

APPLICATION SUPPORTING COMMERCIAL BANK'S CAPITAL MANAGEMENT

VIERA GAFRIKOVA ^{a)}, ZDZISŁAW ODRZYGÓŹDŹ ^{b)}, WIESŁAW SZCZESNY ^{c)}

^{a)} Faculty of Management and Finance, Chodkowska University

^{b)} Faculty of Mathematics and Information Science, Warsaw University of Technology

^{c)} Faculty of Applied Informatics and Mathematics, Warsaw University of Life Sciences

This paper describes the basis - resulting among others from the prudential capital regulations - for capital management at a commercial bank. In the capital management process there are used capital allocation and risk adjusted performance measures. Based on this, the concept of the central MIS extension has been presented in a way that allows to include a wide range of different level managers in the capital management process in order to improve the capital efficiency from the perspective of shareholders.

Keywords: Capital Management, Capital Allocation, Risk Adjusted Performance Measures, Business Intelligence, Management Information System

1. Introduction

The bank's capital, like capital of any other enterprise, constitutes paid in capital contributed by owners and earned capital that comes from profits of the company in the course of business. It is created in accordance with applicable laws, regulations and statute of the bank. Commercial bank capital fulfills many important functions, although its share in total liabilities is relatively low (for example, in the banking sector in Poland it amounted to 10.4% as of the end of June 2013 [1]). The basic function of capital is the buffer function that ensures the bank's survival in case of unexpected losses incurred.

The capital can be viewed from several perspectives. From a purely accounting point of view capital is treated as a free source of funding, primarily for fixed assets and investments in risk-free instruments (for example treasury bonds). Shareholders and their representatives (the Supervisory Board and the General Meeting of Shareholders) expect an adequate return on capital, e.g. in the form of dividends paid. This means that the bank is expected to generate profit depending on the size of capital and cost of capital in the market. Thus, the higher is the bank capital, the higher profit should be generated to share the profit with shareholders, therefore, from this perspective, capital can be associated as the cost. From the perspective of stakeholders such as creditors or institutions that represent them (regulators and rating agencies) capital is seen as a factor determining the size and potential of the bank and an additional security buffer. The perception of the bank affect both the number and type of bank customers. This causes that the problem of optimal use of capital held - in the times of capital deficit - has become one of the most important issues that should be solved with the active participation of a large group of employees. Efficiency in the use of capital can be improved already starting with activities of linear employees. Therefore, in the majority of large banks dedicated modules (applications) are created within the central MIS, that support the absorbed capital efficiency management process, involving fairly large group of employees.

The purpose of this paper is to present the concept how to incorporate the application concerning efficiency management of capital absorbed by business units into the standard central Management Information System (MIS). From the bank's management point of view, the role of this module is to support the optimization of the capital size and structure and capital profitability (a compromise among the return for shareholders, regulatory requirements, rating agencies criteria and cost of financing).

However, it should be noted that in order to implement the absorbed capital efficiency management process by business units effectively, the system of cost management, including the cost allocation to business units, and system of management by objectives should work at the bank. The implementation of the management by objectives concept on the basis of the central MIS is described in [2], [3]. When designing the application, the number of requirements set by supervisors should be taken into account. These requirements are discussed in the next section.

2. Supervisory capital requirements

2.1. Basel Agreements

The activities of banks are subject to extensive regulations, including requirements related to capital. In accordance with the Polish Banking Act "In order

to ensure their economic safety, banks shall be required to possess own funds adjusted to the scale of the operations they conduct” (art. 126, [4]).

External rules require banks to maintain a minimum level of capital, which reduces the probability of their failure, and which in turn increases the stability of the entire banking system. The capital requirements imposed on banks are based on international standards set by the Basel Committee on Banking Supervision, which has developed a set of recommended practices for financial risk management in the banking sector, security and the level of capital banks must hold.

Recent changes in the prudential recommendations, involving the introduction of stricter requirements on bank capital adequacy and liquidity, were forced by the financial crisis that swept through financial markets in the years 2007-2009. Changes are described in the document known colloquially as Basel III, published in 2010 [5]. Prudential standards based on Basel III were transposed to the European legal order in the form of two acts: Regulations [6] and the Directive [7] of the European Parliament and of the Council published in June 2013. The new standards will be effective from January 2014 with a number of transitional periods.

2.2. Capital Adequacy Assessment

Banks are required to assess their capital adequacy in two areas: within the so-called Pillar I and Pillar II. Pillar I precisely defines risks that must be taken into account when assessing the capital adequacy as well as methods of capital requirements calculation for individual types of risks: credit, market, settlement, delivery and counterparty credit risk, operational risk. The capital requirements under Pillar I are called regulatory capital requirements.

Pillar I capital adequacy is determined in relation to the regulatory capital (see section 2.3.), i.e. the regulatory capital may not be less than the total capital requirements.

Under Pillar II, banks are required to estimate the amount of (internal capital) needed to cover all of the material risks in the bank's operations and changes in the economic environment, taking into account the expected level of risk. Risk measurement and determining the resulting capital requirements are generally performed using models of Value at Risk (VaR).

Pillar II capital adequacy assessment is based on comparing the internal capital with so-called available financial resources (AFR). Definition of AFR depends on supervisory regulations in the given country: in some countries AFR are set equal to the regulatory capital, and in other they may differ from the regulatory capital.

2.3. Regulatory capital

The regulatory capital definition is based on the definition of the accounting capital (that is the capital recorded in the bank's balance sheet within the meaning

of the applicable accounting framework). It is, on the one hand, broader than the accounting capital definition, as it may include additional items, which are not included in the accounting capital, and on the other hand is narrower as the different kinds of deductions are taken into consideration in the regulatory capital.

The regulatory capital is composed of two main categories of capital: Tier 1 capital and Tier 2 capital. Tier 1 capital consists of common equity Tier 1 capital (or core Tier 1 capital) and additional Tier 1 capital.

Common equity Tier 1 capital is the highest quality capital and includes funds contributed by the owners and items created from profits earned. At the commercial bank it includes - among others - ordinary shares or other financial instruments, issued directly by the bank, and that meet a number of strict conditions, reserves, retained earnings, funds for general banking risk, interim profits (under certain conditions). Among deductions applicable to common equity Tier 1 capital one can quote items such as intangible assets or significant investment in financial sector entities.

The Additional Tier 1 capital includes for example financial instruments, not necessarily issued by a bank that meet a number of conditions, generally less stringent than the conditions for the classification of instruments as Common Equity Tier 1 capital.

The Tier 2 capital, includes, inter alia, subordinated loans fulfilling a number of strict conditions, such as subordinated loans have an original maturity of at least five years and the nominal amount of loans in the final five year period of their contractual maturity decreases linearly (proportionally) to the time left to maturity and the claim on the principal amount of is wholly subordinated to claims of all non- subordinated creditors.

2.4. Minimum capital levels

Under Pillar I, capital adequacy ratio (CAR) is used to measure the adequacy of the bank's capital base. This indicator is defined as the ratio of capital to 12,5 times the total capital requirements. Banks are obliged to maintain a capital adequacy ratio at the level not lower than 8%. This means equivalently that bank's capital must be greater than total capital requirements.

In accordance with the regulations [6], banks are obliged to calculate – besides CAR – also Core Tier 1 (CT1) ratio and Tier 1 ratio (T1). They are defined as the ratio of Core Tier 1 capital /Tier 1 capital/ to 12,5 times the total capital requirement. The lower limit of CT1 ratio was set at 4,5%, and of T1 ratio at 6%.

In addition to minimum capital requirements described above, banks are required to maintain - mandatory or optional extra capital, so-called capital buffers referred to the Core Tier 1 capital, which in practice means that CT1 ratio has to be higher than 4,5%.

Introduction of three types of capital adequacy ratios and minimum limits for them intends to force banks not only to maintain capital at an appropriate level, but also to provide the proper quality of the capital structure.

2.5. The determinants of capital held by banks

Banks generally maintain capital at a higher level than is required by law, for example, the average capital adequacy ratio for the banking sector in Poland amounted to 14,7% at the end of 2012 [8]. Supervisory requirements are not the only factors that affect the amount of capital held by banks. Among other factors one can name:

- an internal risk assessment performed by the banks themselves
- depositors' expectations – in view of safety reasons
- the expectations of shareholders – due to the required return on capital
- planned development of the bank's activities
- criteria of credit rating agencies
- future regulatory changes in the capital requirements - this is the current case, when banks are preparing for the implementation of Basel III
- recommendation of banking supervision - for example, the Polish Financial Supervision Authority concluded that the dividend for the year 2012 might be paid only by banks that had met several conditions, including capital adequacy ratio above 12% and the Tier 1 capital ratio above 9%.

3. Capital management

3.1. Main areas of capital management

The capital management process consists of two main areas: the capital adequacy management and capital allocation.

Capital adequacy management is closely related to the identification, measurement and monitoring of material risks to which banking activities are exposed. The main objectives of capital adequacy management are:

- ensuring the safe running of the bank in normal and extreme conditions - by maintaining a balance between the ability to take risks (limited by capital owned) and the level of risk generated
- to maintain the capital covering risks at an optimal level for the bank, above the statutory minimum, enabling further development of activities and protection of shareholders' interests
- to keep the preferred capital structure in order to maintain the desired quality of capital to cover risks

The capital allocation means the assignment of the appropriate part of the bank's capital down to lower business units such as organizational units, transactions, business lines, products, customers etc., in order to be able to create value for shareholders by maximizing the return on conducting business activities, taking into account the risk appetite (see e.g. [9], [10]). The capital allocation allows the calculation of return on capital for different banking activities and an evaluation of managers responsible for given activities on the basis of the allocated capital. Dedicated module / application in the central Management Information System can serve to achieve these goals.

3.2. Risk adjusted performance measures

Risk adjusted performance measures (RAPM) can serve as the key to a well-organised, well-structured and transparent capital management process. RAPM compare financial results, for example profits from a particular activity, to the capital amount required to produce these results, taking into account the risk involved in the activity. The traditional measure of return on capital (ROC or ROE – Return on equity) is defined as net income generated during the period divided by average shareholder's equity for the period. This is a very general definition, and in practice there are wide variety of approaches to measure both the net income and the capital. Adjusting by risk the numerator or the denominator (or both) we obtain risk adjusted performance measures. The most commonly used indicators are: RORAC (return on risk adjusted capital), RAROC (risk adjusted return on capital) and RARORAC (risk adjusted return on risk adjusted capital). All these indicators are generally calculated taking into account cost of capital (the capital is not treated as the free source of financing). Capital definitions used in the RAPM methodology generally are closely related to the capital definitions used in the capital adequacy measurement. The formula (1) presents one of possible ways to calculate RARORAC indicator:

$$RARORAC = \frac{EVA}{AC} \quad (1)$$

where *EVA* – means Economic Value Added, also referred to as “economic profit” and *AC* – capital at risk.

The amount of capital at risk depends on the bank's risk appetite and the target level of capitalization. We distinguish between two types of capital at risk: capital absorbed to cover the risk that has already been undertaken (calculated during the monitoring process) and allocated capital to cover the risk in the future (calculated in the budgeting and planning process).

Allocated /absorbed/capital is calculated on the base of regulatory capital requirements (RC) and the internal capital (IC), namely the greater amount of these two is taken as allocated capital:

$$AC = \max(RC, IC)$$

Capital RC is calculated according to the formula (2):

$$RC = CT1\ ratio \cdot 12,5 \cdot REG \quad (2)$$

where *CT1ratio* – target value of the Core Tier 1 ratio established by a bank – see subsections 2.4., 2.5, *REG* – total capital requirements for all regulatory risks – see subsection 2.2.

If the available Core Tier1 capital of the bank (*DC*) is higher than the allocated capital (*AC*), the bank deals with a capital surplus, otherwise (*DC < AC*) with a shortage of capital.

To calculate *EVA*, the formula (3) is used:

$$EVA = NOPAT - C \cdot R_i \quad (3)$$

where *NOPAT* means net operating profit after taxes, *C* – invested capital, *R_i*- unit cost of capital.

The invested capital definition depends on the methodology used by a bank - for example, it can be treated as the allocated capital increased by regulatory deductions from CT1 capital.

If the *EVA* is positive, the company creates value for shareholders, negative *EVA* indicates that shareholder value is destroyed.

The cost of capital is usually defined in line with the methodology CAPM - Capital Asset Pricing Model (see for example [9], p. 111-114). In this model, it is assumed that the required return on investments is determined on the basis of historical data according to the formula (4):

$$R_i = R_f + \beta \cdot Erp \quad (4)$$

where *R_f*- risk-free rate (usually the return rate on treasury bill or treasury bonds), *Erp* -equity risk premium is the excess market return over the risk free rate, *β* – the proportionality factor (sensitivity to market risk).

The *NOPAT* can include various types of adjustments of the net profit, depending on the bank's methodology. The most typical is the exclusion of the result on extraordinary items after taxes. Sometimes so called virtual interest (*VI*) calculated on a surplus or on a shortage of capital are taken into account in the *NOPAT* calculation:

$$NOPAT = NP - EI - VI (1 - TR)$$

where *NP* – net profit, *EI* – result on extraordinary items after taxes, *VI* = *R_f*(*AC-DC*) –virtual interest, *R_f*– risk free rate, *TR* – tax rate.

Virtual interest increase the net profit, in the case of a capital shortage, and decrease the net profit in the case of a capital surplus. This allows the better comparison of different entities with different amounts of capital, as the entity with greater amount of capital is supposed to generate profits easier.

3.3. Capital allocation to transactions and clients

In order to include managers with different levels of responsibility in the process of absorbed capital efficiency management, capital should be allocated to the level of single transaction completion of which requires the bank to hold capital.

Only reports which include amount and cost of assigned capital and the full allocation of administrative costs show to business units full financial impact of the transaction.

Therefore, the report on the EVA at the client level shows full information on effects of customer-bank relationship during the reporting period. Usually, the allocation methodology is based on the technical capabilities of the Management Information System implemented in the bank. Currently, even the simplest MIS includes a module of Funds Transfer Pricing (FTP) which allows to calculate net interest margin on a product-by-product basis (or on other lower than bank level in which we are interested in).

Figure 1 shows a scheme of how to extend the valuation of the typical credit transaction which is valued in MIS by means of FTP and required 8% of capital.

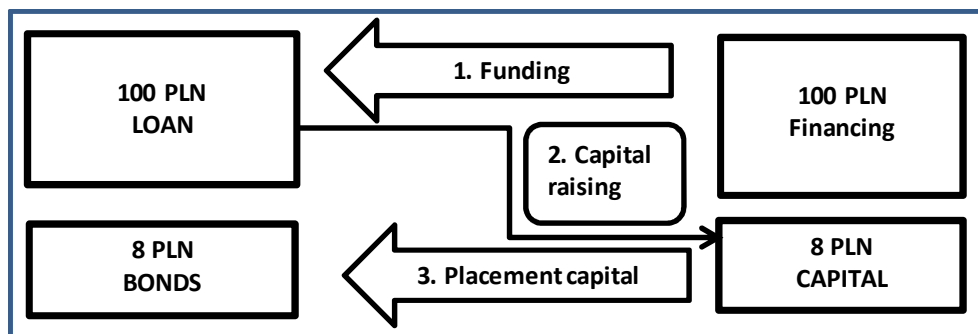


Figure 1. Example of assigning the capital to credit transaction (assuming the required capital at 8% level) illustrating fund flows used in the valuation of the funds according to bank's FTP system

From Figure 1 follows that, from the business unit point of view, capital allocation causes the additional charge for the transaction net interest income, because interest revenues from assets at 8 PLN are lower than cost of capital at 8 PLN. A similar idea can be used in the process of allocating capital to other types of transactions.

4. Construction of capital management system

Due to external regulations, more or less developed capital adequacy management process is established in each bank. However, there is lack of available

analyses and studies concerning the degree of use of the capital allocation process for the capital management in banks. Some banks, including the two biggest Polish banks, PKO BP (see [11], p.110) and Pekao SA (see [12], p. 50), put general information on the functioning of their capital allocation processes in their financial statements. A little bit more information can be found at specialized conferences, for example SAS Forum [13]. Detailed solutions, however, constitute the business secret of banks and are unknown to others. To fulfill the obligations towards supervisors there is no need to build a very extensive support system taking into account the broad participation of business units. However, the inclusion of a broad group of participants enables significant increase of the absorbed capital economic efficiency. When building a capital allocation system in banks there should be taken into account the following elements:

- selection of an appropriate methodology (the consequences of various performance measurement models must be thoroughly thought and models should be detailed described)
- establishment of standards for specifying the capital to be allocated and algorithms for capital allocation to lower levels (e.g. activities, transactions)
- definition of NOPAT calculation algorithm at the whole bank level and at the lower levels. It should be decided what kind of costs should be considered at the lower levels: the direct costs only or also indirect costs? In the case of indirect costs the allocation methods for these costs are needed. The net profit includes the various cost items, for which the lower –level managers are not responsible, in particular for general administrative costs or taxes – to impose these costs on managers may be demotivating for them,
- establishment of centres of responsibility for capital management results,
- establishment of rules for reporting the financial results taking into consideration cost of capital employed

When building the supporting system for the capital management at a bank, we must keep in mind that we are dealing with an integrated process that is based on supervisory regulations and internal procedures approved by the Supervisory Board and the Management Board. Therefore, a solution should be flexible, because existing procedures in this area are subject to periodic review to reflect changing internal and external conditions of the bank's activities. For this reason, the simplest solution seems to be to include to the central MIS the capital management center and based on its functions to modify the internal funds flow and their pricing within the current Funds Transfer Pricing system. This approach allows a fairly easy introduction of a passive capital allocation to the lower levels (for example clients) and after the implementation of the EVA /RARORAC/ reporting at the level of the individual business units to go into more difficult phase of the use of EVA /RARORAC/, namely using them as a Key Performance Indicator (KPI) in the system Management by Objectives for the responsible managers that enables to

increase gradually the efficiency of capital absorbed by individual business divisions.

Support can be organized using a dedicated application that uses data from systems supporting the risk management and the detailed information from financial accounting systems. However, it is an expensive and not optimal way from the point of view of IT infrastructure use.

Therefore, in practice, central MIS is used to support the capital management process, which is cheaper because it only requires to create - within the existing structures of MIS - Capital Management Centre (CMC) at the bank's level and the Divisional Capital Management Centres (DCMC) at the individual business divisions' level. Within the budget DCMC receive from CMC capital adequate for planned business activities.

The incorporation of capital allocation into business processes enables to consider the cost of absorbed capital at the lowest business level. This means that the individual consultant working with a portfolio of clients possesses the related information on the size and cost of capital absorbed. In addition, preparing himself for the price negotiation, he has a comprehensive range of information about the impact of the potential transaction on the EVA for the client. The described solution doesn't require a very large expansion of MIS.

In Figure 2 we present additional elements to be created in a typical central MIS also used to support the management by objectives [2].

One of the most labour-intensive expansion of MIS (see Figure 2) is the Capital Allocation Engine, which requires capital allocations for particular types of risk to the transaction and customer level. The detail of the internal models used (an example of the capital allocation for credit transactions arising from credit risk is given on Figure 1) is a closely guarded secret of each institution disclosed only to the supervisory authorities. The common element of models used for capital efficiency management is the consistency with the level of decentralization of decision-making power concerning transactions exposed to the risk.

In sum, the extension of a well-organized and well-performing central MIS by the capital management module should not require large expenditures. Moreover, the extension of MIS can be carried out by using the institution's own staff resources, as was the case in one of the banks listed on stock exchange in Warsaw (the bank does not desire to disclose its name). The use of the extended MIS system, as shown schematically in Figure 2, has allowed to involve the wider group of employees to the capital management process (at the level of budgeting, monitoring and Management by Objectives – the motivation system). The implementation of this application has positively influenced the capital adequacy ratio value. This in turn means – among others – the credit expansion possibility and also the advantages for shareholders, because the bank is able to spend the greater part of the profits on dividends rather than on the capital increase.

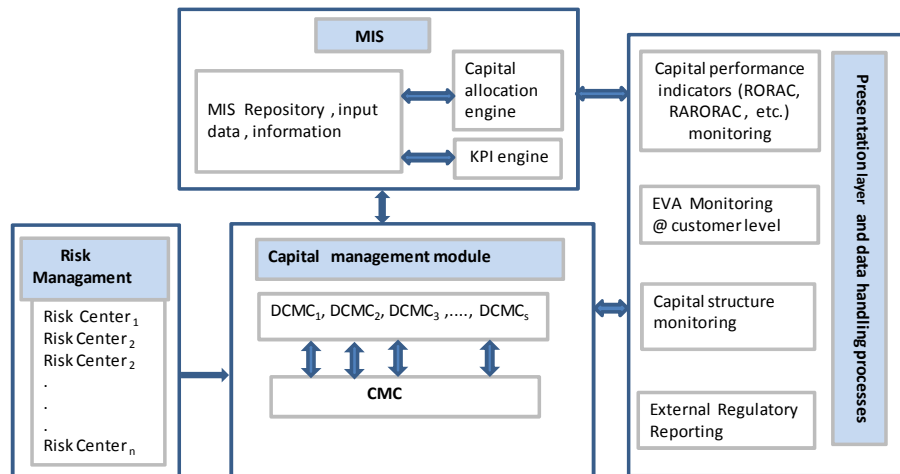


Figure 2. Additional elements of the MIS used to support capital efficiency management taking into account the linear employees engagement

5. Conclusion

In large banks, it is possible to use the more developed form of the capital efficiency management support, namely taking into consideration in the budgeting process the capital allocation to the level of Capital Management Regional Centres specially appointed within the individual business divisions. This approach allows the conscious assignment of capital within the geographical structure. Additionally, it integrates lower level managers, advisers and local staff in their concern to increase the effectiveness of the available capital. Managers can consciously participate in the capital efficiency improvement beginning from the level of the budget and ending during its implementation, due to the information they have on both the capital efficiency (EVA customer reports) and reduction in the availability of capital. This becomes possible because MIS can efficiently provide information to be used by motivation systems.

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