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Abstract

The article is devoted to the consideration of the conceptual foundations and practical implementation of deterministic factor analysis of models of the market price of an ordinary share and its elasticity with a neutral approach to the dividend policy of a public company as an artificial intelligence tool. The methodological basis of the research was formed by the concept of a neutral approach to dividend policy previously developed by the author of this article, models of the market price of an ordinary share and its elasticity in the context of a neutral approach to the dividend policy of a public company, as well as the conceptual foundations of artificial intelligence. It is shown that the factors determining the market price of an ordinary share and its elasticity indicators under the conditions of a neutral approach to the dividend policy of a public company include profit per ordinary share of a public company, return on investment of a public company, market capitalization level (average market discount rate used to determine expected cash flows), acceptable discount rate (profit margin, required by investors per ordinary share of a public company) and the growth rate of the dividend per ordinary share of a public company, assumed to be constant over time. The most universal method of deterministic factor analysis, the method of chain substitutions, has been chosen as a tool for predicting (calculating) the influence of these factors on the level of effective indicators determined by them. The calculation results can be used in predictive and analytical

estimates of the impact of changes in their determining factors on the deviation of the market price of an ordinary share and its elasticity indicators in the context of a neutral approach to the dividend policy of a public company. The author comes to the conclusion that his approach to deterministic factor analysis of models of the market price of an ordinary share and its elasticity with a neutral approach to the dividend policy of a public company is a fairly new and effective tool for managing the market price of an ordinary share of a public company in a neutral approach to the implementation of its dividend policy.

Keywords: artificial intelligence, deterministic factor analysis, model, market price of an ordinary share, elasticity, neutral approach, dividend policy, public company

JEL codes: C38, G17, G35, G39

1. Introduction

In a modern developed market economy, the market price of an ordinary share of a public company is a fairly important indicator of its activity on the stock market (market activity), since knowledge of the market price of an ordinary share allows, on the one hand, to determine the market value of this public company, and, on the other hand, to assess its investment attractiveness.

In addition, the market price of an ordinary share serves as the basis for calculating key financial ratios characterizing the market activity of a public company.

As is well known, maximizing the market value of an ordinary share is the main goal of financial management of a public company, maximizing the material well-being of its owners (shareholders) and is considered a long-term, strategic goal, since shareholders are interested in both current and future profits and takes into account a number of the following important indicators:

- 1) long-term well-being (wealth);
- 2) risks and uncertainties;
- 3) time distribution of profit receipts;
- 4) shareholders' income.

It is the maximization of the material well-being of shareholders that helps streamline the ratio of all other goals of a public company's activities and ensures that in the long-term investors will provide the public company with capital.

At the same time, the main criterion for evaluating the effectiveness of a management decision in the financial sphere of a public company is the subsequent impact of this decision on the market price of its ordinary shares and, accordingly, on the material well-being of shareholders, that is, to what extent it contributes to increasing their wealth by increasing the market value of investments, taking into account a certain risk.

Currently, as the most important tool for maximizing the market value of an ordinary share of a public company, consideration should be given to the interests of all stakeholders interested in the activities of a public company, ensuring its sustainable development, which presupposes the possibility of long-term continuation of effective activities, determined by the availability and level of efficiency of the use of appropriate resources, contributing to the formation of the long-term value of this public company.

The market price of an ordinary share depends on the influence of many factors. According to the author, one of the most significant factors is related to the dividend policy of a public company, since the importance of the dividend policy for the activities of a public company is due to the fact that the dividend policy affects relations with potential and real

investors in ordinary equity, affects the financial strategy of a public company and its investment budget, reduces the levels of liquidity and financial stability of a public company.

It is obvious that the dividend policy of a public company will help maximize the market price of its ordinary shares only if the long-term sustainable development of this public company is ensured by taking into account the interests of all stakeholders interested in its activities. The fulfillment of the above condition is possible only within the framework of a neutral approach to the implementation of the dividend policy of a public company, involving the construction of appropriate formalized models of key indicators of its activity in the stock market (Krylov, 2019, 2020, 2021, 2025) and indicators of their elasticity according to the main determining factors (Krylov, 2023, 2026), developed by the author of this article.

All this makes it advisable to study the influence of the main factors determining the expected market price of an ordinary share of a public company and its elasticity indicators in the context of a neutral approach to the implementation of its dividend policy, using previously obtained relevant models (Krylov, 2019, 2020, 2021, 2023, 2025, 2026), using deterministic factor analysis as an artificial intelligence tool artificial intelligence (AI), because they are deterministic factor models.

It should also be noted that AI is the ability of digital computers or robot-controlled computers to solve tasks that are usually associated with human higher intellectual data processing abilities, or the study of how to make computers capable of doing what humans currently do better (Ertel. 2025).

At the same time, the new wave of AI has not fully brought us intelligence, but only its critical component – forecasting. For the most part, any decision depends on forecasts. Decision-making schemes have been developed in economics, including financial management. The new and not entirely understood consequences of the development of predictive technologies can be combined with the proven logic of economic decision theory and derive a number of ideas to help navigate how to apply AI in this situation. There is no single correct answer to the question of which strategy or AI tools are optimal, because you will inevitably have to find a compromise: more speed means lower accuracy, more independence means less control, more data means less privacy. Forecasting (or prognostics) is the process of filling information gaps. The available information is taken, called data. and the missing information is output from it. Specialists use methods appropriate to a specific predictive task to implement AI (Agrawal et al., 2018).

So, all of the above defines the purpose of this study – to study the theoretical and practical aspects of using an AI tool for deterministic factor analysis of models of the market price of an ordinary share and its elasticity with a neutral approach to the dividend policy of a public company – forecasting based on these models.

This goal defines the objectives of the study, which include the need to choose an appropriate method of deterministic factor analysis that is adequate to these models, to develop calculation formulas reflecting the influence of each of the determining factors, and to make their practical testing.

The purpose and objectives of the study determine its working hypothesis – to consider the possibility of using as an artificial intelligence tool the calculation of the influence of factors on the level of effective indicators determined by them in models of the market price of an ordinary share and its elasticity in a neutral approach to the dividend policy of a public company the most universal method of deterministic factor analysis – the method of chain substitutions.

Moreover, an important place in the analysis is given to forecasting. Economic forecasting is the initial stage of planning. Based on the study of the patterns of development of various economic phenomena and processes, it identifies the most likely ways of this development and provides a basis for choosing and justifying planned decisions at any level of management. Thus, the functions of economic forecasting are exclusively analytical (Sheremet, 2005).

Therefore, according to the author, forecasting can be characterized as one of the most important elements of analysis and defined as the study and development of possible directions for changing the state and, consequently, possible options for managing the state of a public company in the future. One of the main advantages of forecasting is that it serves as a basis for making fully informed and informed decisions.

In addition, economics offers a clear picture of the impact of cheaper forecasts on business. Predictive machines will be used for both traditional (resource management and demand forecasting) and new tasks. Falling forecast prices will affect the value of other concepts and items, increase the value of complementary factors (data, judgment, and actions), and reduce the value of equivalents (human forecasting).

2. Literature review

For the sake of justice, it should be noted that modern AI is only capable of forecasting. Yes, because the forecast is really important. Not everyone understands this, but the forecast is important in all spheres of human activity, including business and private life. Decisions are made based on forecasts; the better they are, the more complete the information and, consequently, the better the results. The machine forecast is an artificial development of useful information, and it is always at the forefront. The quality of the forecast affects the outcome of anything. By reducing the price of the forecast, we make it useful for many other areas, opening up its limitless possibilities (Agrawal et al., 2018).

So, machine learning is considered a revolutionary computing technology and has earned the name "artificial intelligence", because its result – the forecast – is a key component of intelligence, the accuracy of forecasts increases in the learning process, and a high degree of accuracy allows machines to perform tasks that until recently were considered the prerogative of human intelligence, such as object recognition.

The key deep learning technology is based on so-called backpropagation. With it, the machine learns in much the same way as our brain – using examples (how much artificial neurons are similar to real ones is another interesting question besides the advantages of the technology). Most of the problems have moved from the algorithmic category to the predictive one. Machine learning uses probabilistic models to solve problems.

Predictive machines rely on data. In AI, data is presented in three guises. The first is input data that is loaded into algorithms and used for forecasting. The second is training data that is not needed to create the algorithms themselves; with their help, the AI learns to predict in a real environment. Finally, there is also feedback data designed to gradually improve the efficiency of algorithms. In some cases, the types of data overlap, for example, the same information performs all three roles. The more data, the better the forecast.

But data collection can be expensive, so the amount of investment is calculated based on a trade-off between the benefits of obtaining additional data and the costs of it. To make the best decision about investing in data, you need to understand how machines use it.

The impact of predictive machines is most noticeable at the decision level, as they have a number of other key components. When someone (or something) makes a decision, it uses input data from the environment to make a forecast. This prediction was made possible by training, which tells you about the relationships between different types of data and which one is closest to the situation under consideration. Combining a judgment about it with a forecast, the decision maker chooses an action. It leads to a result (positive or negative). The result is a consequence of the decision, it is necessary to complete the picture. The result also provides feedback that is useful for improving subsequent decisions.

Predictive machines, unlike humans, are not capable of making judgments, because only humans can formulate the relative returns of different actions. With the increased accuracy of forecasts, there are more opportunities to consider the impact of actions-in other words, more opportunities for judgments. Predictive machines give a return on judgment,

because by reducing the cost of forecasts, they increase the value of understanding the reward from actions. However, judgment requires costs. Figuring out how to make different actions work in different situations takes time, effort, and experimentation. Many decisions are made in conditions of uncertainty.

Humans have two solutions to this problem: experiments and simulations. If the situation occurs frequently enough, a randomized control trial can be conducted. Recruit people to the experimental group (make them read the book or at least distribute it to everyone and then test their knowledge of the material) and the control group (do not allow them to read the book or simply do not advertise it). After a while, check out how they use AI in their work. Compare the results of the two groups. The difference between the experimental and control groups will be the result of reading the entire book. Machines can also conduct experiments. With a sufficient frequency of events, the ability is not unique to humans.

Modeling-an alternative to experimentation - requires a deep understanding of the situation and processes that generate the available data. It is especially useful when experiments are not possible due to insufficient frequency of the situation or high costs.

Accurate forecasts allow you to predict more and more often, reducing uncertainty. Each forecast has an indirect impact: it makes possible choices that you haven't considered before. And to do this, you do not need to program the "if" and "then" in detail. The predictive machine can be trained using examples. Problems that were not considered predictive before are now being solved. In the past, we were constantly making compromises without even realizing it. Trade-offs are a key aspect of human decision-making.

The improved forecast allows decision makers and machines to use more "if" and "then". This often leads to a positive outcome.

In the absence of a high-quality forecast, we tend to choose reasonable sufficiency – we choose acceptable solutions based on the available information. This is not an optimal, but acceptable solution, given the available information. Predictive machines will reduce the need for it, and therefore funds will be less likely to be invested in such solutions.

We are so used to reasonable sufficiency in business and social life that it is difficult to imagine all the changes that are possible as a result of the development of predictive machines that are able to take into account more "if" and "then" and, therefore, make more complex decisions in a more complex environment. And predictive machines will provide for this new and more advanced methods.

Using AI to perform tasks doesn't always involve full automation, and forecasting is just one of the components. In most cases, the application of judgment and the effective of an action are assigned to a person. However, sometimes it is possible to embed a judgment in the code or, if there are enough examples, teach the machine to predict it. In addition, machines are capable of performing actions. When all elements of the task are performed by a machine, the task is fully automated and the person is eliminated from the cycle.

Most likely, it will be fully automated to perform tasks where this will ensure maximum revenue.

AI tools are a point-by-point solution. Each one is designed for a specific forecast, and most are designed for a specific task. Most startups are focused on building a single AI tool.

Large corporations consist of workflows that turn resources into a product. Workflows are divided into tasks (for example, the initial public offering of Goldman Sachs shares consists of 146 separate tasks). When deciding whether to implement AI, companies should break down processes into tasks, estimate the profit from the cost of developing or purchasing AI for each task, rank the AI based on the cost benefit, and then start working from top to bottom on the list. Sometimes you can add an AI tool to your workflow and immediately see the benefits of improving the efficiency of a task. However, most often this is not so easy. Getting real value out of implementing an AI tool requires reengineering the entire

workflow. As a result, similar to the PC revolution, it will take a long time to see the majority of ordinary companies increase productivity as a result of AI.

But how do you know if an AI tool is needed for a specific task in your business? Any task consists of a number of solutions with a predictive component.

We'll tell you how to analyze AI in the context of a task. Just as we suggested identifying tasks by breaking down the workflow to find a role for AI, we now recommend that you decompose each task into its components.

During our consultations, we found that it is convenient to divide decisions into the following components: forecast, input, judgment, training, action, result, and feedback. Then we developed an "AI template" that simplifies the decomposition of tasks for

finding out the potential role of the predictive machine. The template helps you think about, build, and analyze AI tools. It sets the order in which each component of the problem solution is defined and clarifies their description.

Responsibilities are a collection of tasks. If you break down the workflow and apply AI tools, some tasks previously performed by humans can be automated. Their order and significance may change, and new tasks may be added to them. Consequently, the set of tasks that make up responsibilities will change.

AI tools:

- sometimes they serve as a help, as in the example with spreadsheets and accountants;
- they can narrow down the range of responsibilities, as in the example with order processing centers;
- sometimes they lead to a transformation of responsibilities, when some tasks are added and others are eliminated, as in the example with radiologists;
- they can increase the importance of specific professional skills, as in the example of school bus drivers.

AI tools help change the relative return on certain skills and thus change the type of people who are suitable for a particular job. In the case of accountants, the introduction of spreadsheets has reduced the return on the ability to quickly perform numerous calculations on tracing paper on a calculator. And at the same time, it has increased the return on the ability to ask the right questions in order to take full advantage of the technology for effective scenario analysis.

Senior management should not completely assign AI strategies to the IT department, as the powerful AI tools can go beyond increasing the productivity of tasks performed in accordance with the strategy, and lead to a change in the strategy itself. This requires the presence of three factors:

- a key trade-off of the business model (i.e., "purchase – then delivery" or "delivery – then purchase");
- a trade-off caused by uncertainty (that is, the high cost of returns due to the uncertainty of what the buyer will buy outweighs the high sales in the "delivery-then purchase" model);
- an AI tool that reduces uncertainty; it tilts the scales so that the optimal strategy changes from one alternative to another (reducing uncertainty by predicting likely purchases means that the return from the "delivery – then purchase" model will be higher than from the traditional one).

Another reason that an AI strategy requires the involvement of senior management is that the implementation of AI tools in one part of the company can affect others.

It is advisable to consider deterministic factor analysis as a fairly effective AI tool in modern conditions. Its use in the process of studying market activity indicators and the dividend policy of a public company is quite widely considered in the publications of many researchers.

In particular, according to G. V. Savitskaya, factor analysis is understood as a method of complex and systematic study and measurement of the impact of factors on the value of effective indicators. A distinction is made between deterministic and stochastic factor analysis. Deterministic (functional) factor analysis is a technique for studying the influence of factors

that are related to the effective indicator in a functional way, i.e. the effective indicator can be represented as a product, quotient, or algebraic sum of factors. Stochastic factor analysis is a method of calculating the influence of factors, the relationship of which with the effective indicator, in contrast to the functional one, is incomplete, probabilistic (correlation) (Savitskaya, 2025).

It should be noted that factor analysis, including deterministic analysis, has been developed for quite a long time by many researchers.

Here are some of them.

Thus, Karl G. Jöreskog, considered a classic of factor analysis, established the maximum likelihood method in factor analysis (Jöreskog, 1969).

Henry F. Kaiser developed the Varimaxrotation method (Kaiser, 1958).

Louis Thurstone fundamentally developed multivariate factor analysis (Thurstone, 1931, 1934).

John L. Horn proposed Parallel Analysis-statistically determining the number of factors (Horn, 1965).

H.H. Harman provided a deep understanding of the principles, tasks, and methods of factor analysis, including the deterministic approach (Harman, 1976).

T.A. Brown provides a practical guide to the use of factor analysis, including deterministic analysis (Brown, 2015).

J.F. Hair, B.J. Babin, R.E. Anderson, and W.C. Black have produced a fairly common textbook in the field of multivariate statistical analysis that covers a wide range of methods, including factor analysis, with an emphasis on practical application and interpretation of results (Hair et al., 2019).

R.A. Johnson and D.W. Wichern have written another popular textbook that deals in depth with multivariate statistical methods, including factor analysis (Johnson & Wichern, 2007).

It is important to note that in the literature on factor analysis, both main approaches are often considered: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Deterministic factor analysis is often associated with EFA, where the goal is to identify the structure of data. Modern research also often focuses on confirmatory factor analysis (CFA), which allows you to test hypotheses about the structure of data. In addition, when analyzing publications, you need to take into account different names that can be used to refer to deterministic factor analysis, for example, exploratory factor analysis or simply factor analysis.

Next, we will focus on practical application-oriented models and methods of deterministic factor analysis, since this article is devoted to its use.

It should be particularly noted that models and methods focused on practical application as tools of deterministic factor analysis are quite well developed in theoretical, methodological and practical aspects by numerous representatives of the scientific school of economic analysis of enterprise activity, which originated in the Soviet Union and was further developed in the Russian Federation and a number of other post-Soviet states.

The most famous of them are one of the founders of the above-mentioned scientific school, A. D. Sheremet (Sheremet, 2005, 2008), as well as V.I. Barilenko (Barilenko, 2025), G.V. Savitskaya (Savitskaya, 2025), S.A. Boronenkova and M.V. Melnik (Boronenkova & Melnik, 2016), N.V. Barilenko (Barilenko, 2025), N.P. Lyubushin (Lyubushin, 2006).

It is also worth noting that, in general, there are no significant conceptual differences in the interpretations of practical-oriented models and methods of deterministic factor analysis by the researchers listed above.

The main thing is that the applied methods of deterministic factor analysis should strictly correspond to the model of the relationship between the effective indicator and its determining factors. It should be emphasized that the main types of deterministic (functional) factor models used in practical deterministic factor analysis include additive, multiplicative, multiple, and combined models (Sheremet, 2005).

Let us present the general formulas of the above-mentioned deterministic factor models.

An additive model in which the effective indicator (Y) is an algebraic sum (difference) of the determining factors ($a, b, c, d, f, \dots, z$):

$$Y = a + b - c + d - f + \dots - z. \quad (1)$$

A multiplicative model in which the effective indicator (Y) is a product of the determining factors ($a, b, c, d, f, \dots, z$):

$$Y = a * b * c * d * f * \dots * z. \quad (2)$$

Multiple model, in which the effective indicator (Y) is a quotient of the determining factors (a, b):

$$Y = \frac{a}{b}. \quad (3)$$

A combined model in which the effective indicator (Y) is a dependence on the determining factors (a, b, c, d, f), by combining two or more arithmetic operations (addition, subtraction, multiplication, division), for example:

$$Y = \frac{a-b}{c+d} * f. \quad (4)$$

As a rule, when performing deterministic factor analysis, the influence of purely quantitative factors is first calculated (for example, the cost of fixed assets, the amount of material costs, the number of employees), then structural factors (for example, the share of machinery and equipment in the cost of fixed assets, the share of workers in the staff, the share of equity in the company's capital) and last of all, qualitative factors (for example, turnover and profitability indicators). If there are several quantitative, several structural and/or several qualitative indicators, then the influence of factors of the first level of subordination is calculated first, and then of a lower level (Savitskaya, 2025).

The main methods of deterministic factor analysis of economic indicators include the index method, the method of chain substitutions, the method of absolute deviations, the method of relative deviations, the integral method, and the logarithmic method.

We will briefly describe each of them.

The index method is based on relative indicators (indexes) that express the ratio of the level of a given phenomenon to its level in the past or to the level of a similar phenomenon taken as a base. Each index is calculated by comparing the measured (reported) value with the base value. In analytical practice, various forms of indexes are used: geometric, harmonic, aggregate, and others. Using the index method, you can identify the influence of various determining factors on the studied effective indicator. The essence of this method is as follows: first, the index of the effective indicator and factor indices is determined; second, a scheme is established for the relationship of the index of the effective indicator with the indices of determining factors; third, an algorithm is compiled for calculating the influence of determining factors on the deviation of the effective indicator, according to which, as a rule, the influence on the deviation of the effective indicator a given factor is determined by subtracting the corresponding index of its denominator from the numerator. At the same time, index theory does not provide a general approach to factorization of absolute deviations of the effective indicator when the number of determining factors is more than two and if their relationship is not multiplicative (Sheremet, 2005).

The method of chain substitutions is universal and is used to calculate the influence of individual factors on the deviation of the effective indicator determined by them in any form of dependence between them (additive, multiplicative, multiple and combined). The calculation method consists in consistently replacing the base value of one of the factors with its actual value. However, all other factors remain unchanged. Therefore, each substitution is associated with a separate calculation, the number of which is always one more than the number of factors in the model. In general, we have the following calculation system using the chain substitution method: the basic value of the effective indicator, the intermediate (conditional) values of the effective indicator, and the actual value of the effective indicator. The degree of

influence of a particular factor on the deviation of the result indicator is determined by subtracting the previous one from each subsequent substitution (the first substitution is subtracted from the second substitution, the second substitution is subtracted from the third substitution, the third substitution is subtracted from the fourth substitution, and so on).

The absolute deviation method is used to calculate the influence of individual factors on the deviation of the effective indicator determined by them, if, as a rule, there is a multiplicative relationship between them. When applying it, the influence of each factor is calculated by multiplying its absolute deviation by the basic values of the factors to its right in the model and by the actual values of the factors to its left in the model.

The method of relative deviations is used to calculate the influence of individual factors on the deviation of the effective indicator determined by them, if there is a multiplicative relationship between them. It is especially useful if you already know the relative deviations of the determining factors expressed in decimal.

According to the method of relative deviations, to calculate the influence of the first factor, it is necessary to multiply the base value of the effective indicator by the relative deviation of the first factor.

To calculate the influence of the second factor, it is necessary to add its change due to the first factor to the base value of the effective indicator and then multiply the resulting amount by the relative deviation of the second factor.

The influence of the third factor is determined in the same way: to the basic value of the effective indicator, add its deviations due to the first and second factors and multiply the resulting amount by the relative change in the third factor, and so on.

Summarizing the above brief description of the index method, the chain substitution method, the absolute deviation method, and the relative deviation method, it should be noted that according to the single principle underlying the calculation algorithms inherent in these methods, they are often considered as elements of a more general elimination method.

The elimination method is a logical method that consistently identifies the impact of one factor on the effective indicator, while excluding the actions of all others. This method is based on the fact that each factor changes independently of the others: at the beginning, one factor changes, and other factors remain unchanged, then two, three, and so on, and others remain unchanged. This sequence allows you to determine the influence of each factor on the studied effective indicator separately (isolated influence of each factor).

However, the elimination method has a significant drawback due to the fact that its use assumes that the factors change independently of each other. In fact, they change together and are interconnected, and this interaction results in an additional increase in the effective indicator, which, when eliminated, is added to one of the factors, as a rule, to the latter. In this regard, the magnitude of the influence of factors on the deviation of the effective indicator varies depending on the place where a particular factor is placed in the deterministic factor model.

The integral method and the logarithm method do not have this disadvantage. In the integral method, the additional increment of the result indicator, which was formed from the interaction of factors, is not added to the last factor (as is the case with elimination), but is distributed equally between them. Using the logarithm method, the result of the combined action of factors is distributed proportionally to the share of the isolated influence of each factor on the level of the result indicator.

The integral method allows you to get more accurate results of calculating the influence of factors compared to the index method, chain substitution methods, absolute and relative deviations, and avoid ambiguous assessment of the influence of factors, because in this case the results do not depend on the location of factors in the model, and the additional increase in the effective indicator, which was formed from the interaction of factors, equally. The integral method is applicable for all types of continuously differentiable functions and does not require prior knowledge of which factors are quantitative

and which are qualitative. Applying the integral method requires knowledge of the basics of differential calculus, integration techniques, and the ability to find derivatives of various functions. At the same time, in the theory of economic analysis, finite working formulas of the integral method have been developed for practical applications for the most common types of factor dependencies (multiplicative, multiple, and multiple-additive), which makes this method accessible to every analyst.

The logarithm method is used to measure the influence of factors in multiplicative models. In this case, the calculation result, as in integration, does not depend on the location of factors in the model, and in comparison, with the integral method, an even higher accuracy of calculations is provided. If, during integration, the additional gain from the interaction of factors is distributed equally between them, then using logarithm, the result of the joint action of factors is distributed proportionally to the share of the isolated influence of each factor on the level of the effective indicator. This is its advantage, but the disadvantage is that its scope is limited. Unlike the integral method, logarithms do not use absolute increments of indicators, but rather indices of their growth (decrease).

The scope of application of the above methods of deterministic factor analysis in a systematic form can be represented in the form of a matrix (Table 1).

Table 1. Scope of application of deterministic factor analysis methods in a systematic form

Deterministic factor analysis method	Deterministic factor models			
	Additive	Multiplicate	Multiple	Combined
Chain Substitutions	+	+	+	+
Absolute deviations	-	+	--	-
Relative deviations	-	+	--	-
Index	-	$Y=a*b$	--	-
Integral	-	+	+	$Y=a/\sum x_i$
Logarithmic	-	+	--	-

Source: compiled by the author of the article on (Savitskaya, 2025)

Deterministic factor analysis is used to identify specific factors that have a direct impact on the market price of an ordinary share and key financial coefficients derived from it, which characterize the market activity of a public company and are quite widely considered in numerous publications, in particular (Akhigbe & Madura, 1996; Beaver & Morse, 1978; Black, 1976; Block, Hirt & Danielsen, 2014; Brealey, Mayers & Allien, 2011; Brigham & Houston, 2015; Brooks, 1996; Dontoh, Livnat & Todd, 1993; Fama & French, 1989, 2015; Goetzmann, & Jorion, 1995; Gordon, 1959, 1963; Hauser, 2013; Lintner, 1962; Lee & Finnerty, 1990; Miller & Modigliani, 1961; McLaney, 1992; Pattell & Wolfson, 1984; Petit, 1972; Shim & Siegel, 2008; Van Horne, 1989; Van Horne & Wachowicz, 2005; Walter, 1956; Woolridge, 1983) (Table 2).

Table 2. Key financial coefficients based on the market price of an ordinary share and characterizing the market activity of a public company

Indicator name	Calculation formula	
	Numerator	Denominator
Quotation ratio of an ordinary share	Market price of an ordinary share	Profit per ordinary share

Dividend yield of an ordinary share	Dividend per ordinary share	Market price of an ordinary share
Ratio of a market price to a dividend per ordinary share	Market price of an ordinary share	Dividend per ordinary share

Source: compiled by the author of the article

Let's list some of the researchers of the market price of an ordinary share of a public company through deterministic analysis and briefly describe their scientific results, which help to better understand the mechanisms underlying the pricing of ordinary shares, using the deterministic factor analysis methodology.

E.J. Elton, M.J. Gruber, S.J. Brown, and W.N. Goetzmann cover modern approaches to portfolio analysis and investment, including deterministic factor analysis. Various asset pricing models are considered, such as CAPM and Fama-French (Elton et al., 2014).

Z. Bodie, A. Kane, and A.J. Marcus review asset analysis and management techniques in detail, focusing on factor analysis and multidimensional models such as CAPM and three-and five-factor models (Bodie, Kane & Marcus, 2014).

R.G. Rajan and L. Zingales have explored the institutional aspects of capitalist society, which addresses the topic of factors shaping the ownership structure and capital markets, including equity assets (Rajan & Zingales, 2003).

R.A. Haugen and N.L. Baker devoted their work to empirical testing of international stock pricing models based on general economic indicators and country-level specifics (Haugen & Baker, 1996).

L. Pastor and R.F. Stambaugh investigated the role of liquidity in stock pricing, showing that liquidity is an important factor influencing expected stock returns (Pastor & Stambaugh, 2003).

E.F. Fama and K.R. French introduced a new version of the famous Fama-French three-factor model, expanded to five factors that take into account the company's size, book-to-market ratio, return on assets, and operating income (Fama & French, 2015).

Deterministic factor analysis is also used to study the impact of various factors on the dividends and dividend policy of a public company.

At the same time, it should be noted that the dividends and dividend policy of a public company are quite widely discussed in numerous publications, in particular (Aharony & Swary, 1980; Attig et al., 2021; Block, Hirt & Danielsen, 2014; Brealey, Mayers & Allien, 2011; Brigham & Houston, 2015; Budhijana, 2022; Cao et al., 2022; DeAngelo, De Angelo & Skinner, 1992; Dielman & Oppenheimer, 1984; El-Deeb & Allam, 2024; Fama & French, 2001; Gordon, 1959, 1963; Heba & Hegazy, 2022; Hoang et al., 2024; Hou et al., 2025; Jensen & Johnson, 1995; Li, Zhao & Zhang, 2024; Kalay & Loewenstein, 1986; Lee & Finnerty, 1990; Lintner, 1962; Maquieira, Arias & Espinosa-Méndezmndez, 2023; Mazouz et al., 2023; Miller & Modigliani, 1961; Njoku & Lee, 2024; Sarwar & Hassan, 2021; Ofer & Siegel, 1987; Serlindawati & Chairunisa, 2024; Shim & Siegel, 2008; Tran, 2024; Tran & Bao, 2025; Tran & McMillan, 2021; Van Horne, 1989; Van Horne & Wachowicz, 2005; Walter, 1956; Woolridge, 1983).

Here are some of the scientists who have published research on the dividend policy of a public company through deterministic factor analysis.

These publications illustrate the variety of approaches and conclusions obtained through the use of deterministic factor analysis in studying the dividend policy of public companies. Their authors show the importance of deterministic factor analysis as a tool that allows you to deeply explore the relationships between various factors and decisions on dividends, helping investors and managers make informed decisions in the field of corporate governance, providing an objective understanding of the reasons for the dynamics of dividend payments.

This is how N.S. Sidorova considers internal (liquidity, debt burden, profitability) and external (macroeconomics, legislation) factors of dividend formation (Sidorova, 2024).

A. Brav, J.R. Graham, C.R. Harvey, and R. Michaely, focusing on the general practice of dividend payments, use elements of deterministic factor analysis to identify factors that influence dividend decision-making. This is one of the first fundamental reviews of the current practice of dividend payments (Brav et al., 2005).

Lu Deng, Sifei Li, and Mingqing Liao conducted an empirical study of Chinese companies using deterministic factor analysis to examine the relationship between reporting quality and dividend payments. The study shows the importance of taking into account the qualitative reporting indicator in making decisions on the payment of dividends (Deng, Li & Liao, 2017).

E.F. Fama and K.R. French, studying the decline in the frequency of dividend payments by American public companies, use deterministic factor analysis to determine the role of critical firm characteristics, such as sales growth, operating margin, and balance sheet ratios, in influencing dividend decisions (Fama & French, 2001).

Yen Hai Thi Nguyen used deterministic factor analysis (panel analysis) to study companies from Vietnam and the United States, choosing liquidity, size, profitability, credit leverage, and investment opportunities of a public company as key independent variables, and dividend yield as a dependent variable (Nguyen, 2025).

Having completed a brief review of the literature that reveals the current state of the problem discussed in this article, we turn to the characteristics of the materials and methods of this study.

3. Materials and methods

3.1. Previous research

As it was mentioned earlier, the author of this article in a number of his publications says (Krylov, 2019, 2020, 2021, 2025)) a neutral approach to the implementation of the dividend policy of a public company was formulated and justified, which is based on the unifying agreement of the theory of irrelevant dividends (Miller & Modigliani, 1961; Walter, 1956), the theory of the materiality of the dividend policy (Gordon, 1959, 1963; Lintner, 1962) and the concept of sustainable development (Dunphy, Griffiths & Suzanne, 2007; Freeman, 2010; Friedman & Miles, 2006) of a public company and assumes consideration of the interests of all stakeholders interested in its activities this ensures the sustainable development of this public company in the long term, helping to maximize the market price of its ordinary share.

Within the framework of a neutral approach to the implementation of the dividend policy of a public company, a formalized model of the expected market price of an ordinary share of a public company was obtained, as well as formalized models of its elasticity for the main determining factors that characterize the sensitivity of the expected market price of an ordinary share to each of these factors (Krylov, 2019, 2020, 2021, 2023, 2025, 2026).

The calculations were based on the model of James E. Walter (Walter1956), which is a formalized illustration of the theory of irrelevant dividends (in other words, a passive approach to dividend policy):

$$P = \frac{D + \frac{r}{\rho} * (E - D)}{\rho}, \quad (5)$$

where P is the projected market price of an ordinary share of a public company,

D – dividend per ordinary share of a public company,

E – earnings per ordinary share of a public company,

r – return on investment of a public company,

ρ – market capitalization level (the average market discount rate used to determine expected cash flows),

as well as M. Gordon's model of economic growth (Gordon, 1959), which is a formalized argument in favor of the theory of materiality of the dividend policy (in other words, an active approach to the implementation of the dividend policy):

$$P_0 = \frac{D_1}{k-g} = \frac{D_0 * (1+g)}{k-g}, \quad (6)$$

where P_0 is the projected current (theoretical) value of an ordinary share of a public company at zero, P_0 – прогнозируемая текущая (теоретическая) стоимость обыкновенной акции публичной компании в нулевой момент,

D_1 – expected dividend per ordinary share of a public company for a future period,

D_0 – dividend per ordinary share of the public company of the current period,

k – acceptable discount rate (the rate of return required by investors per ordinary share of a public company),

g – growth rate of the dividend per ordinary share of a public company (assumed constant over time).

To build a model of the expected market price of an ordinary share, first calculate the amount of the dividend per ordinary share from the model of D. E. Walter (formula (5)) and the dividend per ordinary share of the current period from the model of economic growth of M. Gordon (formula (6)), respectively, as follows:

$$D = \frac{\rho * P_0 * \frac{r}{1-\frac{r}{\rho}}}{1-\frac{r}{\rho}}, \quad (7)$$

$$D_0 = \frac{P_0 * (k-g)}{1+g}. \quad (8)$$

Then we equated the amount of the dividend per ordinary share from the model of D. E. Walter (formula (7)) to the dividend per ordinary share of the current period from the model of economic growth of M. Gordon (formula (8)):

$$D = D_0, \quad (9)$$

by introducing a single designation of the expected, i.e. equilibrium, market price of an ordinary share of a public company in relation to the position of a particular investor and the situation on the stock market, as P ($P = P_0$).

This results in the following equality:

$$\frac{\rho * P_0 * \frac{r}{1-\frac{r}{\rho}}}{1-\frac{r}{\rho}} = \frac{P * (k-g)}{1+g}, \quad (10)$$

from which we obtained a formalized model of the expected market price of an ordinary share of a public company (formula 11), which became the basis for constructing formalized models of its elasticity according to the main determining factors (formulas 12-16), which characterize the sensitivity of the expected market price of an ordinary share to each of these factors:

$$P = \frac{\frac{r}{\rho} * E}{\rho - (k-g) * \frac{1-\frac{r}{\rho}}{1+g}}, \quad (11)$$

$$E_E(P) = \frac{E}{P} * \frac{\partial P}{\partial E} = 1, \quad (12)$$

$$E_r(P) = \frac{r}{P} * \frac{\partial P}{\partial r} = \left(\rho - (k-g) * \frac{1-\frac{r}{\rho}}{1+g} \right)^2 + \frac{r * (g-k)}{1+g} + \frac{r * (g-k)^2 * (1-\frac{r}{\rho})}{\rho * (1+g)^2}, \quad (13)$$

$$E_\rho(P) = \frac{\rho}{P} * \frac{\partial P}{\partial \rho} = \frac{\frac{r}{\rho} * \frac{k-g}{1+g} + \frac{(k-g) * (1-\frac{r}{\rho})}{1+g} - \rho}{\rho - (k-g) * \frac{1-\frac{r}{\rho}}{1+g}}, \quad (14)$$

$$E_k(P) = \frac{k}{P} * \frac{\partial P}{\partial k} = \frac{k * (1-\frac{r}{\rho})}{\rho * (1+g) - (k-g) * (1-\frac{r}{\rho})}, \quad (15)$$

$$E_g(P) = \frac{g}{P} * \frac{\partial P}{\partial g} = \frac{g * \rho * (2 * g - k) * (1-\frac{r}{\rho})}{(\rho - (k-g) * \frac{1-\frac{r}{\rho}}{1+g}) * (1+g)^2}, \quad (16)$$

where P is the expected market price of an ordinary share of a public company,

E – earnings per ordinary share of a public company,

r – return on investment of a public company,

p – market capitalization level (the average market discount rate used to determine expected cash flows),
 k – acceptable discount rate (the rate of return required by investors per ordinary share of a public company),
 g – growth rate of the dividend per ordinary share of a public company (assumed constant over time),
 $E_E(P)$ – elasticity of the expected price of an ordinary share of a public company based on earnings per ordinary share,
 $E_r(P)$ – elasticity of the expected price of an ordinary share of a public company in terms of its return on investment,
 $E_p(P)$ – elasticity of the expected price of an ordinary share of a public company by market capitalization level,
 $E_k(P)$ – elasticity of the expected price of an ordinary share of a public company at the rate of profit per ordinary share required by investors,
 $E_g(P)$ – elasticity of the expected price of an ordinary share of a public company based on the rate of dividend growth per ordinary share assumed to be constant over time.

In accordance with the above formulas (11, 12-16), under the conditions of a neutral approach to the implementation of the dividend policy of a public company, the expected market price of its ordinary share, as well as the elasticity of the expected price of an ordinary share of a public company in terms of its return on investment, market capitalization, the rate of profit required by investors per ordinary share of a public company, and the rate of dividend growth per ordinary share assumed to be constant over time is influenced by the following factors: the return on investment of the public company, the market capitalization level, the profit per ordinary share of the public company, the rate of profit required by investors per ordinary share of the public company, and the rate of dividend growth per ordinary share assumed to be constant over time.

Since formulas (11, 12-16) are deterministic factor models, it is advisable to calculate the influence of the factors that determine them on the deviation of the effective indicators by using the appropriate method of deterministic factor analysis.

3.2. Research method

Since the models (11-16) presented in subsection 2.1 "Previous research" are combined and rather complex, it is advisable to use the chain substitution method, which is considered as a research method, for their processing in the framework of deterministic factor analysis.

As noted earlier, the method of chain substitutions is universal and is used to calculate the influence of individual factors on the deviation of the effective indicator determined by them for any form of dependence between them (additive, multiplicative, multiple and combined). The calculation method consists in consistently replacing the base value of one of the factors with its actual value. However, all other factors remain unchanged. Therefore, each substitution is associated with a separate calculation, the number of which is always one more than the number of factors in the model. In general, we have the following calculation system using the chain substitution method: the basic value of the effective indicator, the intermediate (conditional) values of the effective indicator, and the actual value of the effective indicator. The degree of influence of a particular factor on the deviation of the result indicator is determined by subtracting the previous one from each subsequent substitution (the first substitution is subtracted from the second substitution, the second substitution is subtracted from the third substitution, the third substitution is subtracted from the fourth substitution, and so on).

Let us consider the method of calculating the influence of factors by the method of chain substitutions in a general formalized form.

Let there be a deterministic factorial model of the form

$$y = f(x_1, x_2, x_3, \dots, x_n), \quad (17)$$

where y is the effective indicator,

$x_1, x_2, x_3, \dots, x_n$ – its determining factors.

Their basic values are known, respectively ($y^0, x_1^0, x_2^0, x_3^0, \dots, x_n^0$) and actual values ($y^1, x_1^1, x_2^1, x_3^1, \dots, x_n^1$).

At the same time, it is necessary to calculate the influence of each of the factors that determine it on the deviation of the effective indicator y ($x_1, x_2, x_3, \dots, x_n$):

$$\Delta y = y^1 - y^0 = \Delta y(x_1) + \Delta y(x_2) + \Delta y(x_3) + \dots + \Delta y(x_n), \quad (18)$$

where Δy is the absolute deviation of the effective indicator y ,

$\Delta y(x_1)$ – the effect of changing the factor x_1 on the deviation of the effective indicator y ,

$\Delta y(x_2)$ – the effect of changing the factor x_2 on the deviation of the effective indicator y ,

$\Delta y(x_3)$ – the effect of changing the factor x_3 on the deviation of the effective indicator y ,

.....

$\Delta y(x_n)$ – the effect of changing the factor x_n on the deviation of the effective indicator y .

The calculation of the influence of factors on the deviation of the effective indicator y by the method of chain substitutions in this case is carried out as follows:

1 substitution:

$$y^0 = f(x_1^0, x_2^0, x_3^0, \dots, x_n^0) - \text{basic data}, \quad (19)$$

2 substitution:

$$y^{01} = f(x_1^1, x_2^0, x_3^0, \dots, x_n^0) - \text{1st conditional indicator}, \quad (20)$$

we determine the amount of influence of changing the value of factor x_1 on the deviation of the value of the effective indicator y :

$$\Delta y(x_1) = y^{01} - y^0, \quad (21)$$

3 substitution:

$$y^{02} = f(x_1^1, x_2^1, x_3^0, \dots, x_n^0) - \text{2nd conditional indicator}, \quad (22)$$

we determine the amount of influence of changing the value of factor x_2 on the deviation of the value of the effective indicator y :

$$\Delta y(x_2) = y^{02} - y^{01}, \quad (23)$$

4 substitution:

$$y^{03} = f(x_1^1, x_2^1, x_3^1, \dots, x_n^0) - \text{3rd conditional indicator}, \quad (24)$$

we determine the amount of influence of changing the value of factor x_3 on the deviation of the value of the effective indicator y :

$$\Delta y(x_3) = y^{03} - y^{02}, \quad (25)$$

.....

$n + 1$ substitution:

$$y^1 = f(x_1^1, x_2^1, x_3^1, \dots, x_n^1) - \text{actual data}, \quad (26)$$

we determine the amount of influence of changing the value of the factor x_n on the deviation of the value of the effective indicator y :

$$\Delta y(x_n) = y^1 - y^{0n}. \quad (27)$$

After the calculation of the influence of factors is completed, its correctness is checked, which involves comparing the sum of the calculated values of the influence of factors with the deviation of the value of the effective indicator. They must be equal to (18):

$$\Delta y(x_1) + \Delta y(x_2) + \Delta y(x_3) + \dots + \Delta y(x_n) = y^1 - y^0 = \Delta y.$$

Then a conclusion is made about the degree of influence on the deviation of the value of the effective indicator y of the values of each of the factors determining it ($x_1, x_2, x_3, \dots, x_n$).

In practice, it is more convenient to formalize the above calculations of the effect on the deviation of the value of the effective indicator y of changes in the values of its determining factors ($x_1, x_2, x_3, \dots, x_n$) by the chain substitution method in the following table (Table 3).

Table 3. Method of calculating the influence of factors by the method of chain substitutions in tabular form

Substitution	Factors					Effective indicator	The magnitude of the factor's influence
	x_1	x_2	x_3		x_n		
1	x_1^0	x_2^0	x_3^0		x_n^0	y^0	-
2	x_1^1	x_2^0	x_3^0		x_n^0	y^{01}	$\Delta y(x_1) = y^{01} - y^0$
3	x_1^1	x_2^1	x_3^0		x_n^0	y^{02}	$\Delta y(x_2) = y^{02} - y^{01}$
4	x_1^1	x_2^1	x_3^1		x_n^0	y^{03}	$\Delta y(x_3) = y^{03} - y^{02}$
...	...	...	...		...	...	
$n + 1$	x_1^1	x_2^1	x_3^1		x_n^1	y^1	$\Delta y(x_n) = y^1 - y^{0n}$
Total	-	-	-	-	-	$y^1 - y^0 = \Delta y$	$\Delta y(x_1) + \dots + \Delta y(x_n) = \Delta y$

Source: compiled by the author of the article

Completing a sufficient review of the method of chain substitutions of deterministic factor analysis, it is necessary to note its advantages and disadvantages.

The advantages of the chain substitution method are the versatility associated with the possibility of using it to calculate the influence of factors on the deviation of the effective indicator determined by them in all the main types of deterministic factor models mentioned earlier, as well as the relative simplicity of the calculations performed.

The disadvantage of the chain substitution method is due to its consideration as an element of a more general elimination method and, accordingly, assumes that the factors change independently of each other. In fact, they change together and are interconnected, and this interaction results in an additional increase in the effective indicator, which, when eliminated, is added to one of the factors, as a rule, to the latter. Therefore, the amount of influence of factors on the deviation of the effective indicator varies depending on the place where a particular factor is placed in the deterministic factor model.

Thus, the application of the method of chain substitutions requires knowledge of the relationship of factors, their subordination, the ability to correctly classify and systematize them, since the results of calculations depend on the order of substitutions.

Having described the research method in a rather concise form, the main results of which are presented in this article, the author considers it appropriate to proceed to their consideration.

4. Results

4.1. Methodological aspects of deterministic factor analysis of models of expected market price of an ordinary share and its elasticity with a neutral approach to the dividend policy of a public company

The studied deterministic factor models (11, 13-16) are combined and rather complex, which makes it expedient and preferable to use exclusively the method of chain substitutions for calculating the influence of factors on the deviation of the effective indicators determined by them.

In the calculation formulas, we denote the subscript of the basic effective indicators and their determining factors as "0" and the adjusted effective indicators and their determining factors as "1".

We will establish the sequence of calculating the influence of factors on the deviation of the expected market price of an ordinary share and its elasticity indicators with a neutral approach to the dividend policy of a public company in this situation, based on the rule formulated earlier, which determines the procedure for calculating the influence of various factors on the deviation of the corresponding effective indicators when performing deterministic factor analysis. The first step calculates the impact of the market capitalization level (p), the second step calculates the profit per ordinary share of a public company (E), the third step calculates the rate of profit required by investors per ordinary share of a public company (k), the fourth step calculates the dividend growth rate per ordinary share of a public company (g) *taken constant over time*, and the fifth step is the return on investment of a public company (r). In this case, according to the metol algorithm of chain substitutions, the first action includes 3 calculations, and all other actions include 2 calculations each. Let's turn to the consideration of specific techniques.

4.1.1 Methodology for calculating the influence of factors on the deviation of the expected market price of a public company's ordinary share

This technique involves performing the following actions:

1. Determination of the effect on the deviation of the expected market price of an ordinary share of a public company of a change in the market capitalization level (ΔP_p), which involves calculating the base value of the expected market price of an ordinary share of a public company (P_0), its first conditional indicator (P_{ci1}) and subtracting the expected market price of an ordinary share from the first conditional indicator a public company of its basic value:

$$P_0 = \frac{\frac{r_0 * E_0}{\rho_0}}{\frac{\rho_0 - (k_0 - g_0) * \frac{\rho_0}{1+g_0}}{\frac{1-r_0}{1+g_0}}}, \quad (28)$$

$$P_{ci1} = \frac{\frac{r_0 * E_0}{\rho_1}}{\frac{\rho_1 - (k_0 - g_0) * \frac{\rho_1}{1+g_0}}{\frac{1-r_0}{1+g_0}}}, \quad (29)$$

$$\Delta P_p = P_{ci1} - P_0. \quad (30)$$

2. Determination of the effect on the deviation of the expected market price of an ordinary share of a public company of changes in earnings per its ordinary share (ΔP_E), which involves calculating the second conditional indicator of the expected market price of an ordinary share of a public company (P_{ci2}) and subtracting from the second conditional indicator of the expected market price of an ordinary share of a public company of its first conditional indicator, calculated earlier:

$$P_{ci2} = \frac{\frac{r_0 * E_1}{\rho_1}}{\frac{\rho_1 - (k_0 - g_0) * \frac{\rho_1}{1+g_0}}{\frac{1-r_0}{1+g_0}}}, \quad (31)$$

$$\Delta P_E = P_{ci2} - P_{ci1}. \quad (32)$$

3. Determination of the effect on the deviation of the expected market price of an ordinary share of a public company of a change in the rate of profit required by investors for its ordinary share (ΔP_k), which involves calculating the third conditional indicator of the expected market price of an ordinary share of a public company (P_{ci3}) and subtracting the expected market price of an ordinary share of a public company from the third conditional indicator its second conditional indicator calculated earlier:

$$P_{ci3} = \frac{\frac{r_0 * E_1}{\rho_1}}{\frac{\rho_1 - (k_1 - g_0) * \frac{\rho_1}{1+g_0}}{\frac{1-r_0}{1+g_0}}}, \quad (33)$$

$$\Delta P_k = P_{ci3} - P_{ci2}. \quad (34)$$

4. Determination of the effect on the deviation of the expected market price of a public company's ordinary share of a change in the dividend growth rate per ordinary share assumed to be constant over time (ΔP_g), which involves calculating the fourth conditional indicator of the expected market price of a public company's ordinary share (P_{ci4}) and subtracting the expected market price of an ordinary share from the fourth conditional indicator for a public company, its third conditional indicator calculated earlier:

$$P_{ci4} = \frac{\frac{r_0 * E_1}{\rho_1}}{\frac{\rho_1 - (k_1 - g_1) * \frac{\rho_1}{1+g_1}}{\frac{1-r_0}{1+g_1}}}, \quad (35)$$

$$\Delta P_g = P_{ci4} - P_{ci3}. \quad (36)$$

5. Determination of the effect on the deviation of the expected market price of an ordinary share of a public company of a change in its return on investment (ΔP_r), which involves calculating the adjusted value of the expected market price of an ordinary share of a public company (P_{ci4}) and subtracting from the adjusted value of the expected market price of an ordinary share of a public company its fourth conditional indicator, calculated earlier:

$$P_1 = \frac{\frac{r_1 * E_1}{\rho_1}}{\frac{\rho_1 - (k_1 - g_1) * \frac{\rho_1}{1+g_1}}{\frac{1-r_1}{1+g_1}}}, \quad (37)$$

$$\Delta P_r = P_1 - P_{ci4}. \quad (38)$$

4.1.2 Methodology for calculating the influence of factors on the deviation of the elasticity of the expected market price of a public company's ordinary share based on earnings per ordinary share

Since the elasticity of the expected market price of a public company's ordinary share in terms of earnings per ordinary share is equal to 1 and, therefore, does not depend on changes in any determining factors.

4.1.3 Methodology for calculating the influence of factors on the deviation of the elasticity of the expected market price of a public company's ordinary share based on its return on investment

This technique involves performing the following actions:

1. Determination of the impact on the deviation of the elasticity of the expected market price of an ordinary share of a public company on the return on investment of its change in the market capitalization level ($\Delta E_r(P)_p$), which involves calculating the basic value of the elasticity of the expected market price of an ordinary share of a public company on the return on investment ($E_r(P)_0$), conditional indicator ($E_r(P)_{ci1}$) and subtraction from the first conditional indicator of elasticity of the expected market price of an ordinary share of a public company according to its return on investment of the basic value of this elasticity:

$$E_r(P)_0 = \left(\rho_0 - (k_0 - g_0) * \frac{1 - \frac{r_0}{\rho_0}}{1+g_0} \right)^2 + \frac{r_0 * (g_0 - k_0)}{1+g_0} + \frac{r_0 * (g_0 - k_0)^2 * (1 - \frac{r_0}{\rho_0})}{\rho_0 * (1+g_0)^2}, \quad (39)$$

$$E_r(P)_{ci1} = \left(\rho_1 - (k_0 - g_0) * \frac{1 - \frac{r_0}{\rho_1}}{1+g_0} \right)^2 + \frac{r_0 * (g_0 - k_0)}{1+g_0} + \frac{r_0 * (g_0 - k_0)^2 * (1 - \frac{r_0}{\rho_1})}{\rho_1 * (1+g_0)^2}, \quad (40)$$

$$\Delta E_r(P)_p = E_r(P)_{ci1} - E_r(P)_0. \quad (41)$$

2. Determination of the effect on the deviation of the elasticity of the expected market price of an ordinary share of a public company on the return on investment of its change in the rate of profit required by investors per ordinary share of this company ($\Delta E_r(P)_k$), which involves calculating the second conditional indicator of the elasticity of the expected market price of an ordinary share of a public company on the return on investment ($E_r(P)_{ci2}$) and subtracting from it the first conditional indicator of this elasticity, calculated earlier:

$$E_r(P)_{ci2} = \left(\rho_1 - (k_1 - g_0) * \frac{1 - \frac{r_0}{\rho_1}}{1+g_0} \right)^2 + \frac{r_0 * (g_0 - k_1)}{1+g_0} + \frac{r_0 * (g_0 - k_1)^2 * (1 - \frac{r_0}{\rho_1})}{\rho_1 * (1+g_0)^2}, \quad (42)$$

$$\Delta E_r(P)_k = E_r(P)_{ci2} - E_r(P)_{ci1}. \quad (43)$$

3. Determination of the effect on the deviation of the elasticity of the expected market price of an ordinary share of a public company on the return on investment of its change in the dividend growth rate assumed to be constant over time per ordinary share of this company ($\Delta E_r(P)_g$), which implies the calculation of the third conditional indicator of the elasticity of the expected market price of an ordinary share of a public company on the return on investment ($E_r(P)_{ci3}$) and subtracting from it the second conditional indicator of this elasticity, calculated earlier:

$$E_r(P)_{ci3} = \left(\rho_1 - (k_1 - g_1) * \frac{1 - \frac{r_0}{\rho_1}}{1 + g_1} \right)^2 + \frac{r_0 * (g_1 - k_1)}{1 + g_1} + \frac{r_0 * (g_1 - k_1)^2 * (1 - \frac{r_0}{\rho_1})}{\rho_1 * (1 + g_1)^2}, \quad (44)$$

$$\Delta E_r(P)_g = E_r(P)_{ci3} - E_r(P)_{ci2}. \quad (45)$$

4. Determination of the effect on the deviation of the elasticity of the expected market price of an ordinary share of a public company on the return on investment of its change in the return on investment of this company ($\Delta E_r(P)_r$), which involves calculating the adjusted elasticity of the expected market price of an ordinary share of a public company on the return on investment ($E_r(P)_1$) and subtracting from it, the third conditional indicator of this elasticity, calculated earlier:

$$E_r(P)_1 = \left(\rho_1 - (k_1 - g_1) * \frac{1 - \frac{r_1}{\rho_1}}{1 + g_1} \right)^2 + \frac{r_1 * (g_1 - k_1)}{1 + g_1} + \frac{r_1 * (g_1 - k_1)^2 * (1 - \frac{r_1}{\rho_1})}{\rho_1 * (1 + g_1)^2}, \quad (46)$$

$$\Delta E_r(P)_r = E_r(P)_1 - E_r(P)_{ci3}. \quad (47)$$

4.1.4 Methodology for calculating the impact of factors on the deviation of the elasticity of the expected market price of a public company's ordinary share by market capitalization level (the average market discount rate used to determine expected cash flows)

1. Determination of the effect of changes in the market capitalization level ($\Delta E_p(P)$) on the deviation of the elasticity of the expected market price of a public company's ordinary share by market capitalization level изменения рыночного уровня капитализации ($\Delta E_p(P)_p$), which involves calculating the basic elasticity value of the expected market price of an ordinary share of a public company according to the market capitalization level ($E_p(P)_0$), its first conditional indicator ($E_p(P)_{ci1}$) and subtracting from the first conditional elasticity indicator the expected market price of an ordinary share of a public company according to the market capitalization level the basic value of this elasticity is:

$$E_p(P)_0 = \frac{\frac{r_0 * k_0 - g_0}{\rho_0 * 1 + g_0} + \frac{(k_0 - g_0) * (1 - \frac{r_0}{\rho_0})}{1 + g_0} - \rho_0}{\rho_0 - (k_0 - g_0) * \frac{1 - \frac{r_0}{\rho_0}}{1 + g_0}}, \quad (48)$$

$$E_p(P)_{ci1} = \frac{\frac{r_0 * k_0 - g_0}{\rho_1 * 1 + g_0} + \frac{(k_0 - g_0) * (1 - \frac{r_0}{\rho_1})}{1 + g_0} - \rho_1}{\rho_1 - (k_0 - g_0) * \frac{1 - \frac{r_0}{\rho_1}}{1 + g_0}}, \quad (49)$$

$$\Delta E_p(P)_p = E_p(P)_{ci1} - E_p(P)_0. \quad (50)$$

2. Determination of the impact on the deviation of the elasticity of the expected market price of a public company's ordinary share based on the market capitalization level of changes in the rate of profit required by investors per ordinary share of this company ($\Delta E_p(P)_k$), which involves calculating the second conditional indicator of elasticity of the expected market price of an ordinary share of a public company based on the market capitalization level ($E_p(P)_{ci2}$), and subtracting from it the first conditional indicator of this elasticity calculated earlier:

$$E_p(P)_{ci2} = \frac{\frac{r_0 * k_1 - g_0}{\rho_1 * 1 + g_0} + \frac{(k_1 - g_0) * (1 - \frac{r_0}{\rho_1})}{1 + g_0} - \rho_1}{\rho_1 - (k_1 - g_0) * \frac{1 - \frac{r_0}{\rho_1}}{1 + g_0}}, \quad (51)$$

$$\Delta E_p(P)_k = E_p(P)_{ci2} - E_p(P)_{ci1}. \quad (52)$$

3. Determination of the effect on the deviation of the elasticity of the expected market price of a public company's ordinary share based on the market capitalization level of a change in the dividend growth rate assumed to be constant over time per ordinary share of this company ($\Delta E_p(P)_g$), which involves calculating the third conditional indicator of elasticity of the expected market price of an ordinary share of a public company based on the market capitalization level ($E_p(P)_{ci3}$), and subtracting from it the second conditional indicator of this elasticity calculated earlier:

$$E_p(P)_{ci3} = \frac{\frac{r_0 * k_1 - g_1}{\rho_1 * 1 + g_1} + \frac{(k_1 - g_1) * (1 - \frac{r_0}{\rho_1})}{1 + g_1} - \rho_1}{\rho_1 - (k_1 - g_1) * \frac{1 - \frac{r_0}{\rho_1}}{1 + g_1}}, \quad (53)$$

$$\Delta E_p(P)_g = E_p(P)_{ci3} - E_p(P)_{ci2}. \quad (54)$$

4. Determination of the effect on the deviation of the elasticity of the expected market price of an ordinary share of a public company by market capitalization level of changes in the return on investment of this company ($\Delta E_p(P)_r$), which involves calculating the adjusted value of the elasticity of the expected market price of an ordinary share of a public company by market capitalization level ($E_p(P)_1$), and subtracting from it the third conditional indicator of this elasticity, calculated earlier:

$$E_p(P)_1 = \frac{\frac{r_1 * k_1 - g_1}{\rho_1 * 1 + g_1} + \frac{(k_1 - g_1) * (1 - \frac{r_1}{\rho_1})}{1 + g_1} - \rho_1}{\rho_1 - (k_1 - g_1) * \frac{1 - \frac{r_1}{\rho_1}}{1 + g_1}}, \quad (55)$$

$$\Delta E_p(P)_r = E_p(P)_1 - E_p(P)_{ci3}. \quad (56)$$

4.1.5 Methodology for calculating the influence of factors on the deviation of the elasticity of the expected market price of a public company's ordinary share based on the rate of profit required by investors for its ordinary share

1. Determination of the impact of changes in the market capitalization level ($\Delta E_k(P)$) on the deviation of the elasticity of the expected market price of a public company's ordinary share according to the rate of profit required by investors for its ordinary share изменения рыночного уровня капитализации ($\Delta E_k(P)_p$), which involves calculating the basic elasticity value of the expected market price of an ordinary share of a public company based on the rate of profit required by investors for its ordinary share ($E_k(P)_0$), its first conditional indicator ($E_k(P)_{ci1}$) and subtracting the expected market price of an ordinary share from the first conditional elasticity indicator a public company by the rate of return required by investors for its ordinary share, the base value of this elasticity:

$$E_k(P)_0 = \frac{k_0 * (1 - \frac{r_0}{\rho_0})}{\rho_0 * (1 + g_0) - (k_0 - g_0) * (1 - \frac{r_0}{\rho_0})}, \quad (57)$$

$$E_k(P)_{ci1} = \frac{k_0 * (1 - \frac{r_0}{\rho_1})}{\rho_1 * (1 + g_0) - (k_0 - g_0) * (1 - \frac{r_0}{\rho_1})}, \quad (58)$$

$$\Delta E_k(P)_p = E_k(P)_{ci1} - E_k(P)_0. \quad (59)$$

2. Determination of the effect on the deviation of the elasticity of the expected market price of an ordinary share of a public company according to the rate of profit required by investors per its ordinary share of changes in the rate of profit required by investors per ordinary share of this company ($\Delta E_k(P)_k$), which involves calculating the second conditional indicator of elasticity of the expected market price of an ordinary share of a public company based on the rate of profit required by investors for its ordinary share of changes in the rate of profit ($E_k(P)_{ci2}$), and subtracting from it the first conditional indicator of this elasticity calculated earlier:

$$E_k(P)_{ci2} = \frac{k_1 * (1 - \frac{r_0}{\rho_1})}{\rho_1 * (1 + g_0) - (k_1 - g_0) * (1 - \frac{r_0}{\rho_1})}, \quad (60)$$

$$\Delta E_k(P)_k = E_k(P)_{ci2} - E_k(P)_{ci1}. \quad (61)$$

3. Determination of the effect on the deviation of the elasticity of the expected market price of an ordinary share of a public company according to the rate of profit required by investors for its ordinary share of changes in the rate of increase of the dividend per ordinary share of this company assumed constant over time ($\Delta E_k(P)_g$), which involves calculating the third conditional indicator of elasticity of the expected market price of an ordinary share of a public company based on the rate of profit required by investors for its ordinary share of the change in the rate of profit ($E_k(P)_{ci3}$), and subtracting from it the second conditional indicator of this elasticity calculated earlier:

$$E_k(P)_{ci3} = \frac{k_1 * (1 - \frac{r_0}{\rho_1})}{\rho_1 * (1 + g_1) - (k_1 - g_1) * (1 - \frac{r_0}{\rho_1})}, \quad (62)$$

$$\Delta E_k(P)_g = E_k(P)_{ci3} - E_k(P)_{ci2}. \quad (63)$$

4. Determination of the effect on the deviation of the elasticity of the expected market price of an ordinary share of a public company according to the rate of profit required by investors for its ordinary share of changes in the return on investment of this company ($\Delta E_k(P)_r$), which involves calculating the adjusted value of the elasticity of the expected market price of an ordinary share of a public company according to the rate of profit required by investors for its ordinary share. ordinary share changes in the rate of profit ($E_k(P)_l$), and subtracting from it the third conditional indicator of this elasticity, calculated earlier:

$$E_k(P)_1 = \frac{k_1 * (1 - \frac{r_1}{\rho_1})}{\rho_1 * (1 + g_1) - (k_1 - g_1) * (1 - \frac{r_1}{\rho_1})}, \quad (64)$$

$$\Delta E_k(P)_r = E_k(P)_1 - E_k(P)_{ci3}. \quad (65)$$

4.1.6 Method of calculating the influence of factors on the deviation of the elasticity of the expected market price of a public company's ordinary share by the rate of growth of the dividend per its ordinary share (assumed constant over time)

1. Determination of the effect of changes in the market capitalization level ($\Delta E_g(P)$) on the deviation of the elasticity of the expected market price of a public company's ordinary share based on the time-constant rate of increase in the dividend per its ordinary share. изменения рыночного уровня капитализации ($\Delta E_g(P)_p$), which involves calculating the basic elasticity value of the expected market price of a public company's ordinary share based on the dividend growth rate per ordinary share assumed to be constant over time ($E_g(P)_0$), its first conditional indicator ($E_g(P)_{ci1}$), and subtracting the expected market price elasticity from the first conditional indicator an ordinary share of a public company based on the rate of dividend growth per ordinary share assumed to be constant over time, and the basic value of this elasticity:

$$E_g(P)_0 = \frac{g_0 * \rho_0 * (2 * g_0 - k_0) * (1 - \frac{r_0}{\rho_0})}{(\rho_0 - (k_0 - g_0) * \frac{\rho_0}{1 + g_0}) * (1 + g_0)^2}, \quad (66)$$

$$E_g(P)_{ci1} = \frac{g_0 * \rho_1 * (2 * g_0 - k_0) * (1 - \frac{r_0}{\rho_1})}{(\rho_1 - (k_0 - g_0) * \frac{\rho_1}{1 + g_0}) * (1 + g_0)^2}, \quad (67)$$

$$\Delta E_g(P)_p = E_g(P)_{ci1} - E_g(P)_0. \quad (68)$$

2. Determination of the effect on the deviation of the elasticity of the expected market price of a public company's ordinary share based on the time-constant growth rate of the dividend per ordinary share of a public company of the change in the rate of profit required by investors per ordinary share of this company ($\Delta E_g(P)_k$), which involves calculating the second conditional indicator of elasticity of the expected market price of an ordinary share of a public company based on the dividend growth rate per its ordinary share assumed to be constant over time ($E_g(P)_{ci2}$) and subtracting from it the first conditional indicator of this elasticity calculated earlier:

$$E_g(P)_{ci2} = \frac{g_0 * \rho_1 * (2 * g_0 - k_1) * (1 - \frac{r_0}{\rho_1})}{\frac{1 - r_0}{\rho_1} * (\rho_1 - (k_1 - g_0) * \frac{\rho_1}{1 + g_0}) * (1 + g_0)^2}, \quad (69)$$

$$\Delta E_g(P)_k = E_g(P)_{ci2} - E_g(P)_{ci1}. \quad (70)$$

3. Determination of the effect on the deviation of the elasticity of the expected market price of an ordinary share of a public company based on the time-constant rate of increase in the dividend per ordinary share of the company of changes in the time-constant rate of increase in the dividend per ordinary share of the company ($\Delta E_g(P)_g$), which involves calculating the third conditional indicator of elasticity of the expected market price of an ordinary share of a public company based on the dividend growth rate for its ordinary share assumed to be constant over time ($E_g(P)_{ci3}$) and subtracting from it the second conditional indicator of this elasticity calculated earlier:

$$E_g(P)_{ci3} = \frac{g_1 * \rho_1 * (2 * g_1 - k_1) * (1 - \frac{r_0}{\rho_1})}{\frac{1 - r_0}{\rho_1} * (\rho_1 - (k_1 - g_1) * \frac{\rho_1}{1 + g_1}) * (1 + g_1)^2}, \quad (71)$$

$$\Delta E_g(P)_g = E_g(P)_{ci3} - E_g(P)_{ci2}. \quad (72)$$

4. Determination of the effect on the deviation of the elasticity of the expected market price of an ordinary share of a public company based on the time-constant rate of increase in the dividend per its ordinary share of changes in the return on investment of this company ($\Delta E_g(P)_r$), which involves calculating the adjusted value of the elasticity of the expected market price of an ordinary share of a public company based on the time-constant rate of increase in the dividend per its ordinary share increase in the dividend per its ordinary share ($E_g(P)_1$) and subtracting from it the third conditional indicator of this elasticity, calculated earlier:

$$E_g(P)_1 = \frac{g_1 * \rho_1 * (2 * g_1 - k_1) * (1 - \frac{r_1}{\rho_1})}{\frac{1 - r_1}{\rho_1} * (\rho_1 - (k_1 - g_1) * \frac{\rho_1}{1 + g_1}) * (1 + g_1)^2}, \quad (73)$$

$$\Delta E_g(P)_r = E_g(P)_1 - E_g(P)_{ci3}. \quad (74)$$

Concluding the consideration of methods for calculating the influence of factors on the deviation of determined effective indicators in accordance with deterministic factor models (7, 9-12), it should be noted that the criterion for the correctness of using each method is equality (approximate equality, taking into account rounding) of the sum of the results of calculating the influence of factors on the deviation of the effective indicators determined by them.

Figure 1 and Table 4 show the procedure for using the AI tool developed by the author through a flowchart of solutions when using AI (Figure 1) and an AI template (Table 4).

The block diagram of AI solutions presented in Figure 1 shows the sequence of the artificial intelligence process in this case.

Input data. Specify the digital input data required to run the author's mathematical models that reflect the predictive algorithm: basic and adjusted.

Mathematical models. They are filled in with input digital basic and corrected data according to the algorithm of the chain substitution method.

Forecasting. A forecast calculation is made, which is necessary for making a decision.

A judgment. The mechanism (criteria) for evaluating the results (whether they correspond to the actual situation in a public company) is established.

Action. It is decided what actions should be taken to actually achieve the results obtained and their adjustment if necessary.

Result. Final justification and design of the forecast result.

Feedback data. Mathematical models and the forecasting algorithm are improved (if necessary) by providing information about the results, regardless of their success.

Learning action. Digital data that is required for learning mathematical models and predictive algorithms is identified.

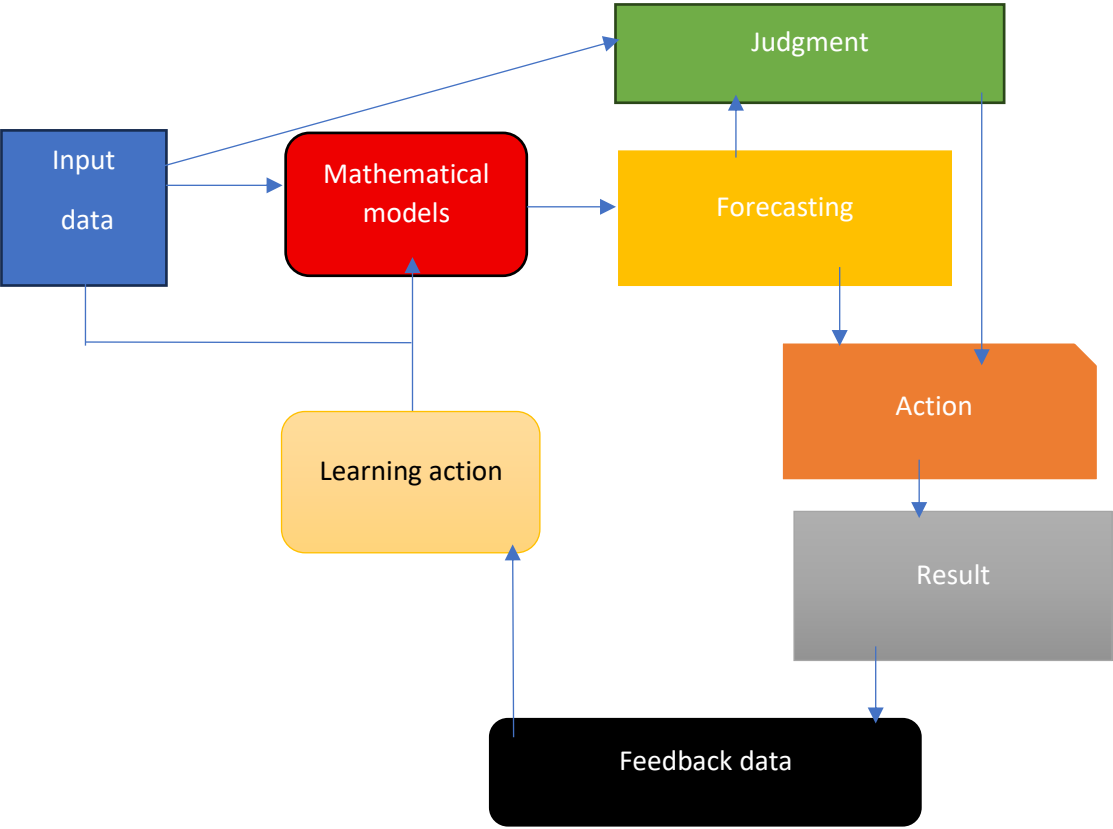


Figure 1. Block diagram of AI solutions

The AI template, which looks like Table 4, is based on the flowchart shown above (Figure 1) and represents its order. As can be seen from Table 4, the process of artificial intelligence considered by the author of this article,

Table 4. AI Template

Input data	Mathematical models	Forecast	Judgment	Action	Result	Feedback data	Learning action

In addition, the sufficient complexity of these deterministic factor analysis techniques as an AI tool makes it advisable to consider their practical use on a specific digital material with the results presented in the form of an AI template similar to Table 4.

4.2. Practical aspects of deterministic factor analysis of models of expected market price of an ordinary share and its elasticity with a neutral approach to the dividend policy of a public company

We will apply the above methods for calculating the influence of factors on the deviation of the determined effective indicators in accordance with deterministic factor models (11, 13-16), represented by formulas (28-74), to the corresponding data of the public company "Gamma" (real name changed), based on the assumption that it is guided by a neutral approach to the dividend policy. politics.

The basic values (at the end of the reporting year) and adjusted (forecast) values (at the end of next year) of some indicators of public company Gamma, which are aimed at ensuring a neutral approach to its dividend policy, are presented in Table 5.

Table 5. Basic and adjusted values of some indicators of the public company "Gamma"

Indicator	Base value	Adjusted value
Market capitalization level (p), %	15.3	16.1
Return on investment of a public company (r), %	23.9	27.3
Earnings per ordinary share (E), RUB	157.48	164.53
Rate of return required by investors per ordinary share of a public company (k), %	12.0	13.0
Dividend growth rate per ordinary share (assumed constant over time) (g), %	5.0	5.0
Expected market price of an ordinary share (P), RUB	1291.514	1303.659
Elasticity of the expected market price of a public company's ordinary share by return on investment ($E_r(P)$)	0.01644	0.01815
Elasticity of the expected market price of a public company's ordinary share by market capitalization level ($E_p(P)$)	-0.45326	-0.39630
Elasticity of the expected market price of a public company's ordinary share based on the rate of return required by investors per its ordinary share ($E_k(P)$)	-0.33726	-0.40246
Elasticity of the expected market price of a public company's ordinary share based on the time-constant rate of dividend growth per its ordinary share ($E_g(P)$)	0.00041	0.00071

Source: compiled by the author of the article

For convenience, we present calculations of the influence of factors on the deviation of the effective indicators determined by them in the form of analytical tables such as Table 3.

Table 6 shows the calculation of the influence of factors by the method of chain substitution on the deviation of the expected market price of an ordinary share of a public company.

Table 6. Calculation of the influence of factors on the deviation of the expected market price of an ordinary share of a public company (RUB)

Substitution	Factors					Effective indicator (P) (RUB)	The magnitude of the factor's influence (RUB)
	p	E	k	g	r		
1	0,153	157,48	0,12	0,05	0,239	1291,514	-
2	0,161	157,48	0,12	0,05	0,239	1186,675	$\Delta P_p = -104,839$
3	0,161	164,53	0,12	0,05	0,239	1265,492	$\Delta P_E = 78,817$
4	0,161	164,53	0,13	0,05	0,239	1233,535	$\Delta P_k = -31,957$
5	0,161	164,53	0,13	0,05	0,239	1233,535	$\Delta P_g = 0$
6	0,161	164,53	0,13	0,05	0,273	1303,659	$\Delta P_r = 70,124$
Total	-	-	-	-	-	$6 - 1 = 12,145$	$\Sigma = 12,145$

Source: compiled by the author of the article

Thus, as a result of an increase in the market capitalization level from 15.3% to 16.1%, the expected market price of an ordinary share of a public company will decrease by 104.839 rubles, but as a result of an increase in earnings per ordinary share from 157.48 rubles to 164.53 rubles, the expected market price of an ordinary share of a public company will increase by 78.817 rubles, the expected market price of an ordinary share of a public company will decrease by RUB 31.957 from 12% to 13%, but if the dividend growth rate per ordinary share, assumed constant over time, is 5%, the expected market price of an ordinary share of a public company will remain unchanged, however as a result of an increase in the return on investment from 23.9% to 27.3%, the expected market price of an ordinary share of a public company will increase by RUB 70.124. As a result of all the factors mentioned above influencing the expected market price of a public company's ordinary share, it will increase by RUB 12.145 in the context of a neutral approach to the implementation of the public company's dividend policy.

Table 7 shows the calculation of the influence of factors by the method of chain substitutions on the deviation of the elasticity of the expected market price of an ordinary share of a public company in terms of its return on investment.

Table 7. Calculation of the influence of factors on the deviation of the elasticity of the expected market price of a public company's ordinary share by return on investment

Substitution	Factors				Effective indicator ($E_r(P)$)	The magnitude of the factor's influence
	p	k	g	r		
1	0,153	0,12	0,05	0,239	0,01644	-
2	0,161	0,12	0,05	0,239	0,01323	$\Delta E_r(P)_p = -0.00321$
3	0.161	0.13	0.05	0.239	0.01679	$\Delta E_r(P)_k = 0.00356$
4	0.16	0.13	0.05	0.239	0.01679	$\Delta E_r(P)_g = 0$
5	0.161	0.13	0.05	0.273	0.01815	$\Delta E_r(P)_r = 0.00136$
Total	-	-	-	-	$5 - 1 = 0.00171$	$\Sigma = 0.00171$

Source: compiled by the author of the article

So, as a result of an increase in the market capitalization level from 15.3% to 16.1%, the elasticity of the expected market price of an ordinary share of a public company in terms of return on investment will decrease by 0.00321, but as a result of an increase in the rate of return required by investors per ordinary share of a public company from 12% to 13%, the elasticity of the expected market price of an ordinary share of a public company in terms of return on investment will decrease by 0.00321. the return on investment of a public company will increase by 0.00356, but if the growth rate of the dividend per ordinary share, assumed constant over time, which is 5%, remains constant, the elasticity of the expected market price of an ordinary share of a public company in terms of its return on investment will remain unchanged, however, as a result of an increase in the return on investment from 23.9% to 27.3%, the elasticity of the expected the market price of a public company's ordinary share based on its return on investment will increase by 0.00136. The effect of all the factors mentioned above on the elasticity of the expected market price of a public company's ordinary share in terms of its return on investment will result in an increase of 0.00171 in the context of a neutral approach to the implementation of the public company's dividend policy.

Table 8 shows the calculation of the influence of factors by the method of chain substitutions on the deviation of the elasticity of the expected market price of an ordinary share of a public company by market capitalization level (the average market discount rate used to determine expected cash flows).

Table 8. Calculation of the influence of factors on the deviation of the elasticity of the expected market price of a public company's ordinary share by market capitalization level

Substitution	Factors				Effective indicator ($E_p(P)$)	The magnitude of the factor's influence
	ρ	k	g	r		
1	0,153	0,12	0,05	0,239	-0,45326	-
2	0,161	0,12	0,05	0,239	-0,48804	$\Delta E_p(P)_\rho = -0,03478$
3	0,161	0,13	0,05	0,239	-0,42853	$\Delta E_p(P)_k = 0,05951$
4	0,161	0,13	0,05	0,239	-0,42853	$\Delta E_p(P)_g = 0$
5	0,161	0,13	0,05	0,273	-0,39630	$\Delta E_p(P)_r = 0,03223$
Total	-	-	-	-	$5 - 1 = 0,05696$	$\Sigma = 0,05696$

Source: compiled by the author of the article

So, as a result of an increase in the market capitalization level from 15.3% to 16.1%, the elasticity of the expected market price of an ordinary share of a public company at the market capitalization level will decrease by 0.03478, but as a result of an increase in the rate of return required by investors per ordinary share of a public company from 12% to 13%, the elasticity of the expected market price of an ordinary share of a public company at the market capitalization level will decrease by 0.03478. the market capitalization rate will increase by 0.05951, but if the growth rate of the dividend per ordinary share, assumed constant over time, which is 5%, remains constant, the elasticity of the expected market price of a public company's ordinary share by market capitalization level will remain unchanged, however, as a result of an increase in the return on investment from 23.9% to 27.3%, the elasticity of the expected the market price of an ordinary share of a public company at the market capitalization level will increase by 0.03223. The effect of all the factors mentioned above on the elasticity of the expected market price of a public company's ordinary share based on the market capitalization level will result in its increase by 0.05696 in the context of a neutral approach to the implementation of the public company's dividend policy.

Table 9 shows the calculation of the influence of factors by the method of chain substitution on the deviation of the elasticity of the expected market price of an ordinary share of a public company according to the rate of profit required by investors for its ordinary share.

Table 9. Calculation of the influence of factors on the deviation of the elasticity of the expected market price of a public company's ordinary share by the rate of profit required by investors for its ordinary share

Substitution	Factors				Effective indicator ($E_k(P)$)	The magnitude of the factor's influence
	p	k	g	r		
1	0,153	0,12	0,05	0,239	-0,33726	-
2	0,161	0,12	0,05	0,239	-0,28646	$\Delta E_k(P)_p = 0,05080$
3	0,161	0,13	0,05	0,239	-0,30307	$\Delta E_k(P)_k = -0,01661$
4	0,161	0,13	0,05	0,239	-0,30307	$\Delta E_k(P)_g = 0$
5	0,161	0,13	0,05	0,273	-0,40246	$\Delta E_k(P)_r = -0,09939$
Total	-	-	-	-	$5 - 1 = -0,06520$	$\Sigma = -0,06520$

Source: compiled by the author of the article

So, as a result of an increase in the market capitalization level from 15.3% to 16.1%, the elasticity of the expected market price of an ordinary share of a public company in terms of the rate of profit required by investors for its ordinary share will increase by 0.05080, and as a result of an increase in the rate of profit required by investors for an ordinary share of a public company, from 12% to 13%, the elasticity of the expected market price of an ordinary share of a public company will increase by 0.05080. the market price of a public company's ordinary share at the rate of return required by investors per its ordinary share will increase by 0.01661, but if the dividend growth rate per ordinary share, assumed constant over

time, is 5%, the elasticity of the expected market price of a public company's ordinary share at the rate of profit required by investors per its ordinary share, However, as a result of an increase in the return on investment from 23.9% to 27.3%, the elasticity of the expected market price of an ordinary share of a public company in terms of the rate of return required by investors for its ordinary share will decrease by 0.09939. The effect of all the factors mentioned above on the elasticity of the expected market price of a public company's ordinary share in terms of the rate of return required by investors for its ordinary share will result in an increase of 0.06520 in the context of a neutral approach to the implementation of the public company's dividend policy.

Table 10 shows the calculation of the influence of factors by the method of chain substitutions on the deviation of the elasticity of the expected market price of an ordinary share of a public company based on the rate of dividend growth per ordinary share assumed to be constant over time.

Table 10. Calculation of the influence of factors on the deviation of the elasticity of the expected market price of an ordinary share of a public company based on the rate of dividend growth per ordinary share assumed to be constant over time

Substitution	Factors				Effective indicator ($E_g(P)$)	The magnitude of the factor's influence
	p	k	g	r		
1	0,153	0,12	0,05	0,239	0,00041	-
2	0,161	0,12	0,05	0,239	0,00038	$\Delta E_g(P)_p = -0.00003$
3	0,161	0,13	0,05	0,239	0,00055	$\Delta E_g(P)_k = 0.00017$
4	0,161	0,13	0,05	0,239	0,00055	$\Delta E_g(P)_g = 0$
5	0,161	0,13	0,05	0,273	0,00071	$\Delta E_g(P)_r = 0.00016$
Total	-	-	-	-	$5 - 1 = 0.00030$	$\Sigma = 0.00030$

Source: compiled by the author of the article

So, as a result of an increase in the market capitalization level from 15.3% to 16.1%, the elasticity of the expected market price of an ordinary share of a public company based on the time-constant growth rate of the dividend per ordinary share of a public company will decrease by 0.00003, but as a result of an increase in the rate of return required by investors per ordinary share of a public company from 12% to 13%, the elasticity of the expected market price of an ordinary share of a public company will decrease by 0.00003. the expected market price of an ordinary share of a public company based on the time-constant growth rate of the dividend per ordinary share will increase by 0.00017, but if the time-constant growth rate of the dividend per ordinary share is constant, which will amount to 5%, the elasticity of the expected market price of an ordinary share of a public company based on the time-constant growth rate of the dividend per ordinary share will increase by 0.00017, but if the time-constant growth rate of the dividend per ordinary share is constant, which will amount to 5%, the elasticity of the expected market price of an ordinary share of a public company based on the time-constant growth rate of the dividend per ordinary share is constant. However, as a result of an increase in the return on investment from 23.9% to 27.3%, the elasticity of the expected market price of a public company's ordinary share based on the time-constant growth rate of the dividend per ordinary share will increase by 0.00016. The effect of all the factors mentioned above on the elasticity of the expected market price of a public company's ordinary share based on the time-constant growth rate of the dividend per its ordinary share will result in an increase of 0.00030 in the context of a neutral approach to the implementation of the public company's dividend policy.

Concluding the review of the above example, it should be noted that in the context of a neutral approach to the implementation of the dividend policy of a public company, it allows not only to determine for a particular public company the degree of sensitivity of the values of key indicators of its activity in the stock market to changes in the values of the

main factors determining them, but also the direction of the influence of these factors on the key indicators of the dividend policy in the direction of increase or decrease their values. All this makes it possible to predict the values of key indicators of activity of a particular public company in the stock market in the event of an increase/decrease in the value of each of the main factors determining them separately (with the values of all other factors unchanged) by a given number of percent, if this public company adheres to a neutral approach to the implementation of the dividend policy.

In addition, the models of elasticities of the market price of an ordinary share of a public company on the stock market based on the main determining factors constructed by the author of this article can be used as tools for managing the values of these elasticities by regulating the values of their determining factors in a neutral approach to the implementation of the dividend policy of this public company.

Drawing a line under the consideration of practical aspects of deterministic factor analysis of models of the expected market price of an ordinary share and its elasticity with a neutral approach to the dividend policy of a public company as an AI tool, we present the results of the author's research in the form of Table 11.

Table 11, Practical aspects of deterministic factor analysis of models of the expected market price of an ordinary share and its elasticity with a neutral approach to the dividend policy of a public company as an AI tool

Input data	Mathematical models	Forecast	Judgment	Action	Result	Feedback data	Learning action
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Basic data:							
ρ_0							
E_0							
r_0							
$k_0,$							
$g_0,$							
P_0							
$E_r(P)_0$							
$E_p(P)_0$							
$E_k(P)_0$							
$E_g(P)_0$							
Adjusted data:							
ρ_1							
E_1							
r_1							
k_1							
g_1							
P_1							
$E_r(P)_1$	(28 – 38)	ΔP_p ΔP_E ΔP_k ΔP_g ΔP_r	The results correspond to the actual situation in this public company and its opportunities in the previous year. This will increase its investment appeal among the main stakeholders.	For the actual achievement of the results obtained, a clear follow-up to the forecast is necessary. Such actions will increase the investment attractiveness of this public company.		Any effect on mathematical models is not required during the forecasting process. The input data must be updated every year.	The digital data required for the training of mathematical models and predictive algorithms (p, E, r, k, g) are identified.
	(39 – 47)	$\Delta E_r(P)_p$ $\Delta E_r(P)_k$ $\Delta E_r(P)_g$ $\Delta E_r(P)_r$					
	(48 – 56)	$\Delta E_p(P)_p$ $\Delta E_p(P)_k$ $\Delta E_p(P)_g$ $\Delta E_p(P)_r$					
	(57 – 65)	$\Delta E_k(P)_p$ $\Delta E_k(P)_k$ $\Delta E_k(P)_g$ $\Delta E_k(P)_r$					
	(66 – 74)	$\Delta E_g(P)_p$ $\Delta E_g(P)_k$ $\Delta E_g(P)_g$ $\Delta E_g(P)_r$					
$E_p(P)_1$							
$E_k(P)_1$							
$E_g(P)_1$							

Source: compiled by the author of the article

As shown in Table 11, the results related to the practical aspects of deterministic factor analysis of models of the expected market price of an ordinary share and its elasticity with a neutral approach to the dividend policy of a public company as an artificial intelligence tool are reflected in a rather concise form, which at the same time simplifies the process of decomposition of the author's research and makes it more understandable to interested parties information users.

5. Discussion

Thus, the working hypothesis of this study – to consider the possibility of using as an artificial intelligence tool the calculation of the influence of factors on the level of effective indicators determined by them in models of the market price of an ordinary share and its elasticity in the context of a neutral approach to the dividend policy of a public company - the most universal method of deterministic factor analysis – the chain substitution method-was fully confirmed.

At the same time, it should be noted that the scientific results considered in this article, obtained by its author and related to the possibility of using the chain substitution method as an AI tool for calculating the influence of factors on the level of effective indicators determined by them in models of the market price of an ordinary share and its elasticity in conditions of a neutral approach to the dividend policy of a public company, described by the formulas (28-74), can be characterized as fundamentally new, having no analogues in relation to this problem.

The fundamental novelty of the author's developments is determined by the fact that a neutral approach to the dividend policy of a public company was formulated, and the underlying models (in particular, (11-16)) were developed again by the author of this article (Krylov, 2019, 2020, 2021, 2023, 2025, 2026).

Since analogs for comparison with the scientific results obtained by the author have not been found in the relevant scientific literature, it seems appropriate to focus on the advantages and limitations of using the chain substitution method and the formulas (28-74) obtained with its help in the context of a neutral approach to the implementation of the dividend policy of a public company.

The advantages are shown in the fact that:

- the universality of the chain substitution method, which implies the possibility of using it to calculate the influence of factors on the deviation of the effective indicator determined by them in any combined deterministic factor models;
- relative simplicity of the calculation method performed by the method of chain substitutions;
- in the context of a neutral approach to the implementation of the dividend policy of a public company, the chain substitution method allows you to determine the effect of the isolated influence of each factor on the deviation of the expected market price of an ordinary share of a public company and its elasticity indicators determined by it;
- the obtained formulas (28-74) can be considered as sufficiently effective means of analyzing and predicting the impact of a particular determining factor on the values of the expected market price of an ordinary share of a public company and its elasticity indicators, which makes it possible to rationalize and improve the process of managing them in the interests of all stakeholders of a public company, contributing to its sustainable development.

The restrictions are related to the fact that:

- the chain substitution method, as an element of a more general elimination method, assumes that factors change independently of each other and does not take into account their interaction;
- the amount of influence of factors on the deviation of the effective indicator varies depending on the place where a particular factor is placed in the deterministic factor model, which implies a certain sequence of calculating the influence of factors on the deviation of the expected market price of an ordinary share and its elasticity indicators with a neutral approach to the dividend policy of a public company.

Overcoming these limitations will be the subject of further research.

Thus, the use of the chain substitution method as an AI tool requires knowledge of the relationship of factors, their subordination, and the ability to correctly classify and systematize them, since the order of substitutions depends on the results of calculations of the impact on the deviation of the expected market price of an ordinary share and its elasticity indicators of the factors that determine them, while taking a neutral approach to the dividend policy of a public company.

6. Conclusions

Drawing a line under the consideration of the use of deterministic factor analysis as an artificial intelligence tool in the study of models of the expected market price of an ordinary share and indicators of its elasticity with a neutral approach to the dividend policy of a public company, it is advisable to formulate the following conclusions:

- to identify the main reasons for changes in the expected market price of an ordinary share of a public company and its elasticity indicators in terms of the market capitalization level, profit per ordinary share of a public company, the rate of profit required by investors per ordinary share of a public company, the rate of growth of the dividend per ordinary share of a public company taken constant over time, and the return on investment of a public company, it is necessary to conduct a factor analysis their models;
- since the models of the above indicators are deterministic, it is necessary to perform their deterministic factor analysis;
- these deterministic factor models are rather complex combined models, which makes it necessary to use the most universal and relatively uncomplicated method of deterministic factor analysis – the chain substitution method;
- as part of the chain substitution method, formulas have been developed to calculate the impact on the deviation of the expected market price of an ordinary share of a public company and its elasticity indicators of each of the factors that determine them;
- the results of these calculations can be used to analyze and forecast the expected market price of a public company's ordinary share and its elasticity indicators;
- practical testing of the scientific results obtained by the author suggests that they can be used as sufficiently effective means of managing the expected market price of an ordinary share of a public company and its elasticity indicators in the context of a neutral approach to the implementation of the dividend policy.

7. Directions for further research

The main directions for further development of the use of deterministic factor analysis as an AI tool in the study of models of indicators of activity of a public company in the stock market (market activity of a public company) and indicators of their elasticity with a neutral approach to the dividend policy should be highlighted:

- research of models of the dividend yield ratio of a public company and its elasticity according to the market capitalization level, the rate of profit required by investors per ordinary share of a public company, the rate of dividend growth per ordinary share assumed to be constant over time, and the return on investment of a public company;
- research of models of the dividend coverage ratio of a public company and its elasticity according to the market capitalization level, the rate of profit required by investors per ordinary share of a public company, the rate of growth of the dividend per ordinary share assumed constant over time, and the return on investment of a public company;
- research of models of the dividend yield of an ordinary share of a public company and its elasticity in terms of the dividend and profit per ordinary share of a public company, the market capitalization level, the rate of profit required by investors per ordinary share of a public company, the rate of growth of the dividend per ordinary share taken constant over time, and the return on investment of a public company;
- research of models of the quotability coefficient of an ordinary share of a public company and its elasticity for the dividend and profit per ordinary share of a public company, the ratio of dividends on its ordinary and preferred shares, the coefficient of coverage of dividends on preferred shares of a public company, the market capitalization level, the

rate of profit required by investors per ordinary share of a public company, increase in the dividend per ordinary share and return on investment of the public company;

- computerization of all the above models.

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