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THE S&P 500 INDEX AND THE "SUPER 6" TECHNOLOGY STOCKS IN THE PANDEMIC CRISIS

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Abstract

The subject of this research is the performance of the US stock market in the conditions of the current Covid-19 pandemic. The interest to this issue is provoked by the quite illogical record-high levels of US stock-market indices, while the economy is seriously injured by the pandemic. The broad S&P 500 index is analyzed in this case, as representative for the whole US economy. Historical performance of the index is reviewed, using its key financial indicators, such as EPS, EPS growth, as well as PE and PBV market ratios. The purpose is to check whether recent growth of stock prices is supported or not by these key indicators.

After a significant, but brief collapse in March 2020, caused by the pandemic, the stock market began to pursue new price records in the months that followed. In the process of the study, it becomes evident that a very important factor for the continued increase of the S&P 500 levels during the period April-August are the so called "super 6" technology stocks, included in the index. This is the reason why special attention is paid to some important performance indicators of these 6 companies. The elaborate comparative analysis of the above set of indicators does not support the high growth of stock prices in recent years and within 2020. It does not provide sound arguments in favor of the high current level of the S&P 500 as a whole, nor does it for the prices of the "super 6" technology stocks.

Key words: stock market, S&P 500, EPS growth, ROE, PE and PBV ratios, FAAANM (FANGAM), stock market bubble

JEL: G11, G12, G15

Introduction

One of the curious phenomena in the conditions of the continuing pandemic of Covid-19 are the consecutive price records on the American stock market. Despite the severe damage the pandemic has inflicted on the global economy, in August 2020, US indices already improved their own February records.

This once again raised questions about the validity of price levels of US indices in the longer term, especially in the last 4 or 5 years. In fact, these issues became relevant during the first years of recovery after the global financial crisis (Blodget, 2011; Koller et al., 2015; Malkiel, 2015). Even then, there were indications that

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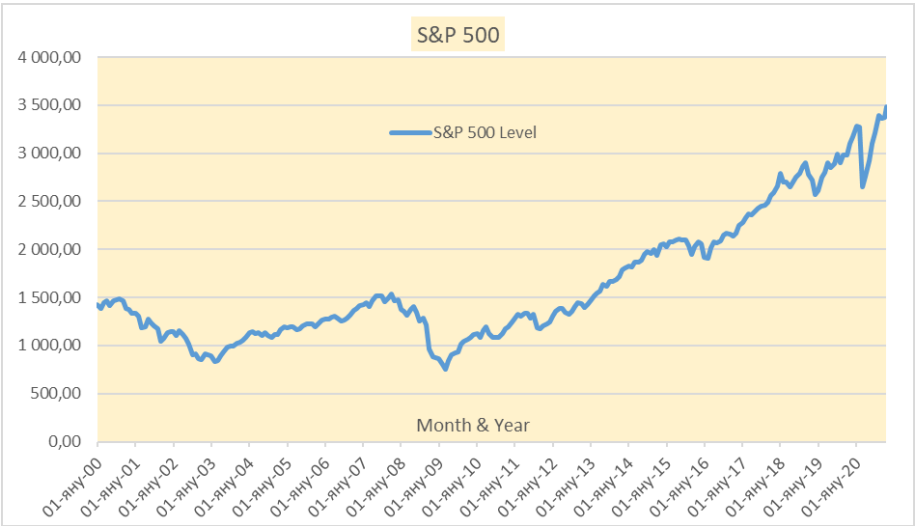
some stock markets, most notably the US, were growing significantly, while the global economic recovery was slower (Shiller, 2013; Nenkov, 2014). Thus, for most of the last decade, there has been an intense debate about the validity (justification) of stock market price levels (Nenkov, 2017; Nenkov 2018; Damodaran, 2012).

The question at this stage should be: *Was the sharp decline in the leading indices in the period February – March 2020 the result of the pandemic alone or was it also the result of the presence of a price bubble before the start of the pandemic?* This is, in fact, the main question to be answered in the present study. Although the indices are considered in the context of the current pandemic, the subject of study are mostly the more persistent factors and indicators of the stock market, covering a longer period of time – the last 2 decades.

An appropriate index for the needs of this analysis is the S&P 500 index. The reasons for choosing this particular index are as follows:

- It is the US market that recorded the most remarkable price records throughout the post-crisis period;
- S&P 500 is one of the most widely monitored indices in the world;
- S&P 500 is quite representative for both the US and the global stock market.



Source: S&P 500 Historical Prices by Month (2020).

Figure 1: Dynamics of the S&P 500 Index during the Period January 1, 2000 – October 16, 2020

Figure 1 shows the dynamics of the S&P 500 index in the period 1.01.2000 – 16.10.2020. The values included in the chart are at the beginning of each month. The graph outlines very well the most significant peaks and troughs 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 in 2018, February 2020, and the highest value so far is on September 2, 2020. The last date within the period of the chart is October 16, 2020. The significant declines are respectively in 2002 – 2003, March 2009, the beginning of 2016, December 2018, March 2020.

In the current 2020, the index has fluctuated widely, mainly due to the pandemic crisis. There was a new record on 19 February 2020 of 3386.15 points. After that came the sharpest decline in the history of the index in March, leading to another trough on 23 March 2020 with 2237.40 (-33.92% from 19 February). Very soon after that, the index reached new record values in August 2020 (3389.78 points on August 18, and 3580.84 points on September 2) to close at 3483.81 points on October 16.

Dynamics of the earnings per share (EPS) of the S&P 500 index in the period 1999 – 2020

Table 1 shows the earnings per share (EPS) of the S&P 500 for the period 1999 – 2020. It is immediately noticeable that the net earnings per share (EPS) increased from $74.45 in 1999 to $140.62 at the end of 2019. This represents an average annual growth rate of 3.25% for the whole period. As of March 31, 2020, EPS drops to $116.77.

Table 1: Earnings per Share (EPS) of the S&P 500 for the period 1999 – 2020 (in USD)

End of Year	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Earnings per share (EPS) ($)	74.45	74.16	36.20	39.52	68.52	79.72
End of Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Earnings per share (EPS) ($)	91.94	96.23	81.64	18.34	61.16	91.44
End of Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Earnings per share (EPS) ($)	99.83	97.63	111.40	112.89	94.79	101.47
End of Year	**2017**	**2018**	**2019**	**31 March, 2020**		
Earnings per share (EPS) ($)	115.49	136.54	140.62	116.77		

Source: S&P 500 Earnings by Year (2020).

The cumulative growth rate for the entire period from 1999 to the end of 2019 amounts to 88.88%, which is slightly less than twice. During this period there were two 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 and the global financial crisis of 2007 – 2009. Table 1 shows how the EPS of the S&P 500 index in 2001 dropped to $36.20, and in 2008 – to only $18.34.

Table 2: Earnings per Share (EPS) Growth of the S&P 500 for the period 1999 – 2020 (in %, year-to-year)

Year	1999	2000	**2001**	**2002**	**2003**	**2004**
EPS Growth (%)	27.74%	3.80%	-50.62%	11.75%	76.66%	20.13%
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
EPS Growth (%)	19.27%	16.73%	-18.81%	-77.52%	242.54%	51.76%
Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
EPS Growth (%)	12.41%	-0.51%	15.82%	2.11%	-15.42%	9.27%
Year	2017	2018	2019	31 March, 2020		
EPS Growth (%)	16.21%	20.49%	5.35%	-13.44%		

Source: S&P 500 Earnings Growth Rate by Year (2020).

Table 2 shows the annual change in EPS of the S&P 500 index for the period 1999 – 2020. No arithmetic mean growth rate was calculated for the whole period, due to the significant fluctuations in some of the years. This would lead to a high average (mean) that would not correspond to actual growth. In this case, the growth rate, calculated as a geometric average, is much more representative (the point-to-point variant is applied).

The S&P 500 EPS geometric average growth rate (point to point) for different periods, ending in 2019, is calculated in table 3. For comparison, the geometric average growth rate of the S&P 500 itself for the same periods, ending in 2019, is also presented in this table.

Table 3: Stock-Price Growth and EPS Growth of the S&P 500 until 2019
(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
1871-2019	4.53%	1.94%	-2.59%
1979-2019	8.83%	2.61%	-6.23%
1989-2019	7.85%	3.72%	-4.13%
1999-2019	4.25%	3.25%	-1.00%
2001-2019	6.04%	7.83%	1.79%
2010-2019	10.99%	4.90%	-6.09%
2015-2019	14.33%	10.36%	-3.97%

Source: Calculations of the author

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 7.82% for the period 2001 – 2019. The above indicators show that EPS growth rate of 10.36% during the last four years – from the end of 2015 to the end of 2019, is much above than in the other periods.

The values thus obtained and presented in the table show that in almost every of the above periods until 2019, the average annual rate of increase of the market value of the S&P 500 index is significantly higher than the rate of increase of EPS (column 4). The only exception is the period 2001 – 2019. 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.

It should also be noted that the value of a share is not determined only by current income, but by a stream of expected future incomes (cash flows). In this sense, the current relatively high returns are a factor for the high value of the

shares only insofar as there is reason to expect that they will continue to be high and will grow long enough in the future.

The performance of the companies in the S&P 500 index by sector during the Covid crisis

As of March 13, 2020, the breakdown of the S&P 500 by sector is as follows:

- Information Technology: 24.4%,
- Health Care: 14%,
- Financials: 12.2%,
- Communication Services: 10.7%,
- Consumer Discretionary: 9.9%,
- Industrials: 8.9%,
- Consumer Staples: 7.2%,
- Energy: 3.6%,
- Utilities: 3.5%,
- Real Estate: 3.1%,
- Materials: 2.5% (Amadeo, 2020).

An appropriate way to compare the price levels of the stock market is by using market ratios, including: price/earnings (PE), price-to-book (PBV), price-to-sales (PS), price/EBITDA (P/EBITDA) and others. In this regard, a very important question that directly concerns the discussion on the validity of stock market price levels over the last few years and at this stage is: *Is it normal for the current PE and PBV of the S&P 500 to be higher than their historical average?* According to some defenders of the record-high values of the indices in recent years, the answer is "Yes" and should be sought in the changed structure of the indices. They are increasingly dominated by high-tech companies, and for them many analysts believe that it is normal for their market ratios to be higher than those in conventional businesses. This should apply in particular to the S&P 500. Indeed, as of 13 March 2020, the ten largest companies in the S&P 500 are:

- Microsoft Corp.,
- Apple Inc.,
- Amazon.com Inc.,
- Facebook Inc. – A,
- Berkshire Hathaway – B,
- Alphabet Inc. Class A shares (GOOGL),
- Alphabet Inc. Class C shares (GOOG),
- JP Morgan Chase & Co.,
- Johnson & Johnson,
- Visa Inc. – A (Amadeo, 2020).

It can be seen that among the largest in the index are the companies from the so-called group FAANG (Facebook, Apple, Amazon, Netscape, Google (Alphabet)), plus Microsoft. They are precisely the companies that have recorded the highest growth rates of their share prices in recent years. These are the leading representatives of the technology sector, which are traded at high market ratios PE, PBV and others. It is in connection with this type of companies that statements such as *"This time is different"* originate. Here it is important to recall that the S&P 500 index is market-weighted and the companies with the highest market capitalization have the greatest weight in forming its averages (including PE and PBV). 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. It is worth analyzing this in more depth.

In connection with the above statements, it is interesting to see how some of the major sectors in the United States have coped during the current Covid crisis. Based on a global sample of over 37 000 publicly traded companies, Aswath Damodaran periodically makes interesting breakdowns regionally and by sector. Thus, he established that the sectors with double-digit negative return (on stocks) for the period 14.02 – 12.06.2020 are *energy, utilities, real estate, industrial goods (and services)* and *the financial sector*. According to him, the main reason for the first four is their capital intensity and their dependence on debt, and for financial companies is the fear of mass bankruptcies. At the same time, at the other pole are *the healthcare sector*, where there is almost no decline, and *the technology sector*, which has lost only 3.2% of its market capitalization (Damodaran, 2020a). In the context of the life cycle of companies, Damodaran also finds a trend of redistribution of value from older, lower-growth and more capital-intensive companies towards younger, higher-growth companies (Damodaran, 2020b).

One of his analyzes presents the 10 worst performing industries and the 10 best performing industries on the stock market during the crisis. He does so for various sub-periods, starting on 14 February 2020, when the market reached its highest level. The ranking is based on the percentage changes in the share prices for the respective period. In *table 4* and *table 5* respectively, they are presented for the period 14.02 – 26.06.2020.

Table 4: Worst performing industries during the Covid crisis
(for the period 14.02 – 26.06.20)

	Industry	Number of Companies	Change in Market Capitalization (%) (14.02 – 26.06.2020)
1	Air Transport	151	-32.66%
2	Oil and gas extraction and exploration	482	-32.45%
3	Space and defense	210	-32.03%
4	Broadcasting	122	-29.76%
5	Oil and gas – distribution	184	-29.76%
6	Reinsurance	33	-28.65%
7	Hotel and Gambling	533	-28.35%
8	Food – wholesale	119	-27.87%
9	Banks (regional)	773	-26.55%
10	Banks (money center)	606	-25.26%

Source: Damodaran (2020b).

All sub-sectors included in Table 4 are severely affected by the Covid crisis. Despite the significant recovery of the stock market after reaching its recent trough in March, as of June 26, these businesses are still between 25% and 32% below the peaks of February 14. The most affected are air transport, oil and gas extraction and exploration, and the space and defense industries. The list ends with the representatives of the financial sector.

Table 5: Best performing industries during the Covid crisis
(for the period 14.02 – 26.06.20**)**

	Industry	Number of Companies	Change in Market Capitalization (%) (14.02 -26.06.2020)
1	Software (internet)	109	40.14%
2	Retail – online	251	19.59%
3	Drugs, biotechnology	906	17.06%
4	Precious metals	516	16.78%
5	Healthcare (information and technology)	314	14.90%
6	Software (systems and application)	1067	6.47%
7	Entertainment	517	5.81%
8	Education	187	4.07%
9	Semiconductors (equipment)	280	2.30%
10	Computer and peripherals	299	0.55%

Source: Damodaran (2020b).

For the companies in table 5, it could be said that in reality there was no crisis, judging by the performance of their shares on the market. Software companies, operating in the field of the Internet, have added as much as 40.19% to their market capitalization in just 4 and a half months. They are followed by online retail trade, whose shares rose by 19.59%, the development and production of drugs (biotechnology) – by +17.06%, precious metals – by +16.78%, information and technology in healthcare – by +14.90%. Also on the plus side (albeit with less impressive, single-digit values) are stocks in the software (systems and applications), entertainment, education, semiconductor (equipment), computer and peripherals industries.

What are the main reasons for this division? In his analyzes of recent months, A. Damodaran, in addition to sectors, groups companies by other significant features. Thus, he identified several important characteristics (factors) that make the difference in the performance of companies (in particular their shares) during the crisis, as follows (Damodaran, 2020a):

- *Level of debt*: Highly indebted companies performed much worse on the stock market during the Covid crisis, as compared with companies with insignificant debt.
- *Whether the company is from the so called growth stocks or from the so called value stocks*: During the first months of the Covid crisis growth stocks beat significantly value stocks.
- *The fact at what stage of its life cycle the company is*: Young companies have performed much better in the Covid crisis than older companies.
- *Capital intensity of the business*: Low capital intensity (capital-light) businesses have been much less affected by the crisis than capital intensive businesses.
- *The practice of repurchasing shares*: At the beginning of the crisis, this practice was often cited as a significant reason for the poor performance of certain companies and sectors. It is believed by many analysts that companies that were more active in repurchasing shares before the crisis were hit harder during the crisis. The explanation is that these companies missed the opportunity to invest the same funds spent on repurchases in timely innovation and restructuring of their businesses. This would help them face any crisis much better prepared.

Performance of the S&P 500 index and "super" 6 in a broader sense – outside the Covid crisis

In the previous section, the differences in the market performance of different sectors and businesses were considered in the context of the Covid-19 crisis. However, for the purposes of this analysis, it is much more important to go

beyond this short period and to track the performance of shares throughout the post-crisis decade (after 2010) or at least in the last 5 years, in particular by the largest technology companies. In this regard, it is interesting to see an analysis in the "Market Commentary", according to which there is a huge difference in this respect between the companies forming the so-called FAANG group (Facebook, Apple, Amazon, Netflix, Google (Alphabet)), plus Microsoft, on the one hand, and the other 494 companies in the S&P 500 index. An appropriate up to date abbreviation for this group of companies could also be FAAANM (Facebook, Apple, Alphabet, Amazon, Netflix, Microsoft). In his recent publications, professor Damodaran refers to them as FANGAM (Damodaran, 2020c).

At the beginning of 2020, the total market capitalization of the six FAAANM (FANGAM) amounts to 14.94% of the total market capitalization of all US shares, as of February 14 it is 16.08%, as of August 14, 2020 this share is already 19.94% (Farr, Miller & Washington, 2020).

These "Super 6" companies account for about 27% of the total market capitalization of the S&P 500 as of June 30, 2020. Due to the high weight of these companies in the index, the movement of their share prices dictates to a very high extent the index as a whole. This can be seen very well as the original S&P 500 is compared to the Invesco S&P 500 Equal Weight ETF (RSP). In the second, the individual companies have equal weights and so the impact of the performance of each of them on the index is balanced. This clears the excessive influence of the FAAANM group of companies due to their huge market capitalization. Thus, it can be seen that between June 2015 and June 2020, the original S&P 500 increased by 45%, and the equal weight index of the same 500 companies increased by only half – by 22% (Farr, Miller & Washington, 2020).

The huge impact of "Super 6" on the overall performance of the S&P 500 becomes even clearer from the analysis of the well-known investor Jeffrey Gundlach of Doubleline Funds. It illustrates separately the performance of only these six major technology companies as a group (FAAANM) and separately the group of the other 494 companies in the S&P 500. As a basis for comparison, Gundlach adds also a broad index of non-US equities in developed and emerging markets (MSCI AC EX-US) (Farr, Miller & Washington, 2020). The study period is from the beginning of 2015 to May 18, 2020. The six of FAAANM beat the remaining 494 companies of the S&P 500 with a striking difference, as well as the broad non-US stock index MSCI AC EX-US. If the value at the beginning of 2015 is taken as 100 points, then during the record levels of February 2020 FAAANM rose to 325 points, at the bottom of March fell to about 240 points, and by May 18, 2020 recovered again to almost 325 points (McGeeney, 2020). This means an increase of 3.25 times, or + 225% over a five-year period. This is equivalent to an average annual growth rate in stock prices (before the Covid 19

crisis – until February 2020) of about 26.6%. In the other two groups the picture is radically different. From 100 points at the beginning of 2015, the remaining 494 companies of the S&P 500 rose to only about 135 points in February, fell below 100 points in the midst of the collapse in March and by May 18, 2020 were at a modest level of about 115 points. This corresponds to an average annual growth rate (before the Covid crisis – until February 2020) of only 6.2%. At the same time, the broad non-US stock index (MSCI AC EX-US) has an even more modest performance. At the record levels of February 2020, it only approached about 120 points, in the market crash in March it dropped down to almost 75 points and by May 18, 2020 it was still below the initial 100 points.

For the entire period 2010-2019, the market capitalization of all US stocks (more than 7,000 issues) increased by about $22.9 trillion, and for FAAANM companies alone – by $4.35 trillion. It follows that 19% of the total increase in market capitalization (for all companies) for this period is due to the FAAANM group (Damodaran, 2020c).

It is in this connection that there has been increasing talk lately of a "highly polarized American market". It is the rally of the shares of the largest technology companies that explains the rise of the market by 40% from the bottom in March. Even more serious is their influence in the Nasdaq technology index, in which only the three largest – Apple, Microsoft and Amazon.com, account for 34% of its market capitalization. The demand for the shares of technology companies is extremely strong, supported by the large share of investments in the stock markets, which are made through index funds. In this sense, there is talk of „asymmetric appreciation" of these technological stocks (Infostock, 2020).

However, does this apply to all technology companies? According to some recent analyzes the answer is "rather not". Between March 20 and August 14, 2020, the technology sector as a whole added $0.97 trillion to its market capitalization, and the FAAANM group alone added $1.39 trillion. It follows that the other technology companies, excluding the FAAANM group, have actually lost about $0.42 trillion (Damodaran, 2020c).

In the end, it became clear that the widely discussed high levels of the S&P 500 during these years were predominantly due to the six of FAAANM. Whether the share prices of the 6 super companies are realistic, is a separate issue, that requires further in-depth research. So, when looking for an answer to the question "Is the S&P 500 overpriced?", it is quite logical for the analysis to focus on the justification of the share prices of these 6 companies.

Main financial indicators of the FAAANM (FANGAM) companies for the period 2006 – 2020

Table 6 presents the price-earnings (PE) ratios of FAAANM companies, including their average values for the period 2006 – 2020 and the current PE as of August 21, 2020. The weights of each of the companies within the whole group – as of August 21, 2020, are also provided. The total market capitalization of the 6 companies amounts to an impressive 7.44 trillion US dollars. The largest weight belongs to Apple (28.64%), followed by Amazon.com (22.19%) and Microsoft (21.65%). The lowest weight is Netflix – 2.92%.

Table 6: PE of FAAANM companies for the period 2006 – 2020

COMPANY	Weight in FAAANM	Average PE – 2006 – 2020	Current PE (21 Aug, 2020)	Difference (%)
Apple	28.64%	16.67	37.72	126.29%
Amazon.com	22.19%	167.23	126.29	-24.48%
Microsoft	21.65%	21.70	36.98	70.42%
Alphabet/Google – (Class A)	14.39%	31.51	34.37	9.09%
Facebook *(2013-2020)*	10.22%	44.14	32.64	-26.05%
Netflix	2.92%	120.83	83.02	-31.29%
Total	**100.00%**			
FAAANM PE (2006 – 2020) – Arithmetic Average		67.01		
FAAANM PE (21 Aug, 2020) – Arithm. Average			58.50	-12.70%
FAAANM PE (2006 – 2020) – Weighted Average		59.14		
FAAANM PE (21 Aug, 2020) – Weighted Average			57.53	-2.73%
S&P 500 PE (2006 – 2020 Average)		24.08		
S&P 500 Current PE (21 Aug, 2020)			29.20	

Sources: Macrotrends (2020), S&P 500 PE Ratio per year (2020), calculations of the author.

Regarding the average PE for the period 2006 – 2020, only Apple and Microsoft seem to have normal ratios – 16.67 and 21.70, respectively. The rest

are above 30, especially high for Amazon (167.23) and Netflix (120.83). The weighted average PE is 59.14.

At the same time, the current PE as of August 21, 2020 is too high for all 6 companies – the lowest is 32.62 (on Facebook). The average current PE (as a weighted average) is 57.53 times profit, almost as much as the weighted average for the period 2006 – 2020 of 59.14. In this case, the weighted averages are used, because they most correctly take into account the influence of each company – the largest influence comes 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 "super 6" on the indicators of the whole index. It can be seen that both the average (for the period 2006 – 2020) and the current PE of the FAAANM, exceed about twice the respective PE ratios of the S&P 500 (for the period 2006 – 2020 and the current as of August 21, 2020). At the same time, these FAAANM ratios are about 3-4 times the usual average S&P 500 for the entire historical period from 1871 until nowadays.

Table 7: PBV of FAAANM companies for the period 2006 – 2020

COMPANY	Weight in FAAANM	Average PBV – 2006 – 2020	Current PBV (21 Aug, 2020)	Difference (%)
Apple	28.64%	8.43	29.48	249.70%
Amazon.com	22.19%	18.13	22.32	23.08%
Microsoft	21.65%	6.77	13.63	101.24%
Alphabet/Google – (Class A)	14.39%	4.78	5.18	8.33%
Facebook *(2013-2020)*	10.22%	6.17	6.89	11.67%
Netflix	2.92%	15.95	23.26	45.85%
Total	**100.00%**			
FAAANM PBV (2006 – 2020) – Arithm. Average		10.04		
FAAANM PBV (21 Aug, 2020) – Arithm. Average			16.79	67.27%
FAAANM PBV (2006 – 2020) – Weighted Average		9.69		
FAAANM PBV (21 Aug, 2020) – Weighted Average			18.47	90.69%
S&P 500 PBV (2006 – 2020 Average)		2.72		
S&P 500 Current PBV (21 Aug, 2020)			3.84	41.42%

Sources: Macrotrends (2020), S&P 500 Price to Book Value per year, (2020), calculations of the author.

Table 7 is analogous to table 6, but it presents the price-to-book (PBV) ratios of FAAANM companies, albeit in the same way. The data in this table can be described by some analysts as quite shocking, given that there are many double-digit values of the PBV ratio. 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 6 companies for the period 2006 – 2020 is 9.69, and the average current PBV as of August 21, 2020 is even twice as high – 18.47. If someone looks at this table out of context, they will think that it is for PE ratios, not PBV ratios – they will simply decide that a technical error has been made in the name of the table.

It can be seen that Amazon and Netflix have the highest average PBV ratios for the period 2006 – 2020 – their values are of the order of 20 times the book value, while the weighted average for the 6 companies is 9.69. At the same time, it can be seen that the current PBV as of August 21, 2020 is higher than the average for the period 2006 – 2020 for each of the 6 companies, and its excess is especially large for Apple (over 3 times) and Microsoft (2 times). The average PBV of the FAAANM for the period 2006 – 2020 is about 3.6 times the average PBV of the S&P 500, and their current PBV is about 4.8 times the average of the S&P 500.

Table 8: Share price growth, EPS growth and ROE of FAAANM companies during the period 2006 – 2020

COMPANY	Average Share Price Growth 2006 – 2020	Average EPS Growth 2006 – 2020	Average ROE 2006 – 2020	Current ROE – 30 June, 2020
1	2	3	4	5
Apple	31.59%	28.60%	37.65%	70.66%
Amazon.com	37.14%	33.61%	20.08%	20.47%
Microsoft	17.42%	11.99%	34.74%	39.45%
Alphabet/Google – (Class A)	14.70%	17.20%	16.86%	15.62%
Facebook *(2013 – 2020)*	25.44%	45.24%	18.61%	22.90%
Netflix	41.84%	33.86%	25.43%	33.32%

Continued

1	2	3	4	5
FAAANM Share – Price Growth	26.99%			
FAAANM EPS Growth		26.33%		
FAAANM Average ROE (2006 – 20)			27.83%	
FAAANM Current ROE – 30 June, 20				38.88%
S&P 500 Share-Price Growth	6.96%			
S&P 500 EPS Growth		2.30%		
S&P 500 Average ROE (2006 – 20)			14.83%	
S&P 500 Current ROE – 30 June, 20				15.92%

Sources: Macrotrends (2020), S&P 500 Book Value Per Share (2020), calculations of the author.

Table 8 presents other important financial indicators of FAAANM companies – return on equity (ROE), average growth rate of share prices and average growth rate of earnings per share (EPS) for the period 2006 – 2020. 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 has always been cited as a key argument in defense of high market price levels.

The table shows that only in Facebook and Alphabet the average annual growth rate of EPS was higher (in Facebook even much higher) than the growth rate of stock prices. For the other 4 companies, the increase in EPS lagged slightly 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. However, it is interesting that the calculated two average growth values for the FAAANM group (weighted according to the market weights of each) are almost identical: the price growth rate is 26.99% and the average EPS growth is 26.33%. Thus, in the end, we should rather assume that the growth of Super 6 share prices in general, in the period 2006 – 2020, is rather supported by the corresponding increase in EPS.

The indicators in table 8 also show that the growth rates of stock prices and EPS in FAAANM are times higher than those of the S&P 500 index: the increase in stock prices is 3 times higher, and on EPS is more than 11 times higher than that of the S&P 500. In this regard, an in-depth analysis of the factors that determine

the extremely high growth of EPS of the "super 6" is needed. Another important feature of the S&P 500 is that the growth of the index itself (stock prices) of 6.96% per year is 3 times higher than the growth of EPS per share of the index of 2.30%. On this basis, it can be argued that the growth rate of the index is not supported by a parallel increase in profits of the 500 companies in the index as a whole.

An important factor for the high growth rate of EPS of FAAANM 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. For the period 2006-2020, the average ROE for the six companies ranged from 16.86% for Alphabet to 37.65% for Apple. Microsoft is in the second place with an ROE of 34.74%, followed by Netflix with 25.43%, Amazon 20.08% and Facebook with 18.61%. The weighted average for the six companies (for the period) is 27.83%. It is almost 2 times higher than the ROE of the S&P 500 of 14.83% (calculated for the period 2006 – 2019).

The current ROE, calculated on the basis of published profits as of June 30, 2020, is higher than the average for the analyzed period for almost all 6 companies. Apple's ROE is again the most impressive – 70.66%, about 2 times higher than the average for the period. It is followed again by Microsoft with 39.45%. It is the lowest on Alphabet – 15.62%. The current weighted average for the 6 of the FAAANM is 38.88%, about 40% higher than the average for the period 2006 – 2020. At the same time, it is more than twice as high as the current ROE of the S&P 500.

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 is not 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 portion 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. Thus, this book value is greatly underestimated, probably at times. As a result, the book value of equity (as the difference between the value of assets and the value of liabilities) is greatly reduced. Ultimately, the ROEs calculated for these companies should be greatly inflated.

One of the consequences of the greatly increased ROE is that preconditions are created for unreasonably high expectations for the growth of EPS – g,

calculated as an internal rate. Thus, for Apple, with an ROE of 70.66% and a retention ratio (b) of 0.5, the calculated internal growth rate would be 35.33% ($g = ROE * b = 70.66\% * 0.5 = 35.33$). This may be subsequently used as an argument in defense of a high future growth rate of 35.33% for the next 5 years, for example. All this seriously distorts the notions about the actual financial efficiency of the FAAANM 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 August 21, 2020 should be only:

$$ROE = \frac{EPS}{BVS} = \frac{EPS}{P0} = \frac{\$13.19}{\$497.48} = 2.65\% \quad (1)$$

This is in fact equal to the so-called current earnings yield (EY) of the shares (EY = EPS/P0). Thus, for an investor who has acquired shares of Apple at a price as of August 21, her current yield is only 2.65%. For comparison, the actual current yield of Amazon.com as of August 21, 2020 is only 0.79%. For the S&P 500 index on the same date it is 3.42%. This current yield is 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 the illogically high current market ratios PE and PBV of FAAANM 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. In this case, it is the very low cost of equity, mainly due to artificially maintained low, close to zero, interest rates. At this stage, this is dictated by the need to support an economy that has been hit hard by the Covid crisis. In reality, however, the artificial maintenance of unnaturally low interest rates and so-called quantitative easing by central banks has been valid for the whole decade since the global financial crisis. It's just that this policy has been further strengthened in the current pandemic crisis.

Conclusion

In conclusion, the following answers could be offered to the questions raised in the study:

1. As to whether the current high values of the S&P 500 index are justified, the answer should be that they are not, judging by the financial indicators analyzed. Neither the growth rate of EPS supports the growth rate of prices, nor the average historical values of the PE and PBV ratios support

the current (as of 21 August, 2020) significantly higher price levels of the index.

2. FAAANM (FANGAM) companies have a very large impact on the overall performance of the S&P 500 and the high prices of their shares both before the pandemic and as of August 21, 2020, are indeed an important factor in the rise of the index.
3. The analysis of the performance of FAAANM (FANGAM) shows that these companies really have impressive indicators of the growth of EPS and return on equity. The growth rate for the period 2006 – 2020 for the group as a whole is comparable to the growth rate of earnings per share and this could possibly be considered to support the current price levels.
4. At the same time, the average market PE and PBV ratios for FAAANM (FANGAM) as a whole for the period 2006 – 2020 can be 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 are even higher and illogical. In other words, market ratios do not support the current price levels of FAAANM shares as a whole.

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