

Dead Reckoning: Investing Lessons from the High Seas

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Few places on Earth are as perilous as the seas off Cape Horn. Waves in the Southern Ocean build uninterrupted over 13,000 kilometers before being squeezed into the narrow body of water between the tip of South America and the Antarctic Peninsula known as the Drake Passage. These are the most powerful currents on Earth: more than 4 billion cubic feet of water per second ... 600x the outflow of the Amazon River. To boot, the confluence of the Atlantic and Pacific Oceans brews ferocious storms, towering waves, and regular hurricane force winds.

Known as the "Sailor's Graveyard", Herman Melville likened the journey around the Cape to the descent into hell from Dante's *Inferno*. Nearby landmarks bear sinister names: Desolation Bay, Deceit Rocks, and countless islands named for ships that have sunk or run aground over the centuries.

I recently read an account of one of these ill-fated voyages: [David Grann's *The Wager: A Tale of Shipwreck, Mutiny, and Murder*](#). Besides the driving rain, howling winds, colossal waves, and forceful currents, (not to mention the onset of scurvy), the crew aboard the HMS Wager in 1741—like all other seafarers of the age—had to contend with the additional challenge of never reliably knowing where they were! Sure, there were decent navigational maps at the time, and measuring one's latitude could be done quite accurately by using the sun or the stars. But longitude—a ship's position east/west—was much more difficult.

The main reason for this was the lack of a reliable clock. Before the advent of better tools, to determine longitude on the open ocean, you'd ideally compare the local time of your position at sea with the time at a fixed reference point (e.g., the port you set out from or the Prime Meridian). Each hour of difference corresponds to 15° of longitude. But timepieces such as pendulum clocks were highly ineffective at sea due to the constant motion of the ship, not to mention changes in temperature and humidity. This meant real consequences: being inaccurate at Cape Horn by even 30 minutes translates into being nearly 500km off course!

Instead, seafarers relied on a technique called "dead reckoning." The concept was theoretically simple, yet fraught with peril: chart your position based on a known starting point, your speed, and your heading. Use a sand hourglass to estimate time and a long, knotted rope dropped overboard to estimate speed. The impact of wind and currents? Adjust using your intuition.

The *HMS Wager* entered the Drake Passage in 1741 and battled storms for an entire month. Its navigators, using dead reckoning, eventually believed they'd made it safely through and plotted a course north ... only to realize they were still smack in the middle and barely avoided running aground. A month later, further up the coast of Chile, the limitations of dead reckoning proved fatal for the Wager. Despite estimating a position 250km offshore to the west, the ship suddenly wrecked into the Patagonian coastline along the Golfo de Penas (the "Gulf of Pain"). Dead reckoning indeed.

Figure 1: Charles Brooking's painting of the Wager before it ran aground, c. 1744



In many ways, investing is a lot like navigating Cape Horn with dead reckoning. The waters of the market are choppy and unpredictable. Investors, like sailors, must grapple with incomplete information, unexpected shifts, and the ever-present possibility of being wildly off course. The currents—momentum—can be powerful. PE multiples, EV-to-EBITDA ratios, earnings expectations, leading economic indicators, discounted cash flow models ... all dead reckoning.

Does this mean that successful investing is as futile as the *HMS Wager's* ill-fated journey? We certainly don't believe so! The following article will illustrate several ideations and tools investors can incorporate into their processes to navigate the choppy, mercurial waters of long-term investing.

Investing without a compass

"If a man does not know to what port he is steering, no wind is favorable to him."
—Seneca

In the 1950s, Dr. William Deming performed a simple experiment. He dropped a marble through a funnel onto a target below, with the goal to have the marble come to rest at the center of the bullseye. Deming compared various strategies for improving accuracy and found that adjusting the position of the funnel after every drop, i.e., reacting immediately to every error, led to an increase in variability and worsened accuracy over time. The best results came from maintaining a consistent approach and making adjustments only after methodically observing patterns of bias over many trials.

We (and many others) have written at length with regards to the importance of having a clear, theoretically sound investment philosophy and a systematic investment process. Just like on the open ocean, they provide North Stars in an uncertain and sometimes hostile environment: frameworks for ensuring focus, discipline, rational thinking, and anchoring with appropriate context.

As an example, one of the foundational underpinnings of our approach to risk management is the clarity that the primary risk we're seeking to guard against is the permanent impairment of capital—an absolute metric.

By contrast, when British shipping company White Star Line developed a new class of ocean liners in the early 1900s, it had relative goals in mind. Instead of competing on speed, the shipping line opted to explicitly outdo its rivals on size and luxury—bigger, more lavish, and with names to match: *Olympic*, *Britannic*, and *Titanic*. Even safety precautions were viewed through a relative lens; though *Titanic* only had enough life vessels for roughly one-third of its total passenger capacity, this was a larger number relative to that required by maritime safety regulations at the time, providing the illusion of safety. And besides, any more lifeboats would clutter the deck and run contrary to the goal of relative opulence.

In our view, investors who worry too much about relative risk or relative performance in the short-run risk making myopic decisions that are sub-optimal over the long-run—both for absolute *and* for relative risk-adjusted returns.

Dead reckoning: The danger of extrapolating trends

"It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so."

—Mark Twain

Dead reckoning relied heavily on assumptions about speed and direction, but what if the wind shifts or a current pulls you off course? Extrapolating inaccuracies too far over time and space can be treacherous.

Golfers know this. On the green, in order to maximize accuracy, a putter's face angle at impact should be perfectly square to the intended line. For putts of less than four feet in length, the ball will generally still go in even if the putter face is open or closed by +/- 2° at impact. (If this doesn't sound like much, don't be so hard on yourself the next time you miss a gimme ... even PGA Tour professionals miss 12% of 4-foot putts!) But at fifteen feet, the margin for error increases: a mere half-a-degree face angle difference is too much to sink a 15-foot putt. Small errors magnify over time and distance. Furthermore, as my colleague Joel Uncles wrote a few years ago, [beware the linearity bias!](#)

Over most of the last three decades, the German economy benefitted from a straightforward business model (admittedly a gross simplification): sell goods to China, get cheap energy from Russia, and rely on the U.S. for defense. The risks inherent in those decisions seem obvious today given how geopolitics have evolved, but the underlying vulnerabilities have been present for thirty years, even if unrealized. What's more, they've grown over time given the compounding of under-investment in domestic skills, supply chains, and capabilities. Germany is now grappling to come to terms with the notion that globalization might not continue unabated.

What assumptions have you made that your investment portfolio is heavily reliant upon, and that may turn out to be false?

Stories: Getting marooned by a market narrative

"You can close your eyes and cross a four-lane highway, but even if you get to the other side, you're still an idiot."

—Mawer CIO

Closely connected to the extrapolation of a trend—in fact deeply at its root—is our propensity as human beings to be profoundly drawn to stories.

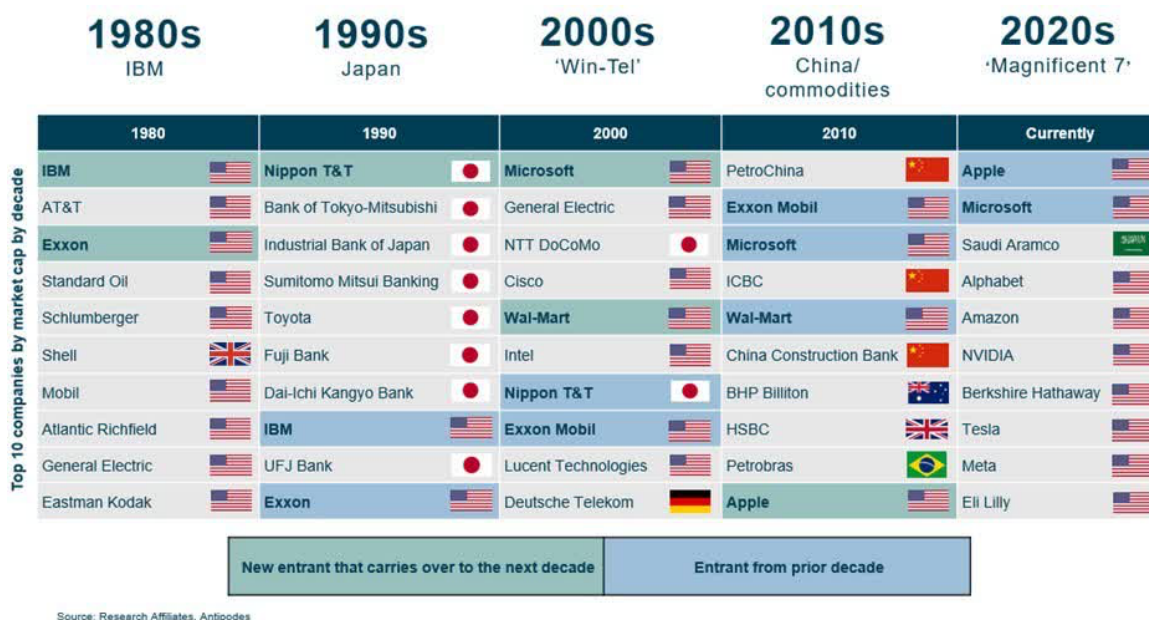
Why? Simply put, evolution has rewarded survival over optimal decision-making. Stories capitalize on our need to make snap judgments about cause-and-effect relationships for survival. A rustling in the bush nearby? Far safer to run for fear of a predator than be curious given the asymmetry of payoffs.

As our ability to communicate through language developed, generational knowledge-sharing via oral tradition further embedded cognitive shortcuts by marrying information with emotion. And from an anthropological perspective, storytelling fostered social cohesion in a group, enhancing trust and collaboration. Our ability to unite individuals under a shared narrative has played a critical role in the development of larger, more complex societies where myths and stories serve as frameworks for social norms and collective goals.

Reflecting on our experience with storytelling through COVID-19 is instructive. Consider the now-ubiquitous Zoom, whose stock price increased nearly seven-fold in the first year of the pandemic with the shift to working from home. Even though the narrative was directionally correct—many firms now have more flexible work-from-home policies than prior to 2020—the hype has subsequently been punished, with the stock down approximately 85% since its peak.

The investment team at Vltava Fund recently shared a thought-provoking chart in a letter to shareholders:

Figure 2: Top 10 most valuable companies in the world over the decades



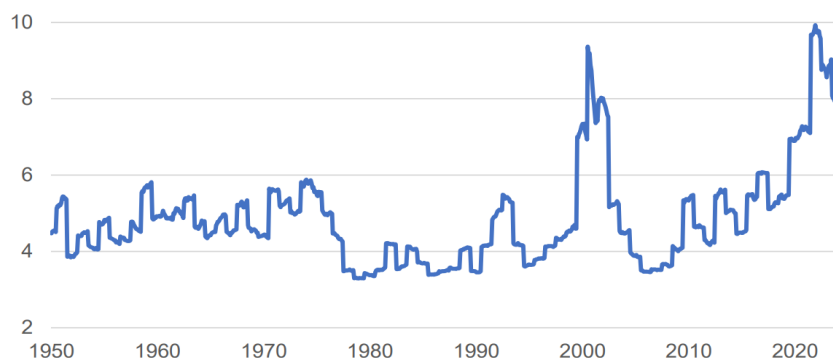
Source: Vltava Fund

To borrow from Vltava's [excellent analysis](#), these biggest companies are effective representatives of the prevailing narratives during each epoch: American exceptionalism and energy dominance; the rise of Japanese economic superiority; the dot-com era and the boundless potential of the Internet; the bullishness around Chinese growth along with the associated demand for commodities; and, the current Magnificent 7.

Soberingly, in each of the past 4 decades, the consensus narrative was a rather poor forecaster of future returns. For examples, the eight Japanese companies that began the 1990s at the top of the market cap spectrum posted an average annualized return of -3% in the 1990s, vastly trailing the MSCI World ex Japan Index, which had an annualized return of +16% over the same decade. Microsoft, Cisco, Intel, Deutsche Telekom, and NTT took many years to recover from their ensuing drawdowns post dot-com bubble ... if they did at all.

Cisco, in particular, is a fascinating cautionary tale: the narrative that led to its outsized valuation in 2000 was largely based on the notion that its products would lay the infrastructure to power the then-emergent Internet for decades to come. Imagine the potential! Fast-forward 25 years and despite incredible advances in technology, the explosion of online collaboration, and the company continuing to dominate network hardware (Cisco claims that its customers include 99% of the world's largest companies), the stock still trades below its peak.

What's more, a worthwhile paper by AQR's Cliff Asness entitled [The Less Efficient Market Hypothesis](#) postulates that markets have become increasingly less efficient over the past thirty years. One exhibit behind this assertion is the price-to-book (P/B) ratio of the most expensive 30% of U.S. stocks compared to the P/B of the bottom 30%.

Figure 3: Value spread from Fama-French

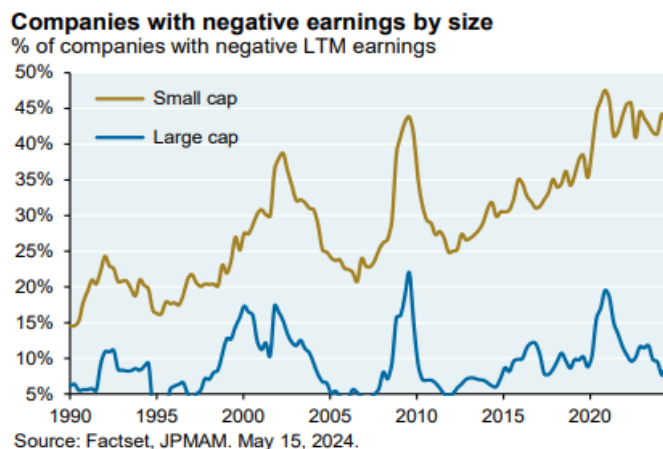
Source: AQR, Ken French data library

Asness goes on to hypothesize that the widely accepted premise that technology has made markets more efficient (think: ever expanding data sets, instantaneous delivery, machine learning) is false. Instead, these technological improvements have merely served as echo chambers, either by boosting storytelling via social media and their associated algorithms, by increasing short-term impulses with the gamification of investing (think: retail trading platforms and ODTE options that expire same-day), or (not mentioned by Asness) because algorithmic trading models are trained on the past thereby fueling momentum, pattern recognition and regressions which may not be representative of the future.

Asness's conclusion: "It should be more lucrative for those who can stick [[to a sensible investment strategy that cares about valuation]] over the long-term, but also harder to stick with it. [...] The periods of underperformance will be more severe and last longer."

Going back to Vltava's exhibit ... perhaps this time is different. Perhaps diversification is a relic of a more prudent past. Perhaps the build-out of AI infrastructure is unlike capex cycles in more traditional industries or unlike networking equipment and Cisco. As the chart below suggests, perhaps a company's ability to generate positive cash flows is no longer relevant. Perhaps human intelligence has finally reached a point whereby we're finally able to overcome our behavioral biases and act without emotion.

The base rates suggest otherwise.

Figure 4: What stories are U.S. small-cap investors telling themselves today?

Triangulation

“There are three sides to every story: your side, my side, and the truth.”

—Robert Evans

Unlike dead reckoning, modern navigation combines multiple tools in order to triangulate for accuracy—GPS, radar, sonar. Likewise, investors should attempt to combine multiple inputs and viewpoints in conducting their research.

In a complex problem like investing, an important starting point is internal: are members of your team *cognitively* diverse—meaning do they have different ways of thinking and tackling problems, either innately or as a function of their education and life experiences—or does your investment team merely serve as an echo chamber promoting a narrow perspective? And further, does your decision-making environment take advantage of the diversity of thought available? After all, diversity of thought within a team is meaningless unless individuals have the humility to hold their stories lightly, to be open and curious to ideas that might challenge their own, and to engage in respectful debate.

In a paper entitled [How to make \(Good\) Decisions](#), Portfolio Manager Paul Moroz outlined a fantastic example of what this looks like in practice:

Debate on the merits of Tencent’s investment case have included team members with the following backgrounds:

- *A lawyer, whose academic focus emphasized the nature of property rights and the role of government in maintaining and shaping rules and regulations. This is material for Tencent given the variable interest entity (VIE) structure through which the stock is listed.*
- *An entrepreneur with a history of incorporating companies and navigating the impact of associated regulations.*
- *Another entrepreneur who launched an internet company in university, with a first-hand appreciation for the merits of a virtual business model.*
- *An investor who grew up in China, is a daily user of Tencent’s WeChat platform, and plays many of Tencent’s online games.*

Three of these four investors have lived in Asia. Two of the four experienced the dot-com bubble and subsequent crash. Given that Tencent’s investment case rests on property rights in China, a robust valuation, a new age, and a scalable business model, this combination of viewpoints creates a better information collage on which to base investment decisions.

Diverse perspectives must be sought externally as well. My colleague John Wilson [wrote on this topic several years ago](#), and he began with a quotation from legendary investor Philip Fisher: “Go to five companies in an industry, ask each of them intelligent questions about the points of strength and weakness of the other four, and nine times out of ten a surprisingly detailed and accurate picture of all five will emerge.”

At Mawer, collecting scuttlebutt is a dedicated part of our process. In our ongoing research into a multi-national cosmetics company, we’ve spoken with management, sell-side analysts, ex-employees, rival multi-nationals, and domestic competitors in key markets ... not to mention being daily users of the products ourselves! One of the key areas of debate is the extent to which recent weakness in China is tied to increasing competition—which may be of graver structural concern—versus broader macro factors. And while none of these perspectives gives us “the answer,” the process of collecting scuttlebutt provides a valuable mosaic, insight into corporate culture from multiple angles, and ultimately a finer sense for KPIs to watch going forward.

Building out a cognitively diverse team, ensuring that intelligent ideas are voiced and heard, and collecting useful, relevant scuttlebutt requires significant investment in time and energy. But they all increase the likelihood of sound, well-informed decision-making.

Margin of safety: Never skirt too close to the rocks

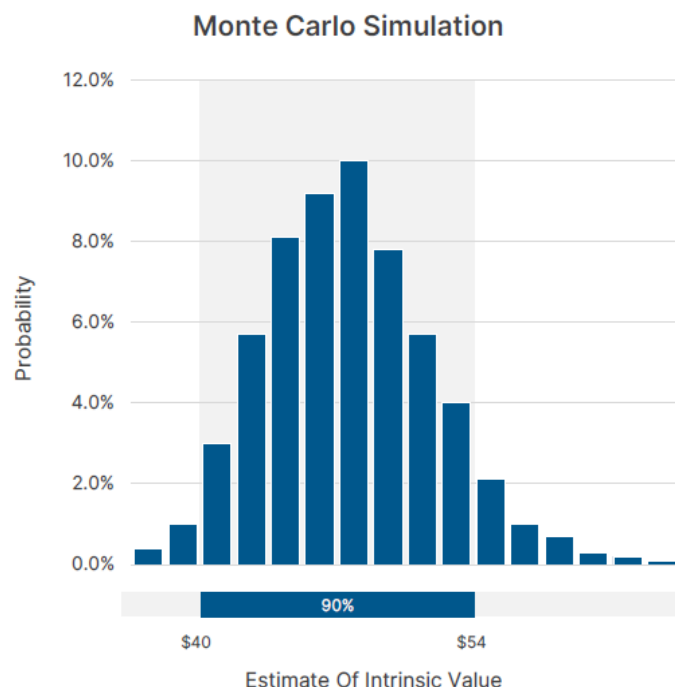
"It is better to be approximately right than precisely wrong."

—John Maynard Keynes

Finally, we come to the importance of having a margin of safety. Cognizant of the limitations of dead reckoning, sailors knew to give Cape Horn a wide berth. Likewise, investors should account for the inevitable unknowns. Buying with a margin of safety—at a price below a company's intrinsic value—provides room to absorb errors in judgment or unexpected squalls.

At Mawer, one of the ways we respect the inherent imprecision in determining intrinsic value is by embracing the sheer uncertainty of the endeavor. Instead of chasing the illusion of exactitude, all of our discounted cash flow models (DCF) are stochastic, powered by Monte Carlo simulation, to incorporate sensitivity analysis. The result? Neither a single price target nor a simplistic bull/bear/base case trifecta, but rather a continuum: a probability distribution of possible outcomes.

Figure 5: Sample output of our DCF model



Of course, we're not blind to that fact that the inputs into our DCFs may be prone to bias and error. But the process of building these models—continually seeing how variability from a given input influences the overall distribution—instills humility and discipline, a respect for the mutability of intrinsic value, and a consistent framework for charting a margin of safety.

Price may be the most obvious margin of safety, but often overlooked is business model strength.

Consider three hypothetical companies:

- Abigail's Average Apples: a lower quality business, earning a return on capital equal to its cost of capital
- Betsy's Better Blueberries: exhibits a decent degree of wealth-creation and earns a return on capital 5% greater than its cost of capital
- Carla's Champion Cranberries: boasts substantial and sustainable competitive advantages, allowing it to earn a return on capital 15% greater than its cost of capital

Assuming each of these companies starts with an intrinsic value of \$100, here's what these companies should be worth over various time horizons:

Company	Intrinsic value					
	Year 0	Year 1	Year 2	Year 3	Year 5	Year 10
Abigail's Average Apples	\$100	\$100	\$100	\$100	\$100	\$100
Betsy's Better Blueberries	\$100	\$105	\$110	\$116	\$128	\$163
Carla's Champion Cranberries	\$100	\$115	\$132	\$152	\$201	\$405

But what if you overpaid for each of these investments? What if you purchased each of them for \$130 in year 0, i.e., 30% above intrinsic value? In all scenarios except the shortest of time horizons, the strength of the high-quality business model provides that margin of safety due to its wealth-creation.

Company	Return since initial investment (annualized)					
	Year 0	Year 1	Year 2	Year 3	Year 5	Year 10
Abigail's Average Apples	-23.1%	-23.1%	-12.3%	-8.4%	-5.1%	-2.6%
Betsy's Better Blueberries	-23.1%	-19.2%	-7.9%	-3.8%	-0.4%	2.3%
Carla's Champion Cranberries	-23.1%	-11.5%	0.9%	5.4%	9.1%	12.0%

This is not to suggest that an appropriate margin of safety on valuation shouldn't be overlooked, and this is a critical point: the greater the valuation error, the longer those competitive advantages and your assumptions regarding wealth-creation need to persist into the future for the business model to overcome the valuation error. After all, as Columbia Business School's Bruce Greenwald once remarked: "In the long run, everything is a toaster."

In [Expectations Investing](#), Michael Mauboussin and Alfred Rappaport recommend tackling the problem of margin of safety backwards: assume the current stock price *is* a company's intrinsic value, and back out what assumptions need to be made and over what time horizon to justify the current price, comparing them to base rates. Yet another helpful method of triangulation, both on the price and the business model.

Tying it all together: The investor's sextant

Much like navigating the seas with dead reckoning, investing is an exercise in managing uncertainty. The ocean of markets is vast and unpredictable, our tools and guideposts—while predicated on sound principles—often unreliable in practice. But by avoiding the temptation to extrapolate trends blindly, being mindful of stories, triangulating information, and always leaving a margin of safety, investors can chart a course toward long-term success.

In investing, as on the high seas, it's better to steer cautiously than to end up dashed on the rocks of overconfidence. Plot your course wisely.

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