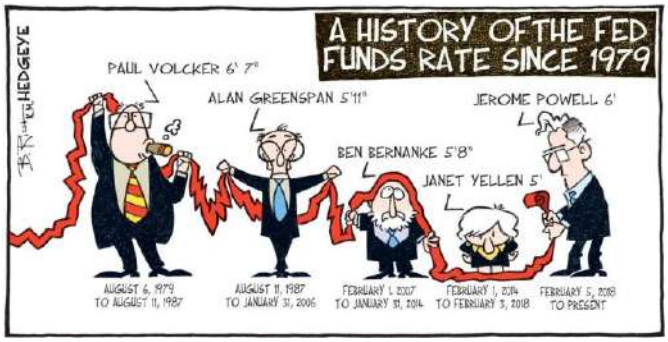
MIMS – Diversified Passive Selection Fund

Portfolio Management Team

Report – December 2022



Fund description

The Passive Fund is composed by a number of Exchange Traded Funds selected by Minerva Investment Management Society, reflecting the output of the research of the Passive Portfolio Team. These ETFs aim to replicate as closely as possible the performance of a basket of securities with specific common properties, thus being effective instruments for investors who wish to express a certain view on industry sectors or economic trends while capturing as little idiosyncratic risk as possible. Each ETF was carefully chosen in line with the macroeconomic outlook. Our allocation is based on a diversification process achieved among geographies, asset classes and sectors.

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Allocation Breakdown

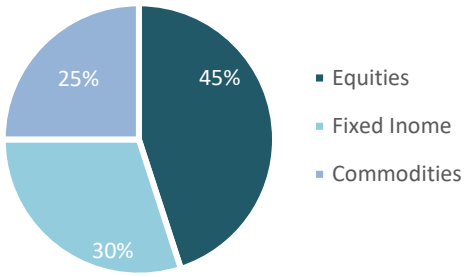
Asset Allocation

Unlike in previous semesters, we overweight fixed income with a strong focus on short duration and high-quality bond ETFs. We think that this asset class has finally resurfaced from the depths of the historical LIRE and is now more appealing to investors. Our lower weight in equity is especially due to the current bearish trend and recession expectations, which will entail pain for the asset class in the following months. To contain sharp drawdowns, our strategy revolves around defensive and tech-light ETFs. With regards to commodities, we implement a conservative allocation but distance ourselves from fossil fuels. Our allocation is thus split in fixed income (30%), equity (45%) and commodities (25%).

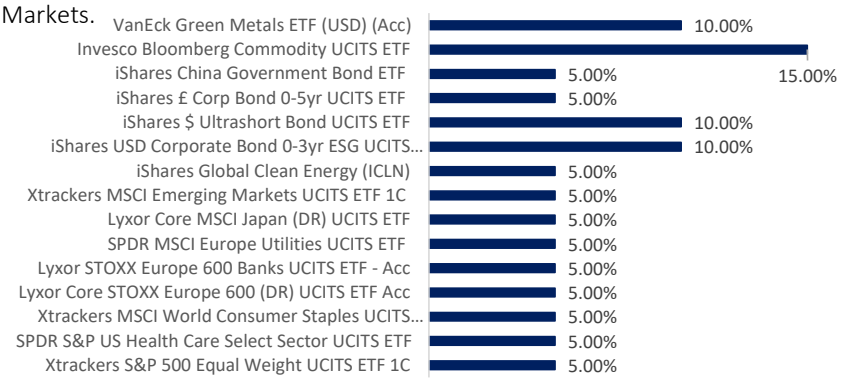
Geographical Allocation

We took a defensive view on the allocation of U.S.A and Europe (whose allocation was kept constant with respect to last semester due to the already limited exposure) due to the adverse macroeconomic environment waiting for us ahead next year. Hence, we prefer to position ourselves globally on multiple asset classes to avoid any local shock or eventual distress. As for Emerging Markets, we underweight China due to future expected decline in performance and eventual geopolitical tensions on the Taiwan front. Exposure to Japan is overweighted mainly because of a positive outlook regarding the Yen, which is now standing at a historical low. However, please note that a messy exit from the YCC policy would probably activate a significant local equity decline alongside the strengthening of the currency. We maintain unchanged our view on other Emerging Markets.

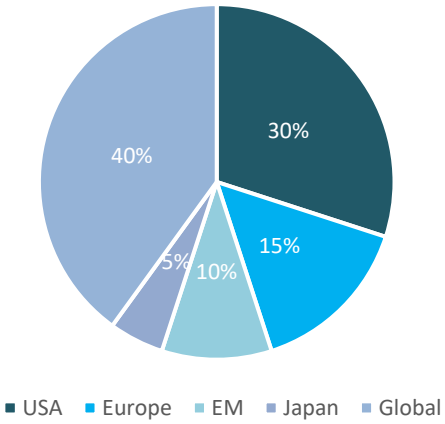
Asset Allocation



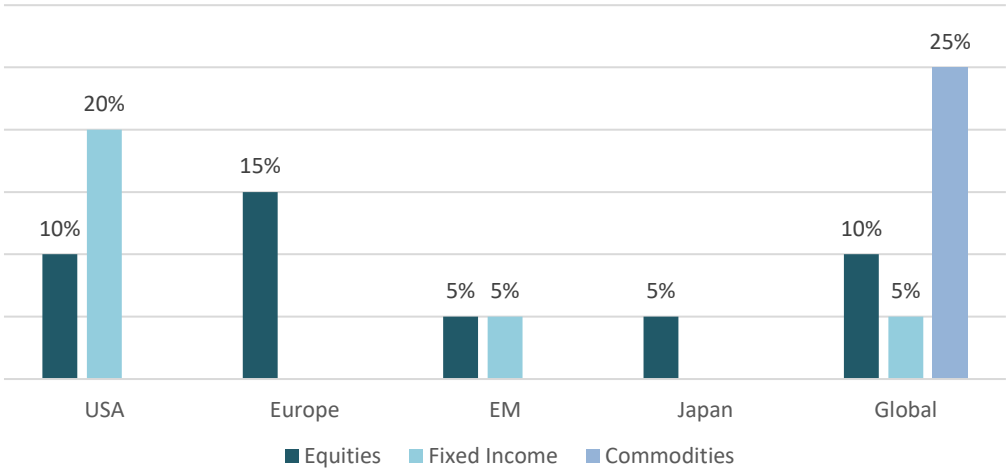
ETFs Breakdown



Geographical Allocation



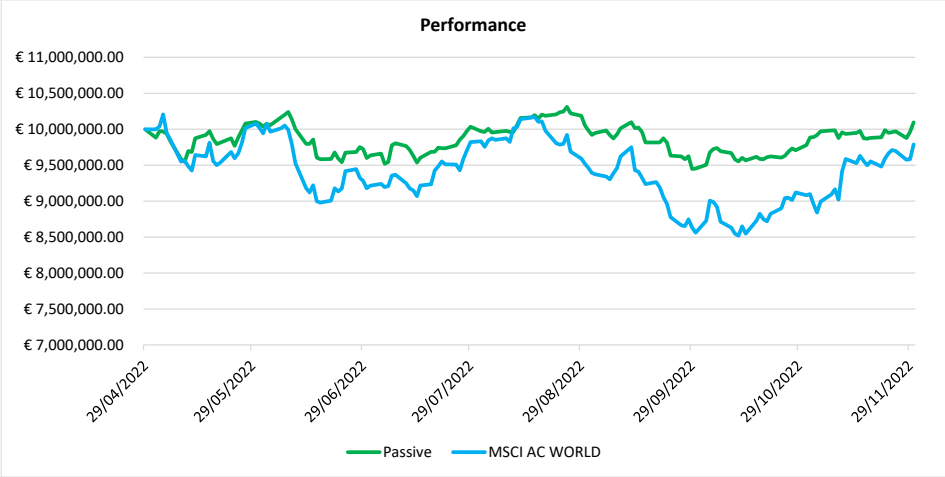
Allocation Breakdown



Performance

Period Return 29/04/2022 - 30/11/2022	0.97%

Daily Mean Return	0.01%
Daily Volatility	0.80%
Annualized Mean Return	2.37%
Annualized Volatility	12.64%



In order to evaluate the performance of our investments, we track the daily value of the portfolio over a period of time stretching from April 2022 to November 2022. At the beginning of the observed period (02/05/2022), we assume an initial investment of €10.00 Million and calculate the number of shares of each ETF that will be bought and held in portfolio, according to the weights chosen during the asset allocation process. Keeping track of the funds' prices, we can determine the value of the portfolio until the end of the period (30/11/2022). We record a final value of €10.10 Million, with an overall return of approximately 0.97% in approximately 6 months. Going into detail, we observe that most of the positive performance is to be allocated to commodities and a positive appreciation of the $, in which a significant portion of our capital is invested. However, this positive performance was offset by the extended decline of global equities.

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Portfolio Macro-Overview

Our portfolio can be ideally divided in 3 main sections:

- "equity indexes ETFs"
- "fixed income ETFs"
- "commodities (hedging) ETFs"

Equity Indexes ETFs

Unlike last semester, we reduce our equity component of the fund by 20%. It now represents 45% of the total allocation, split across 9 ETFs covering different geographic areas: U.S.A., Europe, Emerging Markets and Japan. We also want to highlight that 2 ETFs are globally exposed. Our decision to decrease the allocation revolves around the problematic macroeconomic environment that has developed for the majority of 2022. We strongly think that while equity markets have held well in the most recent months, a bearish market lies ahead. Interest rates are still expected to increase (even if in more moderate terms) in developed markets, inflation is still hot and economic growth will certainly not appear on any headlines for the short term. This view is consistent with both the U.S.A. where investors overreacted to negative news which came out slightly better than expected (e.g. inflation prints) and consequently drove short term bull rallies but they fail to see higher terminal rates and lower expected corporate profits; and Europe where monetary action lagged behind the FED, presumably due to an underestimation of inflation. The equity headwinds created by the comeback of an hurdle rate provided by a tangible yield on risk free sovereign bonds (in US and Germany) and the continuation of the war with its implications, command to be tactically cautious. Hence, we decided to implement a defensive equity strategy targeting Consumer Staples, Financials, Utilities and the Pharmaceutical sector. We believe that these industries will provide the appropriate protection we need through a more stable performance both throughout a recession and "HIRE". We still try to track the broad performance of US and EU markets but we limit tech exposure. After a quick spin of the globe, we take a conservative on Emerging Markets ex-China. While EM have overall benefited from commercial inflows from commodity exports, China is still trying to exit from the real estate crisis and avoid a spike of Covid cases after the lifting of the zero Covid policy restrictions. The re-election of secretary Xi Jinping and his comments on the reunification of Taiwan keep high the geopolitical risks. We take a conservative exposure to Japan as well, but we shift our view from a being bullish on an equity perspective to a currency one. The Yen has hit its lowest level in 32 years and we firmly think that the BoJ will be eventually forced to lift its YCC policy. We see a key pivot in mid-2023 after the election of the next chair. Finally, as a thematic exposure we choose Clean Energy for our planet's approval.

Fixed Income ETFs

As stated in our predecessors' report, fixed income has greatly underperformed during 2022. However, with the expected deceleration of rate hikes due to the already comparatively elevated current level and inflation, which, although still hot, is expected to decrease sharply in 2023, we now spot an appealing opportunity in the asset class. Being out of LIRE, fixed income has become significantly more profitable. In addition, following the recent severe rises in interest rates, an upcoming recession is almost inevitable. For those reasons, we decided to underweight our equity component by 20%, while increasing our fixed income exposure from 10% to 30% of the total allocation. Our fixed income component is spread across 4 ETFs, covering different geographic areas, and denominated in 3 currencies, to guarantee optimal risk diversification. The ETFs included in our portfolio contain investment-grade government and corporate bonds, characterized by short and medium-term maturity, which ensure less volatility to changes in interest rates.

Commodities (Hedging) ETFs

Originally placed as the hedge component of the portfolio, commodities have contributed to offer also an extremely good return in the previous months. For this performance we identify several drivers. Firstly, the supply chain shortages that Covid-induced lockdowns have started. Renewed Chinese lockdowns and the Russia-Ukraine conflict have been the main drivers for the spike in fossil fuels' prices. Earlier this year, agricultural commodities and precious metals were influenced as well. Notwithstanding the positive performance of oil and gas, we downweigh our exposure following the rationale of a warmer-than-expected winter, an impending economic recession and a significant build-up of EU reserves to fight the dependence on Russia's commodities. Despite the predictable tumble of gold in a rate-hiking environment, we think that the asset class showed resilience and due to prolonged geopolitical threats and a relevantly higher global debt level, we think that it could still deliver a positive performance as a calamity-hedge. As a new tactic, we shift a large portion of our allocation to environmental commodities, i.e. materials essential to foster the green transition. This is not just a mere greenwashing tactic, but it underlines our commitment to promote a better future. Moreover, the Ukrainian conflict has been the last straw and a wake-up call to develop alternative energy solutions.

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Xtrackers S&P 500 Equal Weight UCITS ETF 1C

Index: S&P 500® Equal Weight Index (EWI)

Expense Ratio: 0.25% Tracking Error Volatility: 1.41%

Overview

This ETF mimics the performance of the S&P500 Equal Weight Index. This means that it follows the American market, but the weight of each stock is the same and therefore the weights of each sector do not depend on their relative market cap but on the number of stocks that belong to them.

Analysis

This ETF provides exposure to the US market while limiting the exposure to those sectors that are prevailing in the normal S&P 500 index, especially tech, mainly due to the high valuations of the stocks that belong to them. The main sectors to which the ETF is exposed are IT, Industrials, Financials, Health Care and Consumer Discretionary (all around 10-15%). Similarly to last semester, we want to stay defensive through the equal weighting process. As a consequence, we confirm the allocation of 5% already included in our portfolio.

Conclusion

The ETF has returned -0.54% YTD, which while being a negative performance, it is the clear winner against its value-weighted counterpart, which over the same time horizon returned -17.65%. Given the significant risks and uncertainty we are currently facing, we prefer to stick with this index to be more defensive and less exposed to growth stocks. Given the prolonged conflicts in Ukraine, a rate-tightening environment and a recession, a lower exposure to growth stocks seems both prudent and reasonable.

SPDR S&P US Health Care Select Sector UCITS ETF

Index: S&P Health Care Select Sector 25/20 Index

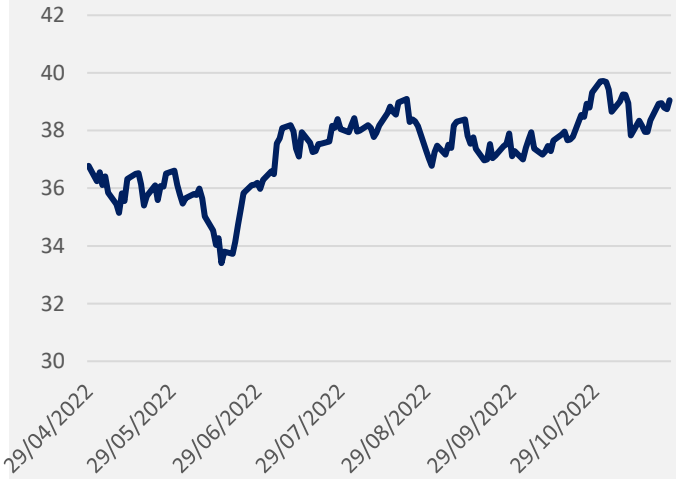
Expense Ratio: 0.15% Tracking Error Volatility: 0.41%

Overview

This ETF is exposed to the stocks belonging to the US Health Care sector. It tracks the performance of the S&P Health Care Select Sector Daily Capped 25/20 Index, where the 25/20 cap on the stocks is present to ensure diversification.

Analysis

In our attempt to select recession-resistant sectors for our equity allocation, we decide to confirm our exposure in this ETF. As previously explained last semester, it is very well-diversified across the range of products and services of this sector, as it contains stocks belonging to the Pharmaceutical, Medical equipment, Medical services and Biotech fields, all in one index. This ensures that we can have exposure to more solid industries which are likely to hold their ground during an economic recession.



Conclusion

The ETF has returned -3.43% YTD. It is reasonable to assume that in the near future the demand for medicines and medical equipment will not drop and will remain at the current levels of today, given the apparent need to fight what is left of Covid-19. Moreover, even in a pandemic-free environment, we think that that the pharmaceutical and health sector will be less sensitive to a market downturn and thus provide resilience for our portfolio.

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Xtrackers MSCI World Consumer Staples UCITS ETF 1C

Index: MSCI World Consumer Staples

Expense Ratio: 0.25% Tracking Error Volatility: 0.02%

Overview

This ETF tracks the performance of the MSCI World Consumer Staples index. It invests in consumer staples stocks from the entire globe.

Analysis

This ETF is exposed to the Consumer Staples sector. Indeed, its biggest holding include wholesalers like Costco and Walmart, consumer discretionary like Nestle and Coca-Cola and even tobacco and related companies like Philip Morris. We take an overweight vision on the sector in order to be positioned defensively for an upcoming recession. The rationale is that these types of companies tend to perform relatively well in adverse macroeconomic conditions due to their offering of essential consumer products, whose demand is unlikely to be heavily impacted by an economic slowdown. We strongly believe in ESG principles, but we still decided to opt for an ETF including companies by the likes of Philip Morris due to the addictive characteristics of its goods, which while ethically questionable, will surely deliver a welcomed performance in the following months.

Conclusion

The ETF has returned 4.06% YTD. We are not targeting excess returns but rather a defensive placement against the current adverse macroeconomic setting. Consumer staples, like many other targeted sectors this semester, may be the shield we are ambitiously looking for.

Lyxor Core STOXX Europe 600 (DR) UCITS ETF Acc

Index: STOXX Europe 600 (Net Return) EUR

Expense Ratio: 0.07% Tracking Error Volatility: 0.09%

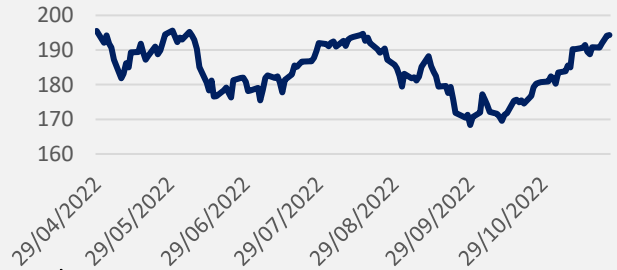
Overview

The investment objective of the Fund is to track both the upward and the downward evolution of the Stoxx Europe 600 Net Return (net dividends reinvested), representative of the stock market performance of the large European companies that pay the most dividends in their respective countries, while minimizing the volatility of the difference between the return of the Fund and the return of the Benchmark Index.

Analysis

This low-cost ETF provides exposure to the European Market overall. The Fund is incredibly diversified in both sectors and geographic exposure, thus minimizing the risk of a sudden shock.

Moreover, the ETF focuses more on financials, industries and healthcare stocks, with tech being the third lowest weighted sector: moving towards more defensive and value stocks and 'hedging' against future rate hikes. Furthermore, the inclusion of dividend-paying stocks in the portfolio gives a reliable stream of income which is mostly appreciated in uncertain macroeconomic scenarios where inflation is at historical highs and won't show slowing signs until the whole effects of the supply chain disruption are reflected on the businesses.



Conclusion

The ETF has returned -7.82% YTD, this negative return is mostly due to the repercussions of the Ukrainian War which has caused many European companies to halt their business in Russia and caused significant damage to the European economy. Furthermore, the. ECB was forced to raise interest rates, in line with the Fed and the BoE to counter the rapid surge in inflation. However, the international tensions are starting to ease up and inflation is slowing down: we want to be positioned in a way that allows us to catch any positive trend in the following months.

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Lyxor STOXX Europe 600 Banks UCITS ETF - Acc

Index: STOXX Europe 600 Banks Net Return EUR

Expense Ratio: 0.30% Tracking Error Volatility: 0.15%

Overview

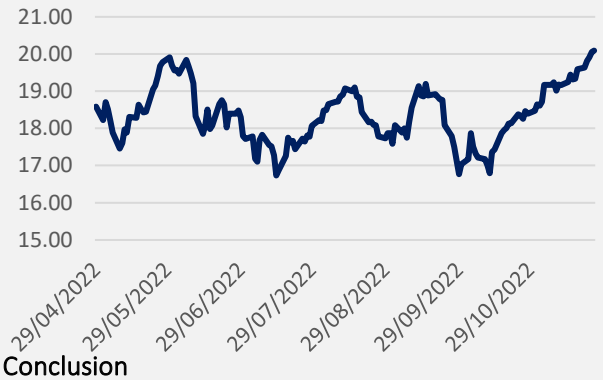
The ETF is passively managed and mimics the STOXX Europe 600 Banks Net Total Return index, constituted with the largest stocks of the bank industry in Europe. While minimizing the volatility of the difference between the return of the Fund and the return of the Benchmark Index.

Analysis

This ETF provides exposure to the financial sector and especially to the banking industry. The main drivers of this choice are:

First, financials historically have strong performance in a rising rate environment, especially for those players with significant balance sheet and whose commercial & corporate division is a significant contributor to the company's profitability. In particular, floating-rate loans are becoming a real driver for bank's profitability and we expect loan loss provisions to remain contained, given the solid outlook of the European economy and its resilience after 8 months of war in Ukraine.

Finally, a high inflation macroeconomic scenario, makes this sector even more attractive.



Conclusion

The YTD return of the ETF is XXX%, however this is very contained in line with the economic consequences of the war in Europe and makes this ETF priced more enticing.

Furthermore, the upward trend of the past couple of months shows the resilience of this defensive sector in geopolitically troubled times.

Lastly, the expense ratio is relatively low, which is something to always take into consideration.

SPDR MSCI Europe Utilities UCITS ETF

Index: MSCI Europe Utilities 35/20 Capped Index

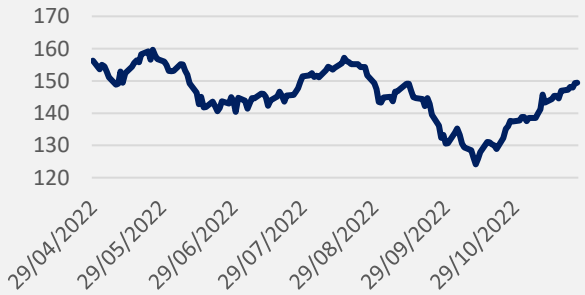
Expense Ratio: 0.18% Tracking Error Volatility: 0.19%

Overview

The ETF seeks to track the performance of the MSCI Europe Utilities 35/20 Capped Index, designed to measure the performance of the large and mid-cap companies which operate in the utilities sector, across 15 countries in Europe.

Analysis

This ETF primarily includes companies that produce most of the energy they distribute. For those companies, such as Iberdrola and RWE AG, energy record prices in Europe are likely to translate into higher earnings. Their costs have remained almost unchanged, while their revenues will increase significantly. Furthermore, many of the companies included in the ETF are leaders in the production of renewable energy, whose price could benefit from traditional energy's higher prices. For energy producers, an eventual risk is related to regulatory intervention, which could negatively affect utility companies' earnings, cutting part of the extra profits obtained in the last months. On the other side, following the increase in gas and energy prices, distributors haven't performed well, as they usually buy at a variable price, depending on the market prices and sell to retail at a fixed price. With a mild winter, European gas storage filled and possible state intervention to support these companies, as already happened with Uniper and EDF, we expect a rebound in these companies' performances in the coming months. Since companies in the utilities sector tend to have high debt levels, due to the large investments required to operate, we decided to gain exposure to European companies, where the current interest rate and the expected terminal rate are lower compared to the Fed ones.



Conclusion

This ETF has registered a -12.04% return in the last year. We expect a positive reversal in the next months.

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Lyxor Core MSCI Japan (DR) UCITS ETF

Index: MSCI Japan Net Total Return Index

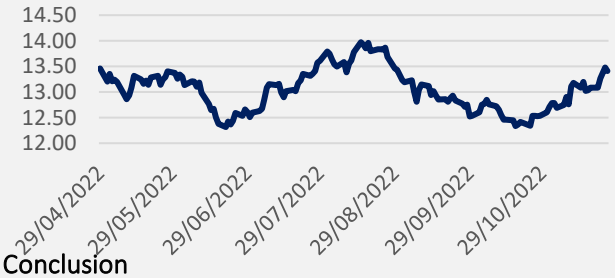
Expense Ratio: 0.12% Tracking Error Volatility: -

Overview

The ETF aims to track the MSCI Japan Net Total Return Index. The index is designed to represent the performance of the large and mid cap segment of the Japanese equity market, and it covers approximately 85% of the free float-adjusted market capitalisation in Japan.

Analysis

Similarly to last semester, we believe that this ETF would grant us an appropriate and cheap exposure to the Japanese economy and currency, thanks to its currency-unhedged peculiarity. However, unlike last semester, we are more bullish from a currency perspective. While we think that the Japanese markets seem rather cheap at this point in time, we would like to take advantage of a historically weak Yen, which could attract investors and especially force the Japanese Central Bank to abandon its low-interest rate policy set by the chair Haruhiko Kuroda. Unlike many other Western countries, Japan has not experienced a drastically high inflation. By contrast, a higher than usual rise in the local CPI was well accepted due to the country's historical difficulty to achieve an acceptable positive level of inflation. As a consequence, monetary policy has not been updated and interest rates remain in negative territory. This monetary choice impacted negatively the Yen, which tumbled to its lowest value in 32 years.



Conclusion

Eventually, we think that the BoJ will be forced to abandon its low-rate policy and we see mid-2023 as the appropriate timeframe due to the conclusion of the mandate of Haruhiko Kuroda and to next spring's "shunto" wage negotiations.

Thus, we place ourselves in anticipation of this occurrence while also gathering the benefits of the Japanese Equity Market.

Xtrackers MSCI Emerging Markets UCITS ETF 1C

Index: MSCI Total Return Net Emerging Markets Index

Expense Ratio: 0.18% Tracking Error Volatility: 1.73% (Y)

Overview

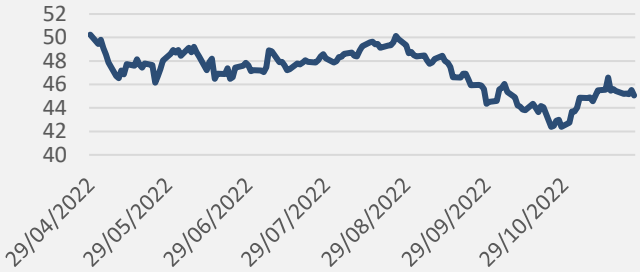
The ETF mimics the performance of the MSCI Total Return Net Emerging Markets Index, a free-float-adjusted market-capitalization index that is designed to measure equity market performance of large- and mid-cap companies in emerging markets. In particular, the fund has a global exposure, including prominent portions allocated in China, India, Taiwan, Brazil, South Korea and Saudi Arabia.

Analysis

Despite the current macroeconomic scenario, with the great majority of Central Banks worldwide rising interest rates to limit inflation and the severe energy and food crisis due to the war in Ukraine, we believe that the portfolio could still benefit from an exposure to emerging markets, especially in the long-run.

More specifically, the ETF is well-diversified from a geographical standpoint. Indeed, it has a limited exposure to China compared to similar funds on emerging markets, therefore reducing the negative impact of the crisis of the real estate sector, the increase in savings and the rise in the real cost of borrowing that the Chinese market is currently witnessing. Conversely, the fund provides a higher exposure on countries that, thanks to recent events, could potentially do well in the future, such as Brazil.

We decided to switch from the previous emerging markets etf to this one as there weren't significant differences and its cost is lower.



Conclusion

Due to the dramatic downward trend registered during the previous year (-32.50% in total return), we believe it is now a good moment to gain exposure on emerging markets, which in the long-run could improve their current outlook, especially if the agreement for the safe trade of cereals from Ukraine proves to effectively work and China fully recovers.

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iShares $ Corp Bond 0-3yr ESG UCITS ETF

Index: Bloomberg MSCI US Corporate 0-3 Sustainable SRI Index

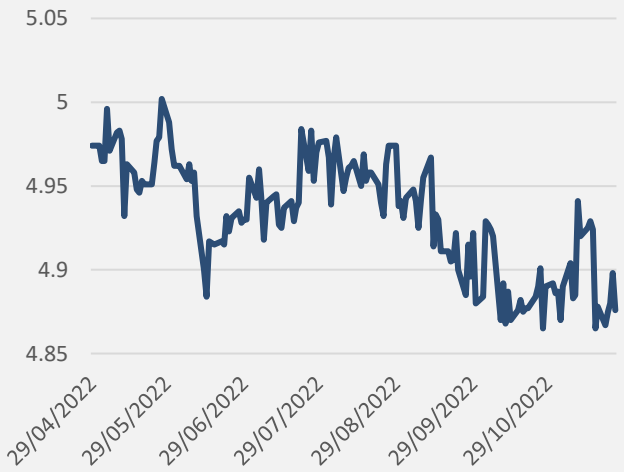
Expense Ratio: 0.12% Tracking Error Volatility: -

Overview

This ETF mimics the performance of the Bloomberg MSCI US Corporate 0-3 Sustainable SRI Index, which is composed of investment-grade, US dollar-denominated corporate bonds, with maturities up to three years and at least a BBB ESG rating.

Analysis

Following major hikes, the federal funds rate has already reached 4%. As a result of the FED's aggressive approach, in October, annual consumer price growth slowed to 7.7 per cent, less than the 8 per cent expected by economists and hit its lowest level since January. According to Bloomberg, the expected U.S. CPI (YoY%) in 2023 is 4.1% and will decrease to 2.4% in 2024. Looking at the estimates, US inflation may already be past its peak, sharply decrease in 2023 and return to standard levels in 2024. Decreasing inflation would lessen FED's urgency to increase interest rates and the US bond market would benefit from a probable slowdown in rate hikes. Given the time of uncertainty, we prefer to invest in corporate bonds with maturities in the short, as they tend to be less volatile to changes in the interest rates.



Conclusion

With an expected terminal federal funds rate of just under 5%, we expect a slowdown in federal funds rate rises and we believe this is the right time to gain exposure to the US corporate bond market.

iShares £ Corp Bond 0-5yr UCITS ETF

Index: Markit iBoxx GBP Corporate 0-5 Index

Expense Ratio: 0.20% Tracking Error Volatility: -

Overview

The iShares £ Corp Bond 0-5yr UCITS ETF seeks to track the Markit iBoxx GBP Corporate 0-5 Index, which measures the performance of investment-grade corporate bonds across multiple countries, with particularly large exposure to the UK corporate bond market.

Analysis

With the aim to fight the increasing inflation, central banks have intensified interest rate rises. Following eight consecutive rises, the Bank of England base rate has already reached 3%. Andrew Bailey, the governor of the Bank of England, declared that new hikes are planned, but smaller in scope. Moreover, in the next months, British finance minister Jeremy Hunt will seek to fill a 50-billion-pound hole in the country's public finances with around 30 billion pounds of spending cuts and 20 billion in tax rises. A restrictive fiscal policy will further contribute to mitigate inflation. Furthermore, this ETF is pound denominated. Losses that could arise from unexpected rises in the Bank of England interest rate would be partially compensated by a consequent pound appreciation.

Conclusion

In the last year, this ETF has returned -6.96%, because of the rising interest rates. In light of all the reasons stated above, we believe that this could be the right moment to include this ETF in our portfolio, as we expect a slowdown in interest rate rises and to be closer to the Bank of England terminal rate.

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Invesco Bloomberg Commodity UCITS ETF

Index: Bloomberg Commodity Index

Expense Ratio: 0.19% Tracking Error Volatility: -

Overview

This fund aims to replicate the performance of the Bloomberg Commodity Index, which tracks prices of future contracts on physical commodities on the commodity markets. The index itself is designed to minimize concentration in one sector and currently includes 23 commodities futures in six sectors (energy, grains, industrial and precious metals, softs and livestock).

Analysis

Due to the prolonged geopolitical uncertainty and the Ukrainian conflict, we decide to maintain an exposure to carbon commodities, but we downsize our investment with respect to last semester. On the other hand, this ETF allows us to gain exposure on a wider and more diversified array of commodities including precious metals, which make up for 17.8% of the exchange traded fund. Despite the rate hikes, we are particularly positive about the outlook of hold and silver as their performance held relatively well against adverse forces in the market. Moreover, due to the elevated stress in international debt markets, we feel that a gold exposure could be ideal to hedge the volatility of an eventual widespread default event.

Conclusion

The ETF yielded an impressive XXXXXX during the semester. We believe that it could still serve us right as long as the macroeconomic environment does not settle down.

VanEck Green Metals ETF (USD) (Acc)

Index: MVIS® Global Clean-Tech Metals Index

Expense Ratio: 0.59% Tracking Error Volatility: -

Overview

This ETF aims to track MVIS® Global Clean-Tech Metals Index, which tries to capture the performance of companies involved in the production, refining, processing and recycling of green materials essential for the ESG transition.

Analysis

Conversely to out previous choice in terms of commodities, we target a very specific niche of environmental commodities needed for the "green transition". We strongly believe in ESG principles and we also think that there is long-term value in an appropriate exposure to the trend. While no viable alternative in terms of direct environmental commodity ETF seems to exist at the time, we believe that an exposure to companies involved in the production, refining, processing and recycling of green materials would be a clever way to invest in this idea, even if some company specific risk will be inevitable.

The ETF is globally diversified mainly across China, Australia, United States and South Africa. Its main holding include Glencore, Freeport-McMoran and Anglo American. The main green materials targeted are cobalt, copper, lithium and zinc.

Conclusion

The fund returns an incredibly low -23.29% YTD. Despite this unfortunate underperformance, we think that it is the perfect chance to join at cheaper valuations. The ESG transition is inevitable. Through this ETF, we believe to be appropriately positioned to surf the green wave.

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iShares China Government Bond ETF

Index: FTSE Chinese Government Bond CNY Index

Expense Ratio: 0.18% Tracking Error Volatility: 0.28%

Overview

This ETF seeks to track the FTSE Chinese Government Bond CNY Index, which includes Chinese Government Bonds, mainly with maturities between 1 and 10 years.

Analysis

The decision to include this ETF in the portfolio is linked to the desire to improve diversification and gain greater exposure to emerging markets. In particular, we decided to invest in the Chinese bond market, with the aim of exploiting the current weakness of the Renminbi. Furthermore, the central bank has large foreign exchange reserves, which support overall stability. The country's foreign exchange reserves, which are the largest in the world, rose by US$23.47 billion to $3.052 trillion in October, up from $3.018 trillion indicated by a Reuters poll of analysts. In addition, despite the first signals of a slowdown,

Conclusion

Adding this ETF ensures better diversification across the entire portfolio. Furthermore, the ETF is RMB denominated and we would be able to benefit in case of a likely appreciation of the renminbi.

iShares Global Clean Energy (ICLN)

Index: S&P Global Clean Energy Index

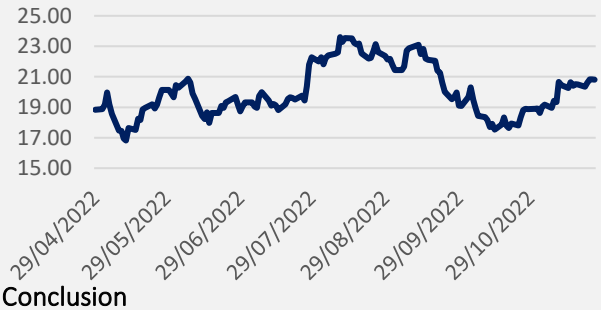
Expense Ratio: 0.4% Tracking Error Volatility: -

Overview

The ETF tracks the S&P Global Clean Energy Index, which includes clean energy-related companies from both developed and emerging markets. This means their businesses focus on solar, wind, and other renewable energy sources. In addition, the ETF screens out companies with any significant connection to controversial weapons, small arms, military contracting, tobacco, thermal coal, oil sands, shale energy, and arctic oil and gas exploration.

Analysis

This ETF reflects our vision regarding the direction of energy production in the next few years and aims to bet on the further development of clean energy sources. Clean energy sources, such as wind, solar, and hydroelectric power, currently supply about 20% of the electricity generated by the power sector. The industry has been growing briskly, quadrupling its electricity generating capacity over the past decade. Moreover, given increasing climate change concerns, the pace has quickened in recent years and we believe it will accelerate even more to help rapidly decarbonize the economy. We are convinced this is the direction the global economy will move towards, with increasing support of governments (e.g. historical $369 billion climate, clean energy legislation approved by US congress this Summer) and we see this ETF as the best way to keep an exposure in the market.



Conclusion

The ETF presents (as of 18 November 2022) a YTD of -2.52%. As far as we are concerned, this is a safe and farsighted investment to achieve a positive return in the long-term while adding a ESG friendly exposure to our portfolio.

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iShares $ Ultrashort Bond UCITS ETF

Index: Markit iBoxx USD Liquid Investment Grade Ultrashort Index

Expense Ratio: 0.09% Tracking Error Volatility: -

Overview

This ETF replicates the performance of the Markit iBoxx USD Liquid Investment Grade Ultrashort Index, which is composed of USD-denominated investment-grade corporate bonds, with ultrashort maturities.

Analysis

Following sharp rises in interest rates, an upcoming recession seems almost inevitable. Despite the dollar has appreciated significantly in the last year, we decided to include this dollar-denominated ETF in our portfolio, as we believe that a probable deep recession could lead to further dollar appreciation. In fact, a severe recession would shift investors' preferences towards investments in safe currencies, causing an increase in the demand for dollars. The corporate bonds included in the ETF are characterized by ultrashort maturities. Because of the extremely short maturities, the ETF is less volatile to interest rate changes.

Conclusion

Including this ETF in our portfolio ensures more secure protection in case of an extremely severe recession and a better diversified currency exposure.

APPENDIX

Asset Class	Security	Weight
Equity	IE00BLNMYC90	4.83%
Equity	IE00BWBXM617	4.83%
Equity	IE00BM67HN09	4.83%
Equity	LU0908500753	4.83%
Equity	LU1834983477	4.83%
Equity	IE00BKWQ0P07	4.83%
Equity	LU1781541252	4.83%
Equity	IE00BTJRMP35	4.83%
Equity	US4642882249	4.83%
Bond	IE00BZ048579	9.65%
Bond	IE00BGCSB447	9.65%
Bond	IE00B5L65R35	4.83%
Bond	HK0000782877	4.83%
Commodities	IE00BD6FTQ80	14.48%
Commodities	US92189Y2046	9.65%
Hedge	SPXW 5/31/23 P3200	3.00%
Hedge	NKY 5/12/23 P21000	0.50%

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Quantitative Research Team

Risk Report – December 2022

Introduction

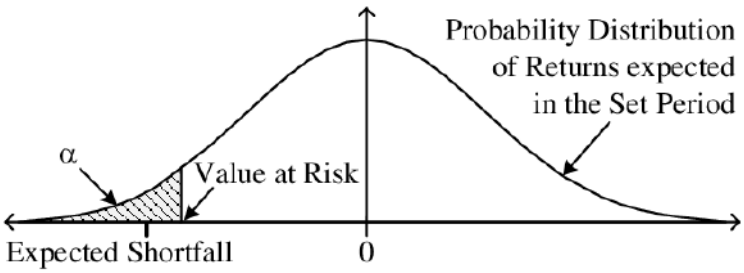
The main objective of this section is to assess and quantify the risk embedded in the Minerva IMS diversified passive selection fund built by the portfolio team. We use a daily perspective on the potential extreme behavior of a basket of assets selected by the portfolio analysts. The analysis will include three VaR and ES models (two parametric and one non-parametric) and the Black-Litterman optimization algorithm to inform the choice of component's weights.

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.



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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 approach 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.

All the analysis has been conducted with Python.

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Parametric approach

In this section we propose to analyze VaR and ES separately for each ETF 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.

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:

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

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 passive 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.

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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.

Simple approach

	VaR 95	VaR 99	ES 95	ES 99
ISHARES CHINA GOVERNMENT BOND ETF RMB	-0.10%	-0.16%	-0.14%	-0.19%
ISHARES $ ULTRASHORT BD. UCITS ETF	-0.25%	-0.35%	-0.31%	-0.41%
ISHARES BOND SRI 0- 3YR UCITS ETF USD DIS	-0.36%	-0.51%	-0.45%	-0.59%
ISHARES MARKIT IBOXX STG CORPORATE BOND 1-5 GBP	-0.39%	-0.56%	-0.49%	-0.65%
XTRACKERS MSCI WLD. CSM. SLS.UCITS ETF 1C	-1.34%	-1.93%	-1.70%	-2.23%
INVESCO BLOOMBERG (LON) COMMODITY UCITS ETF USD	-1.53%	-2.20%	-1.94%	-2.54%
LYXOR CORE MSCI JAP.(DR) UCITS ETF - ACC	-1.56%	-2.23%	-1.97%	-2.58%
VANECK GREEN METALS ETF	-1.59%	-2.29%	-2.02%	-2.66%
LYXOR CORE SXEP.600 (DR) - UCITS ETF ACC	-1.71%	-2.44%	-2.16%	-2.82%
SPDR S&P US HCRE. SLT. SECT.UCITS ETF	-1.72%	-2.49%	-2.19%	-2.89%
SPDR MSCI EUROPE UTILITIES UCITS ETF	-1.84%	-2.64%	-2.33%	-3.06%
XTRACKERS SP5. EQWGT. UCITS ETF 1C	-1.94%	-2.82%	-2.48%	-3.29%
XTRACKERS MSCI EMM. UCITS ETF 1C	-2.01%	-2.88%	-2.54%	-3.32%
LYXOR SXEP.600 BKS. UCITS ETF - ACC	-2.78%	-3.99%	-3.53%	-4.63%
ISHARES GLOBAL CLEAN EN. ETF	-2.93%	-4.21%	-3.72%	-4.87%

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 appear to be slightly higher than the simple approach ones. Indeed, while simple approach equally weights all observations, GARCH puts more weight on the most recent observations, thus, it better estimates the future volatility and allows to produce more reliable risk metrics.

	Simple approach	GARCH
$VaR_{95\%}$	-0.88%	-1.43%
$VaR_{99\%}$	-1.27%	-2.87%
$ES_{95\%}$	-1.12%	-2.50%
$ES_{99\%}$	-1.47%	-4.98%

GARCH

	VaR 95 (GARCH)	VaR 99 (GARCH)	ES 95 (GARCH)	ES 99 (GARCH)
ISHARES $ ULTRASHORT BD. UCITS ETF	-0.13%	-0.25%	-0.22%	-0.40%
ISHARES MARKIT IBOXX STG CORPORATE BOND 1-5 GBP	-0.45%	-0.89%	-0.78%	-1.39%
ISHARES BOND SRI 0- 3YR UCITS ETF USD DIS	-0.51%	-0.96%	-0.82%	-1.44%
ISHARES CHINA GOVERNMENT BOND ETF RMB	-0.47%	-0.99%	-0.85%	-1.70%
XTRACKERS MSCI WLD. CSM. SLS.UCITS ETF 1C	-1.22%	-2.00%	-1.72%	-2.57%
LYXOR CORE MSCI JAP.(DR) UCITS ETF - ACC	-1.22%	-2.27%	-1.94%	-3.36%
LYXOR CORE SXEP.600 (DR) - UCITS ETF ACC	-1.41%	-2.45%	-2.09%	-3.31%
SPDR S&P US HCRE. SLT. SECT.UCITS ETF	-1.58%	-2.51%	-2.17%	-3.13%
XTRACKERS SP5. EQWGT. UCITS ETF 1C	-1.57%	-2.65%	-2.27%	-3.51%
SPDR MSCI EUROPE UTILITIES UCITS ETF	-1.69%	-2.67%	-2.31%	-3.34%
LYXOR SXEP.600 BKS. UCITS ETF - ACC	-2.18%	-3.64%	-3.13%	-4.80%
INVESCO BLOOMBERG (LON) COMMODITY UCITS ETF USD	-2.53%	-4.15%	-3.57%	-5.38%
XTRACKERS MSCI EMM. UCITS ETF 1C	-2.66%	-4.51%	-3.87%	-6.06%
ISHARES GLOBAL CLEAN EN. ETF	-3.92%	-6.52%	-5.60%	-8.54%

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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.
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. Here, you can find the following estimates:

	Estimate	Standard error
$VaR_{95\%}$	-0.79%	0.04%
$VaR_{99\%}$	-1.71%	0.22%
$ES_{95\%}$	-1.37%	0.11%
$ES_{99\%}$	-2.57%	0.36%

Black –Litterman model

Introduction

The Black-Litterman asset allocation model, created by Fischer Black and Robert Litterman, is a sophisticated portfolio construction method. The main trait that distinguishes the model is the Bayesian approach that is embodied in the inclusion of investors' expectations on future returns in building an optimal portfolio. Unlike the Markowitz optimization, in which return is maximized for a given level of risk, the Black-Litterman model combines the subjective views of an investor regarding the expected returns of one or more assets with the market equilibrium vector of expected returns to form a new estimate of expected returns. The resulting new vector of returns leads to intuitive portfolios with sensible portfolio weights.

Inputs

To compute the portfolio composition, the model requires specific inputs. Some of them are common to other optimization models, like the expected excess returns and the variance-covariance matrix. In addition, we have:

- **VIEWS**: each investor has its own expectations about excess returns, which may deviate from the implied market ones. Views can be expressed in either absolute terms (Disney will have an absolute excess return of 5.25%) or in relative terms (Microsoft will outperform Apple by 2%). On the mathematic perspective, views are represented by a column vector with each element corresponds to a absolute/relative returns.

- **PICKING MATRIX**: this crucial element allows us to link each view to its corresponding asset. Mathematically, we have a matrix whose rows express the different views: absolute views have a single 1 in the column corresponding to the ticker's position, whereas relative views have positive numbers in the nominally outperforming asset columns and negative numbers in the nominally underperforming asset columns. All the other values are set to 0.

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Procedure

The Black-Litterman optimization process can be summarized in four parts:

- Estimate the (prior) implied expected returns using relative market capitalization weights and implied risk-aversion;
- Based on the investor views, build the view vector, the picking matrix and the (diagonal) matrix with the variance of each scenario;
- Use all of the previous inputs to compute the (posterior) "Black-Litterman" vector of expected excess returns;
- Use the vector of Black-Litterman posterior returns to compute the new weights for the portfolio.

Key formulas and equations

The starting point is the computation of the implied excess returns via a reverse optimization method:

$$\mathbf{\Pi} = \boldsymbol{\lambda}\mathbf{\Sigma}\mathbf{w}_{\mathbf{market}}$$

Where:
Π is the Implied Excess Equilibrium Return Vector (N x 1 column vector),
Σ represents the covariance matrix of excess returns (N x N matrix),
λ is the risk aversion coefficient,
w_{market} is the market capitalization weight.

The conversion from the prior return vector to the posterior Combined Return Vector ($E[R]$) is done according to:

$$\mathbf{E[R]} = [(\boldsymbol{\tau}\mathbf{\Sigma})^{-1} + \mathbf{P}'\mathbf{\Omega}^{-1}\mathbf{P}]^{-1}[(\boldsymbol{\tau}\mathbf{\Sigma})^{-1}\mathbf{\Pi} + \mathbf{P}'\mathbf{\Omega}^{-1}\mathbf{Q}]$$

Where:
τ is a scalar,
P is is a matrix that identifies the assets involved in the views (K x N matrix),
Ω is a diagonal covariance matrix of error terms from the expressed views representing the uncertainty in each view (K x K matrix),
Q is the View Vector (K x 1 column vector).
This formula can be intuitively interpreted as a weighted average between the (prior) implied returns and our views, with weights that depend on how much we are uncertain regarding every single view.

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