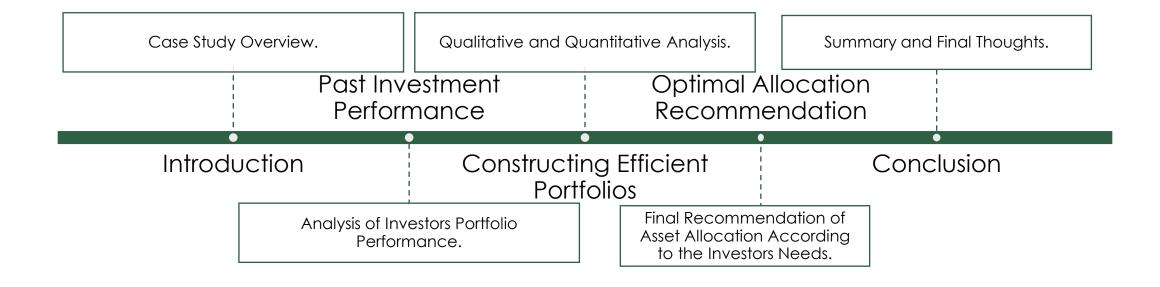
Strategic Asset
Allocation
during Global
Uncertainty



## Agenda



### Introduction

- Financially literate investor based in Singapore.
- We assume the investor to be risk averse.
- The investor is evaluating whether to reallocate his portfolio due to upcoming tuition expenses for his two daughters.
- Refrained from investing into the US market after the financial crisis.
- As of 2017 market outlooks for Europe, India, China and the US remain uncertain.
- Broker sent information, now investor considers reshuffling his portfolio based on the recommended securities and putting more weights into the US.
- Current portfolio makeup unknown.
- Before answering whether he should reshuffle, let's have a look at his portfolios past performance!

### Past Investment Performance

#### **Assumptions:**

- Investor has been making annual contribution of ~\$10,000.00, based on his current contribution.
- He views the \$10,000.00
   contribution as sunk cost and is indifferent to whether he is able to retain the contributions or spend it on his children's tuition.

Initial Investment Per	formance:
Portfolio T(-20):	100000
Portfolio T0:	500000
Years:	20
Annual Contr.:	10000
CAGR:	4.19%
Cum. Return:	127.24%

Investor vs. STI Index					
Metric	Index	Investor	Delta		
CAGR	1.30%	4.19%	2.89%		
Cum. Return:	29.52%	127.24%	97.72%		

Investor vs. SP500 Index					
Metric	Index	Investor	Delta		
CAGR	5.71%	4.19%	-1.52%		
Cum. Return:	203.77%	127.24%	-76.53%		

#### Findings:

- The investor outperforms his native STI index, while underperforming the S&P500.
- The exact makeup of his portfolio is not clear, therefore we assume broad stock indices to be valid barometers of performance.

# Past Investment Performance Projection – Expense/Return Scenarios

Expense/Return Scenarios										
Time:		0		1		2		3		4
Estimated Expenses:		0	SGD	(30'000)	SGD	(60'000)	SGD	(60'000)	SGD	(30'000)
Annual Savings:	SGD	10'000	SGD	10'000	SGD	10'000	SGD	10'000	SGD	10'000
Base Case Portflio:	SGD	531'367	SGD	532'791	SGD	503'018	SGD	471'998	SGD	470'934

- Performance in the next 5 years:
  - In our base case, we assume the investor continues to contribute 10k annually and earn the same mean returns.
  - Based on the estimated expenses, his portfolio will shrink in size by 30k or about 6%.
  - If he is willing to incur the 6% loss and could potentially harvest certain losses for tax purposes, not rebalancing could be an option.

## Past Investment Performance Projection

#### Portfolio Value Assuming 5.2% Annual Return & Net Cash Flows

Time:		t0		t1		t2		t3		t4
Period Begin:	SGD	510'000	SGD	516'520	SGD	493'379	SGD	469'035	SGD	473'425
Period End:	SGD	536'520.00	SGD	543'379	SGD	519'035	SGD	493'425	SGD	498'043

- Given the outflows in the near future, the investor needs to earn around 5.2% per year in order to maintain the t0 balance of ~\$\$500k by the time his daughters both graduate from college.
- In this scenario, the investor is able to pay the tuition and not have to draw on his current principle.
  - He will, however, lose the annual 10k contribution (due to tuition expenses of \$\$50k, while the rest would be covered by the additional gains from rebalancing with the target return of 5.2% using a combination of the suggested funds.

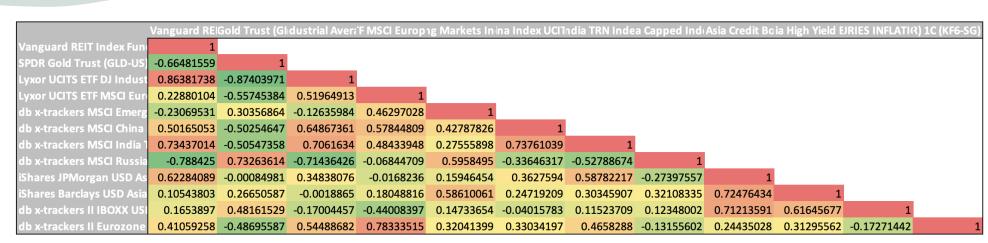
### Optimal Asset Allocation – E[r] = 5.20%

Optimal Portfolio Weights to Limit Principal	Drawdown
Stock	Weight
Lyxor ETF DJ Industrial Average	34.89%
Lyxor ETF MSCI Europe	0.00%
MSCI Emerging Markets Index	0.00%
MSCI China Index	0.00%
MSCI India TRN Index	0.00%
MSCI Russia Capped Index ETF	0.00%
iShares JPMorgan Asia Credit Bond Index	9.13%
iShares Barclays Asia High Yield Bond Index	0.00%
USD TREASURIES INFLATION-LINKED ETF	36.00%
Eurozone Government Bond ETF	11.32%
Vanguard REIT Index Fund	8.67%
SPDR Gold Trust	0.00%

Portfolio Stats		
Port Std:	4.99%	
E[r]:	5.20%	
Sharpe Ratio:	0.87	

- In order to achieve his financial goals, the investor would not need to take on a high level of risk.
- Since his profile leans towards risk averse, this allocation fits his risk profile rather well.
- The solver suggests allocating heavily to fixed-income and developed market indices.

### Adding Two Alternative Investment Vehicles – Pros & Cons



Asset	Beta
GLD	-0.05
REIT	1.3

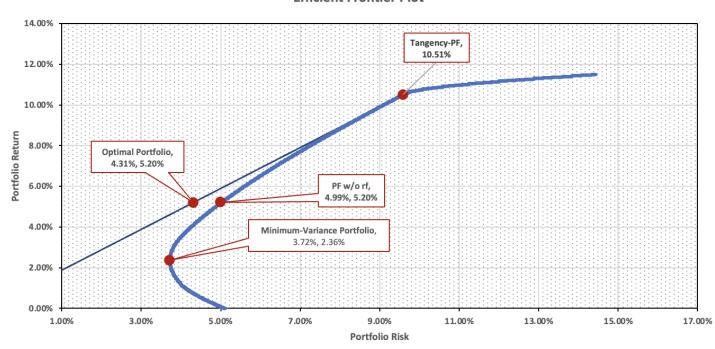


- Diversification benefits
- Gold and Real Estate rely less on market developments
- High negative correlation of Gold to other ETFs
- Rather low correlation between REIT and ETFs
- Gold is a safe-haven
- Due to low, negative beta, Gold will hedge portfolio
- · Real Estate Fund embodies tangible asset

- Investor refrained from investing in the US market after the financial crisis, would he take the risk of another real estate bubble?
- Market outlooks are uncertain Gold does not generate any value or profit
- Hedging the portfolio with gold is in our case due to its beta almost zero. It could reduce volatility of the portfolio, however, it couldn't recover high drawdowns.
- RFIT is more volatile than the market

### Optimal Asset Allocation – Minimum-Variance Portfolio

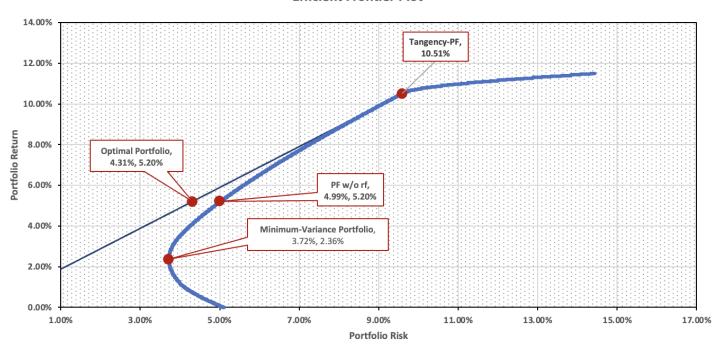
#### **Efficient Frontier Plot**



Optimal Minimum-Variance Portfolio Weights			
Stock	Weight		
Lyxor ETF DJ Industrial Average	13.75%		
Lyxor ETF MSCI Europe	0.00%		
MSCI Emerging Markets Index	0.00%		
MSCI China Index	0.00%		
MSCI India TRN Index	0.00%		
MSCI Russia Capped Index ETF	0.00%		
iShares JPMorgan Asia Credit Bond Index	21.78%		
iShares Barclays Asia High Yield Bond Index	5.44%		
USD TREASURIES INFLATION-LINKED ETF	48.92%		
Eurozone Government Bond ETF	10.10%		
Vanguard REIT Index Fund	0.00%		
SPDR Gold Trust	0.00%		

## Optimal Asset Allocation – Tangency Portfolio

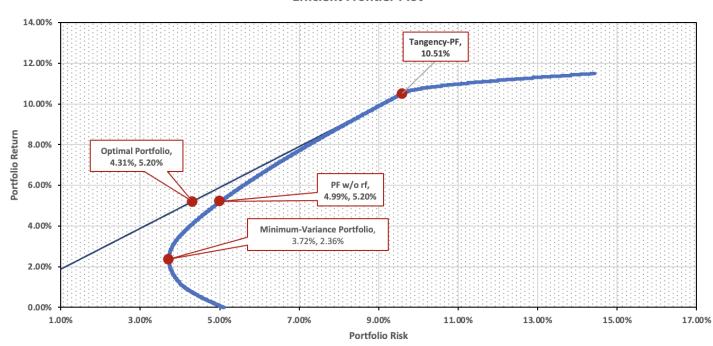
#### **Efficient Frontier Plot**



TANGENCY PORTFOLIO			
Stock	Weight		
Lyxor ETF DJ Industrial Average	62.08%		
Lyxor ETF MSCI Europe	0.00%		
MSCI Emerging Markets Index	0.00%		
MSCI China Index	0.00%		
MSCI India TRN Index	0.00%		
MSCI Russia Capped Index ETF	0.00%		
iShares JPMorgan Asia Credit Bond Index	0.00%		
iShares Barclays Asia High Yield Bond Index	0.00%		
USD TREASURIES INFLATION-LINKED ETF	0.00%		
Eurozone Government Bond ETF	0.67%		
Vanguard REIT Index Fund	37.25%		
SPDR Gold Trust	0.00%		

## Optimal Asset Allocation - Optimal Portfolio with Risk Free Rate

#### **Efficient Frontier Plot**



Optimal Portfolio with risk free rate			
Weight rf	55.07%		
Weight TP	44.93%		
Return	5.20%		
SD	4.31%		
Sharpe-Ratio	1.00		

### Optimal Asset Allocation - Recommendation

Optimal Portfolio Weights to Limit Principal Drawdown			
Stock	Weight		
Lyxor ETF DJ Industrial Average	34.89%		
Lyxor ETF MSCI Europe	0.00%		
MSCI Emerging Markets Index	0.00%		
MSCI China Index	0.00%		
MSCI India TRN Index	0.00%		
MSCI Russia Capped Index ETF	0.00%		
iShares JPMorgan Asia Credit Bond Index	9.13%		
iShares Barclays Asia High Yield Bond Index	0.00%		
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SPDR Gold Trust	0.00%		

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SPDR Gold Trust	0.00%

Portfolio Stats	
Port Std:	4.99%
E[r]:	5.20%
Sharpe Ratio:	0.87

- If he is unwilling or unable to invest at the Risk Free Rate, we suggest reallocating his portfolio to the portfolio optimized to prevent principal drawdown.
  - If able to invest at RFR, we suggest splitting between the risk free asset and the portfolio of risky assets.
- While the minimum variance portfolio suggests a portfolio optimized for volatility, it is not the right fit for our investor.



#### Conclusion

- While the minimum variance portfolio is the optimal distribution, it is not suitable for this investor's needs.
- The tangency portfolio is the optimal risky portfolio, which for this basket of securities is a roughly two to one split between DJ and VNQ.
- Using this basket of stocks, the investor is able to build several portfolios which can assist in achieving his financial goals with manageable levels of risk.
- If the investor chooses to allocate towards the risk free asset, he can achieve the 5.2% necessary to preserve his principal while lowering his portfolio risk.