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Statistical-econometric model used to analyze the operational and insolvency risks

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Abstract. *Operational risk is a matter concerning the financial and banking system. Many credit institutions have adopted as practice the listing of the risk categories, analyzing each and deciding whether they should be reported separately under a controlled risk management (market risk and the credit risk). Managing the operational risk of a bank implies using proved econometrical models that help address the issues in a validated and efficient way in order to mitigate associated risks like the operational and insolvency.*

Keywords: insolvency risk; banking capital, operational risk, analysis, control models.

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Introduction

The insolvency risk is one of the risks that characterize a critical moment in the activity of any economic operator. When insolvency is detected as an event with some probability to manifest in the future of the company, the management must take immediate and appropriate actions to minimize the risk. The process of approaching the insolvency and operational risk through proper decisions can be modelled upon the general decisional process, with emphasis on detection, information, alternative design, coherent set of criteria, best alternative choice, decision analysis (as an unfortunate decision that does not diminish the risks must be immediately countered with new, corrective decisions).

1. Definition of insolvency and own funds functions

Viewed as a bank solvency guarantee, own funds perform multiple functions: the function of guaranteeing against losses through own equity funds and funds assimilated to them; the reliable function – a sufficient amount of equity funds strengthens the confidence of depositors in banks' solvency; the compensation function of possible losses; profits distribution function (Anghelache and Anghelache, 2010).

Defining the risk of insolvency is closely linked to the level of own equity. Thus, we will state that the insolvency risk is the risk of loss of banks' own funds.

2. The regulation of banking capital

The fundamental objective is to promote the stability and security of the financial and banking system through prudential rules and supervisory measures to reduce risk.

After the scope, we distinguish national rules and international rules.
National rules pursue three objectives:
- Protecting depositors against the risk of bankruptcy.
- Security of payment systems and clearing.
- Preventing systemic risk.

International regulations aimed at:
- Preventing systemic global risk.
- Harmonization of competition in the banking market.

3. Regulation of insolvency risk in Romania

The indicator is expressed as a proportion of total assets and off-balance sheet, net of provisions, adjusted according to specific risks.

The solvency ratio level is at least 12%. Credit institutions are required to permanently maintain the defined indicator at a level of at least 12%. If the indicator falls below 12%, concerned credit institutions shall take appropriate measures to restore as soon as possible, the minimum level of this indicator.

The weightings risks applied in accordance with the norms:

- Weighting Zero: Cash and equivalent items; asset items constituting claims on central governments and central banks in Zone A; asset items constituting claims on the European Communities; asset items constituting secured claims directly, expressly, irrevocably and unconditionally by central governments and central banks of Zone A or the European Communities; asset items constituting claims on central governments and central banks in the B zone denominated and funded in the national currency of the borrower; asset items constituting secured claims directly, expressly, irrevocably and unconditionally by central governments and central banks of Zone B denominated and funded in the national currency common to the guarantor and the borrower.
- Weighting 20%: asset items constituting claims on the European Investment Bank - EIB; asset items constituting claims on multilateral development banks; asset items constituting secured claims directly express, irrevocable and unconditional by the EIB; asset items constituting secured claims directly, expressly, irrevocably and unconditionally by multilateral development banks; asset items constituting claims on regional governments or local authorities in Zone A; asset items constituting secured claims directly express, irrevocable and unconditional on regional governments or local from area A68; asset items constituting claims on Zone A credit institutions but not constituting such institutions' own funds; asset items constituting claims with residual maturity less than or equal to one year on Zone B credit institutions; asset items secured directly, expressly, irrevocably and unconditionally by credit institutions in Zone A; asset items constituting claims I or residual maturity of one year and are secured directly expressly, irrevocable and unconditional by credit institutions in Zone B.
- 50% weighting: fully covered mortgage loans for the credit institution on a residential property – The property value will be calculated on the basis of rigorous assessment criteria laid down by law, regulation or administrative provisions; The assessment will be carried out whenever necessary depending on the specific security; Mortgage-covered bonds (mortgage-backed securities) – if they are equivalent in terms of credit risk; Prepaid expenses and accrued income, were not deducted from own funds.
- 100% Weighting: asset items constituting claims on central governments and central banks in zone B, except where denominated and funded in the national currency of the borrower; asset items constituting claims on regional governments or local area B; asset items constituting claims with a residual maturity greater than one year on Zone B credit institutions; asset items constituting claims on non-bank sectors of Zone A and Zone B; property, within the meaning of accounting regulations harmonized with Directive 86/63 5/EEC and IFRS applicable to credit institutions; Portfolios of shares, participation and elements of the own funds of other credit institutions which are not deducted from the own funds of credit institutions.

All other assets except where deducted from own funds.

The own funds of credit institutions are formed in accordance with NBR norm 11/ 15.12.2003 from equity and additional capital. The equity consists of: initial capital and general banking risk fund. The additional capital consists of special funds, reserves and loans.

4. Definition of operational risk

The definition of operational risk is an issue concerning the financial institutions. Many banks have adopted as practice the listing of the risk categories, analyzing each and deciding whether they should be reported separately under a controlled risk management (market risk and the credit risk). It is important to note that operational risk is not limited to financial institutions. Useful examples for approach to defining and measuring this risk can be found in other sectors (Anghelache, 2010; Aisen and Franken, 2009).

Operational risk has been managed locally, within each department with support functions such as legal and internal audit.

The elements of operational risk are those of control of the process, reputation, personnel, legal, acquisition, marketing, gaps in information systems and communications, technological risk, changes in the tax system changes to relevant regulation, size of business, project risk, security.

Risk control is defined as unexpected losses generated after a lack of a system of control or lack of effectiveness of this control system (Anghelache et al., 2009).

The risk of process occurs in connection with a defectuos activity that has the effect of unexpected losses. This risk is related to internal control as a process.

Reputational risk is defined as the risk of loss not estimated on the value of assets after some repercussions on the reputation of the bank. Erosion reputation can intervene even in the marketing of new financial instruments.

Personal risk. Is not limited to the work of the Human Resources Department even if it has functions for risk control. The Human Resources Department has responsibilities by adopting standards and a database infrastructure for knowledge management and by encouraging and promoting professional training.

Legal risk can appear also in the case of legal claims resulting from an act or activity of the staff or the risk that can appear if an internal legal opinion turns out to be wrong in court. The latter risk applies to new financial products or compensation.

Risk of taking can intervene in case of successive purchases of shares through the capital market so as to alter the bank's capital structure.

Marketing Risk can appear in the unforeseen situation that can occur when new financial products are not well enough capitalized through policies and marketing strategies (Anghelache et al., 2009, pp. 147-150).

In a broad definition, technological risks include all risks of system and external pressure caused by technological progress. Technological risk is central to business for investment banks.

Amendments tax system such as changes in taxes have the effect of passing on loss the business. As an example we present the changes that appeared in deducting expenses or the case of Romanian green certificate subsidies.

Changing regulations in this area represents a risk that should be carefully monitored permanently, the result can be major for the institutions activity and the risk of rentability volatility can be extremely high in some cases. Changes in the weighted average risk assets is a good example in this case (Anghelache and Anghel, 2014).

Business size may induce the risk of bankruptcy if the staff, infrastructure and ITC's own mechanisms can not support its development.

Security risk is related to the assets of credit (Ejsing and Lemke, 2009) institutions to be insured for the theft internally and externally. By assets we understand both the institution's own capital assets and other securities/loans, clients assets and intellectual property.

The risk of natural disasters – natural disasters are a major cause of financial loss.

In conclusion, operational risk can be defined as a credit institution's exposure to negative financial results (Hakenes and Schnabel, 2009). These losses may occur as a result of events from outside or inside, trends and changes that weren't foreseen or prevented by corporate governance or the system of internal control systems (policies, standards and other controls). Such losses exclude those already captured by other risk categories (Anghelache et al., 2009, pp. 62-66).

Operational Risk Quantification

Steps to be followed are: identification of a clearly describing exposure to operational risk: establishing a relationship between factors and loss; moderation events with little impact but high frequency and those with high impact but low frequency (Anghelache et al., 2009, pp. 123-126).

When analyzed, the credit risk or market risk (Bolocan and Balogh 2010), many institutions have recourse to a gradual approach, for defining risk; identifying risk factors (Didar, 2010); measuring exposure to these factors, the risk calculation (depending on a number of assumptions such as application specific risk factors exposure, the exposure to these factors and assumed confidence interval).

Qualitative Approaches for operational risk measurement

Most approaches to operational risk and internal control were qualitative, so identification of operational risk was measured in words rather than numbers. A common approach is to achieve an overview of how the Bank manages operational risk and then an assessment of risk based on objective opinion of an experienced person. Much of this task is achieved by most banks internal audit (Berndt and Gupta, 2009).

In 1992, in the US was created a framework document on internal control for all companies, not just for financial institutions. All key concepts in this document have been incorporated into the American Standards on Auditing (SAA). SAA 55 states that internal control is a process conducted by the company's board of directors, management and others, designed to provide assurance regarding the achievement of the following objectives: the veracity of financial statements; effectiveness of operations; compliance with applicable laws and regulations.

Internal control is a process and therefore a series of actions aimed at activities of a company. The components of internal control actions are:

Control of activities provides the framework for control activities. It includes the integrity and ethical values of the company.

The risk assessment – banks must pursue the facing risks including operational risk. It must determine business objectives correlated with sales activities, production, marketing, financial and other, so as to operate effectively across departments. The bank must establish mechanisms to identify, analyze and manage related risks (Pirvu and Mehedintu, 2010).

The control actions must establish and execute controls and procedures to ensure that the measures identified by management are needed on the risks, and they actually carried out.

Information and communication around these activities are information and communication systems, which allow receiving and exchanging information required to lead, manage and control operations.

Monitoring - the entire process must be monitored and if necessary, make changes. In this way the system can react dynamically, modifying, if conditions require.

Sovereign risk – analysis and control model

1. Defining the country risk

The country risk is the probability of losses in international activities as a result of economic events, social and political situation of each country.

Losses can materialize in many forms:
- Loss of opportunities for failure to comply with its clauses;
- Additional costs implied by steps taken for debtors to meet their obligations;
- Real losses materialized in the amounts that can not be recovered.

Methods for analyzing the country risk

An important category of ways of forecasting the country risk is a whole technique called (rating). This technique consists in giving the considered country notes, so that it is possible to classify countries according to their risk analysis. Note can only be applied to global or part of the risk. In this context it may be mentioned the methodology called Credit Risk International to assign grades to 100 specific categories ranging from the existence of political parties per capita GNP.

The advantages of this method translates into simplicity and low cost, while the inconvenience of lies in the lack of prospective vision (i.e. Iran benefit from a rating of excellent in 1978 a few months before the fall of the Shah, Kuwait was considered a country without risk before the invasion of Iraqi troops from 1991). The scoring system can target one type of risk, as is the default. Note in this case concerns only a specific variable, namely the repayment capacity of the country.

It can appeal to rating agencies like Moody's, Standard and Poor's, FitchIBCA that notes sovereign risk. Also, publications like Euromoney list country ratings calculated from financial risks.

- Method of risk indicators (Delphi) consists of:

Background of the set of relevant criteria such as:
- Political criteria: stability of the regime, military, location in an area of conflict, etc.
- Economic criteria: the structure of exports and imports, the savings rate, the situation of the banking sector.
- Financial criteria: rates are calculated, such as foreign reserves/external debt, annuity repayment debt/exports.
- Consult experts on the pertinence scoring criteria.
- The weighting of each criterion and then determine a note (score), indicating the overall country risk analysis.

BERI (business risk indicator) is a risk indicator developed by the US and becomes subject to periodic reviews for each country. This indicator is determined based on 15 criteria, each weighted according to importance. Then, criteria are graded from 0-4 (0 to high risk to low risk and 4), and the combination note-weights for each country gives the final score, the risk indicator.

Definition and characteristics of interest rate risk

Interest rate risk arises from changes in interest rates on the financial market. Changes in interest rates may cause a decline in income earned from interest and fees and/or an increase in interest expenses.
- Operating risk is the risk of increased costs or lower income from interest;
- Balance sheet risk (also called equity risk) is the risk of diminishing asset values or increases of debt.

We find, therefore, that the management of interest on credit institutions should focus on two levels: in terms of operation and balance plan. Changes in interest rates may cause a change in income from interest earned and the change in value of balance sheet assets and liabilities held by the bank. The exploitation plan is a useful indicator of the interest gap calculated as the difference between assets and liabilities sensitive to interest rate changes.

GAP = As – PS

If GAP> 0, the bank is set to LONG and when market interest rates rise situation is favourable because they increase interest income of the bank.

If market interest rate falls, the bank earned interest income will decrease.

If GAP <0, the bank is set to SHORT, and when market interest rates increase because the situation is unfavourable for the bank reduces interest income received. Decreases when interest rates will increase interest income obtained by the bank.

Conclusions

Banks are nowadays facing many challenges due to the last years financial turmoils that affected immediately the entire financial and banking system. Therefore, risk administration became more and more important in all the banking structures, being under if not directly related to bank's management. Financial stability becomes more interconnected with the other economical aspects of the economic system of each country and regions, affecting directly or indirectly each one the other in more complex ways. Therefore, risks are now analysed at a micro and macro level including a more range of factors as economical, political, legislative and so on.

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