

## Behavioral Economics

### How Bias and Irrationality Impact Decision-Making

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For most of its history, economics was assumed to be a purely rational exercise, with actors making financial decisions based on logic and self-interest. That all changed in the 1970s, when two Israeli psychologists, Daniel Kahneman and Amos Tversky, began exploring what they called “heuristics and biases,” which explored the way emotions and irrationality affect our financial decision-making. Although their ideas were initially met with significant skepticism among economists, the field that became behavioral economics is now not only widely accepted but an area of great public interest. It’s been made known to broader audiences by Michael Lewis’s current bestseller “The Undoing Project,” a biography of Kahneman and Tversky.

One of the most widely respected promising thinkers in the field is Urike Malmendier, an economics professor at the University of California, Berkeley. Malmendier, the winner of the Fischer Black Prize in finance, has performed landmark studies on how people’s biases, errors and non-rational behavior play out in the marketplace, as well as in the way they make personal decisions.

Kahneman has cited Malmendier’s work on the dangers of overconfidence, and its dangerous effects on even successful businesses. OUTLOOK spoke with Malmendier about some of the biases we’re most susceptible to, why they persist and why even the experts aren’t immune.

***OUTLOOK: How do you define behavioral economics? Is it just about the things we do to undermine our own financial interests?***

***Urike Malmendier:*** People certainly do have non-rational beliefs that can work against their own best interests. But that’s only part of it.

Standard economics assumes that everything we choose to do, economically and financially, is intended to maximize our own payoff. In behavioral economics, we consider the many reasons why that might not happen. Sometimes it’s intentional and rational. Maybe we’re altruistic, such as toward our children and our families. Social pressure could also cause us to act in a particular way—we don’t want to deviate or stand out. And sometimes our beliefs are wrong and not rational. For example, we always think that tomorrow we’ll start eating less and exercising more, and then tomorrow comes and we don’t do that.

## This Month's Expert



A native of Germany, Dr. Ulrike Malmendier is the Edward and Mollie Arnold Professor of Finance and Professor of Economics

at the University of California, Berkeley. In 2013, her ground-breaking research in corporate finance, behavioral economics and other areas earned her the Fisher Black Prize from the American Finance Association, given every other year to the top financial scholar under 40.

Dr. Malmendier earned her Ph.D. in law from the University of Bonn in 2000 and a Ph.D. in business economics from Harvard University in 2002. Her studies of human behavior and economics run the gamut from CEO overconfidence to the frugality of people raised during the Great Depression, to why people join gyms that they seldom use. She is a founder of the Behavioral Economics Annual Meeting and co-director of the Behavioral Initiative at UC Berkeley. She has served as co-editor and associate editor of several journals in economics and finance. Dr. Malmendier won a 2017 Guggenheim fellowship and was recently elected to the American Academy of Arts & Sciences.

### **OUTLOOK: What are some of the behavioral biases to which we're subject?**

**UM:** Overconfidence is a big one. It can cause investors to assume they know more than they do about the future direction of the market, and to invest based on their overoptimism rather than on more rational expectations. My research has shown that CEOs often overestimate the value they can generate for their companies. As a result, they engage in investment projects and merger decisions that are not optimal for their companies—even though the CEOs think they're optimal. They're not trying to hurt shareholder value; they just keep overestimating the future returns that the moves they make will generate. Our studies have shown they have wrong beliefs about the likelihood of good outcomes.

### **OUTLOOK: How did you measure CEOs' overconfidence?**

**UM:** We looked at the extent to which they “put their money where their mouths were,” by examining documents they're required to file about their trading activity. We assumed that if they really believed they were going to generate more and more value for their companies, they would rarely sell their shares, and they wouldn't exercise their stock options until just before they expired—because the longer they waited, the more the stock would be worth.

That's not the rational way to invest. CEOs tend to get a lot of their compensation in company stock, and it's dangerous to have so much of your portfolio concentrated so narrowly. So, to the extent that they're allowed to do so, it makes sense for CEOs to sell their company stock and to exercise their stock options as soon as they can. Then they can invest the proceeds in a diversified portfolio.

In our study, many CEOs did the smart thing and diversified. But between 10 percent and 50 percent of CEOs, depending on the time period considered, held on to their stock and their options for an unreasonably long time. And on average, these overconfident CEOs ended up with lower portfolio values than they would have had if they had sold their options two to five years before expiration and diversified into an S&P 500 portfolio. They also made merger decisions that tended to perform significantly worse than those of their non-overconfident peers.



Markets can be very good at picking out what your bias is and extracting money from you.”

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***OUTLOOK: How do businesses use ideas of behavioral economics to influence consumers?***

**UM:** Markets can be very good at picking out what your bias is and extracting money from you. Take, for example, our annual ritual of vowing to get back in shape. At the outset, we tell ourselves we’re going to commit to working out several times a week. Membership gyms are very adept at picking up on that overconfidence. Say there’s a gym near your home that charges \$10 for a single visit. But then you sit down with a manager who offers you a membership for \$80 per month. Divide that \$80 by the several visits a week you think you’re going to make, and you’re paying much less than \$10 per visit—which the manager readily points out.

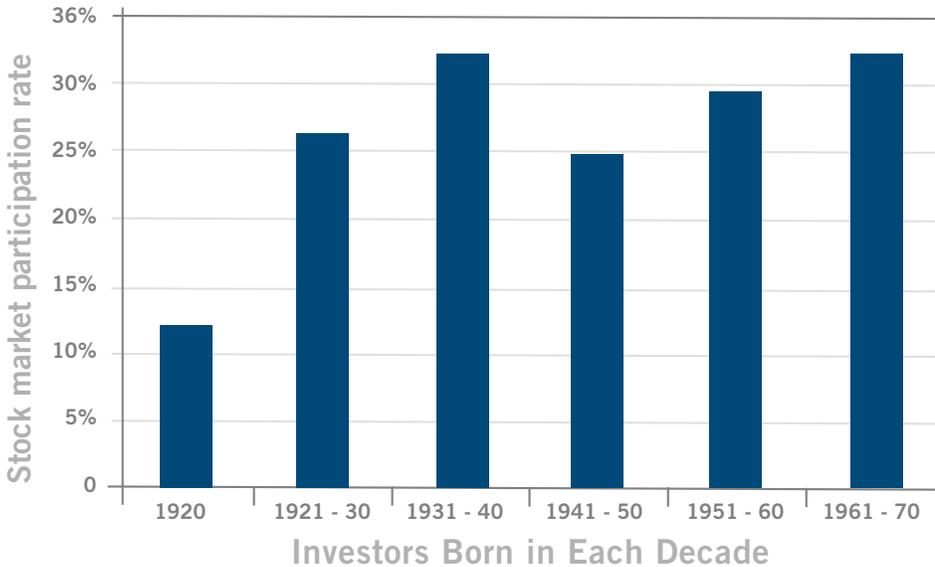
So you join, and after a short while your life gets so busy that you’re down to a couple of visits a month, or none. You’re basically paying \$80 a month for not exercising. In our study, “Paying Not to Go to the Gym,” 85 percent of those who chose a monthly contract didn’t go to the gym often enough to justify the cost. They overestimated their resolve—because of their wrong beliefs. And firms are eager to cater to this overestimation.

***OUTLOOK: Could a government or a company design policies to help people overcome their behavioral biases that lead to poor decisions?***

**UM:** Yes. Many people have looked at ways to do that. For example, if you have to sign up for a program, you may procrastinate. Suppose your company has a retirement savings plan, and offers to match your contributions. Enrolling is generally a smart thing for you to do, and you may tell yourself every day that you need to sign up. But you not only have to fill out the paperwork; you also have to investigate different investment opportunities and decide where to put your money. So you put off that task until tomorrow—and when tomorrow comes, you tell yourself the same story.

But what if the company changed the policy so that everyone is automatically signed up but can opt out at any point? That’s not forcing you into anything. It’s just a way to make sure the benefits don’t get lost. There’s been a lot of excitement in several governments using those types of incentives, and we have strong evidence from private companies that such changes pay off in terms of big changes in people’s behavior. Unfortunately, we have less evidence so far from changes implemented by governments.

**MACROECONOMIC EXPERIENCES AFFECT RISK-TAKING**



Malmendier found that individuals who had lived through economic shocks were much more risk-averse investors from ages 36 to 45. (Due to data limitations, the average for the 1920 cohort includes just ages 44 and 45.) The 1921-30 cohorts came of age during the Depression, while the 1941-50 cohort lived through the lean years of the 1970s.

Source: Ulrike Malmendier and Stefan Nagel

**OUTLOOK:** *How do people’s past investing experiences affect their willingness to take investment risks?*

**UM:** One pillar of behavioral research has been that everyone is born with a set of preferences and risk attitudes that don’t change throughout that person’s life. But it’s becoming increasingly clear that the events we live through alter who we are, affect the choices we make, and how we perceive risk. We call this the “experience effect”—how your decision-making processes are affected by your lifetime experiences. And it affects everyone.

In one project we did to demonstrate how important lifetime experiences are in shaping behavior, we measured the financial market conditions that people had experienced throughout their lives. Specifically, we looked

at the performance of the stock market since the time they were born. Our assumption was that if, by that measure, you’ve lived through comparatively good times, you would be more likely to have a relatively large portion of your liquid assets in the stock market. You’d expect your good experience to continue, and you want to take advantage of that by being in the market. And that’s exactly what we found.

Of all of the groups we looked at, the generation that lived through the Great Depression as teenagers or adults had the lowest average participation rate in the stock market—13 percent. Those born from 1931 to 1940, who experienced the post-World War II boom years during their young adult lives, had twice that participation rate. For the 1941 to 1950 group, the rate dips again, consistent with the fact that they reached their peak investing years during the market slump of the 1970s.



If I look at when each of those people on the Fed Open Market Committee was born and see what inflation they've lived through, I can predict which way they'll lean in predicting future inflation.”

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***OUTLOOK: Do the same forces apply to other parts of a person's finances?***

**UM:** Yes. People who've lived through periods of high inflation, like we saw in the 1970s, tend to have excessively high expectations of inflation. That affects their financial choices. They may want to take a larger mortgage than someone else would, and they will always go for a fixed rate. The intuition is that, because people with high inflation experiences think future inflation will continue to be high, they assess the real value of their repayment obligations as overly low, and they may also view real estate as an inflation hedge. This logic does not apply to adjustable-rate mortgages, which adjust to inflation; hence the preference for fixed-rate mortgages.

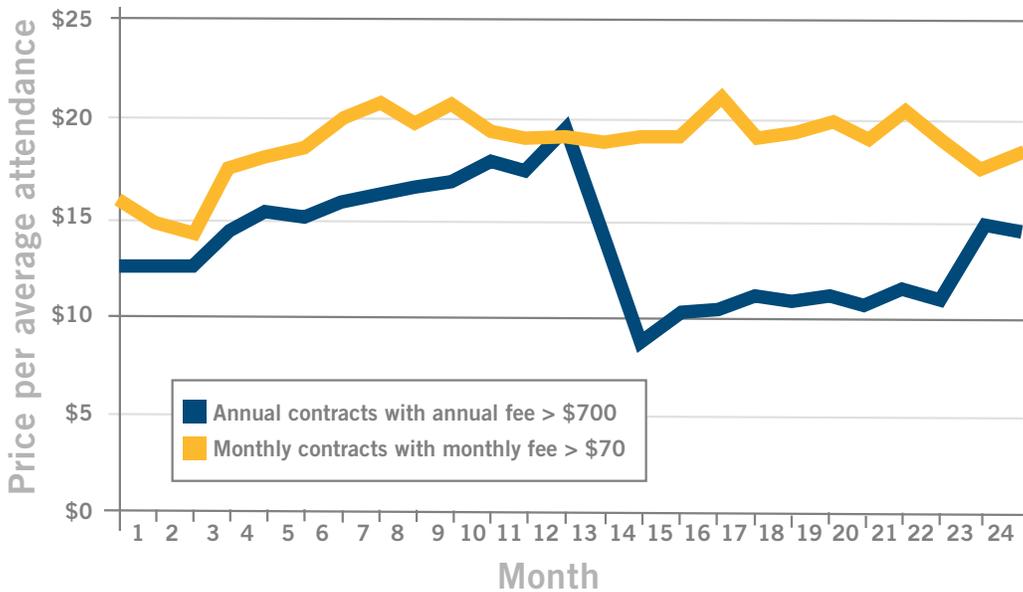
Incidentally, financial experts are just as susceptible as everyday citizens. Think about the members of the Federal Open Market Committee—the people whose inflation expectations lead to the Federal Reserve's decisions about interest rates. Twice a year they have to submit to Congress their beliefs about future inflation. If I look at when each of those people was born, and I see what inflation they've lived through, I can predict which way they'll lean in predicting future inflation. If they've lived through high inflation, they'll tend to overestimate future inflation relative to their FOMC peers.

***OUTLOOK: Does the experience effect influence the future direction of the stock market?***

**UM:** We're finding that it can help explain a big chunk of overall market movements. From prior research, we know that the price/earnings ratio of the whole stock market tends to say a lot about future returns. If stocks are valued rather highly relative to their earnings—if the p/e ratio for the market is high—then there is likely to be future underperformance. The market will tend to fall back toward its long-time averages.

But observing a higher-than-normal p/e ratio for the market right now begs the question of why the market is so highly valued. It turns out that the lifetime experience effect of investors helps to explain it. When the people who are wealthy enough to invest a lot in the stock market happen to have experienced mostly positive market returns, then p/e ratios tend to be high. These investors are excited about stocks and willing to invest at a relatively high price. But if instead, most people in that age group have had a bad experience, p/e ratios are going to be lower, and the stock market will go down.

**PAYING NOT TO GO TO THE GYM**



Malmendier's research showed that gym members who bought a monthly contract ended up spending more than the average of \$10 per drop-in visit available to non-members.

Source: Ulrike Malmendier and Stefano DellaVigna

**OUTLOOK:** What does that mean for millennials, who've had pretty negative financial experiences during their lives so far? Will markets tend to suffer as they reach their investing prime?

**UM:** That is exactly my prediction. We'll find out in a decade or two, when they have accumulated sufficient wealth and are of the right age to be a major force in the market. But if you look at the individual birth years for millennials and consider the weak average market performance during their lifetimes, that should influence their willingness to invest in the stock market and could affect overall market valuations.

**OUTLOOK:** Do behavioral economists ever fall victim to the same biases they study in others?

**UM:** Of course! Just about anyone involved in behavioral research will tell you how much we are all affected by the biases we study. Now, I do think there are certain advantages in spending so much time exposed to these concepts. You learn to recognize some of the warning signs. For example, when the market crashed in 2008, I didn't sell my investments in a panic or stop investing in stocks, as many investors did. I'd had the importance of diversification drilled into me. If anything, I may have invested more broadly after the crash. By the same token, I think I've largely avoided the behavioral trap of overconfidence when it comes to my research—which, if unchecked, can lead to false conclusions.

In other ways, though, I'm completely susceptible. For example, one of my fallacies is overconfidence in managing my own schedule and time. I always think I will be able to squeeze in yet another task, or be able to arrive on time for things, when logic says otherwise. I have all these overlapping items in my Google calendar. Intellectually, I can understand why this creates problems, but even after so many years I haven't learned to overcome it. The amount of things I believe I can fit into one hour is just ridiculous.

# Interest Rates and Economic Indicators

The interest rate and economic data on this page were updated as of 4/30/17. They are intended to provide rate or cost indications only and are for notional amounts in excess of \$5 million except for forward fixed rates.

## KEY ECONOMIC INDICATORS

Gross Domestic Product (GDP) measures the change in total output of the U.S. economy. The Consumer Price Index (CPI) is a measure of consumer inflation. The federal funds rate is the rate charged by banks to one another on overnight funds. The target federal funds rate is set by the Federal Reserve as one of the tools of monetary policy. The interest rate on the 10-year U.S. Treasury Note is considered a reflection of the market's view of longer-term macroeconomic performance; the 2-year projection provides a view of more near-term economic performance.

## ECONOMIC AND INTEREST RATE PROJECTIONS

Forecasts courtesy of Bloomberg and Blue Chip Economic Indicators

				US Treasury Securities	
2017	GDP	CPI	Funds	2-year	10-year
Q2	2.70%	1.80%	1.00%	1.48%	2.60%
Q3	2.40%	2.30%	1.13%	1.61%	2.72%
Q4	2.40%	2.30%	1.24%	1.78%	2.84%
2018	GDP	CPI	Funds	2-year	10-year
Q1	2.40%	2.40%	1.31%	1.93%	2.90%
Q1	2.50%	2.30%	1.40%	2.12%	2.98%

## PROJECTIONS OF FUTURE INTEREST RATES

The table below reflects current market expectations about interest rates at given points in the future. Implied forward rates are the most commonly used measure of the outlook for interest rates. The forward rates listed are derived from the current interest rate curve using a mathematical formula to project future interest rate levels.

## IMPLIED FORWARD SWAP RATES

Years Forward	3-month LIBOR	1-year Swap	3-year Swap	5-year Swap	7-year Swap	10-year Swap
Today	1.20%	1.39%	1.74%	1.96%	2.12%	2.29%
0.25	1.42%	1.48%	1.82%	2.02%	2.17%	2.31%
0.50	1.48%	1.58%	1.88%	2.07%	2.20%	2.34%
0.75	1.52%	1.69%	1.95%	2.13%	2.26%	2.40%
1.00	1.66%	1.77%	2.01%	2.18%	2.30%	2.41%
1.50	1.82%	1.91%	2.12%	2.27%	2.38%	2.50%
2.00	1.93%	2.05%	2.19%	2.31%	2.42%	2.52%
2.50	2.04%	2.13%	2.28%	2.38%	2.47%	2.56%
3.00	2.16%	2.21%	2.37%	2.45%	2.53%	2.61%
4.00	2.32%	2.36%	2.47%	2.55%	2.60%	2.67%
5.00	2.42%	2.48%	2.55%	2.66%	2.68%	2.71%

## HEDGING THE COST OF FUTURE LOANS

A forward fixed rate is a fixed loan rate on a specified balance that can be drawn on or before a predetermined future date. The table below lists the additional cost incurred today to fix a loan at a future date.

## FORWARD FIXED RATES

### Cost of Forward Funds

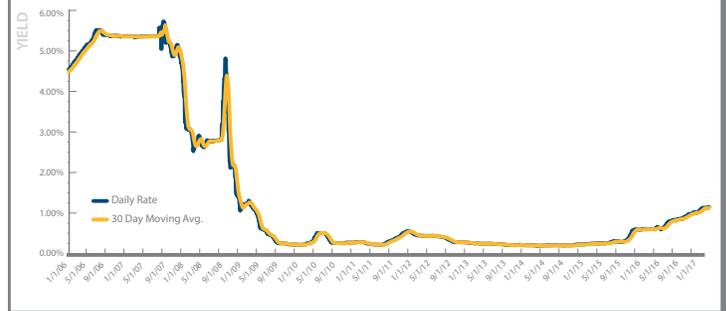
Forward Period (Days)	Average Life of Loan			
	2-yr	3-yr	5-yr	10-yr
30	5	5	5	5
90	10	11	11	9
180	14	18	19	16
365	34	36	37	30

Costs are stated in basis points per year.

## SHORT-TERM INTEREST RATES

This graph depicts the recent history of the cost to fund floating rate loans. Three-month LIBOR is the most commonly used index for short-term financing.

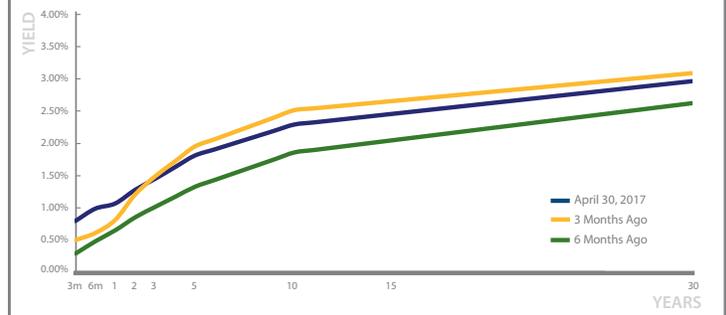
## 3-MONTH LIBOR



## RELATION OF INTEREST RATE TO MATURITY

The yield curve is the relation between the cost of borrowing and the time to maturity of debt for a given borrower in a given currency. Typically, interest rates on long-term securities are higher than rates on short-term securities. Long-term securities generally require a risk premium for inflation uncertainty, for liquidity, and for potential default risk.

## TREASURY YIELD CURVE



## COBANK UPDATE



## CoBank Reports First Quarter Financial Results

CoBank has announced strong financial results for the first quarter of 2017. Net income for the quarter rose 8 percent to \$262.8 million, primarily driven by higher net interest income and noninterest income, partially offset by a higher provision for loan losses and increased operating expenses. Net interest income for the quarter increased 6 percent to \$356.1 million, from \$336.9 million in the same period last year, primarily due to higher average loan volume.

Average loan volume rose 9 percent in the first quarter to \$97.9 billion, from \$89.8 billion in the same period last year. The increase resulted from higher levels of borrowing from customers in all three of the bank's operating segments, including farmer-owned cooperatives, agricultural export finance customers, other food and agribusiness companies, affiliated Farm Credit associations, and rural electric cooperatives.



Tom Halverson

“CoBank benefited during the quarter from trends in the U.S. grain markets, which drove a substantial increase in demand for seasonal financing from farmer-owned grain elevators and other grain industry customers,” said Tom Halverson, president and chief executive officer. “While loan growth would have been more modest otherwise, we are nonetheless pleased with our business performance for the quarter and the overall financial condition of CoBank.”

Credit quality in the bank's loan portfolio remained strong compared to historical averages. At quarter-end, 0.93 percent of CoBank's loans were classified as adverse assets, compared to 0.81 percent at December 31, 2016. Nonaccrual loans decreased to \$188.3 million at March 31, 2017, from \$207.2 million at December 31, 2016, primarily due to a small number of agribusiness loans that were paid off during the 2017 period. The bank recorded a \$15.0 million provision for loan losses in the first quarter of 2017 compared to an \$8.0 million provision in the first quarter of 2016. The 2017 provision was due to growth in loan volume as well as slight deterioration in credit quality in the bank's agribusiness operating segment. The bank's allowance for credit losses totaled \$677.1 million at quarter-end, or 1.34 percent of non-guaranteed loans when loans to Farm Credit associations are excluded.

## About CoBank

CoBank is a \$128 billion cooperative bank serving vital industries across rural America. The bank provides loans, leases, export financing and other financial services to agribusinesses and rural power, water and communications providers in all 50 states. The bank also provides wholesale loans and other financial services to affiliated Farm Credit associations serving farmers, ranchers and other rural borrowers in 23 states around the country.

CoBank is a member of the Farm Credit System, a nationwide network of banks and retail lending associations chartered to support the borrowing needs of U.S. agriculture, rural infrastructure and rural communities. Headquartered outside Denver, Colorado, CoBank serves customers from regional banking centers across the U.S. and also maintains an international representative office in Singapore.

**For more information about CoBank, visit the bank's web site at [www.cobank.com](http://www.cobank.com).**

## COBANK UPDATE

### CoBank Reports First Quarter Financial Results *Continued*



David P. Burlage

“Lower commodity prices are affecting some of our agribusiness borrowers, which is starting to impact credit quality in that portion of our loan portfolio,” said David P. Burlage, CoBank’s chief financial officer. “Further modest deterioration in credit quality is anticipated as long as commodity prices remain low. Overall, however, the risk-bearing capacity of the bank is strong, and we remain well-positioned to meet the borrowing needs of our customers.”

Capital levels for CoBank remained well in excess of regulatory minimums. As of March 31, 2017, shareholders’ equity totaled \$8.7 billion, and the bank’s total capital ratio was 14.7 percent, compared with the 8.0 percent (10.5 percent inclusive of the fully phased-in capital conservation buffer) minimum established by the Farm Credit Administration (FCA), the bank’s independent regulator. At quarter-end, the bank held approximately \$30.4 billion in cash, investments and overnight funds and had 188 days of liquidity, which was in excess of FCA liquidity requirements.

Halverson noted that, despite solid first quarter results, CoBank faces a number of marketplace challenges that could impact earnings over the balance of the year.

“Like all banks, we continue to deal with intense competition for the business of our customers, downward pressure on margins and low interest rates that impact returns on invested capital,” Halverson said. “We remain focused on the factors that we can control and on providing outstanding value to our customers and Farm Credit partners. We are confident in our ability to adjust to market conditions and continue fulfilling our vital mission of service to rural America.” ■