

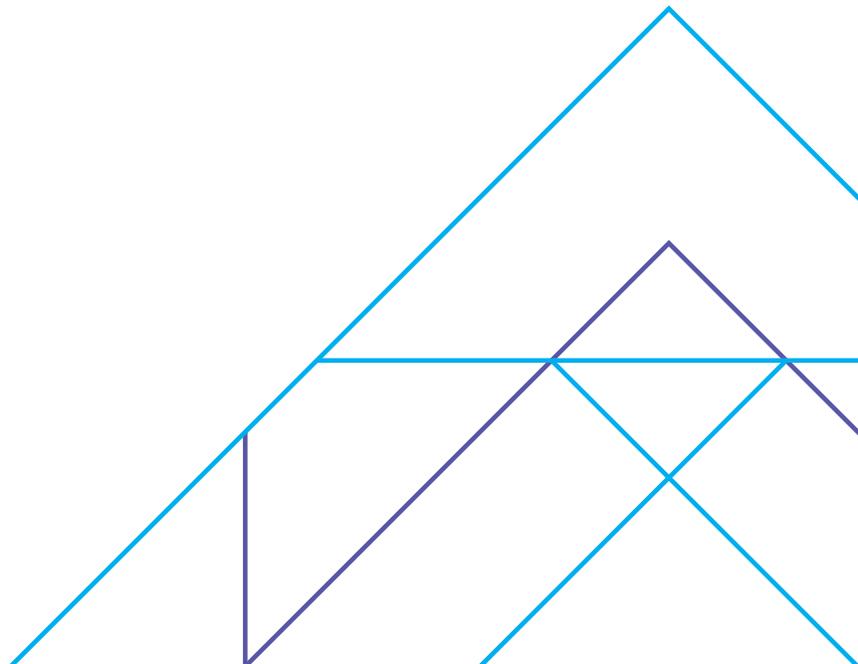
July 2018

Words from the Wise

An AQR Interview with Richard Thaler

Richard Thaler, a founding father of behavioral finance and 2017 recipient of the Nobel Prize in Economics, discusses his pioneering research, including how our behaviors influence decision making and investing and what to do about it. This is the eighth in a series of *Words from the Wise* interviews to be published on AQR.com.

Richard H. Thaler is the Charles R. Walgreen Distinguished Service Professor of Behavioral Science and Economics at the University of Chicago Booth School of Business. He was awarded the 2017 Nobel Memorial Prize in Economic Sciences for his contributions to the field of behavioral economics. He is an author or editor of six books, including the recent *Misbehaving: The Making of Behavioral Economics* (2015), the global best seller (with Cass R. Sunstein) *Nudge: Improving Decisions About Health, Wealth, and Happiness* (2008), *The Winner's Curse: Paradoxes and Anomalies of Economic Life* (1994), and *Quasi-Rational Economics* (1991). He is a member of the National Academy of Science and American Academy of Arts and Sciences, a fellow of the American Finance Association and the Econometrics Society, and served as the president of the American Economic Association in 2015.



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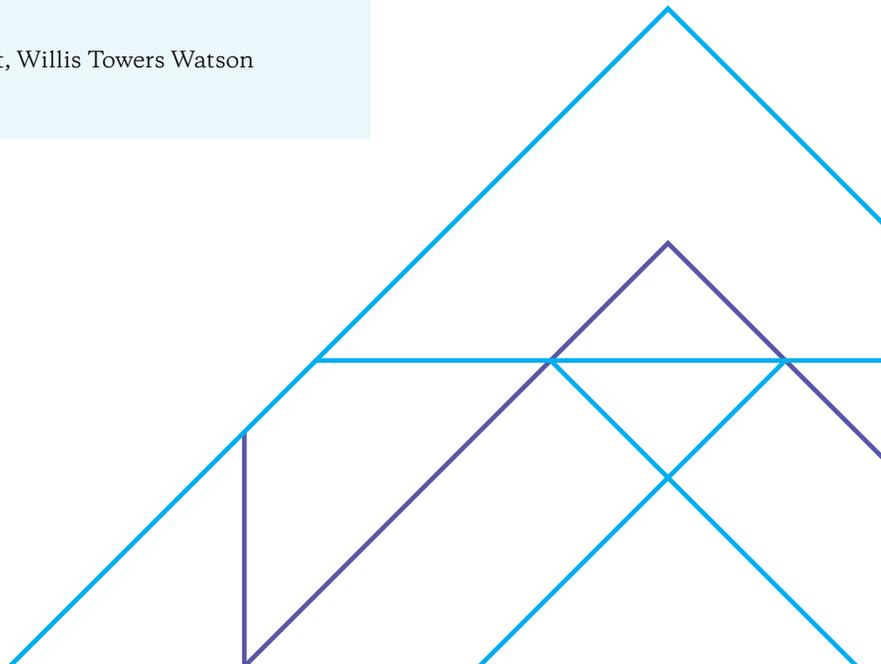
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Executive Summary

Richard Thaler's research contributions lie at the intersection between economics and psychology in that his studies challenge the standard economic assumption that decision makers are always rational and selfish. Here, he finds that individuals are much more human than the so-called *homo economicus* ("economic man"); that is, humans sometimes make irrational decisions. Our conversation with Professor Thaler begins with a brief behavioral economics retrospective discussing how all economists, from the very early days of Adam Smith, considered the human behaviors of everyone in the economy, but then we lost sight of the human element for a while. We then turn to examining how behavioral economics has once again found its place in the economist's toolkit and how it influences modern day thinking and research. As one example, it helps in thinking about the degree of market efficiency and the behavioral characteristics possibly embedded in asset pricing models. This then leads naturally to a discussion of the degree to which investors are able to exploit irrational market behaviors. Along the way, we also learn about the three categories in which behavioral finance can be a useful tool for improving outcomes: self-improvement; improvement of others, and investing. Here, we consider the concept of nudge theory and the powerful impact it has had, among many others, on helping people save more for retirement. We conclude by hearing about Thaler's most proud accomplishments, his heroes, and whether he has any regrets.

Evolution of Behavioral Finance

Sullivan: You're regarded as one of the fathers of behavioral economics, and it seems as though it's taken a long while for behavioral economics to take its rightful place alongside the other pillars of finance and economics. Do you agree, and if so, why do you think it's taken so long?

Thaler: Well, in the very early days, all economics was behavioral; certainly, Adam Smith was a behavioral economist.¹ For example, in his *The Theory of Moral Sentiments* (1759), he discusses self-control problems. In my language, this is about our eternal conflicts between our immediate desires and impulses — what I call our “doer” — and our more reasoned and far-sighted thoughts — what I call our “planner.” Smith used the “impartial spectator” instead of planner, but the ideas are essentially the same. Smith also talks about other aspects of human nature emphasized by modern behavioral economists including loss aversion and overconfidence. So, Smith was definitely a behavioral economist.

There were many other important contributions to behavioral economics, but I would say that the father of behavioral finance is John Maynard Keynes. His [Chapter 12](#), “The State of Long-Term Expectation,” from *The General Theory* (1936) is brilliant. I don't know the last time you read that, but go back and read it. You'll see that he anticipates things like limits to arbitrage, and of course the famous beauty contest was a deep insight.²

Sullivan: I remember he also discussed how in making decisions on issues we don't really understand, we just follow what our neighbors do.

Thaler: Yes, which relates to the famous line that it's better to fail conventionally than succeed unconventionally.³

Sullivan: Yes, exactly.

Thaler: Then there's another great line about the excess volatility of stocks, how markets overreact to news,⁴ which anticipates some of Shiller's work (e.g., 1981).

So, economics was totally behavioral up until around the 1950s. I think what happened was that some of the prominent economists around that time set out to make economics more rigorous. This is a completely admirable activity, because until you make it rigorous, nobody really knows what it is exactly. Samuelson, Arrow, Solow, among others, and even von Neumann and Morgenstern earlier, all took a big step forward for economics by rigorously writing down the math.

Then what I think happened is that a curious norm developed: If the agents in my model are smarter than the agents in your model, then my model is better than your model. Consider the well-known consumption models. So, Keynes' model is C (consumption) is proportional to Y (income), which

1 See, for instance Ashraf, Camerer, and Loewenstein (2005): <https://www.cmu.edu/dietrich/sds/docs/loewenstein/AdamSmith.pdf>.

2 "... professional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the fancy of the other competitors, all of whom are looking at the problem from the same point of view."

3 "Worldly wisdom teaches that it is better for reputation to fail conventionally than to succeed unconventionally" (Keynes 1936).

4 "Day-to-day fluctuations in the profits of existing investments, which are obviously of an ephemeral and non-significant character, tend to have an altogether excessive, and even an absurd, influence on the market" (Keynes 1936).

by the way, is a very good, approximation. Then Friedman comes along and says, no, it's not just Y , it's Permanent Y , defined as a three-year moving average of Y . Well, that's clearly a smarter, better model. Then Modigliani comes along with a more complicated version in which consumers plan their entire lifetime consumption path, and then Barro added future generations, and so on. There was no logical place to stop, and so the models get more and more sophisticated.

I enter the story around 1980, armed with my buddies Kahneman and Tversky, who are providing these brilliant demonstrations of, say, framing effects that threaten any model. For example, they show that people (including physicians) make different choices between treatments depending on whether the outcomes are expressed in terms of the probability of living or dying, although they are just two ways of expressing the same probability. So words matter! But try writing down a formal model that's going to capture whether our experiment uses P instead of $1 - P$. No formal model is going to say those two things are different from one another, but they are.

Sullivan: Some say that you and Fama actually agree on much more than you disagree, that the divide between efficient and inefficient markets isn't as wide as people think. Do you agree?

Thaler: Gene is a good friend of mine, and like all of us, he follows where the research leads. Take his view on the CAPM, which has evolved over the years. Early in his career, he thought the market factor alone provided an accurate model of markets. However, his research has since shown that additional explanatory factors help explain the cross section of returns, which has led to the

three-factor model, and now a five-factor model, which improves on the single-factor CAPM.

Ilmanen: Where do you see the two camps diverge?

Thaler: Mainly on the interpretation of the empirical evidence — whether the factors are mainly driven by risk or behavior. Within the three-factor model, value certainly has a plausible risk interpretation (although there is no evidence that value stocks are in fact riskier than growth stocks). However, there have been explanatory factors added more recently that have been shown to be quite robust but have no plausible risk story. The profitability and momentum factors are good examples.

Ilmanen: What lessons have you learned from Fama and others from the rational camp?

Thaler: All of my research in finance starts with the efficient market hypothesis as the null hypothesis, just as my work on self-control and individual saving started with the life cycle model as the null hypothesis, which assumes that people rationally plan their savings and consumption behavior over their life cycle. Standard models have been essential building blocks to behavioral economics.

I have also learned a great deal from the Fama-French three-factor model and its extensions, as I alluded to a moment ago.

Ilmanen: How do limits to arbitrage influence your view of market efficiency?

Thaler: Take the Palm and 3Com mispricing case around the year 2000; yes, there were limits to arbitrage preventing the convergence of the two

stock prices, but that market was just too small for firms like AQR to trade on the arbitrage opportunity at a meaningful size. Also, I should point out that the mispricing still requires Larry Summers's "idiots" (Summers 1986) because there were people who were buying just Palm. That's not limits to arbitrage; that's just irrational behavior, right?

IImanen: How has research changed with the rise of behavioral economics?

Thaler: I think we've now had more than 20 years of PhD students who have been learning about behavioral economics and are treating it as just part of the repertoire of economist's tools. Consider Raj Chetty, who's perhaps the best economist of his generation. Although he doesn't identify as one, he's partly a behavioral economist; that is, he's as behavioral as he needs to be. For instance, he writes a paper about whether taxes are salient or not (Chetty, Looney, and Kroft 2009). That's a research question he probably wouldn't have written about if he had been born 30 years earlier.

Jesse Shapiro, who I also think the world of, has written some of the best mental accounting papers.⁵ This pragmatic research approach — be behavioral when it is needed — is what I was after in my 1999 paper "The End of Behavioral Finance" (Thaler 1999).

Sullivan: That prediction was nearly 20 years ago now, you said that "In the not-too-distant future, the term 'behavioral finance' will be correctly viewed as a redundant phrase. What other kind of finance is there?" Has the field of finance achieved your vision?

Thaler: I was a bit premature, but yes, I think we're getting closer to my goal of behavioral economics disappearing. Most economists under 40 are at least open to behavioral explanations.

Sullivan: Has behavioral economics become a mainstay in undergraduate textbooks?

Thaler: Sadly, no. Most Econ 101 textbooks include very little on behavioral economics (and little about any kind of finance). Usually, there is just one chapter on behavioral, and typically it's the most controversial one. Half the people love it and say it's the most interesting chapter in the book, and the other half hate it because it comes at the end, and the students say, "Wait a minute! Why were you making us read all this stuff up to this point?"

Honestly, I do not know how I'd write an Econ 101 book, it would be very difficult.

5 See, for instance, Hastings and Shapiro (2013).

Behaviors and Investing

IImanen: How has your thinking on market efficiency changed over the years?

Thaler: Well, at one level — trading — markets seem to have become far more efficient. So, we now have high-speed trading, which means price discovery happens in milliseconds. The costs of trading are now minuscule as well. This is all great for investors and has made the market for trading very efficient.

It's not something that I've studied carefully, but evidence seems to suggest that markets are becoming slightly more efficient in the “hard to beat” sense. It wouldn't be surprising if the rest of the world is catching up to the US in terms of difficulty of beating the market.

IImanen: What about efficiency in terms of the market price being correct?

Thaler: It's very hard to say anything definitive about whether the “price is right,” Especially at the aggregate level. I will say that recent history has not suggested that bubbles have disappeared; take for instance, Bitcoin.

Fischer Black once said that the market price is typically right within a factor of two. I like to say that I think I could have convinced him to revise that to three if he had lived five years longer to see the rise and fall of the tech bubble.⁶ So, that's a big range. I don't think any of us would be surprised if, for instance, we went into a coma and woke up six months later and the market was down 25%.

But that would be like a two- or three-standard deviation event. So, we should be pretty surprised, but we wouldn't be.

So, yes, in some ways I'm making a very traditional rational economic argument, that the cross-sectional efficiency of markets is really competitive, especially in large cap, but not as much at the asset class, or macro level. Not many manage money via tactical asset allocation these days. I once asked George Soros during the tech bubble, “If you thought the S&P 500 was 30% overvalued, what would you do?” He replied, “Nothing.” He said if you bet on markets returning to intrinsic value, you'll die of boredom. So, even Soros in his heyday wasn't making those kinds of bets. Although there are people doing it a little bit around the edges, maybe they'll tilt a little more toward emerging markets for instance. That's really the weak part of the efficient market hypothesis, because you have to ask who is it that's making those tactical bets? So, if the US is say 25% overvalued relative to the EU, who would be betting on this? Hard to say.

IImanen: Will Goetzmann (2016) recently showed how difficult it is to effectively trade against bubbles as they can go on surprisingly long.

Thaler: Gene [Fama] too makes the point that you cannot predict when a bubble is going to end. I completely agree. During the tech bubble I thought it was a bubble in '96 as did Shiller. If I had been a hedge fund manager, I would have gone broke before the bubble burst in 2000. Then there's the real estate bubble of mid-2000s, Shiller was again writing about it very early.

6 Editor's note: Black passed away in 1995, a couple of years before the tech bubble really heated up.

Also, the period of low volatility during the first part of the Trump presidency was a surprise to me. The market seemed to be saying that we were in the safest period in our history. This seemed odd to me, but it continued for nearly a year.

Ilmanen: Some observers point out that there are no old market timers on the Forbes list of billionaires. The success rate is too low on one concentrated bet for consistent success.

Thaler: Right, and that's what we would expect from the evidence. There's a little bit of predictability at a 10-year horizon, but not enough that you could possibly run a business.

Ilmanen: Do you think behavioral finance is more useful for correcting one's own biases or exploiting others' biases?

Thaler: I would say that it's useful for both. In fact, I'd say there are three categories: self-improvement; improvement of others, like nudging; and investing. I think behavioral finance is useful in all three categories.

Regarding self-improvement, we can, for instance, learn that if you're addicted to cashews to not buy cashews. On the improvement of others, we can devise 401(k) plans that are more user-friendly with "nudge" features, such as automatic enrollment and automatic escalation. We can also build plans that include sensible target-date funds and include them as the default plan for auto-enrollment. These are things that will help improve retirement outcomes.

Ilmanen: Indeed, your nudging research to encourage people to save more for retirement seems to have been very effective. A great example of research having important real-world outcomes.

Thaler: A related topic that I've been interested in recently involves people's choices of healthcare plans. There's an estimate that about half of the people who are choosing among employer-sponsored healthcare plans are choosing a dominated option (meaning they will pay more in total no matter how much health care they consume). The main mistake people make is buying a plan with too low of a deductible. So, they'll pay \$500 to lower the deductible by \$250, keeping everything else the same. There's no risk factor here. Something I've been thinking about is how to help people with that issue.

Sullivan: There seems to be some misguided risk aversion there.

Thaler: Yes. So, the basic recipe is that you should select the high-deductible plan if your employer offers one and also to max out your health care spending account (HSA). The tricky details are what to do with low-paid workers who could have liquidity constraints because the HSAs are typically funded gradually during the year. So, if you have, say, a \$4,000 deductible and you have a medical bill to pay in January, there won't be enough money available in your HSA to cover it. So, I've been trying to figure out how to solve that issue.

Ilmanen: What about the third behavioral finance category, investing?

Thaler: Well, obviously that's how we try to make money at Fuller & Thaler. We look for places where investors are most likely to be biased. We do this in a less quantitative way than AQR, and we invest in mostly small-cap stocks.

Ilmanen: Do you have a value tilt?

Thaler: Our biggest product is small-cap value, but philosophically we're not a traditional value shop. We're pure behavioral in the sense that we seek any stock that we believe likely to be mispriced. When the firm first began, I think we called our funds overreaction and underreaction but soon learned that there was no market for those names, so we changed to more traditional names, small-cap value and growth. In-house, we still call them overreaction strategies and underreaction strategies.

I often say that our philosophy is to predict other people's mistakes. I sometimes use a baseball analogy. Suppose that there's a sinker ball pitcher who throws a ball that dips as it comes to the batter. Every baseball fan knows that that will produce a lot of ground balls because it fools the batter into swinging a quarter of an inch too high. Now, the reason why I like that example is that if I tried to swing at such a pitch, there's no chance I would even make contact. Ok, well maybe out of a hundred, I might make contact once, out of luck. My best strategy would be to hold the bat out and hope that the ball hits the bat.

Nevertheless, I can predict the mistake of professional baseball players. So, that's our philosophy, to predict the mistakes of professional investors and analysts. And so, we'll say this is a situation where analysts will underestimate earnings next quarter which is like predicting that that hitter will hit a ground ball. This is just one example of how to use behavioral finance in investing.

Sullivan: Are humans more susceptible to behavioral biases versus other animals?

Thaler: No, not at all. Amos [Tversky] used to have this line about how there were once species that didn't exhibit loss aversion, but they're now extinct! Now, I should say he meant it as a joke. He had a lot of great one-liners, but there is a sense in which loss aversion is rational if you're at subsistence level, right? So, for humans, that was for the first 30,000 or 40,000 years of our existence.

Ilmanen: What about those who connect evolution and behavioral biases or rationality?

Thaler: I really disagree when people say, "we evolved this way; therefore, it must be rational." That makes no sense. We're an obese society now because for most of our existence eating as much as we could whenever we could was a really good strategy. The problem is, of course, that there's no way to test any of these stories.

So, I always say about evolution: it's true, but not helpful to what I do. I'm guessing that things like the sunk cost fallacy come from a sensible rule of

not wasting. There are some exceptions to the rule "don't waste" when it leads to a violation of the sunk cost fallacy. If you want to call that rational, that's fine, but it seems like it would be smarter to learn that there are some exceptions to rationality. So not finishing that dessert is really not being wasteful.

Ilmanen: Does neuroeconomics help us?

Thaler: I have not found neuro to be particularly helpful to me. It's not that I'm against neuroscience; some of my best friends are neuroeconomists. The challenge I keep giving them is to write a paper that does one of two things. It either teaches me something about human behavior that I didn't

think I already knew and had demonstrated. For instance, I already believe in loss aversion. If you tell me that losses and gains light up in different places in the brain, that's interesting, but I have not learned anything new. So, teach me something I didn't think I already knew. It isn't very hard; I don't know very much. The second would be to teach me something that I thought is true but is actually false. Either one of those. So far there are a lot of very fancy colored pictures, but nothing that's gotten me excited.

Ilmanen: Maybe one day.

Thaler: Yes, let all flowers bloom.

Accomplishments, Heroes and Regrets

Ilmanen: What achievements are you most proud of?

Thaler: Among my academic contributions, I'm very proud of the up-and-coming generation of behavioral economists, as I've actively pursued nurturing them. Obviously, writing papers is a passive way of doing that, but we've been having these behavioral economics summer camps since 1994, which have helped to build academic interest in the topic. Shiller and I originally ran these camps, but they are now run by David Laibson and Matthew Rabin, both of whom attended the very first camp. So, that's what I'm most proud of.

Ilmanen: What about your accomplishments?

Thaler: Well, the biggest surprise has been the impact of Cass Sunstein's and my book, *Nudge*. It's a book no publisher initially wanted. There are now some 200 nudge units that we know about. And what are they doing? They're just exploring what works and trying to make government programs more efficient. Some people worry that I'm advocating a nanny state, but it's actually the opposite — it's preventing the nanny state, because our programs always allow opt-out. So, to those who say we are being paternalistic and think we should have no choice architecture at all, I say this is impossible. If you have a 401(k) plan for instance, it has to be either opt-in or opt-out. You have forms, and you have to decide how many funds to offer and so on, right? You cannot skip all that. So, I say why not do a better job of creating that architecture if you can?

The ethos I've tried to generate with the nudge public policy units — there are only two that I have been deeply involved with, one in the UK and one in the US, the others were all launched on their own — I say often that we can't do evidence-based policy without evidence. So, every policy intervention comes with what we call a randomized control trial, or RCT. I don't think that should be politically controversial. Our country spends about one sixth of our GDP on healthcare. If we can make people healthier without banning alcohol or sugary sodas, that would be a good thing. So, yes there are lots of things that we could suggest that would be purely paternalistic and objectionable to many, but we choose to approach policy intervention with what we call libertarian paternalism, which of course is the concept of nudge.

Sullivan: Let's flip to the other side: regrets. Things you missed or maybe got wrong?

Thaler: There are always regrets of missed opportunities for collaborations. There are people that I wish I might have been able to work with more. For instance, Nick Barberis and I were colleagues and we managed to write a couple of papers together, but we could have done more. I also never wrote a paper together with some of the behavioral academics that have since joined AQR, like Toby Moskowitz and Andrea Frazzini. Of course there's only so much that you can do and, as we know, I'm lazy. So, there is some of that.

I'm not one to go back and do much second-guessing. I will say that, especially if you read

Misbehaving, you could come away thinking that this is a man who had a grand plan to lead an insurrection and change a field. But in reality, I was a struggling assistant professor hoping to get one paper published and then maybe a second one, then hoping to get tenure, and then hoping to get some people to take my topic seriously.

I went into finance because my friend and coauthor Werner De Bondt was interested in finance. He and I published a paper together in 1985 in the *Journal of Finance*, which happened to be my first finance paper.⁷ In that same year, I also published a mental accounting paper in *Marketing Science*.⁸ Had you asked me at that time which field I would likely pursue, I would in fact have put all of my money on marketing, not finance.

Blessed with hindsight it is easy to understand the success of behavioral finance. I would say it is explained by two things. First, there is fabulous data, the envy of every branch of economics. We have daily price data going back to 1926, for example. Second, the efficient market hypothesis that underlies most finance theory provides crisp, testable hypotheses that can serve as the null hypothesis for empirical tests. And conveniently many of those hypotheses turn out to be wrong. Compare finance to macroeconomics. Although there seems to be a wealth of data, with new numbers being announced daily, when it comes to things like market crashes or even recessions there are very few. As for crisp null hypotheses, well those are hard to come by as well, unless you include the idea that in recessions wages will fall so that there

will not be involuntary unemployment, which is obviously false. So behavioral macro has been slow to develop, although there is some interest in that now.

As for the failure of behavioral economics in marketing that is harder for me to understand. Don't get me wrong — there are many psychologists in academic marketing departments but they tend to be straight psychologists, not behavioral economists, and there are plenty of economists, but few of them have a behavioral bent. I still think there is a lot of work to do in the space between those two camps and I hope more young academics enter that field.

I then accidentally ended up writing three papers about game shows. That was never a part of any plan. I met some Dutch guys that had this dataset from the show "Deal or No Deal." The show is just like an economics experiment except that the stakes, at least in the Dutch show, is that each player was playing for an expected value of \$360,000.⁹ How about that as a research budget? Then we studied another show that ended with a prisoner's dilemma, and I think the prizes paid out there were about three million pounds.¹⁰

So, I think I've been opportunistic, and I work on what amuses me. Another paper of mine was about the National Football League (NFL). It is maybe one of my best papers and, in some ways, I think it's one of the most important. It gets at this idea from economists, like for instance Gary Becker, that it doesn't matter if 90% of the people at a firm can't

7 See De Bondt and Thaler (1985).

8 See Thaler (1985).

9 See Post, van den Assem, Baltussen, and Thaler (2008).

10 See van den Assem, Dolder, and Thaler (2012).

do probabilities; the 10% who can will be in the jobs where it matters. Now, I think to some extent that's true in the investment business, because if you really don't understand probabilities you won't last very long. But it's certainly not true in the NFL and likely not true in a lot of public companies either. The idea that firms must be maximizing profits because otherwise they would be out of business isn't quite right. There are a lot of companies out there that are poorly managed, and there aren't enough people who know Bayes' rule to fill all the jobs where it's required in order for the firm to truly be maximizing profits.

Ilmanen: The profession has learned much from you. Who are your heroes?

Thaler: Well, obviously, Amos Tversky and Danny Kahneman are two of my heroes. They were my inspiration and then mentors and then very close personal friends. Danny is still my best friend.

Additionally, there have been many economists that I've admired and have been inspired by over the years. Like Ken Arrow (1982), who wrote a paper blessing behavioral economics. Also, Tom Schelling whom I always admired for his writing style. I wish I could write as well as him. Gene Fama is also an inspiration in terms of his persistence and work ethic. Gene also sets a really good example in the finance group at the University of Chicago, and he religiously attends the workshop. If he's in Chicago, he's there.

Ilmanen: So, a bit of a contrast to the self-professed lazy guy.

Thaler: Well, here's evidence of my laziness: our sleep habits. So, Gene and I have identical offices, mine faces east and his faces west. I'm never there early enough for the sun to bother me. He's never there late enough.

Ilmanen: Whether lazy or industrious, you certainly have achieved a lot — advanced our knowledge in new fields, nurtured a new generation of researchers, and helped masses of retirement savers. We thank you for all this, and for this interview.

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