M&A operations

Data Science project
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Abstract

This paper contains an analysis and supervised machine learning model of AT&T stock market. This American telecom company is compared with Verizon, another company from the same industry. The companies were studied from the perspective of its M&A operations and the consequences of these operations on the stock market.

The aim is to observe the relationship between these two companies and understand the effects of the acquisitions and carve-out operations within the period 2015 to 2021.

The study is divided into three parts. In the first part, data is collected from the stock market and from the officially submitted forms, 10-Q and 10-K. In the second part, an exploratory analysis seeks to find common patterns and correlation between strategic operations of these companies, revenues and the stock market. In the third part, the supervised machine learning model aims to create an accurate predictive model of the AT&T stock market.

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1. Definition

1.1. Research objectives

The aim of this study is to analyze mergers and acquisitions operations of two important American companies, AT&T and Verizon, during the period 2012-2020. Both companies are stock entities providing very similar services. They are competitors in the telecommunications industry together with T-Mobile USA as well as various regional services providers. [1]

1.2. Companies

1.2.1 AT&T

AT&T is a holding company with a current market capitalization value of approximately $194.09 billion. Provides wireless network, cell phone, digital television, internet, landline telecommunication services. There are three main segments: Communications, WarnerMedia and Latin America. [2]

Communications segments contains these business units:
1. Mobility nationwide wireless service and equipment.
2. Video - over-the-top (OTT) services.
3. Broadband internet, fiber and telephony voice communication services.
4. Business Wireline - IP-based services.

The WarnerMedia segment contains these business units:
1. Turner - multichannel basic television.
2. Home Box Office - premium pay television and HBO Max.
3. Warner Bros. - production, distribution and licensing of television programming.
4. Eliminations & Other, Xandr advertising, internal sales.

The Latin America segment contains these business units:
1. Vrio - video services.
2. Mexico - wireless service and equipment.

1.2.2 Verizon

Verizon is a holding company with a current market capitalization value of approximately $224.58 billion. Provides services of wireless and wireline products, wireless equipment, communications services, security services and IoT services. There are three main segments: Verizon Consumer Group, Verizon Business Group and Corporate & other. [3]

Verizon Consumer Group contains these business units:
1. Wireless and wireline communications services and products.
2. Wireless equipment and wireless-enabled connected devices.
3. Residential fixed connectivity solutions

Verizon Business Group segment contains these business units:
1. Corporate networking solutions.
2. IoT services.
3. Mobile resource management.

Corporate & other segment contains these business units:
1. Verizon Media - diverse media and technology brands.
2. Other businesses - investments, insurance captives, unallocated corporate expenses.

1.3. Important M&A operations

1.3.1 AT&T

24.7.2015 - Acquisition of DIRECTV
22.10.2017 - Future acquisition of WarnerMedia announced
14.6.2018 - Acquisition of WarnerMedia
25.2.2021 - Future spinoff of DIRECTV announced
17.5.2021 - Future spin-merge of WarnerMedia announced
2.8.2021 - Selling DIRECTV

1.3.2 Verizon

23.6.2015 - Acquisition of AOL, Yahoo!
12.8.2019 - Selling Tumblr
3.5.2021 - Future spinoff of AOL and Yahoo announced
2.9.2021 - Selling Yahoo

1.4. The market

The telecommunications sector consists of companies that transmit data in words, voice, audio, or video across the globe. Telecom equipment, telecom services, and wireless communication are the three basic sub-sectors of telecommunications. The companies often operate with stable customer bases and generate income with the subscriptions of the users. The sector is overall stable in long-term growth and the industry is becoming more and more important with the evolution of new technologies. [4]

In terms of investing the shares of big telecom companies are well suited for conservative, income-focused investors. M&A operations can play a significant role in stock market evolution because they generate uncertainty together with technological advances and shifts in the industry.

The size matters in telecom. Big companies own extensive networks and can absorb costs of expanding networks and services. That is one of the reasons for merging operations.
To get a company's value, analysts turn to the price-to-sales ratio (stock price divided by sales). Another useful measure of growth performance is the average revenue per user and the churn rate, the rate at which customers leave (presumably for a competitor).

1.5. Main reasons to consider M&A as a corporate strategy

1.5.1 Scope Synergies - Growth

The most common reason for financial operations. Telecom companies find it more difficult to gain more growth because their business depends on the number of subscriptors. Their income is often stable each month and they compete with other big companies for each new user. In order to stimulate the growth they merge with adjacent sector businesses and expand their services.

1.5.2 Scale Synergies - Cost

The synergies between telecom companies can be explained by increasing demand on networks and infrastructure. For example the 5G technology needs huge investments and the companies can improve operational efficiency by centralizing the services. [5]

1.5.3 Capability

Telecommunication services are complex, with the requirement to converge the operations of heterogeneous technologies and IT systems into composite services. One of the challenges is to increase efficiency and reduce cost of product delivery. The M&A operations can improve the systems and also the service management.

1.6. Documents and data sources

1.6.1 Strategic and financial data

In order to perform a study and analyze the performance of these companies, the core information was extracted from the 10-K annual report. [6] This report is public and required by the U.S. Securities and Exchange Commission. Contains details about the company history, organizational structure, financial statements, earnings per share, subsidiaries, executive compensation, and any other relevant data. [7]

The 10-Q report was used to gather information on a quarterly basis, also required by the U.S. Securities and Exchange Commission. This form contains financial statements and analysis on the financial condition of the entity. [8]

1.6.2 Stock market data

Another source of information is the historical evolution of stock market prices. Data was gathered with a finance API yfinance, open source Python library with access to the available data on Yahoo Finance. [9]

2. Exploratory analysis

2.1. Initial questions and data preparation

2.1.1 Questions

1. How did the acquisitions or divestitures influenced the stock market?
2. How was the evolution of business metrics during these operations?
3. Is there a correlation between the stocks of these two companies?
4. Is it possible to predict the future growth with the collected data?

2.1.2 Features

Quarterly data:

1. **Revenue by segments.** The money generated from normal business operations, divided by the three strategic business units segments. It is the top line (or gross income) figure from which costs are subtracted to determine net income. The segments changed during the observed period of time, merged with other services and transformed. [10]
2. **Total assets.** Total liabilities and equity of the company, refers to the sum of the book values of all assets. The value of a company's total assets is obtained after accounting for depreciation associated with the assets. [11]
3. **Long term debt.** Any obligations a company bears for a time period that extends past the current operating cycle or current year are considered long-term liabilities. Company's long-term debt is analyzed to see how much leverage a company has and how solvent the company is. [12]
4. **Basic Earnings Per Common Share.** Basic earnings per share is a rough measurement of the amount of a company's profit that can be allocated to one share of its common stock. It is the ability to turn a profit and reflects the company's financial health. [13]

Data was selected with the intention of comparing two companies' financial results. The source is partially reliable, because the audit of reports 10-K is required, but the audit of 10-Q is not.

Daily basis data:

1. **Adjusted close price.** A stock's price is typically affected by supply and demand of market participants. However, some corporate actions, such as stock splits, dividends, and rights offerings, affect a stock's price. Adjusted close prices allow us to see an accurate record of the stock's performance. [14]
2. **Volume.** Volume is counted as the total number of shares that are actually traded (bought and sold) during the trading day or specified set period of time. [15]

2.2. General insights

2.2.1 Stock market during 2015 - 2021

The evolution of the stock market prices during the years 2015 to 2021 is showing more global perspective on the previously studied events. We can observe a relationship between the prices of these two companies.

In the evolution of AT&T price we can observe that the acquisition of DIRECTV did not help to the growth of the company. The pay TV subscriber base shrinked almost 15% since 2016 [26] and the long term debt increased. A significant driving factor was the limited commonality with AT&T core capabilities. Additionally, the characteristics of AT&T's core business may have limited the level of investment or overall business strategy of DirectV, further losing ground against its competitors.

Verizon during its history avoided large acquisitions and the merge and spinoff of AOL and Yahoo did not affect the stock price so much. However, the company's growth remains problematic because the U.S. wireless market is saturated. [27]
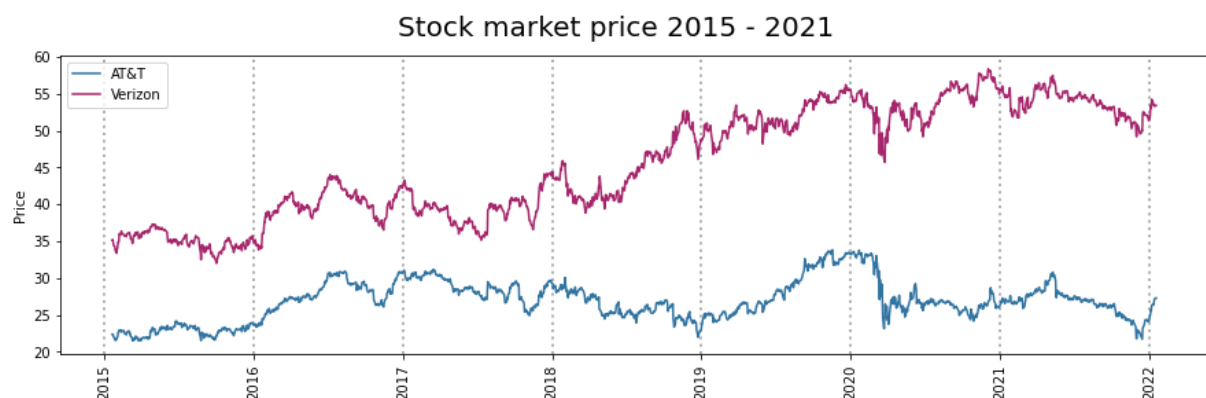
Figure 1. Stock prices 2015 - 2022

The volume of the stocks can indicate market strength, as rising markets are typically viewed as strong and healthy. From the diagram we can observe increased volume in AT&T stocks just after the announcement of the future spinoff of WarnerMedia (17.5.2021).
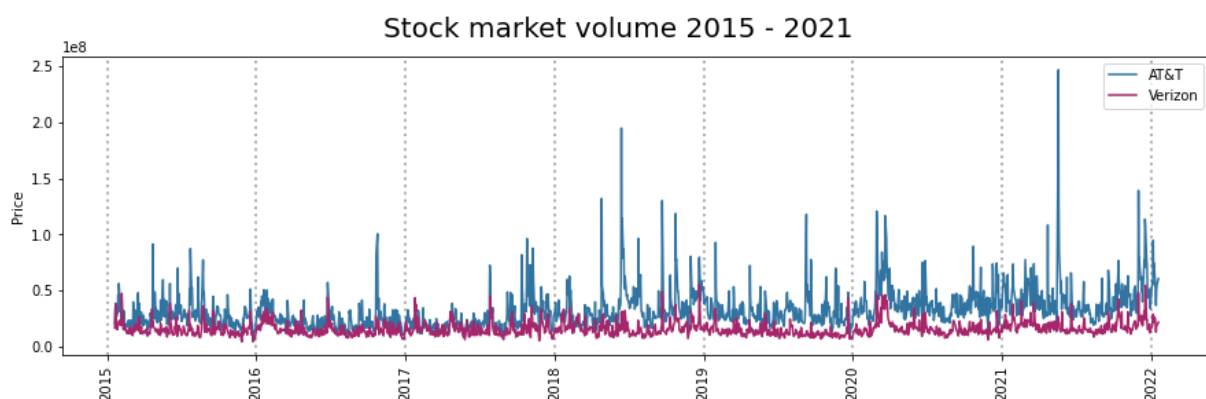

Figure 2. Stock volume 2015 - 2022

2.2.2 M&A operations and stock market prices

On the **23ᵗʰ of June, 2015**, Verizon took a significant step in building digital and video platforms to drive future growth and purchased AOL Inc. and Yahoo. This acquisition enabled Verizon to launch go90. This was the mobilefirst social entertainment platform providing the opportunity for ad-supported mobile video streaming. [16] The stock market price dropped down during one week after this announcement, signaling investors concerns on how the acquisition would drive growth and value to Verizon's core business.
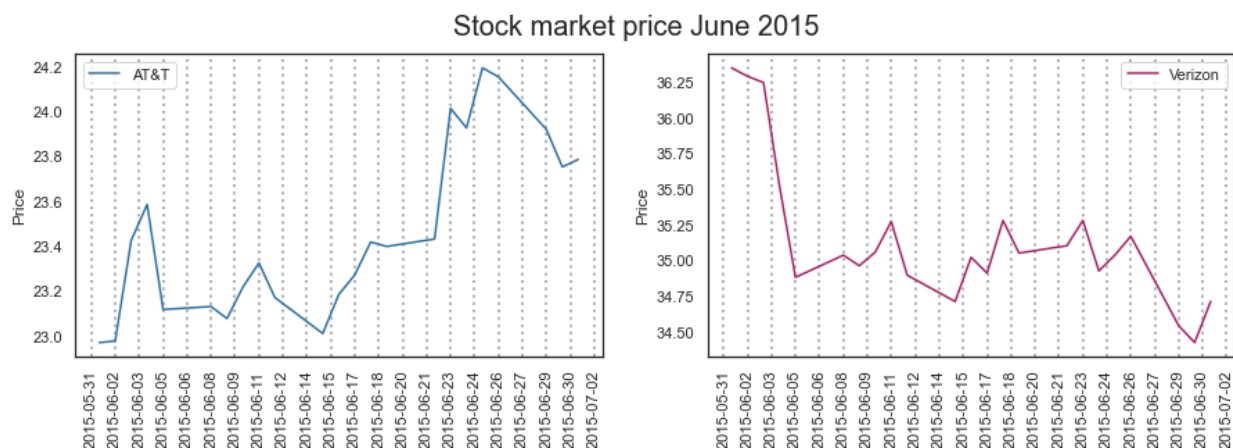
Figure 3. Acquisition of AOL and Yahoo by Verizon

On the **24ᵗʰ of July, 2015**, AT&T Inc. completed its acquisition of DIRECTV. The DIRECTV acquisition significantly diversified AT&T's revenue mix, products, geographies and customer bases. [17] The stock markets did not react so well the day of the announcement. The price dropped down during one week. The interesting fact is that Verizon stock market prices also dropped down in this period without any publicly announced M&A operation. [16]
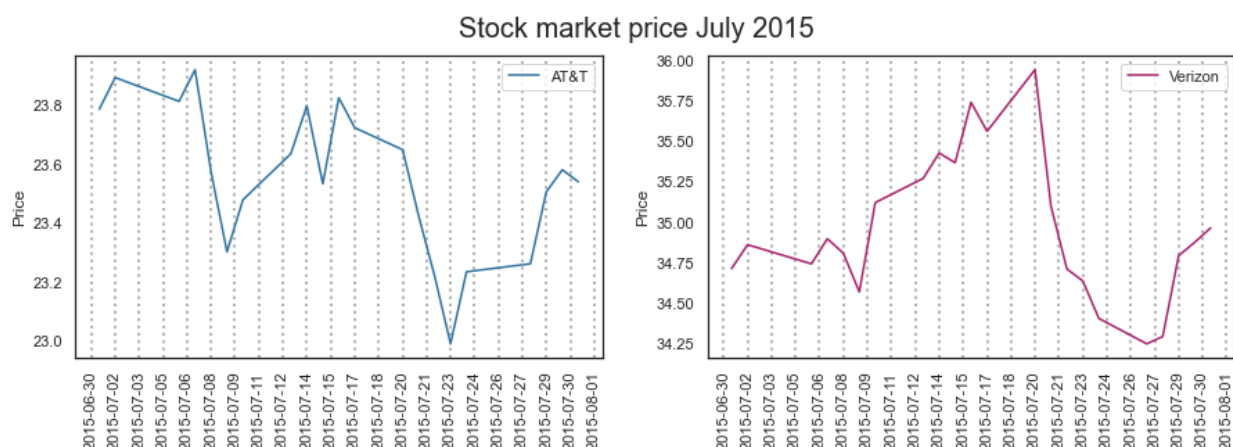

Figure 4. Acquisition of DIRECTV by AT&T

Overall investors were signaling that diversifying just with the objective of diversifying would not bring any value to the company. If investors want to diversify their portfolios they can do so today by investing their own funds in other companies to get exposed to other industries. Additionally, the acquisition of companies operating in non-core adjacent segments, also can

negatively impact the performance of the acquired company. Att and Verizon's management may not have the proper understanding of these segments and result in suboptimal decision making.

On the **22nd of October**, 2017, AT&T Inc. announced the future acquisition of Time Warner, one of the largest media and entertainment conglomerates. Contains HBO, Turner and Warner Bros, manage popular digital sites such as Bleacher Report and some of streaming services including HBO NOW, Boomerang and FilmStruck. [18] The stock market price dropped down during one month. Verizon stock market also experienced negative evolution of its stock market price.
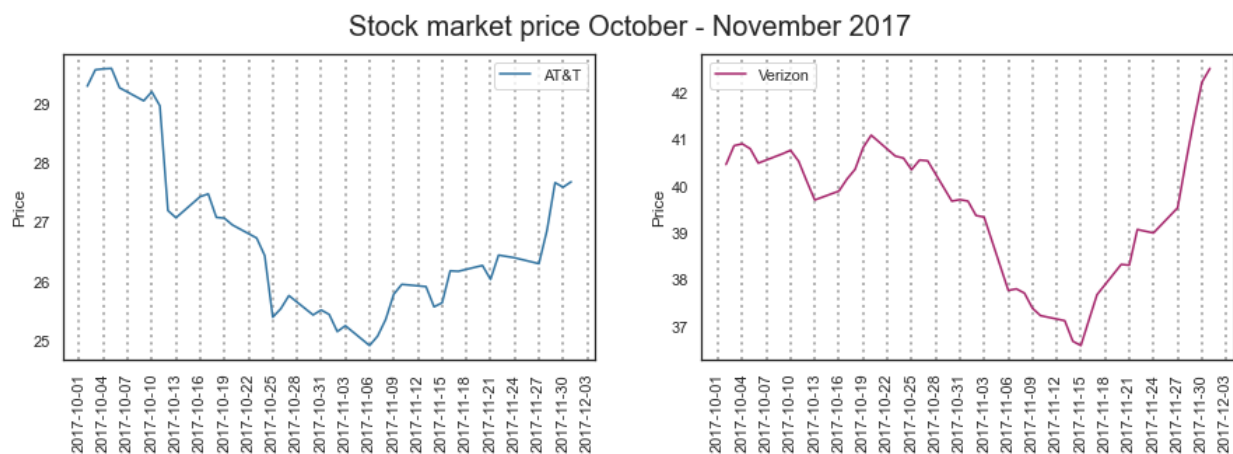
Figure 5. Future acquisition of Time Media announced by AT&T

On the **14th of June, 2018**, AT&T completed the acquisition of Time Warner. [19] The exact day of acquisition the stock price went up but then dropped down. At that time Verizon was investing in fiber-optic network business and its stock market price was growing up. Here we can observe how investing in segments near the core-business of telecommunications does pay off. The fiber optic investment would clearly help Verizon move ahead of competitors and expand its business into new growth areas within the telecommunications industry.
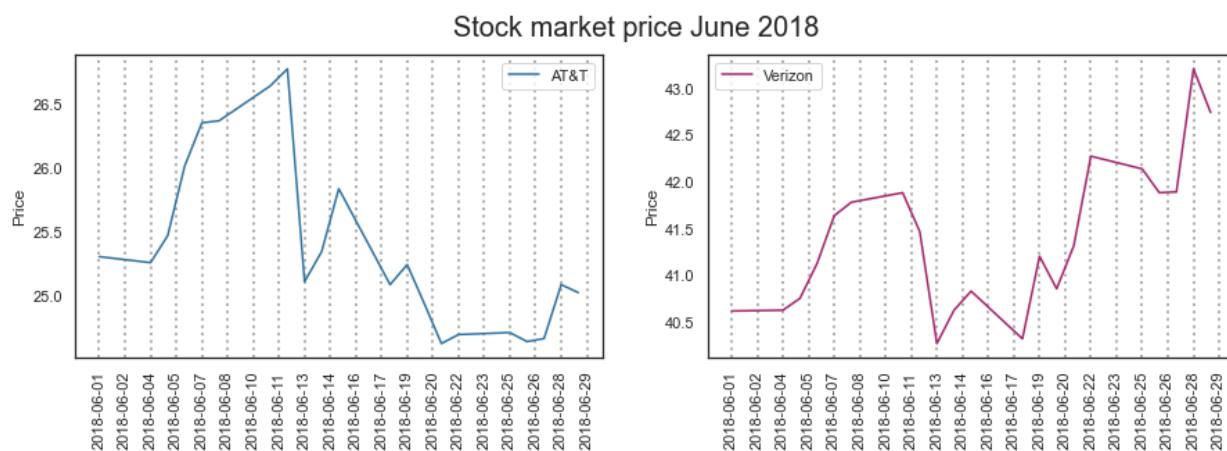

Figure 6. Acquisition of Time Media by AT&T

On the **12th of August, 2019**, Verizon sold Tumblr, the social network which was part of its AOL and Yahoo acquisition. [20] The markets behaved positively after this operation because the Tumblr business was not improving the growth of the core business. At this time AT&T was reorganizing its activities in the Time Warner segment after announcing it on the 4th of March, 2019.
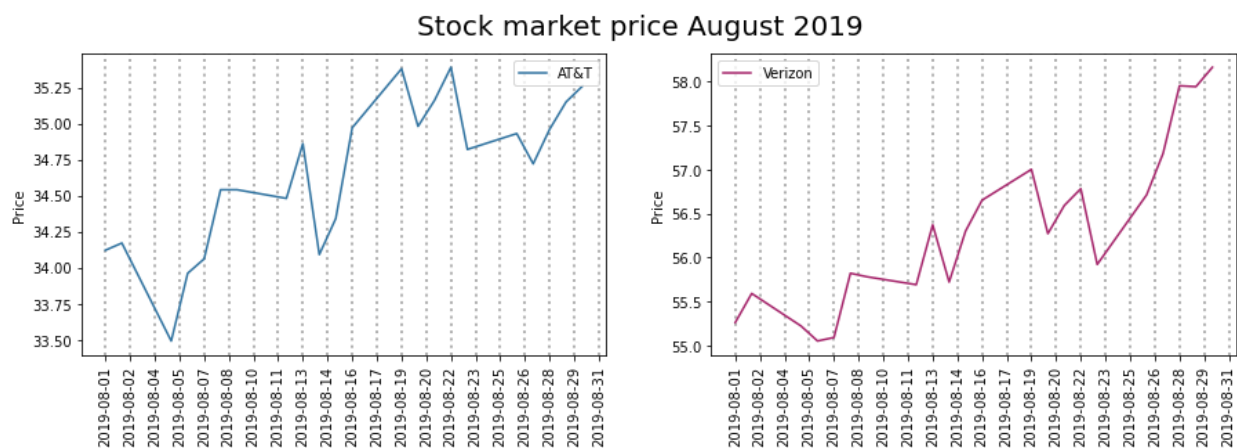
Figure 7. Selling Tumblr by Verizon

On the **25th of February**, 2021, AT&T Inc. announced the future spinoff of DIRECTV. The transaction implies an DIRECTV enterprise value for $16.25 billion, acquired by AT&T for $48.5 billion in 2015. [21] At the beginning the market reacted with a sharp drop-down, but after one week went up again. At the same time AT&T is giving nearly $30 billion to invest in 5G spectrum. This clearly shows that even if the market reacted negatively after selling DIRECTV at a large loss, the investors understand the importance of carve-outs. In this specific case this carve-out allowed AT&T to reallocate funds to create value into a high growth area (5G). This example also highlights the importance of an ongoing evaluation of a company's assets and overall portfolio. By routinely evaluating the portfolio against market and competitive changes, companies are able to understand when it's the right time to sell in order to grow into new areas.
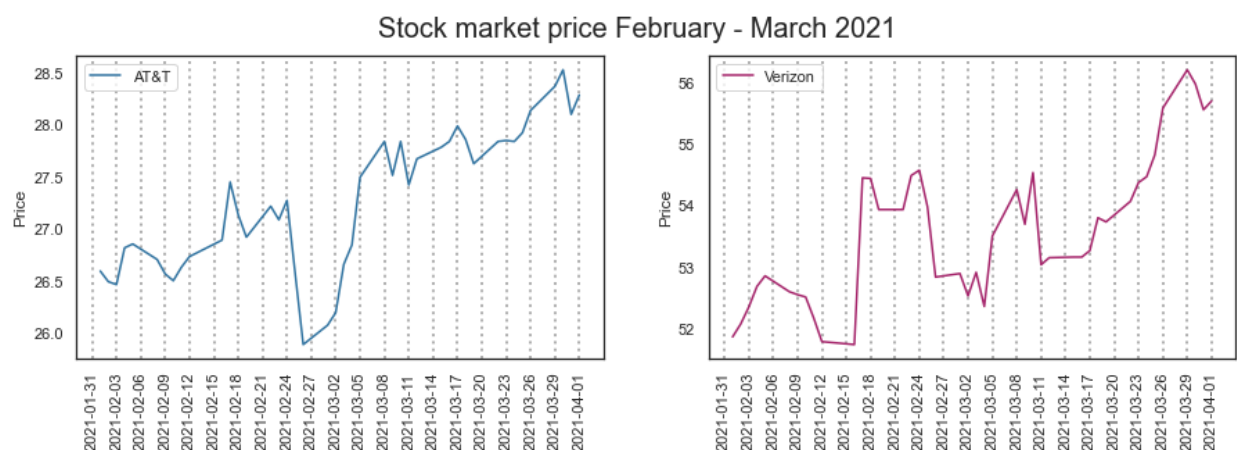
Figure 8. Future spinoff of DIRECTV announced by AT&T

On the **3^{td} of May, 2021**, Verizon announced the future spinoff of AOL and Yahoo. The transaction was valued at $5 billion, Verizon is selling this part of the business to focus on building out its 5G network. [22] The stock market price was going up after this announcement but then was dropping during the rest of the month.

On the **17^{td} of May, 2021**, AT&T announced the future spinoff of Warner Media. This is a separate split and combines WarnerMedia and Discovery's assets into a standalone global entertainment company. [23]
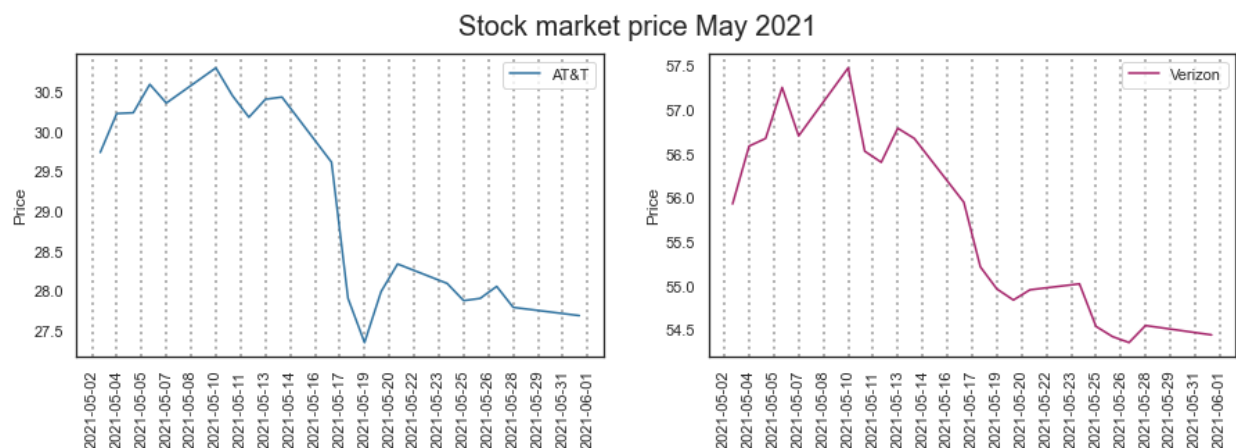
Figure 9. Future spinoff of AOL and Yahoo announced by Verizon

On the **2nd of August, 2021**, AT&T sold DIRECTV, AT&T TV and U-verse video services. As part of the deal, AT&T received $7.1 billion in cash and transferred approximately $195 million of video business debt. [24] The stock market price reacted positively to this spinoff.
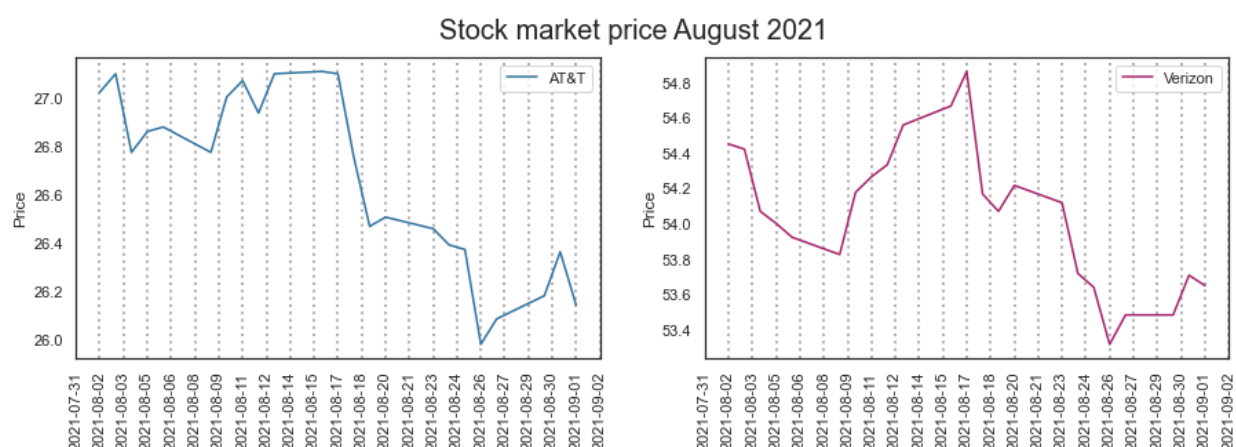

Figure 10. Selling DIRECTV by AT&T

On the **2ⁿᵈ of September, 2021**, Verizon sold AOL and Yahoo, a deal said to be worth $5 billion, around half of the nearly $9 billion Verizon originally paid. [25] The stock market price went down and the market did not react positively to this event.
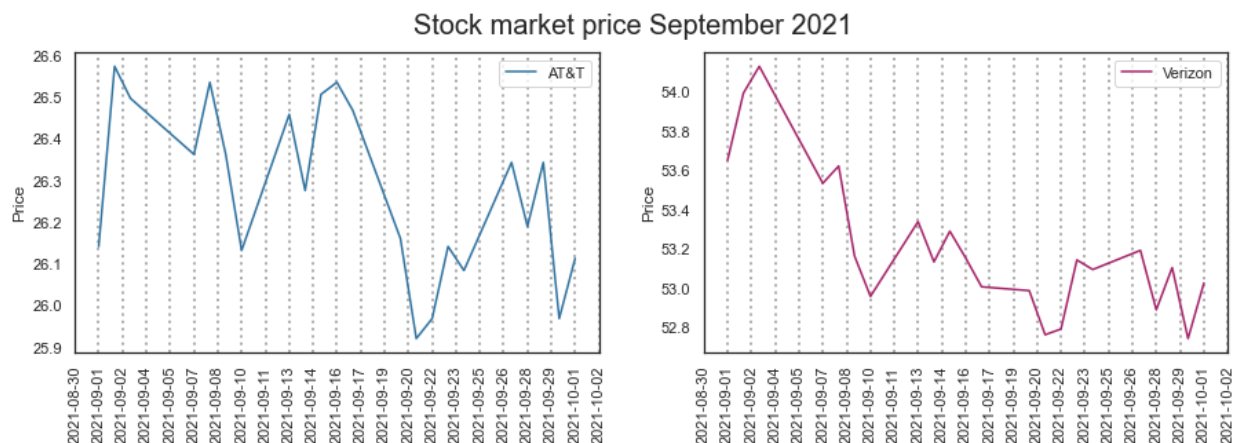

Figure 11. Selling AOL and Yahoo by Verizon

2.2.3 Insights

AT&T:
1. Acquisition of DIRECTV did not help the growth of the company.
2. DIRECTV did not merge effectively with the core business.
3. Spin-off helped to relocate funds to invest in the 5G spectrum.
4. The case highlights the importance of a good M&A and carve-out internal strategy and process.

Verizon:
1. Verizon during its history avoided large acquisitions and the merge and spinoff of AOL and Yahoo did not affect the stock price so much.
2. The Verizon stock market is more stable and the price is much higher than the price of AT&T stock market.
3. Early investment in the fiber optic network helped its core business.

2.2.4 Business metrics AT&T

The segments of AT&T core business have changed during the observed period. The study suggests division based on the actual segments: Communications, Warner Media and Latin America. The segment **Communications** contains former Customer mobility and Business solutions. The segment **Warner Media** is understood as the former Entertainment group, DIRECTV and paid AT&T TV. The last segment is Latin America, containing former services provided outside the U.S of the segment Internacional.
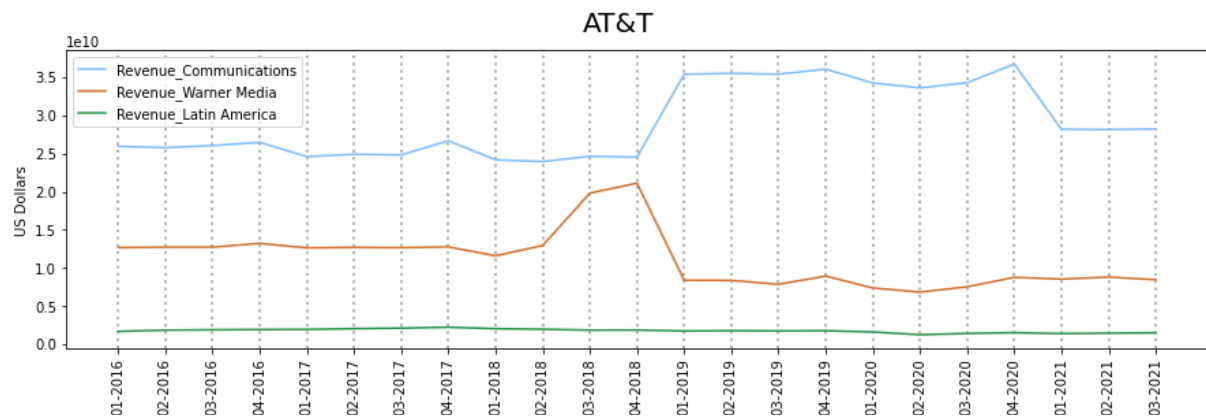
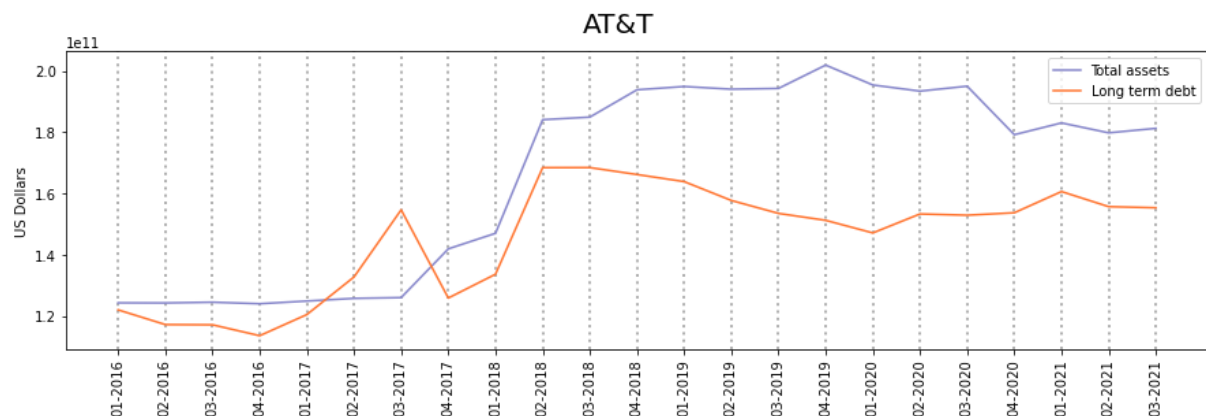*Figure 12. AT&T history of revenues by segments*

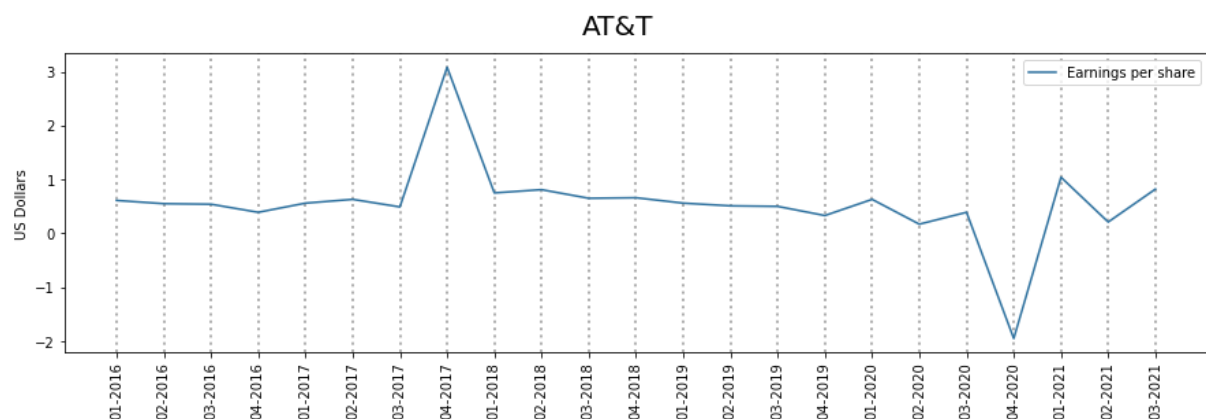*Figure 13. AT&T history of Total assets and Long term debt*

Figure 14. AT&T history EPS

2.2.4 Business metrics Verizon

The segments of Verizon core business have changed during the observed period. The study suggests division based on the actual segments: Consumer, Business and Corporate. The **Consumer** segment contains the former Wireless group. The segment **Business** is understood as the former Wireline group. The last segment is **Corporate**, containing former services of network connection, AOL, Yahoo and other operations.
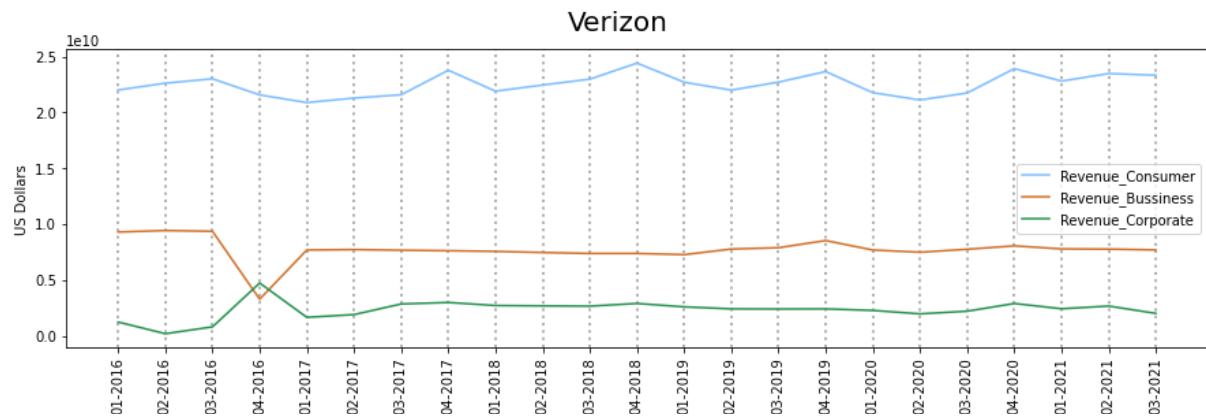

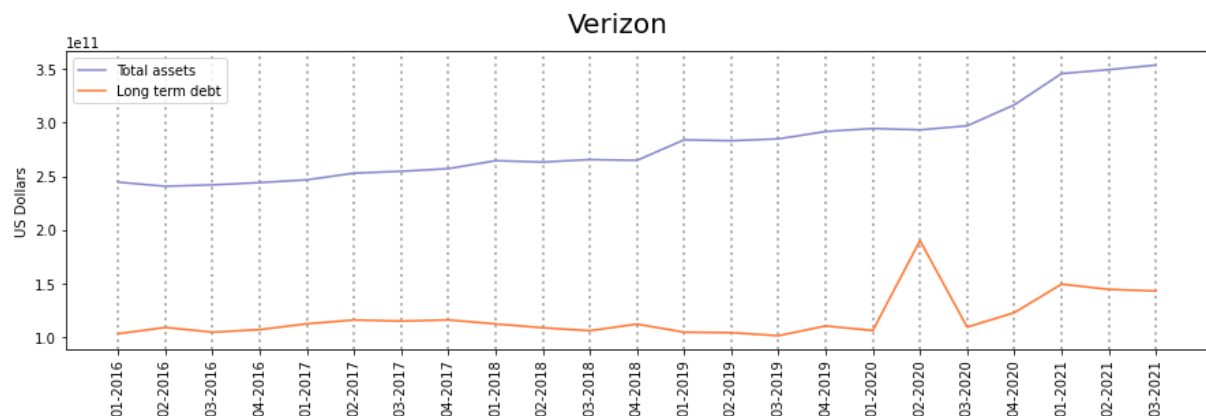*Figure 15. Verizon history of revenues by segments*

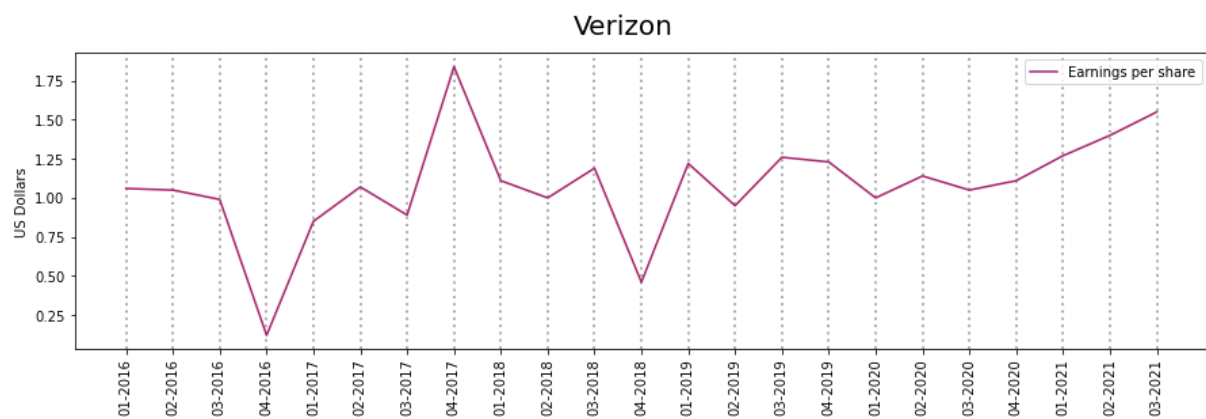*Figure 16. Verizon history Stakeholders equity and Long term debt*

Figure 17. Verizon history EPS

2.2.5 AT&T relationship with Verizon

AT&T and Verizon stock prices are positively correlated and there is a linear relationship between daily return values of these companies. That means these two stocks should not be together in a portfolio because they could move in tandem with each other.
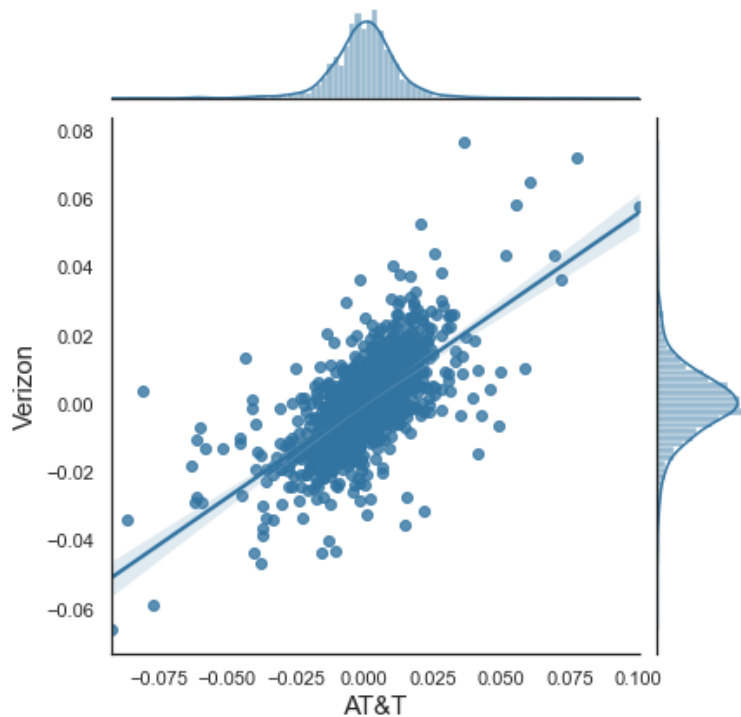

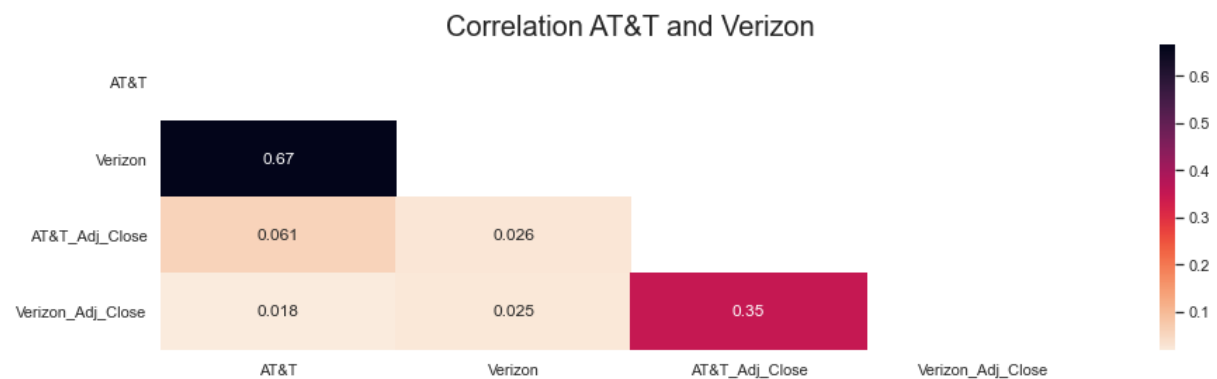*Figure 18. Correlation between AT&T and Verizon Daily Returns*

Figure 19. Correlation between AT&T and Verizon, Daily Returns and Adjusted Close Price

Comparing the expected return with the standard deviation of the daily returns gives a value of risk of each stock. From the diagram we can read that Verizon has low risk and high return. AT&T higher risk and lower return. This could be an indicator of the effect of poor M&A operations and carve-out strategies. While both companies' portfolio and core business is very similar, the additional risk due to poor corporate strategy can really impact stock price and volatility.
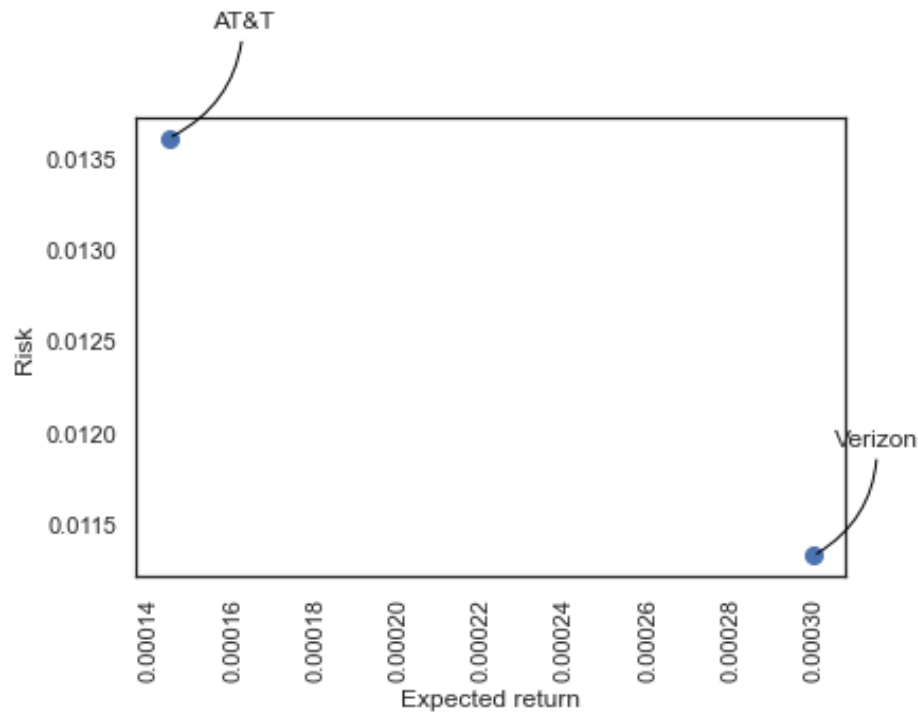

Figure 20. Risk of investing

3. Stock forecast

3.1. AT&T data

The stock information of AT&T was collected in the period between 2015 and 2019 and merged with the information about the revenues of the AT&T business in order to obtain a better predictive model.

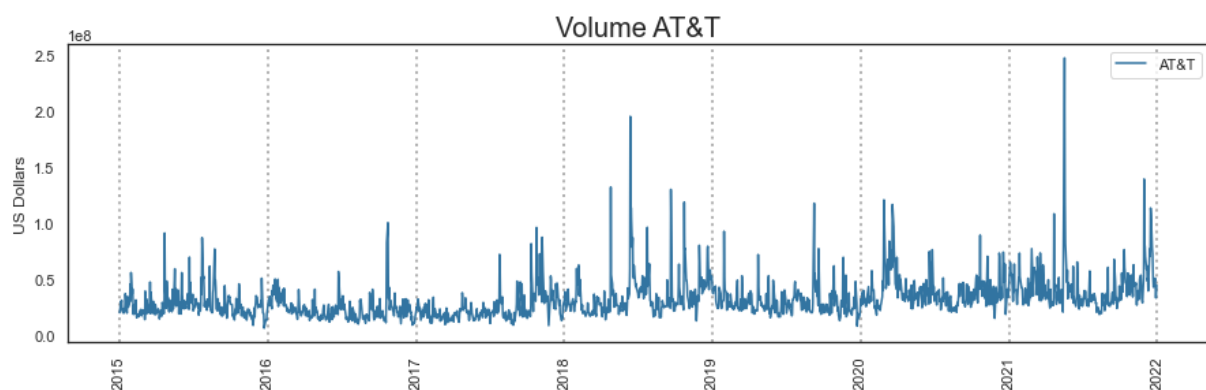*Figure 21. AT&T adjusted stock close price*
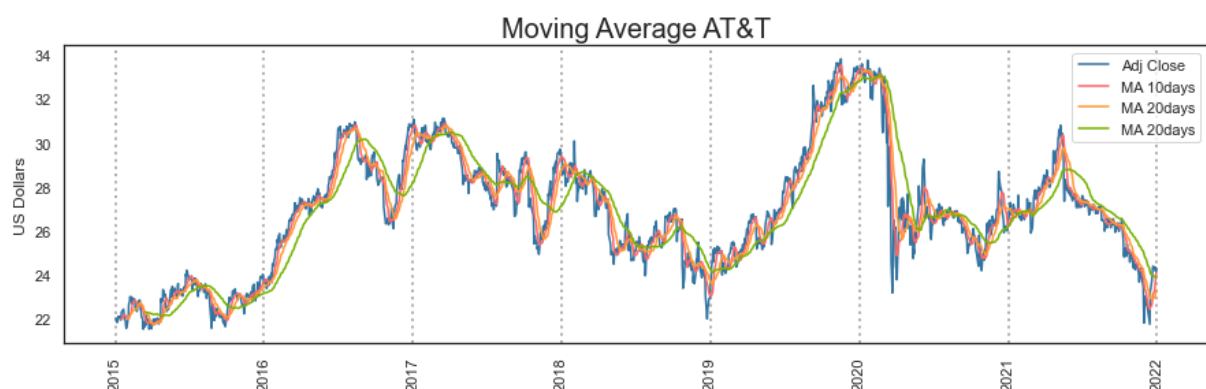

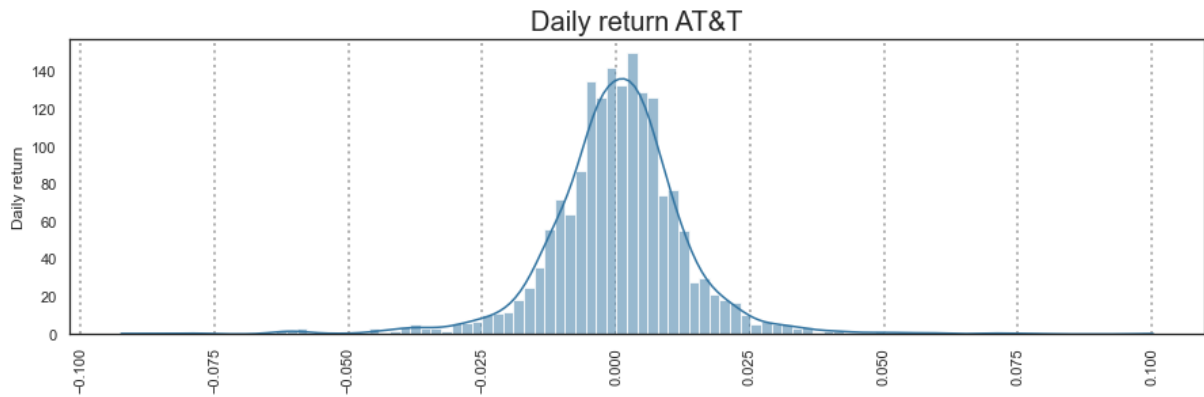*Figure 22. Volume AT&T*

Figure 23. Moving Average AT&T

Figure 24. Daily return distribution
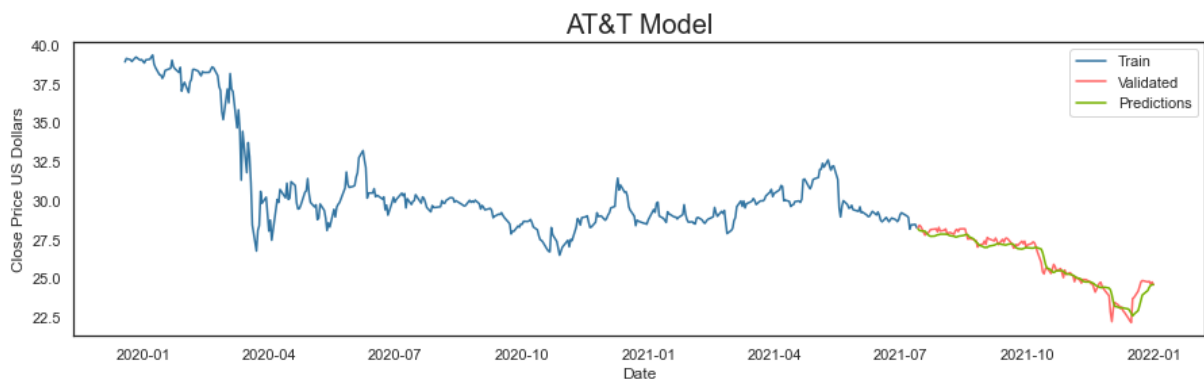
3.2. Stock prediction

Figure 24. Prediction for AT&T stock

Model: Sequential, using Tensorflow and LSTM (long short-term memory).

Training interactions (Epoch): 1

RMSD: 0.46. The RMSD represents the square root of the second sample moment of the differences between predicted values and observed values or the quadratic mean of these differences. The model has very good RMSD value because it is close to 0.

MAE: 0.33. The MAE represents mean absolute error, another way to measure the accuracy of a given model.

The model was tested also with only the values from the stock market. The RMSD score was worse, 0.73. This fact supports the idea that the business financial results improves the performance of the machine learning model.

4. Conclusion

The volume of the AT&T stock market is bigger than the volume of Verizon, but the evolution of AT&T counts with some high peaks. The **Verizon stock market** is more stable and the price is much **higher than the price of AT&T.** The poor M&A and carve-out operations brings additional risk even if industry and core business are similar. That **proves the importance of a good M&A and carve-out** internal strategy and process.

The **acquisition of DIRECTV in 2015 did not help the growth** of the entertainment segment of AT&T. At the beginning the revenues went up but since 2019 were decreasing. The core business did not acquire the adjacent industry well for creation of a valuable synergy. A lot of management attention and resources are consumed during M&A and integrations without any value creation. The same resources and energy could have been applied to other areas of growth through alliances and smaller acquisitions.

During the year 2018 AT&T completed the acquisition of Time Warner and restructured its core business units. This acquisition is visible in the growth of the Entertainment group and the growth of total assets.

The **long term debt of AT&T** raised in 2018. This value can be related to the investment in the fiber-optic network and development of the segment of Warner Media.

The spin-off of DIRECTV negatively affected the value of earnings per share at the and also the stock market. The stock market price went sharply down as well as the stock of Verizon. The DIRECTV was sold with a huge loss. This **highlights the importance** of a dedicated team to routinely **re-evaluate the business portfolio** based on the ever changing environment and competition. And be able to assess if certain assets are not strategically relevant anymore. By understanding this early the sale can be executed at a potential gain.

The last quartier of 2020 the earnings per share of AT&T sharply declined. The company explains this low value due to higher asset impairments, abandonments and COVID-19 impacts. [28]

Both companies made **important carve-out operations during 2021**. Both companies were splitting off parts of its business which did not merge well and did not bring growth to its segment, and they understood the importance to reallocate the funds to areas where the core business has the right knowledge to ensure value creation and growth.

Both **stocks are related to each other** and are having similar problems with new acquisitions to their core businesses.

The **risk of investment in AT&T shares is higher than investment in Verizon** shares, potentially due to poor M+A and carve-out strategy.

5. References

[1] Verizon: Annual report 2020, page 7

https://www.verizon.com/about/investors/annual-report

[2] AT&T: Annual report 2020, page 16

https://investors.att.com/financial-reports/annual-reports/2020

[3] Verizon: Annual report 2020, page 23-24

https://www.verizon.com/about/investors/annual-report

[4] Investopedia: 10-K, What Is the Telecommunications Sector?

https://www.investopedia.com

[5] Kearney: Telecom merges

https://www.es.kearney.com/communications-media-technology/article?/a/telecom-mergers-focus-on-operations-and-double-your-synergies

[6] Investopedia: 10-K

https://www.investopedia.com/terms/1/10-k.asp

[7] EDGAR: Access to financial information

https://www.sec.gov/edgar/search-and-access

[8] Investopedia: 10-Q, SEC Form 10-Q Definition

https://www.investopedia.com/terms/1/10q.asp

[9] Python library: yfinance

https://pypi.org/project/yfinance/

[10] Investopedia: Revenue

https://www.investopedia.com/terms/r/revenue.asp

[11] CFI: Total Assets

https://corporatefinanceinstitute.com/resources/knowledge/credit/total-assets/

[12] Investopedia: Long term debt

https://www.investopedia.com/ask/answers/062415/which-financial-statements-does-company-report-its-longterm-debt.asp

[13] Investopedia: EPS

https://www.investopedia.com/terms/b/basic-earnings-per-share.asp

[14] Investopedia: Adjusted closing price

https://www.investopedia.com/terms/a/adjusted_closing_price.asp

[15] Investorsunderground: Stock Volume

https://www.investorsunderground.com/stock-volume/

[16] Verizon: History of acquisitions

https://www.verizon.com/about/sites/default/files/Verizon_History_0916.pdf

[17] AT&T: News

https://about.att.com/story/att_completes_acquisition_of_directv.html

[18] AT&T: Company profile

https://about.att.com/pages/company_profile_warnermedia

[19] AT&T: Time Warner

https://money.cnn.com/2018/06/14/media/att-time-warner-deal/index.html

[20] The guardian: Verizon

https://www.theguardian.com/technology/2019/aug/12/verizon-tumblr-sale-automattic

[21] CNBC: AT&T spinoff
https://www.cnbc.com/2021/02/25/att-to-spin-off-directv-att-tv-now-and-u-verse-into-new-company.html
[22] The New York Times: Verizon spinoff
https://www.nytimes.com/2021/05/03/business/verizon-aol-yahoo-sale.html
[23] Los Angeles Times: News
https://www.latimes.com/entertainment-arts/business/story/2021-05-16/why-att-is-spinning-off-hbo-cnn-warner-media-discovery
[24] Yahoo finance: News
https://finance.yahoo.com/news/t-tpg-close-directv-transaction-200500452.html
[25] The verge: Yahoo
https://www.theverge.com/2021/9/2/22653652/yahoo-aol-acquired-apollo-global-management-private-equity
[26] The Forbes: Was AT&T's Acquisition Of DirecTV A Mistake?
https://www.forbes.com/sites/greatspeculations/2019/08/09/was-atts-acquisition-of-directv-a-mistake/?sh=5b327a3c47d3
[27] The Forbes: Was AT&T's Acquisition Of DirecTV A Mistake?
https://www.investors.com/news/technology/verizon-stock-buy-now/
[28] AT&T: Earnings 2020
https://about.att.com/story/2021/q4_earnings_2020.html