DETERMINING THE COST OF EQUITY IN THE CONDITIONS OF CRISIS[33]

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Summary

Changes on financial markets caused by *subprime* crisis in the United States and related problems in the real sphere of many European economies have initiated a discussion on the factors of business value, also in the area of methods of determining the cost of equity. Known and commonly used, especially on poorly developed markets, methods in the period of a traditional business cycle required many adjustments. This situation could have caused increase in the role of subjective factors in business valuation. The article, apart from known methods, presents a new concept of determining the cost of equity, adequate to the present turbulent market conditions. It allows determining more precisely the cost of equity of companies operating in the conditions of unstable economies. In these economies the use of known methods of calculating the cost of equity is either impossible or requires the application of many adjustments that often do not guarantee correct result. An advantage of the presented method over other models (even *Bond Yield Plus*) is that risk premium, related to investments in equity, is determined in a manner preventing discretional adoption of its amount. The previous practice indicates that often the amount of this premium was determined at a level expected by the customers. The proposed method limits impact of subjective factors on business value, which often distort the actual business value.

Keywords: enterprise value, cost of capital, financial crisis.
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1   Introduction

The financial crisis, initiated with the collapse on *subprime* credit markets in the United States reviewed the past approach to the business valuation process. The changes that have been noticeable in recent years both on financial markets and in the real sphere of many European economies have initiated a discussion on the factors of business value.

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One of the fundamental financial factors forming business value is the cost of capital. Determining the cost of debt capitals does not seem complicated. The process of estimating the cost of equity is, however, often burdened with a great subjectivity, due to which the results of the estimates may not always be considered reliable.

The article presents the known methods of determining the cost of equity. Their defects and advantages are described. It also presents a new concept of calculating equity, adequate to the present turbulent market conditions. This method enables objective estimation of the expected rates of return on equity, which seems crucial in the business valuation process.

2   The essence and methods of determining the cost of equity

"Capital is a necessary factor of production and, as other factors, has its price" (Brigham, 1996, pg. 14). This price, the so-called cost of capital, is defined as the expected rate of return that should be obtained by a company from its investments to preserve the market value of its shares (Petty, Keown, Scott & Martin, 1993, pg. 267). "The cost of capital of a company expresses the cost of its financing and is a generally required rate of return when assessing economic efficiency of investment projects" (Gajdka & Walińska, 1998, pg. 127).

The cost of capital derives from risk. It means that determining the cost of equity in the conditions of financial crisis gains in particular importance. The situation of economic uncertainty makes the process of forecasting future cash streams seem burdened with high uncertainty. Fluctuations in exchange rates and more and more advanced financial engineering tools make it much harder to forecast the structure of capital. It justifies (particularly in the conditions of crisis) usefulness of verification of the traditional approach to the known methods used to determine the cost of equity.

The most basic model of determining the cost of equity obtained by retaining profit is the approach: income from risk free securities plus risk premium. In this approach, the concept of alternative cost is used. Each potential capital provider, facing the selection of the method of investing capital, has to solve a dilemma concerning determination of the limit rate of return on investment. On the one hand, the provider has the opportunity to carry out an investment which is practically burdened with risk close to zero and, on the other hand, may invest capital in a business project.

The starting point in determining the expected rates of return on equity in this approach will be therefore the determination of the rate of return on risk free instruments, namely bonds and treasury bonds. Return on these instruments depends on the current macroeconomic situation and related demand reported for these instruments by domestic and foreign investors. Owing to the fact that each business activity involves risk, in the discussed model to the rate of return on risk free instruments risk premium is added, whose amount is to reflect the uncertainty connected with the current and expected market situation. It is also to correspond with the current financial position of a company and prospects of its development.

The formula for the cost of equity in the presented approach can therefore be presented as follows (Besley & Brigham, 2009, pg. 480):

$$C_E = R_{RF} + R_P$$

where:

CE [Cost of Equity] (KKW),
RRF [Rate of Return on Risk Free Securities] (bonds or treasury bonds) (RPW),
RP [Risk Premium] (PR).

One of the most commonly used methods of determining the expected rate of return on equity is *CAPM (Capital Asset Pricing Model)*, in which it is assumed that the expected return on investment is proportional to risk related with this return (Best, 2000, pg. 181). According to this model, the cost of capital can be calculated by means of the formula (Malinowska, 2001, pg. 241):

$$C_E = R_{RF} + \beta \cdot \left(R_M - R_{RF} \right)$$

where:

R_M *[Rate of Return on Market]* (rate of return on the WIG, WIG20 index) *(R_A)*,
β [Beta Coefficient][35]

In this model, problems may occur with the determination of the difference between the rate of return on market and risk free rate (the so-called premium for risk). In addition, it involves a serious dilemma, connected with research period selection. It is particularly important in the economies, the capital markets of which have been operating since recently (for instance Poland). In these cases controversies appear, concerning not only research period, but also determining particular deadlines of estimating rates of return. In well-developed countries (for instance, US, UK, Germany, Japan) annual rates of return on market can be adopted (Bodie, Merton & Cleeton, 2009, pg. 76-79). On the other hand, in countries with a short history of functioning of capital markets, due to a small number of the years of functioning stock exchanges, annual rates of return would give too small number, which could affect credibility of the received results (Gajdka & Walińska, 1998, pg. 144).

Despite the fact that the process of determining the cost of equity based on the asset pricing model is not perfect, on its basis it is possible to carry out moderately credible valuation of the cost of equity. For this reason, this model has broad application, especially during valuation of joint-stock companies (Arnold & Hatzopoulos, 2000, pg. 620).

In developing countries, sometimes modification of the capital asset pricing model is recommended, consisting in adding risk of a particular country from the so-called group of *emerging markets.* Companies operating in this type of countries are

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[35] The beta coefficient determines extent in which the rate of return on shares reacts to changes on the market. It informs about the number of percents (approximately) by which the rate of return on shares will increase, if the rate of return on market index increases by 1%. It is thus a measure of sensitivity of a company's return to return on a specific market.

characterized usually by a higher risk level than entities operating in developed economies. Ignoring this fact can cause distortion of information about the actual level of investment risk. CAPM has been created, first of all, for highly developed countries (for instance, US). On the other hand, investing in the mentioned group of states differs significantly. The cost of equity in developing countries may be thus estimated as follows (Sabali, 2008, pg. 51-51):

$$C_E = R_{RF} + \beta_{BM} \cdot \left[E(R_M) - R_{RF}\right] + C_R$$

where:

R_{RF} rate of return on risk free securities (most often US government securities, subject to the redemption term adequate to the time horizon of the investment in question),

β_{BM} beta coefficients of similar investment B in a developed country (usually US),

$E (R_M)$- expected rate of return on market- stock exchange index (usually *Standard & Poor's 500- S&P500* or international stock exchange index, such as, for instance *Morgan Stanley Composite* Index- MSCI),

C_R *[Country Risk]* risk premium of a country (usually *spread* between return on long-term securities, expressed in US dollars, issued by the State Treasury of a particular country, and return on long-term US securities.

Lack of a model of risk investment premium estimation which would be adapted well to the conditions of countries introducing market economy principles (the so-called emerging markets) is one of the reasons for which in the practice of valuation of Polish stock-listed companies it happens that risk market premium is often adopted on the basis of subjective (arbitrary) criteria (Cwynar & Cwynar, 2007, pg. 101).

3   Factors affecting level of the cost of equity

A factor which may significantly affect the expected rate of return on invested capital is return on risk free securities. In the process of business valuation, apart from the selection of the appropriate financial instrument (i.e. treasury bonds or bonds), which would be the basis for determining the cost of equity, it is also important to identify a specific, in terms of time horizon, security.

A serious dilemma to be faced in the business valuation process is the selection of a suitable risk premium, which is the main element of most used in practice valuation models (Zarzecki, 2009, pg. 921). The amount of this premium affects the cost of equity, which, in turn, affects the level of average weighed cost of capital and, as a consequence, business value. Risk premium is composed of two elements: rate of return on market and rate of return on risk free securities. When determining the expected rate of return on equity according to the simplest model "return on risk free securities + risk premium" with the calculation of the amount of risk premium, it is required to consider financial position of the entity, share of debt in the capital structure, industry, degree of complexity of the implemented investment project, market share, intensification of competition, organization and work efficiency, policy

of a state (local government units) with regard to fiscal and customs, legislative policies, etc. (Janik & Paździor, 2010, pg. 95-98).

To determine risk premium in *CAPM*, the most often applied approach is historical approach, consisting in determining the average rate of return on market and the average rate of return on risk free treasury bonds. However, this approach entails a serious dilemma, connected with research period selection. In general, most economists believe that for calculation of the amount of risk premium it is required to adopt possibly long calculation periods (Zarzecki, 2009, pg. 924). For developed economies, we assume most often time horizon of about 100 years (Dimson, Marsh& Staunton, 2002; Annin& Falaschetti, 1998). Some of them, e.g. J. Siegel, calculate risk premium for American companies even on the basis of nearly 200 years (Siegel, 1999, pg. 10-17). Long, few-dozen-year periods were also the object of research conducted by R. Shiller and R. Ibbotson (Welch, 2000, pg. 504).

In the countries of Central and Eastern Europe, it is impossible to bas on long time horizon due to a short period of functioning of capital markets. That makes calculation of risk premium based on historical data burdened with large risk. In such conditions, considering several-dozen-year research horizon is simply impossible. On the other hand, the adoption of a shorter calculation period may distort results. It is shown even in the analyses by E. Dimson, P. Marsh and M. Staunton, from which it can be concluded that in all the analyzed economies the rate of return from the adopted 10-year research period differed significantly from the ones estimated for the time horizon covering 101 years (Dimson, Marsh& Staunton, 2002).

The solution to this situation could also be e.g. considering, in the analysis of monthly or weekly rates of return, which, taking into account a short period of time (a small number of years) of functioning of stock markets would be alternative to annual rates. This could increase slightly the credibility of received results. However, the adoption of several or even dozen-year forecasted period would not take account of any tendencies prevailing on the market of shares. Trends on the capital market last sometimes for many years (www.djaverages.com).Thus, basing on a short time horizon could lead to a situation where rate of return would be determined under the effect of only one tendency.

Apart from research horizon, a serious problem when estimating risk premium based on historical data is to define benchmark of shares, namely stock market index. It seems most adequate to select an index which would include the largest the number of companies. In the US an index fulfilling this criterion is the Standard & Poor's 500 (S&P 500) index, consisting of 500 entities with the greatest market capitalization, listed on the New York Stock Exchange and NASDAQ. In other countries we can mention such indexes as: FTSE 100 (UK), Nikkei 225 (Japan), Bovespa (more than 500 companies) (Brazil).

An important issue in determining market risk premium is also the selection of proper risk free instrument and the application of proper average. In order to estimate the average rate of return, we can use arithmetic average and geometrical average. This, seemingly hardly important issue may be a cause of large discrepancies in the risk premium amount assessment (Cwynar & Cwynar, 2007, pg. 101).

In the risk premium assessment process in the analyses of rating agencies or results of analysis of independent experts can also be helpful. Such include, among others, A. Damodaran who publishes current amounts of risk premium for different countries (www.damodaran.com). The Polish capital market does not have a very rich history, which often makes it impossible to determine risk premium as a difference between the average rate of return and the average rate of return on stock market index. The risk premium determination methodology suggested by A Damodaran enables applying the capital asset pricing model for Polish companies. According to A. Damodaran, for entities functioning in Central European countries it is recommended to adopt risk premium between ca. 7% to 9%. For Bosnia and Herzegovina, A. Damodaran adopts risk premium at the level of less than 15% (www.stern.nyu.edu).

4   New concept of determining the cost of equity

The known models of determining the cost of equity, even in the period of traditional business cycle [36] required, in many cases, the application of adjustments. CAPM has been established based on assumptions that are difficult to fulfill in practice. Therefore, it is nothing particular that in the period of crisis the need for improvement of this model seems even greater. This is indicated by such phenomena as, for instance, exceptionally strong growth in return on treasury bonds and market risk premium adopted by specialists in various countries. An additional factor confirming the justified prudence, while using CAPM, is also seldom encountered fluctuation in prices of shares in many listed companies. These strong fluctuations motivate financiers to pay greater than usually attention to the issues of selection of calculation period when calculating beta coefficient, being one of the elements of the analyzed model structure. The change in duration of the calculation period does not solve the problem. The model should take account of factors adequate to the rapidly changing macro-and microeconomic conditions (Paździor, 2012, pg. 321-329).

From the mentioned argumentation it seems that the estimation of the cost of equity, especially small-sized entities, should be based on as most up-to-date financial information as possible and take account of the current financial position of the valued company. These criteria will appear fulfilled when the cost of capital is estimated based on basic parameters (ratios) determining financial standing of a company. These parameters may be, among others: total debt ratio, overall financial ratio, current and quick liquidity ratios, return on sales measured by operating profit, return on equity. On the basis of this concept, an author's model has been developed of determining the cost of capital, in which this cost depends on the rate of return on risk free securities, risk premium of a country and risk premium of a company. The innovative character consists in the method of calculating risk premium of a company,

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[36] The business cycle can be called recurring periodical fluctuations in the activity of the whole economy (Garbicz & Golachowski, 2006, pg. 149). It consists of four consecutive phases: stimulation, heyday, slope and recession (Bień, 2011, pg. 25). The phase of slope is determined sometimes as crisis. However, it should be emphasized that the force and scope of impact of subprime crisis was so high that its presentation in the structure of a classic business cycle seems unreasonable.

being a derivative of its current financial position . In this model, to each of the adopted ratios weight is assigned.

Weights for different ratios have been assigned based on the conducted simulations of changes in the financial position of the company. The author is aware of the fact that these weights may be subject to change, depending on the number and force of impact of external and internal factors. For this reason, it should be regarded as a proposal which perhaps may require improvement and practical verification in the conditions differing from the assumptions adopted by the author. The whole model also contains defined coefficients and invariables, whose task is to define the degree of reaction of risk premium to changes in the financial position of a company. This model can be described by means of the formula:

$$C_E = R_{RF} + C_R + B_R$$

where:

C_E [Cost of Equity] (K_{KW}),
R_{RF} [Rate of Return on Risk Free Securities] (bonds or treasury bonds) (R_{PW}),
C_R *[Country Risk]* –risk premium of a country with the highest credit rating *(P_{RK})*,
B_R [Business/Enterprise Risk] (P_{RP}).

Risk premium of a country can be adopted as the difference between return on instruments of a specific country, in which the analyzed company operates, and return on instruments of a selected state (possibly average return on states) with the highest credit rating. The estimated amount of risk premium of a country can be also found on numerous financial websites (www.datosmacro.com).

Risk premium... of a company is a derivative of its financial position. This premium can be estimated as follows (Paździor, 2013, pg. 200):

$$P_{RP} = \frac{0{,}35 \cdot DR - \ln\left(0{,}4 \cdot WOSF + 0{,}3 \cdot CR + 0{,}2 \cdot ROS + 0{,}2 \cdot ROE + 0{,}3 \cdot QR\right)}{SW^6} + R_{PWPL} \cdot SW$$

where:

DR – total debt ratio,
$WOSF$ – overall financial ratio,
CR – current liquidity ratio,
ROS – return on trade measured by operating profit,
ROE – return on equity,
QR – quick liquidity ratio,
R_{PWPL} – return on Polish risk free instruments,
SW – the sum of all weights, i.e. (0.35+0.40+0.30+0.20+0.20+0.30 = 1.75).

In order to verify the presented model of determining the cost of equity, a case study has been prepared, where this cost has been estimated given the assumption of different values of ratios used in the formula. As the return rate on risk free instruments the median of return on 10-year French, Japanese, German, US and UK bonds has been adopted (www.market.bizzone.pl). The risk premium of a country has been estimated as the difference between return on 10-year Polish treasury bonds and

the median of return on 10-year bonds of the four mentioned states. The analysis results are presented in Tables 1 and 2.

TABLE 1. RESULTS OF ESTIMATES OF THE COST OF EQUITY DEPENDING ON THE ADOPTED VALUE OF RATIOS SHOWING THE FINANCIAL POSITION OF A COMPANY (PART 1)

DR	0	0,05	0,1	0,15	0,2	0,25	0,3	0,35	0,4	0,45	0,5
WOSF	6	5,1	4,34	3,68	3,13	2,66	2,26	1,92	1,63	1,39	1,18
CR	4	3,52	3,1	2,73	2,4	2,11	1,86	1,63	1,44	1,27	1,11
ROS	0,6	0,55	0,5	0,45	0,4	0,35	0,3	0,25	0,2	0,15	0,1
ROE	0,5	0,45	0,4	0,35	0,3	0,25	0,2	0,15	0,1	0,05	0
QR	2,8	2,46	2,17	1,91	1,68	1,48	1,3	1,14	1,01	0,89	0,78
R_{PW}	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%
P_{RK}	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%
P_{RP}	1,75%	2,31%	2,87%	3,44%	4,00%	4,57%	5,14%	5,72%	6,30%	6,90%	7,51%
K_{KW}	**5,04%**	**5,60%**	**6,16%**	**6,73%**	**7,29%**	**7,86%**	**8,43%**	**9,01%**	**9,59%**	**10,19%**	**10,80%**

Source: Prepared by the author on the basis of conventional data

TABLE 2. RESULTS OF ESTIMATING THE COST OF EQUITY DEPENDING ON THE ADOPTED VALUE OF RATIOS SHOWING THE FINANCIAL POSITION OF A COMPANY (PART 2)

DR	0,55	0,6	0,65	0,7	0,75	0,8	0,85	0,9	0,95	1
WOSF	1	0,85	0,73	0,62	0,52	0,45	0,38	0,32	0,27	0,23
CR	0,98	0,86	0,76	0,67	0,59	0,52	0,46	0,4	0,35	0,31
ROS	0,05	0	-0,05	-0,1	-0,15	-0,2	-0,25	-0,3	-0,35	-0,4
ROE	-0,05	-0,1	-0,15	-0,2	-0,25	-0,3	-0,35	-0,4	-0,45	-0,5
QR	0,69	0,6	0,53	0,47	0,41	0,36	0,32	0,28	0,25	0,22
R_{PW}	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%	2,50%
P_{RK}	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%	0,79%
P_{RP}	8,14%	8,79%	9,47%	10,19%	10,96%	11,81%	12,78%	13,93%	15,39%	17,52%
K_{KW}	**11,43%**	**12,08%**	**12,76%**	**13,48%**	**14,25%**	**15,10%**	**16,07%**	**17,22%**	**18,68%**	**20,81%**

Source: Prepared by the author on the basis of conventional data

The received results indicate that in the case of the application of the above model, along with growth in the share of debt, reduction in the financial safety level, deterioration in liquidity and return, on both sales and equity, the cost of equity increases. The structure of the presented model is based on the assumption that the anticipated rate of return on equity depends directly on the financial position of a

company. For this reason, the actual investment risk premium (calculated as a difference between the cost of equity and return on Polish 10-year treasury bonds) in a hypothetical company ranges from 1.75 percentage points to 17.52 percentage points.

The proposed method seems to fulfill a gap in the process of determining the cost of equity of companies operating in the conditions of unstable economies. It enables empirical calculation of this factor, affecting directly the value of an entity. It is particularly important in countries with unstable financial markets.

This method can be considered as the extension of the *Bond Yield Plus* method, according to which the cost of equity is determined summing up the rate of return on risk free securities and determined subjectively risk premium (Panfil, Szablewski, 2011, p. 87). The advantage of the presented method is that risk premium, related to investment in equity, is determined in a manner preventing the practice of discretional assumption of a level, convergent with clients' expectations. It limits the impact of subjective factors during valuation, namely one of the most important flaws distorting the actual business value [37].

5   Conclusion

The fluctuations on financial markets observed in the period of *subprime* crisis (among others, noticeable changes in the level of return on treasury instruments and market risk premiums) have contributed to the increase in interest in the methods of determining the cost of capital. Previously commonly applied methods are verified. There are also new ones, taking account of factors typical of various phases of the business cycle. One of them is the method of determining the cost of equity presented in this article. It permits more precise determination of the cost of equity of companies operating in the conditions of unstable economies, where it is either impossible to apply known methods of calculating the cost of equity or it requires many adjustments.

The advantage of the presented method over other models (for instance *Bond Yield Plus*) is that risk premium, related to investment in equity, is determined including the current economic and financial position of companies. It limits the impact on the business value of subjective factors that often distort the actual business value.

6   Literature

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[37] At this point, it is worth mentioning the opinion by A. Damodaran, according to whom in practice there is no possibility of carrying out the business valuation process with full objectivity (Damodaran, 2012, pg. 21).

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