Risk-Adjusted Performance Measurement in Banks, with special consideration of the EVA

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List of abbreviations:

EVA	Economic Value Added
NOPAT	Net Operating Profit
NOA	Net Operating Assets
RAROC	Risk – adjusted Return on Capital
RORAC	Return on Risk – adjusted Capital
RARORAC	Risk – adjusted Return on Risk – adjusted Capital
CF	Cash Flow
ROE	Return on Equity
ROI	Return on Investment
ROA	Return on Assets
VaR	Value at Risk
TSR	Traditional Sharpe Ratio
SR	Sharpe Ratio
ROCE	Return on Capital Employed
BIS RATIO	Bank for International Settlement Ratio
RWA	Risk – Weighted Assets
WACC	Weighted Average Cost of Capital

1. Introduction

The concept of Economic Value Added (EVA) was established in 1991 by the New York & Company consultants Stern Stewart Co. as an integrated management - developed and incentive system for the control and management of companies. Core of the EVA approach is to make clear whether a company or a division brings an economic value added, the target being the increase of the shareholder value. Especially in recent years, such value-based concepts enjoyed an increasing popularity, in connection with which EVA gained a special role. As part of a value-oriented management is the Economic Value Added – under the consideration of the shareholder value approach - a crucial measurement and controlling indicator in investment decisions, in the measurement of performance and efficiency and nevertheless as an incentive system. In the meantime, the concept is already adopted by many (top) companies from almost all industries such as Allianz, Sony, Siemens and Coca-Cola.

The idea of the EVA concept is nothing new and has been part of tools of economics and economists for more than 200 years under the name of "economic profit". But why has this concept been won in recent years increased attention and how does it differ from the conventional concepts of corporate management? To answer these questions, the present theses will deal intensively with the basic features of the EVA concept, its calculation and the numerous applications in practice. The focus of this work is to make the transfer of the concept to the banking sector.

The application of the Eva in banks is relatively new, as it started to be implemented in U.S. in 1994. As the banking industry significantly differs from other business sectors, this paper analyses the application of the EVA concept in the banking business. The aim here is taking into account the peculiarities of the banking sector and show in the end of the paper how the EVA is calculated on different levels of a bank, by using as an example the UniCredit Bank Austria AG.

In a first step, first shown at the beginning of the work systematically and in detail the principles and goals of a value-oriented corporate governance. Since the shareholders

have a strong interest in increasing shareholder value, this is the focus value-added management. At the same time this will also address the interaction with the demands of other stakeholders of the company and the interest conflicts of the managers.

A company that wants to value-oriented economy uses an appropriate control and measurement system to implement the strategic and operational performance targets. Various approaches can be implemented for the performance measurement, like the Return on equity or risk-adjusted performance measurement models, like the RAROC, RORAC or a combination of the two – the RARORAC. The purpose of the risk-adjusted performance measurement is on one hand to analyze the profitability of individual transactions or different business units. On the other hand, the risk-adjusted performance measurement concepts offer the management the basis for decision making regarding the adequate capital allocation. The chapters 4 and 5 deal with the return on equity and the give an overview of the risk-adjustment performance measurement indicators.

The following chapter, chapter 6 represents the main part of this master theses and deals with the concept of the Economic Value Added, both as a general approach and as a concept for the banking sector. EVA (Economic Valued Added) is a modern financial measurement tool that determines if a business is earning more than its true cost of capital. Including a cost for the use of equity capital sets EVA apart from more popular measures of bank performance, such as return on assets (ROA), return on equity (ROE), net banking income and the efficiency ratio, which do not consider the cost of equity capital employed. As a result, these measures may suggest a bank is performing well, when in fact it may be diminishing its value to its shareholders. Therefore, this chapter shows the overall concept of the EVA, by going into the calculation of the EVA components: NOPAT, NOA and the Cost of Capital. Furthermore, as already stated, this paper looks at how the EVA is implemented and calculated in banks. An important milestone towards the EVA application is the capital requirements, dictated by the Basel Committee. Due to the significant changes in the

financial markets since 2008, this paper will give an overview both of the Basel II and Basel III requirements.

The EVA concept on can be implemented on both total bank level and on the downstream levels of the bank. These might be segments (Retail, Corporate or Private), departments or units so the bank calculates the so-called Macro EVA for the total bank and Micro EVA for the segments. Chapter 6.4 explains what Macro and Micro EVA means and how it is calculated in the UniCredit Bank Austria.

Both the EVA and the RARORAC have more than the role of evaluating the performance. They are also tools for decision-making, when it comes to capital allocation. Moreover, when looking more closely into the formulas of both indicators, we see a relation between them. With these two issues deals chapter 6.5 and 6.6.

As a result of the findings, a calculation example based on the published UniCredit Bank Austria results is closing this paper. The results are as of December 2010 and the calculation is first on total bank level, then on division level. In this way, the reader gets not only a theoretical overview of what the corporate evaluation in banks is about, but also a look into how the theory is put into practice.

2. Value Based Management

The concept of "value-oriented corporate management" was introduced in the United States during the 80s. The value-based management represents consistent orientation of a company to create sustainable value and thus, depending on the Performance and Value added of the whole company, the managers can be remunerated.[1]

Reasons for the development of the value – oriented corporate management were the protection against hostile take-overs, alignment of the investments in the company's value and the search for standards for the management performance.[2]

2.1 Shareholder Value Approach

Because of the globalization of capital markets and increased implication of the shareholders in the company's decisions, many companies started implementing the "shareholder value approach". This approach originated in the United States, putting the objectives and requirements of the existing shareholder of a company in the center of the corporate activities and decisions.[3]

As part of a greater emphasis on national and especially international capital markets, companies seek for capital in order to investment, expand or develop new products As part of a greater emphasis on national and especially international capital markets, companies seek for capital in order to investment, expand or develop new products. A clear advantage in this will be held by the companies that can attract investors by guaranteeing that the entire management is consistently focused on the efficient use of capital and on maximizing shareholder value.[4] At the same time, this increase in value represents an efficient allocation of resources.

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[1] Cp. Stern, J. (2002): Wertorientierte Unternehmensführung mit EVA, München, P. 2.
[2] Cp. Stern, J. (2002), P. 28 et sequentes
[3] Cp. Albach, H. (1994): Shareholder Value, in: Zeitschrift für Betriebswirtschaft, P. 273ff
[4] Cp. Stern, M. / Shiely, J. (2002): Wertorientierte Unternehmensführung mit Economic Value Added, P. 9

In this context, the shareholders are interested in receiving the highest possible return for the least possible risk for the invested capital (equity).[5] This return is calculated from the accumulated dividend payments and the increase in the share price of the company. The maximization of this future income corresponds to the alternative goal to increase the market value of the equity, because the market value is the price for which the share of a company can be sold.[6]

The shareholder value approach is a business concept that sees the company's activities as a series of payments, the cash flows (CF). By sing the free cash flow (FCF), the value of the company is can be determined. Shareholder value is derived from the discounted valuation point on the free cash flows less the market value of debt. The shareholder value approach involves value management, which in identifies restructure and optimization potential in all areas of the company.[7] Therefore, a management will follow such a strategy, which will have as an aim the increase of the company's value.

For a shareholder the shareholder value is the "total return", which consists of the sum of the market profit, dividends and subscription rights. The formula for the calculation of the shareholder value is:

$$\textit{Shareholder Value = Corporate Value – Borrowed Capital}^{8}$$

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[5] Cp. Schmid, R.H. / Terberger, E. (1999): Grundzüge der Investitions- und Finanzierungsrechnung, P. 48
[6] Cp. Oletzky, T. (1998): Wertorientierte Steuerung von Versicherungsunternehmen: Ein Steuerungskonzept auf Grundlage des Shareholder-Value-Konzepts, in: Versicherungwissenschaften in Hannover, P. 35
[7] Cp. http://www.steuernetz.de/homepages/steuerberater_wirtschaftspruefer/clex/s2.html vom 16. April 2005.
[8] Cp. http://www.steuernetz.de/homepages/steuerberater_wirtschaftspruefer/clex/s2.html vom 16. April 2005

Together with an increase in the market value orientation of the companies, the shareholder value approach became more and more important. This is the starting point for the long-term success and increase in the shareholder value of a company.[9]

In this context, the Economic Value Added (EVA) is a key indicator that helps us to see if the management creates a value added for both the company and shareholders.

2.2 Stakeholder Value Approach

The consideration of shareholder interests as a primary goal does not mean that the value added should be achieved at any price. If a company wants to remain successful, the success must not the achieved at the expense of others. Besides the shareholders, there are additional stakeholders, who are interested in the actions a company is undertaking. These could be the customers, suppliers, the society and especially the employees.[10] An organization can be considered efficient in the purposes of the stakeholder approach if it is able to meet the demands of these different interest groups, thereby increasing the value of the company for all stakeholders and making it sustainable and secure.[11]

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[9] Cp. Herbeck, T. / Krammer. C. / Sinn, W. (2001): Maximierung der Aktienrendite durch wertorientierte Gesamtbanksteuerung in: Die Bank, (2/2001), P.128
[10] Cp. Hahn, D. (1996): Controllingkonzepte, P. 14 et sequentes
[11] Cp. Steinle, C./ Thiem, H./ Dunse, A. (1998): Beteiligungs-Controlling Grundlagen, Realtypen und Gestaltungsempfehlungen, in: CONTROLLING, 10 Jg., 1998, Heft 3, P.140 et sequentes

Below you can find a graphical illustration of the possible stakeholder's of a company:

Figure 1: Stakeholder of a company[12]

The value contributed by the stakeholders to the success of the enterprise, can be measured with the "return on stakeholder" (RoST). The benefits and costs for each stakeholder are here set in a relationship and it can be derived, how much benefit generates. For calculations, the following formula can be used:[13]

Return on Stakeholders = $\dfrac{\textit{Present Value of Benefits}}{\textit{Present Value of Cost}}$

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[12] Own drawing
[13] Cp. Figge F. / Schaltegger S. (2000): What Is 'Stakeholder Value'? Developing a Catchphrase into a Benchmarking Tool, P. 34

The stakeholder concept brings a number of benefits for different groups with it, for example benefits to the society. In this case, this approach leads to an increased transparency that increases public welfare and has a positive impact on the environment. A number of other advantages exist for the state, the investors, the suppliers, customers or employees.[14] However, a conflict management is needed, when the stakeholder approach is a part of a company's life, due to the different interests of different groups. This way, an improper allocation of resources is avoided.[15]

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[14] Cp. Berndt, R. (1997): Business Reengineering, P.133
[15] Cp. Berndt, R. (1997), P. 132.

3. Banks as a Special Case of Corporate Valuation

The main question here is what are the fundamental differences between the valuation of a financial institution and industrial concerns, especially how do banks differ in this context.

One of these peculiarities of the banking business is the banking service itself. It is often characterized by immateriality and thus it contains a time component. Unlike in the industrial production, the business relationship between a credit institution and its customers often does not end with the sale of a product or a service. Moreover, due to the lack o of patent protection, banking products or services are characterized by a limited ability to differentiate products from within the industry.[16]

Therefore, each bank tries, through intensive customer service and care or special services in retail business to better position itself and to stand out against competitors. However, this means that banks differ in their business models from each other and the banking industry is, therefore, inhomogeneous.

The creation of an individually designed strategy is connected with the formation of a bank-specific risk profile with appropriate reflection in the profit and loss account and the relevant valuation indicators. The influence of the risk profile is shown, depending on the business model, in a pronounced sensitivity to credit cycles and credit quality of the borrowers, in the development of certain market prices, like the stock markets.[17]

For the external observer, it is almost impossible to assess the risk adequacy by the measures taken in the risk profile by a credit institution. This would require far-reaching, detailed information on individual bank-specific risks, which are usually not published.

From an investor perspective, however, are bank-specific risks currently of particular interest. The better the bank manages its own risks, the higher is the willingness of investors to invest in the credit institution. In addition, a bank regulatory legal interest is one of the risks of a bank. The insolvency of an individual credit institution represents, in

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[16] Cp. Schubert, T. (1995): Strategische Allianzen im internationalen Bankgeschäft, P.15 et sequentes
[17] Cp. Koch, T. (2000): Bankmanagement, P. 41 et sequentes

contrast to that of an industrial company, is a threat to the entire banking system and thus to the economy, therefore the determination of the risks ad their management plays an important role not only in a bank's valuation.

Given the special sensitivity of banking confidence and the partly insufficient quantification, but also the qualification of the risks, risk management has gained significant importance in the recent years. This is an additional difference between banks and industrial companies. The aim of the risk management is to anticipate risks and absorb them adequately in case of occurrence. Moreover, as an expression of risk management of banks regulatory codes, the BIS Tier I ratio (explained in chapter 6.3.1) are taken into the business strategy and business targets.

Another difference to the industrial companies is the importance of the balance sheet. Since the acquisition of customer deposits is one of the main parts of the banking business, the passive side of the bank's balance sheet has financing function. Moreover the business activities of a bank not only affect their balance sheet structure, but also the content of the statement of cash flows.[18]

The importance of capital flows is limited as in traditional banking it is difficult to make distinctions between operating activities, investing activities and financing activities, distinctions needed for the cash flow method. This results in comparison to industrial companies not only to bank-internal valuation methods, but also to special difficulties in predicting future economic success of a Bank.

Another special feature of the banking business are the strict legal capital requirements. Banks must, unlike industrial companies, hold a certain minimum amount of equity, in order to run their businesses. Chapter 6.3.1 deals with the capital requirements for banks.[19]

One lets go of the individual assessment and finally takes a macroeconomic perspective, to show further differences between financial institutions and industrial

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[18] Cp. Werner, T./Padberg, T. (2002): Bankbilanzanalyse, P. 8 et sequentes
[19] Cp. Werner, T./Padberg, T. (2002), P. 14

companies. Thus, the credit-economic environment in the form of fiscal and monetary policy decisions are very significant for the operational success, and thus for the value of a bank. Furthermore, in an economy banks become responsible for the financial balance between saving and investment decisions. Finally, the conversion of national financial markets to internationally networked financial systems increases the pressure to adopt international standards, both on banks and the local financial market.[20]

The following chapters will shows how risk-adjusted performance measurement and economic value added is dealt with in a bank.

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[20] Source: Capital Management Department UniCredit Bank Austria

4. Return on Equity

The Return on Equity (ROE) is one of the most popular ratios in the Bank analysis. It is one of the 5 Key Ratios of the famous BAI Index of Bank Performance.[21] The ROE enjoys great popularity both in the external analysis of banks and as an internal management tool. Nevertheless, to the interpretation of ROE should be paid more attention. The common interpretation: "The higher the ROE, the better the future performance of a share" is not always consistent. A study showed that there is actually no correlation between the ROE and the future performance of a share.[22]

For an analysis of the future share price, besides the absolute value of the ROE, a great role is played by the changes in ROE and the risk. Bank representatives note that the regulations for capital requirements have a disadvantageous impact on the cost of capital. Though there are minimum capital requirements and legal regulations that restrict the possibility of manipulating the equity in order to maximize the ROE, for a proper assessment of a bank's profitability a risk-analysis, in addition to the profitability analysis is a prerequisite. Therefore, ROE is comparable to the return required by investors. The development of an ROE increased by reducing the capital requirements goes parallel with higher risk, which is reflected in higher cost of equity. In perfect capital markets the high yield effect is offset by the higher risk.[23] If the ROE is increased in this way, there is no real value increase. When increasing ROE, which is in practice, is seem as an increase in shareholder value, banks must as well analyze the changes in risk. Therefore, the ROE can be calculated according to the leverage-adjusted return on equity formula:[24]

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[21] Other key ratios are Net Intererest Margin, ROA, Yield on Earning Assets and the Break-Even Yield
[22] Cp. Bodmer, A. (2001): Value-Based Management für Banken, S.56, after Knight (2007), P. 41-42
[23] Cp. Bodmer, A. (2001), S. 56, after Volkart (1999), P.158
[24] Cp. Bodmer, A. (2001), S. 56, after Volkart (1999), P.158

$$ROE = ROI + \frac{DC}{EC} \times (ROI - k_{DC})$$

Where:

DC: Debt Capital

EC: Equity Capital

When the ROEs of several banks are compared, it happens according to the above formula based on adjusted capital base. The comparability of the ROEs of different banks is also limited because both the numerator and the common denominator are accounting figures that are affected by legal regulations.[25]

Due to the fact that ROE is an exclusively profit-oriented ratio, it must be further analyzed and split by components. These offer a picture of the risk components and their changes over the time.[26] Goldman Sachs developed such a model, called Gorilla – Model, which breaks down ROE into seven indicators:[27]

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[25] Cp. Bodmer, A. (2001), S. 56-57
[26] Cp. Bodmer, A. (2001), S. 57
[27] Cp. Bodmer, A. (2001), S. 57

Gearing	=	Total Assets **Equity**
Operating Efficiency	=	Revenues Gross Profit
Return on Revenues	=	**Profit before Tax** Revenues
Income Tax & Minorities	=	**1 - (Taxes + Minorities)**
Loan Loss Provisioning Rate	=	Provisions for Lost Loans Total Loans
Loan Loss Coverage	=	Gross Profit Provisions for Lost Loans
Asset Utilisation	=	Loans Total Assets

Figure 2: Gorilla – Model for ROE Analysis[28]

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[28] Source: Bodmer, A. (2001), S. 57

5. Risk – Adjusted Performance Measurement

By Risk – adjusted Performance Measurement (RAPM) are generally meant approaches that seek a two-dimensional performance measurement with explicit consideration of the risk of a particular transaction, a portfolio or a business unit.[29] The purpose of the RAPM concepts is the comparison between different bank activities with different risk profiles.[30] RAPM analysis can help the bank management to make rational decisions on the capital allocation, thus on the development, limitation or elimination of some operations.[31] With the help of the RAPM concepts, different profit levels can be compared among them on a risk-adjusted base. Here, there are two different aspects to be mentioned:[32]

- Ex ante-perspective: an important aspect of the risk/return perspective is the existence of two different investment possibilities, which differ in the return expected and the risk potential. A risk-adjusted contemplation of the returns ex ante allows a consistent comparison and thus constitutes a rational basis for decision-making.

- Ex post-perspective: a second standpoint of the risk-adjustment is the performance evaluation from an ex post perspective.[33] If the results of different banking activities with different risk profiles are available, then they are to be compared on a risk-adjusted basis.

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[29] Traditional ratios like ROA or ROE are one-dimensional performance measurement instruments
[30] Cp. Jovic, D. (1999): Risikoorientierte Eingekapitalallokation und Performancemessung bei Banken, P. 163
[31] Cp. Jovic, D. (1999), P. 163, after Jovic, D. (1998), P. 57
[32] Cp. Jovic, D. (1999), P. 163f, after Dowd (1998), P. 141
[33] Cp. Jovic, D. (1999), P. 164, after Zimmermann (u.a) (1996), P. 67

The following graph gives an overview of the different RAPM key figures:

Risk-adjustment / Capital base	Numerator	Common denominator	Numerator & Common denominator
Equity (Base: ROE)	Risk-Adjusted Return on Capital (RAROC)	Return on Risk-Adjusted Capital (RORAC)	Risk-Adjusted Return on Risk-Adjusted Capital (RARORAC)
Assets (Base: ROA)	Risk-Adjusted Return on Assets (RAROA)	Return on Risk-Adjusted Assets (RORAA)	Risk-Adjusted Return on Risk-Adjusted Assets (RARORAA)

Figure 3: Overview of RAPM key figures[34]

The purpose of the risk-adjusted performance measurement is on one hand to analyze the profitability of individual transactions or different business units. On the other hand the RAPM concepts offer the management the basis for decision making regarding the adequate capital allocation. Moreover, the results of the RAPM analysis can influence on long-term the compensation and bonuses of the management.[35]

5.1 RAROC & RORAC Models

Both in theory and in practice, there are numerous definitions of the RAPM approaches. The various concepts pursue the same goal, namely to establish a relationship between the profit and capital by adjusting the risk, which outcomes from the bank's internal estimation of the potential risk of a transaction, a portfolio or a supported business unit.[36]

All the RAPM ratios are linked to the Value-at-Risk (VaR) method. For example, the RORAC shows in the numerator a VaR-based capital size. Nevertheless, the RAPM key figures are based on the Return on Capital (ROC) Ratio. The modification of the ROC into a RAPM size happened via the risk-adjustment of the common denominator (Risk-

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[34] Source: Bodmer, A. (2001), P. 61
[35] Cp. Jovic, D. (1999), P. 164
[36] Cp. Jovic, D. (1999), P. 164

Adjusted Return (RAR)) or of the numerator (Risk-Adjusted Capital (RAC)) or of the both sizes – capital and return.[37] The most important RAPM-ratios are: [38]

- *Risk-Adjusted Return on Capital (RAROC):* the expected loss is to be subtracted and set in relation to the regulatory equity capital. The first bank to use RAROC was Bankers Trust.

- *Return on Risk-Adjusted Capital (RORAC):* The profit, which is not corrected by the expected loss, is to be set in relation to the risk-based capital. The risk capital corresponds to the amount, which is to be invested without risk, in order to cover the expected losses. The Barclays Bank uses RORAC.

- *Risk-Adjusted Return on Risk-Adjusted Capital (RARORAC):* The RARORAC is a risk-adjusted profit, which is in relation to the equity capital. The RARORAC will be closely explained in chapter 5.2.

Below you can see the comparison between the RORC, RORAC & RAROC approaches:

| Assesment criteria | RORC - Figure | RAPM Approaches | |
		RORAC	RAROC
Term	Return on Regulatory Capital	Return on Risk-Adjusted Capital	Risk-Adjusted Return on Capital
Meaning	Profitability in relation to the regulatory equity	Profitability in relation to the economic equity	Risk-adjusted profit in relation to the regulatory equity
Advantages	easy calculation	adequate consideration of the potential risk	combination between the risk-adjustment profit size and the regulatory requirments
Limits of the approach	Little risk consideration, the regulatory equity implies restrictions for the banks	strongly distorted with respect to low-risk positions	little risk differentiation when applying the regulatory equity

Figure 4: Comparison between different RAPM approaches[39]

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[37] Cp. Jovic, D. (1999), P. 165
[38] Cp. Bodmer, A. (2001), P. 61
[39] Source: according to Punjabi (1998), P.76

5.2 RARORAC

As already mentioned in Chapter 5.1, the RARORAC is ratio that shows the relation between the risk-adjusted profit and the economic equity capital. The formula of the RARORAC is:

$$RARORAC = \frac{Income - Costs - Expected\ Loss}{Value\ at\ Risk}$$

Thus, the expected loss is reflected in the numerator and the unexpected loss in the common denominator:

- *The Numerator:* the profit is calculated after the subtraction of the expected loss. The expected loss of a credit transaction is part of the expense and corresponds to the expected exposure multiplied by the expected loss probability.[40] If there no risk of the expected loss existed, no revenues would be generated. Therefore, the expected loss is directly to be subtracted from the income.[41]

- *The Denominator:* Value at Risk (VaR) is the capital that is needed to cover unexpected credit, operational or market risk.[42] VaR is extended from its traditional market risk calculation to other risk types. The various risk classes are taken into consideration:[43]

  - *Market risk:* Risk which refers to an entire category of assets or liabilities. The value of investments may decrease after a time because changes in the macro-economical environment or other events that impact the market. One of the methods to protect against market risk is asset allocation and diversification can.

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[40] Cp. Matten, C. (1996): Manage Bank Capital, P. 59
[41] Cp. Bodmer, A. (2001), P. 61-62
[42] Cp. Matten, C. (2001): Managing Bank Capital, P.149 et sequentes
[43] Cp. Matten, C. (2001), P.152

♦ *Credit risk:* Credit risk is the probability of default of a bond repayment. Government bonds are usually immune to default, as the government can control the amount of money it has. Municipalities could, theoretically default, though it is less common. Bonds issued by corporations are more likely to be defaulted on, since companies often go bankrupt.

♦ *Operational risk*: Risk associated with system or human failure.

The common element in the calculation of the RARORAC and RAROC is the Risk-Adjusted Return (RAR). The RAR – figure is a risk premium of a specific investment after the subtraction of risk factors, which are contributing to the portfolio volatility of the investment. The formula of the RAR is shown below:[44]

$$RAR = (R_A - R_F) - \left[\frac{(R_P - R_F)}{\sigma_P} \right] \times \left[\frac{(cov\ (R_A,\ R_P)}{\sigma_P} \right]$$

| Risk premium | Sharp Ratio | Risk element of premium of A in the portfolio P |

R_A: *Return of investment A*

R_P: *Return of portfolio P*

R_F: *risk-free interest rate*

σ_P: *standard deviation of the portfolio P*

cov (R_A*,* R_P*): covariance between the return on investment* R_A *and return on portfolio* R_P

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[44] Cp. Stoughton, N. / Zechner, J.(2003)

One of the problems of the RAPM indicators of the fact that their definition of risk is inappropriate for the shareholder value generation assessment as was shown in the example of RAR. Because of the explicit expression of the Sharpe ratio in the formula, the RAR shows that the RAPM indicators take both the systematic and unsystematic risk into account. This is contrary to the investors' wish of systematic return for taking risks.[45]

The Bank Austria defines the RARORAC as the ratio between EVA and allocated/absorbed capital uses the following formulas for the calculation of the RARORAC:[46]

$$\textit{RARORAC = EVA / Capital Allocated}$$

The Marginal RARORAC is equal to the ratio between Marginal EVA and allocated/absorbed capital:[47]

$$\textit{Marginal RARORAC = Marginal EVA / Capital Allocated}$$

[45] Cp. Bodmer, A. (2001), P. 63+64
[46] Cp. Capital Management Department of UniCredit Bank Austria
[47] Cp. Capital Management Department of UniCredit Bank Austria

5.3 Sharpe Ratio Approach

The Sharpe Ratio approach is an alternative to the risk-adjusted performance measurement concepts and is used as a performance evaluation tool in Asset Management. [48]

The traditional Sharpe-Ratio can be described as follows: The return R_P of a portfolio P and the return R_B of a benchmark portfolio B (for example, a risk-free investment) are compared. For the comparison, the different between the returns is calculated (d) and set in relation with the standard deviation σ_d. [49]

$$TSR = \frac{R_P - R_B}{\sigma_d}$$

TSR: Traditional Sharpe-Ratio

R_P: Return of portfolio P

R_B: Return of a benchmark-portfolio B

σ_d: Standard deviation of the difference between the returns $d = R_P - R_B$

The TSR is to be interpreted as the difference between the returns of two different investments pro risk unit. Thus, includes the Sharpe Ratio both the return and the risk in the calculation.

From an ex-ante perspective the TSR figure can easy the decision-making. In this case the difference between the returns d as well as the standard deviation σ_d are expected values. From an ex-post perspective, a risk-adjusted performance evaluation is possible

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[48] Cp. Jovic, D. (1999), P. 170, after Zimmermann (u.a) (1996), P. 74-75
[49] Cp. Best (1998): Implementing Value at Risk, P. 155 et sequentes

by calculating the excess return d and the volatility σ_d, occurred in a certain period of time. Thereby, a higher difference in return, respectively a lower standard deviation leads to a higher Sharpe Ratio and vice versa. When comparing two investments, the investment with the higher Sharpe Ratio is to be preferred. [50]

The traditional Sharpe Ratio offers ex-ante or ex-post a risk-adjusted performance evaluation if it is assumed that the evaluated investments show a correlation of zero. If the correlation effects that occur between the investment opportunities and the total portfolio are to be considered, the traditional Sharpe Ratio formula has to be modified.[51]

In order to evaluate if the investment A can be taken into the bank portfolio P, two Sharpe Ratios have to be calculated. On one hand the SR_{P1} of the portfolio including the investment A. On the other hand the SR_{P2} for the portfolio P without the consideration of the investment A.

$$SR_{P1} = \frac{d_{P1}}{\sigma_{P1}} \geq \frac{d_{P2}}{\sigma_{P1}} = SR_{P2}$$

SR: Sharpe Ratio

d: difference between returns

σ: standard deviation of the difference between returns

P1: Portfolio P including investment A

P2: Portfolio P excluding

The formula above is also known as the general formula of the Sharpe Ratio. It analyzes how the correlation differences of different investments influence the portfolio volatility. [52]

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[50] Cp. Jovic, D. (1999), P. 170, nach Modigliani (1997), P.48
[51] Cp. Jovic, D. (1999), P. 170, nach Dowd (1998), P. 145 et sequentes
[52] Cp. Jovic, D. (1999), P. 171

6. Economic Value Added (EVA)

6.1 EVA Concept

A value-based management and execution in the sense of the EVA concept aims to create sustainable value for the company and secure it. A company creates value from an economic perspective, then, if the net operating profit after taxes (NOPAT) exceeds the cost of the invested capital (positive EVA). If the NOPAT is below the cost of capital it means that value is destroyed (negative EVA), thus the company did not succeed to earn its cost of capital.[53]

Additional value can therefore be created only if the company succeeds in the long term, to overbalance the costs of the invested capital. In order to reach such value, all the processes within the company - from planning and capital budgeting to strategic and operational decisions – should be focused on increasing value. Therefore, for the shareholders, the EVA is an important key indicator, that measures whether enough shareholder value has been created and if sufficient profit has been made for the payment of interest for the invested capital.

The EVA belongs to the residual income concepts and represents the difference between the financial performance and capital costs. The EVA has the following components:[54]

- NOPAT (Net Operating Profit after Taxes), which corresponds to the accounting operating profit after taxes.
- Net Operating Assets, also called Capital, which are the total committed assets and should not be confused with equity.
- Cost of capital, known as c*.

Putting the above mentioned components together, we can deduce the formula for the calculation of EVA, also called Capital Charge formula:

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[53] Cp. Stern, M. / Shiely, J. (2002), P.11
[54] Cp. Ehrbar, A. (1999): EVA – Economic Value Added, P. 26 et sequentes

$$EVA = NOPAT - Capital \times c^{*}[55]$$

Alternatively, the EVA can also be determined by the Value Spread formula. In this formula the EVA is shown as the difference between the rate or return and cost of capital:

$$EVA = (ROCE[56] - Cost\ of\ Capital) \times invested\ Capital[57]$$

The capital multiplied with the total cost of capital shows the financing cost of the committed assets of the company. If these are deducted from the operating profit, we come to the Economic Value Added. The depreciation is added to the operating profit. The reason for this is than in the EVA calculation the depreciations are seen as expenses for maintaining capacity.[58]

Stewart states about the depreciations, that: „In fact, the present value of the lease payments should equate to the cash outlay to purchase the asset, or else the lessor would not be able to recover the principal outlay and the interest incurred in purchasing and financing the asset on behalf of the lessee. Depreciation is thus an economic charge.[59]

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[55] Cp. Wirth, J. (2004): Auslösung der Ad-hoc-Pulizität, P. 211
[56] ROCE = Return on Capital Employed
[57] Cp. Fischer, T. (1999): Economic Value Added – Informationen aus der externen Rechnungslegung zur internen Unternehmenssteuerung, P. 2.
[58] Cp. Stewart, G.B. (1991): The Quest for Value, P.20
[59] Cp. Stewart, G.B. (1991), P. 2

6.1.2 NOPAT

NOPAT represents the profit in the EVA concept, more exact it is the profit after tax and before interest.[60]

The basis for determining the NOPAT is the net income. For the calculation all operational expenses are subtracted, non-operating items, like interest expense, are not included in the analysis. A special importance is paid to the taxes which are also called Cash Operating Taxes. The tax payment is adjusted by the deduction of the non-operating or non-cash components. [61]

Stern Stewart & Co. has cataloged more than 160 modifications to be made when calculating the NOPAT, so that the EVA can be calculated more accurate. Nevertheless, for each company a different approach is applied.[62]

The most common adjustments made are related to:

 a) the costs of research and development

 b) the advertising and sales expenses

 c) the staff training and development.

Such expenditures are capitalized under EVA and written off over the expected period of time, because they are investments that are expected to bring a return in the future or they will create value in form of new products or a brand name on a long-term.[63] If the investments would be written off immediately, so there would be an underestimation of the profitability, assets and shareholder value. This would mean that the reported value of the company is much less than in reality, therefore the Shareholders could not monitor the economic value of the company.

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[60] Cp. Stewart,G.B. (1991), P. 90 et sequentes
[61] Cp. Wirth, J. (2004), P. 204.
[62] Cp. Stewart, G.B. (1991), P. 112 et sequentes
[63] Cp. Stern, M. / Shiely, J. (2002), P.21

6.1.1 NOA (Capital)

The capital invested in a company (NOA) is described by Stern Stewart as the "economic book value" because this is, after fulfilling some corrections to the on-balance sheet, the capital ("capital accounts"). The Net Operating Assets are the assets used in the business processes of which, however, the value of the short-term, interest-bearing liabilities must be deducted.

The basis for the determination of the NOA is the balance sheet. Non-operating assets have to be deducted from the capital, for example securities are not to be taken into consideration. The second step in determining the NOA is to scan the balance sheet for non-activated, operational assets. A lack of activation may occur because of legal regulations.[64]

The Net Operating Profit is calculated as follows:

	Book value of fixed assets
+	Book value of current assets
-	securities
-	Assets under construction
-	Other non-operational assets
+	Off balance sheet leasing and rental properties
-	Non-interest bearing current liabilities
-	Deferred taxes
+	Difference in inventory
+	Differences in tangible and fixed assets
+	Investments
-	Goodwill impairment
	Net Operating Assets (NOA)

Figure 5: Calculation of the Net Operating Assets (NOA)[65]

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[64] Cp. Stewart, G.B. (1991), P. 70
[65] Own illustration according to Hostettler, S. (2000): Economic Value Added, P. 111

6.1.3 Cost of Capital

Both equity investors and lenders expect a compensation for opportunity costs that arise when investing their funds in a particular company. The capital costs thus constitute a minimum rate of return for investors, which could be achieved with an alternative investment at the same risk. Another function of the cost of capital in the concept of EVA is that it is used as a basis for discounting future EVAs.[66]

The Weighted Average Cost of Capital (WACC) represents the discount rate or time value of money, with which the present value of future expected cash flows is determined for the investor. Here, the cost of various capital sources of a company is weighted versus the total capital:[67]

$$k_{WACC} = k_E \times \frac{E}{E + D} + k_D \times \frac{D}{E + D}$$

where:

k_{WACC}: Weighted Average Cost of Capital

k_E: Cost of equity Capital

E: Equity Capital

D: Debt Capital

k_D : Cost of debt Capital

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[66] Cp. Copeland, T./Koller, T./Murrin, J.,(2002): Unternehmenswert, P. 250.
[67] Cp. Hostettler, P. (2000), P. 111.

Equity and debt are valued at their fair values and result as a sum into the total capital at market value. By market value the cash flows discounted with the WACC is meant.[68]

6.1.3.1 Calculation of the Cost of Equity Capital

The cost of equity is difficult to be estimates, because there is no explicit definition for it. However, the equity investors demand a risk-adjusted rate of return. Therefore, there are different approaches to calculate the cost of equity. The three most commonly used approaches are the Capital Asset Pricing Model (CAPM), the Arbitrage Pricing Model (APM) and he Dividend Model, briefly described below: [69]

- *Capital Asset Pricing Model (CAPM):* The opportunity cost of the equity capital is the risk-free return for securities plus the systematic risk (beta) multiplied by the company's market risk premium

$$K_E = r_f + [E(r_m) - r_f] \times Beta$$

K_E: Cost of Equity Capital
r_f: Risk Free Return
$E(r_m)$: Expected Value of Return of the Market Portfolio
$E(r_m) - r_f$: Risk Premium
Beta: Systematic Risk of the Equity Capital

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[68] Cp. Hostettler, P. (2000), P. 169 et sequentes
[69] Cp. Copeland, T./Koller, T./Murrin, J.,(2002): P. 265 et sequentes

Beta shows the sensitivity of a stock to the total market. For the determination of Beta, the published estimated of the publicly traded companies can be used.

- *Arbitrage Pricing Model (APM):* The APM is an enrichment of the CAPM. The risk premium depends on external factors. Possible external factors could include economic growth or inflation. The cost of equity derives from the sum of the factors sensitivities multiplied with the income

$$K_s = r_f + [E(D_1) - r_f] \times Beta_1 + [E(D_2) - r_f] \times Beta_2 + \ldots + [E(D_k) - r_f] \times Beta_k$$

E(Dk): expected return of a portfolio, which depends on the k-factor and is independent from othe factors.

Beta: the sensitivity of the stock return to the k-factor

- *Dividend Model:* Dividend model: This model is based on the assumption that the present stock price represents the present value of the expected dividends. Using this model, the cost of equity can be calculated by using the formula:[70]

Ks = (Dividends / Stock Price) + Growth rate of Dividends

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[70] Cp. Hostettler, S. (2000), P. 173

6.1.3.1 Calculation of the Cost of Debt Capital

In most cases there is a contractual agreement for interest of borrowed capital, the ratio between interest expense and average debt provides information on the Interest rate.

Debt Equity Cost = Interest Expense / Interest Bearing Debt Capital

The determination of the debt equity cost is not always possible by using the formula above. Increasingly complex financing and hedging instruments, especially in publicly traded companies provide often only an inaccurate assessment of the interest rates on debt. Companies have to include in the analysis Instruments such as financial market contracts on the capital market, as well.[71]

6.2 Application of the EVA in Banks

The concept of EVA became a commonly used method for profitability measurement and offers a range of applications. The EVA can be used as follows:

- to measure the performance of the company

- as a concept for business valuation or

- as a basis for the implementation of an EVA-based remuneration model.[72]

For a maximum benefit from the EVA concept, the mentioned above possibilities should be implemented in the company. To only measure the value of EVA as part of an assessment system, without analyzing the results for future management decisions would not be the most effective way. The following sub-chapters will provide a better understanding of how the EVA concept can be applied in a bank.

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[71] Cp. Hostettler, P. (2000), P. 170ff
[72] Cp. Männel, W. / Weber, J., Kostenrechnungspraxis, Zeitschrift für Controlling, Accounting & System-Anwendungen, Ausgabe 01/2001, P. 33 et sequentes

6.2.1 EVA as Benchmark for Performance

When measuring the performance, it is recommended to derive the spread from the EVA calculation. The spread is the difference between the return on capital employed (ROCE) and the cost of capital.[73] Through appropriate transformation, it can also be calculated by dividing the EVA with the invested capital (NOA):

$$\textit{Spread = ROCE-Cost of Capital = EVA/NOA}$$

In this way it is possible to compare companies of different sizes, risk profiles, capital intensities and capital structures.[74] However, even within a company the EVA can be calculated not only at total company level, but also at business area level down to individual stores, product lines or even customers.

Example: A bank applies EVA to the customer base, for example, by focusing on the most profitable customers. In order to increase the income, the bank searches to satisfy the needs of the customers by providing them with the appropriate products and advisory services.

The aim of such a performance measurement is to asses the contribution of the respective divisions to the overall success of the company. In this way, it can be clearly seen which areas can be improved and where is potential for expansion. This allows monitoring the company's success, to maintain and to expand it on a long-term. The EVA can be measured on branch level, as well. However, those divisions should receive a higher decision-making authority. This transfer of decisions on profits and capital expenditure should only be performed if the management is convinced that the leaders of the respective units have the necessary knowledge and with all the information for such decisions.[75]

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[73] Cp. Controller News 4/00, o.V., (2000), P. 6
[74] Cp. Controller News 4/00, o.V., (2000), P. 4
[75] Cp. Stern, M./Shiely, J. (2002), P.71

6.2.2 EVA as a Compensation Standard

The Economic Value Added can also be used as a compensation model, depending on the changes of the EVA period on period. Such an incentive system tries to bridge the differences between the interests of shareholders and those of the management. Such conflicts of interest ("agency problem"[76]) arise due to the differences in ownership of shares. The management holds fewer shares than the shareholders. Therefore, it can happen that managers sometimes have objectives such as the pursuit of their own financial interests or the pursuit of prestige, which differ from the objectives of the shareholders.

If the remuneration of the management depends on the EVA improvement, the management will favor those decisions that that are supported by the incentive system.[77] If the remuneration ("Bonus") depends on the improvement of business results or overall profit ratios (eg ROE), there is a risk that the results might be manipulated: the companies result could still look good, though the EVA shows a different picture.[78]

In such compensation models, the managers are constantly in a conflict of interests, on one hand by following its own interests and on the other hand, by trying to fulfill the challenge of improving shareholder value, which is incorporated by the EVA. Nevertheless, standards for the performance evaluation and incentive and reward systems for managers are of great importance in the process of value creation. For this reason, the EVA-based compensation model motivates a clear entrepreneurial thinking of the management by creating a value-based bonus system to encourage and thus to motivate the increase the value.[79] This is achieved by making the remuneration of managers conditional on the contribution to the increase in value of the company. Within the EVA incentive system the managers' interest in increasing the economic profit and making the company sustainable by reducing or avoiding the "value

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[76] Cp. Controller News 4/99, o.V., (1999), P.5
[77] Cp. Stern, M./Shiely, J. (2002), P.229
[78] Cp. Stern, M./Shiely, J. (2002), P.189
[79] Cp. Habegger, H. (1999), P.47

destroying" decisions and processes grows.[80] By setting the EVA targets on a long term, a proper reward for sustaining the good performance of the company is guaranteed, preventing the company's long-term profitability being sacrificed for short-term profits. In this way, long-term incentives are created to serve both the shareholders of the company, as well as to bind successful managers to the company.

Most of the traditional, performance-based compensations systems have the disadvantage of a top and a bottom limit for the bonus. The bottom limit for this bonus should punish for not reaching the set targets and top limit has as aim the prevention of a too high bonus. As shown in figure…. below, these two limits are the critical points of the system. Above the critical point, there is no motivation for the manager to improve his performance, as he will not receive a higher bonus.
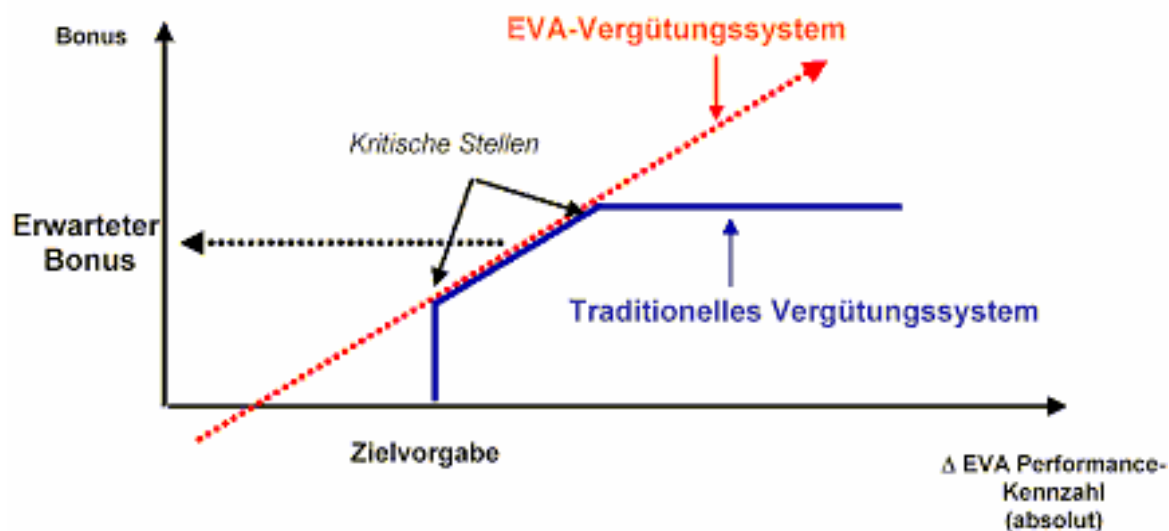

Figure 6: Difference between the EVA-based compensation model and the traditional one[81]

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[80] Cp. Stern, M. / Shiely, J. (2002), P.145
[81] Source: Weber,M. / Koch, M. (2000), P.1348

Accordingly, the result of his area of responsibility is so bad that the manager does not achieve his targets. In this case, the traditional compensations system pays out a bonus, though the result is weak. In order to prevent such cases, the EVA-based compensation system does not have a top or bottom limit for the payment of the bonuses. The manager assumes more responsibility and takes more risks, but in case of success, his performance and motivation is rewarded accordingly.

The bonus bank is another very important feature of the EVA compensation model, where the annual bonus payments are deposited in a bonus account. The difference between other systems is that it allows a negative bonus, a so-called "malus", depending on the performance of the manager. Bonus banking allows a company to better control the short-term and long-term value creation, to better fulfill the demands of the stakeholders and to succeed creating sustainability.[82]

6.2.3 EVA as a Concept for Corporate Valuation

The EVA approach can be applied to publicly traded company valuation. The market value of equity represents the shareholder value. On efficient capital markets, the value of the listed companies can be followed in the stock market report. Assuming, however, that a false assessment by the capital market was made, the valuation of company will be appreciated based on company data.[83]

The value of the operations results from the EVA from the sum of the Market Value Added (MVA), the net operating assets (NOA) and the cost of capital (c*).

The value of the operations can be calculated by using the following formula:

$$\textbf{\textit{Value of the operations = NOA + MVA = NOA + EVA / c*}}^{[84]}$$

[82] Cp. Stern, M./Shiely, J. (2002), P. 191
[83] Cp. Männel, W. / Weber, J (2001), P. 36-37
[84] Cp. Hostettler. S (2000), P. 183

The value results from the sum of the invested assets on valuation date and the present value of all future excess profits.

The MVA corresponds to the present value of all future EVAs. It is the corporate goodwill or the business value of the corporate activity. Compared to the EVA, which evaluates the success of a period, the MVA measures the success at a specified time.[85]

The calculation of the MVA can be done in two ways:[86]

- Ex post: The difference between the market value of the entire company and disclosed assets serves as a performance measurement
- Ex ante: The present value of all future corporate excess profits (EVA) serves as an element for business valuation.

One advantage of the use of EVA for business valuation is among other the better communicability. The EVA uses elements from the traditional accounting, such as Income and asset values, therefore improving the communicability and reducing the difficulties for the application.

According to Wirth, it is though questionable whether the company's valuation can be made by using the EVA. He justified this with the assumption that investment projects with an internal return that equals to the cost of capital show a capital value of zero, thus the value corresponds exactly to the initial investment.[87]

6.3 EVA in Banks

Banks or financial institutions are business entities, which provide monetary and credit-related services. They are not only an intermediary between borrowers and investors, but also provide a variety of off-balance sheet financial services.

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[85] Cp. Fischer, T. (1999), P. 10 et sequentes
[86] Cp. Hostettler. S (2000), P. 184
[87] Cp. Wirth, J. (2004), P. 187 et sequentes

6.3.1 Capital requirements

Banks and lending institutions have a great responsibility in the economy. They have a great contribution to monetary stability and the money supply by economic agents. The capital requirements for the banking sector are of big importance.

6.3.1.1 Definition of Capital

When speaking about bank capital, four perspectives of the capital can be recognized: the treasurer's view, the regulator's view, the risk managers' view and the shareholder's view.

- Treasurer's view: the treasurer is interested in the equity, subordinated debt, generally in all forms of paid-in capital, having as an aim to reduce the cost of capital. Here we speak about the "physical capital".

- Regulator's view: the regulator has a narrower or more exact definition of what capital is. In this view, capital does not include all forms of eligible paid-in capital. In this case, the "regulatory capital" is a term.

- Risk managers' view: the main concern here is the risk of losses, being of less importance who carries the cost of the loss. The risk manager sees the capital as "risk capital".

- Shareholder's view: the main interest of the shareholder is the return on the investment, the equity of the company, share premium accounts etc. The capital from the shareholder's perspective is called "economic capital", which is a sum between the risk capital and the goodwill of the company.[88]

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[88] Cp. Matten, C. (2000), P. 30 et sequentes

The table below gives an overview of how Bank Austria defines capital. Here you can find the accounting definition, the regulatory capital definition (see better explanation of this kind of capital in chapter 6.3.1.2) and the bank internal models.[89]

Accounting Definition	Regulatory Capital	Bank Internal Models

	Tier 3	Economic Capital
Equity	Tier 2	
	Tier 1	

Equity on balance sheet	Regulated via Basel II / Pillar 1	Supervised by regulators under Basel II / Pillar 2
+ Paid in capital	+ Capital used to cover regulatory capital requirements (RWA)	+ Capital required to guard the bank against a defined level of risk
+ Retained earnings		
+ Other reserves	+ Core Capital (Tier 1) incl. share capital, reserves and regulatory deductions	+ Based on bank's own Value-at-Risk models
+ Profit/Loss of the period	+ Subordinated Capital (Tier 2)	+ In UCG Available Financial Resources have to cover Economic Capital
	+ Short Term Subordinated Capital (Tier 3) used to cover market risk	

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[89] Cp. Capital Management Department of UniCredit Bank Austria

6.3.1.2 Basel II

On the 16th of January 2001, the Capital Accord was reformed by the Basel Committee and new capital requirements for banks have been established. They concentrate more on risk then before and also cover   basic principles for qualitative banking supervision and an extension of Disclosure rules designed to strengthen the market discipline.[90]

The new requirements for banks and financial service providers are summed in a "three-pillar strategy". The first column represents the minimum capital requirements, the second pillar, supervisory review processes and the third column, the expansion of the disclosure. Bellow you can see the three pillars illustrated:

Figure 8: The basic concept of Basel II[91]

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[90] Cp. Choudhry, M. (2007): Bank Asset and Liability Management: Strategy, Trading, Analysis, P. 1161 et sequentes

[91] Source: http://www.basel-ii-risk.com/Basel-II/Basel-Three-Pillars/index.htm

The capital adequacy regulation is on equity is commonly known as the " capital adequacy ratio", the "BIS (Bank for International Settlements) ratio" or the "Cooke ratio". The ratio must exceed 8% at all times.

$$BIS\ Ratio = (Capital\ /\ Weighted\ Assets) \geq 8\%$$

The capital for the BIS Ratio is made of two parts: Tier 1 Capital, which is at least 4 % and Tier 2 Capital. Bellow, you can a table showing the capital components in more detail: [92]

CAPITAL

| **TIER 1** is essentially made up of the equity reported in the balance sheet:

• Paid in capital

• Retained earnings

• General (disclosed) provisions: created to cover as yet unidentified risks | TIER 2 includes additional elements such as:

• Re-evaluation of premises (when real estate value changes)

• Hidden reserves (which appear when excessive bad debt provisions on specific loans exist)

• 45% of unrealized gains on securities (when the market value of financial assets is different from the one reported in the book)

• Subordinated debt (capped at 50% of TIER 1. It protects depositors who are paid before subordinated debt-holders in case of default of the bank |

Figure 9: BIS Capital components[93]

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[92] Cp. Dermine. J./ Bissada.Y.J (2002): Asset & Liability Management, P. 36-37

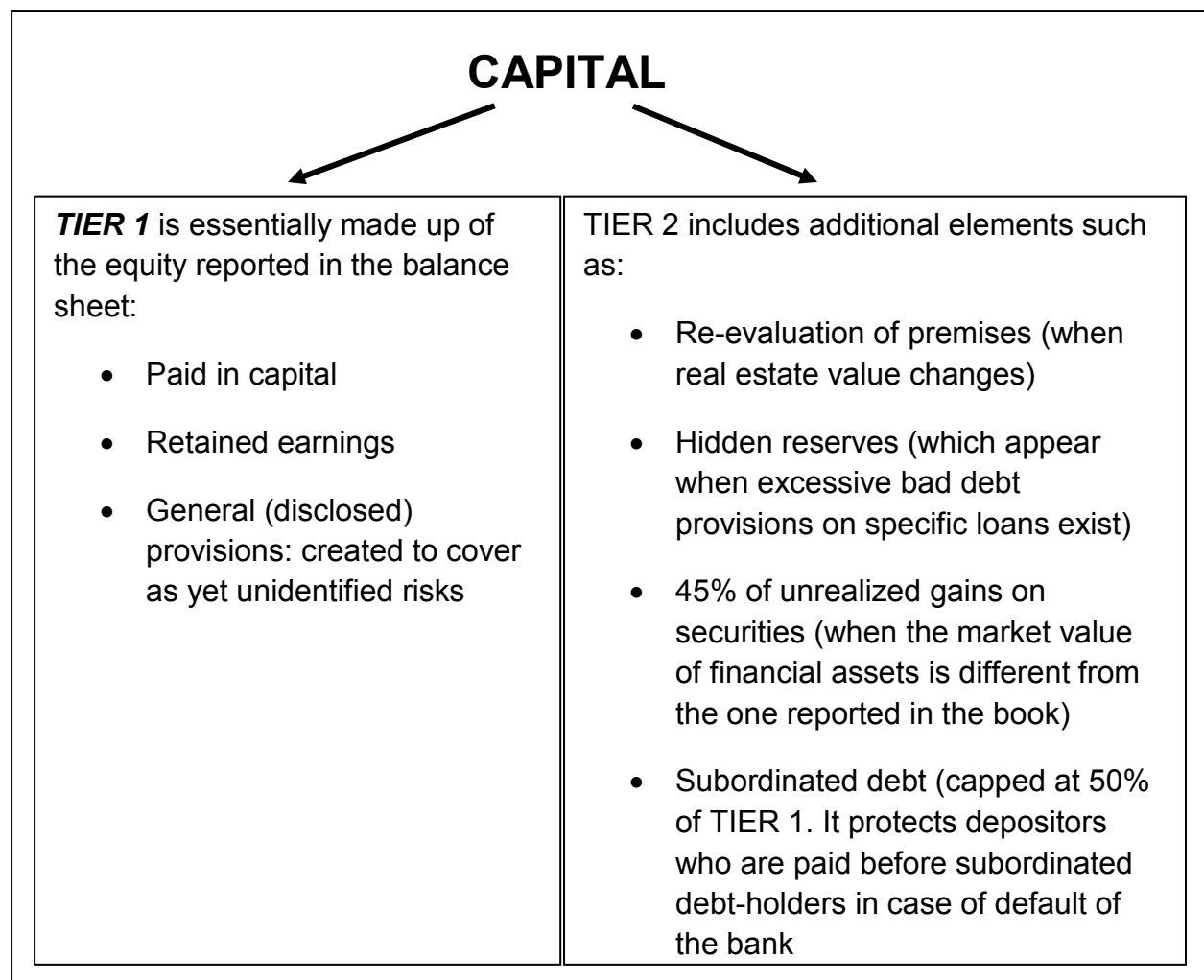The primary purpose of these capital requirements is to protect creditors. Since the equity is of substantial importance in the concept of Economic Value Added, the above-described factors of the capital requirements are to be included in the calculation.

6.3.1.3 Basel III

Basel III marks supplementary recommendations of the Basel Committee on Banking Supervision to the in year 2004 adopted capital requirements (Basel II) for banks. The new recommendations (Basel III) are based, on the one hand, on experience with Basel II and on the other hand, on the knowledge and experience gained from the global financial and economic crisis.

Basel III includes recommendations that have the aim to make the financial world more stable. It will be required from banks to increase the minimum capital requirements and to implement additional capital buffers. Thus, the banks will be able to react stronger and be more stable during a crisis. The new recommendations were adopted by the Basel Committee on Banking Supervision in September 2010.

The recommendation established in "Basel II" in 2004 already retained the banks from covering their credit risk exposures with equity. Now, banks should increase their so-called core capital significantly. The core capital ratio is the ratio of a bank's capital to its risk-related transactions, therefore to the lending and the investment activities. The core capital should absorb losses, caused by credit losses or investments, during a financial crisis. Basel III dictates in the future a hard core capital ratio of 7% (common equity of the minimum capital requirements 4,5% plus 2,5% of common equity capital preservation buffer). Furthermore, more soft core capital that equals to 1,5% and additional capital amounting to 2%, so that added together the result shows 10,5% in capital requirements. Thus, the original pre-crisis requirement is increased significantly. The requirements for other important stability measures have been increased, as well.

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[93] Source: Dermine. J./ Bissada.Y.J (2002), P. 37

The recommendations of Basel III will be implemented by year 2012, both by European directives on European level and the federal governments on national level. Though many regulations are related to the international financial, the federal governments should act nationally and, among other things, increase the transparency of the decision-making of rating agencies. In addition, the so-called short selling is now prohibited.[94]

The Basel III will lead to stricter requirements for quality and quantity of capital, counterparty credit risk and liquidity risk. The table below gives an overview of the changes:[95]

CAPITAL	**Capital Base**	Common Equity as predominant form of capital Deductions mainly from Common Equity Stricter criteria for TIER 1 and TIER 2 instruments TIER 3 capital eliminated
	Capital Buffers	Capital conservation buffer (2,5%) Countercyclical buffer (0 – 2,5%)
	Leverage Ratio	TIER 1 Capital / Exposure ≥ 3%
RWA – Risk Coverage		Increased capital charges for market risk Higher RWA for counterparty credit risk Higher capital requirements for large financial institutions
Liquidity Standards		Liquidity Coverage Ratio (short-term) ≥ 100% Net Stable Funding Ratio (long-term) ≥ 100%

Figure 9: Basel III proposal overview[96]

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[94] Cp.
http://www.bundesfinanzministerium.de/nn_39814/DE/BMF__Startseite/Service/Glossar/B/022__Basel__III.html
[95] Cp. Capital Management Department of UniCredit Bank Austria
[96] Source: Capital Management Department of UniCredit Bank Austria

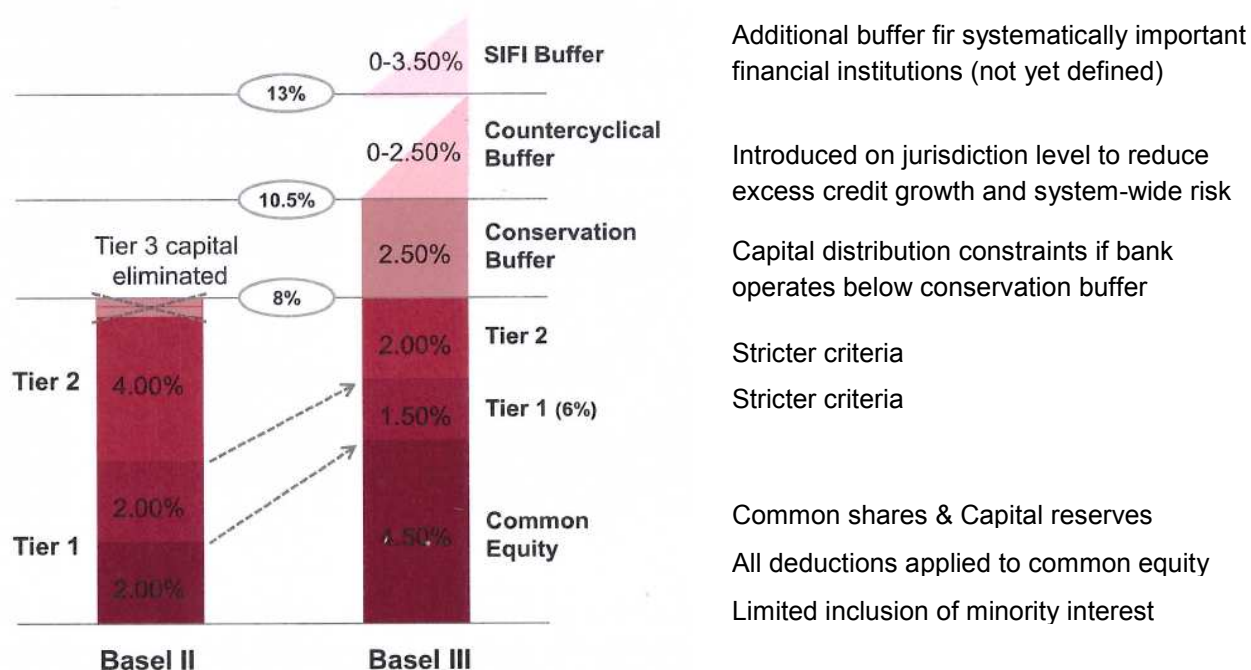The graph below gives an overview of how Basel III will lead to an increase in quantity and quality of the capital:[97]

Figure 10: Increase in quantity and quality of capital: Basel II vs Basel III[98]

6.3.2 Calculation in Banks

Since banks are interested in the interest margin and take the costs for the debt capital in consideration already in the calculation of the interest income, the so-called "equity approach" is used for the calculation of EVA:[99]

$$EVA^{equity} = NOPAT_t - r_t \times E_{t-1}$$

The residual profit is the net profit after tax and interest (EVA equity) which is generated in a certain period. First, the required equity for banking operations (E) is multiplied with the required return on equity (r) and subtracted from the adjusted net operating profit after taxes (NOPAT) for the corresponding period.

For the determination of the EVA value this contribution, the existing Shareholders' equity is only of secondary importance. Instead, the capital required for operations must be determined, which the bank requires depending on its specific risk profile, in order to keep the existing business.

In the Bank Austria, there are two types of EVA - the EVA and the marginal EVA. The difference between EVA and Marginal EVA is that Marginal EVA does not include goodwill effects and in the calculation:[100]

- The NOPAT could differ from the previous definition only for potential losses related to goodwill impairment that would not be considered.

- The Cost of Capital differs from the previous definition as invested capital does not consider any residual debt of goodwill.

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[99] Cp. Ewert, R./Wagenhofer, A. (2000): Rechnungslegung und Kennzahlen für das wertorientierte Management in: Wertorientierte Management-Konzepte und Umsetzungen zur Unternehmenswertsteigerungen, P.8
[100] Cp. Capital Management Department of UniCredit Bank Austria

6.3.1 Conversions

In order to implement EVA in the banking sector, some key adjustments (so-called conversions) might be needed to be carried out to arrive in this way to the "economic" variables at bank level.

Looking at a bank balance from an external view (based on the annual report), the following adjustments come into question:

	Profit after tax acc. Annual Report
-	Net income from financial investments
-	Realized gain on disposal of subsidiaries
-	Provisions for restructuring measures
-	Other operating income and expenses
+/-	Special effects from the adoption of new Accounting rules
-	Weak trading result
+	Goodwill amortization
+	Standardized financial investments
=	**Operating profit after tax adjusted (NOPAT)**

Figure 11: Conversions on total bank level[101]

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[101] Source: Own illustration

Based on profit after tax at first a correction is carried out by the result from financial investments, since this active position of the banks is often used for profit making. However, in order not to present the bank worse than it is, this effect will be smoothed by calculating the standardized net income from investments For this, an assumption that the financial assets ("available for sale") with the risk-free interest rate will bear interest is made. Alternatively, also a return at market rates could be considered.

In addition, all effects that do not originate from operations for the corresponding period are neutralized. In this context, the provisions set up by banks (like restructuring provisions), that are made for expenses in later periods and thus can distort the economic profit of the bank, should be mentioned. The building of reserves, as well as their release will not be considered in the calculation of the operational profit.[102]

6.3.2 Cost of Capital

The determination of the total capital cost on total bank level is easy for a publicly traded bank, because here you can use the "Arbitrage Pricing Theory" "Capital Asset Pricing Model", mentioned in chapter 6.1.3.1.[103]

However, these methods for determining the capital cost for the lower levels of business (segments) is not suitable, since at the individual business areas, no listing exists by which the market value could be determined directly. Nevertheless, there is a possibility to identify a beta value of each business unit in order to calculate its cost of capital.[104]

The risk premium of a bank is calculated by multiplying bank's risk premium on the market by beta.

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[102] Cp. Bank Austria – Capital Management Department
[103] Cp. Stoughton, N./Zechner, J. (2000): Konzepte   zur   Risiko- und   Ertragssteuerung in Kreditinstituten, P. 894
[104] Cp. Kirsten, D.W. (2000): Das bankspezifische Shareholder Value Konzept, P. 181

***Risk premium of a Bank** = Beta x Risk premium of the Market*

In the same way, then even the business-specific capital cost rates are determined. When calculating the risk premium for a unit the beta value of the unit has to be considered. It can be calculated from the volatility of the gross income of each unit in relation to the volatility of the gross income of the bank.[105]

6.4 Implementation of the EVA and RARORAC on different levels of the bank

Crucial to the success of the EVA concept on total bank level is the implementation on the downstream levels of the bank. These might be segments (Retail, Corporate or Private), departments or units so the bank calculates the so-called Macro EVA for the total bank and Micro EVA for the segments.

6.4.1 Macro EVA & RARORAC

The Economic Value Added is a key indicator of Bank Austria Group which is used to measure the financial performance of the bank, by measuring the value creation beyond the Cost of Allocated Capital.

As already explained in chapter 6.3.2, EVA is defined as net operating profit after tax, adjusted for one-off effects, less minimum return required by the market on equity capital employed. Including a cost for the use of equity capital sets EVA apart from more popular measures of Bank performance, such as return on equity (RoE) which do not consider the cost of equity capital employed. Under the current methodology, the equity capital which is expected to generate a return is no longer defined as IFRS equity

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[105] Cp. Habegger, H. (1999): Ermittlung des EVA der strategischen Geschäftseinheiten eines Vermögensverwaltungsinstituts, in: Publikation der Swiss Banking School, 11.Jg (1997-1999), P. 38

but as capital derived from average risk-weighted assets by using the target Tier 1 capital ratio.[106]

EVA - Calculation Formula

\+ Consolidated Profit
\- Extraordinary Items [1)]
= **NOPAT** (**N**et **O**perating **P**rofit **A**fter **T**axes)
\- Cost of Allocated Capital [2)]
=**EVA** (**E**conomic **V**alue **A**dded) - on macro level

[1)] Extraordinary Items:
 * Goodwill impairment
 * Profit (loss) and net write downs on investments
 * Integration costs

[2)] Cost of Allocated Capital:
 = Allocated Capital (AC) * Cost of Equity (CoE)

A positive EVA shows that a company is increasing its shareholder value, a negative one diminishing its shareholder value.

The Cost of Allocated Capital in the Bank Austria is defined and composed as follows:

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[106] Capital Management Departmnt of Bank Austria

		10,93%
Equity risk premium *Calculated using the option based model with the volatility of UCG shares (13yr) as main input.* *For the divisons (except CEE) a sample of banks predominantly operating in the particular sector of the division is used.*	6,09%	6,86%
Debt risk premium *Average over the last 6yrs of the 5yr credit default swap paid by UniCredit.*	0,39%	0,54%
Risk Free Rate *Average over the last 6yrs of the 5yr euro swap rate.*	3,70%	3,54%

Figure 12: Composition of the Cost of Allocated Capital in Bank Austria Group[107]

RARORAC (Risk Adjusted Return On Risk Adjusted Capital) is the ratio between EVA and Allocated Capital and expresses, in percentage terms, the capacity to create value per unit of risk taken. The RARORAC is calculated as shown below:[108]

$$\text{RARORAC} = \frac{EVA}{\text{Allocated Capital (AC)}}$$

Allocated Capital (AC) = (Total RWA avg * CT1 Ratio * Equity Stake)

+ Basel 2 deductions from Capital

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[107] Source: Capital Management Department, Bank Austria
[108] Capital Management Department of Bank Austria

In order to demonstrate how the EVA and RARORAC are calculated, we can assume the following:

Consolidated Profit:	800 mn. €
Extraordinary Items:	150 mn. €
Risk weighted Assets (RWA):	150.000 mn. €
Core Tier 1 Ratio:	8,00%
Cost of Equity Ratio:	10,93%

Please calculate:

1) NOPAT

2) Allocated Capital

3) Cost of Allocated Capital

4) EVA

5) RARORAC

Calculation:

NOPAT = Consolidated Profit – Extraordinary Items = 800 – 150 = 650

Allocated Capital = RWA * Core Tier 1 Ratio = 150.000 * 8% = 12.000

Cost of Allocated Capital = Allocated Capital * Cost of Equity Ratio = 12.000 * 10,93% = 1.312

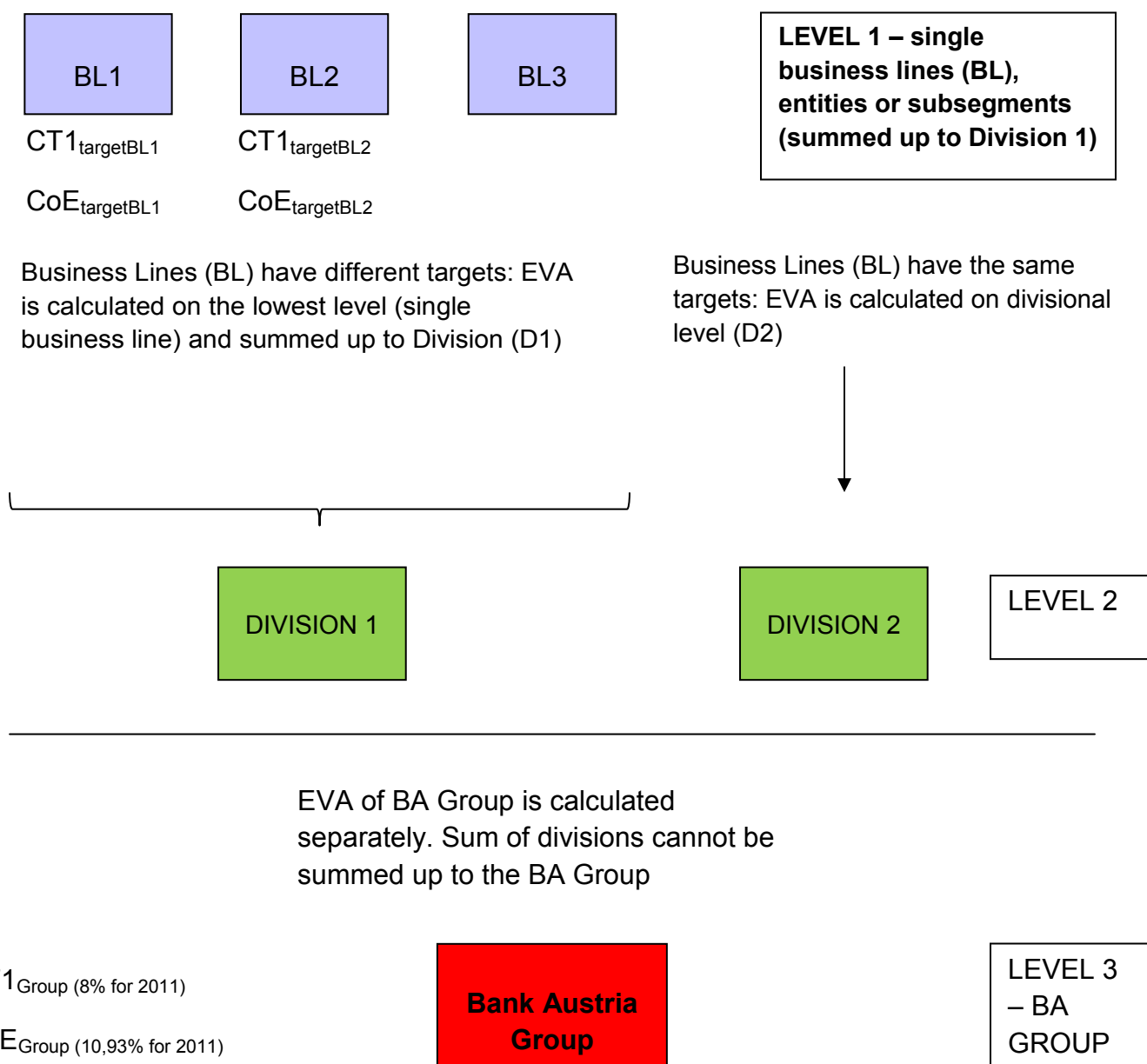*EVA* = NOPAT – Cost of Allocated Capital = 650 – 1.311,6 = -662

RARORAC = EVA / Allocated Capital = -662 / 12.000 = -5,5%

6.4.2 Micro EVA

The EVA can also be calculated on segment, division level or for customer business below the divisional level.

EVA of BA Group is calculated separately. Sum of divisions cannot be summed up to the BA Group

In the Bank Austria Group we can find the following organization:[109]

			LEVEL 1 – single business lines (BL), entities or subsegments (summed up to Division 1)
BL1	**BL2**	**BL3**	
$CT1_{targetBL1}$	$CT1_{targetBL2}$		
$CoE_{targetBL1}$	$CoE_{targetBL2}$		

Business Lines (BL) have different targets: EVA is calculated on the lowest level (single business line) and summed up to Division (D1)

Business Lines (BL) have the same targets: EVA is calculated on divisional level (D2)

DIVISION 1	**DIVISION 2**	LEVEL 2

EVA of BA Group is calculated separately. Sum of divisions cannot be summed up to the BA Group

$CT1_{Group\ (8\%\ for\ 2011)}$

$CoE_{Group\ (10,93\%\ for\ 2011)}$

Bank Austria Group	LEVEL 3 – BA GROUP

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[109] Source: own illustration

Where:

CoE… Cost of Equity

CT1… Core Tier 1 target

6.5 Approach for Capital Allocation

Capital allocation plays a massive role in the mixture of activities of a company, in the case of difficulties of rising funds on the capital markets. Banks are a good example of financial institutions that have access to debt capital, but issue equity seldom. The banking business implies debt financing by its nature, as it accepts deposits, provide services where the depositors are willing to loan their funds at rates below those of the money market. Therefore, without any regulations, banks would prefer high leverage. The capital of a bank depends on the risk of the assets and of the changes and volatility of the asset markets. The regulations promoted by the Basel Committee explained in the chapter 6.3.1 had the aim of dealing with this effect. Additionally to the regulations, many banks have their own monitoring systems, their own internal risk-management programs that are in place to measure and control the risks in accordance to their equity capital.[110]

In order to ensure an optimal capital allocation both on total bank and segment level, the bank must determine first how much capital is needed by each unit to cover the financial risks arising from current business (venture capital).[111] The needed capital is here determined by the risks that are characteristic of the bank's business (eg credit risk, investment risk, market risk etc). Furthermore, the amount of capital required depends on the level of security that the Bank has set for itself. In order to ensure a optimal allocation of capital, many banks use a so-called "internal beta-method for capital allocation", where the capital is allocated by taking in consideration the efficiency and risks of each business unit. For determining the beta coefficients of the respective units one uses the linear regression between the net result of a unit and the net result of

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[110] Cp. Stoughton, N./ Zechner, J. (2003): Optimal Capital Allocation using RAROC and EVA, P. 1
[111] Cp. Kimball, R.C. (1998): Economic Profit and Performance Measurement in Banking. New England Economic Review, (7,8/1998), P.44

the bank. In order to achieve capital allocation and a simultaneous maximization of EVA, both on bank and segment level, it is necessary to ensure an optimal portfolio structure in the beginning of the budgeting period.[112]

The UCI Group capital allocation process follows a "DOUBLE WAY" approach. The allocated capital at the Legal Entity level in fact is the maximum between the economic (EC) and the required (Core Tier 1) capital (RC). With the "double way" approach economic and required capital are calculated separately and the higher between the two is considered the allocated/absorbed one.[113]

According to the aim of the EVA calculation, the capital assumes different names:

Budget & strategic planning process $\longrightarrow$ **ALLOCATED CAPITAL** $\longrightarrow$ **CA = max (RC; EC)**

During the reporting processes $\longrightarrow$ **ABSORBED CAPITAL** $\longrightarrow$ **CA = max (RC; EC)**

The economic capital is defined as the real part of the available capital at risk measured by stochastic model for a given level of confidence. Considering that at the moment our systems do not calculate the economic capital yet, the allocated/absorbed capital is equal to the required capital.[114]

The risk categories considered in the Required Capital computation and subsequent allocation (based on BIS I rules) are, as already mentioned in chapter 5.2:

- Credit risk

- Market risk

- Other requirements (e.g. securitization first losses)

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[112] Cp. Stoughton, N./ Zechner, J. (2000), P. 893
[113] Cp. Capital Management Department of UniCredit Bank Austria
[114] Cp. Capital Management Department of UniCredit Bank Austria

The required allocated/absorbed Core Tier 1 capital (RC) is therefore computed as:[115]

$$RC = CT1 *ES*(av.RWA\ Cr + av.RWAeq\ Mkt + av.RWAeq\ Or)$$

Where:

CT1 = Core Tier 1 target ratio (see page 5)

ES **(1)** = Equity Stake

av.RWA Cr = average risk weighted assets for credit risk (net of UCI's intercompanies)

av.RWAeq Mkt = average capital requirements for market risks divided by 8% (net of UCI's intercompanies)

av.RWAeq Or = average capital requirements for other risks divided by 8% (net of UCI's intercompanies)

6.6 Relation between EVA & RAROC

The equity approach of the EVA concept makes it possible to compare the main risk-adjusted performance measurement key indicators RORAC (Return on Risk Adjusted Capital) with the EVA. The RORAC is used to appreciate the quality of the business the earning activities of a bank. For this, the net profit contribution of each activity (NOPAT) and the risk capital of the relevant department will be related to each other:

$$RORAC = Net\ Profit/\ Risk\ Capital$$

This key indicator allows making a comparison between different banking activities with different risk level or potentials.[116]

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[115] Cp. Capital Management Department of UniCredit Bank Austria
[116] Cp. Paul, S. (2001): Risikoadjustierte Gesamtbanksteuerung, in: Basler Bank Studien, Bern [u.a.], P. 104

Due to the fact that in the Equity Approach, the bank-internally calculated risk capital is also taken in consideration and the NOPAT corresponds to the net profit contribution, the following relationship between the EVA and RORAC is found:[117]

$$EVA = (RORAC - r) \times Equity\ Capital$$

In addition to this risk-adjusted indicator, it is possible to identify a relationship between the EVA and the RAROC (Risk Adjusted Return on Capital), a performance indicator for the overall bank management.

Starting from the "entity approach" of the EVA concept

$$EVA^{entity} = NOPAT - WACC \times NOA$$

by multiplying the appropriate risk capital unit we get to the previous definition. An additional risk adjustment needs to be made, by which the net profit contribution (NOPAT) is reduced by the return on risk capital. This calculation gives us the RAROC.77 In comparison to the EVA, which illustrates the value contribution of a position as an absolute performance measurement, shows RAROC a relative measure that can be composed from both RORAC and the adequate return on risk capital.[118] Therefore, his relationship between EVA and RAROC is shown as follows:[119]

$$EVA = RAROC \times Equity\ Capital$$

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[117] Cp. Paul, P. (2001), P. 106
[118] Cp. Ewert, R./ Wagenhofer, A. (2000), P.39
[119] Cp. Stoughton, N./Zechner, J. (2000), P.883

6.7 UniCredit Bank Austria AG – Calculation Example as of December 2012

EVA calculation example of the Bank Austria Group:

Actuals 12 2010 - external view of BA with BA view of RWAs BASEL 2 approach in ths. EUR	BACA Group	
P&L BA view of Legal Entities		
Goodwill impairment	-378.285	
Profit (loss) and net writedowns on investments	62.110	
Integration costs	-3.990	
Profit (loss) from ordinary activities before taxes	**1.145.807**	P&L
Income taxes	-348.289	
Net profit for the period	**797.518**	
Minority interest	-50.697	
Consolidated Profit	**746.821**	
Total RWA avg	**122.858.835**	
Core Tier 1 Ratio Target	7,20%	
Cost of Equity (Ke)	10,18%	
Month of Reporting Period	12	Input data
Equity stake	93,64%	
Marginal Tax Rate	25,00%	
Consolidated Profit	746.821	
Net extraordinary items	298.868	
Adjustments	13.435	
NOPAT	**1.059.124**	
Allocated Capital	8.283.241	
Deductions from Capital	214.731	Calculation
Allocated Capital (incl. Deductions)	**8.497.972**	
Cost of allocated capital	**865.094**	
EVA	**194.031**	
RARORAC	**2,3%**	

Figure 13: Calculation of EVA & RARORAC[120]

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[120] Source: Own calculation

The Profit & Loss (P&L) data is an extract of the total P&L of the Bank Austria Group per 31.12.2010.

The input data sources:

The Parameters Core Tier 1 Ratio and Cost of Equity is received once a year from UniCredit Group Holding.

The Tax rate for Austria is 25%.

The other items are calculated as follows:

Equity stake:

1 + (Minority Interest / Net profit for the period) = 1 + (-50.697 / 797.518) = 93,64%

Net extraordinary items:

(Goodwill + P/L and net write downs on investments + Integration Costs x (1- Tax rate)) x Equity Stake = -378.285 + 62.110 + -3.990 x 0,75) x 93,64% = 298. 879

Allocated Capital:

Total RWA avg x Core Tier 1 Ratio x Equity Stake = 122.858.835 x 7,20% x 93,64% =

= 8.283.520

Allocated Capital incl. Deductions:

Allocated Capital + Deductions from Capital = 8.283.520 + 214.731 = 8.498.250

Cost of Allocated Capital:

Allocated Capital incl. deductions x Cost of Equity Ratio / 12 x Month of period =

= 8.498.250 x 10,18% / 12 x 12 = 865.122

EVA:

NOPAT – Cost of Allocated Capital = 1.059.134 - 865.122 = 194.012

RARORAC:

EVA / Allocated Capital incl. deductions = 194.012 / 8.498.250 = 2,3%

On divisional level, the EVA and RARORAC are calculated similar (see below). The Bank Austria Group EVA is calculated with the UniCredit Group Core Tier 1 Ratio of 7,2% and Cost of Equity of 10,18%. Please note that the total Bank EVA is not a sum of the divisions.

Actuals 12 2010 - external view of BA with BA view of RWAs BA Group in ths. EUR		
	Marginal EVA	**Marginal RARORAC**
	Act 12 2010	**Act 12 2010**
F & SME	**-87.409**	-7,63%
Private Banking	25.026	65,02%
CIB	338.864	17,81%
GBS	-7.051	-13,87%
Corporate Centre total	-87.102	5,88%
thereof Corporate Centre	-295.538	-92,85%
thereof Intersegment	5.569	0,00%
BA Group Total	**194.012**	**2,28%**

Figure 14: Calculation of EVA & RARORAC[121]

From the results, it is clearly seen that the most profitable divisions are CIB (Corporate and Investment Banking) with an EVA of 339 ths. EUR and a RARORAC of 17,81% and Private Banking division with an EVA of 25 ths. EUR and a RARORAC of 65,02%.

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[121] Source: Own calculation

7. Executive Summary

The corporate valuation of financial institution, especially of banks differs strongly from the corporate valuation on industrial companies. This is not only due to the different businesses and business models, but also due to the role that banks play in the economy. From a macro-economic view the fiscal and monetary policy decisions are very significant for the operational success, and thus for the value of a bank. Furthermore, in the economy banks become responsible for the financial balance between saving and investment decisions. The bankruptcy of a bank not only affects the company itself and its clients, but also ha s an enormous impact on the national financial market and therefore on the economy of a country. In the case of international banking groups, like the UniCredit Group, the political or economical events in one country can affect the rest of the grous. As an example can be given Italy's debt, which affects the interest rates, which affect the pricing policy and not only, but also have the share prices on the stock exchanged. Another example of the Group is the UniCredit Bank in Kazakhstan. The goodwill impairment is not only reflected in the local results, but also in the Group results, which again are reflected in the share prices and the credibility of the bank.

Therefore, banks need to be evaluated properly, also by taking in consideration the upcoming risks. The aim of this paper was to present how the corporate valuation is done in a bank, by implementing risk –adjusted performance measurement tools and especially considering the Economic Valued Added concept. Furthermore, it was aimed to find out how the EVA can be implemented and calculated not only on total bank level, but also on segment level. Nevertheless, the relation between the EVA and RAROC and it's importance for the capital allocation was analyzed.

The purpose of the Risk – adjusted Performance Measurement (RAPM) concepts is the comparison between different bank activities with different risk profiles. RAPM analysis can help the bank management to make rational decisions on the capital allocation, thus on the development, limitation or elimination of some operations. With the help of the RAPM concepts, different profit levels can be compared among them on a risk-

adjusted base. On the other hand the RAPM concepts offer the management the basis for decision making regarding the adequate capital allocation. Moreover, the results of the RAPM analysis can influence on long-term the compensation and bonuses of the management.

The EVA, on the other hand, is a modern financial measurement tool that determines if a business is earning more than its true cost of capital. Including a cost for the use of equity capital sets EVA apart from more popular measures of bank performance, such as return on assets (ROA), return on equity (ROE), net banking income and the efficiency ratio, which do not consider the cost of equity capital employed. As a result, these measures may suggest a bank is performing well, when in fact it may be diminishing its value to its shareholders. EVA is a tool that focuses on maximizing shareholder wealth. EVA is an appropriate tool for motivation system and in this way it motivates managers to think like owners; and provides a common language within the corporate culture. Moreover, the EVA can be seen as a benchmark for performance.

Since the equity is of importance for the EVA calculation, the capital requirements have been presented and discussed as well in this paper. The capital requirements are of immense importance to the banks, and therefore to their profitability. The requirements are summed in the "three-pillar strategy". The first column represents the minimum capital requirements, the second pillar, supervisory review processes and the third column, the expansion of the disclosure. The capital adequacy regulation is on equity and is commonly known as the "capital adequacy ratio", which must exceed 8% at all times. The new banking regulations which will be brought by Basel III add recommendations to the already existing The new recommendations are based, on the one hand, on experience with Basel II and on the other hand, on the knowledge and experience gained from the global financial and economic crisis. The primary purpose of these capital requirements is to protect creditors.

Crucial to the success of the EVA concept on total bank level is the implementation on the downstream levels of the bank. These might be segments (Retail, Corporate or Private), departments or units so the bank calculates the so-called Macro EVA for the

total bank and Micro EVA for the segments. A positive EVA shows that a company is increasing its shareholder value, a negative one diminishing its shareholder value.

The issue of the capital allocation is approached from a "DOUBLE WAY" –perspective in the Bank Austria. The allocated capital at the Legal Entity level in fact is the maximum between the economic (EC) and the required (Core Tier 1) capital (RC). With the "double way" approach economic and required capital are calculated separately and the higher between the two is considered the allocated/absorbed one.

In order to be able to make decisions regarding the capital allocation, the bank uses both EVA and RARORAC analyses in order to support the management in their decision-taking. RARORAC is the ratio between EVA and Allocated Capital and expresses, in percentage terms, the capacity to create value per unit of risk taken. Therefore, the RARORAC is together with the EVA an important and useful tool in capital allocation; also because there is a relation between these two key financial indicators.

The calculation example fulfilled with December 2012 data, shows and EVA of 194.031 ths. Eur and a RARORAC of 2,3% on total bank-level. The EVA of the bank is not a sum of the EVA's of the divisions. Both RARORAC and EVA are calculated separately for the bank and divisions.

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