Fall 2023 QFS Portfolio Team Letters

Fall Semester Performance:

QFS Long/Short: +23.99%
S&P 500: +6.84%

QFS Global Macro: +4.95%
Eurekahedge Macro Hedge Fund Index: +1.06%

QFS Quantitative: +1.04%
S&P 500: +6.84%

Introduction:

Fall 2023 proved to be another exciting year for markets and our portfolios. We began the fall semester ready to tackle themes from last semester, characterized by the Fed's monetary policy, A.I.-driven tech enthusiasm, and continued global political froth. We left the semester excited to review how our strategies performed and how they could be improved upon over winter break.

For our Long/Short Equity Portfolio, we attempted to maintain low net exposure to overall markets while taking positions in US-listed SMID caps (specifically special situations and alpha-driven shorts). Our Global Macro Portfolio sought to selectively position in emerging market trades while placing tactical hedges in accordance with the Fed's hiking cycle. Finally, our Quantitative Portfolio looked to construct a portfolio consisting of uncorrelated trades to harvest alpha in commodity and equity markets.

These are examples of how we understood broader market conditions and adjusted portfolio construction accordingly. Next semester, all portfolios will be excited to execute trades and investments developed over the winter and continue to improve our performance. We look forward to the upcoming semester and to detail our performance in future letters.

Best,
QFS Portfolio Team

About Us:

Quantitative Finance Society (QFS) is a club at NYU's Stern School of Business dedicated to investment analysis, quantitative trading, and macroeconomic research. We host weekly meetings for the broader NYU community to learn a variety of financial market concepts. Additionally, each of our portfolios (Long/Short Equity, Global Macro, and Quantitative) meet weekly to discuss events in markets, collaborate on research, and draft actionable pitches across a variety of asset classes. All portfolio team members meet at large once a week to evaluate our pitches. We also have special events for stock and trading competitions and alumni networking.

<u>Fall 2023 Leadership:</u>

President
Connor Liu

Head of Portfolios
Michael Lu & Rohan Rao

<u>Portfolio Managers:</u>

Long/Short Equity
Agustya Matheth & Daniel Abraham

Global Macro
Kevin Chen & Luciano Zecchi

Quantitative
Edward Yudolevich & Wenxuan Zhou

Fall 2023 Long/Short Equity Portfolio Letter

Portfolio Background:
Our strategy aims to create a basket of securities that we have become intimately familiar with, and which have a clear and imminent path to convergence with our interpretation of fair intrinsic value. We conduct bottom-up analyses of companies of all industries and sizes, focusing on their earnings power, financial health, management quality, and paths to shareholder value creation or destruction.

Overcrowding into the AI theme. 10-year note uncertainty. Fear of an imminent recession (followed by a complete pivot to optimism). Conflict in the Middle East. Both the outcomes and the market's perception of the outcomes of these and other affairs are tough to predict, and nearly impossible to time. As such, we sought to maintain low net exposure to the market and exploit the relatively small size of our portfolio to our advantage in focusing on what we do best - intensive research in structurally under covered or misunderstood corners of the market. We primarily took positions in US-listed SMID caps, emphasizing special situations and alpha-driven shorts, with the latter driving our outperformance this semester.

Fall Semester Performance:
QFS Long/Short Equity: +23.99%
S&P 500: +6.84%

Selected Trades:

Trade: Short Rumble (NASDAQ: RUM)
Return: +36.21%; **PNL:** $229,772.76
Rumble ("RUM") is an online video platform that caters to politically right-wing and far-right-wing users. Think YouTube meets QAnon. Rumble went public via SPAC in 4Q21 at an eye-watering $2B+ valuation despite a mere $9.5MM in 2021 revenues. Our attention was drawn to Rumble when an activist short seller pointed to third-party website and app traffic data to suggest that Rumble was overreporting MAUs (RUM claimed to have 80 million MAUs at the time of the report, but in the subsequent quarterly report, revised their MAU count downward to match the short seller's estimate). It's easy to corroborate the activist's claims yourself – in early 2022, Rumble reported a steep *decline* in minutes watched as MAUs *climbed*, QoQ. We struggled to find a plausible explanation. The same happened between 2Q23 and 3Q23. Fundamentally, we also view Rumble as a stock promotion with no viable business model. Negative *gross* margins confirm what we think their gimmick really is: bribing famous content creators onto a niche platform with ludicrously expensive deals that have zero chance of providing a return on investment. Rumble's lock-up expiry arrived in September 2023 with insiders holding the majority of shares outstanding, and we believed they were sufficiently motivated to cash out with RUM trading at ~20x sales. Rumble shares have fallen since September 1st, and we think there's still significant downside.

Trade: Long Blue Apron Holdings (NASDAQ: APRN)
Return: +87.7%; **PNL:** +$161,673.41

Blue Apron Holdings ("APRN") is a meal kit company that offers weekly boxes with ingredients alongside recipes for the customer to cook themselves. A slightly more speculative (and appropriately sized) investment on our part - Blue Apron shares were down 98% from its $1.8B IPO valuation, and short interest remained in the teens as a % of float. There were many permabears, who correctly argued that the company had received a massive COVID bump, churn from COVID customers was extremely high, incremental customer acquisition costs weren't justified, and that meal kits were a fad. However, with the stock trading at a <$40m market cap nearly three years after COVID, we found those arguments long in the tooth. The Street often misunderstands the American consumer. Yes, customers acquired during COVID churned out, but this largely wasn't because of the perception of the product itself. Of Blue Apron's 6,000 trustpilot.com reviews, 80% were 4 or 5 star, and Blue Apron had recently improved its menu offering. Moreover, with careful pixel counting and some quick math on their May 2022 Investor Day presentation which disclosed helpful cohort graphs on Slide 119, we calculated that Apron's 2012-2017 customer cohort contributed ~$86m (implied 334k customers) in Q1 2019 revenue and ~$54m (implied 168k customers) in Q1 2022. The customer numbers indicate a 3-year churn rate of 50% or an annualized churn of 20.6%. It's not SaaS churn, but it is relatively low for these non-COVID customers, which makes sense given Blue Apron sells a habit-forming item with considerable brand value and emotional attachment and require little operating expense to keep on.

Assuming a continued 30% gross margin, $70 AOV, 20 orders a year, and the above 20.6% churn, the implied lifetime value of that 2012-2017 cohort alone is around $250 million, calculated in 2023. In other words, even if you completely ignored every customer that Blue Apron has acquired since 2017, the lifetime value of their 2012-2017 customer cohort completely covers APRN's $110m in Q3 2023 liabilities, and leaves $140m left to spare and entirely cover APRN's market cap 4 times over. The primary issue was that Blue Apron had significant fixed costs and would continue to burn cash. However, we saw strategic value. An acquirer had the opportunity to purchase a popular brand name, a relatively sticky customer base in the hundreds of thousands, and $500m in NOLs, all for dirt cheap if they could slash OpEx. In fact, we believed the NOLs alone contributed over APRN's market cap in NPV if used at a 3-4% fed funds rate annually. In other words, an acquirer could get the entire APRN business for free.

There were a couple signs Blue Apron insiders had come around to our line of thinking. They chopped marketing expenses by 50% in 2023, in clear recognition of how expensive incremental customer acquisitions are. In May 2022, majority stockholder Joseph Sanberg (ex-Tiger Global) conducted a Twitter poll asking whether he should try to take APRN private. In any case, the valuation was freakishly pessimistic, and we figured the equity was protected from bankruptcy in the near term by Sanberg's recurring private placements, so we took a flier. Luckily, our thesis materialized quickly. APRN announced an acquisition by Marc Lore's Wonder Group in September 2023 at a whopping 137% premium to the previous day's closing price.

Trade: Short BioVie (NASDAQ: BIVI)
Return: +48.66%; **PNL:** $34,659.22

BioVie is a clinical-stage biotech touting therapies for Alzheimer's disease and ascites due to liver cirrhosis. We have followed the BioVie saga for years and view it as a stock promotion orchestrated by newly SEC-charged securities fraudster Terren Peizer, infamous for his Hythiam scheme, which touted a treatment called Gabasync for meth addiction combining approved drugs without any research backing it up. A 2011 study eventually showed Gabasync was no more effective than placebo. Peizer has been advertising BioVie's lead drug NE3107 (for Alzheimer's) *for over 17 years*. NE3107 was previously known as HE3286 when it was owned by Hollis-Eden Pharmaceuticals. Peizer served as President of Hollis-Eden earlier, from 1997 to 1999. A 2003 lawsuit alleged that a Hollis-Eden VP admitted the company intentionally leaked false information about a HIV-AIDS vaccine trial onto a Yahoo message board to 4x their share price and dump shares in 1999. Peizer's tactics haven't evolved – BioVie recently began claiming NE3107 could reverse aging in promotional YouTube videos. With questionable data and chart tricks, BioVie had somehow straggled its way to a pivotal Phase 3 trial and slightly pumped its stock price in the process. We believe this was the end of the road for NE3107 – BioVie would either have to provide real data supporting the drug's efficacy to the FDA (which wasn't possible) or flunk the trial. In November 2023, BioVie announced their trial had failed, blaming "significant deviation from protocol and Good Clinical Practice violations at 15 sites." BioVie stock fell over 60% that day.

Closing Thoughts:

We reflect back on a volatile past few months and are confident that we have emerged as more experienced investors. We were fortunate enough to outperform our benchmarks, emboldening us to keep turning over rocks and learning new lessons.

Best,
Long/Short Equity Portfolio Team

Fall 2023 Global Macro Portfolio Letter

Portfolio Background:
Our portfolio searches for opportunities across all markets, identifying new macroeconomic trends as they form. The fall semester was characterized by the backdrop of bumpy disinflation eventually conforming the bulls, while recession fears kept the bears temporarily in power. Risk-off sentiment emerged at the beginning of the semester up to late October, during which yields across the curve reached multi-decade highs due to the Fed's higher-for-longer mantra and US debt issuance fears.

As such, our portfolio was positioned long in various EM names, long USD, and receiving only among growth-challenged countries such as GBP and CAD. However, after the reversal in US Treasury issuance alongside a Fed pivot signaling the peak of the hiking cycle is behind us, our portfolio quickly began to load positioning across all risk-on assets, particularly in EM bonds and FX. By the risk-off positioning not being extreme towards the beginning of the semester, we were not significantly impacted by this rapid change in the global macro story.

We decided to stay away from Chinese growth-related assets as we felt the story was too volatile and uncertain, which we believe helped portfolio returns. In addition to discussing our portfolio strategy in more depth, the letter also analyzes various selected trades. The letter concludes by discussing some key performance factors and outlining ideas for improvement for the coming semester.

<u>**Fall Semester Performance:**</u>
QFS Global Macro: +4.95%
Eurekahedge Macro Hedge Fund Index: +1.06%

Selected Trades:

Trade: Long Egypt 2047 Eurobonds
Return: +10.88%; **PNL:** +$53,801

Thesis:
Since the onset of the Russian-Ukrainian War, the import-dependent Egyptian economy has suffered from rising food costs and a lack of foreign reserves, culminating in a balance of payments crisis. However, the Israel-Hamas conflict has refocused international efforts on stabilizing the Middle Eastern region, with particular emphasis being placed on Egypt. Specifically, the IMF softened its stance on Egypt concerning its Extended Fund Facility (EEF) program, seemingly paving the way for the program's renewal. This has been accompanied by benign rhetoric/fiscal actions from friendly states such as Saudi Arabia and the United Arab Emirates. Our perspective that markets would move to risk-off sentiment and take a positive outlook on Egypt's future further informed our decision to allocate capital to the long end of the curve (the Eurobonds maturing in 2047).

Commentary:
This semester, markets turned positive towards Egypt's fiscal position, in line with our thesis. Specifically, rumors that the IMF would increase Egypt's credit line from $3 billion to $5 billion (given a successful IMF program review), talks of the European Union promising to accelerate a $10

billion investment plan, and discussions to disburse ~$10 billion in new deposits from Saudi Arabia and the United Arab Emirates, have catalyzed investor bullishness throughout this semester. Moreover, this trade benefited from broad, risk-off sentiment catalyzed by dovish signaling from the Fed. Hence, this trade returned 10.88% for the duration that it was held in our portfolio. The key concern of this trade was liquidity – when we entered long positions, we were crossing a $1-wide market (~2% of the cash price) that could potentially prove tricky should liquidation be needed. However, we attempted to remedy this issue by limiting our notional to $500,000 while strictly tracking news updates to adequately manage this position's risk.

Trade: Long AUD/CAD
Return: +12.49%; **PNL:** +$12,492

Thesis:
Within a few weeks into the semester, it became attractive to trade the increasing central bank divergence between the RBA and the BoC. Canada was leading the disinflation trend ahead of the US, alongside stagnant to negative growth already registered in the second half of 2023. On the contrary, services inflation in Australia remained quite sticky throughout the same period, which, coupled with a change in RBA leadership, suggested that the RBA could act further in raising their policy rate. By expressing this theme through FX, we could exploit the increasing divergence between the two commodity-exporting economies.

Commentary:
While the theme largely played out throughout the semester, we ended up altering the trade expression to have clearer exposure to the central bank decisions of the two countries rather than the other factors that FX is also exposed to. This was done using local short-term interest rate futures expiring in Q1 of 2024. By doing so, we generated a further $166,595 profit as the thesis of a divergence materialized across the last quarter of the year. Liquidity was a significant risk with these futures, so we ensured that we entered our trades in a realistic size in terms of the futures' order books and margin requirements.

Trade: Long USD/BRL
Return: 9.00%; **PNL:** +$49,491

Thesis:
Although having been a strong performer after the presidential election in October 2022, the Brazilian Real experienced great volatility and depreciation a few months before the semester. With that, it became attractive to enter a long BRL position given the hawkish nature of the Brazilian Central Bank and the overly negative sentiment surrounding Brazil's fiscal scenario. Firstly, we believed that market concern over the BCB increasing the pace of rate cuts was unreasonable given the hawkish tone adopted by its members, highlighting FX stabilization as an important driver of the Central Bank response function. Secondly, we were confident that the Brazilian newly elected president Lula would be able to pass important fiscal reforms and control public spending. By expressing this theme through FX, we could exploit our bullish view on the Brazilian economy while also enjoying a positive carry given the interest rate differential between the two countries.

Commentary:
Throughout the semester, BCB acted in line with our hawkish expectations. While the Central Bank started the monetary easing cycle, it adopted a modest 50 bps cut despite lower-than-expected

inflationary numbers and political pressure. Regarding the fiscal aspect, the government was able to pass important measures such as a new Tax Reform. However, President Lula's affirmations regarding the desire to change the fiscal target for 2024 posed an important risk for this trade. Although this flexibilization did not materialize in the end, it was essential to closely track Brazilian fiscal news as well as market positioning to avoid a high intraday depreciation.

Closing Thoughts:
The majority of our Fall 2023 book took advantage of EM opportunities alongside the few remaining surprises in DM central bank policy decisions. Coming into the semester, the slow yet persistent higher grind in USD led us to take a cautious view on EM names, having slightly long exposure to USD. However, as the factors pressuring the Fed to maintain their higher-for-longer mantra dissolved, we began to position for an overall rally in risk assets, particularly EM-carry FX such as BRL, MXN, and KZT. Yet, we ensured not to take a significantly short USD exposure even during the final month of the semester. If there is anything that 2023 has taught us, it is that the macro narrative can change very rapidly. The high number of mini-macro regimes throughout the year supports this thinking.

Despite the portfolio outperforming our respective index (Eurekahedge Macro Hedge Fund Index), we believe we missed out on taking full advantage of some trends our research showed. This was primarily due to our position sizing being relatively small for the first months of the semester, as the volatile macro regime created a hesitancy to put large trade sizes on the portfolio. Then, to make up for the small sizing, we ended up putting too large of an oil futures position on in October, which led to the largest loss across the portfolio. After this event, we believe we were able to find a better balance for managing risk/reward with the trade sizes. We also began adopting stop losses within our trades, helping manage the downside in any one idea.

Looking forward, we will be looking to increase exposure to commodities, which will help diversify the portfolio's overall returns. Our desire to avoid Chinese growth-related assets led to us only putting one commodity position (oil futures). Furthermore, we aim to maintain the credit book's success and also increase the overall sizing of the FX book, where 16 out of the 18 positions were profitable, but the small sizing used led to these returns being relatively insignificant to the overall book.

In the spring, the overall macro atmosphere lies on whether the Fed pivot realizes as the market is currently expecting and whether the lag from the past years' aggressive monetary policies materially begins impacting growth. As in 2023, the data will be king to how this narrative unfolds, and we will continue to take caution in adopting any single macro narrative.

Best,
Global Macro Portfolio Team

Fall 2023 Quantitative Portfolio Letter

Portfolio Background:
This semester, the Quant portfolio focused on interesting strategies that aim to 1. diversify our exposure to different market segments and 2. explore novel concepts in the market. The reasoning is that the only point of quantitative research is to find novel, overlooked factors of the market that may not be priced in. So, we present a few of the strategies we decided to test and implement and why.

Our first strategy went long on LETF pairs when their indices seemed to be trending on momentum. Our signal used autocorrelation over varying lags to calculate the expected value of longing or shorting LETF pairs and discovered that recently, momentum seems to persist enough to make longing LETF pairs worth it.

Next, through observing the prices of VXX and VIXY, we noticed that we could potentially make a profit off of the different ways they rolled futures. The trade expression was to pairs trade VXX and VIXY as their weights for each future differed, then exit the positions as both securities fully roll over to the next month.

Lastly, we executed a strategy in the commodities market that used a futures curve fitting model to bet on momentum in over/underpriced futures caused by potential supply/demand shocks. Each of these strategies trades securities that are not very correlated with each other, and the strategies are mostly neutral to their respective markets.

Fall Semester Performance:
QFS Quantitative: +1.04%
S&P 500: +6.84%

Selected Trades:

Trade: Long Leveraged ETF Pairs
Return: +2.05%; **PNL:** +$20,500

Leveraged ETFs (LETFs) are securities that mirror returns in an underlying index with some multiple (leverage). For example, UPRO is an LETF for SPX with a multiple of 3x, while SPXU is an LETF for SPX with a multiple of -3x. If SPX increases by 10%, UPRO increases by 30% and SPXU decreases by 30%. LETFs experience a phenomenon known as beta slippage. Say SPX increases 25% in 1 day then decreases 20% in the next. Over these two days, SPX has a return of 0%. UPRO has a return of 75% then -60% = -30% overall. The multiple makes the downswings more impactful logarithmically.

An idea then is to trade pairs of LETFs together. If you short both UPRO and SPXU, it seems like you should always be able to capture the beta slippage. However, during periods where SPX has directional momentum (e.g. continually increases), you will win less and less on the winning leg (returns vanishing as SPXU approaches 0) and lose more and more on the losing leg (UPRO increases exponentially). Due to the market pricing in borrow fees, there is little money in shorting these LETF pairs. But it seems that recently, there is money to be made in longing LETF pairs when their indices have momentum. This strategy longs LETF pairs when the expected value for betting on momentum, outputted from a model using index autocorrelations, is positive. The strategy returned 2.05% over the semester.

Trade: VXX-VIXY Arbitrage
Return: +1.70%; **PNL:** +$17,000

Through our regular market research, we found an interesting disparity within a familiar trading instrument–VIX ETFs. VIX is the CBOE volatility index and uses a weighted average of the implied volatilities of the S&P 500 options chain to create a metric for how volatile the stock market is. To get an accurate spot VIX sell side issuers like ProShares (VIXY) and Barclays iPath (VXX) put out ETFs and ETNs, respectively, which represent a portfolio of near and next-term VIX futures. At certain points throughout each month, we noticed that the weightage would differ across the instruments. Thus, we decided to do an arbitrage of sorts where we would take positions on VIXY and VXX assuming that the weightage would return to 100% as the last near-month futures roll. This was not pure arbitrage as we are still exposed to term risk if we enter a position where VIX futures are in contango and the curve inverts to one of backwardation we would likely cut into the edge of the trade. Additionally, we would see credit risk, as VIX ETFs have had anomalies in the past and could even be terminated such as XIV.

That being said, our trade generated 1.7% throughout the semester. In review, we never had significant expectations for this trade, as the low-risk profile would signal lower returns but the pairs trade nature of it allows for little cash lock-up allowing for portfolio reallocation for the managers with a higher risk tolerance. We believe that there could be additional optimization in terms of z-score clearances as on certain days we faced minor losses likely due to the difference in administration fees, large spreads in illiquid markets, etc. which could be avoided with a larger clearance to enter the trade.

Trade: Long Momentum in Futures Based on Term Structure Deviations
Return: +5.08% **PNL:** +$50,800

This trade uses a model used to fit term structures. The model extracts Nelson-Siegel factors which can be used to estimate the futures curve. We fit this model to Natural Gas and Cattle futures, resulting in a function of their prices over their range of maturities. We observe that generally when a single futures price deviates significantly from the curve, it tends to further in the same direction in the short term. Hence, we trade on the short-term momentum of these commodities. The justification for why this works is that deviation from the curve comes from external events that affect the supply and demand of a commodity during a specific month, and that these events persist for some time, increasing the deviation of the futures price. We chose cattle and natural gas as commodities to show that the idea performs on both liquid markets and illiquid inefficient markets. The strategy returned 2.99% for natural gas and 7.16% for cattle futures.

Closing Thoughts:
Although our portfolio suffered some losses from strategies that played out poorly, rendering our overall returns mediocre, we managed to explore interesting strategies across a variety of asset classes. These strategies each incorporated new concepts and observations to methods of trading liquid and well-studied securities. We maintained the quality of our trades through heavy scrutiny,

paying careful attention to cherry-picking and robustness. Moving forward, we plan to test out more strategies using all of the cash in our book, rectifying the mistake we made this semester. Overall, we were satisfied with our progress this semester and plan to continue encouraging market observation and creative ideation.

Best,
Quantitative Portfolio Team