.

Gerhard Otten described an experiment at Siemens in which an internal market predicted that the engineering board would definitely fail to deliver on a software project on time, even when traditional planning tools suggested that the deadline could be met.

While the Hollywood markets have drawn many participants simply on the basis of their entertainment value, the HP and Siemens experiences suggested that motivating employees to trade was a major challenge. In each case, the companies ran real money exchanges, with only a relatively small trading population, and subsidised participation in the market, by either endowing traders with a portfolio, or matching initial deposits. The predictive performance of even these very thin markets was quite striking.

Yet as the Google example discussed in the opening paragraph of this article suggests, internal markets with hundreds of traders are likely to have even greater forecasting power.

In another recent prediction market, traders in Economic Derivatives predict the likelihood that economic data released later in the week will take on specific values. The traditional approach to aggregating forecasts is to simply take an average or a “consensus estimate” from a survey of 30 or so professional forecasters. Comparing average market and consensus forecasts for four variables (non-farm payrolls, retail trade, unemployment claims and business confidence), shows that the market-based predictions of these economic indicators are not only extremely close to the corresponding “consensus” forecast, but also typically closer to the actual outcome, outperforming the experts on average.

The success of prediction markets, like any market, can depend on their design and implementation. For a prediction market to work well, contracts must be clear, easily understood and easily adjudicated. This requirement for clarity can sometimes turn out to be complex. For example, in the course of Siemens’ internal prediction market on whether a software project would be delivered to the client on schedule, the client changed the deadlines. One intriguing question is how much difference it makes whether prediction markets are run with real money or with some form of play.

Illustration: MICHAEL PIZZARELLI
WiseDOM OF THE MASSES

Michael Dirda

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money. Legal restrictions on gambling have led some groups such as Native American tribes to enter the money exchange business, with those who amass the largest play-fortunes digging in. An

One suggestive experiment compares the number of shares bought from the prices of a real-money and play-money stocks in the 2003 NFL football season, finding that both yielded predictions that were approximately equally accurate. Interestingly, both sets of prices also outperformed that of a dozen of 300 people in an online contest, and also easily survived the assessments of these "experts." On "play money" converted to shares, such as Fortissch Exchange, one of the top ten (and second seeded) "contracts" such that a "scientific study will conclude that astrology is a statistically significant predictive method to describe an individual's economic life." Some prediction markets will work better when they concern events that are widely discussed, since trading on such events will have a history and a market and there will be more information on whose interpretation traders can disagree with. "Anonymous public information may be better in motivating trade than private information, especially if the private information is contrarian, since a cadre of highly informed traders can easily drive out the parried, informed traders and the point of the market is starkly visible. Indeed, attempts to set up markets on topics where there are insiders with substantial information advantage have typically failed. For instance, the Centrabe market on who will lead the Liberal Party to the 2007 federal election has generated very little trade despite the inherent interest in these questions. The same has proved true for prediction markets on who will win the US Supreme Court justic..."

In the United States, the legal environment has forced onshore prediction market makers to compromise that have limited their attractiveness. The laws Electronic Market Agreements to limited positions to USI in order to receive a "no action" letter from the Commodity Futures Trading Commission. This compromise limits the scope and depth of their markets, and possibly their liquidity. Platforms such as NewFuture, the Hollywood Stock Exchange and the Fortissch Exchange operate using play money, albeit play money that can sometimes move to real money. Thus these platforms evade anti-gambling legislation by operating as games.

The consulting firms running corporate futures markets that take the same approach as example are proponents of such companies: they have subsidised participation, allowing everyone to take the same positions in all the degrees.

Finally, two markets that we are aware of, Economic Derivatives and Hoodstreet, have obtained regulatory approval for trading of innovative futures contracts. Hoodstreet's Markets Corporation for Economic Derivatives, a joint venture of the University of Queensland and Goldman Sachs that runs markets in economic numbers, has been operating since 2005. Its traders are large institutions, and its markets have attracted volumes of hundreds of millions of dollars. While the US government has taken a strong anti-gambling policy, the idea of innovation will continue to come under fire with Congress helping launched earlier this year at the New York stock markets.

In Australia, the legal environment has prevented prediction markets from establishing themselves in most states. In addition, there is a concern that for major benchmarks such as Centrabe, trading on economic derivatives would bring into conflict with the Australian Stock Exchange and the Australian Futures Exchange. Since Australian betting agencies already handle significant sums of money for elections and major sporting events, relaxing of the rules on such markets would bring little risk, but a significant public benefit.

Prediction markets are extremely useful for estimating the market's expectation of a particular event occurring. Markets on elections always serve a useful public purpose in providing an up to the minute barometer of the probability that a given party or candidate will be elected. For completely key industries exposed to a large amount of political risk, our advice is to follow the betting markets, not the opinion polls or the televised talking heads. Prediction markets do not have their limitations, but they may be useful as substitutes to the other relatively primitive mechanisms for predicting the future or as a consensus check, politically-appointed panels of experts, the petitioning of their clients or holding committee meetings. We are already seeing increasing international use of prediction markets in the private sector, with the experiments at JP, Microsoft and Google now being supplemented with new markets on pharmaceuticals and the like. Online futures technologies or NewsFutures. With the exception of a short- lived attempt by a US defense agency to trade on intelligence, prediction markets, governments have shied away from directly operating them. This was a good policy stance - yet politicians should also recognize that if reliable information generated by trade in these markets is not fully internalised into the profits earned by these private companies, prediction results will be underestimated. In the area of economic derivatives, Centrabe might well be in the interests of government departments to fund the creation of markets that aggregate traders' expectations of future economic values. Indeed, the Reserve Bank of Australia already closely tracks the indices on inflation-indexed bond markets and, if more bonds are indexed - in effect a prediction market.

More generally, the highly restricted view that governments have taken to date in regulating up prediction markets does not appear to take into account the significant informational benefits of such markets. In general, prediction markets provide a public benefit from liberalising gambling regulations to give prediction markets a chance to grow. It could be a few years later a French text (1828-1838), edited and reworked by a Jean Lafarguier, who had been..."

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The secrets of Casanova

Michael Dirda

In the popular imagination, the Hassan Casanova (1725-1798) is, above all, a smooth operator and an unapologetic seducer who loved women" even if no one today could possibly believe such a sweet talker existed. Whether Casanova really did all the things he is known for is a matter of opinion surrounding his intriguing and immensely long book, History of My Life. Over the years, this upstart son of Venetian actors seems to have impressed himself into the palaces of cardinals and the arms of courtesans, hobnobbed with famous princes, and lusted after their sweet charisms. By the time he was 50, Casanova - aka the Chevalier de Seingalt, aka the courteous Parissi Guissenarde, aka the sharp Antonio Protolini - had lived in Venice, Rome, Istanbul, Corfu, Paris, Geneva, Vienna, Marseille, London, Berlin, Madrid, Moscow, Warsaw and Trieste.

Ten years later - broke, ailing and apparently cast aside by Fortune - he accepted a sinecure as the librarian at a nobleman's estate in Dux, a Bohemian backwater of the Austro-Hungarian Empire. There, from 1790 to 1798, as blood flowed in the streets of Prague, Casanova scribbled away, recalling happier times, largely for his own amusement and self-consolation. As he said in a letter: "I write 13 hours a day which passes like 13 minutes. What pleasure is it to recall pleasures? But what pain it is to recollect pain. I amuse myself because I do not invent. What bothers me is the necessity I am under to disguise the names I have for no right to publicize the affairs of others."

Every chapter of his story, which he wrote in French, were read by the debonair Prince de Ligne (the so-called first gentleman of Europe), who enthusiastically compared them to Montaigne's essays in their frankness.

But the book itself was never finished. Casanova had just reached the age of 74 when his mentor, the Duke of Leids, an infamous passion in the Doge's Palace - when he succumbed to an infection of the genito-urinary tract. (Not surprising in one who had, he said, experienced at least 11 episodes of the "pox"). According to several witnesses, his last words were: "I am a tradesman, a philosopher, and die as a Christian."

"The manuscript of the History then drifted into the hands of a grandnephew, who sold it in 1821 to the Leipzig publishing firm of Brockhaus, which published it in a German translation (1823-1828), edited and reworked by a Jean Lafarguier, who had been...

Hercules and Omphale by François

English by Arthur Machen (1894), which resurrects the 19th-century treasury. Not until 1960-1962 did Brockhaus, in conjunction with the now defunct original, finally print the original, to the joy of Casanovians around the world. William Walker has rendered this text into English in 1966, and his is the English version to read, whether entirely (1730-1731), or in the new abridged Everyman edition, which trims the narrative in half, for those with "other calls on their attention."

The novels themselves offer far more than some 400 pages of gentile 18th-century sexual adventures. They provide a top-bottom survey of the glittering, shabby world of Europe before the French Revolution, the soucieu de vie of the aristocrats to the desperation of the common people. They are written with adroit, all with cumulative forces... As the author ages, shadows fall across the brilliant surface of his story. A Proustian sense of the passage of time appears, compounded by an equal curiosity need to understand the relationship between outward events and personal volatilities.

To liken Casanova's History to a novel may suggest that the autobiography is merely fiction. After all, even the most empirical historian can manipulate his own cosmetic enhancement. Lives are chaotic, messy, and crowded with inessentials. Here, order requires themes and a pleasing variety so as to give the driftless out of sight something to hold on to - an object of beauty. The temptation to sharpen or improve an anecdote can be irresistible. At what point does the merely arguable pass into the fantastic? In Casanova's case, questions have periodically arisen about his overall reliability and truthfulness. (One 19th-century book writer even argued that the whole History was made up by his editor!) Consider the book's most famous episode: Casanova's thrilling escape from the Leids, when he incited his improvised for corrupting German youth and being a general nuisance to certain women in power. Did he and Stefan Zweig, Edmund Wilson, and V'S Pritchett have the found the memoir wisely comprehensible. As the author ages, shadows fall across the brilliant surface of his story. A Proustian sense of the passage of time appears, compounded by an equal curiosity need to understand the relationship between outward events and personal volatilities. To liken Casanova's History to a novel may suggest that the autobiography is merely fiction. After all, even the most empirical historian can manipulate his own cosmetic enhancement. Lives are chaotic, messy, and crowded with inessentials. Here, order requires themes and a pleasing variety so as to give the driftless out of sight something to hold on to - an object of beauty. The temptation to sharpen or improve an anecdote can be irresistible. At what point does the merely arguable pass into the fantastic? In Casanova's case, questions have periodically arisen about his overall reliability and truthfulness. (One 19th-century book writer even argued that the whole History was made up by his editor!) Consider the book's most famous episode: Casanova's thrilling escape from the Leids, when he incited his improvised for corrupting German youth and being a general nuisance to certain women in power. Did he and Stefan Zweig, Edmund Wilson, and V'S Pritchett have the found the memoir wisely comprehensible. As the author ages, shadows fall across the brilliant surface of his story. A Proustian sense of the passage of time appears, compounded by an equal curiosity need to understand the relationship between outward events and personal volatilities.

"What about the lengthy conversations - such as the barbecued exchanges with Voltaire - that add so much drama to the History's pages? Can anyone's memory be that good? In the case of the French philosopher, Casanova tells us that each night he scribbled down conversations with Voltaire, Theodore de Bismarck, and Jean Michel. What a joyful day to let him out?"

As it happens, nearly all the evidence confirms that the account in the memoirs is essentially true. The expanded version that appeared in 1828 disposes of this argument (view graph). All subsequent translations, including the one into..."