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# "The Magnificent Seven" Technology Stocks and Their Impact on the S&P 500: A Review 4 Years Later

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**Abstract**

**Purpose:** The subject of this research is the performance of the S&P 500 and the influence of the large technology stocks on it. The interest to this issue is provoked by the continued record-breaking process in the levels of the US stock market. The purpose of the study is to find out: whether recent growth of the index and of the seven large companies (Apple, Amazon, Microsoft, Alphabet, Meta Platforms, Nvidia и Tesla) is supported or not by the key financial indicators, and to what extent the index indicators are influenced by the seven large technology stocks.
**Design/Methodology/Approach:** The current study is a kind of a relook - four years later, of the same issues, explored by the author during the Covid-19 pandemic in 2020. Historical performance of the S&P 500 is reviewed, using its key financial indicators, such as EPS, EPS growth, ROE, as well as "price-to-earnings" (PE) and "price-to-book" (PBV) market ratios. The performance of the seven large technology stocks (Apple, Amazon, Microsoft, Alphabet, Meta Platforms, Nvidia and Tesla) is reviewed in parallel.
**Findings:** The elaborate comparative analysis of the above set of fundamental indicators does not seem to support the high current levels of the S&P 500 as a whole and of most of the companies from "The Magnificent Seven". The major doubt comes because of the unreasonably high levels of most reported PE and PBV ratios, as compared with historic average levels for the market. At the end, fundamental PE and PBV ratios are also derived and compared with the actual market PEs and PBVs of the index and of the seven companies. The derived fundamental PE and PBV ratios also do not support the high levels of the S&P 500 as a whole, and the prices of most of "The Magnificent Seven" technology stocks.
**Practical Implications:** The important implications for investors are that the S&P 500 as a whole and most of "The Magnificent Seven" stocks look significantly overpriced at the background of fundamentals in 2024.
**Originality/Value:** The analyses of this type are normally of private character, done mainly within business entities, specialized on financial markets. Academic research of this matter, which is publicly available, and following the approach of the current study, is extremely limited.
**Paper Type:** Research Paper

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## INTRODUCTION

The achievement of record-after-record high levels by the indices of the developed stock markets and in the first place the US market, continues at this stage. This naturally raises the question of whether the current high levels of market indices are justified. This question explains the relevance of the present study. The current research paper steps on the logic of a previous similar research on this matter by the author amidst the Covid-19 pandemic in 2020 (Nenkov 2021a). The new research is a re-look at the previous issues four years later.

One of the curious stock-market phenomena in the conditions of the pandemic of Covid-19 in 2020 were the consecutive price records on the US stock market. Despite the severe damage the pandemic had inflicted on the global economy, in August 2020, US indices improved pre-pandemic records of February 2020, and continued further with their upward trend until the end of 2021. The study in 2020 did not quite confirm the validity of the S&P 500 levels then. Neither the growth rate of EPS supported the growth rate of prices, nor the average historical values of the "price-to-earnings" (PE) and "price-to-book" (PBV) ratios supported the significantly higher price levels of the index at that time (as of 21 August, 2020) (Nenkov 2021a).

Another important conclusion of the previous study was that the so called "Super Six" large technology companies of that time had an extremely large impact on the overall performance of the S&P 500. The high prices of these six technology giants were indeed the most important factor for the impressive rise of the index during the pandemic of 2020 and later on. The "Super Six" companies were as follows: *Facebook, Apple, Amazon, Alphabet, Netflix and Microsoft* (FAAANM or FANGAM). The analysis of the performance of the six companies showed that these companies had really impressive indicators for the growth of EPS and return on equity (ROE). Regardless of this, however, the average PE and PBV ratios for the "Super Six" as a whole for the period 2006-2020 were defined as illogically high for 4 of the companies and for the group as a whole. The current PE and PBV as of August 21, 2020 were even higher and illogical. In other words, market ratios did not support the price levels of FAAANM shares as a whole at that time (Nenkov 2021a).

The above conclusions are another reason to thoroughly research current S&P 500 levels and the impact of the large technology stocks on the index in 2024. This must include also a research of the validity of price levels of US indices in the longer term. These issues have been relevant throughout the period since the global financial crisis (Blodget 2011). According to Robert Shiller, during this period there have been indications that some stock markets, most notably the US, were growing at a higher speed, while the global economic recovery was slower (Shiller 2014). Thus, for most of the last decade, there has been an intense debate about the validity of high levels of many stock market indices (Nenkov 2017; 2018).

*The purpose* of this research is to examine how far the current price levels of the S&P 500 as a whole and of the largest technology stocks are justified against the backdrop of their fundamentals. *The object* of the study is the level and dynamics of the S&P 500, as well as the price levels of the large technology stocks in the index. *The subject* of the research are the fundamental indicators, relevant to the value of the index and of the group of large technology stocks. Large technology stocks are now presented by the so called "Magnificent Seven", including:

- Apple (AAPL),
- Amazon (AMZN),
- Microsoft (MSFT),
- Alphabet (GOOGL; GOOG),
- Meta Platforms (META),
- Nvidia (NVDA)
- Tesla (TSLA).

They are essentially the previous "Super Six", but without Netflix, and with added Nvidia and Tesla.

*The main hypothesis* is that "The Magnificent Seven" above explain indeed the high current levels of the S&P 500, but at the same time fundamentals do not support the high stock prices of the companies in the group of "The Magnificent Seven".

The motives to focus the analysis on the S&P 500 among so many stock indexes are as follows:

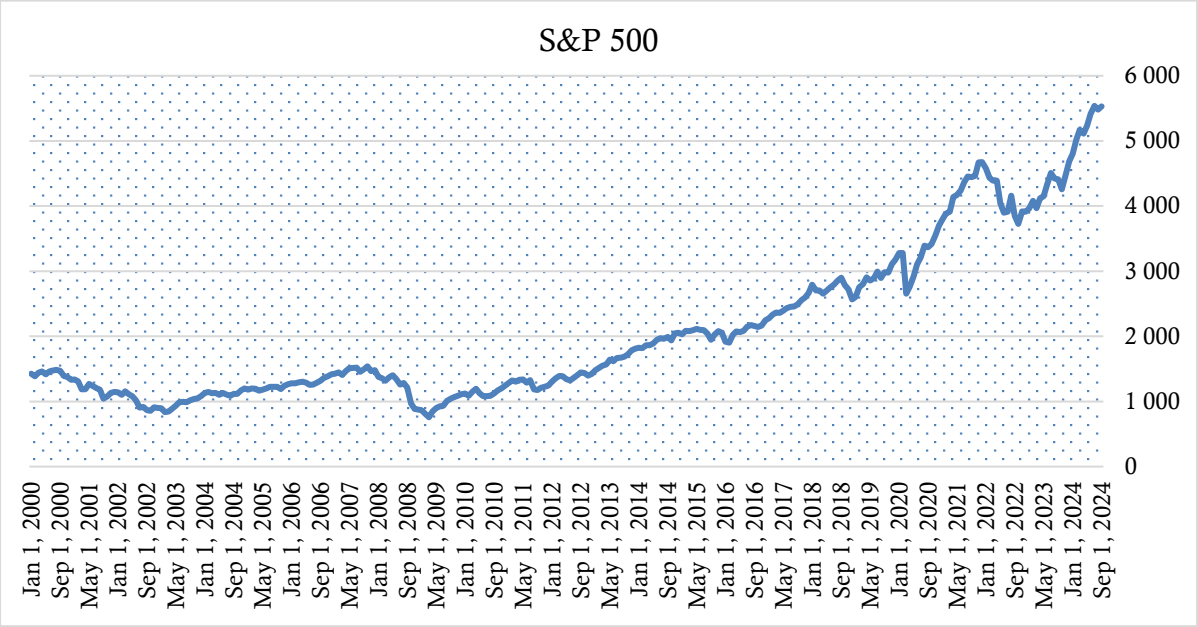
- For most of the period from the beginning of this century until now, the US market has been the one that recorded the most remarkable price records.
- In principle, S&P 500 is one of the most widely monitored indices in the world. It is a very broad index, including 500 large public companies (503 constituents currently) in the US, traded on US stock exchanges (NYSE, NASDAQ, Cboe BZX Exchange) and according to many experts is the most representative of the US stock market as a whole.
- It is considered that its structure by sectors and industries replicates the structure of the US economy as a whole;

- The S&P 500 is also highly representative of the global stock market, as it represents over 30 % of the market capitalization of all public companies in the world.
- The total market capitalization of the S&P 500 is about 75 % of the total market capitalization in the United States (data sources are pointed out in References).

## DYNAMICS OF THE S&P 500 INDEX IN THE PERIOD 1999-2024 AND THE IMPACT OF "THE MAGNIFICENT SEVEN"

Since the beginning of this century, the stock markets have gone through many dramatic events and developments. Figure 1 shows the dynamics of the S&P 500 index in the period January 1, 2000 – September 1, 2024. The values included in the chart are at the beginning of each month. The graph outlines very well the most significant peaks and falls of the index since the beginning of this century. The first peak is in the beginning of 2000, the next one - in October 2007, then in 2015, and 2018, February 2020, January 2022. The highest value of 5 528.93 is at the very end of the period – on September 1, 2024. The significant declines are respectively in 2002-2003, March 2009, the beginning of 2016, December 2018, March 2020, September-October 2022.

Very impressive is the increase of the index during the latest two-year period: from 3 850.52 on September 1, 2022, up to 5 528.93 points, or + 30.36 %. Respectively, the rise from the Covid-19 fall of 2652.39 in March 2020, is +52.03 %




Source: Figure developed by the author. https://www.multpl.com/s-p-500-historical-prices

**Figure 1.** Dynamics of the S&P 500 Index during the Period January 1, 2000 - September 1, 2024

Table 1 shows the earnings per share (EPS) of the S&P 500 for the period 1999-2024. The EPS are inflation adjusted and are in constant July 2024 US dollars. The net earnings per share (EPS) increased from $90.03 in 1999 to $197.32 at the end of 2023. During the period EPS indicate serious volatility, dropping down to only $22.26 in 2008. The other very significant drop is later in 2020 - they drop down to $113.67 from $170.71. As of March 31, 2024, EPS is $192.74.

The cumulative growth for the entire period from 1999 to the end of 2023 amounts to 119.17 %. During this period there were three large-scale stock market crises, because of which not only stock prices, but also profits collapsed. These are: the bursting of the technology bubble in 2000-2002, the global financial crisis of 2007-2009, and the 2020 temporary collapse of the stock market, due to the Covid-19 pandemic.

**Table 1.** Earnings per Share (EPS) of the S&P 500 for the period 1999 – 2024

| *Year* | *1999* | *2000* | *2001* | *2002* | *2003* | *2004* | *2005* |
|---|---|---|---|---|---|---|---|
| **Earnings per share (EPS) ($)** | **90.03** | **90.39** | **43.95** | **47.97** | **83.18** | **96.78** | **111.61** |
| *Year* | *2006* | *2007* | *2008* | *2009* | *2010* | *2011* | *2012* |
| **Earnings per share (EPS) ($)** | **127.05** | **99.11** | **22.26** | **74.24** | **111.00** | **121.19** | **118.51** |
| *Year* | *2013* | *2014* | *2015* | *2016* | *2017* | *2018* | *2019* |
| **Earnings per share (EPS) ($)** | **135.24** | **137.05** | **115.07** | **123.18** | **140.20** | **165.75** | **170.71** |
| *End of Year* | *2020* | *2021* | *2022* | *2023* | *31 Mar. 2024* | | |
| **Earnings per share (EPS) ($)** | **113.67** | **223.23** | **183.08** | **197.32** | **192.74** | | |

Source: https://www.multpl.com/s-p-500-earnings/table/by-year, (6.09.2024)

*Table 2* shows the year-to-year percent change in EPS of the S&P 500 index for the period 1999-2023. These year-to-year changes are indicative of the strong volatility in annual earnings per share. There are occasional high decreases and increases, ranging from -77.54 % in 2008 to +233.51 % in 2009. The mean (arithmetic average) annual growth rate for the entire period is 16.16 %. However, because of the high volatility, the mean growth rate is significantly biased upwards, and is not representative in this case. Much more representative is the cumulative annual average growth rate (CAGR) for the whole period, which is 3.32 %.

**Table 2.** Earnings per Share (EPS) Growth of the S&P 500 for the period 1999 – 2024 (in %, year-to-year)

| *Year* | *1999* | *2000* | *2001* | *2002* | *2003* | *2004* | *2005* |
|---|---|---|---|---|---|---|---|
| **EPS Growth (%)** | | **0.40 %** | **-51.38 %** | **9.15 %** | **73.40 %** | **16.35 %** | **15.32 %** |
| *Year* | *2006* | *2007* | *2008* | *2009* | *2010* | *2011* | *2012* |
| **EPS Growth (%)** | **13.83 %** | **-21.99 %** | **-77.48 %** | **233.51 %** | **49.52 %** | **9.18 %** | **-2.21 %** |
| *Year* | *2013* | *2014* | *2015* | *2016* | *2017* | *2018* | *2019* |
| **EPS Growth (%)** | **14.12 %** | **1.34 %** | **-16.04 %** | **7.05 %** | **13.82 %** | **18.22 %** | **2.99 %** |
| *Year* | *2020* | *2021* | *2022* | *2023* | ***Mean 2000-2023*** | | |
| **EPS Growth (%)** | **-33.41 %** | **96.38 %** | **-17.99 %** | **7.78 %** | **16.16 %** | | |

Source: Calculations of the author
https://www.multpl.com/s-p-500-earnings-growth/table/by-year , (6.09.2024)

The S&P 500 **EPS** geometric average growth rate (point to point) for different periods, ending in 2023, is shown in Table 3. For comparison, the geometric average growth rate (CAGR) of **the S&P 500 itself** for the same periods, ending in 2023, is also presented in this table. The growth rates of EPS and S&P 500 are both based on inflation adjusted EPS and S&P 500 prices (in constant July 2024 US dollars).

**Table 3.** Stock-Price Growth and EPS Growth of the S&P 500 until 2023 (calculated as geometric average)

| **Period** | **S&P 500 Stock-Price Growth (%)** | **S&P 500 EPS Growth (%)** | **Difference (k.4-k.3)** |
|---|---|---|---|
| k.1 | k.2 | k.3 | k.4 |
| 1871-2023 | 2.50 % | 1.98 % | -0.52 % |
| 1979-2023 | 5.59 % | 2.71 % | -2.88 % |
| 1989-2023 | 5.71 % | 3.72 % | -1.99 % |
| 1999-2023 | 3.04 % | 3.32 % | 0.29 % |
| 2001-2023 | 3.30 % | 7.06 % | 3.77 % |
| 2010-2023 | 7.86 % | 4.52 % | -3.34 % |
| 2015-2023 | 8.52 % | 6.97 % | -1.55 % |

Source: Calculations of the author, https://www.multpl.com/s-p-500-historical-prices, https://www.multpl.com/s-p-500-earnings

The significant difference among the growth rates for different periods is normal, provided that the EPS growth is quite uneven in different years and sub-periods. Another factor for this are some specific features of the geometric average (point to point). The low value in the starting year of the respective period is a prerequisite for high calculated growth rate and vice versa. For example, the decreased EPS after the bursting of the internet bubble in 2001 is the main reason for the relatively high EPS geometric average growth rate of 7.06 % for the period 2001-2023. The above indicators show that EPS growth rate of 6.97 % during the last eight years – from 2015 to 2023, is in the high range compared to the other periods.

The values thus obtained and presented in the Table 3 show that in almost each of the above periods until 2023, the average annual rate of increase of the market value of the S&P 500 index is higher than the rate of increase of EPS (column 4). The two exceptions are the periods 1999-2023 and 2001-2023. All other things being equal, this could be used as an argument that the rise in the value of the index for most of the periods is not supported by a parallel rise in earnings per share. This normally results in increased PE ratios over time.

The analysis of stock market performance inevitably involves market ratios, such as PE, PBV, PS and others. The market ratios are widely used, but little is written about them – they are not explored enough in specialized literature sources (Bagna and Ramusino 2017). The reason why they are widely used is that these market ratios (multiples) are excellent for comparing among companies, sectors and markets, because they are "standardized" stock prices (Damodaran 2012). In this sense, the question of whether current stock market levels are too high, can be transformed into the question: *Is it normal for the current PE and PBV ratios of the S&P 500 to be sufficiently higher than their historical average levels?* According to the supporters of the so called "new era", "new economy", or "new world order" (Shiller 2014), the answer should be affirmative. They explain this with the new environment in which companies operate nowadays and with the changed structure of the S&P 500 and other indexes. These indexes are increasingly dominated by large technology companies, for which many analysts believe that it is normal for their market ratios to be higher than those in conventional businesses.

As of August 15, 2024, the breakdown by weight of the top 10 sectors of S&P 500 is as follows (Tun 2024):

- Information Technology: 31.87 % (up from 24.4% in the middle of 2020)
- Health Care: 12.26 %
- Financials: 12.56 %
- Communication Services: 9.07 %
- Consumer Discretionary: 9.68 %
- Industrials: 7.86 %
- Consumer Staples: 6.05 %
- Energy: 3.70 %
- Utilities: 2.59 %
- Real Estate: 2.37 %

The information technology sector stands out with its share of 31.87 %. This share increased significantly from 2020, when it was 24.4 %. Among the largest in the S&P 500 are the technology companies from the group of "The Magnificent Seven" (Apple, Amazon, Microsoft, Alphabet, Meta Platforms, Nvidia, Tesla). The abbreviation that will be used further for the group as a whole is AAMAMNT. With total free-float market capitalization of $13.79 trillion at the beginning of September 2024, AAMAMNT companies represent about 30% of the total market capitalization of the S&P 500. The rest 70 % of the total market capitalization of S&P 500 belong to the rest 493 companies included in the index.

This explains the key contribution of the AAMAMNT companies to the important indicators of the S&P 500 as a whole. For example, the total return of the S&P 500 from the beginning of 2024 until June 13, 2024 was 14.65 %. The major contribution to this impressive half-year return came from the companies in Table 4 (Conte 2024).

Out of the 10 companies with the greatest contribution to the total return of 14.65% during this period, 6 companies belong to the group of "The Magnificent Seven". Only Tesla is not there, because of the serious decline of their stock during that period (Di Pizio 2024). These six large technology companies account for 9.52 percentage points of the total S&P 500 growth of 14.52 %. In other words, these 6 companies "produced" 65.56 % of the total growth of the index during the period.

**Table 4.** Contribution to S&P 500 return by companies (1 Jan, 2024 - 13 June, 2024)

| Rank | Company | Ticker | Contribution to S&P 500 Return |
|---|---|---|---|
| | | | **January 1 - June 13, 2024** |
| 1 | Nvidia | NVDA | 4.94 % |
| 2 | Microsoft | MSFT | 1.24 % |
| 3 | Alphabet | GOOGL | 0.97 % |
| 4 | Meta | META | 0.84 % |
| 5 | Apple | AAPL | 0.81 % |
| 6 | Amazon | AMZN | 0.72 % |
| 7 | Broadcom | AVGO | 0.62 % |
| 8 | Eli Lilly & Co. | LLY | 0.60 % |
| 9 | Berkshire Hathaway | BRK.B | 0.22 % |
| 10 | QUALCOMM | QCOM | 0.21 % |
| | **SUBTOTAL: first 6 companies** | | **9.52 %** |
| | **TOTAL: 10 companies** | | **11.17 %** |
| **Total S&P 500 Return: Jan 1, 2024 - 13 June, 2024** | | | **14.65 %** |

Source: Calculations of the author, https://www.visualcapitalist.com/the-stocks-driving-sp-500-returns-in-2024

The AAMAMNT companies are among the companies that have recorded the highest growth rates of their share prices in recent years and they have been pulling up the S&P 500. This is not anything new. According to Jeffrey Gundlach of Doubleline Funds, during the period from the beginning of 2015 until May 18, 2020, "The Super 6" of that time had a huge impact on the overall performance of the S&P 500 (McGeeney 2020). He illustrated separately the performance of only the six major technology companies as a group (FAAANM - Facebook, Apple, Alphabet, Amazon, Netflix, Microsoft) and separately the group of the other 494 companies in the S&P 500. The results of Gundlah's study indicated that the six of FAAANM beat the remaining 494 companies of the S&P 500 with a striking difference. The average annual growth for the period of the "Super Six" was 26.60 % against 6.20 % for the rest 494 companies in the index (McGeeney 2020). The polarization became even stronger during the Covid-19 crisis in 2020, when these technology giants mainly benefited from this crisis. With regard to this, Damodaran made the conclusion "The strong get stronger" (Damodaran 2020). It is in this connection that there were increasing talks about a "highly polarized American market" (Infostock 2020).

The AAMAMNT companies are the leading representatives of the technology sector, which are traded at high market ratios, such as PE, PBV and others. Given that the S&P 500 index is market-weighted, the companies with the highest market capitalization have the greatest weight in forming its averages (including PE and PBV ratios). This is used as one of the strongest arguments in defense of the "validity" of the higher current PE and PBV of the S&P 500, compared to their historical averages. One of the reasons why the PE and PBV ratios are in the focus of the study is that they are among the most widely used (Bancel and Mittoo 2014; Fernandez 2017). At the same time, they are quite suitable when the stock market as a whole is concerned.

## ANALYSIS OF KEY FINANCIAL INDICATORS OF THE "THE MAGNIFICENT SEVEN" AND THE S&P 500 DURING THE PERIOD 2009-2024

Table 5 presents the price-earnings (PE) ratios of "The Magnificent Seven" companies (AAMAMNT), including their average values for the period 2009-2024 and the current PE as of September 6, 2024. The market-cap weights of each of the companies within the whole group are also provided, as of September 6, 2024. The total market capitalization of the 7 companies amounts to the impressive 14.49 trillion US dollars (and their free-float market cap is $13.79 trillion). The largest weight belongs to Apple (23.34 %), followed by Microsoft (20.61 %) and Nvidia (17.41 %). Alphabet accounts for 12.83 %, Amazon for 12.42 % and Meta Platforms for 8.74 %. The lowest weight is that of Tesla – 4.65 %.

Regarding the average PE for the period 2009-2024, only Apple has a ratio below 20 times earnings - 19.06, which is close to the historic average for S&P 500 of about 15 to 17. Microsoft has a ratio of 24.55 and Alphabet has a ratio of 27.45, quite above the historic average. The PEs of Meta Platforms and Nvidia are respectively 37.60 and 42.61 – too high. The PEs of Amazon and Tesla are extremely high – 138.25 and 99.61 respectively, which is mainly due to the low EPS in the beginning of the analyzed period. This results in abnormally high PE ratios, due to the counter-movement rule identified by Nicholas Molodvsky (1995).

The arithmetic average for the group is 55.59. More representative, however, should be the weighted

average PE, which is **45.53**. In this case, the weighted averages are used, because they most correctly take into account the influence of each company - the largest is from those with the highest market capitalization. This is in line with the nature of the market-weighted S&P 500 index. As mentioned in one of the previous sections, the high relative share is the main reason for the extremely strong influence of "The Magnificent Seven" on the indicators of the whole index.

The current PE as of September 6, 2024 is also predominantly high for the companies in the group. The lowest is 23.15 (Alphabet), followed by 25.54 for Meta Platforms. The highest current PE is that of Nvidia – 70.34. The average current PE for the group (as a weighted average) is 40.15 times profit, almost equal to the weighted average for the period 2009-2024 of 45.53.

**Table 5.** PE of AAMAMNT companies for the period 2009-2024

| COMPANY | Weight in AAMAMNT | Average PE 2009-2024 | Current PE /6 Sep, 2024/ | Difference (%) |
|---|---|---|---|---|
| Apple | 23.34 % | 19.06 | 33.61 | 76.34 % |
| Amazon | 12.42 % | 138.25 | 41.00 | -70.34 % |
| Microsoft | 20.61 % | 24.55 | 34.01 | 38.52 % |
| Alphabet/Google - /Class A/ | 12.83 % | 27.45 | 23.15 | -15.66 % |
| Meta Platforms */2012-2024/* | 8.74 % | 37.60 | 25.54 | -32.07 % |
| Nvidia | 17.41 % | 42.61 | 70.34 | 65.08 % |
| Tesla */2010-2024/* | 4.65 % | 99.61 | 59.19 | -40.58 % |
| **Total** | **100.00 %** | | | |
| **AAMAMNT PE (2009-2024)-Arithmetic Aver.** | | **55.59** | | |
| **AAMAMNT PE (6 Sep, 2024)-Arithmetic Aver.** | | | **40.98** | **-26.29 %** |
| **AAMAMNT PE (2009-2024)-Weighted Average** | | **45.53** | | |
| **AAMAMNT PE (6 Sep, 2024)-Weighted Average** | | | **40.15** | **-11.83 %** |
| **S&P 500 PE (2009-2024 Average)** | | **25.20** | | |
| **S&P 500 Current PE (6 Sep, 2024)** | | | **28.26** | **12.15 %** |

Sources: Calculations of the author, https://www.macrotrends.net/stocks/charts/, (6.09.2024), https://www.multpl.com/s-p-500-pe-ratio/table/by-year , (6.09.2024)

Table 5 also shows that the average PE (for the period 2009-2024) of AAMAMNT companies exceed almost twice the average PE ratio of the S&P 500 of 25.20. The current PE of the S&P 500 of 28.26, is also much lower than that of AAMAMNT. At the same time, these AAMAMNT ratios are about 3 times the usual average S&P 500 PE ratios for the entire historical period from 1871 until nowadays. The current PE of the S&P 500 is by 12.15 % higher than the average for the period. Actually both S&P 500 PEs would have been **even** lower if the 7 companies were taken out. It is useful for the analysis to determine this PE value of S&P 500 without the AAMAMNT. The following relationship can be used:

$$PE_{S\&P500} = a \times PE_{AAMAMNT} + b \times PE_{493} \quad (1)$$

Where:
**$PE_{S\&P500}$** - The PE of the S&P 500 index including all 500 companies,
**a** - The relative weight of the 7 AAMAMNT companies,
**$PE_{AAMAMNT}$** - The average PE of the 7 AAMAMNT companies,
**b** - The relative weight of the rest 493 companies in the index,
**$PE_{493}$** - The PE of S&P 500 without the 7 AAMAMNT companies.

The relative weight of AAMAMNT in the index, as of 6 September, is *a* = 30.37 %, which means that the relative weight of the rest 493 companies is *b* = 60.63 %. Then the implied average PE of S&P 500 without the 7 AAMAMNT companies for the period 2009-2024 is as follows:

$$\mathbf{PE_{493}} = \frac{PE_{S\&P500} - a \times PE_{AAMAMNT}}{b} = \frac{25{,}20 - 0{,}3037 \times 45{,}53}{0{,}6963} = \mathbf{16{,}33} \quad (2)$$

The implied average $PE_{493}$ for the period 2009-2024, which is actually the S&P 500 price to earnings ratio of the index, cleared from the influence of "The Super Seven", would be only 16.33. This number is

practically at the historic average PE values. The calculated current $PE_{493}$ is respectively 23.07.

**Table 6.** PBV of AAMAMNT companies for the period 2009-2024

| COMPANY | Weight in AAMAMNT | Average PBV 2009-2024 | Current PBV /6 Sep, 2024/ | Difference (%) |
|---|---|---|---|---|
| Apple | 23.34 % | 16.08 | 50.39 | 213.38 % |
| Amazon | 12.42 % | 14.04 | 7.60 | -45.87 % |
| Microsoft | 20.61 % | 7.39 | 11.12 | 50.50 % |
| Alphabet/Google - /Class A/ | 12.83 % | 4.74 | 6.18 | 30.48 % |
| Meta Platforms */2012-2024/* | 8.74 % | 6.12 | 8.08 | 32.01 % |
| Nvidia | 17.41 % | 13.90 | 43.43 | 212.37 % |
| Tesla */2010-2024/* | 4.65 % | 18.41 | 10.02 | -45.57 % |
| **Total** | **100.00 %** | | | |
| **AAMAMNT PBV (2009-2024)-Arithm.Aver.** | | **11.53** | | |
| **AAMAMNT PBV (6 Sep, 2024)-Arithm.Aver.** | | | **19.55** | **69.59 %** |
| **AAMAMNT PBV (2009-2024)-Weighted Av.** | | **11.44** | | |
| **AAMAMNT PBV (6 Sep, 2024)-Weighted Av.** | | | **24.52** | **114.40 %** |
| **S&P 500 PBV (2009-2024 Average)** | | **3.19** | | |
| **S&P 500 Current PBV (6 Sep, 2024)** | | | **4.84** | **51.87 %** |

Sources: Calculations of the author, https://www.macrotrends.net/stocks/charts/..... , (6.09.2024), https://www.multpl.com/s-p-500-price-to-book/table/by-year , (6.09.2024)

Table 6 is analogous to Table 5 but it presents the price-to-book (PBV) ratios of AAMAMNT companies, albeit in the same way. The data in this table can be described as quite shocking, given that there are many double-digit values of the PBV ratio. The table looks as if it is for PE ratios, rather than PBV ratios. This is really atypical, given the fact that theoretically the starting point /reference value/ for the PBV ratio of an average company should gravitate around 1. The logic is that the shares of a company with average actual return (ROE), with average cost of equity ($R_E$), which is equal to the average actual return, other things being equal, should be traded at its book value, or at PBV=1.

The weighted average PBV for the 7 companies for the period 2009-2024 is 11.44 and is essentially equal to the mean of 11.53. The weighted average of the current PBV, as of September 6, 2024, is more than twice higher, with an indeed extreme value of 24.52. The highest average PBV ratio for the period 2006-2020 belongs to Tesla 18.41, followed by Apple with 16.08. It can be seen that the current PBV as of September 6, 2020 has some super extreme values – 50.39 for Apple and 43.43 for Nvidia, which explain the abnormally high average. The average PBV of the AAMAMNT for the period 2009-2024 is about 3.6 times the average PBV of the S&P 500, and their current PBV is about 5 times the average of the S&P 500.

By doing the same exercise with PBV, as with PE above, we get an implied average PBV for S&P500 without the 7 large technology stocks ($PBV_{493}$) for the period 2009-2024 of **-0.41**. The implied current $PBV_{493}$ is respectively **-3.71**. This suggests that the average PBV of the other 493 companies in the index is negative, and their contribution to the average PBV of the index as a whole is negative. This is not possible and have no economic sense. Negative PBV ratios are normally rare exception, for example, when a heavily indebted company has a negative book value. In reality a part of these companies in the index have PBVs less than 1, but higher than 0. Other companies have PBVs higher than 1. In any case PBVs of these companies should be relatively close to 1.

One possible explanation for the above illogical results is that the average PBV ratios of the AAMAMNT in Table 6 are not representative for the actual situation. These average values seem to be significantly biased upwards. They are due mainly to extreme values of some of the companies in the group. One way of adjusting databases to correct for this distorting influence of such outliers, is by assigning them certain closer to reality values (Damodaran 2012). In this case we could assign a maximum possible value of PBV of 10. The resulting average PBV for AAMAMNT for the period 2009-2024 would go down to 8.45, and the current would go down to 9.04. These two averages should be much more representative. On the basis of them, the implied average PBV for the period 2009-2024 for the 493 companies would obtain the more reasonable value of **0.90** and the current PBV – of **3.01**.

**Table 7.** Share price growth, EPS growth and ROE of AAMAMNT companies during the period 2009-2024

| COMPANY | Average Share Price Growth 2009-2024 | Average EPS Growth 2009-2024 | Average ROE 2009-2024 | Current ROE - 30 June, 2024 |
|---|---|---|---|---|
| Apple | 26.68 % | 22.58 % | 71.75 % | 147.15 % |
| Amazon | 24.11 % | 28.26 % | 13.87 % | 21.20 % |
| Microsoft | 20.98 % | 13.32 % | 34.22 % | 35.95 % |
| Alphabet/Google - /Class A/ | 16.37 % | 18.52 % | 19.36 % | 30.48 % |
| Meta Platforms */2012-2024/* | 27.72 % | 22.77 % | 19.91 % | 34.16 % |
| Nvidia | | | 32.80 % | 115.52 % |
| Tesla */2010-2024/* | | | -83.76 % | 19.89 % |
| **AAMAMNT Share-Price Growth** | **23.18 %** | | | |
| **AAMAMNT EPS Growth** | | **20.39 %** | | |
| **AAMAMNT Average ROE (2009-24)** | | | **31.57 %** | |
| **AAMAMNT Current ROE-30 June, 24** | | | | **72.32 %** |
| **S&P 500 Share-Price Growth** | **9.48 %** | | | |
| **S&P 500 EPS Growth** | | **7.23 %** | | |
| **S&P 500 Average ROE (2009-24)** | | | **18.25 %** | |
| **S&P 500 Current ROE-30 June,24** | | | | **17.34 %** |

Sources: Calculations of the author, https://www.macrotrends.net/stocks/charts/..... , (6.09.2024). https://www.multpl.com/s-p-500-book-value, (6.09.2024)

Table 7 presents other important financial indicators of AAMAMNT companies - return on equity (ROE), average growth rate of share prices and average growth rate of earnings per share (EPS) for the period 2009-2024. For direct comparison purposes, the same indicators have been calculated for the S&P 500 as well. One idea is to see to what extent the growth rate of stock prices is supported by the growth rate of EPS. This earnings growth has always been cited as a key argument in defense of high market price levels. The growth rates in this case are calculated as geometric average (point-to-point). The calculated EPS growth rates for Nvidia and Tesla are ignored in the table, because they have values, which are meaningless (these values are negative because of negative earnings in the beginning of the period). The average growth rates for the group, respectively, are determined on the basis of the first 5 companies only.

The table shows that the average annual growth rate of EPS was higher than the growth rate of stock prices only for Amazon and Alphabet. For the other 3 companies, the increase in EPS was clearly lower, compared to the increase in their share prices. This gives some reason to question the arguments that the increase in prices is fully justified and supported by the growth of net profits. The calculated average price growth rate for the five companies (weighted according to the market value of each) is 23.18 %, about three percentage points higher than the average EPS growth rate of 20.39 %. Thus, if we assume that these growth rates are representative for all seven companies, the growth of "The Super Seven" share prices in general, in the period 2009-2024, does not seem quite supported as a whole by the corresponding increase in EPS.

The indicators in Table 7 also show that the average growth rates of stock prices and EPS of AAMAMNT companies are about two times higher than those of the S&P 500 index. In this regard, further analysis of the factors that determine this higher growth of EPS of the AAMAMNT companies is needed. The growth of the index itself (stock price levels) is by about two percentage points higher than the growth of its EPS.

An important factor for the high growth rate of EPS of AAMAMNT companies is their high return on equity (ROE). As it has already become clear, it is an indicator of the key fundamental variable *potential for generating income (cash flows)*. Therefore, the ROE ratio, together with the retention ratio, predetermine the so-called *internal growth rate* of EPS in the future (Nenkov 2021). For the period 2009-2024, the average ROE for each of the seven companies has ranged from -83.76 % for Tesla to 71.75 % for Apple. Microsoft is in second place with an ROE of 34.22 %, followed by Nvidia with 32.80 %. Meta Platforms, Alphabet and Amazon have ROE below 20 %. The weighted average for the six companies for the period is 31.57 %. The average ROE of the S&P 500 for the period is much lower – 18.25 %.

The current ROE for the group, calculated on the basis of published profits as of June 30, 2024, is 72.32 %, more than twice higher than the average for the analyzed period 2009-2024. This is due mainly to the extremely high Apple's ROE of 147.15 % and Nvidia's ROE of 115.52 %. The ROEs of the rest are within

the range 19.89 %-35.95 %. The current ROE of S&P 500 is 17.34 %, or 4 times lower than that of AAMAMNT. These extremely high ROEs for Apple and Nvidia should be considered as the major factors for the extremely high PBVs of the two companies. The reason is that ROE is the so called "companion variable" for PBV, or in other words, the variable which has the highest influence over the levels of the PBV ratios (Damodaran 2012).

Here, however, a very important question arises - to what extent the ROE calculated for these companies is indicative of the actual return on equity. The reason for such doubts comes from the fact that ROE is calculated on the basis of the book value of equity, and in these companies it does not seem to be representative at all. The indicator for this are the abnormally high price-to-book value (PBV) ratios discussed above. It would be rather superficial to explain these extremely high coefficients only with the high return and growth. Rather, the book value of most of these companies does not reflect a significant proportion of the value of their assets. These are intangible assets, and it is quite possible that the vast majority of them do not find a place in the balance sheet of these companies at all. A PBV of 50.39 for Apple means that its book value of equity is only 1.98 % of its market value of equity. According to the latest balance sheet as of 30 June, 2024, the total assets of Apple are $331.6 billion, the total liabilities are $264.9 billion, and the shareholder equity is $66.7 billion. The total market capitalization of the company as of 6 Sep, 2024 is $3 381 billion. Other things being equal, this should mean that roughly 90 % of the assets' value of Apple is not accounted for in the balance sheet, most likely because about 90 % of Apple's assets are intangible. Similarly, for Nvidia, with PBV of 43.43, its book value of equity is only 2.30 % of its market value of equity.

Thus, the book value of these companies (as the difference between the book value of assets and the book value of liabilities) is greatly underestimated. As a result, the ROEs calculated for these companies should be greatly inflated (Nenkov 2021).

One of the consequences of the greatly increased ROE is that preconditions are created for unreasonably high forecasts for the growth of EPS - $\boldsymbol{g}$, calculated as internal rate. Thus, for Apple, with a current ROE of 147.15 % and assuming a high retention ratio (b) of 0.8, the calculated internal growth rate would be 117.72 % (g=ROE×b=147.15 %×0.8=117.72 %). This may be subsequently used as an argument in defense of an atypically high future growth rate of 117.72 % for the next 5 years, for example. All this could seriously distort the notions about the actual growth prospects and financial efficiency of the AAMAMNT companies.

Assuming conditionally that the accounting has managed to reflect all tangible and intangible assets at their market value, the book value of equity should be equal to its market value. Thus, the price per share (P0) should be equal to the book value per share (BVS), or: $P_0$=BVS, and the PBV ratio will be equal to 1. In this situation, Apple's ROE on September 6, 2024 should be only:

$$ROE = \frac{EPS_1}{BVS_0} = \frac{EPS_1}{P_0} = \frac{\$6.57}{\$191.80} = 3.43\ \% \qquad (2)$$

This is in fact equal to the so-called current earnings yield (EY) of the shares (EY=EPS/$P_0$). Thus, an investor who has acquired shares of Apple at a price as of September 6, 2024, his current return will be only 3.43 %. The current yield is actually the opposite of the PE ratio, or EY=1/PE. The higher the actual market ratio PE, the lower the earnings yield per share.

The explanation for some illogically high current market ratios PE and PBV of AAMAMNT companies should be sought not so much in their high efficiency, but rather in external factors, in some features of the environment in which the companies operate. Until two or three years ago one major explanation was the very low cost of equity, mainly due to low, close to zero, interest rates. Nowadays, however, this could not be considered a serious factor in this direction.

Another possible explanation is one of the two traditionally most widely used approaches by the investment community - *the castle-in-the-air theory*, enunciated by John Maynard Keynes in 1936. According to this approach "it's perfectly all right to pay three times what something is worth as long as later on you can find some innocent to pay five times it's worth" (Malkiel 2015). The other approach is *the firm-foundation theory*. According to Burton Malkiel the two approaches are mutually exclusive (Malkiel 2015). The current study follows the point of view of the firm-foundation theory, which is essentially the fundamental theory about the value of stocks and other assets (Graham and Dodd 2009; Graham 2006). So far in the study we have been discussing the levels of the S&P 500 and the actual prices of AAMAMNT companies in terms of what we think should be their firm-foundation of value. At the same time history tells us that pricing on the stock market is very often heavily influenced by *the castle-in-the-air theory* thinking. The followers of *the castle-in-the-air theory* are not interested at all about fundamental value. Under such conditions, what a stock needs in order to grow in price is a *good story* about its nifty development on the market over time. Stories such as the incredible value that lies in the upcoming development of artificial intelligence (AI) are unlocking expectations for continued serious growth in the prices of certain companies, and in the first place of "The

Magnificent Seven". In this line of thought, the main question should be: "To what extent are the huge intangible assets of these companies an expression of invisible intrinsic value, and to what extent are they the consequence of exaggerated, unfounded expectations about the future?".

## DERIVATION OF FUNDAMENTAL PE AND PBV RATIOS FOR "THE MAGNIFICENT SEVEN" AND THE S&P 500 FOR 2024

The answer to the question from the previous section requires a further look at the discussed above PE and PBV ratios in the context of the three fundamentals, dictating the intrinsic value of stocks. This is the reason why these fundamentals are also called "value drivers" (Koller, Goedhart and Wessels 2015). Since market ratios (including PE and PBV) are actually standardized prices of stocks, they should also depend on the same three fundamentals. These are *earnings (cash flow) potential, expected growth of earnings and risk* (Damodaran 2012).

Fundamental PE and PBV ratios can be derived from fundamentals. They are supposed to express the correct level for PE and PBV of any stock. The determination of fundamental ratios is actually implicit, short, and hidden DCF valuation of stocks. The corresponding indicators for the three fundamentals, which are appropriate at equity level, are *ROE, expected growth of EPS (g), and the cost of equity ($R_E$).*

The two-stage (high-growth) fundamental model seems appropriate in this case, provided that high-growth companies are concerned. The values of the estimated fundamental ratios are also not undisputed, as the input fundamental variables are normally subject to debates, as is the case with any DCF valuation. The point is to use meaningful and well-reasoned values for each of the input variables in the process.

Under the basic scenario, the two-stage model in this case is with a 5-year first stage. The ROE used for the first stage is the average company (or index) ROE for the period 2009-2024.

Table 8 shows the estimation of the internal growth rate ($g_1$) by companies for the next 5 years, as the product of $ROE_1$ and plowback ratio ($b_1$). The plowback ratio itself is derived from the payout ratio ($1-b_1$), which presents the average payout to shareholders for the last five years, i.e. dividend payouts + stock buybacks. The dividend payments are not significant for most of the companies in the group. The highest is for Microsoft – 24.7 %, followed by Apple with about 18 %, Nvidia with 10 %, Meta Platforms with 4.94 %, Alphabet with 2.81 %. Amazon and Tesla have not payed dividends during the period. At the same time the stock buybacks are significant for five of the companies. The average values, as percent of net income, are 99.67 % for Apple, 77.58 % for Alphabet, 68.81 % for Meta, 67.60 % for Nvidia, 30.80 % for Microsoft. The average buybacks of Amazon amount to only 6.38 %, and for Tesla are 0.0 %.

**Table 8.** Internal growth rate for AAMAMNT and the S&P 500 – Stage 1

| | Stage 1 | | | |
|---|---|---|---|---|
| **Company** | **Payout Ratio 1 ($1-b_1$)** | **Plowback Ratio 1 ($b_1$)** | **$ROE_1$** | **$g_1$ ($ROE_1 \times b_1$)** |
| Apple | 0.8000 | 0.2000 | 71.75 % | 14.35 % |
| Amazon | 0.0638 | 0.9362 | 13.87 % | 12.99 % |
| Microsoft | 0.5550 | 0.4450 | 34.22 % | 15.23 % |
| Alphabet/Google | 0.8039 | 0.1961 | 19.36 % | 3.80 % |
| Meta Platforms | 0.7375 | 0.2625 | 19.91 % | 5.23 % |
| Nvidia | 0.7760 | 0.2240 | 32.80 % | 7.35 % |
| Tesla | 0.0000 | 1.0000 | 19.89 % | 19.89 % |
| S&P 500 | 0.8185 | 0.1815 | 18.25 % | 3.31 % |

Source: Calculations of the author, https://ycharts.com/companies/..., https://www.macrotrends.net/stocks/charts/ …, https://pages.stern.nyu.edu/~adamodar/

The average total payout ratios can be seen in table 8. This ratio of Apple for the last five years is almost 118 % of net income, probably paid out of accumulated cash from earlier periods. It makes no sense to use it as a projection, so the more logical payout ratio of 0.80 is used. The resulting plowback ratios are quite modest for four of the companies, medium for Microsoft, very high for Amazon, and 1 (maximum) for Tesla. The payout ratio for the S&P 500 of 0.8185 is actually the average for the latest three years, and the corresponding plowback ratio is 0.1815.

The average ROEs for the period 2009-2024 are suitable to use in this case. The only exception is Tesla, since its average is negative. For this reason, the latest ROE of 19.89 % is used for Tesla. The calculated internal growth rates for the next 5 years can be put into two groups – high growth rates (for Apple, Amazon, Microsoft and Tesla), and relatively low growth rates (for Alphabet, Meta and Nvidia). The high growth

rates of Amazon and Tesla are due mainly to the extremely high plowback ratios. The low growth rates of Alphabet, Meta and Nvidia are due mainly to low plowback ratios.

Table 9 illustrates the historical and current risk free rates, risk premiums and expected return of S&P 500, which are used in deriving the cost of equity for stocks. The historic average values are normally preferred by academics, while the current rates are normally used by managers and analysts in the practice of capital markets. During the whole period after the Global Financial Crisis, with the exception of the last two years, the current expected return used to be significantly lower than historical average levels, due to the very low interest rates.

**Table 9.** Historic and current expected return for the US market

| Indicator | Period | Risk Free Rate | Risk Premium | Market Return |
|---|---|---|---|---|
| Arithmetic Average Historical Return | 1928-2023 | 4.86 % | 6.80 % | **11.66 %** |
| Geometric Average Historical Return | 1928-2023 | 4.57 % | 5.23 % | **9.80 %** |
| Pablo Fernandez – Survey | 2024 | 4.10 % | 5.50 % | **9.60 %** |
| Average of Monthly Expected Returns | 2008-2024 | 2.51 % | 5.43 % | **7.94 %** |
| Current Expected Return | Aug 2024 | 4.09 % | 4.12 % | **8.21 %** |

Source: Calculations of the author, https://pages.stern.nyu.edu/~adamodar/, Fernandez 2024

The numbers in Table 9 indicate that historic average return is higher than current expected return. The arithmetic average historic return is the highest – 11.66 %. The geometric average is 9.80 % and is very close to the return derived from the latest survey of Pablo Fernandez (for 2024). The average of the monthly expected returns from January 2008 to August 2024 is 7.94 %, which is very close to the current expected return as of August 2024 of 8.21 %.

The main touted advantage of the current cost of equity is that it is up to date. The main disadvantage is that it is too volatile. The main advantage of the historic average is that it is stable and is supposed to be more representative for the long run. The main disadvantage is that it is based to a high extent on periods of the distant past, which are not considered indicative of the future. With regard to this, the cost of equity for AAMAMNT and the S&P 500 for stage 1 of the models (for the next 5 years) is based on the average of current risk free rates and risk premiums for the period 2008-2024. For stage 2 of the model, where it is a question of a period that continues to infinity, the geometric historical average is taken as the most appropriate.

Table 10 shows the estimation of the cost of equity by companies for the first stage of the fundamental model. The Capital Asset Pricing Model (CAPM) is applied, based on the average of monthly current risk free rates of 2.51 %, and of monthly current risk premiums of 5.43 % for the period 2008-2024. The average for the current cost of equity for S&P 500 respectively adds up to 7.94 %. The table contains also the beta coefficients of each of the seven companies, which range from 0.90 for Microsoft to 2.29 for Tesla. The estimated cost of equity varies significantly because of the varying betas. Microsoft has the lowest cost of equity (7.40 %), followed by Alphabet (8.16 %) and Amazon (8.75 %), because of their relatively low betas. Tesla has the highest cost of equity of 14.94 %, followed by Nvidia with 11.58 %

**Table 10.** Cost of Equity for AAMAMNT and the S&P 500 for 2024 – Stage 1

| | Stage 1 | | | |
|---|---|---|---|---|
| **Company** | **$R_{f1}$** | **Beta** | **$(Rm - Rf)_1$** | **$R_{E1}$** |
| Apple | 2.51 % | 1.24 | 5.43 % | 9.24 % |
| Amazon | 2.51 % | 1.15 | 5.43 % | 8.75 % |
| Microsoft | 2.51 % | 0.90 | 5.43 % | 7.40 % |
| Alphabet/Google | 2.51 % | 1.04 | 5.43 % | 8.16 % |
| Meta Platforms | 2.51 % | 1.21 | 5.43 % | 9.08 % |
| Nvidia | 2.51 % | 1.67 | 5.43 % | 11.58 % |
| Tesla | 2.51 % | 2.29 | 5.43 % | 14.94 % |
| | | | | |
| S&P 500 | 2.51 % | 1.00 | 5.43 % | 7.94 % |

Source: Calculations of the author, https://pages.stern.nyu.edu/~adamodar/

The cost of equity for stage 2 of the model (Table 11) is based on the geometric historical average for the longest period 1928-2023. The main argument for this is that the historical average is normally a more sustainable number than the current cost of equity. This makes it more appropriate to use for a long future period, which is supposed to continue until infinity. The geometric average is preferred as the more

representative before the arithmetic average. The long-term geometric average risk free rate is 4.57 % and the long-term geometric average risk premium is 5.23 %. The cost of equity for the S&P 500 adds up to 9.80 %, higher than the cost of equity used for stage 1. Respectively, the long-term cost of equity by companies for stage 2 is also higher than that for stage 1.

**Table 11.** Cost of Equity for AAMAMNT and the S&P 500 for 2024 – Stage 2

| | Stage 2 | | | |
|---|---|---|---|---|
| **Company** | **$R_{f2}$** | **Beta** | **$(Rm - Rf)_1$** | **$R_{E2}$** |
| Apple | 4.57 % | 1.24 | 5.23 % | 11.06 % |
| Amazon | 4.57 % | 1.15 | 5.23 % | 10.58 % |
| Microsoft | 4.57 % | 0.9 | 5.23 % | 9.28 % |
| Alphabet/Google | 4.57 % | 1.04 | 5.23 % | 10.01 % |
| Meta Platforms | 4.57 % | 1.21 | 5.23 % | 10.90 % |
| Nvidia | 4.57 % | 1.67 | 5.23 % | 13.30 % |
| Tesla | 4.57 % | 2.29 | 5.23 % | 16.55 % |
| S&P 500 | 4.57 % | 1.00 | 5.23 % | 9.80 % |

Source: Calculations of the author, https://pages.stern.nyu.edu/~adamodar/

Table 12 contains the input variables for the two fundamental models and the results of applying the models – the fundamental PE and PBV ratios for each of the seven companies and for the S&P 500. The input variables that have not yet been discussed, are the stage 2 growth rate ($g_2$), return on equity ($ROE_2$) and plowback ratio (plowback ratio 2). They are interrelated in the context of the internal growth rate formula. The growth rate of 4.57 % is fixed in this case, on the basis of the long-term risk-free rate. Ideally, the so called intrinsic risk-free rate is supposed to represent the sum of the expected long-term average GDP growth rate and the expected long-term average inflation rate. The foreseen plowback ratio is 0.3 and the resulting ROE is 15.23 %. Having in mind that these forecasted values are until infinity, they are supposed to be more conservative. Yet, in our case they are not so conservative, with a growth rate of 4.57 %, and ROE of 15.23 %, which is quite above the foreseen cost of equity for all companies, except Tesla.

**Table 12.** Input variables for the fundamental models, fundamental PEs and PBVs for AAMAMNT and S&P 500

| **Company** | **$R_{E1}$** | **Plowback Ratio 1** | **$ROE_1$** | **$g_1$** | **PE** | **PBV** |
|---|---|---|---|---|---|---|
| Apple | 9.24% | 0.2000 | 71.75 % | 14.35 % | **18.77** | **5.46** |
| Amazon | 8.75% | 0.9362 | 13.87 % | 12.99 % | **15.10** | **2.29** |
| Microsoft | 7.40% | 0.4450 | 34.22 % | 15.23 % | **25.53** | **4.54** |
| Alphabet/Google | 8.16% | 0.1961 | 19.36 % | 3.80 % | **14.51** | **2.36** |
| Meta Platforms | 9.08% | 0.2625 | 19.91 % | 5.23 % | **12.97** | **2.13** |
| Nvidia | 11.58% | 0.2240 | 32.80 % | 7.35 % | **10.37** | **2.19** |
| Tesla | 14.94% | 1.0000 | 19.89 % | 19.89 % | **7.54** | **1.15** |
| S&P 500 | 7.94 % | 0.18 | 18.25 % | 3.31 % | **14.83** | **2.37** |

| | Stage 2 | | | |
|---|---|---|---|---|
| **Company** | **$R_{E2}$** | **Plowback Ratio 2** | **$ROE_2$** | **$g_2$** |
| Apple | 11.06 % | 0.3 | 15.23 % | 4.57 % |
| Amazon | 10.58 % | 0.3 | 15.23 % | 4.57 % |
| Microsoft | 9.28 % | 0.3 | 15.23 % | 4.57 % |
| Alphabet/Google | 10.01 % | 0.3 | 15.23 % | 4.57 % |
| Meta Platforms | 10.90 % | 0.3 | 15.23 % | 4.57 % |
| Nvidia | 13.30 % | 0.3 | 15.23 % | 4.57 % |
| Tesla | 16.55 % | 0.3 | 15.23 % | 4.57 % |
| S&P 500 | 9.80 % | 0.3 | 15.23 % | 4.57 % |

Source: Calculations of the author, https://pages.stern.nyu.edu/~adamodar/, https://ycharts.com/companies/..., https://www.macrotrends.net/stocks/charts/ …

The obtained fundamental PE and PBV ratios are significantly lower than the discussed in section *"Analysis of key financial indicators of the "The Magnificent Seven" and the S&P 500 during the period 2009-2024"* actual PEs and PBVs. The highest fundamental PE is for Microsoft – it is 25.53, followed by Apple with 18.77. The lowest fundamental PEs are of Tesla – 7.54, and Nvidia – 10.37. The S&P 500 fundamental PE is 14.53, practically at the historical average level. Most company PEs are also quite close to the historical average of about 15 to 17. With regard to PBV ratios, the difference between their actual and fundamental levels is huge. The highest fundamental PBV ratio is that of Apple – 5.46, followed by Microsoft – 4.54. The lowest PBV ratio is that of Tesla – 1.15, followed by Meta Platforms with 2.13 and Nvidia with 2.19.

The low fundamental ratios for Tesla are due mainly to the high cost of equity, which has the levels for companies on emerging markets, with country risk premiums and other additional premiums applied. The fundamental ratios respectively, are also comparable with those for companies in emerging markets. This situation is quite similar for Nvidia as well.

**Table 13.** Comparison: Actual Vs. Fundamental PE and PBV for AAMAMNT and S&P 500

| | Actual Ratios | | Fundamental Ratios | | Difference | | Difference in % | |
|---|---|---|---|---|---|---|---|---|
| | PE | PBV | PE | PBV | PE | PBV | PE | PBV |
| Company | Average 2009-2024 | | 5-Year High Growth | | k.2-k.4 | k.3-k.5 | k.6/k.4 | k.7/k.5 |
| k.1 | k.2 | k.3 | k.4 | k.5 | k.6 | k.7 | k.8 | k.9 |
| Apple | 19.06 | 16.08 | 18.77 | 5.46 | 0.29 | 10.62 | 2 % | 194 % |
| Amazon | 138.25 | 14.04 | 15.10 | 2.29 | 123.15 | 11.75 | 816 % | 513 % |
| Microsoft | 24.55 | 7.39 | 25.53 | 4.54 | -0.98 | 2.85 | -4 % | 63 % |
| Alphabet/Google | 27.45 | 4.74 | 14.51 | 2.36 | 12.94 | 2.38 | 89 % | 101 % |
| Meta Platforms | 37.60 | 6.12 | 12.97 | 2.13 | 24.63 | 3.99 | 190 % | 187 % |
| Nvidia | 42.61 | 13.90 | 10.37 | 2.19 | 32.24 | 11.71 | 311 % | 535 % |
| Tesla | 99.61 | 18.41 | 7.54 | 1.15 | 92.07 | 17.26 | 1221 % | 1501 % |
| **Mean** | **55.59** | **11.53** | **14.97** | **2.87** | **40.62** | **8.65** | **271 %** | **301 %** |
| **Weighted Average** | **45.53** | **11.44** | **16.67** | **3.42** | **28.86** | **8.02** | **173 %** | **235 %** |
| S&P 500 | 25.20 | 3.19 | 14.83 | 2.37 | 10.37 | 0.82 | 70 % | 34 % |

Source: Calculations of the author

Once we have the fundamental PE and PBV ratios, we can compare the actual PEs and PBVs with them. This can be seen in Table 13. The actual and fundamental PE ratios match pretty well for two companies – Apple (19.06 vs. 18.77) and Microsoft (24.55 vs. 25.53). The actual PEs of the rest of the companies are a lot higher than the respective fundamental PE ratios – by only 89 % for Alphabet, but by 1221 % for Tesla. The mean actual PE for all seven companies is by 271 % higher than the mean fundamental ratio and the weighted average is by 173 % higher.

For PBV the differences are even bigger. The PBV fundamental ratios for all seven companies are much higher than their PBV fundamental ratios. The least difference is for Microsoft – 63 %, and the highest is for Tesla – 1501 %. The mean actual PBV ratio for the seven companies is by 301 % higher than the mean fundamental PBV ratio, and the weighted average is by 235 % higher.

## CONCLUSION

The results of the analysis, based on the main financial indicators, related to the stock-price levels of the S&P 500 and of "The Magnificent Seven", confirm both aspects of the main hypothesis:

1. The 7 large technology companies (AAMAMNT) have indeed a very large impact on the overall performance of the S&P 500, and the high prices of their shares are the most important factor for the record-high recent levels of the index. The study proves that the S&P 500 without these 7 stocks, would have a lot more modest financial indicators, such as EPS growth, ROE, PE and PBV.
2. The study indicates that EPS growth rates of the AAMAMNT companies as a whole for the period 2009-2024 are slightly lower than their price growth rates for the same period.
3. The study based on PE and PBV ratios for the 7 companies indicates that their average levels for the period 2009-2024 are more than 2 times higher for PE, and more than 3 times higher for PBV, than their average historical PEs and PBVs of the market as a whole. Also, current PE and PBV

levels as of September 6, 2024, are respectively 2.5 times and 5 times higher than historic average levels.

4. The final check involves fundamental PE and PBV for the 7 companies, based on 2-stage fundamental models. It definitely does not support the high price levels of the AAMAMNT. The derived fundamental PE and PBV ratios seem to be quite in line with historic average levels of the market, and are much lower than the actual average and current PE and PBV for the group as a whole. The average actual PE for the group is by 173 % higher than the fundamental PE, and the actual PBV is by 301 % higher than the fundamental PBV.

The above findings of the study are, of course, subject to discussion. This is one of the ideas behind starting such a research. There can be different views with regard to the representativeness of some actual market ratios used, questions can also be raised with regard to the values of each of the input variables in the models for deriving the fundamental PEs and PBVs. These issues deserve to be addressed in more detail in future studies.

The analyses of this type are normally of private character, done mainly within business entities, specialized on financial markets. Academic research of this matter, which is publicly available, and following the approach of the current study, is extremely limited. The important implications of the results from the current study for investors, however, are clear: S&P 500 as a whole and most of "The Magnificent Seven" stocks look significantly overpriced at the background of fundamentals in 2024.

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