Company Analysis: Autodesk ADSK

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1 Analyse the following publicly listed company: Autodesk

1.1 What are the main drivers of the company and the stock price?

Autodesk's top revenue driver in the growth in subscription revenues. This is because of the maintenance-to-subscription("M2S") program which Autodesk started in June 2017. Following broader trends in the software industry, Autodesk decided to gradually retire maintenance plans (which involves selling licenses and providing customers upgrades when available) to encourage customers to shift to subscription plans.

As can be seen in Fig. 1, subscription plans keep growing in absolute number and as a proportion of total net revenue of the company. Meanwhile, maintenance plans decline both in absolute and relative terms. The year-on-year increase in subscription net revenue is 53%.

In terms of product family, Autodesk's Architecture Engineering and Construction (AEC) products have been its biggest driver. They make up the bigger portion of the revenue and increase 60% in sales over three years (see Fig.2) This is in part due to Autodesk's active investment in its BIM 360 portfolio (product under AEC) by acquiring three companies, Assemble Systems, Plan Grid and BuildingConnected in fiscal 2019. Although these acquisitions increase the operating expenses because of higher headcount, the relative increase in sales is larger.

In Autodesk's earnings call on 25th August, 2020, the management identified on the digitization and increasing use of cloud-based solutions in AEC and manufacturing as the company's principal drivers. Given the usage above pre-COVID levels in China, Korea and Japan in Q2 2021, the management was confident that the business will remain resilient in subsequent quarters.

The stock trend of the last ten years shows that Autodesk begins to depart from S&P 500 from mid 2016 onwards but track the falls in the market benchmark. It was around the same period that tech stocks start to grow. The recent price rise, as I gather from commentaries, is because of the earnings surprise Autodesk give despite the COVID epidemic. The market has also reacted enthusiastically Autodesk's above 20% annual sales growth since 2018.

1.2 With which asset class, index, macro-drivers etc. is the equity price correlated?

Based on the sector Autodesk is in and the markets it serves, I tested its correlation with a few indices. Due to time constraint, I could only test 9 correlations. I would like to test the correlation between Autodesk and SME growth (which they claim to have propped up their FY2021 performance) and e-commerce (to see if market's optimism for e-commerce spills over to that of Autodesk's performance). I could not find good data on these two indicators. All the

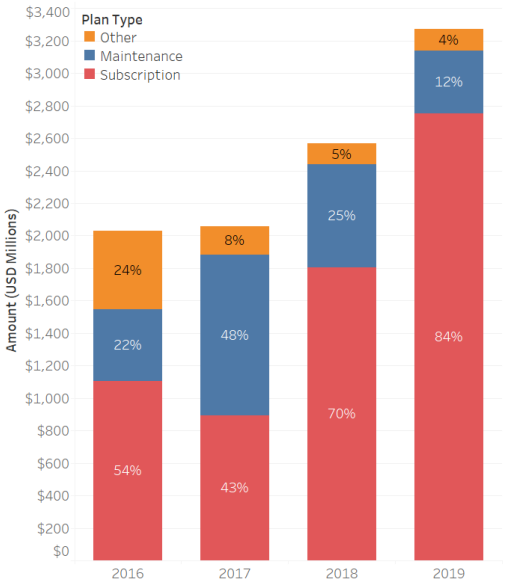


Figure 1: The magnitude of subscription plans' net revenue keeps growing over the last three years, both in absolute amount and as a proportion of the company's net revenue.[a]

[a]Years before 2016 are not comparable due to the company's reclassification of plan types

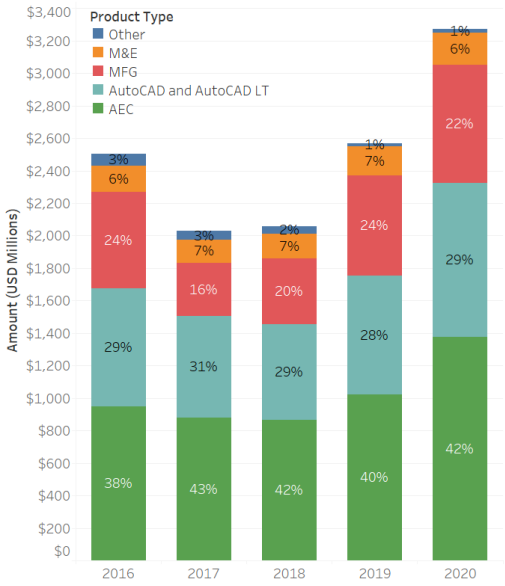


Figure 2: The significant increase in AEC sales drives Autodesk's performance.

correlation charts could be found in the appendix. To see if there is any mean reversion, I tested the lagged terms of the index change as well. All correlations are calculated using percentage change instead of level of the index. The results are reported as follows:

Table 1: Correlations in percentage changes between Autodesk share price and various indices

		Correlation with Autodesk share price		
		Index with no lag	Lag 1	Lag 2
Assets	S&P 500	0.665	-0.075	0.038
	NASDAQ	0.708	-0.060	0.029
	Dow Jones Industrial Average	0.617	-0.084	0.032
	U.S. 10-Year Treasury	0.264	-0.024	0.039
Macro-drivers	U.S. GDP	0.228	0.262	-0.041
	U.S. CPI	0.015	-0.116	-0.137
	OECD Consumer Confidence	0.147	-0.051	-0.155
Industries	U.S. Total Construction Spending	-0.236	-0.114	-0.055
	Dow Jones Oil & Gas Index	0.488	-0.042	0.053

Autodesk's share price correlates strongly with the three stock market indices in the US.

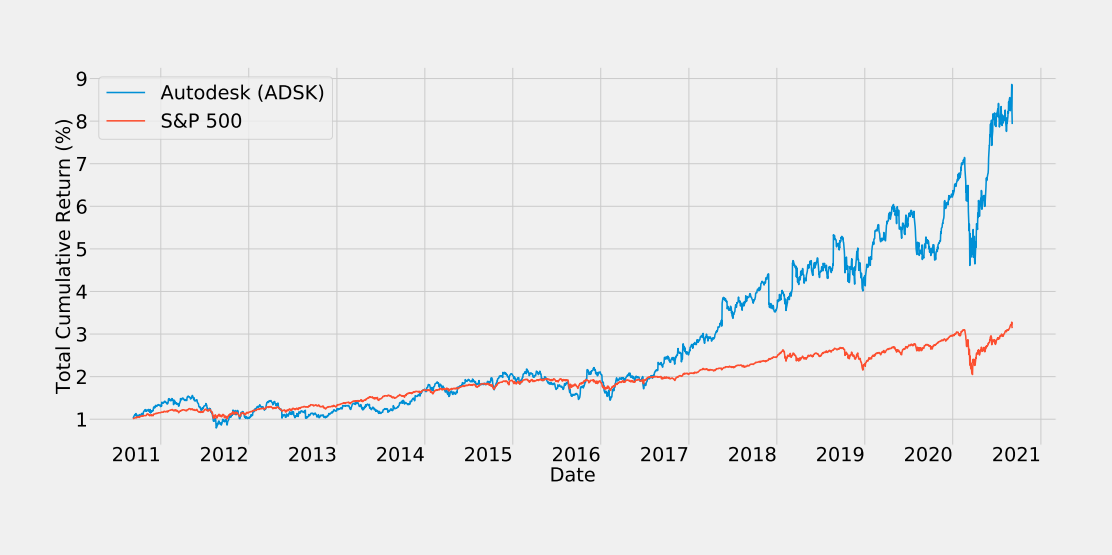


Figure 3: ANSYS has been beating the market return (Source: S&P Global Market Intelligence and CapitalIQ).

Interestingly, it also correlates positively with the US 10-Year Treasury Index. This is unexpected as stock performance is usually negatively correlated with treasury yield when risk-averse investors relocate capital to bonds during market downturn. Autodesk correlates more with the lagged terms of the macro-drivers, suggesting that market takes time to react to macroeconomic trends. The correlation with U.S. total construction spending is too weak to be taken into account. The moderate correlation with Dow Jones Oil & Gas Index suggests potential exposure to the oil and gas industry where many of Autodesk's clients are found.

1.3 Analyse the sector, its main drivers, what allows for a long term competitive advantage in the sector and choose one company which you think is a long term winner or a long term structural loser.

I used Autodesk's SIC CODE (7372- prepackaged software) as a starting point and found a few sectors which describe the business well. Instead of analysing the computer software industry in general, I focus on the design/ engineering software sector in which Autodesk operates. Since software providers are affected by the market they serve, I further divide the sector according to the market Autodesk serves: construction, manufacturing and media.

There are a few drivers for the engineering/ architecture design software sector. First, construction activity. I do not think the direction is clear: governments and firms might struggle to fund existing projects due to the COVID-induced recession, but governments might also use construction as a fiscal stimulus. Second, the demand for contactless project inspection, since travelling to project sites now become less feasible/ desirable. Pre-COVID trends for this sector include the demand for "smart cities" and increase in drone use. CAD products are efficient at producing sustainable architectural designs while drone use can make software solutions to engineering project more seamless.

Design software providers for the manufacturing industry are obviously reliant on consumer spending. New product design will not be needed for firms struggling to survive. While demand

for automobiles dropped significantly during the epidemic, online retail sales remain robust, as is reflected in the significant e-commerce growth in the past few months. Computer-Aided Manufacturing (CAM) software providers might hence still benefit.

Design software providers for the media industry may find opportunities in three market trends. First, the rise in e-commerce could mean more demand for website/ online advertisement designs. Second, the rise in digital media consumption could mean more demand for animation/ enhanced graphic experience. Third, the trends in simulation technologies such as virtual reality and augmented reality are likely to gather steam again and increase demand for graphic design.

Based on these drivers, I think an aggressive annual investment in R&D to catch up with the latest tech trends and innovate is crucial for a long-term competitive advantage. Smooth integration into an enterprise's software infrastructure will also be crucial for these SaaS providers. Lastly, being a favoured software by designer/ engineering students will be a key to stand out in the long run. This might be why many firms in this sector work closely with higher education institutions to ensure there is a stream of trained users.

Although I would have chosen Adobe as a long-term winner in the graphic design software sector, I do not think the sector is Autodesk's focus because of their heavy investment in the AEC family products. When I look at software firms that serve engineers/ manufacturers instead, I consider ANSYS as a long-term winner. ANSYS was founded in 1970 and focused on engineering simulation technologies. The company has been investing heavily into research to provide more advanced products. Its clients include NASA and the US military. ANSYS's market cap is currently at 27.5 billion USD, about half of that of Autodesk and is a median number among Autodesk's competitors [1].

ANSYS's fundamentals are solid. Its debt level is being kept low at no more than 10% debt-to-capital during FY2010-2012 and 17.62% in FY2019. Between FY2013-2018, the company did not take on any debt. Its EBITDA margin averaged at 45.01% in the last ten years. Its net income has also been steadily increasing, with earnings per share almost tripled from $1.96 in FY2011 to $5.36 in FY2019.

Using the period between 2nd March 2018 and 4th September 2020 (reasons will be explained below), I found that ANSYS has a market beta of 1.176 that is higher than average in the comparison group but lower than that of Autodesk (1.285). With its sustained investment in R&D and active new product offerings, I believe ANSYS will continue to be a leader in the industry.

1.4 Is there a better investment alternative in the same sector and if yes, why and which?

I calculated the Sortino ratio for the ten competitors I found for Autodesk. Sortino ratio is similar to Sharpe ratio but penalizes large volatility of the downside, whereas Sharpe ratio only takes into account the general volatility. I used this as a starting point to see if there is a better investment than Autodesk.

The Sortino ratio formula:

$$SortinoRatio = \frac{R_p - R_f}{\rho_d} \tag{1}$$

where
R_p = Expected Return

[1] I picked Adobe, ANSYS, Aspen Technology, AVEVA, Cadence Design Systems, Dassault Systemes, Hexagon AB, Nemetschek, PTC Inc, Synopsys and Trimble as Autodesk's competitors based on the Autodesk's products and markets

R_f = Risk free rate of Return
ρ_d = Standard deviation of the downside

The calculations take only into the stock prices between 2nd March, 2018 to 4th September, 2020 because for some reasons, price data for Aveva is only available on S&P Market Intelligence from 2nd March, 2018 onwards and I have not found a free stock API that allows me to extract price data from non-US stock.

I took the S&P 500 returns as the R_f. Since the calculation is on individual stocks instead of portfolio returns, T-bill or T-note yield will be too high as risk-free rate proxies. I define downside as returns below the expected daily returns. The results are reported as follows:

Table 2: Sortino ratios and betas of the comparison group

	Sortino ratio	Beta
Aveva (AVV)	0.893	0.701
Cadence Design Systems (CDNS)	0.890	1.142
Nemetschek (NEM)	0.886	0.796
Adobe (ADBE)	0.778	1.215
Synopsys (SNPS)	0.761	1.068
Autodesk (ADSK)	0.668	1.285
ANSYS (ANSS)	0.566	1.176
Aspen Technology (AZPN)	0.416	1.037
Dassault Systemes (DSY)	0.235	0.572
Trimble Inc (TRMB)	0.195	1.126
Hexagon AB (HEXA B)	0.116	0.680
PTC Inc (PTC)	0.083	1.042

Autodesk's Sortino ratio is in the mid-range of this group. AVEVA has the highest Sortino ratio. Since Sortino ratio assumes normal distribution of returns, I calculated the daily drawdown to see if I will uncover different temporal risk pattern. For the daily drawndown calculations, a rolling window of 252 days approximating a business year is used.

When the daily and maximum daily drawdowns are plotted, AVEVA's drawdown since global lockdown in March is the worst amongst the six stocks. AVEVA invests heavily into tech trends such as Cloud, IOT and applied AI. Its current 65% recurring revenue contribution also shows room for revenue growth. However, AVEVA's major market, the energy and fuels sector, has been hit hard by the epidemic. The recent huge drawdown implies the market's realisation of the epidemic's adverse impact on AVEVA's short-term future earnings. It is therefore not necessarily a better investment than Autodesk.

The maximum drawdown chart in Fig.5 shows that Adobe is a resilient asset. In fact, Adobe's Q2 FY20 revenue increased 14% despite COVID. As said, this is likely due to the remarkable success of e-commerce, which boosts the advertising and graphic design sector. Adobe's forward P/E ratio is in the middle range of this group at 46.26x. Adobe is therefore a better investment than Autodesk based on both past performance and future e-commerce outlook.

Fig. 5 also show that Cadence and Synopsys are more resilient than Autodesk throughout the whole period. Cadence and Synopsys both provide software solutions for customers to design electronic products. Cadence is highly favoured by analysts with its impressive net income growth (doubled from 16.2% to 41.7% in two years). Cadence's management is effective, as is shown by the increase in ROA from 2014 onwards in Fig.6.

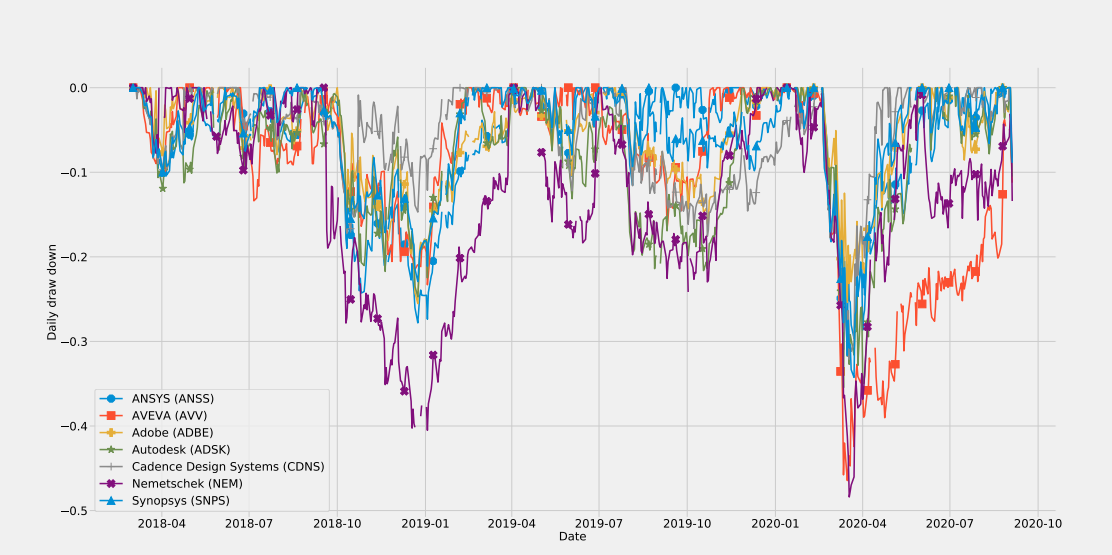


Figure 4: Daily drawdown of the top 7 stocks by Sortino ratio. AVEVA has huge drawdown in the past few months (Own computation on S&P price data)

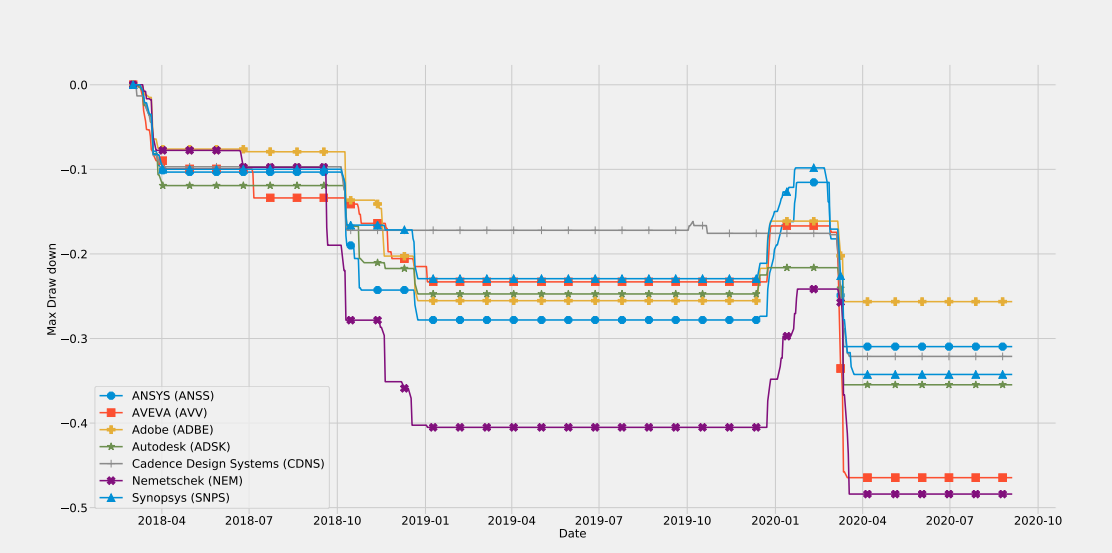


Figure 5: Maximum Daily Drawdown for the top 7 stocks by Sortino ratio. Adobe declines the least since the March market decline.

Synopsys is largely insulated from the COVID epidemic because of the semiconductor design market it focuses on. In Q2 2020, it has a remarkable year-on-year revenue growth of 35.7%. Cadence and Synopsys will therefore also be better investment alternatives than Autodesk in the sector.

ANSYS, the "long-term winner" I picked in the last section, has slightly smaller drawdown than Autodesk throughout the period. But like Autodesk, Nemetschek and AVEVA who provide

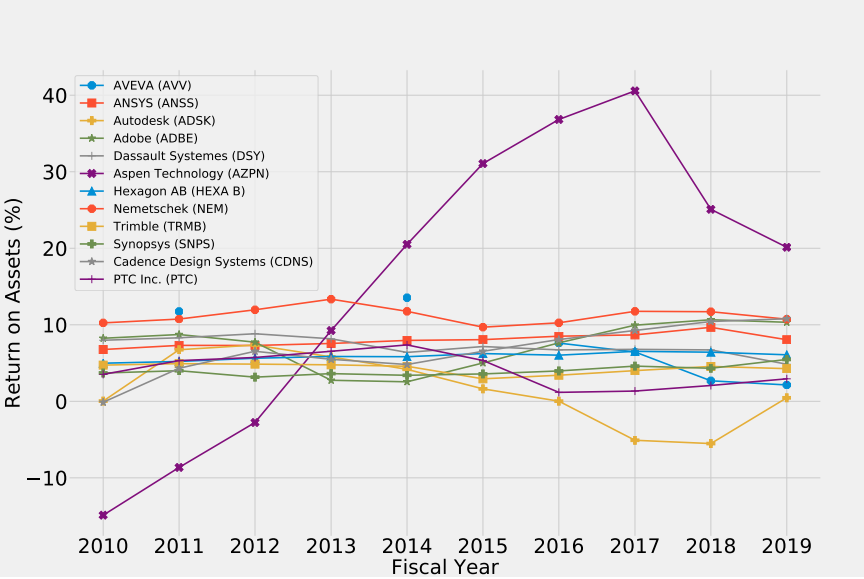


Figure 6: Return on assets performance for the comparison group. Autodesk has the worst ROA in the past few years among its peers.

software solutions for construction and manufacturing engineers, ANSYS has been hit by the decrease in industrial activity during the epidemic.

In conclusion for this question, I consider Adobe, Cadence and Synopsys as better investments than Autodesk based on risk-return trade-off statistics. That being said, the M2S program implemented in 2017 since Anagnost's appointment as the CEO does huge improvement to Autodesk's profitability (both seen in ROA and double digit sales growth). Since Adobe, Cadence and Synopsys's major markets (Adobe: advertising industry, Cadence and Synopsys: semiconductor manufacturing) are different from Autodesk, Autodesk's prospects still make it an attractive investment among its peers who serve the construction/ manufacturing industry.

A Appendix: Charting the trends of ADSK share price and indices

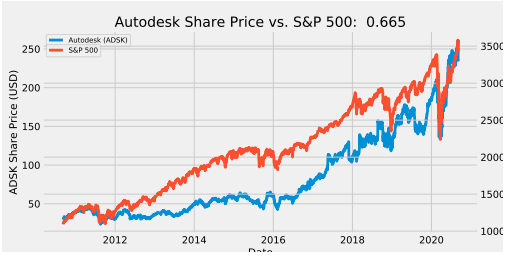


Figure A.1

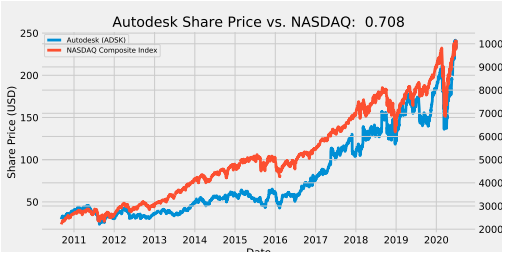


Figure A.2

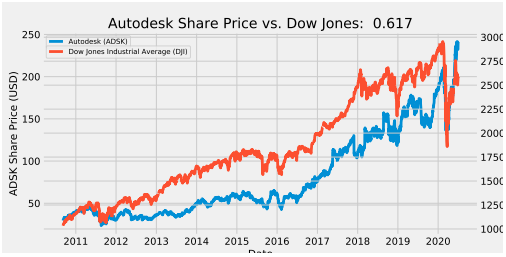
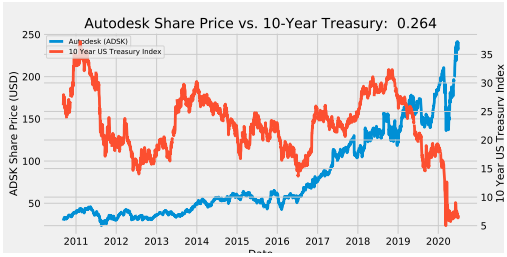


Figure A.3



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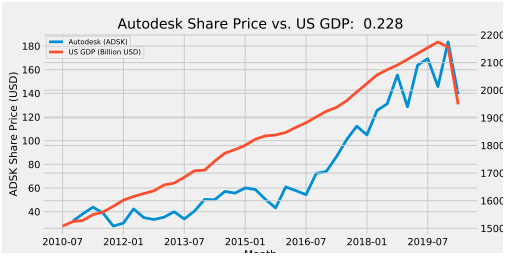


Figure A.5

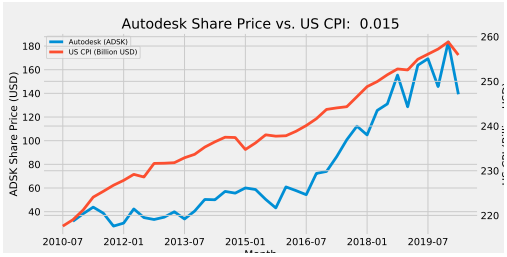
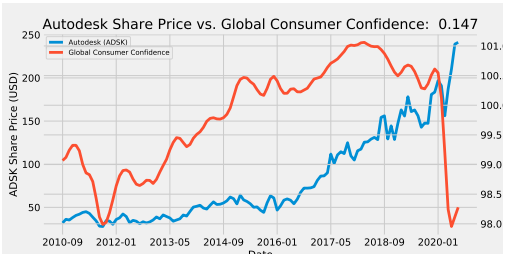


Figure A.6



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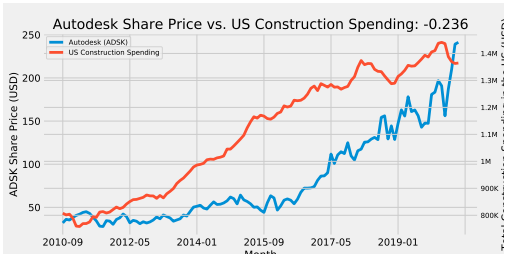

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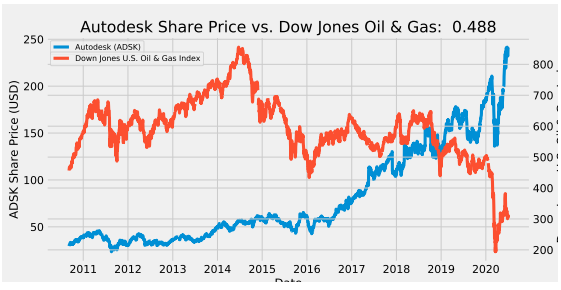

Figure A.9