

A New Way of Thinking: Defined Outcome Investing as a Means to Mitigate Aversions

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Introduction

At the heart of every investment lies a tradeoff between return vs. exposure to loss, risk, and ambiguity. How do investors analyze these factors and ultimately make decisions?

Expected returns play an obvious role, but life goals and psychological factors such as “sleeping well at night” heavily influence investment decisions as well. The typical investor is left struggling with the seemingly incompatible languages of classical finance and human needs and emotions. This struggle can lead to poor decisions – for example, the investor tendency of buying at highs and selling at lows.

Given the difficulty of changing investor mindsets, wealth management firms would do well to offer solutions that acknowledge behavioral tendencies and cognitive biases rather than combat them. Some wealth advisors have already begun doing that through offering what we call “defined outcome investing”, a technique which seeks to mitigate investor concerns while maintaining markets exposure.

This investment method gives exposure to traditional equities, such as the S&P 500, but shapes the potential outcomes to better fit investor needs. An example of a defined outcome investment is a strategy that delivers exposure to the S&P 500 on an annual basis, but limits losses to 12.5% and gains to 15%.

Authored by:

- Joe Halpern, CEO and Portfolio Manager, Exceed Investments
- Lawrence Solomon, COO, Exceed Investments

So far, however, existing defined outcome investments—all of which involve options—suffer shortcomings that make them unsuitable for many investors and/or inaccessible to all but the most affluent investors.

We are introducing a new approach to defined outcome investing that overcomes these shortcomings. Exceed Investments has created a defined outcome index family along with investment products tracking those indexes. These solutions can effectively satisfy demand for broad U.S. equity exposure while mitigating traditional investor concerns.

I. Drivers of Investor Behavior

Personal Exercise: How does behavioral finance affect your decisions?

Select your preferred choice for each option:

(A)	(B)	(C)
Predict fair coin flip: Correct = \$200, Incorrect = Lose \$100 (Expected Value of \$50)	A Fixed \$50	If (B) What is the minimum you would accept?
Predict fair coin flip: Correct = \$10,000, Incorrect = Nothing (Expected Value of \$5,000)	A Fixed \$4,500	
Predict weighted coin flip (odds unknown): Correct = \$10,000, Incorrect = Nothing (Expected Value of \$5,000)	A Fixed \$4,000	

Recent strides in behavioral finance indicate that investors often exhibit one or more of the following behaviors and preferences (termed “aversions” by economists) when making investment decisions:

- **Loss aversion** – Investors experience a dollar lost as materially more impactful than a dollar gained
- **Risk aversion¹** – Investors prefer a known smaller payoff to a greater “all or nothing” payoff
- **Ambiguity aversion** – Investors prefer a smaller expected payoff where odds are known to a greater expected payoff where they are unknown

¹ Note that the term “risk” is used differently in Behavioral Finance and Economics than it is in colloquial English. In Behavioral Finance and Economics, it refers to potential uncertainty, and can refer to uncertainty for both gains and losses. In colloquial English, the term risk is often used to refer to loss potential – e.g., risk/reward tradeoff refers to the potential for loss vs. the potential for gain. In this document, risk will be used in the Behavioral Finance and Economics sense of the word.

Optimal decision making has to take into account the frailties and foibles of human life, such as limited time, fixed minimum expenses, and diminishing marginal utility of money, that don't get reflected in equations of expected outcomes.

Why are investors naturally risk-averse?

There are two drivers of aversion behavior, one rational and the other psychological.

The rational economic driver can be described by Utility Theory, a bedrock of modern economic thinking. It states that humans rationally operate based on expected useful outcomes, and not, for instance, on mathematically expected outcomes. Thus, optimal human decision making has to take into account the frailties and foibles of human life, such as limited time, fixed minimum expenses, and diminishing marginal utility of money, that don't get reflected in equations of expected outcomes. These rational departures from expected outcomes contribute to aversion behavior.

What does this mean in practice? For starters, simply knowing an investment will perform well over the long term isn't useful to many investors. To quote John Maynard Keynes, "In the long run, we are all dead." For instance, a young couple who is saving for a down payment on a house can't take a 20-year outlook on that money. Instead, they need to make sure that down payment is available for a house closing in the near future. So while studies have demonstrated (e.g., *Stocks for the Long Run*, Dr. Jeremy Siegel) that over the long term, equities have consistently outperformed fixed income (and of course, cash), that conclusion is of little value to a young couple whose time frame is much shorter. While mathematical returns may favor equities, that couple is better off with their assets in fixed income. Thus, optimal human decision making has to take into account the needs of human life that aren't reflected in mathematical equations of expected outcomes.

Utility Theory was developed by both Daniel Bernoulli and Gabriel Cramer in the 1700s in the context of solving a riddle called the St. Petersburg Paradox. The St. Petersburg Paradox refers to a lottery where the expected average winnings are infinite, yet participants refuse to spend more than a very small amount on the game. The rub is that participants have a very small chance of winning enormous, even potentially infinite, payouts. The large potential winnings make the average expected outcome high, but the low probability of success limits the practical appeal of the lottery. The Utility Theory has recently been updated by further research into behavioral economics (e.g., the Prospect Theory of Daniel Kahneman and Amos Tversky).

Psychological drivers of aversions refer to human behaviors that appear to have little connection to useful outcomes but nonetheless play important roles in investment decisions. For example, the young couple mentioned above may continue to prefer fixed income to equities even after they have met their down payment needs. As Kahneman points out in his book *Thinking, Fast and Slow*, even if the results are immaterial, most people “like winning and dislike losing – and [they] almost certainly dislike losing more than [they] like winning”. Whether by evolution or other forces, we have seemingly been programmed to favor certain states such as clarity over ambiguity, stability over risk, and loyalty to what we already own to what we don’t own (i.e., the so-called endowment affect), even when there is no rational reason for doing so. Ignoring psychology when analyzing financial decisions can be perilous, as many financial decisions are indeed driven by psychological biases as opposed to rational thought. Examples include the persistent habit of retail investors to sell at market lows and purchase at market highs, the \$100B+ of cash and cash equivalents earning no income within retirement plans, and the use of debit cards over credit cards.

Ignoring psychology when analyzing financial decisions can be perilous, as many financial decisions are indeed driven by psychological biases as opposed to rational thought.

II. Understanding Aversions: Loss, Risk and Ambiguity

Loss Aversion – Investors experience a dollar lost as more impactful than a dollar gained

Would you accept the following coin flip bet?

Heads: Win \$100

Tails: Lose \$100

Humans generally give greater weight to the loss of a dollar than they do to the gain of an additional dollar.

Humans generally give greater weight to the loss of a dollar than they do to the gain of an additional dollar. Thus, a 50/50 bet is not attractive to the average investor; the bet has to be skewed in favor of winning to attract interest.

Thus, going back to our earlier discussion of choosing between equities and fixed income, the possibility of loss on equities is a negative factor for which the market will require a higher expected return vs. fixed income. How much higher? Let's explore:

Measuring loss aversion

The following scenario should be appealing to few rational investors:

- Heads: Win \$100
- Tails: Lose \$100

The following scenario should be appealing to some rational investors:

- Heads: Win \$150
- Tails: Lose \$100

The following scenario should be appealing to many rational investors:

- Heads: Win \$200
- Tails: Lose \$100

People generally place a higher value on an item in their possession than they would on the same item if they did not own it.

However, the following scenario, which is equally mathematically appealing, will not be appealing to many rational investors because it's simply too scary to lose so much.

- Heads: Win \$2,000,000
- Tails: Lose \$1,000,000

As we mentioned earlier, aversions have both a utility driver and a psychological one. The *utility driver* of loss aversion is the **decreasing marginal utility of money** – that is, the utility of the next dollar I earn is not as useful as the utility of the last one I earned. This concept becomes readily apparent to the reader if the stakes are raised – for most Americans, earning an additional \$1,000,000 would be extremely helpful, but losing their last \$1,000,000 earned would be catastrophic. Many studies show that if an investment presents a tolerable cost of losing, odds between 1.5 and 2.5 to 1 are likely to attract investor interest.^{2,3}

There is a *psychological driver* of loss aversion as well. People generally place a higher value on an item in their possession than they would on the same item if they did not own it. Thus, an investor will psychologically value a dollar he owns more than a potential one he does not.

To demonstrate this aversion, several researchers have experimented with the following theme:

- Ask a participant for price X they would be willing to pay for a relatively unimportant item
- Give the participant that item for free
- Ask participant the price Y they would be willing to sell the item for

² Kahnemann, *Thinking Fast and Slow*

³ It should be noted that the standards applied by individuals for investing activities are not universally applied in other aspects of their lives – e.g., at a casino, participants accept odds that are considerably worse than 2:1

$Y > X$ has consistently been observed⁴. Several foundational economic theories suggest these prices should be identical or nearly identical (e.g., Coase theorem, indifference curves), but in practice those theories don't appear to universally hold true.

Risk aversion – Investors prefer a known smaller payoff to a greater “all or nothing” payoff

Which of the following payoffs would you prefer?

A: Win \$100

B: 50% chance of winning \$200

Given that A and B have mathematically equivalent expected outcomes, there are individuals who prefer the certainty of option A (said to be “risk averse”), those who prefer the 50% odds of option B (“risk seeking”), and those who don't care (“risk neutral”).

Risk aversion appears to be the dominant trait among people. Most people who are exposed to uncertainty will attempt to reduce it; in the context of finance, investors prefer an opportunity with a certain payoff (e.g., fixed income) to one with an uncertain payoff (e.g., equities) if the expected returns are equal. Thus, the expected return for equity markets **has to be greater** than returns for fixed income, if markets are efficient. Historically, that has generally been the case (keeping in mind that the potential for loss also plays a role in the greater expected returns for equities).

Utility theory provides a simple explanation for risk aversion, as illustrated by the following example: Assume you are worth \$1M today. You purchase a winning lottery ticket which offers you a choice:

- A guaranteed additional \$1M (so you would be worth \$2M)

⁴ For a relatively recent example, see “Focusing on the Forgone: How Value Can Appear So Different to Buyers and Sellers” by Ziv Carmon and Dan Ariely

- A 50% chance to obtain \$2M (so you would be still be worth \$1M or you would triple your worth to \$3M)

The marginal utility of the first extra \$1M is enormous – you could pay off most/all of your existing debts, significantly upgrade your home, buy the nicest car available, and so forth. What's the utility of the next \$1M? Probably not anywhere near as useful or valuable.

The *psychological* driver behind risk aversion is Direction Risk Aversion, which is demonstrated by humans irrespective of *utility* – that is to say, uncertainty itself delivers a certain cost or displeasure that people will avoid. In an interesting demonstration, one study found that “participants were willing to pay \$38 for a restricted \$50 gift certificate, yet were only willing to pay \$28 for a lottery ticket that provided an equal chance of that \$50 certificate and a \$100 certificate with the same restrictions”⁵. Of course, this finding contradicts common sense and many fundamental economic and behavioral finance theories, a point acknowledged by the researchers.⁶

Ambiguity Aversion – Investors prefer a smaller expected payoff where odds are known to a greater expected payoff where they are unknown

Which of the following games would you prefer to play?

A: Guess what color ball is randomly drawn from an urn of 50 blue balls and 50 red balls

B: Guess what color ball is randomly drawn from an urn of blue and red balls; ratio of blue to red balls unknown

⁵ Gneezy, Uri, John A List, and George Wu. "The Uncertainty Effect: When A Risky Prospect Is Valued Less Than Its Worst Possible Outcome." *Quarterly Journal of Economics* (2006): 1283-309. Print.

⁶ There are certain caveats to this finding, one notably being that in a direct comparison between a \$50 gift certificate and a lottery offering \$50 or \$100, almost all participants did demonstrate their rationality by choosing the lottery. Where common sense appears to break down is where participants are asked to separately value these choices, in which as we previously pointed out they will often give the inferior choice a higher value.

Most people prefer known risks to unknown risks, even if those risks are shown to be mathematically equivalent.

Most people prefer known risks to unknown risks, even if those risks are shown to be mathematically equivalent. Thus, an investor choosing between two investments will favor the one in which he or she understands what can go wrong – i.e., people prefer the devil they know, all else being equal. This behavior was famously demonstrated by the researcher Daniel Ellsberg through experiments that became known as the Ellsberg Paradox, and which have been repeated by several researchers. Here is the gist:

The Ellsberg Paradox

- Participants are presented with an urn of 50 blue balls and 50 red balls. A ball is picked at random and the participant is asked for a preference between blue and red. Participants will generally assign no preference – i.e., odds are 50%
- Participants are next presented with an urn of blue balls and red balls of unknown ratio. A ball is picked at random and the participant is asked for a preference between blue and red. Participants will generally assign no preference – i.e., odds are 50%
- Participants are asked to choose which urn game they prefer. Overwhelmingly, participants will choose the first game despite having indicated both games offer a 50% chance of winning

Ambiguity aversion is a relatively groundbreaking field of research with few widely accepted theories to explain either the utility or psychology drivers behind it. One theory⁷ is that humans seek to minimize their worst-case odds. Since the first urn (with 50/50 split of colors) presents at worst a 50% chance of being wrong, and the second urn presents a greater theoretical chance of being wrong (e.g., if only one blue ball is found in the batch, and the participant chooses blue, he has a 99% chance of being wrong),

⁷ Gilboa, Itzhak and Schmeidler, David. "Maxmin expected utility with non-unique prior"

participants generally prefer the first game. It should be noted the aversion serves no utilitarian purpose in this decision – it pushes a preference which does not ultimately help the user.

One real-world context of ambiguity aversion is that it acts as a deterrent to various potential investments and trading transactions. For instance, it is well documented that United States investors are significantly overinvested in domestic investments. Whereas financial models would generally suggest a 50% global allocation, U.S. investors typically invest only 10% abroad⁸. The authors personally heard this observation in business school classes and then experienced it first-hand in wealth management roles at major investment banks, where American customers showed considerable reluctance to diversify overseas.

The lack of interest in global markets among U.S. investors can be viewed through the lens of ambiguity aversion.⁹ Although U.S. investors are rationally aware that at least some global equities (e.g., European) belong within their portfolios, familiarity leads to an overwhelming favoritism toward U.S. equities.

⁸ See Ahearn and Warnock

⁹ See Massimo Guidolin and Henin Liu

III. Putting it All Together: How Aversions Influence Investment Decisions

Aversions play a significant role in how investors make decisions. Lou Harvey of Dalbar¹⁰ categorizes investors into three major categories:

1. **Maximize Return** – focused on performance
2. **Protect and Grow** – focused on balancing principal protection and desired future growth
3. **Safety-Conscious** – investors so loss-averse that they “don’t want to lose a nickel”

The first group of “thrill seekers” is a minority, whereas the majority of investors fall into the latter two groups and are collectively loss averse. The rub is that most investors allocate a substantial portion of assets to equities – thus, the traditional portfolio allocation of “60/40” split between stocks and bonds.

Equity markets, however, present unbounded loss potential (down to zero), gyrate with a great deal of volatility, and offer unknown probabilities of success. As such, equities as an asset class do an excellent job of triggering several investor aversions – it is therefore no surprise that investors often tend to become either too excited or too scared with their equity holdings at just the wrong time.

A consistent thread of investing advice for several decades has tried to coax investors to hold their equity investments relatively steady, regardless of the slings and arrows of outrageous fortune.

Equities as an asset class do an excellent job of triggering several investor aversions.

¹⁰ As quoted by Gil Weinrich in Think Advisor, “Bad Behavior Cost Mutual Fund Investors 8 Percentage Points in 2014: Dalbar”, April 21, 2015

However, when the going gets tough, it can be difficult for an investor, particularly one with a utility need to meet, to maintain the requisite calm. Without a clear understanding of a maximum equity drawdown during a crash, it is impossible for an investor to ensure his equity investment nest egg will meet his utility needs when required. Similarly, the psychological uncertainty surrounding what may happen next in a market downturn can simply be overwhelming for most individuals.

To make matters more difficult, change can occur not just externally in markets but within a person – health concerns, an approaching spending need, a looming retirement and so forth – making it nearly impossible for most investors to stay in the market and hope for the best.

Perhaps rather than trying to change investors' behavior we should be changing our approach to investing.

Defined outcome investing is an options-based strategy that allows investors to limit their risk/reward exposure to pre-set protection and return levels.

IV. A New Way of Thinking: Defined Outcome Investing as a Means to Mitigate Aversions

Defined outcome investing is an options-based strategy that allows investors to limit their risk/reward exposure to pre-set protection and return levels.

An example of a defined outcome product is one that delivers exposure to the S&P 500 on an annual basis but limits losses to 12.5% down and limits gains to 15%. In this example, the universe of potential returns has been shifted to eliminate extreme up and down markets.

Shifting potential outcomes may better meet the utility and psychological needs of many investors than a direct equity investment would:

- Better understood downside/upside potential and expected returns
- Mitigation or even elimination of aversions - particularly loss, but risk and ambiguity as well
- A simple path forward when the going gets tough – whether it's an upheaval in the capital markets or individually driven, the shaped contours of such a solution better fit utility and psychological needs

This paradigm shift in consistency and outcome transparency allows for a smoother ride through capital events. Ultimately, it allows investors to increase their equity exposure through the better matching of expected outcomes to personal needs.

Products offering defined outcomes include:

- Options strategies
- Structured notes
- Fixed index annuities
- Exceed Investments solutions

All defined outcome solutions are built using options, which by their nature are uniquely able to introduce or eliminate exposures at particular market prices. For instance, a put option allows the owner to sell the reference security at a defined market price. As the reference security sinks in value, the put gains an equivalent amount in value.

Options Example

Imagine a forward-thinking investor at the beginning of 2013 who saw a bull market long in the tooth. Such an investor might sell some or all of his equity positions, putting his assets in more “defensive” positions such as fixed income. Of course, such an investor would also risk missing continued equity growth in 2013, which is precisely what occurred.

Another path would have been for the investor to purchase a put on the S&P 500 with a strike at X% below the market, where X% is defined by the maximum point at which he is comfortable taking a hit. By the end of 2013, that investor would have participated in the substantial rally that occurred, less the cost of his downside protection.

Now imagine that same investor making a similar decision to purchase a put at the beginning of 2008. By the end of 2008, that investor would have been shielded from the significant downturn that affected equity markets that year – any drop below X% would have resulted in an equal increase of X% in his put value, effectively shielding him from harm.

In practice, the use of options introduces a high degree of complexity that most investors cannot accommodate.

Theoretically, most investors should use option strategies to protect their portfolio, add increased return, and so forth. In practice, use of options introduces a high degree of complexity that most investors cannot accommodate. For instance, there are currently over a thousand different options available for sale on the S&P 500. A would-be options user

Despite these complexities, options are extremely popular products due to the flexibility and control they provide. In addition to being utilized directly by investors to take positions in the market, they often function behind the scenes of other financial products marketed to investors.

needs to figure out the duration, type, and magnitude of coverage he seeks. Furthermore, depending on the protection or exposure level sought, options can be quite costly to purchase directly. Deciding how much to spend vs. the benefit derived can itself require substantial options experience. To add further complexity, the expected cost isn't steady but varies with market expectations. For example, think of buying flood insurance on Long Island before and after Hurricane Sandy. Despite these complexities, options are extremely popular products due to the flexibility and control they provide. In addition to being utilized directly by investors to take positions in the market, they often function behind the scenes in other financial products marketed to investors. In these packaged solutions, investors can choose the defined outcome benefits they want while leaving the options design work to product portfolio managers.

For instance, **structured notes** use a portfolio of options (along with the interest income of a fixed income instrument) to create a discrete strategy. A popular structured note is a so-called "buffered note" on the S&P which delivers the same performance as the S&P with a level of downside protection (and often a cap on upside potential to "pay" for the downside protection). The benefit to investors is that they can choose the investment parameters they seek (e.g., protection against the first 10% of losses) without having to directly interact with the underlying options working behind the scenes. These benefits have led to immense popularity of these pre-packaged defined outcome investments, to the tune of \$2 trillion globally.

There are a number of potential drawbacks to structured notes. A structured note is an IOU of the issuer, meaning that customers do not actually own the underlying options and debt instruments. This nuance is not particularly meaningful *unless* the issuer cannot make good on its obligations (e.g., Lehman Brothers), in which case the difference between owning the underlying options and bonds and owning a bank-

issued structured note is night and day. Drawbacks include high fees and illiquidity – it can cost hundreds of basis points to enter and exit a position. The lack of historical standardization of structured notes introduces a separate challenge to their portfolio inclusion – it is relatively difficult to compare historical structured note performance vs. other potential investments opportunities. The lack of standardization can also make it difficult to incorporate structured notes into portfolio allocations and client reporting.

Fixed indexed annuities are a type of defined outcome investment that has become popular over the last few years, especially in consideration of the low yield environment. This product mixes elements of fully principal-protected structured notes and combines them with annuity features, such as tax deferrals. The issuers are insurance companies using options to hedge exposure behind the scenes. A more recent evolution has been the **variable indexed annuity**, which introduces other structured note type choices into the mix, e.g., partial protection rather than full protection in exchange for greater upside. These products suffer from drawbacks similar to structured notes, with added illiquidity due to the annuity structure.

Exceed Investments is introducing a standardized and rules-based method to create defined outcome investments within a wide array of investment vehicles - including '40 Act funds, comingled vehicles, and managed accounts. Like other defined outcome providers, Exceed uses options to shape the exposure for the investor. However, that is where the similarities end. Whereas other packaged solutions are limited to a given wrapper (e.g., bank -ssued structured notes), Exceed's strategies utilize publicly traded securities that can be packaged in almost any vehicle. Products which incorporate Exceed's methodology can offer defined outcome solutions with improved liquidity, lower fees, and mitigated credit risk, among other benefits.

This enables, for the first time, an **ongoing defined outcome portfolio** with parameters that are fairly consistent over time. These strategies are standardized, making their inclusion within portfolios and client reporting a straightforward task.

Exceed has introduced another major innovation with the development of portfolios of defined outcome solutions. A traditional defined outcome solution has a term structure with a fixed beginning and end point and, as such, doesn't lend itself to direct comparison with more traditional investments. For example, when looking to purchase a given two-year structured note vs. a low volatility fund vs. a stable REIT, it would be difficult if not impossible to see how those products would have done against each other over the last 1, 5, or 10 years, or to project how they would do against each other over the next 1, 5, or 10 years. Structured notes are one-off bank offerings for which there is typically no consistent past or future – there is no guarantee that a structured note being offered today will be available for repurchase when it matures, and there is a good chance it wasn't available for purchase several years ago.

In contrast, Exceed's strategies feature the ongoing creation and redemption of exchange-traded option strategies, resulting in an "evergreen" investment not limited to a maturity date. This enables, for the first time, an **ongoing defined outcome portfolio** with parameters that are fairly consistent over time. These strategies are standardized, making their inclusion within portfolios and client reporting a straightforward task. In addition, the standardization enables direct comparison with other asset classes to facilitate transparent decision making.

Exceed's philosophy is to offer investors a straightforward path to defined outcomes. The benefits should be equally appealing to those who traditionally focus only on "vanilla" equity products as well as those using other defined outcome solutions such as structured notes.

Taken in total, Exceed's solutions offer investors the best of two worlds:

- The transformative power of **defined outcome investing**, with its increased clarity and control of downside

exposure, mitigation of aversions, and guidance during turbulent market conditions

- The liquidity, simplicity of access, and standardization of traditional equity products such as indexes, mutual funds, and ETFs

In September, 2014, Exceed partnered with the Nasdaq to create an index product family offering different defined outcome possibilities. These indexes can be used in a number of different vehicles ranging from 40 act funds to managed accounts.

The index family includes the following indexes:

- **Nasdaq Exceed Structured Protection Index (EXPROT):** Maximum principal protection for conservative investors
- **Nasdaq Exceed Structured Hedged Index (EXHEDG):** Protection and enhanced upside participation for neutral investors
- **Nasdaq Exceed Structured Enhanced Index (EXENHA):** Maximum upside potential for aggressive investors

For further information, please contact the authors at:

- Joseph Halpern
joseph.halpern@exceedinvestments.com
- Lawrence Solomon
lawrence.solomon@exceedinvestments.com

Exceed Indexes LLC

A wholly owned subsidiary of Exceed Holdings, LLC
28 W. 44th Street, 16th Floor
New York, NY 10036

For more information visit exceedinvestments.com.

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