# DETERMINING THE COST OF EQUITY IN THE DEVELOPING STOCK MARKET OF BULGARIA: UP-TO-DATE APPROACHES AND METHODS

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## Abstract

This research is focused on one of the most problematic and debatable aspects of financial management – the estimation of the cost of equity capital on the developing stock market of Bulgaria. Each of the available methods has its own serious disadvantages and limitations, which casts doubt on the reliability and validity of the determined cost of equity. At this stage, no method has yet been proven to derive a cost of equity with sufficient certainty to achieve consensus among analysts, managers, investors and academics. This paper explores briefly the disadvantages and limitations of each of the methods, especially in the context of their use at emerging capital markets. The possibilities for finding a solution are sought mainly in improving the application of the Capital Asset Pricing Model (CAPM), as the most widely used in practice. The open issues, related to each of the input variables of the model are analyzed, with focus on the equity risk premium (ERM), mainly from the perspective of emerging and developing stock markets. At the end, a combined approach for determining the cost of equity at the Bulgarian stock market is discussed and proposed.

**Keywords:** cost of equity, risk-free rate, market risk premium, capital asset pricing model (CAPM).

JEL: G12, G15, G31

## 1. Introduction

This article builds upon earlier studies of the authors on the estimation of the cost of equity in developed and emerging stock markets. An essential part of one previous research involves the comparative analysis of the existing methods for determining the cost of equity, with the

hope of highlighting the most durable of them and its eventual application to the emerging Bulgarian capital market (Nenkov, Miteva-Boncheva, 2018). The current study focuses on the opportunities to use the existing instruments for estimating in practice the cost of equity on the Bulgarian developing stock market.

The cost of equity is, may be, the most debated issue in the field of financial management of companies, as well as in the field of the stock markets around the world. *One of the reasons* for this is that it is of extreme importance for the decision making process in the management of company finance. The cost of equity (cost of common-stock financing) is essentially the minimum *required rate of return (RRR$_E$)* by common stockholders, based on their judgment about the degree of risk, associated with their investments. This RRR$_E$ itself sets the *discount rate* applied to future cash flows from investments in common stock or other assets with a comparable level of risk. In other words, if we learn to determine the required rate of return on common stocks, we will be able to determine the RRR and the discount rate for any investment, regardless of whether it is in financial or real assets. *The other reason* for the debates on the cost of equity is that history does not know about any consensus related to the true cost of equity. The continuing discussions refer to both the methods applied in estimating the cost of equity and the specific determined values in the different cases. It can be concluded that determining the cost of equity is a task of increased difficulty.

Among the methods for determining the cost of equity capital (R$_E$ or RRR$_E$), those that follow *the risk-adjusted rate of return approach* prevail. This is explained by the fact that in this case we are looking for a required rate of return on risky investments. Modern theory and practice of financial management offer different methods for determining RRR$_E$, so that it reflects the degree of risk of investments. There are different classifications of the approaches and methods (Brigham, Gapenski, 1994; Zukin, 1990). According to James Zukin, four main methods are applied to determine the required rate of return (Zukin, 1990):

1. Buildup method (approach);
2. Yield-plus-growth method;
3. Capital Asset Pricing Model (CAPM);
4. Arbitrage Pricing Theory (APT).

A logical question is why there are more methods. Is one method not enough? Isn't there one single method more reasonable for analysts, managers and investors to navigate? The truth is that none of the above methods is reliable enough to derive and justify the true cost of equity. Each has significant disadvantages that put in doubt the required rate of return on common

stock they determine. This is one of the most important reasons for the difficulties in determining the cost of equity, mentioned above.

The current study briefly introduces into the main features of each of the methods and focuses on their weaknesses and open issues, related to their application in practice. Special attention is given to the validity of the input variables of those methods and models that are perceived and recommended as more robust. New, derivative models and variants of some of the above four methods are also presented in brief.

## 2. Problems with the practical use of the existing methods for determining the cost of equity

The detailed presentation of the various methods is made in numerous publications on the subject, including publications by the authors of the present study. Here we pay attention mainly to the open issues and disadvantages, related to their application in practice.

### Build-up method (approach)

*The first method* is **"bond yield plus risk premium"**, known in other sources as **the "build-up method"**. In this method, some risk premium is added to the rate of a low-risk security to obtain the required rate for the corresponding risky security (Zukin, 1990).

The main *disadvantages* of the method are that:

- It requires *subjective judgment* as to the amount of the firm's added risk premium;
- The premiums used based on the published data are *historical* and are used as indicators for the future;
- It excludes the influence of other factors that, according to arbitrage pricing theory, for example, are important and should be taken into account.

Ultimately, *the build-up method* is unable to offer a well-founded risk premium. As a rule, it is subjectively determined, and therefore is not recommended for use in the analysis and evaluation of serious investments.

### Yield plus growth method

***The yield plus growth method*** is also known as the ***discounted cash flow (DCF)*** *method*. The assumption is that at the equilibrium price of the common stock $P_0$, in the long-term, the actual rate of return ($R_E$) as an average value, should be equal to the required rate of return from stocks ($RRR_E$). Thus, knowing the price per share ($P_0$), and having the reason to accept it as equilibrium price, we can calculate $RRR_E$ based on a model, derived from the *discounted dividend model (DDM)*, where $R_E$ (i.e. $RRR_E$) is the unknown variable. The DDM itself is a

variant of the DCF model. When expecting a constant annual growth rate of dividends - **g**, the DDM model takes the form:

$$P_0 = \frac{DIV_1}{R_E - g}$$

Where:

$P_0$ = current market price per share of stock,

$DIV_1$ = expected dividend at the end of year 1,

$R_E$ = expected rate of return on the stock,

g = expected long-term average growth rate of dividends.

Provided an equilibrium price ($P_0$) on the market, the derivative formula of the *yield plus growth method* is as follows:

$$R_E = \frac{DIV_1}{P_0} + g$$

Simply put, according to this method, *the total rate of return on a common stock is the sum of the current dividend yield ($DIV_1/P_0$) and the expected future growth of dividends (g).*

One of *the advantages* of the *yield plus growth method* is that, unlike the other three, it is applicable to the cash flows of all types of assets, not just common stocks. We actually use this exact approach in pricing debt and equity financing, but in a variant adapted to these types of securities. Another *advantage of it* is that it is a very simple method to apply. A third *advantage* is that the analyst is not required to derive a risk premium subjectively or through complex procedures.

However, Zukin (1990) defines this method as the weakest in terms of its theoretical foundation. One of the main difficulties in applying this method is the correct determination of the future growth rate. The main problem with the model is regarding its applicability in any conditions. It is effectively *unavailable* for determining the cost of equity capital for companies that do not pay dividends and for non-public companies, whose shares are not traded on the stock exchange. It is unreliable even for public companies paying regular dividends when their shares trade in a small, nascent market, with limited trading volume. Such a market is the Bulgarian one, which is why the adequacy of the formed "market" prices of the shares is seriously questioned.

Thus, the method seems attractive and easy to use, but this only applies to large public companies whose shares are traded intensively in well-developed capital markets and which pay dividends regularly.

## Capital Asset Pricing Model (CAPM)

CAPM model can be seen as an expanded, more developed variant of *the build-up method*. In this model, the required rate of return is a function of the risk-free rate of return and the risk premium. In other words, the model is also based on the logic of the build-up method, but offers a detailed and justified mechanism for objectively determining risk premiums in each specific case. Thus, according to the CAPM, the required rate of common stock is:

$RRR_E\ (R_E) = Risk\ Free\ Rate + Beta \times (Market\ Risk\ Premium)$

Put another way, the rate of return on common stock should be equal to the return on the risk-free security plus the company's systemic risk (beta), multiplied by the market price of risk (the market risk premium).

The CAPM has been continuously criticized over the years. The major criticisms of the model are as follows:

- Some critics of the CAPM express doubts about the realism of the very basic assumptions on which the model is based (Brigham, Gapenski, 1994).
- The main criticisms are how robust is the measure of systemic risk - beta? In particular, the extent to which past betas can be used as a proxy for future betas;
- According to some authors (Grabowski, 2009), the situation after the beginning of the financial crisis of 2008 adds new challenges to the application of the model;
- The most important question regarding the CAPM remains how useful it is in explaining the returns on risky assets, i.e. for the linear relationship between the systematic risk and the rates of return of these assets;
- The results of empirical analyzes in this regard are quite contradictory;
- One of the most frequently cited studies – by Eugene Fama and Ken French of the University of Chicago, concluded that the tests did not support a positive relationship between the average rate of return and market beta coefficients (Fama, French, 1992).

## Arbitrage pricing theory

*The Arbitrage Pricing Theory (APT)* was developed by Stephen Ross in the mid-1970s. Stephen Ross is one of the critics of the Capital Asset Pricing Model (CAPM). He is also one of the authors who published empirical evidence on the unreliability of the CAPM model. APT incorporates certain risk factors into the assessment of the cost of equity capital, thereby seeking to eliminate some of the weaknesses of the CAPM by providing a link to systemic investment risk. According to Roll, Richard and Ross (Roll, et al., 1980), APT provides a solid theoretical

framework, which states that the factors involved in the return formation process, if they exist, are associated with the risk premium. The theory makes the traditional neoclassical assumptions about markets functioning in perfect competition and the absence of restrictions and transaction costs. Just as the CAPM model is derived from the assumption that random asset returns follow a multivariate normal distribution, so APT makes assumptions about the return generation process.

APT specifies several risk factors in order to provide a comprehensive definition of systemic (market) investment risk. In this sense, APT is defined as *the multi-factor analogue of the Capital Asset Pricing Model (CAPM)*.

Common risk factors can include *inflation, gross domestic product growth, political turmoil, changes in interest rates, unemployment rates, exchange rates, etc.* The coefficients *b* before the various factors determine how each asset reacts to the *j*-th common risk factor. The main challenge in using APT to value risky assets is the identification of risk factors. Among the most widely applied factors are *5 macroeconomic factors*, selected on the basis of empirical research (Roll, Richard and Ross, 1980):

- *Industrial manufacturing index*, an indicator of how well the economy is functioning in terms of the physical volume of production;
- *Short term real interest rate*, measured by the difference between the rate of return on short-term bills and the consumer price index;
- *Short term inflation*, measured through unexpected changes in the consumer price index;
- *Long term inflation*, measured as the difference between the rates of return to maturity of long-term and short-term government bonds;
- *Risk from insolvency*, measured through the difference between the norms on returns to maturity on the long term corporate bonds from rating classes Aaa and Baa.

Arbitrage Pricing Theory (APT) is pointed to as the leading alternative to the CAPM. Although APT is significantly newer than the CAPM, it has already undergone a number of empirical studies. Most research generally supports the pricing theory.

However, *a major problem* in the application of the APT model in practice remains that the theory does not offer a well-grounded and developed approach to identifying the essential common risk factors. The latter must be established in the process of formulating the specific model. The same applies to the specific coefficients ($b_{ij}$) in front of each factor, for each individual asset. Put another way, before the model can be used in practice, investors must fill

in a huge amount of missing information about the fundamental relationship between risk and expected return.

A major drawback of this multifactor model is that it was developed with insufficient theoretical guidelines and recommendations regarding the true nature of the "risk-return" relationship. It can be said that all these features of the APT model at this stage make it difficult for the wide range of investors. It is still mainly applied by a limited circle of specialized analyst companies and investment banks, which develop their own specific versions of multifactor models for different situations.

In conclusion, the following main disadvantages and difficulties in the application of APT can be outlined:

- Although APT has been applied in many empirical studies, it can be said to be an "open" theory and this is one of the main problems, namely that the risk factors are not defined, nor their number - chosen for each specific case. This greatly complicates the application of the “theory” in practice, and besides requiring very specific knowledge, skills and information, which limits the circle of those who can try to apply it, APT also takes considerable time;
- Coefficients of the risk factors are also unknown and must be determined on a case-by-case basis, which further complicates the application of the theory;
- Unlike the CAPM, APT requires the establishment of not one, but several beta coefficients and, in general, more unknowns, which significantly complicates the models;
- The method is ultimately difficult to access for the wide range of investors and analysts.

## 3. Why is the CAPM still the most widely used method?

The serious deficiencies highlighted in each of the four methods reasonably cast doubt on their ability to accurately and soundly determine the cost of equity. Possible solutions are generally sought in two directions:

- Search and development of new methods and models;
- Improving the use of some of the existing methods.

As a result of the search for a more reliable way to derive the cost of equity, new and modifications of existing methods and models are emerging. Thus, at the current stage, an

extended, updated *classification of methods for determining the cost of equity* could be proposed. It should look like this:

1) Buildup method (approach);
2) Yield-plus-growth method;
3) Arbitrage Pricing Theory;
4) Capital Asset Pricing Model (CAPM);
5) Three-factor model of Fama and French;
6) Five-factor model of Fama and French;
7) Other CAPM modifications for developed capital markets;
8) Modifications of the CAPM for emerging capital markets;
9) Other ….

It is no coincidence that most of the modifications (in the expanded classification) for the purpose of improvement were made on the basis of the CAPM model. In practice, the models under point 7 and 8 of the classification should be included here. To a certain extent, this also applies to 5 and 6 - the three-factor and five-factor models of Fama and French. They arise precisely as a result of testing the CAPM and follow its logic, adding two new factors at the company level (subsequently two more) with which they try to explain the size of the risk premium. According to Da, Guo, Jagannathan (2010), *the Capital Asset Pricing Model* continues to be the most widely used method of determining the cost of equity.

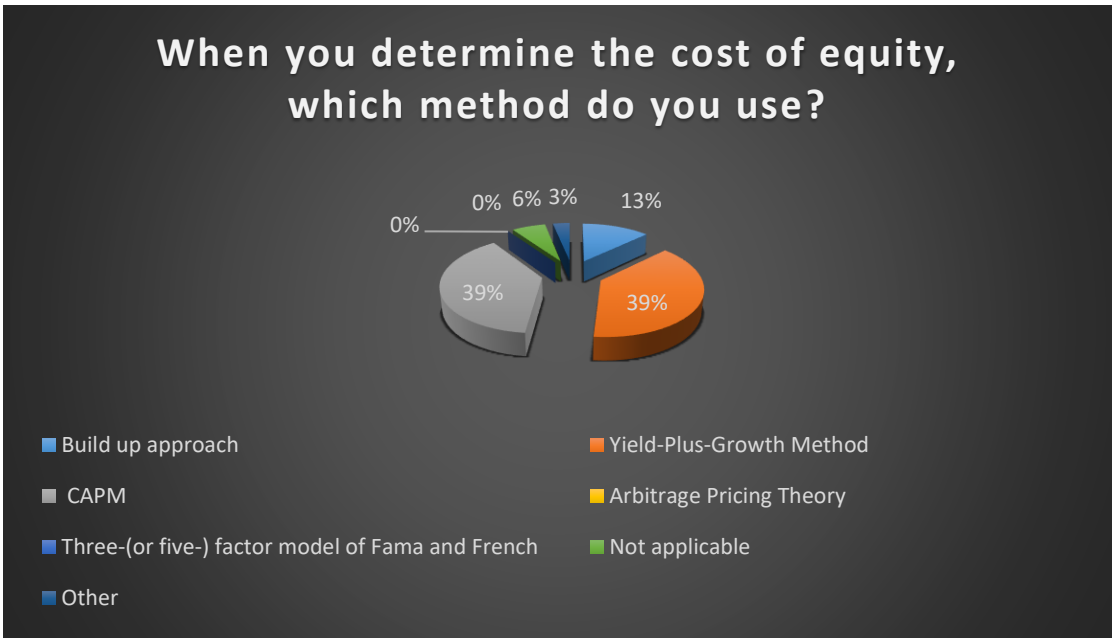
When presenting the alternative methods for determining the cost of equity ($R_E$), some serious shortcomings and problems related to the application of each of them were pointed out. This is one of the explanations for the great popularity of *the Capital Asset Pricing Model (CAPM)*. Research by Harrington indicates that the CAPM in the last one or two decades has been used in parallel with the three-factor model of Fama and French (Harrington, 2009). However, there is not enough information about any widespread entry of the latter into the practice of analysts.

It is obvious that the Capital Asset Pricing Model is not without weaknesses. It has been continuously subject to severe criticism from its inception to the present stage. This is also one of the reasons for developing the *Arbitrage Pricing Theory (APT)* - as an alternative to the CAPM. Due to its prominent shortcomings, however, APT cannot yet establish itself as a sufficiently widely used method for reliably determining the cost of equity capital.

Besides its weaknesses, the CAPM has also its serious merits, which could explain its wide popularity among analysts, appraisers and investors. The main advantages of CAPM could be summarized as follows:

- The prevailing opinion is that the Capital Asset Pricing Model as such is conceptually sound and consistent;
- The model is sometimes defined as extremely attractive on an intellectual level, as well as logical and rational;
- According to a number of recent studies, the CAPM is an acceptable model for determining the cost of capital (Da, Z., Guo, R., Jagannathan, R., 2010);
- The CAPM model is also based on the build-up logic, but offers a detailed and justified mechanism for the objective determination of risk premiums in each specific case;
- The theory on which the model is built is clear and sound, despite some obstructions regarding its assumptions.

**Figure 1**:




**Source:** Own research of the authors

A survey among financial managers and financial experts of companies in Bulgaria from 2017 shows that the most used methods are CAPM (39% of respondents) and Yield plus growth method (39% of respondents) (Fig. 1). Interestingly, the CAPM is preferred by representatives of the financial sector (50% of them), and the other method is preferred by representatives of the real sector (slightly more than 50%). Multifactor models are not specified, which is also not

surprising, given their limitations discussed above and the specific resources and skills required for their application.

## 4. Open issues with the application of the CAPM at the present stage

Possibilities in relation to improving the use of existing methods are sought above all along the lines of APT and CAPM. Considering the lack of a solid theoretical basis and the difficult accessibility of APT, CAPM seems more promising in this regard. After all, most empirical studies confirm the correlation between the rate of return of portfolios and their systemic risk (Da, Guo, Jagannathan, 2010). For example, Sharpe and Cooper (1972) found a positive correlation between rate of return and risk, although not completely linear. Grundy, and Malkiel (1996) also argue that the beta coefficient is a very useful measure of risk in down markets, i.e. just when it is important and needed.

The accumulated in-depth studies and conclusions regarding the model as a whole and regarding the calculation of its individual components (variables) are a very important prerequisite for significantly improving the way of its application. In this sense, successfully predicting the cost of equity (required rate of return) using the CAPM is primarily a function of its correct use. The improved application of the CAPM necessarily goes through the refinement of the three input variables: *the risk-free rate, the market risk premium* and *the systemic risk (beta)*, because they are the main reason for the weaknesses of the model and for the criticisms towards it.

### *Risk-free rate*

Damodaran (2008) states two main criteria that risk-free assets must meet:

- Absence of default risk;
- Absence of reinvestment risk.

Regardless of the available discussions, it can be said that regarding ***the risk-free rate*** there is some consensus among specialists in the theory and practice of the leading capital markets. Thus, if we use the CAPM, based on the risk-free rate, the beta coefficient, and the market risk premium of the US developed stock market, it would be most appropriate for ***the risk-free yield to be the yield on long-term government bonds (10-Year T-Bonds)***. In the original version of the model the yield used was that of T-Bills. The use of the 10-Year T Bond yield leads to significantly better prediction of the cost of equity, more in line with what is indicated by other market analyses. It is also much more in line with long-term predictions under the model.

### *Beta coefficients*

One of the most criticized elements of the CAPM used to be the ***beta coefficient***. There are multiple approaches to determining beta, depending on the sources used, the historical beta being practically the easiest to calculate. It is defined as the regression of the return of a given stock against the return of a given market index. These are the so-called *regression beta coefficients* (*or historical betas*).

It is this approach that is the main reason for the criticism of the beta coefficient. Numerous studies on the stability of beta have generally concluded that this measure of risk is not robust across individual stocks. They change over time as a result of changing the nature of the business, restructuring and changing the capital structure. This makes beta coefficients from past periods unreliable indicators of systemic risk in the future.

At the same time, however, the same studies found that beta coefficients by *sector (industries)* and beta coefficients of *portfolios* are stable over time. Thus, a suitable way to significantly improve the reliability of the results of applying the CAPM is by using *sectoral regression beta coefficients*. When estimating beta for an emerging market company that is not public, we may use average beta data for companies in the same sector for which information is available. In case there are prerequisites not to use local analogues, the estimated sector betas for US analogue companies can be applied, because they have more comprehensive data (Pereiro, 2002).

An alternative way of improving the model in this regard is by deriving and using the so-called *fundamental beta coefficients* of the respective companies (Damodaran, 2012).

### *Market risk premium*

Regarding the third element (the third input variable) of the CAPM – ***the market risk premium***, it is difficult to assume that there is a consensus. **The question of what is the correct market risk premium remains one of the most controversial in the field of financial management and continues to cast doubt on the accuracy of the calculated cost of equity.**

The market risk premium can be determined using three widely advocated methods (Damodaran, 2012): *The first* is by surveying subgroups of investors, managers and academics about their expectations of the expected risk premium. *The second* method is based on historical data, assuming that the future will be like the past. *The third* method is based on anticipatory judgments, which attempt to predict the future.

Welch surveyed 226 economists in 2000, including investors, managers and academics about the level of the expected market premium (Welch, 2000). On average, economists then predicted a risk premium of around 7% for a 10-year horizon and between 6% and 7% for a 1

to 5-year horizon. The evaluations of the individual respondents varied extremely widely - from the pessimistic 2% to the optimistic 13%, which showed that this method was highly dependent on individual attitudes.

Calculating the market risk premium based on **historical data** is one of the most preferred and used methods in practice. At the same time, the values obtained can again vary greatly. Three main reasons can be inferred for the resulting differences in historical market premium values:

- *The length of the historical period* - we would make better judgement regarding the future values, if we use longer historic period, rather than shorter, although more recent period;
- Selected *risk-free asset* - we could use short-term or long-term government securities in calculating the market risk premium. It would be best to choose risk-free assets with a maturity close to that of the investment in the calculations. In the practice of the last two or three decades, it has been accepted to use long-term government securities rather than short-term ones (as outlined above).
- *Averaging method* - in the calculation of the historical market premium for risk, two average values are mainly used - *the arithmetic mean* and *the geometric mean*. Copeland, Koller and Murrin (2000) consider the arithmetic mean to be more appropriate, as it determines the same probability of the fulfillment of the different development options, while the geometric mean is more accurate for past results, but not suitable for predicting the future. On the other hand, Damodaran (2002) defends the thesis that the geometric mean is more appropriate, because it reflects our desire for a risk premium that we can use for the long-term.

The arithmetic mean is always higher than the geometric mean, and the difference between them becomes larger as the variance of the rate of return increases. The longer the unit interval becomes, the smaller the arithmetic mean becomes and the closer it gets to the geometric mean. Accordingly, Copeland, Koller and Murrin (2000) recommend that the market risk premium should be determined by the calculations on a 2-year interval basis.

Koller, Goedhart, Wessels (2005) calculate a market risk premium for the period 1903-2003 for the US market between 6.2%, calculated as an arithmetic mean and 4.4%, calculated as a geometric mean. This means significant difference of about 2 percentage point. Based on another empirical research, Pratt and Grabowski (2008), in turn, conclude that the market risk premium is in the range of 4% to 6%.

An alternative to the historical market risk premium is *forward thinking*, for predicting the future. One way to do this is by calculating the market portfolio's expected rate of return - $\boldsymbol{E(R_m)}$, by adding analysts' consensus forecasts for the dividend growth rate (***g***) of the S&P 500 index to the index's dividend yield - $\boldsymbol{DIV/P_0}$. In other words, we arrive at the familiar "yield plus growth" method. We then subtract the risk-free rate from the expected market rate of return, thus calculated, and obtain the predicted *market risk premium* (***ERP***). The premium calculated in this way is actually the so-called by Aswat Damodaran ***implied risk premium*** *for common stocks* ***(implied equity risk premium - ERP)*** (Damodaran, A, 2008). To do this, he constructed a two-stage discounted dividend model for the broad index S&P 500.

The opinions presented so far reflect only a small part of the views on the correct market risk premium. One of the most extensive and impressive studies on the matter is that of Pablo Fernandez of 2006 (Fernandez, 2006). According to him, one of the reasons for the differences is that the term *risk premium for common stocks (equity risk premium – ERP)* is used to denote four different concepts:

1) Historical risk premium (historical equity premium) – HEP;
2) Expected risk premium (expected equity premium) - EEP;
3) Required risk premium (required equity premium) – REP and
4) Implied risk premium (implied equity premium) – IEP.

The Capital Asset Pricing Model assumes that EEP and REP are equal. Fernandez believes that the historical premium is easily calculated and is the same for all investors. However, the same does not apply to the other three – EEP, REP, IEP. They are different for different investors and are unobservable. A serious problem is that there is no uniform implied premium (IEP) for the market as a whole. Different investors have different IEP and use different REP.

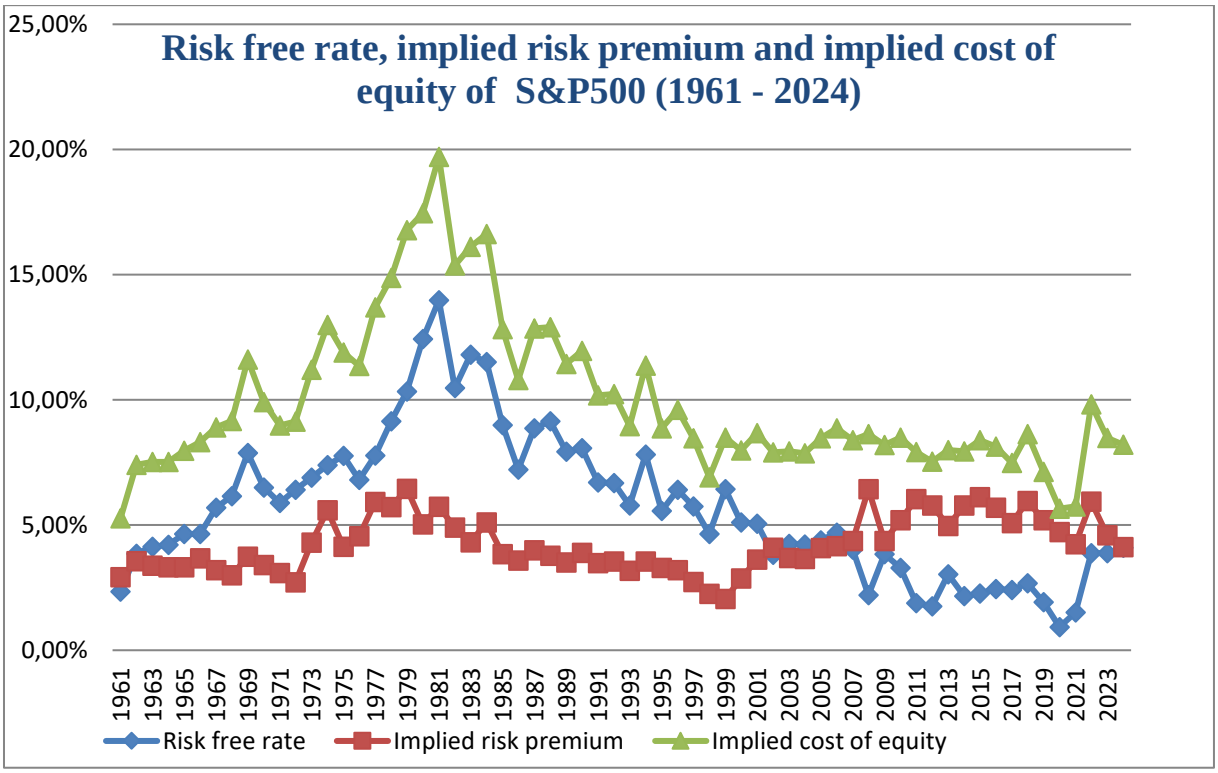
Pablo Fernandez surveys all the major authors and textbooks on finance and business valuation and finds great diversity in both the interpretation and the size of the market risk premium used. In their study from 2011, Fernandez, Aguirreamalloa, and Corres (2011) conducted a survey among three groups of participants in the process of analysis and determination of the cost of capital: 1) *professors of economics and finance*, 2) *analysts, and* 3) *companies*. Questions were sent to 19,500 email addresses, from which 5,731 responses were received. From them it is clear that the average used market risk premium for the USA in 2011 was 5.5%. The standard deviation was 1.7%. Accordingly, the average premium used by professors was 5.7%, analysts – 5.0%, companies – 5.6%.

These studies by Pablo Fernandez continue annually until present and some results of the most recent one are shown in Table 1. The studies confirm the lack of consensus among

analysts, investors and academics regarding the market risk premium. Another important feature is that professors mainly adhere to *the historical risk premium* (HEP), while practitioners more often prefer *the current implied* risk premium (IEP).

Figure 2 presents the risk-free rate, implied risk premium and implied cost of equity of the S&P 500 for the period 1961-2024. The figure shows the significant year-to-year variation of the current (implied) risk premium, the current risk-free rate, and the current cost of equity of the US S&P 500 index for the period 1961-2024. This is the reason for the problem of representativeness of current input variables when forecasting the cost of equity over a long future period.

**Figure 2:**

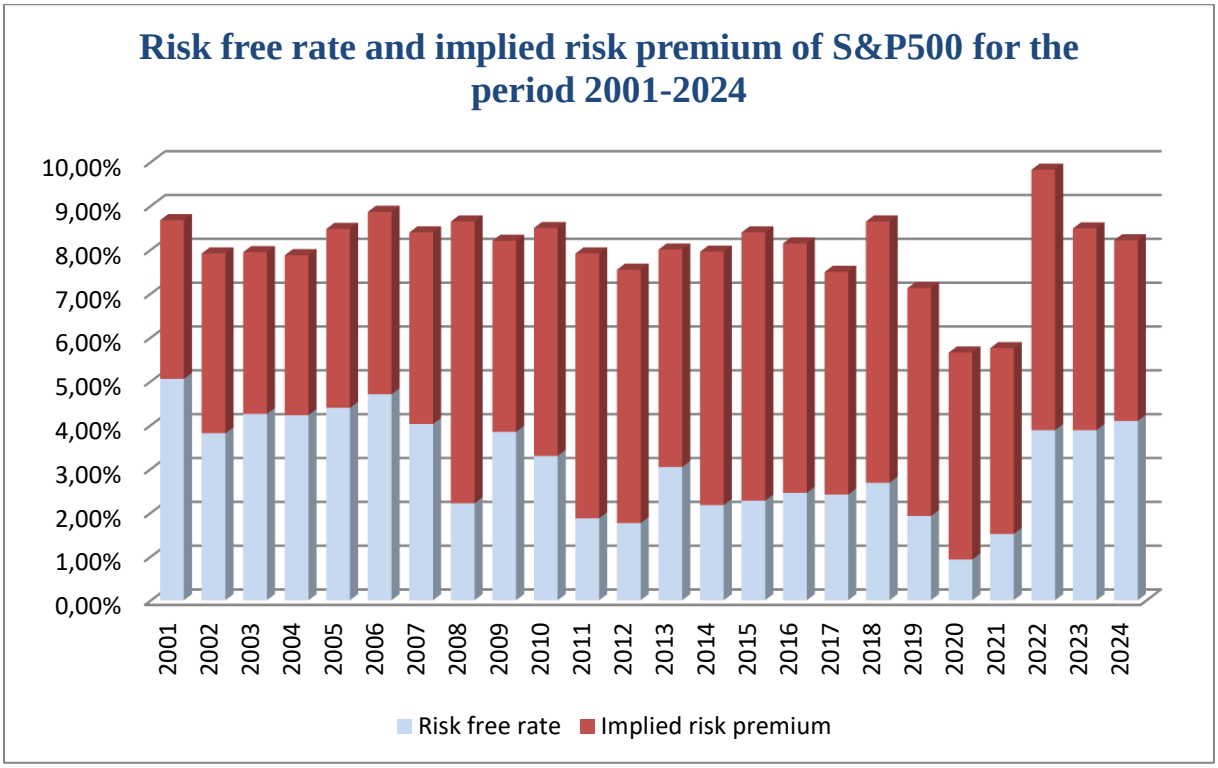



**Source:** Figure developed by the authors

Data: http://pages.stern.nyu.edu/~adamodar/ , (15.10.2024)

Figure 3 also presents the risk-free rate, implied risk premium and implied cost of equity of the S&P 500, but it focuses on the period from the beginning of the 21st century until August 2024. The implied cost of equity during this period ranges from 5,65% at the end of the pandemic year 2020 to 9,82% at the end of 2022. These differences are mainly due to the fluctuations of risk-free rates, and to a lower extent they are due to fluctuations of equity risk premiums. The current cost of equity, as of August 2024, is 8,21%.

**Figure 3:**




**Source:** Figure developed by the authors

Data: http://pages.stern.nyu.edu/~adamodar/ , (15.10.2024)

Table 1 provides today's summarized picture (as of 2024) of historical and current risk free rates and market risk premiums for the S&P 500. During the whole period after the Global Financial Crisis, with the exception of the last two years, the current expected return used to be significantly lower than historical average levels, due to the very low interest rates. The numbers in Table 1 indicate that historic average return is higher than current expected return. The arithmetic average historic return is the highest – 11,66%. The geometric average is 9,80% and is very close to the return derived from the latest survey of Pablo Fernandez (for 2024) of 9,60%. The average of the monthly expected returns from January 2008 to August 2024 is 7,94%, which is very close to the current expected return as of August 2024 of 8,21%.

**Table 1: Risk Free Rate, Market Risk Premium and Market Return of the S&P 500**

| | Period | Risk Free Rate | Risk Premium | Market Return |
|---|---|---|---|---|
| Arithmetic Average Historical Return | 1928-2023 | 4,86% | 6,80% | **11,66%** |
| Geometric Average Historical Return | 1928-2023 | 4,57% | 5,23% | **9,80%** |
| Pablo Fernandez - Survey | 2024 | 4,10% | 5,50% | **9,60%** |
| Average of Monthly Expected Returns | 2008-2024 | 2,51% | 5,43% | **7,94%** |

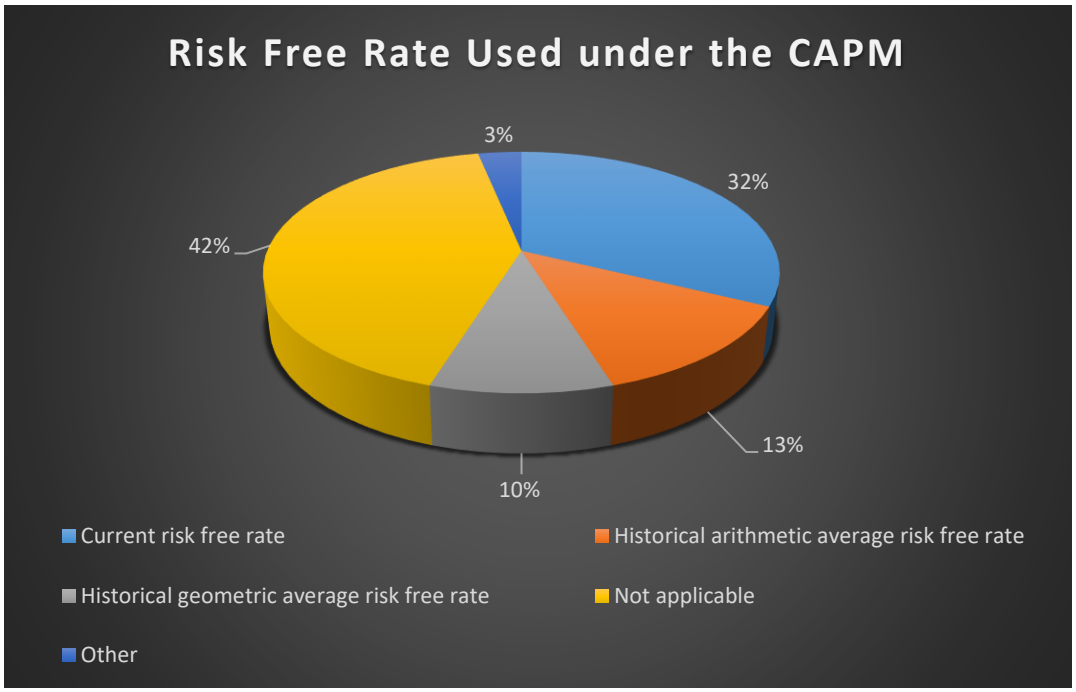
| | | | | |
|---|---|---|---|---|
| Current Expected Return | Aug 2024 | 4,09% | 4,12% | **8,21%** |

Source: Calculations of the authors

https://pages.stern.nyu.edu/~adamodar/

Fernandez, et. al., 2024

**Figure 4:**




**Source:** Own research of the authors

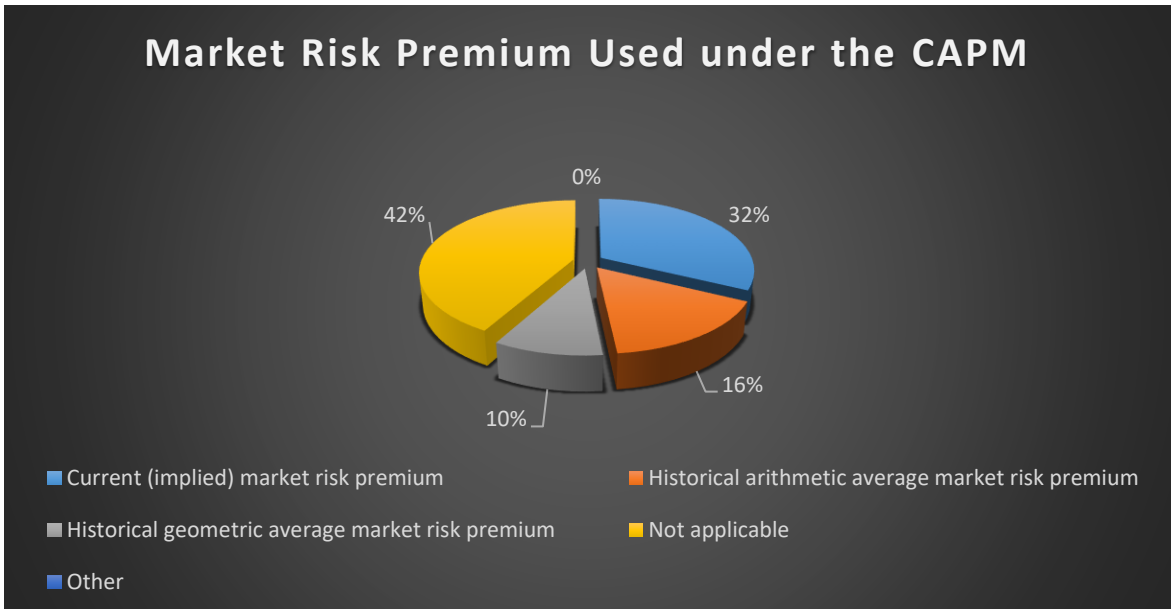
The survey among companies in Bulgaria from 2017 also confirms that there is a strong differentiation of opinions on the risk free rate, risk premium and cost of equity. In terms of choosing between historical arithmetic mean, historical geometric mean and current market premium, the preference is for the current, although not so strongly. Figure 4 shows that 32% of respondents prefer to use the current risk free rate, 13% use the historical arithmetic mean, and 10% use the historical geometric mean, 3% answered "other". The remaining respondents - 42%, are actually those who do not use the CAPM.

Figure 5, which illustrates the different preferences regarding the market risk premium, shows about the same picture: 32% of respondents trust the current market risk premium, 16% use the historical arithmetic mean, and 10% use the historical geometric mean. The remaining respondents - 42%, are again those who do not use the CAPM.

One of the features of equity valuation in the capital markets from the global financial crisis until 2022 was that the current cost of capital was strongly favored, i.e. current risk-free rate

plus current risk premium. One of the leading reasons for this was that the current implied cost of equity during this period was significantly lower due to the low interest rates. This helped a lot the justification of increasing stock prices and market ratios, and the record high stock-index levels during the period.

**Figure 5:**



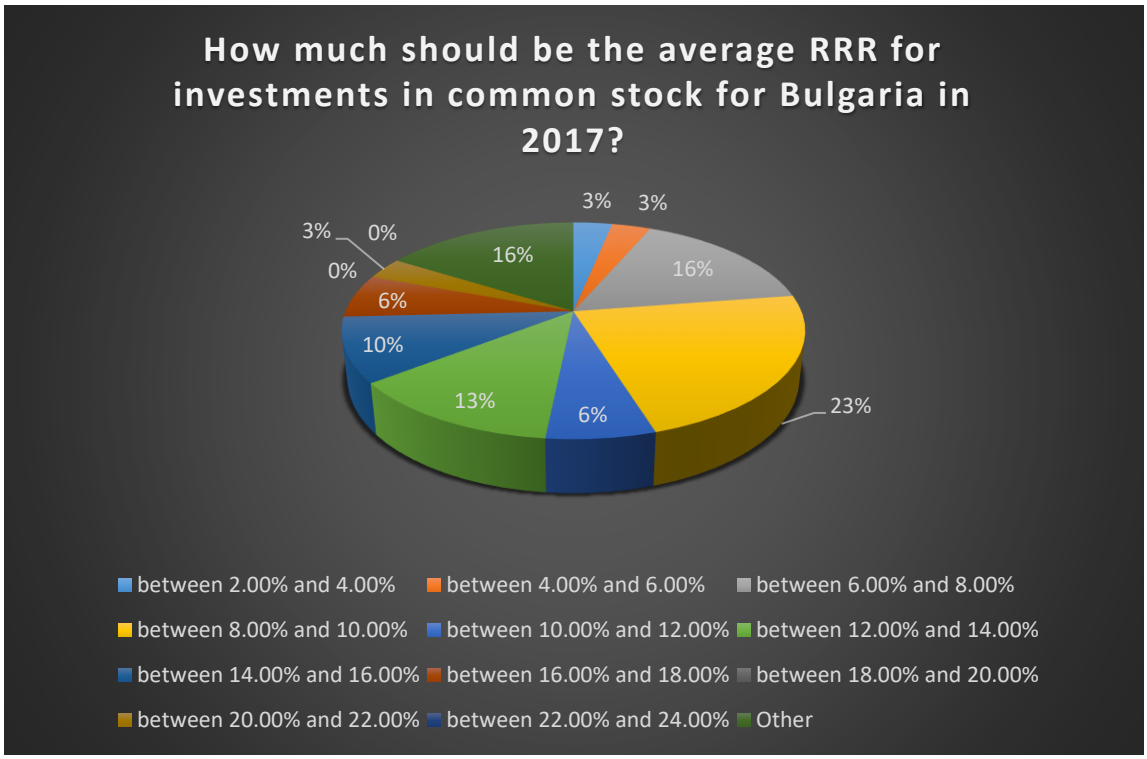

**Source:** Own research of the authors

## 5. A practical CAPM-based approach for the estimation of the cost of equity for the developing stock market of Bulgaria in 2024

It is clear that estimating the cost of equity in developed stock markets is a task of increased difficulty. This difficulty is even greater when we talk about determining the cost of equity in emerging or developing stock markets, such as Bulgaria. These markets are considered by investors to be with higher uncertainty and higher risk. The opinions regarding the true cost differ significantly and the debates are normally more intensive.

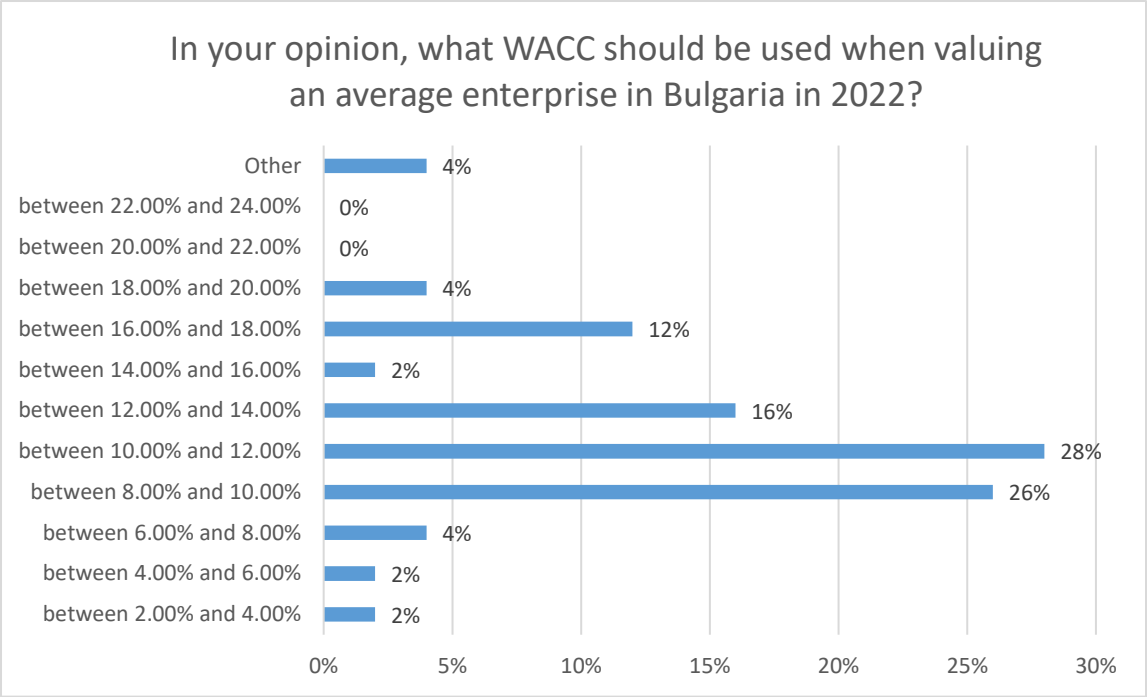
This can be seen on Figures 6 and 7. Figure 6 illustrates answers on a survey among financial experts and directors in Bulgaria in 2017. The question is: “How much should be the average RRR for investments in common stock in Bulgaria for 2017?” Figure 7 illustrates answers on a survey among appraisers of enterprises and financial assets in Bulgaria in 2022. The question is: “In your opinion, what WACC should be used when valuing and average enterprise in Bulgaria in 2022?”. The two figures show the huge diversity of opinions about the cost of equity and weighted average cost of capital (WACC) respectively. The answers are split along a broad range of values in each of the two figures, starting at 2.00% and ending at 24.00%.

**Figure 6:**




**Source:** Own research of the authors

**Figure 7:**




**Source:** Own research of the authors

Most of the emerging and developing markets have very short history. Some of them, like the Bulgarian stock market, are also very small and with low intensity of trade. The stock prices on these markets are not representative enough for the value of stocks, and the derived statistical data, needed to apply correctly the CAPM, is not quite reliable. The direct application of the CAPM on the basis of this local data is not recommended (Damodaran, 2012). A more sophisticated approach can be used, involving (Damodaran, 2012):

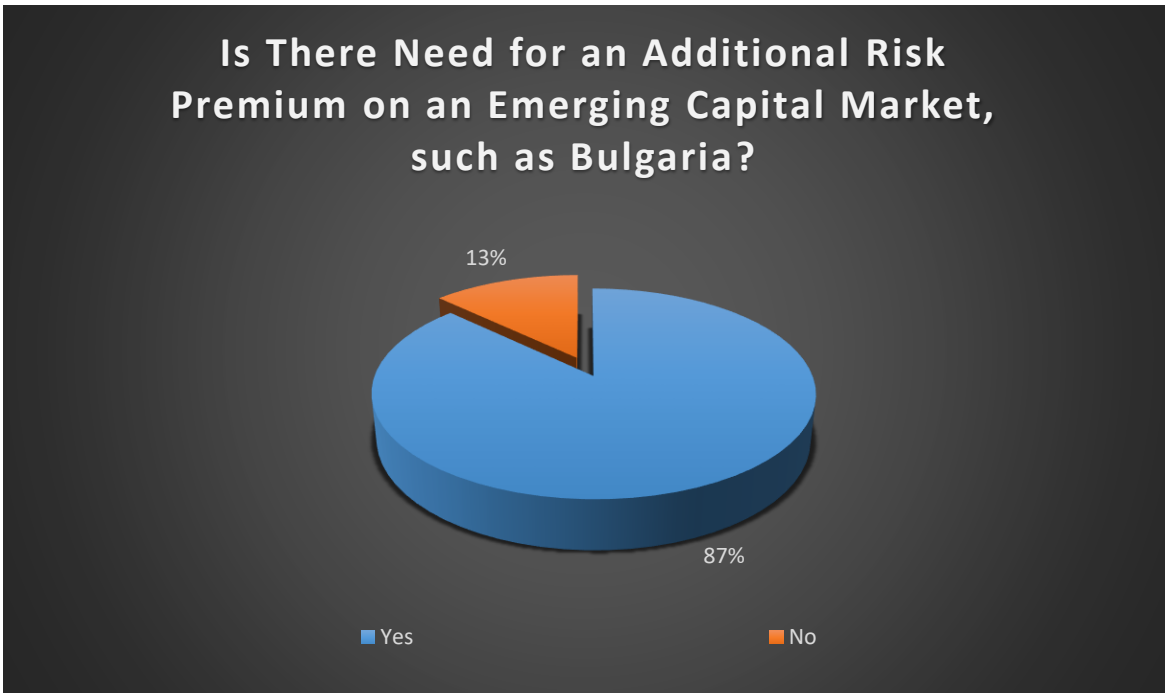
1/ Apply the CAPM on the basis of a mature stock market, such as US market or other.

2/ Estimate and add an appropriate country risk premium for the respective emerging market.

3/ Add eventually specific risk premium, such as size premium, industry premium or other if appropriate.

There are controversial opinions with regard to the need of country risk premiums or other additional premiums. The arguments in favor of such premiums seem sound enough, since the perception of international investors about emerging markets is one of higher uncertainty and risk. Within the 2017 survey, 87% of the interviewed experts confirmed the need for an additional risk premium on the emerging capital market of Bulgaria.

**Figure 8:**




**Source:** Own research of the authors

With regard of the above, one possible reliable approach to the derivation and the justification of the cost of equity for the Bulgarian stock market is demonstrated below. It takes into account the fact that the Bulgarian capital market is a developing one. The approach involves the capital asset pricing model (CAPM) to determine the cost of equity in a *mature stock market* (in this case US market). A ***country risk premium*** is added for Bulgaria, plus a *specific risk premium* for the relatively smaller size of companies in Bulgaria (*size premium*). The country risk premium itself is a function of the spread on internationally traded BG government bonds and a multiplier, equal to the ratio between the standard deviation of stocks and the standard deviation of bonds on emerging markets. Data is taken from the website of Prof. Damodaran (Damodaran, 2024) and from 2018 Ibbotson Risk Premia Over Time Report (Morning Star, 2018). In this case, long-term geometric average for the risk-free rate and for the equity risk premium are used – 4,57% and 5,23% respectively. Beta for the market is equal to 1. The spread on BG bonds at the start of 2024 is 1,74% and the multiplier is 1,34. Given the average market capitalization of the BGBX 40 companies, a corresponding size premium of 3 to 4% would be appropriate (3,5% used in this case).

Thus, the cost of equity (RE) for the average public enterprise in Bulgaria in 2024 is equal to:

RE = Risk free rate (USA)

+ Beta × Equity risk premium (mature market (USA))

+ Spread on BG government bonds × Multiplier

+ Specific premium for the smaller size of companies in Bulgaria =

= 4,57% + 1,0 × (5,23%) + 1,74% × 1,34 + 3,00% = 9,80% + 2,33% + 3,50% =

= 15,63%

The approach is illustrated in more detail in Table 2:

**Table 2: Estimating the cost of equity for the market portfolio in Bulgaria in 2024**

| Position | Indicator | Value |
|---|---|---|
| 1 | Risk free rate - 10 Year US T-bonds yield – $R_f$ | 4,57% |
| 2 | Market risk premium (ERP) - US market - (Rm - Rf) | 5,23% |
| 3 | Beta with leverage for the sector (in this case – the US market portfolio) – $\beta_L$ | 1,00 |
| | | |
| 4 | Equity risk premium (ERP) for sector (in this case the US market) - $\beta_L$ × (Rm - Rf) | 5,23% |
| 5 | **Cost of equity for the sector in USA (in this case the market)** | **9,80%** |
| 6 | Default spread on BG government bonds | 1,74% |
| 7 | Multiplier emerging markets (st.dev of stocks/st.dev of bonds) for 2024 | 1,34 |
| 8 | Country risk premium for Bulgaria (p.6 x p.7) | 2,33% |
| 9 | Specific risk premium for the smaller size of companies in Bulgaria | 3,50% |
| 10 | **Cost of equity for the market portfolio in Bulgaria** | **15,63%** |

Source: Calculations of the authors

https://pages.stern.nyu.edu/~adamodar/

## Conclusion

The deeper the research into equity pricing methods, the more arguments are made that no single method is good enough. CAPM emerges as the most promising. The updated classification of methods also points in this direction. This is not because the model is without serious weaknesses, but because of the practical limitations and shortcomings of alternative methods. Most of the disadvantages of the CAPM can be overcome, including through the way of derivation of beta coefficients. The main problem with the application of CAPM that still remains, is the multivariate calculation of the market risk premium - current, historical arithmetic average or historical geometric average. This leads to serious differences in the resulting cost of equity. There is still no consensus among analysts, academics and managers on this issue.

With regard to emerging markets, the direct application of the CAPM (as well as other methods) is problematic and is not recommended. The local statistical data from these markets,

used for the models, is not quite representative and is often very misleading, because of short history, small size, insignificant trade volume, etc. of the market. An alternative approach is recommended, which is demonstrated on the example of the Bulgarian developing market. Within this approach, the CAPM is applied for a mature capital market (US market), a country risk premium, and a specific risk premium are then derived and added for the developing market of Bulgaria.

## Bibliography


Brigham, Eugene F., Louis C. Gapenski. 1994. Financial Management - Theory and Practice, The Dryden Press.

Copeland, Tom, Tim Koller , Jack Murrin. 2000. Valuation – Measuring and Managing the Value of Companies, John Wiley & Sons, New York.

Fama , Eugene, Ken French. 1992. The Cross-Section of Expected Stock Returns, Journal of Finance, June 1992, pp. 427-465.

Grabowski, RJ 2009. Cost of capital estimation in the current distressed environment, Journal of Applied Research in Accounting and Finance, 4(1), 31–40.

Grundy, Kevin, Burton Malkiel . 1996. Reports of Beta's Death Have Been Greatly Exaggerated, Journal of Portfolio Management 22, no.3 (Spring 1996), p. 36-44.

Damodaran , Aswath . 2012. Investment Valuation - Tools and Techniques for Determining the Value of Any Asset, John Wiley & Sons, New York.

Damodaran , Aswath . 2008. What is the risk-free rate? A search for the Basic Building Block, Stern School of Business, New York University

Fernandez, P., Garcia de la Garza, Fernandez, L., 2024. Survey: Market Risk Premium and Risk-Free Rate used for 96 countries in 2024

Koller , T., Goedhart , M., Wessels , D. 20 1 5 . Valuation – Measuring and Managing the Value of Companies, John Wiley & Sons, New York

Nenkov, D. 2012. Dynamics of capital markets and its impact on the cost of equity, Verslo ir law aktualijos / Current Issues of Business and Law, ISSN 1822-9530 print / ISSN 2029-574X online, 2012, p.370

Nenkov, D., Miteva-Boncheva, D., 2018. Sravnitelen analiz na metodite za opredelyane cenata na sobstvenia capital (Сравнителен анализ на методите за определяне цената на собствения капитал), Ikonomicheski i socialni alternativi (Икономически и социални алтернативи), 3, 2018 г., pp. 5-18, Sofia.

Pereiro, Luis E. 2002. Valuation of Companies in Emerging Markets: A Practical Approach, John Wiley & Sons.

Pratt, S., Grabowski, R. 2008. Cost of Capital: Applications and Examples, 3 rd ed., USA, John Wiley & Sons

Roll, Richard, and Stephen A. Ross. 1980. "An Empirical Investigation of the Arbitrage Pricing Theory." Journal of Finance 35, no. 5 (December): P. 1075

Sharpe, William F., Guy M. Cooper. 1972. Risk-Return Classes of New York Stock Exchange Common Stocks: 1931-1967, Financial Analysts Journal, March-April, 1972, pp. 46-54.

Welch, I., 2000. View of Financial Economists on the Equity Premiums and on Professional Controversies, Journal of Business, 501-537

Zukin , James H. 1990. Financial Valuation: Businesses and Business Interests, WGL

Web sources:

Damodaran , A. 2008. http://pages.stern.nyu.edu/~adamodar/ , (Accessed 20 May, 2016)

Fernandes , P. 2006. The Equity Premium in Finance and Valuation Textbooks, SSRN, WP No657 http://hq.ssrn.com/rankings/Ranking_display.cfm?TRN_gID=10&redirectFrom=true , (Accessed April 2, 2012)

Fernandez, P., Aguirreamalloa , J., Corres , L. 2012. US Market Risk Premium used in 2011 by Professors, Analysts and Companies: a Survey with 5,731 Answers, SSRN-id1805852, http://hq.ssrn.com/rankings/Ranking_display.cfm?TRN_gID=10&redirectFrom=true , (Accessed April 15, 2013)

Harrington, S. (2009). Cost of capital for pharmaceutical, biotechnology, and medical device firms, from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1512938 , ( Accessed Oct. 2, 2012)

Da, Z.; Guo , R.; Jagannathan , R. (2010). CAPM for estimating the cost of equity capital: Interpreting the empirical evidence, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1571299 , (Accessed March 11, 2012)

Data sources:

Morning Star, 2018 Ibbotson Risk Premia Over Time Report

Damodaran, 2024, https://pages.stern.nyu.edu/~adamodar/