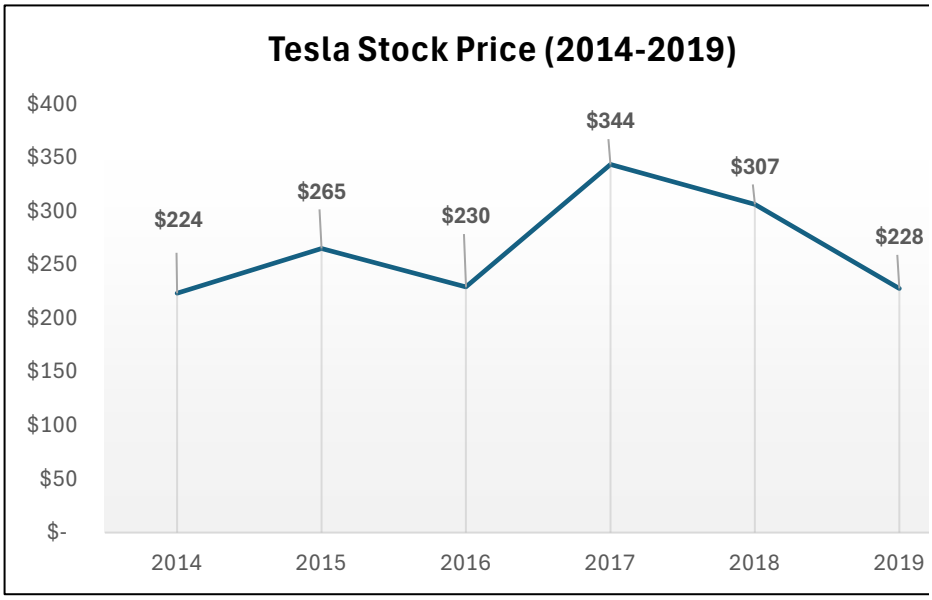
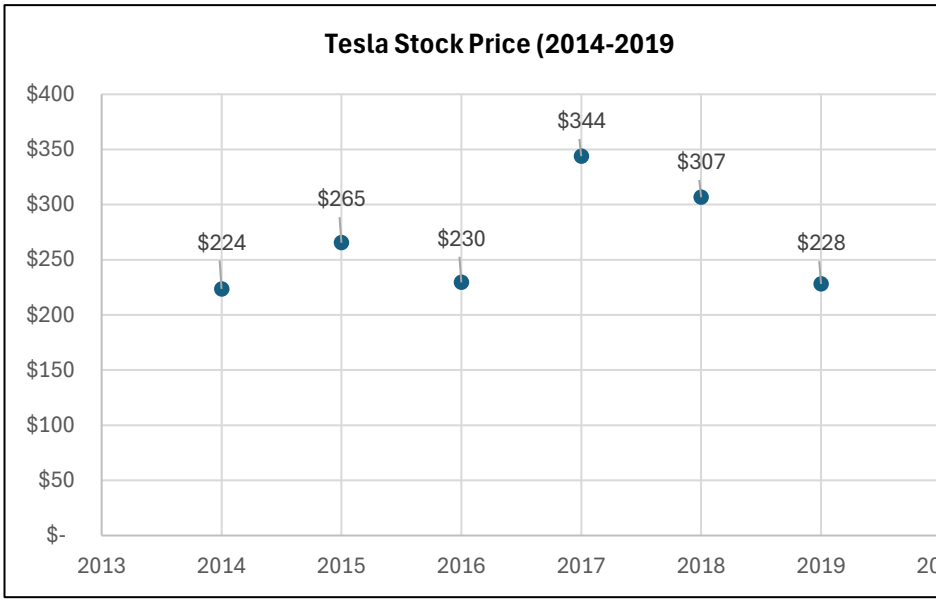
1) Suppose that on July 25, 2014 you purchased chares in Tesla inc. It is now 5 years later decide to evaluate your holdings to see if you have done well with this investment . The below shows the end of July market prices of TSLA





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TSLA Stock Prices			
Date	Price	% Return	Cum. Return
2014	$ 224	0%	1
2015	$ 265	18.71%	1.187144966
2016	$ 230	-13.53%	1.02656886
2017	$ 344	49.82%	1.537997048
2018	$ 307	-10.82%	1.371606208
2019	$ 228	-25.64%	1.019993738

B

C

E

The difference between these two charts is that the line chart is a continuous line over time while the scatter plot is composed of discrete points. In the case of analyzing TSLA stock, using a line chart is more appropriate in observing the slope over time. However, if our goal was perhaps to make a forecast of the price in the future, using the scatter plot is helpful in crafting our own line through trend/regression analysis .

020

CAGR
0.33%

D

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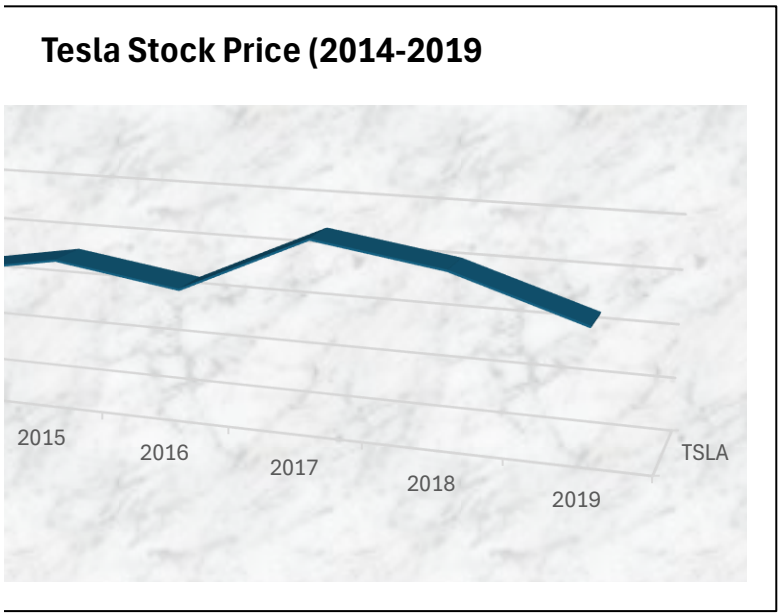
The enhancements to the graph d
help interpret more than what is a
being shown in the line and scatte
Simple visuals go a long way in de
relaitonships, overdoing it can de
what is being conveyed by the dat



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2) In your position as research assistant to a portfolio manager , you need to analyze the profita companis in the portfolio. Using the data for Oracle Corp. (ORCL)

Fiscal Year	2019	2018	2017	2016	2015
Total Revenue	39506	39831	37728	37047	38226
Net Income	11083	3825	9335	8901	9938
Profit Margin	0.28	0.10	0.25	0.24	0.26
Growth (TR)	-0.82%	5.57%	1.84%	-3.08%	0
Growth (NI)	189.75%	-59.03%	4.88%	-10.43%	0

TR (CAGR)	NI (CAGR)
0.83%	2.76%

CAGR = GEOMEAN (1 + ARRAY) - 1
GEOMEAN = (Product of x)^(1/n)

B

Net income is growing faster than total revenue when comparing growth rates. This is positive for our investment because this means cashflow growth which can be used for investment activities and other growth opportunities.

I

TR (CAGR)	NI (CAGR)
0.88%	31.29%

CAGR = AVG(C:F)

C

This result is less accurate than the last approach because it ignores compounding returns . The return on Net Income using the average is far greater in this model perhaps due to the volatile nature of the returns. GEOMEAN accomplishes what the average ignores, and therefore provides a much more reliable growth rate. With a r more stable growth rate the average could apply more

growth rate the average could apply more effectively.

ability of the

A

Fiscal Year	2015	2016	2017	2018	2019
Total Revenue	38226	37047	37728	39831	39506
Net Income	9938	8901	9335	3825	11083
Profit Margin	0.26	0.24	0.25	0.10	0.28
Growth (TR)	0.00	-3.08%	1.84%	5.57%	-0.82%
Growth (NI)	0.00	-10.43%	4.88%	-59.03%	189.75%

D

3) Repeat Problem 2 using the data below for Kroger Co.. However, this time you sh
worksheet to use as a template Replace the data for Oracle with that of Kroger.

Oracle					
Fiscal Year	**2019**	**2018**	**2017**	**2016**	**2015**
Total Revenue	39506	39831	37728	37047	38226
Net Income	11083	3825	9335	8901	9938
Profit Margin	0.28	0.10	0.25	0.24	0.26
Growth (TR)	-0.82%	5.57%	1.84%	-3.08%	0
Growth (NI)	189.75%	-59.03%	4.88%	-10.43%	0

TR (CAGR)	NI (CAGR)
0.83%	2.76%

A

Kroger in both cases has faster Sales and Net income growth when compared to Orac

B

In 2019, Oracle was more profitable. The year had a 189.75% increase in Net Income
Margin. However, when looking in the long-term, Kroger shows strong growth potenti
historical growth rate metrics.

Based off these assessments, I believe that Oracle would be a great invesment for ris
are not afraid of volatility in performance. For the more risk averse investor, a stable c
may provide a safer investment choice, especially with such as an outstanding growt

ıould create a copy of your

Kroger					
Fiscal Year	**2019**	**2018**	**2017**	**2016**	**2015**
Total Revenue	121162	122662	115337	109830	108465
Net Income	3076	1890	1959	2021	1711
Profit Margin	0.03	0.02	0.02	0.02	0.02
Growth (TR)	-1.22%	6.35%	5.01%	1.26%	0
Growth (NI)	62.75%	-3.52%	-3.07%	18.12%	0

TR (CAGR)	NI (CAGR)
2.81%	15.79%

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e and a 0.28 Profit
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sk-taking investors who
company such as kroger
th rate.

4)

Using the data for Johnson & Johnson presented below

a) Calculate the ratio of each year's data to the previous year for each of the above it

b) From your calculations in part a, calculate each year's rate of growth.

c) Calculate the average growth rate (using the average function) for each item using

d) Use the Geomean function to estimate the compound annual growth rate for each

e) compare the results from part c to those in part d (Geomean vs Avg). Is it true that t
growth rate is always greater or equal to the geometric average ?

f) Contrast the results from those of the geometric average to those of the arithemeti
variables listed below. What do you oberve about the differences in the two growth es
Retained Earnings? What do you oberve about the differences in the two estimates fo
Operations and Net Income.

(Hint: Look at the results from part b (the individual yearly growth rates) for each varia
conclusions about the variation between the arithmetic and geometric averages

1) Sales

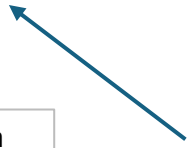
2) Retained Earnings

3) Total Assets

4) Net Cash from Ops

5) Net Income

Focus Group	Avg	Diff	Geomean
Sales	2.46%	0.12%	2.34%
Retained Earnings	2.42%	0.19%	2.23%
Total Assets	4.06%	0.13%	3.93%
Net Cash From Ops	4.84%	0.13%	4.71%
Net Income	246.57%	248.18%	-1.61%



F

The growth estimates for Sales and Retained Earnings are very similar. Both are around 2.5% and have thesimilar magnitude differences between their Avg and Geomean,which sits between 10 to 20 basis points. This applies to Total Assets and Net Cash from Operations as well. Their magnitude difference are the same at 13 basis points, Net Cash from Ops just happens to have a little bit higher of a growth rate by about 80 basis points compared to Total Assets.

When comparing Net Cash from Operations and Net Income, their is a distinctive difference in the average versus the geomean. The Geomean difference yields a realistic comparable less affected by the volatility in Net income over time. This is opposite for the average, which is an astounding 242% greater than the Net Cash from Ops.

Ultimately, through the Geomean appraoch to solving growth rate, we get a more reliable interpretation of comparables for financial data.

ems for JNJ.

the results from part b.

of the above items

the arithmetic average

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stimates for Sales and
or Net Cash from

able to draw some

Fiscal Year	2014	2015
Sales	74334	70200
EBIT	20929	18368
Interest Expense	518	552
Total Net Income	16323	15409
Earnings Per Share	6.29	5.89
Total Assets	131119	133411
Accounts Payable	7633	6668
Total Liabilities	61367	62261
Retained Earnings	97245	103879
Net Cash from Ops	18471	19279
FCF	14757	15816

Fiscal Year	2014	2015
Sales	1	0.944
EBIT	1	0.878
Interest Expense	1	1.066
Total Net Income	1	0.944
Earnings Per Share	1	0.936
Total Assets	1	1.017
Accounts Payable	1	0.874
Total Liabilities	1	1.015
Retained Earnings	1	1.068
Net Cash from Ops	1	1.044
FCF	1	1.072

Fiscal Year	2014	2015
Sales	0	-5.56%
EBIT	0	-12.24%
Interest Expense	0	6.56%
Total Net Income	0	-5.60%
Earnings Per Share	0	-6.36%
Total Assets	0	1.75%
Accounts Payable	0	-12.64%
Total Liabilities	0	1.46%
Retained Earnings	0	6.82%
Net Cash from Ops	0	4.37%
FCF	0	7.18%

	Category	Avg Growth Rate	
(+)	*Sales*	2.46%	>
(+)	*EBIT*	1.07%	>
(-)	*Interest Expense*	23.87%	>
(+)	*Total Net Income*	246.57%	>
(+)	*Earnings Per Share*	80.01%	>
(+)	*Total Assets*	4.06%	>
(-)	*Accounts Payable*	-0.03%	>
(-)	*Total Liabilities*	12.08%	>
(+)	*Retained Earnings*	2.42%	>
(+)	*Net Cash from Ops*	4.84%	>
(+)	*FCF*	6.02%	>

C

All Average Growth rates are greater in value compared to their Geomean counterpart

E

2016	2017	2018
71937	76481	81534
21350	19565	21253
763	1017	1194
16540	1300	15297
6.33	1.34	6.67
141208	157303	152954
6918	7310	7537
70790	97143	93202
110551	101793	106216
18767	21056	22201
15541	17777	18531

2016	2017	2018
1.025	1.063	1.066
1.162	0.916	1.086
1.382	1.333	1.174
1.073	0.079	11.767
1.075	0.212	4.978
1.058	1.114	0.972
1.037	1.057	1.031
1.137	1.372	0.959
1.064	0.921	1.043
0.973	1.122	1.054
0.983	1.144	1.042

A

2016	2017	2018
2.47%	6.32%	6.61%
16.23%	-8.36%	8.63%
38.22%	33.29%	17.40%
7.34%	-92.14%	1076.69%
7.47%	-78.83%	397.76%
5.84%	11.40%	-2.76%
3.75%	5.67%	3.11%
13.70%	37.23%	-4.06%
6.42%	-7.92%	4.35%
-2.66%	12.20%	5.44%
-1.74%	14.39%	4.24%

B

Category	Geomean Rate
Sales	2.34%
EBIT	0.38%
Interest Expense	23.22%
Total Net Income	-1.61%
Earnings Per Share	1.48%
Total Assets	3.93%
Accounts Payable	-0.32%
Total Liabilities	11.01%
Retained Earnings	2.23%
Net Cash from Ops	4.71%
FCF	5.86%

I added conditional formatting to better depict growth patterns. Cash Sources (+) and Cash Sinks (-) have opposite formatting rules.

D