In this video, Retsef takes the concepts you have covered thus far in the program, along with the new concept of correlation and illustrates how analytics can help to better inform investment decisions for a portfolio of stocks.

In the video you just watched, Retsef mentions risk measures. For more information on this concept, please see the following resources:

- **Expected Shortfall (CVaR) (https://en.wikipedia.org/wiki/Expected_shortfall)** . Wikipedia.
- **Risk Measure. (https://en.wikipedia.org/wiki/Risk_measure)** Wikipedia.
- **Value at Risk. (https://en.wikipedia.org/wiki/Value_at_risk)** Wikipedia.

Discussion 3.1: Selecting your Portfolio [20

Minutes]

🎯 Learning Outcome Addressed:

- Use an empirical distribution from the data.

This is a required activity and will count toward course completion.

You have now learned how to interpret risk and calculate the expected return from stocks such as Walmart, Amazon, and Home Depot. Based on the analysis Retsef performed in Video 3.2 regarding these three stocks, how would you configure your portfolio if you were investing your own money? In this discussion, reflect on the analytic tools you've become familiar with and the readings introduced throughout this module to develop a response and reasoning for your portfolio choice.

Be sure to read the statements posted by your peers. Engage with them by responding with thoughtful comments and questions to deepen the discussion.

Suggested Time: 20 minutes

Rubric: Discussion 3.1

Criteria	Exceeds expectations	Meets expectations	Below expectations
Thoughtful and complete response to the question(s)	**4 pts** Fully responds to the question(s), post is supported by connections to the reading and real-life examples, and post makes additional connections to the field of data engineering with novel ideas, critical thinking, or extensive application of how to use the topic in future work.	**3 pts** Fully responds to the question(s), and post is supported by connections to the content or real-life examples.	**0 pts** Partially responds to the question(s), or connections to the content are missing or vague.
Engagement with the learning community	**2 pts** Posts thoughtful questions or novel ideas to multiple peers that generate new ideas and group discussion.	**1.5 pts** Asks questions or posts thoughtful responses to	**0 pts** No responses to peers or posts minimal or vague responses to peers

		generate a single peer's response.	that do not motivate a response (e.g., "I agree.").

Search entries or author | Unread | Subscribed

Reply

Javier Di (https://classroom.emeritus.org/courses/9054/users/226884)

Apr 11, 2024

I would personally divide the portfolio between Amazon and Home Depot to get the benefits of diversification/ correlation, while excluding Wall-Mart which has a very low expected return/risk ratio historically.
Then based on the individual expected returns and risks of Amazon & Home Depot I would chose the individual weightings for the 2 stocks to maximize the expected return/ risk relationship in this portfolio. A 50/50% portfolio allocation for each stock would seem reasonable to me.
The historical data presented showed that Amazon and Home Depot do not move together each month, which gives the benefits of diversification and changes of obtaining positive returns for a higher % of the time.

A particular interesting real life application of this concept is the Ray Dalio All Weather portfolio which produces positive returns in almost every year by implementing a portfolio of stocks, long term and short term bonds, commodities and gold and a superior risk/reward given negative correlations between asset classes (depending on inflation, macro, growth, etc)

	Amazon	Home Depot
Expected Returns	3.23%	2.04%
Risk	8.40%	5.26%
Coefficient Variation	2.6x	2.6x

Weights	50.0%	50.0%		WA Totals
WA Returns	1.6%	1.0%	WA Returns	2.6%
WA Risk	4.2%	2.6%	WA Risk	6.8%
			Return/ Risk	0.39x

Edited by **Javier Di (https://classroom.emeritus.org/courses/9054/users/226884)** on Apr 11 at 2:55am

Reply (1 like)

Mariana Flores (https://classroom.emeritus.org/courses/9054/users/237198)

Apr 13, 2024

Hi Javier, so nice to meet you. Great post, diversifying the portfolio between Amazon (AMZN) and Home Depot (HD) is a great way to maximize the risk-adjusted rate of return. I'm with you, the Ray Dalio All Weather portfolio is a great example especially as it is medium risk and has an average annual compound rate of 7.5% in the last few decades.

Evaluating securities through analytics is so informative – thank you for sharing.

Reply (1 like)

Roman Jazmin (https://classroom.emeritus.org/courses/9054/users/225803)

Apr 17, 2024

Being a conservative investor, I will only choose stocks based on their Coefficient of Variation (CV) and compare it with other stock's CV. Why? The CV will tell me the amount of risk assumed over, or in comparison to the expected return from an investment. You still need to evaluate every stock's (1) Risk Measure, and (2) determine each stock's Value at Risk (VaR).

Reply

Manjari Vellanki (https://classroom.emeritus.org/courses/9054/users/231480)

Apr 11, 2024

If I'm investing my own money, by collecting 60 months of historic data (2014 to 2019) and comparing between Amazon, Home Depot, and Walmart stocks:

Investment portfolios often include a mix of high and low risk investments. Riskier investments have the potential for bigger losses, but there is also the opportunity for larger gains. Low risk investments are seen as safer with smaller returns. High risk investments are hard to predict as there is inconsistency in given period. But the low-risk investments come with a certain amount of consistency. Again, it relies on various other factors like:

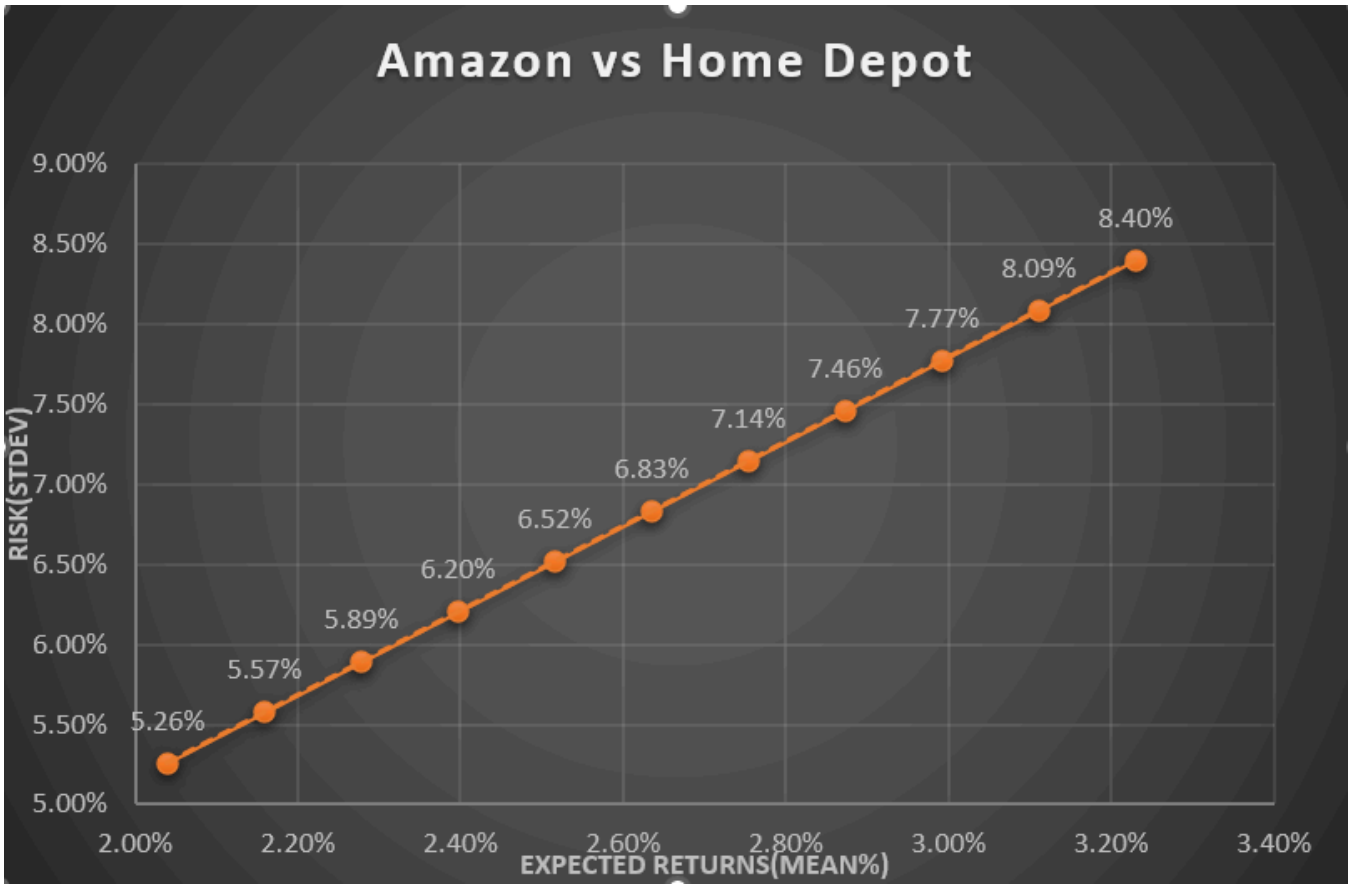
- Term of financial goals (long term vs short term)
- Volatility of stocks

Individual representation of stocks (Expected returns (Mean%) vs Risk):

Based on statistics that are derived from data, “Walmart” is not the best choice as it has low expected returns with high-risk percentages. I did little deeper between Amazon and Home Depot and tried to find out the relation between these two stocks by calculating the Expected returns (Mean %) and Risk (Standard deviation) at different weights of Amazon and HD:

AMZN	**Home Depot**	**Mean**	**std**
0%	**100%**	2.04%	5.26%
10%	**90%**	2.16%	5.57%

20%	**80%**	2.28%	5.89%
30%	**70%**	2.40%	6.20%
40%	**60%**	2.52%	6.52%
50%	**50%**	2.64%	6.83%
60%	**40%**	2.75%	7.14%
70%	**30%**	2.87%	7.46%
80%	**20%**	2.99%	7.77%
90%	**10%**	3.11%	8.09%
100%	**0%**	3.23%	8.40%



I found that Amazon and HD stocks are positively correlated and diversifying between these two stocks is not going to affect the outcome. I would rather configure my portfolio by investing 50% of investing money in Amazon and another 50% in Home Depot might give better results. My decision might change by learning through end of module 😊

Edited by Manjari Vellanki (https://classroom.emeritus.org/courses/9054/users/231480) on Apr 11 at 4:31pm

Reply (1 like)

(http

Diego Milanes (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/228518)

Apr 11, 2024

Hi Manjari,

Thank you for your analysis. I found it very complete. For the last plot, how did you compute the expected mean and risk from the combination of the two stocks? Could you provide more information about the procedure you have used? Thanks a lot

Reply

(http

Manjari Vellanki (https://classroom.emeritus.org/courses/9054/users/231480)

Apr 12, 2024

Hi Diego-

Thanks for your feedback. I have generated these plots using Excel Scatter chart by considering x-axis as combined expected returns at different weightage (Formula: Weightage of Amazon* Expected return(Mean%) of Amazon + weightage of HD * Expected return(Mean %) of HD) and did the same for y-axis (Stddev /Risk) .Calculated values were included in the table.

Hope it is helpful!

Reply

(http

Ricardo Anaya (https://classroom.emeritus.org/courses/9054/users/228915)

Apr 14, 2024

I was on the same mood, however 50% and 50% will have more risk , I went more into the safe 70% Home Depot and 30% Amazon

but choices are always though, It has less risk but also less returns...

I like your graph

Reply (1 like)

Manjari Vellanki (https://classroom.emeritus.org/courses/9054/users/231480)

Apr 15, 2024

Hi Ricardo-

Nice to meet you. Choices are always differ and eager to know the most beneficial portfolio configuration :)

Reply

Isabella Tockman (https://classroom.emeritus.org/courses/9054/users/207395)

Apr 26, 2024

Hi Manjari,

Your analysis is quite insightful, especially in demonstrating the correlation between Amazon and Home Depot stocks.

Reply

Manjari Vellanki (https://classroom.emeritus.org/courses/9054/users/231480)

Apr 26, 2024

Thanks Isabella !

Nice to meet you :)

Reply

Diego Milanes (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/228518)

Apr 11, 2024

As we do not have access to the data used in the video, I'll try to extrapolate some statistics from the empirical data to an analytical description and extract more information, and provide an informed suggestion on the portfolio.

1) From the video, the time series corresponding to the random variables 'return' looked, at first sight, like normally distributed. To confirm this, I took the information from the percentiles and compared it with the percentiles extracted, assuming that the returns behaved normally distributed with mean given by the expected return and standard deviation given by the risk. As observed in the table below, despite the numbers not being the same (statistical fluctuations are normal), the order of magnitude and the behaviour looked quite similar, and therefore I will suppose that the empirical data for the returns can be modeled, in a first approximation, as Gaussian distributions.

	Empirical information taken from the video			Based in normal distribution approximation		
	Empirical Q25	Empirical Q50	Empirical Q75	Normal Q25	Normal Q50	Normal Q75
Amazon	-2,12	4,05	8,19	-2,44	3,23	8,90
Homedepot	-1,30	1,65	6,00	-1,50	2,04	5,59
Walmart	-1,90	0,72	4,18	-2,55	1,08	4,71

2) With this model, we can study other statistics unavailable in the video. For instance, the probability of having a positive return (using 1-norm.cdf()) or analysing the Value-at-Risk (VaR) (using norm.ppf()), which corresponds to the return lost in a set of worst-case scenarios. The table below highlights the best (b) and worst (w) investments based only on the given statistics. For example, we can see that the VaR is very high for Amazon in the 10%, 5% and 1% of worst-case scenarios. With these numbers at hand, I'd suggest investing in Homedepot, which is the best in most statistics.

	Empirical information taken from the video			Based in normal distribution approximation			
	ExpReturn(%)	Risk(%)	CoeffVariation	P(Return>0) or zero VaR (%)	VaR of investment at worst 10% (%)	VaR of investment at worst 5% (%)	VaR of investment at worst 1% (%)
Amazon	3,23 (b)	8,4 (w)	2,60	65	7,5(w)	10,6(w)	16,3(w)
Homedepot	2,04	5,26 (b)	2,58(b)	65,1(b)	4,7(b)	6,6(b)	10,2(b)
Walmart	1,08 (w)	5,38	4,98(w)	58(w)	5,8	7,8	11,4

3) One can think of creating a portfolio of investments instead of targeting just one. Make sure you don't put all your eggs in the same basket. For this, a more complicated approach must be

taken. There are 3 variables to consider, which are A, H, W, the percentage of the total money that I plan to invest in each stock, and the addition of the three must be 100%. I'll consider that I initially have 100 USD. Thus, A, H and W will represent the money invested. On the other hand, we have the total return, which can be written as R = A*RA + H*RH + W*RW, where RX is the return for company X, which, in our case, is represented by the three random variables. My suggestion is to build a probability function for each of the allowed {A,H,W} combinations and compare a set of statistics for each model to decide as we did above. This sounds like overkill and not achievable in the 20 minutes suggested for this discussion. I hesitate to learn tools to solve this problem in the next modules!

Reply (2 likes)

○

(http

Diego Milanes (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/228518)

Apr 11, 2024

The lines of the tables weren't displayed. Sorry for that.

Reply

○

(http

Javier Di (https://classroom.emeritus.org/courses/9054/users/226884)

Apr 12, 2024

Thank you Diego and very good analysis. My only comment from the investing/ professional world would be that Value at Risk is not a metric used to pick individual stocks but rather assess the maximum one day loss you can have in a given portfolio, after that portfolio of stocks has been constructed.
I wouldn't mind a high value at risk which is a one day loss in exchange for a high expected yearly or monthly returns. Tech stocks like Amazon that are more volatile for example will offer a high VAR but also a high return for investors holding them through the year and are good stocks to hold in the portfolio.

Hope this helps, Javier

Reply

○

(http

Roy Nunez (https://classroom.emeritus.org/courses/9054/users/229552)

Apr 14, 2024

Hi Diego,

Thank you for sharing your analysis.

I agree that the Value-at-Risk for Amazon does put risk in perspective and make an argument for Home Depot as the preferred stock. I would agree with the pick if we are were for shorter term investments. I do think that the coefficient of variation provides another perspective to consider especially since its value for Amazon is very close to Home Depot's. Amazon has been a very rewarding stock for many longer term investors based on my personal observations in past years and based on the some of the values mentioned like the expected returns which are noteworthy. I do agree with you we should never all our eggs in one basket.

Reply

Haitham Farag (https://classroom.emeritus.org/courses/9054/users/233864)

Apr 12, 2024

Decision Points

Invest in one or more stocks?

What will be that one stock or those stocks (among the available 3 options)?

What would be the portfolio (stocks) diversification ratio?

Case Parameters

source Video 3.2: Portfolio Selection Problem Introduction

	mean	min	10th	25th	50th	75th	90th	max	range
Amazon	3.23%	-20.22%	-5.67%	-2.12%	4.05%	8.19%	13.35%	24.06%	44.28%
Home Depot	2.04%	-15.10%	-4.14%	-1.30%	1.65%	6.00%	8.26%	15.65%	30.74%
Wallmart	1.08%	-15.56%	-4.54%	-1.90%	0.72%	4.18%	7.43%	14.78%	30.34%

	Amazon	Home Depot	Walmart
Expected returns (mean)	3.23%	2.04%	1.08%
Risk	8.40%	5.26%	5.38%
Coefficient of variation	2.6	2.58	4.98

Decision Process

	Conservative	Moderate	Aggressive
Determine the personal tradeoff (between *Expected Return* and *Risk) threshold*	Highest Return (Mean) Lowest Risk (SD)	Highest Return at Moderate Risk	Highest Return
Determine the frequency of trading (buy/sell the same stock) relatively long-term holding vs speculative	Long-term holding	Long-term holding	Speculative (buy low sell high)
Invest in one or more stocks?	One stock	Two Stocks	Switch portfolio based on market situation (any of or a combination of the 3 options)
What will be that or those stocks (which stock/s to pick among the available 3 options)?	Home Depot	Amazon & Home Depot	Depends on the stock position opportunity e.g. go for the highest spread/range Amazon then Home Depot with the possibility (depending on stock price) to park capital in the Walmart stock while good positions become available.

			Use the percentile table to assess position entry and exit points.
What would be the ratio of diversification among the portfolio stocks?	Not applicable	Arbitrary (in the absence of a diversification model) 60%-70% Home Depot 40%-30% Amazon	The ratio of portfolio stocks is continuously changing.

Edited by **Haitham Farag** (https://classroom.emeritus.org/courses/9054/users/233864) on Apr 16 at 8:25am

Reply (1 like)

Timothy Andrew Ramkissoon (https://classroom.emeritus.org/courses/9054/users/226697)

Apr 16, 2024

This decision process is well thought out and clear. Much of it is in line with the answer I gave. Home Depot stocks for long term investment and Amazon for its high return possibility.

Reply

Haitham Farag (https://classroom.emeritus.org/courses/9054/users/233864)

Apr 16, 2024

Thank you for reviewing my response to the assignment and for the feedback.

Reply

Dawn Prewett (https://classroom.emeritus.org/courses/9054/users/233112)

Apr 16, 2024

I appreciated the very methodical way that you went about your decision(s). Using a matrix is a great way to see your options in a comparative format and can really help resolve analysis paralysis - at least for me. In the video it was mentioned that we were

only holding on to the stocks for a single month, so my analysis had held steady with that. Looking back, I think you may have recognized what I did not and included that as a variable as well, which definitely adds another layer of interest to your recommendations.

Reply

(http

Haitham Farag (https://classroom.emeritus.org/courses/9054/users/233864)

Apr 16, 2024

Thank you for the feedback. I missed the single-month holding to the sotck/s part. Entry price is a decisive consideration more so for short term investment (one month). I would not take a position in a stock where it's price is at the high end of its probable spread (SD) spectrum, even if that stock has the highest expected return.

Reply

(http

Isabella Tockman (https://classroom.emeritus.org/courses/9054/users/207395)

Apr 26, 2024

Hi Haitham,

I wanted to commend you on your detailed response, especially the inclusion of a table illustrating different types of investments, ranging from conservative to aggressive. It provided a clear and insightful overview of the various investment options. Great job!

Reply

(http

Haitham Farag (https://classroom.emeritus.org/courses/9054/users/233864)

May 14, 2024

Thanks Isabella for taking the time to review my response and the kind feedback.

Reply

(https:/

Yossr Hammad (https://classroom.emeritus.org/courses/9054/users/229118)

Apr 12, 2024

Given :

STOCK	AMAZON	HOME DEPOT	WALMART	
ER	3.23%	2.04%	1.08%	
RISK	8.40%	5.26%	5.38%	
C.V	2.6	2.58	4.98	

with the givens i would diversify between the three sectors would help manage the risk.
we can use the expected shortfall as a risk measure, as it measure the average loss of a prtfolio in the worst case scenario. we will need to minimize the ES or CVAR while having the highest level of return possible. we can calculate ES as follow
the confidence level is 5%, the expected shortfall is the same as their return as it is below 5% confidence level.
based on this i would allocate my portfolio as 40% amazon 30% home depot and 30% walmart.

Reply

Roman Jazmin (https://classroom.emeritus.org/courses/9054/users/225803)

Apr 13, 2024

If given a choice between Amazon, Walmart, and Home Depot, where I can only choose 1 stock to invest my money in, how will I determine which stock should I invest in?

From what I learn from the video presentation and after reading the resources from the given reading links, I would first derive or create a Standard Deviation of Expected Return table and enter 3 values, 1. Expected Returns, 2. Risk, and 3. the Coefficient of Variation, for each of the 3 stocks I am to choose from.

I am a conservative investor. Meaning I will only choose stocks that have a good balance of minimized risk with an acceptable percentage of Expected Returns. From the table, how would

I use the Coefficient of Variation (CV)? Well once I filter out all the stocks that have a good balance of minimized risk with an acceptable percentage of Expected Returns, I will use each stock's CV and compare it with other stock's CV.

The CV values or percentages will tell me the amount of risk assumed over, or in comparison to the expected return from an investment. As quoted from Investopedia.com, CVs that have "The lower the ratio of the standard deviation to mean return, the better risk-return tradeoff."

Looking at the chart given to us of the 3 values of the 3 given stocks, it looks like that Home Depot will be the best stock to invest in because its CV percentage has "the better risk-return tradeoff" compared to Amazon's or Walmart's CV values.

Am I done at this point? No, I will still need to assess every stock's (1) Risk Measure, which is the amount of currency that I would need to keep in reserve for a stock I want to invest that will be acceptable to a regulator, and (2) find out about each stock's Value at Risk (VaR) which is the measure of the probable loss a given stock might have under normal market conditions. The VaR gauges the amount of currency needed to cover the possible losses.

Given the fact that I was not given any stock's Risk Measure or their VaRs, I will rely on what values I have been given to evaluate , which is the stocks' CV percentages. As stated before, Home Depot has the best CV as compared to Amazon or Walmart. So, I would invest in Home Depot.

Reply (2 likes)

Mariana Flores (https://classroom.emeritus.org/courses/9054/users/237198)

Apr 13, 2024

Hi Roman, so nice to meet you. Great post, assessing expected return, risk, and coefficient of variation (CV) provides a great method to evaluate Amazon, Home Depot, and Walmart securities. I'm with you, when assessing through the coefficient of variation, investing on Home Depot makes sense.

Evaluating securities through analytics is so informative – thank you for sharing.

Reply

Mariana Flores (https://classroom.emeritus.org/courses/9054/users/237198)

Apr 13, 2024

Rational investors aim to maximize the return for the risk they incur. One way to minimize risk is through a diversified portfolio of securities which typically yields a superior risk-adjusted rate of return. Analytics can help to inform better investment decisions for a portfolio of securities by providing insights and guiding decisions. If I were to invest in a portfolio of securities considering three retail stocks – Walmart (WMT), Amazon (AMZN), and Home Depot (HD) and based on the analysis in Video 3.2 regarding these three stocks, I would evaluate the timeseries of return on the stocks over time including historical minimum return, maximum return, and range of return as well as the tradeoff between expected return and risk when configuring my portfolio.

Evaluating the Expected Return and Risk is vital when forming a good investment plan. Amazon (AMZN, 3.23%) also has the highest expected return with Walmart (WMT, 1.08%) having the lowest and Home Depot (HD, 2.04%) falling in between. However, Amazon (AMZN, 8.04%) also has the highest risk compared to Home Depot (HD, 5.26%) and Walmart (WMT, 5.38%). As a rational investor I would ultimately seek to maximize my return for the risk that I would be willing to take with the best risk-to-reward ratio as measured by the Coefficient of Variation (CoV). A lower ratio signals a more favorable tradeoff between risk and return, in this case, Home Depot (HD, 2.58) would be most favorable which is closely followed by Amazon (AMZN, 2.6) then Walmart (WMT, 4.98) with the highest ratio (and 1.98 and 1.91 the amount compared to Home Depot and Amazon respectively).

I would also take into consideration the Beta of each security and depending on the macro-economic conditions, I would adjust my portfolio accordingly. In times of economic uncertainty and duress, risk cannot be eliminated through diversification. Securities providing the highest return for a given amount of risk may mitigate systemic risk. Securities with a Beta lower than one are defensive stocks as is the Consumer Staples sector. Meaning that in times of macro-economic crises, these types of stocks will typically protect better against downside exposure and lose less. Conversely when the economy flourishes, its value is also less likely to outperform the broader market where stocks with a Beta greater than one would be more ideal in economic prosperity.

Based on these metrics and the expected return of the investments as well as the degree of volatility or downward risk I may be willing to experience over time, I would create a diversified portfolio of Walmart (WMT), Amazon (AMZN), and Home Depot (HD) securities to reach my investment goals taking into consideration my level of risk, expected return, risk-to-reward ratio, and macro-economic market conditions.

Reply (1 like)

(http

Dawn Prewett (https://classroom.emeritus.org/courses/9054/users/233112)

Apr 16, 2024

Your analysis is thorough and, based on some of your language, I'd guess that you've played the market a bit. I'd be curious to hear what two stocks you would pick for a relatively short horizon and what, if anything, you would add to the data mix.

Reply

Jignesh Dalal (https://classroom.emeritus.org/courses/9054/users/229173)

Apr 13, 2024

There are 3 options of retails store Amazon, Walmart and Home Depot which are currently publicly being traded on stock market. Now the idea is to if I were to invest 1000 dollar today and analyze them what stock option is better to invest into that being 2 stocks or 1 stock to expect best return at the end of the month.

Here I am trying to configure my portfolio based on current standing of stock with past 6 months of empirical/historical data of 6 months by applying the data science and statistics techniques that I have learned so far.

Understanding the cumulative closing price of each 3 stocks Amazon, Home Depot, Walmart. I tried to understand and process the standard deviation, risk measures and average return for stock by analyzing the historical stock prices over past 6 months.

Now calculating the daily return, to understand the standard deviation of there returns, which will give me an idea about volatility(Risk) and average return of the stock(Amazon, Walmart, Home Depot) to better decision making.

Code for analysis template:

```
Import numpy as np

import pandas as pd

#historical daily closing prices of stock for past 6 months

stock_prices=[numerical values ]

#calculate daily returns

stock_return = np.diff(stock_prices)/ stock_prices[:-1]

#calculate standard deviation of daily returns(volatility(Risk) of stock)
```

stock_std_dev = np.std(stock_return)

stock_std_dev

#calculate average return for each stock

stock_avg_return =np.mean(stock.return)

#create a table with standard deviation and average retun

data ={”Stock”: [”Amazon”, “Home Depot”, “Walmart”]

#repeat the stock names in array for output 3 times

“Standard Deviation” : [”stock_std_dev”]

#repeat the stock names in array for output 3 times

“Average Return” : [”stock_avg_return”]

}

investment_tabel = pd.DataFrame(data)

investment_tabel

To make better and informed decision there are few factors like volatility and average return to be analyzed.

Below table details are approx values and derived from above code template.

Stock	Standard Deviation	Average Return
Amazon	~0.036	0.0007
Home Depot	~0.016	0.0001
Walmart	~0.008	-0.0029

1. Volatility (Risk) - As we can see from findings Walmart shows the lowest volatility, indicating the least day-to-day price fluctuations and this the lowest risk among the three.
2. Average Return: Amazon has the highest return, although with higher vocality. Despite Walmart being less volatile and negative returns indicating a decrease in price on average period of time.

Conclusion:

Walmart being the safest choice shows negative returns, implies might not grow in value based on recent performance. Home Depot offers a middle ground with lower volatility than Amazon

and a positive average return. Amazon with higher risk level offer highest potential return. Eventually decision depends on the risk tolerance and investment goals. Home Depot is a safe choice compared to Walmart's negative return.

Now if we try to correlate and apply correlation coefficient measures between Amazon, Walmart and Home Depot to decide which 2 stocks are better to invest into.

#Code template to generate correlation

#create a data frame with all daily returns for correlation analysis

returns_data ={

"Amazon Returns": amzn_returns, "Home Depot Returns": hd_returns, "Walmart Returns": wmt_returns

}

return_df - pd.DataFrame(returns_data)

#calculate correlation matrix

correlation_matrix = returns_df.corr() correlation_matrix

Here is the correlation matrix for the daily returns of Amazon, Home Depot, and Walmart:

	Amazon Returns	**Home Depot Returns**	**Walmart Returns**
Amazon Returns	1.000	-0.186	0.188
Home Depot Returns	-0.186	1.000	-0.151
Walmart Returns	0.188	-0.151	1.000

Analysis:

- Amazon and Home Depot : Shows negative correlation suggesting good diversification.
- Home Depot and Walmart : Shows negative correlation, indicating a slight tendency to move inversely relative to each other.
- Amazon and Walmart : Shows positive correlation, suggesting their returns tends to move in same direction although the correlation is weak.

Time series graph to show daily return of Amazon and Home Depot over past six months:

****Please see the file attached for refrerence*****

The visualization supports that combination of Amazon and Home Depot might offer beneficial diversification, helping to balance the risk and return in investment strategy.

Now let's look into coefficient of variation to measure the relative variability that standardized the standard deviation by dividing it by average return.

Let's try to calculate the coefficient of variation for Amazon, Home Depot, Walmart.

#code to calculate coefficient of variation based on standard deviation and average return from pas values of Amazon, Walmart, Home Depot.

Calculate the coefficient of variation for each stock (CV = Standard Deviation / Mean)

investment_table['Coefficient of Variation'] = investment_table['Standard Deviation'] / investment_table['Average Return']

investment_table

Stock	Standard Deviation	Average Return	Coefficient of Variation
Amazon	0.036	0.0007	54.65
Home Depot	0.016	0.0001	259.34
Walmart	0.008	-0.0029	-2.79

Based on Coefficient of variation:

- Amazon : Returns more adequately compensate for risk involved.
- Home Depot: Less volatile, does not provide enough return relative to its risk.
- Walmart : Unfavourable due to negative return, impacting the risk-return profile negatively.

Quick Recap of Finding so far:

1. Volatility : Amazon being most volatile(0.036), Home Depot being the middle ground(0.016) and Walmart with lowest vitality(0.008).
2. Average Return : Amazon showing the most positive return with high risk, Home Depot with small positive return, and Walmart with negative return.
3. Correlation : Amazon and Home Depot showing negative correlation, suggesting return often moves in opposite direction, providing a natural risk hedge. Home Depot and Walmart also shows a negative correlation.
4. Coefficient of variance: Amazon return and risk is more favourable (54.56). Home depot showing higher coefficient suggesting higher risk for each unit(259.34). Walmart with negative return leads to be unfavourable.

Questions asked:

Why consider more than one stock:

- Spread your risk
- Balance the scales
- Capture more opportunities.
- Benefits of diverse portfolio
  - Shooting out the ride
  - Increase chances of reward
  - Harness growth from multiple sources

Conclusion :

Based on numbers, a balanced investment approach like Amazon and Home Depot, with their low correlation and differing performance characteristics, can manage risks better while harnessing growth from diverse sector. This strategy helps in achieving a healthier , more stable growth trajectory over long term.

Edited by Jignesh Dalal (https://classroom.emeritus.org/courses/9054/users/229173) on Apr 13 at 7:32pm

Screenshot 2024-04-13 at 9.29.18 AM.png (https://classroom.emeritus.org/files/2460192/download?download_frd=1&verifier=2ao4H71wGBWtxZQNHR1hhaMShiuEYVQVQXn6LAxF)

Reply (2 likes)

(http

Ricardo Anaya (https://classroom.emeritus.org/courses/9054/users/228915)

Apr 14, 2024

thanks for sharing the details and code.

great response and analitics, great conclusion by the way

Reply

(http

Haitham Farag (https://classroom.emeritus.org/courses/9054/users/233864)

Apr 16, 2024

Thanks for sharing the code, decision process and analysis.

Reply

https:/

Roy Nunez (https://classroom.emeritus.org/courses/9054/users/229552)

Apr 13, 2024

company	mean	min	10th	90th	max	range	**expected returns**	risk (standard deviation	coefficient of variation
Amazon (AMZN)	**3.23 %**	-20.22 %	-5.67 %	**13.35 %**	**24.06 %**	44.28 %	3.23%	8.40%	**2.6**
Home Depot (HD)	2.04 %	-15.10 %	-4.14 %	8.26%	15.65 %	30.74 %	2.04%	5.26%	2.38
Walmart (WMT)	1.08 %	-15.56 %	-4.54 %	7.43%	14.78 %	30.34 %	1.08%	5.38%	4.98

Based on these values and a longer investment term perspective, I would keep a portfolio heavily weighted with Amazon stock.

The reasons are:

1. In the mean return for five year period/Expected Return, 3.23%, is higher than the other 2 stocks.

1. The 90th percentile returns are considerably higher, meaning that 90 percent of the monthly return values are equal to or less than 13.35%, which is a 5.09% higher per boundary than the 8.26% Home Depot 90th value.
2. The Max value is 8.40% more than Home Depot

Now when considering Risk, I understand that the higher standard deviation does indicate more volatility. However, while the risk (standard deviation) is higher then the others, the Coefficient of Variation (SD/Mean), suggesting a lower dispersion around the mean and therefore the Relative Risk provides another perspective of the risk that is much more comparable to the other stocks, i.e. 2.6 vs 2.58 for AMZN and HD respectively.

When considering Value at Risk (VaR), the 10th percentile of returns for Amazon is -5.67. While -1.53 lower than HD and -1.13 than Walmart, considering the longer term investment, this is a risk I can tolerate.

Now when considering diversifying my portfolio to optimize its performance over time, I would consider adding Walmart to protect my portfolio from heavy losses in events such as recession risks, higher inflation, geopolitical risks, etc. From my experience tech stocks offer quicker growth upwards in price action, but in the case of the aforementioned events, they are the stocks that are correlated with heavy and rapid losses. Walmart is categorized as a consumer staples stock, and therefore less correlated to the many of economic conditions which will affect tech stocks like amazon or even consumer discretionary stocks like Home Depot which sells mostly non-essential goods. Amazon also contributed to the consumer staples category but its not its primary classification and therefore, higher associated and correlated with tech sector stock prices.

Reply (1 like)

○

(http

Turki Alghusoon (https://classroom.emeritus.org/courses/9054/users/229165)

Apr 14, 2024

Hi Roy,

I like your point on Amazon's Coefficient of Variation. I actually did not strongly consider the coefficient of variance in my analysis and relied on the standard deviation instead. However and after reading your analysis on the standard deviation AND the coefficient of variance, I now have more confidence in the Amazon stock and would probably choose it for my investment instead of Home Depot.

Reply

○

(http

Roy Nunez (https://classroom.emeritus.org/courses/9054/users/229552)

Apr 15, 2024

Hi Turki,

Yep, Retsef, didnt elaborate on Coefficient of Variation much in this particular video, but he did mention relative risk in a previous video and it made me want to dig deeper on its impacts in relation to this example and provided me with the extra perspective and confidence on Amazon stock.

Thank you for your comment.

Reply

(http

Lee Lanzafame (https://classroom.emeritus.org/courses/9054/users/231975)

Apr 15, 2024

Interesting points, I just had a look and it seems like Walmart operates in these countries Africa, Canada, Central America, Chile, China, India, Mexico where as Amazon is operating in 131 countries - Like you suggested, I can't help but think Amazon is the stronger investment.

Reply

(http

Roy Nunez (https://classroom.emeritus.org/courses/9054/users/229552)

Apr 16, 2024

Based on most of the data points provided in this section by Retsef I agree it definitely is the stronger investment especially with a long term perspective in mind.

Reply

(http

Mhelissa Yayalar (https://classroom.emeritus.org/courses/9054/users/233590)

Apr 25, 2024

Hi Roy,

As you described, CV helps evaluated the risk performance of each stocks. Similar to your analysis, I also calculated:

1. Amazon:

- Mean (Expected Return): 3.23%
- Risk (SD): 8.40%
- CV = (Risk / Mean) x 100% = (8.40% / 3.23%) x 100% = 260%

2. Home Depot:

- Mean (Expected Return): 2.04%
- Risk (SD): 5.26%
- CV = (Risk / Mean) x 100% = (5.26% / 2.04%) x 100% = 258%

3. Walmart:

- Mean (Expected Return): 1.08%
- Risk (SD): 5.38%

- CV = (Risk / Mean) x 100% = (5.38% / 1.08%) x 100% = 498%

Interpretation:

- Though you may prefer to choose Amazon, I think since both Amazon and Home Depot have the lowest CVs, this suggests that they are relatively both stable investments choices.

Reply

Ricardo Anaya (https://classroom.emeritus.org/courses/9054/users/228915)

Apr 14, 2024

If t was my own money, If the option would be a single Stock, among Amazon, Home Depot and Walmart.

Based on the information we have:

	Amazon	Home Depot	Walmart
Expected Returns	3.23%	2.04%	1.08%
Risk	8.40 %	5.26%	5.38%
Coefficient of variation	2.6	2.58	4.98

As professor Retsef mentions, It is normal to choose either Home Depot or Amazon

I would choose Home Depot in the option

If I had wo Choices I would split 70% Home Depot and 30% Amazon

If I had three choices, I would split 60% Home Depot 30% Amazon and 10% Walmart

Do distribute Risk, and get a average Expected Returns

However statistics is nice, but stock is always risky as many externa events are not in the statistics, event, industry trends, geopolitics, competition, etc. It is always good to be cautions when investing. I would not use to recommend, not unless I have tried already.

Reply

Turki Alghusoon (https://classroom.emeritus.org/courses/9054/users/229165)

Apr 14, 2024

One way for me to determine which stock to invest in would be to calculate the Value at Risk (VaR) using the variance co-variance method to determine What is the worst loss that I can expect in any given month 95% confidence.

The variance co-variance method assumes stock returns follow a normal distribution given a mean and standard deviation. Since we have the standard deviation and mean for each of the stock, we can use the ppf function to determine that the Value at Risk for each stock [ppf(0.05, stock mean, stock std)]

Doing so, we arrive at the values below for the 3 stocks

Stock	Mean	VaR [ppf(0.05,mean,std)]
Amazon	3.23%	- 10.58%
Home Depot	2.04%	- 6.61%
Walmart	1.08%	- 7.76%

From the VaR values above, it becomes clear to me that Home Depot is the stock in the sweet spot of with the lowest Value at Risk and the 2nd highest expected return. And therefore, I would choose to invest in Home Depot.

Another option would be to split my investment equally between Home Depot and Amazon. Doing so would allow my to capitalize on the strong upward potential of amazon while hedging my risk with the low VaR of the home Depot stock.

Reply (1 like)

(http

Swati Sharma (https://classroom.emeritus.org/courses/9054/users/236938)

Apr 15, 2024

Hello Turki: Your use of Value at Risk (VaR) to assess investment options is smart. Home Depot's low VaR and decent return make it an appealing choice. Splitting investment between Home Depot and Amazon shows a balanced strategy. Thank you for sharing!

Reply

(http

Chris Cosmas (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/226607)

Apr 17, 2024

Hello Turki,

I appreciate your implementation of the VaR concept as I got a bit confused calculating it. It is an interesting risk metric and proves to be quite helpful in taking an informed decision.

I am still trying to understand the absolute vs the relative VaR as their definitions are very similar.

It would be interesting to look at other metrics that highlight potential gains other than the expected return instead of focusing solely on the potential losses.

Reply

(http

Shahrod Hemassi (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/224267)

Apr 20, 2024

Hi Turki. I like the statistical analysis that you have conducted here and how you have demonstrated the use of the Value at Risk calculation to identify that Home Depot is the stock that you would choose. I would be interested in how you would use the VaR calculation based on a mix of stocks. I expect we will learn some useful techniques to do that going forward. Thanks for your interesting post.

Reply

(http

Gustavo Santana (https://classroom.emeritus.org/courses/9054/users/120927)

Apr 20, 2024

Hello Turki, thanks for bringing this method to the analysis. Do you think it's possible to have a graph showing the percentages of VaR with different % of confidence? In this way, we could find the sweet spot about how much risk we're willing to take given the possible results.

Reply

Koffi Henri Charles Koffi (https://classroom.emeritus.org/courses/9054/users/208039)

Apr 23, 2024

hi Turki , this really a nice though , the ways you assess the risk here , another thought also , Walmart and Amazon stock are somehow related since they are competitor so the Walmart stock I think can negatively/positively affect the stock price of the amazon stock

Reply

Dawn Prewett (https://classroom.emeritus.org/courses/9054/users/233112)

Apr 14, 2024

Based on the information provided and our short holding period of only one month, I believe our best choice would be a mix of both Amazon and Home Depot stocks.

Given the short holding period, it's unrealistic to expect the natural mitigation of stock fluctuations that tends to happen over time to play much of a role in this situation. However, a well diversified portfolio can help counterbalance fluctuation; essentially while one stock may fall the other may rise or hold steady. Identifying the stocks most likely to do this is essential.

These are all technically retail stocks, but Amazon stands out a bit from the three due to their cloud computing service (AWS) that most would argue places them square in tech. This not only boosts their numbers, but could help diversify the natural rise and fall of the stocks value. So, while Amazon does present the greatest risk, it also offers the greatest expected return and if paired with the right company, that risk could be offset.

While Walmart is indeed a stable company, it is not the right pairing in this particular instance. It has a much lower expected return, but has a higher overall risk than Home Depot. Moreover, the CoV is very high in comparison to the other two, suggesting a lower return relative to it's risk.

Home Depot, in contrast, has a CoV simlar to Amazon's, so while it has a lower expected return, it also presents lower risk. This will help to mitigate some of the risk we are taking on with Amazon. Additionally, these two companies are the most different of the three choices, making them a better overall pairing.

Reply (2 likes)

(http

Lee Lanzafame (https://classroom.emeritus.org/courses/9054/users/231975)

Apr 15, 2024

"Additionally, these two companies are the most different of the three choices, making them a better overall pairing." good work, i never thought of it like that, i wonder if the most successful traders follow a similar principle.

Reply

(http

Dawn Prewett (https://classroom.emeritus.org/courses/9054/users/233112)

Apr 15, 2024

Diversification is such an important part of building a portfolio, including sector. You simply do not want a bunch of stocks from the same sector littering your portfolio as they are likely to deal with the same highs and lows simultaneously. Having moved forward into the next section, it looks like there is a data driven way to do this as well.

Reply

(http

Haitham Farag (https://classroom.emeritus.org/courses/9054/users/233864)

Apr 16, 2024

Considering Amazon's business (AWS) as part of the investment decision is a solid tactic.

Thanks for highlighting, the importance of analysis beyond numbers.

Reply

(https:/

Lee Lanzafame (https://classroom.emeritus.org/courses/9054/users/231975)

Apr 15, 2024

- I would invest in multiple stocks to diversify risk

- I would calculate the following metrics similarly to how Retsef did ie expected returns, risk and coeff of variation

- I'm risk averse, normally I wouldn't pick any of the 3, if I had to choose one though I would chose Amazon as I buy most of my things from there. This module might convince me to also pick Home Depot as well because it falls in between Amazon and Walmart with the stats we calculated and is highly dependent on the success of housing which has performed very well over the last 50 years.

Reply

Swati Sharma (https://classroom.emeritus.org/courses/9054/users/236938)

Apr 15, 2024

in this example by Retsef, we have return(mean),Risk(standard deviation) and coefficient of variable(lesser the better) for three different stocks. as we saw that Amazon has maximum return compared to the other two, and the risk and COV are maximum as well. follwing is the process i would use to make my desicision:

1. Using tools like variance, standard deviation, and covariance, I would assess the risk associated with each stock. While Amazon may offer higher returns, it also comes with higher risk compared to Walmart and Home Depot. Therefore, I would allocate a smaller portion of my portfolio to Amazon to reduce risk.
2. Considering the expected return from each stock, I would weigh the potential gains against the associated risks. While Amazon may offer higher returns, Walmart and Home Depot provide more stability. I would aim for a balanced portfolio that offers a mix of growth and stability.
3. Understanding the correlation between the stocks is crucial. If these stocks have low correlation with each other, combining them in a portfolio can further reduce overall portfolio risk. However, if they are highly correlated, the benefits of diversification may be limited.

   Overall, my portfolio configuration would involve allocating a maximum portion to stable stocks like Walmart and Home Depot, while also including a smaller portion to high-growth but higher-risk stocks like Amazon. This approach allows me to benefit from potential

upside while minimizing downside risk through diversification and risk management strategies.

Reply

(http

Priscilla Annor-Gyamfi (https://classroom.emeritus.org/courses/9054/users/226376)

Apr 16, 2024

Great post Swati but I believe the coefficient of variation could also be a great factor to consider in your decision.

Reply

(http

Swati Sharma (https://classroom.emeritus.org/courses/9054/users/236938)

Apr 22, 2024

Hello Priscilla: yes, i agree with you, thank you for bringing it up.

Reply

(https:/

Todd Engle (https://classroom.emeritus.org/courses/9054/users/228910)

Apr 16, 2024

Looking at my portfolio, I would evaluate and divide my portfolio up by the Coefficient of Variance in this case representing Risk.

In my analysis, I planned on investing $10,000 and comparing it to if I had invested the principal investment equally across all indices. I did this using Excel to import stock data spanning one year. My initial data set was from April 2023 to April 2024 and it showed that I would have increased my portfolio by 2.88% if I had distributed by Coefficient of Variance.

Principle Investment $10,000

	Amazon	Home Depot	Walmart
Mean	34.70%	10.62%	6.55%

Standard Deviation	21.03%	10.23%	6.34%
Coeff of Variation	6.06	9.64	9.69

Distribution of Principle	**Amazon**	**Home Depot**	**Walmart**	**P&L**	**ROI**
Equal Dist of Invest.	33.33%	33.33%	33.33%	$1,729	17.29%
CoV Dist of Invest.	44.35%	27.90%	27.75%	$2,017	20.17%

As I toggled through the years, it became apparent that you would have to redistribute your portfolio due to the dynamic change of the Coefficient of Variance variable. Therefore, I did another analysis to see what would be gained if I had recalibrated my portfolio annually in April. Constantly it outperformed (except during a year of loss) over the five years.

		P&L	**ROI**	**Delta**
2021 - 2022	Equal Dist	$636	6.36%	
	CoV Dist	$1,059	10.59%	4.24%
2021 - 2022	Equal Dist	$2,963	29.63%	
	CoV Dist	$3,486	34.86%	5.23%
2021 - 2022	Equal Dist	$117	1.17%	
	CoV Dist	$320	3.20%	2.03%
2022 - 2023	Equal Dist	-$1,329	-13.29%	
	CoV Dist	-$2,090	-20.90%	-7.61%
2023 - 2024	Equal Dist	$1,729	17.29%	
	CoV Dist	$2,017	20.17%	2.88%
TOTAL	Equal Dist	$4,115	6.36%	

CoV Dist	$4,793	10.59%	4.24%

If I calibrated my portfolio each April using the Coefficient of Variance as my Risk indicator, I still made out 4.24% better than if I had just divided up my investment equally across each stock.

Edited by **Todd Engle** (https://classroom.emeritus.org/courses/9054/users/228910) on Apr 16 at 12:29am

Reply

Chris Cosmas (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/226607)

Apr 17, 2024

Hello Todd,

Very interesting analysis I really appreciate you showing us different scenarios and real-world applications of the CoF vs equal distribution it is very interesting to see that it beats the equal distribution at every period.

Also interesting point to re-distribute the investment as time goes on. It shows how variables relationships change through time.

Reply

Timothy Andrew Ramkissoon (https://classroom.emeritus.org/courses/9054/users/226697)

Apr 16, 2024

Investing in stocks requires knowledge of the companies, their target markets and balancing their risk and return. I would diversify my investment across all three stocks to mitigate risk. Given the data provided in the video:

	Amazon	Home Depot	Walmart
Expected Returns	3.23%	2.04%	1.08%
Risk	8.4%	5.26%	5.38%
Coeff of Variation	2.6	2.58	4.98

I would allocate into Amazon for growth potential, a significant portion to Home Depot for stability and a small portion to Walmart.

Amazon has both the highest expected returns and the highest risk, this stock has the potential for significant growth, but to offset the high risk, a more stable stock should be added to the portfolio to create balance. Home Depot has a moderate expected return and a significantly lower risk while Walmart has the lowest expected return with comparable risk.

Standard Deviation:

Amazon = 0.2898

Home Depot = 0.2293

Walmart = 0.2319

Investment strategy

- Allocate a portion of the portfolio to Amazon for growth potential (about 30%). Monitor market trends and company performance. Consider the high-risk factor and withdraw investment if needed.
- Allocate a significant portion to Home Depot for stability (about 60%). Consider long term holding as stock in the most stable in the portfolio.
- Allocate a small portion to Walmart (about 10%). Consider it a defensive stock and monitor any changes in company strategy.

Diversifying the portfolio can help manage risks while aiming for reasonable returns.

Reply

(http **Priscilla Annor-Gyamfi (https://classroom.emeritus.org/courses/9054/users/226376)**

Apr 16, 2024

Great investment strategy Timothy. I like the added actions you have outlined to each of these strategies. They are very realistic and I would have done same.

Reply

(https:/ **Priscilla Annor-Gyamfi (https://classroom.emeritus.org/courses/9054/users/226376)**

Apr 16, 2024

Based on analysis Retsef gave in the video 3.2 regarding these three stocks, I would first of all consider the expected returns (mean), risk(standard deviation) and coefficient of variation

(standard deviation/mean) from the historical data available for the products/stocks I am considering. After, I will compare their respective risks and expected returns. If the risk is relatively lower across products and expected mean is reasonably high but the not the lowest, I will consider in investing in that stock.

From the example used, Amazon has a higher expected return(3.23%) but the highest risk(8.40%) while home depot has the second highest expected value(2.04%) and the lowest risk(5.26%). Walmart on the other has the lowest expected return and the second highest risk(5.38%). Inasmuch as we want to go for stock with the highest expected returns, there is the need to also consider the risk involved. My next step will be to use the coefficient of variation recorded for the three stocks to determine their volatility or risk. Considering their respective coefficient of variation, I will confidently consider investing a greater portion of my money in Home Depot which records the lowest coefficient of variation followed by Amazon and the least portion of my money in Walmart. This is because I read that it is good to diversify your portfolio to help manage risk while you make reasonable returns on your investment.

I can also employ the use of the Empirical Cumulative Distribution Function (ECDF) to further understand the distribution of the data, trends and quartile ranges as well as predict the probability of the expected returns and that of minimum and maximum values of the dataset. This can give me a more detailed idea of what to expect over time as my expected return and make comparison with the historical data which will lead me to making a well informed data-driven decision.

Edited by **Priscilla Annor-Gyamfi (https://classroom.emeritus.org/courses/9054/users/226376)** on Apr 16 at 9:54am

Reply

Ahmad Abu Baker (https://classroom.emeritus.org/courses/9054/users/234460)

Apr 16, 2024

Hello Priscilla,

Thank you for sharing your approach to portfolio allocation based on the analysis from Video 3.2. It's clear that you have a solid grasp on the importance of considering both risk and expected returns when making investment decisions. Your use of the coefficient of variation as a measure to compare the relative riskiness of each stock is particularly insightful. It's a valuable metric for assessing which stocks might offer reasonable returns for the level of risk they carry.

I also appreciate your mention of using the Empirical Cumulative Distribution Function (ECDF). It's a great tool for gaining deeper insights into the potential behavior of stock returns, beyond just the averages. Using ECDF can certainly help in visualizing the

variability and potential extremities in the stock returns, which might not be apparent from the mean and standard deviation alone.

Given your strategy, I'm curious about how you weigh the importance of liquidity and market trends in your investment decisions. Do you adjust your portfolio allocations based on market conditions or do you prefer to set a strategy and stick to it over time?

Looking forward to hearing more about your investment philosophy!

Best regards,

Reply

Ahmad Abu Baker (https://classroom.emeritus.org/courses/9054/users/234460)

Apr 16, 2024

After reviewing the insights from Retsef's analysis in Video 3.2, and considering the historical performance and risk profiles of Walmart, Amazon, and Home Depot, I would approach my portfolio configuration with a focus on balancing growth and stability. Here's how I'd allocate my investment:

1. **Amazon (50%)** - Given Amazon's expansive growth potential and its proven track record in adapting to market changes, I view it as a strong candidate for capital appreciation. Although Amazon exhibits higher volatility, which suggests a higher risk level, the company's continuous innovation and expansion into new markets present significant upside potential.
2. **Home Depot (30%)** - Home Depot has demonstrated resilience and steady growth, particularly with consistent homeowner and professional spending. The stock offers a stable dividend yield, which can be appealing for risk-averse investors seeking regular income. It acts as a balance within the portfolio by providing steady returns and less volatility compared to Amazon.
3. **Walmart (20%)** - As a defensive stock, Walmart provides stability during economic downturns due to its essential retail services. Including Walmart in the portfolio could serve as a hedge against potential losses from the more volatile tech sector.

This diversified allocation aims to optimize the portfolio by blending growth with stability, aligning with both my risk tolerance and investment horizon. Tools like the Sharpe Ratio and beta coefficients have been instrumental in understanding the risk-adjusted returns of these stocks.

I am keen to hear your thoughts on this strategy and how you would adjust it according to your own risk tolerance and market outlook.

Reply

(http

Jignesh Dalal (https://classroom.emeritus.org/courses/9054/users/229173)

Apr 16, 2024

Hi Ahmad, Thank you for detailed insights. I appreciate how you have tailored your investment to match your risk tolerance and goals, Blending sectors and stability. It's insightful to see how you allocate higher percentages to stocks you believe have higher growth potential, while still maintaining a hedge with stable stocks like Walmart.
Could you share more about how you specifically use the Sharpe Ratio and beta coefficients to assess and compare the risk-adjusted returns of these stocks? I'm eager to learn more about interpreting these financial indicators to refine investment choices.

Much appreciated

Reply

(https:/

Chris Cosmas (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/226607)

Apr 17, 2024

To answer this question I have used the code given in the previous assignment to calculate the absolute and relative VaR for the three presented stocks utilizing historical data between years 2015 and 2019. This has also been coupled with the calculation of the standard distribution of daily returns and the mean return rate through Python using the following code:

```
tickers = ("AMZN","WMT","HD")

for ticker in tickers:
    try:
        yf.pdr_override()
        start = datetime.strptime('2014-01-01', '%Y-%m-%d')
        end = datetime.strptime('2019-12-31', '%Y-%m-%d')

        historical_data = yf.download(ticker, start, end)

        alpha = 0.01
        num_shares = 1
```

```
        on_date = '2019-12-30'
        share_price = historical_data['Adj Close'][on_date]
        daily_return_rates = historical_data['Adj
Close'].pct_change().dropna().sort_values().reset_index(drop=True)
        standard_dev = daily_return_rates.std()
        xth = int(np.floor(alpha*len(daily_return_rates))) - 1
        xth_smallest_rate = daily_return_rates[xth]

        mean_return_rate = daily_return_rates.mean()

        rel_VaR = num_shares * share_price * (mean_return_rate - xth_smallest_rate)
        abs_VaR = -num_shares * share_price * xth_smallest_rate


        print("--------")
        print(ticker)
        print("The mean return rate is", mean_return_rate)
        print(" ")
        print("The estimated relative VaR and absolute VaR of an investment of", num_shares,
"shares of", ticker, "on", on_date, "with price $", round(share_price,2), "per share is $",
round(rel_VaR,2), "and $", round(abs_VaR,2), "respectively.")
        print("")
        print ("The standard deviation of", ticker, "is", standard_dev)
        print("--------")
    except:
        print("Not available")
```

```
These were the results:
--------
AMZN
The mean return rate is 0.0011935516077465802

The estimated relative VaR and absolute VaR of an investment of 1 shares of AMZN on 2019-1
2-30 with price $ 92.34 per share is $ 5.38 and $ 5.27 respectively.

The standard deviation of AMZN is 0.01877219892336318
--------
--------
WMT
The mean return rate is 0.0004432098872017154

The estimated relative VaR and absolute VaR of an investment of 1 shares of WMT on 2019-12
-30 with price $ 37.24 per share is $ 1.18 and $ 1.16 respectively.

The standard deviation of WMT is 0.011770239401592998
--------
--------
HD
The mean return rate is 0.0008033410602202164
```

```
The estimated relative VaR and absolute VaR of an investment of 1 shares of HD on 2019-12-
30 with price $ 196.19 per share is $ 6.5 and $ 6.35 respectively.

The standard deviation of HD is 0.011649435235931144
--------

The VaR calculations were computed at the 99% confidence level. The calculations are based
on the investment in one stock.
Based on the above information my portfolio would be split between the Amazon and Home Dep
ot stocks as Amazon even though is shown to be riskier because of a larger standard deviat
ions presents the highest expected rate of return.
On the other hand Home Depot presents a lower standard deviation than Walmart and a much h
igher expected rate of return.
```

Reply (1 like)

(http

STEPHEN HUTSON (https://classroom.emeritus.org/courses/9054/users/233645)

Apr 17, 2024

Thanks for sharing the source code to generate the relative and absolute VaRs here Chris! This analysis is a really helpful example of alternative statistical approaches being taken to do a more in depth analysis of where it would make the most sense to invest

Reply

(http

Haitham Farag (https://classroom.emeritus.org/courses/9054/users/233864)

May 15, 2024

Good day Chris

I tried to get the Python code provided in

https://colab.research.google.com/drive/1iNwgdrqREKPtrHyZr7QtbkyKp_DE17VK?usp=sharing#scrollTo=3F0vrUX5Bqux (https://colab.research.google.com/drive/1iNwgdrqREKPtrHyZr7QtbkyKp_DE17VK?usp=sharing#scrollTo=3F0vrUX5Bqux)

to run with no luck!

Your response is a gem, can not thank you enough.

Kind regards

Reply (1 like)

STEPHEN HUTSON (https://classroom.emeritus.org/courses/9054/users/233645)

Apr 17, 2024

Based on the information provided in this video, I would first look at the correlation between these three stocks to see if any negative correlation exists between Amazon, Walmart, and Home Depot - if there is any negative correlation or even zero correlation between these stocks then by diversifying my investment, I would be able to lower the overall risk significantly so that I can try to target a point where I'm taking on moderate risk for a return hopefully closer to but not quite equal to the mean expected return of Amazon. If all the information I had to go off of was the data from video 3.2, I would likely diversify my investment between Amazon and Home Depot given that Amazon has the highest expected return, and Home Depot has the second highest return but lowest risk in order to minimize risk from just investing in Amazon. In a real world scenario I would also consider looking at other industries to invest in in my portfolio to further increase my ability to diversify investments.

Reply

Shahrod Hemassi (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/224267)

Apr 20, 2024

If I was to select my portfolio using the 3 stocks offered (Amazon, Home Depot, and Walmart) based on the statistics that were made available with the goal of maximizing returns over a 1 month period, I would seek an optimal mix of stocks that maximizes return and minimizes risk.

From Retsef's video, we could see that Amazon had the highest expected return value of 3.23% but also the highest risk of 8.40%. Home Depot had the second highest expected return value of 2.04% and the lowest risk of 5.26%. Walmart had the lowest expected return value of 1.08% and the second highest risk of 5.38%.

I tend to be conservative so my primary concern would be to evaluate the risk in building my portfolio. In Retsef's example, we are focusing on Standard Deviation to evaluate risk. Walmart appears to be the least attractive stock due to it having the lowest expected return and the second highest risk. It also has the highest coefficient of variation of 4.98 which indicates that there is more volatility in this stock's performance, which I would shy away from

in the interest of reducing risk. I would likely exclude this stock from my portfolio based on the information available. If I was only going to invest in 1 stock, Walmart would not be the stock based on the information provided.

While Amazon's high expected return value is enticing, I also would be concerned by the high risk value. I would focus on building my portfolio based on a mix of Amazon and Home Depot in the interest of reducing risk while having a promising expected return value.

I would conduct an analysis of the historical data available for these 2 stocks, and I would use the Empirical Cumulative Distribution Function to predict the future values when using the different mixes that I would like to evaluate. I would evaluate the ECDF output to identify a few optimal mixes from that function.

When doing this, I would also want to analyze my Expected Shortfall with each of the optimal mixes that I identified using the ECDF. My goal will be to choose a mix where the risk (Expected Shortfall) versus reward (expected returns) are reasonable. Having conducted this statistical analysis, I will feel more comfortable and confident when building my portfolio.

Reply

Gustavo Santana (https://classroom.emeritus.org/courses/9054/users/120927)

Apr 20, 2024

Looking through the data we have now, I would invest both in Amazon and Home Depot, being the two most likely to give me returns with less risk, Wallmart even in the 50th percentile is barely profitable with a 0.72% increase rate, mostly having losses before that percentile.

Reply

Koffi Henri Charles Koffi (https://classroom.emeritus.org/courses/9054/users/208039)

Apr 23, 2024

since Walmart and Amazon are both competitor , that mean their storck price may be related (dependent)

so my first choice is :

1. investe 30% in amazon
2. invest 30% in Walmart
3. invest 40% Home depot (since it offer more profit and less risk)

Reply

Mhelissa Yayalar (https://classroom.emeritus.org/courses/9054/users/233590)

Apr 24, 2024

I find this topic very interesting because it's a scenario that I resonate with personally. Specifically, learning about Expected Shortfall, Value at risk, and various other risk measures provides great resources in managing my 401k investments by helping evaluate investments option risks while increasing my investments.

In the video, the Amazon, Walmart and Home Depot historical comparisons of return on investment, Home Depot appears to have much lower risk, but Amazon had a much higher return on investment in stocks. Though the initial question was to evaluate which one of the 3 stocks should we choose, the latter question of perhaps selecting more than one stock is much more feasible. Therefore, as with any investment, putting all your investments into one stock is not a smart move, hence why investors diversify their stocks across multiple markets.

With that, I think the benefits in investing in all 3 stocks is much more advantageous than investing in one. For instance, although Home Depot has lower risks of loss, having perhaps Walmart's rate of return will balance the loss or lessen amount. Or, vice versa, if Walmart lost then returns from Amazon and Home Depot may cover write-off the losses. Though there's a risk of all 3 stocks losing the investments, there's also the probability that my investments will yield positive return based on the historical rate of returns performances of all 3 stocks.

Reply

Isabella Tockman (https://classroom.emeritus.org/courses/9054/users/207395)

Apr 26, 2024

In configuring my portfolio, I would opt for a combination of Amazon and Home Depot stocks. Amazon stands out due to its high expected return, presenting an opportunity for significant profit. On the other hand, Home Depot offers the lowest standard deviation among the options,

which helps to minimize the overall risk exposure of the portfolio. By selecting these two stocks, I aim to strike a balance between maximizing potential returns and mitigating risk.

To arrive at this decision, I utilized tools like the ECDF to visualize the historical data of the stocks and understand their behavior over time. Analyzing the trends revealed insights into the performance of each stock, aiding in the selection process. Additionally, I employed risk measures such as VaR and ES to assess potential losses over time. This analysis provided valuable information on the downside risk associated with each stock, allowing me to fine-tune the portfolio configuration for a more conservative approach if deemed necessary.

Overall, my portfolio choice reflects a strategic balance between expected returns and risk management, informed by thorough analysis and the application of analytical tools introduced throughout this module.

Reply