Assessing Discount Rate for a Project Financed Entirely with Equity Capital

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Abstract. *Estimating discount rate for an investment project is one of the most challenging tasks in capital budgeting. In this paper we discuss different kind of models for cost of equity capital proposed in finance literature (static CAPM, conditional CAPM, APT, build-up model), focusing especially on advantages and disadvantages of using each of them. In the final section, we estimate the discount rate for a certain project financed entirely with equity capital, using a version of build-up model.*

Key words: capital budgeting; discount rate; cost of equity capital; risk-return models; build-up models.

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Introduction

Investment decision has major consequences for the future development of a company. Assessing a project under uncertainty may be an extremely complex task. Uncertain future events which could affect the entire economy, a business or a project, lead to variable cash flows, which have different values that the projected ones under certainty, in a deterministic environment.

An investment assumes a capital expenditure at the present moment, hoping that it will generate income streams that increase the value of the firm. In this respect, investment analysis must be extremely rigorous, to be able to reveal if earnings are big enough to justify the capital expenditure, according to the level of risk assumed by investor.

Risk consists of possibility that an unfavorable state of nature appears and determines variance of future financial flows. It may be seen from three different perspectives (Halpern, Weston, Brigham, 1998, p. 499):

- *individual risk* – it is the risk induced by the project if this is the only project of the firm and the company equity is the only security owned by investor;
- *firm risk* – it is the supplementary risk generated by a project for the investor who hold the company as a portfolio of projects, each of them having an individual specific risk;
- *market risk* – it is a part of project risk if the firm is a portfolio of projects and investor owns a diversified portfolio of many companies.

Individual risk and firm risk can be diminished through diversification, while market risk is a systematic one. It appears no matter the diversification level and

cannot be decreased. The cost of capital or discount rate catches the risk of a project and it is defined as "the expected rate of return that the market requires in order to attract funds to a particular investment"[1].

Beside cash flows estimation, assessing discount rate is very important for Discounted Cash Flows method (DCF). We concisely depict further on some models for appraisal the cost of equity capital, highlighting the advantages and disadvantages for each of them.

Growth models

There are three categories of growth models: single-stage, two-stage and three-stage models.

Single-stage growth model (or Gordon model) presumes that investment is expected to produce stable financial streams, which increase from a period to another with a stable rate, for a very long time. Two-stage model separates the time interval into two periods: for the first period, we are not able to forecast stable income streams, while in the second period cash flows will enhance at a constant sustainable rate. The three-stage model establishes three development steps. In the first period, the growth rate of financial flows equals the average growth rate of firm profits. Companies with high growth rates attract new competitors; thus, in the second period, enhancement is limited to the growth level of industry. However, industries with high returns get strong competition, which determines a cut in earnings. Therefore, after the first two stages, the growth rate will stabilize in long run to the level of the growth rate for the hole economy.

These types of models have some disadvantages. First, the result is a cost of equity capital, used as discount rate only for those projects that are all-equity financed. Second, the assumption of constant growth rate in perpetuity in the Gordon model is not reliable. Third, historical growth rates are not stable for long periods, thus they do not equal the current or the projected growth rates.

Capital asset pricing model and its extensions

Sharpe (1964) and Lintner (1965) developed the standard version of Capital Asset Pricing Model (from now on CAPM), which states a linear relationship between the rate of return required by investors and the specific risk for an asset. Expected return $E(R_i)$ in CAPM represents in fact the cost of capital for a project entirely financed with equity: $E(R_i) = R_f + \beta_e \times (E(R_M) - R_f)$, where:

$\beta_e = cov(R_i, R_M)/\sigma_M^2$ is the volatility of equity capital, R_f stands for the risk free rate and $E(R_M)$ is the expected rate of return for the market portfolio (often assimilated with a market index).

The CAPM presumes some simplified assumptions[2] and that is why there are certain limits for using it. Beta estimation is done through a regression of historical returns for the analyzed asset on historical returns of market index. This procedure implies some inconvenient: the period chosen for computing historical returns (a longer period offers more information, but implies more changes in the structure of risk), frequency of data (annual, monthly or daily quotations), market index or other portfolio used for R_M (for transnational investments, for example, it is difficult to say which is the market index that we must use).

It is well known that CAPM roused many controversies. Does beta represent a good measure of risk and is there in deed a linear relationship between beta and expected return?

Black, Jensen and Scholes (1972) tested CAPM and found that assets with low beta had superior returns than returns assessed through CAPM, while assets with high beta performed worse than expected according to CAPM.

Black (1972) built an alternative to classic CAPM by eliminating one restrictive hypothesis. He presumed that investors do not have access to borrow funds at risk free rate and found that return for an financial asset is better explained by a two-factor CAPM (R_M and R_Z), called CAPM with substitute portfolio. Expected return for portfolio Z (minimum variance zero-beta portfolio Z is uncorrelated with market portfolio $\sigma_{ZM} = 0$) replaces the risk free rate when it can not be identified: $E(R_i) = E(R_Z) + \beta_i \times [E(R_M) - E(R_Z)]$. Merton (1973) developed an intertemporal CAPM that succeeded to explain the discrepancies discovered by Black, Jensen and Scholes in their study from 1972. He obtained a simple formula for rate of return, under the assumptions of autocorrelation between cash flows, while interest rate and market price of risk are unchanged. Its author did not test the model.

Roll (1972) said that CAPM is not testable because market portfolio is not observable. The previous tests were not correct or conclusive because the model used an approximation for market portfolio (a market index, but not all assets quoted in a financial market). Even beta, as a measure of risk, depends on how the market portfolio is chosen, which means that the same asset may have different beta for two investors, if they chose two different proxies for market portfolio.

Chan and Chen (1988) concluded in their study done for period 1949 – 1983 that a pricing model with one factor (CAPM) does not describe entirely the risk – return relation, but can not be rejected either for a model with two factors (firm size – ln(MV) beside return for market portfolio).

Starting with these results, Fama and French (1992) performed a new study, for period 1963 – 1990, and they found that linear relationship between average return and beta disappears, while firm size explains an important share of changes in rate of return. The two authors synthesizes in their paper previous results regarding other factors that influence cross-section average return, such as: firm size – Banz (1981), leverage – Bhandari (1983), E/P (price earning ratio) – Basu (1983) or BM (book-to-market value) – Stattman (1980) and Rosenberg, Reid and Lanstein (1985). Fama and French tested some models with various combinations of these factors. They ascertained that only size and BM significantly explain the cross-section average return, while E/P and leverage provide redundant information. They use the following model to asses the rate of return for a financial asset: $E(R_i) = \gamma_0 + \gamma_1 \times \ln(MV) + \gamma_2 \times \ln(BM)$.

The model becomes difficult to use for those companies that were recently quoted or are not quoted at all. In this situation, beta for traded companies in the same industry (with a similar structure for economic and financial risk), corrected with leverage, could be used as a proxy for risk assumed by investors in non traded firms. "Bad news" came from Myers and Turnbull (1977). They considered that beta is influenced by many factors: it depends on relation between forecasting errors for cash flows and forecasting errors for market return, it depends on economic life of assets, nature and trend of cash flows, and methodology used for estimation. It is difficult to get beta for a company or industry (taken as reference) that presents the same stream of cash flows, the same life period with the analyzed project. Measurement errors distort results. The observed beta for a company with high opportunities to develop (it owns valuable growth options) is higher than that for a firm with no such opportunities, and the estimated discount rate is higher comparing with the case when company owns only tangible assets.

CAPM has the advantage of a simple and easy to use model. Its "survival" relies on some explanations: others pricing models empirical support is no better than that for CAPM, it has an intuitive theoretic support and tests that disputed the correctness of the model are not so conclusive and comprehensive to lead to model rejection. The static version of CAPM also has obvious disadvantages: rate of return assessed with CAPM can not be used as discount rate for a project which is not entirely financed with equity capital, because it does not match to forecasted cash flows. Extrapolation of discount rate obtained from historical data presumes time stability of firm structure of risk (historical beta) and of inflation rate (if we use nominal returns). For example, if we analyze a project for developing new products or markets, its risk is higher than the level of risk for this company before adopting the new project.

Hypothesis for static CAPM are not satisfied: investors have a dynamic behavior, they act for many periods and volatility for a security (beta) is changing over time and it depends on information available at any moment.

Jagannathan and Wang (1996) built a pricing model named conditional CAPM. This time, beta is changing from a period to another, while static CAPM holds for each period. Conditional expected rate of return for a security (depending on available information) is a linear function of its conditional volatility.

The two authors said that wealth portfolio is not observable and that is why it is assimilated to a market portfolio, constituted entirely of shares. They identified three more factors that can measure more accurate the return for aggregate wealth portfolio: return on human capital – its volatility is $\beta_i^{labor} = cov(R_{it}, R_t^{labor})/var(R_t^{labor})$, market risk premium – with volatility $\beta_i^{prem} = cov(R_{it}, R_t^{prem})/var(R_t^{prem})$ and a value-weighted portfolio for a significant stock index, with volatility $\beta^{vw} = cov(R_{it}, R_t^{vw})/var(R_t^{vw})$. This new model, named *P-L Model* (*Premium Labor Model*) is in fact a multifactorial CAPM:

$$E(R_{it}|I_t) = c_0 + c_{vw} \times \beta_i^{vw} + c_{prem} \times \beta_i^{prem} + c_{labor} \times \beta_i^{labor}.$$

Another empirical study was performed by He, Kan, NG și Zhang (1996). Covariance between stock return and market factors and risk premium are both time variable. Essentially, the model states that the expected return for a large number of stocks is determined by covariance with a small number of market factors. Anyway, said the authors of the model, the macroeconomic factors (such as human capital, identified and used by Jagannathan and Wang in 1996) have greater explanatory power for cross-section of expected returns for securities than firm specific factors (MV or BM).

This model is a discreet time alternative for continuous model developed by Merton (1973), in which return for

financial assets follows the lognormal distribution function. The rates of return are not discreet anymore, but instant values at different moments, into a continuous process. Such a dynamic CAPM could be more realistic, but these considerations are strictly theoretical, because in practice there are many inconveniences for applying it.

Conditional CAPM is more alike arbitrage pricing model build by Ross than CAPM, because there are considered more factors. The most important accomplish of this model is time variation for volatility and establishment of a linear relationship between expected return and two or many betas, instead of single one.

Arbitrage pricing theory (APT)

Ross (1976) developed the model that also sustains the linear function between expected return and beta. If there are not arbitrage opportunities, an efficient market reaches equilibrium and model becomes:

$$E(R_i) = R_f + \beta_1 \times (E(R_1) - R_f) + \beta_2 \times (E(R_2) - R_f) + ... + \beta_k \times (E(R_k) - R_f)$$

Its advantage consists of considering many factors (return for market portfolio in CAPM could be one of them), which makes the model more rigorous. The disadvantage of time instability of volatility (beta) remains. More than that, it is difficult to identify the economic factors with high sensitivity for firm. That is why practitioners prefer CAPM to APT.

Statistical methods (such as factorial analysis) provide two categories of information: number of factors that influenced historical returns for stocks, also beta and risk premium for each factor. The disadvantage is that it does not identify the factors that significantly explain the variability for stock return.

We get multifactor risk-return models with economic basis and statistical relevance by replacing unidentified factors, obtained with statistical methodologies, with specific economic factors. Chen, Roll and Ross (1986) emphasized such a range of factors: changes in industrial production, anticipated and unanticipated inflation, changes in risk premium and term structure of interest rates.

Kan and Zhang (1999) said that these kinds of models (with unidentified factors, such as conditional CAPM, APT) are not testable, because we chose the factors for empirical analysis by economic intuition and we do not know if they are the factors with most important influence on asset pricing. If the model is not correctly specified, null hypothesis and alternative hypothesis are both wrong. It is certain that there are not only entirely good models or entirely bad models. We do not have to test them to examine if they are right or wrong, but find a possibility to compare their performances in explaining the cross-section returns for financial assets.

Build-up models

This model compounds the rate of return for a security (the discount rate) by adding different risk premiums to risk free rate. The traditional form for this model is: $E(R_i) = R_f + RP_m + RP_s + RP_u$, where RP_m is market risk premium, RP_s represents size premium and RP_u stands for unsystematic, firm specific risk. A new alternative for the model[3] also includes an industry specific risk premium (+/- RP_i).

The build-up model has the important advantage of eliminating beta with all inconvenient that accompanies it. It is a simple model and this is the reason why many practitioners prefer it to other pricing models. Applying it is not such an easy task as we could think, because these risk premiums must be rigorously estimated.

Risk free rate (R_f) is represented only by income return gained by investors for 10, 20 or 30-year constant maturity bonds. Total return includes also capital gain return, which implies some risk and it is not appropriate for riskless asset.

Market risk premium (RP_m) used for assessing discount rate is a forward looking concept, even if it is estimated from historical data. First, we have to choose a reliable market benchmark, usually a market index with a high coverage in number of industries and market capitalization (for example, S&P 500 is chosen to represent the US capital market). This time, rate of return for market portfolio is represented by total return, provided also by dividends and capital gain.

Methodologically, it is recommended arithmetic, instead of geometric average, because it captures the uncertain nature of return and let it vary over time. Using geometric mean presumes that risk premium will be the same for every future period. Geometric average is more appropriate for historical returns analysis, while arithmetic mean is used especially in forecasting.

Another concerning aspect is how long should be the historical period for estimating market risk premium (for US market, reliable data is available from 1926). A longer period presents the advantage that the analysis includes different past events, that may occur again in the future.

There are also disadvantages: using a longer period, the estimated value for market risk premium is affected with very high or very low values in some periods, because of events such as economic crisis, wars, that are not expected to happen again in the future period.

Annin and Falaschetti (1998) discussed about rolling average approach used in practice to estimate equity risk premium. The appraiser have to choose a significant window of historical data, calculates a risk premium, then moves the window one year forward and determines another premium. There are many disadvantages with this methodology. First, we do not know the exact length of the window for determining the rolling average (for USA, there were usually used 30-year data windows, because of changes in capital market in early '70s). Second, years in the middle of the period are considered in many windows, so they have a higher impact on average premium, while years from the beginning and ending of time period are included in fewer rolling windows, so they have little weight in ultimate equity risk premium.

There are still many controversies and debate about equity risk premium, because of its impact on ultimate value derived under different approaches. The few risk premiums included in a model, the higher the impact of equity risk premium on discount rate (it decreases from CAPM and three-factor Fama-French to APT and build-up model).

It is widely recognized that small capitalization companies have higher expected returns than large companies in the same industry, because investors bear a higher risk. They expect to compensate this kind of risk through a specific risk premium called size premium.

Barad (2002) emphasized two approaches to measure size effect on return: first, there is a *small stock premium*, which captures the excess return for small companies to return expected for large companies; second, there is a *size premium*, focusing on isolating size effect on return of specific risk. The latest approach is used in developing the cost of capital for discounting purposes, in the build-up model, because it is more appropriate to catch return due to size effect and it is removed the possibility of twice capturing the risk, through different premiums.

Martin and Seigneur (2001) determined size premium as a margin between excess return to R_f (arithmetic average for actual return of a stock minus risk free rate) and excess return to R_f from CAPM (which is $\beta \times (R_M - R_f)$).

The additional risk captured by beta in CAPM is now integrated in the build-up model with a *company-specific risk premium* (RP_u).

To asses industry risk premium, we have to estimate first beta for that industry, which is a complex procedure, because some companies (usually the large capitalization ones) operate in more than one field and that is why their overall risk is lower. These companies are often excluded from analysis when beta is computed. Kaplan and Peterson (1997) performed a study and demonstrated (like other previous studies) that beta calculated with *pure play* method (when there are included in analysis only those companies that operate exclusively in one industry) is higher, because they are, in most cases, small and undiversified companies, and its risk is higher than industry average. The authors developed a *full information* methodology for including in industry beta determination those divisions of large, diversified companies that belong to industry in discussion.

Industry risk premium (+/- RP_i) is determined as (beta industry $\times$ ERP) – ERP, where ERP represents equity risk premium and industry beta is calculated using full-information beta methodology.

If we use cost of capital computed from data for publicly traded companies, most of them held by minority stockholders (it is the case for cost of capital data published by Ibbotson Associates), discount rate have to be adjusted with a risk premium for lack of liquidity (for privately held companies) and also for lack of control for minority shareholders, that can not influence company policies.

No matter what model we use to estimate discount rate, we have to keep in mind some important aspects:

- free cash flows must be discounted with a risk-adjusted discount rate, which is a weighted average cost of capital (not only cost of equity capital);
- each project has a specific risk structure and that is why we are not allowed to use the cost of capital for the company as discount rate for all new projects, but only for those investments that mentain the same pattern of risk like the overall firm;
- cost of capital is in fact an estimation, which is more accurate if we use a cost of capital for entire industry (taking as a proxy firms with similar features) instead of cost of capital for the analyzed company;
- we use nominal discount rate for nominal free cash flows, which means that we have to integrate expected inflation, even if not all components of cash flows are affected by inflation (amortization

and depreciation, for example); we start estimation with a real rate and after that we transform it in a nominal rate, using anticipated inflation rate;

■ the disadvantage of extrapolation historical data for future periods maintains for risk free rate too; first we determine a real historical risk premium and then we add it to current risk free rate;

■ it is preferable to use arithmetic average than geometric mean for assessing expected returns or risk premiums, because the second is more appropriate for compound rate of return, but not for expected return.

Case study concerning assessment of discount rate for a project entirely financed with equity capital

The objective of this section is to asses the discount rate for an investment in a leather shoes factory. A detailed analysis of the project regarding estimation of cash flows was performed before and does not constitute the object of this study. A company from textile industry, as unique shareholder of the new firm, fulfills the project. The project is all-equity financed. Therefore, the discount factor for projected cash flows is a cost for equity capital. The estimated annual turnover is about 400 thousands USD and the firm belongs to the segment of small/middle companies in this field.

The new company is privately held and for this industry we do not have enough information about traded companies in Romania, to use them as a proxy to appraise the cost of capital. Under these circumstances, we appeal to a complex procedure, consisting of two stages:

1. assessing discount rate for the project according to its risk category, assuming that it is accomplished in the United States of America (we chose USA because of data accessibility for estimating a proper discount rate);

2. assessing discount rate for the same project implemented in Romania, by adding some supplementary risk premiums to discount factor obtained in the first stage.

We start with risk free rate and then we add a range of risk premiums to reflect the level of risk for the analyzed project, in a build-up model.

Stage 1: Assessing discount rate for a similar project operated in USA

Expected rate of return for investor is computed with the following formula:

$$r = R_f + RP_m + RP_s + RP_{i\ (manufacturing)}$$

R_f is assimilated to yield to maturity for treasury bonds issued by US Treasury, with 10, 20 or even 30 years constant maturity. The rate of return is determined from daily market prices for securities with the same maturity (20 years, for instance) and become public information. Annual average (at 31st of December, 2006) for daily quotations of yield to maturity for US Treasury bonds with 20-year constant maturity is approximately 5% (4.9973%)[4].

This average value represents expected return from two sources: income (coupon) and capital gain. The risk free rate corresponds only to the first component, because only debt payments promised by issuer to investor are riskless, while security price variations depend on changes in capital market. An empirical study, performed for a period of 20 years ending at 31st of December 2006, revealed that income return had an overwhelming weight in total return: 98% for government bonds, 99% for corporate bonds and 95% for municipal bonds[5]. Therefore, we consider that risk free rate is total return for government bonds with 20-year constant maturity, which is 5%.

RP_m stands for risk premium of capital market in USA and it is determined as excess return for market portfolio (S&P 500 index) to risk free rate. Rate of return for market index S&P 500 is calculated as annualized average from average of monthly total return for a period of 120 months (Avg), as follows[6]:

$$R = (1 + Avg)^{12} - 1$$

This return is accompanied by risk, quantified through annualized standard deviation, determined with the following formula:

$$\sigma = \sqrt{[SD^2 + (1 + Avg)^2]^{12} - (1 + Avg)^{24}},$$

where SD stands for standard deviation of monthly total return for a period of 120 months.

The annualized average return for S&P 500 for the last 10 years, at 31st of December 2006, was 9.64%, and the standard deviation was 16.88%, which means that market risk premium is 4.64%.

$RP_s + RP_{i\ (manufacturing)}$ stands for size and industry premium and it represents the supplementary risk assumed by an investor in this industry, if the new firm is small or

medium size, with different features compared to average firm from manufacturing field.

Ibbotson Associates publishes annually statistics for each industry regarding cost of capital determined through five different models (we also wrote, in parenthesis, the average values for cost of capital of small/medium size companies in manufacturing industry[7]):

- *CAPM* takes into account only the systematic risk, measured by beta (13%);
- *CAPM + Size Premium* establishes a proper discount rate for the risk of small or medium companies (17.01%);
- *3-Factor Fama-French* uses market value of equity (MV), book-to-market ratio (BM) and a capital market factor for calculating expected return (17.9%);
- *1-Stage Discounted Cash Flows* (Gordon model) keeps a constant annual growth rate for dividends in perpetuity (15.19%);
- *3-Stage Discounted Cash Flows* uses three different growth rates, as follows: the growth rate for profits of the firm for the first five years, the growth rate for the whole industry for the next five years and, finally, the growth rate for the entire economy, after the tenth year (6.5%).

The rate of return estimated even with CAPM or a growth model (one or three-stage discounted cash flows) is not a reliable measure for the risk of the analyzed project. We have to choose between the second and the third model. As the two values are close enough, we appreciate that their average reflects more accurately the level of risk assumed by investor. The risk premium for size and industry in this case is 7.82% and the discount rate for a project in manufacturing industry, if it is implemented in USA by a small size firm, is 17.46%.

Stage 2: Assessing discount rate for the project operated in Romania

Estimating expected rate of return for investor starts with the rate of return for a similar project accomplished in USA, plus a range of specific risk premiums for Romania and for the new company:

$$r = r_{USA} + RP_{m \text{ (supplementary for Romania)}} + RP_{\text{country risk for Romania}} + RP_{s \text{ (supplementary for Romania)}} + RP_{\text{supplementary for minority shareholders}} + RP_{i \text{ (supplementary for manufacturing industry in Romania)}}$$

$RP_{m \text{ (supplementary for Romania)}}$ catches supplementary risk assumed by an investor on Romanian capital market besides the case of a similar investment in US financial market. It is determined according to the surplus of risk taken on unit of return gained. We have determined the historical annualized rate of return and the standard deviation for BET from daily prices registered at Bucharest Stock Exchange[8], between 1st of January 1998 and 31st of December 2006. We used USD quotations for BET and the same formulas for mean and standard deviations (as well as for S&P 500) in order to get comparable results. We preferred the arithmetic mean to geometric mean, because it is thought that the first pictures better the annualized rate. Average return for this period is 27.52% and standard deviation is 49.77%. The quantity of risk on unit return gained is 1.81 (while the same ratio for US capital market is 1.75).

$RP_{\text{capital market in Romania}} = RP_{\text{capital market in USA}} \times$ risk on unit return for Romania/risk on unit return for USA $= 4.64\% \times 1.81/1.75 = 4.8\%$, which corresponds to a $RP_{m \text{ (supplementary for Romania)}}$ of 0.16%. This value may be surprising for someone, but there are a couple of explanations. Bucharest Stock Exchange performed very well for the analyzed period, especially in 2002 and 2004 (annualized rate of return for BET – USD was 80.2%, respectively 87.3%), but also in 2005 (46.7%) and 2006 (59.8%). For the same period, American capital market registered poor returns (for instance, annualized return for S&P 500 was 9.8% in 2004, 4.5% in 2005, or even negative, –6.9% in 2001 or –21.7% in 2002).

Country risk (or sovereign) is not diversifiable because investors hardly can constitute a portfolio of securities issued in different countries. In this respect, a risk premium must pay for the sovereign risk. It could be determined in three different ways:

- As a margin between coupon rate for bonds issued by Romanian government on international financial markets and coupon rate for similar securities issued by US Treasury. The Public Finance Ministry in Romania did not recently issued bonds denominated in USD, therefore this method cannot be used, despite of its simplicity.
- As country default spreads, according to notes granted for the two countries by the main international rating agencies. Romania received for foreign currency bonds the following ratings from these agencies: BBB (Fitch Ratings[9], modified in August 2006), Baa3 (Moody's[10], improved in October 2006) și BBB- (Standard & Poor's[11]). USA rating is Aaa or AAA, which is the maximum note for all agencies (investment in US

Treasury bonds is a safe one). According to sovereign ratings provided by Moody's[12], the country risk premium for government bonds noted with Aaa (USA) is zero, for Baa3 (Romania) is 2%, while for Ba1 is 3.25%. We took Moody's as a reference because this agency did the most recent change of rating for Romania and improved its note from Ba1 to Baa3, on 6th of October 2006. This alternative method offers a value of 2% for $RP_{country\ risk\ for\ Romania}$.

■ From relative standard deviation of capital market from the analyzed country in comparison with USA[13], we can determine a relative standard deviation for Romanian financial market, as a ratio between ó(BET) and ó(S&P 500), that is 21.23% / 9.86% = 2.15. For Romania, we used the annualized standard deviation for BET in ROL, for year 2006 (ó(BET) = 21.23%). We did not rely anymore on USD quotations, because the national currency met a strong appreciation in 2006 (from an exchange rate of 3.1078 ROL/USD on 1st of January 2006 to 2.5676 ROL/USD on 31st of December 2006). Therefore, the variance of returns for BET in USD (ó(BET) = 69.7%) is due in large measure to exchange rate risk and to a certain extent to financial market risk. For USA, we have considered the annualized standard deviation for S&P 500, for year 2006 (ó(S&P 500) = 9.86%). $RP_{country\ risk\ for\ Romania}$ = $RP_{m\ USA}$ × (relative standard deviation – 1) = 4.64% × 2.15 – 4.64% = 5.34%.

The value of 2% obtained from the second method is much smaller than this value of 5.34%, determined with the third method. It is happening because the last method includes the influence of financial market risk, which was also reflected before by another risk premium (RP_m). The risk premium for capital market in Romania is 0.16%, while the country risk premium, calculated also from performances of capital markets in the two countries – USA and Romania – is 5.34%. We do not trust the second value, because it is obtained using only one-year data (2006). For US capital market, in 2006, E(S&P 500) = 11.8%, σ(S&P 500) = 9.86% and ratio E(S&P 500)/σ(S&P 500) = 0.848. The risk free rate is 5% and RP_m could be 6.8%. For Romania, for the same period (2006), E(BET-ROL) = 18.9%, σ(BET-ROL) = 21.23% and ratio E(BET-ROL)/σ(BET-ROL) = 1.124, while E(BET-USD) = 55.5%, σ(BET-USD) = 69.7% and ratio E(BET-USD)/σ(BET-USD) = 1.256. We reassess now $RP_{m\ (supplementary\ for\ Romania)}$ and the

new value is 2.21% (for BET in ROL), respectively 3.27% (for BET in USD). These values are significantly different from those calculated with annualized data, for the last 10 years, for BET and S&P 500 (0.16% for BET in USD or -1.24% for BET in ROL).

In this respect, using the third method, we can determine a country risk premium as a spread between 5.34% and the risk premium from the capital market in Romania of 2.21% (hypothetically established, only from quotations for BET in ROL in 2006), that is 3.13%. If we would use values for BET in USD, the component of country risk premium related to capital market (for 2006) would be higher (3.27% instead of 2.21%, because of exchange rate movements). Therefore, we consider the exchange rate risk closer to country risk than to financial market risk. In this situation, we use as a proxy for $RP_{country\ risk\ for\ Romania}$ the average of the values from the two methods (2% and 3.13%), that is 2.57%.

Concerning the manufacturing industry, we estimate that for the specific field of producing leather shoes, there is a supplementary risk in Romania beside USA, because of the strong competition of similar products. We refer here to substantial imports of footwear, made of substitute of leather, from China or other countries. These poor quality and low prices products target the category of consumers with low income. As Romanian society will develop and consumer's income will increase, this type of substitute products will "lose field" to quality, but more expensive products. Barriers to entry for this industry are not significant and new competitors could appear anytime. Therefore, we consider that $RP_{i\ (supplementary\ for\ manufacturing\ industry\ in\ Romania,\ footwear\ production)}$ is 2%. This value is subjectively fixed, without a rigorous appraisal, because of lack of data or detailed analyses concerning this specific industry in Romania.

We mentioned before that the new firm is small size and it must compete with large size national or international producers or importers for well-known brands, similar in quality with products obtained by the company in discussion. We remind that when we assessed discount rate for similar projects in manufacturing industry in USA, we took the data for small composite in this industry. That is why we think that a supplementary size premium for the project operated in Romania is not needed.

The last component of discount rate is $RP_{supplementary\ for\ minority\ shareholders}$. It is needed only if there are many small stockholders that have no control on decisions adopted

by majority shareholders. The new firm has a unique stockholder that decides alone the future strategy. From this perspective, a risk premium for minority shareholders is not necessary for the project.

We conclude that discount rate (in fact, the cost of equity capital) for USD projected cash flows is: r = 17.46% + 0.16% + 2.57% + 2% = 22.2%.

Conclusions

Estimating discount rate is always a "touch stone" in every valuation process. Cash flows appraisal follows a precise pattern. All we need to do is to focus only on entries required in the free cash flows model. Things become more complicated when assessing discount rate, because there are many valuation models, some of them are unsophisticated but strongly disputed, and some of them are complex but little preferred by users. Choosing a model for estimating discount rate depends on available information and on user's reasons and preferences.

Estimated discount rate for the project consisting in a footwear production unit must be taken with caution. The build-up model, used in this situation, may lead to estimation errors, because every single risk premium is subjectively assessed. The more risk premiums to estimate, the little reliable the final result. We can say how important these errors for a valuation process are only after we estimate the projected cash flows. Sensitivity analysis of the project reveals such information, because discount rate is one of the investment variables that must be modified (other variables are kept unchanged). The sensitivity of the project to discount rate is given by the response of NPV and IRR to a change with one percentage point of discount factor. If the project is sensitive to r, it means that a supplementary risk premium of 3% for manufacturing industry in Romania (instead of 2%) may drive to completely different conclusions concerning efficiency of the project or even the decision to adopt or to reject the project. We chose this particular premium as an example because we mentioned before that it is not very well grounded.

Notes

[1] International Glossary of Business Valuation Terms

[2] Piață concurențială perfectă (sau cel puțin eficientă), finanțare în totalitate din capitaluri proprii, amortizarea este egală cu investițiile de înlocuire, creșterea provine numai din profitul net, absența fiscalității, transparența și gratuitatea informației, orizont de previziune limitat la o singură perioadă etc.

[3] Propusă de Ibbotson Associates, care furnizează și date referitoare la primele de risc pe industrii, în cadrul „Ibbotson SBBI Yearbook Valuation Edition"

[4] Seriile de date au fost preluate de pe site-ul băncii centrale a SUA, www.federalreserve.gov

[5] Sursa: Lehman Brothers U.S. Government Bond, U.S. Credit and Municipal Bond Indexes, 12/31/06, www.franklintempleton.com

[6] Modelul de determinare a mediei și dispersiei este preluat din *Cost of Capital Yearbook* - Ibbotson Associates, www.morningstar.com

[7] Statistics for SIC Code 3: Manufacturing, Ibbotson Associates, www.morningstar.com

[8] Sursa datelor: www.bvb.ro

[9] Sursa: www.fitchratings.com, Fitch Ratings Ltd., New York

[10] Sursa: www.moodys.com, Moody's Investors Service

[11] Sursa: www.standardandpoors.com, Standard & Poor's, The McGraw-Hill Companies, New York

[12] Sursa: www.sjsu.edu/faculty/watkins/countryrisk, conform datelor privind ratingul de țară furnizate de Moody's

[13] Metoda este propusă de Aswath Damodaran - www.performancetrading.it

References

Annin, M., Falaschetti, D., „Equity Risk Premiums Still Produce Debate", *Valuation Strategies* (1998) (January/February), www.morningstar.com, Ibbotson Associates – Research papers

Barad, M.W., "Technical Analysis of the Size Premium", 2002, www.morningstar.com, Ibbotson Associates - Research papers

Black, F., „Capital Market Equilibrium with Restricted Borrowing", *The Journal of Business*, vol. 45, nr. 3 (iulie), 1972, pp. 444-455

Black, F., Jensen, M. C., Scholes, M. (1972). *The Capital Asset Pricing Model: Some Empirical Tests*, în M.C. Jensen (editor), *Studies in the Theory of Capital Markets*, Praeger Publishers, New York

Chan, K.C., Chen, N., „An Unconditional Asset-Pricing Test and the Role of Firm Size as an Instrumental Variable for Risk", *The Journal of Finance*, vol. 43, nr. 2 (iunie), 1988, pp. 309-325

Chen, N., Roll, R., Ross, S.A., „Economic Forces and the Stock Market", *Journal of Business*, vol. 59, nr.3 (iulie), 1986, pp. 383-403

Fama, E. F., French, K. R., „The Cross-Section of Expected Stock Returns", *The Journal of Finance*, vol. 47, nr. 2 (iunie), 1992, pp. 427-465

Halpern, P., Weston, F.J., Brigham, E.F. (1998). *Finanțe Manageriale – modelul canadian*, Editura Economică, București

He, J., Kan, R., Ng, L., Zhang, C., „Tests of the Relations Among Marketwide Factors, Firm-Specific Variables, and Stock Returns Using a Conditional Asset Pricing Model"-, *The Journal of Finance*, vol. 51, nr. 5 (decembrie), 1996, pp. 1891-1908

Jagannathan, R., Wang, Z., „The Conditional CAPM and the Cross-Section of Expected Returns", *The Journal of Finance*, vol. 51, nr. 1 (martie), 1996, pp. 3-53

Kan, R., Zhang, C., „Two-Pass Tests of Asset Pricing Models with Useless Factors", *The Journal of Finance*, vol. 54, nr. 1 (februarie), 1999, pp. 203-235

Kaplan, P. D., Peterson, J. D., „Full-information Industry Betas", 1997, www.morningstar.com, Ibbotson Associates – Research papers

Lintner, J., „Security Prices, Risk and Maximal Gains from Diversification", *The Journal of Finance*, vol. 20, nr. 4 (decembrie), 1965, pp. 587-615

Martin, H.G. Jr., Seigneur, R.L., „Cost of Capital", American Institute of Certified Public Accountants, National Business Valuation Conference, December, 2001, www.morningstar.com, Ibbotson Associates - Research papers

Merton, Robert C., „An Intertemporal Capital Asset Pricing Model", *Econometrica*, vol. 41, nr. 5 (septembrie), 1973, pp. 867-887

Myers, S. C., Turnbull, S. M., „Capital Budgeting and the Capital Asset Pricing Model: Good News and Bad News", *The Journal of Finance*, vol. 32, nr. 2 (mai), 1977, pp. 321-333

Ross, Stephen A., „The Arbitrage Theory of Capital Asset Pricing", *Journal of Economic Theory*, vol. 13 (decembrie), 1976, pp. 341-360

Sharpe, W. F., „Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk", *The Journal of Finance*, vol. 19, nr. 3 (septembrie), 1964, pp. 425-442