MIMS – Multi Asset Global Opportunities Fund

Portfolio Management Team

Report – May 2024

Fund description

MIMS – Multi Asset Global Opportunities Fund is an actively-managed fund by Minerva Investment Management Society, based on environmental, social, and governance (ESG) criteria.

The ultimate goal of this portfolio is to achieve long-term growth whilst controlling volatility. To that end, this fund will be comprised of a multitude of securities with the possibility, in exceptional cases, to take short term speculative positions. Hedging positions might be implemented through financial derivative instruments. To ensure diversification, this virtual portfolio is spread across geographies, sectors and asset classes, and is built through fundamental analysis, ESG integration and macroeconomic views.

In total, the asset allocation will aim to include around 30 different securities with a changing risky component to take advantage of contingent market conditions. The dynamic asset allocation prevents us from using a reference benchmark. The portfolio will be rebalanced every six months, with exceptional reviews to position for market shocks. The holdings only include instruments from the public markets, spread across equity, fixed income, real estate and commodities. ETPs might be considered to take additional exposures to niche markets.

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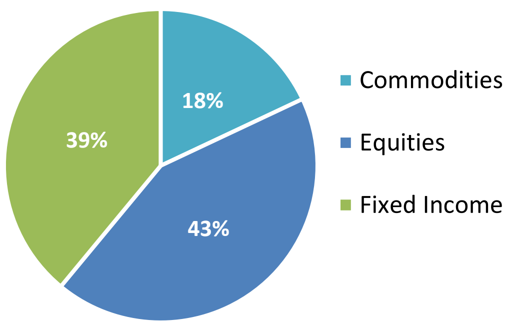
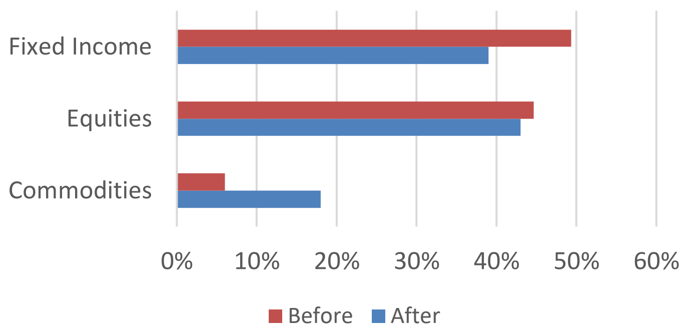
Asset Allocation



Asset Class Rebalancing



Investment Approaches

Top-down Approach

Starting from the macroeconomic outlook provided by the Macro Research Team, the Investment Team identifies appealing industries, geographies and asset classes for which the best-performing securities will be analyzed thoroughly.
The Team applies a shared approach to the different asset classes by considering the main return drivers for any holding.

Bottom-up Approach

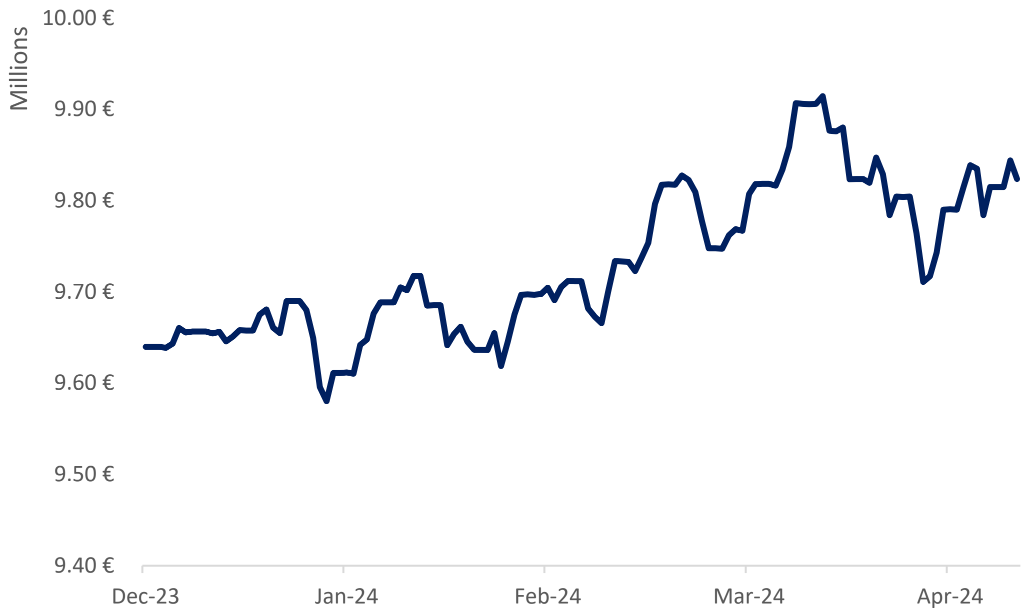
If a security stands out to one of the Investment Analysts, the suggestion is discussed with the Team and further analysis follows.
Long-term growth potential combined with high ESG standards and limited risk downsides both on a micro and macro level are required to consider the investment.

Research Contribution

The investment process uses internal research produced by the Research division of Minerva IMS.
The Macro Team provides the outlook underlying the top-down approach. The Equity Team provides recommendations on potential stock holdings. Findings by the Markets and Alternatives Team are used for particular asset classes.

Performance

22.12.2023 – 30.04.2024



Update on performance -> update

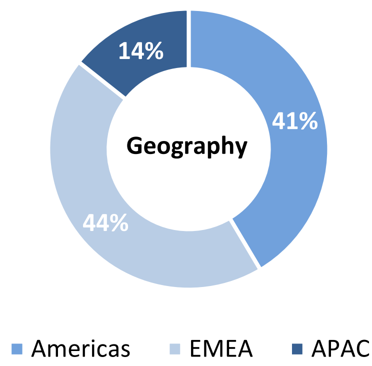
During the current semester, the fund has reported a profit of **1.91%,** beginning at **€ 9,639,720** and ending at **€ 9,823,543,** with an annualized performance of **4.584%.**
The return of the fund was mainly driven by the **equity allocation of the portfolio,** thanks to a meticulous cherry-picking of good fundamentals. However, the **bond allocation of the portfolio** did not perform as expected, as we overestimated inflation risk by excessively exposing ourselves towards inflation-linked bonds, which underperformed during the period as inflation started to decline.

Methodological note

The analysis considered the cumulative gain over the entire period since inceptions. Any security is held only in a discrete number, stock dividends and bond coupons are reinvested at the end of the day in which payments are received. The fund value is measured at the close of each trading day. Corporate events, dividend reinvestment and fund rebalancing are carried out at the market close.

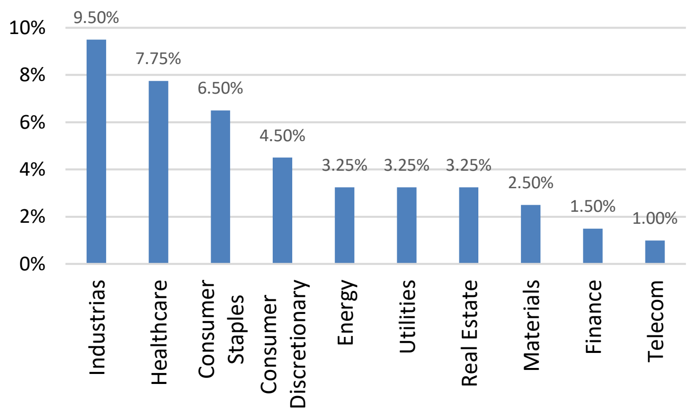
New positioning - Top 10 Holdings

Security	Weight	Security	Weight
USA -T-NOTE 2.25% 15NV24	12.00%	Crude Oil	5.00%
UST 3.875 30-NOV-2027	8.00%	Gold	4.00%
EUUNI 0.700 06-JUL-2051	8.00%	BTP FX 3.2% JAN26 EUR	3.00%
Copper	6.00%	Natural Gas	3.00%
ROMANIA TF 2,124% LG31 EUR	5.50%	iShares € Corp Bond 0-3yr ESG UCITS ETF	2.50%

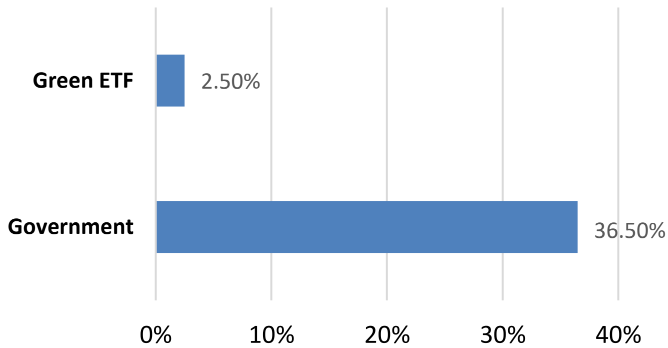


Sector breakdown

Equity



Bond



DISCLAIMER
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New entries		Outs
↗ USA -T-NOTE 2.25% 15NV24		↘ FRGV 0.100 01-MAR-2025
↗ ROMANIA TF 2,124% LG31 EUR		↘ ITGV 15-DEC-2024
↗ BTP FX 3.2% JAN26 EUR		↘ DEGV 2.200 12-DEC-2024
↗ Rentokil		↘ Terna
↗ Sandvik		↘ United Airlines
↗ Mazda		↘ AT&T
↗ Alpha Bank		↘ Vodafone
↗ Appllied Materials Inc		↘ British American Tobacco
↗ Texas Pacific Land		↘ Bank of China
↗ Sanlorenzo		↘ Coca-Cola
↗ ITC		↘ Southwest Airlines
↗ Abbott India		↘ ICBC
↗ Entegris		↘ Roche
↗ Shimano		↘ Avio S.p.a.
↗ TTFGAS		↘ Bayer

RATIONALE OF THE REBALANCING

As per fund approach, every 6 months there is a rebalancing of the portfolio. We monitor in depth the evolution of the prices of the securities in our portfolio, when we believe the securities have reached their maximum potential, with the market price converging to our target price, we substitute them with other securities with higher potential. As for what concerns currency risk, we decided to take calculated views on currency pairs, hedging "naturally" unwanted tail risks on Euro pairs.

↘ OUTS

First, we have decided to remove all those fixed-income securities that do not fit our new macro considerations on the foreseeable futures (for example we have removed **European** inflation-adjusted securities, as we believe the **past inflationary waves have slowed down**). Secondly, we substituted part of our equity portfolio, as we believe that some of the securities have either reached their full potential or lost any strategic relevance in the portfolio.

↗ NEW ENTRIES

This new semester allocation has witnessed significant adjustments, in response to a rapid evolution of the global macro environment entering 2024. As for what concerns the fixed-income side, we have embraced a blended view on rates based on different currencies, adopting a long-duration-biased Barbell strategy on Euro rates (to maximize potential gains from what we believe are **incoming rate cuts from ECB**), while taking a more "agnostic" and opportunistic short-duration approach on USD rates (we believe, notwithstanding recent positive inflation data, **rates cuts will come more prudently from the Fed**). We believe that **credit spreads are excessively tight** at the moment, therefore preventing us from seeing any outstanding risk-reward opportunity. Lastly, as for what concerns the equity side of the portfolio, we have focused on an in-depth cherry-picking of thematic and value stocks, betting on industry and country-specific trends: for the Americas we decided to go overweight on a combination of **high-tech, export-oriented niche markets** that we believe undervalued and **inflation-robust** companies with sound fundamentals; on top of that, we have firstly introduced securities from the APAC region, with a focus on **India** (betting on the strong demographic impact on **pharma, consumer staples and discretionary**) and **Japan** (focusing on **export-oriented** and high value-added industries).

= UNCHANGED

A considerable stake in the equity portion of the fund remained unchanged. This is because we chose to maintain a position in those companies (mainly value stocks) that we still believe both **undervalued,** in terms of financials and **growth prospects**, and of **strategic importance** for the portfolio, either because coherent with the major macro catalysts driving the allocation or because useful in **driving down volatility and hedging**. Furthermore, commodities remained roughly the same as in the previous report but scaled up in terms of overall percentage of the portfolio, as we believe this asset class will thrive entering a new period of **macro uncertainty**.

Texas Pacific Land Corp.

Company Overview

Texas Pacific Land Corp. is one of the largest landowners in the State of Texas, operating under two main business segments: *Land & Resource Management* and *Water Services & Operations*. Its surface and royalty ownership allows revenue generation throughout the entire value chain of oil and gas development, including through fixed fee payments for use of the firm's land, from oil and gas royalty interests, and revenues related to saltwater disposal on land. The firm also generates revenue from pipeline, power line and utility easements, commercial leases, material sales and seismic and temporary permits, sales of materials used in the construction of infrastructure, providing sourced water and treated produced water.

Financial Analysis

In 2023, the company experienced compression in YoY revenue growth from dec 22 to dec 23 (-5.4%). However, after first three quarters of financial distress in 2023, the company showed strong results at year end, beating expectations by 2.25%, with a 2.3% surprise and a positive price impact of 2.7%. Company EPS are in line with the ones of the industry, but with a price relative smaller than peers. However, this analysis is affected by the inclusion of Texas in the Investment Service Industry rather than in the Oil one. Hence, lower than average EPS are expected. Nevertheless, compared to EPS growth, the company is trading at a favorable P/E, with EPS expected to grow in line with NI and sales revenues up to 2026. Finally, the P/52w of 88% provide a good momentum strategy and suggest the company hasn't exploited its full upward potential. Overall, the company also present stronger internal funding capabilities, better financial leverage and debt service coverage and ultimately higher liquidity with respect to comparables, thus corroborating the thesis of TPL being a high-quality company.

Considerations

As for what concerns the ability of TPL to deal with the ongoing market dynamics, the company is expected to benefit from a rise in the in demand for oil pushed both by middle east conflict & energy demand, supported also by its low exposure to dollar fluctuations and its high capability of maintaining strong performance during inflation crisis.

On top of that, after careful analysis, it seems clear that markets have not fully appreciated TPL's strong revenues (+9.17%) and NI (+13.44%) compared to past year quarter results (Q4 2023 vs Q4 2022), contributing to make the stock a potential tailwind for positive alpha.

Entegris Inc

Company Overview

Entegris, Inc. engages in the development, manufacture, and supply of specialty materials for the microelectronics industry. It operates through the following segments: Materials Solutions (MS), Microcontamination Control (MC), and Advanced Materials Handling (AMH).

Financial Analysis

The company exhibits solid financial health across various metrics. Its liquidity ratios underscore its robustness, with a current ratio of 3.85 and a quick ratio of 2.67, indicating ample short-term assets to cover immediate liabilities. This liquidity is further emphasized by a strong CFO/Interest ratio of 13.6%, contrasting with the market's 245%, and an EBIT/Interest ratio of 1.15x compared to the market's 31x, showcasing efficient cash flow management and sufficient earnings to cover interest expenses. Additionally, the company's non-CFO/Interest ratio of 1.80x contrasts with the market average of 57.16x, suggesting reduced reliance on non-operating cash flows for covering interest expenses. Collectively, these metrics portray a company with a solid financial position and effective debt management capabilities.

Considerations

Main catalysts in support of the narrative of the stock's rise are the following: 1) Mega trend of AI industry, that will necessarily imply higher demand of microelectronic components; 2) Potential rise of tension with China, which implies a concentration of manufacture of micro production in China (22% according to Statista). Potential tensions increased by Trump presidency (rise in duties and tariffs and consequent retaliatory policies) will allegedly increase demand for national companies. All of this reasons contribute to support the stock momentum.

Applied Materials Inc.

Company Overview

Applied Materials, Inc. provides manufacturing equipment, services, and software for the semiconductor, display, and related industries. Its segments include Semiconductor Systems, Applied Global Services, and Display & Adjacent Markets. The Semiconductor Systems segment offers equipment for various semiconductor manufacturing processes. Applied Global Services optimizes equipment performance, while the Display & Adjacent Markets segment focuses on display technologies for consumer devices.

Financial Analysis

Applied Materials, Inc. is currently rated as overweight with a target price of 223, reflecting a long-term growth expectation of 10%. Despite a slight reduction in sales (-0.48%) compared to Q1 2023, the company saw a notable increase in net income (+18%), leading to a significant rise in earnings per share (EPS) by 19% compared to the same period last year. This positive trend in profitability is expected to continue into the future. The company's Debt-to-Equity (D/E) ratio is 34.4%, notably lower than the industry average of 83.0%. , suggesting a more conservative approach to capital structure management. Applied Materials, Inc. boasts an impressive internal funding rate of 659.0%, surpassing the market average of 516%. This indicates the company's strong ability to finance its operations internally, reducing reliance on external capital.

Considerations

Despite geopolitical challenges and potential trade tensions, the AI sector remains an attractive investment opportunity. Investors should assess market dynamics and capitalize on the sector's positive momentum for potential gains, especially considering Applied Materials, Inc. crucial role within the value chain (as a supplier of specialized machinery for microprocessors production) and competitive advantage in the manufacture of ad-hoc equipment.

Sandvik

Company Overview

Sandvik AB, based in Stockholm, is an engineering firm specializing in mining and rock excavation, metal cutting, and materials technology. The investment thesis here encompasses three main catalysts.

Financial Analysis

1) Flock to quality: the company's brands are perceived by the client base as the best in class, because of their strong focus on innovation, sustainability and technology (in particular digitalization, data analysis and AI). On top of that, Sandvik itself present sound financials - proper leverage (D/E: 44.2%, interest coverage: 10x), higher-than-peers marginality (EBITDA margin ≈ 20% as of 1q-24), high liquidity and cash generation - that do not justify a lower valuation than national peers (PE TTM ratio at 22x as of May-24, with the Swedish Machinery industry average staying at 23.5x).

Considerations

2) Expected revenue and margin expansion: ongoing product portfolio optimization (branch spin-off) and overall management shift in focus towards high technology divisions (particularly automotive and aerospace) with high marginality, supported by strong M&A activities and "buy-and-build" strategy to acquire critical technologies and expand the product offering (strong economies of scale). 3) Riding the trend: the market currently underestimate the strength of fundamentals driving Sandvik's growth. Because of the high entry barriers, its advanced technological know-how and its unique role in the supply chain, the company is positioned to benefit from both the main investment themes: for the mining division, from the global electrification trend and the anticipated supply gap for electrification metals (which increases the focus on those technologies capable of unlocking future supply); for the manufacturing division, from its role of trusted provider of highly-specialized components in the electric vehicle industry.

Rentokil

Company Overview

Rentokil Initial plc is a global leader in pest control and hygiene services. Founded in 1903, the company offers a comprehensive range of solutions including pest management and hygiene products across North America, the UK, Europe, Asia, and the Pacific. Rentokil is positioned to benefit from constant demand due to its leading role in the essential pest control and hygiene sectors.

Financial Analysis

With ongoing investments in technology, Rentokil is also well-poised to leverage increasing global health standards and awareness. The company reported significant revenue growth of 45.8% reaching £5.4 billion, with a notable organic growth of 4.9%. The company also achieved a 57.0% increase in adjusted operating profit, enhancing the adjusted operating margin by 120 basis points to 16.6%. Rentokil's strategic acquisitions have effectively expanded its market presence, completing 41 deals that integrate well within its growth strategy. The company continues to diversify its hygiene and well-being services, further strengthening its market position in the global landscape.

Considerations

With projected earnings and revenue growth rates of 16% and 4.8% per annum respectively, and an expected return on equity of 15% over the next three years, Rentokil Initial is set to maintain its trajectory of growth. The company's focus on expanding its global footprint and integrating innovative technologies is likely to drive continued success in its sector.

Alpha Bank

Company Overview

Alpha Services and Holdings S.A., headquartered in Athens, Greece, is a premier financial services provider recognized since 1879. Operating through a wide network of subsidiaries, Alpha Services offers a diverse range of banking products, including loans and deposits, alongside wealth management, insurance, real estate management, and investment banking solutions.

Financial Analysis

In 2023, Alpha Bank reported revenues of € 3.24 billion, compared to € 2.8 billion of the previous year. Net profit soared to € 1.3 billion, driven by operational efficiencies and robust management. The operational cost-to-income ratio improved to 49%, reflecting heightened efficiency. With earnings projected to grow by 13.5% and revenue by 9.2% YoY, Alpha Services is positioned to capitalize on the improving economic environment in Greece. Regulatory reforms and economic stabilization are anticipated to drive further growth, with a forecasted EPS growth of 13.6% annually. The company's total assets grew to € 132 billion, with total liabilities also increasing to € 123 billion. The Capital Adequacy Ratio improved to 17%, demonstrating strong capital resilience. Furthermore, a dividend of € 0.21 per share has been announced, underscoring confidence in the bank’s future profitability and stability.

Considerations

Alpha Services and Holdings boasts a strong position within the Greek banking sector, enhanced by its comprehensive service offerings and long-standing market presence. The company’s strategic focus on digital banking advancements and expansion into new markets provides a stable foundation for its valuation against regional banking competitors.

Sanlorenzo

Company Overview

Sanlorenzo S.p.A., headquartered in Ameglia (SP), is a leading Italian manufacturer of luxury yachts. Founded in 1958, Sanlorenzo operates through three divisions: Yacht, Superyacht, and Bluegame. It offers a comprehensive range of services including yacht maintenance, charter services, and a second-hand yacht sales division, solidifying its position in the luxury yacht market.

Financial Analysis

Sanlorenzo has demonstrated outstanding financial health with consistent growth in earnings and revenue, with earnings growing at an average annual rate of 32.3% and revenues at 14.9% per year. Its return on equity is impressive at 25.9%, with net margins of 10.7%. With a low debt-to-equity ratio of 18.6%. Financial indices such as P/E Ratio (15.2x, which is lower than industry average) and EV/EBITDA (9.26x) indicate a stable valuation trend, supporting the investment thesis. Sanlorenzo is poised for further growth driven by the expanding global affluent class, combined with a high customer retention rate and emerging markets, with analysts forecasting an 8.2% and 6.1% annual growth in earnings and revenue respectively.

Considerations

Innovations in yacht design and the integration of eco-friendly technologies are likely to attract new customers and comply with future environmental regulations. With strong financial fundamentals, strategic market positioning, and significant growth catalysts, Sanlorenzo presents a compelling investment opportunity for those looking to capitalize on the high-end luxury goods market's resilience and growth.

Abbott India

Company Overview

Abbott India Limited is an India-based company that is engaged in the pharmaceuticals business. The Company has a portfolio of offerings in diagnostics, medical devices, nutrition products and branded generic medicines.

It provides products and solutions across various therapeutic areas, such as women's health, gastroenterology, central nervous system, metabolic, multi-specialty, and vaccines, among others.

Financial Analysis

Abbott India Limited reported financial results for the second quarter, which are in support of a strong growth path for the years to come: the company reported sales were INR 14.94 billion compared to INR 13.79 billion a year ago and basic earnings per share from continuing operations of INR 147.27 compared to INR 124.95 a year ago. Abbott P/E ratio of 48x is in line with industry average.

Considerations

However, because of its possibility to rely on the widest distribution network on the country and higher retaining ratios for its products respect to comparable companies, Abbott is the favorite to capitalize on the ongoing demographical trends and increasing focus on pharma and healthcare

Hindustan Unilever

Company Overview

Hindustan Unilever Ltd is one of India's largest consumer goods companies, incorporated in 1933. HUL's operations span across food, homecare, personal care and water purifier categories. Its top products include soaps, detergents, shampoos, skin care products, toothpastes and deodorants.

Financial Analysis

Hindustan Unilever Limited reported earnings results for the fourth quarter ended March 31, 2024. For the fourth quarter, the company reported revenue was INR 154.41 billion compared to INR 153.75 billion a year ago. Net income was INR 25.58 billion compared to INR 26 billion a year ago. Basic earnings per share from continuing operations was INR 10.89 compared to INR 11.06 a year ago.

Considerations

Because of its strong brand popularity (the company owns brands as Lipton and Sunsilk) and wide customer base, this company is among the favorite to capitalize on ongoing demographic trends, with the possibility of leveraging pricing power and increase marginality

ITC

Company Overview

ITC Limited is an India-based holding company. The Company's segments include fast moving consumer goods (FMCG); Hotels; Paperboards, Paper and Packaging, and Agri Business. FMCG segment consists of cigarettes, cigars and others, such as education and stationery products, personal care products, safety matches and branded packaged foods businesses, which include staples and meals, snacks, dairy and beverages, biscuits and cakes, chocolates, and coffee and confectionery.

Financial Analysis

ITC Limited reported earnings results for the first quarter ended June 30, 2023. For the first quarter, the company reported revenue was INR 193.62 billion compared to INR 201.52 billion a year ago. Net income was INR 51.05 billion compared to INR 43.90 billion a year ago. Basic earnings per share from continuing operations was INR 4.11 compared to INR 3.56 a year ago. Diluted earnings per share from continuing operations was INR 4.1 compared to INR 3.56 a year ago.

Considerations

The main catalysts for the company are the following: 1] increase in consumer goods not sufficiently appreciated compared to the demographic trends; 2] because of its highly diversified business lines, ITC stock is currently trading at a deep discount compared to consumer goods industry average (PE ratio of 18x compared to a 26.5x industry average): we do not see this diversification as a potential threat for profitability, rather an investment opportunity to capitalize on India's growing market.

Honda

Company Overview

Honda Motor Co., Ltd. stands as a key player in the global automotive and motorcycle markets, with a strong track record of financial health and operational efficacy. The company is well-positioned for continued innovation and market expansion, focusing significantly on electric vehicles (EVs) and sustainable technologies.

Financial Analysis

Regarding financial health, the firm maintains a long-term debt-to-equity ratio of 44.72% and a total debt-to-equity ratio of 78.55%, demonstrating a strategic approach to leveraging that supports expansion while maintaining financial stability. In terms of cash flow and liquidity, the company generated ¥ 325.56 billion in operating cash flow, reflective of effective capital management. Its current and quick ratios of 1.45 and 0.76, respectively, ensure sufficient liquidity to meet short-term obligations. Meanwhile, in terms of revenue and profitability, for the fiscal year 2024, Honda reported revenues of ¥ 5.43 trillion and a net profit of ¥ 237.6 billion, showcasing strong market performance and profitability. The net profit margin stands at 4.84%, with an operating margin of 5.79%, which indicates consistent profitability. Moreover, Honda offers a dividend yield of 3.92% and has maintained a continuous dividend payout for 33 years, highlighting a robust commitment to returning value to shareholders. Considering the market positioning, trading at a P/E ratio of 7.79 and a price-to-book ratio of 0.69, Honda presents as an attractive undervaluation relative to industry standards, representing a compelling buy for investors. The recent stock price increase to ¥ 1,756, significantly below the fair value estimate of ¥ 2,110, provides an appealing entry point for investment.

Considerations

Additionally, Honda is actively enhancing its footprint in sustainable transportation, aligning with global shifts toward greener technologies. This strategic focus is supported by a stable financial structure and effective liquidity management. Honda's mix of solid financial health, strategic market initiatives, and a robust dividend policy positions it as a strong candidate for long-term investment. With its focus on innovation and expansion in the EV sector, Honda is well-prepared to capitalize on future growth opportunities in the evolving automotive landscape.

Shimano

Company Overview

Shimano Inc. is a prominent company in the consumer cyclicals sector, focusing on manufacturing and distributing bicycle components, fishing tackle, and rowing equipment.

Financial Analysis

With a significant presence across the world, Shimano boasts a strong financial foundation, with a minimal long-term debt-to-equity ratio of 0.41%, illustrating a conservative leverage approach. Shimano's liquidity ratios, including a current ratio of 10.5 and a quick ratio of 8.47, significantly surpass industry norms, suggesting a robust capacity to meet short-term obligations. Shimano has demonstrated impressive profitability, with its net income nearly doubling from December 2023 to March 2024 and its stock achieving a 52-week high of ¥ 26,395.

Considerations

Shimano's consistent dividend payments over 33 years and a dividend yield of 1.10% underscore its commitment to shareholder returns and its confidence in expanding market presence in its core BUs, which are expected to face significant increases consumer demand. The company's earnings have shown strong results, often surpassing forecasts and indicating robust operational resilience and effective market strategies.

BTP FX 3.2% JAN26 EUR

With a net yield to maturity (YTM) standing at 5.33% and a modified duration of 6.23, Romanian government bonds offer an attractive income stream relative to bonds from other developed countries. To this extent, Romania boasts an investment-grade rating of BBB- by S&P with a debt-to-GDP ratio of 49%, therefore underscoring the country's commitment to fiscal responsibility. What further enhances the appeal of these bonds is the country's strong and expanding economy. Over the past decade, Romania has consistently exhibited robust economic growth, with an average annual GDP growth rate ranging between 4% to 5%. This growth trajectory is diversified across multiple sectors, including manufacturing, agriculture, and services, which contributes to the resilience and dynamism of the Romanian economy.

Looking ahead, the economic outlook remains promising, with forecasts indicating continued growth and development. As Romania continues to integrate further into the European market and leverage its membership in the European Union, there is considerable potential for capital appreciation of government bonds. This, combined with the attractive yields and stable fiscal metrics, positions these bonds as an appealing option for investors.

USA -T-NOTE 2.25% 15NV24

This opportunity on US treasuries seek to capitalized on short-term high interest rates (both in nominal and real terms), with a 6-months investment horizon: gross yield is at 5.35% and modified duration at 0.49.

BTP FX 3.2% JAN26 EUR

This Italian government bond offers a net yield to maturity (YTM) of 5.19%, with a modified duration of 1.65. Its coupon rate of 3.2% (paid semi-annually) provides a steady income stream. Italy's recent BBB rating reaffirmation by DBRS underscores its creditworthiness: the country's economy has proven resilient, with inflation in February below the Eurozone average. Moreover, stable governance and access to funding enhance Italy's stability and growth prospects, offering investors a stable investment environment with attractive yields, backed by a resilient economy and favorable credit ratings.

Natural Gas

The rationale underpinning the potentiality of the commodity are: 1) the request to move toward renewable energy sources; 2) the clear impossibility of meeting the international demand without the supplement of fossil fuels. The demand dynamics are expected to remain strong throughout 2024 and 2025, especially because of the rising relevance of AI and tech. Consequently, the macroeconomic environment, with shortage of oil and energy crisis will maintain prices and demand stable, despite the higher ESG requirements. In conclusion, more than a peak in price the commodity provides a good hedge against high inflation with modest possibility of prices increment and minimal risk of downturns.

Detailed Holdings

USA -T-NOTE 2.25% 15NV24	US912828G385	12.00%
UST 3.875 30-NOV-2027	US91282CFZ95	8.00%
EUUNI 0.700 06-JUL-2051	EU000A3KTGW6	8.00%
Copper	LCPCASH	6.00%
ROMANIA TF 2,124% LG31 EUR	XS2027596530	5.50%
Crude Oil	CRUDOIL	5.00%
Gold	GOLDBLN	4.00%
BTP FX 3.2% JAN26 EUR	IT0005584302	3.00%
Natural Gas	TTFGAS	3.00%
iShares € Corp Bond 0-3yr ESG UCITS ETF	IE00BYZTVV78	2.50%
Albemarle Corp	US0126531013	2.50%
Abbott India	INE358A01014	2.25%
Mazda	JP3868400007	2.25%
Hindustan Unilever	INE030A01027	2.25%
Sandvik	SE0000667891	2.00%
Appllied Materials Inc	US0382221051	2.00%
GSK	GB00BN7SWP63	1.75%
ASML	NL0010273215	1.75%

Snam	IT0003153415	1.75%
Shimano	JP3358000002	1.75%
Rentokil	GB00B082RF11	1.75%
Texas Pacific Land	US88262P1021	1.75%
Imperial Brands	GB0004544929	1.50%
Genmab A/S	DK0010272202	1.50%
Brookfield Infrastructure Partners	BMG162521014	1.50%
Eni	IT0003132476	1.50%
Airbus	NL0000235190	1.50%
ITC	INE154A01025	1.50%
Apha Bank	IT0003242622	1.50%
Entegris	US29362U1043	1.50%
Target	US87612E1064	1.50%
Philip Morris	US7181721090	1.25%
Sanofi	FR0000120578	1.25%
Sanlorenzo	IT0003549422	1.25%
Pfizer	US7170811035	1.00%
Verizon	US92343V1044	1.00%

Quantitative Research Team

Risk Report – May 2024

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Introduction

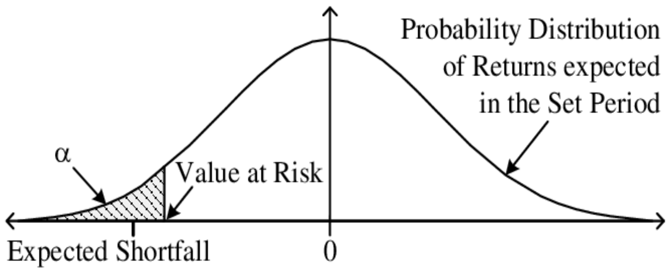
The main objective of this section is to assess and quantify the risk embedded in the allocation built by the Portfolio team. We use a daily perspective on the potential extreme behavior of a basket of assets selected by the portfolio analysts. The analysis will include three VaR and ES models (two parametric and one non-parametric) and an overview of how sentiment analysis can be considered a factor for short term investments.

As the Investment Risk division, our focus is the estimation of the two main risk indicators:

- The daily Value at Risk (VaR): the maximum portfolio loss that occurs with α% of probability over a time horizon of 1 day. For instance, if the VaR (α=5%) = -3.00%, it means that tomorrow there is a 5% probability of encountering a loss in the interval [-100%, -3.00%] potentially;

- The daily Expected Shortfall (ES): the expected return on the portfolio in the worst α% of cases. So, it is just a mean of the returns lower than the VaR.

A simple technique to estimate these two measure is based on a historical approach: given a time series of returns of a financial security, we can easily compute the desired quantile of the historical distribution to estimate the VaR, and, after that, estimate the ES just by averaging the values below this threshold.



However, this naive approach is not well suited for our purpose: in fact, by considering our portfolio as a single financial asset, we are losing all the information that comes from all the components; moreover, with this approach we are simply focusing on the past behavior of the fund, while our main goal is to retrieve a risk metric for the future possible trends.

In order to overcome these issues, we propose two alternative techniques that provides better risk estimates:

- Parametric approach (simple and time-series modelling approach),
- Bootstrapping.

The first method is very well suited for understanding the main vulnerabilities in the portfolio composition, while with the second one it is possible to observe how the metrics varied in the past quarters.

For both pieces of analysis we used daily market prices of portfolio constituents for the past 6 months,. All the analysis has been conducted with Python.

Parametric approach

In this section we propose to analyze VaR and ES separately for each asset included in the portfolio and then, to estimate the VaR and ES for the whole fund by taking into account the correlation between portfolio constituents.

Parametric approach is based on the assumption that returns of a financial security follow some theoretical distribution. Thus, VaR and ES can be expressed as an α-percentile of the distribution. The crucial step to accurately estimate VaR and ES is to select the appropriate distribution of returns and estimate it's parameters.

It is possible to state that stock returns do not follow Gaussian distribution due to the presence of "fat tails": unexpected events might have a huge impact on the stock prices, so it is possible to observe extreme values more frequently than a Normal distribution would predict. For this reason, we assume that stock returns follow a Student-t distribution, thus, the parameters to be estimated are the mean μ, volatility σ and number of degrees of freedom ν.

To obtain more valid and robust results, we proceed with two alternative parameter estimation approaches – (a) simple approach, and (b) time-series modelling approach. For all parts of analysis, we use the last 252 return observations, which correspond to 1-year window.

Simple approach

Under the simple approach, we estimate the above-mentioned parameters in the following way:

1. We assume that the mean historical daily return of each security are a good estimate for the expected future return. Thus, μ is estimated as a simple average of daily returns.

2. Volatility of returns σ is calculated as a simple standard deviation of returns.

3. Number of degrees of freedom ν is selected in a way that it best approximates the empirical distribution of returns. In order to do that, we used the Kolmogorov-Smirnov statistic that, for a given empirical cumulative distribution function F and a proposal Fn, is:

$$Dn = \sup x|(Fn - F)|$$

Ideally it should be equal to 0 for a perfect fit, so our goal is to minimize it by proposing different ν for Student-t distribution.

Time-series modelling approach

Because the volatility of returns is not constant over time, it is often modelled by conditional heteroscedasticity processes. The most common way to model volatility is through a Generalized Autoregressive Conditional Heteroscedasticity model GARCH(p,q), where the forecast of the next-period volatility depends on the previous p shocks to stock returns (derived from some mean model) and previous q forecasts of volatility:

$$\sigma_{t+1|t}^2 = \omega + \sum_{i=1}^{p} \alpha_i \epsilon_{t-i}^2 + \sum_{j=1}^{q} \beta_j \sigma_{t-j+1|t-j}^2$$

The advantage of GARCH model is that it allows to better estimate the current forecast of return volatility by putting more weight on more recent information. Thus, in the periods of market turbulence GARCH model will produce higher volatility forecasts than the simple average of squared deviations from the mean (see the graph at the bottom).

Because the portfolio is composed exclusively of equity instruments traded on liquid markets, we can assume that prices are efficient, and thus returns can be described by a constant mean model for GARCH(p,q) process, which implies that current mean estimates do not depend on previous returns or shocks. GARCH(p,q) then is estimated by Maximum Likelihood (MLE), which optimizes the distribution parameters. We subsequently use MLE estimates of distribution to derive VaR and ES.

Parametric approach (continued)

Value-at-Risk

Once the parameters of stock returns are known, it is possible to calculate VaR. We estimate the VaR for 95% and 99% confidence level by applying the following formula:

$$VaR_\alpha = \sigma * T_\nu^{-1}(\alpha) + \mu$$

where σ is the estimated volatility of a security, $T_\nu^{-1}(\alpha)$ is the α-percentile of a Student-t distribution with ν degrees of freedom, and μ is the expected return of a stock.

Expected Shortfall

Expected shortfall is defined as a conditional expectation of loss, given that the loss occurred. If we introduce the assumption of a continuous distribution of returns of a security, then parametric expected shortfall is simply defined as a tail conditional expectation, and thus can in general be defined by the following formula for any security X :

$$ES_\alpha(X) = -\frac{1}{\alpha}\int_0^\alpha VaR_\gamma(X)\,d\gamma$$

Under the assumption of Student-t distribution with ν degrees of freedom it can be proven that the expected shortfall would be given as:

$$ES_\alpha(X) = \sigma * \frac{\nu + \left(T_\nu^{-1}(\alpha)\right)^2}{\nu - 1}\frac{\tau_\nu\left(T_\nu^{-1}(\alpha)\right)}{\alpha} + \mu$$

where σ is the estimated volatility of a security, $T_\nu^{-1}(\alpha)$ is the α-percentile of a Student-t distribution with ν degrees of freedom, $\tau_\nu(\cdot)$ is the probability density function of Student-t distribution with ν degrees of freedom and μ is the expected return of a stock.

We estimate the ES for 95% and 99% confidence level.

Portfolio VaR and ES

Considering the correlation between the stocks, we estimate the VaR and ES of the whole portfolio for 95% and 99% confidence level by applying the following formulas:

$$VaR_{\alpha,ptf} \approx \sqrt{\boldsymbol{VaR_\alpha} * \boldsymbol{\rho} * \boldsymbol{VaR_\alpha}'}$$

$$ES_{\alpha,ptf} \approx \sqrt{\boldsymbol{ES_\alpha} * \boldsymbol{\rho} * \boldsymbol{ES_\alpha}'}$$

where $\boldsymbol{VaR_\alpha}$ and $\boldsymbol{ES_\alpha}$ are column vectors of individual stock VaR and ES, respectively and $\boldsymbol{\rho}$ is the correlation matrix between securities

The approximation arises because of the assumption of Student-t distribution of returns – the formulas above become an equality the closer the distribution of returns is to the Gaussian.

Results

GARCH results are much higher in magnitude than the simple approach ones, most likely due to the higher volatility in the markets recently. Indeed, GARCH puts more weight on the most recent observations, thus, it better estimates the future volatility and produces more reactive risk metrics.

	Simple approach	GARCH
$VaR_{95\%}$	-0.57%	-0.86%
$VaR_{99\%}$	-0.83%	-1.94%
$ES_{95\%}$	-0.37%	-1.69%
$ES_{99\%}$	-0.97%	-3.64%

TOP & BOTTOM 5 assets (simple approach)

	VaR 95	VaR 99	ES 95	ES 99
BTP FX 3.2% JAN26 EUR	-0.11%	-0.16%	-0.14%	-0.19%
iShares € Corp Bond 0-3yr ESG UCITS ETF	-0.44%	-0.64%	-0.56%	-0.75%
UST 3.875 30-NOV-2027	-0.61%	-0.86%	-0.76%	-0.99%
ROMANIA TF 2,124% LG31 EUR	-0.61%	-0.90%	-0.79%	-1.06%
USA -T-NOTE 2.25% 15NV24	-0.62%	-0.93%	-0.81%	-1.11%

	VaR 95	VaR 99	ES 95	ES 99
Mazda	-3.14%	-4.56%	-4.01%	-5.30%
Entegris	-3.76%	-5.63%	-4.92%	-6.69%
Imperial brands	-2.78%	-6.62%	-5.86%	-13.35%
Albemarle Corp	-5.50%	-9.14%	-7.86%	-12.08%
Natural Gas	-8.49%	-12.32%	-10.86%	-14.42%

Bootstrapping

When estimating a certain metric, one of the main problems in Statistics is the lack of the whole population data and the consequent use of only a sample. In our case the population data is the complete historical price data of the securities that are part of our portfolio, in which we only have the data of recent years.
Bootstrapping is a statistical technique that by having only a sample of the population data, provides estimates of statistical metrics that are closer to the ones obtained from the population data.

	Estimate	Standard error
$VaR_{95\%}$	-0.59%	0.04%
$VaR_{99\%}$	-0.85%	0.10%
$ES_{95\%}$	-0.73%	0.05%
$ES_{99\%}$	-1.01%	0.12%

Given a sample of size n, implementing bootstrap is very simple:
• Sample with replacement n times from the original sample (note that one observation could be selected more than once);
• Compute the metric of interest (in our case the VaR or ES) on this newly created sample and save it;
• Repeat the previous steps M times with M→+∞ (we have selected M=100.000 for instance);
• Average and compute the standard error of the metrics estimated in each step.

With this method, by estimating the expected shortfall and the standard errors, we can retrieve a more insightful view of our portfolio, but in this case, we are losing the risk contribution of each stock that we had in the previous case.

TOP & BOTTOM 5 assets (GARCH)

	VaR 95 (GARCH)	VaR 99 (GARCH)	ES 95 (GARCH)	ES 99 (GARCH)
BTP FX 3.2% JAN26 EUR	-0.21%	-0.43%	-0.37%	-0.69%
iShares € Corp Bond 0-3yr ESG UCITS ETF	-0.41%	-0.78%	-0.66%	-1.17%
UST 3.875 30-NOV-2027	-0.66%	-1.31%	-1.12%	-2.11%
ROMANIA TF 2,124% LG31 EUR	-0.64%	-1.37%	-1.18%	-2.38%
USA -T-NOTE 2.25% 15NV24	-1.14%	-2.50%	-2.17%	-4.51%

	VaR 95 (GARCH)	VaR 99 (GARCH)	ES 95 (GARCH)	ES 99 (GARCH)
GSK	-4.90%	-11.53%	-10.15%	-22.78%
Abbott India	-5.59%	-13.12%	-11.55%	-25.89%
Applied Materials In	-6.55%	-15.10%	-13.23%	-26.01%
Albemarle Corp	-6.73%	-15.20%	-13.24%	-28.45%
ASML	-6.83%	-16.01%	-14.07%	-31.46%