It All Adds Up: How Options Trading Impacts the Stock Market

Solving the Auction Equation

Calculating Risk: Should Auditors Use Numbers or Words?

The Mathematics of Decision Making
“When you can measure what you are speaking about, and express it in numbers, you know something about it. But when you cannot measure it, when you cannot express it in numbers, your knowledge of it is of a meager and unsatisfactory kind.”

– Lord Kelvin

Numbers are as critical to business as they are to science. Like Lord Kelvin, researchers in the College of Business measure, quantify, and express their work in numbers.

This issue of Perspectives offers some examples of empirical research currently being conducted by faculty and graduate students in our three academic departments. Sophie Ni is a PhD student in finance. Under the guidance of faculty members Neal Pearson and Allen Poteshman, she performed an in-depth analysis of years of options trading data. But, more importantly, her research is about understanding the importance of those numbers—what they reveal about options trading patterns and their implications. Accountancy PhD student Dave Piercey, building on the research of Associate Professor Mark Pecher, is also looking at what numbers tell us. His research examines how expressing risk assessment verbally rather than numerically allows auditors more latitude in judgment because words are inherently more vague than numbers.

Just as the College is providing the intellectual environment for these doctoral students to conduct their research, we are committed to training all our students in the discipline of quantitative analysis—now and in the future. In coming years, Business students will be able to watch the daily gains and losses of the stock market in the Market Information Laboratory that will be located on the first floor of the recently approved Business Instructional Facility. Real-time financial information, SEC filings, stock-market reports, and business news will provide students with the data—the numbers—they need to know to complete projects.

At the College of Business, we express concepts and ideas in numbers every day. We hope that this issue gives you a better understanding of a few of our research initiatives and convinces you that, as Lord Kelvin states, we “know something about it.”

Avijit Ghosh
Dean
DO OPTIONS TRADERS MANIPULATE THE MARKET?
Researchers investigate how options trading influences stock prices.

CALCULATED DECISIONS
Applying advanced analytical methods to improve business decision making.

DETECTIVE WORK
How auditors use numbers and words to assess risk.

AND THE SURVEY SAYS …
Survey success means asking the right people the right questions.

SEEING THE BIG PICTURE
Accountancy research initiatives spark new ideas.

RESEARCH FOCUS: AUCTIONS
Using mathematical models to study bidding behavior and auction prices.

RESEARCH FOCUS: GAMBLING
What is the economic impact of legalized gambling?

4 FOR 4: UNDERSTANDING EARNINGS NUMBERS
Louis Chan explains earnings quality and forecasts.

COLLEGE BRIEFS
News from the College of Business
There are many ways to probe for problems in the financial system. In the Enron case, for example, investigators focused on falsified profit figures that had been covered up with numerical sleight-of-hand.

But there are other ways to uncover problems using numbers. One of them is the sophisticated analysis of large quantities of financial data. This is what a College of Business graduate student and two of her professors teamed up to do as they examined trading on the options markets.

They looked for patterns of trading activity that disrupt the financial system or that might suggest illegal behavior, such as manipulation of stock prices. Their research uncovered evidence that options trading does influence stock prices and that some of the impact appeared to have resulted from market manipulation by traders who write option contracts.

Exploring the Options

Options give investors the right to buy or sell stocks at a specified price within a specified period. Holders of options stand to make money when the price of the stock moves in a way favorable to them. For instance, if they hold options to buy XYZ Corp. stock at $25 a share and the price jumps to $30, they will make money when they exercise their option, even after paying a small fee (called the premium) per share to the firm that wrote the option contract. In essence, they are getting a $30 value for $25, minus the option premium.

Prior to 1973, options trading on organized exchanges had been barred. However, beginning in that year, the Securities and Exchange Commission began to allow such options trading on a pilot basis. Gradually the program was expanded, and now on any given day options are traded on many American stocks—and the volume of options is huge. For example, 124 million option contracts were traded in April 2005 alone.
A Multi-Billion Dollar Shift on Expiration Day

Initially, regulators proceeded with caution as they gave a green light to options trading. Among other things, they feared that options trading in itself would impact stock prices. Over the years, little evidence of that was found. Although some early research suggested that options trading decreased price volatility of stocks that had options on them, subsequent work showed there was no evidence that volatility, in fact, decreased.

But a groundbreaking study at the College of Business suggests that options trading clearly impacts the prices of underlying stocks. Sophie Xiaoyan Ni, a PhD student in finance, and coauthors Neil D. Pearson and Allen M. Poteshman, both faculty members in the Department of Finance, found options trading causes a multi-billion-dollar shift in the market value of stocks on which options are held. This effect occurs on the day the options expire.

One reason for this shift appears to be efforts by professional traders to manipulate the value of stocks in order to avoid potential market losses for the investment banks they work for. The investment banks stand to lose when the price goes against them on option contracts they have written. Because federal law bars market manipulation, such a practice would be illegal.

“We presented our findings to regulators at the Securities and Exchange Commission’s Office of Economic Analysis,” said Poteshman, an associate professor of finance. “They were interested in what we had discovered and are continuing to evaluate our findings.”

Doing the Math

To reach their conclusion, the trio mined massive amounts of options trading data from 1996 through 2002 and then applied a sophisticated mathematical analysis to that data. They uncovered evidence that options trading periodically causes significant ripples in the stock market, shifting the cumulative value of all stocks that have options on them by an average of at least $9.1 billion each month on option expiration day.

Options trading: Buying or selling the right to buy or sell stocks at a specified price within a specified time.

Hedge trading: Taking a position in the stock market that fully or partially offsets the price risks from your current options position, so that gains or losses in one market offset losses or gains in the other market.

Proprietary traders: Traders who work for investment banks, which do much of the heavy lifting that makes markets run, including underwriting new stock issues, providing brokerage services, and selling options.

Public customers: A broad category of investors that includes hedge funds, pension funds, college endowments, insurance companies, and individual investors.
How Options Trading Works

To understand what the researchers found, consider a simple example of how the system works. Assume you pay $1 per share for an option to buy XYZ Corp. stock at $25. You make money if the stock rises above $26 and you exercise the option. The more it rises above $26, the more you make. If it hits $26, you only break even after paying $1 for the option. “But if it ends up at $25 and you optioned it for $25 you’re out the buck you paid for the option,” said Pearson, a professor of finance.

If it ends up at $25, you probably wouldn’t exercise the option. Meanwhile the trader who wrote the option for his firm pockets the $1 option fee you paid on each share. If the option covered 10,000 shares, his firm makes $10,000.

If the stock rises to $26, the trader’s firm makes nothing. If it rises above $26, it begins to lose money; the higher the price, the bigger the losses. So it’s to the trader’s advantage that the stock price on option exercise day be at $25 a share or less.

Who’s Manipulating the Market and Who’s Paying the Price?

The research that Ni, Pearson, and Poteshman conducted allowed them to draw some interesting conclusions. Here’s what they found:

• A pattern in which the price of stocks with options on them tended to cluster close to the option strike price on the day on which option holders must either buy the stock or let the option expire unused. Options expire just once a month at 10:59 a.m. Central Standard Time on the Saturday following the third Friday.

• Evidence that hedge trading, which is routinely done to protect against wide swings in the market, helped produce this clustering. This is not illegal.

• Evidence that proprietary traders, who work for investment banks, appear to have manipulated the market to push stocks on which they had written options closer to the option price. This would be illegal.

“The people who appear to benefit from manipulation are the proprietary traders at the big investment banks,” said Pearson. “We don’t have evidence on any particular one because we analyzed aggregate data. To the extent that any manipulation occurs, it hurts the buyers of options,” he said.

And it is the buyers of options who represent the broad category of investors called public customers. “Public customers include you and me, hedge funds, pension funds, college endowments, and insurance companies,” said Poteshman.

The amount of money involved is large and getting larger as more investors move into the options market. “At the end of 2003, the daily stock option trading volume was six times that of early 1996, the starting time of our study,” said Ni. When the price of a stock is shifted toward the option strike price, it doesn’t just impact the investors who hold options, it impacts anyone who owns the stock. And that means all investors pay the price.

— Doug McInnis

Doctoral Program Focuses on Empirical Research

Sophie Ni’s collaboration with Neil Pearson and Allen Poteshman required number crunching, data analysis, and, ultimately, a comprehensive understanding of options markets. Dissertations and research papers in the field of finance show clearly that numbers are at the heart of academic inquiry in the discipline.

Ni is one of almost 20 PhD students in the Illinois Department of Finance who are studying a range of issues including stock splits, convertible bond issues, deviations from Black-Scholes values, analyst performance, and trading strategies.

“Empirical research is the strength of the Department of Finance and also of the PhD program,” said Neil Pearson, professor and program director. “PhD students work closely with the faculty and receive rigorous training in research design and data analysis.”

Only a handful of PhD students are admitted by the department each year from an applicant pool of around 200. Pearson and the selection committee look for students who have a track record of success in their academic careers and who show evidence of research potential. Of the five PhDs who graduated in 2005, three accepted faculty positions in the US, one accepted a position in Hong Kong, and the fifth took a position at a Korean university. Illinois alumni are on the faculty of Northwestern, Michigan State, Notre Dame, Georgia Tech, the University of Florida, and many other universities. Some graduates of the doctoral program join financial firms or consultancies.

Current research topics of finance PhD students

Evangelos Benos
Private Benefits and Cross-Listings in the United States
Qian Deng and Brandon Julio
Option Market Reaction to Stock Splits
Stephen Dimmock
Loss-Aversion, Dynamic Inconsistency, and Household Portfolio Choice
Joong Ho Han
Banks vs. Non-banks: Firm’s Choice of Lenders and the Role of Distance in the Credit Market
Brian Henderson
Timing of Convertible Bond Issues and Post-Issue Performance
Woojin Kim
Value of Analyst Recommendations: International Evidence
Sangwoo Lee
Consistency of Analyst Performance
Minqiang Li
Deviations from Black-Scholes Values Follow a Simple Law
Joseph Marks
Acceleration Strategies

For information about current PhD students and their research, visit www.business.uiuc.edu/finance/phd/students.asp.
All good detectives know the importance of solid evidence collection. They can’t build any kind of a case without it. But unraveling mysteries also requires a healthy dose of professional judgment. Detectives might ask themselves: What’s the probability that a suspect has the technology savvy to mastermind an elaborate Internet scam?

The goal in assessing such probabilities is to be objective, but past experience, preconceptions, and personal biases impact any detective’s work. It’s true for private investigators who solve crimes, and, as University of Illinois accountancy researchers have found, it’s also true for auditors – the numerically nimble sleuths who examine financial statements.

Making a Case for Confirmation Proneness

Research by Mark Peecher, associate professor of accountancy, and Dave Piercey, accountancy doctoral student, confirms that an auditor’s preconceived ideas about the probability of material misstatement can affect how the auditor quantifies that risk. The foundation for this research was laid when Peecher was himself a doctoral student at Illinois in the early 1990s. His dissertation examined and validated the concept of confirmation proneness – that is, the idea that auditors who start out with a preferred conclusion gather evidence in a way that builds a justifiable case to reach that preferred conclusion.

Peecher’s research asked auditors to examine a case study and determine the probability that unusual fluctuations in the financial ratios were caused by a material misstatement. “My focus was on how auditors diagnose what could be the cause of such fluctuations,” says Peecher. “It’s similar to how doctors make a diagnosis. They have to determine whether the patient’s symptoms are just a variation in their health or whether something is really wrong. Good doctors don’t run every test known as a way to cover all the bases. They start with the symptoms and then estimate the probabilities of what might be wrong.” And in Peecher’s research those probability numbers showed a pattern of confirmation proneness.

A decade later, when Piercey presented his ideas on extending this research, Peecher provided important direction and perspective. For Peecher’s project, auditors were asked to make their risk assessment judgments using numbers. “My dissertation is really silent on the extent to which auditors would have responded using words,” he says. “Dave has taken the research another step by examining the verbal component.”

Just the Facts

The first part of Piercey’s research mirrored Peecher’s earlier work with professional auditors. For the study, nearly 600 undergraduate accounting students in three groups were given a case to evaluate. One group was told that their boss wanted...
them to look favorably on the client; the second was told to be completely objective; and the third was told to be skeptical of the client. The students analyzed the case and made judgments regarding the numerical probability of misstatement in the financials.

“We knew from Professor Peecher’s work that an auditor’s preconceptions of the risk of misstatement can affect the probability number chosen to reflect that risk in the auditor’s final judgment,” says Piercey. “This part of my research confirmed Professor Peecher’s earlier conclusions.”

In the next phase of the research, half the students were asked to express the probability of misstatement in words. For example, where the students might have earlier determined that it was 70 percent likely that a company’s assets were overstated, they were now asked to express that assessment without using numbers. They could choose from a variety of phrases, such as almost certain, very likely, somewhat uncertain, some possibility, slightly likely, a chance, or not quite impossible. Participants were then asked to complete a numerical scale indicating what that expression means to them from a probability perspective.

When Piercey evaluated the students’ responses, he found something interesting. “The effects of initial preferred conclusions on the students’ final judgments were more extreme when they responded with words rather than numbers,” he says. “There is more latitude of judgment with a verbal expression because of the variety of words available and their vagueness.”

Such vagueness means “more backpedaling can be done when words are used rather than numbers,” says Piercey. “Words offer the auditor an opportunity to recast or deny the early assessment, but in a plausible way because the words are vague. Such recasting is more difficult to do with numbers because they are more precise.”

Participants in Dave Piercey’s research were asked to choose from the following list of probability phrases when stating their assessment of misstatement. The vagueness inherent in these choices demonstrates the latitude available to auditors when using words as opposed to numbers.

- Almost impossible
- Not quite impossible
- Only a chance
- A chance
- Very unlikely
- Slightly likely
- Reasonably possible
- Somewhat unlikely
- Some possibility
- Substantial doubt
- Somewhat likely
- Reasonably certain
- Not quite certain
- Almost certain
- Quite uncertain
- Very likely
- Slightly improbable
- Probable
- Somewhat possible
- Substantial evidence
- Almost certain

In his research, Piercey tested the hypothesis of plausible deniability by dividing his “pro-client verbal group” in two and asking those in one group to define their verbal expression of probability on a numerical scale before they knew the outcome of the case and asking those in the other group to define it after they knew the outcome. The data indicated that if students made the verbal expression of the probability “somewhat possible,” for example, and then were told that the outcome was unfavorable, they would rate the expression “somewhat possible” more broadly on a numerical scale than was done by the group who defined the numerical scale before they knew the outcome was unfavorable. According to Piercey, “plausible deniability allows a single, unambiguously documented risk assessment to be both aggressive and conservative at the same time and to change with whatever the current demands of justification may be.”
It’s similar to what a meteorologist faces when forecasting the weather. By predicting “thunderstorms possible” rather than “chance of thunderstorms 80%,” the forecaster makes a broader statement, which allows for more backpedaling room and, from the meteorologist’s perspective, hopefully less scrutiny.

But as Piercey explains, psychological research indicates that while most people prefer to communicate their opinions verbally, they prefer to receive opinions in numerical format. “This is why we see auditors using words to express probability, but the public preferring the precision of actual numbers,” he says. “It would be easier for a client to come back and say, well you said it was 70 percent likely, meaning it should happen 70 percent of the time. That’s much easier for the public to evaluate and find fault with than a verbal expression of ‘somewhat possible,’ which could have a range of numerical probabilities.”

**Uncovering More Clues**

According to Piercey, the bottom line of this research is that the value of audit risk assessments often has the potential to be undermined because words allow judgments to be more extreme and, at the same time, less precise than numbers. While he is not advocating for standards to be changed so that only numbers are used to express probability, what Piercey is saying is that “in the case of uncertainty or risk, the bias and potential problems with relying on verbal expressions of probability are shown to exist, and these limitations need to be recognized.”

The next step for Piercey will be conducting the research using professional auditors as the subjects. As he prepares to complete his PhD next year and pursue an academic career, he is also considering a future research project that will examine how litigation risk might impact the verbal expression of probability and how auditors use words when dealing with more than one audience—for example, what verbal expressions might be chosen when making the same assessment and delivering it first to a pro-client boss and then an anti-client regulator.

- Cathy Lockman

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**Collecting Evidence of Plausible Deniability**

Dave Piercey formulated the concept of plausible deniability based on data uncovered from his research. The accompanying graph illustrates the responses of participants who were asked to read a case about a client business and then were given an incentive to be lenient on the client.

Participants evaluated the probability that the financial statements of the business were misstated and made an assessment of that probability using numbers or words. The black vertical line on the chart shows the average response of participants who used numbers to indicate the probability of misstatement—that is, an average probability of 45 percent.

Participants who were asked to use a verbal expression of probability (e.g., some possibility, somewhat likely) were significantly more lenient than those who used numbers, as the blue line indicates. After choosing a phrase, they were asked to define it on a numerical scale. For instance, if the phrase “somewhat likely” was chosen, the participant had to indicate how well that phrase described different probabilities between 0 and 100 percent. The blue line shows that the average phrase chosen and defined by participants was most closely associated with probabilities in the 10 to 40 percent range of misstatement, rather than the 45 percent chosen by those who expressed the probability with numbers.

The red line shows the average response of participants who chose a phrase but were not asked to define it until after learning that the financials were in fact misstated. As the red line indicates, the participants then saw their selected phrase as being less lenient (40 to 60 percent likely rather than 10 to 40 percent) and more vague (i.e., more closely associated with a wider range of probabilities) than that represented by the blue line.

These results suggest that words are more sensitive to the private motivations of the auditor than numbers and that an original verbal audit risk assessment can be substantially redefined less leniently and more vaguely if adverse evidence later surfaces.
Seeing the Big Picture

Snapshots of Illinois Accountancy Researchers’ Work
In our everyday lives, numbers dictate what we do and when we do it. We drive an extra half mile to save a penny on a gallon of gasoline, for example, or we plot the week’s spending from sales fliers in the Sunday newspaper.

Numbers drive the business world as well, though the process is more complex than crafting a household budget. At the College of Business, researchers routinely study the world of numerical calculations that underlie business decision making. But the numbers are just the beginning. It is the quality of the information revealed through the thorough and experienced analysis of those numbers that sets the research apart. The work of three faculty members in the Department of Accountancy illustrates the breadth of applied research in the College – and the quality of the information such work uncovers. One delves into ways to improve the economics of the fast-food industry, another focuses on ways Japanese camera makers can lower their manufacturing costs, and a third examines ways that novice investors differ from professional stock analysts. The answers these researchers turned up suggest strategies that, broadly applied, could help reshape large portions of the American economy.

**Focusing on Collaboration**

When it comes to the low-tech point-and-shoot camera, one company’s model is pretty much like another. So Japanese camera companies compete for customers on price, and slashing manufacturing costs is one way to do that. Ken Koga, assistant professor of accountancy, focused on one strategy for lowering those costs – getting product designers and manufacturing engineers to collaborate as the product is still in the design stage.

That collaboration may generate labor-saving ideas. “Snapping parts together is easier than having those parts screwed together, or you can color code screws so that the worker won’t put the wrong screws in the wrong place,” said Koga. “The emphasis is on reducing labor by reducing mistakes or by making the tasks more efficient.”

There is also a savings in materials costs if you improve manufacturing. For instance, if workers avoid making defective products, that saves both the materials, which would otherwise have to be thrown away, and the cost of labor involved in making them. But these savings can’t happen unless the designer engineers the camera accordingly.

“My findings are broadly applicable to any assembly line product that competes on cost, including cars, home electronics, and even computers,” Koga said. As such, his work provides an example for American manufacturers looking for an edge in their fight to keep jobs here.

Collaboration between product designer and the manufacturing side might sound like an obvious step, but it doesn’t always occur, especially in America where product designers and manufacturing engineers work in different offices. But in Japan, executives of all stripes tend to work in a big open office where there’s no avoiding one another. “There are very few individual offices in Japan,” said Koga. “Everyone sits in a huge room and knows what everyone else is doing.”

The end result is that they talk to one another. “When people talk, ideas flow,” said Koga. “The interactive effect is subtle, yet very powerful.” The collaboration is such that managers are keenly aware of what other managers are doing. “In Japan, when I talked to managers about past production, they had very sharp memories about what had happened to each person involved. They would recall if someone was off with the flu and that illness had set product design back. That meant that they were working together. The American manufacturers weren’t able to recall such specifics.”

This doesn’t mean that Japanese workers necessarily like each other or want to collaborate. The product designer may want to create an aesthetic masterpiece and let the manufacturing engineers figure out how to make it. The engineers may be thinking that the product designers should consider how to manufacture the product as it is being designed. But working together in a single room forces collaboration that might otherwise not happen.
Research You Can Sink Your Teeth Into

Anyone who has labored in the fast-food industry knows that workers come and go. Since they aren’t staying for the long haul, these workers often focus only on their own interests, not on those of the restaurant. The challenge for management is to devise compensation plans that get short-term workers to work efficiently and still do the job well – a challenge faced by other American industries where worker turnover is high.

To create a strategy that works, Anne Farrell, assistant professor of accountancy, created a virtual delicatessen online and hired workers to make cyber sandwiches on their computer screens.

“If you look at the sandwich shop where a worker will only remain employed for a couple of months, that worker may take whatever actions earn him the highest pay, but this may come at the expense of the shop itself,” she said. “For example, if the worker can make a lot of sandwiches, but they’re not very good sandwiches, he may do so if that results in higher pay. But badly made sandwiches today come with a cost to the shop tomorrow – lost customers. The job of management is to design an incentive plan that will ensure that the worker cares about quality today even though he may not be working for the shop tomorrow.”

At the outset, the workers at the computer deli are paid based on the number of sandwiches they sell. Sandwiches are only thrown away if they contain four or more mistakes, such as putting on the wrong ingredient. “Workers can make up to three mistakes per sandwich and still get a bonus. It’s very appealing to them to make a lot of sandwiches and make a lot of mistakes because pay will be higher. One solution, said Farrell, is to pay workers a percentage of sales of perfectly made sandwiches. “Then there’s instantly an incentive to care about quality.”

Of course, there are drawbacks, too. When you emphasize quality, production may fall. But the lost production may be more than offset by gains. The shop might be able to charge a higher price for higher-quality sandwiches, said Farrell. “And there is a savings from not having to discard badly made sandwiches.”

So Farrell set her student volunteers to work turning out virtual sandwiches. Some were paid based on production quantity, while others were paid based on both quantity and quality. Sure enough, they made better sandwiches when quality was factored into their pay.

Farrell also looked at workers who were likely to remain employed much longer. These workers recognized that their future depended on making a quality product today, so management didn’t need to pay them to make good sandwiches. However, when management did factor quality into pay, workers become creative. “Compared to workers who were only paid for quantity, these workers quickly figured out more efficient ways to do their jobs well,” said Farrell. “The end result is that long-term workers, those who were paid for both quantity and quality, maintained production levels and also produced higher-quality products.”

“One size doesn’t fit all workers,” Farrell said. “You need to know what your labor market is like. You need to know if you’re hiring people that intend to remain with the firm for the long-term or not. And you need to design their incentive plans accordingly.”
What Press Releases Tell Us About Earnings Figures

When ordinary investors look at a stack of earnings figures, they don't perceive it the same way as professional stock analysts do. For instance, if a corporate press release gives the good news before the bad, the ordinary investor focuses on the good news. The professionals aren't fooled; they wade through the data until they get to the heart of the matter.

Researchers have begun to focus on this arena, and their findings help to explain why the general public sometimes gets burned when they make their own investment decisions. "The nonprofessionals end up putting more weight on the information that management chooses to emphasize and they're not even aware that they are doing it," said Brooke Elliott, assistant professor of accountancy, who has studied such phenomena extensively.

"Analysts know what to look for," she said. "They're very good at identifying relevant information. They have the analytical skills to take the data and figure out what it means. The format doesn't mess them up."

In research for a recent paper, she had both graduate students and professional analysts evaluate a hypothetical company, X Technologies, which reported a quarterly profit of $17 million before calculating the financial impact of such things as research and development costs and amortization of certain expenses. When these were included, the earnings vanished; the company had actually lost $1.4 billion.

The students, who functioned as nonprofessional investors, and the professional analysts were asked to evaluate four versions of X Technologies' press releases, some of which emphasized the bad news, while others accentuated the good news. The analysts saw the big picture regardless of how the data was presented, but they were more inclined to think the company had presented a true and accurate picture of its finances when X Technologies was explicit about reasons for the red ink.

The students were swayed by the format. For instance, they invested more money when management emphasized the $17 million profit than when management was candid about the massive losses. "It's not that they consciously decided to rely on the $17 million figure," said Elliott. "They relied on it because it was presented first." By contrast, when the management was candid about the scope and reasons for the massive losses, the students saw the earnings as lower and invested less money.

"The professional analyst is always on guard," said Elliott. "Nonprofessionals react to the press release almost like they would react to an ad on TV. If they're relying on what management tells them and the management is not being truthful, then they're more likely to make bad investment decisions."

- Doug McInnis
The design of the waiting lines at amusement parks, airline crew scheduling, and the disposal of surplus weapons-grade nuclear plutonium are just a sampling of the diverse range of areas where private and public decision makers utilize operations research to assist them as they solve complicated problems.

Operations research is the discipline of applying advanced analytical methods to data to help make better decisions. Executives and high-ranking officials in virtually all industries make countless routine decisions on a daily basis, but the types of decisions that incorporate operations research and decisions analysis tools most effectively are those high-stakes decisions that require allocation of scarce resources— for instance, whether to expand or replace a building or whether to implement large-scale information technology projects.

These high-stakes decisions can be made more objectively when software tools are used to aid in planning for such projects or for predicting their financial implications across the organization. One such tool, called multi-objective decision analysis, is often applied to complicated situations where there are conflicting priorities and scarce resources. The government has used it to make decisions such as where to locate hazardous facilities, balancing health and safety issues, environmental concerns, and financial objectives. Healthcare organizations have also used it to prioritize capital expenditures because their needs often far outweigh their ability to finance them.

What such organizations have found is that analytical software tools are crucial because they provide a platform for collaboration and sharing of information that guides the organization to the best course of action.

Don Kleinmuntz has seen the impact of this approach again and again. A professor of business administration, Kleinmuntz has studied the field of decision analysis, a subfield of operations research, for the better part of three decades. He says that analytical tools can improve managerial decision making because they use data from the real world to solve problems that real people have in real organizations.

### Calculated Decisions

**“You can put numbers on almost everything. More things can be quantified meaningfully than we often give ourselves credit for in real organizations, real business situations.”**

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**Sorting Throught the Options**

As a founder and principal of Strata Decision Technology, a Champaign-based company that develops software tools to help organizations make strategic decisions, Kleinmuntz knows firsthand how the tools can benefit an organization. For instance, when a Southern healthcare organization was reviewing a lengthy list of capital expenditures, decision analysis tools made it easier for management to sort through the options and solicit input from across the organization—a job that would have been far more time-consuming and far less objective had the tools not been available.
"Collecting the right data and having reviewers from across the organization read and score each capital proposal made the planning and decision-making process transparent," said Kleinmuntz. "The evaluation process helped staff members feel they had an impact on allocation decisions and provided the executive team with a sense of control and resource flexibility." Another positive outcome from this decision-making approach is that the staff is more confident that long-range strategic objectives will be met because of the process and their use of the sophisticated software tool.

"One of the things that sometimes is hard to communicate, no matter what the industry, is that an organization has to look at allocations to a whole portfolio of activities. Some directly support their strategies, and some generate funds and resources that allow them to indirectly support the strategies," he said.

"And they really have to understand how all their different activities fit together, in terms of supporting the overall reason why the organization is there and what it's trying to accomplish. The most important thing is giving the organization a framework for thinking clearly about that full range of objectives. You don’t want them to think about one particular goal at a time.”

A Successful Equation

The framework for a holistic analysis is part human communication and collaboration, part data collection, and part review and analysis. Such a framework gives organizations a way to break down a problem by thinking about the various aspects of an issue.

Analytical software, Kleinmuntz said, provides a platform to consistently synthesize the issues and construct an optimal solution. "This is not a situation where you turn the computer on, press a button, the answer pops out, and it’s all over. What you really need to do is have everybody sitting at the table, discussing what they care about, what they're trying to accomplish, how attractive or unattractive the projects are. So the process is really breaking down a big messy problem into a series of relatively simple judgments.”

The actual mathematics involved in such decision-making tools is often quite straightforward. The equations may involve nothing more than basic algebra. But figuring out exactly what numbers to use in the equations is tricky. A protocol must be developed to allow people to turn those simple judgments into meaningful data.

For the questions to elicit that data involves understanding the psychology of the way people make judgments. The challenge is to design questions that are easy and intuitive to answer. It can even be as rudimentary as asking the experts to rate the impact of a proposed project on a particular objective using a scale from zero to 100. In other cases, more sophisticated financial forecasting models need to be used, but the experts still provide the critical assumption and inputs.

The framework allows an organization to throw out the no-brainers – the projects that are overwhelmingly approved and disapproved – in order to concentrate on the ones that occupy gray areas. "Focus people's attentions on the decisions where there might be honest disagreements, differences in priorities and values, and this becomes a way for them to talk about that and arrive at a consensus about the ultimate decision. So the goal here is not to just get a decision, or not even to get the best decision, but to get a high-quality decision that all the key players in the organization feel comfortable is the right decision. That way they can understand why, without necessarily becoming experts in the underlying mathematics.”

Beyond the Classroom and Boardroom

Kleinmuntz teaches decision and risk analysis and is the editor-in-chief of Decision Analysis, an academic journal published by INFORMS, the Institute for Operations Research and the Management Sciences. He brings his skills in decision analysis as both a researcher and an entrepreneur to the classroom, providing students with exposure to real-world problems and solutions.

Kleinmuntz is also examining new methods and approaches for allocating resources when there is a lot of risk as well as competing objectives. A current project involves helping organizations, including the government, decide when and how to spend money on buildings or other facilities in order to reduce hazards. Decisions need to be made, for example, about how much to spend to make buildings more resistant to damage from earthquakes, storms, or other natural hazards. Such decisions may turn out to be even more useful in determining what to do about man-made hazards as well, including measures that reduce exposure to risk of terrorist attacks. All of these problems are part of a numbers game that involves high stakes, lots of uncertainty, and the critical need to spend scarce funds in the most effective way.

"You can put numbers on almost everything," said Kleinmuntz. "More things can be quantified meaningfully than we often give ourselves credit for in real organizations. For important decisions, it's worth the time and effort to do that, because the stakes are high. And that's when you really want to pay attention to these things.”

- Laura Weisskopf Bleill
And the Survey Says ...
A Question of Design

Sharon Shavitt, a professor of business administration and research professor in the SRL, knows how important proper methodology is to achieving reliable, accurate survey results, and she shares this knowledge through her research.

According to Shavitt, social factors strongly affect survey participants and, consequently, they impact survey results. “Understanding the way people answer questions is relevant to improving survey methods. The survey interview is a social interaction and is subject to the same influences of any social interaction.” Noting the importance of trust, self-awareness, and motivation in participants, Shavitt said that “asking people to engage in thinking about and calculating answers where they have to search their memory and work to do it is an issue of motivation.” She explained that the best way to combat the problems of motivation is to design questions that can yield the most honest and complete answers but that are relatively painless for the respondent. Creating a survey that meets both needs can be difficult for those untrained in survey design, which is why SRL provides assistance in those areas.

Phrasing is also essential to obtaining valid survey results. According to Shavitt, when designing a survey it is important to look at each question carefully and think about whether it is clear and whether it helps the respondent to give a complete answer. People falsely assume that succinct questions lead to the best answers because respondents will not be confused by wordiness. However, longer questions often get more valid results because they “provide cues to help respondents recall relevant instances,” Shavitt explained. For instance, consider the question:

How many trips do you take in your automobile on a typical weekday? This could include driving your children to school or to activities; driving to work; driving to a store or to other places of business; going out for entertainment; and taking other trips. Be sure to count return trips separately.

This is a long question, but according to Shavitt it is much better than asking simply:

How many trips do you take in your automobile on a typical weekday?

With this shorter question, “the respondent might have a harder time understanding it or remembering all of the relevant instances and so will give you a less accurate response,” she said.
Making it Personal to Generate Responses

The growth in the number of surveys people are asked to complete has caused response rates to decrease to an average of about 30 percent. But, said Shavitt, there are personalization techniques that increase the likelihood of participation. Often, people believe that impersonal tones are what interest participants, but they can have adverse effects.

“Things that personalize or appear to personalize the survey can dramatically increase the rate of response,” she said. “This would include putting a Post-It note request on the survey packet or using a real stamp rather than a postage meter on the reply envelopes. These techniques attract attention to the survey request and convey the impression that there are real people on the other end of the survey request who are asking you to do them this favor.” Other important ways to increase the response rate include following-up with postcards and phone calls.

The success of a survey also depends on a number of other conditions. Often one of the most important is making sure that a representative sample is drawn. Quality, not quantity, is what counts. “As long as you meet a minimum requirement, it isn’t how many people you sample, it’s who you sample that matters. In other words, if you are trying to draw conclusions about the characteristics of a given population, the most important characteristic of a sample is whether it truly represents that population,” said Shavitt. For example, if you want to predict the outcome of a presidential election, the responses of 1,000 people randomly selected from the population of likely voters is much more useful than a sample of 100,000 museum patrons. The latter group is very likely to be biased in terms of education and income, and therefore cannot give you a valid prediction of the population’s preferences.

How Cultural Differences Impact Survey Responding

As globalization continues to affect international communication and business relations, awareness of cultural variations is crucial to such topics as data collection. As part of SRL’s 40th anniversary in 2004, the Sheth Foundation/Sudman Symposium on Cross-Cultural Survey Research was held on campus to discuss global survey measurement. Researchers from around the world shared their findings and perspectives on cognitive and psychological aspects affecting survey respondents as well as the challenges cultural boundaries create for data gathering.

Shavitt has a special research interest in cross-cultural factors affecting consumer persuasion, attitudinal and value judgments, and survey responding. At the symposium, she presented information on the relationship between cultural orientation and socially desirable responding, which is based on the research she conducted with Timothy Johnson, SRL director, and Ashok Lalwani, a PhD student in marketing. The research, to be published in an upcoming issue of the Journal of Personality and Social Psychology, addresses the relationship between individualistic and collectivistic cultural values or backgrounds and the ways people present themselves on surveys.

Previous research has shown that people with individualistic cultural values or backgrounds, such as people from the United States and Western Europe or people with a European cultural background, tend to emphasize independence, self-reliance, and a desire to be unique. On the other hand, people with collectivistic cultural values or backgrounds, such as people from East Asia or those with an Asian cultural background, emphasize interdependence with others, family and group goals, belongingness, and fitting in to their groups. As a result, Shavitt said, “Ashok, Tim, and I found that although people with both types of cultural backgrounds or values try to present themselves in a desirable way on surveys, they do so in distinct ways.” Individualism was associated with self-deceptive enhancement (SD E), a type of desirable responding that involves inflating one’s skills and abilities to present oneself in an unrealistically positive light. In contrast, collectivism was associated with impression management (IM), a type of desirable responding that involves misrepresenting one’s actions in order to appear appropriate and to fit in with group norms.

The results show how socialization impacts the way people from each group answer questions. For instance, when taking a survey, people from a European-American background would be more likely than those from an East Asian background to claim that they are unusually perceptive, skillful, and able to work independently. In contrast, someone from an East Asian background would be more likely than someone from a European-American background to deny engaging in transgressions such as littering, speeding, or gossiping. This makes it difficult to compare, for instance, self-reported rates of misconduct across cultural groups. “Surveys conducted across cultures must consider the distinct ways in which national or ethnic groups are likely to answer certain types of questions,” noted Shavitt. “It may mean, for instance, that someone from a European-American background would be more likely to admit to a bad pattern of consumer choices [IM], but also more likely to be overly optimistic about their ability to change that pattern on their own [SD E]. Our future research will address these sorts of implications.”

In the last five to ten years, there has been an explosion in cross-cultural survey research and the issues that surround it. Sensitivity to cultural differences is critical for institutions that serve people of different populations. Said Shavitt, “As businesses become global, understanding the differences in how consumers answer questions is very important to conducting valid market research.”

– Rosalyn Yates

For more information on the services provided by the Survey Research Laboratory, contact SRL’s main office at the University of Illinois at Chicago by calling 312-996-5300 or the office on the Urbana-Champaign campus at 217-333-4273. www.srl.uic.edu
The eBay Auction Experience

Professor of Business Administration Richard Engelbrecht-Wiggans, a self-professed “auction junkie,” has long frequented local auction houses and estate sales in pursuit of items for numerous hobbies. Then came eBay, which brought together buyers and sellers who had previously been unable to find each other and allowed them the chance to establish prices for items that previously did not have a market.

In the beginning, neither buyers nor sellers on eBay knew what sort of prices to expect, which led to some real bargains. In this auction junkie’s dream come true, Engelbrecht-Wiggans came away with a fair number of “finds.” It didn’t take long, however, for eBay bargains to become scarcer as naïve buyers with little understanding of the item being offered would bid the prices up beyond reason. Engelbrecht-Wiggans became frustrated but also curious about how eBay auctions might evolve and what might be learned from such auctions more generally.

Up for Bid

In any auction, potential bidders range from the very sophisticated to the totally naïve. Their knowledge regarding the worth of the item and how to bid to get the best possible deal varies widely. In the bidding process, the most crucial point is to know your own level of expertise and to know to adjust your bidding accordingly. Bidders who do not adjust their bids enough suffer from what has become known as the “winner’s curse.” The winner of an item tends to be the bidder who most overestimates its value.

Fact File

- Naïve bidders may well bid a price above what sophisticated bidders consider reasonable.
- Sophisticated bidders bid cautiously when competing with naïve bidders.
- Naïve bidders hurt sellers’ profits by influencing the behavior of sophisticated bidders.
- While market pressures will prevent the number of naïve bidders from becoming large, market pressures will not necessarily drive naïve bidders to extinction.

Using Mathematical Models to Study Bidding Behavior and Auction Prices

According to Engelbrecht-Wiggans sophisticated bidders realize that their knowledge is imperfect, take that into account when calculating their bid, and bid appropriately low. But a bidder who does not adjust enough will tend to win items at unfavorable prices; naïve bidders tend to be cursed with a monetary loss whenever they win the item.

In the real world, naïve bidders may learn from experience and become appropriately sophisticated. Those who do not learn may eventually lose enough money to be driven from the market place. Therefore, in the long term, one might expect naïve bidders to disappear. But that does not yet seem to be the case with eBay. So, Engelbrecht-Wiggans and George Deltas of the Department of Economics at Illinois examined this question: Will the naïve bidders disappear or can some survive long term? After considering these issues intuitively, they constructed formal mathematical examples to see if things would work out as their intuition suggested.
The Naïve-Bidder Effect

Engelbrecht-Wiggans and Deltas began their study with one naïve bidder and a number of sophisticated ones. Naïve bidders often bid the price above what any sophisticated bidder would consider reasonable. The sophisticated bidders realize that they cannot win at a reasonable price and have little hope of recovering whatever money, time, and effort it takes to research the value of the item. Therefore, they either refrain from bidding entirely or invest only minimal effort in estimating the item’s value, and thus bid very conservatively. However, if all of the sophisticated bidders either refrain from bidding or bid very conservatively, then the lone naïve bidder wins at a bargain price. Next, Engelbrecht-Wiggans and Deltas considered a market with some naïve bidders.

Sophisticated bidders, knowing that their competition in any particular auction may be naïve, still bid very cautiously. With few enough naïve bidders in the market, naïve bidders seldom end up bidding against each other; a sufficiently small number of naïve bidders will still do quite well. So, while market pressures will prevent the number of naïve bidders from becoming large, market pressures will not necessarily drive naïve bidders to extinction. A suitably small population of naïve bidders may be able to persist forever.

Where does this leave real-world sellers? Naïve bidders hurt sellers’ profits by changing the behavior of sophisticated bidders. If naïve bidders are not eliminated as the process evolves, then sellers may need to take matters into their own hands. And, indeed, certain real-world sellers employ strategies that actually have the effect of discouraging naïve bidders. On eBay, for instance, some sellers will only deal with bidders who have a history of having bid in other auctions without creating problems. Also, some farmland auctions require bidders to present letters of credit certifying they have the financing to make a purchase; in this case, the credit-granting agency may provide a reality check on any individual’s grossly inflated ideas of the land’s value. In cases of bidding for contracts, those seeking bids can set specifications for a job in an attempt to ensure that everyone fully understands what the contract will require and that only those up to the task actually bid.

The naïve-bidder effect described by Engelbrecht-Wiggans and Deltas is a very real phenomenon—and not just on eBay. Sellers who are aware of its impact can take action to counter it.

The Combinatorial Auction Experience

Traditional auctions sell goods, one at a time, to the highest bidder. However, when there are a number of goods for sale and potential buyers can bid for goods in bundles, some bidders may value a package of goods more than any single item. Mu Xia, assistant professor of business administration, has conducted research that examines the concept of bundled pricing—and its effects on buyers and sellers.

Imagine that a ticket broker has both a Cubs ticket and a White Sox ticket to auction and there are three interested bidders, Anna, Bill, and Carl. Anna, a Cubs fan, is only interested in the Cubs game. She is willing to pay up to $30 but would not take the White Sox ticket even for free. Bill, a not-so-loyal Sox fan, values the White Sox ticket at $20 but will attend a Cubs game if the ticket costs less than $5. Carl, an out-of-towner, would like to see both teams play but is not interested in just one game. He will pay $60 for the two tickets but only $10 for either one by itself. If the tickets are auctioned individually and no bidder knows how much other bidders value the tickets, then Carl will not bid over $10 for either ticket, fearing that if he ends up losing the auction of the second ticket he will be worse off than if he had not bid at all. The outcome of such an auction would be: Anna gets the Cubs ticket for $30, Bill gets the Sox ticket for $20, and Carl gets nothing.

In retrospect, the auction did not achieve the “best” outcome—that is, the
Auctioneers may earn larger profits by bundling items together rather than selling them individually.

In auctions that allow bundled bids, the process of determining who wins and how much they pay is more complicated. Because of the indivisible nature of the goods, both the bundle prices and individual prices are computed rather mechanically.

The auctioneer must decide what allocation will maximize revenue in a bundled bid situation.

Bundled Pricing

Xia, in his research with colleagues Gary Koehler of the University of Florida and Andrew B. Whinston from the University of Texas, raised the issue of individual versus bundled pricing and examined the different approaches taken by earlier researchers. In their 2004 research article, “Pricing Combinatorial Auctions,” in the European Journal of Operational Research, they propose a systemized approach to bundled pricing.

The first step is to determine who wins when there are true bundle bids—that is, when potential buyers bid on their preferred bundle of goods for a single price. In single-item auctions, the auctioneer simply awards the good to the highest bidder. However, in auctions that allow bundled bids, the auctioneer must decide, depending upon item availability, the allocation that brings the most revenue. In the earlier example, the auctioneer would want to maximize revenue, given that he has only two tickets to sell, so he would sell both to Carl.

The second step is to determine how much bidders should pay when they win their desired bundle. The price paid can be different from the bid in order to reveal the bidders’ true valuations and for individual items to be assigned a price. There are two approaches: the first is pricing the bundles (attaching a price to each bundle), and the other, individual pricing, computes a price for each individual item being auctioned, with the price for any bundle being the sum of prices of all the components.

Xia and his colleagues examined all the earlier research on these approaches and found that because of the indivisible nature of the goods both the bundle prices and individual prices are computed rather mechanically to satisfy some properties of the resulting prices. The goals of pricing are two-fold. First, given how the prices are computed, bidders would not want to misrepresent their valuation of the bundle—i.e., they will bid what they really value the bundle for. Second, the prices help explain why bidders won or lost a bundle and help bidders evaluate their bid for future auctions.

- Janet Fitch

Fact File

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- In auctions that allow bundled bids, the process of determining who wins and how much they pay is more complicated.
- Because of the indivisible nature of the goods, both the bundle prices and individual prices are computed rather mechanically.
- The auctioneer must decide what allocation will maximize revenue in a bundled bid situation.

Richard Engelbrecht-Wiggans is a professor in the Department of Business Administration. He graduated from Harvard University with a degree in chemistry and physics and earned a PhD in games and optimization from Cornell University. He enjoys teaching the theory and principles of auctions to students by conducting actual auctions in class.

Mu Xia is an assistant professor of information systems in the Department of Business Administration. After graduating from Tsinghua University, Beijing, China, he earned a PhD from the University of Texas at Austin.

George Deltas, an associate professor in the Department of Economics, earned his PhD from Yale University. His research interests include auctions and industrial organization.
Today, two out of every three Americans say they have participated in some form of gambling in the last 12 months. Many states across the country have turned to lotteries, riverboat casinos, and pari-mutuel betting in hopes of stimulating economic development and augmenting the tax base. John Kindt, professor of business and legal policy at the University of Illinois, has researched the costs and benefits of legalized gambling in the US and has presented his findings to state and federal legislative bodies weighing the economic and social issues associated with legalized gambling activity.

### Gambling and Economic Development

From a business perspective, the main issue is whether gambling constitutes a valid strategy for economic development. While the dollars invested in legalized gambling projects and the jobs initially created are evident, Kindt explains that the industry has been criticized for inflating the positive economic impact or trivializing the negative impact of legal gambling. He says the gambling industry misleads the public by financing “impact” studies instead of conducting “cost-benefit” analyses. Impact studies emphasize narrow job gains produced by a gambling activity, while cost-benefit analyses provide a broader perspective of the costs of such activities, including the impact on the criminal justice system, small businesses, other social institutions, and the overall economy. According to one study, licensed gambling is responsible for $289 in social costs for every $46 of social benefits.

In his April 2005 testimony before a US congressional committee, Kindt summarized all of the academic cost-benefit studies, indicating that the ratio is at least $3 in costs for every $1 in benefits. Legalized gambling also has an economic impact on other businesses. Just as new businesses choose not to locate in high-crime areas, they tend also to avoid areas where gambling activities are located. So it is often just the cluster of services associated with gambling that locate in the same area. When casinos are built in a new community, pre-existing businesses face added pressures due to displaced spending and bankruptcy, the rates of which are 18 to 42 percent higher than in nongambling communities.

Kindt also takes exception with the industry’s claims of economic development through job creation. Although locally there may be new jobs created initially, Kindt asserts that over time and across a region gambling actually has a negative effect on job creation. “The drains on society created by legalized gambling could easily translate into a net loss of jobs on a statewide or regional level,” he said. “Furthermore, it can be argued that the combined economic positives and negatives result in a net negative economic multiplier.” Electronic slot machines, for example, do not create net new jobs. Instead, each machine drains an average of $100,000 per year from consumer spending, which translates into a lost economic multiplier of $200,000 to $300,000 to the consumer economy, resulting in lost jobs.

### Sleight of Hand

Some economic impacts are deceiving. Traditional businesses in communities that initiate legalized gambling can anticipate increased personnel costs due to increased employee absenteeism and declining productivity. Kindt asserts that “the best blue-collar and white-collar workers, the Type A personalities, are the most likely to become pathological gamblers” and that “a business with 1,000 workers can anticipate increased personnel costs of $50,000 to $500,000 or more per year”—simply

The Economic Impact of Legalized Gambling

**PLAYING THE NUMBERS**

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Today, two out of every three Americans say they have participated in some form of gambling in the last 12 months. Many states across the country have turned to lotteries, riverboat casinos, and pari-mutuel betting in hopes of stimulating economic development and augmenting the tax base. John Kindt, professor of business and legal policy at the University of Illinois, has researched the costs and benefits of legalized gambling in the US and has presented his findings to state and federal legislative bodies weighing the economic and social issues associated with legalized gambling activity.

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because various forms of legalized gambling are accessible to its workers.

Another issue concerns the substitution of spending on gambling for other spending, particularly by people of limited income. Every $10 expended on gambling represents $10 that is not spent on food, clothing, transportation, or other forms of entertainment. A related problem is the fact that legalized gambling, particularly that set up to increase state or city revenues, constitutes a regressive tax. According to the National Gambling Impact Study Commission, disadvantaged socioeconomic groups tend to gamble with proportionately greater amounts of their overall income than do more educated and affluent citizens. Marketing efforts for state lotteries routinely target disadvantaged groups, leading some groups, such as the Illinois NAACP, to oppose gambling expansion.

What legalized gambling produces, says Kindt, are a variety of ills caused by pathological gambling. Unlike traditional businesses, gambling activities “cater to a market consisting of addicted and potentially addicted consumers,” and most pre-existing traditional businesses will find it quite difficult to compete for “consumer dollars” that are being transformed into “gambling dollars.” In South Dakota, for example, field research confirms that the introduction of widespread gambling, including casinos and video gambling terminals, increased the number of problem and probable pathological gamblers. Similar to drug addiction, gambling addiction has doubled from approximately 1 percent to 2 percent of the US public during the last decade, combined with a doubling of problem gambling from approximately 2.5 percent to 5 percent of the US public. More alarming, rates for teenagers and college students are double these adult rates.

According to the Maryland Department of Health and the Better Government Association, each newly created pathological gambler has been calculated to cost society from $13,200 to $52,000 per year. But these studies include only a portion of the social welfare, bankruptcy, and crime costs – costs that impose a burden on all businesses, particularly small businesses, which lack the asset base necessary to cushion against them.

Many gambling proponents try to tie the economic benefits of lotteries and other gambling activities to the educational

### Fact File

- The social costs of legalized gambling far outweigh the social benefits.
- Traditional businesses in areas where casinos are located incur increased personnel costs due to rising absenteeism and declining productivity.
- Economic benefits created by legalized gambling diminish rapidly, and in many cases casinos actually stall regional economic activity.
- Gambling revenue is substituting for, rather than augmenting, tax support of education, leading to decreased educational funding in “real” dollars.

### The Impact of Gambling Expansion

While state and local governments may benefit in the short run from revenue generated by licensed gambling, the economic benefits diminish rapidly. In many cases, casinos actually stall regional economic activity, resulting in increased state budget crises. From the economic and strategic-development perspective, major businesses are concerned with the trend toward expanding gambling, explains Kindt. “Among other reasons, non-gambling-related businesses will not be competing for consumer dollars or recreational dollars on a ‘level playing field,’ because legalized gambling can cater to an addicted and potentially addicted market segment.”

In addition, the trend toward expanding gambling does not necessarily equate to higher revenues for the taxing body. In Illinois, for instance, no more than 35 percent of casino revenues are returned to state and local governments, which according to Kindt means “that at minimum, two-thirds of the net money lost by Illinois gamblers goes back to Las Vegas. Simply put, you don’t have to expand gambling in Illinois to raise more tax money. Just raise the taxes on casinos in operation, and you’ll get revenues right away.” However, not everyone sees it that way. Kindt notes that earlier this year legislation lowering the taxes on Illinois casinos was sent to the governor for his approval, despite the fact that the Illinois Government Administration Committee had voted 8 to 1 to recommend to the legislature a bill that would actually eliminate Illinois casinos.

In the final analysis, says Kindt “gambling does not make a genuine contribution to economic development because it produces no product and no new wealth.”

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John Kindt is a graduate of the College of William & Mary and holds an MBA and a JD from the University of Georgia. He also earned two graduate degrees in international law from the University of Virginia. He joined the University of Illinois College of Business in 1978. His views on the economic effects of legalized gambling are often quoted in newspapers, magazines, and law journals across the country. Kindt advocated the establishment of the US National Gambling Impact Study Commission to analyze the multifaceted issues involved in the proliferation of gambling in the United States.
What does "earnings quality" mean and how is it measured?

Earnings quality is the extent to which reported earnings reflect operating fundamentals. There are many accounting choices that can be made, so there really isn’t any single, widely used, one-size-fits-all measure of the quality of earnings. However, one indicator that has become widely used by academics and practitioners is accounting accruals. This measure, which is useful for equity valuation, represents the difference between a firm’s accounting earnings and its underlying cash flow—the idea being that cash flow (“money in the bank”) is something tangible that can be measured and monitored. Large positive accruals indicate that earnings are much higher than the cash flows generated by the firm. The difference arises because of accounting conventions as to when and how much revenues and costs are recognized. When an increase in earnings is accompanied by high accruals, this suggests low-quality earnings.

The financial press has noted managers’ tendencies to put a good face on earnings, and the SEC has initiated a research program on earnings management. In the context of stock prices, to the extent that the market fixates on reported income and does not take into account the quality of a firm’s historical earnings, there may be temporary deviations of price away from their correct values. Put another way, measures of earnings quality may have predictive power for future movements in stock prices.
How does earnings quality influence a stock’s future price?

There is some evidence that the quality of reported earnings has a bearing on future stock price performance. Companies where reported earnings are much higher than the underlying cash flows generally have low-quality earnings and tend to have poor stock price performance in the future. In particular, companies that report improved year-on-year earnings but where the underlying cash has not improved, have disappointing returns.

There are three reasons why this is the case. It may be a signal of managers’ overly aggressive accounting of their revenues and expenses. Generally accepted accounting principles give firm managers some latitude in terms of the timing and magnitudes of revenues and expenses. As managers inflate earnings above cash flows, accruals rise. High accruals may reflect, for example, increases in accounts receivable as managers record sales prematurely, or they may reflect decreases in current liabilities as managers understate liabilities, such as warranty expenses. Because investors focus on reported bottom-line income, they are temporarily fooled.

Another explanation may be that a firm’s high level of accruals may be a reflection of strong past growth in sales. Investors may tend to be overly optimistic about such firms, extrapolating past trends from short histories too far into the future and thereby overestimating future sales growth.

A third explanation is that the firm may be experiencing a slowdown that investors do not immediately recognize. The components of accruals, such as changes in inventories, receivables, and payables, are commonly used by security analysts as indicators of business conditions. A build-up of inventories, for instance, may suggest overproduction or difficulties in generating sales. The components of accruals may serve as early indicators of improvement or deterioration in operating performance, but the market may be slow to react to this information.

It’s also possible that there is no one single explanation, but that all enter in. For example, when sales growth starts to slow, managers may face mounting pressures to inflate earnings in order to meet analyst forecasts, thereby leading to an increase in accruals. These pressures may be all the stronger insofar as investors and analysts maintain exaggerated expectations about future profitability growth. At the same time, inventory may start to accumulate as sales flatten, and accounts receivable may rise as competitive pressures force firms to extend better credit terms, so accruals increase.

What factors influence earnings forecasts and how does the forecasting process impact the market?

Wall Street analysts provide research reports and recommendations to their investor clients. At the same time, brokerage firms have an interest in portraying their corporate clients in the most positive light so that they can help them raise capital (and earn fees by doing so). During the late 1990s, these conflicts of interest unfortunately tilted analysts toward providing overly flattering forecasts of their corporate clients’ earnings. Research I’ve conducted with colleagues provides comprehensive evidence of systematic patterns of analyst behavior that document these conflicts of interest.

Analyst research may be tilted to favor a stock in several ways. Long-term growth rates in earnings and price targets may be overstated, the stock may receive a bullish buy recommendation, or an analyst may adjust forecasted earnings to ensure that actual earnings do not come up short of the estimate. Evidence of bias can be detected by tracking quarterly earnings surprises. Our results indicate that the cross-sectional distribution of earnings surprises in the US has undergone a pronounced shift. In particular, there is a rise in the proportion of non-negative earnings surprises over time, from 48.88 percent in the late 1980s to 75.59 percent in 1999-2000. The coincidence of this shift with the climb in the equity market as well as in underwriting activity is one clue that analyst bias due to conflicts of interest is the culprit here. Some of these conflicts of interest continue to influence forecasting— and thus, the market, today.

Editor’s Note
4 for 4 is a regular feature of Perspectives, which allows us to catch up with College newsmakers. We pose four questions and share the answers here.
Numbers from 2005 Recruiting Season Up

Data from Business Career Services show that the newest College of Business alumni were in demand when they graduated and left the Urbana campus this past May. BCS staff reported a 16 percent increase in the number of companies attending the Business Career Fair this spring (from 95 to 110). Although the same number of companies (147) interviewed on campus this spring as last, recruiters scheduled 17 percent more interviews (from 296 to 346) and job listings increased by 26 percent (from 504 to 636).

“The number of companies coming to campus to specifically recruit our students is a strong reflection of the quality of our program and the diversity of our students,” commented Lois Meerdink, assistant dean for career services. On-campus employer demand for majors this spring was the highest for majors in accountancy (119 companies), finance (114), economics (94), industrial distribution management (90), and marketing (88).

Fifty-three percent of 2005 College of Business graduates were offered starting bonuses for their jobs. The year before, 32 percent reported receiving bonuses. “Bonuses come and go with the job market,” said M Meerdink. Preliminary statistics show the average 2005 starting salary jumped from $43,383 to $46,227, about a 7 percent increase from a year ago.

BCS data reveal a heightened awareness by students of the need to hone their interview preparation skills. Unprecedented numbers of Business students—more than 1,500— took advantage of new and existing employment skills workshops in 2005. Among the new offerings were workshops featuring mock interviews, Wall Street internships, and a non-traditional accounting careers night. Previously offered sessions on “working” the career fair, researching a company, and resume review continue to be popular. Corporate support for special programs remains strong.

Individual career advising appointments in spring topped 1,400 in 2005. BCS staff coordinate the range of services provided to Business undergraduate and graduate students.

Financial Literacy Focus of Summer Research

Illinois is one of only three states currently requiring that high school students receive financial literacy education that will prepare them to effectively self-manage their financial resources, including retirement accounts. South Dakota and New Hampshire are the only other states that mandate financial education, according to a study conducted by three undergraduate students who participated this summer in the Summer Research Opportunity Program (SROP). The federally funded program is designed to expose students who are from under-represented groups to graduate study and graduate-level research at a research-intensive institution.

Irma Briones, enrolled at St. Edwards University in Texas, Kimberly Ng, studying at Pontifical Catholic University in Puerto Rico, and Clarissa Turner, enrolled at Livingstone College in North Carolina, concluded that high school curricula across the U.S. reflect a systematic lack of education addressing personal financial topics. The team also looked at a variety of socio-economic indicators such as per capita income and education expenditures per pupil to see if the data correlated to state requirements for financial literacy programs. They found no evidence that the indicators are related to state high school graduation requirements.

The trio worked on the project with mentors Virginia France, assistant professor of finance, and Michael Sandretto, an instructor in accountancy.

New Name, Same Great Services and Experiences

Illinois Business Consulting (IBC), formerly called OSBI Consulting, announced its new name in mid-August with a modified business model and some fresh ideas to implement. IBC staff wanted a name that is more descriptive of their service portfolio, which includes all aspects of business consulting such as financial modeling, market analysis and feasibility studies, and strategy formulation. Traditionally, Illinois MBA students have provided the consulting services, with more limited participation from students in other Business programs. IBC staff members now actively recruit students—both graduate and undergraduate—from all College of Business curriculums and all colleges on campus to serve on client teams.

IBC provides consulting services to organizations large and small, profit and not for profit. A 5K run at the University of Illinois' Arboretum on campus is scheduled for October 1 to raise funds to support services to non-profits.

For more information about IBC and the 5K run, check the website: www.ibc.uiuc.edu.

Military Veterans Scholarship Announced

The College of Business announced in May the establishment of a $250,000 education scholarship fund for military veterans and active members of the military from Illinois. The fund will provide financial assistance to qualified applicants admitted either to the part-time MBA program on the Urbana campus or to the 20-month Executive MBA program offered at the Illini Center in downtown Chicago.

Scholarships will be based on need, merit, or both, said Robert G. van der Hooning, director of executive education at the College. The scholarship is not to exceed 15 percent of program cost and may be combined with grants from other military assistance programs, such as the Illinois Veteran Grant Program. By combining the scholarship fund with the IVG program, qualified students may reduce overall program costs by more than 50 percent, van der Hooning said. The scholarship program will be available through 2007.

For more information, visit www.mba.illinois.edu.
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