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## **RISK MONITORING ON BANKING SUPERVISION**

***A RESEARCH OF THE SUPERVISORY ENTITIES' CONCEPTS, STRUCTURE  
AND BEHAVIOR REGARDING RISKS SUPERVISION***

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## I. Introduction

The Basel Committee for Banking Supervision (BCBS) is a forum for the discussion of subjects related to banking supervision. Its main function is to coordinate the exchange of experiences among national supervisory entities, in order to obtain effective supervisory activities inside all countries. To reach its goals, BCBS elaborates and discloses documents, where principles and quality minimum standards for banking regulation and supervision are established.

Although all the BCBS efforts, the degree of compliance with its orientations varies from country to country. The timing for the adoption of its recommendations depends on the complexity of the nation's financial market, as well as on the power and soundness of its banking regulatory and supervisory authorities.

Many questions are posed when the subject is risk supervision. The BCBS Capital Accords base the minimum capital requirement on the amount of risk exposure. Supervisory authorities have, thus, the responsibility of assuring that banks are measuring and controlling their risks properly:

*How is the process of compliance with Basel Principles, Guidelines and Accords around the world?*

*Which risks are assumed to be more important for the financial systems of each country?*

*Is the existing banking regulation of the countries adequate to support their supervisory activities?*

*How are supervisory authorities structured to play their role?*

*Do supervisors monitor the risks of the banks under their responsibility? If so, which risks are monitored and which are the main instruments and tools used to monitor these risks?*

*Is risk information useful to an analysis of systemic risk?*

Willing to answer these questions and to enhance the discussions related to this theme, this paper presents the main conclusions of a wide research among supervisory entities from 74 countries<sup>1</sup>. More specifically, the next section comprehends the analysis of the supervisor's awareness level concerning risks on banking institutions and the compliance stage of the supervisory actions regarding risks with the Basel principles, guidelines and capital accords. Processes and tools developed by supervisors to monitor the main risks - credit, market and liquidity risks – are analyzed, and a special attention is given to the use of early warning systems as a supervisory risk monitoring tool. It also evaluates the importance and use of risk information to a systemic risk analysis. Finally, the following section describes briefly the Brazilian supervisory structure and behavior, making a comparison with the results of the research.

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<sup>1</sup> The research was elaborated by means of the survey entitled “Survey on Market and Liquidity Risks Monitoring – Analysis of Trends and Acting of Banking Supervision”, also presented at Annex 1.

## II. Research's Results

### Part I – Countries' Economic and Financial Profiles

The participant countries were initially divided into two main peer groups<sup>2</sup>: Developed Countries and Emerging Countries. The first part of the analysis consists in identifying the financial-economic profile of each peer group, by means of the following parameters<sup>3</sup>: GDP, Number of Banks per 100.000 Population<sup>4</sup>, Concentration in Banking System<sup>5</sup>, Banking System Assets Relative to GDP, Percent of Bank Assets that are Foreign Owned and Percent of Bank Assets that are Government Owned.

Results reveal that Developed Countries have shown much higher GDP, number of banks and banking assets volume than others. They also have lower governmental interference in the economy and are less dependent on foreign capital. Emerging Countries are assisted by a financial system smaller in number of banks and assets volume. Their average GDP represents only 5% of the Developed Countries' average GDP. The dependence on foreign capital in Emerging Countries is positively related with their income level and negatively related with the governmental interference in the economy. The lower the income, also the greater was banking concentration.

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<sup>2</sup> "Developed Countries" comprehends high income countries with sound stocks markets. "Emerging Countries" comprehends all the countries that do not fit in the first group. Tables also show the results according to the World Bank's Income Level classification (high, medium-high, medium-low and low income). The special group "Fiscal Paradies" is also analyzed in separate. The classification of a country as "Fiscal Paradise" is based on the Brazilian Fiscal Regulation. Brazil is classified as an (medium-low income) emerging country.

<sup>3</sup> Parameters data source: World Bank (GDP parameter) and BARTH, James R., DOPICO, Luis G., NOLLE, Daniel E. and WILLCOX, James A. "An International Comparison and Assessment of the Structure of Bank Supervision". Feb. 2002

<sup>4</sup> The results of the "Number of banks per 100,000 population" parameter was strongly distorted for the Developed Countries and Fiscal Paradies groups due to a single outlier Fiscal Paradise country that presented the amount of 1,152 banks/100,000 population. Thus, this country was subtracted from the sample for the calculation of this parameter.

<sup>5</sup> Percent of banking system assets accounted for by 3 largest banks.

The special group “Fiscal Paradieses” has shown the highest number of banks, compared to the population size. High levels of bank assets relative to GDP and high concentration of these assets in foreign hands were also characteristics of this group. Their average GDP, however, is close to the low-income countries’.

Table 1 shows the averages and standard deviations of the parameters used to conceive the groups’ profile. The database of the information comprehends a higher number of countries than the research’s participants. Thus, Table 1 shows the results for both samples: Strict Sample, that comprehends only the participant countries; and Broad Sample, that comprehends information from the whole database. Numbers demonstrate that Strict Sample may be considered a representative sample of the Broad Sample.

**Table 1 – Peer Groups Profile – Financial Systems’ Size and Structure**

<b>PEER GROUPS PROFILE - Financial Systems' Size and Structure * (Strict Sample**)</b>							
	<b>GDP</b> <i>(US\$ Millions)<sup>1</sup></i>	<b>N° Banks/ 100.000 Population<sup>2</sup></b>	<b>Banking Concentration (%)<sup>2</sup></b>	<b>Bank Assets/ GDP - (%)<sup>2</sup></b>	<b>Foreign Owned Bank Assets - (%)<sup>2</sup></b>	<b>Gov. Owned Bank Assets - (%)<sup>2</sup></b>	
Developed Countries	1.244.620,9 (2.579.070,0)	5,3 (10,1)	57,4 (26,6)	251,1 (190,2)	30,7 (36,9)	18,2 (22,1)	
Emergente	62.229,5 (137.034,5)	0,8 (1,5)	59,6 (19,9)	80,5 (75,7)	39,2 (30,5)	32,7 (21,7)	
High Income	1.046.051,7 (2.347.108,6)	4,6 (9,3)	56,9 (24,5)	229,8 (180,5)	28,6 (34,9)	23,8 (22,8)	
Medium-High Income	76.185,9 (163.627,7)	1,4 (2,1)	55,9 (20,6)	96,6 (94,8)	49,9 (28,7)	28,3 (19,1)	
Medium-Low Income	64.110,4 (117.675,9)	0,3 (0,5)	61,1 (22,0)	59,0 (30,8)	35,7 (32,5)	33,0 (25,7)	
Low Income	9.513,6 (16.831,3)	0,0 (0,0)	74,8 (12,3)	25,7 (8,5)	34,9 (0,0)	45,6 (0,0)	
<b>Total</b>	<b>353.543,3 (1.357.412,0)</b>	<b>2,4 (6,4)</b>	<b>58,8 (22,3)</b>	<b>138,5 (149,1)</b>	<b>35,9 (33,0)</b>	<b>28,9 (22,4)</b>	
<i>Fiscal Paradieses</i>	<i>15.764,0 (28.886,8)</i>	<i>9,2 (12,6)</i>	<i>66,0 (26,3)</i>	<i>271,7 (227,5)</i>	<i>60,0 (30,0)</i>	<i>30,8 (24,0)</i>	
<b>PEER GROUPS PROFILE - Financial Systems' Size and Structure * (Broad Sample***)</b>							
Developed Countries	921.907,5 (2.103.014,0)	5,8 (11,3)	57,3 (26,8)	243,0 (200,0)	30,1 (35,6)	8,3 (15,9)	
Emerging Countries	70.887,4 (180.612,5)	5,6 (19,7)	60,9 (20,7)	79,9 (70,4)	38,1 (31,7)	24,6 (24,0)	
High Income	793.809,1 (1.938.172,0)	12,0 (27,2)	57,0 (24,6)	225,7 (186,4)	33,4 (37,4)	10,7 (18,3)	
Medium-High Income	67.989,6 (127.868,7)	3,8 (9,9)	60,5 (20,7)	100,7 (86,0)	46,8 (27,5)	18,2 (19,9)	
Medium-Low Income	96.310,0 (239.797,1)	1,8 (6,0)	62,1 (23,0)	67,0 (44,7)	35,8 (32,2)	26,6 (23,8)	
Low Income	27.367,9 (103.835,7)	0,2 (0,2)	62,3 (20,8)	31,6 (20,5)	24,7 (26,9)	34,0 (28,4)	
<b>Total</b>	<b>260.002,9 (1.052.887,9)</b>	<b>5,7 (17,7)</b>	<b>59,9 (22,6)</b>	<b>126,0 (141,4)</b>	<b>35,8 (32,9)</b>	<b>19,9 (23,1)</b>	
<i>Fiscal Paradieses</i>	<i>19.367,8 (37.984,8)</i>	<i>19,6 (30,9)</i>	<i>68,3 (25,5)</i>	<i>242,9 (215,2)</i>	<i>61,1 (30,5)</i>	<i>11,8 (20,9)</i>	

\* average (standard deviation)

\*\* Total of the 74 research's participant countries

\*\*\* Total of the 105 database countries

Sources:

<sup>1</sup> Total GDP 2003 (www.worldbank.org)

<sup>2</sup> International Comparison and Assessment of the Structure of Bank Supervision (Barth, Dopico, Nolle e Willcox - 2002)

## Part II – Banking Supervision Structure

The second part of the analysis focused on the identification of banking supervision structure relative to the main risks: credit, market, liquidity, operational and systemic. Three aspects regarding each risk were analyzed: importance, supervisory activities and existing regulation.

The results showed that although there is great diversity of economies and complexity levels of financial systems around the world, banking supervision is focused on risks and credit risk is considered the most important<sup>6</sup>.

**Table 2 – Risk Importance Ranking**

	Risk Importance Ranking *				
	1°	2°	3°	4°	5°
Developed Countries	CR	LR	MR SR	OR	-
Emerging Countries	CR	LR	SR	OR	MR
High Income	CR	MR LR OR SR	-	-	-
Medium-High Income	CR	LR	OR	SR	MR
Medium-Low Income	CR	LR	SR	MR OR	-
Low Income	CR	LR	OR	SR	-
<b>Total</b>	<b>CR</b>	<b>LR</b>	<b>SR</b>	<b>OR</b>	<b>MR</b>
<i>Fiscal Paradises</i>	<i>CR</i>	<i>LR</i>	<i>OR SR</i>	<i>MR</i>	-

\* Risk Ranking for average score up to 3 (very important, important or relevant). Risks with the same average score are classified in the same rank. There is no correlation between rank and average score among peer groups.

CR = Credit Risk

MR = Market Risk

LR = Liquidity Risk

OR = Operational Risk

SR = Systemic Risk

<sup>6</sup> The ranking score used to quantify risk importance was: 1 = Very Important; 2 = Important; 3 = Relevant e 4 = Irrelevant.

Table 3 – Risk Importance – Results by Peer Groups

	Risk Importance *				
	Credit Risk	Market Risk	Liquidity Risk	Operacional Risk	Systemic Risk
Developed Countries	Very Important	Important	Important	Important	Important
Emerging Countries	Very Important	Important	Important	Important	Important
High Income	Very Important	Important	Important	Important	Important
Medium-High Income	Very Important	Important	Very Important	Important	Important
Medium-Low Income	Very Important	Important	Important	Important	Important
Low Income	Very Important	Relevant	Very Important	Important	Important
<b>Total</b>	<b>Very Important</b>	Important	Important	Important	Important
<i>Fiscal Paradises</i>	Very Important	Important	Very Important	Important	Important

\* Risk importance scale comprehens the following levels: Very Important, Important, Relevant and Irrelevant

The analysis of Supervisory Activities showed that the need of a sophisticated supervisory structure is positively correlated with the economy size and the volume of banking assets. It's important to highlight that this correlation is stronger to market risk than to credit and liquidity risks, which are risks derived from more traditional banking activities (borrower-lender intermediation).

Table 4 – Percent of Countries with Supervision Specialized on Risks

	Percent of Countries with Supervision Specialized on Risks *				
	Credit Risk	Market Risk	Liquidity Risk	Operacional Risk	Systemic Risk
Developed Countries	80%	80%	60%	50%	35%
Emerging Countries	64%	47%	64%	23%	38%
High Income	79%	83%	67%	42%	38%
Medium-High Income	86%	57%	86%	43%	50%
Medium-Low Income	76%	52%	71%	19%	43%
Low Income	21%	14%	21%	14%	14%
<b>Total</b>	<b>68%</b>	<b>56%</b>	<b>63%</b>	30%	37%
<i>Fiscal Paradises</i>	100%	100%	100%	100%	100%

\* Countries that supervise risk by means of a specialized staff and/or an early warning system

The research confirms the success of Basel efforts to aware regulators and supervisors to the importance of regulation focused on risks. Minimum Capital Requirement to cover credit risk is regulated in the great majority of the countries, and regulation for best practices on liquidity risk management was also broadly adopted.

**Table 5 – Percent of Countries with Capital Minimum Requirements Based on Risks Exposures**

<b>Percent of Countries with Capital Minimum Requirements Based on Risks Exposures</b>					
	<b>Credit Risk</b>	<b>Market Risk</b>	<b>Liquidity Risk</b>	<b>Operacional Risk</b>	<b>Systemic Risk</b>
Developed Countries	<b>95%</b>	<b>65%</b>	20%	5%	5%
Emerging Countries	<b>81%</b>	30%	8%	8%	-
High Income	<b>88%</b>	<b>63%</b>	17%	4%	4%
Medium-High Income	<b>86%</b>	36%	14%	14%	-
Medium-Low Income	<b>76%</b>	38%	-	10%	-
Low Income	<b>93%</b>	7%	14%	-	-
<b>Total</b>	<b>85%</b>	40%	11%	7%	1%
<i>Fiscal Paradises</i>	<b>75%</b>	17%	8%	8%	-

Results also showed the awakening to operational risk. 42% of High and Medium-High Income countries have already developed specialized supervisory activities relative to this risk.

Table 6 – Supervisory Structure

Supervisory Structure					
	Credit Risk	Market Risk	Liquidity Risk	Operacional Risk	Systemic Risk
Developed Countries	Specialized Team	Specialized Team	Specialized Team	Supervision Activities	Supervision Activities
Emerging Countries	Specialized Team	Supervision Activities	Specialized Team	Supervision Activities	Supervision Activities
High Income	Specialized Team	Specialized Team	Specialized Team	Supervision Activities	Supervision Activities
Medium-High Income	Specialized Team	Supervision Activities	Specialized Team	Supervision Activities	Supervision Activities
Medium-Low Income	Specialized Team	Supervision Activities	Specialized Team	Supervision Activities	Supervision Activities
Low Income	Supervision Activities	Other Responsible	Supervision Activities	When Needed	Supervision Activities
<b>Total</b>	Specialized Team	Supervision Activities	Specialized Team	Supervision Activities	Supervision Activities
<i>Fiscal Paradises</i>	Specialized Team	Supervision Activities	Specialized Team	Supervision Activities	Supervision Activities

Early Warning - Risk monitored by an early warning system

Specialized Team - Risk monitored by a risks specialists team

Supervision Activities - Risk is part of supervisory regular activities, but not monitored by a risks spcialists team

When Needed - Risk analyzed only when its importance is observed

Other Responsible - Risk is not analyzed by banking supervision

Table 7 – Bank Regulation

Bank Regulation					
	Credit Risk	Market Risk	Liquidity Risk	Operacional Risk	Systemic Risk
Developed Countries	Sound	Sound	Directives	Directives	Indirect
Emerging Countries	Sound	Directives	Sound	Directives	Indirect
High Income	Sound	Sound	Directives	Directives	Indirect
Medium-High Income	Sound	Indirect	Directives	Directives	Indirect
Medium-Low Income	Sound	Directives	Directives	Indirect	Indirect
Low Income	Sound	Indirect	Sound	Directives	Directives
<b>Total</b>	Sound	Directives	Directives	Directives	Indirect
<i>Fiscal Paradises</i>	Sound	Directives	Directives	Indirect	Indirect

Sound - Rules and penalties well defined

Directives - Regulation based on directives an best practices risk management recomendatdations

Indirect - Existing regulation may be indirectly interpreted to the risk

Non-Existing - There is no regulation to the risk

Developed Countries are one step beyond when the subject is market risk. Either banking regulation or supervision activities are more structured in this peer group.

It's important to highlight the Medium-High Income countries situation. Although having developed financial markets and being less dependent on foreign capital, these countries have not shown a market risk regulation adequate to their profile. This lack of adequacy may lead them into a position of fragility, becoming more susceptible to systemic crises.

Regarding systemic risk, according to Schüler (2003), this risk is the main reason why banks are regulated and supervised. Peer groups from all levels of income have confirmed its importance, but Medium-High Income countries showed more emphasis on supervisory actions, which reinforces their susceptibility to the problem.

Results also reflect that systemic awareness is intrinsic to the role of supervisory authorities. The majority of the countries have demonstrated no need of direct regulation relative to this subject, although its importance has been evoked.

### **Part III – Risks Monitoring Instruments**

The third part of the analysis focused on the importance and use of monitoring instruments<sup>7</sup> relative to the three main risks: credit, market and liquidity risks. The following instruments were analyzed:

Credit Risk – Credit VaR; Credit VaR Back-testing; Stress Scenarios; Credit Risk Classification; Portfolio Quality Index and Non-Performing Index.

Market Risk – VaR; VaR Back-testing; Stress Scenarios and Gap Maps.

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<sup>7</sup> Availability and frequency of information relative to each instrument were also part of this study.

Liquidity Risk – Liquidity Index; Liquidity VaR; Liquidity VaR Back-testing; Stress Scenarios; Funding Rates; Cash Flow; Stress Scenarios on Cash Flow and Assets Concentration.

The three risks monitoring have shown the following characteristics in common:

- (1) Supervisory authorities support their monitoring on information that allows comparisons among the supervised institutions. This information is usually generated by instruments of low complexity calculation process;
- (2) Risk monitoring information in Developed Countries is bigger in volume and smaller in frequency when compared to information in Emerging Countries. Emerging Countries also tend to produce their own information from raw data while Developed Countries receive treated information directly from banks;
- (3) Stress Scenarios Analysis were seen from two different points of view: Developed Countries and Fiscal Paradises supervise the quality of the stress scenarios analysis elaborated by supervised institutions; Emerging Countries, beyond evaluating the ability of stress scenarios analysis of their supervised institutions, they also use their own stress scenarios to evaluate the institutions' potential of loss before adverse situations.

The monitoring instruments ranking has pointed "Credit Risk Classification" as the most important supervisory tool to monitor credit risk, principally in the Emerging Countries peer group.

Market Risk showed difference of behavior among peer groups: while Developed Countries preferred VaR information as the main supervisory tool, the other groups still base their market analysis on gap maps.

An important difference among peer groups' "Number Ones" relative to the liquidity risk monitoring instruments ranking is the information frequency. Developed

Countries monitor liquidity through cash flow on a quarterly basis. Emerging Countries and Fiscal Paradises are supported by liquidity index data, with a “twice a month” frequency.

**Table 8 – Credit Risk Monitoring Instruments Ranking**

<b>Credit Risk Monitoring Instruments Ranking *</b>						
	<b>1°</b>	<b>2°</b>	<b>3°</b>	<b>4°</b>	<b>5°</b>	<b>6°</b>
Developed Countries	RC PQ IR	-	-	-	-	-
Emerging Countries	RC	PQ	IR	-	-	-
High Income	PQ	RC	IR	SC	-	-
Medium-High Income	RC	PQ	IR	-	-	-
Medium-Low Income	RC	IR	PQ	SC	-	-
Low Income	RC	PQ IR	-	-	-	-
<b>Total</b>	<b>RC</b>	<b>PQ</b>	<b>IR</b>	-	-	-
<i>Fiscal Paradises</i>	<i>RC</i>	<i>PQ</i>	<i>IR</i>	-	-	-

\* Instruments Ranking for average score up to 3 (very important, important or relevant). Instruments with the same average score are classified in the same rank. There is no correlation between rank and average score among peer groups.

SC = Scenarios Analysis

RC = Credit Risk Classification

PQ = Portfolio Quality Rate

IR = Insolvency Rate

**Table 9 – Market Risk Monitoring Instruments Ranking**

<b>Market Risk Monitoring Instruments Ranking *</b>				
	<b>1°</b>	<b>2°</b>	<b>3°</b>	<b>4°</b>
Developed Countries	VR	SM	VB	GM
Emerging Countries	-	-	-	-
High Income	VR	SM	VB	GM
Medium-High Income	GM	VR	SM	-
Medium-Low Income	GM	SM	-	-
Low Income	-	-	-	-
<b>Total</b>	<b>GM</b>	<b>SM</b>	-	-
<i>Fiscal Paradises</i>	<i>GM</i>	-	-	-

\* Instruments Ranking for average score up to 3 (very important, important or relevant). Instruments with the same average score are classified in the same rank. There is no correlation between rank and average score among peer groups.

VR = VaR

VB = VaR Back-testing

SM = Scenarios Analysis

GM = Gap Maps

**Table 10 – Liquidity Risk Monitoring Instruments Ranking**

<b>Liquidity Risk Monitoring Instruments Ranking *</b>								
	<b>1°</b>	<b>2°</b>	<b>3°</b>	<b>4°</b>	<b>5°</b>	<b>6°</b>	<b>7°</b>	<b>8°</b>
Developed Countries	CF	SF AC	-	-	-	-	-	-
Emerging Countries	LI	CF AC	-	-	-	-	-	-
High Income	CF	AC	SF	LI	-	-	-	-
Medium-High Income	LI CF	AC	-	-	-	-	-	-
Medium-Low Income	LI	AC	CF	SL FR	-	-	-	-
Low Income	LI	CF	AC	-	-	-	-	-
<b>Total</b>	<b>LI CF</b>	<b>AC</b>	-	-	-	-	-	-
<i>Fiscal Paradises</i>	<i>CF</i>	<i>AC</i>	<i>LI</i>	-	-	-	-	-

\* Instruments Ranking for average score up to 3 (very important, important or relevant). Instruments with the same average score are classified in the same rank. There is no correlation between rank and average score among peer groups.

LI = Liquidity Index

SL = Scenarios Analysis

FR = Funding Rates

CF = Cash Flow

SF = Scenarios Analysis on Cash Flow

AC = Assets Concentration

Comparing the monitoring processes of the three risks, results show that:

- (1) Liquidity risk has the highest information frequency, especially if Developed Countries are excluded of the sample;
- (2) Market risk monitoring is better structured on Developed Countries;
- (2) VaR as a supervisory tool is used only to monitor market risk in Developed Countries;
- (3) “Credit VaR” and “Liquidity VaR” are not used as supervisory tools. Instead, supervisory authorities prefer less complex information, such as “Credit Risk Classification” and “Assets Concentration”, respectively

Many countries have justified the non-use of VaR as a supervisory tool due to the lack of comparability of information among the supervised institutions. And, as far as institutions have more freedom to develop internal models, the shorter will be the comparability power of this instrument. For this reason, VaR measures are seldom used by supervisors for risk monitoring purposes.

The analysis of the peer groups’ main characteristics reveals the unanimity of risk awareness. However, market risk supervision is more structured in Developed Countries, while Emerging Countries and Fiscal Paradises give more emphasis to liquidity risk.

Fiscal Paradises’ supervisory authorities are aligned with the Emerging Countries’ risk importance and measurement instruments. Nevertheless, their supervisory processes are more alike to Developed Countries, i.e., they tend to collect information more than to calculate them.

The peer groups’ percents of early warning systems use are compatible with the importance level given to each risk.

A higher percent of Medium-High and Medium-Low Income countries make use of early warning systems, when compared to Developed Countries. Once these peer

groups have also revealed higher percentages to calculate information, their systems seem to be closer to the early warning concept<sup>8</sup> than the systems from Developed Countries, principally to liquidity risk systems, where timely information is essential.

**Table 11 – Percent of Countries with Early Warning Risk Monitoring Systems**

<b>Percent of Countries with Early Warning Risk Monitoring Systems</b>					
	<b>Credit Risk</b>	<b>Market Risk</b>	<b>Liquidity Risk</b>	<b>Operacional Risk</b>	<b>Systemic Risk</b>
Developed Countries	<b>65%</b>	<b>55%</b>	40%	25%	25%
Emerging Countries	49%	23%	45%	8%	26%
High Income	<b>58%</b>	<b>50%</b>	38%	21%	25%
Medium-High Income	<b>64%</b>	21%	<b>57%</b>	14%	43%
Medium-Low Income	<b>67%</b>	29%	<b>67%</b>	10%	29%
Low Income	14%	14%	7%	-	7%
<b>Total</b>	<b>53%</b>	32%	44%	12%	26%
<i>Fiscal Paradises</i>	<b>50%</b>	33%	<b>58%</b>	8%	42%

**Table 12 – Ranking of the Principal Risk Instruments for a Systemic Risk Analysis**

<sup>8</sup> Indirect Supervision Early Warning Systems are the group of structured actions developed by supervisors to the indirect monitoring of institutions, based on (regular frequency) collected or calculated information, with the objective of alerting to atypical behaviors or values, relative to the existing historical of the institutions, or to the probability of losses under predefined scenarios. The systems' information has not to be accurate, but must be sufficiently efficient to timely dimension the size of the problem.

<b>Ranking of the Principal Risk Instruments for a Systemic Risk Analysis *</b>							
	<b>1°</b>	<b>2°</b>	<b>3</b>	<b>4°</b>	<b>5°</b>	<b>6°</b>	<b>7°</b>
Developed Countries	VR	PQ IR	SM	-	-	-	-
Emerging Countries	RC	AC	PQ LI	IR CF	-	-	-
High Income	SM	VR RC PQ IR	GM	-	-	-	-
Medium-High Income	RC	PQ CF	-	-	-	-	-
Medium-Low Income	RC	LI	GM IR	AC	SM PQ	FR	SC SL
Low Income	AC	CF	RC PQ IR	LI	-	-	-
<b>Total</b>	<b>RC</b>	<b>PQ</b>	<b>IR AC</b>	<b>CF LI</b>	-	-	-
<i>Fiscal Paradises</i>	<i>RC</i>	<i>AC</i>	<i>CF</i>	-	-	-	-

\* Instruments Ranking for average score up to 3 (very important, important or relevant). Instruments with the same average score are classified in the same rank. There is no correlation between rank and average score among peer groups.

Credit Risk

SC = Scenarios Analysis  
 RC = Credit Risk Classification  
 PQ = Portfolio Quality Rate  
 IR = Insolvency Rate

Market Risk

VR = VaR  
 SM = Scenarios Analysis  
 GM = Gap Maps

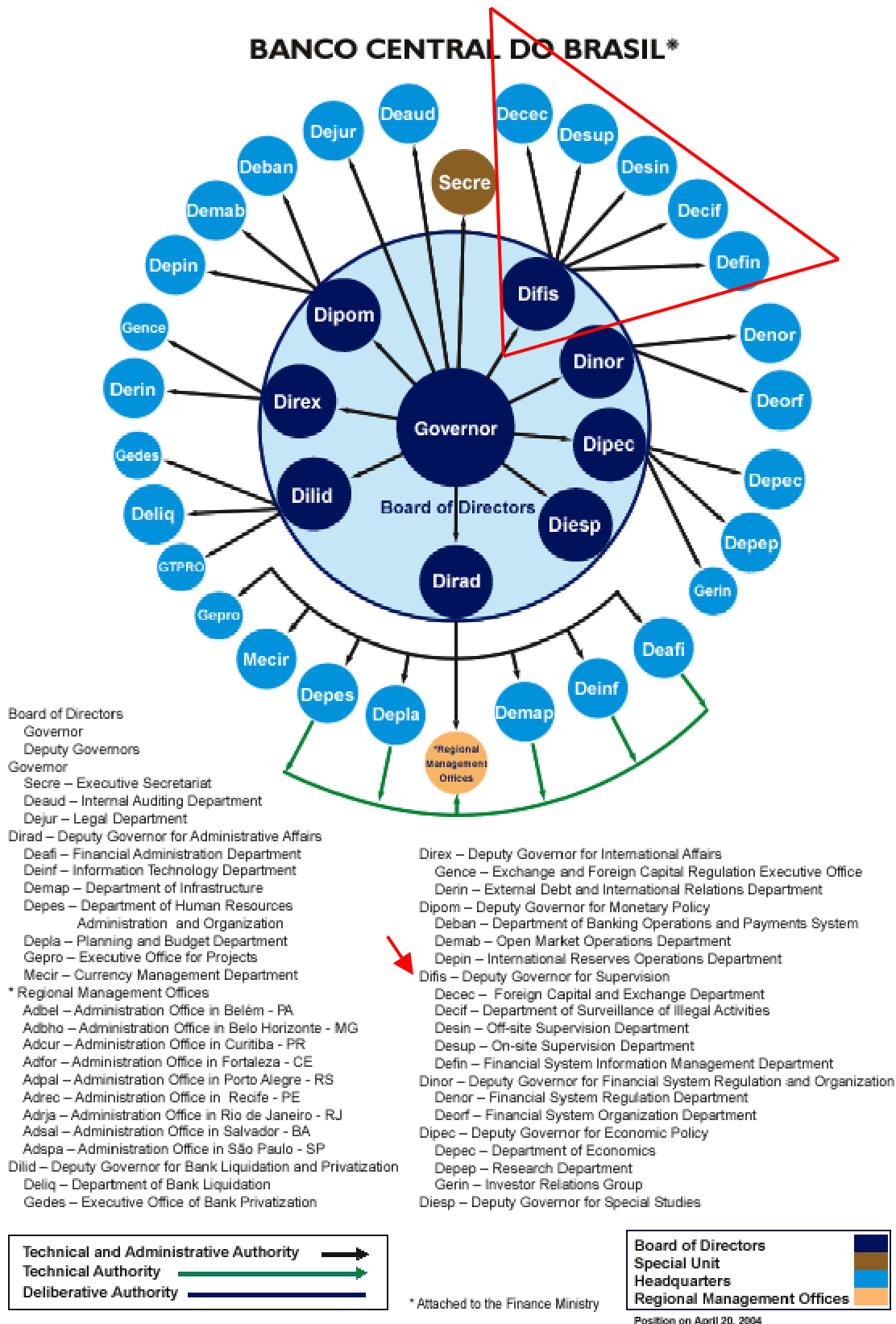
Liquidity Risk

LI = Liquidity Index  
 SL = Scenarios Analysis  
 FR = Funding Rates  
 CF = Cash Fow  
 AC = Assets Concentration

Finally, the study revealed that peer groups use their main risk information as an auxiliary tool to systemic risk analysis. This loss of importance of risk information for a systemic analysis is due to the natural limitation of its meaning. Risk information allows the evaluation of individual sensibility to the several financial and economic factors. Nevertheless, it's not sufficient to consider interdependences among institutions.

According to DeVries (2004) and Diebold and Santomero (1999), interdependences among financial institutions are a strong field to systemic problems, because they may enhance the severity as well as the speed of contagion. Further information is needed, then, to embrace these aspects for a systemic analysis.

### III. Brazilian Risks Supervision - A Comparison with the Research's Results



Brazilian supervision is inside Central Bank and its structure comprehends five departments under the Deputy Governor for Supervision - Difis: On-site Supervision

Department - Desup, Off-site Supervision Department - Desin; Financial System Information Management Department - Defin; Foreign Capital and Exchange Department - Decec and the Department of Surveillance of Illegal Activities - Decif.

Risk monitoring activities are developed by Off-Site Supervision Department and have two main objectives: support the Board of Directors with risk information relative to the Brazilian Financial System and ensure an indirect bank monitoring able to sign timely punctual or group abnormalities in the supervised institutions. Currently, off-site supervision is structured with two early warning systems, one for credit risk and the other for liquidity risk. A market risk monitoring system, as well as the improvement of both existing systems, is under construction.

Brazil is classified as Medium-Low Income<sup>9</sup> and Emerging Country<sup>10</sup>. Its understanding of the importance of a supervision focused on risk is aligned with its peer groups' behavior. According to Brazilian supervisors, credit risk is also the main risk of the financial system.

The priority to credit and liquidity risks given to the indirect supervisory actions also follows the Emerging Countries trends. Brazilian monitoring systems, however, are more developed and complexes, when compared with the existing ones around the world, mainly regarding the information timing aspect. Liquidity monitoring, for example, processes daily 1-day lag information.

Relative to market risk, the early warning system under construction<sup>11</sup> will implement monitoring instruments considered important supervisory tools by researched countries and will be able to produce information in a shorter frequency than the world's average.

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<sup>9</sup> World Bank's classification.

<sup>10</sup> IFC's classification.

<sup>11</sup> This project, in particular, also comprehends the liquidity monitoring system improvement. Credit risk monitoring is being improved by a separate project.

Brazil is conscious of the operational risk importance and has already outlined the steps for the implementation of its regulation and supervision. This gap between awareness and regulatory and supervisory actions can be also observed on the researched countries, mainly due to the fact that Basel II is still under implementation process.

Systemic Risk is classified by Brazilian supervisory authorities as very important and actions regarding its monitoring are being developed.

Finally, Brazilian risks regulation may be considered aligned with its peer groups. Currently, Brazil presents sound regulation regarding credit and market risks and its regulated guidelines to liquidity risks follow the Basel's sound practices recommendations. Some aspects, however, are not entirely in compliance with the Basel Accords. The permission of the use of internal models is still to be implemented. Regulation for capital requirement based on internal risk models, comprehending credit, market and operational risks, is part of the Central Bank's regulatory plan, to be implemented gradually, inside a 5-years time horizon.

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<sup>12</sup> Deutschen Genossenschafts- und Raiffeisenverbands

<sup>13</sup> Asociación de Supervisores Bancarios de las Américas

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