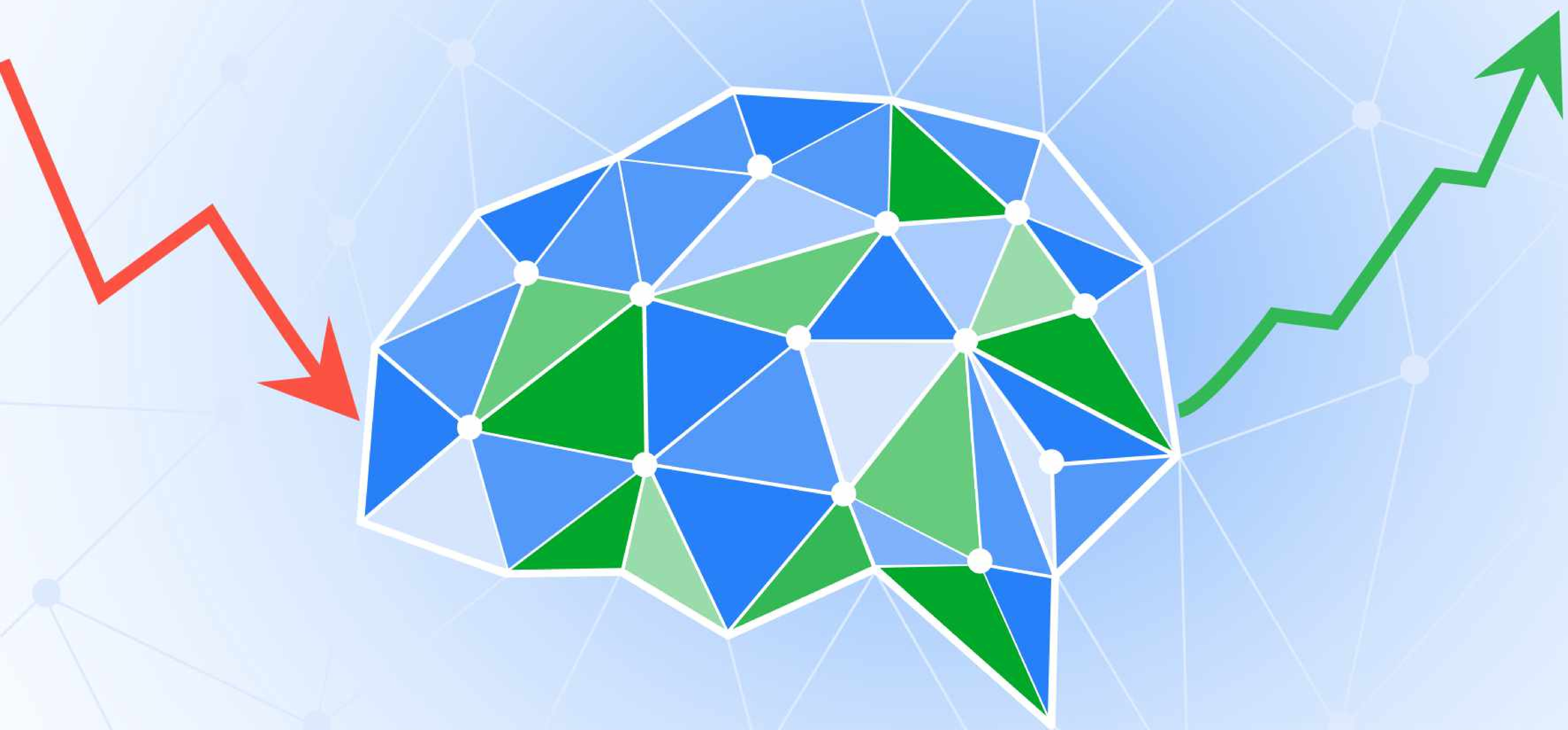
PRACTICAL BEHAVIOURAL FINANCE FOR RISK-AWARE INVESTORS

Your personal guide to better investing



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Practical Behavioural Finance for Risk-Aware Investors

> To invest successfully over a lifetime does not require a stratospheric IQ, unusual business insight, or inside information. What's needed is a sound intellectual framework for decisions and the ability to keep emotions from corroding that framework.
>
> — Warren Buffett

Dear Investor,

We applaud and welcome your aspiration to join a unique community of intelligent, risk-aware investors. **This book will help you to invest better** – to risk less and earn more – and to gain valuable knowledge unavailable to most investors. It has already helped many individual investors worldwide, and 92% of readers rated this book 'very useful'.

Let's start with some unfortunate facts. Our consolidation of 27 individual studies shows that **over 90% of individual investors lose money to institutions because these individuals manage their risk poorly**. As experts, we know that apart from knowledge and the ability to process information, sound risk management involves a clear understanding of why one makes investment decisions and how one reacts to risk.

Nobel prize-winning ideas of behavioural finance backed by thousands of academic and practical studies show that individual investors are prone to myriads of suboptimal decision-making patterns. These are called behavioural biases, and they seriously impair long-term investment returns. Most of the aforementioned study participants were prone to several biases at a minimum, and **our studies revealed the same result: over 99.5% (!) of investors make at least one of the 19 typical investing mistakes**.

Behavioural finance studies biases and how they influence financial market decisions. Put simply, it asserts that investors are not perfectly rational, and that their investing- and risk-taking decisions are heavily influenced (read – determined) by psychological biases. Behavioural finance emerged as a concept many decades ago and has received many theoretical and practical affirmations. It can help anyone to make better decisions with respect to their finances, and consequently has become a widely discussed topic among finance practitioners and the general investment public; even financial regulators have started to pay close attention and promote it. **To say the least, it would be very unwise for you to ignore the eye-opening concepts of behavioural finance and continue to invest blindfolded**. The most significant risk is not knowing your risks! Every day spent ignoring these powerful ideas exposes you to additional risks.

We have analysed thousands of client cases, ranging from newcomers to professional traders, and we know it is common and perfectly acceptable to have biases. **Even professionals are prone to some – the authors of this book, professional risk managers and research analysts with 20 years of financial market experience, are no exception!** The number or degree of your biases do not make you a bad or a good investor. Rather, the identified biases indicate which potentially detrimental behavioural patterns need your attention. Importantly, what distinguishes a genuinely risk-aware investor is a readiness to honestly acknowledge one's own biases, to seek the knowledge required to overcome them, and then have the discipline to apply this knowledge.

At PRAAMS, we have designed a **unique BehaviouRisk Diagnostic System to determine your true investment profile and identify your unique combination of cognitive and emotional biases and their degree**. BehaviouRisk is based on behavioural finance ideas and helps individuals to become better and more intelligent, risk-aware investors. Furthermore, it enhances standard risk profiling. We are delighted to offer you this opportunity to obtain a personalised report and give yourself a distinct investing advantage.

Investing theory says that **each investor has his own risk profile or risk tolerance, i.e., a maximum amount of risk he is comfortable assuming**. Investors with substantial risk tolerance are comfortable with high-risk instruments, while those with minimal risk tolerance limit the risk in their portfolios. Any risk mismatch impairs long-term returns: taking greater risks than one can manage leads to losses, while avoiding risks when one can handle them diminishes potential return because risk and return are connected. The first mistake is far more detrimental.

It is essential to understand your true risk tolerance correctly. Standard risk-profiling questionnaires, such as the one you are likely to have been given by your investment firm, are oversimplistic and incomplete. Conflict of interest aside, the approach focuses only on external factors such as experience and investment horizon. It ignores the critical influence of your unique biases. Your real risk profile is a combination of external and internal factors, and BehaviouRisk helps you to ascertain this. When you know your true risk tolerance, you will no longer be misled by financial advisors who may try to sell you unsuitable products.

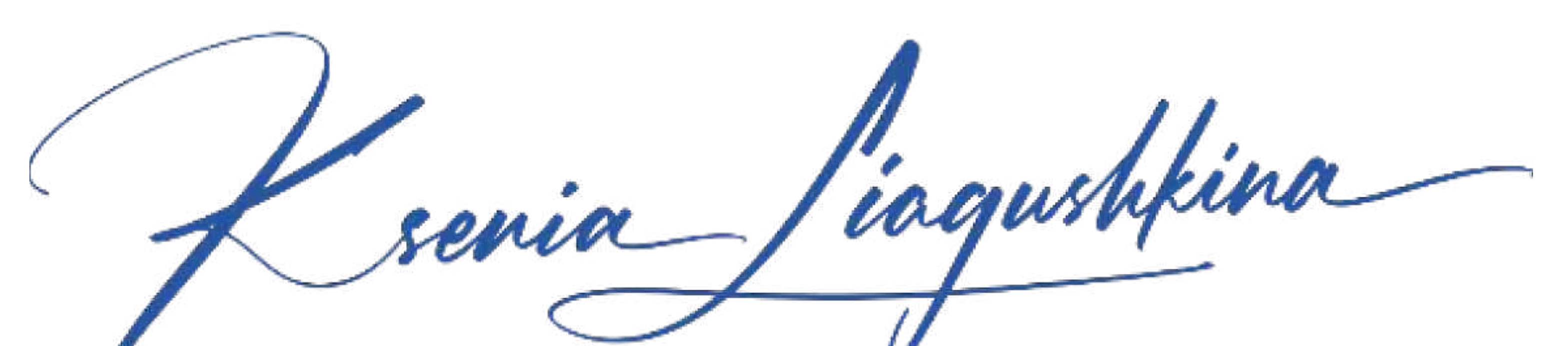
It is important to remember that behavioural investment profiling is just one of the key elements to successful investing. Others include Asset risk profiling and Analytica, which help you analyse risks and returns of every investment globally, Portfolio Auditor and Portfolio Selector to check key portfolio metrics and explore new investment opportunities, and the Volatility predictor to monitor instrument performance and de-risk before the storms. Leave your email at praa.ms to be the first to receive these services.

Join the PRAAMS risk-aware community on Medium, Facebook, LinkedIn, Instagram, YouTube, and other social media platforms and **consider sharing your new knowledge and this book with others** to help them achieve their goals and make financial markets a better place for everyone.

We wish you the best of luck in what we believe will be a fascinating journey to becoming an intelligent, risk-aware investor. It may not be easy, but **this is a valuable investment in yourself**.

Sincerely yours and always ready to help,

Co-Founder and CEO



Co-Founder and COO

Behavioural biases

Behavioural economists and psychologists have discovered over 200 biases and, on many occasions, assigned different names to almost identical concepts. We have two pieces of good news. First, not all these biases are relevant when it comes to investment decisions. In this book, **we focus on the 19 most common and significant behavioural biases** that have the greatest effects on individual investors. Second, in this book, we use well-established terminology and merge closely related concepts to maximise clarity and save you time.

Other **great news is that you can overcome your biases**. Cognitive biases, i.e., mistakes in decision-making, can be effectively corrected with education, such as the advice below. However, emotional biases, i.e., reactions based on personal reactions, are more difficult to manage and require permanent discipline and control in addition to awareness, although again the advice below will be enormously helpful. Optimally, one should use risk IT solutions such as PRAAMS to obtain bias-free, professional, and complete advice.

For each of the 19 biases, there is a brief description with examples, information on the consequences the bias has for individual investors and, most importantly, what you can do to overcome them. **We address the most common and harmful biases first**.

To ascertain your unique combination of cognitive and emotional biases and their degree, and to understand your true risk tolerance, we strongly advise that you take advantage of the PRAAMS BehaviouRisk Diagnostic System at no cost while PRAAMS is being alpha-tested.

Overconfidence bias (emotional)

What is overconfidence bias? It is the psychological tendency for a person to overestimate his own abilities. Overconfidence bias is one of the most common and harmful biases, and exacerbating matters, a person with this bias often finds it difficult to recognise and admit to it.

What are the consequences? In investing, overconfidence bias prompts investors to make and rely on overly precise forecasts, leading to consistent underestimation of risks. It also results in investors being too assured in their judgements and likely to ignore further relevant information about the investment. Typically, a person with a solid overconfidence bias trades too frequently and has poor diversification. The latter lead to poor long-term performance for individual investors, as proven by many studies (e.g., Trinugroho and Sembel's 2011 study and review). An overconfident person is quick to make investment decisions based on incomplete information, which he assumes equips him with an information advantage. He is also likely to tenaciously hold the investment until the market proves him seriously wrong.

What can I do? First, carefully and frankly analyse how overconfidence bias displays itself in your decision-making. This bias is dangerous because one does not readily acknowledge it. Assuming you believe that you have an excellent investment-picking ability, we suggest you compare your portfolio's returns to a benchmark like the S&P 500 index or several broad-based funds for several years. Studies suggest your performance may lag the market. In the financial markets, you are trading against institutions with armies of analysts and traders with high-speed computers that have better access to relevant information and can process it faster than you.

The same advice is valid if you trade excessively. If your annual portfolio turnover exceeds 20% (more than one-fifth of your portfolio is reinvested each year), it is worth taking notes on each trade for several quarters and examining the respective returns. Benchmarking against a broad index or a fund can be very illustrative.

Next, record your reasoning for investing in a particular asset. Try to be as frank as possible; ultimately, you are investing your money, and no one can help you better than yourself. A typical sign of overconfidence bias is that even an insignificant amount of information from a widely available source may motivate you to trade. Our experience shows that providing an investor with an independent second opinion in terms of return and risk numbers can help immensely to re-evaluate the trade.

Finally, it is wise to pay attention to portfolio diversification. If your portfolio includes less than twenty investments or the share of any of them exceeds 5%, it is a red flag for insufficient diversification. Ask yourself this question: “If I didn’t have asset X yesterday, would I buy this amount today?”. Often the answer is ‘no’, which means that over time overconfidence pushed you to grow your position in X above what you consider appropriate. Diversification is not only about percentages in your portfolio; proper diversification is also about avoiding concentrations in regions, countries, industries, and other common risk factors. To properly analyse the degree of portfolio diversification, you will likely need the help of a professional investment risk manager.

Loss aversion bias (emotional)

What is loss aversion bias? This is a behavioural pattern whereby a person is more inclined to avoid losses than to enjoy gains. Scientists have found that a person, on average, will accept the risk of losing $1 only if offered the opportunity to gain at least $2 in return. The gain-loss ratio is 2 to 1; i.e. a person, on average, desires higher gain vs risk.

What are the consequences? The implication in investing is quite simple: an investor with loss aversion bias would prefer to keep an unprofitable investment than sell it and rebalance the portfolio. The desire to avoid losses motivates the investor to wait until the investment’s price recovers – even though it may never happen. Typical justifications used by such investors include: “it will go up again”, “it is just a paper loss”, “it becomes a loss only when I sell it, and before that, I still have a chance to break even on this investment”, and many others. Similarly, many investors with strong loss aversion bias tend to fix profits as soon as they appear, thus limiting potential upside and engaging in more frequent trading strategies.

A combination of holding unprofitable investments for too long (‘keep the losers’) and quick profit fixing on profitable investments (‘sell the winners’) leads to poor investment results. Over a longer period, loss aversion bias increases the risk and diminishes return, which is especially dangerous for long-term investing. The negative effect of loss aversion worsens for investors who rebalance their portfolios more frequently. In this case, these investors will hold more ‘losers’ and sell ‘winners’ with smaller gains.

What can I do? The most important practical advice for overcoming loss aversion bias is the use of stop losses. It is wise to set these when an investment is made and agree to execute them when triggered, which requires self-discipline. As with any pre-determined rule, one must consider the nuances of the particular asset beforehand.

For example, if the regular volatility of an asset is high, for example, a typical asset-price swing is from -20% to +20%, the stop loss should be wider than -20%. However, if the asset has low regular volatility (for example, from -5% to +5%), then a 7-10% stop loss may be ok, depending on one's risk tolerance. Remember that the stop losses help to overcome loss aversion bias and many other negative investing patterns.

The same is valid for taking profits. One may want to set a take-profit level when an investment is made and execute it when the time comes, which again requires discipline. As with losses, individual characteristics should also be considered to avoid the early sale of 'winners'.

Finally, one should always remember the importance of diversification, which usually suffers when an investor has a severe loss aversion bias.

Mental accounting (cognitive)

What is mental accounting? This is a psychological pattern whereby an individual tends to group his assets into several mental accounts, and subjectively assigns different values to each. For example, a person can categorise his wealth by its source (e.g. salary, bonus, inheritance, insurance payment) or intended use (e.g. leisure, savings, basic needs). Another example is treating certain sums of money as 'easy come': found money, presents, lucky lottery or casino gains etc. Labelled as such, individuals are more inclined to spend them faster and with fewer worries and to bet with this money more easily and regret less if the stake did not win. Easy come, easy go indeed! Another example of mental accounting is when an individual is less likely to buy something if forced to pay in cash rather than with a credit card. The mental category of 'credit card money' is viewed as future money, whereas 'cash money' is considered current money, usually perceived as more valuable. Money labelling makes no sense: $1 is $1 regardless of the artificial mental account into which it is deposited.

What are the consequences? The first is creating layered portfolios, i.e. mentally dividing the portfolio into several layers, with each targeting a different strategy. For example, the first layer pursues wealth preservation, the second, aggressive capital appreciation, and the third, moderate capital appreciation and constant income flow. Strongly pronounced mental accounting sees an investor considering these layers unrelated, as each targets different investment outcomes. However, the layered approach ignores the crucial fact that the assets in these layers may correlate and thus offset each other on a combined or portfolio level. For example, the fall in the value of one layer may offset the gains of another layer, rendering the portfolio return suboptimal.

Another type of layering relates to the intended use of the funds from the investment portfolio. Many investors, for example, treat one layer of their portfolio as intended for pension, another for college debt payoff, and a third for current income.

The third type of layering treats returns from dividends or coupons and returns from capital appreciation differently. An investor pursuing a wealth preservation strategy focuses on preserving the principal and tends to spend the dividends and coupons. Similarly, an investor focusing on a current income strategy tends to prefer instruments that pay high dividends or coupons and, as a result, forces himself into higher-risk investments where the principal is at greater risk.

The fourth type of layering is about treating initial investment and earned returns differently, as with the 'easy come,

easy go' effect above. It is typical for such an investor to make higher-risk investments as returns accumulate and his total wealth grows. This investor feels he has been doing well and has earned enough to assume riskier bets.

Layering ignores the correlations between individual assets, worsening the total portfolio return. Moreover, layering has no rational grounds. Consequently, at PRAAMS, we consider the risks of individual assets and evaluate their correlations at the portfolio level, as both are critical.

What can I do? Dividing your wealth or investment portfolio into layers makes no sense and may even be harmful. It is wise to recognise this temptation in the early stages and come to terms with it. It is the total portfolio return that matters, nothing else. Diversification is one of the fundamental strategies required to achieve stable and predictable portfolio returns. Also, it is wise to remember that $1 is always $1 regardless of its source, intended use, or one's level of wealth. A $100 lottery win is the same as your grandmother's $100 birthday gift cheque, and its value is the same whether you have a portfolio worth 10 thousand or 10 million.

Affinity bias (emotional)

What is affinity bias? This is a behavioural pattern whereby a person buys a product or service not just because of its practical use but also because it helps to communicate to others his values or desired image. For example, ordering expensive whisky or wine to be perceived as a wealthy connoisseur or buying a Tesla to be regarded as a successful, environmentally conscious individual.

What are the consequences? In investing, affinity bias displays itself in the choice of asset class, particular characteristics, or names of investments. Some people invest in crypto assets to be viewed as modern and intelligent investors, for the excellent opportunity to tell a story, or the fear of missing out. Another group of investors is highly inclined towards environmental, social and governance (ESG) topics because they believe that investing in assets that score highly in ESG rankings conveys an image of them as caring citizens with forward-thinking modern values. One more example is patriotic investing, when a person prefers investing in companies operating in his country, region, or city. Many investors also buy the securities of companies because they like their well-communicated corporate values and want to be associated with them: Apple for talented and innovative misfits, Tesla for eco-friendly geniuses and big dreamers, Nike for sports passion and health values etc. Finally, some investors buy hedge funds, derivative products, or other complex asset classes to be perceived as more sophisticated investors.

The fundamental problem with affinity-driven investing is that the investment decision is not based solely on the asset's risk-return characteristics. An investor's desire to stand out or communicate a better image of himself has nothing to do with achieving investment objectives within his risk tolerance. The bias introduces unnecessary noise and makes investment results suboptimal. Ultimately, it leads to excessive risk-taking, lower returns, or both. For example, almost all crypto assets are very high-risk investments and buying them will increase the portfolio's risk but not necessarily the return. Additionally, a strong inclination towards patriotic investing dramatically limits the investable universe and renders a portfolio suboptimal.

What can I do? First, acknowledge that some investment decisions may involve elements of affinity bias. Then, base your investing decisions solely on the risk-return characteristics of a security and its portfolio effect. Nothing else. Studies prove that a company's attractive social image or appealing marketing campaigns may influence the

performance of its securities, but the result is usually short-lived and unreliable. We understand that some investors try to make this world a better place by investing in securities of companies with shared values. We agree that this may be good for the future of the planet, but we warn that it has little to do with rational investing. To promote their values and beliefs, these investors may suffer lower returns while accepting higher risks.

Cognitive dissonance (cognitive)

What is cognitive dissonance? Cognitive dissonance is a widespread behavioural pattern among investors and refers to the discomfort resulting from holding two different beliefs. When new information conflicts with one's existing knowledge or prior decisions, one might refuse to update the latter to avoid this mental discomfort.

What are the consequences? One may come up with a series of apparently logical explanations for why keeping an underperforming asset in one's portfolio is okay. These may include "the price fall is temporary, "the financials of the company will improve soon", "this time it is different", or "many other investors want to buy this asset, so its price will go up soon". Or one may continue investing in an asset after it has gone down without refreshing the investment research on the asset.

What can I do? The first step is to recognise cognitive dissonance in investment decision-making or other spheres of your life. Try to recall when you refused to change an earlier decision, only to discover that it was incorrect or that you could have done better. It does not matter whether it was a big decision like buying a house, or a minor one like picking a stock in which to invest. The more you recall, the more likely it is that you are prone to cognitive dissonance bias.

The next step is to avoid several mistakes commonly made in attempting to correct cognitive dissonance bias. The first mistake is changing your core beliefs rather than your actions. You can convince yourself that holding a fallen stock expected to drop further is a good idea. This path of least resistance will help to alleviate the bias temporarily but will not correct the initial mistake. The decision to sell a collapsed stock is still there to be made. The second error is admitting the mistake and promising not to repeat it. The promise of future action alleviates the dissonance today but does not correct the primary cause. A third typical incorrect response is changing the context of an action. With the fallen stock example, you may come up with explanations along the lines of "I do not see other better investment opportunities at the moment, so there is no point in selling now", or "All stocks are expected to fall further in this market meltdown, so there is no point in selling this particular one". Such reasoning changes the context but does not correct the mistake itself. The only correct decision when holding a fallen stock expected to fall further is to sell it.

The third step is to set external rules such as stop losses, or to always seek an independent second opinion. There are different kinds of stop losses: absolute ("sell when the price drops below $12") and relative ("sell when the price falls 20%"), and hard and soft stops – gradually downsizing one's position after a soft stop loss level and fully liquidating it after a hard stop is reached. A good rule is to place a stop loss when an investment decision is made so that it is executed automatically when triggered. Stop losses help to achieve optimal investment decisions and minimise the temptation to circumvent the cognitive dissonance bias. The same is true for an independent second opinion – trusted advice motivates one to make the right decision. The key is that it must be unbiased. If your consultant recommended the fallen stock, his advice is unlikely to be impartial. He is exposed to the same cognitive dissonance bias, and thus he might be unwilling to readily admit his prior mistake.

Finally, self-discipline is vital. Realising your bias and knowing how to overcome it is half the job. The other half is doing so systematically when investing.

Illusion of control bias (cognitive)

What is illusion of control bias? This bias describes a behavioural pattern whereby a person believes that he can control or influence the results of a process, whereas he cannot. A typical example is throwing dice: many committed casino players are convinced that the way they throw dice influences the final sum. Psychologists from Harvard University found that the illusion of control bias becomes more acute when decision-making is undertaken in competitive environments or with active involvement. These are familiar feelings for an individual investor in the financial markets.

What are the consequences? Illusion of control bias pushes investors to trade more frequently – especially those engaged in active or online trading. Studies show that excessive trading among individual investors leads to poorer investment results (e.g., Trinugroho and Sembel's 2011 study and review). This bias also encourages investors to hold more concentrated positions, especially in stocks of the companies over which they believe they have control or better-than-market understanding. Using specific techniques such as iceberg or limit orders gives the illusion of better control over the trading outcomes and exacerbates the effect of the bias. Finally, a widespread consequence is that investors who are successful in other areas of their lives – for example, their professional careers or businesses – falsely think that they will also be successful traders. However, investing is an entirely different sphere and requires a different type of knowledge, and the assumed transfer of ability may seriously harm the investment results.

What can I do? It is wise to remember that sometimes confidence may stem from the illusion of control bias. Investing is always a game of probabilities, and no one knows anything much better than anyone else or with 100% certainty (if this is the case, it is most likely insider trading, an illegal trading practice). If you feel you have exceptional knowledge or control, it would be an excellent strategy to challenge the grounds for your confidence, for example, by considering the opposite viewpoint and the risks of being wrong. Reassessment is essential if this assumed superior knowledge motivates you to invest more or trade specific financial instruments more frequently. This is also a beneficial exercise if you have above-average success in some other, notable area of life and tend to perform well in competitive or continually changing environments. Another piece of advice is to describe your decision in writing: when considering an investment, write down five good reasons to buy and five good reasons to sell. It may be challenging initially, but it is an excellent exercise in disciplining oneself to obtain the whole picture. Finally, employing stop-loss or take-profit orders is a good idea, irrespective of whether you are inclined to illusion of control bias.

Recency bias (cognitive)

What is recency bias? Recency bias is a widely present psychological pattern whereby people recall the most recent events more readily than those in the distant past. Moreover, they may incorrectly believe that recent events will reoccur soon. A good example would be investors focusing on the most recent (say, up to three years) performance results of a fund or manager without considering the longer-term (say, up to 10 years) performance.

What are the consequences? The performance of asset classes is cyclical: in one period, equities perform better, and for the next, bonds may take the lead. Recency bias encourages cycle following, exposing one to poorer returns and more significant risks and less diversification than required. This is because following the cycle means one invests closer to its end. Even worse, deep reliance on a short performance history is highly dangerous because it increases the chances of investing in a bubble that is about to burst. Also, relying only on the few most recent observations cannot provide a statistically objective picture.

What can I do? First, it is wise to get rid of the "this time it's different" approach. It is very harmful because it does not consider a more extended history, which is essential. Recency bias may prompt you to adopt a return-chasing mindset, resulting in overly concentrated portfolios. No one knows where the markets will be tomorrow, and it makes little sense, especially for individual investors, to place large bets on a few selected investments. Studies clearly show better long-run results are produced by diversified portfolios that can withstand return cycles. The second piece of advice is never to make any decisions based on small samples or partial information. The fundamental law of statistics states that only by using larger samples can one obtain a comprehensive picture and form a solid basis for making decisions. Of course, looking for information is time-consuming and may cost you a little. Think of it not as a cost but as an investment in your better future returns. Good investment research always pays off!

Confirmation bias (cognitive)

What is confirmation bias? Confirmation bias is a behavioural pattern whereby a person tends to overvalue facts confirming his beliefs and devalue those that contradict them. Simultaneously, confirmation bias leads people to actively seek and collect evidence bolstering their claims. This bias is quite common among investors.

What are the consequences, and what can I do? Quite often, investors read almost exclusively the market analysts that share their positive opinions on their stocks. History shows that these investors will likely become seriously disappointed at some point. A wiser strategy would be to read all the analysis, including supporting and negative views.

Similarly, many investors tend to invest excessively in their employers' stocks, motivated by what they hear daily at work about how their employer is about to beat its competitors.

Confirmation bias tends to produce heavily concentrated portfolios as investors become overly confident. If a particular position exceeds 10% of your portfolio, it is wise to revisit the analytical grounds and consider alternative views.

The modern manifestation of this bias is investor websites. At any moment, there are several darling stocks, and naysayers who express alternative opinions risk being heavily bullied. Confirmation bias pushes the users who bought these stocks to actively devalue views that contradict their beliefs. This explains the numerous dramatic increases and subsequent drastic falls of many 'meme' stocks. It is wise not to rely on the opinions of such bullies, as they are very likely to be influenced by confirmation bias. There are few good examples of good 'meme' stock investing, so you should take great care when drawing upon ideas from investor websites or other collective-mind sources.

Another widespread example of confirmation bias is excessive or blind reliance on technical analysis. Some investors tend to make investment decisions based on Elliot waves or Fibonacci retracements, for example. These investors believe in these tools, and many public stories seemingly confirm the incredible power of these technical patterns. However, when other vital pieces of information, such as companies' fundamentals, are ignored, any approach, including technical analysis, is more likely to disappoint than generate consistent returns in the long run. A wiser strategy would be to take every other piece of information, confirming and disproving your view, into account.

Status quo bias (emotional)

What is status quo bias? It is an emotional pattern whereby a person with several choices prefers the option closest to what he already has. In other words, the person is more inclined to make no change or seek to maintain the status quo. This bias resembles and often acts together with loss aversion bias (to risk $1, a person needs at least $2 in exchange to break even psychologically) and endowment bias (a person assigns a higher value to an investment he owns than to the same investment he does not own). Status quo bias is one of the most common among investors and, at the same time, one of the most difficult to eliminate.

What are the consequences? Firstly, many investors tend to hold securities with which they are familiar or have an emotional attachment. For example, some investors buy Google, Facebook, and Apple stocks because they use their products daily. They confuse the familiar company name with proper analysis of the risk-return characteristics of the company's security. Secondly, investors with status quo bias tend not to rebalance their portfolios even if this results in excessive risk or offers insufficient returns. One reason is that they are inclined to avoid any change in the first place. Another is a false perception that transaction costs or taxes associated with buying and selling will be high (usually not). If a person also has loss aversion bias, the effect of status quo bias becomes more pronounced, exacerbating the temptation to avoid losses.

What can I do? It is always wise to get an independent second opinion that is free of emotional attachments to specific names in your portfolio and can provide a clear numbers-based picture of risks and return. Investing is a long journey; it is easy to lose sight of the end-goal if there is only one set of eyes, even if you are an experienced investment professional. We also strongly recommend regular in-depth reviews of your portfolio, which should become an essential investment hygiene exercise. Finally, many investors with status quo bias lose comfort when faced with the necessity to pay taxes and incur transaction costs. However, in many cases, these appear small relative to potential underperformance or excessive risk-taking if no due action is taken. Plain numbers usually help a lot.

Self-control bias (emotional)

What is self-control bias? This bias refers to a lack of short-term self-discipline when pursuing long-term goals. Consider saving enough for retirement, a very typical investment goal. The self-disciplined investor will put aside money regularly, for instance, from monthly salary or annual bonus, sacrificing today's pleasure for tomorrow's benefits. An investor with severe self-control bias will spend his current income on expensive discretionary items because he values today's satisfaction more than the remote joy of a good pension. When retired, the former will

maintain a high standard of living, while the latter will probably see it drop sharply, and need to rely on others to make do. because he values today's satisfaction more than the remote joy of a good pension. When retired, the former will maintain a high standard of living, while the latter will probably see it drop sharply, and need to rely on others to make do.

What are the consequences? People with severe self-control bias often fail to create a retirement plan or to save enough for retirement. Being motivated by short-term consumption, such investors tend to invest less than the plan requires or buy higher-risk securities hoping for quick significant gains to fund both current consumption and retirement needs. Almost inevitably, such excessive risk-taking results in losses. As retirement approaches, such investors try to invest in even higher-risk assets to compensate for both previous losses and lost time. Worse, their natural tendency to invest in securities producing current income (to consume it) rather than long-term wealth worsens the situation.

What can I do? First, it is worth having a financial plan, ideally long-term, that covers retirement. A simple estimate of your earning capabilities while working and your spending needs when retired will give a reasonable estimate of how much you need to invest. Nowadays, there are many simple applications available that will do this for you. Creating an investment policy statement (IPS), a document summarising your long-term investment objectives and constraints, is even better. However, a good IPS usually requires the paid services of an investment professional.

Secondly, for investors with severe self-control bias, the issue is not just about having a plan but also about being methodical about executing it. Discipline in everyday spending is crucial. The idea of dollar-cost averaging – a simple investment strategy aimed at investing equal amounts of money to buy securities regardless of price may appeal to you. It should encourage you to invest regularly and worry less about a security's price and market timing, thus making self-control bias less acute. Another simple yet fascinating motivation is compound interest. An interest rate of 1% becomes 1.2% yearly, on average, if invested for 30 years. Not much, in fact. A 5% annual interest rate gives a 332% return over 30 years, or 11.1% yearly on average. This is way better; more than double! And 10% invested for 30 years becomes an average of 54.8% annually – an even more astonishing multiple. The lesson is to invest consistently and start early.

The idea is that today's dollar is much more valuable than tomorrow's because of interest rates. Consider the following example. You want to buy a new Volkswagen SUV for $50,000 today, which is a reasonable sum to spend on a practical family SUV. But ask yourself: are you willing to pay $216,000 for the exact Volkswagen? Of course, not! This sum would buy an outstanding Porsche or an Aston Martin, not a family SUV. And, of course, no one would spend $872,000 on any Volkswagen! The trick is that these are the sums you lose from your retirement money if you purchase the SUV today. $50,000 is equivalent to $216,000 at a 5% interest rate and $872,000 at a 10% interest rate. Spending instead of investing is worth a second thought.

Representativeness bias (cognitive)

What is representativeness bias? It is a behavioural tendency to classify new and unknown concepts in a way that resembles familiar constructs. Our perception tries to find the closest analogy from our experience to describe new knowledge. However, sometimes new and old concepts are incredibly different, resulting in an incorrect understanding of new ideas. Worse, mistaken perception tends to stay with us for a long time.

What are the consequences? Such stereotypes impair investors' ability to make the right decisions. Consider an investor who without diligent research classifies a stock as a 'growth stock' because it resembles other stocks he used to classify as 'growth stocks', i.e. it fits his stereotype of a 'growth stock'. The incorrect 'growth stock' label might result in poor decisions. Another aspect of the bias is making decisions based on small samples, incorrectly assuming these are representative of the entire population. One might want to jump to a conclusion after seeing just a few examples, while the broader picture may be more complex and different.

What can I do? Choosing an asset manager based on its most recent performance or relying on a trending research analyst with several good top picks is unwise. Studies show that the previous year's top-ranked funds tend to become the current year's low-rankers. The same is valid for analysts: great advice tends to be followed by poor. Unsurprisingly, the situation is the same for asset classes – a good performance yesterday does not guarantee a good performance tomorrow. The better investment strategy is to hold a diversified combination of assets and asset classes to level out temporary spikes. Also, it is wise to avoid attempts to pick the best performers for the next year, by basing your decision solely on recent performance. Portfolio selection must always be based on comprehensive long-term statistical analysis.

Another piece of advice is cycle diversification. Different industries react differently to economic cycles. Some sectors decline before the cycle and rise before it reaches its lowest point; the decline of others coincides with the cycle, while the rest are laggards. A diversified portfolio should include examples of all three types to level out the price fluctuations caused by an economic cycle. Similarly, higher-risk asset classes such as stocks and long-term bonds tend to exhibit a sharper reaction to economic cycles, displaying more significant swings during expansions and contractions. An investor must remember these nuances and diversify the portfolio with less volatile instruments to level out the cyclical effect.

Finally, basing decisions on stereotypes rather than statistics may lead to poor investment results. If an investor is asked whether the AA-rated bond of a company with declining revenue, shrinking net profit, and problems with suppliers should be considered a safe or unsafe investment. Some would focus on the worsening financials and supplier chain risks as these are stereotypes for a risky investment and answer that such an investment is unsafe. However, we already know that this is an AA-rated bond. Thus, the probability of default is very close to zero, and so it is likely to be a safe investment when all factors are considered.

Regret aversion bias (emotional)

What is regret aversion bias? This behavioural pattern results in people avoiding regret and consequently making the wrong decision. For example, an investor who has experienced losses is likely to abstain from active investing for some time, intimidated by the fear of making the wrong decision again. The reverse is also true. An investor who saw his portfolio jump in value may be unwilling to fix the profit because it could be a mistake should the growth continue.

What are the consequences? This bias typically manifests itself in staying too long in both 'losing' and 'winning' positions. Investors abstain from selling losers to avoid admitting that they made a mistake and thereby avert the associated regrets. Similarly, investors refrain from selling winners as they do not want to miss out on further growth and then regret it. Both types of behaviour are irrational and risky, leading to excessive losses and missed opportunities over time. Another facet of this bias is excessively risk-averse behaviour after experiencing losses, or

with respect to assets or sectors that have recently devalued. Insufficient risk-taking undermines investment returns. Finally, investors prone to this bias may find it easier to invest in risky assets if they know that many others have done the same. 'Meme' stocks are a good example. Here, investors feel that their investment decision is a good one because many other investors have invested too. As such, even if it turns out to be a poor decision, they will not be alone in regretting it, which in theory may alleviate some of their own remorse.

What can I do? Regret aversion bias is widespread among investors. The good news is that experienced, self-disciplined investors are less prone to its adverse consequences. Key to overcoming this bias is spotting its manifestations, which are centred on the fears associated with making investment decisions. Among these are the general unwillingness to invest in risky assets – even if they suit your risk tolerance – as the chance of making a bad decision is higher. Fear of making a mistake results in taking no action at all, and holding a position for too long while incurring losses may trigger fears of investing altogether.

No decent return comes without risk, and risk avoidance is as harmful as excessive risk-taking. The financial market is inherently cyclical, and the chances are that a spike will follow a dip, and, if not invested, you will miss it. Losing is an unavoidable part of investing, and no successful long-term investor has only 'winners' in his portfolio. Successful investing is more profit than loss, not zero loss. No one can always be right about market timing, and no one can perfectly predict stock direction. Consequently, mistakes are inevitable, and it is ok to make them. Similarly, it is ok to sell winners before they reach their peak, and it is ok to buy falling stocks before they reach their bottom. What is not ok is standing still precisely when action is needed.

Self-attribution bias (cognitive)

What is self-attribution bias? This phenomenon describes a person's inclination to account for successes with internal reasons such as talent and intelligence and to attribute failures to external factors such as bad luck or poor economic conditions. For example, an employee with a solid self-attribution bias will ascribe his recent promotion to his hard work and deep experience in his field. At the same time, when not promoted for several years, the same employee will attribute it to the short-sightedness of his boss and poor corporate culture.

What are the consequences? Self-attribution bias is widespread among both experienced traders and beginner investors. It usually takes the following forms: "My investment went up because I am good at investment research, I can crunch financial figures, and I can tell good investment opinions from bad ones", or "My investment portfolio shrank a lot because of unexpected high market volatility and unpredictably poor macroeconomic conditions." Investment success belongs to me, while investment failure is due to someone else.

This attitude, if pervasive for a long period of time, or present after a period of good investment returns, deprives investors of opportunities to learn from past mistakes and makes them falsely overconfident in their ability to forecast the future. In more practical terms, unjustified overconfidence leads to excessive risk-taking and much more frequent trading, resulting in poorer investment returns. Furthermore, it may also result in low portfolio diversification, one of the forms of excessive risk-taking.

What can I do? Good advice regarding self-attribution bias is to be as objective as possible. Apart from your skill, your investment gains are also thanks to luck and many unobservable factors. Aside from market complexity, your

investment losses are also potentially due to your incomplete analysis. Proper investment analysis includes an assessment of the reasons behind gains and losses. The key to success is constant (and ideally, written) analysis of which initial guesses were correct and what was unexpected. The adverse effects of self-attribution bias can be relieved by objective analysis before and after your investments.

Framing bias (cognitive)

What is framing bias? Framing bias is a behavioural pattern whereby a person responds differently depending on the context of the question, i.e., how the situation is presented.

What are the consequences? Frames are different visual information settings or varying ways to word a question. Framing bias lies at the heart of many marketing tricks and, sadly, is very frequent in financial markets. A typical example is positive-negative or optimistic-pessimistic framing. Tversky and Kahneman presented the most famous example of such framing in 1981 (Kahneman won a Nobel prize in 2002).

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences is as follows:

Positive frame:

- If Program A is adopted, 200 people will be saved.
- If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.

Negative frame:

- If Program C is adopted, 400 people will die.
- If Program D is adopted, there is 1/3 probability that nobody will die and 2/3 probability that 600 people will die.

All four options are identical in expected numbers: 200 lives will be saved, and 400 will be lost. Despite this, the study showed that with the positive frame, less-risky option A was preferred (72%). However, with the negative frame, a riskier option was selected (78%).

One of the most debatable implications of framing bias in the financial markets is risk profiling questionnaires used by many investment firms to determine clients' risk tolerance. Risk tolerance is critical to successful investing and tampering with it will have grave consequences for investment returns. Stating that 'this investment gives you a 60% chance of reaching your financial goals' elicits a much better response than 'this investment gives a 40% chance of falling short of your financial goals', even though these options are identical. Another trick is formulating a questionnaire in terms of sizeable losses ('your portfolio lost 25%, what would you do next?'). Losses, on average, tend to stimulate people to engage in more risk-taking behaviour than the prospective profits warrant. By using these and other tricks, investment firms can 'lead' their clients into more risk-aggressive profiles to be able to legally sell them higher-risk products, which bring them higher fees and commissions.

What can I do? The most critical advice is to make investment decisions based solely on numbers, i.e., expected return and risk. The rest is likely to be a frame or noise that can obstruct good choices. Regarding risk profiling and understanding your risk tolerance, profiling should be undertaken by genuinely independent advisors who have no conflict of interest. Moreover, proper risk profiling must be done using behavioural finance techniques in addition to classic risk questionnaires focused on risk objectives and constraints.firms to determine clients' risk tolerance. Risk tolerance is critical to successful investing and tampering with it will have grave consequences for investment returns. Stating that 'this investment gives you a 60% chance of reaching your financial goals' elicits a much better response than 'this investment gives a 40% chance of falling short of your financial goals', even though these options are identical. Another trick is formulating a questionnaire in terms of sizeable losses ('your portfolio lost 25%, what would you do next?'). Losses, on average, tend to stimulate people to engage in more risk-taking behaviour than the prospective profits warrant. By using these and other tricks, investment firms can 'lead' their clients into more risk-aggressive profiles to be able to legally sell them higher-risk products, which bring them higher fees and commissions.

Outcome bias (cognitive)

What is outcome bias? This is a behavioural pattern whereby a person makes decisions based on the outcomes of events rather than the underlying factors that led to such events. For example, concluding that it is worth investing in a stock because it has been going up for the past three years. Three consecutive years of growth is an outcome, but nothing was said about the factors behind this growth. The stock may well be up because of pure luck or because the market has been soaring over the past three years. Before making a decision, one has a single set of information. Once the decision is made and the outcome is known, you have more information, and the quality of the decision is clear. The trick is that it is easier to judge the value of the decision once one knows the outcome.

What are the consequences? Investors often choose investments based purely on past performance (i.e. the end result), and do not consider what contributed to this outcome. For example, the recent returns of a particular bond may look better than others, and they may create the temptation to invest. However, the performance may be easily explained by the bond's higher level of risk. By investing based on past performance alone, one may end up accepting a level of risk beyond one's tolerance and risk comfort zone. Similarly, consider investing in an asset that is performing exceptionally well. It may mean investment in an overvalued asset. Even worse, a dramatic increase in an asset's price may mean that it is just a bubble about to burst. Gamestop, and other 'meme' stocks are perfect examples. Another mistake associated with outcome bias is not investing in specific strategies simply because their past results were poor. In the future, the respective strategy may be more profitable because it relied on a sound investment approach and its past performance was simply bad luck.

What can I do? Our first recommendation is to recognise your potential inclination to this bias. Our next piece of almost universal advice is to more research on any investment, especially if it has a history of demonstrating above-average results. It is so often the case that an above-average performance is explained by above-average risk exposure. More information and understanding how the returns have been generated is critical. In terms of your research, good areas to explore are diversification, risk exposure, correlation with the benchmark, tracking errors, and standards of performance disclosure. If you deal with complex instruments like structured notes with embedded option baskets, it may be quite challenging to estimate all the risks involved. In such cases, it makes sense to ask for

the help of a professional risk manager. We reiterate that external advice must be independent to avoid any conflict of interest.

Hindsight bias (cognitive)

What is hindsight bias? "I knew it all along!" This is a behavioural pattern whereby a person tends to view the actual outcome of an event as entirely predictable, and to overestimate his ability to have foreseen the outcome after it has occurred. The belief is held despite the result not being clearly predictable and where many outcomes were possible. For example, many investors today say that the only possible consequence of quantitative easing was a rising stock market, and that the US housing bubble was obvious to predict before 2007-08. Worse, a person's confidence in 'correctly' predicting the future can grow over time, inspired primarily by hindsight bias and not by superior forecasting ability. Persons with strongly pronounced hindsight bias tend to remember only correct predictions, forget their past mistakes, and believe strongly in their perfect foresight. This way, they deprive themselves of learning from the past, which is critical in investing.

What are the consequences? Such investors tend to fall into excessive risk-taking over time. The same is true for asset managers: hindsight bias leads them to falsely believe in their forecasting abilities and to take extreme risks on behalf of their clients. Similarly, hindsight bias also drives discontent with good asset managers: their mistakes may seem obvious after the effects of the error become clear. However, these mistakes could have been difficult or impossible to predict. Many cases prove that excessive risk-taking will result in errors and poor investment results.

What can I do? First, admit that your behaviour might sometimes exhibit patterns of hindsight bias. It is not easy to recall all your good and bad investments, but the habit of reviewing the reasons and assumptions for the investment before and after would help a lot. Many prominent successful investors write down their thoughts before making any investment and, regardless of profitability, scrutinise these assumptions later. By doing this, they have plenty of information to learn from and have documented grounds to remember past decisions correctly without hindsight bias.

Availability bias (cognitive)

What is availability bias? This bias is the tendency to regard specific events as more likely because they are easier to recall. For example, many people think being killed by a shark is more likely than being killed by a coconut. However, according to statistics, the latter is around 15 times more likely. Being killed by a shark is easier to recall from your memory (perhaps, thanks to a famous movie); do you know anyone who knows anyone who can relate a real story about deadly coconuts?

What are the consequences? The most common root of availability bias is advertising. It is more likely that an average investor will pick a heavily advertised ETF firm because its name is easier to recall. Also, investment firms tend to promote their best funds heavily, thereby feeding investors the illusion that all their ETFs are that good. The second is about how closely a company's image relates to one's beliefs and values. For example, a strong supporter of the environmental movement will regard companies that claim the ESG agenda is their top priority (not necessarily true) as more attractive. Another explanation deals with an investor's focus. An employee at a venture capital fund

investing in IT companies is likelier to say that the best investments are in the IT sector. At the same time, an employee at a biotech-focused fund would prioritise biotech companies for investment.

What can I do? So often, the easiest-to-recall answer tends to be incorrect. If you feel that you already have the answer without proper research, this may well be a sign of availability bias. It is better to check again if you notice that it was very easy for you to select a specific investment. It could be because this investment has recently been in the news, be it in the financial press or on investor forums. Perhaps you work in this sphere and you constantly hear about your industry's great potential. Or is it because of a specific investment firm or its products' massive advertising trap? Once recognised, the second essential piece of advice is to undertake more profound research. Thoroughly conducted, numbers-driven research helps to overcome availability bias and many other biases effectively.

Conservatism bias (cognitive)

What is conservatism bias? It is described as a behavioural pattern whereby people tend to stick to their prior views or forecasts and thus underreact to new information. It takes mental effort to process fresh data and update beliefs, and humans are inclined to exert minimal effort unless further information is immediately critical to survival.

What are the consequences? A good example is a company issuing a new earnings forecast that sharply contradicts the previous one. An investor displaying conservatism bias will underreact to the revised numbers by sticking to the old forecast rather than making decisions based entirely on the updated estimates. Another example is a stock market analyst stubbornly sticking to his previous estimates. Typically, analysts start changing their views only when confronted with overwhelming evidence of the opposite. Consequently, blindly following analysts' recommendations exposes investors to a different aspect of conservatism bias.

Investors heavily prone to conservatism bias tend to cling inflexibly to their views and react and adapt slowly to the new information together with great mental stress. The result is that they base their investment decisions on outdated, and thus erroneous, data and tend to lose more due to higher exposure to short-term market swings.

What can I do? The first step is acknowledging that you are prone to conservatism bias. Cognitive biases can usually be eradicated by education and advice, though conservatism bias is challenging to overcome. This bias makes it difficult for you to acknowledge new facts and update your old beliefs, one of which is conservatism bias itself! As such, it may take some time and effort. That said, the second step is to stop clinging to previous forecasts or views. New information such as drastically negative earnings releases, failed tests of a primary product of a biotech company, and dissolution of significant profitable partnerships should be acted upon instantly and decisively. Generally, once you have processed all the critical relevant information, your investment decision should follow immediately. Once you know that you are inclined to conservatism bias, you should act consciously when new information contradicts your previous forecast or beliefs, remembering that your typical reaction may not always be rational. Finally, it is wise to seek independent professional advice from someone you know is not inclined to conservatism bias.

Anchoring and adjustment bias (cognitive)

What is anchoring and adjustment bias? This is a behavioural pattern whereby one interprets new information using an arbitrary anchor and then adjusts one's new opinion relative to this anchor. For example, if an investor buys a stock at $100 a share, the answer to whether the market is now overvalued or undervalued will be relative to this random $100 anchor. Another example may be an investor that bought the stock at $100, saw it rise to $150 and then decline to $120. If this investor is heavily exposed to anchoring and adjustment bias, he will judge the success of this investment relative to the latest $150 anchor. In his view, the investment 'lost' 20%, creating a need for an investment to grow back to $150 to break even. The rational investor interprets new information without relation to existing anchors. In answering whether to hold or sell this position, the rational investor will base his decision on the company's and market's fundamentals, and the $100 and $150 will play no role.

What are the consequences? Individual investors exposed to anchoring and adjustment bias tend to have forecasts too close to current levels. For example, if the stock price is $100 today and such an investor were asked to estimate the price in one year, the most likely answer would be in the $90-110 range, or the $70-130 range if the stock's historical volatility were higher. Secondly, the same individual investor would forecast future returns based on the most recent returns. For example, if the stock grew 15% last year, the investor would expect it to grow around 15% next year. The third implication is that individual investors become stuck with firm views on a company's competitive position. Consider a company that has been a leader in its market segment for several years. This anchor of being a leader would be reproduced in such an investor's mind for many years, even though the market situation may have changed by that time. Another implication is doggedly sticking to original forecasts. Imagine an investor forecasting that the stock price would increase from $100 to $140 in a year based on a 40% net profit growth forecast. If the company reports 20% or 80% net profit growth in six months, this investor is unlikely to adjust his forecast significantly down or up.

What can I do? The first sensible step in overcoming anchoring and adjustment bias is to recognise it. It is a cognitive bias and can be eradicated by education and controlling your analytical process. A tendency to cling to any anchors, be they figures, levels, or beliefs is a red flag for this bias, and noticing such red flags and reconsidering your conclusion will add value to your analysis. The same is valid when you read financial media, analysts' research, or other opinions on a market or a company. If you spot anchoring in their logic, perhaps it is not a good idea to rely on their conclusions.

Key takeaways:

- Over 90% of individual investors lose money due to poor risk management
- Good risk management includes a clear understanding of how and why you make particular investment decisions and react to risk
- Behavioural finance is a particularly important body of knowledge that has won Nobel prizes, and that finance practitioners and the general investment public discuss widely
- It asserts that investing- and risk-taking decisions are heavily determined by psychological biases
- Over 99.5% of individual investors are prone to biases in investing
- It is dangerous to ignore ideas of behavioural finance. They have been repeatedly proven and failure to identify one's biases will compromise one's investing outcomes.
- It is perfectly acceptable and common to have biases; even professionals are prone to some
- The genuinely risk-aware investor is ready to honestly acknowledge his own biases, seek the knowledge required to overcome them, and have the discipline to apply it
- BehaviouRisk will help to determine your unique combination of cognitive and emotional biases and their degree in a personalised report
- Every investor has his own risk profile or risk tolerance, i.e., there is a maximum amount of risk he is comfortable assuming
- Any mismatch between investor risk profile and asset risk profile is detrimental to long-term investment returns
- It is essential to understand your risk tolerance correctly
- Industry-standard risk-profiling questionnaires are oversimplistic and incomplete and need to be augmented with behavioural investment profiling
- Knowing your true risk tolerance is an effective tool to avoid mis-selling and conflict of interest among investment advisors
- Behavioural investment profiling is just one of several key elements in successful investing

Conclusion

Thank you for reading this book, and congratulations on taking one giant step closer to being an intelligent, risk-aware investor.

This book has already helped many individuals around the world to invest better, and we sincerely hope that you will find it useful too. At PRAAMS, we know how important it is for individual investors to access, understand, and efficiently use the same, top investment and risk management tools that top financial institutions utilise. Without them, in more than 90% of cases, individual investors are bound to lose money.

Your new knowledge of behavioural finance, the most common and harmful biases, and the ways to overcome them will help you to invest better – to risk less and earn more – and you are ready to apply it today. Additionally, with PRAAMS BehaviouRisk, you can determine what combination and degree of biases are unique to you and consequently ascertain your true risk profile. When you know your real risk tolerance, you will no longer be misled by financial advisors who may try to sell you unsuitable products.

Please consider sharing your new knowledge and this book with others to help them and make financial markets a better place.

It is important to remember that behavioural investment profiling is just one of several key elements in successful investing. Others include Asset risk profiling and Analytica, which help you analyse risks and returns of every investment globally, Portfolio Auditor and Portfolio Selector to check key portfolio metrics and explore new investment opportunities, and the Volatility predictor to monitor instrument performance and de-risk before the storms. These services will allow you to obtain independent, professional, and numbers- and probability-based analysis of risk and return for your investment decisions at the individual asset and portfolio levels to account for cross-correlations. At PRAAMS, we have the knowledge, expertise, and IT capabilities to analyse all types of investment risks (credit, market, liquidity, infrastructure etc.) for all major asset classes, including equity, fixed income, ETF, FX, and commodities to name a few, in addition to on-demand tailored analysis of more complex instruments such as structured notes, for example

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