

T.C  
MARMARA ÜNİVERSİTESİ  
AVRUPA TOPLULUĞU ENSTİTÜSÜ  
AVRUPA TOPLULUĞU İKTİSADI ANABİLİM DALI

730389

**HARMONIZATION OF THE TURKISH BANKING REGULATION TO THE  
EUROPEAN UNION, WITH SPECIAL EMPHASIS TO RISK MANAGEMENT**

Doktora Tezi

T.C. YÜSEKÖĞRETİM KURULU  
DOKÜMAN İZLENİM MERKEZİ

İMRE S. ERSOY

730389

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İ.E

## SUMMARY

The study aims to analyze the international regulatory and supervisory framework for risk management that emerged as a response to the banking crises, to define the regulatory architecture in the EU accordingly, and to reflect the implications of the harmonization of Banking Regulation of Turkey with the EU, in terms of preventing possible future systemic banking crises in Turkey.

The banking crises in the developing countries like Turkey are systemic banking crises and erupt when the existing institutional problems couple with macroeconomic shocks of particularly interest rate and exchange rate volatilities. In the developed countries, like EU member states, however, the problems are more restricted to individual bank problems or significant incidences due mainly to microeconomic credit, market and operational risks. The international regulatory and supervisory framework of BIS for risk management, which is extended to EU with parallel initiatives, increases the capital adequacy levels of the developing country banks. However, as the Basel framework covers the risk exposures of developed country banks, and as EU does not adapt the Basel initiatives that concern the developing countries, the harmonization of the regulatory and supervisory framework of Turkey with the EU does not immunize the Turkish Banking System from new crises. Turkey should adapt the International Risk Management Regulation rather than precisely adopting, and implement the initiatives for Effective Supervision and Interest Rate Risk Management. Turkish banks should apply higher standards than required by Basel I, prepare them to Basel II, and besides Basel frameworks, also apply the ALM Techniques to protect themselves from their own risk exposures to crises.

## ÖZET

Bu çalışma, bankacılık krizlerini önlemek amacıyla risk yönetimi konusunda geliştirilen uluslararası yasal ve denetim çerçevesini, bu çerçevenin Avrupa Birliği uzantısını ve Türk bankacılık sisteminin Avrupa Birliği bankacılık sistemi ile uyumlaştırılmasının Türk bankacılık sistemini yeni muhtemel krizlerden ne ölçüde koruyabileceğini analiz etmeyi amaçlamaktadır.

Türkiye gibi gelişmekte olan ülkelerde bankacılık krizleri sistemik krizlerdir ve varolan kurumsal problemler, özellikle faiz ve kur volatilitesi gibi makroekonomik şoklarla birleşince ortaya çıkar. Avrupa Birliği üyeleri gibi gelişmiş ülkelerde ise bankacılık problemleri bireysel veya dar kapsamlı problemlerdir ve kredi, piyasa ve operasyonel riskler gibi mikroekonomik risklerden kaynaklanır. Avrupa Birliğinde de paralel yasal düzenlemelerle uygulanan BIS'in uluslararası yasal ve denetim çerçevesinin, gelişmekte olan ülkelerin sermayelerini arttırmak yönünde olumlu etkisi olmaktadır. Ancak, Basel düzenlemeleri, gelişmiş ülke bankalarının maruz oldukları risklere karşı bankaları koruyan yapıda olduğu ve Avrupa Birliği geliştirmekte olan ülkelerle ilgili yasal düzenlemeleri kendisine uyarlamadığı için, Türk bankacılık düzenlemelerinin Avrupa Birliği ile uyumlaştırılması, Türk Bankacılık Sistemini yeni krizlere karşı koruyamayacaktır. Türkiye, Uluslararası Risk Yönetim Mevzuatını olduğu gibi almak yerine kendisine uyarlamalı ve Etkin Denetim, Faiz Risk Yönetimi konularındaki düzenlemeleri uygulamaya başlamalıdır. Türk bankaları, Basel I'in gerektirdiğinden daha yüksek standartlar uygulamalı, Basel II'ye hazırlanmalı ve Basel yasal düzenlemeleri yanısıra Aktif/ Pasif Yönetimi tekniklerini de uygulayarak kendilerini maruz oldukları kriz risklerine karşı korumalıdır.



## TABLE OF CONTENTS

|  |       |
|--|-------|
| ACKNOWLEDGEMENTS   | ii    |
| ABSTRACT   | iii   |
| ÖZET   | iv    |
| TABLE OF CONTENTS  | v     |
| LIST OF TABLES   | x     |
| LIST OF FIGURES  | xiii  |
| LIST OF ABBREVEATIONS  | xiv   |
| LIST OF APPENDICES   | xviii |
| INTRODUCTION   | 1     |
| I. THE BANKING CRISES OF THE DEVELOPED AND DEVELOPING COUNTRIES                    | 4     |
| I.I. The Quantitative Facts About Banking Crises                                   | 4     |
| I.I.1. The Number and Frequency of Banking Crises                                  | 4     |
| I.I.2. The Cost of Banking Crises  | 8     |
| I.II. The Determinants of Banking Crises in the Developed and Developing Countries | 10    |
| I.II.1. The Theories of Banking Crises   | 10    |
| I.II.2. The Case Studies on the Determinants of Banking Crises                     | 11    |
| I.II.3. The Empirical Studies on the Leading Indicators of Banking Crises          | 12    |
| I.II.3.1 The Empirical Studies for the Developed and Developing Countries          | 13    |
| I.II.3.2 The Empirical Studies for the Developing Countries                        | 15    |

|   |    |
|---|----|
| I.III. The Risk Exposures of Banks to Crises in the Developed and Developing Countries        | 18 |
| I.III.1. The Banking Risk Exposures   | 18 |
| I.III.2. The Risk Exposures of Banks to Crises in the Developed Countries                     | 20 |
| I.III.3. The Risk Exposures of Banks to Crises in the Developing Countries                    | 25 |
| I.III.3.1. The East Asian Banking Crises  | 25 |
| I.III.3.2. The Latin American Banking Crises in Mid 1990's                                    | 27 |
| I.III.3.2.i. The Banking Crisis in Brazil   | 28 |
| I.III.3.2.ii. The Banking Crisis in Argentina   | 29 |
| I.III.3.2.iii. The Banking Crisis in Mexico   | 30 |
| I.III.3.3 The Banking Crisis in Russia  | 32 |
| I.III.4. The Banking Crisis in Turkey   | 34 |
| <br>  |    |
| II. THE INTERNATIONAL PRUDENTIAL BANK REGULATION AND SUPERVISION FOR BANKING CRISES           | 42 |
| II.I. The Effectiveness of International Prudential Bank Regulation and Supervision Framework | 42 |
| II.I.1. The Alternatives for Prudential Bank Regulation and Supervision                       | 42 |
| II.I.2. The Efficiency of Prudential Bank Regulation and Supervision                          | 44 |
| II.I.3. The Harmonization of Prudential Bank Regulation and Supervision                       | 46 |
| II.II. The International Regularity and Supervisory Framework                                 | 48 |
| II.II.1. The Evolution of the International Regulatory and Supervisory Framework              | 48 |
| II.II.2. The Risk Exposure Spectrum of the Basel Frameworks                                   | 50 |
| II.II.3. The Credit Risk Coverage of the Basel Frameworks                                     | 52 |
| II.II.3.1. The Standard Approach of Basel I for Credit Risk                                   | 52 |
| II.II.3.2. The Basel II framework for Credit Risk   | 54 |
| II.II.3.2.i. The Standardized Approach of Basel II for Credit Risk                            | 54 |
| II.II.3.2.ii. Internal Ratings –Based Approaches of Basel II for Credit Risk                  | 56 |
| Risk  |    |
| II.II.4. The Market Risk Coverage of the Basel Frameworks                                     | 59 |
| II.II.4.1. The Standard Approach for Market Risk  | 59 |
| II.II.4.2. The Internal Models Approach for Market Risk                                       | 62 |
| II.II.4.3. Combination of Standard and IM Approaches for Market Risk                          | 63 |

|   |    |
|---|----|
| II.II.5. The Operational Risk Coverage of the Basel Frameworks  | 64 |
| II.II.6. The Interest Rate Risk Coverage of the Basel Frameworks  | 65 |
| II.II.7. The Business Risk Coverage of the Basel Frameworks   | 65 |
| II.III. The Impact of Basel Frameworks on the Developed and Developing Countries                        | 67 |
| II.III.1. The Impact of Basel I on the Developed and Developing Countries                               | 67 |
| II.III.2. The Possible Impact of Basel II on the Developed and Developing Countries                     | 70 |
| II.III.2.1. The Possible Impact of Basel II on the Developed Countries                                  | 71 |
| II.III.2.2. The Possible Impact of Basel II on the Developing Countries                                 | 76 |
| II.III.2.2.i The Direct Impact of Basel II on the Developing Countries                                  | 76 |
| II.III.2.2.ii The Indirect Impact of Basel II on the Developing Countries                               | 79 |
| II.III.2.3. The Impact of Basel Frameworks on Turkey  | 81 |
| III. APPLICATION OF BASEL CAPITAL ADEQUACY FRAMEWORK TO THE TURKISH BANKING SYSTEM                      | 84 |
| III.I Capital Adequacy Requirement of TBS for Credit Risk According to Basel I                          | 84 |
| III.I.1 The Dataset for Capital Adequacy Calculations for the Credit Risk                               | 84 |
| III.I.2. The Capital Adequacy Ratio Calculations for Credit Risk  | 87 |
| III.I.3 The Result of the Capital Adequacy Ratio Calculations for Credit Risk                           | 88 |
| III.II. Capital Adequacy Requirement of TBS for Market Risk with the Standard Method of Amended Basel I | 89 |
| III.II.1. The Dataset for Capital Adequacy Calculations for Market Risk with SM                         | 89 |
| III.II.2. The Calculation of Capital Adequacy Ratio with the SM of Amended Basel I                      | 91 |
| III.II.2.1. Capital Requirement for Interest Rate Risk  | 91 |
| III.II.2.1.i General Market Risk for Interest Rate Related Instruments                                  | 91 |
| III.II.2.1.ii Specific Risk for Interest Rate Related Instruments                                       | 94 |
| III.II.2.2. General Market Risk and Specific Risk of Equities Positions                                 | 94 |
| III.II.2.3. General Market Risk of Foreign Exchange Positions   | 95 |
| III.II.2.4. Calculated MCR and VaR for Market Risk  | 96 |
| III.II.2.5. Capital Adequacy Ratio of TBS with Standard Approach of Amended Basel I                     | 96 |
| III.II.3. The Result of Capital Adequacy Ratio Calculations with Standard Method                        | 98 |
| III.III. Capital Adequacy Requirement of TBS for Market Risk with the IMB Approach of Amended Basel I   | 99 |

|  |     |
|--|-----|
| III.III.1. The Dataset for VaR Computation with the IMB Approach   | 99  |
| III.III.2.The Calculations of VaR, MCR and Capital Adequacy Ratio with the IMBA  | 102 |
| III.III.2.1.Calculated VaR and MCR for Market Risk with IMB Approaches   | 102 |
| III.III.2.2.The Capital Adequacy Ratio Computations with IMBA of Amended Basel I   | 103 |
| III.III.3.The Result of Capital Adequacy Computations with IMB Approach  | 105 |
| III.IV. Capital Adequacy Requirement of TBS with Standard Approach of Basel II   | 107 |
| III.IV.1. The Dataset for the Standard Method Calculations of Basel II   | 107 |
| III.IV.2.The CA Ratio Calculations with the Standard Approach of Basel II  | 108 |
| III.IV.3.The Result of CA Calculations with Standard Method of Basel II  | 111 |
| IV. THE EFFICIENCY OF HARMONISING THE RISK MANAGEMENT REGULATION OF THE EU AND TURKISH BANKING SYSTEMS                   | 112 |
| IV.I The Comparison of Risks and Risk Management Legislation Between the EU and the Turkish Banking Systems              | 112 |
| IV.I.1. The Comparison of Macroeconomic, Microeconomic and Institutional Risks in the EU and the Turkish Banking Systems | 112 |
| IV.I.1.1 Institutional Risks   | 113 |
| IV.I.1.2 Macroeconomic Risks   | 113 |
| IV.I.1.3 Microeconomic Risks   | 116 |
| IV.I.2. The Comparison of Risk Management Regulation in the EU and the Turkish Banking Systems                           | 119 |
| IV.II. The Problems Encountered in the Application of Risk Management Practices in Turkey                                | 123 |
| IV.II.1. The Problems Encountered in the Application of Basel I  | 123 |
| IV.II.2. The Possible Problems to be encountered with the Application of Basel II  | 128 |
| IV.III. The Proposals to Increase the Efficiency of Risk Management in Turkey  | 131 |
| IV.III.1. In the framework of the Basel Committee Initiatives:   | 131 |
| IV.III.2. In the framework of Responsibilities of the Regulatory/Supervisory Authorities                                 | 133 |
| IV.III.3. In the framework of the Responsibilities of Banks  | 135 |

|  |     |
|--|-----|
| IV.III.3.1.The Need for Asset/ Liability Management                              | 136 |
| IV.III.3.2.The Principles for Interest Rate Risk Management (ALM)                | 138 |
| IV.III.3.3.The Application of ALM to Turkish Banking                             | 140 |
| IV.III.3.3.i. The Dataset for Asset Liability Management                         | 140 |
| IV.III.3.3.ii. The Duration Gap Analysis and Sensitivity Analysis for<br>ALM     | 142 |
| IV.III.3.3.iii. The Results of Duration Gap Analysis and Sensitivity<br>Analysis | 145 |
| CONCLUSIONS  | 146 |
| REFERENCES   | 150 |
| APPENDICES   | 160 |



## LIST OF TABLES

- Table 1.1: Banking Crises in the World Economies after 1980s
- Table 1.2: Costs of Financial Insolvencies
- Table 1.3: Results and Costs of Banking Reforms
- Table 1.4: The Summary Table for the Empirical Studies of Banking Crises
- Table 1.5: The Banking Risk Spectrum
- Table 1.6: Banking Failures (Near Failures) in G-10 Countries
- Table 1.7: Losses due to Derivatives (1993-1999)
- Table 1.8: Risk Factors in Losses
- Table 1.9: The Sectoral Distribution of Bank Loans in Japan
- Table 1.10: Price Indexes of Residential Real Estate
- Table 1.11: Risk Exposures of Banks in the Developed Countries
- Table 1.12: Macroeconomic Outlook of the Four East Asian Countries
- Table 1.13: Contributors to Banking Crises in East Asian Countries
- Table 1.14: The Risks Associated with the East Asian Banking Crises
- Table 1.15: Comparison of Macroeconomic Indicators of Latin America and East Asia
- Table 1.16: The Economic Outlook of Russian Federation
- Table 1.17: Risk Exposures of Banks in the Developing Countries
- Table 1.18: Total Debt of Turkey (in Bio USD)
- Table 1.19: Short-term Borrowing to F.C Reserves
- Table 1.20: Auction, Inflation, Currency Basket Depreciation
- Table 1.21: 12 Months C/A Deficit to F.C Reserves
- Table 1.22: The Deposit and Loan Shares of Turkish Banks
- Table 1.23: Total Liabilities and Loans of Turkish Banks
- Table 1.24: The Private Sector Loans to GDP
- Table 1.25: The Rates and Duration of Domestic Debt

|  |
|--|
| Table 2.1: Capital Adequacy Calculations in Basel I  |
| Table 2.2: Available Options for Calculation of Risks in Basel I   |
| Table 2.3: Capital Adequacy Calculation in Basel II  |
| Table 2.4: Available Options for Calculation of Risks in Basel II  |
| Table 2.5: Basel Capital Adequacy Accord: Tier 1 and Tier 2 Capital  |
| Table 2.6: Basel Capital Adequacy Accord: Risk Weights   |
| Table 2.7: Risk Weights Under the Standardized Approach  |
| Table 2.8: Data Inputs of the Foundation and Advanced IRB Approaches                                       |
| Table 2.9: Available Options for the Calculation of Credit Risk  |
| Table 2.10: Credit Risk Mitigation Techniques  |
| Table 2.11: Basel Standardized Approach Capital Charges (KC) for Asset Categories                          |
| Table 2.12: The Standardized Approach for Operational Risk   |
| Table 2.13: Change in Capital Requirements for Credit Risk   |
| Table 2.14: Average Changes in Minimum Capital Requirements  |
| Table 2.15: Contributions to Overall Likely Change in Minimum Capital Requirements for all EU Institutions |
| Table 2.16: Change in Capital Requirements for Credit Risk   |
| Table 2.17: Claims on Sovereigns   |
| Table 2.18: Claims on Banks  |
| Table 3.1: Consolidated B/S of Turkish Banking System as of September 2002                                 |
| Table 3.2: Off-B/S Accounts of Turkish Banking System as of September 2002 (In Bio TL)                     |
| Table 3.3: Capital Adequacy Ratio Calculation of TBS according to Basel I                                  |
| Table 3.4: Trading Portfolio of the Turkish Banking System   |
| Table 3.5: Interest Rate Risk Analysis- The Calculation of General Market Risk (TL)                        |
| Table 3.6: Interest Rate Risk Analysis- The Calculation of General Market Risk (USD)                       |
| Table 3.7: Interest Rate Risk – Calculation of Specific Risk   |
| Table 3.8: Equities Risk Analysis (in Bio TL)  |
| Table 3.9: Foreign Exchange Risk Analysis (in Bio TL)  |
| Table 3.10: Summary Table for Market Analysis (in Bio TL)  |
| Table 3.11: Capital Adequacy Standard Ratio of Turkish Banking System                                      |
| Table 3.12: Trading Portfolio of TBS as of 30/09/2002  |

Table 3.13: The P.V. of Trading Portfolio of TBS as of 30/09/2002

Table 3.14: The Results of VaR & MCR Computations with IMB Approaches

Table 3.15: Summary Table for Market Risk Analysis

Table 3.16: Summary Results of VaR Computations with the IMB Approaches

Table 3.17: Capital Adequacy Ratio of Turkish Banking System

Table 3.18: Capital Adequacy Ratio of Turkish Banking System with IMB Approaches

Table 3.19: Present Values TBS Portfolios with Total Capital Markets Portfolio Included

Table 3.20: Capital Adequacy Computations with Total Capital Markets Portfolio Included

Table 3.21: Capital Requirements with the Standard Approach of Basel II

Table 3.22: The Results of Application of Basel Capital Adequacy Framework to TBS

Table 4.1: GDP Growth in the EU and Turkey (%)

Table 4.2: The Ratio of Budget Deficit-Surplus to GDP in the EU and Turkey

Table 4.3: Inflation Rates in the EU and Turkey (1996=100, CPI)

Table 4.4: Long-term Interest Rates in the EU and Turkey (%)

Table 4.5: Short-term Interest Rates in the EU and Turkey, (% , 3 Months T/B)

Table 4.6: The Asset Sizes of Banks in the EU and Turkey (in Bio €)

Table 4.7: The Foreign Currency Share of Banks in the EU and Turkey as of 1999

Table 4.8: Total Loans / Total Deposits in the EU and Turkish Banking

Table 4.9: Total Deposits / Total Liabilities in the Turkish and EU Banking

Table 4.10: Total Expenses / Total Liabilities in the Turkish and EU Banking

Table 4.11: Total Equities / Total Assets in the Turkish and EU Banking

Table 4.12: Present Values of Assets and Liabilities of Turkish Banking System

Table 4.13: Total FC F.C and TL Assets and Liabilities of TBS (in TRL)

Table 4.14: Mismatch for Total Assets and Liabilities

Table 4.15: Mismatch for FC Assets and Liabilities

Table 4.16: Mismatch for TL Assets and Liabilities

Table 4.17: Duration Gap Analysis for FC Assets and Liabilities

Table 4.18: Duration Gap Analysis for TL Assets and Liabilities



## LIST OF FIGURES

Figure 1.1: Maturity Structure of Turkish Banks' Assets and Liabilities

Figure 1.2: O/N Interbank Rates

Figure 1.3: 2000-2001 Crises

Figure 2.1: Basel and EU Timeframes

Figure 4.1: Convergence of ALM and Market Risk Management

Figure 4.2: Scenario 1 for Sensitivity Analysis

Figure 4.3: Scenario 2 for Sensitivity Analysis

Figure 4.4: Scenario 3 for Sensitivity Analysis

## LIST OF ABBREVIATIONS

**\$:** US Dollar

**\$m:** Million US Dollar

**\$b:** Billion US Dollar

**€:** Euro

**AIRB:** Advanced Internal-Based Approach

**ALM:** Asset and Liability Management

**AMA:** Advanced Measurement Approach

**ASA:** Alternative Standardized Approach

**B / S:** Balance Sheet

**BCBS:** Basel Committee on Banking Supervision

**BIS:** Bank for International Settlements

**Bio:** Billion

**Bp:** Basis points

**BNA:** Banco de la Nación de Argentina

**BRSA:** Banking Regulation and Supervision Agency

**BRW:** Benchmark Risk Weight

**CA:** Capital Adequacy

**C / A:** Current Account

**C.B:** Central Bank

**CAA:** Capital Adequacy Accord

**CAD:** Capital Adequacy Directive

**Cap.:** Capital

**CMP:** Capital Markets Portfolio

**Comp:** Compounded

**Cont'd:** Continued

CP: Consultative Paper  
Curr: Currency  
CPI: Consumer Price Index  
D: Developed  
Deriv: Derivatives  
EAD: Exposure at Default  
ECA: Export Credit Agency  
ECAI: External Credit assessment Institution  
EME: Emerging Market Economy  
EQ: Equities  
Et al: And others  
Etc.: Et cetera  
EU: European Union  
EUR: Euro  
EVT: Extreme Value Theory  
EWMA: Exponentially Weighted Moving Average  
F.C: Foreign Currency  
F.X: Foreign exchange  
FDIC: Federal Deposit Insurance Corporation  
FGG: Financial Guardian Group  
FIRB: Foundation Internal Based Approach  
Foreign-exch.: Foreign exchange  
Forex: Foreign exchange  
G / B: Government Bond  
G 1: Group 1  
G 2: Group 2  
G-10: Group of Ten  
Gov.: Government  
GDP: Gross Domestic Product  
HD: Horizontal Disallowance  
HS: Historical Simulation  
IMB: Internal Models Based

**IMF: International Monetary Fund**  
**Incl.: Including**  
**Inter: Internal**  
**IRB: Internal Rating Based**  
**IRBA: Internal Rating Based Approach**  
**KC: Capital Charges**  
**LD: Less Developed**  
**LGD: Loss Given Default**  
**M / M: Marked to Market**  
**M: Maturity**  
**M2: Money Supply**  
**Max: Maximum**  
**MC Simulation: Monte Carlo Simulation**  
**MCR: Minimum Capital Requirement**  
**Met: Method**  
**MNC: Multinational Company**  
**No: Number**  
**NPL: Non-Performing Loan**  
**NPV: Net Present Value**  
**O / N: Over-night**  
**OECD: Organization for Economic Development**  
**Oper.: Operational**  
**OTC: Over the Counter**  
**P / L: Profit / Loss**  
**P.S: Post script, note**  
**PP: Pages**  
**PD: Probability of Default**  
**Prob.: Problem**  
**PSBR: Public Sector Borrowing Requirement**  
**PSE: Public Sector Entity**  
**PV: Present Value**

PwC: Price Waterhouse Coopers  
Q: Quarter  
QIS: Quantitative Impact Study  
Rep: Republic  
Repo: Repurchase Agreement  
Reg.: Regulation  
Res.: Reserves  
RWTA: Risk Weighted Total Assets  
S & Ls: Saving and Loan Institutions  
S.T.: Short-term  
SM: Standard Method  
SDIF: Saving Deposits Insurance Fund  
SME: Small and Medium sized Enterprises  
SR: Specific Risk  
Sys.: System  
T / B: Treasury bill  
TBS: Turkish Banking System  
Tier I Capital: Core Capital  
Tier II Capital: Supplementary Capital  
TL: Turkish Lira  
TRL: Turkish Lira  
USA: United States of America  
USD: United States Dollar  
Var- Cov: Variance -Covariance  
VaR: Value at Risk  
VaRp: Portfolio VaR  
VD: Vertical Disallowance  
WB: World Bank

## LIST OF APPENDICES

**APPENDIX 1: Supplementary Capital**

**APPENDIX 2: Credit Conversion Factors for Off-B/S Items**

**APPENDIX 3: Securities Portfolio of TBS as of September 2002, in Billion TL**

**APPENDIX 4: VaR and MCR Computations with different VaR Methods**



## INTRODUCTION

During the past twenty years, globalization and liberalization of financial markets, deregulations and innovativeness were the common policies almost all over the world. The multiplicity of financial agents, the complexity of instruments, the internationalization of investment opportunities brought with it many benefits like more efficient provision of financial services and better allocation of resources. However, globalization also introduced new and highly complex elements of risk and increased both the number and frequency of banking crises over the same period of time. Since 1980, at least two thirds of International Monetary Fund (IMF) member countries experienced significant banking sector problems. Four of the G-10 countries have suffered banking crises; several problems also hit banks in some Nordic countries. The banking crises of the 1980s and 1990s have pointed out the link between financial liberalization and financial fragility especially in developing countries as systemic banking crises were mainly experienced by the developing countries. While the epicenters of these financial crises in the 1990s were in Mexico, East Asia, Russia and Brazil, they were felt more globally. Although, no systemic crises have been witnessed in the European Union (EU), Turkey experienced systemic banking crises since 1990s.

Regulators realized that the crises presented a real threat to the world's financial system. Hence, a new framework started to be developed for the banking industry for risk management in order to bring financial stability and to level play the field internationally. Bank for International Settlements (BIS), has developed set of guidelines to strengthen the regulatory, supervisory frameworks, while IMF and the World Bank (WB) have stepped up surveillance of the financial sector in individual countries. The 1988 Basel Capital Accord was a decisive step in creating a level international playing field for bank capital by establishing common standards for the regulation of credit risk.

The financial crises of the 1990s however, drew attention to the ineffectiveness of the 1988 Basel Capital Accord (Basel I), as in some of the Asian countries affected by the crises, capital standards were being introduced but provided little protection due to poor accounting standards and weak supervision. The Core Principles for Effective Banking Supervision issued in 1997 is intended to be a remedy for such supervisory weaknesses. In the following years, the individual bank failures due to derivatives risks enforced the Basel Committee to amend the 1988 Accord to cover market risk in addition to credit risk and it is adopted in 1998. However, with the erosion in the effectiveness of Basel I, especially for credit risk, the Basel Committee started consultations in 1999 for a new capital accord (Basel II), which will replace Basel I, once finalized.

The regulations of the Basel Committee for Banking Supervision (BCBS) are law in Group Ten (G-10). The 1988 Basel Accord, which is extended to the EU with Capital Adequacy Directive (CAD), also established common levels of capital requirement across the world as more than 100 countries adopted the Basel I framework. Turkey is one of those developing countries that adopted the 1988 Basel Capital Accord. However, Turkey could not immunize herself from the systemic banking crisis of 1994. The Turkish Banking System, again badly hit by the 2000-2001 crises is being restructured and the Banking Regulation is being harmonized with the EU under the surveillance of IMF. In this context, the Market Risk Amendment of the Basel Capital Adequacy Accord has also started to be implemented in Turkey since 2002. Turkey also intends to adopt the Basel II framework. The adoption of the regulatory and supervisory framework of BIS is good for developing countries like Turkey as they adopt at least the minimum standards. Nevertheless, emerging market crises, some of which were repetitive despite the application of the new international regulations, bring to minds the question that it may be too early to think that the harmonization of the Banking Regulation with the EU will prevent Turkey from future possible banking crises, as merely increasing the capital ratios may not suffice.

Chapter I makes a thorough analysis of the theories, case studies, empirical studies of banking crises and the crises cases of the last two decades, to drive general conclusions regarding the determinants of banking crises and the different risks banks are exposed in the developed world and in the developing countries in general, in the European Union and Turkey in particular.



Chapter II first evaluates the efficiency of the prudential bank regulation and supervision framework itself. Then, examines the risk exposures that are covered by the Basel I and Basel II frameworks. Thirdly, evaluates the impact of Basel frameworks for the developed and developing countries in general and for EU and Turkey in particular, in order to find out if the Basel frameworks can bring financial stability internationally.

Chapter III carries a quantitative impact study for Turkish banking system by applying the 1988 Basel Capital Adequacy Accord, the Amended Basel Capital Adequacy Accord and the Basel II proposal on the consolidated Turkish Banking System Balance Sheet. This analysis demonstrates the capital adequacy requirement of Turkish Banking System vis-à-vis BIS legislations and the level of coverage provided by the Basel frameworks to the risk exposures of Turkish Banking System quantitatively.

Chapter IV, first analyses the existing macroeconomic, microeconomic and institutional risks and the regulatory, supervisory frameworks of the Turkish banking system in the framework of a comparative analysis with the EU. Secondly, the problems Turkey encounters in the application of Basel I, and the possible problems to be encountered in the application of Basel II are assessed by laying down the deficiencies of risk management framework in Turkey due to precise adoption of the frameworks. Last but not least, some proposals are forwarded for BCBS, Banking Regulation and Supervision Agency of Turkey (BRSA) and especially for banks in Turkey to increase the efficiency of risk management framework.

## **I. THE BANKING CRISES IN THE DEVELOPED AND DEVELOPING COUNTRIES**

The banking crises generally arise when the microeconomic and / or institutional problems of the banks and banking systems couple with macroeconomic volatilities. However, the banking crises in the developed and developing countries show different characteristics. In this chapter, the different characteristics of the developed and developing world banking crises will be scrutinized. In the first section, the quantitative differences in terms of number, frequency and cost of banking crises will be analyzed. In the second section, the differences in terms of determinants of banking crises will be dissected with a methodical analysis of theories, case studies and empirical studies on the leading indicators of banking crises. In the third section, the differences in terms of risk exposures of banks to crises in the developed and developing countries in general and for EU and Turkey in particular will be examined.

### **I.I. THE QUANTITATIVE FACTS ABOUT THE BANKING CRISES OF THE DEVELOPED AND DEVELOPING COUNTRIES**

The banking crises affected not only the developing countries but also the developed countries. However, the research of quantitative facts show that the banking crises in the developing countries are different from the crises of developed countries in terms of number, frequency and cost of banking crises.

#### **I.I.1. The Number and Frequency of Banking Crises**

The banking crises in the world economies since 1980s are abundant. Lindgren et al (1996) indicates that between 1980-1996 there were 41 'banking crises' and 108 'significant banking problems'. Hutchison (1999) evidence more than 94 episodes of banking sector distresses since mid-70s.

The banking crises are more numerous in the developing countries. Goldstein (1997) reports that out of the 67 banking crises since 1980, 52 were in developing countries. Lindgren et al. (1996) identifies that out of the 41 banking crises, only 4 are in developed countries. Also, the developing countries banking crises are more frequent than the crises in the developed countries. Hutchison (1999) indicates that between 1975-80 there were 9 banking crises,

between 1991-95, there were 34 crises and by 1997 there were 7 new and 29 continuing episodes with higher frequency in developing countries rather than developed.

However, as is evident from the results of banking crises studies, there is no general consensus about the number of banking crises in the world economies. This stems from the fact that there is no consent on the distinction between systemic banking crises, banking crises, significant distresses and bank failure(s).

It is easy to identify a single bank failure or a group of bank failures in a country. In some countries banks ran into problems but it did not have a significant impact on neither the functioning of the banking sector or on the macro economy. The bank distress in the U.K in 1991 with the failure of BCCI can be given as examples of bank(s) failure(s).

Nevertheless, there is no definitive distinction between significant incidences, crises and systemic crises. Hardy and Pazarbaşıoğlu (1999) define significant distresses as severe but limited financial system problems. The definition of Gup (1998) is that significant incidents refer to large and unusual losses that may or may not result in failure. Lindgren et al (1996) define significant incidence as extensive unsoundness short of a crisis. For banking crises, the definition of Lindgren et al. (1996) is that the word crises refer to cases where there were runs or other substantial portfolio shifts, collapses of financial firms, or massive government intervention.

Kaufman (1996) defines systemic banking crisis as successive losses along a chain of institutions, markets. Demirguc-Kunt and Detragiache (1997, pp.12) define quantitatively an episode of distress as systemic risk, if at least one of the following four conditions are in the picture: “The ratio of non-performing assets to total assets in the banking sector exceeds 10%, the cost of the rescue operation was at least 2% of GDP, banking sector problems resulted in a large scale nationalization of banks, extensive bank runs took place or emergency measures such as deposit freezes, prolonged bank holidays or generalized deposit guarantees were enacted by the government in response to the crises.”

Table 1.1 demonstrates the number of banking crises worldwide and both the abundance and frequency of banking crises in the developing countries.

Table 1.1: Banking Crises in the World Economies since 1980s

| Country               | Lindgren et al (1996)  | Kaminsky & Reinhart (1996,1998) | Hardy and Pazarbaşıoğlu (1998) | Demirguc & Detragiache (1999) |
|-----------------------|------------------------|---------------------------------|--------------------------------|-------------------------------|
|                       |                        |                                 | Crisis / Distress              |                               |
| Algeria               |                        |                                 | 1990                           |                               |
| Argentina             | 1980-82, 1989-90, 1995 | 1980, 1985, 1994                |                                |                               |
| Benin                 | 1988                   |                                 | 1987                           |                               |
| Bolivia               |                        | 1987                            |                                |                               |
| Brazil                |                        | 1985-94                         |                                |                               |
| Bulgaria              | 1991-96                |                                 |                                |                               |
| Cameroon              | 1989-93, 1995-96       |                                 | 1989                           |                               |
| Canada                |                        |                                 | 1983                           |                               |
| Central African. Rep. | 1976-92                |                                 |                                |                               |
| Chad                  | 1979-83                |                                 |                                |                               |
| Chile                 | 1981-87                | 1981                            |                                | 1981                          |
| Columbia              |                        | 1982                            | 1984                           | 1982-85                       |
| Congo                 | 1994-96                |                                 | 1994                           |                               |
| Cote d'Ivoire         |                        |                                 | 1988                           |                               |
| Costa Rica            |                        |                                 | 1994                           |                               |
| Denmark               |                        | 1987                            | 1990                           |                               |
| Dominican Republic    |                        |                                 | 1992                           |                               |
| Ecuador               |                        |                                 | 1992                           | 1995                          |
| El Salvador           |                        |                                 | 1995                           | 1989                          |
| Equatorial Guinea     | 1983-85                |                                 |                                |                               |
| Estonia               | 1992-95                |                                 |                                |                               |
| Finland               | 1991-94                | 1991                            | 1991                           | 1991-94                       |
| France                |                        |                                 | 1994                           |                               |
| Guinea                | 1980-85                |                                 |                                |                               |
| Guyana                |                        |                                 |                                | 1993-95                       |
| India                 |                        |                                 |                                | 1991-94                       |
| Indonesia             |                        | 1992                            | 1992, 1997                     | 1992-94                       |
| Iceland               |                        |                                 | 1985                           |                               |
| Israel                |                        | 1983                            |                                | 1983-84                       |
| Italy                 |                        |                                 |                                | 1990-94                       |
| Jamaica               |                        |                                 | 1994                           |                               |
| Japan                 |                        |                                 | 1992                           | 192-94                        |
| Jordan                | 1989-90                |                                 | 1989                           | 1989-90                       |

|                  |               |            |            |            |
|------------------|---------------|------------|------------|------------|
| Kenya            |               |            | 1993       | 1993       |
| Korea            |               |            | 1997       |            |
| Kuwait           | Mid-1980s     |            |            |            |
| Latvia           | 1995-96       |            |            |            |
| Lebanon          | 1988-90       |            |            |            |
| Libena           | 1991-95       |            |            |            |
| Lithuania        | 1995-96       |            |            |            |
| Macedonia        | 1993-94       |            |            |            |
| Madagascar       |               |            | 1988       |            |
| Malaysia         | 1985-88       | 1985       | 1985       | 1985-88    |
| Mali             |               |            | 1987       | 1987-89    |
| Mexico           | 1982, 1994-96 | 1982-92    | 1982, 1994 | 1982, 1994 |
| New Zealand      |               |            | 1989       |            |
| Nepal            |               |            |            | 1988-94    |
| Niger            | 1983-96       |            |            |            |
| Nigeria          |               |            |            | 1991-94    |
| Norway           | 1987-93       | 1988       | 1991       | 1987-93    |
| Panama           | 1988-89       |            |            | 1988       |
| Papua New Guinea |               |            |            | 1989       |
| Paraguay         |               |            | 1995       |            |
| Peru             |               | 1983       | 1983       | 1983       |
| Philippines      | 1981-87       | 1981       | 1981, 1997 | 1981-87    |
| Portugal         |               |            |            | 1986       |
| Sao Tome         | 1980-96       |            |            |            |
| Senegal          | 1983-88       |            | 1983       | 1983-88    |
| Somalia          | 1990          |            |            |            |
| Sri Lanka        |               |            |            | 1989-93    |
| South Africa     | 1985          |            | 1985, 1989 | 1985       |
| Spain            | 1977-85       | 1978       |            |            |
| Swaziland        |               |            |            | 1995       |
| Sweden           | 1990-93       | 1991       | 1992       | 1990       |
| Tanzania         | 1988-96       |            |            | 1988-94    |
| Thailand         | 1983-87       | 1979, 1983 | 1983       | 1983       |
| Togo             |               |            | 1989       |            |
| Turkey           | 1982, 1991    | 1991       | 1982       | 1991, 1994 |
| Uganda           |               |            |            | 1990, 1994 |
| Uruguay          | 1981-85       | 1971, 1981 | 1982       | 1981-95    |
| USA              |               |            |            | 1980       |
| Venezuela        | 1994-96       | 1993       | 1994       | 1993-94    |

Source: Bell J., (2000, p.7)

## I.I.2. The Costs of Banking Crises

The banking crises are very damaging. Kaminsky (2000) points out that the estimates of the average cumulative loss of output per banking crises in the world economies are about 12%. The costs of major financial insolvencies as a percentage of their Gross Domestic Products (GDP) are shown in table 2 below. As the table demonstrates, the costs of insolvencies in the developing countries are much higher than in the developed countries mainly due to the systemic nature of the crises in the developing countries.

Table 1.2 Costs of Financial Insolvencies

| Country     | Date    | Scope                         | Cost (% GDP) | \$ Billion |
|-------------|---------|-------------------------------|--------------|------------|
| Japan       | 1990s   | Bad loans, property prices    | 14%          | 550        |
| China       | 1990s   | 4 large state banks insolvent | 47%          | 498        |
| U.S         | 1984-91 | 1400 S&Ls, 1300 banks failed  | 2,70%        | 150        |
| South Korea | 1998-   | Restructuring of banks        | 28%          | 90         |
| Mexico      | 1995-   | 20 banks recapitalized        | 17%          | 72         |
| Argentina   | 1980-82 | 70 institutions closed        | 55%          | 46         |
| Thailand    | 1997-   | Banking sector                | 32%          | 36         |
| Spain       | 1977-85 | Nationalized 20 banks         | 17%          | 28         |
| Malaysia    | 1997-   | Banking sector                | 35%          | 25         |
| Sweden      | 1991-94 | 5 banks rescued               | 4%           | 15         |
| Venezuela   | 1994-   | Insolvent banks               | 20%          | 14         |
| France      | 1994-95 | Credit Lyonnais               | 0,7%         | 10         |
| Norway      | 1987-93 | States takes over 3 banks     | 8%           | 8          |
| Israel      | 1977-83 | Entire banking sector         | 30%          | 8          |
| Chile       | 1981-83 | 8 institutions closed         | 41%          | 8          |
| Finland     | 1991-93 | Savings banking sector        | 8%           | 7          |
| Australia   | 1989-92 | Two large banks recapitalized | 2%           | 6          |

Source: Jorion, P. (2000), Value at Risk

Note: Data adapted from Caprio and Klingebiel (1999)

Additionally, the restructuring of banking is not equally successful in every country. The developing countries are generally less successful in banking reforms and consequently their reform costs are much higher. Goldstein and Turner (1996) indicate that the estimates of the resolution costs of banking crises since 1980, only in developing and transition countries, have reached a quarter of a trillion dollars. Table 3 shows the results and the costs of reforms of some developing and developed countries in percentage of their GDPs.<sup>1</sup>

<sup>1</sup> The total cost of the restructuring of the Turkish Banking system after the systemic banking crises in 2000-2001 is declared by BRSA (2003) as 47,2 billion USD. The cost of restructuring of the State-owned banks and the banks confiscated by Saving Deposits Insurance Fund (SDIF) is 39,3 billion USD, which is 26,6% of DP. The cost of restructuring of the Private Sector banks is 7,9 billion USD, which is 5,3% of Turkey's GDP.

Table 1.3 Results and Costs of Banking Reforms

| Substantial Progress | Cost / GDP | Moderate Progress | Cost / GDP | Slow Progress     | Cost |
|----------------------|------------|-------------------|------------|-------------------|------|
| Cote d'Ivoire (1991) | 13         | Chile (1983)      | 33         | Kuwait (1992)     | 45   |
| Peru (1991)          | 0,4        | Egypt (1991)      | ...        | Mauritania (1993) | 15   |
| Philippines (1984)   | 4          | Finland (1991)    | 9,9        | Tanzania (1992)   | 14   |
| Spain (1980)         | 15         | Ghana (1989)      | 6          |                   |      |
| Sweden (1991)        | 4,3        | Hungary (1993)    | 12,2       |                   |      |
|                      |            | Korea (1993)      | ...        |                   |      |
|                      |            | Poland (1993)     | 5,7        |                   |      |

Source: Dziobek and Pazarbaşıoğlu (1998)

Note: Reforms begun in year shown; costs are cumulative fiscal outlays in % of GDP, not including government cost recoveries.

Also, on top of the loss of output due to crises and resolution costs, the output losses due to the recessions after the banking crises, as indicated by Hutchison (1999), have been as high as 25% for some developing countries like Chile and Thailand.

The analysis of the quantitative facts about banking crises demonstrate that the banking crises of the developing countries are to a great extent more numerous, frequent, costly and systemic compared with the banking crises of the developed world.

## **I.II. THE DETERMINANTS OF BANKING CRISES IN THE DEVELOPED AND DEVELOPING COUNTRIES**

In this section, the macroeconomic, microeconomic and institutional determinants of banking crises in the developed and developing countries will be searched. For this purpose, first, the theories of banking crises, then the case studies of banking crises and thirdly the empirical studies on the leading indicators of banking crises will be examined.

### **I.II.1. The Theories of Banking Crises**

The theories of banking crises try to explain banking crises in the world economies with one single theory. They explain some of the macroeconomic and /or institutional determinants of banking crises, however, the theories fall short of capturing all the determinants of banking crises and neither can they capture the different determinants of banking crises in the developed and developing countries. The theories of “Irrational Bubbles and Euphoria Approach” and “Rational Speculative Bubbles and Rational Runs” are the most advocated theories of banking crises.<sup>2</sup> Other theories of banking crises include the theory of “Asymmetric Information ” and “Random Withdrawal Risk Approach”.<sup>3</sup> Amongst the theories of banking crises, the lending booms of the “Irrational Bubbles and Euphoria Approach” explains many developed and developing country banking crises.<sup>4</sup> Some

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<sup>2</sup> As Benink (1998, pp.80-86) asserts, Fisher, Minsky, Kindleberger, Calomiris and Gorton explain financial crises with the “Irrational Bubbles and Euphoria Approach.” Their explanation of banking crises is that over-indebtedness, speculative and excess demand for finance and an insufficient perception of the risks involved (euphoric expectations) creates a financial fragility during the expansion phase of the business cycle, and a banking crisis occurs when the bubble bursts. The explanation of banking crises of McKinnon and Pill in line with the Irrational Bubbles and Euphoria Approach is that capital inflows lead to consumption booms and current account deficits, triggering capital flight and banking crises in an economy with unregulated banking, deposit insurance and moral hazard problems. The theory of “Rational Speculative Bubbles and Rational Runs” brings another explanation to the banking crises. Blanchard-Watson, Flood and Garber, Santoni, Schwert, Wilson-Sylla-Jones explain banking crises with the rational deviations of the asset prices from the market fundamentals causing speculative bubbles that are afterwards accompanied by a rational run that terminates the price-fixing scheme (be it fixed exchange rates, fixed deposit rates or other).

<sup>3</sup> Mishkin (1996), following Akerloff and Stiglitz-Weiss explain banking crises with the “Asymmetric Information” theory. Asymmetric Information creates adverse selection and moral hazard problems due to asymmetric distribution of information between people, some knowing more than others and exploiting this advantage. As Boyd et al (2001,pp.2) affirm, Waldo, Chang and Valesco are amongst the advocates of the “Random Withdrawal Risk” approach that explains banking crises with “sunspots” which means that the crises can occur without major shocks to fundamentals.

<sup>4</sup> The lending boom is explained by Gourinchas et al (2001,p.3) as follows: “During a lending boom the typical story goes, credit to the private sector rises quickly. Leverage increases and financing is extended to projects with low-possibly even negative- net present value, either because monitoring becomes more difficult when the volume of lending increases rapidly, which increases the likelihood of fraud (including looting, self-lending or



economists claim that the main trigger of banking crises is the lending boom that burst when coupled with macroeconomic volatility.<sup>5</sup> However, as will be discussed in the following section “Irrational Bubbles and Euphoria Approach” can explain neither the Latin American nor the Turkish banking crises. Hence, there is no consensus on a single theory that brings an explanation neither to the determinants of all the banking crises, nor of the developed and developing countries banking crises.

### **I.II.2 The Case Studies on the Determinants of Banking Crises**

The case studies, which explain the common macroeconomic, microeconomic and institutional determinants of banking crises, reveal that the determinants of banking crises are different for the developing and the developed countries.

Some of the case studies explain the determinants of banking crises for the world economies. Hutchison and Mc Dill (1998, pp.5-6) summarize the IMF findings of the case studies on the common features of banking crises. Unsustainable macroeconomic policies, especially expansionary monetary and fiscal policies that cause lending booms and asset price bubbles and sudden changes in the global financial conditions such as large shifts in the terms of trade and world interest rates are the common macroeconomic risks. The common institutional features of systemic banking crises are identified as rapid financial liberalization; the maturity structure and currency composition of portfolio flows and the allocation and pricing of domestic credit; exchange rate misalignments and political instability; weak supervisory and regulatory policies that increase moral hazard; deficiencies in accounting, disclosure, and legal frameworks which allow financial institutions to disguise the extent of their difficulties and the lack of prompt corrective government action in times of arising problems.

Domac and Peria (2000, pp.2) states that “the following factors have been identified by the literature as the key determinants of banking crises: credit risk, lack of adequate capital,

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ever greening), or because domestic borrowers’ net worth increases. As lending expands, the quality of funded projects goes from bad to worse, exposure increases and the banking sector becomes more vulnerable”

<sup>5</sup> Hutchison and Mc Dill (1998) and Kaminsky (2000) explain all crises with the surges in capital flows-lending booms-asset price collapses. Hardy (1998), Gavin and Hausman (1998) find that lending booms is an important predictor of all banking crises. Mishkin (1999) explains both the East Asian and Mexican crises with the lending booms.

sharp increases in short term interest rates, currency mismatches, presence of a deposit insurance scheme, financial liberalization, lending booms, and external economic conditions”

Some case studies explain the determinants of banking crises in the developing countries. Goldstein and Turner (1996) indicates that banking crises in the developing countries are due to volatility in terms of trade, in international interest rates, in real exchange rates, in growth and in inflation rates and also due to lending boom-asset price collapses, surges in capital inflows and increasing bank liabilities with large maturity and currency mismatches; inadequate preparation for financial liberalization, heavy government involvement and loose controls on government lending, weakness in the accounting, disclosure and the legal framework, distorted incentives for bank owners, managers, creditors and bank supervisors.

There are also case studies that points out to the distinction between the determinants of banking crises in the developed and developing countries. Mishkin (1999) asserts that in the emerging market economies (EMEs), a decline in unanticipated inflation does not promote financial instability as debt contracts are of very short duration and continuously reprised to reflect expectations of inflation. However unanticipated exchange rate depreciation or devaluation which is not important for most of the industrialized countries dramatically affects balance sheets (B/S) and precipitates financial instability in EMEs as the increase in foreign currency (F.C.) denominated debt burden of firms results in a decline of the net worth.

### **I.II.3. The Empirical Studies on the Leading Indicators of Banking Crises**

The empirical studies, first pioneered by the “Early Warning Signals” study of Kaminsky& Reinhart in 1996, try to capture which indicators show the upcoming of or prepare the setting for a new banking crisis. First, the empirical studies carried both for the developed and developing countries will be examined, then the empirical studies for the banking crises of the developing countries will be analyzed.

### **I.II.3.1 The Empirical Studies for the Developed and Developing Countries**

The empirical studies mainly focus on the macroeconomic and institutional determinants of banking crises as the dataset for microeconomic determinants are not always available or reliable. There are however, few studies, which focus solely on the microeconomic indicators of banking crises. The empirical study of Hardy (1998) shows that the primary direct microeconomic indicators are the level of bank capitalization, changes in banks' capitalization due mainly to non-performing loans (NPLs) and rapid change in the maturity structure of banks' assets and liabilities.

Kaminsky and Reinhart tried to identify the early warning signals of banking crises by examining the behavior of some of the macroeconomic variables for the months before and after the banking crises. Kaminsky & Reinhart as explained by Kaminsky (2000) reveal that over borrowing, loss of foreign exchange reserves; high real interest rates, low output growth, decline in stock prices and real exchange rates tend to signal an incoming crisis.

Hutchison and McDill (1998) analyzed the macroeconomic and institutional determinants of 65 episodes of banking sector distresses between 1975-1997. Their empirical study concludes that the institutional determinants of central bank independence, explicit deposit insurance, financial liberalization and moral hazard; and the macroeconomic determinants of real GDP growth and change in stock prices are significant leading indicators of banking crises.

Hardy and Pazarbasioglu (1999) carried an empirical study for the macroeconomic and microeconomic determinants of banking crises on 50 sample countries, 38 of which suffered 23 severe problems and 20 systemic crises. The results of the study reveals that, in terms of macroeconomic determinants, a fall in real GDP, consumption boom, over- investment, a rise followed by a sharp fall in inflation, rising real interest rates already in the preceding years before the crises, a sharp decline in the real exchange rate and an adverse trade shock are identified as the leading indicators of banking crises. In terms of microeconomic determinants, a decline in domestic bank deposits, a boom and bust of credit growth are found to be the leading indicators of crises. The empirical study of Hardy and Pazarbaşıoğlu

conclude that banking crises show different characteristics regionally and that significant incidences are more affected by domestic factors like rapid credit expansion, growth in consumption, rising real interest rates, whereas systemic banking crises are more influenced by external variables like a decline in growth and movements in real exchange rates.

Demirgüç-Kunt and Detragiache (1997) studied the determinants of systemic banking crises for a sample of 30 developed and developing market economies for the period of 1981-1994. The findings of the study disclose that low GDP growth, high real interest rates, inflation, and the ratio of M2 to reserves which is a measure of external vulnerability is significantly related to the probability of systemic banking crises. In terms of institutional determinants, high values of “law and order” and the existence of explicit deposit insurance are found to be strongly correlated with systemic banking crises and these two indicators are more significant when the sample is restricted to developing countries.

Gonzalez- Hermosillo researched in 1999 early warning indicators of individual bank failures across countries by using a regression model, employing bank specific indicators together with institutional factors like moral hazard, and also macroeconomic, regional, contagion factors. Their study suggests that individual bank failures are strongly associated with liquidity, market, credit risk and the macroeconomic environment. Their conclusion is that the primary warning signals are the non-performing loans and equity capital ratios and that the leading indicators of individual banking crises show inconsistencies across countries as country cases exhibit idiosyncratic characteristics.<sup>6</sup>

There are also economists who find “sunspots” as the determinants of banking crises in their empirical studies.<sup>7</sup> There are other empirical studies which focus on the different affects certain indicators play in different political and institutional environments.<sup>8</sup>

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<sup>6</sup> For more details see Bell, J. (2000, pp.5- 6) and Hardy and Pazarbasioglu (1999)

<sup>7</sup> Boyd et al (2001) evidences in their study that unusually large movements in output, inflation, real equity values, and real credit extension are relatively rare in the three years preceding a crisis, their conclusion is that banking crises are often, although not necessarily always, driven by “sunspots.”

<sup>8</sup> The empirical study of Keefer (2002, pp.26) points out to the differing effects of financial liberalization and deposit insurance on the banking crises of different countries. Keefer comments on the fact that “ the traditional policy instruments and indicators used in the financial sector should be viewed differently in different institutional environments... Terms of trade shocks, found to be of minor importance in previous literature, have a significant and discernible impact on the probability of crises in countries lacking checks and balances. Conversely, precisely because of their lack of credibility, in countries lacking checks and balances, the ratio of

The empirical studies both for the developed and developing countries show that there are some common microeconomic, macroeconomic and institutional determinants of banking crises. Central bank independence, explicit deposit insurance, financial liberalization, moral hazard, and the non-existence of law and order are the main institutional determinants of banking crises. Over borrowing, over-investment, consumption boom, loss of foreign exchange reserves, high real interest rates, high inflation, low output growth, decline in stock prices, appreciation in real exchange rates, deterioration in terms of trade are the main macroeconomic determinants of banking crises. Capital adequacy and balance sheet structure deteriorations and credit risk are detected as the main microeconomic determinants of crises by a couple of empirical studies carried.

The empirical studies also demonstrate that the systemic banking crises are associated more with institutional determinants and macroeconomic determinants of GDP, interest rates, inflation rates, real exchange rates and external vulnerability. The significant incidences are associated more with domestic factors like rapid credit expansion, growth in consumption, rising real interest rates. The individual bank failures however are strongly associated with liquidity, market, credit risk and the macroeconomic environment.

### **I.II.3.1 The Empirical Studies for the Developing Countries**

The empirical study of Eichengreen and Arteta (2000) focuses on the banking crises in the EMEs in a 25 years time frame. Eichengreen and Arteta claim that lending booms, the exchange rate regime, destabilizing external factors, precipitous and inadequate financial liberalization, inadequate prudential supervision and weakness in the legal and institutional framework are among the leading suspects of banking crises in EMEs.

The empirical study of Rossi (1999) finds that better regulatory and supervisory framework reduces the incidence of banking crises in developing countries. Hutchison & Mc Dill (1998) also evidence real interest rate changes, inflation and volatility in exchange rates as factors leading to banking crises in developing countries. Hawkins & Mc Klau (2000) evidence increased bank liabilities as a leading indicator for developing countries' banking crises in

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the money supply to foreign reserves is a weak indicator of impending crises, but it is a very good indicator in countries that exhibit strong checks and balances.”

their empirical studies. Hardy & Pazarbasioglu (1999) evidence inflation and rising real interest rates as variables strongly related with banking crises in the EMEs. Hutchison and Mc Dill (1998) and Hardy (1998) find adverse trade shocks as causes of banking crises in developing countries.

The empirical studies for the developing countries designate that the major macroeconomic determinants of banking crises in the developing countries are changes in real interest rate rates, inflation and exchange rates; lending booms, increased bank liabilities and destabilizing external factors. The major institutional determinants of banking crises of the developing countries are precipitous and inadequate financial liberalization, inadequate prudential supervision, weakness in the legal and institutional framework and heavy government involvement. The studies also show that the systemic banking crises in the developing countries are affected more by macroeconomic and institutional determinants, whereas the individual bank failure(s) of the developed countries are affected more by the microeconomic determinants. Table 1.4 illustrates the determinants of banking crises in the developed (D) and less developed countries (LD).



Table 1.4 The Summary Table for the Empirical Studies of Banking Crises

| Indicators        | Hutchison Mc Dill 1998<br>Hutchison 2000 | Kaminsky &<br>Reinhart 2000 | Hardy 1998<br>H& Pazarbaşıoğlu 2000 | Eichengreen &<br>Arteta 2000 and Others |
|-------------------|--|-----------------------------|-------------------------------------|---|
| Macroeconomic     |  |                             |                                     |   |
| Fall in stocks    | <b>D/LD</b>                              | <b>D/LD</b>                 |                                     |   |
| FX reserves       |  | <b>D/LD</b>                 |                                     |   |
| GDP growth        | <b>D/LD</b>                              | <b>D/LD</b>                 | <b>D/LD</b>                         |   |
| Interest Rates    | <b>LD</b>                                | <b>D/LD</b>                 | <b>D/LD</b>                         |   |
| Exchange rates    | <b>LD</b>                                | <b>D/LD</b>                 | <b>D/LD</b>                         | <b>LD</b>                               |
| Inflation         | <b>LD</b>                                |                             | <b>D/LD</b>                         |   |
| Terms of trade    | <b>LD</b>                                |                             | <b>D/LD</b>                         | <b>LD</b>                               |
| Regional factor   |  |                             | <b>D/LD</b>                         |   |
| Consumption boom  |  |                             | <b>D/LD</b>                         |   |
| Lending boom      |  |                             |                                     | <b>LD</b>                               |
| Over- borrowing   |  | <b>D/ LD</b>                |                                     | <b>LD</b>                               |
| Over- investment  |  |                             | <b>D/LD</b>                         |   |
| Institutional     |  |                             |                                     |   |
| Deposit Ins.      | <b>D/LD</b>                              |                             |                                     |   |
| Reg./Supervision  |  |                             |                                     | <b>LD</b>                               |
| C.B. independence | <b>D/LD</b>                              |                             |                                     |   |
| Gov. Intervention |  |                             |                                     | <b>LD</b>                               |
| Liberalization    | <b>D/LD</b>                              |                             |                                     | <b>LD</b>                               |
| Moral hazard      | <b>D/LD</b>                              |                             |                                     |   |
| Microeconomic     |  |                             |                                     |   |
| Capital           |  |                             | <b>D/ LD</b>                        |   |
| Balance Sheet     |  |                             | <b>D/ LD</b>                        |   |
| Market Risk       |  |                             |                                     |   |
| Credit Risk       |  |                             | <b>D/ LD</b>                        |   |

Note: The shaded area in the table demonstrates the macroeconomic determinants of systemic crises.

### I.III. THE RISK EXPOSURES OF BANKS TO CRISES IN THE DEVELOPED AND DEVELOPING COUNTRIES

In this section, the microeconomic determinants of banking crises will be more deeply scrutinized. For this purpose, first, the banking risk exposures will be examined. Then the banking crises experiences will be analyzed in order to find out the risk exposures of banks to crises in the developed countries and the developing countries in general and the EU and Turkey in particular. The analysis of the risk exposures associated with the banking crises of the developed and developing countries is important not only to take the necessary precautions but also to find the right remedies in terms of regulations.

#### I.III.1. The Banking Risk Exposures

There are inherent microeconomic risk exposures in banking that renders banks prone to crises. The risk exposures of banks are the same for banks all over the world. However, the fragilities of banks and banking systems to certain risks may vary between countries.

Table 1.5 The Banking Risk Spectrum

| Financial Risks            | Operational Risks          | Business Risks           | Event Risks           |
|----------------------------|----------------------------|--------------------------|-----------------------|
| Balance Sheet Structure    | Business Strategy Risk     | Legal Risks              | Political Risks       |
| Income Statement Structure | Internal Sys. & Oper. Risk | Policy Risks             | Contagion Risk        |
| Capital Adequacy           | Technology Risk            | Financial Infrastructure | Banking crisis risk   |
| Credit Risk                | Mismanagement& fraud       | Systemic (Country) Risk  | Other exogenous risks |
| Liquidity Risk             |                            |                          |                       |
| Interest Rate Risk         |                            |                          |                       |
| Market Risk                |                            |                          |                       |
| Currency Risk              |                            |                          |                       |

Source: Greuning, H. and Bratanovic, S. (2000), Analyzing Banking Risk, p.4

The Financial Risks are bank specific risks. The credit risk includes failures of loan policy, inadequate assessment of credit risk, ever greening, insufficient diversion of loan portfolio, concentration, connected lending, mortgage loans, over-investment, etc. The interest rate risk is more the subject of ALM. The balance sheet structure risk, the liquidity risk, the interest rate risk and currency risks are interrelated risks. A bank that carries an open foreign exchange position is subject to currency risk due to non-hedged position but will also be exposed to interest rate risk and liquidity risk. These interrelated risks arise mainly due to maturity mismatches in the balance sheet structures. Market risk involves the risk of the trading portfolios and concerns mainly the derivatives risks. NPLs, high operating costs,



increased competition are the sources of income statement structure risks. The capital adequacy is required to absorb all these banking risk exposures and inadequate capital is itself a financial risk.

The Operational risks are also bank specific risks and involve corporate governance problems, business strategy risks, poor management, lack of essential banking skills, operational problems, technological and internal system problems and fraud.

The Business Risks of banks are legal, policy, financial infrastructure and country (systemic) risks that arise due to institutional and domestic macroeconomic environments. Unprepared financial liberalization, lack of regulatory and supervisory structures, lack of transparency, deficiencies in accounting and disclosure, the problems with the legal framework or with the implementation of legislation; information asymmetry, moral hazard and adverse selection due to poorly designed banking safety nets like deposit insurance; loose controls on connected lending, distorted incentives, underdeveloped securities markets, large state-owned banking industry, heavy government involvement, political instability, lack of confidence to authorities and politicians; the government, Central Bank, regulatory and supervisory policy choices are among the institutional factors that renders banks prone to business risks. Also, volatility in domestic macroeconomic indicators (in real output growth, real interest rates, real inflation, asset prices, international reserves, budget deficit, heavy short term debt, exchange rates, etc.) renders banks prone to crises.

Event risks of banks include political, exogenous, contagion and banking crisis risks and refer mainly to the external risks that arise from the out of the country events. The volatility in world interest rates, crises in other countries, problems in external balance, deterioration in terms of trade etc are amongst the event risks that renders banks prone to crises.

### I.III.2 The Risk Exposures of Banks to Crises in the Developed Countries

The G-10 countries, some of which are EU member states had banking problems since 1980s.<sup>9</sup> In G-10, out of the 24,898 banking institutions-12, 500 only in USA- there were 73 bank failures or near failures and only 13 significant incidents until 1999.

Table 1.6 Banking Failures (Near Failures) in G-10 Countries

| Country     | No. of Banks | Years                     | Associated Risks   |
|-------------|--------------|---------------------------|--|
| Belgium     | 4            | 1980 1982 1997            | Poor management, liquidity, fraud  |
| Canada      | 9            | 1985 1993-94              | Real Estate and energy loans, lack of confidence of depositors, management |
| France      | 12           | 1988 1989 1993 1996       | Problem loans, Real Estate loans, fraud                                    |
| Germany     | 2            | 1974 1983                 | Loans, FX exposure   |
| Italy       | 4            | 1982 1988 1996            | Problem loans, fraud   |
| Japan       | 14           | 1992 1993-97              | Problem loans, Real Estate Loans   |
| Netherlands | 5            | 1981 1982                 | Real Estate Loans, Foreign Trade Financing                                 |
| Sweden      | 5            | 1991 1992                 | Unknown  |
| Switzerland | 9            | 1980 1987-88 1991-92      | Excess risk, loan loss provisions  |
| U.K         | 3            | 1984 1990- 91             | Loan quality/Loan losses/Fraud   |
| U.S.A       | 6            | 1982-85 1988 1990<br>1991 | Problem loans, Real Estate Loans, Energy loans, Securities Losses, Fraud   |

Source: Benton E. Gup, (1998, p.60-64)

Gup (1998) indicates that almost 30% of failures (near failures) in the G-10 countries are due to problem loans, almost 20% due to real estate loans and 10% due to fraud like in the cases of BCCI and Credit Lyonnais. Poor management, lack of confidence of depositors, lack of liquidity, FX exposure, excessive loan loss provisions, excessive risk due to derivatives, concentration are among the other reasons of bank failures in G-10.

Most of the incidents involved large losses associated with derivative activities like in the case of Barings. The following table, although it includes multinational companies (MNCs) and their branches in the EMEs, gives an idea about the extent of derivatives losses.

<sup>9</sup> The G-10 countries are Belgium, France, Germany, Italy, Netherlands, Sweden, U.K, Canada, Japan, Switzerland and USA

Table 1.7: Losses due to Derivatives (1993-1999)

| Entity                      | Date     | Instrument          | Loss (\$m) |
|-----------------------------|----------|---------------------|------------|
| Orange County, CA           | Dec-1994 | Reverse Repos       | 1,810      |
| Showa Shell Sekiyu, Japan   | Feb-1993 | Currency Forwards   | 1,580      |
| Kashima Oil, Japan          | Apr-1994 | Currency Forwards   | 1,450      |
| Metallgesellschaft, Germany | Jan-1994 | Oil futures         | 1,340      |
| Barings, U.K                | Feb-1995 | Stock index futures | 1,330      |
| Ashanti, Ghana              | Oct-1999 | Gold "exotics"      | 570        |
| Yakult Honsha, Japan        | Mar-1998 | Stock index deriv.  | 523        |
| Codelco, Chile              | Jan-1994 | Copper futures      | 200        |
| Procter & Gamble, U.S       | Apr-1994 | Differential swaps  | 157        |
| Nat West, U.K               | Feb-1997 | Swaptions           | 127        |

Source: Jorion, P. (2000), Value at Risk

The analysis of the individual cases in table 1.8 also shows the risk factors that play a predominant role in the financial failures of the developed countries.

Table 1.8: Risk Factors in Losses

| Entity  | Loss (\$b) | Market Risk          | Operational       | Funding               | Lack of controls |
|---------|------------|----------------------|-------------------|-----------------------|------------------|
| Barings | 1,3        | Yes, Japanese Stocks | Yes, rouge trader |                       | Yes              |
| MGRM    | 1,3        | Yes, oil             |                   | Yes, recapitalization | Yes              |
| O.C     | 1,7        | Yes, interest rates  |                   | Yes, default          | Yes              |
| Daiwa   | 1,1        | Yes                  | Yes, rouge trader |                       | Yes              |

Source: Jorion, P. (2000), Value at Risk

The country-wise analysis of the banking crises in G-10 and the EU shows that the main culprit has been the credit risk especially in real estate loans that created banking problems due to boom and bust cycles.

The Canadian economy entered a boom period in late 1970s fuelled with heavy borrowing by energy and agricultural firms and the period which ended in recession in 1982 caused banking problems. In the early 1990s, there were some other bank failures in Canada as there was a weak market for real estate and other assets, and increasing cost pressures on banks due to intensified competition.

The Savings and Loan Institutions (S&L) crisis in the USA from 1980s to mid-1990s was mainly due to "government –directed" home lending. The crisis caused even the bankruptcy of Federal Deposit Insurance Corporation (FDIC) in 1985, which then is replaced with a new

insurance fund in 1989. Barth and Litan (1998) indicate that between 1980 and 1991, 10% of all banks and 25% of S&Ls failed due to real estate loans but liberalization with lax regulation and supervision, moral hazard due to safety nets and regulatory forbearance for S&Ls were the contributing factors.

In Japan, the deregulations and liberalization started at a slow pace by mid 1970s and continued until mid 1980s. From 1975s, the real estate loans were increasing, but in the second half of 1980s, the characteristics of bubble economy started to show itself with a sharp run-up in asset prices and with booming economic and monetary growth. The banking crisis emerged when monetary policy tightened in 1990. As Cargill et al (1998) define; the problems grew into a severe crisis by the end of 1990s. The real estate prices sharply dropped due to increases in interest rates and the associated recession caused loan problems in the balance sheets of banks. The crisis has persisted for many years because of the government's delay with it and mainly due to incentives for regulatory authorities to adopt forbearance and forgiveness when dealing with the troubled banks, and due to pervasive government deposit guarantees. Table 1.9 shows the decrease in manufacturing loans and the sharp increase in real estate loans from 1985 onwards in Japan.

Table 1.9: The Sectoral Distribution of Bank Loans in Japan

| Years | Manufacturing | Real Estate | Construction | Private |
|-------|---------------|-------------|--------------|---------|
| 1985  | 26,12         | 7,71        | 0            | 9,25    |
| 1986  | 23,58         | 9,61        | 5,52         | 9,79    |
| 1987  | 20,46         | 10,22       | 5,23         | 11,29   |
| 1988  | 19,09         | 11,14       | 5,26         | 12,86   |
| 1989  | 16,65         | 11,54       | 5,4          | 15,25   |
| 1990  | 15,74         | 11,28       | 5,31         | 16,27   |
| 1991  | 15,57         | 11,6        | 5,59         | 16,84   |
| 1992  | 15,06         | 12,08       | 5,94         | 16,78   |
| 1993  | 16,04         | 11,4        | 6,24         | 16,09   |
| 1994  | 15,64         | 11,69       | 6,41         | 15,94   |
| 1995  | 14,98         | 11,84       | 6,42         | 16,7    |
| 1996  | 14,56         | 12,19       | 6,32         | 17,32   |
| 1997  | 14,11         | 12,49       | 6,33         | 17,76   |
| 1998  | 14,33         | 12,77       | 6,47         | 18,42   |

Source: Bank of Japan

In the EU, it is not possible to talk about EU-wide banking crisis. The banking crisis in Spain in 1987 is not analyzed here as it was before Spain's accession to EU and it is not possible to consider Spain as a developing country by that time. In France, the combination of boom- and –bust real estate cycles between 1991-1995 and over concentration of real estate loans created banking problems. However, as the French Treasury Department does not let bankruptcy with the fear of systemic risk, no French banks have gone bankrupt. In Italy, banking problems occurred during 1990-97. The main problem was the reduction of profits due to increased competition and the problem showed itself mainly in the South.

In the Nordic countries, the banking crisis in 1990s was preceded by liberalization of banks' funding sources and very significant deregulation causing credit booms combined with supervision that failed to keep up.<sup>10</sup> The ERM crisis in 1992 and the tax law change caused a 50% decline in real estate.<sup>11</sup> At the end of 1992, NPLs amounted to 14% of the GDP and almost half of them were real estate related. Eichengreen and Arteta (2000, p.29) point out that in all the Scandinavian countries, there followed a credit finance surge in capital formation and deterioration in the current account balance and a reluctance to tighten monetary conditions despite the sharp growth of lending and private indebtedness. Berg (1998) indicates that when the real estate price bubble burst, the loans were much higher than the market values of their collaterals. The recession and high interest rates that followed increased the business loan losses of banks. As Herring (1998) emphasizes, besides the real estate price bubble that burst, moral hazard due to safety nets was the additional contributing factor for bank crisis in the Scandinavian countries. The fact that real estate related lending played a central role in the Scandinavian banking crisis can be observed from the following table which shows the increase in price indexes of residential real estate.

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<sup>10</sup> In Norway, the ratio of bank loans to GDP increased from 40% in 1984 to 65% in 1988. In Sweden, following liberalization, bank loans for the private sector increased from 46% in 1985 to 60% of in 1990.

<sup>11</sup> Denmark that was already a EU member Nordic country by that time can be treated differently from the rest of the Nordic countries as real estate loans were being marked to market, and Denmark was not heavily dependant on foreign funding.

Table 1.10: Price Indexes of Residential Real Estate

| Year | Denmark | Finland | Norway | Sweden |
|------|---------|---------|--------|--------|
| 1980 | 68,1    | 28,9    | 30,7   | 77     |
| 1981 | 64,9    | 33,2    | 33,7   | 69     |
| 1982 | 63,4    | 39,5    | 53,2   | 69     |
| 1983 | 77      | 47      | 56,9   | 65     |
| 1984 | 88,9    | 52,9    | 65,3   | 65     |
| 1985 | 104,1   | 55,1    | 78,8   | 67     |
| 1986 | 116,2   | 57,3    | 103,4  | 71     |
| 1987 | 107,7   | 64      | 111,5  | 74     |
| 1988 | 108,9   | 87,3    | 114,8  | 81     |
| 1989 | 108,1   | 106,5   | 107    | 88     |
| 1990 | 100     | 100     | 100    | 100    |
| 1991 | 101,3   | 85,3    | 93,6   | 92     |
| 1992 | 99,7    | 69,8    | 89,5   | 79     |
| 1993 | 98,7    | 64,7    | 91,4   | 67     |
| 1994 | 110,7   | 68,9    | 102,7  | N.A    |
| 1995 | 119,1   | 66,2    | 109,3  | N.A    |
| 1996 | 131,9   | 70,2    | 118,1  | N.A    |

Source: Scandinavian Central Banks

Hence, the major risk exposures of banks in the developed countries were the credit risk, market risk, operational risk as well as policy and legal risks.

Table 1.11 Risk Exposures of Banks in the Developed Countries

| Financial Risks            | Developed Country Crises |
|----------------------------|--------------------------|
| Balance Sheet Structure    |                          |
| Income Statement Structure |                          |
| Capital Adequacy           |                          |
| Credit Risk                | √                        |
| Liquidity Risk             |                          |
| Interest Rate Risk         |                          |
| Market Risk                | √                        |
| Currency Risk              |                          |
| <b>Operational Risks</b>   |                          |
| Business Strategy Risk     | √                        |
| Internal Sys. & Oper. Risk |                          |
| Technology Risk            |                          |
| Mismanagement& fraud       | √                        |
| <b>Business Risks</b>      |                          |
| Legal Risks                | √                        |
| Policy Risks               | √                        |
| Financial Infrastructure   |                          |
| Systemic (Country) Risk    |                          |
| <b>Event Risks</b>         |                          |

### I.III.3 The Risk Exposures of Banks to Crises in the Developing Countries

The business risks due to institutional and domestic macroeconomic problems are the major risk exposures of banks for crises in the developing countries. As Moscow (1998) underlines, banks in these emerging markets are both more likely to be subject to macroeconomic shocks and less able to absorb them due to their institutional structures.

In this subsection, the major banking crises in the developing world, the East Asian, Latin American and Russian banking crises will be analyzed.

#### I. III.3.1 The East Asian Banking Crises

The systemic banking crises of East Asian countries started in June 1997 and affected ten countries, namely China, Hong Kong, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand. The following table shows the macroeconomic outlooks of the most severely hurt countries before the onset of the crises.

Table 1.12: Macroeconomic Outlook of the Four East Asian Countries

| Indicators           | Indonesia |      |      | Malaysia |      |      | Philippines |      |      | Thailand |      |      |
|----------------------|-----------|------|------|----------|------|------|-------------|------|------|----------|------|------|
|                      | 1995      | 1996 | 1997 | 1995     | 1996 | 1997 | 1995        | 1996 | 1997 | 1995     | 1996 | 1997 |
| Trade Balance        | -0,76     | -0,1 | -0,2 | -3,8     | 0,58 |      | -8,8        | -9,4 | -2,3 | -7,1     | -6,7 | 0,14 |
| GDP growth           | 8,22      | 7,98 | 4,65 | 9,5      | 8,6  | 7,8  | 4,8         | 5,8  | 9,7  | 8,8      | 5,5  | 0,43 |
| Inflation Rates      | 8,95      | 6,64 | 11,6 | 5,3      | 3,6  | 2,7  | 8,1         | 8,4  | 5    | 5,7      | 5,9  | 5,6  |
| Real Exch. Rates     | 100       | 105  | 69   | 107      | 112  | 107  | 110         | 116  | 91   | 102      | 108  | 72,4 |
| Lending boom         | 53,4      | 55,4 | 69,2 | 85       | 93   | 107  | 38          | 49   | 57   | 97,6     | 102  | 116  |
| S.T Debt / F.C. Res. | 189       | 176  |      | 31       | 41   |      | 83          | 80   |      | 114      | 100  |      |
| Fiscal Balance       | 2,44      | 1,26 | 0    | 0,9      | 0,76 | 2,52 | 0,57        | 0,28 | 0,06 | 2,94     | 0,97 | -0,3 |
| Current Account      | -3,2      | -3,4 | -2,2 | -8       | -5   | -5   | -2,7        | -4,8 | -5,2 | -8,1     | -8,1 | -1,9 |
| Saving Ratio         | 27,7      | 27,5 | 28   | 34,7     | 37,8 | 39   | 17,2        | 19,4 | 18,8 | 33,3     | 33,2 | 32,6 |

Source: Corsetti et al (1998,p.40-50)

Note: Trade Balance, Lending Boom, Fiscal Balance, C/A and Savings Ratio data are indicated as % of GDP

The table shows that by the end of 1996, the real exchange rates had appreciated. Since the countries were formally or informally pegged to the dollar and their inflation exceeded that of the USA, the appreciation of their currencies reduced their export competitiveness, which in turn caused a large current account deficit. The high ratio of short-term foreign currency denominated debt to international reserves and the boom in domestic lending are also clearly evidenced from the table. As Schwartz (1998, pp.140) indicates, bank credit growth rates



exceeded their GDP growth rates by 69% in Indonesia, 107% in Malaysia, 70% in South Korea and 116% in Thailand as of 1997.

In East Asia, the credit boom to the private sector that was fuelled with the short term and mismatched capital inflows were channeled to the investment of non-traded goods. The misallocation of resources is clearly evident from the fact underlined by Schwartz (1998, pp.156) that in Korea for example 20 of the largest 30 conglomerates displayed in 1996 a rate of return on invested capital below the cost of capital. Thus when the asset price bubble burst for commercial property between 1990-1995 and residential property between 1992-1997, it caused a problem for the whole financial system and Indonesia, Korea, Malaysia, the Philippines and Thailand faced a twin banking and currency crisis with 50% depreciation of their currencies and 50% declines in stock prices.

Almost all the institutional discrepancies existed in East Asia. As Corsetti et al (1998) and Caprio and Caprio et al (1998) identify, the rapid capital account liberalization and financial market deregulation with inadequate preparation, weakness in accounting and disclosure, lack of transparency of banks' financial condition contributed significantly to the financial difficulties.<sup>12</sup>

In East Asia, a significant percentage of bank assets are in state owned banks. As the IMF Report (1997, pp.150) declares, even if state ownership did not have a high concentration in the banking sector as the case was for South Korea, still the NPLs at end-1996 of South Korean commercial banks was 56% due to political influence on lending. In East Asia, political pressures, weak and not very credible government involvement was present before and during the crisis. Political pressures to maintain high rates of economic growth led to implicit and explicit public guarantees that consequently created moral hazard problems and structural distortions before the outbreak of the crisis.

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<sup>12</sup> Actually, the East Asian financial crises had drawn attention to the ineffectiveness of the 1988 Basel Capital Accord-BCBS (1988)- as in some of the Asian countries affected by the crisis, capital standards were being introduced but provided little protection due to poor accounting standards and weak supervision. The BCBS's Core Principles for Effective Banking Supervision in 1997, -BCBS (1997)- is intended to be a remedy for such supervisory weaknesses.



Table 1.13: Contributors to Banking Crises in East Asian Countries

|           | Deregulation | Corruption & Forbearance | Politics in Credits | Government Guarantees | Foreign Currency Inflows | Bubbles |
|-----------|--------------|--------------------------|---------------------|-----------------------|--------------------------|---------|
| Indonesia | Yes          | Yes                      | Yes                 | Yes                   | Yes                      | Yes     |
| Malaysia  | No           | Yes                      | Yes                 | Yes                   | Yes                      | Yes     |
| S. Korea  | No           | Yes                      | Yes                 | Yes                   | Yes                      | Yes     |
| Thailand  | Yes          | Yes                      | Yes                 | Yes                   | Yes                      | Yes     |

Source: Shwartz, A (1998,p.157)

The economists locate that the East Asian banking crises was mainly due to the vulnerability of banks to business risk exposures in terms of institutional problems, and financial risk exposures in terms of balance sheet structures, credit and currency risks.

Table 1.14: The Risks Associated with the East Asian Banking Crises

| Economists                        | Risks                                 | Theoretical Explanation         |
|-----------------------------------|---------------------------------------|---------------------------------|
| Hardy (1998)                      | Pegged Exchange Rates                 |                                 |
| Garcia (1998)                     | Contagion                             |                                 |
| Schwartz (1998)                   | Institutional, bubbles, banking prob. |                                 |
| Barth (1998)                      | Institutional, bubbles                |                                 |
| Radelet & Sachs (1998)            | Foreign Currency inflows              |                                 |
| Corsetti, Pesenti, Roubini (1998) | Banking Sector problems               | Random Withdrawal Risk          |
| Stiglitz (1998)                   | Institutional                         |                                 |
| Demirgüç, Detragiache (1998)      | Institutional                         |                                 |
| Rodrick (1998)                    | Institutional                         | Asymmetric Information          |
| Mishkin (1999)                    | Institutional, bubbles                | Asymmetric Information          |
| Caprio (1998)                     | Institutional                         |                                 |
| Krugman, Greenspan, Fisher (1998) | Institutional, bubbles                | Irrational Bubbles and Euphoria |
| Mc Kinnen & Pill (1998)           | F.C. inflows, bubbles                 | Irrational Bubbles and Euphoria |
| Glick and Moreno (1999)           | Competitiveness prob., bubbles        |                                 |
| Kaminsky (2000)                   | Bubbles                               |                                 |

Source: Prepared with the information from Roubini, N. (1997), The Asian Currency Crises of 1997

### I.III.3.2. The Latin American Banking Crises in Mid 1990's

The crises in Latin American countries have a repetitive nature as the case is with many developing countries banking crises. Argentina and Brazil had banking crises in 1994 after the Mexican crisis. The Mexican crisis was not the first and both Brazil and Argentina lived through severe banking crises in late 1990s as well. Also other Latin American countries like Chile had severe banking crisis. Here the determinants of Latin American crises in mid-1990s will be examined.

Table 1.15: Comparison of Macroeconomic Indicators of Latin America and East Asia

| Country   | Short-term Foreign Liabilities / GDP (%) | Private Loans/ GDP (%) | Private Sector Credit/ GDP (%) | Private Credit Growth (%) | Net Foreign Liabilities of Banks / GDP (%) |
|-----------|--|------------------------|--------------------------------|---------------------------|--|
| Argentina | 6,2                                      | 7,8                    | 17,1                           | 29,4                      | 2,1  |
| Brazil    | 5,2                                      | 6,5                    | 30,7                           | 0                         | 4,4  |
| Mexico    | 7,5                                      | 9,8                    | 7,6                            | 46,1                      | 4  |
| Indonesia | 13,5                                     | 20,3                   | 49,8                           | 53,9                      | 2,3  |
| Korea     | 12,4                                     | 17,4                   | 60,5                           | 29                        | 1,9  |
| Thailand  | 24,6                                     | 36,4                   | 95,6                           | 34,2                      | 21,7                                       |

Source: Pery, G. and Lederman D., (1999) Adjustments after Speculative Attacks in Latin America and Asia: A Tale of Two regions? World Bank Latin American and Caribbean Studies, The World Bank, Washington D.C: IMF International Financial Statistics; Private Loans from BIS

Table 15 clearly shows that the extent of Short-term Foreign Liabilities /GDP, Private Sector Credit / GDP and Private Loans / GDP were at much lower levels in Latin America compared to the East Asian Countries before the onset of crises.<sup>13</sup>

### I.III.3.2.i. The Banking Crisis in Brazil

Institutional problems were severe in Brazil before the onset of the crisis. System monitoring was lax and enforcement of regulations was loose. Between 1985 to mid-1997, the Central Bank had 11 different presidents. Bankers were encouraged to find and exploit loopholes as creativity is rewarded with profit. Bankers in Brazil also enjoyed an unusually strong lobby in Congress and The Banking Associations were effective in obtaining favorable legislation for activities. Hence, Brazil lived through severe banking crisis despite the fact that banks used to publish complete financial statements twice a year and there were no connected lending and as Bydalek (1998) asserts, capital adequacy ratios for most banks exceeded 12% and for some banks even exceeded 20%.

By the early 1990's banks' inflationary revenue had grown up to 40% of the revenue from financial intermediation. The number of banks in Brazil had increased from 111 in 1988 to 246 by 1994 due to inflationary profits. The primary activity of banks was trading in government securities and interest arbitrage. Banking was money brokering and inflation had camouflaged the problems. As Dziobek and Pazarbaşıoğlu (1998,pp.9) specify, in high inflation economies, inflation disguises the extent of damage to the financial and banking system, which a period of deflation quickly exposes.

<sup>13</sup> Here, the Private Credit Growth is the cumulative growth of total credit to private sector at constant local prices during 24 months prior to the crises.

Banks in Brazil are hurt by the new macroeconomic climate resulting from the introduction of the 1994 Plano Real, which brought currency stabilization and end to hyperinflation.<sup>14</sup>

After the introduction of the 1994 Plan, to compensate the loss of inflationary revenue, the banking system expanded lending that caused banks to make huge losses as they lacked the infrastructure and the credit culture to evaluate loan portfolios in a non-inflationary environment. In Brazil, financial sector loans to the private sector grew by almost 60% during the first year of the Plan. Table 1.15 also shows the high level of Private Sector Credit to GDP ratio in Brazil. As the IMF Staff Country Report (1999) indicates such a rapid growth of bank loans, at first, partly compensated for the loss of the “float”. But the downturn in economic activity in the 2Q of 1995, as a result of increased interest rates after the Mexican Crisis led to a substantial increase in NPLs.

#### **I.III.3.2.ii. The Banking Crisis in Argentina**

The macroeconomic fundamentals were quite good before the onset of the crisis in Argentina. Argentina had a minor current account deficit, it had rather stable political and economic structures and relatively high reserves and its debt structure was long term. Structurally, Argentina had gone quite far with its reforms, especially in terms of privatization. Supervision had also improved in Argentina in the previous few years and there was no Deposit Guarantee in the system before the crisis. Also, capital requirements for banks were at 11.5%, and 8% for Tier One Capital.<sup>15</sup>

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<sup>14</sup> In Brazil, various stabilization plans, the Cruzado Plan in 1986, the Bresser Plan in 1987, the Summer Plan in 1989 and the two Collar Plans in the early 1990's failed to control inflation. On the contrary, the collapse of each of these plans further accelerated the price increases and eventually produced hyperinflation. Inflation in 1993 was more than 2 % per working day. At the beginning of 1994, Brazil's government implemented the Social Emergency Fund to reduce the fiscal deficit and the Real Plan, which entailed the introduction of a new currency, the real. Initially, the real was set equal to the US dollar and was allowed to float against the US currency within a band. The Plan brought down inflation from a monthly rate of 50% in June 1994 to less than 1% in 1996. Low inflation has brought stability and economic growth, unemployment, trade deficit and budget deficit, and also the Banking Crises.

<sup>15</sup> In Argentina, the 1985 Austral Plan included wage and price freezes as well as a pegged currency. However since the government was not able to balance the budget, the CB expanded money creation, consequently, inflation exploded again in the late 1980's, coupled with stagnation. President Menem and Domingo Cavallo, have implemented radical structural reforms to eliminate the roots of Argentina's fiscal imbalances and hyperinflation by deregulation of the economy, privatization, liberalization and the Convertibility Law of 1991. Convertibility Law re-established confidence and annual output grew an average 8.9% between 1991 and 1994 and inflation dropped from an annual average rate of 2314% in 1990 to 0% in 1996.

However, the major institutional problem was that the Argentina Banking system had roughly half of the system's assets in public banks. Within that, public sector assets were split approximately 50-50 between the Banco de la Nación de Argentina (BNA), the large federal public bank that was too big to fail, and a whole host of provincial and municipal banks. The provincial banks were extremely weak with non-performing portfolios of about 40% before the crisis. The wholesale banks and quasi banks also had questionable lending activities. The weaknesses in the provincial and municipal banks, as well as some wholesale banks exacerbated the difficulties in the banking system as this was the segment of the banking sector that was not easy for the superintendency to supervise due to Argentina's federal structure.

In the wake of the Mexican currency crisis, capital left the country and the subsequent credit crunch brought sharply higher interest rates. The initial crisis started with the wholesale banks, many of which were overextended and the falling stock and bond prices created additional difficulties. Provincial banks lost their sources of financing and many became technically insolvent because of earlier mismanagement. During the crisis, as Herrer (1997) identifies, the wholesale banks lost 70%, the provincial banks lost 40%, and the commercial banks lost 30% of their deposits. After the initial shock, the crisis reached tremendous proportions and is aggravated by the liquidity crisis due to restrictions on the lender of last resort capacity of the Central Bank (CB) as the currency regime was quasi-Currency Board. Interbank rates skyrocket, dollarization increased and some banks failed.

### **I.III.3.2.iii. The Banking Crisis in Mexico**

Macro economically, in the early 1990's there was a rapid increase in private sector lending of banks and surge in capital inflows to Mexico. As Zahler in the BIS document states, bank credit to GDP increased from 20% in 1987 to more than 40% in 1994 and the debt of domestic banks to international banks doubled between 1991-1994. In 1994, investment opportunities in industrialized countries and monetary tightening in the US had slowed inflows to Latin America. At the same time, Mexico's rising demand for imports resulted in a huge current account (C/A) deficit.<sup>16</sup>

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<sup>16</sup> In Mexico, speculation of an eventual devaluation of the Mexican currency coupled with an increase in US interest rates and the reluctance of foreign banks to lend more to Mexico forced the governments to announce in August 1982 its inability to service its foreign debt. This had triggered the global debt crisis and inflation

When capital started to leave Mexico in early 1994, the CB provided liquidity by expanding domestic credit, but was reluctant to sharply increase interest rates. In November however, reserves dropped sharply after renewed unrest in the political arena. The authorities were eventually forced to widen the peso's floating band on December 1994 and two days later the government had to abolish the peso band completely due to the sharply dropping reserves. The 1994 collapse of the peso brought strong capital outflows, high exchange rate volatility, sharply higher interest rates, a scarcity of liquidity and depressed domestic demand.

The institutional problems of banking were quite severe in Mexico. In the 1982 debt crisis, all the banks in Mexico (60) had been nationalized. In early 1990's, the Mexican banking system was left with 18 banks and they were again privatized in 1991-1992. As Ünal and Navarro (1999) emphasize, in 1994 Mexico had to deal with a banking crisis shortly after their privatization as the lack of legal and regulatory framework and lax oversight shadowed the success of the privatization process. During privatization, banks were sold at higher prices than their market value and wanted to recover their investments with risky business. After the privatization, banks started to use creative methods like rescheduling payments of mortgages according to the payment capacities of borrowers. Also, some of the investors who bought the banks had no previous experience of banking. The Mexican banks could not develop the necessary market and credit risk capabilities due to financial repression, caps on interest rates, credit allocation regulation, high liquidity requirement and inadequacy in authority's supervision. The share of NPLs in total loans began to rise before the 1994 crisis due to the increase in lending. Actually, the banks' net open foreign currency positions were subject to a ceiling but Mexican Banks with creative methods had increased their foreign exchange positions. A rapid privatization of the banks and rapid liberalization on the one hand; the reduction in public sector borrowing and the following rapid expansion of credits under weak supervision on the other hand were the main causes behind the banking crisis in Mexico.

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climbed, the budget deficit reached 17% of GDP and economic output fell 4.2% the next year. In the following years, several debt restructurings were agreed, including the Brady Plan. The economic reforms and the Programme of Immediate Economic Re-ordering, launched after the 1982 crisis forced the governments to implement tight macroeconomic policies. As a consequence, Mexico experienced a long period of stagnation. Its real output and the inflation rate returned to the level attained in 1981 only in the early 1990's. This austerity, while reducing the inflation to 7% by 1994 from 30% in 1990, also reduced the pace of nominal demand and output growth, resulting in rising unemployment and the banking crises in 1995.

The 1994 peso crisis badly hurt the newly privatized banks. As Graf (1999) underlines, the already weak situation of the banking sector was aggravated by the devaluation of the peso and its effects on the interest rates, inflation and output and this caused banks not being able to service their foreign currency debts. As a result of interventions, mergers and consolidations, the group of 18 banks privatized reduced to 10 banks, only half of which remained under the control of the original shareholder.

### I.III.3.3 The Banking Crisis in Russia

The Banking crisis in Russia stemmed from institutional factors of corruption, managerial deficiencies, and unsuccessful privatization process but mainly due to problems related with system transition. Macro economically, the Russian crisis also shows resemblances to the Brazilian Banking crisis in terms of beaten inflation and the loss of main source of revenue. There was prevailing budget deficits and the decline in oil prices also created a terms of trade problem. The external shock from the Asian crises caused a flight of portfolio investments away from Russia as the majority of the government debt stock was at international investors. Russia is forced to devaluate ruble in 1998 and is faced with difficulties to service its debt. 200 out of almost 1600 banks failed. However, the Russian economy soon recovered as can be observed from the following table.

Table 1.16: The Economic Outlook of Russian Federation

| MACROECONOMIC INDICATORS               | 1999 | 2000 |
|--|------|------|
| Real GDP Growth (% annual)             | 3,2  | 6,5  |
| Inflation                              | 36,7 | 22   |
| Unemployment                           | 12   | 10   |
| Consolidated Fiscal Balance (% to GDP) | -2   | 0    |
| C/A (in Bio US\$)                      | 25   | 40   |
| Balance of Payments (% to GDP)         | 14   | 18   |

Source: OECD Economic Outlook, 2000, p.129

The analysis of the risk exposures of banks to crises in the developing countries shows that the developing country banks are exposed mainly to foreign exchange risk, interest rate risk, and the interrelated liquidity risk and balance sheet structure risks due to short-term capital inflows. The credit risk is evidenced mostly as the end result of problems in the banking sector in the developing countries rather than a factor causing banking crises itself. Market risk is not evidenced as a major risk exposure of banking crises in the developing countries, as derivatives are not widespread.



Operational risks are neither the major risk exposures of developing country banks to crises, as operational risks are associated more with stand alone bank (s) failure(s), whereas the banking crises in the developing countries show more of a systemic nature. The business risks due to institutional and domestic macroeconomic problems are the major risk exposures of banks for crises in the developing countries.<sup>17</sup> Event risks like banking crises risk due to being an EME also plays a role due to sudden outflows of short-term foreign currency inflows when there is a crisis in one of the EMEs. The table below illustrates the main risk exposures of developing countries banks to crises.

Table 1.17: Risk Exposures of Banks in the Developing Countries

| <b>Financial Risks</b>     | <b>Developing Country Crises</b> |
|----------------------------|----------------------------------|
| Balance Sheet Structure    | √                                |
| Income Statement Structure |                                  |
| Capital Adequacy           |                                  |
| Credit Risk                | √                                |
| Liquidity Risk             | √                                |
| Interest Rate Risk         | √                                |
| Market Risk                |                                  |
| Currency Risk              | √                                |
| <b>Operational Risks</b>   |                                  |
| Business Strategy Risk     |                                  |
| Internal Sys.& Oper. Risk  |                                  |
| Technology Risk            |                                  |
| Mismanagement& fraud       |                                  |
| <b>Business Risks</b>      |                                  |
| Legal Risks                | √                                |
| Policy Risks               | √                                |
| Financial Infrastructure   | √                                |
| Systemic (Country) Risk    | √                                |
| <b>Event Risks</b>         |                                  |
| Political Risks            |                                  |
| Contagion Risk             |                                  |
| Banking crisis risk        | √                                |
| Other exogenous risks      |                                  |

<sup>17</sup> As will be recalled from the preceding section, the empirical studies of the banking crises had spotted the institutional determinants and certain macroeconomic determinants of volatilities in interest rates, exchange rates, inflation, terms of trade and GDP growth as the major sources of systemic banking crises.

#### I.III.4. The Banking Crisis in Turkey

The Turkish Banking System lived through severe banking crises at end 2000-early 2001.<sup>18</sup> The 2000-2001 banking crises in Turkey are systemic banking crises that show parallel characteristics to other developing country banking crises. The Turkish banking crises is different from the banking problems in the EU as they are not systemic crises, as it is not possible to talk about an EU-wide banking problem and as the determinants of banking problems and risk exposures of banks in the EU are different than those of Turkey.

In December 1999, Turkey signed the 17th Stand-by Agreement with the IMF. The IMF programme of Turkey envisaged a drop in inflation with a foreign exchange anchor during which structural problems would be solved. The Stability Programme is designed to cease the prevailing instability in the Turkish economy in terms of high interest rates, high Public Sector Borrowing Requirement (PSBR), high inflation rate, high budget deficit that were the main macroeconomic deficiencies of the system. The stability programme had also intended to solve the institutional problems in terms of regulatory and supervisory frameworks and to create a more robust banking system in Turkey. Actually, the 17th Stand-by Agreement was signed as the total debt of the Turkish economy had grown to unsustainable levels as shown in table 1.18 below.

Table 1.18: Total Debt of Turkey (in Bio USD)

| Years | GDP   | Domestic Debt | External Debt | Total Debt | Total Debt/ GDP % |
|-------|-------|---------------|---------------|------------|-------------------|
| 1996  | 183,9 | 29,2          | 79,2          | 108,4      | 58,9              |
| 1997  | 196,9 | 30,6          | 84,2          | 114,8      | 58,3              |
| 1998  | 212   | 37,1          | 96,3          | 133,4      | 62,9              |
| 1999  | 190,8 | 42,4          | 102,9         | 145,3      | 76,1              |
| 2000  | 200,1 | 54,2          | 119,6         | 173,8      | 86,8              |
| 2001  | 148,1 | 84,8          | 115           | 199,8      | 134,9             |

Source: Uras, G., (2002), Milliyet dated 03/07/2002

Due to the quasi currency board regime of the IMF programme with fix Net Domestic Assets and no sterilization, and the fixed currency basket devaluation, the banks' short term foreign currency borrowings as shown in table 1.19 and consequent excess foreign exchange position openings with creative methods caused an increase in the liquidity of the TL.

<sup>18</sup> The Turkish banking system faced with other banking crises in 1994 and in 1997-1998 but the most severe one was the last crisis which will be analysed here.



Table 1.19: Short-term Borrowing to F.C Reserves

| DATES             | SHORT TERM BORROWING/ FC. RESERVES (%) |
|-------------------|--|
| 1999 IV.Quarter   | 1,01                                   |
| 2000 I. Quarter   | 1,08                                   |
| 2000 II. Quarter  | 1,02                                   |
| 2000 III. Quarter | 1,1                                    |
| 2000 IV.Quarter   | 1,44                                   |

Source: Uygur, E. (2001), Krizden Krize Turkiye, p.11

The TL liquidity helped the rates of Treasury auctions and inflation to drop sharply first but than very slowly. This caused an increase in the gap between the inflation and the fixed currency basket depreciation as is clearly evidenced in the following table

Table 1.20: Auction, Inflation, Currency Basket Depreciation

| Dates     | T/B Auction<br>Comp. Rates | CPI<br>Annual | WPI<br>Annual | WPI next year<br>Anticipation | WPI Antic.<br>year-end | Curr. yearly<br>% change |
|-----------|----------------------------|---------------|---------------|-------------------------------|------------------------|--------------------------|
| 1999 July | 101,4                      | 65            | 52,4          | 58,3                          | 59,8                   |                          |
| August    | 116,5                      | 65,4          | 53,7          | 60,2                          | 61,3                   |                          |
| September | 113,2                      | 64,3          | 54,4          | 60,5                          | 62,1                   |                          |
| October   | 109,3                      | 64,7          | 55,2          | 57,1                          | 61,3                   |                          |
| November  | 96,4                       | 64,6          | 56,3          | 53,4                          | 60,5                   |                          |
| December  | -                          | 68,8          | 62,9          | 44,1                          | 56,8                   | 19,9                     |
| 2000 Jan. | 38,3                       | 68,9          | 66,4          | 37,5                          | 38,9                   | 18,5                     |
| February  | 42,1                       | 69,7          | 67,5          | 38,6                          | 39,9                   | 17,1                     |
| March     | 39,9                       | 67,9          | 66,1          | 38                            | 40,7                   | 15,7                     |
| April     | 34,5                       | 63,8          | 61,5          | 36,3                          | 39,4                   | 14,8                     |
| May       | 39,4                       | 62,7          | 59,2          | 35,3                          | 38,9                   | 13,8                     |
| June      | 41,9                       | 58,6          | 56,8          | 34,9                          | 39,1                   | 12,8                     |
| July      | 34,5                       | 56,2          | 52,3          | 33                            | 37,8                   | 12,3                     |
| August    | 33,2                       | 53,2          | 48,9          | 34                            | 38,7                   | 11,8                     |
| September | 33,6                       | 49            | 43,9          | 32,2                          | 37,9                   | 11,4                     |
| October   | 38                         | 44,4          | 41,4          | 30,5                          | 37,2                   | 11,2                     |
| November  | 41                         | 43,8          | 39,1          | 29,9                          | 37,8                   | 11                       |
| December  |                            | 39            | 32,7          | 29,9                          | 37                     | 10,9                     |
| 2001 Jan. |                            | 35,9          | 28,3          | 27,1                          | 28,2                   | 10,7                     |

Source: Uygur, E. (2001), Krizden Krize Turkiye, p.6

The appreciation of TL created an increase in the C/A Deficit as shown in table 1.21 below.

Table 1.21: 12 Months C/A Deficit to F.C Reserves

| DATES     | C/A DEFICIT / F.C. RESERVES |
|-----------|-----------------------------|
| 1999 Dec. | 0,059                       |
| 2000 Jan. | 0,102                       |
| 2000 Feb. | 0,152                       |
| 2000 Mar. | 0,215                       |
| 2000 Apr. | 0,229                       |
| 2000 May  | 0,267                       |
| 2000 June | 0,277                       |
| 2000 July | 0,286                       |
| 2000 Aug. | 0,335                       |
| 2000 Sep. | 0,336                       |
| 2000 Oct. | 0,392                       |
| 2000 Nov. | 0,467                       |
| 2000 Dec. | 0,497                       |

Source: Uygur, E. (2001), Krizden Krize Turkiye, p.12

The shocking way the take-over of the weak banks carried out caused a confidence problem for the banks towards each other.<sup>19</sup> Banks started to cut lines to each other and some banks with very high leverages were badly squeezed to liquidity. On 22 November 2000, Turkish Markets started to live a liquidity crisis, which is interpreted as a speculative attack on foreign currency. The attack caused turbulences in the market as the CB was not capable of providing liquidity to the system due to the quasi currency board regime. The liquidity crisis did not turn into a deep financial crises due to increased over-night (O/N) interest rates, loss of CB Reserves and a 7.5 Billion US\$ of Supplemental Reserve Facility from IMF.

After the November 2000 crises, the Turkish economy continued with the crawling peg regime despite the second warning of IMF about the currency regime.<sup>20</sup> On the 19th of February 2001, a new speculative attack started due to a debate between the Prime Minister and the President. The O/N rates which jumped to 6200% levels and the loss of more than 5 Billion US\$ of reserves could not prevent the foreign exchange crisis this time. Other factors like international rating firms' immediate rate cuts also helped the extent of the crisis to exacerbate.

<sup>19</sup> In addition to T.Ticaret Bank, Interbank and Bank Ekspres, in December 1999 five more banks, namely Egebank, Yurtbank, Yasarbank, Esbank and Sümerbank are overtaken by the SDIF In October 2000, Banking Regulation and Supervision Agency (BRSA) decided the transfer of Etibank and Bank Kapital to SDIF and the banking permissions of Kibris Kredi Bank is invalidated.

<sup>20</sup> IMF had insisted on a devaluation before starting the programme at end 1999. IMF also asked for the crawling peg to be broadened before the envisaged date in order to ease the pressure on the currency but again the government insisted on not devaluing the currency.

On the 21st of February 2001, the 17th IMF programme ended and currency regime changed from crawling peg to floating exchange rate. The liquidity crises due to mismatches of maturities, the very high interest rates and the hit from the almost 100% depreciation of the domestic currency caused banks to be insolvent. A deep financial crisis followed suite with the liquidisation, closure and merger of more than 20 banks in Turkey. Deppler (2001) explains the crises with high PSBR, weak banking system, current account deficit, appreciation of TL, high interest and inflation rates.

The Turkish banking system had severe institutional problems and the banking system was already very weak before the onset of the crises. The explicit deposit insurance scheme since the 1994 banking crises had created moral hazard and adverse selection problems. There was corruption, lack of trust to politicians and authorities that were apparent with the risk premiums. There were deficiencies in accounting and disclosure frameworks. The regulatory framework was not capable of providing a consolidated auditing, risk management, corporate governance and effective supervision of banks. There were also problems with the implementation of legislation. Lax supervision created problems in terms of limiting the huge open positions of banks. The holding banking, connected lending were all widespread.

There was also heavy government involvement as can be seen from the following table about the loan and deposit shares of Turkish banks.<sup>21</sup> The share of State owned banks in loans amounted more than 30% of the overall lending in Turkey. The deposit share of State-owned banks was at the levels of 40% of the total deposits of Turkish banking system before the onset of the crisis. The State owned banks were funding the budget deficit of Turkey with 14 Billion USD of O/N funding due to the huge PSBR.

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<sup>21</sup> The number of State owned banks that were granting credits were 8 and that were collecting deposits were only 4 out of the 80 banks in the system by 2000.

Table 1.22: The Deposit and Loan Shares of Turkish Banks

| Years | LOANS |         |         | DEPOSITS |         |         |
|-------|-------|---------|---------|----------|---------|---------|
|       | State | Private | Foreign | State    | Private | Foreign |
| 1990  | 48.5  | 48.6    | 2,8     | 46.7     | 51.3    | 1,9     |
| 1991  | 49.0  | 47.3    | 3,5     | 46.2     | 51.7    | 1,9     |
| 1992  | 47.5  | 49.0    | 3,4     | 49.7     | 48.5    | 1,7     |
| 1993  | 39.6  | 57.1    | 3,1     | 43.5     | 54.8    | 1,5     |
| 1994  | 43.4  | 54.4    | 2       | 43.8     | 54.2    | 1,9     |
| 1995  | 44.0  | 53.7    | 2,1     | 43.2     | 54.0    | 2,7     |
| 1996  | 38.9  | 59.1    | 1,9     | 44.0     | 53.3    | 2,5     |
| 1997  | 37.7  | 59.2    | 2,9     | 39.8     | 56.7    | 3,4     |
| 1998  | 31,8  | 64.9    | 3,2     | 40.6     | 56.6    | 2,6     |
| 1999  | 31.4  | 65.3    | 3,1     | 39.7     | 57.4    | 2,7     |

Source: The Bankers Association, Banks in Turkey 1995,1999

The funding of PSBR has been the most important duty of not only the state owned banks but also the private banks since 1990s. The liabilities of banks were being channeled to finance the government debt as shown in the following table.

Table 1.23: Total Liabilities and Loans of Turkish Banks

| Years                | 1980 | 1990 | 2000 |
|----------------------|------|------|------|
| Liabilities (Bio \$) | 10   | 38   | 119  |
| Loans (Bio \$)       | 9    | 24   | 46   |

Source: Yildirim, A. (2002), Sabah, 12/12/2002

The banks were not granting loans to the private sector and there was crowding out as is comparatively shown in table 24.

Table 1.24: The Private Sector Loans to GDP

|         |      |
|---------|------|
| Japan   | 220% |
| U.S.A   | 140% |
| Germany | 135% |
| Turkey  | 8%   |

Source: Yildirim, A. (2002), Sabah, 12/12/2002

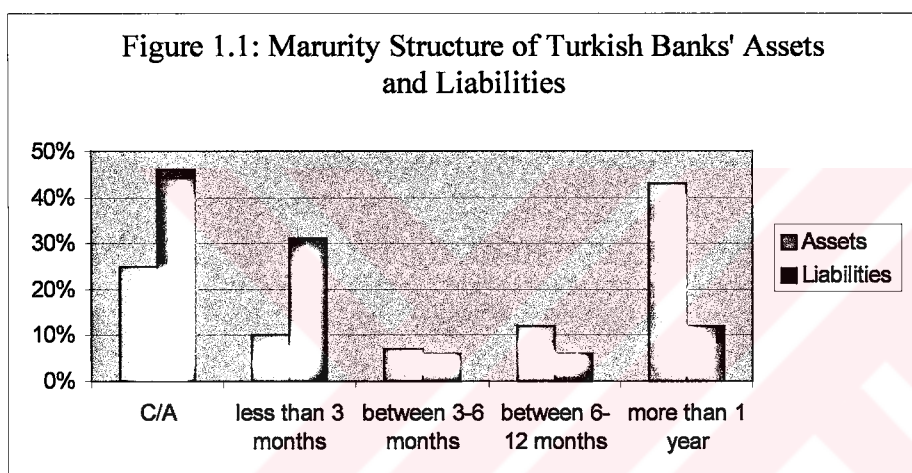
Due to the unsustainable level of PSBR, the rates of government borrowing were very high and maturities were very short termed as shown in table 25.

Table 1.25: The Rates and Duration of Domestic Debt

| Years | Average Annual Rate | Average Duration (days) |
|-------|---------------------|-------------------------|
| 1999  | 109,50%             | 479                     |
| 2000  | 38,10%              | 411                     |
| 2001  | 96,50%              | 147                     |

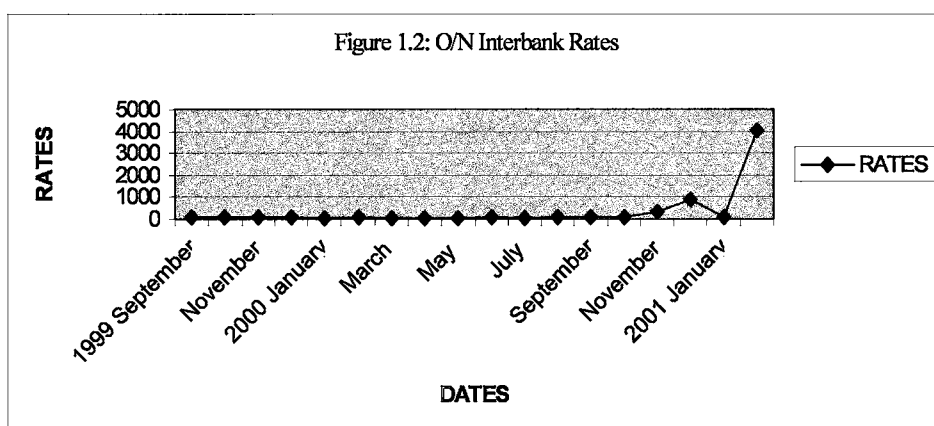
Source: Yildirim, A. (2002), Sabah, 12/12/2002

The banks' main job of funding PSBR created mismatches in the B/Ss of banks. The figure below demonstrates the maturity structure of Turkish Banks.



Source: Uyur, E. (2001), Krizden Krize Turkiye

The balance sheet mismatches of the Turkish banks caused liquidity problems because of the macroeconomic shocks in terms of increase in the interest rates as shown in figure 1.2, and due to a sudden currency depreciation of almost 100% due to the foreign exchange regime change from crawling peg to floating exchange rate regime.



Source: Central Bank of Turkey (2001)

The banks had huge government bond portfolios funded by short-term liabilities and huge non-hedged open foreign currency positions. Hence the interest rate rise hit the mismatched balance sheets and created funding losses as well as liquidity problems. The capital market portfolios (CMP) deteriorated due to changes in the yields of the CMP and the open positions caused banks to make huge foreign exchange losses. The shrink in the economic activity caused banks to have serious problems also in their loan portfolios. The equities of the already under capitalized Turkish banking sector eroded. The macroeconomic shocks and their effect on the Banking System are shown in figure 1.3.

Figure 1.3: 2000-2001 Crises

| Macroeconomic Shocks                                | The Effects on the Banking Sector                                    |
|---|--|
| Rapid and considerable increase in Interest Rates → | Maturity Mismatch → funding loss                                     |
| Rapid depreciation of TL →                          | Considerable Value loss of the CMPs Open Positions → Exchange losses |
| Slow-down in Economic Activity →                    | Asset Quality ↓<br>Credit Risk ↑<br>Result: Capital Erosion          |

Source: Pazarbaşıoğlu, C. (2003), Conference hosted by BRSA on May 2003

The existing institutional problems and microeconomic risk exposures of banks to macroeconomic volatility caused a deep financial crisis in the Turkish banking system when considerable volatility in interest rates and foreign exchange rates hit the banks. The Balance Sheet Structure, Interest Rate, Liquidity and Currency Risks due to the huge and rather longer-term capital markets portfolios funded by non-hedged open foreign currency positions and shorter termed liabilities were the main financial risk exposures of the Turkish banking system. Hence, the Turkish banking crises is similar to the banking crises experiences of the other developing countries in terms of predominance of business and macroeconomic risks and different from the individual banking distresses in a number of EU member states where the predominance of microeconomic risks in terms of credit, market and operational risks are observed.

To minimize the risk of banking crises, the microeconomic fragilities of banks and the structural weaknesses of the banking systems need to be strengthened. The microeconomic fragilities of banks can be strengthened by better managing, controlling and measuring these

risks. The structural deficiencies of the banking system can be corrected by strengthening the legal- accounting- disclosure frameworks; by decreasing political interference; by improving market infrastructure and incentive frameworks; and also by strengthening the broader operating environment of property rights, creditors' rights, and enforcement of laws. The International Regulatory and Supervisory framework designed by Bank for International Settlements (BIS) to minimize the risk of banking crises and the coverage of risks provided by the framework will be analyzed in the second chapter.





## **II. THE INTERNATIONAL PRUDENTIAL BANK REGULATION AND SUPERVISION FOR BANKING CRISES**

The international prudential regulation and supervision framework of the BCBS of BIS enforces rules for the strengthening of the banks and banking systems. In this chapter, the international framework of prudential bank regulation and supervision designed by the Basel Committee will be analyzed. The analysis will first focus on the effectiveness of the international regulatory and supervisory framework. Then, the risk exposures covered by the Basel Basel II and I frameworks will be scrutinized. The third section will center on the impact of the Basel frameworks on the developed and developing countries in general, and on the EU and Turkey in particular.

### **II.I. THE EFFECTIVENESS OF INTERNATIONAL PRUDENTIAL BANK REGULATION AND SUPERVISION FRAMEWORK**

In this section, the prudential bank regulation and supervision framework itself will be examined in terms of the alternatives, the efficiency and the success of harmonization of prudential bank regulation and supervision internationally.

#### **II.I.1. The Alternatives for Prudential Bank Regulation and Supervision**

Kirkpatrick and Brownbridge (1999) classify bank regulation into economic and prudential regulation. (p.3) Economic regulation such as controls on interest rates, foreign exchange transactions, capital flows have been dismantled with globalization, while prudential regulation increased. Conversely, some countries-Malaysia, Chile, Korea to name a few- has adopted restrictive policies to decrease the macroeconomic volatility associated with short-term, mismatched capital inflows.<sup>22</sup>

Proponents of the restrictive policies like Krugman (1999), Stiglitz (1998), Eatwell and Taylor (1998) point out to the destabilizing effects of short term capital flows, yet, controlling capital inflows decrease the risk of sudden capital outflows at the cost of stepping back from globalization and efficiency of resource allocation and it has not proved to immunize the system from crises.<sup>23</sup>

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<sup>22</sup> The major macroeconomic affects of short-term capital inflows are lending booms, interest rate and exchange rate volatilities, the last two due to sudden outflows.

<sup>23</sup> Edwards, S. claims (1998, p.2-3) that Chile had to stand more of macroeconomic volatility after the introduction of the restrictive regime of capital controls. The interest rates increased and the Central Bank lost



To achieve financial stability and prevent systemic risks, the alternative proposals for external prudential governance are those that rely heavily or fully on internal governance and market forces. Some critics, White (1993), Schwartz (1995) Daniellson (2001), question the need for regulation and supervision, whereas a totally non-statutory “free banking” system is advocated by some economists like Glasner (1995) Selgin (2000), White (2000)<sup>24</sup>. Free banking is a highly competitive system with private deposit insurance scheme and private clearinghouse and stands on the pillars of internal governance and market discipline instead of external governance.<sup>25</sup> However, the freer banking systems are associated with market failures like concentration of monopoly power and systemic crises due to information asymmetries and principle-agent problems.<sup>26</sup> Justification for the interference of prudential regulation and supervision to the free functioning of markets and the world-wide adaptation of the second-best policy alternative of external governance stem from these market failures associated with internal governance and market discipline.<sup>27</sup>

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15% international reserves to finance the short-term capital outflows. The East Asian crises also proved that Korea could not immunize herself from systemic banking crises with the controls on short-term inflows.

<sup>24</sup> Scottish banks in the 19th century operated as “free banks” with no restriction of government authorities and today a system quite close to free banking is operative in New Zealand with limited regulation and more reliance to market forces and corporate governance. New Zealand’s banking system is rated by Moody’s Investor Services as the third soundest banking system in the world.

<sup>25</sup> In the free banking model, internal governance strengthens the microeconomic fragilities of banks as owners with their capital at risk appoint fit and proper management who properly measure and manage risks. In case of internal governance failures, the private deposit insurance schemes, large bank creditors, other banks, markets, credit-rating agencies exert market discipline to force the bank either to correct its deficiencies or exit from the system.

<sup>26</sup> In the free banking model, internal governance strengthens the microeconomic fragilities of banks as owners with their capital at risk appoint fit and proper management who properly measure and manage risks. In case of internal governance failures, the private deposit insurance schemes, large bank creditors, other banks, markets, credit-rating agencies exert market discipline to force the bank either to correct its deficiencies or exit from the system.

<sup>27</sup> The public choice theory explanation for the non-existence of free banking today underlines the fact that demand for protection comes from bank owners for their self-interest (not from the customers) and supply for protection comes from the self-interested politicians, governors.

## II.I. 2 The Efficiency of Prudential Bank Regulation and Supervision

Incentive compatible prudential external governance exists to correct the market failures by reinforcing internal governance and market discipline. Lindgren et al (1996), Goldstein (1996), Kaufman (1996), Goodhart (2000), Mishkin (2000), -to site only a few- argue that prudential, incentive compatible regulatory and supervisory setting helps market disciplining mechanisms to work effectively for the internal governance of banks. Empirical evidence of a survey carried by Barth et al (2001b, pp.41) with the data from 107 countries' external governance frameworks also proves that external governance which "force accurate information disclosure, empower private sector monitoring of banks and foster incentives for private agents to exert corporate control work best to promote bank performance and stability." The objectives of such a statutory approach is to prevent systemic banking crises, to protect consumers and to achieve broader social objectives like preventing concentration of political and economic power.

Nevertheless, just like the market failures of internal governance and market discipline, the external governance may also fail. The ex-post regulatory and supervisory frameworks designed to correct market failures have sometimes become the root causes of banking sector problems.<sup>28</sup> Implicit or explicit deposit insurance schemes and lender of last resort facilities prevent systemic risk today at the cost of new financial instabilities in the future due to adverse selection and moral hazard problems they create.<sup>29</sup> Such failures of ex-post external governance cause a vicious circle of regulations. Regulatory initiatives like deposit insurance and lender of last resort facilities that distort the banks' incentives towards risk, necessitate regulatory responses like capital requirements and supervision of institutions to ensure that robust risk management strategies are established. Also, the exploitation of regulatory loopholes necessitates the design of smarter regulatory initiatives each time.

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<sup>28</sup> Maehara (1995, pp.154-155) classifies policy options as ex-ante and ex-post. "Ex-ante prudential policy includes portfolio regulations such as capital standards and supervision. It aims at laying the foundation for prudent management of financial institutions and preventing the emergence of systemic risks. Ex-post prudential policy, such as the deposit insurance system and the lender-of-last-resort function of a central bank, primarily attempts to deal with systemic problems once they occur."

<sup>29</sup> Government safety nets like deposit insurance and lender of last resort facilities create adverse selection problems because depositors will have no incentive to monitor their banks and will prefer the banks that offer the highest return. Government safety nets also create moral hazard problems as they encourage excessive risk taking at the cost of the government and taxpayers. Turkey stands as a good example of how a long lasting mispriced deposit insurance scheme created moral hazard and adverse selection problems and weakened the banking system.

As Herring and Litan (1995, pp.4) put it “markets are dynamic and present a moving target for policymakers”. Hence, ex-ante regulation also runs the risks of lagging behind the market developments; discouraging changes in markets; being too lax, too intrusive, quasi fiscal rather than prudential, wrongly designed, inadequately implemented, and open to regulatory arbitrage. Supervision, on the other hand, tends to focus on formalities rather than on actual risk and does not generally foster the development of new activities and management of risks, as they are not updated often enough. Poor supervision, forbearance, wait and see policies, weak enforcement of regulations, and policies of protecting rather than disciplining also stand as examples of supervisory failures.

Heavy reliance on regulation may also weaken the incentive structure and cause systemic crises.<sup>30</sup> Barth et al (2001a) also proves that in most of the countries, the government pursues a strong grabbing hand approach -rather than a holding hand approach -that is not positively associated with easing market failures and increasing stability but more so with corruption.

To correct the failures of external governance, many proposals have been forwarded. To cite only a few, narrow banking (Herring and Litan 1995), replacement of subordinate-debt with demand deposit (Calomiris 1998), cross-guarantee schemes (Daniellson 2001), introduction of a Global Super Regulator (Eatwell and Taylor 1998), reallocation of authority to solve the problems associated with safety nets (White 2000), an accentuated role to IMF in resolving the liquidity problems without creating moral hazard (Calomiris 1998) have all been proposed but none has yet been incorporated to external governance framework.<sup>31</sup> Nevertheless, an international external governance framework has been created to level play the field with harmonized standards and to prevent the internationally destabilizing effects of national financial failures.

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<sup>30</sup> Demirguc & Detragiache (1997) empirically show the correlation between regulation and banking crises, while Barth et al (2000) empirically prove that the more restrictive the bank regulation, the greater is the likelihood for banking crises.

<sup>31</sup> The narrow bank proposal suggests that a narrow class of deposits are covered by extremely safe and liquid assets and safety nets, whereas the market would discipline all other activities of banks. Subordinated debt proposal is a means of increasing market discipline and supervisory discipline in which the interest spread (risk premium) on a required minimum amount of subordinated debt (that can not be called like demand deposit but has to be rolled over at short intervals) is used as an indicator of the solvency of the bank.

### **II.1.3 The Harmonization of Prudential Bank Regulation and Supervision**

Harmonization of standards globally for the regulation and supervision of banks is hard in the presence of the already discussed differences in the microeconomic and institutional structures of banking systems and macroeconomic stances of countries.

In the developed world, the Basel Committee initiatives are enforceable in G-10 on a consolidated basis. The international regulatory and supervisory system is based on home country supervision with the initiatives from the Basel Committee and support from IMF and the WB. Besides the international efforts for the harmonization of Prudential Bank Regulation and Supervision by G-10, a closely parallel effort to harmonize the regulatory and supervisory framework is also observed in the EU. The EU initiative is closely parallel to BCBS initiative as nine EU Member States are represented in the Basel Committee and European Commission participates to Basel Committee meetings as observer.<sup>32</sup> The EU legislation is designed to harmonize the standards between member states of the union and it is overlapping with the Basel Process.<sup>33</sup>

The harmonization of banking standards for countries with similar microeconomic, macroeconomic and institutional settings is more efficient but still has some problems. As Llewellyn (2000, pp.192) puts it, “the optimum mix of the components of the regime will vary between countries, over time for all countries, and between banks” The differences in deposit insurance premiums, bank reserve requirements, tax rates, bankruptcy laws; rapidly changing market practices, the slowness of internationally negotiated regulations and the non-existence of an internationally recognized supervisor are prone to create problems for level playing the field. Also there is the risk of procyclicality of regulations due to failures in terms of validity of the approach and adequacy of coverage of risks.<sup>34</sup>

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<sup>32</sup> The EU countries that are represented in the Basel Committee are namely Belgium, France, Germany, Italy, Luxembourg, the Netherlands, Spain, Sweden and the United Kingdom.

<sup>33</sup> The Basel Committee initiatives, after negotiations and modifications for EU, become EU Directives and are adapted by the EU member states.

<sup>34</sup> The concerns regarding the capital adequacy calculations, the enhanced homogeneity and the neglect for endogeneity of risks envisaged by the non-robust VaR models, the incentive structure regarding the regulators and Rating Agencies, the menu of regulatory options that may lead to regulatory arbitrage are only some of the topics that will be discussed under this heading.

In the developing world, on the other hand, more than 100 countries implement the internationally harmonized standards today. For these countries, the harmonization of standards is good as some of the countries adopt at least the minimum standards. However, exporting the “best” practices sometimes poses new problems for countries that are at different structural stances. “Prioritization of standards for implementation must necessarily vary from economy to economy, taking into consideration their current status in observance of standards, economic circumstances, financial structures, legal and institutional frameworks, and policy priorities. A balance needs to be struck between international and domestic considerations”<sup>35</sup>

The strengthening of the institutions, the markets and the infrastructure for better compatibility to shocks by the second best policy option of external governance, despite its market failures, is however a prerequisite for the developing world since they are more prone to macroeconomic volatility, less able to self-govern and threat more the global systemic stability. However, if the international regulatory and supervisory framework is designed by taking into consideration the banking risk exposures of the developed countries and if the developing countries adopt the framework without taking into consideration neither the domestic nor the developing country risk exposures of banks, then the effectiveness of harmonization of the standards becomes questionable.

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<sup>35</sup> See Reddy (2001,p.5) for the quote from Sheng, A. (2000)

## **II.II. THE INTERNATIONAL REGULATORY AND SUPERVISORY FRAMEWORK**

In this section, the international regulatory and supervisory framework will be examined. First, the evolution of the international regulatory and supervisory framework will be analyzed. Secondly, the risk exposure spectrum of the Basel framework will be dissected. Then, the international regulatory and supervisory framework will be scrutinized in terms of each single risk exposure covered by the Basel Frameworks.

### **II.II.1 The Evolution of the International Regulatory and Supervisory Framework**

The BCBS is set up by the Central Bank governors of G-10 (plus Luxemburg and Switzerland) in 1974 and plays a leading role in international efforts towards supervisory cooperation and regulatory harmonization.

In 1988, due to the complaints of unfair competition and concerns regarding the financial health of international banks, after the failure of Herstatt Bank, the BCBS led the development of a risk-based capital standard for the internationally active banks of G-10. The purpose of the Basel Capital Adequacy Accord (CAA) was to strengthen the soundness and stability of international banks and to create a level playing field for bank capital in the international banking system. The Accord, that was supported mainly by European and North American banks, has been phased in by 1993 and became a world standard in a short period of time.<sup>36</sup>

The 1988 Basel CAA brought uniformity to the disclosure of financial conditions of banks, converged the international capital standards and improved capital ratios of banks especially in the developing world. However, the setbacks of the Accord coupled with financial innovation led in time to regulatory capital arbitrage, erosion in its effectiveness and last but not least it could not prevent the banking crises particularly in the developing countries. Hence, The 1988 Capital Accord could not achieve its main and stated goal of more stable

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<sup>36</sup> Herring and Litan (1995, pp.108-109) assert that “Banks in Europe and North America initially were very supportive of the Basel efforts to harmonise bank capital rules since they viewed them primarily as a way to constrain the growth of Japanese banks, which Japanese regulators allowed to operate with greater leverage than other banks”



financial system. Besides academicians and market professionals, the Basel Committee has also identified the setbacks concerning the one-size-fits-all approach of the 1988 CAA and the need for more incentive based approaches. Consequently, supplementary rules have first been proposed.<sup>37</sup> In 1994, the amendment for netting is finalized which ensures that the claims and obligations are set off against each other when the counter parties are the same. In 1995, the conversion of other derivative instruments is introduced for capital adequacy assessment.<sup>38</sup> Despite these revisions in the accord, financial innovation, the growth of derivative markets and derivatives disasters in the developed countries, as in the case of Barings Bank, necessitated that the authorities amend the Accord in 1996, (effective January 1, 1998) to take a better and separate account of market risk besides the credit risk.

As the analysis in the first chapter also proved, the banking crises in the developed countries were mainly due to credit, and since 1990s market risk exposures of banks. However, after the East Asian Banking crises, which showed that the banking crises in the developing countries may erupt despite high capital adequacy ratios, a major supplement of “The Core Principles for Effective Banking Supervision” is issued by BCBS in 1997.

The Basel Committee started communicating with the industry in 1999 for a new capital adequacy framework, due mainly to the discrepancies regarding the measurement of credit risk of the existing framework and the need for the inclusion of operational risk. BCBS assumes to finalize the “New Basel Capital Accord” (Basel II) by mid- 2004. The debate between the BCBS and the industry is carried through consultative papers (CP), quantitative impact studies (QIS), comments and consequent modifications.<sup>39</sup> Basel II, once finalized will

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<sup>37</sup> “The Supervisory Recognition of Netting for Capital Adequacy Purposes”, “The Prudential Supervision of Netting, Market Risks, and Interest Rate Risks”, and “Measurement of Banks’ Exposure to Interest Rate Risk”

<sup>38</sup> Multiplication Factors for Derivative Instruments

| Residual Maturity | Interest Rate | Exchange Rate and Gold | Equities | Gold |
|-------------------|---------------|------------------------|----------|------|
| 1 year or less    | 0.0           | 1                      | 6        | 10   |
| 1 to 5 years      | 0.5           | 8                      | 7        | 12   |
| More than 5 years | 1.5           | 10                     | 8        | 15   |

<sup>39</sup> Basel Committee issued the first consultative paper “A New Capital Adequacy Framework” in 1999. In 2001 the Committee released a second consultative paper “The New Basel Capital Accord”-BCBS (2001a), BIS (2001a)- which is referred to as Basel II. The next consultative paper is issued on July 2002, which then is followed by a new one in spring 2003.

replace the 1988 Basel CAA (Basel I) and is assumed to start being implemented by the G-10 at year-end 2006 and then progressively by the developing countries.<sup>40</sup>

### II.II.2. The Risk Exposure Spectrum of the Basel Frameworks

The Basel framework protects banks from risks by assigning capital charges for risk exposures. The adequacy of capital is important as it serves as a cushion against a fall in the value of bank's assets and losses, absorbs future unidentified losses, and provides incentive to refrain from excessive risk taking. Capital also plays a critical role on the soundness and governance of banks and also as described by Santos (2000, pp.22) "...can be used to define the threshold for the transfer of control from shareholders to the regulators."

Basel I brought capital requirements to credit risk, as at the époque credit risk was considered as the main reason for banking crisis. A major amendment to the Accord is made in 1996 with the aim of specifying separate capital requirements for market risk.

Table 2.1: Capital Adequacy Calculation in Basel I

|   |
|---|
| $\frac{\text{Total Capital}}{\text{Credit Risk} + \text{Market Risk}} \geq 8\%$ |
|---|

The existing Basel I framework, as shown in table 2.2 provides options for the calculation of capital adequacy to protect the banks against credit and market risks.

Table 2.2: Available Options for Calculation of Risks in Basel I

| Risk   | Choice    | Calculation Method       |
|--------|-----------|--------------------------|
| Credit | No choice | Standard Approach        |
| Market | Simple    | Standard Approach        |
| Market | Advanced  | Internal Models Approach |

<sup>40</sup> Basel II will also be implemented on a progressive basis by the developed countries. In 2007, the floor on overall capital requirements will not be allowed to fall below 90% of the existing capital adequacy requirement of the Basel I framework (for institutions using advanced approach to measure risk). The floor on overall capital requirements will be 80% of the existing capital adequacy requirement of Basel I by 2008.



The minimum capital requirement of a bank is calculated by summing arithmetically the credit risk requirement plus the capital charges for market risk, derived from the models approach or standard approach or a mixture of the two. <sup>41</sup>

The New Basel Capital Accord proposal stands on three mutually reinforcing pillars. Pillar one covers on a consolidated basis, regulatory capital requirements for credit risk, market risk and operational risk. This first pillar is designed to improve capital adequacy regulation for credit risk, and to specify capital regulations for operational risk, while capital charges for market risk stay the same as in the Basel I framework. Asset securitization is also dealt with under the first pillar. The other two pillars of the new Accord consist of Supervisory Review Process, in which interest rate risk is also handled, and Market Discipline. These second and third pillars of Basel II are designed to cope with the business risks, albeit without defining any corresponding capital charges. The risks incorporated in the Capital Adequacy Calculation of Basel II are demonstrated in table 2.3.

Table 2.3: Capital Adequacy Calculation in Basel II

|   |
|---|
| $\frac{\text{Total Capital}}{\text{Credit Risk} + \text{Market Risk} + \text{Operational Risk}} \geq 8\%$ |
|---|

Basel II, compared with Basel I's one-size-fits-all broad brush structure that focuses only on credit risk, is more risk-sensitive, bases regulatory credit risk capital requirements relatively more in line with the economic capital, includes incentives for better risk management, and offers a flexible menu of approaches as illustrated in table 2.4.

Table 2.4: Available Options for Calculation of Risks in Basel II

| Choice       | Credit Risk                                | Market Risk              | Operational Risk     |
|--------------|--|--------------------------|----------------------|
| Simple       | Standardized Approach                      | Standardized Approach    | Basic Indicator      |
| Intermediate | Foundation Internal Ratings Based Approach |                          | Standardized         |
| Advanced     | Advanced Internal Ratings Based Approach   | Internal Models Approach | Internal Measurement |

<sup>41</sup> For the calculation of capital requirements for credit and market risks, the measure of market risk is to be multiplied by 12.5 (the reciprocal of 8% capital ratio) and added to the sum of risk-weighted assets. The distribution of the available Tier 1,2 and 3 capital are carried thereafter according to the amount of capital needed, where Tier 3 capital may not exceed 250% of Tier 1 capital. The Capital Ratio of a bank can thus be calculated as: Capital Ratio=Eligible Capital (excluding unused T3) / Total Risk Assets

Now, the Basel frameworks will be analyzed in terms of each single risk exposure covered.

### **II.II.3. The Credit Risk Coverage of the Basel Frameworks**

The credit risk exposure of banks has been the first concern of International Regulatory and Supervisory framework. The main reason behind this initiative, as already mentioned, was that after liberalization of markets, credit risk was detected as the main culprit of bank problems in the developed countries by late 1980s. The aim of the Basel I framework was to safeguard the credit risk exposures of banks by assigning capital adequacy requirements for credit risk. Basel II proposal redefines credit risk coverage of the framework.

#### **II.II.3.1. The Standard Approach of Basel I for Credit Risk**

Basel I assigned capital adequacy requirements for credit risk exposures of banks for both 'on' and 'off' balance sheet items. A further aspect of credit risk is counter party risk and the accord has a preferential treatment for countries that are full members of OECD or countries that have concluded special lending arrangement with the IMF, associated with the Fund's General Arrangements to Borrow.<sup>42</sup>

In order for the banks to have adequate capital consistent with the credit risk profile of the bank, risk weights are assigned for bank assets and off balance sheet items. Assets and off - balance sheet items are classified into four risk buckets of 0%, 20%, 50% and 100% and weighted by the buckets' risk weight, whereas contingent liabilities are first converted into a credit equivalent and then weighted by the appropriate risk weight. Also, a minimum 8% capital adequacy ratio is assigned for the riskiest assets.

As demonstrated in tables 2.5 and 2.6 below, the banks are required to maintain minimum total capital ratio of 8% of a basket of risk adjusted assets, with at least 4% met by Tier I capital (core capital), and Tier II capital (supplementary capital) is limited to 100% of Tier I

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<sup>42</sup> Under Basel I, the potential losses due to credit risk are valued according to the book value accounting rather than the market value. The Accord treats credit risk on a consolidated basis. Hence, investments in unconsolidated banking and financial subsidiary companies are deducted from capital and investments in the capital of other banks and financial institutions are deducted from capital at the discretion of national authorities.

capital. The minimum capital adequacy requirement for banks is thus calculated by multiplying the Risk-Weighted Total Assets (RWTA) with 8%. However, it is at the discretion of the individual countries to set a higher capital adequacy requirement than 8% or to adjust the risk weights.

Table 2.5: Basel Capital Adequacy Accord: Tier 1 and Tier 2 Capital

| Capital measure | Components   | Recommended ratio                                  |
|-----------------|--|--|
| Tier 1          | Paid-up capital (common stock) and disclosed reserves  | At least 4%  |
| Tier 2          | Undisclosed, revaluation, and general loan-loss reserves; subordinated debt; and hybrid debt instruments | Limited to 100% of tier 1 capital                  |
| Total capital   | Tier 1 plus tier 2 (where tier 1 can range from 50% to 100% of the total)                                | At least 8% of which at least 4% is tier 1 capital |

Source: Lindgren, Garcia and Saal, (1996) p.188-189

Table 2.6: Basel Capital Adequacy Accord: Risk Weights <sup>43</sup>

| Assets included  | Risk category | Risk weight (percent) |
|--|---------------|-----------------------|
| <u>Balance Sheet items:</u>                                  |               |                       |
| Cash and loans to governments and Central Banks              | 1             | 0                     |
| Claims on public sector entities                             | 2             | 10                    |
| Claims on OECD banks   | 3             | 20                    |
| Loans secured by mortgages on residential property           | 4             | 50                    |
| All other assets, including commercial loans                 | 5             | 100                   |
| <u>Off-balance-sheet items:</u>                              |               |                       |
| Each off-balance-sheet item is scaled by a conversion factor | 6             | Applicable weight     |

Source: Lindgren, Garcia and Saal, (1996), p.188-189

<sup>43</sup> Subordinated Debt is limited to 50% of Tier I Capital; General Provisions/ general loan loss reserves is limited to 1.25%, exceptionally 2% of risk assets; for Asset revaluation reserves latent gains on unrealised securities will be subject to a discount of 55%. For a more comprehensive and detailed understanding, see Annex I, Annex II BIS (1988), BIS (1998)

### **II.II.3.2. The Basel II framework for Credit Risk**

The definition and composition of regulatory capital (Tier1, Tier 2), the minimum capital requirement (8%) and the system of minimum ratios to risk-weighted assets stay the same under Basel II.<sup>44</sup> However, the measurement of risks of the risk-weighted assets has changed and became more risk -sensitive. To determine the regulatory capital requirements for credit risk, the flexible Basel II framework offers three possibilities: The Standard Approach, the ‘Foundation’ Internal Ratings- Based (IRB) Approach and the ‘Advanced’ Internal Ratings- Based Approach (IRBA).

#### **II.II.3.2.i. The Standardized Approach of Basel II for Credit Risk**

The Standardized Approach of Basel II is a revised version of the Standardized Approach of Basel I with wider range of risk weights linked to external rating. In Basel I, risk weights were related with the location and type of borrower, whereas in the Standardized Approach of Basel II, the OECD/non-OECD distinction is abandoned and risk weights are based on external credit assessment of eligible External Credit Assessment Institutions (ECAIs) or Export Credit Agencies (ECAs).<sup>45</sup>

Under Base II, a greater risk differentiation is introduced to the Standardized Approach through the diversification of banks’ exposures to sovereigns, to banks and to corporates.<sup>46</sup>

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<sup>44</sup> In terms of the minimum total capital ratio, the denominator under the new Basel Accord is the total of the risk-weighted assets for credit risk and 12.5 times the sum of the capital charges for market and operational risk.

<sup>45</sup> Jones (2001,pp.7) explains that “t[T]he eligibility criteria for ECAIs in order to be recognised by national supervisors are: Objectivity - The existence of an established and tried assessment methodology and credit assessments to be rigorous, systematic, and subject to some form of validation based on historical experience. Independence - ECAIs not to be subject to political or economic pressure. International Access/Transparency – The methodology and the assessments should be freely available. Disclosure - ECAIs to disclose qualitative and quantitative information. Resources - ECAIs should have sufficient resources to carry out assessments. Credibility - Will, in part, be derived from 1-5, above.”

<sup>46</sup> Public Sector Entities (PSEs) will either be treated as banks or sovereigns according to in whose jurisdictions the PSEs are established. Multilateral Development Banks will be treated as bank claims but under option 2. Risk weights for Securities firms will be treated as claims on banks if they are subject to supervisory and regulatory control under the new capital adequacy framework. Insurance companies will be treated as corporate

Also the range of risk buckets for corporate claims has increased from 100% to a range between 50%-150% to increase risk sensitivity. 'The sovereign floor' of Basel I is abandoned with Basel II which will be to the benefit of highly rated banks and corporates in low rated countries. The incentives for short-term lending has been relatively reduced in Basel II, but still a preferential risk weight one category more favorable is applied for banks rated minimum BBB- if the original maturity of the claim is up to three months, including the domestic interbank exposures. Basel II Standardized Approach is more detailed than the Basel I framework in many areas like netting, incorporation of granularity, concentration of counter party risk etc.<sup>47</sup>

To calculate the regulatory capital requirement for credit risk under the Standardized Approach, the risk weight that corresponds to the ECAI's (or supplemented by ECA's) assessment of the borrowers' rating is mapped by the supervisors into the standardized risk buckets and then multiplied by the 8% minimum capital requirement. The risk weights according to external ratings of sovereigns, banks and corporates are shown in table 2.7.

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for risk weighting. Also risk weights for Retail Assets, Claims Secured by Residential Property will be (50%), Claims Secured on Commercial Real Estate (100%), Higher Risk Categories- in terms of unsecured portion of past due assets, if deemed necessary venture capital and private equity investments (150%), Other Assets (100%), for Off-Balance Sheet items the current framework will be retained with a few exceptions in terms of Over the Counter (OTC) derivatives, short-term commitments (20%), guaranteed repo-style transactions (100%).

<sup>47</sup> Under Basel II, on- balance-sheet netting is limited to the netting of loans and deposits to a single counter party. For guarantees and credit derivatives, the substitution approach of Basel I hold for Basel II, but an additional capital floor is applied excluding only the guarantees provided by sovereigns and banks. Also, capital requirements will apply to residual risks for maturity or currency mismatches. Basel II is designed to cope with the existing problems like exposures of Asset Securitisation for which a standardised approach and an IRBA are defined. Basel II also introduces incentive compatible standards to the regulatory regime through granularity. Concentration of counter party risk is also incorporated in the IRB approach by means of a supervisory capital adjustment (up or down) applied to the total risk weighted- assets after comparing with the granularity of a reference portfolio.

Table 2.7: Risk Weights Under the Standardized Approach

|                            |            |          |              |           |          |         |
|----------------------------|------------|----------|--------------|-----------|----------|---------|
| Sovereign creditworthiness | AAA to AA- | A+ to A- | BBB+ to BBB- | BB+ to B- | Under B- | Unrated |
| Risk-Weights               | 0%         | 20%      | 50%          | 100%      | 150%     | 100%    |

|                                     |            |          |              |           |          |         |
|-------------------------------------|------------|----------|--------------|-----------|----------|---------|
| External credit assessment of banks | AAA to AA- | A+ to A- | BBB+ to BBB- | BB+ to B- | Below B- | Unrated |
| Risk Weights <sup>48</sup>          | 20%        | 50%      | 50%          | 100%      | 150%     | 50%     |
| Risk Weights for Short-term claims  | 20%        | 20%      | 20%          | 50%       | 150%     | 20%     |

|                   |            |          |             |           |         |
|-------------------|------------|----------|-------------|-----------|---------|
| Credit Assessment | AAA to AA- | A+ to A- | BBB+ to BB- | Below BB- | Unrated |
| Risk Weights      | 20%        | 50%      | 100%        | 150%      | 100%    |

Source: BCBS, (2001c) Consultative Document: The Standardized Approach to Credit Risk, Supporting Document to the New Basel Capital Accord, p.8-12

### II.II.3.2.ii. Internal Ratings –Based Approaches of Basel II for Credit Risk

The IRB approach, as defined by BCBS (2001d) allows banks to use their own internal risk assessments to derive regulatory capital charges for credit risk, based on their own risk profiles. Banks are encouraged to use their own internal models for the computation of Value at Risk (VaR) and Minimum Capital Requirements (MCR) with the idea that banks are better informed about their risks than regulators. Foundation and Advanced IRB Approaches reward the low-risk portfolios with a lower capital requirement.

Internationally active banks with above-average risk profile and involved in complex risk transfers are expected to start with the implementation of the IRB Approach and others progressively. In the IRB Approach, banks will categorize their assets into six classes where corporate, bank and sovereign exposures are treated similar, and a separate framework is

<sup>48</sup> An optionality is introduced for supervisors in assigning risk weights to bank lending. Consequently, either the ECAI assessment for the bank will be used or all banks in a given country will be applied a one category less weight than that of the sovereign's with the maximum risk weight of 100% excluding banks in below B-rated countries where the risk weight will be equal to 150%.



applied for retail, project finance and equity exposures.<sup>49</sup> For each exposure class, three main elements, that of risk components, a risk weight function and a set of minimum requirements must be met for a bank to be eligible for IRB treatment.<sup>50</sup>

The risk components of credit risk to corporate, sovereign and bank exposures are probability of default (PD) of the borrower according to the rating grade, loss given the default of the borrower (LGD) and exposure at default (EAD). In the IRB Approach, the regulatory risk weights are derived from the above mentioned risk components of PD, LGD, EAD and in some cases Maturity (M) depending on risk grades. The data input methods of the Foundation and Advanced IRB Approaches are summarized in table 2.8.<sup>51</sup>

**Table 2.8: Data Inputs of the Foundation and Advanced IRB Approaches**

| <b>Data Input</b>           | <b>Foundation IRB</b>  | <b>Advanced IRB</b>  |
|-----------------------------|--|--|
| Probability of default (PD) | Provided by banks based on own estimates   | Provided by banks based on own estimates   |
| Loss given default (LGD)    | Supervisory values set by the Committee  | Provided by banks based on own estimates   |
| Exposure at default (LGD)   | Supervisory values set by the Committee  | Provided by banks based on own estimates   |
| Maturity (M)                | Supervisory values set by the Committee<br>Or<br>At national discretion, provided by bank based on own estimate( with an allowance to exclude certain exposures) | Provided by banks based on own estimates<br>(with an allowance to exclude certain exposures) |

Source: BCBS, (2003a) Consultative Document, Overview of the New Basel Capital Accord, p.5

<sup>49</sup> Retail loans include credit cards, installment loans, revolving credits, residential mortgages and small business facilities.

<sup>50</sup> The broadly categorised minimum requirements for the foundation IRBA are: a) Meaningful differentiation of credit risk b) Completeness and integrity of rating assignment c) Oversight of the rating system and processes d) Criteria of rating system e) Estimation of PD f) Data collection and IT systems g) Use of internal ratings h) Internal validation i) Disclosure requirements j) Minimum requirements for supervisory estimates of LGD and EAD

<sup>51</sup> In the Foundation IRB approach, PD is determined by institutions as a result of internal rating process. The Benchmark risk weight (BRW) is then derived through feeding PD data into the formula determined by supervisors. LGD values are set by supervisory rules. EAD is determined by supervisors using the credit conversion factors provided in the standardized approach with the exception of indrawn commitments. Risk weights depending on the remaining maturity (M) is also determined by supervisors for corporates, banks and sovereigns, but there is a right of choice between 3 years or 1-7 years. In the foundation IRB approach, the length of the underlying historical observation period used must be at least 5 years. In the Advanced IRB approach, in addition to calculating PD, the bank can estimate the LGD of an exposure though with more rigid minimum requirements and internal estimates of EAD are used. BRW is calculated in the same way as in the foundation approach. Supervisors determine maturity and 1-7 years is mandatory. For LGD and EAD estimates, minimum data observation period is 7 years.

Basel II defines a broader collateral category for risk mitigation techniques that are shown in the following table.<sup>52</sup>

Table 2.9: Available Options for the Calculation of Credit Risk

| Choice       | Risk Calculation                           | Mitigation Technique   |
|--------------|--|------------------------|
| Simple       | Standardized Approach                      | Simple                 |
| Intermediate | Foundation Internal Ratings Based Approach | Comprehensive          |
| Advanced     | Advanced Internal Ratings Based Approach   | Institution Calculated |

Under the foundation IRBA, credit risk mitigation factors are treated broadly, whereas the advanced IRBA supplies a wider range of collateral.<sup>53</sup>

Table 2.10: Credit Risk Mitigation Techniques

| Simple Approach                                       | Comprehensive Approach   | Institution Calculated                                       |
|---|--|--|
| <i>Standardized Approach only</i>                     | <i>Standardized and IRB foundation Approach</i>  | <i>IRB Advanced Approach only</i>                            |
| <u>Collateral:</u>                                    | <u>Collateral for Standardized Approach:</u>   | <u>Collateral:</u>   |
| Cash on deposits                                      | Same as Simple Approach+ Equities not included in a main index but traded on a recognized exchange   | No restrictions  |
| Minimum BB- Securities issued by sovereigns, PSEs     |  |  |
| Minimum BBB- Securities issued by firms,banks,corpor. | <u>Collateral for IRB Approach:</u><br>Same as Comprehensive Approach+ different recognition of physical collateral (residential and commercial real estate) |  |
| Equities in main index                                | <u>Guarantees and Credit Derivatives:</u><br>Sovereign entities and other PSEs with a lower risk weight than the obligor.                                    | <u>Guarantees and Credit Derivatives:</u><br>No restrictions |
| Gold  | Banks with a lower risk weight than the Obligor  |  |
| Non-rated bonds under certain conditions              | Corporates rated A or better<br>Non-rated corporates with a PD of A and above (IRB foundation only)  |  |

Source: Derived from Aksel, K. (2002) Price Waterhouse Coopers

<sup>52</sup> For risk mitigation techniques, the Standardised Approach defines a broader collateral category including cash specific debt securities of sovereigns, PSEs, banks, securities firms and corporates; certain equity securities traded on recognised exchanges: certain Undertakings for Collective Investment in Transferable Securities and units in mutual funds; and gold. For collateralised transactions, the Comprehensive Approach takes account of the possible changes in the value of collateral and its exposure by introducing the use of a two-fold haircut system-standard supervisory haircuts and the other based on the banks' own estimation of the collateral volatility-. The Simple Approach for collateral that requires higher capital uses the substitution approach of Basel I where the definition of collateral is narrower and where there are more operational requirements.

<sup>53</sup> For statistical and explanatory details of the treatment of Credit Risk Mitigation Techniques under Standard Approach, see BCBS (2001c)



#### **II.II.4. The Market Risk Coverage of the Basel Frameworks**

The second risk exposure recognized as a culprit of banking problems in the developed world is the market risk exposure. The innovativeness in the markets after the liberalization by early 1980s started to cause problems for the banks by the end of the decade due to improper use of derivatives. Hence, as already mentioned, the Basel I framework is amended to incorporate the market risk in 1996, and the regulations for market risk stay the same under the Basel II framework with the exception of a few changes in the definitions.

The regulation for Market Risk measurement requires banks to set aside capital for the risk of losses arising from market price movements of the “on” and “off” B/S trading positions (marked to market, and consolidated) of interest rate related instruments, equities, foreign exchange, commodities and options. Banks with trading activities greater than 10% of their total assets or with trading activities greater than \$ 1 billion are obliged to hold capital against their market risk exposures. The Market Risk regulation defines an additional tier 3 capital consisting of short-term subordinated debt (subject to certain conditions) solely for the market risks.<sup>54</sup> The regulation for the measurement of market risk to determine the regulatory capital charge allows banks to use internal models based or standard approach or a combination of the two.

##### **II.II.4.1 The Standard Approach for Market Risk**

The Basel ‘Standardized Approach’ uses Gap Analysis for interest rate related instruments (and maturity ladders for commodities) and Scenario Analysis for substantial options books to quantify market risk.<sup>55</sup> Duration Gap Analysis mixes Gap Analysis and Duration Analysis.<sup>56</sup> In Duration Gap Analysis, the rate sensitive ‘on and off ’ balance sheet

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<sup>54</sup> Short-term subordinated-debt should be unsecured, subordinated, fully paid-up, have an original maturity of at least two years, not be repayable before the agreed repayment date, be subject to a lock-in clause in terms of interest and principle if bank falls below minimum capital requirements. Also, long term-subordinated debt cannot exceed 50% of tier 1 capital.

<sup>55</sup> Risk exposures can be quantified by a number of approaches like Statistical Analysis, Scenario Analysis, Dynamic Analysis, Gap Analysis, Duration Analysis and Duration Gap Analysis.

<sup>56</sup> In Gap Analysis assets and liabilities are separated into time ladders according to their maturities. An asset or liability is considered to be interest rate sensitive if the cash flow of the asset or liability changes parallel to a change in interest rates. The gap is the difference between these rate sensitive assets and liabilities. A positive gap means that the rate sensitive assets are greater than rate sensitive liabilities, which indicates that a rise in interest rates will cause a faster rise in asset returns than liability costs. Duration Analysis was first applied to

instruments are placed in time buckets according to their maturities, netted and then weighted by an estimate of its duration.

(2.1) Risk weight for a time band= duration weight \* assumed change in yield

If the duration gap for a time bucket is found as 0 due to the matched durations of assets and liabilities, then that part of the balance sheet is considered immune from interest rate changes. And in Scenario Analysis, different scenarios are set and possible gains and losses under these scenarios are investigated.

In the Basel 'Standard Approach', the capital charge for all asset categories is the sum of the net position, the vertical disallowance, the horizontal disallowance plus a net charge for options where appropriate. The standard method uses the "building-block" approach to measure market risk where specific and general market risks are calculated separately and then added to give the overall capital requirement. The concern of general market risk is the effect on the market value of assets due to changes in prices and is netted, whereas specific risk is related to the risks due to the individual issuer and is calculated on gross positions, only offset in case of matched positions in the identical issue.

For the calculation of capital charges with the Standard Method, the general market risk and the specific risks are calculated for interest rate related instruments and equities. For foreign exchange (and gold), commodities and options, only the general market risk is calculated. The general outlook for the Standard Approach is summed in the table below.<sup>57</sup>

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bonds with coupon payments. Duration is the present value weighted average term to reprising and gives an indication about the sensitivity of a bond price to small changes in yield.

<sup>57</sup> In the table below, 'Qualifying items' include securities issued by public sector and multilateral development banks and those rated investment grade by at least two recognised credit rating agencies. Net open position includes net spot and forward position, guarantees and similar instruments, net future income/ expenses not accrued but fully hedged, net delta equivalent of the total book for currency options, excluding structural foreign exchange positions.

Table 2.11: Basel Standardized Approach Capital Charges (KC) for Asset Categories

| Assets                            | KC for Specific Risk   | KC for General Market Risk   |
|-----------------------------------|--|--|
| Interest rate related instruments | government: 0%<br>qualifying-residual maturity<br>≤ 6 months: 0.25%<br>6-24 months: 1%<br>≥ 24 months: 1.6%<br>other: 8%     | Sum of the risk-weighted net short or net long positions for each currency slotted in 13 time bands.<br>The total KC is the sum of the net position plus vertical and horizontal disallowances.  |
| Equities                          | 8% of KC for the absolute sum of the long and short positions (4% for liquid and diversified portfolios, 2% for index funds) | 8% for the aggregate net position, that is to the difference between the sum of the shorts and sum of the longs.   |
| Foreign Exch. (and gold)          |  | A KC of 8% for the sum of the net short or net long positions- whichever greater for forex and the net position in gold, regardless of sign, converted at spot rates. Capital charges for derivatives are applied as for the underlying asset (excluding derivatives to hedge positions.)  |
| Commodities                       |  | Simplified method or maturity ladder with 7 time bands is used where the sum of short and long positions are matched and multiplied by the spread. For the net positions carried forward a surcharge of 0.6% is applied. A KC of 15% is then applied for the remaining net position in each commodity.   |
| Options:                          |  | Simplified approach uses 8% SR and 8% general market risk to calculate KC. Delta-plus method weights the option position with option's delta to calculate the portfolio delta upon which the KC is based on. Gamma and Vega sensitivities are also measured to calculate the total KC For substantial books, Scenario approach is used and an additional KC is required based on scenario analysis of the hedged positions with respect to changes in the underlying and its volatility. |

Source: Derived from BCBS, (1996), "Amendment to the Capital Accord to Incorporate Market Risk"

#### II.II.4.2. The Internal Models Based Approach for Market Risk

The alternative method for market risk measurement is the Internal Models Based (IMB) Approach. The rationale behind the use of internal risk management models is to link regulatory capital requirements to bank specific market risk exposures rather than applying a one-size-fits-all market risk measurement standard. The use of IMB Approach is subject to minimum qualitative and quantitative standards.<sup>58</sup>

The IMB Approach is largely based on the VaR models that are pioneered by Risk Metrics and derived from the Portfolio Theory and Black-Scholes model. VaR is used by regulators to set minimum capital standards for market risk and by bank management to measure and manage market risks. The theoretical background of VaR models is explained in detail by Jorion (2000) Cuthbertson and Nitzsche (2001), Dowd (1998), Bo (2001), and Saita & Sironi (1999). The state-of-the-art VaR system provides a single, statistical measure of the worst expected portfolio losses in overall dollar values over a given horizon under ‘normal’ market movements at a given confidence level. The standardized Basel parameters for VaR estimates are 10 business day holding period and 99% coverage, implying that there is a chance of a loss greater than the VaR value with only 1% of probability. Market-risk related capital requirements must be met on a daily basis.<sup>59</sup>

<sup>58</sup> Qualitative conditions include independent risk control units; eligible board and senior management for risk control; both internal and external audits; integration of the output from the market risk model into the bank’s daily risk management; clearly documented procedures for risk management, back-testing and stress testing. Quantitative conditions include standardization of model inputs like standard parameter for the VaR percentile, portfolio holding period (i.e. a 10 days VaR for the 1st percentile, the use of 1 years data and the update of at least ones each quarter), and model assumptions (the distribution of price changes, correlation between price changes, volatility, and the data series on which these assumptions apply) on which the sensitivity of VaR estimates depends on. One should also mind the different applications like the use of diversification offsets across asset categories being at the discretion of authorities. For the details of the qualitative and quantitative standards the reader should refer to BCBS (1996) “Amendment to the Capital Accord to Incorporate Capital Risks”

<sup>59</sup> 
$$KC = \max_t [ M * \sum_{i=1}^{60} ( VaR_{t-1} / 60 ), VaR_t ] + SR$$

The capital charge is based on the larger of:

- i) the previous day’s forecast of portfolio VaR, 10-day at the 1<sup>st</sup> percentile
- ii) the average of (10-day, 1<sup>st</sup> percentile) VaR estimates for the prior 60 business days, multiplied by Multiplier (M) of minimum 3 and maximum 4 at the discretion of the regulator depending on the number of exceptions between VaR estimate and real return observed over the last 250 trading days and summed by the Specific Risk, not less than one-half of SR capital charges using the Internal Models Based Approach. This plus factor is determined by back testing of the internal model.

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VaR can be measured with different models that may be divided into four main categories:

- i) Variance-Covariance Methods: Moving Average, Risk Metrics Model, ARCH Models
- ii) Nonparametric Models: Historical Simulation Methods
- iii) Monte Carlo Simulation Methods
- iv) Extreme Value Theory

The Internal Models Approach necessitates the use of Stress Testing to evaluate the capacity of the bank to absorb the potential largest losses experienced. Stress Testing is used to test the vulnerability of the portfolios to future hypothetical events by giving the maximum loss number that can be suffered.<sup>60</sup> The regulators to validate the accuracy of the Internal Model use Back Testing.<sup>61</sup>

#### II.II.4.3 Combination of Standard and Internal Models Approaches for Market Risk

Basel framework enables banks to apply a combination of internal models and standardized methodology where the risks are simply summed as long as broad risk categories and risks to be consolidated are assessed using a single approach. Banks are also required not to modify the combination of two approaches without regulatory justification and there is no time limit for any compulsory move to internal models approach once the combination of approaches is

<sup>60</sup> Stress Testing highlights hidden vulnerabilities like changes in volatilities and it is a good means of testing ‘what if’s. The first method of Stress Testing is Scenario Analysis, and the second method is the mechanical approach to Stress Testing like Factor Push Analysis, Worst Case Scenario Analysis and Maximum Loss Optimisation.

<sup>61</sup> Each quarter the regulatory control is carried for the exceptions, that is the number of times the P/L lies outside the %1 lower tail VaR forecast. In the green zone up to 4 exceptions, there is no intervention. In the yellow zone, where there are 5 to 9 exceptions out of 250, the capital adequacy multiplier is gradually increased. In the red zone with ten or more exceptions, the multiplier will be increased to 4 and a regulatory investigation will be started.

Table: The Back Testing Approach to Evaluate Internal Models Accuracy

| Zone        | Number of exceptions | Multiplying Factor |
|-------------|----------------------|--------------------|
| Green Zone  | 0-4                  | 3                  |
| Yellow Zone | 5                    | 3.4                |
|             | 6                    | 3.5                |
|             | 7                    | 3.65               |
|             | 8                    | 3.75               |
|             | 9                    | 3.85               |
| Red Zone    | ≥ 10                 | 4                  |

justified. In the following chapters, the Combination of Standardized and Internal Models Approaches will be evaluated for better market risk measurement methods.

### II.II.5. The Operational Risk Coverage of the Basel Frameworks

Operational Risk, another microeconomic cause of banking problems, is incorporated into the Basel II framework and is defined by BCBS as “ the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events”. In the January 2001 Consultative Package, the definition of Operational Risk is clarified as also incorporating legal risk. The preliminary assessment of operational risk regulatory capital charge was 20%, which is afterwards revised to 15% of current minimum regulatory capital. The Capital Charge for Operational Risk is based on one or a combination of the Basic Indicator, Standardized, Internal Measurement Approach (Advanced Measurement Approach), and the lately incorporated Alternative Standardized Approach.

The Basic Indicator Approach relates the capital charge to bank’s overall risk exposure proxied with a single indicator and charges a fixed percentage of a bank’s gross income (alpha factor). In the Standardized Approach, bank’s activities are divided into standardized business lines, standardized broad indicators and standardized loss factors per business line. Within each business line, the capital charge is calculated by multiplying an indicator of operational risk by a fixed percentage (beta factor), the relevant loss function. The total capital charge is derived from the sum of the capital charges for all business lines.<sup>62</sup>

Table 2.12: The Standardized Approach for Operational Risk

| Business Units | Business Lines     | Indicator                     | Capital factors |
|----------------|--------------------|-------------------------------|-----------------|
| Investment     | Corporate finance  | Gross Income                  | $\beta_1$       |
| Banking        | Trading and Sales  | Gross Income or VaR           | $\beta_2$       |
| Banking        | Retail Banking     | Annual average assets         | $\beta_3$       |
|                | Commercial banking | Annual average assets         | $\beta_4$       |
|                | Payment Settlement | Annual Settlement through put | $\beta_5$       |
| Others         | Retail brokerage   | Gross Income                  | $\beta_6$       |
|                | Asset management   | Total funds under management  | $\beta_7$       |

Source: Aksel, K., (2002), The New Basel Consultation Document: Framework of the New Accord, p.39

<sup>62</sup> The qualitative criteria for Standardised Approach of Operational Risk are hardened with CP3. Institutions must have an operational risk management function; operational risk data must be tracked by business line, also validation and regular review are required.



In the Advanced Measurement Approach (AMA), the Internal Measurement Approach, banks will collect data for an operational risk exposure indicator, (data representing the loss event probability and for losses given such events) and the capital charge will be calculated by applying a fixed percentage (gamma factor) to the data collected.

For Operational Risk, an Alternative Standardized Approach (ASA) is included to the Basel framework with the latest Consultative Document CP3, which bases capital requirements for operational risk on a measure of business volume rather than income.<sup>63</sup>

#### **II.II.6. The Interest Rate Risk Coverage of the Basel Frameworks**

The Interest Rate Risk exposure is handled under the pillar II of the Basel II framework. There is no mandatory capital charge for interest rate risk, but supervisors can ask for remedial action if they determine that the bank is not holding enough capital for interest rate risks. Gap Analysis, Duration Analysis or Simulation Analysis are the suggested techniques for the measurement of interest rate risk. As BCBS (2001) emphasizes, these analyses are to be supported by Stress Testing and by Standardized rate shocks for Supervisory purposes.<sup>64</sup>

For the assessment of interest rate risk, capital requirements will be demanded by supervisors for the banks that will have economic value declines by more than 20% of the liable capital (tier 1 and tier 2) with standardized 200 basis points (bp) of interest rate shock.

#### **II.II.7. The Business Risk Coverage of the Basel Frameworks**

The BCBS (1997) “Core Principles for Effective Banking Supervision” has been issued to fight against some of the institutional determinants of systemic banking crises. The Committee has closely cooperated with the non G-10 supervisory authorities in developing these principles as institutional causes of crises are much more accentuated in the developing

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<sup>63</sup> ASA uses a three years average of loans and advances multiplied first by 0.035 and then by the beta to give the capital charge.

<sup>64</sup> For details of the interest rate risk management and control, see BCBS (2001b) Consultative Document: Principles for the Management and Supervision of Interest Rate Risk, Supporting Document to the New Basel Capital Accord



world. There are 25 main principles that are intended to serve as reference and they relate to preconditions for effective banking supervision; licensing and structure; prudential regulations and requirements; methods of ongoing banking supervision; information requirements; formal powers of supervisors and cross-border banking. The principles and the means of implementation are extremely important as they can cure the supervisory weaknesses and create the necessary environment to solve the institutional problems of particularly the developing countries. However, the principles are designed to be applied by all countries in the supervision of the banks in their jurisdiction, is not binding, and had created a widespread belief at the time of its issuance that such supervisory prerequisites should be an explicit part of future international initiatives.

The Supervisory Review Process pillar and the Market Discipline pillar of Basel II are designed to safeguard to a certain extent the business risk exposures of banking. However, no capital charges are defined for Market Discipline or for Supervisory Review Process.

The main aim of the supervisory review process is to ensure that a banks' capital position is consistent with its risk profile. To that end, four key principles of the supervisory review are underlined. The first principle points to the fact that it's the bank's responsibility to ensure capital adequacy. The second principle concerns the supervisory responsibility of the evaluation of banks internal adequacy assessments and their duty in taking appropriate supervisory action. The third principle gives the supervisors the power to require banks to hold capital in excess of the minimum. The fourth principle elaborates the conditions for Supervisors' intervention. Supervisory transparency and accountability are also handled under Pillar II of the Basel II proposal. The third pillar of the New Basel Accord aims to improve market discipline through enhanced disclosure by banks in order to ensure that market participants can monitor individual banks. To this end, disclosure requirements, recommendations and responses are elaborated in four key areas relating to the scope of application of the Accord, the composition of the capital, exposure assessment - management processes, and the capital adequacy.

Hence, the Basel framework, which enforces rules for the strengthening of banks and banking systems against banking crises focus mainly on the microeconomic fragilities of banking systems in terms of credit, market and operational risks which were spotted as the causes of banking crises in the developed countries.

## **II.III. THE IMPACT OF BASEL FRAMEWORKS ON THE DEVELOPED AND DEVELOPING COUNTRIES**

The Basel frameworks define no capital charges for business risks and the microeconomic risks associated with the macroeconomic volatility despite the fact that business risks due to institutional problems and domestic macroeconomic volatility are the main causes of systemic banking crises of the developing countries. Hence, the Basel frameworks imply an asymmetric treatment between the developing and developed world as they are designed for the developed countries and as there are gaps concerning the linkages of the frameworks with systemic stability.<sup>65</sup> In this section, first, the impact of Basel I on the developed and developing countries will be analyzed. Secondly the possible impact of Basel II on the developed world in general and for EU in particular will be investigated. Then, the possible impact of Basel II on the developing countries will be evaluated with a special emphasis to the Turkish banking case.

### **II.III.1 The Impact of Basel I on the Developed and Developing Countries**

The stated goals of the Basel Accords, as already mentioned, are to increase financial stability and to level play the field. The existing Basel I framework converged international capital standards, increased the capital adequacy ratios of banks in the developing countries but could not achieve its stated goal of more stable financial systems. This is mainly due to the shortcomings of the Basel I framework in capturing the risk exposures of banks both for the developed but particularly for the developing countries.

Basel I is a one-size-fits-all framework for credit risk. The fact that different type of banks undertakes different types of risks and the differences in the institutional and operating frameworks are mistreated. Also, the broad-brush approach of the risk-weighting system,

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<sup>65</sup> The Basel II framework will have serious impacts both on the developed and particularly on the developing countries. The finalisation of the framework has been recently delayed to mid 2004, as some of the developed countries are still not happy with Basel II. The stumbling block, as mentioned in an article in 'The Economist' under the heading of 'Blockage in Basel' dated 2<sup>nd</sup> of October 2003, is mainly the American banks and their regulators who are unhappy on several technical issues. The main problem is on the capital charges for expected losses on bad loans as American banks that are active in small-business loans and credit cards realised with the latest QIS that the expected losses for these items are high and consequently the banks have to spare large amounts of capital. The American regulators want a new impact study. However, the EU is angry about these latest developments and their regulators consider starting the implementation even if the Basel II process is delayed.

with the small number of risk categories ignores the measurable differences in risks within risk categories. The requirement of 8% regulatory capital is in conflict with economic capital, as the crude additive risk approach does not take the different default risks into account. This creates an incentive for capital arbitrage (in the forms of shifting the asset composition toward less-weighted assets through securitization or by creating credit substitutes) as it enables banks to choose assets whose regulatory risk-weights are low relative to the economic (true) risk weights. With asset securitization, banks increase their economic risk without any corresponding increase in capital. The bucket approach of capital requirement thus leads to a reduction of quality of loan portfolio as high quality assets are carried off the B/S.<sup>66</sup>

The capture of market risk has been quite important for the developed world, as market risk is one of the main reasons of the banking problems in the developed countries. However, VaR systems also have certain shortcomings. VaR systems are based on certain assumptions, like distribution normality or linearity or methods like mapping that may not hold true and consequently may blur the validity of the computations. In the Roundtable Limits of VaR (1998) it is mentioned that increasing reliance on VaR introduces new risks, unreliability of correlation matrices makes VaR meaningless, widespread hedging with VaR can lead to breakdown of correlation in financial markets and lead traders to find ways to get around the VaR assumptions. VaR systems have also proven to exacerbate crises.<sup>67</sup>

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<sup>66</sup> Other shortcomings of the Basel I framework for credit risk include: The credit risk mitigation possibilities through collateral and guarantees are not sufficiently recognized in Basel I. There is no reward for portfolio diversification and no punishment for concentration of risks, as Herring and Litan (1995) assert, the risk weights applied to individual assets do not take into account the reduction of portfolio risk due to correlation of risks between assets. There are problems concerning the components of 8% capital rule. As Heffernan (1996) underscores, the book value of equity is taken into consideration for Tier 1 capital rather than the market value and there is ambiguity regarding the components of Tier 2 capital.

<sup>67</sup> Daniellson, J. (2001b) proves that VaR's dependence on a single quintile of the profit and loss distribution implies that it is easy to manipulate reported VaR with specially crafted trading strategies like options. VaR does not capture all the relevant market risks, like event risk, liquidity differences among institutions and model risks and there is no theory that proves that VaR is the most appropriate risk measurement method. Daniellson, (2001a, 2001b) also underlines the fact that VaR systems may exacerbate crises like the case has been with Asia in 1997 and Russia in 1998, as by disregarding the endogeneity of risk and liquidity at the systemic level they produce inaccurate volatility estimates. VaR systems forecast the future possible losses based on the past data, however market prices do not follow an independent stochastic process, rather volatility is determined in the market and forecasting risk changes the nature of risk. Also, regulation encourages the homogeneity in risk aversion and trading strategies with the use of similar models.

Each VaR method has its strengths and weaknesses. The Covariance VaR method assumes that returns are normally distributed and this leads to misleading results. With the Historical Simulation VaR, the time series chosen is extremely important and it assumes that historical distribution of returns will remain the same over the next periods. Historical Simulation Method overcomes the fat tail problem and non-linear sensitivity but can be less sensitive to market volatility changes and poses problems in terms of the availability of data. The Monte Carlo Simulation VaR is computationally demanding and only good for complex instruments like options. VaR results are enlightening only when accompanied by a thorough discussion of how the risk measures were calculated and how they are related to actual performance.

Stress tests also has shortcomings. Stress tests are subjective and all relevant risk may not have been incorporated. To overcome the shortcomings of Stress Testing Worse Case Loss and Extreme Value Theory (EVT) that are not incorporated into this study are used. EVT, like HS is an unconditional method and produces less volatile risk forecasts. However, as Saltoglu and Lee (2001) emphasize, EVT concentrates on the maximum loss even with 1% probability but has not proved to be the best method. Also, Regulators use hypothesis-testing methods for evaluating the accuracy of VaR models. However, these methods may often misclassify forecasts from inaccurate models as accurate.

For the developing countries, the OECD/ non-OECD membership criterion of the Basel I framework, which will change under Basel II, is crude and unfair. Jones and Spratt (2001) draw attention to the fact that Basel I only created an incentive for developing countries to search for OECD membership like in the case of South Korea for example, who levied all the controls in 1990s mainly for the sake of becoming an OECD member.<sup>68</sup>

The 0% risk weight to cash and loans to government and central banks for all maturities is not realistic due to the probability of default risk of the issuer country in the developing world. As Kauffman (1996) underlines, the low risk attributed to government bonds facilitates the financing of budget deficits of the developing country governments and creates crowding out. The 20% risk weight for interbank loans to OECD countries (or for less than 1 year non-OECD countries) encourages short-term bank lending to developing countries

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<sup>68</sup> Due to the privileges enjoyed, five countries joined OECD since Basel I has been effective, namely Hungary, Poland, Check Republic, Mexico and South Korea.

despite the devastating effects of short term capital reversals which contributed to the crises of the developing countries. The 10% (0-50% at national discretion) risk weight to claims on PSEs is also misleading as there may be repayment problems of PSEs at the due maturity date in the developing world. Loans carry a risk-weight of unity despite the fact that in the loan book of a bank there are differences regarding the risk of loans to private sector customers and risk of the country to which the loan is granted. As Goldstein (1996) underlines, granting a loan to a bank in Turkey (an OECD member) carries a lower risk weight than granting to Microsoft under the Basel I framework.

Furthermore, compliance with 8% capital rule is not very meaningful for developing countries if there is connected lending, non-adequate provisioning against doubtful loans, and weakness in financial infrastructure, or if other elements of prudential/ supervisory standards are not met. Goldstein (1996) highlights the fact that critical in implementing capital standards is the parallel implementation of appropriate loan-valuation and classification practices and supporting accounting standards. Otherwise, it is always possible to fulfill the capital adequacy requirements with less accurate inputs.

For Market risk, the banks in the developing countries generally apply the Standard Approach. The 'Standard Approach' of Basel I is a 'one-size fits all' approach to market risk. The Duration Gap Analysis that is applied for the interest rate risk in the Standard Approach provides only a crude measurement of market risk. The analysis can be sensitive to holding periods, is accurate only if the interest rate change is minor and does not take into account the impact of interest rates on asset and liability values.<sup>69</sup>

### **II.III.2 The Possible Impact of Basel II on the Developed and Developing World**

The Basel II framework is designed to solve certain shortcomings of Basel I. However, it doesn't seem that the Basel II framework will be able to achieve its stated goal of financial stability mainly due to its ignorance of the risk exposures of banks in the developing countries, its complexity, the subjectiveness of the supervisory process with too much of discretion it offers and due to pro-cyclicality and competitive inequality introduced to the

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<sup>69</sup> Other shortcomings of the Basel I framework include: The diversification of risks and its benefits are not accounted for in the arithmetical adding up of the net positions of the same sign, which implies a correlation of +1 across asset classes. Furthermore, there is no incentive for banks to apply better practices once the minimum capital requirement is reached.



system by ECAIs and IRBAs. Proposed Basel II framework has several shortcomings regarding the content of its pillars. Some of these drawbacks caused several delays due to the necessary but still inadequate modifications done for its finalization.<sup>70</sup> The continuing modifications increased the already existing complexity and overly prescriptive nature of the Accord whereas its vagueness remains. One political economic explanation for the questions about its one-day realization and ironic anticipations for a Basel III, IV is because as expressed by Hilton in *The Banker* (2002a) Basel II is the product of a 1000 political compromises.

### II.III.2.1 The Possible Impact of Basel II on the Developed Countries

The Basel II framework will change the capital requirements of banks. For credit risk, the table below illustrates that the internationally active banks in G-10 will have reductions in capital requirements with the use of more sophisticated approaches. The smaller size G-10 banks with more of retail loans, however, will have much higher capital adequacy gains with the use of the Foundation IRB Approach for credit risk. The table below also demonstrates that the G-10 Group 1 banks will target for the Advanced IRB Approach and the G-10 Group 2 banks will endeavor to start with the Foundation IRB Approach.

Table 2.13: Change in Capital Requirements for Credit Risk

| Country Groups | Standardized | Foundation IRB | Advanced IRB |
|----------------|--------------|----------------|--------------|
| G-10 Group 1   | 0%           | -7%            | -13%         |
| G-10 Group 2   | -11%         | -27%           | N/A          |

Note: Group 1 banks are large internationally active banks. Group 2 banks are more domestically focused smaller size banks.

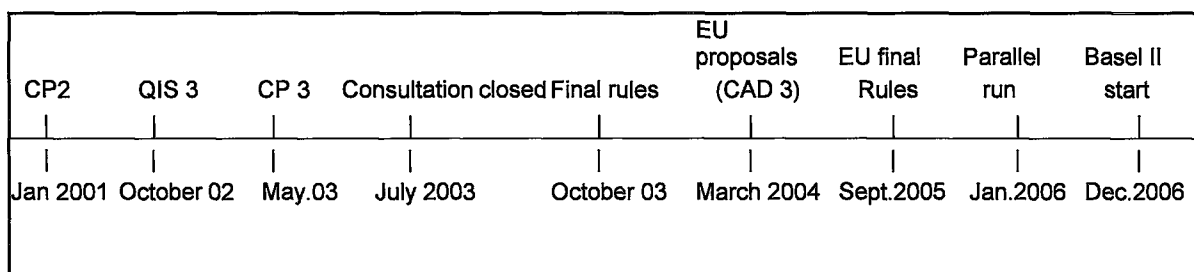
Source: PwC, (2003), *Financial Services Bulletin*

In the EU, at the time Basel Committee was preparing the Basel II proposal; Commission of the EU had already started working on a review of the EU rules on capital standards, namely

<sup>70</sup> Even the results of QIS2 showed that, for all groups of banks, capital requirements for credit risk increase under the Standardised Approach and even more under the foundation IRBA which is counter to the intention of the Accord. The most important but still insufficient modification done in November 2001 and further in June 2002 concerns the flattening of the IRB risk weight curve that relates to PD, the risk weights for borrowers and pro-cyclicality. In conjunction, in 2002, flattening of the risk-weight curve for corporate credits and Credit Risk Stress Testing are introduced to prevent potential cyclicality of the IRB approaches. Also, in order to narrow the gap between foundation and advanced IRBAs, the maturity assumption in the foundation approach is redefined as 2.5 years and a reduction in LGD values by 5% is incorporated.

the Solvency Ratio Directive and the Own Funds Directive.<sup>71</sup> Though minor, there are differences between the Basel II and EU initiatives.<sup>72</sup> To ensure a level playing field with G-10, Basel II and the parallel new EU legislation will normally be implemented at the same time. However, final rules for EU will be set in 2005 and EU will start the implementations even if the Basel timeframe is postponed.

Figure 2.1: Basel and EU Timeframes



Source: Ilaco, C., (2002) The New Basel Accord, Banks' Current State of Readiness: A European Perspective, PwC

According to PwC (2002), the majority of the large EU banks have already decided on an approach and many banks have allocated resources. Most medium- to-large sized banks will use Foundation IRB and only 10% of the banks are aiming for Advanced IRB and Germany, UK, the Netherlands and Scandinavia are taking the lead. For credit risk, Saving and Cooperative banks in Germany, Sweden, Austria and UK have actively started loss data pooling. For operational risk, most EU banks are aiming for the Standardized Approach and only a handful of banks are going for AMA at initial entry. However, at this stage only less than a quarter of banks have allocated budget for operational risk measuring costs.

According to QIS 3 of EU, Basel II in general will reduce capital requirements by around 5% with appropriate incentives for banks to move to more sophisticated approaches.

<sup>71</sup> In the EU, Solvency Ratio Directive of 1989 and the Capital Adequacy Directive (CAD) of 1993 with the amendments in 1995, 1996,1998 for the risk weighted capital adequacy ratio and the standards to limit the market risk are the same with the 1988 Basel Accord and the 1996 Basel Market Risk Amendment. The subsequent directives regarding minimum level of initial capital, holding of equity in non-financial institutions, large exposures to a single borrower, connected group lending and the standards to limit money laundering have also been set in the EU in line with the Basel Accord. Supervision also stays mainly at national control in the EU as the directives are based on the principles of mutual recognition and the principle of home-country control.

<sup>72</sup> There are three main differences between CAD 3 of EU and Basel II. CAD3 will also apply to investment firms in the EU. Accordingly, the EU Commission is considering to apply lower operational risk capital charges for investment firms. Secondly, the Commission is considering to recognise insurance as operational risk mitigant whereas in the Basel II framework, insurance is recognised as risk mitigant only for institutions using AMAs. Thirdly, the Commission has suggested permitting small institutions using Standardised Approach to credit risk for some portfolios.



Table 2.14: Average Changes in Minimum Capital Requirements

|                      | SA     | FIRB    | AIRB   |
|----------------------|--------|---------|--------|
| EU G1 Institutions   | 8.54%  | 1.99%   | -3.67% |
| EU G2 Institutions   | -1.07% | -23.75% | -17%   |
| EU+6 G2 Institutions | 3.09%  |         |        |
| All EU Institutions  |        | -5.31%  |        |
| All EU Institutions* | 1.91%  | -6.86%  | -8.74% |

Note: \*: likely to adopt approach in question

G1 Institutions: Large International Institutions

G2 Institutions: Smaller not internationally active banks

EU+6: EU plus some acceding countries

Source: EU (2003) European Commission Review of the Capital Requirements for Credit Institutions and Investment Firms, Third Quantitative Impact Study:

The above results indicate the capital requirements decrease by around 6% for EU G1 institutions applying AIRB Approach compared with the FIRB Approach. As in the case of G-10 Group1 banks, it is reasonable to think that the EU G1 Institutions will aim for the AIRB Approach. However, there will be radical decrease of capital requirements under the FIRB Approach for G2 institutions in the EU. The main reason behind this sharp fall is the considerable activities of EU G2 institutions in retail business including small and medium size enterprises (SMEs).<sup>73</sup> The following table illustrates the items that contribute to the change in capital requirements.

Table 2.15: Contributions to Overall Likely Change in Minimum Capital Requirements for all EU Institutions

|                     |         |                             |        |
|---------------------|---------|-----------------------------|--------|
| Sovereign           | 1%      | Trading Book                | 0,12%  |
| Bank                | 1,20%   | Specialized Lending         | 0,74%  |
| Retail (incl. SMEs) | -10,99% | Equity                      | 1,06%  |
| Corporate non SMEs  | -3,02%  | Receivables                 | -0,02% |
| Corporate SMEs      | -3,75%  | Investment Related Entities | 0,94%  |
| Operational Risk    | 8,83%   | General Provisions          | -1,75% |
| Securitisation      | 0,24%   |                             |        |

Source: EU (2003) European Commission Review of the Capital Requirements for Credit Institutions and Investment Firms Third Quantitative Impact Study:

The main source of reduction in capital requirements, as shown in the above table, is the retail portfolio of loans to SMEs. Also, capital requirements are lower for corporate non-SME customers and to corporate-SMEs. Operational risk is the main source of increase in

<sup>73</sup> For EU+6, the capital requirements increase with the use of Standard Approach and the capital requirements with FIRB and AIRB are not calculated. According to FS Regulatory Focus of PwC (2002) in Central and Eastern Europe, there is some awareness of Basel II. The awareness is more in the pre-accession countries, whereas, in the south and eastern parts of the region awareness appears low. More than 40% of the surveyed banks in the Central and Eastern Europe have not taken any action whatsoever to comply with Basel II.

capital requirements with Basel II. The operational risk charge could amount to 12% of total capital on average. Hence, in the developed countries, a bank's minimum capital requirement could increase significantly unless this increase is mitigated with the use of FIRB and /or AIRB approaches for credit and AMA for operational risks.

Therefore, for credit risk, the developed countries will generally aim for the IRB Approach once they start implementing Basel II. However, the IRB Approach may create problems. The major problem regarding IRBA concerns the widespread use of IRBA that may exacerbate business cycles and the widespread use of similar risk management systems that may threaten systemic stability. The Committee also accepts that the more risk-sensitive framework has the potential to amplify business cycles and accordingly made a number of modifications, however BCBS (2001) in the Consultative Document has expressed a wishful belief that the more risk sensitive capital framework will overweight this risk.

In addition to its complexity, the compliance costs for the IRBA are also too high.<sup>74</sup> Banks using IRBA would achieve lower total regulatory capital charges and a higher risk-weighted capital ratio, but the incentive for banks to move to IRBAs will also rely on the high compliance costs of IRBA.

Rodriguez (2002), Weder and Wedow (2002), Jones and Spratt (2001) point out to the probable technical setbacks of the IRB Approach. Plotting the varying risk weights derived from the mapping of the default rates to rating classes will create problems. Also the mapping of the information produced by different banks' different internal models into a common one for the purpose of regulatory capital allocation will pose problems for regulators. Santos (2000) emphasizes that IRBA also falls short to account for differences across institutions in portfolio diversification that can reduce portfolio's overall risk exposure.

Daniellson (2001a, 2001b, 2002) argues that the natural tendency for pro-cyclicality is accentuated with the IRBA due to the widespread use of risk management systems which will give the same signals to all decision makers; due to incentives for short term lending

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<sup>74</sup> Rodriguez (2002, pp.3) asserts that the “.. The Credit Suisse Group estimates compliance costs at an average of \$15 million per bank for about 30,000 banks worldwide.”

which still continue; due to the cyclic nature of PD, and also due to the fact that models treat risk as exogenous.<sup>75</sup>

Regarding the practical implications in the implementation of Basel II, a conference hosted by PRMIA/ISDA is held in London where 180 risk managers gathered in September 2002. Credent (2002) identify that the accurate and long enough data requirement of advanced IRBA is one of the greatest concerns. The pooled external data used for advanced approach is again another concern as it may not match with the bank's portfolio and may cause systemic risks. Return of investment of implementing Basel II is declared to be negative.<sup>76</sup>

As regards the Operational Risk, the Basic Indicator Approach charges a fixed operational risk proxy over profits. This is disadvantageous for the profitable banks and ambiguous for the banks that had loss for the past three years. The qualitative criteria have been hardened with CP3. Hence, the enhanced qualitative criteria for the Standardized Approach may cause the banks to prefer the crude Basic Indicator Approach for operational risk. In the Standard Approach of Operational risk, fix beta values are used as a proxy. However, these beta values can differ from country to country. Alternative Standardized Approach applies a multiplication factor (beta) of 15% for the aggregated retail and commercial banking business lines and aggregates the total gross income for the remaining six business lines with a beta of 18%. The betas of the alternative standardized approach should not be higher than alpha 15% of the basic indicator approach in order to encourage banks to use advanced techniques.

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<sup>75</sup> The cyclic nature of PD is problematic as PDs that determine the capital requirements are relatively low during booms causing a reduction in regulatory capital and vice versa. The fact that models treat risk as exogenous creates problems because, as expressed by Daniellson (2001a, 2001b, 2002), the market prices are endogenous and there are vicious feedback loops between prices, volatility and liquidity. The agents alter their behavior in the presence of risk-based regulation and this creates a potential for contagion and procyclicality and these are not recognized in Basel II. The endogeneity of risk causes agents behave in the same way especially after a shock and hence a direct loop from regulations to prices is established. During the recent crises, especially in the Russian crises of 1998, this was evident as crises deepened due to the existence of risk limits, which caused all banks behave in the same manner.

<sup>76</sup> Ilaco (2002) also stresses the fact that obtaining good quality data is a major problem for almost all banks in the EU. Data availability creates serious problems, also the system changes after mergers render data collection almost impossible. For scarce default data problem, small banks are sharing resources to share the cost of internal rating system development. The data problem is more severe with operational risk than for credit risk. Data pools are being developed by the industry but still there is limited data available for operational risk.

The Banker (2002b) states that in the USA, some banks like State Street, Mellon Bank that are specialized in custody, asset management and payment systems will be at a disadvantage vis- a- vis the non-banks. They have formed the Financial Guardian Group (FGG) and lobby for the removal of operational risk from pillar I to pillar II. In the USA there are charter options and also banks like Goldman Sachs, Merrill Lynch that are not registered as banks. Such de-banking will put a pressure on their European rivals. This will not only cause problems in terms of calculating operational risk for non-credit institutions but also will put European financial institutions at a disadvantage internationally as in the EU the new capital requirements will be imposed not only to banks but also to investment banks, securities firms and fund managers.

Regarding Pillar II, the decision to implement the Standardized Approach or one of the IRBAs to banks country- wise is at the discretion of supervisors. It has also been stated in the Accord that supervisors can intervene if the capital does not provide enough of a buffer for the risks of the bank. However, as Santos (2000) points out, neither the trigger point for intervention nor the forms of interference has been ex-ante specified. Hence, this increased power, with the increased transparency under pillar III may cause unjust regulatory implementations and accentuate the homogenous behavior of banks and thus deepen the crises.

### **II.III.2.2 The Possible Impact of Basel II on the Developing Countries**

The impact of the change of the rules of the game with Basel II will be more severe for the developing countries. There will be the direct impact of Basel II in terms of capital requirements for those developing countries that decide to implement Basel II. There will also be the indirect impact of Basel II in terms of cost of borrowing whether the developing countries adopt the Basel II framework or not.

#### **II.III.2.2.i The Direct Impact of Basel II on the Developing Countries**

The result of the QIS for the Group1 and 2 banks of the developing countries in table 2.16 demonstrate the direct impact of the new framework on the developing countries. The table

illustrates that the capital requirements will rise for the majority of developing world banks, as they will be using mostly the Standard Approach for credit risk.

Table 2.16: Change in Capital Requirements for Credit Risk

| Country Groups    | Standardized | Foundation IRB | Advanced IRB |
|-------------------|--------------|----------------|--------------|
| G-10 Group 2      | -11%         | -27%           | N/A          |
| EU Group 2        | -11%         | -27%           | N/A          |
| Other (Groups1&2) | 2%           | -3%            | N/A          |

Note: Group 2 banks are more domestically focused smaller sized banks. Other represents banks from non-G-10 and non-EU countries, including China, Hong Kong, Singapore, South Africa, Korea, and a number of Latin American, Asian and Central and Eastern European countries.

Source: PwC, (2003) Financial Services Bulletin.

The developing country banks applying Standard Approach will encounter problems due to the almost non-existence of Rating Agencies and rated corporates. ECAIs are not widespread throughout the world, more so in the USA, much less in EU and almost non-existent in the developing world. However, the irony here is that developing countries will be using the Standard Approach rather than IRBA if they want to adopt Basel II.<sup>77</sup>

The main weakness of the Standardized Approach lies in its crisis promoting nature. Jones and Spratt (2001), Powell (2002), Daniellson (2001a) point to the fact that ECAI or ECA assessments may induce pro-cyclicality to capital charges and thus aggravate the boom and bust cycles by leading to over lending in booms and credit crunch in recessions.

Standardized Approach decreases but does not abandon the incentives for short-term lending as it attributes a better rating to less than three months lending to banks. Also, as Altman and Saunders (2000) claim, assigning identical risk weights to investment grade and speculative

<sup>77</sup> ECAI assessments will pose homogeneity problems of rating of the same borrower across countries, as even today it is possible that the same firm be rated quite differently by two eligible ECAIs. ECAI assessments may not reveal the reality as in the case of Enron where three eligible credit rating agencies gave an investment grade up until 5 days before its bankruptcy. Powel (2002) argues that the quality of ECAI ratings may deteriorate due to market competition and also the rating of a sovereign by an ECAI or ECA is subjective due to the non-quantifiable nature of political risk, which will directly affect the sovereign's cost of borrowing. It is neither clear nor will it be easy to force the ECAs in different countries to use a uniform approach for rating. Also, the fact that local rating agencies tend to rate on a country specific relative basis seems will cause problems. The macroeconomic, microeconomic and institutional differences between developing and developed countries will create rating comparison problems Also, the ECAI assessments of sovereigns are lagging rather than leading the market and exacerbating the crises due to downgrading during the crises as the case has been with crises in the East Asia, Russia and Turkey. Also as Powell (2002,pp.14) points out "if capital requirements and the cost of lending to a particular country depend on a country's rating and this depends on market access, then there is potential circularity, not just pro-cyclicality"

grade borrowers for less than 3 months claims will create regulatory arbitrage in favor of lower rated loans.

The other drawbacks of the Standardized Approach include the unrated banks and corporates being assigned a higher risk grade than the rated ones, which will create a positive disincentive for those afraid of being rated below B-. The Committee's explanation is that otherwise costs would increase very much for small and medium size enterprises but still the ambiguity remains. For risk weights, enough of attention is not paid to the maturities of claims. The sovereign borrowers are favored vis-à-vis the corporates and banks. Also, the risk buckets that are expanded could be further expanded to avoid regulatory distortions, to increase risk sensitivity and to increase incentives to seek higher ratings especially by corporates. Last but not least, the credit risk is still treated in additive fashion that does not take into account the portfolio diversification.

Powel, A. (2002) draws attention to the fact that the extent of volatility in the developing countries compared to G-10 will render almost impossible the capture of expected and unexpected risks with the IRB Approach due to the fact that systemic risk of even a well-diversified portfolio in an emerging market economy is greater when compare with G-10. Also, the implementation of the Advanced IRB Approach will pose problems for the developing countries in terms of quality and quantity of data required, requirements regarding the rating process and prerequisites for supervisory framework.

Also, one of the major problems of this two-fold regulatory system is that the differences in regulatory capital charges between Standard Approach and IRBA will cause regulatory arbitrage in terms of high rating sovereigns borrowing from IRBA banks and low rated ones borrowing from banks using the Standard Approach. There are also concerns about competitive equality regarding the large international banks' operations in EMEs, where they will be using a different system than the domestic one. Also, the use of IRBA by the already strong banks seems will cause a consolidation in the banking sector worldwide due to the comparative advantages they will be enjoying.

Regarding the second pillar, Basel II leaves too much of discretion to national regulators which may increase not only regulatory arbitrage but also regulatory forbearance and corruption especially in the developing countries. Also, the banks in the developing countries



are heavily exposed to interest rate risk and volatility in interest rates is one of the major causes of systemic banking crises in the developing countries. However, neither the capital charges are defined nor a 200 bp. of a parallel interest shock is explanatory of a crisis situation for a developing country.

This asymmetry of treatment between the developing and developed countries does not provide the means for the developing countries to protect themselves from the new banking crises. The soundness and stability of banks and the global financial system now is and seemingly will be under threat with the international Regulatory and Supervisory framework of Basel II. Also, as pointed out by Lindgren et al. (1996, pp.126) the developing countries must also realize that “while the value of identifying best practices is clear, the real work must take place in applying those practices to create a sound banking environment in each different economic, political and institutional context”

#### **II.III.2.2.ii The Indirect Impact of Basel II on the Developing Countries**

The Basel II framework has important implications for the cost of emerging market borrowing. Weder and Wedow (2002) points out that the abolition of the zero-risk weight treatment of OECD countries will create a considerable difference for countries like Turkey, Ecuador, and Indonesia. As Fisher (2002) emphasizes, nearly two thirds of the non-OECD sovereign borrowers rated by Moody's are speculative grade, and for them capital requirements could considerably rise. This may also cause a widening of bond market spreads for lower quality borrowers.

The countries that will benefit most from the new framework are highly rated non-OECD sovereigns, whereas low rated sovereigns will be negatively affected. The risk weights of Singapore and Taiwan will fall from 100% to 0%. Chile, Kuwait, Israel and Slovenia will also benefit, as their risk weightings will fall from 100% to 20%. Non-OECD triple B rated sovereigns of China, Malaysia, Qatar, Latvia, Estonia, South Africa, Uruguay, Croatia, Thailand, Trinidad-Tobago, Tunisia, and Egypt also benefit as their weightings fall from 100% to 50%. The main losers are lower rated OECD countries like Hungary and Greece with an increase in risk weighting from 0% to 20%; Mexico, South Korea, Poland, Czech Republic with an increase in weighting from 0% to 50%, and amongst them Turkey stands to lose the most, with its risk weighting increasing from 0% to 100%.



Table 2.17: Claims on Sovereigns

| Country   | Current Classification | Current Weighing | New Classification S&P 2001 | New Weighing |
|-----------|------------------------|------------------|-----------------------------|--------------|
| Greece    | Zone A                 | 0%               | A-                          | 20%          |
| Poland    | Zone A                 | 0%               | BBB+                        | 50%          |
| Turkey    | Zone A                 | 0%               | B+                          | 100%         |
| Hungary   | Zone A                 | 0%               | A-                          | 20%          |
| Chile     | Zone B                 | 100%             | A-                          | 20%          |
| Kuwait    | Zone B                 | 100%             | A                           | 20%          |
| Singapore | Zone B                 | 100%             | AAA                         | 0%           |
| Taiwan    | Zone B                 | 100%             | AA+                         | 0%           |

Source: Aksel, K. (2002) The New Basel Consultation Document: Framework of the New Accord, Price Waterhouse Coopers, p.13

Winner Banks under the Standard Approach include banks in non-OECD, A- and above rated countries of Taiwan, Singapore, Kuwait, Chile, Israel and Slovenia. The losers are banks in Greece, Poland and Hungary with increased new weightings. The main losers are banks in sub-investment grade OECD countries like Turkey and Mexico. For Turkish banks, risk weights will increase from 20% to 100%. Banks in sub-investment non-OECD countries like Argentina and Brazil will also lose, as under both methods the risk weighting over three months will increase from 20% to 100%.

Table 2.18: Claims on Banks

| Banks                   | Current Weighting | New Weighting-Option I | New Weighting- Option II |
|-------------------------|-------------------|------------------------|--------------------------|
| Bank in Kuwait (BB-)    | 100%              | 50%                    | 100%                     |
| Bank in Singapore (AAA) | 100%              | 20%                    | 20%                      |
| Bank in Poland (BBB+)   | 20%               | 50%                    | 50%                      |

Source: Aksel, K.(2002) The New Basel Consultation Document: Framework of the New Accord, Price Waterhouse Coopers, p.14

Weightings will remain at 100% for all corporate rated below A-; the only beneficiaries will be corporates in Chile, Hungary, Israel and Slovenia, with weightings unchanged under the Standard Approach. With the IRB Approach, as indicated by JP Morgan (2001), the risk weighting will be lower for structured and collateralized facilities giving corporates more flexibility to fund from banks through structured transactions.

Hence, the rise of capital requirements for low rated borrowers will increase the cost and decrease the level of international bank lending to developing countries.<sup>78</sup> Also, the more pro-cyclical lending to the developing world may cause financial disturbances that may

<sup>78</sup> There are however studies like that of Weder and Wedow, (2002) which shows that by relaxing the assumptions concerning a constant required return on capital, no allowance for diversification, binding capital requirements i.e., economic capital equals required capital, only moderate increases in spreads for low-rated countries are evidenced and all countries rated BB and higher are evidenced to see spreads narrowing.

threaten the financial stability worldwide. The home and host supervision of the emerging market activities of the international banks will also pose problems. Pillars 2 and 3 will impose stricter burdens on international banks due to the differences in compliance and regulatory capacity between the home and host countries. These problems if not solved may reduce the incentive of international banks to expand their operations in developing countries

Taking into consideration all the above mentioned handicaps of the Basel II proposal on the developing countries, economists like Jones et al. (2002b) empirically prove that an international loan portfolio which is diversified across the developed, emerging and developing regions have a lower portfolio risk than one focusing on developed markets and want the modifications to be done accordingly before the Committee's 2004 final release.

### **II.III.2.3. The Impact of Basel Frameworks on Turkey**

Turkey had adopted the 1988 CAA of Basel I and it enabled the Turkish banks to hold at least the minimum standards of capital adequacy. By 1999, Turkey started to deal with the institutional problems of the Turkish Banking System. In mid 1999, Banks Act No: 4389 is ratified. With this Act, BRSA is established as a separate supervisory authority. Conditions for establishing a bank and for starting operations and auditing mechanisms are strengthened, amendments to articles of association and assignments of shareholders are carried out, general exposure limits are reduced, and personal liability is introduced by BRSA (1999). These developments in the regulatory and supervisory frameworks, however, could not immunize the banking system in Turkey from the systemic banking crises.<sup>79</sup>

Other recent regulatory initiatives after the banking crises of 2001, and under the "Programme of Restructuring Turkish Banking" as described by BRSA (2003a) include Provisioning Regulation and Regulation on the Establishment and Operations of Banks, and as explained by BRSA (2001c), Regulation on Banks' Internal Control and Risk Management Systems. Turkey also started to implement the Market Risk Amendment of Basel I since January 2002, and on a consolidated basis since June 2002 with the Regulation on Measurement and Assessment of Capital Adequacy of Banks.

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<sup>79</sup> Actually regulations have not always guaranteed proper implementation in Turkey.

The changes in the regulatory and supervisory setting in Turkey aim the harmonization of Turkish Banking regulation with the EU. The new Banking Law No: 4389 dated 19 December 1999 and the consequent regulations in Turkey has rendered the regulatory and supervisory framework in Turkey parallel to the EU legislative framework for banking.<sup>80</sup>

BRSA is also planning to implement precisely the “New Capital Adequacy Norms” of Basel II, earliest by 2007. QIS-3 of BIS has been hosted by BRSA in Istanbul on March 10-11, 2002 and some Turkish banks participated to the QIS process. Thus, the regulatory and supervisory framework for banking in Turkey will continue being parallel to the EU framework.

The precise adoption of Basel framework brings at least the minimum standards to bank capital in developing countries like Turkey, however, it may run short of immunizing the Turkish banking system from possible new banking crises. First of all, as discussed in the

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<sup>80</sup> The Council Directive 73/183/EEC of 28 June 1973 on the abolition of restrictions on freedom of establishment and freedom to provide services in respect of self-employed activities of banks and other financial institutions is parallel to the Turkish Banking Law No: 4389, article 7 and Regulation on the establishment and freedom to provide services latest updated on June 10, 2003

First Council Directive 77/780/EEC of 12 December 1977 on the coordination of the laws, regulations and administrative provisions relating to the taking up and pursuit of the business of credit institutions is parallel to the Turkish Banking Law No: 4389, article 7.

Council Directive 86/635/EEC of 8 December 1986 on the annual accounts and consolidated accounts of banks and other financial institutions, which is amended latest by 17.07.2003 is parallel to the Turkish Banking Law No: 4389, article 13

Second Council Directive 89/646/EEC of 15 December 1989 on the coordination of laws, regulations and administrative provisions relating to the taking up and pursuit of the business of credit institutions and amending Directive 77/780/EEC is parallel to the Turkish Banking Law No: 4389, article 7 and 8

Council Directive 92/30/EEC of 6 April 1992 on the supervision of credit institutions on a consolidated basis is parallel to the Turkish Banking Law No: 4389, article 13 and regulation dated 31 January 2002

Council Directive 89/299/EEC of 17 April 1989 on the own funds of credit institutions is parallel to the Turkish Banking Law No: 4389, article 13 and Regulation dated 03 October 2001

Council Directive 89/647/EEC of 18 December 1989 on a solvency ratio for credit institutions is parallel to the Turkish Banking Law No: 4389, article 13 and Regulation dated 03 October 2001

Council Directive 92/121/EEC of 21 December 1992 on the monitoring and control of large exposures of credit institutions is exactly the same with the Banking Law No: 4389, article 11

Directive 94/19/EC of the European Parliament and of the Council of 30 May 1994 on deposit-guarantee schemes is parallel to the Banking Law No: 4389, article 15 and related regulation dated 3rd of August 2001.

first chapter, the systemic banking crises in Turkey are mainly due to institutional problems and the risk exposures of banks to macroeconomic volatility in interest and exchange rates. Short-term borrowing and short foreign exchange positions fund the huge and long-term government bond exposures of Turkish banks. The short term funding of the government bond portfolios creates duration mismatches in the balance sheets of banks and create liquidity crises when macroeconomic volatility in interest rates hit the bond portfolios and exchange rate volatility hits the short positions. However, as discussed in this chapter, the Basel frameworks provide coverage to microeconomic credit, market and operational risks of banks and do not safeguard the risk exposures of banks and banking system in Turkey.

Secondly, besides the impact of Basel I, the direct and indirect impact of Basle II on the developing countries, seems will also be severally felt in Turkey due also to the harmonization efforts of Turkey with the EU legal framework with adapted BCBS principles for risk management that concern the developed countries. In terms of the existing Basel I, the adoption of minimum standards despite the institutional problems, the OECD privileges for credit risk weights and the problems with Standard Approach and VaR methods to calculate market risk seems problematic also for Turkey. In terms of the direct impacts of Basle II, the possible increase in capital requirements, the calculation of risk charges for credit, market and operational risks due to lack of rating culture, the problems associated with ECAI assessments and the non-existence of datasets, the still existing privileges to short term borrowing, 0% risk weight to government lending in domestic currency and the lack of appropriate interest rate risk management frameworks, and in terms of indirect impacts of Basel II, the cost and level of international bank lending to Turkish government and Turkish banks seems will also cause problems for Turkey.

The robustness of the existing risk measurement framework and the possible effects of implementing the New Basel Capital Accord in Turkey will be quantitatively tested in chapter three. The efficiency of harmonizing the regulatory and supervisory framework of Turkey with the EU, in terms of preventing Turkish banks from possible new banking crises will be evaluated in chapter four and some proposals for Turkey will be forwarded.

### **III. APPLICATION OF BASEL CAPITAL ADEQUACY FRAMEWORK TO THE TURKISH BANKING SYSTEM**

In chapter three, Capital Adequacy Requirements of Basel I and Basel II frameworks are applied to the Turkish Banking System (TBS). The September 2002 Consolidated B/S and Off-B/S Accounts of the TBS are used for the calculations. First, the Capital Adequacy Ratio of TBS for credit risk is calculated with the Standard Method according to the 1988 CAA of Basel I. Secondly, the VaR and MCR for market risk are calculated with the Standard Method of Basel I. Third, the VaR and MCR for market risk are computed with the IMB Approach of Basel I.<sup>81</sup> The capital charges for credit and market risks are thereafter arithmetically summed to arrive to the Capital Adequacy Ratio of the TBS according to amended Basel I framework. As the fourth step, the Capital Adequacy Ratio of TBS for credit, market and operational risks are calculated according to the Standard Approach of the proposed Basel II framework.

#### **III.I CAPITAL ADEQUACY REQUIREMENT OF TBS FOR CREDIT RISK ACCORDING TO BASEL I**

In this section, the capital adequacy requirement of TBS for credit risk will be calculated with the Standard Method according to the 1988 CAA. First, the dataset for capital adequacy calculations will be handed over. The September 2002 Consolidated B/S and Off-B/S Accounts will be used to calculate the MCR of TBS for credit risk and also for all other risk exposures. Secondly, the capital adequacy calculations for credit risk will be carried for TBS. Thirdly; the result of capital adequacy calculation for credit risk of TBS will be briefly evaluated.

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<sup>81</sup> Both the Standard Method and the Internal Models Based Approaches are the options to calculate market risk according to the BCBS(1996). However, as the calculations are quite complicated, the two approaches are evaluated separately.

### III.I.1 The Dataset for Capital Adequacy Calculations

The on-off B/S Accounts of TBS are constructed by BRSA (2002) using the data that is periodically submitted by the banks.

|                           | BALANCE SHEET                                    | DOMESTIC C.        | FOREIGN C.         | TOTAL              |
|---------------------------|--|--------------------|--------------------|--------------------|
| 1                         | Cash Assets                                      | 870.053            | 998.684            | 1.868.737          |
| 2                         | Due from the Central Bank                        | 1.104.085          | 1.128.825          | 2.232.910          |
| 3                         | Due from Interbank Market                        | 5.762.500          | 2.126.226          | 7.888.726          |
| 4                         | Due from Banks                                   | 2.070.962          | 14.755.992         | 16.826.954         |
| 5                         | Securities Portfolio (6+7) (Net)                 | 9.797.259          | 12.885.623         | 22.682.882         |
| 6                         |  |                    | 10.715.905         | 20.316.950         |
| 7                         |  | 196.214            | 2.169.718          | 2.365.932          |
| 8                         | Required Reserves                                | 2.615.491          | 6.905.340          | 9.520.831          |
| 9                         |  |                    | 0                  | 14.598             |
| 10                        | Loans  | 18.172.954         | 24.685.166         | 42.858.120         |
| 11                        | Past Due Loans (Net) (12-13)                     | 2.549.371          | 3.397.859          | 5.947.230          |
| 12                        | a) Past Due Loans                                | 9.556.312          | 3.771.707          | 13.328.019         |
| 13                        | b) Loan Loss Reserves (-)                        | 7.006.941          | 373.848            | 7.380.789          |
| 14                        |  |                    | 1.248.084          | 13.348.287         |
| 15                        | Lease Financing Receivables (Net)                | 0                  | 0                  | 0                  |
| 16                        | Subsidiaries and Associated Companies (Net)      | 5.470.397          | 1.507.823          | 6.978.220          |
| 17                        | Securities in Non-Trading Portfolio (Net)        | 40.299.836         | 17.882.762         | 58.182.598         |
| 18                        | Fixed Assets to be Sold                          | 1.517.143          | 0                  | 1.517.143          |
| 19                        | Fixed Assets (Net)                               | 7.191.149          | 15.629             | 7.206.778          |
| 20                        | Other Assets                                     | 3.479.233          | 1.450.594          | 4.929.827          |
| 21                        | <b>TOTAL ASSETS (1+...+20)-(6+7+12+13)</b>       | <b>112.883.179</b> | <b>89.120.662</b>  | <b>202.003.841</b> |
| 22                        | Deposits   | 54.155.691         | 76.242.395         | 130.398.086        |
| 23                        | Due to Central Bank                              | 2.719              | 505.020            | 507.739            |
| 24                        | Due to Interbank Market                          | 29.433             | 2.873.902          | 2.903.335          |
| 25                        | Due to Banks                                     | 2.907.060          | 18.935.467         | 21.842.527         |
| 26                        |  |                    | 758.150            | 6.337.708          |
| 27                        | Funds  | 3.607.273          | 7.825              | 3.615.098          |
| 28                        | Securities Issued (Net) (29+30)                  | 20                 | 1.302.532          | 1.302.552          |
| 29                        | a) Bonds & Bills                                 | 2                  | 1.302.532          | 1.302.534          |
| 30                        | b) Asset Backed Securities and Other Sec. Issued | 18                 | 0                  | 18                 |
| 31                        | Lease Financing Obligations (Net)                | 21.344             | 63.724             | 85.068             |
| 32                        | Taxes, Duties, Charges & Premiums Payable        | 501.804            | 1.055              | 502.859            |
| 33                        | Subordinated Debt                                | 1.115.658          | 390.744            | 1.506.402          |
| 34                        | Interest and Expense Accruals                    | 2.054.265          | 772.691            | 2.826.956          |
| 35                        | Reserves   | 2.590.317          | 452.075            | 3.042.392          |
| 36                        | Other Liabilities                                | 3.807.478          | 2.592.276          | 17.292.279         |
| 37                        | <b>SUBTOTAL (22+...+36)-(29+30)</b>              | <b>76.372.620</b>  | <b>104.897.856</b> | <b>181.270.476</b> |
| 38                        | Paid up Capital                                  | 12.901.776         | 97.237             | 12.999.013         |
| 39                        | Legal & Provisional Reserves                     | 47.201.986         | 0                  | 47.201.986         |
| 40                        | Fixed Asset Revaluation Fund                     | 616.048            | 0                  | 616.048            |
| 41                        | Securities Revaluation Fund                      | 509.178            | 0                  | 509.178            |
| 42                        | Profit (Loss) for the Period                     | -335.569           | 0                  | -335.569           |
| 43                        | Profit (Loss) for Previous Years                 | -40.257.291        | 0                  | -40.257.291        |
| 44                        | <b>TOTAL OWNERS EQUITY (38+...+43)</b>           | <b>20.636.128</b>  | <b>97.237</b>      | <b>20.733.365</b>  |
| 45                        | <b>TOTAL LIABILITIES (37+44)</b>                 | <b>97.008.748</b>  | <b>104.995.093</b> | <b>202.003.841</b> |
| 46                        | Non-Cash Credits and Obligations                 | 12.075.208         | 32.056.311         | 44.131.519         |
| 47                        | Commitments (48+49)                              | 20.824.152         | 32.775.566         | 53.599.718         |
| 48                        |  |                    | 29.167.127         | 30.839.180         |
| 49                        | b) Other Commitments                             | 19.152.099         | 3.608.439          | 22.760.538         |
| A/Ls that concern FX Risk |  |                    |                    |                    |

Source: BRSA (2002)



| Table 3.2: Off-B/S Accounts of Banking System as of September 2002 (In Bio TL) |  |                   |                   |                   |
|--|--|-------------------|-------------------|-------------------|
| 1  | <b>LETTERS OF GUARANTEE (2+3)</b>                            | <b>11.307.798</b> | <b>20.480.564</b> | <b>31.788.362</b> |
| 2  | a) Uncollateralized  | 3.467.202         | 6.148.780         | 9.615.982         |
| 3  | b) Collateralized  | 7.840.596         | 14.331.784        | 22.172.380        |
| 4  | <b>BANKERS ACCEPTANCES (5+6)</b>                             | <b>1.511</b>      | <b>1.970.707</b>  | <b>1.972.218</b>  |
| 5  | a) Uncollateralized  | 0                 | 426.435           | 426.435           |
| 6  | b) Collateralized  | 1.511             | 1.544.272         | 1.545.783         |
| 7  | <b>LETTERS OF CREDIT (8+9)</b>                               | <b>334</b>        | <b>8.035.320</b>  | <b>8.035.654</b>  |
| 8  | a) Uncollateralized  | 0                 | 2.332.859         | 2.332.859         |
| 9  | b) Collateralized  | 334               | 5.702.461         | 5.702.795         |
| 10   | <b>GUARANTIES AND ENDORSEMENTS (11+12+13)</b>                | <b>765.420</b>    | <b>1.405.541</b>  | <b>2.170.961</b>  |
| 11   | a) Underwritings   | 4.191             | 998               | 5.189             |
| 12   | b) Endorsements  | 11.045            | 15.651            | 26.696            |
| 13   | c) Other Guaranties  | 750.184           | 1.388.892         | 2.139.076         |
| 14   | <b>UNSECURED PREFINANCING CREDITS</b>                        | <b>143</b>        | <b>164.181</b>    | <b>164.324</b>    |
| 15   | <b>FX &amp; INTEREST RATE CONTRACTS (16+19+22+25+28)</b>     | <b>1.665.640</b>  | <b>29.006.755</b> | <b>30.672.395</b> |
| 16   | a) Forward FX Purchase & Sale Transactions (17+18)           | 1.238.613         | 13.501.945        | 14.740.558        |
| 17   | i. Forward FX Purchase Transactions                          | 647.181           | 6.395.299         | 7.042.480         |
| 18   | ii. Forward FX Sale Transactions                             | 591.432           | 7.106.646         | 7.698.078         |
| 19   | b) Swaps (20+21)   | 394.527           | 11.805.743        | 12.200.270        |
| 20   | i. Money Swaps   | 394.527           | 11.688.076        | 12.082.603        |
| 21   | ii. Interest Rate Swaps                                      | 0                 | 117.667           | 117.667           |
| 22   | c) Futures (23+24)   | 0                 | 3.035.982         | 3.035.982         |
| 23   | i. Money Futures   | 0                 | 409.096           | 409.096           |
| 24   | ii. Interest Rate Futures                                    | 0                 | 2.626.886         | 2.626.886         |
| 25   | d) Money Options (26+27)                                     | 32.500            | 40.359            | 72.859            |
| 26   | i. Seller (Issuer)   | 32.500            | 40.359            | 72.859            |
| 27   | ii. Buyer  | 0                 | 0                 | 0                 |
| 28   | e) Interest Rate Options (29+30)                             | 0                 | 322.726           | 322.726           |
| 29   | i. Seller (Issuer)   | 0                 | 161.363           | 161.363           |
| 30   | ii. Buyer  | 0                 | 161.363           | 161.363           |
| 31   | <b>IRREVOCABLE COMMITMENTS (32+.....+39)</b>                 | <b>10.285.821</b> | <b>2.132.287</b>  | <b>12.418.108</b> |
| 32   | a) Forward Asset Purchase Commitments                        | 5.330             | 0                 | 5.330             |
| 33   | b) Forward Deposit Purchase & Sale Commitments               | 44                | 14                | 58                |
| 34   | c) Unpaid Capital for Equity Participations                  | 17.919            | 5.064             | 22.983            |
| 35   | d) Unused Credit Lines                                       | 153.638           | 83.483            | 237.121           |
| 36   | e) Commitments for Underwriting (without a guarantee to buy) | 0                 | 0                 | 0                 |
| 37   | f) Debt from Required Reserves                               | 8.109             | 121.757           | 129.866           |
| 38   | g) Unused Credit Cards Lines                                 | 9.915.165         | 1.898.828         | 11.813.993        |
| 39   | h) Other Irrevocable Commitments                             | 185.616           | 23.141            | 208.757           |
| 40   | <b>REVOCABLE COMMITMENTS (41+42)</b>                         | <b>8.866.277</b>  | <b>1.476.151</b>  | <b>10.342.428</b> |
| 41   | a) Revocable Unused Credit Lines                             | 8.840.324         | 1.328.409         | 10.168.733        |
| 42   | b) Other Revocable Commitments                               | 25.953            | 147.742           | 173.695           |
| 43   | Other  | 6.415             | 460.369           | 466.784           |

Source: BRSA (2002)



### III.1.2. The Capital Adequacy Ratio Calculations for Credit Risk

The Standard Method to calculate capital adequacy ratio according to 1988 CAA of Basel I is elaborated in chapter II, and the details of the Accord are in Appendices 1 and 2. The capital adequacy ratio is calculated according to the BCBS (1988), and the BRSA (2001) regulations and examples, which are identical. The calculations are shown in table 3.3.

Table 3.3 Capital Adequacy Ratio Calculation of TBS according to Basel I.

|   |                   |
|---|-------------------|
| <b>1 CORE CAPITAL (From 2to 6)</b>                                    | <b>19.608.139</b> |
| 2 a. Paid up Capital  | 12.999.013        |
| 3 b. Legal (and Provisional) Reserves                                 | 47.201.986        |
| 4 c. Optional Reserves and Reserves for Probable Losses               | 0                 |
| 5 d.Profit (Loss) for the Period                                      | -335.569          |
| 6 e. Profit (Loss) for Previous Years                                 | -40.257.291       |
| <b>7 SUPPLEMENTARY CAPITAL ( From 8 to 14)</b>                        | <b>2.631.628</b>  |
| 8 a.General Loan Loss Reserves  | 0                 |
| 9 b.Fixed Asset Revaluation Fund                                      | 0                 |
| 10 c.Rev. Fund for Fixed Assets                                       | 616.048           |
| 11 d.Provisions for Revaluation of F.A of Subs.and Aff.in10           | 0                 |
| 12 e. Subordinated Debts  | 1.506.048         |
| 13 f. Free Reserves for Probable Risks                                | 0                 |
| 14 g. Securities Revaluation Fund                                     | 509.178           |
| <b>15 TIER 3 CAPITAL</b>  | <b>0</b>          |
| <b>16 CAPITAL (1+8+16 )</b>   | <b>22.239.767</b> |
| <b>17 CAPITAL BASE FOR THE RATIO</b>                                  | <b>22.239.767</b> |
| <b>18 DEDUCTIONS FROM THE CAPITAL BASE</b>                            | <b>14.845.290</b> |
| 19 a. All Capital Participations and Investments to the Uncons.F.I    | 6.978.220         |
| 20 b. Special Expense Values(Cost Accounts)                           | 3.423.847         |
| 21 c. Preliminary Expenses  | 1.932.554         |
| 22 d. Pre-paid Expenses   | 2.510.669         |
| 23 e.Difference of Fair Value and the Book Value of Uncons. Particip. | 0                 |
| 24 f. Subordinated Loans extended to Other Banks Operating in Turkey  | 0                 |
| 25 g. Consolidation Goodwill  | 0                 |
| 26 i. Capitilised Costs   | 0                 |
| <b>27 CONSOLIDATED OWN FUNDS (17-18)</b>                              | <b>7.394.477</b>  |
| <b>28</b>   |                   |
| 29 a.0% Risk Weight(42x0%)  | 0                 |
| 30 b.20% Risk weight (91x% 20)  | 12.675.080        |
| 31 c.50% Risk Weight (123x% 50)                                       | 0                 |
| 32 d.100% Risk Weight(138x% 100)                                      | 61.724.053        |
| 33 e.Market Risk Exposure   | 0                 |
| <b>34 STANDARD CAPITAL ADEQUACY RATIO (27 / 280)</b>                  | <b>10.02%</b>     |

Source: Derived from BRSA (2001a and 2001b)

### III.I.3 The Result of the Capital Adequacy Ratio Calculations for Credit Risk:

The Capital Adequacy Standard Ratio of TBS for credit risk is calculated as 10.02% under certain assumptions about the definition of capital and the risk weights for the MCR calculations of credit risk for TBS.<sup>82</sup> . The ratio is higher than the minimum internationally required ratio of 8% due mainly to the 0% credit risk weight assigned to Capital Markets Portfolio (CMP).



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<sup>82</sup> The assumptions are as follows:

- a) In “Core Capital”, Optional Reserves and Reserves for Probable Losses is considered as 0.
- b) In “Supplementary Capital”, General Loan Loss Reserves, Fixed Asset Revaluation Fund (including cost value increases, shares of subsidiaries and affiliates and property sales), and Free Reserves for Probable Risks are considered as 0.
- c) In the “Deductions from the Capital Base”, Special Expense Values (Cost Accounts), Preliminary Expenses and Pre-paid Expenses are in the same order considered as equal to Other Non-interest Expenses, Net Expenses from Extraordinary Transactions and Personal Expenses of the Consolidated Income Statements of TBS for September 2002. Other items of Deductions from the Capital Base are considered as 0.
- d) In the “Risk Weighted Assets, Non-cash Credits and Obligations”, the following risks are considered to have a risk weight of 20%: Due from Banks, Collateralized Letters of Guarantee, Collateralized Letters of Credit, half of total FX& Interest Rate Contracts, and a quarter of Interest and Income Accruals. Due to the almost non-existence of mortgage loans, the risks with a 50% weight are considered as nil. The following risks are considered to have a risk weight of 100%: Past Due Loans (Net), Fixed Assets (Net), Other Assets, Non-collateralized Letters of Guarantee, Non-collateralized Letters of Credit, Irrevocable Commitments, half of total FX& Interest Rate Contracts, and a quarter of Interest and Income Accruals.

## **III.II. CAPITAL ADEQUACY REQUIREMENT OF TBS FOR MARKET RISK WITH THE STANDARD METHOD OF AMENDED BASEL I**

In this section, the capital adequacy requirement for market risk will be calculated for TBS with the Standard Method (SM). For the SM calculations of market risk, first, the dataset will be presented. Secondly, the MCR and the VaR will be calculated with the SM. The capital adequacy ratio for credit and market risks of TBS will be computed thereafter by summing the capital charges for credit and market risks. Third, the result of capital adequacy ratio calculation will be briefly evaluated.

### **III.II.1. The Dataset for Capital Adequacy Calculations for Market Risk with SM**

For the calculation of market risk exposure of TBS, the trading portfolio of the TBS is needed. The on and off –B/S accounts from tables 3.1 and 3.2 and the Securities Portfolio of TBS from table in Appendix 3 are used to derive the trading portfolio of the TBS. Also, certain assumptions are made regarding the amounts and currencies of each trading position.<sup>83</sup> Table 3.4 demonstrates the long and short positions of the TBS Trading Portfolio.

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<sup>83</sup> The following assumptions are made to derive the trading portfolios of the TBS:

- a) The Capital Markets Trading Portfolio of TBS Sector is assumed to be the “Government Bonds” item of the B/S, as the Capital Markets Investment Portfolio is shown in “Securities in Non-Trading Portfolio.” However, the Foreign Currency Indexed Government Debt Securities are deducted from the “Government Bonds”, as suggested by BIS and BDDK. (9,601,045 -1,945,487 = 7,655,558 Bio TL and 10,715,915 Bio TL in FC). CMP to Asset Size proportional Interest and Income Accruals (12,100,203/10 for TL and 1,248,084/10 for TL in FC) are added to the “Government Bonds” Portfolio and 8,865,578 Bio TL, and 5,420,354 TL equivalent F.C Capital Markets Trading Portfolios are achieved for EUR and USD. The CMP in FC is divided equally into USD and EUR as banks are assumed to carry hedged positions.
- b) For the repo portfolio, due to the general practice in the Turkish Market, only the sum of government bonds and treasury bills from table 3.4 are taken into account. (7,541,115 for TL and 10,757,521 TL in FCs.)
- c) For repos, from the “Funds Obtained From Repo Transactions”, the “Reverse Repo Receivables” of the Consolidated B/S is deducted as suggested by BIS and BDDK (5,564,960 TL of Repo Volume in TL and 758,150/2 =379,075 TL of Repo Volume in USD and EUR each are achieved.)
- d) Forward FX Purchase and Sale amounts are taken from Table 3.2. The Forward FX purchase and sale amounts in FC are divided equally into USD and EUR again with the assumption that banks are assumed to carry hedged positions.
- e) For Swaps, the positive Money Swap and Interest Rate Swap amounts in Table 3.2 are considered as the Purchases of Money Swaps and Interest Rate Swaps and Money Swap Sales and Interest Rate Swap Sales are considered as 0. Another reason behind this interpretation is the positive derivatives amount of the Consolidated B/S. The Money Swap Purchases and Interest Rate Swap Purchases in FC are equally divided into USD and EUR.
- f) For futures, the Money Futures and Interest Rate Futures amounts in Table 3.2 are considered as the purchases, FC futures are equally divided into USD and EUR.

Table 3.4: Trading Portfolio of the Turkish Banking System

| POSITIONS (in Billion TRL)     | CURRENCY  |           |           |
|--------------------------------|-----------|-----------|-----------|
|                                | TRL       | USD       | EUR       |
| <b>LONG POSITIONS</b>          |           |           |           |
| Capital Markets Portfolio      | 8.865.578 | 5.420.354 | 5.420.354 |
| Repo Portfolio                 | 7.541.115 | 5.378.761 | 5.378.761 |
| Forward FX Purchase            | 647.181   | 3.197.650 | 3.197.650 |
| Money Swap Purchase            | 394.527   | 5.844.038 | 5.844.038 |
| Interest Rate Swap Purchase    | 0         | 58.834    | 58.834    |
| Money Futures Purchases        | 0         | 204.548   | 204.548   |
| Interest Rate Futures Purchase | 0         | 1.313.443 | 1.313.443 |
| <b>SHORT POSITIONS</b>         |           |           |           |
| Repos                          | 5.564.960 | 379.075   | 379.075   |
| Forward FX Sales               | 591.432   | 3.553.323 | 3.553.323 |
| Money Swap Sales               | 0         | 0         | 0         |
| Interest Rate Swap Sales       | 0         | 0         | 0         |
| Money Futures Sales            | 0         | 0         | 0         |
| Interest Rate Futures Sales    | 0         | 0         | 0         |

Source: Derived from Table 1 and Table 2 and the Securities Portfolio of TBS

For the maturity structure of the Trading Portfolio, again certain assumptions are made.

The average maturity of Capital Markets Position in TL is considered as 3 months and in FC 29 months as estimated by Riskturk (2002). The TL Capital Markets Position is divided equally between 1 month, 1-3 months and 3-6 months and the repo portfolio is divided equally between the 1-3 months and 3-6 months time bands. FC Capital Markets Position and repo portfolios are divided equally between the 1-2 years and 2-3 years time bands both for USD and EUR. The average maturity of repos is considered to be 1 month for TL and 1-3 months for FC. Swap Purchases in TL are considered to have an equally divided maturity of 1-3 months and 3-6 months for TL and a maturity of 1-3 months for USD and EUR positions. Forward FX purchases and sales are assumed to have an equally divided maturity of 1-3 and 3-6 months in TL and 3-6 months for USD and EUR positions. Money Futures purchases are assumed to have a maturity of 1-3 months and Interest Rate Futures purchases are assumed to have a maturity of 3-6 months in FCs.

### **III.II.2. The Calculation of Capital Requirement with the SM of Amended Basel I**

The Amended Basel Capital Adequacy Accord to Incorporate Market Risk is evaluated in Chapter 2. As already discussed, the SM calculation for Market Risk takes into account the market risk exposure of the trading positions of interest rate related instruments, equities, foreign exchange, commodities and options and uses the “building-block” method. Here, the capital requirements for interest rate risk, equities risk and foreign exchange risks (as commodities and options risks are almost non-existent in the TBS) are calculated separately and then summed to calculate the MCR for market risk and the VaR.

#### **III.II.2.1. Capital Requirement for Interest Rate Risk**

The specific risk for interest rate risk and general market risks are calculated separately and then added to give the overall capital requirement for interest rate risk exposure.<sup>85</sup>

##### **III.II.2.1.i General Market Risk for Interest Rate Related Instruments**

In order to calculate the general market risk for Interest Rate Related Instruments, each long and short trading position is placed into a Maturity Ladder Table of 13 time bands with ascending fix risk weights. The Maturity Ladder Tables are used to calculate the risk weighted long and short positions for each currency. The capital charge for interest rate related instruments are the sum of vertical and horizontal disallowances.<sup>86</sup>

The MCR calculations and the calculation methods for Interest Rate General Market Risk for TL denominated instruments are shown in table 3.5.

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<sup>85</sup> The specific risk and general market risks of interest rate risk are already elaborated in chapter II.

<sup>86</sup> The vertical disallowance (V.D.) is calculated by summing up the risk weighed long positions within themselves and short positions within themselves and then the smaller of the sum of shorts or sum of longs in absolute values is multiplied by 10%. Horizontal Disallowance (H.D.) is calculated for the long or short position whose absolute value is smaller but only when both short and long positions exist in the time bands. Otherwise horizontal disallowance is considered as 0. H.D. is 40% for time zone I, and 30% for time zones II and III. The horizontal disallowances are calculated by applying 100% capital charge to the risk weighted non-netted positions, in order to take into account the risks that may arise due to a parallel shift in the yield curve.

Table 3. 5: Interest Rate Risk Analysis- The Calculation of General Market Risk (TL)

| CURRENCY: TL  |               |           |           |         |              |        |        |               |        |         |          |          |        |
|---|---------------|-----------|-----------|---------|--------------|--------|--------|---------------|--------|---------|----------|----------|--------|
| Maturity Ladder   | Time Band-I   |           |           |         | Time Band-II |        |        | Time Band-III |        |         |          |          |        |
|   | 1 MNTH        | 1-3 M.    | 3-6 M.    | 6-12 M. | 1-2 Y.       | 2-3 Y. | 3-4 Y. | 4-5 Y.        | 5-7 Y. | 7-10 Y. | 10-15 Y. | 15-20 Y. | 20+ Y. |
| <b>Long Positions</b>   |               |           |           |         |              |        |        |               |        |         |          |          |        |
| CMP.  | 2.955.193     | 2.955.193 | 2.955.193 |         |              |        |        |               |        |         |          |          |        |
| Repo Portfolio  |               | 3.770.558 | 3.770.558 |         |              |        |        |               |        |         |          |          |        |
| I.R. Swap Purchases   |               |           |           |         |              |        |        |               |        |         |          |          |        |
| M. Swap Purchases   |               | 197.264   | 197.264   |         |              |        |        |               |        |         |          |          |        |
| Forw. FX Purchases  |               | 323.591   | 323.591   |         |              |        |        |               |        |         |          |          |        |
| M. Futures Purchases  |               |           |           |         |              |        |        |               |        |         |          |          |        |
| I.R. Futures Purchases  |               |           |           |         |              |        |        |               |        |         |          |          |        |
| <b>Short Positions</b>  |               |           |           |         |              |        |        |               |        |         |          |          |        |
| Repos   | 5.564.960     |           |           |         |              |        |        |               |        |         |          |          |        |
| I. R. Swap Sales  |               |           |           |         |              |        |        |               |        |         |          |          |        |
| M. Swap Sales   |               |           |           |         |              |        |        |               |        |         |          |          |        |
| Forward FX Sales  |               | 295.716   | 295.716   |         |              |        |        |               |        |         |          |          |        |
| M. Futures Sales  |               |           |           |         |              |        |        |               |        |         |          |          |        |
| I. R. Futures Sales   |               |           |           |         |              |        |        |               |        |         |          |          |        |
| Vertical      Horizontal I      Horizontal II      Horizontal III |               |           |           |         |              |        |        |               |        |         |          |          |        |
| Capital Requirement   | 177           | 0         |           | 0       |              |        | 41,705 |               |        |         |          |          |        |
| <b>TOTAL</b>  | <b>41,882</b> |           |           |         |              |        |        |               |        |         |          |          |        |

**CALCULATION METHOD:**

| Risk Weights                     | 0             | 0,002  | 0,004  | 0,007 | 0,0125 | 0,0175 | 0,0225 | 0,0275 | 0,0325 | 0,0375 | 0,045 | 0,0525 | 0,06 |
|----------------------------------|---------------|--------|--------|-------|--------|--------|--------|--------|--------|--------|-------|--------|------|
| Risk W. Pos.                     |               |        |        |       |        |        |        |        |        |        |       |        |      |
| T. Short Positions               | 0             | 591    | 1.183  | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0     | 0      | 0    |
| T. Long Positions                | 0             | 14.493 | 28.986 | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0     | 0      | 0    |
| Vertical C. Requir.              | 0             | 59     | 118    | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0     | 0      | 0    |
| Mat. Lad. Net Posy.              | 0             | 13.902 | 27.804 | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0     | 0      | 0    |
| Short Position                   | 0             |        |        | 0     |        |        |        | 0      |        |        |       |        |      |
| Long Position                    | 41.705        |        |        | 0     |        |        |        |        |        |        |       |        |      |
| HCR-I                            | 0             |        |        | 0     |        |        |        | 0      |        |        |       |        |      |
| Net Remaining P.                 | 41.705        |        |        | 0     |        |        |        | 0      |        |        |       |        |      |
| HCR-II                           | 0             |        |        |       |        |        |        |        |        |        |       |        |      |
| Net Remaining P.                 | 41.705        |        |        |       |        |        |        | 0      |        |        |       |        |      |
| HCR-III                          | 41.705        |        |        |       |        |        |        |        |        |        |       |        |      |
| <b>TOTAL CAPITAL REQUIREMENT</b> | <b>41.882</b> |        |        |       |        |        |        |        |        |        |       |        |      |

The Capital Requirement calculations and the calculation methods for Interest Rate General Market Risk for USD denominated instruments are shown in table 3.6. The calculations are not repeated for the EUR positions since the USD and EUR positions are assumed to be equal.



Table 3.6: Interest Rate Risk Analysis- The Calculation of General Market Risk (USD)

| CURRENCY: \$           | Time Band-I |           |              |               | Time Band-II   |           |        |        | Time Band-III |         |          |          |        |
|------------------------|-------------|-----------|--------------|---------------|----------------|-----------|--------|--------|---------------|---------|----------|----------|--------|
|                        | 1 MNTH      | 1-3 M.    | 3-6 M.       | 6-12 M.       | 1-2 Y.         | 2-3 Y.    | 3-4 Y. | 4-5 Y. | 5-7 Y.        | 7-10 Y. | 10-15 Y. | 15-20 Y. | 20+ Y. |
| <b>Maturity Ladder</b> |             |           |              |               |                |           |        |        |               |         |          |          |        |
| <b>Long Positions</b>  |             |           |              |               |                |           |        |        |               |         |          |          |        |
| CMP.                   |             |           |              |               | 2.710.177      | 2.710.177 |        |        |               |         |          |          |        |
| Repo Portf.            |             |           |              |               | 2.689.380      | 2.689.380 |        |        |               |         |          |          |        |
| I.R.Swap Purch.        |             | 58.834    |              |               |                |           |        |        |               |         |          |          |        |
| M. Swap Purc.          |             | 5.844.038 |              |               |                |           |        |        |               |         |          |          |        |
| Forw. FX Purch.        |             |           | 3.197.650    |               |                |           |        |        |               |         |          |          |        |
| M. Futures Purch.      |             | 204.548   |              |               |                |           |        |        |               |         |          |          |        |
| I.R. Futures Purch.    |             |           | 1.313.443    |               |                |           |        |        |               |         |          |          |        |
| <b>Short Positions</b> |             |           |              |               |                |           |        |        |               |         |          |          |        |
| Repos                  |             | 379.075   |              |               |                |           |        |        |               |         |          |          |        |
| I. R.Swap Sales        |             |           |              |               |                |           |        |        |               |         |          |          |        |
| M.Swap Sales           |             |           |              |               |                |           |        |        |               |         |          |          |        |
| Forw. FX Sales         |             |           | 3.553.323    |               |                |           |        |        |               |         |          |          |        |
| M.Futures Sales        |             |           |              |               |                |           |        |        |               |         |          |          |        |
| I.R.Futures Sales      |             |           |              |               |                |           |        |        |               |         |          |          |        |
|                        |             | Vertical  | Horizontal I | Horizontal II | Horizontal III |           |        |        |               |         |          |          |        |
| Capital Requirement    |             | 1.497     | 0            | 0             | 177.274        |           |        |        |               |         |          |          |        |
| <b>TOTAL</b>           |             | 178.771   |              |               |                |           |        |        |               |         |          |          |        |

**CALCULATION METHOD:**

| Risk Weights                     | 0              | 0,002  | 0,004  | 0,007 | 0,0125  | 0,0175 | 0,0225 | 0,0275 | 0,0325 | 0,0375 | 0,045 | 0,0525 | 0,06 |
|----------------------------------|----------------|--------|--------|-------|---------|--------|--------|--------|--------|--------|-------|--------|------|
| Risk W. Pos.                     |                |        |        |       |         |        |        |        |        |        |       |        |      |
| T. Short Positions               | 0              | 758    | 14.213 | 0     | 0       | 0      | 0      | 0      | 0      | 0      | 0     | 0      | 0    |
| T.Long Positions                 | 0              | 12.215 | 18.044 | 0     | 67.494  | 94.492 | 0      | 0      | 0      | 0      | 0     | 0      | 0    |
| Vertical C. Requis.              | 0              | 76     | 1.421  | 0     | 0       | 0      | 0      | 0      | 0      | 0      | 0     | 0      | 0    |
| Mat.Lad. Net Posy.               | 0              | 11.457 | 3.831  | 0     | 67.494  | 94.492 | 0      | 0      | 0      | 0      | 0     | 0      | 0    |
| Short Position                   | 0              |        |        |       | 0       |        |        | 0      |        |        |       |        |      |
| Long Position                    | 15.288         |        |        |       | 161.986 |        |        |        |        |        |       |        |      |
| HCR -I                           | 0              |        |        |       | 0       |        |        | 0      |        |        |       |        |      |
| Net Remaining P.                 | 15.288         |        |        |       | 161.986 |        |        | 0      |        |        |       |        |      |
| HCR-II                           | 0              |        |        |       |         |        |        |        |        |        |       |        |      |
| Net Remaining P.                 | 177.274        |        |        |       |         |        |        | 0      |        |        |       |        |      |
| HCR-III                          | 177.274        |        |        |       |         |        |        |        |        |        |       |        |      |
| <b>TOTAL CAPITAL REQUIREMENT</b> | <b>178.771</b> |        |        |       |         |        |        |        |        |        |       |        |      |

The total capital requirement for Interest Rate General Market Risk is the sum of the total calculated capital requirements of TL, USD and EUR denominated instruments and equals to 399,424 billion TL.



### III.II.2.1.ii Specific Risk for Interest Rate Related Instruments

To calculate the Specific Risk for interest rate related instruments, the Government Bonds with their accruals from table 3.1 are used. However, since the government bonds have 0% risk weight, the specific risk is calculated as 0 as shown in table 3.7

Table 3.7: Interest Rate Risk – Calculation of Specific Risk

| Type of Capital Market Instrument    | Rate  | Total Market | Capital Requirement |
|--------------------------------------|-------|--------------|---------------------|
| 1 Government Bonds                   | 0,00% | 21.651.779   | 0                   |
| <b>Qualifying- Residual Maturity</b> |       |              |                     |
| 2 - Less than 6 months               | 0,25% |              | 0                   |
| 3 - Between 6-24 months              | 1,00% |              | 0                   |
| 4 - More than 24 months              | 1,60% |              | 0                   |
| 5 Others                             | 8,00% |              | 0                   |
| 6 TOTAL (1+2+3+4+5)                  |       | 21.651.779   | 0                   |

### III.II.2.2. General Market Risk and Specific Risk of Equities Positions

Equities Risk, as discussed in Chapter II, is also subject to General Market Risk and Specific Risk. The FC Equities positions are assumed to be U.S.A equities. The TL and USD Equities positions are considered to be liquid and well diversified; thus subject to 4% Specific Risk. The General and Specific Risk Capital Requirements of Equities Positions are calculated below. The calculated capital requirement for General Market Risk of Equities Positions is 189.275 Bio TL and for Specific Risk of Equities Positions is 94,637 Bio TL as shown in table 3.8.

Table 3.8: Equities Risk Analysis (in Bio TL)

|              | Positions     |            |               |            | Total Specific Risk Capital Requirement<br>[(L4+S4) x0,04] | Net Position Subject to General Market Risk NP=(L4-S4) | General Market Risk Capital Requirement [NP*0,08] |
|--------------|---------------|------------|---------------|------------|--|--|---|
|              | Subject to %8 |            | Subject to 4% |            |  |  |   |
|              | LONG (L8)     | SHORT (S8) | LONG (L4)     | SHORT (S4) |  |  |   |
| TURKEY       |               |            | 196,214       |            | 7,849  | 196,214  | 15,697  |
| U.S.D        |               |            | 2,169,718     |            | 86,789   | 2,169,718  | 173,577   |
| JAPAN        |               |            |               |            |  |  |   |
| OTHER        |               |            |               |            |  |  |   |
| <b>TOTAL</b> |               |            |               |            | <b>94,637</b>  |  | <b>189,275</b>                                    |

### III.II.2.3. General Market Risk of Foreign Exchange Positions

First, the net foreign exchange position is derived by using the on and off-B/S items of TBS. Then the calculations for market risk of foreign exchange positions are carried under certain assumptions as shown in table 3.9.<sup>87</sup>

Table 3.9: Foreign Exchange Risk Analysis (in Bio TL)

| F.C   | Long Position |                         |                       |                               | Short Position |                         |                      |                               | Net Posy (L-S)     | Value of items to be deducted from Capital |
|---|---------------|-------------------------|-----------------------|-------------------------------|----------------|-------------------------|----------------------|-------------------------------|--------------------|--|
|   | On B/S (L1)   | Off B/S Term Trans (L2) | Non-Cash Credits (L3) | Total Long Posy. (L=L1+L2+L3) | On B/S (S1)    | Off B/S Term Trans (S2) | Non-Cash Credit (S3) | Total Short Posy (S=S1+S2+S3) |                    |  |
| USD   | 44.560.331    | 15.997.274              | 0                     | 60.557.605                    | 52.497.546     | 3.932.398               | 16.028.156           | 72.458.100                    | -11.900.495        |  |
| EUR   | 44.560.331    | 15.997.274              | 0                     | 60.557.605                    | 52.497.546     | 3.932.398               | 16.028.156           | 72.458.100                    | -11.900.495        |  |
| <b>Total</b>  |               |                         |                       | <b>121.115.210</b>            |                |                         |                      | <b>144.916.200</b>            |                    |  |
| <b>Total Net Positions</b>  |               |                         |                       |                               |                |                         |                      |                               |                    |  |
| - Total Short Net Positions   |               |                         |                       |                               |                |                         |                      |                               | <b>23.800.990</b>  |  |
| - Total Long Net Positions  |               |                         |                       |                               |                |                         |                      |                               | 0                  |  |
| <b>The Bigger the total net short and long positions</b>                  |               |                         |                       |                               |                |                         |                      |                               | <b>-23.800.990</b> |  |
| <b>Exemption for the total value of items to be deducted from capital</b> |               |                         |                       |                               |                |                         |                      |                               | 0                  |  |
| <b>Gold Position</b>  |               |                         |                       |                               |                |                         |                      |                               | 0                  |  |
| <b>Exemption</b>  |               |                         |                       |                               |                |                         |                      |                               |                    |  |
| The bigger the non netted-off position total                              |               |                         |                       |                               |                |                         |                      |                               | 144.916.200        |  |
| Capital Base  |               |                         |                       |                               |                |                         |                      |                               |                    |  |
| Foreign Currency Net General Position/ Capital Base                       |               |                         |                       |                               |                |                         |                      |                               |                    |  |
| <b>Base Value for Capital Requirement</b>                                 |               |                         |                       |                               |                |                         |                      |                               | <b>23.800.990</b>  |  |
| <b>Capital Requirement (23.800.990 x 0,08)</b>                            |               |                         |                       |                               |                |                         |                      |                               | <b>1.904.079</b>   |  |

The MCR for foreign exchange positions risk is calculated by applying the 8% capital adequacy ratio to the base value for capital requirement, as shown in the above table.

The calculated capital requirement for FX Position Risk is 1,904,079 Bio TL.

Hence, the capital requirements for interest rate, equities and foreign exchange trading portfolio risks are calculated separately.

<sup>87</sup> Gold positions and exemptions are assumed to be 0

### III.II.2.4. Calculated MCR and VaR for Market Risk

The calculated capital requirements for interest rate, equities and foreign exchange trading portfolio risks will be summed to find the “Calculated Capital Requirement for Market Risk”, in other words MCR. Then, the “Value at Risk” will be calculated by multiplying the calculated capital requirement for market risk with the reciprocal of 8% minimum capital requirement ratio, that is 12.5. The calculations for capital requirement of market risk are shown in table 3.10.

Table 3.10: Summary Table for Market Analysis (in Bio TL)

|    | <b>DEFINITIONS</b>  | <b>Amount</b>     |
|----|---|-------------------|
| 1  | <b>Calculated Capital Requirement for Interest Rate Risk-Standard Method (2+3+4)</b>      | <b>399.424</b>    |
| 2  | Calculated Capital Requirement for General Market Risk                                    | 399.424           |
| 3  | Calculated Capital Requirement for Specific Risk  | 0                 |
| 4  | Calculated Capital Requirement for Options with Interest Rate Risk                        | 0                 |
| 5  | <b>Calculated Capital Requirement for Equities Portfolio Risk-Standard Method (6+7+8)</b> | <b>283.912</b>    |
| 6  | Calculated Capital Requirement for General Market Risk                                    | 189.275           |
| 7  | Calculated Capital Requirement for Specific Risk  | 94.637            |
| 8  | Calculated Capital Requirement for Options with Equities Position Risk                    | 0                 |
| 9  | <b>Calculated Capital Requirement for Foreign Exchange Risk-Standard Method (10+11)</b>   | <b>1.904.079</b>  |
| 10 | Capital Requirement   | 1.904.079         |
| 11 | Calculated Capital Requirement for Options with Foreign Exchange Risk                     | 0                 |
| 12 | <b>Total VaR-Internal Model</b>   | <b>0</b>          |
| 13 | <b>Calculated Capital Requirement for Market Risk (1+5+9+12)</b>                          | <b>2.587.415</b>  |
| 14 | <b>Value at Risk (12,5 x Row 13)</b>  | <b>32.342.688</b> |

The VaR for the Turkish Banking Sector as of September 2002 is 32.342.688 billion T.L. and the Calculated Capital Requirement for Market Risk is 2.587.415 billion TL.

### III.II.2.5. Capital Adequacy Ratio of TBS with Standard Approach of Amended Basel I

So far, the credit and market risks are calculated according to the SM of Basel I. The last step is to sum the market risk with the credit risk (table 3.3) in order to derive the Capital Adequacy Ratio of TBS according to the Amended Capital Adequacy Standard Ratio of Basel I. The Capital Adequacy Standard Ratio of TBS is illustrated in Table 3.11.

Table 3.11: Capital Adequacy Standard Ratio of Turkish Banking System

|   |                   |
|---|-------------------|
| <b>1 CORE CAPITAL (From 2to 6)</b>                                    | <b>19.608.139</b> |
| 2 a. Paid up Capital  | 12.999.013        |
| 3 b. Legal (and Provisional) Reserves                                 | 47.201.986        |
| 4 c. Optional Reserves and Reserves for Probable Losses               | 0                 |
| 5 d.Profit (Loss) for the Period                                      | -335.569          |
| 6 e. Profit (Loss) for Previous Years                                 | -40.257.291       |
| <b>7 SUPPLEMENTARY CAPITAL ( From 8 to 14)</b>                        | <b>2.631.628</b>  |
| 8 a.General Loan Loss Reserves  |                   |
| 9 b.Fixed Asset Revaluation Fund                                      | 0                 |
| 10 c.Rev. Fund for Fixed Assets                                       | 616.048           |
| 11 d.Provisions for Revaluation of F.A of Subs.and Aff.in10           | 0                 |
| 12 e. Subordinated Debts  | 1.506.048         |
| 13 f. Free Reserves for Probable Risks                                |                   |
| 14 g. Securities Revaluation Fund                                     | 509.178           |
| <b>15 TIER 3 CAPITAL</b>  | <b>0</b>          |
| <b>16 CAPITAL (1+8+16 )</b>   | <b>22.239.767</b> |
| <b>17 CAPITAL BASE FOR THE RATIO</b>                                  | <b>22.239.767</b> |
| <b>18 DEDUCTIONS FROM THE CAPITAL BASE</b>                            | <b>14.845.290</b> |
| 19 a. All Capital Participations and Investments to the Uncons.F.I    | 6.978.220         |
| 20 b. Special Expense Values(Cost Accounts)                           | 3.423.847         |
| 21 c. Preliminary Expenses  | 1.932.554         |
| 22 d. Pre-paid Expenses   | 2.510.669         |
| 23 e.Difference of Fair Value and the Book Value of Uncons. Particip. | 0                 |
| 24 f. Subordinated Loans extended to Other Banks Operating in Turkey  | 0                 |
| 25 g. Consolidation Goodwill  | 0                 |
| 26 i. Captilised Costs  | 0                 |
| <b>27 CONSOLIDATED OWN FUNDS (17-18)</b>                              | <b>7.394.477</b>  |
| <b>28</b>   |                   |
| 29 a.0% Risk Weight(42x0%)  | 0                 |
| 30 b.20% Risk weight (91x% 20)  | 12.675.080        |
| 31 c.50% Risk Weight (123x% 50)                                       | 0                 |
| 32 d.100% Risk Weight(138x% 100)                                      | 6.750.121         |
| <b>33 e.Market Risk Exposure</b>                                      | <b>32.342.688</b> |
| <b>34 STANDARD CAPITAL ADEQUACY RATIO (27 / 28)</b>                   | <b>7,13%</b>      |

Source: Derived from BRSA (2001a and 2001b)

### **III.II.3.The Result of Capital Adequacy Ratio Calculations with Standard Method:**

The Capital Adequacy Ratio of TBS for credit and market risks as of September 2002 is calculated as 7.13%.<sup>88</sup> Hence, Turkish Banking System needs additional capital even though the risk weight is considered as 0% for credit risk calculations of CMP, for interest rate general market risk calculations of non-trading CMP, and for interest rate specific risk calculations of trading CMP. Also, the Standard Approach as is observed from the computations, does not take market volatilities into account.



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<sup>88</sup> The Securities and Government Bond Positions are deducted from the risk weight calculations as they are already calculated. Hence, the 100% risk-weighted assets reduce to 58,758,121 due to the reduction of total 2,365,932, TL in other securities.

### III.III. CAPITAL ADEQUACY REQUIREMENT OF TBS FOR MARKET RISK WITH THE IMB APPROACH OF AMENDED BASEL I

The Internal Models Based Approaches of Basel I is already discussed in Chapter II. In this section, first, the dataset for VaR computations with the IMB approach will be derived. Secondly, VaR, MCR and Capital Adequacy Ratios will be computed with different VaR methods and Stress Testing. Third, the results of Capital Adequacy Ratio computations will be evaluated.

#### III.III.1. The Dataset for VaR Computation with the IMB Approach

The observation period for VaR computations in this study is from 30.09.2001 to 30.09.2002. The observation period is composed of 261 working days and is appropriate for computations since the minimum observation period advised for daily VaR calculations is 250 trading days. The portfolio is the same trading portfolio derived from the on and off B/S Accounts of TBS. However, for simplicity reasons the swap and future positions and the purchase and sale of forward FX transactions in TL are ignored in the VaR calculations with the IMB Approach.<sup>89</sup> The Trading Portfolio for VaR calculations with the IMB Approach is shown in Table 3.12.

Table 3.12: Trading Portfolio of TBS as of 30/09/2002

| POSITIONS (in Bio TL)     | TRL       | USD       | EUR       |
|---------------------------|-----------|-----------|-----------|
| <b>LONG POSITIONS</b>     |           |           |           |
| Capital Markets Portfolio | 8.865.578 | 5.420.354 | 5.420.354 |
| Repo Portfolio            | 7.541.115 | 5.378.761 | 5.378.761 |
| Forward FX Purchase       | 647.181   | 3.197.650 | 3.197.650 |
| <b>SHORT POSITIONS</b>    |           |           |           |
| Repos                     | 5.564.960 | 379.075   | 379.075   |
| Forward FX Sales          | 591.432   | 3.553.323 | 3.553.323 |

<sup>89</sup> It is worth noting though, that the swap and future positions are long positions and forward FX purchases and sales in TL are with the same maturity but with more of purchases. Hence, had they been incorporated to the VaR calculations with IMB Approach, the VaR figure and the MCR would be higher.

For the VaR computations, the Present Value (PV) of each instrument in the Trading Portfolio of TBS is required. In order to calculate the PV of each instrument, first of all, data about the maturity dates and transaction dates of the instruments are needed.<sup>90</sup> Secondly, data about the rates and prices of the instruments are needed. The calculation of the PV of each instrument in the trading portfolio requires yield data for the specific day on which the VaR figure is to be computed. The price and rate data for 30.09.2002 is derived from different sources.<sup>91</sup> Also, daily price data for each instrument is needed for the whole observation period for the calculation of price volatility and it is provided by Riskturk. For the CMP, first, the future cash flows are calculated and then the PV are derived.<sup>92</sup> The forward rates are calculated according to the assumed transaction date and rates.<sup>93</sup>

<sup>90</sup> Assumptions are made for the maturities and transaction dates of the instruments. The maturity structure assumption of the trading portfolio is the same as for the Standard Method calculation of Market Risk. The transaction date assumptions are made commensurate with the duration of the instruments and the observation period of the VaR computations.

<sup>91</sup> CBT buying rates of USD and EUR as of 30/09/2002 is as follows: CBT Buying Rate for USD/TRL=1,652,645. CBT Buying Rate for EUR/TRL=1,615,791. The yield of Eurobonds is 9% for USD and 10% for EUR, USD with semi-annual and EUR with annual coupon payments. The yield data for Eurobonds is from HSBC (2003) database. The Turkish T/B and repo rates are taken from the yield curve data of Risktürk.

<sup>92</sup> For PV calculations, the formula is:  $PV = FV / (1+y)^n$ , where y is annual yield, n is the number of periods.

| POSITION  | CURR | TR.DATE    | PURCHASE VALUE          | MATUR.     | RATE   | FUTURE VALUE            |
|-----------|------|------------|-------------------------|------------|--------|-------------------------|
| T/B (CMP) | TRL  | 02.09.2002 | 2.955.193.000.000.000   | 02.12.2002 | 0,4697 | 2.955.193.000.000.000   |
| T/B(CMP)  | TRL  | 02.09.2002 | 2.955.193.000.000.000   | 02.10.2002 | 0,3934 | 2.955.193.000.000.000   |
| T/B(CMP)  | TRL  | 02.09.2002 | 2.955.193.000.000.000   | 02.03.2003 | 0,5721 | 2.955.193.000.000.000   |
| T/B(R.P.) | TRL  | 02.09.2002 | 3.770.558.000.000.000   | 02.12.2002 | 0,4697 | 3.770.558.000.000.000   |
| T/B(R.P.) | TRL  | 02.09.2002 | 3.770.558.000.000.000   | 02.03.2003 | 0,5721 | 3.770.558.000.000.000   |
| REPO      | USD  | 02.09.2002 | 379.075.000.000.000     | 02.12.2002 | 0,4697 | - 379.075.000.000.000   |
| REPO      | EUR  | 02.09.2002 | 379.075.000.000.000     | 02.12.2002 | 0,4697 | - 379.075.000.000.000   |
| REPO      | TRL  | 02.09.2002 | - 5.564.960.000.000.000 | 02.10.2002 | 0,3934 | - 5.564.960.000.000.000 |

<sup>93</sup> The following calculations are carried for forward positions:

| TRANS. DATE | PUR/SALE | TL EQUIV IN BIO TRL | RATE AT TR.DATE | CURR | AMOUNT      | MATURITY DATES | TL INTER. RATES | FC INTER RATES | FW RATE | CASHFLOW AT FWD MATURITY |
|-------------|----------|---------------------|-----------------|------|-------------|----------------|-----------------|----------------|---------|--------------------------|
| 01.05.2002  | P        | 1.065.880           | 1.331.884       | USD  | 800.279.904 | 01.11.2002     | 0,4829          | 0,0211         | 1636205 | 1.309.422.320.518.530    |
| 03.06.2002  | P        | 1.065.880           | 1.438.010       | USD  | 741.218.768 | 03.10.2002     | 0,5095          | 0,0194         | 1671424 | 1.238.890.461.681.130    |
| 01.07.2002  | P        | 1.065.880           | 1.569.143       | USD  | 679.275.248 | 01.10.2002     | 0,4912          | 0,0185         | 1753723 | 1.191.260.484.260.300    |
| 01.08.2002  | S        | 1.184.441           | 1.688.194       | USD  | 701.602.422 | 02.02.2003     | 0,5955          | 0,0171         | 2172281 | 1.524.077.445.590.200    |
| 02.09.2002  | S        | 1.184.441           | 1.621.347       | USD  | 730.528.998 | 02.01.2003     | 0,534           | 0,0173         | 1898996 | 1.387.271.565.306.730    |
| 02.09.2002  | S        | 1.184.441           | 1.621.347       | USD  | 730.528.998 | 02.12.2002     | 0,5001          | 0,0174         | 1816156 | 1.326.754.354.582.570    |
| 01.05.2002  | P        | 1.065.880           | 1.201.493       | EUR  | 887.129.596 | 02.10.2002     | 0,5654          | 0,0321         | 1464951 | 1.299.601.394.679.490    |
| 03.06.2002  | P        | 1.065.880           | 1.348.566       | EUR  | 790.380.300 | 02.12.2002     | 0,5955          | 0,0319         | 1722626 | 1.361.529.376.445.690    |
| 01.07.2002  | P        | 1.065.880           | 1.560.255       | EUR  | 683.144.742 | 01.11.2002     | 0,534           | 0,0323         | 1818402 | 1.242.231.942.749.730    |
| 01.08.2002  | S        | 1.184.441           | 1.653.079       | EUR  | 716.505.987 | 02.12.2002     | 0,534           | 0,0323         | 1926584 | 1.380.409.093.427.430    |
| 02.09.2002  | S        | 1.184.441           | 1.597.675       | EUR  | 741.352.903 | 02.03.2003     | 0,5955          | 0,0319         | 2040832 | 1.512.976.335.203.500    |
| 02.09.2002  | S        | 1.184.441           | 1.597.675       | EUR  | 741.352.903 | 02.03.2003     | 0,469           | 0,0319         | 1941365 | 1.439.236.590.875.540    |



The derived PVs of the TBS Trading Positions as of 30.09.2002 is illustrated in table 13. <sup>94</sup>

Table 3.13: The P.V. of Trading Portfolio of TBS as of 30/09/02

| TYPE OF POSITION | CURR. TYPE | TRNSACTION DATE | PURCHASE VALUE          | MATURITY DATE | C. / INT RATE FWD.RATE | PRESENT VALUE AS OF 30.09.2002 |
|------------------|------------|-----------------|-------------------------|---------------|------------------------|--------------------------------|
| EUROB. (CMP)     | USD        | 02.09.2002      | 2.710.177.000.000.000   | 02.09.2005    | 10%                    | 3.240.935.037.261.680          |
| EUROB. (CMP)     | USD        | 02.09.2002      | 2.710.177.000.000.000   | 02.09.2004    | 10%                    | 3.077.574.295.667.730          |
| EUROB. (CMP)     | EUR        | 02.09.2002      | 2.710.177.000.000.000   | 02.09.2004    | 9%                     | 3.075.148.157.226.970          |
| EUROB. (CMP)     | EUR        | 02.09.2002      | 2.710.177.000.000.000   | 02.09.2005    | 9%                     | 3.246.697.168.748.790          |
| EUROB. (R.P.)    | EUR        | 02.09.2002      | 2.689.380.000.000.000   | 02.09.2004    | 9%                     | 3.051.550.488.320.870          |
| EUROB. (R.P.)    | EUR        | 02.09.2002      | 2.689.380.000.000.000   | 02.09.2005    | 9%                     | 3.221.783.089.520.940          |
| EUROB. (R.P.)    | USD        | 02.09.2002      | 2.689.380.000.000.000   | 02.09.2005    | 10%                    | 3.216.065.177.538.570          |
| EUROB. (R.P.)    | USD        | 02.09.2002      | 2.689.380.000.000.000   | 02.09.2004    | 10%                    | 3.053.958.012.051.820          |
| T/B (CMP)        | TRL        | 02.09.2002      | 2.955.193.000.000.000   | 02.12.2002    | 0,4697                 | 3.051.309.027.752.590          |
| T/B (CMP)        | TRL        | 02.09.2002      | 2.955.193.000.000.000   | 02.10.2002    | 0,3934                 | 3.050.746.939.139.730          |
| T/B (CMP)        | TRL        | 02.09.2002      | 2.955.193.000.000.000   | 02.03.2003    | 0,5721                 | 3.063.480.332.518.430          |
| T/B (R.P.)       | TRL        | 02.09.2002      | 3.770.558.000.000.000   | 02.12.2002    | 0,4697                 | 3.893.193.326.143.090          |
| T/B (R.P.)       | TRL        | 02.09.2002      | 3.770.558.000.000.000   | 02.03.2003    | 0,5721                 | 3.908.722.806.131.450          |
| REPO             | USD        | 02.09.2002      | 379.075.000.000.000     | 02.12.2002    | 0,4697                 | - 401.966.514.448.687          |
| REPO             | EUR        | 02.09.2002      | 379.075.000.000.000     | 02.12.2002    | 0,4697                 | - 402.610.703.963.420          |
| REPO             | TRL        | 02.09.2002      | - 5.564.960.000.000.000 | 02.10.2002    | 0,3934                 | - 5.765.162.786.897.260        |
| FORWARD          | USD        | 01.05.2002      | 800.279.904             | 01.11.2002    | 1.636.205              | 50.362.457.469.307             |
| FORWARD          | USD        | 03.06.2002      | 741.218.768             | 03.10.2002    | 1.671.423              | - 9.662.647.104.726            |
| FORWARD          | USD        | 01.07.2002      | 679.275.248             | 01.10.2002    | 1.753.723              | - 68.284.453.664.802           |
| FORWARD          | TRL        | 01.08.2002      | 1.524.077.445.590.200   | 02.02.2003    | 2.172.281              | 78.220.388.382.018             |
| FORWARD          | TRL        | 02.09.2002      | 1.387.271.565.306.730   | 02.01.2003    | 1.898.996              | 92.736.554.802.088             |
| FORWARD          | TRL        | 02.09.2002      | 1.326.754.354.582.570   | 02.12.2002    | 1.816.156              | 28.174.454.238.752             |
| FORWARD          | EUR        | 01.05.2002      | 887.129.596             | 02.10.2002    | 1.464.951              | 132.719.283.717.687            |
| FORWARD          | EUR        | 03.06.2002      | 790.380.300             | 02.12.2002    | 1.722.626              | - 3.145.415.597.453            |
| FORWARD          | EUR        | 01.07.2002      | 683.144.742             | 01.11.2002    | 1.818.402              | - 104.303.434.461.068          |
| FORWARD          | TRL        | 01.08.2002      | 1.380.409.093.427.430   | 02.12.2002    | 1.926.584              | 71.080.027.988.694             |
| FORWARD          | TRL        | 02.09.2002      | 1.512.976.335.203.500   | 02.03.2003    | 2.040.831              | 110.344.946.594.268            |
| FORWARD          | TRL        | 02.09.2002      | 1.439.236.590.875.540   | 02.03.2003    | 1.941.365              | 9.667.324.652.599              |
| <b>TOTAL P.V</b> |            |                 |                         |               |                        | <b>35.969.333.339.730.700</b>  |

The Present Value of TBS Trading Portfolio is 35,969,333,339,730,700 T.L.

<sup>94</sup> In table 14, EUROB (CMP) and T/B (CMP) stand for the Eurobonds and Treasury Bills in the Capital Markets Portfolio whereas EUROB (R.P) and T/B (R.P) stand for Eurobonds and Treasury Bills in the Repo Portfolio.

### III.III.2.The Calculations of VaR, MCR and Capital Adequacy Ratio with the IMBA

VaR computes the maximum loss that the portfolio may be exposed by the end of the next working day. The methods used in this study for the computation of VaR are Variance-Covariance Method with EWMA and Garch volatilities, the Historical Simulation Method and the Monte Carlo Method. Also Stress Testing is applied for the crises period of 20/01/2001-20/03/2001. The VaR and MCR computations are in Appendix IV. Here only the results of the computations will be demonstrated. When VaR of the portfolio (VaRp) is computed, the MCR can be easily calculated.<sup>95</sup>

#### III.III.2.1 Calculated VaR and MCR for Market Risk with IMB Approaches:

The results of different VaR measurement methods are summarized in Table 3.14

Table 3.14: The Results of VaR & MCR Computations with IMB Approaches

| METHOD                   | VOLATILITY | VaR (Bio TL) | MCR (Bio TL) |
|--------------------------|------------|--------------|--------------|
| Variance-Covariance      | EWMA       | 445.974      | 4.230.780    |
| Variance-Covariance      | GARCH      | 447.083      | 4.241.297    |
| Monte Carlo Simulation   | EWMA       | 481.399      | 4.566.844    |
| Historical Simulation    | EWMA       | 748.153      | 7.097.430    |
| Stress Testing (Var-Cov) | GARCH      | 2.543.162    | 24.125.968   |

The Variance-Covariance Method with EWMA and GARCH volatilities and the Monte Carlo Simulation Method produces quite similar VaR and MCR results. The Historical Simulation method, which bases its calculations on the price data of the period, gives almost twice as high VaR and MCR results, as the observation period is just after the crises time with hectic price movements. The MCR results of Stress Testing for the crises period of January 20- March 20, 2001 demonstrates the level of capital required in crises situations for the Turkish Banking System.

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<sup>95</sup> The formula for the calculation of MCR is as follows:  $MCR = 3 \times VaRp \times \sqrt{10}$ , 3 is the multiplicative k factor which is minimum 3 but under certain conditions which may be maximum 4. The reason for the multiplication of VaRp with the square root of 10 is because VaRp is computed with a 1 day time horizon but according to Basel directives the Capital Requirement is computed with a horizon of ten days.

### III.III.2.2.The Capital Adequacy Ratio Computations with IMBA of Amended Basel I

The Capital Adequacy Ratio Computations first requires that the VaR results of the IMBA be incorporated to the Market Risk Analysis as shown in Table 3.15.

Table 3.15: Summary Table for Market Risk Analysis

| DEFINITIONS |   | Amount            |
|-------------|---|-------------------|
| 1           | <b>Calculated Capital Requirement for Interest Rate Risk-Standard Method (2+3+4)</b>      | <b>399.424</b>    |
| 2           | Calculated Capital Requirement for General Market Risk                                    | 399.424           |
| 3           | Calculated Capital Requirement for Specific Risk  | 0                 |
| 4           | Calculated Capital Requirement for Options with Interest Rate Risk                        | 0                 |
| 5           | <b>Calculated Capital Requirement for Equities Portfolio Risk-Standard Method (6+7+8)</b> | <b>283.912</b>    |
| 6           | Calculated Capital Requirement for General Market Risk                                    | 189.275           |
| 7           | Calculated Capital Requirement for Specific Risk  | 94.637            |
| 8           | Calculated Capital Requirement for Options with Equities Position Risk                    | 0                 |
| 9           | <b>Calculated Capital Requirement for Foreign Exchange Risk-Standard Method (10+11)</b>   | <b>1.904.079</b>  |
| 10          | Capital Requirement   | 1.904.079         |
| 11          | Calculated Capital Requirement for Options with Foreign Exchange Risk                     | 0                 |
| 12          | <b>Total VaR-Internal Model</b>   | <b>445.974</b>    |
| 13          | <b>Calculated Capital Requirement for Market Risk (1+5+9+12)</b>                          | <b>3.033.389</b>  |
| 14          | <b>Value at Risk (12,5 x Row 13)</b>  | <b>37.917.363</b> |

The computation of Value at Risk with IMBA that is demonstrated here is carried with the Variance- Covariance Method, EWMA volatility. The summary results of the VaR computations with the other methods are in table 3.16.

Table 3.16 Summary Results of VaR Computations with the IMB Approaches

| METHOD                   | VOLATILITY | Total VaR-Internal Model | Value at Risk (Bio TL) |
|--------------------------|------------|--------------------------|------------------------|
| Variance-Covariance      | EWMA       | 445.974                  | 37.917.363             |
| Variance-Covariance      | GARCH      | 447.083                  | 37.931.225             |
| Monte Carlo Simulation   | EWMA       | 481.399                  | 38.360.175             |
| Historical Simulation    | EWMA       | 748.153                  | 41.694.600             |
| Stress Testing (Var-Cov) | GARCH      | 2.543.162                | 64.132.213             |

Then, the computed Value at Risk will be incorporated with the Credit Risk capital charges to compute Capital Adequacy Ratio of TBS as shown in Table 3.17 for Variance-Covariance Method, EWMA volatility.

**Table 3.17: Capital Adequacy Ratio of Turkish Banking System**

|  |                   |
|--|-------------------|
| <b>1 CORE CAPITAL (From 2to 6)</b>   | <b>19.608.139</b> |
| <b>2 a. Paid up Capital</b>  | 12.999.013        |
| <b>3 b. Legal (and Provisional) Reserves</b>                                 | 47.201.986        |
| <b>4 c. Optional Reserves and Reserves for Probable Losses</b>               | 0                 |
| <b>5 d.Profit (Loss) for the Period</b>                                      | -335.569          |
| <b>6 e. Profit (Loss) for Previous Years</b>                                 | -40.257.291       |
| <b>7 SUPPLEMENTARY CAPITAL ( From 8 to 14)</b>                               | <b>2.631.628</b>  |
| <b>8 a.General Loan Loss Reserves</b>  |                   |
| <b>9 b.Fixed Asset Revaluation Fund</b>                                      | 0                 |
| <b>10 c.Rev. Fund for Fixed Assets</b>                                       | 616.048           |
| <b>11 d.Provisions for Revaluation of F.A of Subs.and Aff.in10</b>           | 0                 |
| <b>12 e. Subordinated Debts</b>  | 1.506.048         |
| <b>13 f. Free Reserves for Probable Risks</b>                                |                   |
| <b>14 g. Securities Revaluation Fund</b>                                     | 509.178           |
| <b>15 TIER 3 CAPITAL</b>   | <b>0</b>          |
| <b>16 CAPITAL (1+8+16 )</b>  | <b>22.239.767</b> |
| <b>17 CAPITAL BASE FOR THE RATIO</b>   | <b>22.239.767</b> |
| <b>18 DEDUCTIONS FROM THE CAPITAL BASE</b>                                   | <b>14.845.290</b> |
| <b>19 a. All Capital Participations and Investments to the Uncons.F.I</b>    | 6.978.220         |
| <b>20 b. Special Expense Values(Cost Accounts)</b>                           | 3.423.847         |
| <b>21 c. Preliminary Expenses</b>  | 1.932.554         |
| <b>22 d. Pre-paid Expenses</b>   | 2.510.669         |
| <b>23 e.Difference of Fair Value and the Book Value of Uncons. Particip.</b> | 0                 |
| <b>24 f. Subordinated Loans extended to Other Banks Operating in Turkey</b>  | 0                 |
| <b>25 g. Consolidation Goodwill</b>  | 0                 |
| <b>26 i. Captilised Costs</b>  | 0                 |
| <b>27 CONSOLIDATED OWN FUNDS (17-18)</b>                                     | <b>7.394.477</b>  |
| <b>28 RISK-WEIGHTED ASSETS, NON-CASH CRED.&amp;OBLIG.</b>                    | 109.350.564       |
| <b>29 a.0% Risk Weight(42x0%)</b>  | 0                 |
| <b>30 b.20% Risk weight (91x% 20)</b>  | 12.675.080        |
| <b>31 c.50% Risk Weight (123x% 50)</b>                                       | 0                 |
| <b>32 d.100% Risk Weight(138x% 100)</b>                                      | 58.758.121        |
| <b>33 e.Market Risk Exposure</b>   | 37.917.363        |
| <b>34 CAPITAL ADEQUACY RATIO (27 / 28)</b>                                   | <b>6,76%</b>      |

### III.III.3.The Results of Capital Adequacy Computations with IMB Approaches

Table 3.18:Capital Adequacy Ratio of Turkish Banking System with IMB Approaches

| METHOD                   | VOLATILITY | VaR-Internal Model | VALUE AT RISK (Bio TL) | CAP. ADEQ. RATIO |
|--------------------------|------------|--------------------|------------------------|------------------|
| Variance-Covariance      | EWMA       | 445.974            | 37.917.363             | 6,76%            |
| Variance-Covariance      | GARCH      | 447.083            | 37.931.225             | 6,76%            |
| Monte Carlo Simulation   | EWMA       | 481.399            | 38.360.175             | 6,73%            |
| Historical Simulation    | EWMA       | 748.153            | 41.694.600             | 6,54%            |
| Stress Testing (Var-Cov) | GARCH      | 2.543.162          | 64.132.213             | 5,45%            |

The TBS is under-capitalized and needs additional capital to reach to minimum 8% Capital Adequacy level. Also, the results show that the Capital Adequacy Requirement with the IMB Approach for market risk produces much lower capital adequacy ratios compared with the Standard Method as the IMB Approach for market risk calculates the risk of trading CMP.

However, there is still one very important point that deserves attention regarding the capital adequacy calculations of the existing Basel I framework. As already mentioned, in the Standard Approach for credit risk, the total CMP has 0% risk weight and in the Standard Approach for Market Risk, the risk of trading CMP is considerably neglected. The IMB Approach for market risk, on the other hand, calculates the risk of only the Trading CMP. Hence, the risk of the non-trading CMP, which is much bigger than the trading CMP is not calculated in the existing Basel I framework. Conversely, as discussed in the first chapter, the interest rate risk is one of the major causes of crises in the developing world. In Turkey, the huge CMP in the banking books, funded with non-hedged short FX positions and short-term mismatched borrowing has been spotted as the main cause of the systemic banking crisis in 2000-2001. As the Basel I framework does not cover the risks of the non-trading CMP, the total CMP is incorporated into the calculations of VaR and MCR to compute the real risk exposure of TBS.<sup>96</sup> The table below shows the PVs of the Turkish Banking System Portfolios with total CMP incorporated.

<sup>96</sup> In the Consolidated Balance Sheet of the Turkish Banking System, the Capital Markets Portfolio is divided into "Trading Portfolio" and "Non-Trading Portfolio". The same database and assumptions used in the calculation of market risk with IMB Approach holds true. The only difference is the addition of the non-trading portfolio to the market risk computations.

Table 3.19: Present Values TBS Portfolios with Total Capital Markets Portfolio Included

| TYPE OF POSITION  | CURR. TYPE | TRNSACTION DATE | PURCHASE VALUE          | MATURITY DATE | C. / INT RATE FWD. RATE | PRESENT VALUE AS OF 30.09.2002 |
|-------------------|------------|-----------------|-------------------------|---------------|-------------------------|--------------------------------|
| EUROB. (CMP)      | USD        | 02.09.2002      | 7.180.867.500.000.000   | 02.09.2005    | 10%                     | 8.587.160.574.260.480          |
| EUROB. (CMP)      | USD        | 02.09.2002      | 7.180.867.500.000.000   | 02.09.2004    | 10%                     | 8.154.321.006.830.330          |
| EUROB. (CMP)      | EUR        | 02.09.2002      | 7.180.867.500.000.000   | 02.09.2004    | 9%                      | 8.147.892.723.124.350          |
| EUROB. (CMP)      | EUR        | 02.09.2002      | 7.180.867.500.000.000   | 02.09.2005    | 9%                      | 8.602.427.877.586.050          |
| EUROB. (R.P.)     | EUR        | 02.09.2002      | 2.689.380.000.000.000   | 02.09.2004    | 9%                      | 3.051.550.488.320.870          |
| EUROB. (R.P.)     | EUR        | 02.09.2002      | 2.689.380.000.000.000   | 02.09.2005    | 9%                      | 3.221.783.089.520.940          |
| EUROB. (R.P.)     | USD        | 02.09.2002      | 2.689.380.000.000.000   | 02.09.2005    | 10%                     | 3.216.065.177.538.570          |
| EUROB. (R.P.)     | USD        | 02.09.2002      | 2.689.380.000.000.000   | 02.09.2004    | 10%                     | 3.053.958.012.051.820          |
| T/B (CMP)         | TRL        | 02.09.2002      | 16.388.409.333.333.300  | 02.12.2002    | 0,4697                  | 16.921.433.337.621.200         |
| T/B (CMP)         | TRL        | 02.09.2002      | 16.388.409.333.333.300  | 02.10.2002    | 0,3934                  | 16.918.316.201.695.000         |
| T/B (CMP)         | TRL        | 02.09.2002      | 16.388.409.333.333.300  | 02.03.2003    | 0,5721                  | 16.988.930.900.258.700         |
| T/B (R.P.)        | TRL        | 02.09.2002      | 3.770.558.000.000.000   | 02.12.2002    | 0,4697                  | 3.893.193.326.143.090          |
| T/B (R.P.)        | TRL        | 02.09.2002      | 3.770.558.000.000.000   | 02.03.2003    | 0,5721                  | 3.908.722.806.131.450          |
| REPO              | USD        | 02.09.2002      | - 379.075.000.000.000   | 02.12.2002    | 0,4697                  | - 401.966.514.448.687          |
| REPO              | EUR        | 02.09.2002      | - 379.075.000.000.000   | 02.12.2002    | 0,4697                  | - 402.610.703.963.420          |
| REPO              | TRL        | 02.09.2002      | - 5.564.960.000.000.000 | 02.10.2002    | 0,3934                  | - 5.765.162.786.897.260        |
| FORWARD           | USD        | 01.05.2002      | 800.279.904             | 01.11.2002    | 1.636.205               | 50.362.457.469.307             |
| FORWARD           | USD        | 03.06.2002      | 741.218.768             | 03.10.2002    | 1.671.423               | - 9.662.647.104.726            |
| FORWARD           | USD        | 01.07.2002      | 679.275.248             | 01.10.2002    | 1.753.723               | - 68.284.453.664.802           |
| FORWARD           | TRL        | 01.08.2002      | 1.524.077.445.590.200   | 02.02.2003    | 2.172.281               | 78.220.388.382.018             |
| FORWARD           | TRL        | 02.09.2002      | 1.387.271.565.306.730   | 02.01.2003    | 1.898.996               | 92.736.554.802.088             |
| FORWARD           | TRL        | 02.09.2002      | 1.326.754.354.582.570   | 02.12.2002    | 1.816.156               | 28.174.454.238.752             |
| FORWARD           | EUR        | 01.05.2002      | 887.129.596             | 02.10.2002    | 1.464.951               | 132.719.283.717.687            |
| FORWARD           | EUR        | 03.06.2002      | 790.380.300             | 02.12.2002    | 1.722.626               | - 3.145.415.597.453            |
| FORWARD           | EUR        | 01.07.2002      | 683.144.742             | 01.11.2002    | 1.818.402               | - 104.303.434.461.068          |
| FORWARD           | TRL        | 01.08.2002      | 1.380.409.093.427.430   | 02.12.2002    | 1.926.584               | 71.080.027.988.694             |
| FORWARD           | TRL        | 02.09.2002      | 1.512.976.335.203.500   | 02.03.2003    | 2.040.831               | 110.344.946.594.268            |
| FORWARD           | TRL        | 02.09.2002      | 1.439.236.590.875.540   | 02.03.2003    | 1.941.365               | 9.667.324.652.599              |
| <b>TOTAL P.V.</b> |            |                 |                         |               |                         | <b>98.483.925.002.790.800</b>  |

The inclusion of the total CMP produces almost triple as high Total Present Values. The VaR, MCR and the Capital Adequacy Ratios are computed with the IMB Approaches for the TBS portfolio incorporating total CMP and the following results are achieved.

Table 3.20: Capital Adequacy Computations with Total Capital Markets Portfolio Included

| METHOD                   | VOLATILITY | VaR-Inter. Met. | VaR (Bio TL) | CAP.ADEQ. RATIO |
|--------------------------|------------|-----------------|--------------|-----------------|
| Variance-Covariance      | EWMA       | 806.019         | 42.417.925   | 6,49%           |
| Variance-Covariance      | GARCH      | 805.085         | 42.406.250   | 6,49%           |
| Monte Carlo Simulation   | EWMA       | 873.627         | 43.263.025   | 6,45%           |
| Historical Simulation    | EWMA       | 1.422.040       | 50.118.188   | 6,08%           |
| Stress Testing (Var-Cov) | GARCH      | 4.839.451       | 92.835.825   | 4,50%           |

The results show that the VaR and MCR considerably rise and Capital Adequacy Ratio fall even further with the inclusion of the total capital markets portfolio to the computations.



### **III.IV. CAPITAL ADEQUACY REQUIREMENT OF TBS WITH STANDARD APPROACH OF BASEL II**

In this section, the Capital Requirement of TBS is calculated with the Standard Approach of Basel II. First, the dataset for the Standard Method calculations of Basel II will be presented. Then, the calculations for Capital Adequacy Ratio will be carried. As the third step, the results of the calculations will be evaluated.

#### **III.IV.1. The Dataset for the Standard Method Calculations of Basel II**

The on and off-B/S of TBS as of 30 September 2002 in Tables 3.1 and 3.2 are used for the Standard Method Calculations of Basel II. The analysis is carried by using table 3.21 supplied by BCBS (2003c) as part of QIS3.<sup>97</sup> The Capital Adequacy calculations with the Standard Approach of Basel II may bear some errors since there is neither any other source to verify, nor any legal documentation present as yet. Hence the calculation results should be seen as a crude analysis of how the Capital Adequacy Ratio of Turkish Banking Sector would be if Basel II were to be applied today.

In the calculations, the sovereign risk is assumed as 100% since with Basel II the privilege Turkey is enjoying due to being an OECD member will no more prevail and the risk weight for long term B grade sovereign rate is 100%. For bank exposures, the first option is chosen where the banks have a rating one category lower than sovereign rating, though capped at 100%. Hence bank exposures have a risk weight of 100%. For corporate exposures, rating by ECAs and ECAIs are not common in Turkey, thus the non-rated 100% risk weight is applied for corporate exposures. For operational risk, the basic indicator approach is used. A 15% alpha factor for operational risk charge is applied to the average of the gross incomes of the sector for 2000, 2001 and 2002.

The Capital Adequacy Ratio of Turkish Banking Sector is calculated in the following subsection.

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<sup>97</sup> Table 3.20 is organised for calculations with the current accord and the Standard Approach of Basel II, however since current accord calculations are already completed, only the Standard Approach of Basel II calculations will be carried.



### III.IV.2.The CA Ratio Calculations with the Standard Approach of Basel II

Table 3.21: Capital Requirements with the Standard Approach of Basel II

| <b>CAPITAL REQUIREMENTS WITH STANDARD APPROACH OF BASEL II</b>   |                    |                   |
|--|--------------------|-------------------|
| <b>Capital Held</b>  |                    |                   |
| <b>Capital held by bank before supervisory deductions</b>        |                    |                   |
|  | Reporting currency | Euros             |
| Eligible Tier One Capital:                                       | 19.608.139         | -                 |
| Eligible Tier Two Capital:                                       | 2.631.628          | -                 |
| Eligible Tier Three Capital                                      | -                  | -                 |
| <b>Total eligible capital</b>                                    | <b>22.239.767</b>  | <b>-</b>          |
| <b>Supervisory Deductions</b>                                    |                    |                   |
|  | Current            | Standardized      |
| Supervisory Deductions relating for related entities             | -                  | -                 |
| Deductions for securitisation exposures                          | -                  | -                 |
| For capitalized assets   | -                  | -                 |
| For investments  | -                  | -                 |
| For originations   | -                  | -                 |
| Other supervisory deductions                                     | -                  | 14.845.290        |
| <b>Total supervisory deductions</b>                              | <b>-</b>           | <b>14.845.290</b> |
| <b>Risk weighted assets</b>                                      |                    |                   |
| 1) Banking Book  | Current            | Standardized      |
| <b>1a) Drawn and off-balance sheet exposures</b>                 |                    |                   |
| Total corporate (of which:)                                      | 0                  | 74.911.243        |
| Corporate not including SMEs, specialized lend and rec.          | 0                  | 74.255.888        |
| Specialized lending  | 0                  | 655.355           |
| Sovereign  | 0                  | 32.085.289        |
| Bank   | 0                  | 24.715.680        |
| Retail (not including SMEs); of which:                           | 0                  | 2.527.727         |
| Residential Mortgages  | 0                  | 0                 |
| Non-mortgage retail (not including small business)               | 0                  | 0                 |
| Non-mortgage retail (qualifying revolving exposures)             | 0                  | 2.527.727         |
| SME exposures (of which:)  | 0                  | 1.834.363         |
| Treated as corporate   | 0                  | 1.834.363         |
| Treated as retail  | 0                  | 0                 |
| Equity   | 0                  | 2.365.932         |
| Purchased receivables  | 0                  | 0                 |
| Securitized assets (incl. liquid facilities& early amortization) | 0                  | 0                 |
| Originators  | 0                  | 0                 |
| Investors  | 0                  | 0                 |
| <b>1b) Commitments</b>   |                    |                   |

|   |                |                     |
|---|----------------|---------------------|
| Total corporate of which                                      | 0              | 0                   |
| Corporate not including SMEs, specialized lend and rec.       | 0              | 0                   |
| Specialized lending   | 0              | 0                   |
| Sovereign   | 0              | 0                   |
| Bank  | 0              | 0                   |
| Retail (not including SMEs); of which:                        | 0              | 0                   |
| Residential Mortgages   | 0              | 0                   |
| Non-mortgage retail (not including small business)            | 0              | 0                   |
| Non-mortgage retail (qualifying revolving exposures)          | 0              | 0                   |
| SME exposures   | 0              | 0                   |
| Treated as corporate  | 0              | 0                   |
| Treated as retail   | 0              | 0                   |
| <b>1c) Counter party exposures</b>                            |                |                     |
| <b>i) Repo-style transactions</b>                             |                |                     |
| Corporate not including SMEs, specialized lend. & receivables | 0              | 3,168.854           |
| Sovereign   | 0              | 0                   |
| Bank  | 0              | 0                   |
| Retail (Non-mortgage retail: not incl. small business)        | 0              | 0                   |
| SME exposures   | 0              | 0                   |
| Treated as corporate  | 0              | 0                   |
| Treated as retail   | 0              | 0                   |
| <b>ii) OTC derivatives</b>                                    |                |                     |
| Corporate not including SMEs, specialized.lend. and receiv.   | 0              | 15,336.198          |
| Sovereign   | 0              | 0                   |
| Bank  | 0              | 0                   |
| Retail (Non-mortgage retail: not incl. small business)        | 0              | 0                   |
| SME exposures   | 0              | 0                   |
| Treated as corporate  | 0              | 0                   |
| Treated as retail   | 0              | 0                   |
| <b>Sub-total: banking book risk weighted assets</b>           | <b>0</b>       | <b>156.945.286</b>  |
| <b>1d) Offset for general provisions</b>                      |                |                     |
| General provisions  |                |                     |
| General provisions not included in capital                    |                |                     |
| Total EL charge (RWA)   |                |                     |
| Total offset for specific provisions (RWA)                    |                |                     |
| Remaining EL charge   |                |                     |
| Offset for general provisions                                 |                |                     |
| <b>Total: risk weighted assets for credit risk</b>            | <b>0</b>       | <b>156.945.286</b>  |
| <b>2) Trading Book</b>  | <b>Current</b> | <b>Standardized</b> |
| <b>2a) Counter party exposures (risk weighted assets)</b>     |                |                     |

|   |                   |                   |
|---|-------------------|-------------------|
| Repo-style transactions   | 0                 | 0                 |
| OTC derivatives   | 0                 | 0                 |
| <b>2b) Specific risk charge (risk weighted assets)</b>                                    |                   |                   |
| Standard method   | 0                 | 17.358            |
| Internal model method capital charge  |                   | 0                 |
| Internal model method (equivalent risk-weighted assets)                                   | 95.579.775        | 0                 |
| <b>2c) General market risk charge (risk weighted assets)</b>                              |                   |                   |
| Market risk capital charge  | 7.646.382         |                   |
| Market risk charge (risk weighted asset equivalent)                                       | 0                 |                   |
| <b>Total: trading book risk weighted assets</b>   | <b>95.579.775</b> | <b>95.579.775</b> |
| <b>3) Current Accord Reconciliation</b>   |                   |                   |
| <b>4) Operational risk requirements</b>   |                   |                   |
| Basic Indicator Approach (risk weighted assets equivalent)                                | 5.936.693         |                   |
| Standardized Approach (risk weighted assets equivalent)                                   | 0                 |                   |
| Advanced Measurement Approach*  | 0                 |                   |
| * Not used in overall capital calculations  |                   |                   |
| <b>Total operational risk requirements (risk weighted assets)</b>                         |                   | <b>5.936.693</b>  |
| <b>5) Overall Capital ratios</b>  |                   |                   |
| <b>5a) Risk weighted assets for exposures included in QIS 3</b>                           |                   |                   |
| Banking Book requirements*  | -                 | 156.945.286       |
| Trading Book requirements (counterap. and specific risk)                                  | 0                 | 17.358            |
| Market risk   | 0                 | 7.646.382         |
| Large exposures (EU only)   | 0                 | 0                 |
| Operational risk  |                   | 5.936.693         |
| * Adjusted to remove effects of risk-weighted asset equivalent for deduct. for securities |                   |                   |
| <b>5b) Risk weighted assets for other exposures</b>                                       |                   |                   |
| Related entities (investments with risk weighting treatment)                              | 0                 | 0                 |
| <b>5c) Risk weighted assets for exposures not included in QIS 3*</b>                      |                   |                   |
|   |                   |                   |
| <b>5d) Capital ratios</b>   |                   |                   |
| Tier 1 + Tier 2 + Tier 3 Capital  | 22.239.767        | 22.239.767        |
| Supervisory deductions  | 0                 | 14.845.290        |
| Risk weighted assets  | 0                 | 170.545.718       |
| <b>Overall Capital Ratio</b>  |                   | <b>4,30%</b>      |

### III.IV.3.The Result of CA Calculations with Standard Method of Basel II

The overall capital ratio of Turkish Banking System is calculated as 4.3% with the Standard Method of Basel II. The reason of the quite sharp fall in capital adequacy ratio stems from the changes in the credit risk calculation method of Basel II and the addition of operational risk charges. The VaR computations are the same with the Basel I framework. For the calculation of credit risk capital adequacy charges, the risk-weighted assets have considerably increased as items like trading CMP, bank lending are also incorporated into the calculations with a 100% risk weight. The operational risk charges also caused the capital adequacy ratio of TBS to fall as the considerable disadvantage of operational risk charges can only be offset with the use of more sophisticated IMB approaches and AMA for operational risk.

The results of Capital Adequacy Ratio computations with the Standard and IMB Approaches of Basel I and with the Standard Approach of Basel II are summarized in Table 3.22.

Table 3. 22: The Results of Application of Basel Capital Adequacy Framework to TBS

| <b>BASEL</b> | <b>APPROACH</b> | <b>RISKS</b>                  | <b>METHOD</b>         | <b>CAPITAL ADEQUACY RATIO</b> |
|--------------|-----------------|-------------------------------|-----------------------|-------------------------------|
| Basel I      | Standard        | Credit Risk                   |                       | 10.02%                        |
| Basel I      | Standard        | Credit & Market               |                       | 7,13%                         |
| Basel I      | IMB             | Credit & Market               | Variance-Covariance   | 6,49%                         |
| Basel I      | IMB             | Credit & Market               | Monte Carlo           | 6,45%                         |
| Basel I      | IMB             | Credit & Market               | Historical Simulation | 6,08%                         |
| Basel I      | IMB             | Credit & Market               | Stress Testing        | 4,50%                         |
| Basel II     | Standard        | Credit & Market & Operational |                       | 4,30%                         |

As evident from the above table, the Basel II framework assigns capital charges more closely in line with the risk exposures of TBS as it produces similar results to the Stress Testing Results of Basel I. However, still the risk of the total CMP is not incorporated into the calculations as sovereign risk in the domestic currency has a 0% risk weight. The capital requirement of TBS will considerably rise with the Basel II framework and the banks will need almost twice as much capital to reach the 8% minimum capital adequacy ratio. However, the efficiency of precisely adopting the BIS regulatory framework, for the harmonization of the risk management regulation of TBS with the EU, in preventing future banking crises in Turkey is still unanswered and it will be discussed in the last chapter.

## **IV. THE EFFICIENCY OF HARMONISING THE RISK MANAGEMENT REGULATION OF THE EU AND TURKISH BANKING SYSTEMS**

In this chapter, the efficiency of Banking Regulation Harmonization of Turkey with the EU will be discussed. The analysis will be carried first in terms of comparison of the risks and the risk management structures between the EU and the Turkish banking systems. Secondly, the problems encountered in Turkey in the application of Basel I and the possible problems to be encountered in the application of Basel II will be evaluated. Last but not least, some changes and alternatives for Turkish Banking System will be proposed to increase the efficiency of harmonization of Turkish banking regulation with the EU.

### **IV.I THE COMPARISON OF RISKS AND RISK MANAGEMENT LEGISLATION BETWEEN THE EU AND THE TURKISH BANKING SYSTEMS**

In Chapter I, the differences between the determinants of banking crises in the developed and developing countries in general, for the EU and Turkey in particular are discussed. In Chapter II, the BIS Regulations of G-10 for risk management, that are altered according to the needs and then adapted by the EU with parallel initiatives and that are precisely adopted by the developing countries like Turkey are discussed. Here, a comparative analysis of the existing risks and risk management structures between the EU and the Turkish Banking Systems will be carried in more detail.

#### **IV.I.1 The Comparison of Macroeconomic, Microeconomic and Institutional Risks in the EU and the Turkish Banking Systems**

The banking crises in Turkey, as already discussed are severe systemic crises due to the institutional problems and microeconomic risk exposures of banks to macroeconomic shocks. However, it is not possible to talk about a EU-wide systemic crisis. The banking problems in some of the EU member states like France, Italy are significant incidences due to the boom and bust cycles related mainly to mortgage loans or derivatives or fraud. Hence, the individual banking problems in the EU were mainly due to credit, market and operational risks whereas other macroeconomic, microeconomic and especially institutional risks were almost non-existent.

#### IV.I.1.1 Institutional Risks

Institutional risks like inadequate regulatory and supervisory structures, lack of transparency, moral hazard and adverse selection due to poorly designed banking safety nets, information asymmetry, distorted incentives, underdeveloped securities market, heavy government involvement, political instability, lack of confidence to authorities and politicians are still present in the Turkish Banking system.<sup>98</sup> The restructuring after the crisis helped to decrease the extent of the institutional risks but there is still a long way to catch the EU standards.<sup>99</sup>

#### IV.I.1.2 Macroeconomic Risks

It is possible to see the prevailing differences between the EU and Turkey in terms of macroeconomic risks by comparing the Maastricht convergence criteria indicators.<sup>100</sup> The GDP growth rate volatility in Turkey and the EU are presented in table 4.1.

Table 4.1: GDP Growth in the EU and Turkey (%)

| COUNTRIES | 1999 | 2000 | 2001 | 2002 |
|-----------|------|------|------|------|
| Belgium   | 2,5  | 4    | 1    | 1,3  |
| Denmark   | 1,7  | 3,3  | 1    | 1,7  |
| Germany   | 1,5  | 3    | 0,6  | 0,8  |
| Greece    | 3,5  | 4,1  | 4,1  | 3,8  |
| Spain     | 3,8  | 4,1  | 2,8  | 2,4  |
| France    | 2,9  | 3,8  | 1,8  | 1,5  |
| Ireland   | 8,3  | 11,5 | 5,9  | 3,9  |
| Italy     | 1,4  | 2,9  | 1,8  | 2,3  |
| Luxemburg | 7,5  | 7,5  | 3,5  | 5,3  |

<sup>98</sup> The fund managers in the Turkish Banking system are experts in increasing capital with a couple of deal slips, in opening 10-20 times bigger foreign exchange positions than the legal framework permits with fictitious forward purchases, in disguising profits and / or postponing tax payments with domestic or international CMP instruments, in disguising losses with purchases of fictitious foreign currency payments on the last accounting day of the year etc.

<sup>99</sup> The recent accounting scandal case of İmarbank of Uzan group despite the threefold auditing procedure introduced to the system in conjunction with the Restructuring Programme is a good example of the still existing institutional problems in the Turkish Banking System.

<sup>100</sup> Inflation rate will be no more than 1.5% above the average inflation rate of the lowest 3 inflation countries in the EU. The long-term interest rates should be no more than 2% above the average of the three countries with the lowest inflation rates. The budget deficit should be no more than 3% of GDP. The national debt should be no more than 60% of GDP.

|          |      |     |      |     |
|----------|------|-----|------|-----|
| Holland  | 3,6  | 3,5 | 1,1  | 1,3 |
| Austria  | 2,3  | 3   | 1    | 1,3 |
| Portugal | 2,9  | 3,5 | 1,7  | 1,8 |
| Finland  | 3,5  | 5,6 | 0,7  | 1,6 |
| Sweden   | 3,8  | 3,6 | 1,2  | 2,4 |
| U.K      | 2,1  | 3,1 | 1,9  | 2,3 |
| Turkey   | -4,7 | 7,4 | -7,4 | 7,8 |

Source: Eurostat, Euro-Mediterranean Statistics, Luxembourg 2002 and TBB, and European Economy, Economic forecasts, Spring 2003

The differences between EU and Turkey in terms of the levels of budget deficit or surplus to GDP are presented in table 2.

Table 4.2: The Ratio of Budget Deficit-Surplus to GDP in the EU and Turkey

| COUNTRIES | 1999  | 2000 | 2001 | 2002  |
|-----------|-------|------|------|-------|
| Belgium   | -0,8  | 0,1  | 0,2  | 0     |
| Denmark   | 3     | 2,5  | 2,5  | 1,9   |
| Germany   | -1,1  | 1,2  | -2,7 | -2,5  |
| Greece    | -1,6  | 0,8  | 0,1  | 0,8   |
| Spain     | -1,1  | -0,3 | 0    | -1,8  |
| France    | -1,8  | -1,3 | -1,4 | 0     |
| Ireland   | 2     | 4,5  | 1,7  | 0,7   |
| Italy     | -1,9  | -0,5 | -1,4 | -0,5  |
| Luxemburg | 2,3   | 5,8  | 5    | 2,8   |
| Holland   | 0,5   | 2,2  | 0,2  | 0,4   |
| Austria   | -2    | -1,5 | 0,1  | 0     |
| Portugal  | -2    | -1,5 | -2,2 | -1,8  |
| Finland   | 2,3   | 7    | 4,9  | 2,6   |
| Sweden    | 1,9   | 3,7  | 4,7  | 2,1   |
| U.K       | 1,2   | 4,1  | 0,9  | -1,1  |
| Turkey    | -11,7 | -6   | -29  | -14,4 |

Source: Eurostat, Euro-Mediterranean Statistics, Luxembourg 2002 and TBB and European Economy, Economic forecasts, Spring 2003

The differences of inflation rates in table 3 and interest rates in tables 4 and 5 and their volatilities give indication about the prevailing macroeconomic divergence of the Turkish and EU economies and the microeconomic risk exposures of banks in Turkey to macroeconomic shocks.<sup>101</sup>

<sup>101</sup> The national debt/ GDP ratio -which is another Maastricht Convergence Criteris- is 102% in 2001 for Turkey. The national debt to GDP ratio is also very high for some EU countries like Italy and Belgium, respectively 109.4% and 107% in 2001. This is the reason why national debt/GDP ratios are not demonstrated in this study. However, it is very important to note that in Turkey the maturities of the debt stock is uncomparably short-termed compared to EU and for many years the real debt stock of Turkey has not been transparently reflected.



Table 4.3: Inflation Rates in the EU and Turkey (1996=100, CPI)

| COUNTRIES | 1996 | 1997  | 1998   | 1999  | 2000  | 2001  |
|-----------|------|-------|--------|-------|-------|-------|
| Belgium   | 100  | 101,5 | 102,04 | 103,6 | 106,4 | 109   |
| Denmark   | 100  | 101,9 | 103,3  | 105,4 | 108,3 | 110,7 |
| Germany   | 100  | 101,5 | 102,1  | 102,8 | 104,9 | 107,4 |
| Greece    | 100  | 105,4 | 110,2  | 112,6 | 115,8 | 120,1 |
| Spain     | 100  | 101,9 | 103,7  | 106   | 109,7 | 113,2 |
| France    | 100  | 101,3 | 102    | 102,5 | 104,4 | 106,3 |
| Ireland   | 100  | 101,2 | 103,4  | 106   | 111,5 | 116   |
| Italy     | 100  | 101,9 | 103,9  | 105,7 | 108,4 | 110,9 |
| Luxemburg | 100  | 101,4 | 102,4  | 103,4 | 107,3 | 109,8 |
| Holland   | 100  | 101,9 | 103,7  | 105,8 | 108,2 | 113,9 |
| Austria   | 100  | 101,2 | 102    | 102,5 | 104,5 | 106,2 |
| Portugal  | 100  | 101,9 | 104,2  | 106,4 | 109,7 | 114,3 |
| Finland   | 100  | 101,2 | 102,6  | 103,9 | 107   | 109,8 |
| Sweden    | 100  | 101,9 | 102,9  | 103,4 | 104,8 | 107,6 |
| U.K       | 100  | 101,8 | 103,4  | 104,8 | 105,6 | 106,9 |
| Turkey    | 100  | 185,8 | 342,9  | 565,5 | 752,8 | 875,9 |

Source: Eurostat, Euro-Mediterranean Statistics, Luxembourg, 2002

Table 4.4: Long-term Interest Rates in the EU and Turkey (%)

| COUNTRIES | 1999  | 2000 | 2001 |
|-----------|-------|------|------|
| Belgium   | 4,8   | 5,6  | 5    |
| Denmark   | 4,9   | 5,6  | 5,1  |
| Germany   | 4,5   | 5,3  | 5,1  |
| Greece    | 6,3   | 6,1  | 4,8  |
| Spain     | 4,7   | 5,5  | 5,3  |
| France    | 4,6   | 5,4  | 5,1  |
| Ireland   | 4,7   | 5,5  | 4,9  |
| Italy     | 4,7   | 5,6  | 5    |
| Luxemburg | 4,7   | 5,5  | 5,2  |
| Holland   | 4,6   | 5,4  | 4,9  |
| Austria   | 4,7   | 5,6  | 5    |
| Portugal  | 4,8   | 5,6  | 5,1  |
| Finland   | 4,7   | 5,5  | 5,2  |
| Sweden    | 5     | 5,4  | 5    |
| U.K       | 5     | 5,3  | 5,1  |
| Turkey    | 108,7 | 40,6 | 94,6 |

Source: DIE, 2001

Table 4.5: Short-term Interest Rates in the EU and Turkey, (% , 3 Months T/B)

| <b>COUNTRIES</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> |
|------------------|-------------|-------------|-------------|
| Euro 11          | 3           | 4,4         | 4,3         |
| Denmark          | 3,4         | 5           | 4,7         |
| Greece           | 10,1        | 7,7         | 7,4         |
| Sweden           | 3,3         | 4,1         | 3,7         |
| U.K              | 5,5         | 6,2         | 5,7         |
| <b>Turkey</b>    | <b>18,4</b> | <b>33,3</b> | <b>86,5</b> |

Source: Eurostat, Euro-Mediterranean Statistics, Luxembourg, 2002

#### IV.I.1.3 Microeconomic Risks

The microeconomic risks of the EU and Turkish Banking Systems will be compared in terms of asset sizes of banks, open foreign exchange positions, loans to deposit and deposits to liability ratios as well as expenses to liabilities and equities to assets ratios.

The smallness and volatility of the total asset sizes of banks in Turkey compared to EU is clearly evidenced in table 4.6.

Table 4.6: The Asset Sizes of Banks in the EU and Turkey (in Bio €)

| <b>Countries</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> |
|------------------|-------------|-------------|-------------|
| Germany          | 5,078       | 6,148       | 6,386       |
| Austria          | 495         | 552         | 587         |
| Belgium          | 778         | 779         | 846         |
| Denmark          | 213         | 233         | 257         |
| Finland          | 125         | 127         | 155         |
| France           | 3,502       | 3,106       | 3,422       |
| Holland          | 1,369       | 1,606       | 1,749       |
| U.K              | 4,213       | 5,112       | 5,508       |
| Spain            | 963         | 1,102       | 1,202       |
| Sweden           | 271         | 343         | 331         |
| Italy            | 1,568       | 1,786       | 1,845       |
| Luxemburg        | 603         | 647         | 721         |
| Portugal         | 242         | 276         | 298         |
| Greece           | 140         | 189         | 190         |
| Ireland          | 302         | 335         | 422         |
| EU Average       | 1,383       | 1,556       | 1,594       |
| Turkey           | 126         | 164         | 130         |

Source: Special Feature on Banking, European Federation Key Statistics 2001

As can clearly be seen in table 4.7, there is no equilibrium between the foreign currency assets and liabilities in Turkey. As of 2001, the shares for Turkish Banking System grew to

48% in assets and 58% in liabilities. This gives an indication about the foreign currency risk the TBS is heavily exposed compared to banks in the EU.

Table 4.7: The Foreign Currency Share of Banks in the EU and Turkey as of 1999

| <b>Countries</b> | <b>Assets</b> | <b>Liabilities</b> |
|------------------|---------------|--------------------|
| Belgium          | 22%           | 23%                |
| Germany          | 19%           | 15%                |
| Spain            | 9%            | 12%                |
| France           | 14%           | 15%                |
| Ireland          | 63%           | 64%                |
| Italy            | 6%            | 8%                 |
| Luxemburg        | 40%           | 40%                |
| Austria          | 31%           | 34%                |
| Finland          | 20%           | 19%                |
| Sweden           | 34%           | 43%                |
| U.K              | 50%           | 49%                |
| Turkey           | 38%           | 48%                |

Source: Bank Profitability Financial Statements of Banks, 2000

The total loans to total deposits ratio for banks in the EU and Turkey in table 4.8 shows the low and decreasing percentage of loans in Turkey. The ratio indicates the extent of crowding out in Turkey compared to stable and increasing loan to deposit ratios in the EU. The table also demonstrates why the main reason for banking crises in Turkey is not credit risk.

Table 4.8: Total Loans / Total Deposits in the EU and Turkish Banking

| <b>Countries</b> | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> |
|------------------|-------------|-------------|-------------|-------------|-------------|
| Germany          | 1,15        | 1,38        | 1,49        | 1,3         | 1,27        |
| Austria          | 1,11        | 0,81        | 1,02        | 0,79        | 0,8         |
| Belgium          | 0,9         | 1,06        | 1,03        | 1,05        | 0,97        |
| Denmark          | 0,86        | 0,87        | 0,92        | 1,02        | 1,03        |
| Finland          | 0,89        | 1,15        | 1,07        | 1,18        | 1,13        |
| France           | 1,2         | 1,3         | 1,33        | 1,35        | 1,23        |
| Holland          | 1,25        | 0,93        | 0,94        | 0,96        | 0,91        |
| U.K              | 1           | 0,97        | 0,99        | 1,02        | 0,99        |
| Spain            | 0,85        | 0,97        | 0,99        | 1,02        | 1,99        |
| Sweden           | 0,83        | 0,84        | 0,86        | 0,85        | 1,12        |
| Italy            | 1,31        | 1,37        | 1,46        | 1,69        | 1,72        |
| Luxemburg        | 0,49        | 0,51        | 0,6         | 0,57        | 0,64        |
| Portugal         | 0,72        | 0,85        | 0,99        | 1,13        | 1,2         |
| Greece           | 0,4         | 0,53        | 0,72        | 0,46        | 0,67        |
| Ireland          | 1,13        | 1,18        | 1,51        | 2,13        | 1,65        |
| EU Average       | 0,93        | 0,98        | 1,05        | 1,09        | 1,08        |
| Turkey           | 0,68        | 0,6         | 0,42        | 0,55        | 0,34        |

Source: Special Feature on Banking, European Federation Key Statistics 2001

The high Total Deposit to Total Liabilities ratio for Turkey compared with the EU in table 4.9 shows that TBS is more deposit banking based with lack of securitization.

Table 4.9: Total Deposits / Total Liabilities in the Turkish and EU Banking

| Countries  | 1997  | 1998  | 1999  | 2000  | 2001  |
|------------|-------|-------|-------|-------|-------|
| Germany    | 48,1  | 43,74 | 43,63 | 36,75 | 37,33 |
| Austria    | 42,02 | 40,09 | 54,6  | 63,5  | 58,5  |
| Belgium    | 35,34 | 37,39 | 37,42 | 43,8  | 47,01 |
| Denmark    | 52,03 | 48,09 | 47,97 | 47,86 | 43,54 |
| Finland    | 56,53 | 57,35 | 44,7  | 42,85 | 38,7  |
| France     | 29,77 | 29,99 | 27,68 | 27,33 | 26,58 |
| Holland    | 47,32 | 45,94 | 46,6  | 52,14 | 56,85 |
| U.K        | 52,79 | 52,34 | 51,23 | 47,04 | 49,41 |
| Spain      | 55,28 | 53,23 | 54,12 | 58,48 | 58,23 |
| Sweden     | 43,32 | 39,57 | 40,01 | 46,06 | 37,16 |
| Italy      | 31,33 | 30,64 | 29,61 | 28,38 | 28,99 |
| Luxemburg  | 37,59 | 34,4  | 32,39 | 34,93 | 32,03 |
| Portugal   | 50,6  | 47,77 | 46,84 | 46,37 | 45,3  |
| Greece     | 78,84 | 77,83 | 71,56 | 66,31 | 68,94 |
| Ireland    | 48,67 | 43,62 | 36,45 | 33,86 | 31,04 |
| EU Average | 47,1  | 45,46 | 44,32 | 45,04 | 43,97 |
| Turkey     | 62,03 | 62,06 | 63,16 | 62,19 | 66,66 |

Source: European Banking Federation Key Statistics 2001

Table 4.10 shows that the Turkish banks are not efficient compared to banks in the EU.

Table 4.10: Total Expenses / Total Liabilities in the Turkish and EU Banking

| Countries  | 1995  | 1996  | 1997 | 1998  | 1999  |
|------------|-------|-------|------|-------|-------|
| Germany    | 5,79  | 5,36  | 5,16 | 5,09  | 4,99  |
| Austria    | 6,39  | 5,62  | 5,46 | 5,12  | 5,28  |
| Belgium    | 9,13  | 8,05  | 8,35 | 8,25  | 7,31  |
| Denmark    | 6,28  | 5,13  | 4,96 | 5,11  | 4,7   |
| Finland    | 7,82  | 6,21  | 5,1  | 5,85  | 5,96  |
| France     | 7,75  | 6,88  | 6,63 | 6,89  | 5,84  |
| Holland    | 5,85  | 6,26  | 6,07 | 6,4   | 6,78  |
| U.K        | 6,31  | 5,5   | 5,39 | 5,91  | 4,81  |
| Spain      | 7,92  | 7,63  | 6,01 | 5,13  | 4,14  |
| Sweden     | 8,67  | 6,88  | 5,59 | 5,84  | 5,34  |
| Italy      | 7,65  | 7,21  | 6,25 | 5,4   | 4,15  |
| Luxemburg  | 7,16  | 6,32  | 6,44 | 7,03  | 6,21  |
| Portugal   | 7,93  | 7,73  | 6,56 | 5,75  | 4,83  |
| Greece     | 10,92 | 10,52 | 9,17 | 9,43  | 9,46  |
| Ireland    | 6,48  | 6,07  | 5,7  | 6,17  | 6,99  |
| EU Average | 6,95  | 6,75  | 6,18 | 6,22  | 5,78  |
| Turkey     | 19,41 | 19,64 | 22,2 | 25,21 | 29,02 |

Source: European Banking Federation Key Statistics 2001

The Total Equities to Total Assets ratio in table 4.11 shows that no compensation for the differences in risks have been envisaged in terms of Capital Adequacy in Turkey.<sup>102</sup>

Table 4.11: Total Equities / Total Assets in the Turkish and EU Banking

| Countries  | 1995 | 1996  | 1997 | 1998  | 1999  |
|------------|------|-------|------|-------|-------|
| Germany    | 4,2  | 4,06  | 4,07 | 3,9   | 4,01  |
| Austria    | 9,92 | 10,61 | 10   | 10,04 | 10,12 |
| Belgium    | 2,55 | 2,52  | 2,6  | 3,08  | 3,08  |
| Denmark    | 6,93 | 6,89  | 6,54 | 6,31  | 6,07  |
| Finland    | 4,77 | 5,27  | 5,48 | 5,45  | 5,5   |
| France     | 4,42 | 4,12  | 4    | 4,09  | 4,65  |
| Holland    | 4,58 | 4,56  | 4,23 | 3,84  | 4,13  |
| U.K        | 3,88 | 4,19  | 4,17 | 4,26  | 4,26  |
| Spain      | 8,62 | 8,6   | 8,58 | 8,33  | 7,99  |
| Sweden     | 5,89 | 4,91  | 5,32 | 5,02  | 5,48  |
| Italy      | 6,49 | 6,3   | 6,22 | 6,54  | 6,65  |
| Luxemburg  | 2,5  | 2,47  | 2,28 | 2,4   | 2,51  |
| Portugal   | 8,23 | 9,16  | 8,97 | 10,33 | 10,74 |
| Greece     | 4,84 | 4,47  | 10   | 5,98  | 6,21  |
| Ireland    | 6,7  | 6,68  | 5,69 | 6,01  | 6,28  |
| EU Average | 5,63 | 5,65  | 5,55 | 5,7   | 5,84  |
| Turkey     | 4,33 | 4,05  | 8,73 | 8,48  | 5,22  |

Source: European Banking Federation Key Statistics, 2001

#### IV.I.2. The Comparison of Risk Management Regulation in the EU and the Turkish Banking Systems

It is already discussed in Chapter II that the Basel Principles, which are designed for the developed world, are binding in G-10, are adapted by EU with parallel initiatives and are precisely adopted in the developing countries like Turkey. The 1988 Basel I framework that is amended in 1996 to incorporate market risk was a measure to provide capital adequacy for credit and also market risk due mainly to wide-spread use of derivatives in the developed world. The EU immediately initiated parallel directives. Turkey adopted the amended legislative framework in 2002 despite the almost non-existence of derivatives. Also the majority of banks are using the Standard Method of the Amended Basel I framework, which requires almost no capital charges for the CMPs of Turkish Banks. However, one of the major reasons behind the 2000-2001 crises was the huge CMPs of the Turkish Banks, which

<sup>102</sup> Some of the comparative microeconomic data are past-dated. See Chapter I for the updated microeconomic data for the Turkish Banking System.

were funded with the short positions opened with creative techniques despite legislative restrictions and with mismatched short-term borrowing. The efforts to harmonize the Turkish regulatory framework to EU, with the anticipation of becoming an EU member, seems to override the efforts to determinate the true risks and to define corresponding measures in order to protect banks from new banking crises in Turkey.

The Principles of BIS regarding Risk Management as pointed out by Yüzbaşıoğlu (2003,pp.15) are: Regulations on Measurement and Assessment of Capital Adequacy of Banks (1988, 2001), Core Principles for Effective Supervision (1997), Regulations on Banks' Internal Control and Risk Management Systems and Regulations on Principles and Procedures of Independent Auditing in Banking and Principles for Effective Risk Management (Credit, market, interest rate, liquidity, operational risk etc.)

The banking legislation in the EU and the corresponding Turkish Law and regulations for Risk Management stem from the same BIS framework.<sup>103</sup> The new Banking Law No: 4389 dated 19 December 1999 in Turkey is in many areas parallel to the EU legislative framework for banking.<sup>104</sup> The comparison of the Community Legislation in force and that of Turkey also shows that Turkey has not adopted certain EU directives.<sup>105</sup>

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<sup>103</sup> The related BIS principles behind the legal structure of the EU and adopted legal structure of Turkey particularly for the management of risk are the Principles of International Convergence of Capital Measures and Capital Standards and the related Amendments; Measuring and Controlling Large Credit Exposures and Intra-Group Transactions and Exposures and Risk Concentration Principles; International Accounting Principles; Framework for the evaluation of Internal Control Systems; Sound Practices for Loan Accounting; Credit Risk Disclosure and Related Matters; Enhancing Bank Transparency; Internal Audit in Banking Organizations and the relationship of the Supervisory Authorities with internal and external Auditors and Enhancing Corporate Governance in Banking Organizations

<sup>104</sup> The details of the parallel EU and Turkish legislation for banking are already discussed in Chapter II.

<sup>105</sup> The EU Directives that are not adopted by Turkey:

- a) Council Directive 89/117/EEC of 13 February 1989 on the obligations of branches established in a Member State of credit institutions and financial institutions having their head offices outside that member state regarding the publication of annual accounting documents
- b) Commission Directive 91/31/EEC of 19 December 1990 adapting the technical definition of 'multilateral development banks' in Council Directive 89/647/EEC of 18 December 1989 on a solvency ratio for credit institutions.
- c) Commission Directive 95/67/EC of 15 December 1995 making a technical amendment to Council Directive 89/647/EEC on a solvency ratio for credit institutions as regards the definition of 'multilateral development banks'.
- d) Directive 97/5/EC of the European Parliament and of the Council of 27 January 1997 on cross-border credit transfers.
- e) Directive 2000/12/EC of the European Parliament and of the Council of 20 March 2000 relating to the taking and pursuit of the business of credit institutions.

The analysis of the directives that are not adopted by Turkey shows that either they concern solely EU member states or institutions in the EU, or because some of the directives are very recent and do not as yet pose a problem for the Turkish Banking system as in the case of the directive concerning the supervision of electronic banking.<sup>106</sup>

There are also certain BIS principles that have not turned into parallel legislations in the EU mainly because either they are incorporated in the Basel frameworks, or because they are to the interest of other countries, especially developing.<sup>107</sup> The crucial point here is that some of the BIS principles that interest the developing countries like the “Core Principles for Effective Supervision”, that is designed after the Asian crises, is not adopted by EU and hence by Turkey. Also “Principles for the Management of Interest Rate Risk” which has a

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f) Directive 2000/46/EC of the European Parliament and of the Council of 18 September 2000 on the taking up, pursuit and prudential supervision of the business of electronic money institutions.

g) Directive 2001/24/EC of the European Parliament and of the Council of 4 April 2001 on the reorganization and winding up of credit institutions.

h) Regulation (EC) No 2560/2001 of the European Parliament and of the Council of 19 December 2001 on cross-border payments in euro

i) Directive 2002/87/EC of the European Parliament and of the Council of 16 December 2002 on the supplementary supervision of credit institutions, insurance undertakings and investment firms in a financial conglomerate.

<sup>106</sup> The BIS principles behind the legislative framework of the EU that are not adopted by Turkey

- a) The Supervision of financial conglomerates
- b) The supervision of cross-border banking
- c) Risk Management for Electronic Banking and Electronic Money Act
- d) Risk Management Principles for Electronic Banking
- e) Minimum Standards for the supervision of international banking groups and their cross-border establishments

<sup>107</sup> The BIS principles that do not have corresponding EU directives are:

- a) The management of banks' international lending: country risk analysis and country exposure measurement and control
- b) The management of banks' off-balance sheet exposures: a supervisory perspective
- c) Framework for supervisory information about the derivatives activities of banks and securities firms
- d) Principles for the management of interest rate risk
- e) Core Principles for Effective Banking Supervision
- f) Operational Risk Management
- g) Sound Practices for managing liquidity in Banking Organizations
- h) Supervisory Guidance for Managing Settlement Risk in Foreign Exchange Transactions
- i) Principles for the Management of Credit Risk
- j) Sound Practices for Banks' Interactions with Highly Leveraged Institutions
- k) Customer due diligence for Banks
- l) Supervisory Guidance on Dealing with Weak Banks
- m) Parallel-owned banking structures
- n) Shell banks and banking offices
- o) Consolidated KYC Risk Management



crucial importance for developing countries like Turkey due to the high volatility in the markets and the huge CMPs of the TBS is not adopted by EU and hence by Turkey.<sup>108</sup>

The existing wide differences in terms of risks between the EU and Turkey and quite converged regulatory frameworks to cope with these risks, mostly through precise adoption as in the cases of Basel I and II, is one of the main reasons behind the banking problems encountered in Turkey.<sup>109</sup> In Turkey, the regulatory and supervisory framework for risk management does not enable the capture and management of all the macroeconomic, microeconomic and institutional risks that the banks are exposed. The Basel framework increases the requirement for capital adequacy in Turkey but does offer protection to the risks the banks in Turkey are exposed. The harmonization of regulations of Turkey with the EU is important but the immunization of the system from crises with proper risk management practices will converge Turkey more to EU.



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<sup>108</sup> See [www.tbb.org.tr](http://www.tbb.org.tr) for Turkish, [www.bis.org](http://www.bis.org) for BIS and [www.europa.eu.int](http://www.europa.eu.int) for EU legislation on Banking

<sup>109</sup> The regulatory framework to manage risks despite the wide range of differences in risks between the developing and developed world also explain the reason behind the increasing frequency of developing world banking crises.

## **IV.II. THE PROBLEMS ENCOUNTERED IN THE APPLICATION OF RISK MANAGEMENT PRACTICES IN TURKEY**

In Chapter II, the impact of the Basel frameworks on the developed and developing countries are analyzed. In Chapter III, the capital adequacy framework of Basel I and Basel II are applied to the TBS Consolidated B/Ss. The shortcomings of Basel II and I for the developing countries all hold true for Turkey. However, the analysis carried in Chapter III draws attention to certain specific problems that Turkey does and will encounter in the application of Basel frameworks. Here, the setbacks in terms of Risk Management Practices in Turkey regarding Basel I and possible problems to be encountered in the application of Basel II will be evaluated.

### **IV.II.1. The Problems Encountered in the Application of Basel I**

The Basel I framework will be in force until end-2006 and the developing countries are neither expected nor possibly can adopt the Basel II framework immediately afterwards. Hence, the TBS will continue living in an environment of risks that are not truly protected with the existing risk management framework. The Basel I framework covers the individual bank failure risks of the developed countries by assigning risk charges to credit, market and operational risks. The institutional risks and the microeconomic fragilities of banks to macroeconomic shock that cause systemic banking crises in Turkey are all ignored.

Turkey precisely adopts the risk weights for credit risk of 1988 Basel CAA. However, especially the 0% risk weight to government borrowings is not appropriate for Turkey due to the weight of CMP in the B/Ss of banks. Also, the crises analysis of the developed and developing countries and the differences between the risks the EU and TBS are exposed justify that the worldwide 8% MCR is not enough to absorb the risks in the TBS. Hence, in Turkey the discretionary power of the authorities should be better exercised in taking the country and institution specific factors into account when issuing regulations.

Turkish Banks need to be better capitalized. The quantitative analysis carried in Chapter III shows that even with the Standard Method, which almost excludes the CMP risk, -one of the

most important risk factor for Turkish banks- TBS is already short of 8% MCR.<sup>110</sup> Also, Basel I apply to only banks but not to other financial institutions. However, for Turkey, the increase in the transparency and standardization of the accounting standards and the strengthening of all the financial institutions is vitally important.

In Turkey, a risk management culture that uses the risk sensitivity in the decision-making processes of both the Asset / Liability Committee members and Treasury Managers could not be established. This is mainly due to the following factors: The Standard Method of Amended Basel I is used by the majority of banks and the use of SM does not allow for evaluation of risks in the decision making process. The main reason for the widespread use of Standard Method is the cost of the Internal Risk Management Models and the low Capital Adequacy Ratio achieved with the use of SM.<sup>111</sup> Also, as Sezgin (2002) points out, the almost non-existence of derivatives, the lack of liquidity and the shallowness of the Turkish Markets do not enable the banks to minimize their risks and to shift between instruments in order to make changes in their risk portfolios.

The Duration Gap Analysis used in the Standardized Approach to measure the interest rate risk is not appropriate for Turkey due to the risk weights of the time bands. The maturities up to 1 month receive a 0% risk weight. However, the maturities of especially the deposits and repos are very short termed in Turkey. The 1-3 month, 3-6 month and 6-12 month maturities also receive very low risk weights. However, in Turkey the concentration of maturities of TL denominated instruments is 3 months. Also, the Standard Approach ignores risk diversification; despite the fact that there is negative correlation between some of the market instruments in the Turkish market as seen in the correlation matrix.<sup>112</sup>

<sup>110</sup> The CA ratio of Turkish banking system is computed as 7.13 % with the amended CAA.

<sup>111</sup> The results of VaR computations even with the Variance- Covariance method produced twice as high VaR and MCR results compared to the results of the Standardised Approach.

<sup>112</sup> This is not a problem only for Turkey but for all the countries. For Turkey the correlation between USD and EUR rates is strong. However the correlation between the daily returns of USD, EUR with the daily returns of Eurobonds and TL Government Bonds are insignificant and negative. USD Eurobonds and TRL Government bonds have a positive correlation though insignificant.

**CORRELATION MATRIX OF THE INSTRUMENTS IN THE PORTFOLIO OF TBS**

|  |      |      |       |       |
|--|------|------|-------|-------|
|  | 1    | 0,74 | -0,13 | -0,25 |
|  | 0,74 | 1    | -0,08 | -0,21 |

The Standardized Approach for Market Risk assigns 0% risk weight to specific interest rate risk of government bonds hence does not properly measure even the risk of trading CMPs.

The Standard Approach for market risk also ignores volatilities. However; the main economic risk for Turkey is the extent of macroeconomic volatility in interest and exchange rates. Thus, the SM applications that are widely used in Turkey do not play a role of immunizing banks from probable new systemic risks.<sup>113</sup>

The IMBA, which uses the VaR methods for the computation of market risk, measures VaR of only the trading portfolios. The risk weight of the investment CMP is 0% under the existing Basel I framework.<sup>114</sup> Especially for CMPs this is not a valid approach for Turkey since the main risk arises from the huge government deficit and the consequent huge government borrowing. Also, since the determinants of banking crises are not the derivatives risk in Turkey, there is no need for the regulatory framework in Turkey to explain in full length the measurement of Options positions risks or for complex derivative risks.<sup>115</sup>

Sezgin (2002, pp.7-13) points out to the deficiencies of the VaR methods for Turkey. In the parametric VaR computations, due to the distribution normality assumption, the effects of the huge volatilities in the exchange and interest rates are not properly reflected.<sup>116</sup> The determination of the yield curves is problematic due to the illiquidity and the shallowness of the markets.<sup>117</sup> The frequency and extent of volatilities in Turkey also cause problems in the

|  |       |       |      |      |
|--|-------|-------|------|------|
|  | -0,13 | -0,08 | 1    | 0,09 |
|  | -0,25 | -0,21 | 0,09 | 1    |

<sup>113</sup> With the Standard Method, the VaR and MCR results would have been the same during the 20.02.2001-20.03.2001 periods for which a Stress Testing is applied, due to the ignorance of volatilities.

<sup>114</sup> The huge difference between the computed VaRs of only the trading CMP and the whole CMP of the Turkish Banking System was striking as will be recalled from the computation results in chapter III.

<sup>115</sup> The trading portfolios are quite small and the trading activity is much less in countries like Turkey when compared with the developed countries like the EU member states. The commercial banks do not trade equities for their customers, there is almost no bank that writes options, the interest rate and money futures and swaps are at negligible levels. FX and CMP risks are the major sources of risk for Turkey.

<sup>116</sup> Kurtosis adjustments are needed to the parametric VaR computations for the Turkish market.

<sup>117</sup> In the Turkish markets, there is a concentration of maturities in short term, the shallowness of markets decreases the indicative nature of the medium-term instruments' interest rates on the yield curve and the instruments with long term maturities are illiquid.

volatility forecasting methods.<sup>118</sup> The differences in the liquidity of instruments in the CMP and the continuous change of liquid instruments in the portfolio due to the shortness of maturities necessitates continuous instrument wise arrangements in the VaR calculations of Turkey. Also, there is the crude aggregation of the credit and market risks in the Standard and the IMBAs and the Turkish markets are exposed to an aggregation risk due to the fact that risks are not normally distributed.

As Daniellson (2001b) points out, to calculate the VaR for a ten days time horizon, square root of time method is used, which is meaningful only if returns are normally distributed, and the volatility of returns are constant across time. These assumptions do not hold true for Turkey. Also, data for one year is too short as precision of forecasting increases with longer time horizons and year-to-year volatilities vary extremely in Turkey. The VaR and MCR computations for Turkey would differ to a great extent if the data set of 2001 had been used instead of 2002. Also, as again Daniellson(2001b) underlines VaR is to be measured at the 99% risk level. Hence regulators require banks to hold capital against an event that occurs roughly 2.5 times a year. However, since systemic failures are extremely rare events, it implies that the violation of VaR has almost no relevance to systemic failures of Turkey that occur rarely but have catastrophic outcomes for the economy.

Model risk is also very important with VaR calculations. Siegel and Marshall (1996) proved with their empirical study that VaR results show wide variations even using the same model. Kerkhof et al (2002) empirically proved that the multiplication factor of BIS for model risk is quite conservative and misspecification risk of the model risk dominates the estimation risk of the model risk. BIS take the misspecification risk and the estimation risks of the VaR Models into consideration with a multiplication factor of minimum 3. In Turkey, where the risk management culture is not as yet established, the maximum multiplication factor of 4 for model risk may be applied.

Basak and Shapiro (2001) question the usefulness of VaR based risk management as VaR managers often have higher loss in extremely bad circumstances. The risk manager reduces his risks that occur with  $(100-\alpha)\%$  probability, but ignores the  $\alpha$  of states.

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<sup>118</sup> Sezgin (2002) assert that the TL interest rate volatility for 91 days is estimated as 1.6% with EWMA 0.94 and 6,75 with Simple Moving Average.

Berkelaar et al (2001), basing their model on Basak and Shapiro (2001) arrive at the conclusion that in very bad states VaR management pushes up the market prices due to gambling strategy. Jaschke (2001) also shows that quintile-VaR are “blind” towards large losses, which occur with a very small probability such as with the “doubling strategy” in trading. Cuoco and Liu (2002) empirically prove that VaR based capital requirements lead to an increased probability of extreme losses. In Turkey, where the risk management culture, corporate governance culture and the risk sensitive strict limits for traders are not as yet established, the probability of gambling and doubling strategies and the risk of extreme losses may increase even more.

The VaR computations for the TBS in chapter III also verify that there are extreme differences between various VaR methods. The Variance-Covariance computations for the Turkish markets with EWMA and GARCH volatility produced almost the same VaR and MCR results. However, the Variance-Covariance Approach is very misleading when returns are not normally distributed as the case is in Turkey.<sup>119</sup> The Monte Carlo (MC) Simulation Method produced similar results with Variance-Covariance approach for Turkey as seen in Chapter III. However, since complex derivatives like options are not used in the Turkish markets, MC Simulation Method is not necessary for the computation of risks in the Turkish markets.

Historical Simulation Method (HS) is problematic in cases of structural changes like currency regime change where the past data becomes invalid as is quite frequently experienced in Turkey. One of the major setbacks of the HS Approach for Turkey is related to the length of estimation period, as too short a period may produce unreliable results and too long a period becomes insensitive to news. The MCR results of the HS method for Turkey are much higher than the results of Variance-Covariance and Monte Carlo Methods. The calculated MCR with HS is higher than the total equities of the Turkish Banking sector as the observation period was the just- after-crises period. However, Historical Simulation Method, when comprises the cycles and volatility with long enough database, should be

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<sup>119</sup> It depends on linearity assumption and in cases of non-linearity; delta-gamma approach has limitations in terms of implementation and validity. In the Variance-covariance approach, there is a need for mapping and for the computation of VaR basic building blocks, the ignorance of firm specific risk and the use of beta of the market for the portfolio beta are quite arbitrary.



preferred in the measurement of VaR for the Turkish market, as it comprises the real market movements.<sup>120</sup>

The Stress Testing results for the most hectic crises period of 20.02.2001-20.03.2001 shows that a MCR of 45,909, 936 Bio TRL is needed for the Turkish banking sector, which is almost four times higher than the total equities of TBS by that time. However, the problem is that stress tests do not suggest probability of occurrence, thus it is hard to determine how to respond to a stress test result. Also, for Turkey system wise stress tests are also needed besides the stress tests applied by individual banks due to the systemic nature of crises in Turkey. Actually, the use of VaR is more of an art than science and VaR methods are useless if the operating environment and the management incentives are deficient as the case is in Turkey.

#### **IV.II.2. The Possible Problems to be Encountered with the Application of Basel II**

The computations for the TBS in Chapter III with the Standard Method of Basel II produced a Capital Ratio of 4.3%. The reason why the Capital Ratio of 7.13% with the amended CAA of Basel I dropped to 4.3% can be explained with the sovereign, bank and corporate risk weights of 100% due to the abandoning of the preferential treatment to OECD countries like Turkey and the almost non-existence of externally rated firms by ECAs in Turkey.

The ECA or ECAI assessments and the rating concept are almost non-existent in Turkey. However, Turkey will be using the Standard Approach rather than IRBA when adopts Basel II. The necessity to have external rating will force firms in Turkey to have a rapid external rating and the development of some deeper relations with the rating agencies.

In terms of risk weights, the 100% risk weight assigned by the Standard Approach to non-rated corporate claims will create a positive disincentive for those afraid of being rated below B- in Turkey. As 0% risk weight is assigned to lending in domestic currency to Treasury or State-owned enterprises, the risk of the non-trading CMPs will still not be incorporated into the risk measurements. As pointed out by Özcan (2003, pp.5), the

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<sup>120</sup> Saita and Sironi (1999) empirically proved that Historical Simulations appear to be the most accurate estimation method at the 99% confidence level.



introduction of 100% risk weight for lending in other currencies to Treasury or State-owned enterprises, on the other hand, will cause problems in terms of securitisation and syndication and also will increase the cost of international banks' lending to Turkey. Also, as Jones (2002a) underlines, Basel II proposal implies an increase in capital requirements for project finance compared to corporate lending although project finance has a crucial importance for Turkey.

In terms of Risk Mitigating Techniques, Post-dated checks assigned to banks and promissory notes are widely used as collateral in Turkey. However, these are not recognized as risk mitigants in the Basel II framework, despite the fact that they are highly regarded as risk mitigants as they are drawn due to a trade transaction.<sup>121</sup> In the Simple Risk Mitigating Techniques for collaterals, the assets that have a currency mismatch with the exposure are excluded from the eligible collateral definition. This will create problems for Turkey. The Comprehensive Risk Mitigating Technique is required for any collateral to be taken into consideration despite the maturity and exchange rate mismatch between the credit and collateral. However, as pointed out by Aksel (2003) the use of advanced credit risk mitigation technique necessitates automated surveillance of the collaterals in an electronic environment which enables an automatic distinguishing of which collateral is for which credit. For Turkey, the use of advanced techniques will take quite long.

In the Standardized Approach, there are differences in terms of definitions and applications between Turkey and the developed countries. For example in the developed countries there is seniority in credits that does not exist in the Turkish system. During QIS 3, transfer pricing between business lines, the distribution to business lines for operational risk, collaterals, and the non-existence of mortgage markets caused problems in the computations.

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The IRBA is designed to move away from external regulation and towards market discipline. However, the complexity of IRBA, the data set and system-wise problems, the very high compliance costs, lack of skills and expertise even for EU member states makes it almost

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<sup>121</sup> This problem has been conveyed by BRSA to BIS as a response to the latest Consultative Document, (CP3).

<sup>122</sup> This point is discussed in the TIDE meeting (2003) and is conveyed by BRSA to Basel Committee.

impossible for Turkish banks to move soon to the foundation IRBA.<sup>123</sup> In the IRBA, the capital requirements that are determined by PDs have a cyclical nature. PD is relatively low during booms causing a reduction in regulatory capital. The MCR will increase during periods of recession and this cyclic effect will be more pronounced for Turkey due to the extent of volatility.<sup>124</sup>

The IRBA of Basel II requires from the banks a credit risk rating system with the data set for their credits.<sup>125</sup> At minimum 5 years of historical PD data is needed for the foundation IRB, 7 years of LGD and EAD will be necessary to move to Advance IRB. This will create problems for Turkish banks, as most of the Turkish banks are even unaware that the rules of the game for banking are changing. Also, it is hard to collect trustable past data in Turkey about the credits and defaults due to lack of transparency, the non-established international accounting standards and unofficial economy that are quite common in Turkey. The high default rates and high volatility in economic activity in emerging markets, even with the foundation IRB based capital requirements are hard to verify and calibrate, thus are discouraging. Hence, as suggested by Aksel (2003,pp.12) for developing countries like Turkey some parameters need to be changed.

For Operational Risk, it is hard to measure and collect data for operational risk and returns are not normally distributed in Turkey and these will create misleading VaR results. Banks in Turkey will be using the Basic Indicator Approach for operational risk. This means that Turkish banks will need 15% of capital for operational risks.<sup>126</sup> Also, no capital requirement should be calculated for business lines that incur loss in standardized approach, alternative standardized approach, and for the bank as a whole in basic indicator approach.<sup>127</sup> Also, operational risk mitigation should be enabled.<sup>128</sup>

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<sup>123</sup> Inero, (2002) asserts that For the top 100 banks, it could take from 2 to 5 years, cost up to \$40 million, and extra staffing of 20-75 personnel to develop and build a fully integrated credit risk management system.

<sup>124</sup> During crises the low PDs will require additional capital. However crisis periods are not the best times to raise private capital, which may consequently cause a credit crunch and deteriorate the financial problems.

<sup>125</sup> As will be recalled from Chapter II, The foundation IRBA requires the computations of PD with the banks' risk rating system based on bank's own estimates. The Advanced IRBA requires the bank to compute PD, LGD, EAD and M with the risk rating system based on bank's own estimates.

<sup>126</sup> The developed countries will compensate this increase in MCR with the decrease of capital requirements they will enjoy due to the use of IRBA and this will not be the case for Turkey.

<sup>127</sup> This is the case faced in the Basel II computations in Chapter III as well.

### **IV.III. THE PROPOSALS TO INCREASE THE EFFICIENCY OF RISK MANAGEMENT IN TURKEY**

The Basel framework is designed for developed countries, not for the developing world. The practice of precise adoption of the Basel rules by the developing countries will not immunize the Banking System in the developing world from new banking crises. These crises will not only threaten the developing countries, but also the financial stability in the developed world. The systemic banking crises that continue with an increased frequency in the developing world can only be prevented with the co-ordinated efforts of the Basel Committee, the regulatory and supervisory authorities and the banks in the developing world. The following proposals to increase the efficiency of risk management in Turkey also hold true for the rest of the developing world.

#### **IV.III.1. In the framework of the Basel Committee Initiatives:**

The efforts of the Basel Committee for Banking Supervision to bring international standards for the measurement and management of risk in cooperation with the industry are to be appreciated. However, although the BCBS is formed of G-10 governors and their initiatives are only binding in G-10, the Basel Committee should be aware of the fact that the international financial stability will not be achieved with the increasing financial instability in the developing countries. To that end, the Basel Committee has certain responsibilities:

1. The Basel Committee should also consider the different macroeconomic, microeconomic and institutional risks of the developing world in its international efforts to bring financial stability.

The Standardized Approach of Basel I that produces low MCR and that does not take the volatilities into account should be abolished unless the developing country banks use either a trustable combination of the Standardized and IRB approaches with readjusted risk weights for each time band or adapts Basel II by 2007.

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<sup>128</sup> These problems about operational risk are conveyed by BRSA to Basel as response to CP3

The VaR computations should be enforced for the trading and non-trading portfolios for the developing countries as for them the main risk is due to huge government bond portfolios rather than derivatives. The establishment of a risk management culture should be encouraged in the developing countries. The parameters of VaR computations should be adjusted for the developing countries to take the rare but catastrophic systemic risks into account.

In the Basel II framework, the risk buckets of the Standardized Approach that are expanded should be further expanded to avoid regulatory distortions and to increase risk sensitivity. The incentives to short term lending should be abandoned. The 0% risk weight for lendings to Treasury in domestic currency should be abolished. The ECAI assessment that creates additional problems in the developing countries should be solved by ECA assessments of also the corporates and banks. The problem concerning the ignorance of portfolio diversification affect due to the crude aggregation of credit and market risk should be solved. The developing country demands in terms of risk weights should be more carefully considered, as it will mainly be the developing country banks that will use the Basel II Standardized Approach.<sup>129</sup>

The Basel II Foundation IRBA parameters should be readjusted for developing countries to ensure healthy computations of PD and to ease the more accentuated pro-cyclicality of PDs in the developing countries.

2. The Basel Committee should not draw initiatives that will deepen the already existing gap between the developing and developed world if the aim of the Basel Committee is also to level the playing field.

The problem due to increase in MCR that will induce a very sharp cost increase and reduction of loans to developing countries should be solved. As Jones and Spratt (2003) emphasizes, the playing field can not be leveled if for a B- rated company, the capital requirement rises from 8% to 20.8%, whereas for an AA- borrower in the developed world, the capital requirement drops from 8% to 1.18%.

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<sup>129</sup> Several remarks are made by the developing countries about adjustments in the risk weights. The risk weight of consumer loans is asked to be adjusted from 75% to 50% by BRSA as a response to CD 3.

The increased risk of developing world crises in consequence of increase in costs and reduction in lending to developing world and the widespread use of IRB application that may increase procyclicality of lending to developing countries should be solved. The consolidation problem in the developing countries that will be faced due to the comparative capital requirement advantage of the IRBA banks should be solved. The decrease in FDI to the developing world due to the two-fold regulatory system with different regulatory charges causing regulatory arbitrage and creating competitive inequality problems for the multinational's operations in the developing world and regulatory/ supervisory problems for the home and host countries should be solved before the finalization of Basel II framework.

#### **IV.III.2. In the framework of Responsibilities of the Regulatory/Supervisory Authority:**

Until the Basel II framework, BRSA should redefine the Risk Management Regulation in Turkey by taking into consideration the country specific problems that Turkey encounters in the application of Basel I, and immediately start implementing the 1997 “Core Principles for Effective Bank Supervision” and the “Principles for Interest Rate Risk Management”.

Concerning Basel II, BRSA should inform the government about the fact that the rules of the game will be radically changing by end-2006 and force the government to lobby for their problems during the very limited time left.<sup>130</sup> BRSA should also invite the shareholders of banks to the established Steering Committee for Basel II, cooperate with the Regulatory/ Supervisory Authorities of the other developing countries, and lobby to Basel Committee to convey the possible problems Turkey will encounter with the application of Basel II especially in terms of the its indirect impacts.

Actually, the efforts of BRSA of Turkey in adopting the amended framework of Basel I in 2002, in participating to QIS 3 and in commenting to CP 3 are to be appreciated. The efforts of Bankers Association of Turkey are to be applauded in organizing conferences about Basel

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<sup>130</sup> The blockage of USA for Basel II has already postponed the finalisation of Basel process to mid-2004. One single developing country might not produce a similar affect but tens of developing country governments exerting pressure may produce similar results. Also, it is better than opting out today like China and India have already done and like many more will most probably do.

II and especially in hosting the QIS 3 in Istanbul. However, BRSA has to be proactive both in the period before the finalization of Basel II and also until the end-2006 period.

Turkey did not participate to the Basel II process until QIS 3 but during QIS 3, BRSA declared that Turkey would adopt Basel II. In CP3, the first comment of BRSA is about the demand of optionality of non G-10 to stay in the framework of the existing accord.<sup>131</sup> First of all, the developing countries do not have to adopt the new framework. Second, the choice to stay with the existing framework will be of no help to the increasing costs and decreasing lending from the developed world to Turkey. Third, the existing Basel I framework under the OECD umbrella can't immunize the Turkish Banking System from new crises. Hence, BRSA must decide as soon as possible in cooperation with the banks whether and when Basel II can be adapted to Turkey.

Squeezed between the inadequacy of capital even under the existing framework in Turkey and harmonization of the regulatory framework of Turkey with Basel and the EU, BRSA asks in the response document of CP 3 the preferential treatment to short term bank exposures under option 2 to be also applied to short-term sovereign exposures. However, in order to protect the Turkish Banking System from new crises, short term borrowing in any form should not have a preferential treatment in Turkey.

In CP3, BRSA proposes an integrated approach, in which the use of rating agencies' assessments be supplemented by a uniform and adequate set of regulatory tools to ensure to level the playing field. However, there is no rating culture in Turkey and the rating agencies are almost non-existent. The firms are almost unaware of the radical change that will take place by 2006 and only a handful of banks show interest to the Basel II developments.

For the moment, Turkish firms, banks and existing rating agencies are doing almost nothing for the Basel II process. However, Basel II will have serious affects on Turkey whether the new framework is adopted / adapted or not. Moody's and S&P have started ratings in Pakistan and India. Firms in Spain, Germany, France, Switzerland, Italy and Poland are rushing for external rating. Germany and Australia have their own rating agencies since

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<sup>131</sup> "As some countries divide their banks, into significant banks that will apply the new Accord, and the second category will remain in the framework of the existing accord. This may be adopted for the non G-10".



international rating agencies do not rate SMEs even in the EU. Turkey must also have domestic rating agencies for SMEs. The Turkish firms should start to have external ratings. For the IRB Foundation Approach, the banks should start PD data collection immediately. Hence, if Basel II can and will be adapted in Turkey, then BRSA should immediately start leading the industry about what banks, firms and rating agencies should do.

BRSA did not comment in CP3 about some issues that are raised by the other developing countries like Brazilian Central Bank (2003), Banco de Mexico (2003) and Asian Bankers' Association (2003). These issues should also be carefully considered by BRSA. These comments are about the irrelevance and inaccuracy of alpha - beta factors for operational risk; the definition of SMEs that do not correspond to the definition of SMEs for developing countries, the preferential risk weight treatment to retail exposures that may jeopardize bank credit to corporate firms, the necessity to include the benefits of international diversification in capital requirements determination due to the lower correlation between the financial and macroeconomic variables of emerging and developed economies; the need for adjustment for the high confidence level that may effect banks in emerging markets in a disproportional manner due to their loss proportion functions having longer and fatter tails; the chronic bank capitalization shortages and hence credit constraints the developing countries will be facing.

Whether the decision is to move to Basel II or not, BRSA should be in close cooperation with banks and design the regulatory framework using the discretionary power where possible, instead of copying regulations as the case was with Basel I. The fact that Turkey is a developing country and face the risks that developing countries face should have priority to harmonization of regulations to EU.<sup>132</sup>

#### **IV.III.3. In the framework of the Responsibilities of Banks:**

Basel II framework underlines that it is the bank's responsibility to properly measure and manage their risks. The problems so far evaluated in terms of the risks and risk measurement methods necessitate that the banks in the developing countries find, within the broad

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<sup>132</sup> "The Core Principles for Effective Supervision" and "The Principles to Manage Interest Rate Risk" are among the Basel principles that should have been adapted by Turkey.



legislative framework, their own solutions for the management of their own risks. Hence, even if BRSA does not change the Basel I rules for Risk Management, the banks should apply higher standards than BRSA requires. Also, even if BRSA does not start implementing the “Principles for Interest Rate Risk Management”, the banks should start implementing the Asset Liability Management Techniques, besides preparing themselves to Basel II.

#### IV.III.3.1.The Need for Asset/ Liability Management

In Turkey, one of the most important problems is the mismatch of maturities between the assets and the liabilities that creates an interest rate risk. The banks in Turkey have and still are profiting from the Government bond and Treasury bill exposures leveraged with short foreign exchange positions and short term funding. The liabilities in TL are very short-termed with an average maturity of 3 months. The foreign currency borrowing is also very short-termed. In the Interbank Markets for TL and FC, the maximum maturities are 1 month. However, the major investment of T/Bs has maturities of 3-12 months and G/Bs over 1 year. This main source of profit due to the high indebtedness of the government becomes the main source of problem during crises due to the extent of macroeconomic volatility an interest rates and foreign exchange rates.

In Turkey, the other most important problem is the non- established risk management culture. In the TBS, “Passive” risk management is applied and the efforts are to move to “Defensive” risk management in order to control risk. However, “Active” risk management should be the policy.<sup>133</sup> The coordination between the risk department and the treasury

<sup>133</sup> Evolution in Applications of VaR

A) Passive

|                            |
|----------------------------|
| <b>Reporting Risk</b>      |
| Disclosure to Shareholders |
| Management Reports         |
| Regulatory Requirements    |

B) Defensive

|   |
|---|
| <b>Controlling Risk</b>                           |
| Setting Risk Limits<br>(desk level and firm-wide) |

C) Active

|                              |
|------------------------------|
| <b>Allocating Risk</b>       |
| Performance Evaluation       |
| Capital Allocation           |
| Strategic Business Decisions |

department in banks is vitally important for the management of risk on time. The risk management culture with the daily market risk computations, with foreign exchange rate and interest rate shocks applied, with limits set and observed according to risk, with VaR models backed by stress tests and scenario analysis and with the performance evaluations that takes risk levels into account should be established.

The need for ALM arises due to the above-mentioned shortcomings. However, neither the existing Basel framework that Turkey has adopted, nor the Basel II framework that Turkey intends to adopt provides concrete solutions for the Asset / Liability Management of banks.

The Basel I Standard Method uses the Duration Gap Analysis for the calculation of interest rate risk. However, it is a reporting based analysis and cannot provide active risk management. On the other hand, the VaR models cannot calculate the ALM risk. The VaR due to interest rate risk, the effect of maturity mismatch on the profit/ loss and economic value, the required capital to get protected against interest rate risk cannot be computed with the VaR methods that are used in the existing framework.

As the interest rate risk is part of the Supervisory Review Pillar II of Basel II, it is underlined that supervisors can require a reduction in risk or an increase in capital especially for banks whose interest rate risk leads to an economic value decline of more than 20% of Tier 1 and Tier 2 capital due to a standardized (2%) interest rate shock. However, a standardized 2% interest rate shock is quite inadequate for the interest rate risk measurement of Turkey where the O/N Interbank rates may rise up to 7000% as the case has been in the 2001 crises. It is also mentioned that supervisors may also decide to apply additional capital charges to their banking system in general, without ex-ante defining the trigger point of intervention. Hence, national supervisors applying additional capital charges seems to be very much of a wishful thinking for the Turkish case where the banking system is already short of the minimum capital adequacy under the Basel I framework. The BCBS (1997) defines Principles for Interest Rate Risk Management, in other words ALM, which Turkey did not adopt.

#### IV.III.3.2. The Principles for Interest Rate Risk Management (ALM)

BIS set Principles for the Management of Interest Rate Risk in 1997. The Sources of Interest Rate Risk that have to be measured are specified as Repricing Risk, Yield Curve Risk, Basis Risk and Optionality Risk. The Effects of Interest Rate Risk are defined as Income Effect and Value Effect. Value Effect measures sensitivity of a bank's economic value to interest rate fluctuations by Duration, Sensitivities and Value at Risk. Income Effect measures the sensitivity of a bank's earnings to fluctuations in interest rates by Gap Analysis, Dynamic Income Simulation and Earnings at Risk. Hence, Gap Analysis, Duration Analysis and Static-Dynamic Sensitivity Analysis are indicated as options to measure interest rate risk. As described by Jovic (2002), both the Value and Income effects have certain strengths and shortcomings.<sup>134</sup>

The BCBS (2003b) published a revised version of 1997 principles in order to detail the risk management principles of the Basel II framework before finalization. The Consultative Document on the "Principles for the Management and Supervision of Interest Rate Risk" is issued for comments until end of October 2003. It is underlined in the CP that banks should have a risk management process that effectively identifies, measures, monitors and controls interest rate risk exposures.<sup>135</sup> The interest rate risk of the trading portfolios are to be

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<sup>134</sup> The advantages of Economic Value Perspective are:

- Easy calculation
- Risk measures provide a clear overview on the Risk Situation
- Controllable risk measures

The disadvantages of Economic Value Perspective are

- Snapshot analysis
- Static interest and FX scenarios
- Assumption of balance sheet run off (no future business)

Shortcomings of the Static Income Effect (Gap Analysis)

- Aggregation in Timebands (assumption of simultaneous repricing)
- Insufficient reinvesting assumption
- Covers only parallel interest rate movements and ignores yield curve risk
- Ignores differences in spreads between market interest rates and the coupon rate of a position (basis risk)
- Does not take into account customer behaviour (optionality)
- Static Income effect is only a rough approximation

Advantages of Income Simulation

- Time horizon based view
- Income effect is an easy interpretable risk measure
- Captures the liquidity impact of the interest rate fluctuations

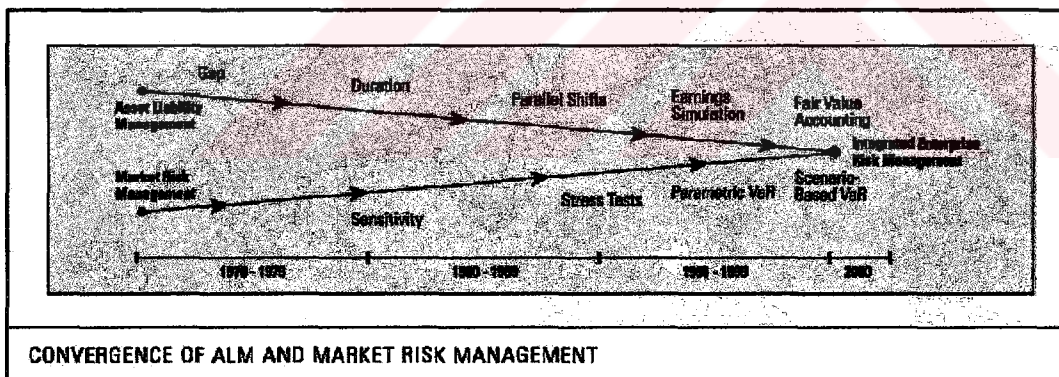
Disadvantages of Income Simulation

- Numerous assumptions
- Complex calculations
- Short term view

measured with VaR and of non-trading portfolios with Gap Analysis, Duration Analysis or Static-Dynamic Sensitivity Analysis. It is also made clear that operating limits must be set for the management of interest rate risk.

The changes between the 1997 and 2003 principles for interest rate risk management are in Principle 13-15 and in Annexes 3 and 4.<sup>136</sup> In Annex 3, the framework is described as also allowing institutions to use these parameters for calculating appropriate shocks themselves when they have material exposure outside G-10 countries and for supervisors in emerging market and other non-G10 countries to derive simple shocks that are appropriate for their own countries. In Annex 3 it is also mentioned that the relative simplicity of a 200 bp parallel rate shock has the disadvantage of ignoring exposures that might be revealed through scenarios that include yield curve twists, inversions and other relevant scenarios. Supervisors will continue to expect institutions to perform multiple scenarios in evaluation of their interest rate risk as appropriate to the level and nature of risk they are undertaking.<sup>137</sup> Actually, the Principles for Interest Rate Risk Management converges the VaR with ALM

Figure 4.1: Convergence of ALM and Market Risk Management



Source: Risktürk

<sup>135</sup> BIS(2003c), the Principles for the Management of Interest Rate Risk also requires appropriate board and senior management oversight, adequate system for measuring, monitoring, controlling risk; adequate system of internal controls, interest rate risk report to the supervisory authorities.

<sup>136</sup> Principle 13 is about interest rate risk public disclosure. Principle 14 is about standardised interest rate shock results of banks to be submitted to the supervisory authority for supervisory treatment. Principle 15 is about immediate remedial action of supervisors to increase the capital or reduce the risk or a combination of both. In Annex 4 an example of a Standardised framework for Gap Analysis is supplied

<sup>137</sup> Parallel upwards and downwards rate shock or 1<sup>st</sup> and 99<sup>th</sup> percentile of observed interest rate changes using a one year holding period and minimum five years of observation will be applied for exposures in G-10 countries. For exposures in non-G10 countries, either a parallel rate shock substantially consistent with 1<sup>st</sup> and 99<sup>th</sup> percentile of observed interest rate changes using a one year holding period and a minimum five years of observations for the particular non- G10 currency, or 1<sup>st</sup> and 99th percentile of observed interest rate changes using a one year holding period and a minimum five years of observations will be applied

For Turkey, under the Basel II framework, Duration Gap Analysis and Static Sensitivity Analysis should be made compulsory instead of providing options of Gap Analysis or Duration Analysis or Static- Dynamic Sensitivity Analysis. These two methodologies would be more commensurate with the complexity of Basel II and will hinder Turkish banks from applying the least costly but least protective ALM technique of Gap Analysis. However, these new principles for interest risk measurement will be effective by earliest 2007 for Turkey. Hence, Turkish banks should adapt the 1997 “Principles for Interest Rate Risk Measurement” without losing anymore time. Amended Basel I allows banks to apply a Combination of Internal Models and Standardized Methodology. Hence, an Automated Combination of the Standard Method should be used with the VaR methodology in order to incorporate the effects of interest rate risk measurement. The Combined Methodology should use the Duration Gap Analysis and Sensitivity Analysis for the measurement but particularly on line management of interest rate risk.

#### **IV.III.3.3.The Application of Asset/ Liability Management to Turkish Banking**

In this subsection, the Duration Gap Analysis and the Static Sensitivity Analysis will be applied to the Turkish banking System. First, the dataset will be provided. Secondly, the analysis will be carried. Third, the results of the analysis will be discussed.

##### **IV.III.3.3.i. The Dataset for Asset Liability Management**

In order to carry the analysis, first the present values of the Assets and Liabilities of the TBS are calculated and presented in table 4.12. The FC and TL deposits, FC and TL loans, and Syndicated loans are added to the already existing CMP and Repo Portfolios of the TBS. As the second step, the Assets and Liabilities of TBS are separated into FC and TL denominated asset and liability items in order to see the mismatch gap between the assets and liabilities.



Table 4.12: Present Values of Assets and Liabilities of Turkish Banking System

| POSITION      | CURRENCY | TRNS. DATE | PURCHASE VALUE         | MAT. DATE  | RATE   | PRESENT VALUE           |
|---------------|----------|------------|------------------------|------------|--------|-------------------------|
| EUROB. (CMP)  | USD      | 02.09.2002 | 7.180.867.500.000.000  | 02.09.2005 | 10%    | 8.587.053.645.884.810   |
| EUROB. (CMP)  | USD      | 02.09.2002 | 7.180.867.500.000.000  | 02.09.2004 | 10%    | 8.154.213.663.407.910   |
| EUROB. (CMP)  | EUR      | 02.09.2002 | 7.180.867.500.000.000  | 02.09.2004 | 9%     | 8.147.892.723.124.350   |
| EUROB. (CMP)  | EUR      | 02.09.2002 | 7.180.867.500.000.000  | 02.09.2005 | 9%     | 8.602.427.877.586.050   |
| EUROB. (R.P.) | EUR      | 02.09.2002 | 2.689.380.000.000.000  | 02.09.2004 | 9%     | 3.051.550.488.320.870   |
| EUROB. (R.P.) | EUR      | 02.09.2002 | 2.689.380.000.000.000  | 02.09.2005 | 9%     | 3.221.783.089.520.940   |
| EUROB. (R.P.) | USD      | 02.09.2002 | 2.689.380.000.000.000  | 02.09.2005 | 10%    | 3.216.065.177.538.570   |
| EUROB. (R.P.) | USD      | 02.09.2002 | 2.689.380.000.000.000  | 02.09.2004 | 10%    | 3.053.917.809.770.760   |
| T/B (CMP)     | TRL      | 02.09.2002 | 16.388.409.333.333.300 | 02.12.2002 | 0,4697 | 16.934.875.832.030.600  |
| T/B (CMP)     | TRL      | 02.09.2002 | 16.388.409.333.333.300 | 02.10.2002 | 0,3934 | 16.918.316.201.695.000  |
| T/B (CMP)     | TRL      | 02.09.2002 | 16.388.409.333.333.300 | 02.03.2003 | 0,5721 | 16.942.629.788.796.300  |
| T/B (R.P.)    | TRL      | 02.09.2002 | 3.770.558.000.000.000  | 02.12.2002 | 0,4697 | 3.896.286.103.715.590   |
| T/B (R.P.)    | TRL      | 02.09.2002 | 3.770.558.000.000.000  | 02.03.2003 | 0,5721 | 3.898.070.092.821.550   |
| REPO          | USD      | 02.09.2002 | -379.075.000.000.000   | 02.12.2002 | 0,4697 | -402.202.265.547.059    |
| REPO          | EUR      | 02.09.2002 | -379.075.000.000.000   | 02.12.2002 | 0,4697 | -402.846.832.875.317    |
| REPO          | TRL      | 02.09.2002 | -5.564.960.000.000.000 | 02.10.2002 | 0,3934 | -5.765.162.786.897.260  |
| FC DEPOSITS   | FC       |            |                        |            |        | -76.357.184.052.474.700 |
| TL DEPOSITS   | TRL      |            |                        |            |        | -54.032.498.594.169.700 |
| TL LOANS      | TRL      |            |                        |            |        | 18.186.084.549.898.200  |
| FC LOANS      | FC       |            |                        |            |        | 25.217.230.165.775.800  |
| SYND.LOANS    | FC       |            |                        |            |        | -3.349.236.498.086.280  |

The total FC and TL Assets and Liabilities are presented in Table 4.13.<sup>138</sup>

Table 4.13: Total F.C and TL Assets and Liabilities of TBS (in TRL)

|                                |                                |                           |                                |
|--------------------------------|--------------------------------|---------------------------|--------------------------------|
| FX DEPOSITS                    | 76.357.184.052.474.700         | EUROB. (CMP)              | 8.587.053.645.884.810          |
| SYND. LOANS                    | 3.349.236.498.086.280          | EUROB. (CMP)              | 8.154.213.663.407.910          |
|                                |                                | EUROB. (CMP)              | 8.147.892.723.124.350          |
|                                |                                | EUROB. (CMP)              | 8.602.427.877.586.050          |
|                                |                                | EUROB. (R.P.)             | 3.051.550.488.320.870          |
|                                |                                | EUROB. (R.P.)             | 3.221.783.089.520.940          |
|                                |                                | EUROB. (R.P.)             | 3.216.025.130.700.910          |
|                                |                                | EUROB. (R.P.)             | 3.053.917.809.770.760          |
|                                |                                | FX LOANS                  | 25.217.230.165.775.800         |
| <b>TOTAL LIABILITIES in FC</b> | <b>79.706.420.550.561.000</b>  | <b>TOTAL ASSETS in FC</b> | <b>71.252.094.594.092.400</b>  |
| REPOS                          | 5.765.162.786.897.260          | T/B (CMP)                 | 16.934.875.832.030.600         |
| REPOS                          | 402.202.265.547.059            | T/B (CMP)                 | 16.918.316.201.695.000         |
| REPOS                          | 402.846.832.875.317            | T/B (CMP)                 | 16.942.629.788.796.300         |
| TL DEPOSITS                    | 54.032.498.594.169.700         | T/B (R.P.)                | 3.896.286.103.715.590          |
|                                |                                | T/B (R.P.)                | 3.898.070.092.821.550          |
|                                |                                | TL LOANS                  | 18.186.084.549.898.200         |
| <b>TOTAL LIABILITIES in TL</b> | <b>60.602.710.479.489.300</b>  | <b>TOTAL ASSETS in TL</b> | <b>76.776.262.568.957.200</b>  |
| <b>TOTAL LIABILITIES</b>       | <b>140.309.131.030.050.000</b> | <b>TOTAL ASSETS</b>       | <b>148.028.357.163.050.000</b> |

<sup>138</sup> Total assets in TL are more than total liabilities in TL and it is vice versa for total FC assets and liabilities, which gives indication about the foreign exchange short positions of the system.

The third step concerns the computation of duration mismatch.<sup>139</sup> Table 4.14 illustrates the dataset for Interest Rate Risk Analysis with total assets and liabilities, the mismatch between total assets and liabilities and the mismatch in the durations of total assets and liabilities. Table 4.15 shows the mismatch of FC Assets and Liabilities and Table 4.16 demonstrates the Mismatch for TL Assets and Liabilities.

Table 4.14: Mismatch for Total Assets and Liabilities

|                                   |                         |
|-----------------------------------|-------------------------|
| Duration of Assets Portfolio      | 0,928                   |
| Duration of Liabilities Portfolio | 0,184                   |
| Duration Mismatch                 | 0,753                   |
| Total Asset Value                 | 148.028.357.163.049.000 |
| Total Liabilities Value           | 140.309.131.030.050.000 |
| NPV                               | 7.719.226.132.999.440   |

Table 4.15: Mismatch for FC Assets and Liabilities

|                                   |                         |
|-----------------------------------|-------------------------|
| Duration of Assets Portfolio      | 1,706                   |
| Duration of Liabilities Portfolio | 0,24                    |
| Duration Mismatch                 | 1,437                   |
| Total Asset Value                 | 71.252.084.594.092.500  |
| Total Liabilities Value           | 79.706.420.550.561.000  |
| NPV                               | - 8.454.325.956.468.520 |

Table 4.16: Mismatch for TL Assets and Liabilities

|                                   |                        |
|-----------------------------------|------------------------|
| Duration of Assets Portfolio      | 0,205                  |
| Duration of Liabilities Portfolio | 0,111                  |
| Duration Mismatch                 | 0,118                  |
| Total Asset Value                 | 76.776.262.568.957.300 |
| Total Liabilities Value           | 60.602.710.479.489.400 |
| NPV                               | 16.173.552.089.467.900 |

#### IV.III.3.3.ii. The Duration Gap Analysis and Sensitivity Analysis for ALM

The Duration Gap Analysis will be applied to the TL and FC Assets and Liabilities of TBS and then Sensitivity Analysis will be carried for TBS under different scenarios.

In table 4.18, the Duration Gap Analysis for FC denominated Assets and Liabilities is demonstrated. The changes in the NPVs are computed for interest rate changes from 0,5% to

<sup>139</sup> The Duration Convexity Analysis is carried to reach to the Duration of the total assets and liabilities as shown below for the total assets and liabilities.



2,5%, each with a 50 bp of increase. A 2,5% change in FC interest rates cause a 24% change in the NPV of the portfolio due to the mismatch of duration and gap between the FC Assets and Liabilities.

Table 4.17: Duration Gap Analysis for FC Assets and Liabilities

| Change in Rates | NPV                      | Change in NPV           | % Change |
|-----------------|--------------------------|-------------------------|----------|
| 0,50%           | - 8.851.722.876.927.310  | - 397.396.920.458.787   | 5%       |
| 1,00%           | - 9.249.119.797.386.100  | - 794.793.840.917.575   | 9%       |
| 1,50%           | - 9.646.516.717.844.890  | - 1.192.190.761.376.360 | 14%      |
| 2,00%           | - 10.043.913.638.303.600 | - 1.589.587.681.835.150 | 19%      |
| 2,50%           | - 10.441.310.558.762.400 | - 1.986.984.602.293.930 | 24%      |

The Duration Gap analysis for TL denominated A/Ls in table 4.19 below demonstrate that a 20% change in the interest rates may cause 8% loss of value depending on the mismatch of duration and gap between the assets and liabilities.

Table 4.18: Duration Gap Analysis for TL Assets and Liabilities

| Change in Rates | NPV                    | Change in NPV           | % Change |
|-----------------|------------------------|-------------------------|----------|
| 4%              | 15.899.375.831.636.900 | - 274.176.257.830.963   | -2%      |
| 8%              | 15.625.199.573.806.000 | - 548.352.515.661.925   | -3%      |
| 12%             | 15.351.023.315.975.000 | - 822.528.773.492.888   | -5%      |
| 16%             | 15.076.847.058.144.100 | - 1.096.705.031.323.850 | -7%      |
| 20%             | 14.802.670.800.313.100 | - 1.370.881.289.154.810 | -8%      |

The Sensitivity Analysis shows the sensitivity of the portfolio to stand- alone and auto correlated rate shock scenarios. For Sensitivity Analysis, first the difference in the PV of Assets and Liabilities is calculated, and then different auto correlated rate shocks are applied to TL and FC government bond rates, FC rates and FX rates.

The first scenario is a 10% rate shock for TRL Government bonds (G/B) and auto correlated rate shocks for the other instruments. This scenario produces almost a 20% loss of value for the portfolios of TBS.

Figure 4.2: Scenario 1 for Sensitivity Analysis

|                   |                        |  |  |
|-------------------|------------------------|--|--|
| Portföy Grubu     | TURKISH_BANKING_SECTOR |  |  |
| Portföy Tarihi    | 30.09.2002             |  |  |
| Başlangıç Tarihi  | 30.03.2002             |  |  |
| Bitiş Tarihi      | 30.09.2002             |  |  |
| Volatilité Tipi   | MOVAVRG                |  |  |
| PV                | 8,098,745,246,812,747  |  |  |
| PV (Analiz)       | 6,635,518,627,582,850  |  |  |
| Yüzdesele Deęişim | % -18.07               |  |  |

| VERİMEĞRİLERİ |       |      |                       |
|---------------|-------|------|-----------------------|
| EUR.LIB       | % OTO | Oto. | Non-Parallel Deęerler |
| TRL.GOV       | % 10  | Oto. | Non-Parallel Deęerler |
| USD.GOV       | % OTO | Oto. | Non-Parallel Deęerler |
| USD.LIB       | % OTO | Oto. | Non-Parallel Deęerler |

| VARLIKLAR |       |      |          |
|-----------|-------|------|----------|
| EUR       | % OTO | Oto. | Deęerler |
| USD       | % OTO | Oto. | Deęerler |

The second scenario is a 20% auto correlated rate shock of G/B, which produces 35% loss.

Figure 4.3: Scenario 2 for Sensitivity Analysis

|                   |                       |  |  |
|-------------------|-----------------------|--|--|
| PV                | 8,098,745,246,812,747 |  |  |
| PV (Analiz)       | 5,223,804,574,668,662 |  |  |
| Yüzdesele Deęişim | % -35.5               |  |  |

| VERİMEĞRİLERİ |       |      |                       |
|---------------|-------|------|-----------------------|
| EUR.LIB       | % OTO | Oto. | Non-Parallel Deęerler |
| TRL.GOV       | % 20  | Oto. | Non-Parallel Deęerler |

Scenario 3 is a 20% auto correlated foreign exchange rate increase in USD. This scenario creates more than 30% decrease of value for TBS.

Figure 4.4: Scenario 3 for Sensitivity Analysis

|                      |       |                       |               |          |
|----------------------|-------|-----------------------|---------------|----------|
| Volatilite Tipi      |       | MOYAVRG               | SPOT DEĞERLER |          |
| PV                   |       | 8,098,745,246,812,747 | EUR           | 19.93    |
| PV (Analis)          |       | 5,588,339,188,594,729 | USD           | 20       |
| Yüzdesel Değişim     |       | %-31                  |               |          |
| <b>VERİMEÇRİLERİ</b> |       |                       |               |          |
| EUR.LIB              | % OTO | Oto.                  | Non-Parallel  | Değerler |
| TRL.GOV              | % OTO | Oto.                  | Non-Parallel  | Değerler |
| USD.GOV              | % OTO | Oto.                  | Non-Parallel  | Değerler |
| USD.LIB              | % OTO | Oto.                  | Non-Parallel  | Değerler |
| <b>VARLIKLAR</b>     |       |                       |               |          |
| EUR                  | % OTO | Oto.                  | Değerler      |          |
| USD                  | % 20  | Oto.                  | Değerler      |          |

#### IV.III.3.3.iii. The Results of Duration Gap Analysis and Sensitivity Analysis

The results of Duration Gap Analysis show that the affect of an interest rate increase on the value of the portfolio may be as high as ten times more or half as much depending on the gap and duration of assets and liabilities. The Sensitivity Analysis demonstrated the effects of parallel rate shocks on the value of assets and liabilities of TBS quantitatively. It is also evidenced from the analysis that the sensitivity of the TBS portfolio is higher to auto correlated interest rate changes of the government bonds than to auto correlated foreign exchange rate changes.

The Duration Gap Analysis and Sensitivity Analysis reveal that these ALM techniques provide the means for banks to automatically evaluate their interest rate and currency risks. The liquidity and balance sheet structure risks are also measured as the changes in value indicate the possibility of problem in terms of liquidity and the duration analysis enables the banks to manage their balance sheet structure risks. Hence, the main financial risk exposures of Turkey can be better measured and managed with ALM. Banks in the developing countries like Turkey should apply ALM techniques in order to protect themselves against their own risk exposures to crises.

## CONCLUSIONS

Globalization and liberalization, despite numerous benefits, also created the setting for banking crises in the world economies since 1980s. The banking crises in the developing countries however, are more numerous, frequent and more costly than the crises in the developed world. The case studies, empirical studies and the analysis of banking crises show that the determinants of banking problems in the developed and developing countries are different. Systemic banking crises erupt in developing countries when the existing institutional and microeconomic risk exposures of banks to interest rate, currency and the interrelated liquidity and balance sheet structure risks couple with macroeconomic shocks, particularly in terms of interest rate and exchange rate volatilities. In the developed countries however, the problems are more restricted to individual bank problems or significant incidences due mainly to boom and bust cycles and the banks in the developed countries are mainly exposed to credit, market and operational risks.

The analysis shows that the systemic Turkish banking crises demonstrate similar characteristics to the banking crises of the developing countries and are different than the G-10 banking problems or the individual banking distresses in a number of EU member states. The existing institutional risk exposures in the Turkish banking system particularly in terms of moral hazard and the inadequate supervisory, regulatory frameworks as well microeconomic risks due to the huge and longer-term capital markets portfolios funded by non-hedged open foreign currency positions and shorter termed liabilities caused recently a systemic banking crisis when coupled with macroeconomic volatility in interest and exchange rates.

In order to prevent banking crises in the world economies, BCBS of BIS initiates regulations for G-10, the EU also initiates parallel regulations immediately and 100 more countries, mostly developing, adopt the Prudential Bank Regulation and Supervision framework, which is a second-best policy alternative and which is also associated with market failures. The shortcomings of the Basel I framework necessitated a new regulatory and supervisory framework particularly for capital requirements concerning credit risk. However, Basel II proposal also has serious shortcomings in bringing financial stability and level playing the international field for banking. The Basel I framework requires capital charges for credit and

market risk exposures of banks. Basel II framework, which will replace Basel I once finalized, covers also the interest rate and business risks, but charges capital requirements only for credit, market and operational risk exposures of banks. However, these risks that is associated with the banking crises of the developed countries runs short of capturing the risk exposures of banks to crises in the developing countries like Turkey.

From the global perspective, the Basel II framework will also change the rules of the game for banking. For G-10 and the EU, the capital requirements will decline with the use of more sophisticated internal risk measurement methods and the banks heavily active in retail business will profit out the most from the new framework. For the developing countries that will implement the Basel II framework, the capital requirements will rise radically as these countries will mainly use the Standard Approach and as the increase in capital requirements due to capital charges for operational risk can only be offset with the use of more sophisticated credit and operational risk measurement techniques. This most probably will cause acquisitions of the developing country banks by the banks of the developed countries. The Basel II framework will however have indirect impact on the developing countries, whether if these countries apply the new framework or not. The Basel II framework will radically change the cost and amount of borrowing of some developing countries. The high rated non-OECD developing countries will profit out the most from the new framework. The major negative impact will be on the developing countries like Turkey that are low rated OECD members.

From the EU perspective, the regulatory and supervisory framework of Turkey is now in many ways parallel to the legislative framework of the EU for banking, which is a slightly modified version of the Basel framework, despite the fact that there are still existing wide differences between the microeconomic, institutional and macroeconomic risk exposures of banks between the EU and Turkey. However, there are certain BIS principles that have not turned into parallel legislations in the EU like the “Core Principles for Effective Supervision” and “Principles for the Management of Interest Rate Risk”, mainly because they are to the interest of developing countries. Consequently, Turkey has not adopted these regulations despite their crucial importance for developing countries.



Turkey has adopted the Basel CAA of 1988 but it did not prevent Turkish banking system from banking crises. This is mainly because the Basel I framework that is designed for the developed countries, with its shortcomings, is precisely adopted in Turkey, without due care for country specific conditions in terms of macroeconomic, microeconomic and institutional settings. In Turkey, the Market Risk Amendment of Basel I is again precisely adopted in 2002 despite the fact that market risk, just like the credit risk, is not one the main causes of systemic problems of the Turkish banking system. The Basel II framework will, most probably, also be precisely implemented in Turkey. The credit, market and operational risk exposures of Turkish banks will be safeguarded with Basel II and the capital requirements of banks in Turkey will radically increase. However, the banks in Turkey will still not be protected against their own risk exposures and against possible new systemic banking crises.

The application of the Basel I and II frameworks to the consolidated balance sheets of the Turkish Banking System as of September 2002 reveals certain more specific problems regarding the precise implementation of the Basel frameworks. The Turkish Banking System is short of 8% minimum capital requirements even with the Standard Method of the existing Basel I framework both for credit and market risks. However, the Standard Method, that is used by the majority of banks in Turkey does not take market volatilities into account and thus cannot immunize the banks in Turkey from probable new systemic crises. The calculations with Standard Method of Basel II, on the other hand, provides much higher and actually more realistic capital requirements due to the sovereign, bank and corporate risk weights of 100%. However, the most important problem regarding the application of Basel frameworks to Turkey is that the main risk of Capital Market Portfolios is not properly handled. The Basel I framework assigns 0% risk weight to credits to government, the Standard Approach assigns no risk weight to the specific risk of Government bonds, the IMB approach considers the risk of trading portfolio but ignores the risk of investment portfolios. The credit risk of the non-trading portfolio is not still incorporated into the calculations with the Basel II framework as it assigns 0% risk weight to government lending in domestic currency.

In order to prevent the systemic banking crises that threat the global financial stability in the developing countries like Turkey, the Basel Committee should consider the different macroeconomic, microeconomic and institutional risks of the developing world in its

international efforts to bring financial stability and should not deepen the already existing gap between the developed and developing countries. The Regulatory and Supervisory authorities in the developing countries like Turkey should lead the industry for Basel II in terms of the establishment of risk management and rating culture, the necessity for the establishment of local rating agencies, the data collection of banks, the privileges the foundation IRB Approach for credit risk, the advanced measurement methods for operational risk and the increase in the concentration of retail banking activities will provide in terms of capital requirements. However, BRSA should first think about the real problems and corresponding remedies of the Turkish banking system rather than prescribing the medicines of a recovered patient's disease without due care to the sort of illness. Hence, BRSA should start by redefining the Risk Management Regulation by taking into consideration the problems Turkey encounters in the application of Basel I, and also start implementing the "Core Principles for Effective Supervision" and the "Principles for Interest Rate Risk Management" without losing any more time.

However, since it is mainly the banks' responsibility to measure and manage their risks, Turkish banks, under the existing Basel framework should apply higher standards than legally required by BRSA. For Basel II, Turkish banks should immediately start preparing themselves to the increase in cost and decrease in the amount of international bank lending; and should get prepared to increases in capital requirements by starting data collection for the foundation IRBA and advanced operational risk measurement approaches and by increasing their concentration in retail business activities. Turkish banks, besides the Basel frameworks, should also apply Asset Liability Management techniques, in order to protect themselves against their own risk exposures to possible new systemic banking crises.



## REFERENCES

- Aksel, K. (2002). "The New Basel Consultation Document, Framework of the New Accord", PwC Conference on May 2002.
- Aksel, K. (2003). "Basel II is a Chance", unpublished notes from the TIDE meeting held at Garanti Bank.
- Altman and Saunders. (2000). "An Analysis and Critique of the BIS Proposal on Capital Adequacy and Ratings", [www.pages.stern.nyu.edu/~caltman/BISproposal.pdf](http://www.pages.stern.nyu.edu/~caltman/BISproposal.pdf)
- Asian Bankers' Associations. (2003). "Comments to CP3" issued on 20<sup>th</sup> August 2003 at [www.bis.org](http://www.bis.org).
- Banco de Mexico. (2003). "Comments to CP3" issued on 20<sup>th</sup> August 2003, [www.bis.org](http://www.bis.org),
- Barkelaar et al. (2001). "The Effect of VaR Based Risk Management on Asset prices and the Volatility Smile", [www.papers.ssrn.com](http://www.papers.ssrn.com)
- Barth J. et al. (1998). "The Role of Governments and Markets in International Banking Crises: The case of East Asia", edited by George Kaufman, Bank Crises: Causes, Analysis and Prevention
- Barth, Caprio and Levine. (2001a). "The Regulation and Supervision of Banks Around the World: A New Database", Policy Research Working Paper 2588, The World Bank
- Barth, Caprio, Levine. (2000). "Banking Systems Around the Globe: Do Regulation and Ownership Affect Performance and Stability", Policy Research Working Paper 2325, The World Bank
- Barth, Caprio, Levine. (2001b). "Bank Regulation and Supervision: What Works Best?" Policy Research Working Paper 2725, The World Bank [www.bis.org/bcbs/events/b2ealev.pdf](http://www.bis.org/bcbs/events/b2ealev.pdf)
- Basak S. and Shapiro, A. (2001). "Value at Risk Based Risk Management: Optimal Policies and Asset Prices", Social Science Research Network Electronic Library [www.papers.ssrn.com](http://www.papers.ssrn.com)
- BCBS. (1996). "Amendment to the Capital Accord to Incorporate Market Risks", Basel [www.bis.org/publ/cbs24.pdf](http://www.bis.org/publ/cbs24.pdf)
- BCBS. (1997). Core Principles for Effective Banking Supervision, Basel [www.bis.org/publ/bcbs30a.pdf](http://www.bis.org/publ/bcbs30a.pdf)
- BCBS. (2001a). "Consultative Document: The New Basel Capital Accord", Basel [www.bis.org/publ/bcbsca03.pdf](http://www.bis.org/publ/bcbsca03.pdf)

BCBS. (2001b). “Consultative Document: Principles for the Management and Supervision of Interest Rate Risk”, Supporting Document to the New Basel Capital Accord, Basel [www.bis.org/publ/bcbsca09.pdf](http://www.bis.org/publ/bcbsca09.pdf)

BCBS. (2001c). “Consultative Document: The Standardised Approach to Credit Risk”, Supporting Document to the New Basel Capital Accord, Basel. [www.bis.org/publ/bcbsca04.pdf](http://www.bis.org/publ/bcbsca04.pdf)

BCBS. (2001d). “Consultative Document: The Ratings-Based Approach”, Supporting Document to the New Basel Capital Accord, Basel. [www.bis.org/publ/bcbsca05.pdf](http://www.bis.org/publ/bcbsca05.pdf)

BCBS. (2003a). “Consultative Document, Overview of the Basel Capital Accord”, Basel

BCBS. (2003c). “QIS3 Electronic Workbook”, Basel, [www.bis.org/bcbs/qis/qis3wb1.htm](http://www.bis.org/bcbs/qis/qis3wb1.htm)

BCBS. (2003b). “The Principles for the Management of Interest Rate Risk”, Basel, [www.bis.org](http://www.bis.org)

Bell, J. (2000). “Leading Indicator Models of Banking Crises – a critical review by James Bell”, Financial Stability Review- December 2000 [www.bankofengland.co.uk/fsr/fsr09art3/pdf](http://www.bankofengland.co.uk/fsr/fsr09art3/pdf)

Benink, H. (1998). “Financial Fragility: Theories and Empirical Evidence”, from Bank Crises: Causes, Analysis and Prevention, Editor: George Kaufman, Jai Press Inc, London

Berg, S. (1998). “Bank Failures in Scandinavia”, from Preventing Bank Crises: Lessons from Recent Global Bank Failures, Edited by Caprio, G. et al, EDI Development Studies

BIS. (2003). “BIS Banking Regulation” [www.bis.org](http://www.bis.org)

BIS. (1988). “International Convergence of Capital Measurement and Capital Standards”, Basel, [www.bis.org/publ/bcbs04A.pdf](http://www.bis.org/publ/bcbs04A.pdf)

BIS. (1998). “International Convergence of Capital Measurement and Capital Standards” (July 1988, Updated to April 1998), Basel, [www.bis.org/publ/bcbsc111.pdf](http://www.bis.org/publ/bcbsc111.pdf)

BIS. (2001a). “Overview of the New Basel Capital Accord”, Basel, [www.bis.org/publ/bcbsca02.pdf](http://www.bis.org/publ/bcbsca02.pdf)

BIS. (2001b). “The New Basel Capital Accord: an explanatory note”, Basel [www.bis.org/publ/bcbsca01.pdf](http://www.bis.org/publ/bcbsca01.pdf)

Bo, D. (2001). “Value at Risk”, Undergraduate Research Opportunity Programme in Science, [www.gloriamundi.org/var/pub/dbo.pdf](http://www.gloriamundi.org/var/pub/dbo.pdf)

Boyd, J. et al. (2001). “A Users’ Guide to Banking Crises”, University of Minnesota and Federal Reserve Bank of Minneapolis [www.eco.utexas.edu/~bsmith/bankingcrisestestnew.pdf](http://www.eco.utexas.edu/~bsmith/bankingcrisestestnew.pdf)

Brazil Central Bank. (2003). "Comments to CP3" issued on 20<sup>th</sup> August 2003 at [www.bis.org](http://www.bis.org)

BRSA. (1999). "Banks Act No: 4389 as amended by the Act No: 4743" [www.bddk.org.tr/english/legislation/banks\\_act\\_4389.doc](http://www.bddk.org.tr/english/legislation/banks_act_4389.doc)

BRSA. (2002). "On and off-B/S Accounts of TBS", [www.bddk.org.tr](http://www.bddk.org.tr)

BRSA. (2003a). "Banking Sector Restructuring Progress Report VII" by Banking Regulation and Supervision Agency, [www.bddk.org](http://www.bddk.org)

BRSA. (2001a). "The Regulatory Framework of BRSA", [www.bddk.org.tr/turkce/mevzuat/mevzuat.htm#2](http://www.bddk.org.tr/turkce/mevzuat/mevzuat.htm#2)

BRSA. (2001b). "The Regulatory Framework, Example" [www.bddk.org.tr/turkce/mevzuat-Piyasa%20Riski-Standart%20Metod-Ornek-ek](http://www.bddk.org.tr/turkce/mevzuat-Piyasa%20Riski-Standart%20Metod-Ornek-ek)

BRSA. (2001c). "Regulation on Banks' Internal Control and Risk Management Systems", [www.bddk.org.tr/english/legislation/INTERNAL%CONTROL%20AND%20MANAGEMENT.doc](http://www.bddk.org.tr/english/legislation/INTERNAL%CONTROL%20AND%20MANAGEMENT.doc)

Bydalek, P.L. (1998). "Lessons from Recent Global Bank Failures; The Case of Brazil" Preventing Bank Crises: Lessons from Recent Global Bank Failures, EDI of the WB

Calomiris. C. (1998). "Blueprints for New Global Financial Architecture", [www.house.gov/jec/imf/blueprint.htm](http://www.house.gov/jec/imf/blueprint.htm)

Caprio et al. (1998). "Preventing Bank Crises: Lessons from Recent Global Bank Failures", The World Bank, D.C.

Caprio, G. (1998). "Banking Crises: Expensive Lessons", edited by Kaufman G, Bank Crises: Causes, Analysis and Prevention, 1998, Jai Press Inc.

Garcia, G. (1998). "The East Asian Financial Crises", edited by Kaufman G, Bank Crises: Causes, Analysis and Prevention, 1998, Jai Press Inc.

Cargill et al. (1998). "The Banking Crisis in Japan", from Preventing Bank Crises: Lessons from Recent Global Bank Failures, Edited by Caprio, G. et al, EDI Development Studies

Central Bank of Turkey. (2001). [www.tcmb.gov.tr](http://www.tcmb.gov.tr)

Corsetti, G., Pesenti, P., Roubini, N. (1998). "What caused the Asian currency and financial crisis?" [www.pages.stern.nyu.edu/~nroubini/asia/](http://www.pages.stern.nyu.edu/~nroubini/asia/)

Credient. (2002). "Implementing Basel II: the practical implications", [www.risk.sungard.com/credient/ns\\_biiii.php](http://www.risk.sungard.com/credient/ns_biiii.php)

Coco, D. and Liu, H. (2002). "An Analysis of VaR-based Capital Requirements", [www.gloriamundi.org](http://www.gloriamundi.org)

Cuthbertson K and Nietzsche D. (2001). "Financial Engineering: Derivatives and Risk Management", John Wiley and Sons Ltd, N.Y.

Daniellson, J. (2002), "On the Feasibility of Risk Based Regulation", [www.riskresearch.org](http://www.riskresearch.org)

Danielson, J. (2001b). "The Emperor has no Clothes: Limits to Risk Modeling", Financial Markets Group LSE, [www.riskresearch.org](http://www.riskresearch.org)

Daniellson, J. et al. (2001a). "An Academic Response to Basel II", [www.riskresearch.org](http://www.riskresearch.org)

Demiurgic- Kent and Detragiache E. (1997). "The Determinants of Banking Crises: Evidence from Developing and Developed Countries", IMF Working Papers 106

Deppler. (2001). "" Financial times article, the content of which appeared in the daily Milliyet on 24/07/2001

DIE. (2001). "Statistics", [www.die.gov.tr](http://www.die.gov.tr)

Domac, I. and Peria, M. (2000). "Banking Crises and Exchange Rate Regimes: Is there a link?" [www.utdt.edu/congresos/economia/pdfs/bkexch\\_aug.pdf](http://www.utdt.edu/congresos/economia/pdfs/bkexch_aug.pdf)

Dowd, K. (1998). "Beyond Value at Risk: The New Science of Risk Management", John Wiley & Sons, New York

Dziobek, C. and Pazarbasioglu, C. (1998). "Lessons from Systemic Bank Restructuring", IMF, [www.imf.org/external/pubs/ft/issues/issues14/index.html#tab1](http://www.imf.org/external/pubs/ft/issues/issues14/index.html#tab1)

Eatwell, J. and Taylor, L. (1998). "International Capital Markets and the Future of Economic Policy", Centre for Economic Policy Analysis Working Paper Series III, Working Paper No: 9, [www.newschool.edu/cepa/papers/archive/cepa0309.pdf](http://www.newschool.edu/cepa/papers/archive/cepa0309.pdf)

Edwards, S. (1998). "Barking up the Wrong Tree", Financial Times, October 7, 1998  
[www.anderson.ucla.edu/faculty/sebastian.edwards/mirage\\_final/pdf](http://www.anderson.ucla.edu/faculty/sebastian.edwards/mirage_final/pdf)

Eichengreen B. and Arteta, C. (2000). "Banking Crises in Emerging Markets: Presumptions and Evidence", [www.socrates.berkeley.edu/~arteta/bankcris.pdf](http://www.socrates.berkeley.edu/~arteta/bankcris.pdf)

EU. (2003). "EU Legislation on Banking", [www.europa.eu.int](http://www.europa.eu.int)

EU. (2003). "European Commission Review of the Capital Requirements for Credit Institutions and Investment Firms", Third Quantitative Impact Study

Eurostat. (2000). Bank Profitability Financial Statements of Banks

Eurostat. (2001). Special Feature on Banking, European Federation Key Statistics

Eurostat. (2003). European Economy, Economic forecasts, Spring 2003

Eurostat, (2002). Euro-Mediterranean Statistics Luxembourg, 2002

Fisher, S. (2002). "Basel II: Risk Management and Implications for Banking in Emerging Market Countries", CitiGroup, William Taylor Memorial Speech [www.iie.com/fisher/pdf/fisher09190.pdf](http://www.iie.com/fisher/pdf/fisher09190.pdf)

Gavin, M. and Hausmann, R. (1998). "The roots of Banking Crises: The Macroeconomic Context", [www.iadb.org/oce/pdf/318.pdf](http://www.iadb.org/oce/pdf/318.pdf)

Glasner, D. (1995). "Free Banking and Economic Development", Foundation for Economic Education, Volume: 45, No: 7, [www.libertyheaven.com](http://www.libertyheaven.com)

Goldstein, M. (1996). "The Case for International Banking Standard", Institute for International Economics, Policy Analysis in International Economics, [www.iie.com/publications/publication.cfm?pub\\_ =42](http://www.iie.com/publications/publication.cfm?pub_ =42)

Goldstein, M. (1997). Press Release: "New International Banking Standard Needed to Counter Worldwide Banking Crises", [www.iie.com/press/bankpres.htm](http://www.iie.com/press/bankpres.htm)

Goldstein, M. and Turner, P. (1996). "Banking Crises in Emerging Economies: Origins and Policy Options", BIS Economic Papers No: 46, [www.bis.org/publ/econ46.pdf](http://www.bis.org/publ/econ46.pdf)

Goodhart, C. (2000). "The Organisational Structure of Banking Supervision", Financial Stability Institute Occasional Papers No: 1, [www.bis.org/fsipapers01.pdf](http://www.bis.org/fsipapers01.pdf)

Gourinchas, et al. (2001). "Lending Booms: Latin America and the World", National Bureau of Economic Research Working Paper Series, Working Paper 8349 <http://papers.nber.org/papers/w8249.pdf> and [www.nber.org/papers/w8249](http://www.nber.org/papers/w8249)

Graf, P. (1999). "Policy Responses to the Banking crisis in Mexico", Bank Restructuring in Practice, BIS Policy Papers, NO: 6 August 1999, BIS Monetary and Economic Department Basel Switzerland

Greuning, H. and Bratanovic S. (2000). "Analysing Banking Risk: A Framework for Assessing Corporate Governance and Financial Risk Management", The World Bank, Washington D.C

Jones-G. and Spratt. S. (2001). " Will the proposed new Basel Capital Accord have a negative effect on developing countries?" [www.jubileepus.org/analysis/articles/griffith\\_jones\\_Basel\\_capital.htm](http://www.jubileepus.org/analysis/articles/griffith_jones_Basel_capital.htm)

Jones-G, et al.(2002a). "Basel II and Developing Countries: Diversification and Portfolio Effects", FMG, The London School of Economics [www.fmg.lse.ac.uk/pdfs/DP437.pdf](http://www.fmg.lse.ac.uk/pdfs/DP437.pdf)

Jones-G. et al. (2002b). "The Onward March of Basel II: Can the Interests of Developing Countries be Protected?" Institute of Development Studies, University of Sussex

Gup, B. (1998), "Bank Failures in the Major Trading Countries of the World: Causes and Remedies", Quorum Books, London

Hardy D. (1998). "Are Banking Crises Predictable?". Finance and Development-A quarterly magazine of IMF December 1998, Volume 35, Number 4 [www.imf.org/external/pubs/ft/fandd/1998/12/hardy.htm](http://www.imf.org/external/pubs/ft/fandd/1998/12/hardy.htm)

Hardy D. and Pazarbasioglu C. (1999). "Determinants and Leading Indicators of Banking Crises: Further Evidence", IMF Staff Papers Vol: 46 No: 3, September November 1999 [www.imf.org/external/pubs/ft/staffp/1999/09-99/pdf/hardy.pdf](http://www.imf.org/external/pubs/ft/staffp/1999/09-99/pdf/hardy.pdf)

Harrer, A.(1997). "Banking Crises in Latin America in the 1990's:Lessons from Argentina, Paraguay and Venezuela", IMF Working Papers, [www.imf.org/external/pubs/ft/wp/wp97140.pdf](http://www.imf.org/external/pubs/ft/wp/wp97140.pdf)

Hawkins, J. and Klau, M. (2000). "Measuring Potential Vulnerabilities in Emerging Market Economies", [www.bis.org/publ/work.91.pdf](http://www.bis.org/publ/work.91.pdf)

Heffernan, S. (1996). Modern Banking in Theory and Practice, Wiley, N.Y

Herring, R., (1998)," Banking Disasters: Causes and Preventive Measures, Lessons Derived from the U.S Experience", from Preventing Bank Crises: Lessons from Recent Global Bank Failures, Edited by Caprio, G. et al, EDI Development Studies

Herring, R and Litan R. (1995), Financial Regulation in the Global Economy, The Brookings Institution, Washington D.C

HSBC, (2003). Database for Eurobond yields from [www.hsbc.com](http://www.hsbc.com).

Hutchison, M and Mc Dill. (1998). "Are All Banking Crises Alike? The Japanese Experience in International Comparison", [www.econ.ucsc.edu/faculty/hutch/nber.pdf](http://www.econ.ucsc.edu/faculty/hutch/nber.pdf)

Hutchison, M., (1999), "Early Warning Indicators of Banking Sector Distress", FRBSF Economic Letter, September 17,1999 [www.frbsf.org/econsrch/wklyltr/wklyltr99/el99-28/html#subhead1](http://www.frbsf.org/econsrch/wklyltr/wklyltr99/el99-28/html#subhead1))

Ilaco, C. (2002). "The New Basel Accord: Banks' current state of readiness: A European perspective", PwC Conference on May 2002, PwC

IMF. (1999). "Brazil: Selected Issues and Statistical Appendix", Staff Country Report No:99/97 [www.imf.org/external/pubs/cat/longres.cfm?sk=3206.0](http://www.imf.org/external/pubs/cat/longres.cfm?sk=3206.0)

IMF. (1997). IMF Yearly Report, [www.imf.org](http://www.imf.org)

Insero, R. (2002). "Credit Risk Data Challenges Underlying the New Basel Capital Accord", the RMA Journal April 2002

Jaschke, S. (2001), "Quantile-VaR is the Wrong Measure to Quantify Market Risk for Regulatory Purposes" [www.gloriamundi.org](http://www.gloriamundi.org)

Jones, G.and Spratt S. (2003), « CP 3 Comments », [www.bis.org/bcbs/cp3\\_comments.htm](http://www.bis.org/bcbs/cp3_comments.htm)



Jorion, P. (2000). "Value at Risk", Conference Notes from the Conference organized by WB and TBB and held in İstanbul

Jovic, D. (2002). "Asset Liability Management", notes from the conference held at Istanbul Commerce University on March 5<sup>th</sup> 2002.

JP Morgan, (2001). "The New Basel Accord: Implications for Emerging Market Borrowers", Emerging Market Research, 19 January 2001, New York

Kaminsky, G (2000). "Currency and Banking Crises: The Early Warnings of Distress" [www.gwu.edu/~clai/working\\_papers/Kaminsky\\_Graciela\\_07-00.pdf](http://www.gwu.edu/~clai/working_papers/Kaminsky_Graciela_07-00.pdf)

Kaufman, G. (1998). Bank Crises: Causes, Analysis and Prevention, Jai Press Inc.

Kaufman G. (1996). "Bank Failures, Systemic Risk, and Bank Regulation", Cato Journal, Vol.16, No 1(Spring & Summer 1996), Copyright Cato Institute

Keefer, P. (2002). "Politics and the Determinants of Banking Crises: The Effects of Political Checks and Balances", The World Bank [www.bcentral.cl/books/v3/085\\_112Keefer.pdf](http://www.bcentral.cl/books/v3/085_112Keefer.pdf)

Kerkhof, J., et al. (2002). "Model Risk and Regulatory Capital", [www.gloriamundi.org](http://www.gloriamundi.org)

Kirkpatrick, C and Brownbridge, M. (1999). "Financial Sector Regulation: The Lessons of the Asian Crises", [www.idpm.man.ac.uk/wp/fd/fdwp02.pdf](http://www.idpm.man.ac.uk/wp/fd/fdwp02.pdf)

Krugman, P. (1999). "Analytical Afterthoughts on the Asian crisis", [www.wws.princeton.edu/~pkrugman/MINICRIS.htm](http://www.wws.princeton.edu/~pkrugman/MINICRIS.htm)

Lindgren et al. (1996), Bank Soundness and Macroeconomic Policy, International Monetary Fund, Washington, D.C

Llewellyn, D. (2000). "Bank Fragility and Regulation: Evidence From Different Countries", Edited by Kaufman G., Elsevier Science Inc, NY

Lopez J, Saidenberg M. (2000). "The Development of Internal Models Approaches to Bank Regulation and Supervision: Lessons from the Market Risk Amendment" edited by Kaufman G, Bank Fragility and Regulation: Evidence from Different Countries.

Maehara, Y. (1995). "Financial Regulation in the Global Economy" edited by Herring and Litan, Comments to the article " Prospects for International Cooperation in the Regulation and Supervision of Financial Services".

Mishkin, F. (1999). "Global Financial Instability: Framework, Events, Issues", [www.gsb.columbia.edu/faculty/fmishkin/Pdpapers/jep99/pdf](http://www.gsb.columbia.edu/faculty/fmishkin/Pdpapers/jep99/pdf)

Mishkin, F. (2000). "Securing a safety net against economic free fall", Financial Times, June 6, 2000, [www.gsb.columbia.edu/faculty/fmishkin.html](http://www.gsb.columbia.edu/faculty/fmishkin.html)

Mishkin, F. (1996). "Understanding Financial Crises: A Developing Country Perspective", NBER, Working paper 5600, [www.stern.nyu.edu/globalmacro](http://www.stern.nyu.edu/globalmacro)



Moskow, M. (1998). "Regulatory Efforts to Preventing Banking Crises", Preventing Bank Crises: Lessons from Recent Global Bank Failures, EDI of the World Bank,

OECD, (2002). Economic Outlook 2002, [www.oecd.org](http://www.oecd.org)

Özcan, H., (2003) "Basel II is a Chance", unpublished notes from the TIDE meeting held at Garanti Bank.

Pazarbaşıoğlu, C. (2003). Conference hosted by BRSA on May 2003, [www.bddk.org.tr](http://www.bddk.org.tr).

Pery, G. and Lederman, D. (1999). "Adjustments after Speculative Attacks in Latin America and Asia: A Tale of Two regions?" World Bank Latin American and Caribbean Studies, The World Bank, Washington

Powell, A. (2002). "A Capital Accord for Emerging Economies?" Universidad Torcuato Di Tella and Visiting Research Fellow, World Bank. [www.econ.worldbank.org/files/13169\\_wps2808.pdf](http://www.econ.worldbank.org/files/13169_wps2808.pdf)

PwC. (2002), "Diagnostic Findings for Credit Risk and Operational Risk", European Financial Services Regulatory Practice, Pricewaterhouse Coopers

Reddy, Y.V. (2001). "Issues in Implementing International Financial Standards and Codes", Public Lecture by Deputy Governor of the Reserve Bank of India at the Centre for Banking Studies of the Central Bank of Sri Lanka, Colombo, [www.bis.org/review/r010703c.pdf](http://www.bis.org/review/r010703c.pdf)

Risakturk. (2002). [www.risakturk.com.tr](http://www.risakturk.com.tr)

Rodriguez, J. (2002). "International Banking Regulation: Where is the Market Discipline in Basel II?" Policy Analysis No: 455 [www.cato.org/pubs/paspa455.pdf](http://www.cato.org/pubs/paspa455.pdf)

Rossi, M. (1999). "Financial Fragility and Economic Performance in Developing Economies: Do Capital Controls, Prudential Regulation and Supervision Matter?" IMF Working papers. [www.imf.org/external/pubs/ft/wp/1999/wp9966.pdf](http://www.imf.org/external/pubs/ft/wp/1999/wp9966.pdf)

Roubini, N. (1997), "The Asian Currency Crisis of 1997", [www.stern.nyu.edu/globalmacro/](http://www.stern.nyu.edu/globalmacro/)

Saita, F., Sironi, A. (1999), "Market Risk Measurement and Capital Regulation: An Empirical Evaluation of VaR Alternative Approaches", [www.gloriamundi.org](http://www.gloriamundi.org)

Saltoğlu, B. and Lee T. (2001). "Evaluating Predictive Performance of Value-at-Risk Models in Emerging Markets: A Reality Check", [www.gloriamundi.org/var/pub/thlbs.pdf](http://www.gloriamundi.org/var/pub/thlbs.pdf)

Santos, J. (2000). "Bank Capital Regulation in Contemporary Banking Theory: A Review of Literature", BIS Working Papers No90, [www.bis.org/publ/work90.pdf](http://www.bis.org/publ/work90.pdf)

Schwartz A. (1998). "Asian Banking Crises in the 1990s: All Alike", edited by George G. Kaufman Bank Crises: Causes, Analysis and Prevention, Jai Press Inc.

Schwartz, A. and Bordo, M. (1995). "The Performance and Stability of Banking Systems Under Self-Regulation: Theory and Evidence", The Cato Journal Vol.14, No: 3  
[www.cato.org/pubs/journal/cj14n3-5.html](http://www.cato.org/pubs/journal/cj14n3-5.html)

Sezgin, C., (2002). "Risk Yönetimi Uygulamasında Yaşanan Sorunlar", Conference held at İstanbul Trade University on March 5th 2002

Siegel, M. and Marshall, C. (1996). "Value at Risk: Implementing Risk Measurement Standard", [www.papers.ssrn.com/sol3/delivery.cm/9612064.pdf?abstracted=1212](http://www.papers.ssrn.com/sol3/delivery.cm/9612064.pdf?abstracted=1212)

Stiglitz, J. (1998). "Boats, Planes and Capital Flows", Financial Times, 03-25-1998  
[www.stern.nyu.edu/globalmacro/IFS RefromStiglitzFT398.htm](http://www.stern.nyu.edu/globalmacro/IFS RefromStiglitzFT398.htm)

Taleb, Nassim N. (1998). "Roundtable, the limits of VaR", Journal: Derivative Strategy, [www.gloriamundi.org](http://www.gloriamundi.org)

TBB. (2003). Turkish Banking Legislation on Banking, [www.tbb.org.tr](http://www.tbb.org.tr),

The Banker. (2002a). "Article by Andrew Hilton, dated 02 August 2002

The Banker, (2002b) "Can Basel II Made to Work?" dated 02/08/2002  
[www.thebanker.com/art2aug02.htm](http://www.thebanker.com/art2aug02.htm)

The Bankers Association (1995-2001) "Banks in Turkey", TBB, [www.tbb.org.tr](http://www.tbb.org.tr)

The Economist. (2003). "Blockage in Basel" dated 2<sup>nd</sup> Oct 2003.

TIDE meeting (2003). "Basel II is a Chance", held at Garanti Bank

Unal, H., and Navarro, M. (1999). "The Technical Process of Bank Privatization in Mexico", Published by Journal of Financial Services Research and BIS Meeting on Bank Restructuring, 8 Sept 1999

Uras, G. (2002). "Daily Paper Milliyet dated 03/07/2002

Uygur, E. (2001), "Krizden Krize Türkiye: 2000 Kasım ve 2001 Şubat Krizleri", Ankara Üniversitesi Siyasal Bilgiler Fakültesi.

Weder, B. and Wedow, M. (2002). "Will Basel II Affect International Capital Flows to Emerging Markets?" [www.sabanciuniv.edu/fass/economics/seminars/wederseminar.pdf](http://www.sabanciuniv.edu/fass/economics/seminars/wederseminar.pdf)

White, L (1993). "Banking Without Regulation", Foundation for Economic Education, Volume: 43, No: 10 [www.libertyheaven.com](http://www.libertyheaven.com)

White, W., (2000). "What Have We Learned from Recent Financial Crises and Policy Response", BIS Working Papers No: 84

Yıldırım, A.(2002). "Daily Paper Sabah, dated 12/12/2002

Yüzbaşıođlu, N. (2003). “Risk Management and Supervision of Banks”, Conference Notes at Bankers’ Association, Turkey on 16 January 2003

Zahler, R. (year is not indicated). Strengthening the financial system in less developed countries: The Latin American Experience, <http://www.bis.org/publ/plcy07h.pdf>



## APPENDICES

### APPENDIX 1: Supplementary Capital

I) Undisclosed reserves: Unpublished or hidden reserves, though unpublished, have been passed through the profit and loss account and which are accepted by the bank's supervisory authorities.

II) Revaluation reserves: Such revaluations can arise in to ways:

a) from a formal revaluation, carried through to the balance sheets of banks' own premises

b) from a notional addition to capital of hidden values which arise from the practice of holding securities in the balance sheet valued at historic costs. Such reserves may be included within supplementary capital provided that the assets are considered by the supervisor authority to be prudently valued, fully reflecting the possibility of price fluctuations and forced sale. Alternative b is relevant to those banks whose balance sheets traditionally include very substantial amounts of equities held in their portfolio at historic cost but which can be realised at current prices and used to offset losses. The Comm. considers these "latent" revaluation reserves can be included among supplementary elements of capital since they can be used to absorb losses on a going-concern basis, provided they are subject to a substantial discount in order to reflect concerns both about market volatility and about the tax charge which would arise were such cases to be realised. A discount of 55% on the difference between the historic cost book value and market value is agreed to be appropriate in the light of these considerations.

III) General provisions/ general loan-loss reserves:

General provisions or general loan-loss reserves are created against the possibility of future losses. Where they are not ascribed to particular assets and do not reflect a reduction in the valuation of particular assets, these reserves qualify for inclusion in capital and it has been agreed that they should be counted within tier 2. Where however, provisions have been created against identified losses or in respect of a demonstrable deterioration in the value of particular assets, they are not freely available to meet unidentified losses which may subsequently arise elsewhere in the portfolio and do not possess an essential characteristic of capital. Such specific or earmarked provisions should therefore not be included in the capital base. The Comm. will aim to develop before the end of 1990 firm proposals applicable to all member countries, so as to ensure consistency in the definition of general provisions and general loan-loss reserves eligible for inclusion in the capital base by the time the interim and final minimum target standards fall to be observed. In the event an agreement is not reached, the amount of such reserves or provisions that qualify as capital would be phased down so that, at the end of transitional period, such items would constitute no more than 1.25 percentage points, or exceptionally and temporarily up to 2 percentage points, of risk assets within the secondary elements.

IV) Hybrid debt capital instruments: In this category fall a number of capital instruments, which combine certain characteristics of equity and certain characteristics of debt. Each of these has particular features which can be considered to affect its quality as capital. It has been agreed that, where these instruments have close similarities to equity, in particular when they are able to support losses on an on-going basis without triggering liquidation,

they may be included in supplementary capital. In addition to perpetual preference shares carrying a cumulative fixed charge, the following instruments, for example, may qualify for inclusion: long-term preferred shares in Canada...

V) Subordinated term debt: Subordinated term debt instruments with a minimum original term to maturity of over five years may be included within the supplementary elements of capital, but only to a maximum of 50% of the core capital element and subject to adequate amortisation arrangements.

## **APPENDIX 2: Credit Conversion Factors for Off-B/S Items:**

1. Direct credit substitutes and acceptances – Credit conversion factor 100%
2. Certain transaction-related contingent items (e.g. performance bonds, bid bonds, warranties and standby letters of credit related to particular transactions)- 50%
3. Short-term self-liquidating trade-related contingencies (such as documentary credits collateralised by the underlying shipments)-20%
4. Sale and repurchase agreements and asset sales with recourse, where the credit risk remains with the bank-100%
5. Forward asset purchases, forward deposits and partly paid shares and securities, which represent commitments with certain drawdown-100%
6. Note issuance facilities and revolving underwriting facilities-50%
7. Other commitments (e.g. formal stand by facilities and credit lines) with an original maturity over one year-50%
8. Similar commitments with an original maturity of up to one year, or which can be unconditionally cancelled at any time- 0%

### **Foreign Currency and Interest Rate Related Contingencies:**

In order to calculate the credit equivalent amount of its off-balance-sheet interest rate and foreign exchange rate instruments under this current exposure method, a bank would sum:

- The total replacement cost (obtained by “marking to market”) of all its contracts with positive value, and
- An amount for potential future credit exposure calculated on the basis of the total notional principal amount of its books, split by residual maturity as follows:

#### **Conversion of Derivatives under Current Exposure Method:**

| Residual maturity | Interest rate contracts | Exchange rate contracts |
|-------------------|-------------------------|-------------------------|
| Less than 1 year  | nil                     | 1%                      |
| One year and over | 0.5%                    | 5%                      |

#### **Or By Conversion of Derivatives under Original Exposure Method:**

| Maturity                       | Interest rate contracts | Exchange rate contracts |
|--------------------------------|-------------------------|-------------------------|
| Less than 1 year               | 0.5%                    | 2%                      |
| One year and less than 2 years | 1%                      | 5%(i.e. 2%+3%)          |
| For each additional year       | 1%                      | 3                       |

### APPENDIX 3: Securities Portfolio of TBS as of September 2002, in Billion TL

|   | TL         | FC         | TOTAL      |
|---|------------|------------|------------|
| 1 Government Bonds                                | 4.085.193  | 10.650.681 | 14.735.874 |
| 2 Treasury Bills                                  | 3.455.922  | 106.840    | 3.562.762  |
| 3 Income Partnership Certificates                 | 114.515    | 0          | 114.515    |
| 4 FX Indexed Gov. Debt Securities                 | 1.945.487  | 0          | 1.945.487  |
| 5 Other Gov. Debt Securities                      | 0          | 18.239     | 18.239     |
| 6 Asset Backed Securities                         | 0          | 0          | 0          |
| 7 Private Sector Bonds                            | 0          | 290.781    | 290.781    |
| 8 Commercial Paper                                | 0          | 1.145      | 1.145      |
| 9 Bank Notes and Bank Guaranteed Notes            | 0          | 0          | 0          |
| 10 Shares   | 137.157    | 0          | 137.157    |
| 11 Investment Fund Participation Certificates     | 56.773     | 595.620    | 652.393    |
| 12 Foreign Government Bonds                       | 0          | 12.054     | 12.054     |
| 13 Foreign Bank Bonds                             | 1.341      | 262.839    | 264.180    |
| 14 Gold   | 0          | 17.176     | 17.176     |
| 15 Other Securities                               | 940        | 930.251    | 931.191    |
| 16 TOTAL (1 to 15)                                | 9.797.328  | 12.885.626 | 22.682.954 |
| 17 Securities in Non-Trading Portfolio (18 to 22) | 40.299.649 | 17.882.762 | 58.182.411 |
| 18 a) Bonds Held Against Legal Reserves           | 5.586.846  | 1.038.958  | 6.625.804  |
| 19 b) Govt. Debt Securities Held as Coll.-CBRT    | 7.252.338  | 8.143.628  | 15.395.966 |
| 20 c) Shares Held as Collateral- Other Instit.    | 73.556     | 62         | 73.618     |
| 21 d) Other Securities Held as Coll.-Other Inst.  | 805.445    | 176.817    | 982.262    |
| 22 e) Other                                       | 26.581.464 | 8.523.297  | 35.104.761 |

Source: BRSA

### APPENDIX 4: VaR and MCR Computations with different VaR Methods

#### A) Variance-Covariance Method with EWMA Volatility:

| RISK TURK                        |                            | RISK TURK                     |                                       |
|----------------------------------|----------------------------|-------------------------------|---------------------------------------|
| FINANCIAL SOFTWARE & CONSULTANCY |                            | Riskturk Piyasa Riski Modülü® |                                       |
| Sistem                           | Portfoyer                  | Veri Seti                     | Konfigurasyon                         |
| VaR                              | Araçlar                    | Analiz                        | Riskturk                              |
| VaR Detay                        | Enstrüman                  | Trader                        | Karar Tarafı                          |
| Portföy                          | Döviz Kuru                 | Vade Dilihi                   | Pozisyon                              |
| <b>SONUÇ:</b>                    | 2003-08-09 15:23:27-310-34 |                               |                                       |
| <b>Portföy Grubu</b>             | TURKISH_BANKING_SECTOR     | <b>Parametreler</b>           | VOLATILITE-TIPI : EWMA, Lambda : 0.97 |
| <b>Portföy Tarihi</b>            | 30.09.2002                 | <b>PV</b>                     | 35.969.335.339.730.700                |
| <b>Başlangıç Tarihi</b>          | 30.09.2001                 | <b>VaR</b>                    | 445.974.401.838.833                   |
| <b>Biteş Tarihi</b>              | 30.09.2002                 | <b>VaR/PV</b>                 | 1.24                                  |
| <b>Hesaplama Yöntemi</b>         | VarCovar -CESITLENDIRILMIS | <b>Sermaye Yeterlilik</b>     | 4.230.780.760.484.276                 |
| <b>Güven Aralığı</b>             | 0.95                       |                               | Portföye.glt                          |



## B) Variance-Covariance Method with GARCH Volatility:

| RISK-TURK<br>FINANCIAL SOFTWARE & CONSULTANCY |                            | Riskturk Piyasa Riski Modülü® |               |                              |                         |              |          |
|---|----------------------------|-------------------------------|---------------|------------------------------|-------------------------|--------------|----------|
| Sistem  | Portföyler                 | Veri Seti                     | Konfigürasyon | VaR                          | Araçlar                 | Analiz       | Riskturk |
| VaR Detay                                     | Enstrüman                  | Trader                        | Karsi Taraf   | Portföy                      | Döviz Kuru              | Vade Dili mi | Pozisyon |
| <b>SONUÇ:</b>                                 | 2003-08-09 15:26:50-156-35 |                               |               |                              |                         |              |          |
| <b>Portföy Grubu</b>                          | TURKISH_BANKING_SECTOR     |                               |               | <b>Parametreler</b>          | VOLATILITE-TIPI : GARCH |              |          |
| <b>Portföy Tarihi</b>                         | 30.09.2002                 |                               |               | <b>PV</b>                    | 35,969,333,339,730,700  |              |          |
| <b>Başlangıç Tarihi</b>                       | 30.09.2001                 |                               |               | <b>VaR</b>                   | 447,082,989,057,426     |              |          |
| <b>Bitiş Tarihi</b>                           | 30.09.2002                 |                               |               | <b>VaR/PV</b>                | 1.24                    |              |          |
| <b>Hesaplama Yöntemi</b>                      | VarCovar -CESITLENDIRILMIS |                               |               | <b>Sermaye Yeterlilik</b>    | 4,241,297,483,992,178   |              |          |
| <b>Güven Aralığı</b>                          | 0.99                       |                               |               | <a href="#">Portföye git</a> |                         |              |          |

## C) Historical Simulation Method:

| RISK-TURK<br>FINANCIAL SOFTWARE & CONSULTANCY |                             | Riskturk Piyasa Riski Modülü® |               |                              |                                       |              |          |
|---|-----------------------------|-------------------------------|---------------|------------------------------|---------------------------------------|--------------|----------|
| Sistem  | Portföyler                  | Veri Seti                     | Konfigürasyon | VaR                          | Araçlar                               | Analiz       | Riskturk |
| VaR Detay                                     | Enstrüman                   | Trader                        | Karsi Taraf   | Portföy                      | Döviz Kuru                            | Vade Dili mi | Pozisyon |
| <b>SONUÇ:</b>                                 | 2003-08-09 15:27:35-769-36  |                               |               |                              |                                       |              |          |
| <b>Portföy Grubu</b>                          | TURKISH_BANKING_SECTOR      |                               |               | <b>Parametreler</b>          | VOLATILITE-TIPI : EWMA, Lambda : 0.97 |              |          |
| <b>Portföy Tarihi</b>                         | 30.09.2002                  |                               |               | <b>PV</b>                    | 35,969,333,339,730,700                |              |          |
| <b>Başlangıç Tarihi</b>                       | 30.09.2001                  |                               |               | <b>VaR</b>                   | 748,153,201,351,588                   |              |          |
| <b>Bitiş Tarihi</b>                           | 30.09.2002                  |                               |               | <b>VaR/PV</b>                | 2.06                                  |              |          |
| <b>Hesaplama Yöntemi</b>                      | Tarihsel Benzetim -STANDART |                               |               | <b>Sermaye Yeterlilik</b>    | 7,097,430,159,941,974                 |              |          |
| <b>Güven Aralığı</b>                          | 0.99                        |                               |               | <a href="#">Portföye git</a> |                                       |              |          |

## D) Monte Carlo Method:

| RISK-TURK<br>FINANCIAL SOFTWARE & CONSULTANCY |                            | Riskturk Piyasa Riski Modülü® |               |   |                                       |             |          |
|---|----------------------------|-------------------------------|---------------|---|---------------------------------------|-------------|----------|
| Sistem  | Portföyler                 | Veri Seti                     | Konfigürasyon | VaR   | Araçlar                               | Analiz      | Riskturk |
| VaR Detay                                     | Enstrüman                  | Trader                        | Karar Tarafı  | Portföy                                     | Döviz Kuru                            | Vade Bilimi | Pozisyon |
| <b>SONUÇ:</b>                                 | 2003-08-09 15:29:25-468-37 |                               |               |   |                                       |             |          |
| <b>Portföy Grubu</b>                          | TURKISH_BANKING_SECTOR     |                               |               | <b>Parametreler</b>                         | VOLATILITE-TIPI : EWMA, Lambda : 0.97 |             |          |
| <b>Portföy Tarihi</b>                         | 30.09.2002                 |                               |               | <b>PV</b>                                   | 35,969,339,339,730,700                |             |          |
| <b>Başlangıç Tarihi</b>                       | 30.09.2001                 |                               |               | <b>VaR</b>                                  | 481,399,537,441,108                   |             |          |
| <b>Bitiş Tarihi</b>                           | 30.09.2002                 |                               |               | <b>VaR/PV</b>                               | 1.34                                  |             |          |
| <b>Hesaplama Yöntemi</b>                      | Monte Carlo                |                               |               | <b>Sermaye Yeterlilik</b>                   | 4,566,844,851,888,815                 |             |          |
| <b>Çıvan Aralığı</b>                          | 0.39                       |                               |               | <input type="button" value="Portföye git"/> |                                       |             |          |

## E) Stress Testing:

| RISK-TURK<br>FINANCIAL SOFTWARE & CONSULTANCY |                            | Riskturk Piyasa Riski Modülü® |               |   |                         |             |          |
|---|----------------------------|-------------------------------|---------------|---|-------------------------|-------------|----------|
| Sistem  | Portföyler                 | Veri Seti                     | Konfigürasyon | VaR   | Araçlar                 | Analiz      | Riskturk |
| VaR Detay                                     | Enstrüman                  | Trader                        | Karar Tarafı  | Portföy                                     | Döviz Kuru              | Vade Bilimi | Pozisyon |
| <b>SONUÇ:</b>                                 | 2003-08-09 15:31:56-607-38 |                               |               |   |                         |             |          |
| <b>Portföy Grubu</b>                          | TURKISH_BANKING_SECTOR     |                               |               | <b>Parametreler</b>                         | VOLATILITE-TIPI : GARCH |             |          |
| <b>Portföy Tarihi</b>                         | 30.09.2002                 |                               |               | <b>PV</b>                                   | 35,969,339,339,730,700  |             |          |
| <b>Başlangıç Tarihi</b>                       | 20.01.2001                 |                               |               | <b>VaR</b>                                  | 2,543,162,840,786,449   |             |          |
| <b>Bitiş Tarihi</b>                           | 20.03.2002                 |                               |               | <b>VaR/PV</b>                               | 0.07                    |             |          |
| <b>Hesaplama Yöntemi</b>                      | VarCovar - CESTLENDIRILMIS |                               |               | <b>Sermaye Yeterlilik</b>                   | 7,125,849,000,000,000   |             |          |
| <b>Çıvan Aralığı</b>                          | 0.39                       |                               |               | <input type="button" value="Portföye git"/> |                         |             |          |

**BC YÖKSEKOKULU  
BOKURASYON MERKEZİ**