



# Now that Behavioral Finance Has Demonstrated that Investor Behavior is (Somewhat) Predictable Does that Mean that Arbitrage Must Make the Biases in Question Disappear?

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## ABSTRACT

We consider whether or not the rationale for behavioral-finance-based stock investment is self-defeating. In other words, once predictable biases in behavior are identified, and everyone is aware of them, won't investors anticipate the behavior in question, all try to move to the front of the queue at once, and thus arbitrage the phenomena in question out of existence? This question is addressed in the format of a conversation between a student and a mentor, and revolves around four quotations. Taken literally, the discipline of behavioral finance argues that the arbitrage won't occur because we're too hardwired to do so. Even if we stipulate that behavioral finance is correct that investors exhibit various biases, that rationale seems implausible on its face. More plausible is an incentive for those large money managers, whose actions effectively set prices in the short-term, to behave in a way that undermines the expected arbitrage. We argue that this incentive is their emphasis on transitory phenomena (e.g., short-term corporate performance, short-term investment returns), which not only supports an entire industry but also induces herd-following behavior instead of arbitrage. These individuals are acting rationally, relative to their incentives, but those incentives are inconsistent with general economic logic, and so what results is local optimization but global sub-optimization. Ultimately, we believe that a more likely explanation is that it is difficult to get a man to understand something, when his salary depends on his not understanding it.

**Key words:** Arbitrage, behavioral finance, bias, stock market

## INTRODUCTION

I won't drop names. But, many years ago when I was a graduate student in statistics I had the good fortune to serve as a computer programmer for a gentleman who went on to become a well-published academic economist and, eventually, a big-time money manager as well. He performed some early work in behavioral finance as it pertained to the stock market. I'll call him "Joe". The topic is a riddle within the discipline of behavioral finance, namely: once the biases in investor behavior described by behavioral finance become known, why aren't they arbitrated away?

## METHODS

Instead of the usual journal article structure, the topic is presented in the format of an imaginary conversation between myself (as student) and Joe (as mentor). The conversation is organized around four quotations. "Literary license" is applied quite liberally throughout.

### Meet Joe

My introduction to Joe began with a knock on my office door and, once invited inside, the visitor saying something to the effect of: "My name's Joe. I hear you're an experienced SAS programmer. I'm doing some time-sensitive work on stock prices. What would it cost to buy a significant portion of your time?"

I was working my way through graduate school by taking on programming projects, typically for 10 hours per week, and so I quoted Joe a weekly rate. Joe said: "That's quite a lot.", to which I replied: "Please tell me about your project, I'll describe my approach to the programming and then you can decide whether what I propose is worth it."

Joe removed a printout from his briefcase containing a SAS program written by someone else. The purpose was to first read in a large and complex file of stock prices (so large, indeed, that the tape containing the input data could only be run as a "large overnight-only job") and create a SAS dataset with one record per company per trading day. This dataset would then be restructured, details such as dividends and stock splits properly accounted for, and then annual returns calculated for each of the stocks in the dataset. Finally, the economic work would begin in earnest by simulating a purchase of each stock meeting a behavioral-finance-based criterion on January 1 of year 1, holding those stocks for a year, estimating the annual return of that cohort, performing risk adjustment, repeating the process on January 1 of year 2, etc. This is now quite standard procedure – the sort of thing that the "back-test" button on numerous financial websites now transparently handles – but back in the day this wasn't at all simple to do and required specialized expertise. Joe's programmer had tried to accomplish the entire task using a single program containing thousands of lines of code. Every midnight the program would fail, because the dataset hadn't been read in correctly.

I told Joe that the fatal flaw in his programmer's approach was the design decision to run the code as a single unit rather than modularizing it. Moreover, it was failing in its first task of reading in the data, which was quite complicated, and no progress could be made until that barrier had been overcome. I suggested that the first few records from the input tape could be copied onto a much smaller disk file, so that testing using this smaller file could proceed during the day, and also that this design approach could be gradually extended once the data were read in properly.

I concluded by telling Joe that as a programmer I try to avoid overconfidence, I don't assume that my code will work correctly, and instead design it with a view towards it working "the second time". Joe told me that I was a behavioral economist at heart, and that one of the principles of behavioral finance is that money can be made in the stock market by taking advantage of investor overconfidence, and that he would pay me my stated hourly rate in cash out of his own pocket if I could guarantee that we would finish by the end of the semester, at which point I realized that I would be working for 10X rather than 1X. I asked Joe why he was willing to pay me out of his own pocket. He replied that my hourly rate was more than his department would allow, but finishing by the end of the semester was valuable to him, as he planned to become a money manager, and his plan for getting there involved enhancing his academic credibility, and to him publications had greater economic value than merely as part of a path toward promotion and tenure. He then remarked: "In the job market there's no objective criterion for determining the value of someone's services. People are paid to solve problems. If you're one of the few people who can solve a problem that's important to someone you'll be well paid." That's sound advice, and was ultimately worth far more to me than earning a few dollars for writing some SAS code.

### **Quotation 1**

*(Benjamin Graham) "In the short run, the market is like a voting machine – tallying up which firms are popular and unpopular. But in the long run, the market is like a weighing machine – assessing the substance of a company."* [1]

Me: "So, Joe, what I think you were trying to tell me when we first met was that, at the present moment, my labor has no objective value, but instead depends on how financially important my problem-solving abilities are to you, and also how much you're willing to pay."

Joe: "I'm also telling you that, in the short run, a share of stock has no objective value, and instead entirely depends on what people are willing to pay for it."

Me: "But you aren't willing to sell me a share of General Electric for \$0.01, nor buy it from me for \$1,000.00. Isn't there an objective value that falls somewhere between those two extremes?"

Joe: "Perhaps. But the range is so wide as to render the concept of a single number which represents "the" objective value meaningless."

Me: "But, longer term, it's good for me to develop my programming skills, because I'll be more marketable and my labor will command a better price."

Joe: "Yes. Although at any particular moment the wage you're able to negotiate for your skills will be somewhat unpredictable. If you continue to develop your skills your mean hourly rate will increase, but the variance will always remain."

Me: "That helps me to better understand what Benjamin Graham was trying to say. At any point in time we're living in the short term, and so at any point in time the precise value of a share of stock is unknown (and unknowable). The likely price will fall within a range, and if the company is doing well the range will be shifted up and if the company is doing poorly the range will be shifted down."

Joe: "That's almost correct. Remember that the market is forward looking, so you need to replace "is doing poorly" with "is expected to do poorly in the future"."

Me: "So, at any point in time, there could be a panic, or my company could become unpopular for any number of reasons, and the price of my stock could fall, and there's no guarantee when and if it will recover."

Joe: "Yes."

Me: "That doesn't seem like much fun. Is there any way I can protect myself against all this?"

Joe: "Yes and no. Let's assume for the moment the economy isn't about to enter another Great Depression, and also that the CEO of the company whose stock you own doesn't show up on tomorrow's evening news, with people interviewing the surviving neighbors and them saying that he was quiet and kept to himself and we didn't suspect a thing. If the company in question consistently pays dividends then that brings economics into the picture in addition to psychology, because those dividends represent real money and their value can be assessed according to financial considerations."

Me: "My economics textbooks say that there's no fundamental difference between retaining earnings and paying them out as dividends. What matters are things like the compounding rate of earnings growth, return on equity, and so forth. Are you saying that there is a difference?"

Joe: "Yes and no. From the perspective of economics there's no difference whether earnings are retained or paid out. If the stock price was based on something called intrinsic value then it wouldn't matter either, but you and I just stipulated that there's no such thing as intrinsic value. What you asked about, instead, was stock price, and what I'm saying is that a dividend stream provides an objective benchmark which makes the stock price more predictable."

Me: "Even though my economic textbooks talk about intrinsic value, and so does the Capital Asset Pricing Model and Modern Portfolio Theory and all the rest?"

Joe: "Even though..."

## **Quotation 2**

*(Dan Ariely) "Our irrational behaviors are neither random nor senseless—they are systematic and predictable. We all make the same mistakes over and over because of the basic wiring of our brains." [2]*

Me: "So, Joe, you're telling me that the stock price of a highly cyclical company like a housing developer might vary by a factor of 5-10 over the course of an economic cycle."

Joe: "Yes, I'm telling you something more. What I'm saying is that the price will vary (somewhat) predictably over the course of an economic cycle. Cyclical investors count on that."

Me: "My economic textbooks say..." (at which point Joe rolls his eyes) "that the value of a cyclical company should be based on average corporate earnings, averaged across the entire business cycle. Shouldn't the price of D R Horton remain constant across the cycle, or perhaps slowly increase as its earnings slowly advance from cycle to cycle?"

Joe: "Yes and no. You should take into account the risk of bankruptcy near the bottom of the cycle but, if the company is well-capitalized, what you assert is sound from the perspective of intrinsic economic value."

Me: "Which doesn't actually exist, as pertaining to stock prices."

Joe: "Yes."

Me: "My economic textbooks say..." (at which point both Joe and I roll our eyes) "that if something in the stock market is predicable then it will be subject to arbitrage and thus disappear. But you're saying that the relationship between the economic cycle and the behavior of groups of stocks like housing developers is (somewhat) predictable, and isn't arbitrated away into non-existence."

Joe: "The people who say that are called cyclical investors. Various other schools of value investing assert much the same thing. They have a point, I think, although it isn't so simple to demonstrate scientifically."

Me: "Why not?"

Joe: "Because when you test it on a database the quantitative criteria you can apply to define "cyclical companies I'd like to buy" don't precisely match how actual investors make the

classification, and can end up including stocks you'd be crazy to own. That's part of the reason that the research you're helping with is so hard. Another part of the reason is that economists deal not absolute returns but risk-adjusted returns, and how to properly perform the risk adjustment is devilishly difficult."

Me: "But the big money managers aren't constrained by what can be published in an academic journal. Why don't they just load up on cyclical companies during the dead of economic winter and make out like bandits?"

Joe: "People from the discipline of behavioral finance say it's because they can't help themselves. For example, they say that the reason that investors overreact to recent news is that our ancestors who reacted to rustling in the bushes by running from the tiger survived, and our ancestors who reacted to rustling in the bushes by running from the wind survived, but our ancestors who reacted by staying put were eventually eaten and didn't contribute to our gene pool. The behavioral finance researchers have done some great work demonstrating all kinds of biases, most of it by analyzing the results of simple games that they play with undergraduate volunteers."

Me: "Come to think of it, I tend to over-react and I'll bet that my decision making has all kinds of predicable flaws. But, are you certain that the simple games that they play with undergraduate volunteers apply to the stock market?"

Joe: "Maybe yes and maybe no. But what I will say is this. Behavioral finance was in part created as a reaction to the excesses of Modern Portfolio Theory, which started by embedding all kinds of unrealistic assumptions about rational behavior into their models, and behavioral finance is the enemy of Modern Portfolio Theory, and as a practitioner of behavioral finance I relish that my enemy is well chosen."

Me: "And now what you're trying to do is to publish in the behavioral finance literature, and use that as a credential for getting people to pay you to invest their money. That's rather clever."

Joe: "Thanks."

### **Quotation 3**

*(Upton Sinclair) "It is difficult to get a man to understand something, when his salary depends on his not understanding it." [3]*

Me: "But, come on Joe, these professional money managers have to be smart, and many of them have PhDs in things like economics and finance, and you're telling me that none of them have figured this out?"

Joe: "Actually, the thing that most of them are smart about is salesmanship."

Me: "OK, then, no one on their staff has figured this out?"

Joe: "Well, perhaps they have."

Me: "And so why doesn't the arbitrage happen? I'm not sure that I buy the story about the tiger, not when there's so much money to be made by thinking clearly."

Joe: "I'll challenge you to figure that one out yourself. Two clues: Upton Sinclair and that buffoon hedge fund manager on the television who's always trying to guess what's going to happen 20 minutes from now."

Me: "What about this? How money management is marketed is by short-term performance. If I'm holding a cyclical company and it doesn't go up right away my performance will be worse than the other money managers who're following the herd, and I'll lose customers, which is a problem because part of my compensation depends on the amount of assets being managed, and even if I'm right in the long run it won't matter and so I can't act on what I believe."

Moreover, the entire food chain, including the guys in the financial media, depends on the fiction that short-term corporate performance, and short-term price performance, matter, even though they're mostly noise. The people who manage money don't have an incentive to stock up on cyclical companies, or value stocks, or anything like that, and even if a few do so there aren't enough of them to affect the prices or the short-term irrationality in the market. It is difficult to get a man to understand something, when his salary depends on his not understanding it. Am I close?"

Joe: "Yes, and I'll only add this. The biggest investors in the market – pension funds and the like -- don't trade. They're like an elephant in a bathtub – if they try to sell lots of shares the price they'd receive would drop, and so they just collect dividends, hope that earnings continue to compound, and wait. Their behavior is entirely rational, driven by all the things you studied in Econ101, and because they don't trade their behavior doesn't affect today's stock prices. In fact, most of what they hold aren't even stocks, but are things like government obligations, corporate bonds, and the like."

As you proceed down the food chain, you move from these noble and rational pachyderms to the institutional equivalent of day traders. They've convinced someone that they have specialized expertise in gambling, they operate with borrowed money and thus when prices drop they have to sell rather than buy, they have the attention span of a mosquito and, unless you happen to be an entomologist, there's nothing noble about a mosquito. Because they're the people who trade regularly they're the ones who effectively set prices in the short term. Regardless of their actual beliefs, it's to their advantage to behave as if they suffer from the decision making flaws which behavioral finance describes and, so far as I'm concerned, if it looks like a duck, and walks like a duck, and quacks like a duck, it's probably a duck.

If I were to translate this into the language of economics: the individuals in question are acting rationally, relative to their incentives, but their incentives are inconsistent with traditional economic logic, not even to mention the best interests of their customers, and so what results is local optimization but global sub-optimization. The lack of arbitrage is one manifestation of this global sub-optimization."

#### **Quotation 4**

*(John Maynard Keynes) The market can stay irrational for longer than you can stay solvent. [4]*

Me: "It seems like your main task will be to educate your customers to ignore short-term pain in the interest of long-term gain."

Joe: "Yes."

Me: "You'd need to invest very carefully, because of how irrationally prices can behave in the short term. As I understand it, behavioral finance doesn't have a lot to offer toward predicting short-term behavior. It seems to me that if prices are effectively set by the behavior of a small number of large short-term traders what you might need instead is game theory."

Joe: "Perhaps."

Me: "I wish you the best of success. When it comes time for you to manage money please give me a call, I might be your first customer. Especially if you can provide an answer about one small detail. When a panic hits in earnest, even if you remain clearheaded won't your customers react with their lizard brains? How can you guarantee that they won't bail at just the wrong time?"

### **Postscript**

Joe wasn't able to answer that particular question on the spot, and after our research project ended we lost touch. Many years later I was pleasantly surprised to notice his face on the cover of an investment magazine, and did a bit of research on him. His funds have a value orientation, and include cyclical stocks, dividend-paying stocks, and all of the other usual suspects, and he markets them under the notion that behavioral finance teaches that investors are attracted to bright shiny objects and overpay for them, and so the opposite of a bright shiny object is probably a bargain. He seems to be very good at what he does, although the nagging suspicion remains that what he's selling isn't necessarily behavioral finance but instead is his penchant for independent thinking and his talent as a trader.

I didn't bother finding out whether Joe ever developed an answer to my question, but other money managers have. One approach is to limit the ability of customers to withdraw money, thus preventing them from selling in the middle of a panic even if they wanted to. Another approach is to buy back a customer's shares at a discount, and convince them that doing so is a wonderful favor.

### **DISCUSSION**

The main question that Joe and I were discussing is whether or not the rationale for behavioral-finance-based stock investment is self-defeating. In other words, once predictable biases in behavior are identified, and everyone is aware of them, won't investors anticipate the behavior in question, all try to move to the front of the queue at once, and thus arbitrage the phenomena in question out of existence?

Taken literally, the discipline of behavioral finance argues that the arbitrage won't occur because we're too hardwired to do so. Even if we stipulate that behavioral finance is correct that investors exhibit various biases and don't behave in an entirely rational manner, that rationale seems implausible on its face. More plausible is an incentive for those large money managers, whose actions effectively set prices in the short-term, to behave in a way that undermines the expected arbitrage. We argue that this incentive is their emphasis on transitory phenomena (e.g., short-term corporate performance, short-term investment returns), which not only supports an entire industry but also induces herd-following behavior instead of arbitrage. Ultimately, we believe that a more likely explanation is that it is difficult to get a man to understand something, when his salary depends on his not understanding it.

### **References**

[https://www.goodreads.com/author/quotes/755.Benjamin\\_Graham](https://www.goodreads.com/author/quotes/755.Benjamin_Graham) (The precise wording of the quotation is disputed.)

*Ariely, Dan. Predictably Irrational : the Hidden Forces That Shape Our Decisions. New York :Harper Perennial, 2010.*

Upton Sinclair, I Candidate for Governor of California and How I Got Licked, reprint edition published by University of California Press, 1994.

<https://www.connexpartners.com/blog/22-inspiring-john-maynard-keynes-quotes>