ACTL3182: Asset-Liability & Derivative Modelling

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Section 1: Stock Selection Rationale *(Q1, Q11)*

1.1 – Index Tracking Portfolio *(Q1)*

Prior to stock selection, it is important to denote the purpose and scope of our investigation. For our index tracking portfolio, we are aiming to replicate the performance of the FTSE100 using a passive investment strategy. Mathematically, this means that we are targeting an expected daily portfolio return equal to the expected daily return of the FTSE100 index. Following from the teachings of modern portfolio theory, we aim to simultaneously minimise tracking error (standard deviation of the difference in returns between our portfolio and the FTSE100). The derivation for our optimisation problem can be found in *Explanation 1*.

Regarding stock selection, creating a diverse portfolio is essential in minimising unsystematic risk. Accordingly, 30 stocks were selected from all 11 sectors and over 20 of the 57 industries defined by the ICB standards. Furthermore, it was ensured that at most 3 stocks were selected from the same sector, and at most 2 from the same industry. Selections of stocks from sets of industries that showcase a high level of dependence (such as 'oil, gas and coal', and 'airlines') were also avoided. Finally, to further diversify the portfolio stocks were selected from different levels of market capitalisation – specifically small, mid and large capitalisation levels. Further exploration of this notion can be found in *Explanation 3*. The list of selected stocks for the index tracking portfolio and their respective tickers can be found in *Table 1*.

1.2 – Capital Growth Portfolio *(Q1, Q11)*

The purpose of our capital growth portfolio is to maximise capital gains, with its performance measured by its excess growth in value over the FTSE100 index. For our stock selection rationale, we assume at least a weak-form market efficiency and thus identify stocks whose true value may not be recognised by the market yet. We also extend this into our active management strategy, rebalancing weights based on the release of new information before the information can be reflected in a stock's prices.

1.2.1 – Finance Sector Stocks (Banking & Private Equity)

Recent interest rate hikes (up to the current rate of 5% in the UK) have significantly expanded net margins in lending activities. This is because as interest rates rise, banks tend to charge a higher rate on loans relative to the interest they pay on deposits. Therefore, banks are observing rising revenue from both pre-existing variable rate loans, new lending and refinancing opportunities at higher rates. Furthermore, in Q2 2024, private equity firms announced 122 deals valued at $196 billion USD, nearly doubling the $100 billion USD in Q1 2024 (EY, 2024). Accordingly, the deals market is showcasing a high deal-flow, with more acquisition and exit opportunities. This not only results in a direct increase in revenue due to additional opportunities, but also allows leading banking and private equity firms to be more selective with the capital they deploy, thus raising their margins.

Considering the factors above, 7 financial institutions were selected. This composed of 5 banks and 2 private equity firms. Banks with significant operations across both retail and investment banking divisions were preferred as they can capitalise on both factors discussed above. The selected finance stocks as well as a further justification of individual selections and weights can be found in *Explanation 4*. In summary, the stocks were deemed profitable in the short according to their financial performance and current economic outlook. The key short term risks were regarding interest rate volatility (affecting demand and reliability of lending), geopolitical tensions (affecting international business) and regulatory risk (investigations of HSBA.L and NW.L).

1.2.2 – Basic Materials Sector Stocks (Gold)

Current macroeconomic factors, geopolitical tensions and consumer behaviours act as compelling indicators for significant returns in the basic materials sector. As global inflationary pressures persist, gold and other commodities act as effective hedges capable of preserving value despite the depreciation of fiat currencies. China's recent stimulus package has also significantly increased demand for gold, driving its price forward. Amidst current geopolitical tensions, basic metals serve as strategic assets for investment into national security and infrastructure. Furthermore, by their use cases in the emerging renewables industry, demand is currently increasing for basic materials (such as copper and lithium). Accordingly, this has resulted in significant increases in revenue for gold and basic materials producers, as well as increasing investor interest within the industry.

Considering the factors above, 8 basic materials stocks were selected of which 4 showcase a significant focus on gold mining. The selected stocks and further justification for their individual selection can be found in *Explanation 5*. In summary, the industry faces key supply chain risks with rising global geopolitical tensions. The industry also faces issues of their perception surrounding environmental concerns, with certain companies more exposed than others. Regardless, the stocks were deemed relatively profitable and thus added to our capital growth portfolio.

1.2.3 – Industrials Sector Stocks (Military & Geopolitical Tensions)

Rising geopolitical tensions in Eastern Europe and the Asia-Pacific region have induced an uptake in military spending. Accordingly, companies in the industrials sector with military contracts or involvement in military projects have seen a significant increase in demand. Amidst increasing cyber warfare and technological enhancement by geopolitical competitors, we observe increasing global security concerns. This has further driven the demand for threat detection and surveillance technology. Combined, these factors have fostered an environment in which defence related stocks in the industrials sector are likely to showcase favourable returns in the short term.

The selected stocks and their justifications can be found in *Explanation 6*. In summary, the industrials sector demonstrates significant growth and profitability. RR.L, BA.L, BAB.L are lower risk stocks that are

performing significantly well and thus likely to yield short term investment profits. QQ.L and SMIN.L are also highly profitable, growing stocks but are slightly riskier due to their size and SMIN.L's ongoing internal restructuring.

Section 2: Summary of Findings *(Q2-Q10)*

2.1 – Selected Portfolio Compositions *(Q3, Q9)*

For our tracking portfolio, stock weights were selected by solving the minimisation problem defined in *Explanation 1*. In summary, the portfolio weights were optimised such that:

- The expected return of the portfolio matches the expected return of the FTSE100 index.
- The tracking error between our portfolio and the FTSE100 index was minimised given the constraint of no short selling.

The minimisation problem highlights that the tracking error increases with the variance of the portfolio and decreases with its covariance with the FTSE100. Accordingly, we can see in *Table 2* that significant constituents of the FTSE100 (large-cap stocks) such as RIO.L, HSBA.L, AZN.L tend to have larger allocated weights (above 6.4%). However, this relationship does not necessarily hold with other large-cap stocks such as RR.L – likely due to their risk levels. Alternatively, the MVP selects portfolio weights such that the variance of the portfolio is minimised. The composition of the MVP can be found in *Table 3*, which showcases RR.L with a weight of 0, and only ITH.L and PRTC.L with weights above 6%. These weights reflect the stock's contribution to the portfolio variance.

The weights for our capital growth portfolio defined in *Table 4* were selected using fundamental analysis. According to the exploration in Explanation *1* to *Explanation 6*, stocks were allocated weights of 7.5%, 5%, 2.5% and 1.25% based on their anticipated short-term capital growth levels. A total of eight of 20 stocks were given a weight of 7.5%, whilst only two stocks were given a weight of 1.25% due to their lower levels of financial performance.

2.2 – Portfolio Performances *(Q2, Q4, Q7, Q10)*

When visualising the portfolios' daily values, we observe some interesting trends. Notably, that the capital growth portfolio demonstrated significant growth of over 8.5×10^7 AUD. However, it is important to note that majority of this growth was observed on the first day, as seen in the plot below. This is further reflected in *Figure 1*, which showcases the daily returns generally centre around 0 despite a few days in which the portfolio yielded relatively large magnitude of returns. Alternatively, the index tracking portfolio demonstrated much lower growth. However, this isn't necessarily against our aims, as the goal of the portfolio was to track the performance of the FTSE100 index. Overall, the capital growth portfolio yielded a continuously compounded growth rate of 17.02% over the investment period, whilst the tracking portfolio demonstrated a rate of 0.35%.

When compared to the FTSE100 index, our tracking portfolio showcased a relatively significant difference in mean daily returns as seen in _Table 6_. Specifically, the FTSE100 index yielded a mean daily return of 0.043% whilst the tracking portfolio yielded a much lower 0.016% over the investment period. Ideally, the tracking portfolio should have a mean return which

Daily Portfolio Closing Values in AUD from 16th Sep 2024 to 18th Oct 2024
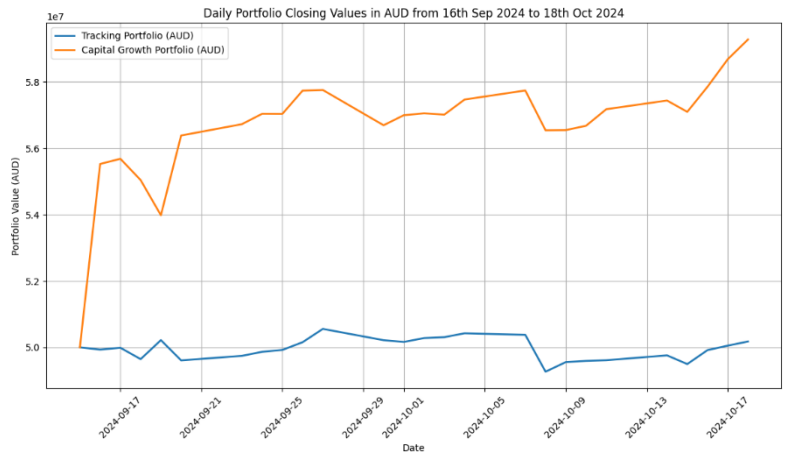
matches that of the index. When measuring against its aims, we must not only consider the significant difference in targeted mean daily returns (0.026422%) but also the empirical daily tracking error,

$$\sqrt{Var(\widehat{r_p - r_{FTSE}})} = \sqrt{\left[w'\hat{\Sigma}w - 2w'\widehat{\sigma_{p,FTSE}} + \widehat{\sigma_{FTSE}^2}\right]} = 0.00318$$

This relatively smaller tracking error indicates that, on average, the portfolio deviates a relatively small amount from the FTSE100. As index tracking is generally a longer-term strategy which is susceptible to market cycles and volatility in the short term, it is likely that an investigation over a longer tracking period would yield even better results.

When considering the standard deviation of daily returns, we observe that capital growth portfolio showcased significantly larger volatility (as shown in _Table 6_). This can be partially attributed to the lower levels of diversification (by number of stocks, sectors and industries specifically) within the portfolio as well as the overall selection of riskier stocks. Considering its goal to maximise its excess growth over the FTSE100 index, we see more optimistic results. Specifically, the mean daily return over the investment period for our growth portfolio beat the FTSE100 index by 0.669096%. This measure reiterates the capital growth portfolio's strong performance.

2.3 – MVP Theory Findings _(Q6)_

2.3.1 – Correlation Insights

Analysis of the tracking portfolio stocks' correlation matrix in _Figure 5_ showcases that stocks tend to be positively correlated. A significant reason for this is that stocks prices are generally just driven by the same factors such as macro-economic conditions and investor sentiment. However, negative correlations such as that between VOD.L and CCH.L (-0.22) allow for hedging against risk and thus suggest the potential for improvement in the diversification of the tracking portfolio stocks. Most correlation values are relatively moderate in magnitude (between 0.1 and 0.4). This suggests that the portfolio has capitalised on at least some of the diversification of sectors, industries and market-cap levels discussed above. Analysis of the growth portfolio stocks' correlation matrix in _Figure 4_ showcases relatively higher levels of positive correlation. This can be attributed to the lower amounts of

diversifications of sector and industries, as these are typically driven by the same market forces such as industry trends.

2.3.2 – MVP and MVS Derivations & Insights *(Q6, Q8-9)*

The minimum variance portfolio was found by selecting the weights w that minimise the portfolio variance whilst ensuring the constraint of no short selling. Mathematically, this is represented by the Lagrangian $L(w, \gamma) = w'\Sigma w + \gamma(1 - 1'w)$. By doing so, the weights in *Table 3* were derived. This process can be extended by adding an additional condition, that the expected return of the portfolio $(w'z)$ is equal to a specified target return μ. Repeating this process across all possible target returns using the given set of stocks yields the minimum variance set below.

Efficient Frontier with Individual Stocks and Random Portfolios
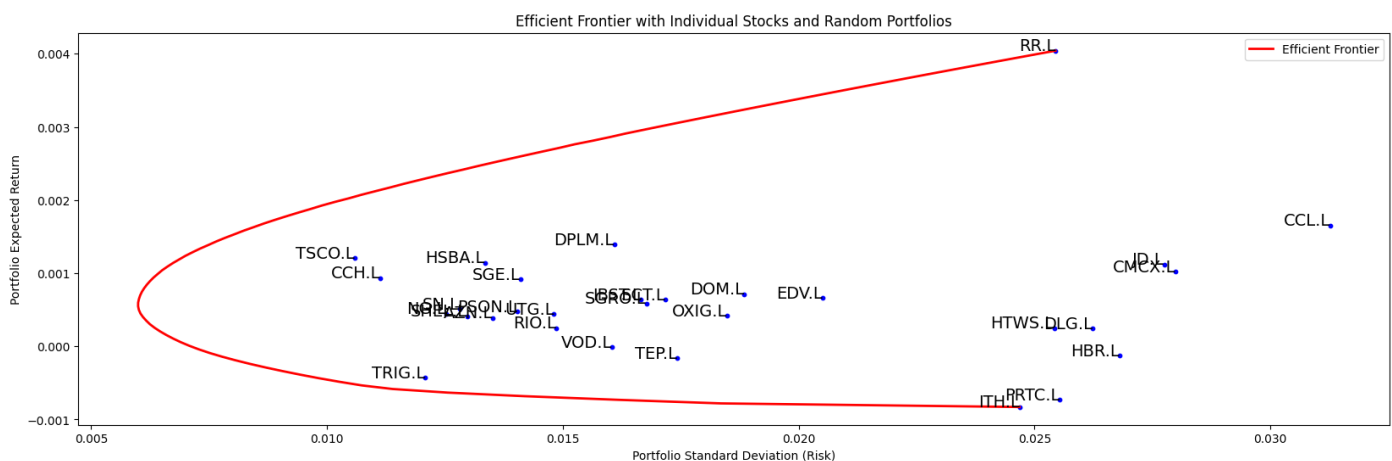
Looking at the plotted efficient frontier, we can observe the portfolios that maximise the expected return for a given level of risk. Here, we see that only RR.L lies on the efficient frontier, whilst ITH.L lies on the inefficient frontier and all other selected stocks lie inside the curve. The MVP weights in *Table 3* showcase a weight of 0% for RR.L but a weight over 6% for ITH.L. Whilst this seems somewhat contradictory, it is because the MVP is derived considering the variance and covariance level of the stocks – specifically, $\sigma_p^2 = \sum_{j=1}^{n} \sum_{i=1}^{n} w_i w_j \sigma_{ij}$. Thus, tickers that exhibit significant amounts of variance (plot above) or covariance (*Figure 5*) such as RR.L exhibit lower weights.

Section 3 – Executive Summary

The report provides an analysis of two portfolios following an index tracking and a capital growth model respectively. In constructing the index tracking portfolio, diversification and mean-variance theory were considered to select stocks and weights to replicate the FTSE100 index's performance. In contrast, the capital growth portfolio was selected using fundamental analysis and the efficient market hypothesis (weak form) to maximise capital returns more than the FTSE100 index. Key findings indicated higher volatility but substantially higher growth for the capital portfolio. The tracking portfolio, however, demonstrated much lower volatility in accordance with the index, but its mean tracking difference was relatively significant. In future investigations, we can benefit from increasing the investment horizon, especially for the capital growth portfolio.

Section 4 – Appendix

Explanation 1 - Lagrangian for Index Tracking Portfolio

Denote:

- r_p as the daily return of our portfolio.

- r_f as the daily return of the FTSE100.

- Σ as the covariance matrix of our portfolio stock daily returns

- w as the vector of weights of our portfolio stocks

- $\sigma_{p,f} = Cov(r_p, r_f)$

- σ_f^2 as the variance of the FTSE100 returns

- z as the vector of expected daily returns for each stock in our portfolio

- μ_f as the expected daily returns of the FTSE100

- w_i as the weight of the ith stock in our portfolio.

<u>Objective</u>: min $\{Var(r_p - r_f)\}$

$$Var(r_p - r_f) = Cov(r_p - r_f, r_p - r_f)$$
$$= Var(r_p) + Var(r_f) - 2Cov(r_p, r_f)$$
$$= w'\Sigma w - 2w'\sigma_{p,f} + \sigma_f^2$$

<u>Constraint 1</u>: $\mathbb{E}[r_p - r_f] = 0$

$$\mathbb{E}[r_p - r_f] = w'z - \mu_f$$
$$= 0$$
$$\Rightarrow w'z = \mu_f$$

<u>Constraint 2</u>: $w'1 = 1$.D

<u>Bounds</u>: $w_i \in [0, 1] \ \forall$ stocks i.

<u>Lagrangian</u>:

$$L(w, \lambda, \gamma) = \frac{1}{2}[w'\Sigma w - 2w'\sigma_{p,f}] + \lambda(1 - w'1) + \gamma(\mu_f - w'z)$$

Explanation 2 - Market Capitalisation Levels

- Small cap: Market capitalisation between 250M and 2B.
- Mid-cap: Market capitalisation between 2B and 10B.
- Large cap: Market capitalisation above 10B.

Explanation 3 - Why diversifying stock market cap levels reduce unsystematic risk

Including a variety of assets that respond differently to set economic events results in a reduction in unsystematic risk. Empirical studies have shown that this logic applies for diversification across different market capitalisation levels.

Note that the selected capitalisation levels are defined as:

- Small cap: Market capitalisation between 250M and 2B.
- Mid-cap: Market capitalisation between 2B and 10B.
- Large cap: Market capitalisation above 10B.

A company's market cap often reflects its stage in the business cycle. Companies with different capitalisation levels have different levels of financial resilience, operational flexibility, investor sentiment and access to capital. Larger capped companies tend to be more stable with more established market positions, and thus are often more resilient to economic downturn (for example). However, smaller capped companies tend to be less stable with greater growth potential.

Table 1 - Index Tracking Portfolio Selected Stocks & Tickers

SECTOR	LARGE-CAP	MID-CAP	SMALL-CAP
BASIC MATERIALS	Rio Tinto Group	Endeavour Mining plc	Ibstock plc
COMMUNICATION SERVICES	Vodafone Group Public Limited Company	Pearson plc	Helios Towers plc
CONSUMER CYCLICAL	Carnival Corporation & plc	JD Sports Fashion Plc	Domino's Pizza Group plc
CONSUMER DEFENSIVE	Tesco	Coca-Cola HBC AG	N/A
ENERGY	Shell plc	Harbour Energy plc	Ithaca Energy plc
FINANCIAL SERVICES	HSBC Holdings plc	Direct Line Insurance Group plc	CMC Markets Plc
HEALTHCARE	AstraZeneca PLC	Smith & Nephew plc	PureTech Health plc
INDUSTRIALS	Rolls-Royce Holdings plc	Diploma PLC	N/A
REAL ESTATE	SEGRO Plc	Unite Group PLC	N/A
TECHNOLOGY	The Sage Group plc	Softcat plc	Oxford Instruments plc
UTILITIES	National Grid plc	The Renewables Infrastructure Group Limited	Telecom Plus Plc

SECTOR	LARGE-CAP	MID-CAP	SMALL-CAP
BASIC MATERIALS	RIO.L	EDV.L	IBST.L
COMMUNICATION SERVICES	VOD.L	PSON.L	HTWS.L
CONSUMER CYCLICAL	CCL.L	JD.L	DOM.L
CONSUMER DEFENSIVE	TSCO.L	CCH.L	N/A
ENERGY	SHEL.L	HBR.L	ITH.L
FINANCIAL SERVICES	HSBA.L	DLG.L	CMCX.L
HEALTHCARE	AZN.L	SN.L	PRTC.L
INDUSTRIALS	RR.L	DPLM.L	N/A
REAL ESTATE	SGRO.L	UTG.L	N/A
TECHNOLOGY	SGE.L	SCT.L	OXIG.L
UTILITIES	NG.L	TRIG.L	TEP.L

Explanation 4 - Finance Stock Selections & Justifications

The selected banking stocks are:

STOCK NAME	STOCK TICKER
HSBC HOLDINGS PLC	HSBA.L
BARCLAYS PLC	BARC.L
LLOYD'S BANKING GROUP PLC	LLOY.L
STANDARD CHARTERED PLC	STAN.L
NATWEST GROUP PLC	NWG.L

The selected private equity stocks are:

STOCK NAME	STOCK TICKER
3I GROUP PLC	III.L
HG CAPITAL TRUST PLC	HGT.L

Some general information for each stock is:

TICKER	HISTORY	RECENT NEWS	SIZE & PROSPECTS
FINANCE – BANKING STOCKS			
HSBA.L	Established in 1865. Initially facilitated trade over Europe and Asia. Has since expanded into UK and Europe in the retail banking wealth, private banking and investment banking divisions.	Recently announced restructuring (after investment period, therefore ignored). Focus on global asset management divisions and using technology to improve efficiency and customer service.	Very large and stable market share. Global presence with some prospects to grow further in many countries such as Australia. However, this is not within the investment horizon.
BARC.L	Established in 1690. Initially a goldsmith banking business. Expanded to various sectors such as retail banking and investment banking.	750M pound share buyback program. Heightened focus on digital banking and improved capital allocation.	Large market share and relative stability. Relatively strong global presence, through room to grown. Significant investment

	Specifically, expanded their investment banking division in north America upon the acquisition of Lehman Brothers in 2008.		prospects in short term due to share buyback.
LLOY.L	Established in 1765. Initially focussed on retail banking but has since expanded into commercial banking. Mostly present in the UK	Fears of increasing default rates. Digital focus – aiming to improve efficiency and customer service.	Medium market share. Prospects to grow in counties outside of the UK, but not in the short term.
STAN.L	Established in 1969 upon the merger of 2 banks. Initially in trade and markets, but has since expanded into wealth, corporate banking and investment banking.	Announced largest ever share buyback. Focus on wealth in growing markets/ economises such as Hong Kong and Singapore.	Relatively large market share. High prospects in short term due to share buyback. High long-term prospects due to increasing presence in growing economies.
NWG.L	Founded in 1927. Initially in retail banking. Expanded into commercial and investment banking as well as wealth.	Regulatory compliance fines. Digital focus on expansion in the UK.	Smaller prospects in the short term due to regulatory issues.
FINANCE – PRIVATE EQUITY STOCKS			
III.L	Founded in 1945. Initially in private equity and venture capital but has since expanded into infrastructure investments.	Increased deal flow and stronger asset portfolio driving stock prices. Focus on improved capital allocation and increased capacity for	Small market share. Strong revenue due to investor sentiment around industry and current level of deal flow. Prospects for short term growth.

HGT.L	Founded in 1989. Initially in private equity and venture capital. Has maintained a focus on technology and software investments.	Investments performing well upon recent AI revolution.	Small market share. Prospects for short term growth with AI sector.

Below are some key metrics for fundamental analysis. These are for Q2 2024, compared against Q2 2023 whever required:

TICKER	EBITDA (000)	GROSS PROFIT (000)	EPS	SHARE PRICE (28/06/2024)	P/E RATIO	DPS	D/E RATIO	REVENUE GROWTH
HSBA.L	NA	16,194.00	0.35	8.64	24.69	0.1	0.65	0.11
BARC.L	NA	7,711.58	0.11	2.64	24.44	0.04	10.2	0.08
LLOY.L	NA	5,770.70	0.01	0.69	69	0.01	3.21	0.17
STAN.L	7,294.00	4,588.00	0.36	9.05	25	0.09	2.82	0.09
NWG.L	7,026.11	4,808.70	0.18	3.94	22	0.08	1.69	-0.04
III.L	833500	1125579	0.86	38.75	45	0.17	-	0.03
HGT.L	NA	NA	NA	NA	NA	NA	NA	0.09

Some additional metrics for HGT.L are:

- 10% increase in assets under management.
- Constant debt (between Q2 2024 and Q2 2023).

The key short-term risks for finance sector stocks are:

- Geopolitical Risks: International firms such as HSBA.L are prone to financial downturn in regions with geopolitical instability. For example, companies such as HSBA.L and STAN.L are exposed to Asian markets and potentially affected by any trade conflicts between the US and China. These can induce further market risk, and regulatory risk, as well as restrict operations.
- Interest Rate Risk: Central banks constantly adjust rates in accordance with inflation and economic conditions. Companies who are heavily tied to domestic lending can be heavily

influenced by changes in interest rates. This can affect delinquency rates, demand for financing and thus affect a finance stock's performance. This affects all banks listed above.

- Regulatory Risk: Specific banks such as NW.L have recently faced regulatory scrutiny, with other banks having ongoing investigations (such as HSBA.L). This can result in fines and reductions in investor sentiment, and thus can result in financial losses.

Investment Justification:

HSBA.L offers consistent performance with a large market capitalisation and significant international presence. It has a relatively moderate EPS of 0.35, but large profits compared to other companies. Further, their D/E ratio reiterates their stable structure. BARC.L and STAN.L resemble companies with similar structure (large capitalisation and international presence) but present unique features. Namely, they are currently offering significant share buybacks, resulting in a significant incentive for short term stock growth. The smaller domestic banks NW.L and LLOY.L offer moderate dividend yields of 0.18 and 0.11 respectively. NW.L's P/E ratio of 69 indicates a potential overvaluation, however the companies' firm involvement in the UK banking space makes them potentially profitable investments. Finally, the private equity firms are benefitting significantly from the current increase in deal flow. They showcase strong gross returns above 10% each (Q2 2024 vs Q2 2023) and growing levels of assets under management. This showcases their recent increase in scale and magnitude of investment, indicating a potential short-term price rise. Based on our fundamental analysis and its according short-term profitability, we will attach the following weights to the stocks above in our capital growth portfolio.

TICKER	WEIGHT
HSBA.L	0.05
BARC.L	0.075
LLOY.L	0.0125
STAN.L	0.075
NWG.L	0.0125
III.L	0.075

Explanation 5 – Basic Materials Stock Selections & Justifications

The selected basic materials stocks with a significant focus on gold are:

STOCK NAME	STOCK TICKER
FRESNILLO PLC	FRES.L
ENDEAVOUR MINING PLC	EDV.L
SERABI GOLD PLC	SRB.L
ALTYNGOLD PLC	ALTN.L

The other selected basic materials stocks are:

STOCK NAME	STOCK TICKER
ANTOFAGASTA PLC	ANTO.L
RIO TINTO PLC	RIO.L
GLENCORE PLC	GLEN.L
ANGLO AMERICAN PLC	AAL.L

Below is some further information about each company, as well as the justification for their selection specifically.

COMPANY TICKER	GENERAL HISTORY	RECENT HISTORY	SIZE & PROSPECTS
FRES.L	Founded in 1887. Mexican producer of previous metals. World's largest producer of silver. Significant producer of gold.	Labour strikes and regulatory issues, causing issues with production levels.	Very significant share, especially in gold and silver. Significant focus on improvements in operational efficiency using modern technology.
EDV.L	West African gold mining company. Founded in 2002.	Recent production increases. Recent acquisitions of mines in West Africa.	Relatively large share. Focus on efficiency has resulted in steady growth.
SRB.L	Established in 2004. Gold research and production in Brazil.	Recent discovery of gold deposits.	Relatively smaller share. In the niche of high-grade gold mining. Prospects of significant short-term revenue.

ALTN.L	New company which began operating in Kazakhstan in 2008.	Recent improvements in equipment and thus enhancements in operational efficiency.	Very small market share. Prospects of growth and development.
ANTO.L	Founded in 1888. Chilean mining company with a highly significant production of copper.	Issues regarding cooper production due to water scarcity in Chile.	Large market share in copper. Likely to grow based on rising copper demands from renewables growth.
RIO.L	Established in 1873. Mining company producing lots of different metals including gold.	Recent focus on renewables and ESG. Investments into technology and equipment.	Large market share. Strong long-term position, with likely growth due to recent investments.
GLEN.L	Founded in 1974. Mining and commodities trade. Work with various types of materials and energy.	Benefitting from recent commodity prices. Announcing focus on mining assets.	Large market share. Prospects for growth upon focus on mining.
AAL.L	Founded in 1917. Operations in iron, copper, diamonds and platinum.	Recent focus on decarbonisation and ESG. Investments into technology and equipment.	Large market share. Stable portfolio with recent investments likely to prosper growth.

Below are some recent metrics on production costs:

TICKER	PRODUCTION COSTS (RECENT)
FRES.L	$14.5 per ounce of silver
EDV.L	$1287 per ounce of gold
SRB.L	$1320 per ounce of gold
ALTN.L	$1100 per ounce of gold
ANTO.L	$1.82 per pound of copper.
RIO.L	$1.38 per pound of copper. $21 per ton of iron ore. $1900 per tonne of aluminium.
GLEN.L	Primarily trade.

	AAL.L		$1.57 per pound of copper. $37 per ton of iron. Other metals too.

Below are some metrics for fundamental analysis. These are for Q2 2024, compared to Q2 2023 wherever applicable.

TICKER	EBITDA (000)	GROSS PROFIT (000)	EPS	SHARE PRICE (28/06/2024)	P/E RATIO	DPS	D/E RATIO	REVENUE GROWTH
FRES.L	296592	196192	0.05	7.1	142	0.03		0.18
EDV.L	228800	275400	-0.27	21.12	-78	0.41	0.39	0.06
SRB.L	8362	10295	0.07	0.87	12	-	0.06	0.31
ALTN.L	9960	8840	0.15	1.81	12	-	0.77	0.006
ANTO.L	654400	551350	0.13	26.67	-	0.04	0.48	0.17
RIO.L	5269500	4353000	1.78	65.78	37	0.89	0.25	0.03
GLEN.L	2189500	1348000	-0.01	5.7	-	-	0.88	0.09
AAL.L	2405000	4323000	-0.28	31.62	-	0.21	0.63	-0.03

The key short-term risks for basic materials sector stocks are:

- Supply Chain & Geopolitical Risks: Market conditions fluctuate heavily based on the state of the supply chain and global geopolitics. Short term shifts in these can result in significant commodity volatility as well as reductions in production for basic materials companies.
- Regulatory Risk: For example, Rio Tinto's Serbian lithium mining plans have faced significant oppositions both through regulation and the public's environmental concerns. This is a growing concern for the basic materials sector, with companies spending significant amounts of their annual revenue on shifting to environmentally sustainable practices.

Investment Justification:

The basic materials sector stocks have produced significant recent growth and profitability. Considering the recent geopolitical conditions, gold and other rare other metals are becoming key investments against currency devaluation. The stocks listed above showcase relatively strong gross profits an overall revenue growth compared against Q2 2023. SRBL.L demonstrates significant potential with a 31% revenue increase and a moderate P/E ratio of 12, suggesting an undervaluation of its pricing. RIO.L demonstrates stability and a high EPS and DPS of 1.78 and 0.89 respectively suggesting a strong yield for investors. The companies also showcase competitive production costs, indicating the potential for strong levels of growth in the short term. Due to their significant size and revenue growth, FRES.L are likely to yield large potential profits. The other firms can also be considered relatively profitable mostly

based on their growth and other factors discussed above. Therefore, we conclude the following weights for our capital growth portfolio.

TICKER	WEIGHT
FRES.L	0.075
EDV.L	0.05
SRB.L	0.05
ALTN.L	0.05
ANTO.L	0.05
RIO.L	0.05
GLEN.L	0.05
AAL.L	0.025

Explanation 6 - Justification for Industrial Sector Stocks

The selected industrials stocks are:

STOCK NAME	STOCK TICKER
ROLLS-ROYCE HOLDINGS PLC	RR.L
BAE SYSTEMS PLC	BA.L
QINETIQ GROUP PLC	QQ.L
BABCOCK INTERNATIONAL GROUP PLC	BAB.L
SMITHS GROUP PLC	SMIN.L

Below is some further information about each company, as well as the justification for their selection specifically.

COMPANY TICKER	GENERAL HISTORY	RECENT HISTORY	SIZE & PROSPECTS
RR.L	Founded in 1906. Initially began as a luxury car manufacturer. Expanded into defence and aerospace manufacturing industries.	Struggled amidst decline in travel over the COVID-19 period. Recent focus on military contracts has shown significant growth.	Large share. Significant short term growth prospects amidst rising geopolitical tensions.
BA.L	Founded in 1999 after a merger between 2 companies. Focus on defence, aerospace and security.	Heavily involved in contracts surrounding tensions in Europe and Asia.	Large share. Significant short term growth prospects amidst rising geopolitical tensions.
QQ.L	Founded in 2001. Focus on defence technology and research into defence technology.	Upon AI revolution, QQ.L have significantly progressed in their technological initiatives.	Small share. Thriving company in the cybersecurity and defence technology. Prospects for growth over short term amidst rising geopolitical tensions.

| BAB.L | Founded in 1891. Focus on engineering for naval fleets. | Recent restructuring. Have shifted focus to naval military contracts. | Relatively large market share. Significant short term growth prospects amidst rising geopolitical tensions. |
| SMIN.L | Founded in 1851. Focus on various types of engineering (medical and detection) | Recent shift in focus towards infrastructure security. | Large market share. Potential for growth upon rising global security concerns. |

Below are some key metrics for fundamental analysis. These are as of Q2 2024, compared against Q2 2023 wherever necessary.

TICKER	EBITDA (000)	GROSS PROFIT (000)	SHARE PRICE (28/06/2024)	P/E RATIO	DPS	D/E RATIO	REVENUE GROWTH
RR.L	793135	1330094	5.77	21	-	-	0.19
BA.L	1114932	694073	16.68	83	0.25	0.7969	0.14
QQ.L	87483	76088	5.6	80	0.02	-	0.41
BAB.L	113626	91,281	6.6	51	0.01	-	0.09
SMIN.L	170686	353968	21.55	-	0.09	-	0.05

Below are some key risks for the above stocks:

- Geopolitical Risks: Whilst increasing tensions are beneficial for miliary technology producers, political instability can result in disruptions in supply chains and operations for companies.
- Aerospace Dependence (RR.L): A significant proportion of RR.L's revenue is derived from manufacturing and engineering for the aerospace sector. This can pose risks as market dynamics and economic conditions change. However, this is unlikely in the short term.
- Integration Risks (SMIN.L) have been exposed to a recent acquisition. This can potentially result in various issues if companies do not synergise well, resulting in poorer financial performance.

Investment justification:

The industrials sector has showcased immaculate revenue growth and significant earnings over the Q2 2023 and Q2 2024 period. RR.L's highly profitable military contracts and EPS of 0.28 are positive indicators for investment return. Similarly, BA.L have presented a record-breaking EBITDA whilst simultaneously benefiting from stability and recent government contracts in the UK and US. QQ.L also showcases significant growth but relatively lower overall earnings, suggesting relatively high potential. Due to the ongoing short-term integration risks within SMIN.L and the smaller size of QQ.L, they are likely slightly riskier investment options. Accordingly, we can speculate the stocks above are highly profitable, and have attached the following weights to them without our growth portfolio.

TICKER	WEIGHT
RR.L	0.075
BA.L	0.075
QQ.L	0.05
BAB.L	0.075
SMIN.L	0.05

Table 2 - Tracking Portfolio Selected Stocks & Weights

NO.	TICKER	NAME	WEIGHT	CAP- LEVEL
1	AZN.L	AstraZeneca PLC	0.069817	Large
2	CCH.L	Coca-Cola HBC AG	0.056986	Mid
3	CCL.L	Carnival Corporation & plc	0.014044	Large
4	CMCX.L	CMC Markets Plc	0.008737	Small
5	DLG.L	Direct Line Insurance Group plc	0.038579	Mid
6	DOM.L	Domino's Pizza Group plc	0.015018	Small
7	DPLM.L	Diploma PLC	0.008191	Mid
8	EDV.L	Endeavour Mining plc	0.015222	Mid
9	HBR.L	Harbour Energy plc	0.017115	Mid
10	HSBA.L	HSBC Holdings plc	0.065309	Large
11	HTWS.L	Helios Towers plc	0.012396	Small
12	IBST.L	Ibstock plc	0.026262	Small
13	ITH.L	Ithaca Energy plc	0.043162	Small
14	JD.L	JD Sports Fashion Plc	0.014499	Mid
15	NG.L	National Grid plc	0.052683	Large
16	OXIG.L	Oxford Instruments plc	0.00886	Small
17	PRTC.L	PureTech Health plc	0.031858	Small
18	PSON.L	Pearson plc	0.014873	Mid
19	RIO.L	Rio Tinto Group	0.107465	Large
20	RR.L	Rolls-Royce Holdings plc	0.004833	Large
21	SCT.L	Softcat plc	0.01759	Mid
22	SGE.L	The Sage Group plc	0.016663	Large
23	SGRO.L	SEGRO Plc	0.013304	Large
24	SHEL.L	Shell plc	0.066524	Large
25	SN.L	Smith & Nephew plc	0.082223	Mid
26	TEP.L	Telecom Plus Plc	0.013784	Small
27	TRIG.L	Renewables Infrastructure Grp	0.061721	Mid
28	TSCO.L	Tesco PLC	0.027834	Large
29	UTG.L	Unite Group PLC	0.017308	Mid
30	VOD.L	Vodafone Group Public Limited Company	0.057138	Large

Table 3 - MVP Composition

NO.	TICKER	WEIGHT
1	AZN.L	0.03672
2	CCH.L	0.024925
3	CCL.L	0.009251
4	CMCX.L	0.022979
5	DLG.L	0.039752
6	DOM.L	0.029662
7	DPLM.L	0.015034
8	EDV.L	0.03073
9	HBR.L	0.047728
10	HSBA.L	0.020419
11	HTWS.L	0.039529
12	IBST.L	0.031215
13	ITH.L	0.062871
14	JD.L	0.020781
15	NG.L	0.035403
16	OXIG.L	0.036
17	PRTC.L	0.06077
18	PSON.L	0.034871
19	RIO.L	0.039671
20	RR.L	0
21	SCT.L	0.031255
22	SGE.L	0.025355
23	SGRO.L	0.032352
24	SHEL.L	0.036141
25	SN.L	0.033989
26	TEP.L	0.048504
27	TRIG.L	0.054272
28	TSCO.L	0.019074
29	UTG.L	0.035541
30	VOD.L	0.045206

Table 4 - Growth Portfolio Selected Stocks & Weights

NO.	TICKER	NAME	WEIGHT
		FINANCE SECTOR STOCKS	
1	HSBA.L	HSBC Holdings plc	0.054545
2	BARC.L	Barclays PLC	0.072727
3	LLOY.L	Lloyds Banking Group plc	0.036364
4	STAN.L	Standard Chartered PLC	0.054545
5	NWG.L	NatWest Group plc	0.036364
6	III.L	3i Group Ord	0.072727
7	HGT.L	HgCapital Trust Ord	0.072727
		BASIC MATERIALS SECTOR STOCKS	
8	FRES.L	Fresnillo plc	0.048387
9	EDV.L	Endeavour Mining plc	0.03871
10	SRB.L	Serabi Gold plc	0.03871
11	ALTN.L	AltynGold plc	0.029032
12	ANTO.L	Antofagasta plc	0.03871
13	RIO.L	Rio Tinto Group	0.03871
14	GLEN.L	Glencore plc	0.03871
15	AAL.L	Anglo American plc	0.029032
		INDUSTRIALS SECTOR STOCKS	
16	RR.L	Rolls-Royce Holdings plc	0.066667
17	BA.L	BAE Systems plc	0.05
18	QQ.L	QinetiQ Group plc	0.05
19	BAB.L	Babcock International Group PLC	0.083333
20	SMIN.L	Smiths Group plc	0.05

Table 5 - Portfolio Daily Values and Growth

DATE	TRACKING PORTFOLIO VALUE (AUD)	CAPITAL GROWTH PORTFOLIO VALUE (AUD)	TRACKING PORTFOLIO DAILY GROWTH (AUD)	CAPITAL GROWTH PORTFOLIO DAILY GROWTH (AUD)
2024-09-16 OPEN	50000000	50000000	NaN	NaN
2024-09-16 CLOSE	49932530	55525590	-67470.08	5525594
2024-09-17 CLOSE	49987210	55681500	54681.11	155907.3
2024-09-18 CLOSE	49644690	55039820	-342518.1	-641678.8
2024-09-19 CLOSE	50217500	53980660	572804.2	-1059164
2024-09-20 CLOSE	49606820	56383030	-610678.7	2402367
2024-09-23 CLOSE	49743450	56724200	136628.3	341172.1
2024-09-24 CLOSE	49865140	57037250	121689	313057.3
2024-09-25 CLOSE	49921730	57034290	56596.86	-2963.843
2024-09-26 CLOSE	50154650	57735400	232916.8	701106.9
2024-09-27 CLOSE	50555910	57754380	401258.1	18983.87
2024-09-30 CLOSE	50215350	56692050	-340554.1	-1062331
2024-10-01 CLOSE	50162430	56995360	-52920	303309.3
2024-10-02 CLOSE	50279700	57051230	117261.8	55874.58
2024-10-03 CLOSE	50306320	57012560	26619.74	-38674.83
2024-10-04 CLOSE	50423830	57466700	117514.1	454140.1
2024-10-07 CLOSE	50376620	57739640	-47213.61	272937.1
2024-10-08 CLOSE	49266160	56539800	-1110454	-1199832
2024-10-09 CLOSE	49555510	56546010	289344.9	6210.276

2024-10-10 CLOSE	49591560	56676440	36050.17	130426.8
2024-10-11 CLOSE	49611530	57175660	19969.21	499217.9
2024-10-14 CLOSE	49758230	57437280	146699	261621.8
2024-10-15 CLOSE	49495890	57096090	-262331.4	-341189.4
2024-10-16 CLOSE	49916530	57852510	420634.8	756419.1
2024-10-17 CLOSE	50050930	58681290	134402.3	828778.7
2024-10-18 CLOSE	50176280	59276660	125345.9	595368.2

Figure 1 - Portfolios Daily Growth

Daily Growth in Portfolio Values in AUD from 16th Sep 2024 to 18th Oct 2024 at Close
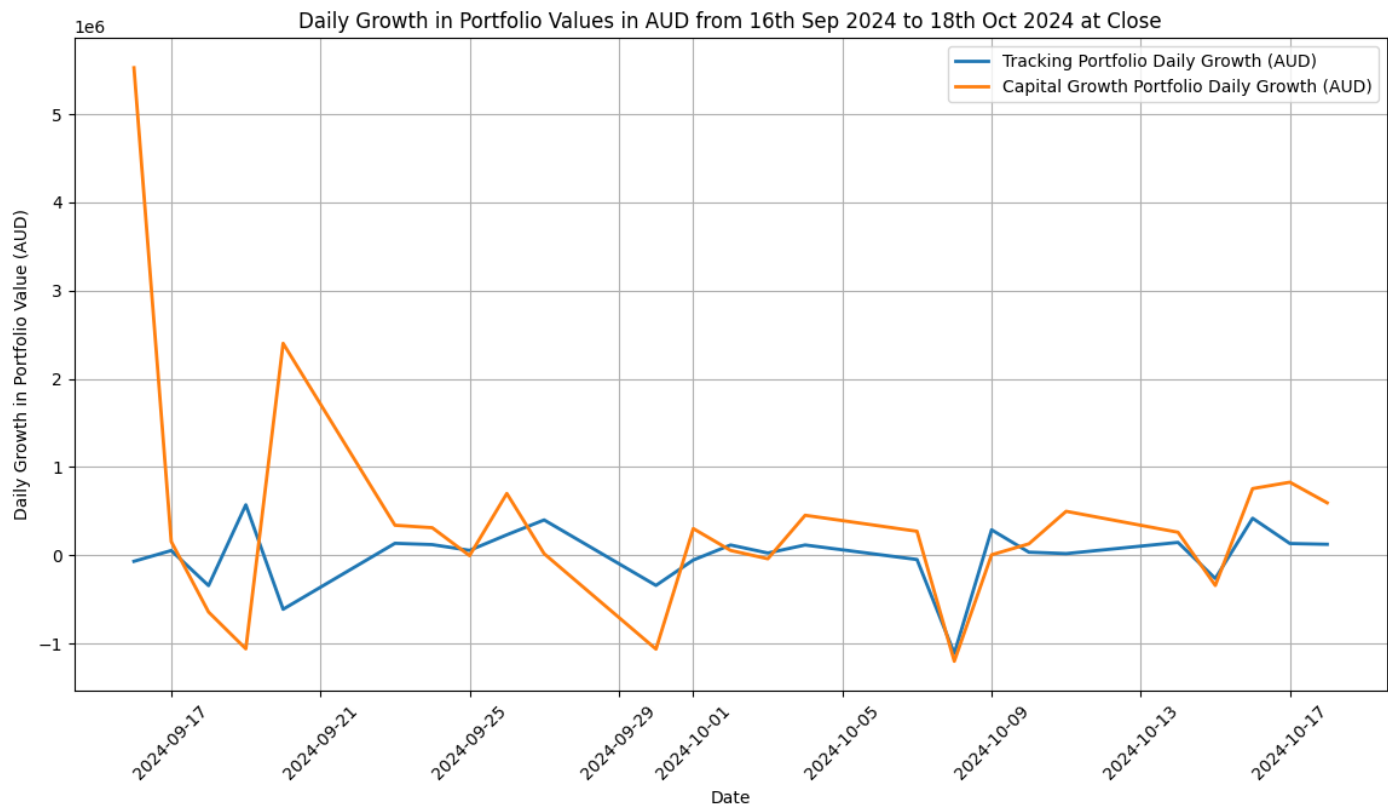
Figure 2 - Daily Continuously Compounded Returns (Growth)

Continuously Compounded Daily Returns

Figure 3 - Daily Continuously Compounded Returns (Tracking)
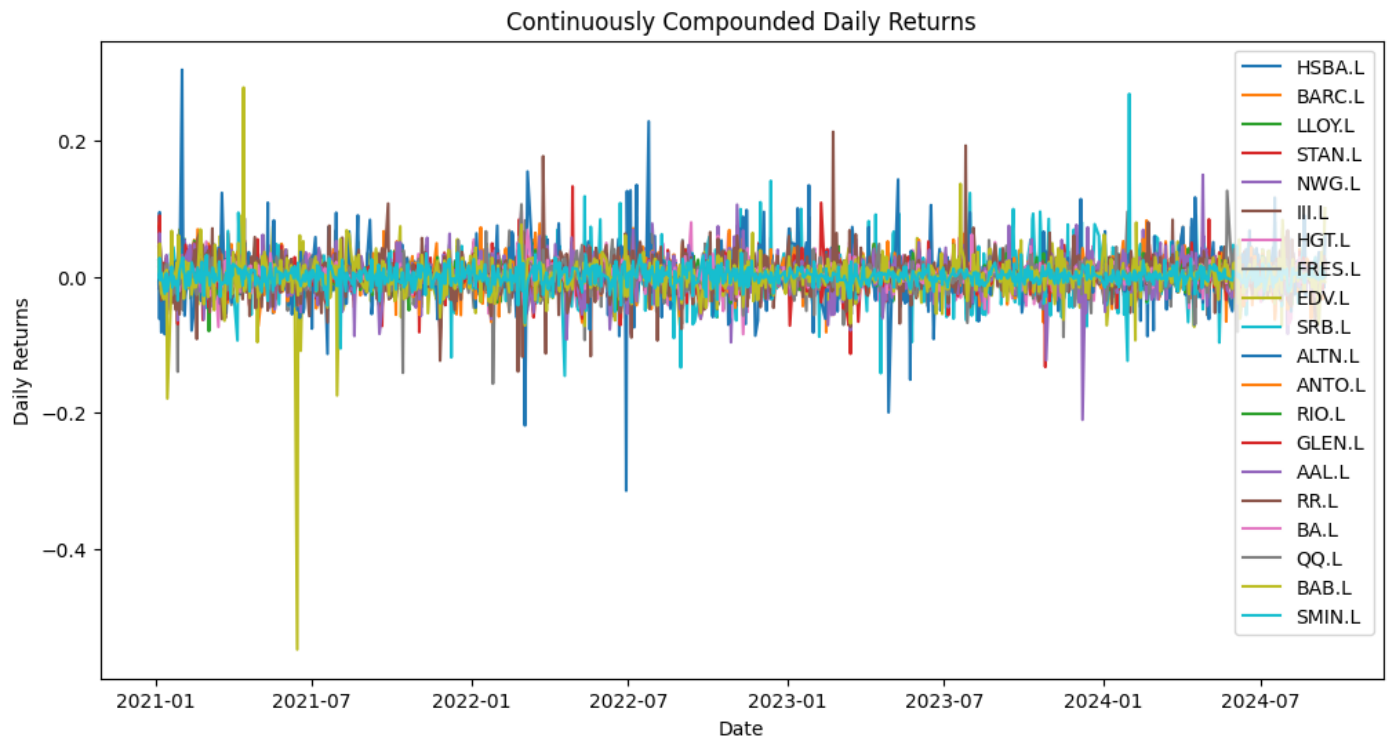

Continuously Compounded Daily Returns
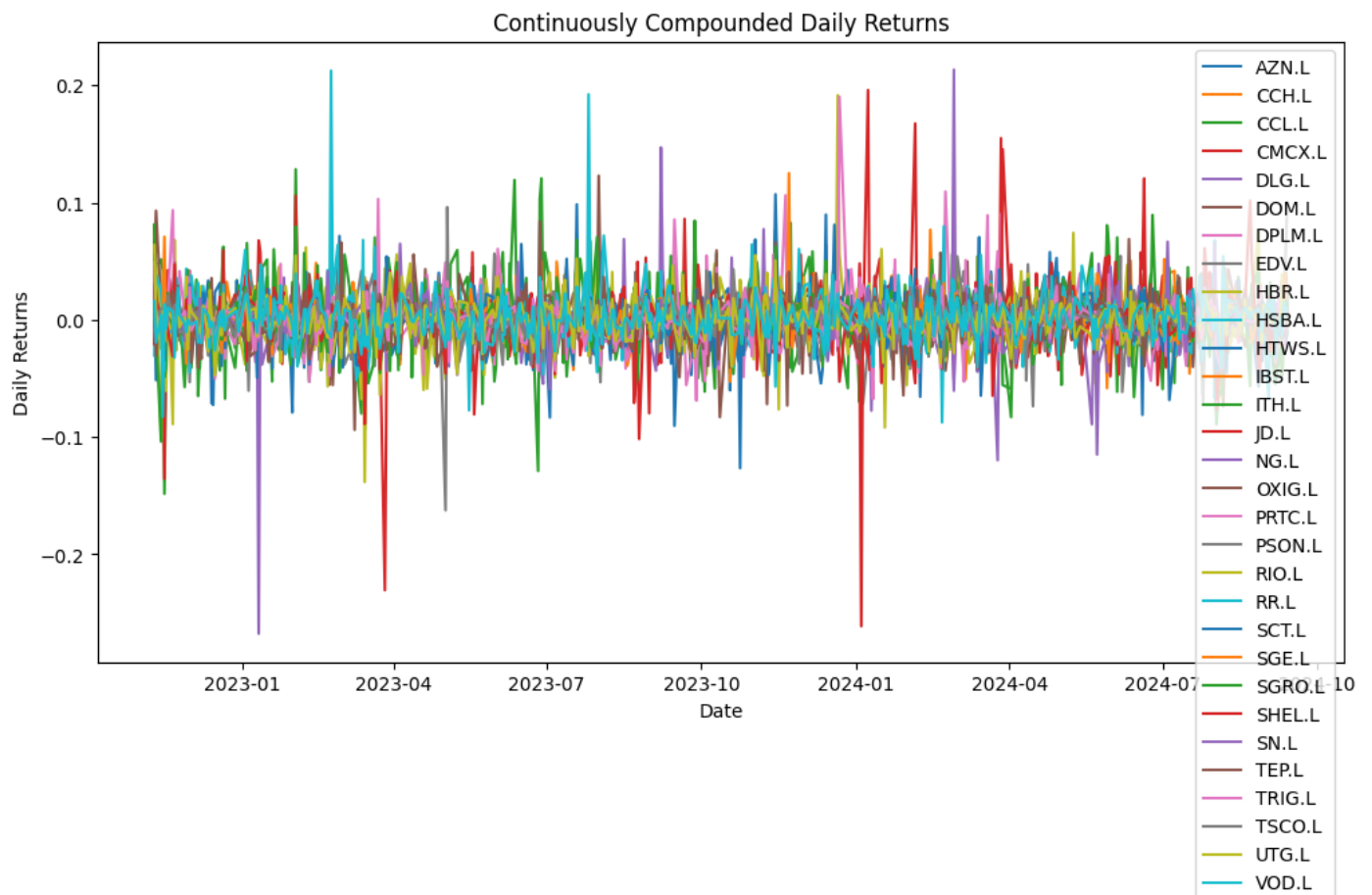
Table 6 - Portfolios Overall Performance Statistics

PORTFOLIO	MEAN RETURNS (%)	STANDARD DEVIATION
FTSE	0.042781	0.006228
GROWTH PORTFOLIO	0.711877	0.025137
TRACKING PORTFOLIO	0.016358	0.00687

Figure 4 - Growth Stocks Correlation Matrix Heatmap

Ticker	AAL.L	ALTN.L	ANTO.L	BA.L	BAB.L	BARC.L	EDV.L	FRES.L	GLEN.L	HGT.L	HSBA.L	III.L	LLOY.L	NWG.L	QQ.L	RIO.L	RR.L	SMIN.L	SRB.L	STAN.L
AAL.L	1	0.086	0.681	0.095	0.22	0.402	0.27	0.391	0.715	0.233	0.311	0.27	0.327	0.373	0.105	0.746	0.212	0.276	0.097	0.327
ALTN.L	0.086	1	0.069	0.023	0.012	0.029	0.113	0.142	0.076	0.068	0.017	0.083	0.033	0.062	-0.03	0.053	0.029	0.056	0.14	0.031
ANTO.L	0.681	0.069	1	0.147	0.231	0.407	0.243	0.401	0.703	0.25	0.334	0.315	0.354	0.373	0.147	0.694	0.256	0.336	0.081	0.344
BA.L	0.095	0.023	0.147	1	0.266	0.073	0.076	0.07	0.188	0.025	0.144	0.112	0.045	0.027	0.425	0.138	0.2	0.212	0.069	0.099
BAB.L	0.22	0.012	0.231	0.266	1	0.294	0.099	0.085	0.239	0.137	0.2	0.197	0.257	0.249	0.3	0.215	0.282	0.252	0.093	0.187
BARC.L	0.402	0.029	0.407	0.073	0.294	1	0.115	0.092	0.452	0.337	0.622	0.471	0.767	0.735	0.167	0.358	0.46	0.43	0.073	0.634
EDV.L	0.27	0.113	0.243	0.076	0.099	0.115	1	0.396	0.225	0.117	0.037	0.102	0.099	0.099	0.059	0.222	0.073	0.094	0.138	0.087
FRES.L	0.391	0.142	0.401	0.07	0.085	0.092	0.396	1	0.33	0.154	-0.01	0.076	0.05	0.11	0.023	0.32	0.035	0.112	0.121	0.049
GLEN.L	0.715	0.076	0.703	0.188	0.239	0.452	0.225	0.33	1	0.238	0.378	0.28	0.388	0.394	0.143	0.715	0.255	0.323	0.072	0.373
HGT.L	0.233	0.068	0.25	0.025	0.137	0.337	0.117	0.154	0.238	1	0.217	0.408	0.365	0.346	0.091	0.214	0.262	0.32	0.063	0.231
HSBA.L	0.311	0.017	0.334	0.144	0.2	0.622	0.037	-0.01	0.378	0.217	1	0.4	0.593	0.567	0.184	0.365	0.382	0.364	0.011	0.686
III.L	0.27	0.083	0.315	0.112	0.197	0.471	0.102	0.076	0.28	0.408	0.4	1	0.476	0.432	0.152	0.264	0.386	0.497	0.04	0.385
LLOY.L	0.327	0.033	0.354	0.045	0.257	0.767	0.099	0.05	0.388	0.365	0.593	0.476	1	0.782	0.162	0.328	0.447	0.43	0.055	0.587
NWG.L	0.373	0.062	0.373	0.027	0.249	0.735	0.099	0.11	0.394	0.346	0.567	0.432	0.782	1	0.116	0.345	0.362	0.394	0.053	0.542
QQ.L	0.105	-0.03	0.147	0.425	0.3	0.167	0.059	0.023	0.143	0.091	0.184	0.152	0.162	0.116	1	0.129	0.242	0.191	0.018	0.127
RIO.L	0.746	0.053	0.694	0.138	0.215	0.358	0.222	0.32	0.715	0.214	0.365	0.264	0.328	0.345	0.129	1	0.203	0.28	0.104	0.359
RR.L	0.212	0.029	0.256	0.2	0.282	0.46	0.073	0.035	0.255	0.262	0.382	0.386	0.447	0.362	0.242	0.203	1	0.353	0.017	0.379
SMIN.L	0.276	0.056	0.336	0.212	0.252	0.43	0.094	0.112	0.323	0.32	0.364	0.497	0.43	0.394	0.191	0.28	0.353	1	0.091	0.357
SRB.L	0.097	0.14	0.081	0.069	0.093	0.073	0.138	0.121	0.072	0.063	0.011	0.04	0.055	0.053	0.018	0.104	0.017	0.091	1	0.011

Figure 5 - Tracking Stocks Correlation Matrix Heatmap

Ticker	AZN.L	CCH.L	CCL.L	CMCX.L	DLG.L	DOM.L	DPLM.L	EDV.L	HBR.L	HSBA.L	HTWS.L	IBST.L	ITH.L	JD.L	NG.L	OXIG.L	PRTC.L	PSON.L	RIO.L	RR.L	SCT.L	SGE.L	SGRO.L	SHEL.L	SN.L	TEP.L	TRIG.L	TSCO.L	UTG.L	VOD.L
AZN.L	1	0.203	0.084	0.094	0.111	0.083	0.159	0.069	0.027	0.168	0.028	0.126	0.064	0.083	0.266	0.086	0.155	0.137	0.066	0.072	0.129	0.18	0.178	0.086	0.256	0.15	0.081	0.153	0.172	0.088
CCH.L	0.203	1	0.231	0.108	0.221	0.182	0.277	0.005	0.011	0.256	0.206	0.288	0.1	0.278	0.185	0.164	0.145	0.15	0.119	0.275	0.23	0.233	0.21	0.072	0.253	0.145	0.063	0.246	0.258	0.252
CCL.L	0.084	0.231	1	0.152	0.12	0.223	0.285	0.079	0.2	0.303	0.24	0.301	0.137	0.332	0.057	0.263	0.209	0.135	0.234	0.425	0.304	0.209	0.235	0.209	0.243	0.105	0.096	0.096	0.281	0.154
CMCX.L	0.094	0.108	0.152	1	0.124	0.134	0.244	0.138	0.067	0.131	0.151	0.184	0.07	0.19	0.035	0.165	0.153	0.058	0.107	0.148	0.212	0.049	0.199	0.093	0.226	0.112	0.093	0.148	0.184	0.123
DLG.L	0.111	0.221	0.12	0.124	1	0.152	0.187	0.062	0.067	0.211	0.13	0.193	0.039	0.177	0.136	0.134	0.117	0.105	0.114	0.193	0.176	0.106	0.194	0.153	0.153	0.094	0.19	0.183	0.204	0.185
DOM.L	0.083	0.182	0.223	0.134	0.152	1	0.273	0.13	0.077	0.147	0.21	0.259	0.082	0.242	0.122	0.253	0.133	0.057	0.14	0.184	0.295	0.146	0.276	0.056	0.173	0.14	0.201	0.179	0.296	0.139
DPLM.L	0.159	0.277	0.285	0.244	0.187	0.273	1	0.109	0.049	0.163	0.273	0.384	0.106	0.393	0.161	0.391	0.209	0.155	0.163	0.16	0.483	0.43	0.43	0.034	0.282	0.198	0.238	0.206	0.37	0.133
EDV.L	0.069	0.005	0.079	0.138	0.062	0.13	0.109	1	0.097	0.037	0.074	0.042	0.094	0.098	0.091	0.064	0.109	0.014	0.222	0.073	0.124	0.056	0.154	0.086	0.033	0.032	0.104	0.073	0.141	0.061
HBR.L	0.027	0.011	0.2	0.067	0.067	0.077	0.049	0.097	1	0.235	0.078	0.197	0.434	0.092	-0.005	0.113	0.091	0.091	0.364	0.196	0.092	-0.005	0.05	0.556	0.085	0.111	0.087	0.092	0.113	0.195
HSBA.L	0.168	0.256	0.303	0.131	0.211	0.147	0.163	0.037	0.235	1	0.112	0.286	0.156	0.233	0.084	0.134	0.126	0.163	0.365	0.382	0.177	0.077	0.062	0.401	0.234	0.184	0.076	0.305	0.155	0.29
HTWS.L	0.028	0.206	0.24	0.151	0.13	0.21	0.273	0.074	0.078	0.112	1	0.311	0.071	0.299	0.06	0.3	0.16	0.072	0.086	0.181	0.269	0.156	0.348	0.001	0.168	0.214	0.232	0.174	0.322	0.131
IBST.L	0.126	0.288	0.301	0.184	0.193	0.259	0.384	0.042	0.197	0.286	0.311	1	0.136	0.338	0.097	0.354	0.161	0.173	0.229	0.321	0.34	0.228	0.36	0.187	0.276	0.252	0.233	0.261	0.383	0.256
ITH.L	0.064	0.1	0.137	0.07	0.039	0.082	0.106	0.094	0.434	0.156	0.071	0.136	1	0.113	0.071	0.208	0.107	0.079	0.206	0.141	0.06	0.013	0.15	0.359	0.073	0.149	0.084	0.047	0.137	0.214
JD.L	0.083	0.278	0.332	0.19	0.177	0.242	0.393	0.098	0.092	0.233	0.299	0.338	0.113	1	0.071	0.293	0.17	0.069	0.159	0.284	0.379	0.297	0.357	0.12	0.243	0.151	0.202	0.237	0.343	0.18
NG.L	0.266	0.185	0.057	0.035	0.136	0.122	0.161	0.091	-0.005	0.084	0.106	0.097	0.071	0.09	1	0.056	0.1	0.072	0.057	0.023	0.064	0.176	0.05	0.191	0.191	0.233	0.193	0.257	0.356	0.261
OXIG.L	0.086	0.164	0.263	0.165	0.134	0.253	0.391	0.064	0.113	0.134	0.3	0.354	0.208	0.293	0.09	1	0.226	0.072	0.163	0.216	0.345	0.265	0.337	0.046	0.271	0.212	0.198	0.102	0.275	0.103
PRTC.L	0.155	0.145	0.209	0.153	0.117	0.133	0.209	0.091	0.091	0.126	0.16	0.161	0.107	0.17	0.056	0.226	1	0.072	0.094	0.182	0.255	0.163	0.215	0.084	0.171	0.11	0.147	0.085	0.242	0.086
PSON.L	0.137	0.15	0.135	0.058	0.105	0.057	0.155	0.014	0.091	0.163	0.072	0.173	0.079	0.069	0.1	0.072	0.072	1	0.117	0.144	0.103	0.18	0.128	0.124	0.226	0.118	0.077	0.14	0.151	0.15
RIO.L	0.066	0.119	0.234	0.107	0.14	0.14	0.163	0.222	0.364	0.365	0.086	0.229	0.206	0.159	0.057	0.163	0.094	0.117	1	0.203	0.168	0.063	0.128	0.439	0.116	0.174	0.059	0.134	0.159	0.162
RR.L	0.072	0.275	0.425	0.148	0.193	0.184	0.16	0.073	0.196	0.382	0.181	0.321	0.141	0.284	0.023	0.216	0.182	0.144	0.203	1	0.26	0.123	0.16	0.345	0.256	0.147	0.115	0.179	0.288	0.231
SCT.L	0.129	0.23	0.304	0.212	0.176	0.295	0.483	0.124	0.092	0.177	0.269	0.34	0.06	0.379	0.064	0.345	0.255	0.103	0.168	0.26	1	0.386	0.417	0.111	0.258	0.191	0.19	0.185	0.381	0.091
SGE.L	0.18	0.233	0.209	0.049	0.106	0.146	0.43	0.056	-0.005	0.077	0.156	0.228	0.013	0.297	0.176	0.265	0.163	0.18	0.063	0.123	0.386	1	0.349	-0.015	0.228	0.139	0.149	0.154	0.272	0.069
SGRO.L	0.178	0.21	0.235	0.199	0.194	0.276	0.43	0.05	0.062	0.348	0.36	0.357	0.12	0.128	0.05	0.337	0.215	0.128	0.16	0.16	0.417	0.349	1	0.004	0.275	0.245	0.329	0.257	0.722	0.211
SHEL.L	0.086	0.072	0.209	0.093	0.153	0.056	0.034	0.086	0.556	0.401	0.001	0.187	0.359	0.12	0.05	0.046	0.084	0.124	0.439	0.345	0.111	-0.015	0.004	1	0.143	0.168	0.086	0.134	0.127	0.222
SN.L	0.256	0.253	0.243	0.226	0.153	0.173	0.282	0.033	0.085	0.234	0.168	0.276	0.073	0.243	0.191	0.271	0.171	0.226	0.116	0.256	0.258	0.228	0.275	0.143	1	0.143	0.129	0.204	0.273	0.18
TEP.L	0.15	0.145	0.105	0.112	0.094	0.14	0.198	0.032	0.111	0.184	0.214	0.252	0.149	0.151	0.233	0.212	0.11	0.118	0.174	0.147	0.191	0.139	0.245	0.168	0.143	1	0.19	0.164	0.3	0.236
TRIG.L	0.081	0.063	0.096	0.093	0.19	0.201	0.238	0.104	0.087	0.076	0.232	0.233	0.084	0.202	0.193	0.198	0.147	0.077	0.059	0.115	0.19	0.149	0.329	0.086	0.129	0.19	1	0.1	0.317	0.179
TSCO.L	0.153	0.246	0.096	0.148	0.183	0.179	0.206	0.073	0.092	0.305	0.174	0.261	0.047	0.237	0.257	0.102	0.085	0.14	0.134	0.179	0.185	0.154	0.257	0.134	0.204	0.164	0.1	1	0.257	0.302
UTG.L	0.172	0.258	0.281	0.184	0.204	0.296	0.37	0.141	0.113	0.155	0.322	0.383	0.137	0.343	0.356	0.275	0.242	0.151	0.159	0.288	0.381	0.272	0.722	0.127	0.273	0.3	0.317	0.257	1	0.214
VOD.L	0.088	0.252	0.154	0.123	0.185	0.139	0.133	0.061	0.195	0.29	0.131	0.256	0.214	0.18	0.261	0.103	0.086	0.15	0.162	0.231	0.091	0.069	0.211	0.222	0.18	0.236	0.179	0.302	0.214	1

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