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THE INFLUENCE OF THE US STOCK MARKET ON THE INSTITUTIONAL SECURITY STRATEGY OF THE MANAGEMENT OF INNOVATIVE DEVELOPMENT

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Abstract
The innovative development of the USA is a complex process and includes many industries and sectors of the economy. The stock market has an unbridled influence on innovation. The current institutional security strategy of innovation development management depends on how effective the stock market is. The article reveals the cyclical growth of the US stock market, the regularity of changes and interdependence of cycles, as well as a decrease in the duration of the corresponding cycles through the intensification of regulation by the US government.
The article considers a hypothesis about the accelerating growth of the US stock market. This hypothesis has a right to exist due to the emergence of significant growth factors in the relevant market in recent years. The list of these factors has been clarified. The study of the corresponding hypothesis was carried out by assessing the dynamics of the S & P500 stock index over a distance of 80 years.
It has been determined that stock market growth hypothesis is confirmed only at 40-year intervals. At shorter time intervals, the corresponding hypothesis has not been confirmed.
The conclusions obtained in the article and the proposed methodology for the analysis of the US stock market will be useful for the formation of a state policy strategy for increasing the institutional security of the country's innovative development management.

Keywords: *US stock market, S & P500 stock index, stocks of American corporations, security, management, innovation*
JEL Codes: *G30; O31.*

Introduction

During a long time, the US stock market was known as a market with stable development of the central American corporations' shares value. However, some factors have emerged in the world recently, additionally contributed to its growth. Such factors are:

1) monetary growth – US dollars, which has grown, including as a result of unprecedented financial assistance to American corporations (redemption of corporate bonds by the state, reduction of the discount rate);

2) globalization of investment processes, when investors, who were once "locked" within national markets, were able to enter the US stock market due to modern information and communication technologies. In conditions when practically all markets are almost not growing, investment resources from other countries began to enter the US stock market, thereby further contributing to its growth.

3) reduction in the US income tax;

4) government sanctions for competing companies;

5) cheaper credit resources for commercial structures;

6) devaluation and weakness of the national currencies of most alternative countries. The second economically largest country is China. Although it has significant GDP growth rates, the country's government deliberately devalues the national currency to support its exports. So investing in the Chinese stock market is risky due to the weakness of the country's currency. The situation is similar to other developing countries. Besides, for example, the Russian stock market is dominated by resource-extracting low-tech companies, while the US market is dominated by many innovative IT companies;

7) The unlimited and cheap financial resources of the US stock market for issuing shares and bonds makes it interesting to transfer the jurisdiction of global corporations to the United States, even if their products and services are sold in other countries.

These and many other factors form the basis for the emergence of the hypothesis that the growth rate of the American stock market should accelerate. Under these conditions, the study of the growth rate of such a market becomes relevant.

Many works [1-15] studied the growth factors of the stock market (inflation, dividends, government regulation). In particular, it was stated that the stock markets of developing countries hardly grow, while the US stock market is growing steadily. In [12], even such growth was considered as a factor of capital outflow from developing countries to the detriment of the economies of such countries. In addition, this work substantiates the use of the dynamics of stock indices as tools for identifying sustainable growth of the country's stock market.

In [16 - 28] the close connection of the country's economic growth with the cyclical nature of macroeconomic development was studied. Many issues of sustainable development of both the country's economy and its stock market are hidden in the peculiarities of such a cycle. In these works, the connection of the stock market (lending volumes) with the development of the country's economy was also studied. In particular, in [18] the development of the financial market is defined as a factor of significant economic development of the country's economy.

At the same time, the issue of accelerating the growth of the US stock market remained unresolved.

Materials and Methods

For a quantitative study of the rate of change in the growth of the US stock market, the dynamics of the S & P500 stock index was chosen. The index basket includes more than 500 of the leading American companies with the largest capitalization. The index is defined as the weighted average of the capitalization indicator of the companies included in the index. So, when the shares of these companies rise in value, the quantitative value of the S & P500 stock index rises. This index is often viewed as a barometer of the American economy.

The dynamics of the S & P500 index for the period 1941 - 2021 was investigated using both chain indices that determine the change in the indicator, and using the formula:

$$(\text{CAGR}):\text{CAGR} = \left(\left(\frac{V_N}{V_0} \right)^{\frac{1}{N}} - 1 \right) \cdot 100\% \quad (1)$$

where V_N – is the final index value;

V_0 – initial index value.

N – number of years.

$$N = N_k - N_0 \quad (2)$$

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where N_k – final year for evaluation;

N_0 – the starting year for evaluation.

This method is also outlined in [1]. According to the given method, it is possible to determine the average annual growth of the stock index during the study period.

The index value of change in the indicator under study (in the reporting year compared to the previous one) (I) was estimated by the formula:

$$I = \frac{Z_1}{Z_0} \quad (3)$$

Z_1 – the value of the analyzed indicator (stock index S & P500) in the reporting year;

Z_0 – the value of the investigated certificate No. (stock index S & P500) in the year preceding the reporting year.

The value of the S & P500 stock index by years is presented in Table 1.

Table 1. The value of the S & P-500 stock index by years

Years	Value	Notes
1941 - 1945	10	The index value began to be published since 1957, however, these years and this value was chosen as a base by the rating agency Standard & Poor's
1946 - 1964	-	The value of the index for these years is not known exactly. In the calculations, it was determined approximately according to the timetable.
1965 - 1980	130	The value of the index fluctuated during these years, but over 20 years this value did not exceed 133 and was close to 130 (see Fig. 1)
1981	133	Values as at January
1982	121	Values as at January
1983	147	Values as at January
1984	169	Values as at January
1985	177	Values as at January
1986	208	Values as at January
1987	259	Values as at January
1988	247	Values as at January
1989	284	Values as at January
1990	352	Values as at January
1991	336	Values as at January
1992	419	Values as at January
1993	438	Values as at January
1994	474	Values as at January
1995	465	Values as at January
1996	617	Values as at January
1997	776	Values as at January
1998	975	Values as at January
1999	1282	Values as at January
2000	1401	Values as at January
2001	1373	Values as at January
2002	1130	Values as at January
2003	855	Values as at January
2004	1130	Values as at January
2005	1182	Values as at January
2006	1283	Values as at January
2007	1443	Values as at January
2008	1380	Values as at January
2009	822	Values as at January
2010	1070	Values as at January
2011	1282	Values as at January
2012	1308	Values as at January
2013	1493	Values as at January
2014	1776	Values as at January
2015	2052	Values as at January
2016	1930	Values as at January
2017	2275	Values as at January
2018	2826	Values as at January
2019	2595	Values as at January
2020	3265	Values as at January
2021	3802	Values as at January

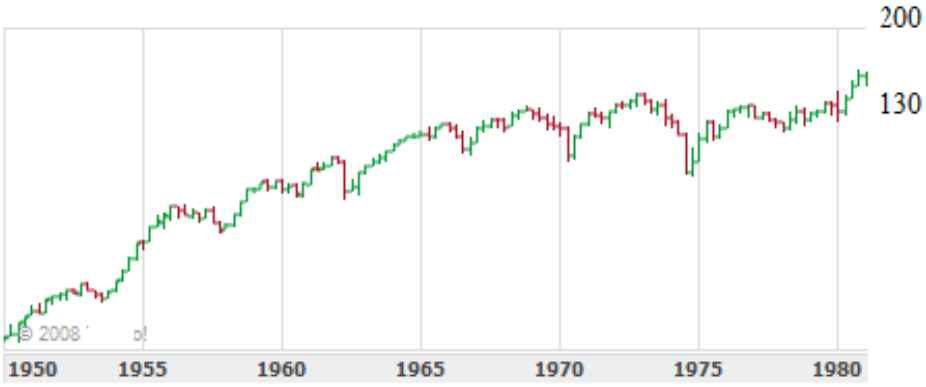

Figure 1. Fluctuations of the S&P 500 stock index in 1965 - 1980

Results and Discussion

The study period reaches 80 years. For 80 years, the average annual growth rate of the index has been 7.71% per year. If this period is divided equally into two periods of 40 years each, 1941 - 1981 and 1981 - 2021, then using formula (1), we can determine that the hypothesis about the acceleration of the growth rate of the S & P500 stock index is confirmed (Fig. 2):

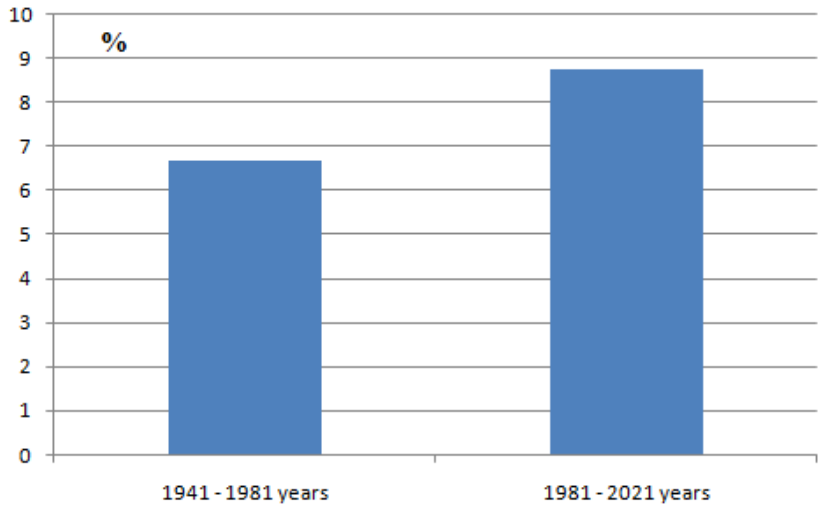

Figure 2. CAGR values over periods of 40 years

In the period 1941-1981, the average annual growth rate of the studied index is 6.68%, and in the period 1981-2021, it is 8.74%. An increase in the number of periods and a simultaneous decrease in the duration of each does not give such a result.

If the study period (80 years) is divided into four parts (20 years each), then we get the following result (Fig. 3).

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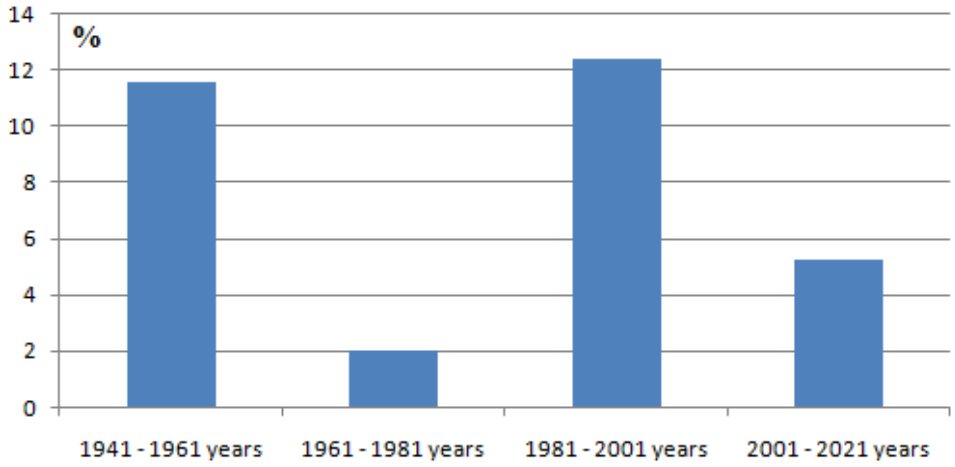

Figure 3. CAGR value over periods of 20 years

If the studied period (80 years) is divided even more, then we get the following results (Fig. 4 - 6).

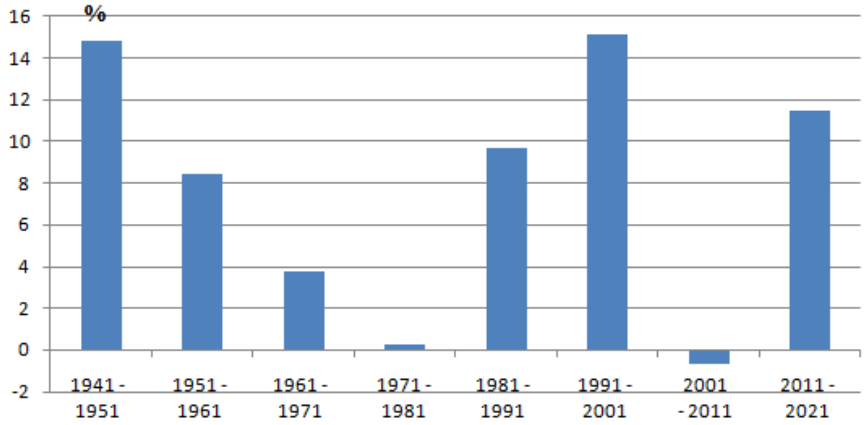

Figure 4. CAGR value over periods of 10 years

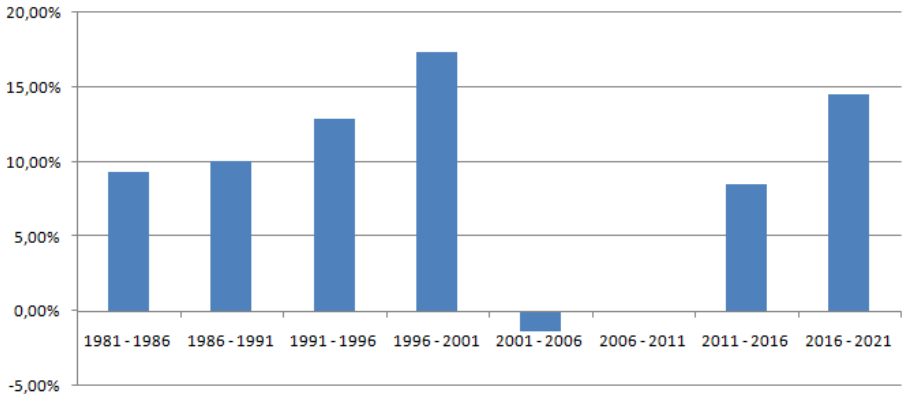

Figure 5. CAGR value over periods of 5 years

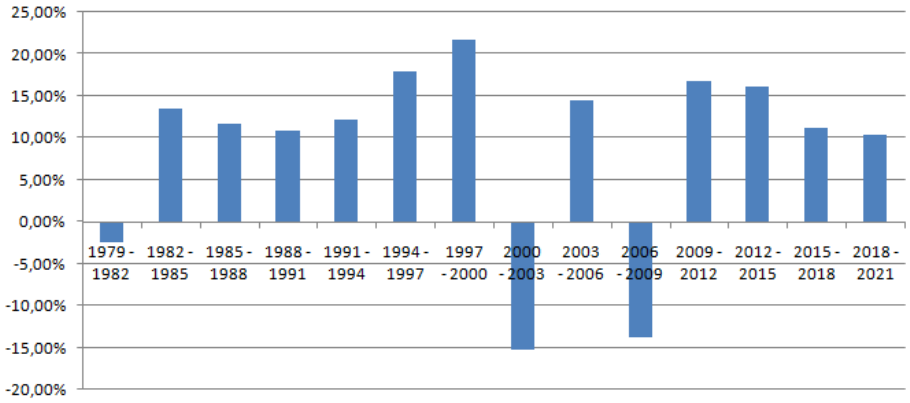

Figure 6. CAGR value over periods of 3 years

Dynamics of change index values of the studied indicator were determined by the formula (3), are shown in Fig. 7.

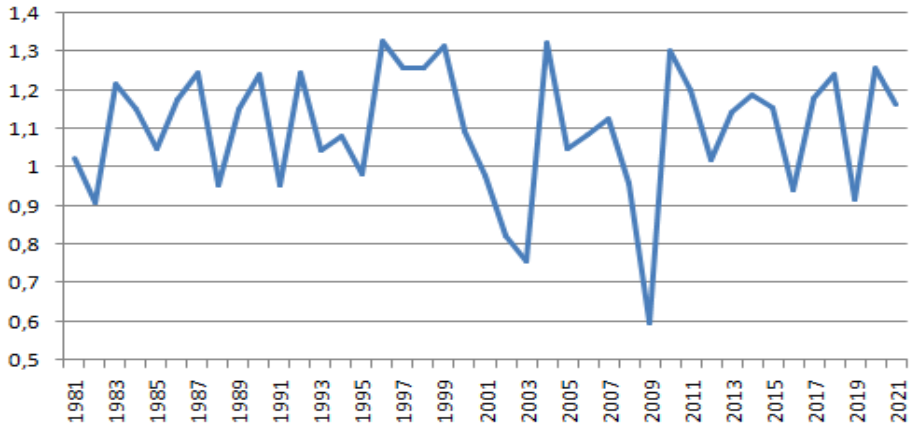

Figure 7. Dynamics of chain indices of changes in the studied indicator for the period 1981 - 2021

Examination of Fig. 3 - 7 does not reveal the acceleration of the growth of the US stock market.

However, if we take a closer look at the last 40 years of the US stock market and build an economic-mathematical model of the stock index S & P500, we can still see the acceleration.

Economic and mathematical model of the S&P-500 index are shown in Fig. 7.

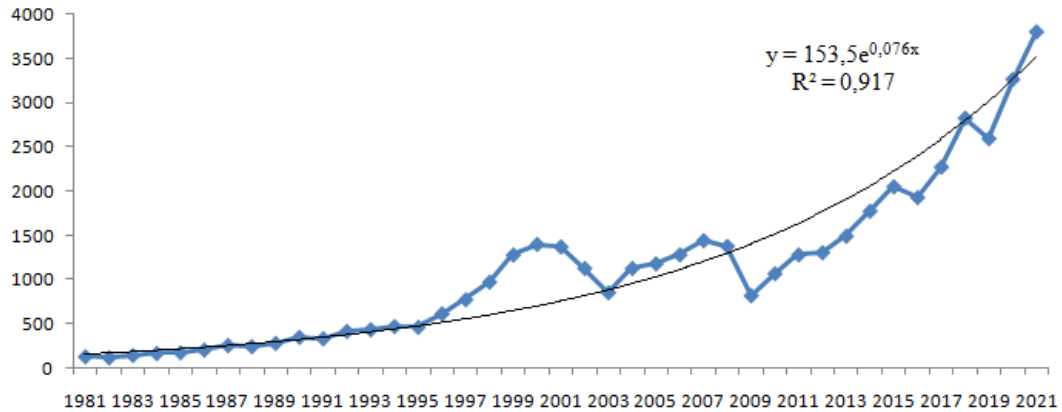

Figure 7. Economic and mathematical model of the S&P-500 index

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The conclusion about the corresponding acceleration should be made based on the exponential model of behavior of the studied index (Fig. 8).

Conclusions

The hypothesis about the acceleration of the growth of the US stock market is confirmed only at 40-year intervals. At shorter time intervals, the corresponding hypothesis is not confirmed.

Testing of two methods for studying the rate of growth of the US stock market has shown that the more appropriate method for detecting the acceleration of the market (and in general the stock market in any country) is a method of determining a CAGR that allows to determine the average annual growth rate at any time interval. The use of chain indices of changes in the studied indicator does not provide such opportunities.

The US stock market developed cyclically. For example, between 1965 and 1980, the S & P500 stock index fluctuated but did not grow; 1985 - 2000 - its accelerated growth took place; 2000 - 2010 there is a period of "stagnation" again; 2010 – 2021 there is a period of growth. There is a regularity in this cyclicality: after a period of "stagnation", there is a period of growth and vice versa; the longer the period of "stagnation", the more significant the increase in the period of growth, and vice versa. So, the increase is not constant and endless, like stagnation. The duration of such periods can be up to 10 - 20 years. The activation of the US government to maintain the growth of its own stock market leads to a decrease in the corresponding time intervals.

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