

PORTFOLIO FINANCE REPORT

BT2201 Finance Assignment

Group 37

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This report aims to provide potential investors with 2 portfolio options according to their risk appetite. We ran a thorough analysis of various ETF returns over the past 20 years and manipulated the data accordingly. We then performed regression with Fama French Models to derive expected returns for each ETF followed by calculating the weights for the various portfolios.

The allocation for each portfolio is rebalanced at the start of every year through the Portfolio Analytics package so as to maintain the same optimal portfolio weights despite price movements in each asset so to as maximise risk-adjusted returns. Backtesting demonstrates that this strategy yields higher returns compared to portfolios that are not rebalanced. As such, our portfolio returns are calculated with the consideration of rebalancing.

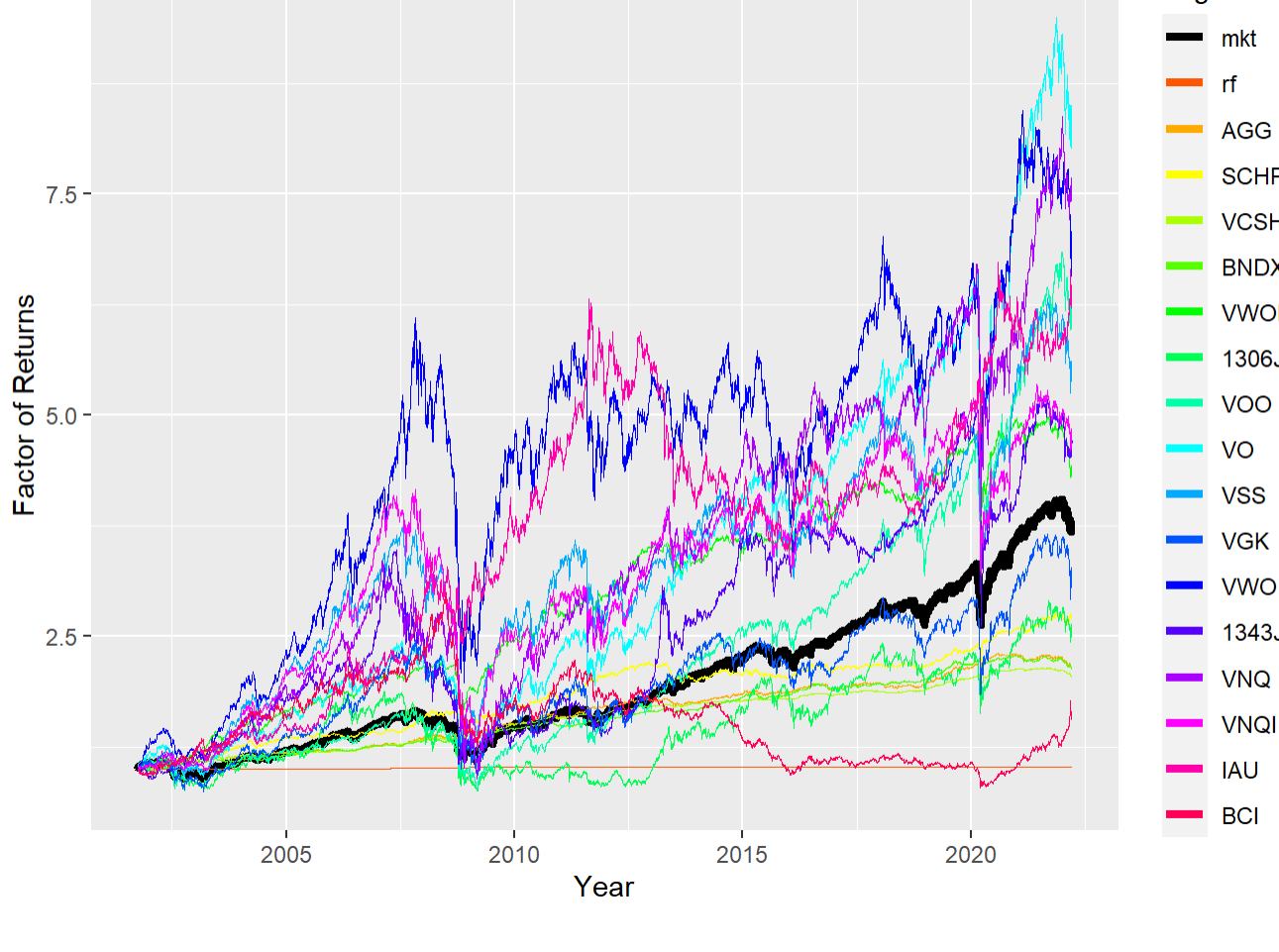
Twenty year annualised change in USDJPY

x
USDJPY.Currency0.9932928

20 YEAR ANNUALISED RETURNS WITH CORE CHARACTERISTICS

	AssetClass	Benchmark	Annualised 20 Year Returns (%)	Fees (%)	Risk Spread (Proxy for Liquidity)
AGG US Equity	US Bond Market	LBUSTRLU Index	3.46	0.040	0.02
SCHP US Equity	US Inflation Protected Bonds	LBUSTRLU Index	4.54	0.050	0.01
VC3H US Equity	US Corporate Bonds	BUCETRLU Index	3.13	0.040	0.01
BNXG US Equity	Global Bond Market	BGRCETRLU Index	3.36	0.070	0.01
VWOG US Equity	Emerging Market Bonds	BURCETRLU Index	7.33	0.200	0.08
1306.JT Equity	Japanese Market Equity	TPX Index	5.14	0.088	0.10
VDO US Equity	US Large Cap Growth Equities	SPX Index	8.77	0.030	0.02
VO US Equity	US Mid Cap Equity	CRSPMT Index	10.13	0.040	0.13
VSS US Equity	Global Small Cap excluding US Equity	TGPMWNU Index	8.36	0.070	0.29
VOK US Equity	European Market Equity	ACER Index	5.41	0.080	0.03
VWU US Equity	Emerging Markets Equity	FCDECF Index	8.62	0.080	0.01
1343.JT Equity	Japanese Real Estate	132REIT Index	8.80	0.155	0.40
VNQJ US Equity	US Real Estate	NZCYGDR Index	10.20	0.120	0.02
VNQ US Equity	Global Real Estate excluding US	SPRMGLNU Index	7.49	0.120	0.20
IAU US Equity	Gold	GOGLUMNU Index	8.80	0.350	0.01
BCI US Equity	Commodity Futures	BGDMTR Index	0.86	0.150	0.06

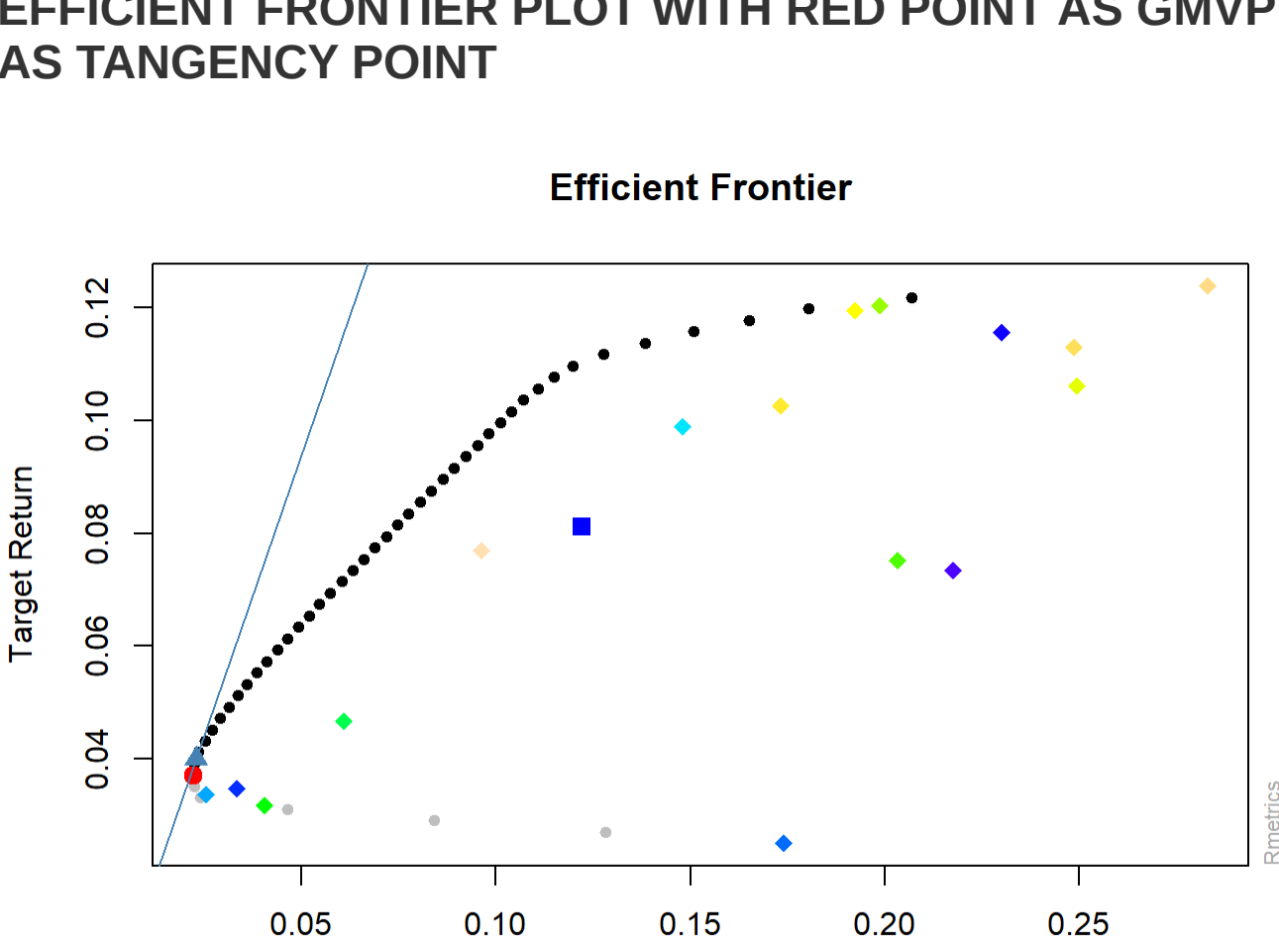
TIME SERIES RETURNS OF SECURITIES WITH MARKET IN BLACK



mUCAPM OF ETFS USING REGRESSION WITH FAMA FRENCH 5 FACTOR MODEL

	mUCAPM (%)
JT1306	7.34
JT1343	11.05
AGGUS	3.49
BCIUS	2.51
BNXGUS	3.37
IUAUS	9.89
SCHPUS	4.58
VC3HUS	3.18
VDOUS	7.52
VNQJUS	12.03
VNQUS	10.81
VOUS	11.95
VDOUS	10.26
VSSUS	11.30
VWOGUS	12.38
VWOGUS	7.49

EFFICIENT FRONTIER PLOT WITH RED POINT AS GMVP AND BLUE TRIANGLE AS TANGENCY POINT

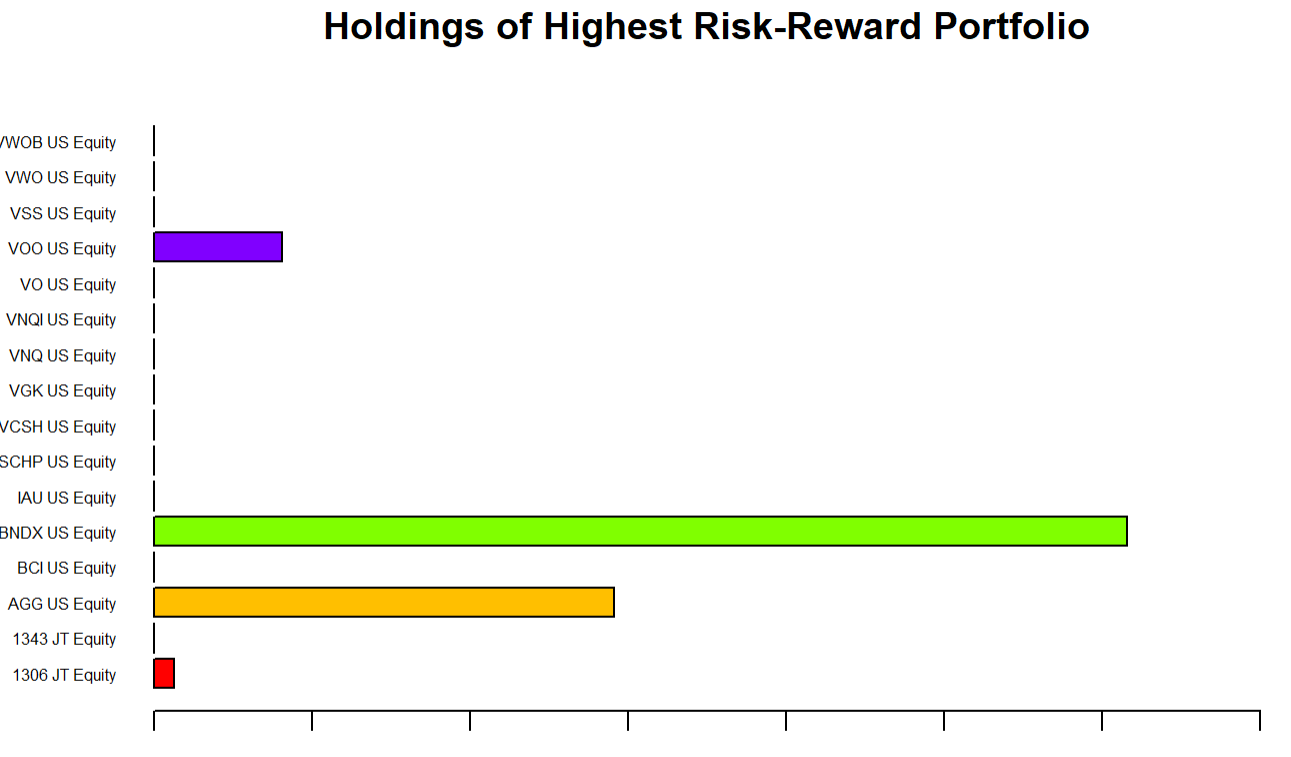


PORTFOLIO 1: HIGHEST RISK-REWARD PORTFOLIO WITH ANNUALISED RETURN OF 4.01%

RISK LEVEL : LOW

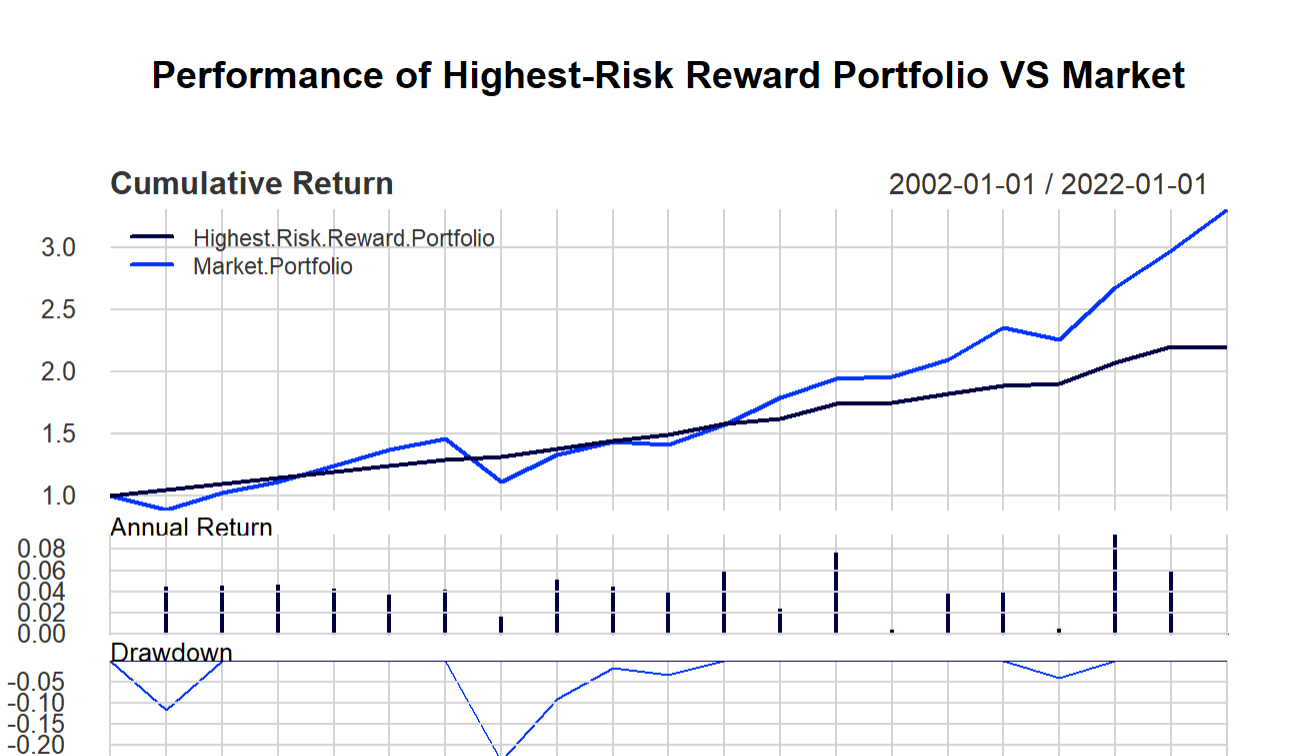
This portfolio optimises the risk to return ratio. This portfolio is best suited for those with cash holdings that seek to beat inflation but still achieve a higher return than risk free assets while minimizing their risk. To achieve this, the portfolio invests primarily in Global Market Bonds, US Market Bonds as well as US and Japanese Equity.

Holdings of Highest Risk-Reward Portfolio



	Weights(%)
1306.JT Equity	1.24
1343.JT Equity	0.00
AGG US Equity	29.11
BCI US Equity	0.00
BNXG US Equity	61.96
IUA US Equity	0.00
SCHP US Equity	0.00
VC3H US Equity	0.00
VOK US Equity	0.00
VNQJ US Equity	0.00
VNQ US Equity	0.00
VO US Equity	0.00
VDO US Equity	6.08
VSS US Equity	0.00
VWOG US Equity	0.00
VWOG US Equity	0.00

Performance of Highest-Risk Reward Portfolio VS Market

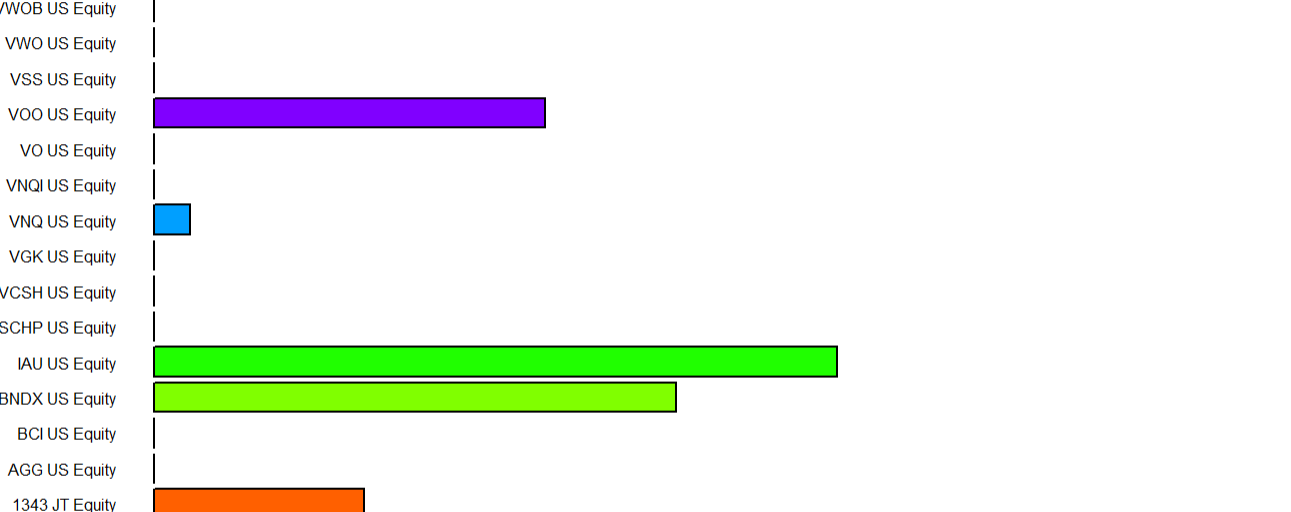


PORTFOLIO 2: MEDIUM-RISK PORTFOLIO WITH ANNUALISED RETURN OF 7.42%

RISK LEVEL : MEDIUM

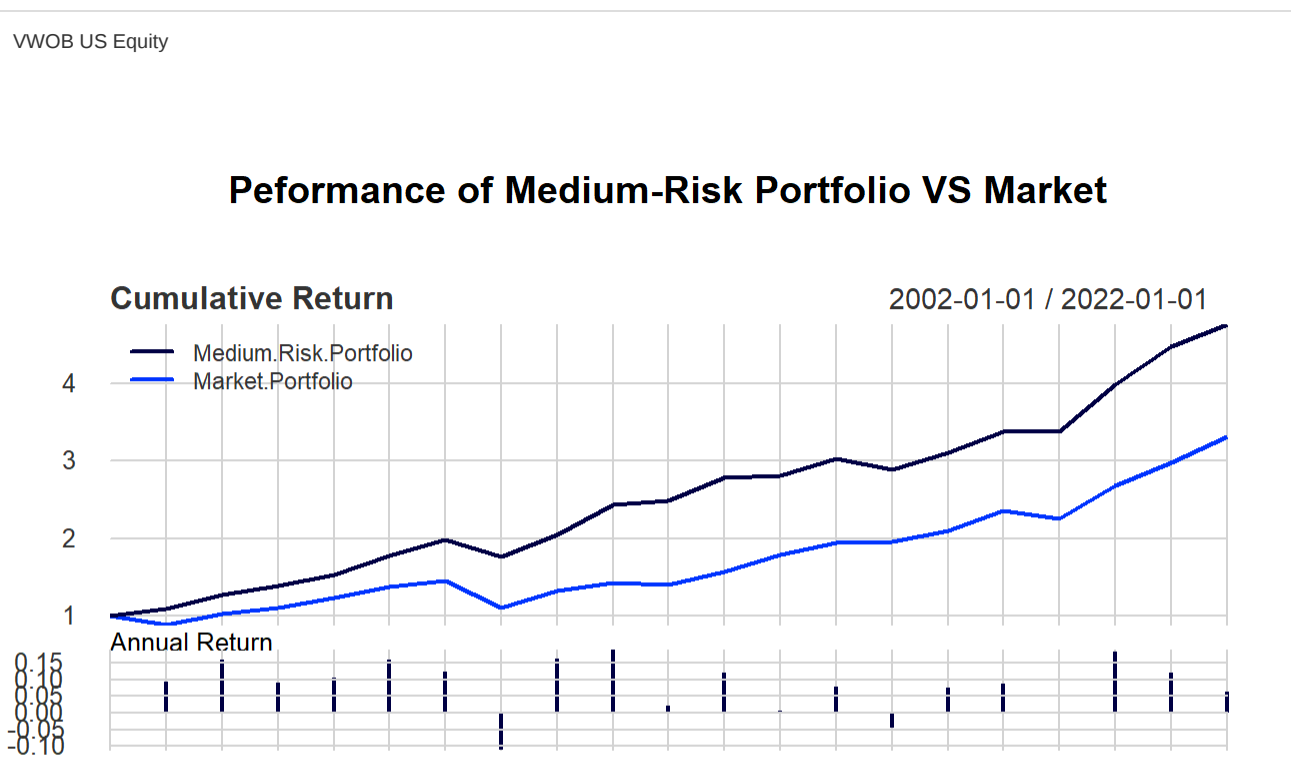
The investment objective of this portfolio is to achieve greater returns with lower risk as compared to the market's performance. This portfolio is the most suited for those who are seeking average returns with medium risk. To achieve this, the portfolio will invest in the Japanese and US Real Estate, Large Cap Growth Equities, Gold and US Bond Market.

Holdings of Medium-Risk Portfolio



	Weights(%)
1306.JT Equity	0.00
1343.JT Equity	11.41
AGG US Equity	0.00
BCI US Equity	0.00
BNXG US Equity	28.85
IUA US Equity	37.06
SCHP US Equity	0.00
VC3H US Equity	0.00
VOK US Equity	0.00
VNQJ US Equity	1.94
VNQ US Equity	0.00
VO US Equity	0.00
VDO US Equity	21.34
VSS US Equity	0.00
VWOG US Equity	0.00
VWOG US Equity	0.00

Performance of Medium-Risk Portfolio VS Market

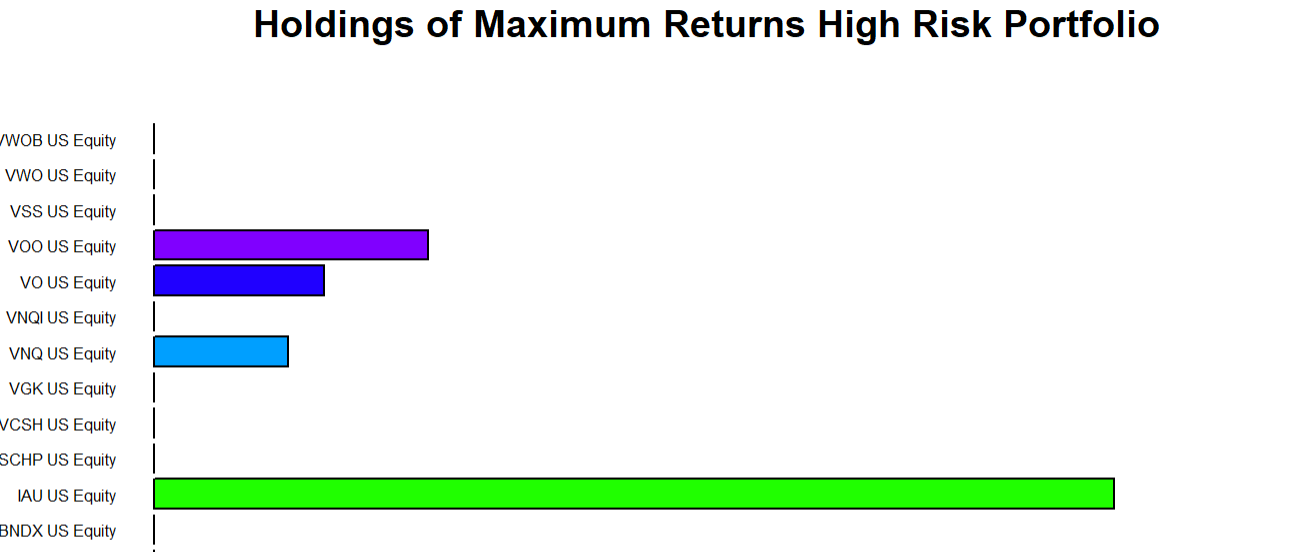


PORTFOLIO 3: MAX RETURN PORTFOLIO WITH ANNUALISED RETURN OF 10.05%

RISK LEVEL: HIGH

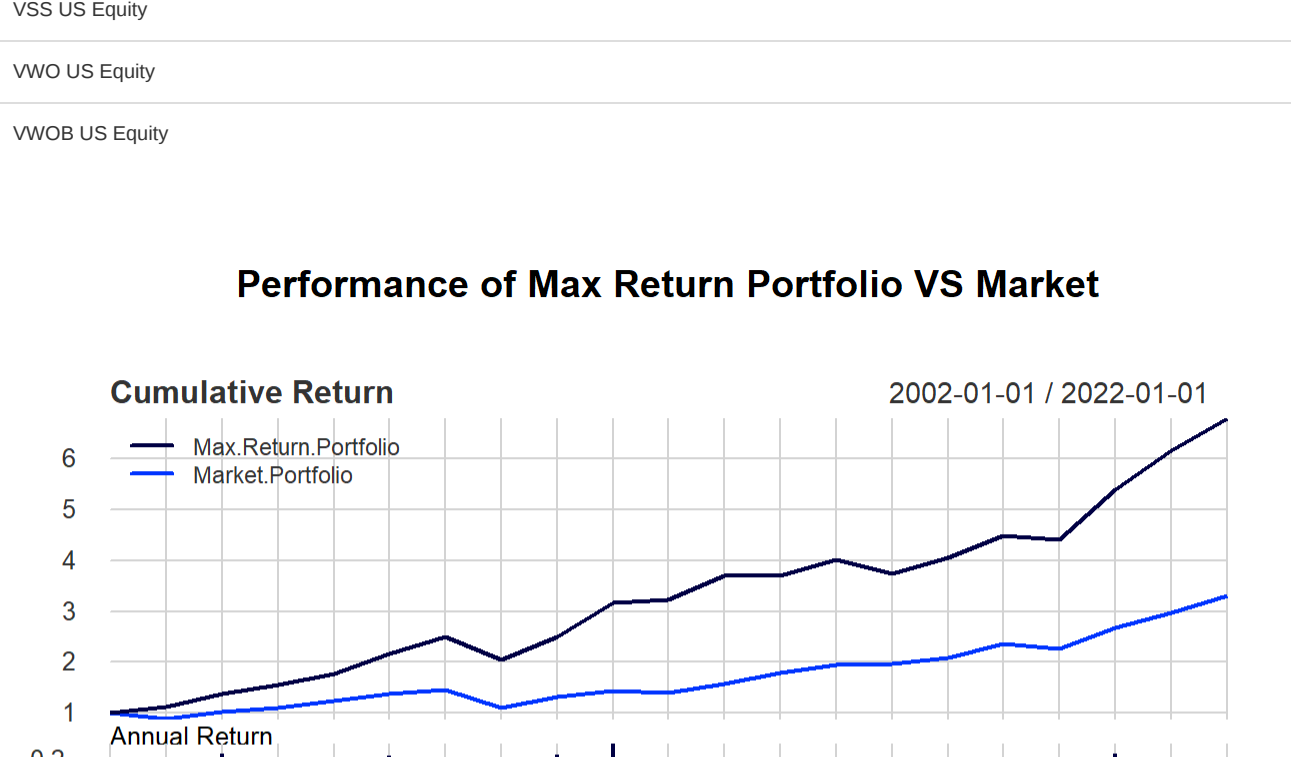
The investment objective of this portfolio is to produce a high overall total return. This portfolio is the most suited for those with the highest risk appetite. To achieve this, the portfolio will invest in the Japanese and US Real Estate, Gold, US Mid Cap Equity as well as Large Cap Growth Equities Market. This portfolio guarantees a higher return as compared to the other two portfolios suggested and also outperforms the market portfolio.

Holdings of Maximum Returns High Risk Portfolio

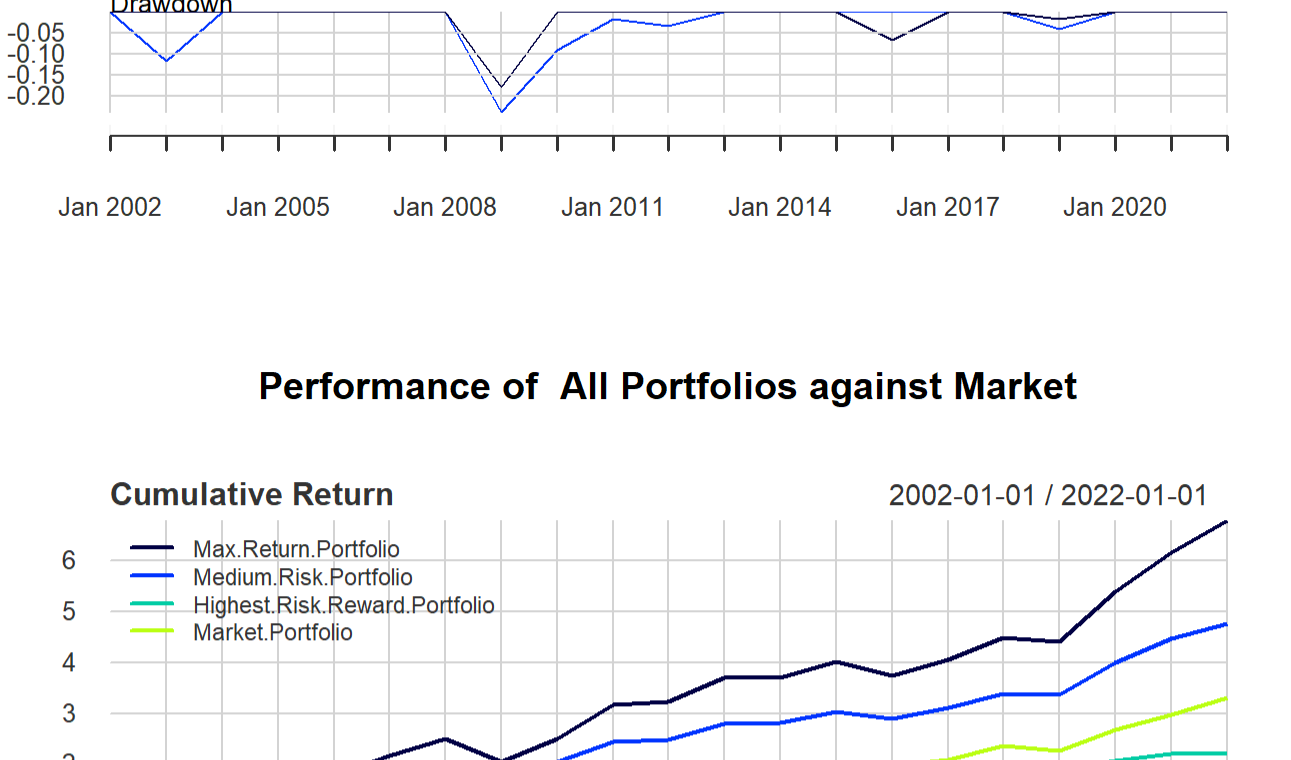


	Weights(%)
1306.JT Equity	0.00
1343.JT Equity	16.55
AGG US Equity	0.00
BCI US Equity	0.00
BNXG US Equity	0.00
IUA US Equity	62.09
SCHP US Equity	0.00
VC3H US Equity	0.00
VOK US Equity	0.00
VNQJ US Equity	7.25
VNQ US Equity	0.00
VO US Equity	9.21
VDO US Equity	14.89
VSS US Equity	0.00
VWOG US Equity	0.00
VWOG US Equity	0.00

Performance of Max Return Portfolio VS Market



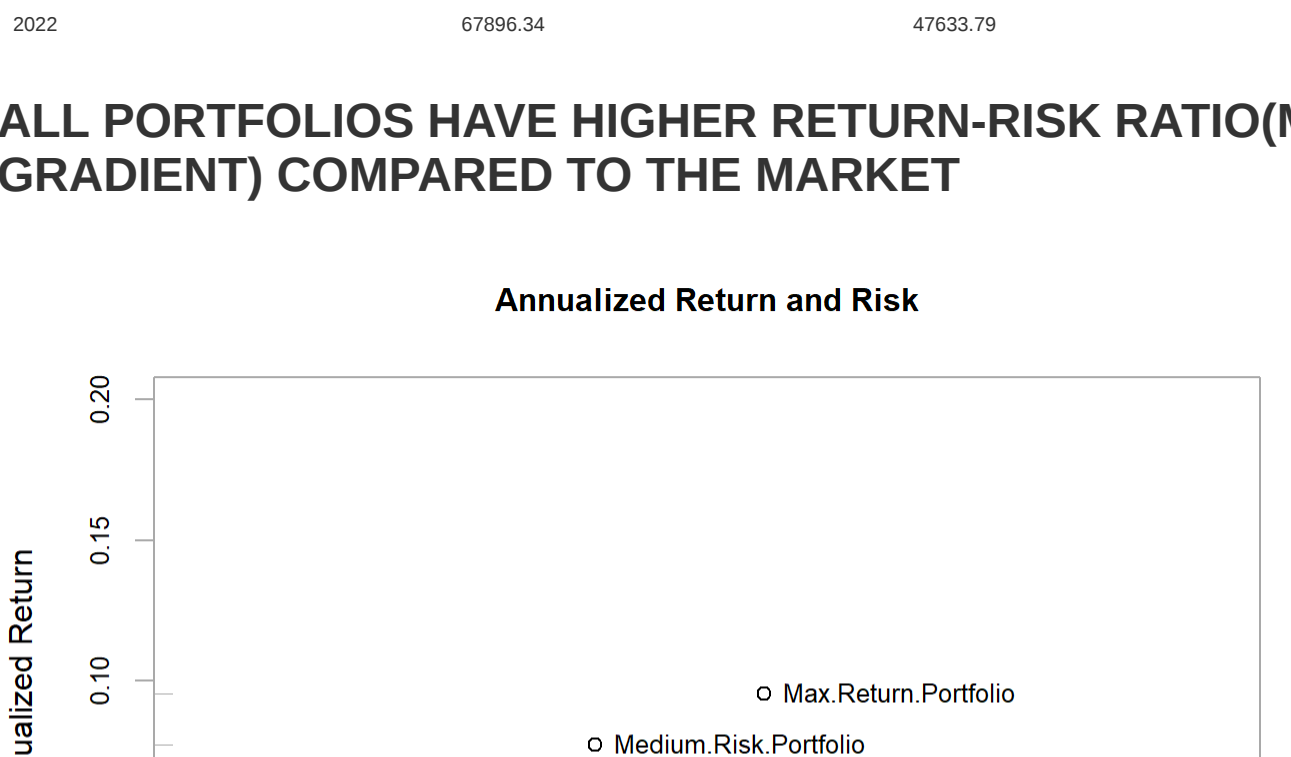
Performance of All Portfolios against Market



Growth of initial 10,000 YEN capital over time for portfolios against market

	Max Return Portfolio	Medium-Risk Portfolio	Highest Risk-Reward Portfolio	Market
2002	10000.00	10000.00	10000.00	10000.00
2003	11287.25	10807.90	10448.41	8828.91
2004	13839.50	12880.05	10929.01	10234.83
2005	15911.82	13859.37	11458.71	11106.72
2006	17798.35	15288.10	11928.09	12064.31
2007	21098.59	17706.90	13270.06	13707.44
2008	24907.59	18666.12	13884.26	14856.90
2009	20434.73	17607.81	13099.01	11116.79
2010	25008.04	20511.15	13789.48	14216.62
2011	31754.68	24375.17	14378.43	14216.64
2012	32214.06	24881.28	14940.03	14106.93
2013	36950.08	27872.57	15821.01	15684.31
2014	38987.50	28965.50	16396.88	17505.47
2015	40048.16	30274.94	17432.48	19418.10
2016	37370.38	28938.45	17511.90	18622.58
2017	49024.64	31110.89	18183.63	20863.82
2018	44028.89	33825.09	18884.16	22568.42
2019	44030.70	35728.50	19933.14	22568.42
2020	53883.87	36690.35	20753.97	20756.52
2021	61831.74	44743.34	21978.91	28776.10
2022	67896.34	47632.79	21998.44	30688.15

ALL PORTFOLIOS HAVE HIGHER RETURN-RISK RATIO(MEASURED BY GRADIENT) COMPARED TO THE MARKET



Some other Alternative ETFs we considered but did not have the data for:

1. GLDM (SPDR Gold MiniShares Trust) [to replace IAU (iShares Gold Trust)] GLDM has a lower expense ratio (0.18%) compared to IAU (0.25%). And among the other Gold ETFs that has an expense ratio of around 0.18%, GLDM has the higher AUM.

2. SCHH (Schwab US REIT ETF) [to replace VNQ Vanguard Real Estate ETF] SCHH has a lower expense ratio of 0.07% compared to VNQ (0.12%). There is however some underperformance by SCHH compared to the benchmark which requires further DD to be done.

3. BITO ProShares Bitcoin Strategy ETF BITO was released in 2021 and tracks the performance of Bitcoin via BTC future contracts. Although it only tracks Bitcoin, Bitcoin is the largest cryptocurrency in this asset class. However, more data is required before we can perform a detailed optimisation and come to an effective conclusion.