ESTIMATING SMEs COST OF EQUITY USING A VALUE AT RISK APPROACH

THE CAPITAL AT RISK MODEL

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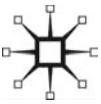

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To Silva, Ivana, Gianfranco,
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Contents

List of Tables xi

List of Figures xiii

Acknowledgements xv

About the Authors xvi

Introduction 1

1 The Financial Structure of Small and Medium Firms and the Impact on the Cost of Capital 6
1.1 Introduction 6
1.2 Literature review 7
1.3 Capital markets and growth: the equity gap 12
1.4 Business financing: a framework of reference 17
1.5 Options for growth and cost of capital 23
1.6 Conclusions 27

2 Valuation of Small and Medium Enterprises: Critical Aspects of Method and Evaluation of Credit Risk 31
2.1 Valuation of the firm 31
2.2 The valuation of small and medium enterprises: critical aspects 32
2.2.1 The comparable approach: stock market multiples 33
2.2.2 The comparable approach: correction of the Beta 34
2.2.3 Excess debt 38
2.2.4 The liquidity of the investment 39
2.2.5 Critical aspects of use 40
2.3 Cost of debt and cost of equity: a comparison 41
2.4 Models for debt pricing used in estimating the cost of equity 43
2.4.1 Probability of default 44
2.4.2 Loss given default 45
2.4.3 The models for estimating the cost of equity 47

2.5 Unexpected losses in equity returns 51
2.5.1 Value at Risk 54
2.5.2 Pricing unexpected loss 56

3 The Capital at Risk Model: Theoretical Aspects 59
3.1 Unlevered firms and totally levered firms 59
3.2 The Value at Risk Approach for pricing 60
3.3 Determination of the expected returns through a structural model 66
3.3.1 The expected returns by creditors for the levered firm 66
3.3.2 The required return by creditors for the totally levered firm 68
3.4 Determination of expected returns on debt: a practical example 69
3.4.1 Expected returns on debt for the levered firm 69
3.4.2 Expected returns on debt for the totally levered firm 71
3.5 Expected returns for levered firms 74
3.5.1 The model for estimation of the cost of equity without risky debt 75
3.5.2 Model for estimation of the cost of equity with risky debt 76
3.5.3 The general formula for quantification of the cost of equity: an example 76
3.6 The Capital at Risk Model with corporate taxes 79
3.7 Corollary: optimal capital structure 80

4 Application of the Capital at Risk Model to Small and Medium Enterprises 85
4.1 The unlevered firm: expected returns 85
4.2 The capital at risk 85
4.2.1 Probability distribution of the operating earnings and the returns 87
4.2.2 The historical ROCE probability distribution 88
4.2.3 The construction of future scenarios to determine capital at risk 92
4.3 The loss rate for the shareholders 94
4.4 Cost of debt 97

4.5 Cost of capital for the indebted firm 98
4.6 The Capital at Risk Model: an example 98
4.6.1 Cost of equity for unlevered firms and without taxation 98
4.6.2 The cost of the third-party capital 101
4.6.3 The cost of the equity capital for the levered firm 102
4.6.4 The model with corporate tax 103

5 The Capital at Risk Model Applied to the Firms Alpha, Beta and Gamma 105
5.1 Introduction: objectives and presentation of the ADI rating 105
5.2 Alpha 108
5.2.1 Qualitative analysis 108
5.2.2 Economic–financial analysis 111
5.2.3 Quantification of the cost of capital 113
5.2.4 Economic and financial plan 118
5.2.5 Valuation of Alpha through discounted cash flows 121
5.2.6 Use of the cost of unlevered capital obtained with the CAPM/total Beta method 121
5.2.7 Use of the cost of unlevered capital obtained with the CaRM method 123
5.2.8 Valuation of the costs of financial distress 124
5.3 Beta 125
5.3.1 Qualitative analysis 125
5.3.2 Economic–financial analysis 128
5.3.3 Quantification of the cost of capital 130
5.3.4 Economic and financial plan 135
5.3.5 Valuation of Beta through discounted cash flows 137
5.3.6 Use of the cost of unlevered capital obtained with the CAPM/total Beta method 139
5.3.7 Use of the unlevered cost of capital obtained with the CaRM method 140
5.4 Gamma 141
5.4.1 Qualitative analysis 141
5.4.2 Economic–financial analysis 144

5.4.3 Quantification of the cost of capital 146
5.4.4 Economic and financial plan 152
5.4.5 Valuation of Gamma through discounted cash flows 154
5.4.6 Use of the unlevered cost of capital obtained with the CAPM/total Beta method 156
5.4.7 Use of the unlevered cost of capital obtained with the CaRM method 157
5.5 Conclusions 158

Appendix A 167

Appendix B 186

References 197

Index 205

List of Tables

3.1	Output obtained with the Merton model	70
3.2	Expected returns on debt for various levels of debt	73
3.3	Cost of equity for various levels of debt	77
3.4	Value of the firm and costs of financial distress	81
4.1	Determination of the Value at Risk and of the k factor	90
4.2	Analysis of scenario	100
5.1	Technical score	106
5.2	Categories of credit worthiness	106
5.3	Interest coverage ratio and ratings for smaller and riskier firms	107
5.4	Probability of default for categories of rating	107
5.5	Financial and economic analysis of Alpha (2008–2012)	111
5.6	Alpha rating (2008–2012)	112
5.7	Alpha comparables	113
5.8	ROCE values for Alpha (2003–2012)	114
5.9	Alpha assumptions	118
5.10	Alpha P/L	119
5.11	Alpha balance sheet	120
5.12	Alpha cash flow statement	120
5.13	Financial and economic analysis of Beta (2008–2012)	128
5.14	Beta rating (2008–2012)	129
5.15	Beta comparabes	130
5.16	ROCE values for Beta (2003–2012)	131
5.17	Beta assumptions	135
5.18	Beta P/L	136
5.19	Beta balance sheet	136
5.20	Beta cash flow statement	137
5.21	Financial and economic analysis of Gamma (2008–2012)	145
5.22	Gamma rating (2008–2012)	146
5.23	Gamma comparables	147
5.24	ROCE values for Gamma (2003–2012)	148
5.25	Gamma assumptions	152

5.26	Gamma P/L	153
5.27	Gamma balance sheet	153
5.28	Gamma cash flow statement	154
5.29	Cost of capital for different values of CaR% and loss rate	161
A.1	Conditional descriptive statistics for the ROCE	172
A.2	Conditional empirical quartiles for the ROCE	173
A.3	Distribution of frequency of the observations for years (2003–2007)	175
A.4	Distribution of frequency of the observations for years (2008–2012)	176
A.5	Statistics describing the explanation variables	177
A.6	Empirical quantiles of the 'explanation' variables	177
A.7	Co-relationships between variables considered in the study	178
A.8	Test for the absence of linear co-relationship	178
A.9	Results of linear regression on the panel data	182
A.10	Statistics describing regression residuals for dynamic models	183
B.1	Empirical quantiles for the context variables according to Ateco code	186
B.2	Empirical quantiles for the ROI for year and type of company	187
B.3	Empirical quantiles for the variables of context by year	189
B.4	Empirical quantiles of the ROCE for year and Ateco code	191
B.5	Descriptive statistics for the conditional ROCE at the Ateco codes observed	193

List of Figures

1.1	Corporate finance: a framework	18
3.1	Value of the capital invested in theoretical certain and uncertain flows	64
3.2	Distribution of the asset values	67
3.3	Expected return on debt, as a function of the leverage ratio	74
3.4	Cost of equity, as a function of the leverage ratio	79
3.5	Dynamic of the value of the firm with fiscal benefits on the debt and costs of financial distress	81
3.6	Progress of the cost of the capital with an increase in the leverage ratio	82
4.1	Breakdown of the unlevered value	86
5.1	Business hierarchy chart for Alpha	108
5.2	Packaging sector performance	109
5.3	End market Alpha	110
5.4	Positioning throughout the life cycle of Alpha's product	110
5.5	Performance of Alpha ROCE (2003–2012)	115
5.6	Division of business value (CAPM /total Beta approach)	122
5.7	Division of the business value (CaRM approach)	124
5.8	Business hierarchy chart for Beta	125
5.9	End market Beta	126
5.10	Positioning throughout the life cycle of Beta's product	127
5.11	Performance of Beta ROCE (2003–2012)	132
5.12	Division of the business value (CAPM approach)	139
5.13	Division of the business value (CAPM /total Beta approach)	140
5.14	Division of the business value (CaRM approach)	141
5.15	Business hierarchy chart for Gamma	142
5.16	The furnishing sector in Italy (2003–2012)	143
5.17	End market Gamma	143
5.18	Positioning throughout the life cycle of Gamma's product	144

5.19	Performance of Gamma ROCE (2003–2012)	148
5.20	Division of the business value (CAPM approach)	155
5.21	Division of the business value (CAPM /total Beta approach)	157
5.22	Division of the business value (CaRM approach)	158
5.23	Comparison of CAPM total Beta and CaRM for different levels of rating	164
5.24	Equity/book value comparison	165
5.25	Cost of equity, unlevered CAPM compared to CaRM	165
A.1	Historical distribution of ROCE	168
A.2	Distributions of the conditional ROCE observed on the Ateco code	169
A.3	Distributions of frequency of the conditional ROCE for the five Ateco codes chosen	169
A.4	Distributions of frequency of the conditional ROCE for the three types of companies identified in the dataset	170
A.5	Distribution of the conditional ROCE for the year of observation	170
A.6	Study of the relationship between quantitative variables	179
A.7	Diagnostic plot for model residuals	185

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Introduction

Estimating business value is a problem of great complexity, which fascinates academics and professionals due to variables not yet clarified and for its importance in the decisions that the financial community makes constantly, as investment plans begin with a comparison between cost and value. Only a comparison between costs and benefits allows one to make rational and effective choices, but this implies a profound knowledge of the variables necessary to resolve the problem of capital budgeting. Whereas cost usually represents well-known market data, value is the essence of accurate investigations, projections and analysis, which seek to describe an investment's ability to generate adequate returns in relation to the degree of risk of the operation.

Measuring value is an ever more relevant topic from many perspectives: operations of M&A, strategies of development, integration and restructuring of businesses and in the preparation of accounts[1]. The logic of the value includes the requirement of interpreting the dynamic of expected flows, of projecting it over a period of time appropriate for the type of investment, knowing the operational risk and summarising it in a discount flow rate. The objective difficulty associated with a process of valuation is calculating the variables that, as they are projections, can only be estimated by the analyst. The more distant the effective values in respect of those expected, the greater the over or undervaluation which can result, making the study of every type indispensable to reflect the specific features of the firms.

The variable to which academics have always paid most attention is the 'cost of capital' which constitutes the discount rate to be used in the process of actualisation of the flows and that should interpret the remuneration expected on investments in markets with the same degree of risk. As the firms can choose to finance their own needs completely by means of the shareholders (unlevered) or by means of the shareholders with creditors (levered), we have in any event the problem of estimating the cost of capital contributed by the shareholders. Over time, financial scholarship has proposed many approaches to estimate the cost of capital including CAPM (Sharpe 1964; Lintner, 1965; Black, 1972), the Dividend Discount Model (Gordon and Shapiro, 1956), APT (Ross, 1976), the Three Factor Model (Fama and French, 1993), the approach based on market multiples and the approach based on options theory (Black and Scholes, 1973; Merton, 1974).

The best known and most widely used is certainly the Capital Asset Pricing Model, both in the basic and modified versions. This is a single factor model according to which the expected return from the shareholders can be divided into a risk-free component and a premium for risk weighted by a beta coefficient. The risk premium represents the differential expected from a well-diversified investor who invests their capital in the market portfolio. The beta coefficient expresses the reactivity that the asset of interest shows towards the market, identifying the only risk parameter for the well-diversified investor. The estimate of this parameter requires a historical series of company prices, information that is available only for listed companies, which makes this measure partially or totally inadequate for unlisted firms in a regulated market. For these unlisted firms, the inadequacy of the traditional models in their original formulation makes a series of corrections necessary, to take into account the many aspects that distinguish unlisted firms from listed firms. Indeed, as well as not having available historical data on the returns, unlisted firms are often small and, as has often been demonstrated empirically, this can produce extra returns that the CAPM is unable to capture in the original formulation. Moreover, the entrepreneur or the shareholders of target firms often do not hold a well-diversified portfolio, as their capital is usually invested in one or just a few initiatives. This increases the investment risk, as 'idiosyncratic risk' is also added to the risk. Finally, the reliability of available historical

data is often very low in terms of explaining the development of the actual risk.

All this obliges us to review traditional models, to re-adapt them to business situations in small or medium unlisted firms. The most widespread approach consists in using market information for (listed) comparable firms with the (non-listed) target firms. This is based on the assumption that, by exploiting a sufficiently wide sample of listed comparable firms to the target firms, in terms of sector of belonging and degree of risk, one can estimate the risk parameter of interest (for example the beta), calculating an average beta for listed firms and applying it to target firms, after having corrected it according to the degree of financial leverage of the latter. In our opinion, the use of this method can lead to results that are at times aseptic in respect of specific features of the target firms, if the application is done using a simple sector average. Indeed, it should not be forgotten that the comparables are usually large business groups with very different growth rhythms, operational leverage, financial leverage, and accounting and tax situations from those of the target. Finally, we must not forget the objective difficulty of always being able to find a sample of comparable firms.

To avoid such a problem, this work proposes an alternative model to estimate the cost of risk capital valid also for firms not listed. This model, known as CaRM (Capital at Risk Model), bases the estimate of the cost of the risk capital on the VaR (Value at Risk) for the first time. The VaR models have been known for some time as instruments of risk management and are particularly useful to measure the maximum loss that can occur with a predefined confidence level over a certain period of time. Despite their limits, they have been used for some time to estimate credit and market risk. Indeed, the estimated quantification of credit risk for the pricing of credit often considers a spread higher than the simple remuneration of the loss expected, so as to cover unexpected losses quantified through VaR methods.

If the unexpected losses describe the risk premium associated with a credit operation, probably the same unexpected losses could describe the risk premium expected by shareholders. Indeed, if the expected third-party remuneration were calculated at the limit for an extreme debt level (firms totally levered), the creditors of these firms would find themselves in a situation similar to that of the shareholders

acting solely as lenders (unlevered firms). By exploiting the model of Merton and of Modigliani and Miller (1958), we can see how, for growing levels of debt, the expected return by third-party lenders goes from the initial risk-free rate (because at low levels of debt there is no unexpected loss) to gradually higher values (since loss grows). Indeed, an increase of the financial leverage highlights increasing values of unexpected loss, so that, in absence of taxation, for a ratio between financial debt and asset value of 100% (Equity value is zero), the expected return on the debt is equal to the expected return by shareholders of unlevered firms (as the only risk is operative risk). Basically, starting from a model for credit pricing based on a Value at Risk approach, we first reach the estimated cost of the risk capital for unlevered firms and subsequently for levered firms.

Moreover, to apply this model, we have tried to provide an explanation based on the dimensions which define the risk premium associated with the discount rate. Generally, the model is based on the theory that the flows to be discounted during the process of business valuation (expected flows) can be divided into certain flows and uncertain flows. Those flows considered certain are flows with very high probability of recovery, representing the percentile of the probability distribution of future flows at the confidence level desired. As flows are very unlikely to descend below the minimum level, we have decided to consider them 'certain' flows and discount them at a risk-free rate. The uncertain flows (represented by the difference between flows expected and the certain flows) are risky flows that, as such, need to be discounted at a rate in line with the risk and thus provide the Capital at Risk value. Therefore, the value of a financial activity is the sum of the current value of certain flows plus the current value of uncertain flows (CaR). In this way, the cost of the risk capital can be calculated as the risk-free rate over the fraction of certain capital and the free-risk rate plus a risk premium over the fraction of uncertain capital.

After having illustrated the critical issues inherent in financing small and medium firms, the impact of the specific structure of the capital on the expected return of the contributing risk capital (Chapter 1), the operative solutions to estimate the cost of capital best adapted to such types of firms and how own techniques for pricing credit risk can be used to estimate the cost of risk capital (Chapter 2), we describe the theory behind the CaRM (Chapter 3),

and an adaptation is provided for firms not listed on the regulated markets (Chapter 4) and finally we provide a comparative analysis with the CAPM method through three case studies (Chapter 5).

These cases have indicated not only that the results are in line with the well-known theory of Modigliani–Miller but they have also highlighted a close dependency between the cost of risk capital and ratings, which is fundamental today in light of the specific economic and financial context of reference and the influence that the rating attributed to a firm can have on its value. The approach developed has the advantage of summarising in a single parameter the specific risk associated with the operation, as well as considering the risk of fluctuation in flows produced from variations in market conditions, plus the degree of financial and operational leverage of the firms, and incorporating elements of the specific firm; such as, for example, variations in business volume and more or less accentuated flows in respect of the market average, the degree of investment necessary to maintain the productive structure unchanged and the major downwards shift which the expected value can suffer. It is interesting to observe how the results obtained with the latter model, unlike the CAPM, are in line with the degree of risk of the firms analysed. More specifically, the expected returns grow to the detriment of the rating[2] attributed to the firms. Behavioural analysis indicates that use of the CAPM could cause an underestimation of the cost of capital if the firms were high risk and an overestimation in the case of low (or average) risk firms. Despite having used a very limited sample, we believe that the results achieved are thought provoking and worth further study.

Notes

Introduction is written by Gabriele Toniolo.

1. As the IAS/IFRS principles allow in application of 'fair value'.
2. This rating reflects the firm's general risk.

1
The Financial Structure of Small and Medium Firms and the Impact on the Cost of Capital

1.1 Introduction

This chapter examines the main critical aspects relevant to financing small and medium-sized enterprises (SMEs). Consolidated scholarship fully identifies the implicit constraints to SME financing. Such academic research is extremely interesting, as it explores links with the theory of market imperfections. More specifically, some scholarship of greater significance highlights the effects of the asymmetrical distribution of information on the conditions of financing SMEs and the conditions that can lead to credit rationing. In the case in point, the research identifies orders of priority in choosing preferred sources of financing.

Thus, there would be endogenous factors related to the same market functioning that would impose significant links to an SME's access to sources of financing using debt or equity. Naturally, the financial links then become strong links to development. However, market internationalisation involves a relevant financial need associated with development, competition on a global scale and the ability to support the process of innovation essential to business continuity. As well as the aforementioned factors, which we can describe as structural, we add the cyclical factors associated with the normal progress of expansive and recessive stages of the macroeconomic cycle. The formation and subsequent explosion of speculative market bubbles (especially on the credit markets) can intensify drying up of flows of liquidity to the firms.