# The Limits of Predictability

January 2024

**Dear Investors**,

Mark Twain once said that history does not repeat itself, but it rhymes. Over the past few years, we have lived through a cycle of high interest rates—now approaching its end—which has led most of the market to remain averse to equity investments for an extended period. At the beginning of 2023, almost no one considered allocating additional capital to equities. Even among professional investors, the prevailing view was to move in the opposite direction, as it was widely believed that investing in equities made little sense while fixed income offered such attractive returns. However, between the peak of pessimism regarding Brazil (in March) and year-end, the equity market rose by 30%. Once again, the period of greatest pessimism and highest interest rates proved to be the most favorable moment to increase capital allocation to equities.

This same cycle of high interest rates—which leads to aversion toward equities and a preference for fixed income, precisely when the opposite would be more favorable for investments—has occurred many times before and is bound to continue repeating itself. Even with this awareness, most people will behave in the same way they did in previous cycles. Human errors have been repeated for thousands of years, not because they are unknown, but because human nature remains unchanged and persistently carries the same flaws that have been documented since antiquity.

There are a few things we can do to avoid being part of these collective mistakes. One is to understand how these pendulum-like market movements unfold over time. We discussed this in our March 2023 letter. Another is to adopt a more realistic and philosophical approach to the future of the economy and the possibility of predicting it. This is the topic we will address here, while also sharing how some of our investment theses evolved over the past year.

## Unpredictable Events Are What Define History

Economic projections always rely on the information available at the time and on the most probable events as components of a "base case," which is then extrapolated over a given time horizon without further adjustments. There is no better way to quantify an inherently unpredictable future, but the absence of a more effective method does not make this approach perfect. What often ends up completely invalidating these projections are unpredictable events—either because they were unimaginable at the time or because their probability of occurrence was so low that they were excluded from scenario analyses.

History is full of such events. In recent years, the event with the greatest global economic impact was entirely unforeseen: the pandemic. Before the crisis emerged, it was impractical to incorporate the probability of a global pandemic into any financial model. Even more so, it would have been unrealistic to dedicate resources to detailing what would happen to each company if such an unlikely event were to materialize.

Similarly, it is not possible to foresee and incorporate the wide range of possibilities associated with highly impactful factors into economic models—such as technological progress, political outcomes, the outbreak or resolution of wars, or large-scale social trends. We know there will be surprises in the future, but we do not know when they will occur, how significant they will be, or whether their impact will be positive or negative. This element of randomness is irreducible. No level of skill or effort can eliminate the unpredictability of a large part of what the future holds.

It is critical to fully internalize this aspect of reality, as human psychology seeks to avoid uncertainty at all costs. This creates a tendency to adopt coherent narratives as the “base case” and assign them a much higher degree of confidence than they truly deserve. In doing so, we replace the realistic state of uncertainty with the comfort of an illusion of knowledge about the future.

The most common mistake in this attempt to predict the future of the economy is to become satisfied upon finding a narrative of events that appears coherent and plausible. Intuitively, this makes sense, but there are countless possible future scenarios that are equally coherent and plausible. Attempting to envision all these scenarios, assign probabilities to each, and extend this type of analysis across sequential events over a long time horizon is a task that quickly exceeds manageable levels of complexity. Therefore, from a pragmatic standpoint, the best course of action is to remain realistic about the extent of uncertainty inherent in macroeconomic projections.

## Not Everything Is Unpredictable, Though

In a world filled with randomness, there are elements that are more predictable, as they depend on structural factors that are either immutable or evolve so slowly that they are unlikely to generate meaningful surprises. These are the points of stability we seek to identify, as they serve as anchors for sound investment theses.

For example, it is reasonable to assume that people will continue to travel between cities from time to time, without major fluctuations in the number of trips over multi-year periods. There are limited transportation options for distances of several hundred kilometers. In Brazil, these options are cars, buses, and airplanes. Each mode of transport offers different levels of comfort, speed, and cost. All three have coexisted for many years, and the number of passengers carried by each changes only gradually, making it reasonable to expect continued demand across all three segments.

In the bus segment, the size of a country’s fleet tends to be quite stable, as it serves travel demand dispersed across millions of passengers. As a result, new bus sales are largely driven by the replacement cycle of older vehicles, motivated by the fact that aging buses break down more frequently, leading to higher maintenance costs and operational issues (such as a fully loaded bus breaking down on the road). Under this relatively straightforward logic, it is reasonable to infer that the older a given bus fleet is, the higher the likelihood that bus sales will increase in the near term.

This reasoning formed the basis of our investment thesis in Marcopolo, a manufacturer of bus bodies. No assumptions regarding domestic political developments, interest rate curves, or expectations of local or global recessions played a meaningful role in this thesis. We simply observed that the Brazilian bus fleet had aged well beyond its normal level and inferred that future demand for new buses would be driven by the operational pressures caused by older vehicles. Once this setup was understood, concluding that Marcopolo would benefit was a small step, as the company is the industry leader and serves roughly half of Brazil’s demand for new buses. This was the thesis that generated our highest return in 2023, with the stock appreciating by more than 150%.

As a general rule, the closer the underlying assumptions are to the real, observable world—and the simpler the inferences drawn from them—the greater the likelihood that the conclusions will prove correct. Predicting that older buses will experience more mechanical issues, leading owners to replace them with new ones, is far easier than forecasting how policymakers will shape the national economy over time.

However, it was not always as gratifying as it is now to discuss this investment thesis, as we had to wait several years for what we anticipated to materialize. This leads us to the next point.

## It Is Easier to Predict What Will Happen Than When

The scenario we outlined for Marcopolo may seem obvious in hindsight, but we purchased our first shares in the company at the end of 2019. The fleet was already aged at that time. We did not foresee the pandemic, which affected travel demand globally—an extremely atypical and unpredictable event. After passenger volumes in intercity bus travel began to recover, we significantly increased our investment in Marcopolo. This was shortly before we published our October 2021 letter outlining this thesis. We then waited another year and a half, until early 2023, for the company's results to begin improving meaningfully.

Even when anchored in events with a high probability of proving correct, the timing of their materialization remains a constant risk in investing. Absent the pandemic, our investment would likely have become profitable much earlier, with a higher annualized return. Conversely, if demand for new buses had remained weak for a few more years, the annual return could have been mediocre—even if our thesis ultimately proved correct.

The best way to deal with this uncertainty around timing is to understand the order of magnitude of how long we may have to wait for the event to materialize—in Marcopolo's case, we knew the aging fleet would not withstand a decade without renewal, but it could very well last a few more years—and to demand, in the entry price, a margin of safety that keeps the rate of return acceptable even in a prolonged waiting scenario, which was certainly the case when we allocated capital to Marcopolo's shares.

There is a meaningful element of luck involved in investing at the right time. In two other relevant positions in our portfolio, we have had different experiences. In Porto (formerly Porto Seguro), the leader in auto insurance in Brazil, we anticipated that profitability would improve following the repricing of auto insurance policies implemented in 2022. This played out over the course of 2023—a relatively short timeframe that did not require a high level of conviction on our part to maintain the position.

By contrast, our investment thesis in Multi (formerly Multilaser), discussed in our September 2023 letter, is still being tested and may face some challenging months in the near term. It is also a turnaround thesis aimed at restoring historical profitability, with a meaningful margin of safety at current share prices.

This uncertainty around timing—even in highly probable events—is what makes patience such an important virtue in investing. The sequence of events follows its own course, entirely indifferent to how our expectations evolve over time. Given this rigidity of reality, the only viable approach is to adapt ourselves to the facts and structure our investment strategies accordingly.

## Some Mistakes Are Inevitable

Due to the uncertainties surrounding both the occurrence of certain events and the timing of their materialization, it is impossible to construct an investment thesis in the real economy that is 100% certain. After all, the possibility of bad luck is just as real as that of good luck. This brings us to another investment thesis: Blau.

Blau is a pharmaceutical company with a history of strong profitability and solid growth. One of its main products is immunoglobulin, a significant portion of whose domestic demand comes from the Ministry of Health, which conducts tenders periodically. The production capacity of immunoglobulin manufacturers in Brazil is broadly aligned with total domestic demand, including the volumes purchased by the Ministry of Health.

In 2023, the immunoglobulin tender called for an unusually high volume, exceeding what domestic manufacturers were able to supply. As a result, the Ministry of Health obtained an exceptional authorization allowing international companies—without ANVISA registration—to participate in the bidding process.

As a result, manufacturers with lower production standards and without the costs associated with ANVISA registration won the tender, displacing the entire volume that was typically supplied by domestic producers. Consequently, locally produced volumes were redirected to the private sector, leading to an unusually high level of price competition that compressed margins across the segment.

It remains unclear—even to industry participants—why the tender volume was so elevated, as it appears inconsistent with the level of public healthcare consumption for the period. There is currently an ongoing investigation to determine whether there were irregularities in these purchases from international suppliers. This type of event is very difficult to anticipate and price in. In principle, it could affect any company exposed to the public sector, but it is infrequent and, when it does occur, it typically comes as a negative surprise.

As a result of this setback, the lack of visibility regarding how future tenders will be conducted, and a challenging near-term outlook for the healthcare services sector as a whole—currently under financial pressure—we decided to significantly reduce our capital allocation to Blau. We still like the business, but we prefer to reallocate most of the investment toward companies with fewer associated uncertainties.

**It Is Essential to Consistently Follow a Sound Method**

Given the presence of randomness in investing, even the best strategy, executed flawlessly, will not always deliver strong returns. There will be good years and bad years. Only over longer periods does it become clear which strategies work, and which do not. With economic cycles typically lasting five to six years, this tends to be the minimum period required to assess the results of a strategy, assuming it has been applied consistently throughout. This raises two important considerations.

The first is that following the instinct to adjust an investment approach based on short-term results is entirely ineffective. Not only does it tend to produce poor outcomes—since the strategy that performed well in the recent past is unlikely to be the one that delivers strong results in the near future—but frequent changes also make it impossible to determine what truly works. It is akin to a doctor, in search of an effective treatment, deciding to test a different medication on each patient. The result would be a mix of non-random and random factors, rendering any attempt at data analysis entirely inconclusive.

The second consideration is that investment cycles are very long. With some luck, an investor will experience 10 to 12 economic cycles over the course of their adult life. This is a relatively small number of opportunities to put an investment approach to the test. As such, learning to invest empirically is a flawed strategy. A better path is to study as many past investment cases and economic cycles as possible, rather than using one's own lifetime as a testing ground for learning how to invest.

We have followed this approach at Ártica since inception, more than 10 years ago. We selected a long-established investment philosophy—one that has consistently delivered strong returns for previous generations of investors—and continue to refine our methods over time through ongoing study. As a result, we have also been able to achieve solid results over the years.