

## Chapter 8

# Auditing Mental Accounting

### Example 1: Wasteful Education

In 2007 I began a five-year research project wherein I attempted to understand what is truly ailing the K–12 education system in America. Along the way I discovered a disturbing practice that is relevant to the topic of this book.

While touring an elementary school in South Florida, I passed a classroom that caught my attention. The door was open, but lights were off. I flipped them on to discover a room filled from wall-to-wall and floor-to-ceiling with nothing but desks and chairs. When I asked the principal about the display, she explained the rationale behind it. Turns out, every year the school gets a budget. Well, actually not *a* budget, but rather many budgets. Among them is one for teacher salaries, one for textbooks, one for maintenance, and yes, one for furniture. If the principal comes in under budget on say, school furniture one year, she can't apply the savings to something she might need more of at that moment, like maybe a new coat of paint for the gymnasium. If she

doesn't spend the furniture budget that year, the money remains in the county coffers. Here is where it gets really interesting though. If she comes in under budget for furniture this year, there is a high probability they will reduce her furniture budget for next year. So, rather than risk having her budget reduced for anything in any given year, she will continue to buy furniture with her furniture budget even if it means shoving it into an empty classroom or using the facilities budget to build a shed out back to store it all until it can be fully depreciated and thrown away.

I know, I know. You're befuddled by the waste and stupidity of the education system. If you're anything like I was when I stared into the abyss of that classroom, you're probably shaking your head, mouth agape, wondering how it's possible that things like this still go on. However, if you think about it, given the system as it exists, her logic is actually unassailable. Given her constraints and how she is assessed, would you behave differently?

Over those five years I found episode after episode of similar situations and amazingly, every single time, the people in charge were as frustrated with the state of the education system as you and I. Even more incredible, when I would meet their bosses and their bosses' bosses they all had a similar story to share. Each had a pet peeve about the system that caused them to make decisions that could be perceived as irrational to those on the outside, but made sense to them given the constraints.

No doubt by now you're ready to tear the hair out of your head, prepared to march straight down to your school board to either raise hell or take a position on the board so that you can singlehandedly straighten out these knuckleheads. But before you do you might want to continue reading because, very shortly, I will argue that the same cognitive flaw responsible for this colossal error in judgement among the leadership in education is also responsible for a systematic error in judgement exhibited by nearly all institutional money managers (traders and allocators alike), and yes, it probably applies to you too.

## Example 2: Drunken Economics

Back in 1998, behavioral economist Richard Thaler teamed up with Eldar Shafir to learn about the thought process among wine enthusiasts. They asked subscribers of Orley Ashenfelter's newsletter, *Liquid Assets*, the following question:

Suppose you bought a case of a good 1982 Bordeaux in the futures market for \$20 a bottle. The wine now sells at auction for \$75 per bottle. You have decided to drink a bottle. Which of the following best captures your feeling of the cost to you of drinking this bottle?

1. \$0
2. \$20
3. \$20 plus interest
4. \$75
5. -\$55 (I drank a \$75 bottle for which I only paid \$20)

Interestingly, respondents were fairly evenly dispersed with the percentages for each answer being 30%, 18%, 7%, 20%, and 25%, respectively. Put another way, in the mind of more than half the respondents, drinking the wine either cost them nothing or it actually saved them money. The researchers found the results so fascinating, they followed up a year later with a related experiment. Their findings were later published in a paper with the very literal title, "Invest Now, Drink Later, Spend Never." It's worth noting that the great majority of respondents were people who most would consider to be financially sophisticated individuals, including many professional investment managers and economists.

## Example 3: Bet the House

On the back of Kahneman and Tversky's Prospect Theory paper, Thaler conducted a study in 1990 to see how decisions are affected by prior outcomes – namely, gains and losses. In the study MBA students gambled with real money and were given the following three problems. (The percentage of students choosing each option is provided in brackets.)

Problem 1: You have just won \$30. Now choose between:

- a. A 50% chance to gain \$9 and a 50% chance to lose \$9. [70%]
- b. No further gain or loss. [30%]

Problem 2: You have just lost \$30. Now choose between:

- a. A 50% chance to gain \$9 and a 50% chance to lose \$9. [40%]
- b. No further gain or loss. [60%]

Problem 3: You have just lost \$30. Now choose between:

- a. A 33% chance to gain \$30 and a 67% chance to gain nothing. [60%]
- b. A sure \$10. [40%]

As it happens MBA students are really no different than the typical gambler at a Las Vegas casino. Gamblers who are up money often create a separate mental account for “house money,” which is somehow distinct from the rest of their wealth. It’s a phenomenon aptly named the *house money effect*, because the casino is often referred to as *the house* and so when gamblers are up money at the casino they tend to think of those winnings as the house’s money. Many gamblers will even go so far as to physically separate their money from the house’s money, putting one in the left pocket and the other in the right.

What is significant about Thaler’s study, along with many others that came before and after, is not so much that a separate mental account is created, but that the money in these two accounts are actually treated differently. As the results show gamblers playing with house money exhibit a greater propensity for risk. Those who were experiencing losses tended toward risk aversion, *unless* the gamble offered a chance to break even. In other words, the very assessment of a bet’s risk/reward is affected by whether individuals are betting with “their” money or the “house’s.”

### Example 4: Half Off

James is a global macro portfolio manager with 20 years of experience. He purchased a one-touch option on the S&P Index with a barrier at 3000 for 10% of a \$1 million payout. For those unfamiliar with one-touch options, worry not. For the purposes of this example all you need to understand is that James has bet the S&P Index will “touch,” i.e. trade at, the 3000 level at some point between the day he purchased

the option and the day it expires. If it trades at 2000 during that time frame, he gets 100% of the payout or \$1 million. If it does not touch, he gets nothing in return for the \$100,000 premium he paid up front. Based on the payoff profile, it would be fair to assume the chances of it touching 3000 are low.

Two weeks later, the S&P Index jumps up and the option is now worth 20% or \$200,000. James decides to unwind half the position in order to “recoup” his initial investment of \$100,000, thereby leaving only the house’s money at risk.

Well done, James. That’s a very wise decision that serves as evidence of your ability to remain disciplined. A decision that would be applauded by even the most experienced traders. After all, it’s an age-old strategy that has been passed down from generation to generation.

Unfortunately, it’s also irrational.

In fact there is absolutely no difference between what James did and what gamblers in Las Vegas do on a daily basis. James created a mental account that differentiated between *his* money and the *house’s* money. There are numerous issues to consider here.

Firstly, money is fungible, which means there is no difference between money in your left pocket and money in your right, money earmarked for furniture and money earmarked for textbooks, \$75 in your bank account and a bottle of wine that you can sell today for \$75. As for James, all \$200,000 is money to do with as he pleases.

I know what you’re thinking. The risk/reward has changed and so too should his assessment of the trade’s value. I wholeheartedly agree, so long as it is assessed based on the merit of the trade itself. The issue is that the doubling of James’ original investment is purely a function of where he bought it (10%) and what it’s valued at today (20%), neither of which are inherently relevant to either market fundamentals or technical indicators. The only relevance “20%” has is that it creates an opportunity for him to put his initial investment of \$100,000 cash back into his account while creating a separate mental account for the \$100,000 he still has at risk.

To reiterate, the problem isn’t simply that mental accounting has occurred, but that the two accounts are actually treated differently. Having “pocketed” the original investment and now playing with the

house's money means the gambler, err, I mean trader will be more risk tolerant with the remaining position. This is inconsistent with the tenets of expected utility theory. In other words it is irrational.

Beyond that, what Thaler and others have proven is that this generally accepted strategy of taking off enough of a position in order to cover your initial investment wasn't the result of decades of experience or wisdom being passed down from generation to generation, but rather flawed intuition shared by MBA students, gamblers, and experienced investors alike. As a result of simply being repeated time and again by market participants, the wisdom behind it is rarely questioned, even though it should be.

Ultimately, the goal for all decision-makers should be objectivity. If your assessment of one bet with one set of characteristics and one set of outcome probabilities is affected by whether the money you are betting with has come out of your left pocket or your right then you are not being objective. You are making a mistake.

The common thread that ties all the preceding examples together is that the law of fungibility has been broken leading to irrational decisions and suboptimal results. In the education example formal barriers in the form of segregated budgets created the inefficiencies that frustrate us all. For the wine enthusiasts, because the current value of \$75 hadn't been realized (i.e. converted to cash), it was difficult for them to see the fungibility of that money, and therefore the true cost of the wine they were drinking. Fundamentally, there is really no difference between the MBA students in example 3 and James in example 4. In both cases (and that of the typical gambler), the law of fungibility was broken when the distinction was made between their own and the house's money. Even though it may feel right and make intuitive sense, fundamentally it is as irrational as ordering more furniture to be stacked in an empty classroom.

## **How to Stop Turning Winners into Losers**

To give an example of how this impacts dynamic trading, two weeks before a Bank of Japan meeting, a client – let's call him Max – purchased a dollar call spread in the US Dollar (USD) versus Japanese Yen (JPY).



**Figure 8.1** USD/JPY spot  
SOURCE: Bloomberg Finance L.P.

He risked 25 basis points (0.25%) of his assets under management (AUM) based on his view that the Bank of Japan (BoJ) would cut interest rates. The BoJ action slightly exceeded the expectations he stated ahead of time in his trade write-up. The market immediately reacted by buying USD and selling JPY, pushing it from 118.50 to a high of 121.65 (+2.65%) within a matter of hours (Figure 8.1).

Max's call spread was showing a profit of 1.8% of AUM with less than 24 hours to go before expiration. The options' expiration is significant, because it sets a line in the sand for the idea, and its expression. What Max was effectively saying by structuring his trade with that expiration date is that whatever the BoJ does, the impact is likely to be quick and powerful, with 123.00 (the call strike he was short) representing the upper boundary of his expectations. He was proven right.

At that moment, the call spread had a delta of 80. In other words if the call spread had a notional of \$100 million per strike, then the P&L on the position was behaving similar to that of an outright cash position of \$80 million. With the expiration looming near Max decided to unwind the call spread and convert it into that cash equivalent. He set the stop/loss "just below where spot was when the announcement came out." Within a matter of days, the stop was hit and the trade was over. Max had turned a 1.8% winner into a 0.3% gain.

The questions we aim to answer: Did Max make a mistake, if so what mistake did he make, what can cognitive science tell us about his

thought process, and can we use decision architecture to improve on the process going forward?

### *The Mistake?*

Max followed the process beautifully including thoughtful research and analysis regarding policy expectations and the resulting price action it would likely trigger, as well as the development of an appropriate strategy for expressing that specific view. He did a proper trade write-up complete with rationale, expectations, premortem, and reassessment triggers, and when one was triggered, he executed according to the script. In other words there wasn't a single mistake in the trade that he named "JPY14." He even recognized that the cash position was a new trade, separate and distinct from JPY14.

However, when a new trade is established it isn't sufficient to merely acknowledge it as such. A new trade write-up needs to be written, complete with its own unique rationale, premortem, supporting evidence and reassessment triggers. In this case it wasn't done. Why? Max says he was busy with other things and since it was effectively a continuation of an idea he'd already written up it wasn't a priority. *That* was a mistake. Although he recognized this should be considered a new trade, separate and distinct from JPY14, he clearly hadn't mentally processed it as such.

Had he followed the prescribed protocol, one specifically designed to help nudge him toward better decisions, he would have created a new trade write-up, thereby forcing him to mentally process it. He would have expressly noted the capital at risk (max downside) for the trade as 150 basis points. A sixfold jump from that which he thought appropriate for JPY14. Although you might argue, as he did (briefly), that given the fact that the BoJ decision was now known, JPY15 involved less uncertainty, and therefore should be sized accordingly. I disagree for two reasons.

First, the jump in spot reflected the new policy and therefore shifted spot to its new reference point. Where spot would move in relation to that new reference point involved a different set of factors, each of which engendered their own uncertainty. Secondly, even if you take issue with



my first point, the question is was he now six times more certain about the future of USD/JPY as his relative position size implied? It's possible, but highly unlikely. Instead, the more likely explanation for the increased exposure was related to the profitability of JPY14 (1.5% versus 1.8%) and the original risk relative to the protected profit (25bps versus 30bps). In his mind Max was playing with house money, and research tells us we are far less risk averse with house money than we are with "real" money. Which leads us to the science behind this mistake.

### ***The Science: Hedonic Framing***

Back in 1998, Read, Lowenstein, and Rabin wrote about a concept they called choice bracketing to explain why it is that decisions are often made and assessed as a group, rather than one at a time. What is most interesting is that the brackets should theoretically and mathematically have absolutely no effect. In other words, if you consider the value function for outcomes  $x$  and  $y$ , it should look like this:  $v(x+y) = v(x) + v(y)$ . Yet their research showed that it wasn't typically the case. Due to our very human aversion to loss, it often means that  $v(x+y) \neq v(x) + v(y)$ , and vice versa.

Consider, for example, how you would feel about winning a single lottery of \$75 versus winning one lottery for \$50 and a second one immediately after for \$25. According to research done by Richard Thaler, 64% say the two-time winner is happier (read: experiences greater utility). Think about this for a moment. The outcome is exactly the same. In both cases you wind up with \$75, yet because of the way the winnings are bracketed you have the following:  $v(\$75) < v(\$50 + \$25)$ . In the pursuit of happiness, our actions can defy the laws of logic. Does it really matter? The answer is a resounding "Yes!"

Thaler coined the term *hedonic framing* for the phenomenon and devised a set of principles to help us predict people's behavior given what we know. Keep in mind Thaler isn't condoning the behavior, he is merely attempting to model it. In doing so, we stand a better chance of identifying when we are likely to act irrationally, and that in turn can help us take action to defend against our own natural instincts. According to Thaler, the principles we follow for maximizing utility when we evaluate

joint outcomes which assume the prospect theory value functions are as follows:

1. Segregate gains: (because the gain function is concave).
2. Integrate losses: (because the loss function is convex).
3. Integrate smaller losses with larger gains: (to offset loss aversion).
4. Segregate small gains (silver linings) from larger losses: (because the gain function is steepest at the origin the utility of a small gain can exceed the utility of slightly reducing a large loss).

### ***The Science: Mental Accounting***

Some time ago one of my graduate students submitted a decision log in which she described how a friend had purchased two tickets to a Beyonce concert for \$900 each. When the person she was due to attend with backed out she faced a decision. Should she go alone and sell the other ticket, offer the other ticket to the young daughter of a friend who had done her a favor recently, or sell both tickets online for the prevailing price of \$5,000 per ticket?

Her friend saw the first option like this. She paid \$1,800 for the pair of tickets - \$5,000 she would receive from the sale = She would effectively have been paid \$3,200 to attend the show, and that made her very happy (read: high utility). According to copious studies on the subject that's how most people would analyze the decision, but it's dead wrong. The reason is that money is fungible. If she can exchange her ticket for \$5,000 then that ticket is equivalent to \$5,000. It may not look like \$5,000 cash looks but it is exactly the same. Let's look at her change in wealth after each of the following scenarios.

She buys two tickets and sells one: +\$3,200

She buys two tickets and gives one to friend's daughter: -\$1,800

She buys two tickets and sells both: +\$8,200

This way of framing the decision shows how the ticket holder viewed it. Essentially, her reference point was her initial wealth and so attending the concert alone was viewed as a gain. However, if the problem were

reframed using the maximum return as the reference point, it would look like this:

She buys two tickets and sells one:  $-\$5,000$

She buys two tickets and gives one to a friend's daughter:  $-\$10,000$

She buys two tickets and sells both:  $+\$0$

Due to our natural aversion to losses it's very likely my student's friend would have come to a very different decision had she framed the problem in this way. She also would have seen just how much she was "paying" her friend for the favor. Of course, we haven't considered the utility (read: happiness) gained by attending the concert (a) alone, (b) with a friend, or (c) with the friend's daughter, but the point of this exercise is to show that it matters how the options are framed. In other words, where the parentheses are placed may not affect the math, but it certainly affects the behavior, and that in turn affects the outcome.

As it relates to Max, it matters whether he tagged the JPY cash position as a unique trade, separate and distinct from JPY14. Although it's true that  $(1.8\% - 1.5\%) = (1.8\%) - (1.5\%)$ , the decision-making along the way is different.

### ***Decision Architecture: Avoiding the Mistake***

There are three things that stand between the way we make decisions and the way we should make them:

1. Ability
2. Cognitive bias
3. Motivation

Anyone reading this has the ability to make proper decisions. We tend to falter when it comes to bias and motivation. Unfortunately, it requires hard work to overcome bias and avoid its corrosive effects, even if we do recognize it. Unless we make the direct connection between the bias and our performance it's unlikely we will muster up the motivation necessary to avoid its deleterious effects.

Over the time we have been working together Max has made great strides in understanding how his decisions are affected by cognitive bias. Just as importantly, he has made a tremendous effort to incorporate the tools devised to help him avoid it into his daily process. In fact I consider him to be a model client, exhibiting the kind of curiosity, introspection, and motivation required to improve.

In the case of the episode discussed earlier, several processes have been put in place to help him *bracket* his decisions in order to better analyze his decisions and reach optimal conclusions more often. The detailed trade write-up including all the requisite components is one. Giving trades distinct names in order to isolate the specific, unique objectives of the structure is another. Calculating and writing down the capital at risk (CaR) in combination with writing a premortem is designed to make the experience of the potential loss more salient prior to establishing the risk. This results in more appropriate position sizing and allows the decision maker to be better prepared for that eventuality should it occur down the road. By doing so it reduces the emotional impact in the future, thereby reducing the likelihood that the affect heuristic will lead to a flawed decision at some point over the life of the trade.

In the end though, this one slipped through the cracks. As his decision architect I must develop additional safeguards that improve the odds that he will implement the process as prescribed next time. What makes it so challenging for many portfolio managers is that they are essentially left to their own devices as far as process goes. They don't have to turn in time sheets or fill out a requisition form explaining why they need capital for a new project as it is for most line managers in other industries. That gives portfolio managers the freedom to be sloppy and undisciplined. The next step is to create a fictitious version of that external accountability for Max, but it must at least carry the perception of validity teeth.