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TABLE OF CONTENTS

Asset Management

ESG , an ethical approach to investing	p.3
By Afonso Batalha & Madalena Moura	

What about REITs?	p.4
By Miguel Vieira	

Equity Research

A semester with Equity Research	p.5
By Isabel Pires & Miguel Florêncio	

Pumping profits: KSB's growth trajectory	p.6-7
By Bernardo Trindade, Afonso Lopes & Francisco Murta	

Investment Banking

Birkenstock's IPO: an economic analysis	p.8
By Diogo Telhado	

Coupling rescues troubled Farfetch	p.9
By Pedro Ruela & Filipe Carneiro	

Quantitative Trading

Exploring finance with Machine Learning	p.10-11
By João Afonso, Dinis Corte Real, Miguel Caetano Nunes & Duarte Pereira	

ESG , AN ETHICAL APPROACH TO INVESTING



By Afonso Batalha



By Madalena Moura

In the dynamic landscape of modern finance, the integration of **Environmental, Social, and Governance (ESG)** principles has emerged as a transformative force shaping investment strategies. This article endeavors to unravel the origins of ESG, elucidate its importance, explore its utility, and delineate the domains where its application is most impactful.

The idea of ethical investments has been around since 2004 and was initially raised by the United Nations. Later, in 2006, the UN launched the **Principles for Responsible Investment (PRI)** initiative that marked a significant milestone, encouraging institutional investors to incorporate ESG factors into their decision-making processes. Since then, ESG has evolved from a niche concept to a mainstream consideration in global finance. From the beginning it got a lot of criticism and was accused of being a very “Woke concept”, nowadays, though broadly used, it’s still a divisive issue.

But what is ESG?

ESG stands for Environmental, Social, and Governance. But it translates to the recognition that financial success should not come at the expense of environmental

degradation, social inequality, or compromised governance. **However, you might be wondering, how is this measured?**

Measuring a company’s ESG performance involves diverse approaches. It all begins with the rating agencies. Names like MSCI, Sustainalytics, and ISS can pop up. These entities are expected to assess companies globally and individually. As in any case of assessment, there are benchmarks to be reached, these are defined with the help of indices such as Dow Jones Sustainability and FTSE4Good. The criteria applied in these indices come from specific indicators. In the environmental sector, we might see some criteria like the Carbon Footprint, Resource Usage and Environmental Impact. Regarding social criteria, labor practices, community engagement and human rights are taken into consideration. Finally, governance criteria will evaluate the board's structure, the executive compensations and the business ethics.

Then these criteria will be scored and weighted in order to present the most reliable result. Companies may also perform self-assessments or engage in third-party audits. Industry-specific guidelines and regulatory disclosures contribute to a complete evaluation.

However, you might still be considering whether **there is any usage of this index beyond public satisfaction?** The answer is yes.

In corporate finance, the incorporation of **ESG considerations is a key strategy** that is imperative for a company’s success with profound implications for risk management, value creation, investment decisions, and stakeholder engagement.

In the risk mitigation optic, ESG factors act as crucial risk indicators. Companies neglecting environmental responsibilities, displaying weak social practices, or lacking transparent governance structures expose themselves to heightened operational and reputational risks. ESG analysis equips investors with the tools to identify and proactively mitigate these risks, ensuring a more resilient investment portfolio.

ESG also serves as a mechanism for long-term value creation. Companies embracing robust ESG practices are not only ethical contributors to societal well-being but are also better positioned to navigate economic downturns. Their commitment to sustainability attracts investment and fosters customer loyalty, establishing a foundation for

sustained financial performance that extends beyond short-term market fluctuations. Furthermore, ESG factors have become pivotal in investment decision-making. Investors increasingly recognize the intrinsic link between a company's ESG performance and its potential for sustainable financial success. A comprehensive assessment, integrating ESG criteria, provides investors with a more nuanced understanding of a company's strengths, weaknesses, risks and opportunities, facilitating more informed and responsible investment decisions.

ESG emerges as a powerful tool for meaningful stakeholder engagement. **Companies with strong practices resonate positively with customers, employees, and communities.** By enhancing their reputations, building trust, and fostering positive relationships with diverse stakeholders, these companies establish a solid foundation for long-term success and sustainability.

ESG is therefore integral for asset management, guiding investment funds focused on sustainability and responsible investing. These funds utilize ESG criteria to screen and select companies for their portfolios, aligning investments with the values of socially conscious investors. This integration not only promotes ethical investment practices but also encourages companies to adopt and maintain high ESG standards, the reporting of which has become the norm, reflecting a company’s commitment to transparency and accountability. Mandated by stock exchanges, regulatory bodies, and industry associations, ESG disclosure ensures that companies communicate their performance in key areas.

A recent example of ESG-focused investments happened on the second day of COP28, where the UAE committed \$30bn to ALTERRA, a new private investment climate vehicle. In partnership with BlackRock, \$2bn will fund climate opportunities across BlackRock’s private debt and infrastructure equity strategies and \$1bn will be allocated to BR’s Climate Transition-Oriented Private Debt strategy, supporting low-carbon transition in middle-market companies in Europe and the US.

However, there is a lot of criticism of ESG investing, as Carole Crozat, former head of fundamental research at BlackRock Sustainable Investing, puts it: the current theory is “an illusion”. Stating that “the biggest sin of sustainable finance over the past 10 is maintaining the illusion that those three objectives could always go together,”

However the truth is that ESG principles have evolved from a debated concept to a transformative force in global finance. Criticized yet crucial, ESG measurement

involves rigorous assessments, steering companies towards environmental, social, and governance excellence. Beyond public satisfaction, ESG is a strategic imperative, impacting risk, long-term value, investment decisions, and stakeholder engagement.

Recent commitments, like the UAE's \$30bn to ALTÉRRRA, highlight the growing significance of ESG in finance. Nevertheless, it's essential to approach ESG with a critical mindset. Is it the best way to analyze a company's actions? Or should we look for a

WHAT ABOUT REITS?



By Miguel Vieira

When it comes to investing, the go-term for most people is usually “stocks”, but, what about REITs? This acronym stands for Real Estate Investment Trust and allows investors to get exposure to Real Estate without the hassle of hands-on management.

REITs might not be on the radar for many retail investors, especially in Europe where housing prices are reaching unaffordable standards. However, in the United States, REITs have become a popular choice, covering everything from data centres to healthcare facilities. The best part? **REITs are required to distribute 90% of their taxable income to shareholders, making them attractive for those looking to diversify their portfolio and enjoy some solid dividends.**

One of the biggest REITs in the HealthCare Facilities Industry is Ventas. Founded in 1998 and with a portfolio of over 1,400 properties, Ventas focuses on Senior Housing Communities and Outpatient Medical Buildings across the US, UK, and Canada. Their straightforward business model involves owning and leasing facilities to healthcare operators, tapping into profits from asset appreciation, rental income, and cost-effective maintenance.

Operating in a somewhat risky industry due to heavy regulations and potential tenant challenges, Ventas counters with significant growth potential. Their strategic focus on Senior Housing aligns with the shifting demographics towards an ageing population—a key market segment for their business. In fact, Senior Housing represents almost 50% of Ventas' NOI (Net Operating Income).

Our analysis of Ventas kicks off with a qualitative dive into market dynamics, business models, and growth prospects. Shifting gears to a quantitative approach, we adapt traditional stock metrics to fit the unique nature of REITs.

One of the major examples is the P/E ratio. While it is normal to analyse stocks using this indicator, we could not use it for REITs. This is mainly due to the influence of property depreciation and amortization (negative value) on companies' earnings, which does not happen. In fact, it is exactly the opposite: **Real Estate tends to appreciate over time.** For this reason, **FFO – Funds from Operations** was created, replacing earnings and consequently, P/E Ratio when analysing REITS and giving a more accurate measurement of their operating performance. FFO is calculated by adding depreciation and amortization back to earnings as well as losses on sales of assets and then subtracting any gains on sales of assets and any interest income, which are considered unrecurring gains and for that reason excluded from the calculus of FFO, which is only supposed to reflect operational cash-flows. As we determine the price-to-earnings ratio we could also determine the price-FFO ratio, which in Venta's case is 16\$ as of the end of 2022.

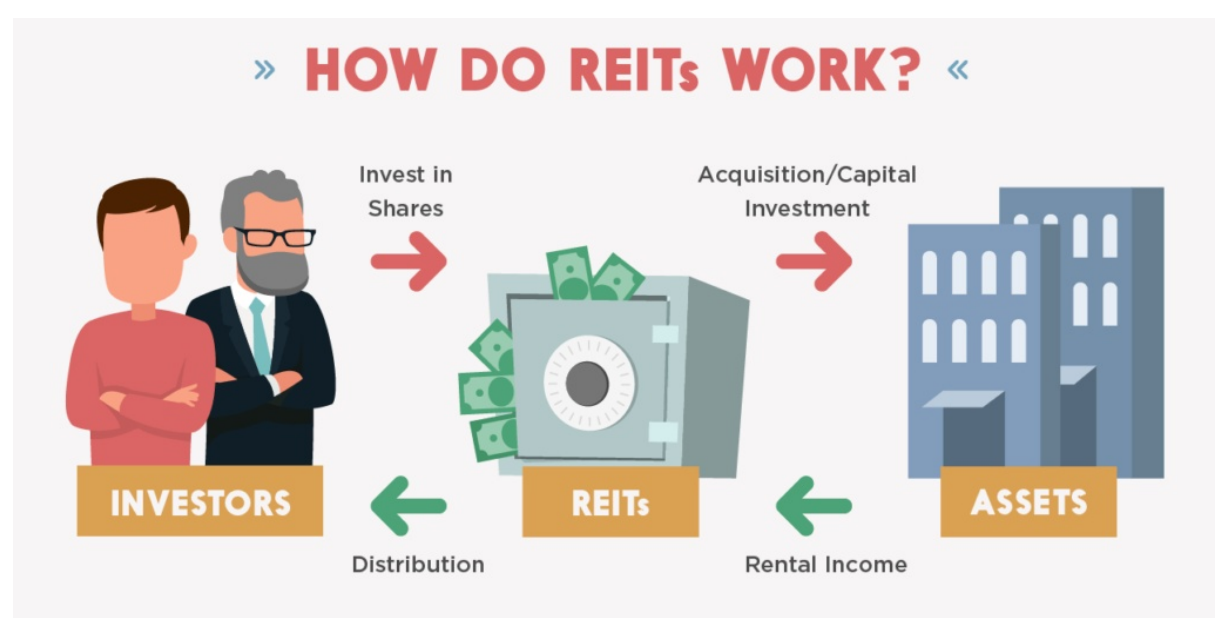
Another important metric to evaluate the profitability of a REIT is **NOI – Net Operating Income**, which equals to all the revenue generated from the proprieties owned minus the operating expenses. In other

industries, this is known as EBIT and allows us to determine how profitable Ventas is. The segment in which is generated the most part of it is Senior Housing Communities with almost 50% followed by Outpatient Medical Facilities with 22%.

As REITs are required to distribute at least 90% of taxable income, **their high dividend yields end up being one of its most regarded characteristics for investors**, as it gives them an idea of how fast they are going to reach the break-even point, bearing in mind that the focus of REITs is not their share valuation but their dividend. Ventas has a dividend yield of 3.72% as of 2022, which is slightly below average.

To get a more complete view of this company we looked at more two simple metrics: Return on Assets and Debt to Equity ratio. The first one complements the profitability measures already mentioned analysing at which rate this REIT can invest its capital, which is 1.58%. The second gives us a look at the level Ventas is using debt to finance their operations, in this case, 138%.

Summing up, REITs offer a smart way to include real estate in your portfolio without the headache of direct management. To find the right fit, start with a qualitative analysis of property types, business models, and market prospects. Then, dive into a quantitative analysis, considering adapted indicators like Price-FFO ratio, NOI, Dividend Yield, Return on Assets, and Debt-to-Equity ratio for a comprehensive evaluation.



A SEMESTER WITH EQUITY RESEARCH



By Isabel Pires



By Miguel Florêncio

The primary responsibility of the **Equity Research** department at TIC is to examine and choose stock for potential investment while developing a well-founded thesis on the conducted analysis. In this article, we will explore the major steps taken by the Equity’s Research department throughout this semester.

The department began with a team composed of Francisco Murta, Bernardo Trindade, Miguel Florêncio, Eduardo Bastiana and Isabel Pires. To start the year we picked a company, **Atkore**, in the electrical components and equipment sector, an industry analysed last semester.

Right after starting, the Equity Research department welcomed three new valuable members: Francisco Nogueira, Afonso Lopes and Tiago Portugal. From October to November, the team devoted their efforts to research and analysis of **Atkore’s** business. This was a period of teamwork and technical learning.

Within the **Atkore Stock Thesis**, the department began with a detailed exploration of various parameters and metrics central to the company's financial health. Revenues, cost structures, and profitability were analysed to establish a comprehensive understanding of **Atkore's** current standing.

Beyond the financials, the historical trajectory of the company emerged as a crucial aspect of the analysis.

By tracing **Atkore's evolution** over time, the team gained insights into the company's resilience and adaptability. The strategic acquisitions made by **Atkore** underscored its significance in the electrical components and equipment sector and its ambitious growth agenda. This historical context became the foundation upon which the team built a nuanced understanding of **Atkore's** potential trajectory.

Following the history, the Equity Research department delved into **Atkore's** business model and overall operations. Understanding how the company operates on a day-to-day basis is instrumental in forming a comprehensive stock thesis. Additionally, an in-depth study of the industry landscape was undertaken, focusing on trends, market structure, potential risks, and technological innovations that could impact **Atkore's** performance. An example of the risks found in **Atkore’s** sector is the cost of raw materials, which are in constant fluctuation due to the intense competition.

The large number of companies in the electrical components and equipment sector leads to the risk explained before, and one of the biggest players in this sector is **Nucor**, which holds a major percentage of the market share, other important competitors are **Prysmian, Encore Wire, Belden, Southwire, Legrand, Zekelman**.

Finished the **Atkore’s** report, the Equity Research Department embarked on their big project for the remaining of the semester: a stock pitch for **Oxy Capital**. This year, the challenge was different: **Oxy** gave a specific company for the group to analyse with specific topics and specific questions. Definitely delving more deeply into the company and into the industry.

The Equity Research department has set its sights on a new venture: **a compelling stock pitch centred around KSB Group**, a huge manufacturer of valves, pumps and related systems. To navigate the complexity of **KSB Group**, the team has strategically divided into small, specialized teams, each tasked with researching a different foundational aspect. These include the Company Overview, Company History, Industry Dynamics, and Competition or Peers.

As such by synthesizing information on the company's overview, history, industry dynamics, and competitive landscape, we are laying the groundwork for a robust stock pitch that not only captures the current state of **KSB** but also anticipates its potential future growth.

The next crucial step in our research involves delving into the valuation metrics and risk assessment of **KSB**. This phase of our analysis aims to determine the intrinsic value of the company through valuation methods, such as **discounted cash flow (DCF)**. In the upcoming analysis, the team plans to **incorporate various scenarios and stress testing into the DCF model**. This forward-looking approach enables a nuanced assessment of **KSB's** resilience under diverse market conditions, contributing to a more robust risk assessment. By exploring different potential scenarios, the team aims to uncover the factors that could influence **KSB's** performance and gauge its ability to weather fluctuations in the market.

The group acknowledges that there is still much work to be done and in the next month the complexities of financial analysis, industry dynamics, and risk assessments will demand ongoing dedication and time. This intensive phase will ensure the presentations are insightful and persuasive.

The culmination of the Equity Research department's efforts is set to take centre stage on February 20th at **Oxy Capital**.



PUMPING PROFITS: KSB'S GROWTH TRAJECTORY



By Bernardo Trindade



By Afonso Lopes



By Francisco Murta

KSB SE & Co. KGaA is a global industry leader in the manufacturing and sale of pumps, valves, and associated services. Established in 1871 and headquartered in Frankenthal, Germany, the company has a rich history spanning over a century. Operating on a global scale, KSB is organized into three key segments: Pumps, Valves, and KSB SupremeServ.

KSB operates in six market areas within the pumps segment, catering to General Industry, Mining, Energy, Building Services, Petrochemicals/Chemicals, and Water.

Remarkably, the company consistently ranks among the top three suppliers in these markets, underscoring its market leadership and expertise.

The valves business has undergone strategic restructuring to align with market potential effectively. This initiative is part of the **CLIMB 21** growth program, emphasizing portfolio optimization and positioning the company in growing markets with stable earnings potential.

The service and spare parts business, operating under the KSB SupremeServ brand, plays a pivotal role in the company's revenue stream. Currently, service and spare parts contribute significantly, accounting for 32% of the customer order intake. As part of the growth strategy, KSB aims to increase the share of service and spare parts business in sales revenue from 35% to 40% by 2025.

KSB's international presence is robust, with manufacturing and assembly operations in 25 countries. The company's extensive distribution network spans over 100 countries, ensuring a wide reach for its products and services.

Europe stands out as the most significant revenue contributor, constituting 49% of annual sales. Additionally, the Asia/Pacific region, characterized by fast-growing markets, generates 25% of the sales revenue. The Americas (North and South) and the Middle East/Africa/Russia contribute to the remaining percentage, reflecting a well-diversified revenue stream that makes KSB independent of the cycles of a single economic sector or region. It is also noteworthy to recognize that a quarter of the revenue comes from regions with high growth potential.

The company's commitment to customer satisfaction is evident in its focus on post-sale services. With a substantial installed base of KSB pumps and valves valued at 30 billion euros globally, KSB capitalizes on service and spare parts, making up 32% of customer

order intake. This not only ensures customer loyalty but also provides a solid, high-margin business opportunity.

KSB's ambitious growth strategy, CLIMB 21, aims to achieve sustainable and profitable growth. This program targets increasing the return on sales to over 8% by 2025. Key aspects include portfolio optimization, market-focused organizational restructuring, and investments in employee training, service centres, and logistics. The emphasis on digital solutions, such as remote monitoring and 3D printing of spare parts, underscores KSB's commitment to enhancing efficiency, performance, and reliability for its customers.

Now that we've gained a comprehensive insight into KSB and its operations, let's assess two potential scenarios.

On the bullish side, despite the loss (in Free Cash Flow) of €100 million in 2022 caused by the sanctions imposed on Russia, the massive **price increases** and the unpredictable disruptions in logistics chains, KSB has shown a strong first half in 2023.

The company managed to make €1,387 million in revenue (previous year: €1,146 million), growing 21% year over year. In terms of EBIT, the first six months of the 2023 financial year amounted to €112 million (previous year: €53 million) which results in an EBIT Margin of 8,1%. These results prove the **excellent recovery** from the harrowing year of 2022 and that KSB can **easily emerge** from difficult times like the lived-in subprime crises.

Looking for the subsegments of KSB, the Pumps segment registered €746 million in revenue (previous year: €608 million) and an EBIT of €19,186 million (previous year: €10,495 million), which results in 11,9 % EBIT Margin in 2023 (previous year: 1,7%). In the SupremeServ segment, the revenue was €457 million (previous year: €378 million) and the EBIT €88,563 million (previous year: €46,961 million), resulting in a 12,4% EBIT Margin. The Valves segment contributes

IN FIGURES		
1871 FOUNDED	#3 GLOBALLY BY REVENUES	€2.6bn 2022A REVENUES
33% SPARES & SERVICE REV.	170 GLOBAL SERVICES SITES	6% to > 8% EBIT MARGIN
15,000+ EMPLOYEES	€30bn INSTALLED VALUE	450k # OF CUSTOMERS

€184 (previous year: €160 million) in revenue and €4,360 (previous year: € -3,96 million) in EBIT giving a 2,4% in EBIT Margin. It's possible to observe a strong improvement in the margins of each segment.

The improvement of the previous outlook made in the 2022 Annual report, it's also a **vote of confidence** from the management about the business.

In 2022 the outlook made was:

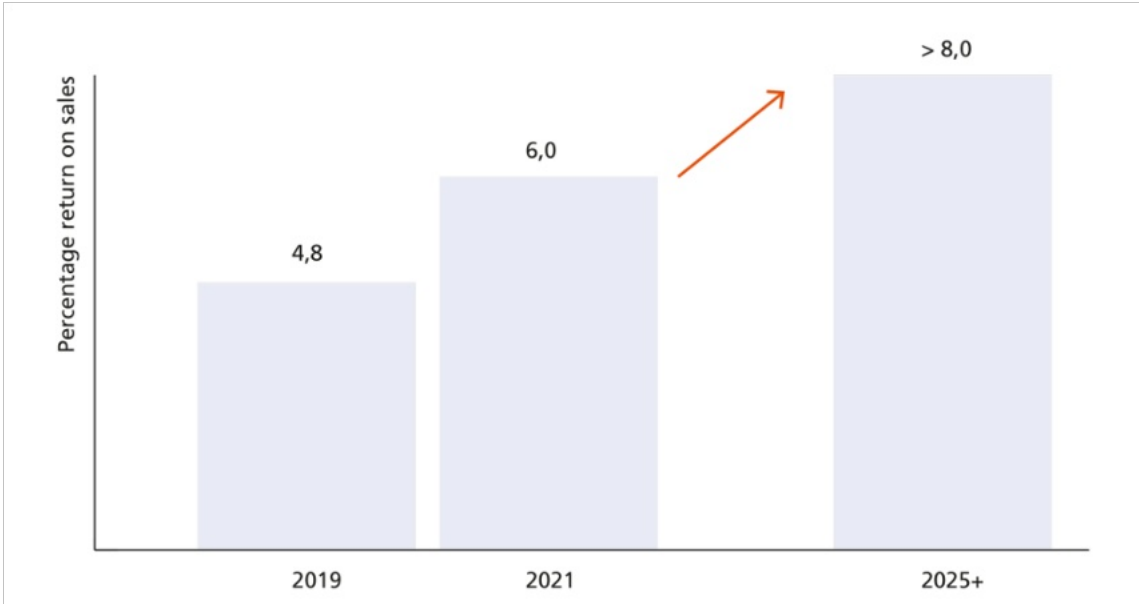
- Order intake: €2,750 million to €3,000 million.
- Sales revenue: €2,500 million to €2,850 million.
- EBIT: €165 million to € 200 million.
- For the first half report of 2023, the new outlook was in the following ranges:
- Order intake: €2,900 million to €3,100 million.
- Sales revenue: €2,800 million to €2,950 million.
- EBIT: €210 million to € 230 million.

The Balance sheet of KSB remains very strong, the company has a tangible book value of 989 million and a net cash of €125 million, this numbers show a **healthy financial position** that can give a solid base for KSB Growth.

The current price of the shares is €660 with 1,751,327 shares outstanding this results in a €1,156 million market cap. With a net Cash of €125 million the enterprise value of the stock is €1,031 million. If the company makes an EBIT of €210 million, the EVEBIT=4.9x times.

It's possible to conclude that the company can have a bullish side of the revenue growth and the profitability presented in the last half report, the robust financial position that the companies have and the low valuation that the stock is currently trading.

However, **what happens if the economy enters a recession or if the valve and pump market cools down?** In other words, how can the company be expected to perform during a downturn scenario? Here, an understanding of the demand for the company's products and services is required. If the sales are segmented into greenfield demand and replacement demand (sales to new customers vs. sales to already existing customers, respectively), during a downturn the latter rises while the former tends to fall. With greenfield demand commanding higher gross margins, the company may find itself exposed to **two different risks in the case of a crisis**: not only would revenue shrink, but the new sales mix (consisting of more replacement sales) would also come with lower margins.



These effects together could compress the bottom line to a point where KSB may not show a profit.

Given this possibility, it's now necessary to determine how likely it is to materialise. To study this, it's not enough to simply look at the net income figure for the previous years; instead, figuring out what the revenue needed to be in order to cover fixed costs and comparing it with actual revenue seems like a much better way of approaching the problem. With these two numbers, it becomes possible to determine a margin of safety, determined as the percentage of revenue in excess of the break-even point. This metric's average for the past six years was 13%, but what happened to it during 2020, the year when everything shut down? It dropped to 6%, meaning that in 2020, the worst year for KSB in the recent past, revenue could have been 6% lower and the company wouldn't have shown a loss, revealing a resilient business. In addition to that, in 2021 and 2022, this margin of safety expanded to 20%, meaning the company has grown more robust in recent years.

Lastly, we will analyse what makes KSB's business capable of making a profit even during what was probably the most challenging year for corporations in the past few decades. Here, the factor that most contributed to this was **"recurring revenue"**, but not in its traditional definition. Although not included in the segmentation above, SupremeServ's revenue had been increasing steadily until 2021, when it spiked (and it shows no sign of slowing down), contributing to a healthy top line. This was possible due to the nature of the business: **pumps and valves aren't simply installed and forgotten about; they need, for instance, spare parts and routine maintenance**, allowing KSB to capitalize on these needs. For that reason, having grown consistently over the past few years, the SupremeServ division is poised to become a guarantee of stability to KSB when conditions become adverse (pumps and valves need repairs during recessions too). Therefore, with an ever-growing source of steady revenue and a comfortable margin of safety over the break-even point, we believe KSB is in the best position it has been in years to deal with a potential downturn scenario.

In conclusion, the comprehensive analysis of KSB SE & Co. KGaA reveals a company that stands as a **global industry leader** in the manufacturing and sale of pumps, valves, and associated services. Established in 1871, KSB has demonstrated resilience and adaptability over its rich history, with a strong global presence and a diversified revenue stream.

The strategic initiatives, particularly the CLIMB 21 growth program, showcase KSB's commitment to sustainable and profitable growth. The emphasis on portfolio optimization, market-focused restructuring, and investments in digital solutions align with the company's vision for the future.

The recent financial performance, despite challenges such as sanctions and disruptions in logistics chains, paints a bullish picture for KSB. The company's revenue growth of 21% year over year in the first half of 2023, coupled with improved EBIT margins in each business segment, reflects **effective management and operational excellence**.

Looking forward, KSB's solid financial position, with a tangible book value of 989 million euros and a net cash position of 125 million euros, provides a robust foundation for future growth. The current share valuation and enterprise value suggest an attractive investment opportunity, supported by a low EV/EBIT ratio.

However, prudent consideration must be given to potential economic downturns or market cooling. Analyzing the company's performance during challenging periods reveals a margin of safety that has expanded to 20%, indicating **increased resilience in recent years**. Furthermore, the recurring revenue from the SupremeServ division, driven by the ongoing need for spare parts and routine maintenance, positions KSB favourably even in adverse conditions.

In essence, KSB emerges as a **well-positioned and resilient entity**, with a strategic growth plan, strong financial fundamentals, and a business model that thrives on stability and recurring revenue. The company's ability to navigate challenging scenarios and maintain profitability underscores its strategic foresight and adaptability in an ever-evolving market landscape.

BIRKENSTOCK'S IPO: AN ECONOMIC ANALYSIS



By Diogo Telhado

On October 11th, the renowned German brand **Birkenstock** went public, marking the occasion with a catastrophic start, **ranking as the tenth worst first day for a publicly traded company in the last 100 years**. To illustrate, the stock opened at 46\$, depreciating by 12% in the initial minutes on the market. However, since then, not only has the stock recovered its value, but it has also experienced an increase of almost 4\$ at its maximum compared to the **Initial Public Offering (IPO)** price. The question arises: is this reversal in trend a result of a successful internal policy change within the company, or were external factors instrumental in masking and forgetting one of the most disappointing and catastrophic IPOs ever?

To answer this question, we must understand the global economic situation, specifically that of the United States, as Birkenstock is listed on the **NYSE**. On November 28th, **Federal Reserve Governor Christopher Waller**, in a speech in Washington, D.C., expressed being "encouraged" by recent data

and *"increasingly confident that policy is currently well positioned to slow the economy and bring inflation back to 2%."* Two weeks later, the FED had its meeting, during which, as usual, Chairman Jerome Powell spoke, summarizing the country's economic situation, officials' forecasts, and consequent decisions. The main decision, as expected, was the maintenance of the interest rate in the range of 5.25-5.50%. However, Chairman Powell also mentioned that the data since the last meeting was very positive, making it possible to estimate achieving inflation below 2.5% as early as 2024. He also emphasized the positivity of this data not being accompanied by a significant rise in the unemployment rate. Finally, he stated that he foresaw interest rates experiencing cuts of 75 basis points in the coming year, being the most significant information conveyed by Jerome Powell.

Well, what is considered most important can be relative, but it was undoubtedly the statement that had the most significant impact on the markets. Immediately after these words were spoken, the **major American indices rose by about 1%**. This happened due to the fact that when interest rates decrease, it becomes cheaper for companies to borrow money (lowering their cost of borrowing), which can enhance profitability and, coupled with decreased discount rates, increase the attractiveness of the company's future earnings, thereby driving up its stock price. Moreover, in such a scenario, alternative investments, notably bonds, lose their appeal due to their diminished returns. Investors, seeking more lucrative opportunities, consequently pivot towards stocks, escalating demand and subsequently, prices.

Another notable repercussion of this speech was the **significant decline in yields**, specifically those of the 10-year American Treasury Bonds. As evidenced by the graph, the yield to maturity of these securities plummeted from 5% to approximately 3.8% within a span of a month and a half. To contextualize, such a sharp decline had not been observed since the onset of the COVID-19 pandemic. It is noteworthy that those astute enough to have acquired bonds in late October are currently enjoying a rare profit margin of around 10%. This stands in stark contrast to the typically stable and less reactive nature of bonds compared to equities, making such substantial gains a rarity.

On the other side, prospective investors who hesitated and refrained from purchasing have seemingly **'missed the train'**. It is imperative to acknowledge that, if current projections materialize and inflation continues its downward trajectory as anticipated, we may be poised for an extended period without witnessing figures akin to the present scenario.

In conclusion, my personal opinion is that Birkenstock chose an inopportune time for their IPO. The global economy is currently undergoing an unstable phase, and it remains uncertain whether this shift in the economic cycle will result in a soft landing. Due to this uncertainty, the markets are highly volatile, data-dependent, and reactive to every change that may indicate something about the future. Moreover, being a brand with such a rich history and positive image, it could have leveraged that to its advantage; however, it ended up with its image negatively marked after this **unsuccessful entry into Wall Street**.



COUPLING RESCUES TROUBLED FARFETCH



By Pedro Ruela



By Filipe Carneiro

In a surprising turn of events, the once-dominant player in online luxury retail, **Farfetch Holdings plc**, finds itself on the brink of a significant restructuring. The London-based e-commerce marketplace, which had ambitions to revolutionize how luxury is sold online, recently revealed a **\$500 million rescue deal with Korean e-commerce giant Coupang, Inc.** This essay delves into the narrative behind Farfetch's downfall, exploring the financial challenges, strategic missteps, and the role of external factors, leading to its acquisition by Coupang.

Burning Cash and Strategic Drift:

Farfetch's **IPO marked a turning point** in its financial health, with the company burning through at least \$1 billion in cash since going public. The increasing complexity of its business model and a departure from its core marketplace platform contributed to rising costs and a challenging path to profitability. The *Financial Times* noted **"cracks in the business model"**, emphasizing Farfetch's reliance on discounts and a lack of momentum in its platform solutions business.

The Legal Fallout:

However, the optimism surrounding Farfetch has given way to legal challenges. **Shareholders**, represented by investor Michael Ragan, **filed a securities class action**

lawsuit accusing Farfetch's management, including **CEO José Neves**, of making false statements regarding the company's business and prospects. The lawsuit alleges that shareholders were misled about the state of key markets and gross merchandise value growth.

Stock price:

The urgency of this acquisition becomes apparent when examining Farfetch's stock performance, and its decision to exit the stock market follows a challenging period for Farfetch. From a pandemic high of \$73 in February 2021, its **NYSE-listed** shares plummeted to \$1.60 on October 20, 2023, and hit a new low of \$0.64 on December 15. **This downward spiral prompted a trading halt and signalled the urgency for a strategic shift.** Farfetch's exit is emblematic of a company grappling with financial challenges and seeking refuge from the scrutiny of public markets. As it transitions into private ownership under Coupang, the luxury e-commerce player aims to navigate a new course, shielded from the volatile tides of the stock market.

About Coupang:

Coupang, a Fortune 200 company listed on the **New York Stock Exchange (NYSE: CPNG)**, is one of the largest retailers in the world. Its mission is to revolutionize the lives of its customers and create a world where people wonder, **"How did we ever live without Coupang?"** Coupang offers a variety of services, including same-day and dawn delivery of merchandise, delivery of prepared foods through Coupang Eats, fintech through Coupang Pay, and video streaming through Coupang Play. Coupang is headquartered in the United States, with operations and support services performed in markets including South Korea, Taiwan, Singapore, China, and India. It brings to the table not only financial stability but also a track record of operational excellence and innovative logistics.

Possible synergies:

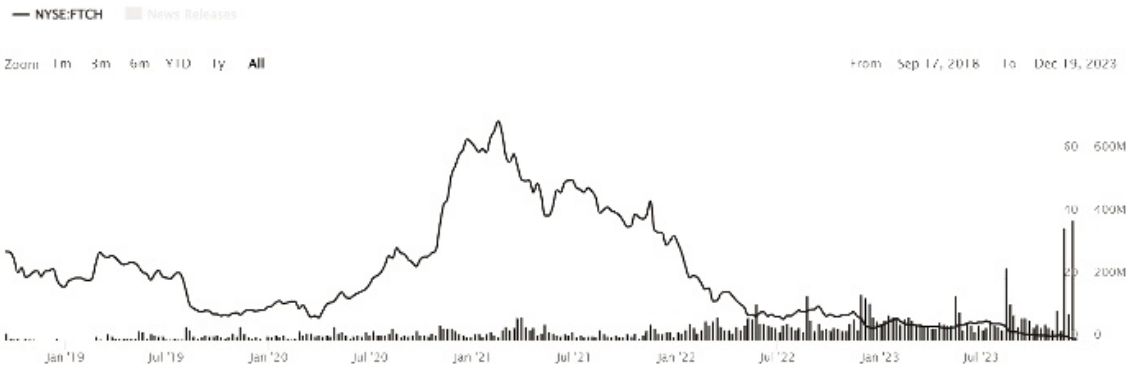
In considering the acquisition of Farfetch by Coupang, the synergies between these two giants in their respective domains are evident and potentially transformative. Coupang, known for its **cutting-edge logistics and technological infrastructure**, stands to

provide Farfetch, a leader in luxury fashion e-commerce, with **unparalleled distribution and operational efficiency.** This collaboration could significantly elevate Farfetch's capability to deliver luxury products with speed and precision, a critical factor in customer satisfaction in the high-end market. Furthermore, Farfetch's expansive luxury brand portfolio complements Coupang's strategy to diversify into new market segments, particularly in luxury retail. The merger could also leverage Coupang's vast customer data, applying advanced analytics to understand and cater to evolving consumer preferences in luxury fashion. Additionally, this acquisition **opens doors for Farfetch to penetrate new geographic markets, particularly in Asia**, where Coupang has a robust presence. The synergy lies not just in combining resources but also in uniting Farfetch's luxury retail expertise with Coupang's operational excellence, potentially setting new benchmarks in the e-commerce landscape.

"Coupang's proven track record and deep experience in revolutionizing commerce will enable us to deliver exceptional service for our brand and boutique partners, as well as for our millions of customers around the world," said José Neves in a release.

In conclusion, Farfetch's departure from the stock market is a notable chapter in its journey, highlighting the unpredictable nature of the business landscape and the adaptive measures companies must take to stay afloat, and it urges stakeholders to not only recognize the challenges posed but also to embrace them for future success.

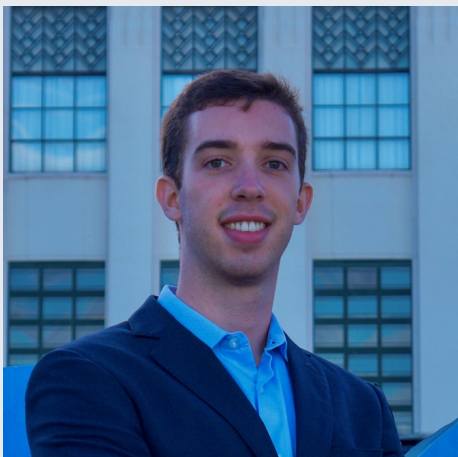
Its acquisition by Coupang represents a **turning point** in the trajectory of the once high-flying luxury e-commerce company. The acquisition enhances the challenges faced by Farfetch, including strategic missteps, financial struggles, and legal controversies. As Coupang assumes the reins, the collaborative future of these two entities promises that it will undoubtedly reshape the landscape of global luxury e-commerce. This move prompts reflection on the e-commerce industry's complexities and the evolving dynamics of luxury retail in the digital era.



EXPLORING FINANCE WITH MACHINE LEARNING



By João Afonso



By Dinis Corte Real

Machine Learning (ML) is causing a **revolution in the way we think and work across various fields, and Finance is no exception.** Financial Machine Learning has been transforming the financial industry, reshaping how institutions analyze data, make decisions, and manage risk. However, Financial Data has some unique and particularly challenging characteristics when applying ML models, leading to overfitted models that prove to be unsuccessful in implementation.

Therefore, our project focuses on learning and creating a package containing cutting-edge advanced ML techniques in order to apply them correctly to any type of financial data and develop successful trading strategies. In this article, we will focus on the first part of our project: understanding and processing data in order to extract the maximum amount of information and improve the predictive power of our model.

Data Structure

Firstly, we need to understand the structure of the data. **Financial data is presented in the form of bars:** a specific unit interval to represent and organize the data. The most typical structure is time bars, where the sample variables (let's assume for simplicity,

the adjusted close price) are extracted at fixed time intervals. There could also be other structures such as tick bars, where sample variables are extracted each time a pre-defined number of transactions takes place, or volume/dollar bars, with a pre-defined volume/value of transactions. However, these bars have very poor statistical properties: they are highly correlated and non-normal, which influence very negatively the performance of a ML model.

Due to that, we used a different type of bar: **information-driven bars**. The idea of these bars is to extract sets of trades containing equal amounts of "information". There are two types of information-driven bars: **tick imbalance bars**, where we define an "imbalance", that is the sum of the binary evolution of the data (1 if goes up, and -1 if down), and sample a bar when the imbalance is higher than the average of the past imbalance; and **tick run bars**, where we sample a bar when a sequence (e.g. a series of 1s) diverges from expectation. Similarly to the previous ones, we can extend tick imbalance/run bars to volume/dollar bars, taking into account not only the evolution of the close price but also the volume/value involved. After developing and testing every hypothesis, we concluded that the **Dollar Run Bars were the ones that showed the best statistical properties** and, consequently, were the best to use in our project.

Sampling features within financial datasets reveals a crucial step in preparing them for machine learning algorithms. Recognizing the limitations of applying ML directly to continuous datasets, the importance of sampling bars to construct an organized features matrix emerges as undeniable. As a result, we could opt for methodologies like **linspace sampling** and **uniform sampling**, aiming to downsampling to address scalability challenges, agnostic to how valuable is the information of the excluded observations; nevertheless, the **CUSUM filter**, an event-based sampling method, shows up as a better approach to infuse ML algorithms with actionable insights. By implementing this, a sample is only selected as long as it represents a shift in the mean value of features, like the adjusted close price, away from a target value.

Labelling

Financial data is not labelled, to use supervised machine learning models, we need to assign custom labels to each observation. In financial literature, a common labelling method is the **fixed-time horizon approach**, where a predetermined threshold (τ) and a fixed bar horizon (h) dictate the labels (-1, 0,

1) based on the price return. However, this method faces challenges with the use of time bars, as they lack good statistical properties, as previously described, and applying a fixed threshold independently of volatility, leading to mislabelling and information loss.

To address these issues, proposed solutions include **adjusting thresholds based on volatility or using volume or dollar bars**. However, a fundamental flaw persists as the method overlooks price paths, making positions without a stop-loss limit impractical for building investment strategies.

In response, we implemented the **triple-barrier method**, introducing both horizontal (profit-taking and stop-loss) and vertical (time expiration) barriers. The horizontal barriers are dynamically set based on estimated volatility, providing a more adaptive and informative labelling strategy. If the upper or lower barrier is touched first, the observation is labelled as 1 or -1, respectively. If the vertical barrier is touched first, the observation can be labelled as 0 or based on the sign of the return.

When aiming to learn both the side and size of a bet, the labelling method must be adjusted. However, in the absence of underlying models to set the position's sign, differentiating between profit-taking and stop-loss becomes challenging. The approach here involves arbitrarily setting a side (long), assuming symmetric barriers, and studying the first barrier hit to label observations accordingly

In scenarios where only the size of the bet needs determination, knowing the side becomes crucial for discriminating between profit-taking and stop-loss, allowing for asymmetric horizontal barriers. In this case, we can use a **Meta-Labeling technique**: the model outputs only two possibilities (0 or 1), representing pass or bet. The probability of the predicted label being 1 can be utilized to estimate the size of the bet.

The binary classification nature of financial problems introduces a trade-off between false positives and false negatives. Elevating the true positive rate often amplifies the false positive rate. Meta-labeling emerges as a valuable strategy for enhancing F1-scores. This involves building a model with high recall, compensating for lower precision through meta-labeling on positives predicted by the primary model. The secondary ML algorithm's role is not to identify betting opportunities but to validate the accuracy of positives predicted by the primary model, guiding decisions on whether to act or abstain.

To conclude the labelling process, class imbalance in some ML classifiers can hinder the performance of the models, so it is advisable to **drop extremely rare labels**, focusing on more common outcomes, and enhancing the robustness and efficiency of the model.

Within financial series, the challenge of non-stationarity is linked to the fact that time series, which are known for their rich memory that portrays the history influencing the series' mean over time, lack stationarity, which is vital to most supervised ML models. As a result, it turns out to be crucial to increase stationarity present in our samples carefully, preventing an extreme reduction of memory, which is fundamental to guaranteeing the predictive capabilities of our model.

Since traditional transformations that intend to overcome this problem, such as the standard integer differentiation, enforce stationarity but at the cost of frequently erasing all memory, it was mandatory to rely on an innovative technique that was capable of both attributing stationarity to the datasets and preserve sufficient memory: **Fractional Feature Differentiation (FFD)**. This methodology uses the backshift operator on real-valued features, implementing fractional differentiation with an exponent d that preserves more memory when closer to 0 and yields more stationary features when closer to 1. The optimal value of d can be determined by resorting to a hypothesis test, such as the ADF.

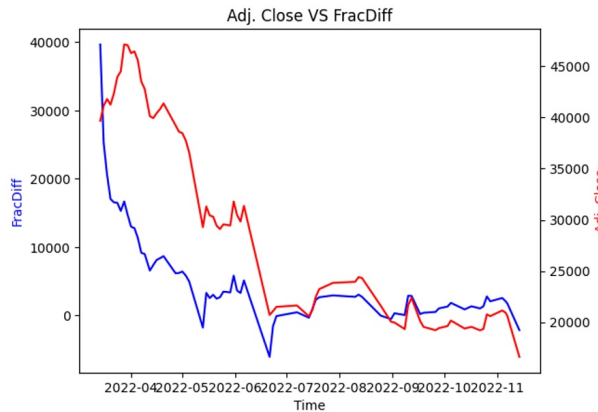


By Miguel Caetano Nunes



By Duarte Pereira

There are two distinct possible implementations of fractional differentiation: the **expanding window method**, which uses all the past data; and the **fixed-width window method**, which only considers a defined timespan of the data. Using the expanding window, the impact of the oldest data causes a misrepresentation of the actual evolution of the data. Therefore, we opted for the fixed-width FracDiff, that tackles this problem, as represented below.



After FFD, we delve into addressing a common issue in financial application: **non-independent and non-identically distributed (non-IID)** observations. The prevalent IID assumption in machine learning literature poses challenges, particularly in finance, where it often leads to unrealistic results.

When utilizing the labelling methods explained priorly, we assign a label to an observed feature, where the label is a function of price bars that occurred over a time interval. If there is an overlapping of intervals that correspond to two consecutive outcomes, then the respective labels will both depend on a common return, implying that the series of labels is not IID. Restricting the bet horizon to prevent overlap is impractical, limiting feature sampling frequency to the defined bet horizon.

There are several other ways to tackle this problem of non-IID labels and we will address it by computing sampling and weighting schemes that correct for the undue influence of overlapping outcomes, simultaneously preventing the model from overfitting. To estimate a label's uniqueness, i.e., its non-overlapping quality, we will use its average uniqueness over its lifespan, calculated through the inverse of the average number of concurrent labels at time t , over the label lifespan.

Also, when sampling with replacement (bootstrap), it becomes increasingly likely that in-bag observations will be redundant to each other and very similar to out-of-bag observations, resulting in an inefficient bootstrap. A great solution to this adversity, and better than dropping all overlapping outcomes or selecting only the data with greater uniqueness, is to utilize **sequential bootstrap**. In this process, draws are made

according to a changing probability that controls for redundancy, making overlaps or repetitions still possible, but decreasingly likely. The samples that result from the sequential bootstrap method will be much closer to IID than those from a standard bootstrap.

Now that we have a solution to bootstrap samples closer to IID, we will bring in a method to weigh the resulting samples, with the purpose of improving the performance of our ML algorithm. These weights will be a function of both uniqueness and absolute return, to guarantee that overlapping outcomes aren't disproportionately considered and that more importance is given to labels associated with large absolute returns

As a further adjustment to better deal with the dynamic aspect of financial markets, we would like to add time-decay factors that multiply the weights already derived and ensure that older samples are less relevant than newer ones. The final weight has no decay, and all other weights are adjusted relative to that.

Finally, in addition to sample weights, applying class weights is useful to correct for underrepresented labels, particularly in classification problems where important classes have scarce occurrences.

Conclusion

With all these steps completed, we have **transformed financial data into a dataset capable of being used by Machine Learning algorithms** to make accurate and valuable predictions for our investment strategies.

Therefore, the next steps of our project consist of: studying the best modeling algorithms to generate predictions; developing a rigorous backtesting methodology; generating the best financial features with the highest predictive power; and finally, creating an investment strategy based on the techniques we have developed throughout the project.

A letter from the President and Vice-President

Dear **TIC Members** and **IST Community**,

As we find ourselves halfway through the current term, we wanted to take a moment to express our sincere gratitude to each and every one of you for your continued support and trust in our leadership roles as President and Vice President of Técnico Investment Club.

First and foremost, we wish to express our sincere appreciation for the overwhelming response to our last recruitment, exceeding all expectations. The enthusiasm and talent displayed by the multitude of candidates were truly remarkable and the inclusion of exceptional individuals, who have since demonstrated their dedication and commitment to furthering the goals of TIC, have undoubtedly enriched the fabric of our club.

To the esteemed members of the board, we extend our deepest thanks for embracing the challenges that come with your respective roles. Your invaluable contributions have been instrumental in driving the club forward, and we are immensely grateful for your continued support, collaboration, and friendship.

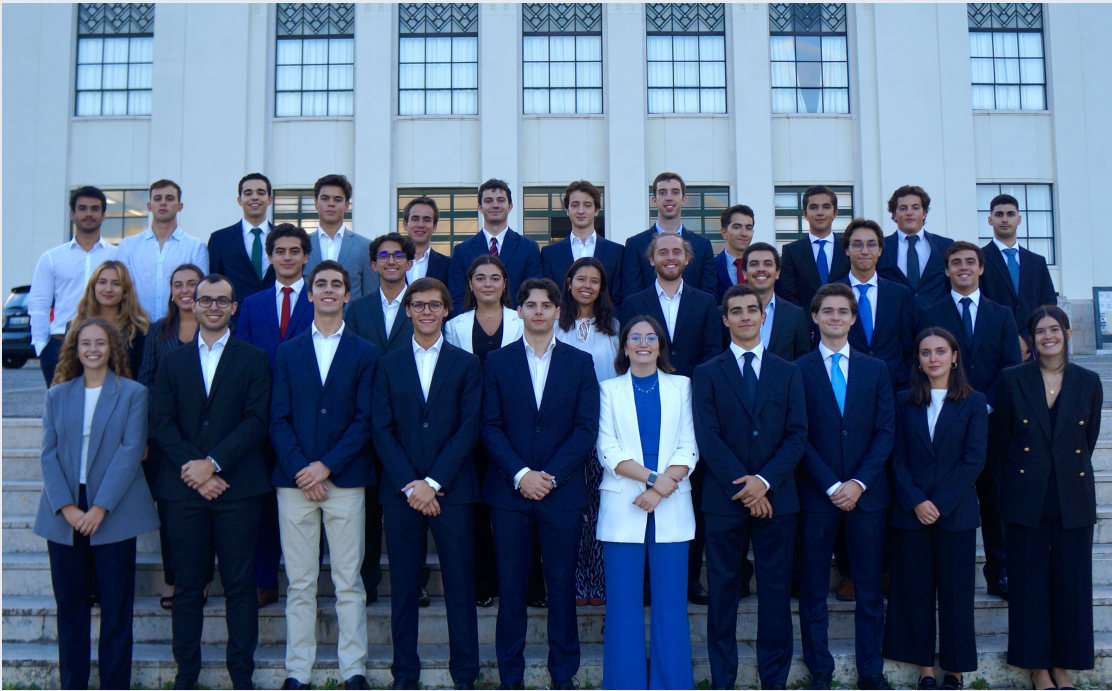
As we reflect on the accomplishments of the past months, we are reminded that our journey is far from over, having still countless milestones to reach. With this in mind, we are confident that with the continued dedication and effort of our members, we will accomplish great things together.

Thank you once again for your ongoing support and enthusiasm. Let us continue to strive for excellence and make the most of the opportunities that lie ahead.

Warm regards,

Daniel Quintas
President

João Martins
Vice President



Thank you