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Private Cost of the Capital Model (PCOC)

***Abstract.** In this paper, the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Model (APM), i.e. the most widely used models of estimating cost of equity, are presented. In addition, a new model of calculating the private cost of capital is introduced. This model is the Private Cost of Capital Model (PCOC) – a new concept based on the Pepperdine PCOC survey project which was launched in 2007 by J.K. Paglia. It may be worthwhile to conduct a similar survey among private companies in Poland, and other countries, to get direct estimates of the private cost of capital.*

***Keywords:** business valuation, private cost of capital, non-public companies*

Introduction

The cost of capital can be defined as the minimum expected rate of return on a given investment that offsets the risk of investing money in that particular venture. The cost of capital is a function of risk: the higher the risk, the higher the expected return. It is also defined as opportunity cost, which represents the return the investor might earn when investing his or her money in alternative projects of a similar risk profile. As a result, the cost of capital is an opportunity cost or the cost of lost opportunities rather than a classical cost of investing money. It is estimated as the total return that an investor might expect on a similar amount invested in a portfolio of securities (projects) bearing similar risk.

Nearly in all the methodologies for estimating the cost of capital which are known in the theory and applied in practice, expected returns are calculated based on historical data describing the activity of public companies.¹ The differences in these methodologies concern, among others, the average measure used (arithmetic or geometric mean), the size of the sample, time series available, exclusions and other adjustments etc.

The use of stock data is imperfect, however, in its describing listed companies only, and disregarding non-public companies (also known among investors as “private” companies)². In the paper the most important methods of estimating the cost of equity are discussed and a new method for estimating the cost of capital tailored to the specific profile of private (non-public) companies is proposed. It is a so-called the Private Cost of Capital Model (PCOC).

1. Methods of estimating the cost of equity

The cost of equity is estimated with a variety of methods. In the United States and other market economies the cost of equity is usually estimated with the following methods and models:

- Capital Asset Pricing Model (CAPM) – a single-factor valuation model,
- Arbitrage Pricing Model (APM) – a multifactor valuation model,
- Approach based on the Dividend Growth Model (DGM) – in this approach valuation is based on the predicted future dividend and its growth rate,
- Discounted Cash Flow Method (DCF method) – in this approach the cost of capital is estimated based on cash flow predictions made by analysts and the current stock prices,
- Fama-French Model – a three-factor valuation model,
- Butler-Pinkerton Model (BPM) – a single-factor valuation model using the so-called total beta, incorporating the company’s total risk, i.e. systematic and company-specific risk,
- Build-up Approach – based on build-up of individual risk components.

There are two methods (also known as models or theories) which are widely recognised in the theory of valuation:

- CAPM – Capital Asset Pricing Model,

¹ Among other methods, the most popular one is the so-called DCF method (for estimating the cost of capital), which derives the cost of capital as an internal rate of return (IRR) where cash flows predicted by analysts are considered equal with the company’s current market valuation. See e.g. J.J. Siegel, *The Application of the DCF Methodology for Determining the Cost of Equity Capital*, “Financial Management” 1985, Vol. 14, No. 1, pp. 46-53.

² In terms of numbers, public companies are in minority practically in all the countries across the world, although they might be very significant to the economy. In the United States as of the end of June 2013 there were 4920 public companies, against 5434 in 2005 and 7194 in 2000.

– APM – Arbitrage Pricing Model, which is a multi-factor asset valuation model.

Combined application of the two models gives rise to many difficulties, particularly complications related to measurement. Nonetheless, both models are correct in theoretical terms as they incorporate risk and expected inflation. Application of CAPM involves estimation of three factors which jointly define the cost of capital:

- risk-free rate of return,
- market risk premium,
- systematic (market) risk.

The CAPM model is a widely applied method used to estimate the cost of capital in developed countries, where the data essential to determine the cost of capital of a given listed company, i.e. the risk-free discount rate, the expected market return and the risk index (beta) of this company, are relatively easily available. With reference to non-public companies, the main problem is to estimate the index risk. The formula of the CAPM model is as follows³:

$$k = R_f + \beta(R_m - R_f), \quad (1)$$

where:

- k – after-tax cost of equity,
- R_f – risk-free discount rate,
- R_m – expected rate of return on the market (average return on the stock market),
- β – risk index reflecting the volatility of returns for a given company in reaction to changes in returns on the market.

The model is sometimes called a single-factor model as it requires sole estimation of one variable measuring sensitivity of returns (i.e. the beta coefficient). CAPM offers different results depending on the techniques used to estimate individual components of the model. The differences concern the risk-free rate (which, in turn, implies the category of the market premium used), as well as the methods used to estimate the market premium (arithmetic or geometric mean) and the risk index.⁴

³ This formula may be found in most of the textbooks on finance, financial analysis and management accounting. See e.g. F.R. Kaen, *Corporate Finance*, Blackwell, Cambridge, Mass 1995, p. 294; *Ibbotson Cost of Capital 2009 Yearbook*, Morningstar, Chicago 2009, p. 22.

⁴ It should be noted that CAPM is a subject to criticism. For example, P. Fernandez maintains that: “The CAPM is an absurd model because its assumptions and its predictions/conclusions have no basis in the real world. According to the dictionary, a theory is “an idea or set of ideas that is intended to explain facts or events”; and a model is “a set of ideas and numbers that describe the

CAPM is used to estimate the cost of equity capital which under this approach is a function of individual risk index describing given share's sensitivity to the returns yielded by the economy as a whole (usually represented by the stock market index). The APM approach also enables estimation of the cost of equity but unlike the previous model it uses a variety of factors to determine the risk of a given business.⁵ The set of these variables can vary with the situation, and the most popular factors include⁶: the difference between interest on long- and short-term bonds, inflation rate, sales growth rate in the manufacturing industry, difference between high- and low-risk returns on corporate bonds. In practice, also other very specific factors may be incorporated (such as commodity price indices for a given industry, income level in certain groups of population, energy price index, oil price index, consumption of certain resources, etc). The APM model is defined as follows:

$$k = R_f + \sum_{i=1}^p \beta_i [E\{R_i\} - R_f] \quad (2)$$

where:

- k – after-tax cost of equity,
- R_f – risk-free discount rate,
- β_i – risk index reflecting volatility of returns for a given company in reaction to changes in i ,

past, present, or future state of something.” With the vast amount of information and research that we have, it is quite clear that the CAPM does not “explain facts or events,” nor does it “describe the past, present, or future state of something.” The use of CAPM is also a source of litigation: many professors, lawyers... get nice fees because many professionals use CAPM instead of common sense to calculate the required return to equity. Users of the CAPM make many illogical errors valuing companies, accepting/rejecting investment projects, evaluating fund performance, pricing goods and services in regulated markets, calculating value creation... It is important to differentiate between a fact (something that truly exists or happens: something that has actual existence; a true piece of information) and an opinion (what someone thinks about a particular thing). We all should try to explain a portion of “the world as it is”, not of “the world as we model it.” Ricardo Yepes, professor of philosophy of my university, wrote: “Learning means being able to keep perceiving reality as it truly is: complex - and not trying to fit every new experience into a closed and pre-conceived notion or overall scheme.” See: P. Fernandez, *CAPM: an absurd model*, <http://ssrn.com/abstract=2505597> [18.11.2014].

⁵ The assumptions of the APM model (sometimes also referred to as APT – *Arbitrage Pricing Theory*) may be found in the majority of textbooks on finance, investment and financial analysis. Cf. e.g. R.A. Haugen, *Modern Investment Theory*, Prentice-Hall, Englewood Cliffs 1993, pp. 260-273.

⁶ N.F. Chen, R. Roll, S.A. Ross, *Economic Forces and the Stock Market*, “Journal of Business” 1986, No. 59, pp. 383-403. An interesting attempt to apply the APM to the estimation of the cost of capital in various industries was made 20 years ago by a group of American researchers in their project commissioned by the Institute of Quantitative Research in Finance. Cf. M.A. Berry, E. Burmeister, M.B. McElroy, *Sorting Out Risks Using Known APT Factors*, “Financial Analysts Journal” 1988, March-April, pp. 29-42.

p – number of risk factors in the model,
 $[E\{R_i\} - R_f]$ – market risk premium for the i -th factor.

There is no standard, universal APM approach. The set of variables can vary with each economy, industry or group of companies. It can also change over time. On the one hand, it may be considered as the model's weakness but on the other it may be also seen as its strength (better reflection of the reality). Further in the text, estimations of the cost of equity using the two methods, CAPM and APM, in selected US companies are presented. The five-factor APM model used by the Alcar company takes into account the sensitivity of returns of individual stocks to the returns on the following factors⁷:

- short-term inflation (SINF),
- long-term inflation (LINF),
- short-term interest rates (INT),
- bankruptcy risk premium (PREM),
- monthly gross domestic product (GDP).

Both the CAPM and APM models have their limitations, which is why business valuation practitioners are more inclined to apply the build-up approach⁸. Further in the text the author will focus on the methods of estimating the cost of capital in a transborder (international) dimension.

2. New method of estimating the cost of capital in private companies

In the end of June 2013, in Poland, there were more than 4 million entities operating in the national economy, of which 364428 were companies. Among those companies there were 303551 limited companies and 10332 joint stock companies⁹. On the other hand, at the beginning of September 2013, there were 890 public companies, including 443 companies listed on the main and secondary markets of the Warsaw Stock Exchange and 447 companies listed on the alternative NewConnect market. These data show that public companies in Poland represent 8.6% of joint stock companies and only 0.24% of all the companies. There is

⁷ M. Grinblatt, S. Titman, *Financial Markets and Corporate Strategy*, McGraw-Hill, Boston 1998, p. 374.

⁸ D. Zarzecki, *Użyteczność metody składania w szacowaniu kosztu kapitału własnego*, "Przeгляд Organizacji" 2010, No. 2, pp. 36-40. Methods of estimating the cost of equity are also described in: D. Zarzecki, *Metody wyceny przedsiębiorstw*, Fundacja Rozwoju Rachunkowości w Polsce, Warszawa 1999, pp. 147-201, 245-260.

⁹ *Zmiany strukturalne grup podmiotów gospodarki narodowej w rejestrze Regon, I półrocze 2013*. GUS, Warszawa 2013, p. 31.

no doubt that business valuation professionals will more often face valuations of private rather than public companies.

The estimation of the cost of capital in non-public companies is usually based on the data and statistics available for public markets (stock markets) with appropriate adjustments tailored to specific characteristics of private companies. The most recognised method used to estimate the cost of equity in valuation of non-public companies is the Build-up approach, which – similarly to other methodological concepts – is based on historical data.¹⁰

The new method of estimating the cost of capital tailored to the needs of income-based valuation of private companies referred to as PCOC (Private Cost of Capital) was proposed by John Paglia and Robert Slee. The model is based on the results of a research project conducted by the Pepperdine University, which was started in 2007. In the questionnaire survey carried out under the project, expectations concerning returns were gathered for many sectors of private (non-public) capital markets; the questions were asked to various lenders (offering different types of debt or equity capital) who conveyed the details concerning a variety of criteria to be met by investors. Questionnaire surveys are conducted online in semi-annual periods; the surveys are addressed to professional financiers.¹¹

The PCOC model is as follow:

$$PCOC = \sum_{i=1}^N [(CAPi + SCAPi) \times MVi/MVT] \quad (3)$$

where:

- N – the number of sources of capital,
- MVi – the market value of all outstanding securities i ,
- MVT – the total market value of all classes of outstanding securities,
- $CAPi$ – the median expected return for capital type i ,
- $SCAPi$ – the specific CAP risk adjustment for capital type i .

There are four steps to determining PCOC¹²:

1. To determine the appropriate capital types by which to compare, review the credit boxes described in the most current Pepperdine survey (Table 1). Select the appropriate median CAP from the survey results for each qualifying capital type.
2. Determine the market value of each capital type (MVi).

¹⁰ D. Zarzecki, *Użyteczność metody składania...*, pp. 36-40.

¹¹ G.R. Trugman, *Understanding Business Valuation. A Practical Guide to Valuing Small and Medium Sized Businesses*, AICPA, New York 2012, pp. 483-486; R. Slee, J.K. Paglia, *Private Cost of Equity Capital Model*, "The Value Examiner. A Professional Development Journal for the Consulting Disciplines" 2010, March-April, pp. 23-31.

¹² R. Slee, J.K. Paglia, *op. cit.*, p. 29.

Table 1. PCOC Data (required return – gross annualized rates %)

No.	Source of financing	Description	I Quartile	Median	III Quartile
1.	Bank (Cash Flow Loan)	\$1M loan	5.4	6.5	7.1
2.	Bank (Cash Flow Loan)	\$50M loan	3.8	5.0	6.3
3.	Bank (Cash Flow Loan)	\$100M loan	3.6	4.8	6.1
4.	ABL (Asset-Based Lenders)	\$1M loan	6.5	12.0	18.0
5.	ABL (Asset-Based Lenders)	\$50M loan	3.0	3.3	4.0
6.	ABL (Asset-Based Lenders)	\$100M loan	2.8	3.0	3.5
7.	Mezzanine Funds	\$1M EBITDA	18.0	20.0	22.0
8.	Mezzanine Funds	\$25M EBITDA	17.9	18.5	19.0
9.	Private Equity Group	\$1M EBITDA	25.0	30.0	30.8
10.	Private Equity Group	\$25M EBITDA	25.0	28.0	30.0
11.	Private Equity Group	\$50M EBITDA	22.0	25.0	30.0
12.	Venture Capital	Startup	35.0	40.0	50.0
13.	Venture Capital	Early Stage	30.0	35.0	45.0
14.	Venture Capital	Expansion	20.0	30.0	40.0
15.	Venture Capital	Later Stage	20.0	30.0	35.0
16.	Business Angel	Seed	30.0	50.0	100.0
17.	Business Angel	Startup	30.0	40.0	75.0
18.	Business Angel	Early Stage	25.0	35.0	50.0
19.	Business Angel	Expansion	20.0	30.0	40.0
20.	Business Angel	Later Stage	20.0	30.0	40.0
21.	Factor	\$100K/month	58.5	74.5	88.2
22.	Factor	\$1M/month	35.4	41.2	53.6
23.	Factor	\$5M/month	31.3	32.7	35.4

Source: *Pepperdine Private Capital Markets Project Winter 2011 Report*, December 2010. Quoted in: G.R. Trugman: *Understanding Business Valuation. A Practical Guide to Valuing Small and Medium Sized Businesses*, AICPA, New York 2012, p. 484.

3. Apply a specific *CAP* risk adjustment (*SCAPi – risk adjustments*) to the selected median capital type based on a comparison of subject results to the appropriate credit box. Use first and third quartile returns as a guide to this adjustment.

4. Calculate the percentage of capital structure for each *CAP* (MV_i/MV_T). Multiply each weight of capital structure component by its *CAP*. Add individual percentages to derive *PCOC*.

In mathematical terms, *PCOC* is in fact the weighted average cost of capital. The major difference between *PCOC* and *WACC* is the method used to collect information essential to estimate individual components of the cost of capital. The classical *WACC* method uses historical data from public markets (cost of equity) and the actual borrowing rate in the credit market adjusted by the so-called tax

shield (cost of debt)¹³. In the PCOC method, on the other hand, all the data comes from the questionnaire survey and refers to the actual current expectations concerning returns for various categories of financing dedicated to private companies.

In a survey conducted in spring 2010 by Maretno Harjoto and John Paglia in the US market (350 correctly filled questionnaires in total), the following findings were made: debt accounted for 25% of total financing in private companies, after-tax cost of capital amounted to 8.4%, cost of equity – to 2%, effective tax rate – 32% and WACC – 16.67%.¹⁴ WACC in private companies turned out to be twice as high as in the case of public companies.¹⁵

Conclusions

In the traditional approach to valuation of non-public companies, it is assumed that the cost of capital estimated for public companies is the right reference for estimating the cost of capital also in private companies. The PCOC model, however, is based on a different assumption – that the public and private markets are not similar enough to consider them substitutes. Each of them has its specific, unique types of risk as well as expectations concerning returns. There are also structural differences. PCOC uses also market data on non-public companies (broad investors) which are suitable for private companies.¹⁶

The application of the PCOC model to estimation of the cost of capital in private companies is a relatively simple, interesting and intuitive method of estimating the cost of capital. It would be valuable to consider conducting a similar survey in Poland and other countries. The results might provide an alternative method to estimate the cost of capital in non-public companies – which represent a vast majority of business entities in any economy.

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¹³ The cost of debt is in fact the marginal borrowing rate determined based on the analysis of the existing loan agreements, interviews with lenders and observations of the current market rates used in companies with similar ratings. See: M.L. Zyla, *Fair Value Measurement. Practical Guidance and Implementation*, John Wiley & Sons, Hoboken 2013, p. 298.

¹⁴ M.A. Harjoto, J.K. Paglia, *Cost of Capital and Capital Budgeting for Privately-Held Firms: Evidence from Business Owners Survey*, “Journal of Accounting and Finance” 2012, Vol. 12(5), p. 83.

¹⁵ A. Damodaran, *Cost of Capital by Sector*, NYU Stern School of Business, 2010, http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/wacc.htm [9.09.2011].

¹⁶ R. Slee, J.K. Paglia, op. cit., p. 31.

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Koszt kapitału w spółkach prywatnych

Streszczenie. W artykule omówiono metody CAPM i APM – najważniejsze metody szacowania kosztu kapitału własnego. Następnie zaprezentowano nową metodę szacowania kosztu kapitału odpowiednią dla spółek prywatnych (niepublicznych). Jest nią model szacowania kosztu kapitału w spółkach prywatnych – Private Cost of Capital Model (PCOC).

Słowa kluczowe: wycena przedsiębiorstw, koszt kapitału w spółkach prywatnych, spółki niepubliczne