The Relationship Between Financial Stability and Banking Regulations in Turkey (1990-2010)

Dr. Göksel TİRYAKİ[1]

Abstract

In this study, it is focused on how and to what extent today's fundamental banking regulation tools such as capital, liquidity, provisioning and reserve requirements applied by international agencies do influence the financial stability in both short and long term. In this analysis, the data derived from quarterly financial reports of Turkish Banking System for the period of 1990-2010 are used in order to display and measure the relationship between financial stability and banking regulations. According to our model, banking regulations, specifically liquidity management, capital adequacy and provision policy are meaningful and influential factors over financial stability in the long run. Also, in the short run, provision policy and liquidity management are significant banking regulation tools.

Key Words: Financial Stability, Banking Regulations, Financial Stability Index, Main Banking Regulation Tools

JEL Qualification: G00, G10, G21

Özet

Bu çalışmada, büyük oranda uluslararası kurallara bağlanan sermaye, likidite, kredi karşılıkları ve zorunlu karşılıklar gibi temel bankacılık düzenleme araçlarının finansal istikrarı kısa ve uzun dönemde nasıl ve ne kadar etkilediğine odaklanılmaktadır. Finansal istikrar ile bankacılık düzenlemeleri arasındaki ilişkinin gösterilmesi ve ölçülmesi Türk Bankacılık Sektörü'nün 1990-2010 arası çeyrek dönem finansal tabloları üzerinden yapılmıştır. Oluşturduğumuz modele göre, likidite yönetimi, sermaye yeterliliği ve karşılık politikası gibi düzenleme araçları uzun dönemde finansal istikrar üzerinde etkili olurken, kısa dönemde karşılık politikası ve likidite yönetiminin finansal istikrar üzerinde önemli tesiri olduğu anlaşılmıştır.

Anahtar Kelimeler: Finansal İstikrar, Bankacılık Düzenlemeleri, Finansal İstikrar Endeksi, Temel Bankacılık Düzenleme Araçları

JEL Sınıflaması: G00, G10, G21

1. INTRODUCTION

After 2008-2009 global financial crisis, financial stability, once again and this time with more concern, has attracted attention worldwide. In point of fact, since early 1970's, financial stability has always been a major concern for the financial system, investors, creditors, regulators, supervisors, and financial economists. However financial stability is not

[1] gtiryaki@bddk.org.tr, Senior Bank Examiner, Turkey Banking Regulation and Supervision Agency, This article does not represent any institutional view of Banking Regulation and Supervision Agency of Turkey. It is completely individual view of the author.

a subject as price stability or the independence of central banks that is analyzed and researched widely by the financial economic literature.

Today, the importance of financial stability for economic environment is widely accepted (Yücememiş, 2011). Especially, in which direction and how much impact the regulation on banking system have on financial stability is a significant issue. After 2008 financial crisis, two methods are commonly promoted by international economic and financial world as remedy. First, all central banks around world should boost liquidity conditions for financial system with different tools and in large amounts and second, national and supranational regulators must try to tighten financial regulation worldwide for responding financial crisis. Therefore, basically in this paper, the role of banking regulation over gaining and sustaining financial stability is analyzed based on experience of Turkey.

This paper basically consists of three main parts. First of all, a financial stability index is established based on current theoretical and practical experience and our essential banking regulation tools are explained. In this part, the components of our financial stability index and the details of our banking regulation tools are demonstrated. Secondly, the relationship between our financial stability index and basic banking regulations tools is analyzed using historical and practical results and co-integration method statistically. As a result, our theoretical, historical and statistical findings are explained together. Our findings are compared with current theoretical approach and implications for the future researches related to this subject and actual banking regulation efforts are presented.

2. THE LITERATURE REVIEW

In the literature, there is no unique and basic definition for financial stability (Schinasi, 2004, 3-8), (Borio and Drehmann, 2009, 3-5), (Mishkin, 2000, 2-4), (Crockett, 1997, 6-7), (Chant, 2003, 3-4), (Padoa-Schioppa, 2002, 20-21), (Haldane, Hoggart, Saporta, Sinclair, 2004, 2-3). Financial stability is a complex and ambiguous concept. It is difficult to define and to measure its level are a very difficult effort. In spite of these difficulties, many researchers and financial professionals define financial stability and its frames. There are a number of financial stability definitions in the literature, however, as Borio and Drehmann, (2009, 4) mentioned very appropriately; *"Most definitions of financial stability share three useful elements. First, they focus on the financial system as a whole, as opposed to individual institutions. Second, they do not consider the financial system in isolation, but ultimately measure the economic (welfare) benefits and costs in terms of the "real economy" (economic activity). Third, they make an explicit reference to financial instability, the converse of stability, which is more concrete and observable"*.

Under above explanations, financial stability can be defined as a financial system, which consists of financial institutions, markets and settlement systems, having a resilient structure and operating efficiently for providing financial intermediary functions in order to support economic growth against external and internal shocks. Although there are many internal and external factors affecting financial stability, it is generally accepted that a robust financial regulation and supervision mechanism diminishes the risks on the financial system and contributes to operation of the financial system.

According to common theoretical approach, banking regulations are important for financial stability and effective and efficient banking regulations and supervision infrastructure have positive effects on the financial system and the economic activities and reduce negative economic externalities (Mishkin, 1997, 55-96), (Rossi, 1999 , 20-21), (Padoa-Schioppa, 2002, 3-11), (Chami, Khan, Sharma, 2003, 20-21), (Barth, Caprio, Levine, 2004, 205-248), (Aspachs-Bracons, Goodhart, Tsomocos, Zicchino, 2006, 13-18), (Hurst, Barrell, Kirby, 2008, 56-65), (Rudiger, Jens, Fabrice, 2009, 1-32) (Aizenman, 2009, 1-16), (Caprio,

2010, 24-26). After every financial shock and economic crisis, first thing that comes to the mind is tougher regulations. However each regulation tool has a different impact and consequence over the financial system and stability. Therefore, this is a significant study to test the existing dominant theoretical framework related to correlation between banking regulations and financial stability. This relationship should be examined with using the actual data whether regulation is a panacea for promoting financial stability.

In this study, it is focused on how today's fundamental banking regulation tools such as capital, liquidity, provisioning and reserve requirements affect financial stability in both short and long term based on data of Turkish Banking System's 1990-2010 financial reports. Thus, analyzing the impacts of basic banking regulation tools is meaningful to determine their scope and weight in order to support financial stability and legal framework of banking.

3. DETERMINATION OF FINANCIAL STABILITY INDICATORS AND ESSENTIAL BANKING REGULATION TOOLS

In order to analyze the connection and the correlation between financial stability and banking regulation these concepts should be defined and quantified precisely. Although concepts such as stability and regulation are inherently abstract and difficult to quantify, quantifying these concepts is useful to test the current dominant theoretical approach. That's why; the financial stability index and basic banking regulation tools constructed in this study are based on present common theoretical frames and practical applications.

3.1. Financial Stability Index

Today, International Monetary Fund (IMF), many central banks and regulatory bodies utilize certain indexes and financial ratios in order to monitor and analyze financial stability. Usually these ratios are named as financial soundness indicators; they are essentially used to gauge and evaluate soundness and efficiency of each country's financial system.[2] In this context, The Central Bank of Republic of Turkey (CBRT) uses a financial soundness index in its financial stability report.[3] In this paper, we will use a specific financial stability index adapted from CBRT's financial soundness index.

According to consolidated data, Turkish Banking Sector, directly and indirectly, controls approximately 95 percent of the financial institutions in Turkey (CBRT, 2010, 39). So, many items in balance sheets of the banking sector are a very significant indicator in terms of the financial system. There are many macro and micro factors and variables that affect banks' balance sheet and income statement items. The level of some items presented in balance sheets and income statements or changes in those items from one period to another indicates important inferences about improvements, sensitivities, vulnerabilities and potential problems of the banking sector. That's why, in this study the financial stability index and main banking regulation indicators are based on quarterly total balance sheets and income statements of the banking sector.

Similar to our perspective in this matter, Ahumada and Budnevich (2001) use some banking ratios as early warning indicators to predict financial vulnerability, Kibritçioğlu (2003) forms an banking sector fragility index using some special banking ratios, also Aspachs-Bracons, Goodhart, Tsomocos and Zicchino (2006) aim to measure financial fragility with the help of some ratios and capital index derived from banking sector data.

[2] IMF, http://www.imf.org/external/np/sta/fsi/eng/fsi.htm (15.12.2011)
[3] CBRT, Financial Stability Report, http://www.tcmb.gov.tr (15.12.2011) CBRT has prepared Financial Stability Report since 2005 two times in a year.

Besides, Özcan (2006) and Gençay (2007) use their financial soundness index adapted from CBRT's index to display financial stability level.

After 2008-2009 global financial crises, Tymoigne (2011) signifies that a financial fragility index is useful and essential to understand and gauge financial stability in terms of Minskian financial instability hypothesis[4] of household, reel and financial sector. Although there are different thoughts in literature about the early warning mechanism and many economic and financial crises occurring abruptly, the purpose of such index is not to determine how and when an economic and financial crises happen, it should rather try to detect negative implications, symptoms and situations before crises happen and to assist to impede these sort of unfavorable circumstances and to support healing period.

Under these conditions, in this study Financial Stability Index is developed and presented below (Table: 1).

Table 1: The Components of Financial Stability Index

	Indicators	Direction of Impact to Index	Weight of Indicators
Financial Intermediary	Total Credits / Total Deposits	Positive	0.25
	Total Deposits /Total Assets	Positive	0.25
	Total Credits /Total Assets	Positive	0.25
	Credit Growth Ratios	Positive	0.25
Asset Quality	Total Capital / Total Credits	Positive	0.25
	Total Non-Performing Loans / Total Credits	Negative	0.25
	Net Non-Performing Loan / Total Capital	Negative	0.25
	Fixed Assets[5] / Total Assets	Negative	0.25
Profitability	Net Profit / Total Assets	Positive	0.25
	Net Profit / Total Capital	Positive	0.25
	Interest Revenues /Interest Expenses	Positive	0.25
	Non-Interest Revenues /Non-Interest Expenses	Positive	0.25
Capital Strength	Leverage Ratio[6]	Positive	0.50
	Free Capital[7] / Total Assets	Positive	0.50

The Index is constituted by four main components. Each component consists of some special ratios that are calculated from total balance sheet and income statement of The Turkish Banking Sector. The details of these ratios and the Index are exhibited in the Table 1. These ratios are calculated from quarterly financial statements of March 1990 – December

[4] *"… Stability breeds instability is a famous Minsky slogan, meaning that financial instability and economic turmoil are endogenous phenomena that stem from the over-optimistic sentiments and confidence that overtake the economy during a boom, leading to lower standards of investment evaluations and thinner cushions of safety."* (Fernandez L., Kaboub F., Todorova Z., 2008, 2)

[5] **Fixed Assets**: All Participation + Tangible Assets + Net Non-Performing Loans + Other Physical Assets

[6] **Leverage Ratio**: Total Capital / (Total Assets + (Off-Balance Sheets Credits X 0.5) + (Derivatives X 0.01) The Conversion Ratios of Off-Balance Sheets Credits and Derivatives are adapted from current banking regulations.

[7] **Free Capital**: Total Capital – Fixed Assets

2010 period. The all data of The Turkish Banking Sector are received from CBRT and The Turkish Banking Association (TBA).[8]

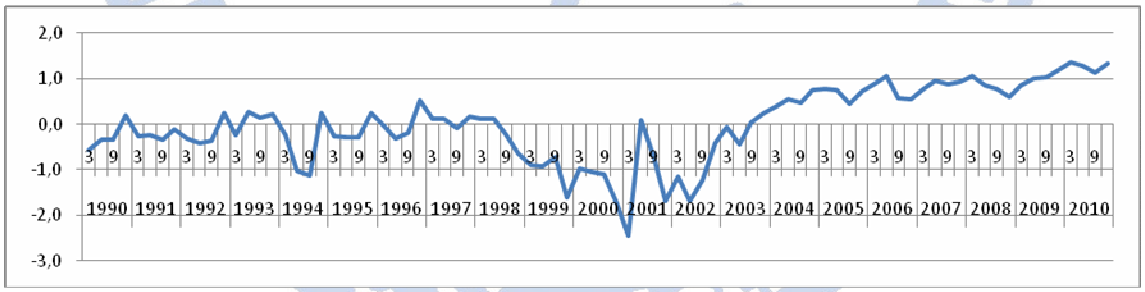
To sum up, in order to analyze the relationship between financial stability and banking regulations, it is accepted that a quantitative The Financial Stability Index is a must. In the literature, there are a number of indices related to indicators of banking and economic crises. Some of these indices are Banking Sector Fragility Index of Kibritçioğlu (2003), Speculative Pressure Index of Eichengreen, Rose and Wyplosz (1996) and Index of Currency Market Turbulence of Kaminsky and Reinhart (1999), however the concept of financial stability is quite different from and more comprehensive than banking shocks and economic crises. After 2008-09 global financial crises, both the meaning of financial stability and the approach to this concept are widened and evolved substantially. Therefore we need to have a different measuring tool for the financial stability concept. So, our new Index which is more appropriate and closer to financial stability concept is adapted from CBRT's The Financial Soundness Index. Thus, the Index is designed to obtain a functional tool to monitor financial stability in Turkey.

3.2. The Calculation of Financial Stability Index

The details of financial intermediary, asset quality, profitability and capital strength which are the components of The Financial Stability Index are shown above. Under these circumstances, we are able to calculate the Index as follows:

$$FSI_t = \frac{\frac{(FI_t - \mu_{FI})}{\sigma_{FI}} + \frac{(AQ_t - \mu_{AQ})}{\sigma_{AQ}} + \frac{(P_t - \mu_P)}{\sigma_P} + \frac{(CS_t - \mu_{CS})}{\sigma_{CS}}}{4}$$

In the above formula; FSI stands for financial stability index, FI stands for financial intermediary, AQ stands for asset quality, P stands for profitability, CS stands for capital strength, μ stands for average, σ stands for standard deviation. When we plot the indices calculated according to this formula, using quarterly data of the Turkish Banking Sector between 1990 and 2010, we can get below Graph 1 for our Financial Stability Index.



Source: Calculated from data of Electronic Data Distribution System of CBRT: http://evds.tcmb.gov.tr/cbt.html (30.06.2011), Statistical Report of TBA: http://www.tbb.org.tr/tr/Banka_ve_Sektor_Bilgileri/Tum_Raporlar.aspx (30.06.2011)

Graph 1: Financial Stability Index 1990-2010

[8] Electronic Data Distribution System of CBRT: http://evds.tcmb.gov.tr/cbt.html (30.06.2011), Statistical Reports of TBA: http://www.tbb.org.tr/tr/Banka_ve_Sektor_Bilgileri/Tum_Raporlar.aspx (30.06.2011)

In the last 30 years, Turkey experienced two major financial and economic crises. These are 1994 and 2000-2001 economic crises. Besides to these serious internal crises, Turkey faced many external financial shocks during this period. In 1998 Asian Crisis, in 1999 Russian Crisis, in 2003 Iraq invasion, in 2006 market turmoil and in 2008 and 2009 global financial crisis are main external source of shocks affecting Turkish financial system and economic environment. When we look at the Index, we can easily detect very significant effects of 1994 and 2000-2001 economic and financial crises over financial stability. Especially in the 1999-2002 periods, financial stability was devastated by deep economic crisis atmosphere. However, after this time, financial stability bounced back quickly and followed a positive pattern due to banking and government budgetary reforms.

Financial Stability Index (Graph 1) exhibits the influence of important external shocks over financial stability. The impacts of 1998 Asian crisis and 1999 Russian crisis on financial stability are seen in the middle of 1998 in our Index. Also, we can directly observe from the Index the deterioration of financial stability during invasion of Iraq at the beginning of 2003, market turmoil in the middle of 2006 and after collapse of Lehman Brothers in the last quarter of 2008. As seen from our Index, the effect of 2008-2009 global financial crises over financial stability in Turkey was generally limited. Actually this result was consistent with real economic and financial conditions of Turkey during 2008-2009 global crises period.

All the explanations above are demonstrated that our Index indicates generally parallel consequences about financial and economic realities of Turkey. Therefore, we can conclude that our Index passed the test of the real life experience of Turkey economic and financial atmosphere during 1990-2010 periods. For these periods, another significant real life test is banking failure in Turkey. During 1990-2010, 25 banks were bailed out by Turkey Saving Deposits Insurance Fund (SDIF) because of inadequacy of capital, serious financial troubles and misusage of banking sources (Turkey Banking Regulation and Supervision Agency (BRSA), September 2010, 15).

One of the greatest economic crises in the modern Turkish History is 1994 economic crisis, due to the crisis three banks were bailed out by SDIF in April 1994 (SDIF, 2011). Another failure time for The Turkish Banking System was 1997-1999 Asian and Russian crises periods, one bank in November 1997, another one in December 1998, two banks in January 1999 and five banks in December 1999 failed. In terms of their results, the greatest financial and economic crisis in modern Turkish History was 2000-2001 crisis period. During this period, one bank in September 2000, two banks in October 2000, another one in December 2000, one bank in February 2001, one bank in March 2001, five banks in July 2001 and one bank in November 2001 were bailed out by SDIF. During deep 2000-2001 financial crisis, besides to failed banks, some other troubled banks had to be recapitalized by owners or the government, merged with other banks and sold in the Turkish Banking Sector. All of these reform actions exhibit the severity of this devastating financial crisis. Also, the management and supervision of one bank in June 2002 and one bank in July 2003 were transferred to SDIF in the healing and reform period after serious financial crisis (BRSA, September 2010, 14, 23, 43). When we compare to the deterioration of financial stability in our Index and failure time of above mentioned banks, we can easily see the correlation between these two events. Thus, our Index significantly reflects failures of these banks. So our Index is able to exhibit structural problems for The Turkish Banking Sector.

3.3. Main Banking Regulation Tools and Indicators

Primarily Basel 1, 2, 2.5 and 3; capital requirements, liquidity management and provisioning are common and important banking regulation fields and tools. So using these regulation tools in a regulation analysis is unavoidable. The literature contains many

examples of the researches and analysis dealing with these subjects (Barth, Caprio and Levine, 2006, 46-63). On the other hand, besides to these basic ones, there are many more different banking regulation tools (Mishkin, 2000**,** 2-47). In order to conduct any analysis, obtaining real data set for the research field is very important. In our research, we have a strong data set related to capital requirements, liquidity management, provisioning and reserve requirements with the same period of The Financial Stability Index.

It is assumed that overall consequences and impacts of main banking regulation tools can be observed from changes and trends in the balance sheets and income statements of the banking system. Otherwise the regulation, which is an abstract and legal concept, is very hard to be quantified to be used in a quantitative analysis. Thus, we summed up four major regulation indicators because of their importance and role for the banking system and the bank regulation. In Table 2 presented below, we summarized these ratios which are calculated from balance sheets of The Turkish Banking Sector of 1990-2010 periods same as the Financial Stability Index.

Table 2: Basic Banking Regulation Indicators	
Capital Adequacy	**Capital Ratio:** Total Capital / Total Assets
Liquidity Management	**Liquidity Ratio:** Cash + Banks Receivables + Money Markets / Total Assets
Provision Policy	**Total Provisions Ratio:** Provisions of Non-Performing Loans + Other Provisions / Total Capital
Reserve Requirement	**Reserve Requirement Ratio:** Reserve Requirement of Deposits / Total Liabilities

In our analysis, we need an indicator of capital regulation for 1990-2010 periods. For this purpose, capital ratio (percentage of total capital in a balance sheet), an essential sign of capitalization for every institution, is selected. Although there are many more ratios calculated to analyze the capitalization of institutions, the share of capital in a balance sheet is a concise measure of capital requirement. The level of capital in the balance sheet of a bank is a fundamental reference point for that bank to decide whether the bank has a safe and sound financial structure or not. Also, Tier One Ratio (another indicator for the capital level of a bank) is a vital part of the banking regulation rules from Basel I to Basel III. For instance, Barth, Caprio and Levine (2006), VanHoose (2008) and Fabrice, Jens and Rudiger (2009) imply the importance of the capital level of the banks as a regulation tool.

Besides to the international regulation standards, current the banking law of Turkey recognizes the level and management of capital in a bank balance sheet as a significant corrective regulation tool. As we know from Basel banking regulation standards, the point of view adopted by banking regulation and supervision authorities is that the level and quality of the bank capital is usually the first and common regulation indicator. For instance, in a BRSA's paper related to the effects of Basel III rules to The Turkish Banking System, it is exhibited that 91.2 % of banks' regulatory capital composed of Tier One Capital as of June 2010 (BRSA, December 2010, 11). That's why we accept the level of capital in a bank balance sheet as a strong banking regulation indicator in our analysis. Thus our perspective is coherent with theoretical and practical approaches, stating that the level of capital is a significant and functional indicator regarding banking regulations.

Second banking regulation indicator is dependent upon the liquid assets of banks. One of the basic tools that are used by regulatory agencies is the portion of liquid assets in banks' balance sheets. Especially in terms of banking crisis (bank runs) and financial crisis, liquidity is one of the most important regulation instruments to ease crisis conditions and to control the management of investor and depositor sentiments. For instance, through the periods of 2008-

2009 global financial crisis and European debt crisis (2010 - …), the central banks provide the great amount of liquidity in order to manage crisis atmosphere.

The amount of liquid assets in banks' balance sheets is used as a main indicator for monitoring and analyzing the liquidity management of banks. Therefore, liquid assets are generally compared to short term, long term and total liabilities. At this point, which items in a bank balance sheet are accepted as liquid asset is a very significant issue. In our study, we take some specific balance sheet items such as cash, receivables from banks and money markets as liquid assets in order to analyze the consequences and impacts of liquidity regulation and supervision approaches of regulatory agencies. Because we assume that the level of essential liquid assets in banks' balance sheets is a fundamental and common indicator for the approaches of regulatory bodies for providing a sound and safe banking system. A weak liquidity management and insufficient liquid assets in a banking system reflect a vulnerable circumstance for banking (bank runs) and financial shocks.

In terms of Basel standards, liquidity regulation is also significant, similar to capital requirements. Especially after 2008-2009 global financial crisis, Basel Committee on Banking Supervision (BCBS, 2011) published its "Principles for Sound Liquidity Risk Management and Supervision" in 2008, "Consultative Document" regarding liquidity standards in 2009 and finally announced "Basel III: International Framework for Liquidity Risk Measurement, Standards and Monitoring" in 2010. Also, before Basel Committee's publications regarding liquidity standards, some specific liquidity ratios were went into effect by BRSA in 2006. Before these specific liquidity ratios, there were some general legal texts (these texts are still valid) based on the discretion of BRSA about liquidity management of banks. As seen above, we find the liquidity standards and regulation present in both national and international level, therefore to see the impacts of liquidity regulations of regulatory bodies by using the percentage of liquid assets in banks' balance sheets is assumed as a reasonable methodology in our analysis.

Like capital requirement and liquidity management, accounting and provisioning policies of banks is one of the main regulation fields for the banking activities. Particularly regarding transparency and market discipline, accounting and provisioning policy should be reliable and consistent in the banking system. The balance sheets of banks are significant indicators in order to track and monitor the consequences of the banking activities for regulators, investors, creditors and depositors. Provisioning policy of a bank for the losses is a basic corrective and characteristic factor in order to provide more accurate and dependable data in the financial reports. Hence evaluating and controlling the provisioning policy of banks is used as one of the principal regulation instruments by regulatory agencies.

Globally, regulators always see the changes in the provisioning policies of banks for loss as a strong regulation tool. For instance, the third pillar of Basel II standards is market discipline. The declaration of fundamental information about risk and capital of banks to the public is the essential part of the market discipline. Therefore, in order to sustain market discipline, publicly available information related to banking activities must be reliable and trustworthy and this requires a safe and sound accounting practices and provisioning policy. Also during and after 2008-2009 financial crises, the leader of Group of 20 declared that they have to obtain more dynamic and procyclical provisioning policy and consistent and reliable accounting rules for supporting financial stability (Toronto G20, 2010). Besides, Basel Committee makes significant advices regarding fair value and procyclical accounting practices and dynamic provisioning policy (BCBS, October 2010, 9-10).

Also, Benston and Kaufman (1996), Mishkin (1997), Borio and Tsatsaronis (2005) strongly underline the importance of market discipline and reliable financial reports and responsibility of regulators and governments about providing sufficient information to the public in the financial system.

In Turkey, there are some strict regulations in the banking law and its decrees related to sound accounting practices and proclaiming consistent financial reports of all banking activities. Although sometimes, when the adverse conditions present affecting the banking system as a whole these rules can be softened in order to smooth the net profits of banks (for instance during in 2009 by effects of global financial crisis), all accounting data and financial reports are tried to verify truly and consistently by these accounting regulations. Therefore we use in our analysis "Provisions of Non-Performing Loans + Other Provisions / Total Capital" (Total Provisions) Ratio as a regulation indicator. Thus the strength of banks' provision policy through years is observed by our research.

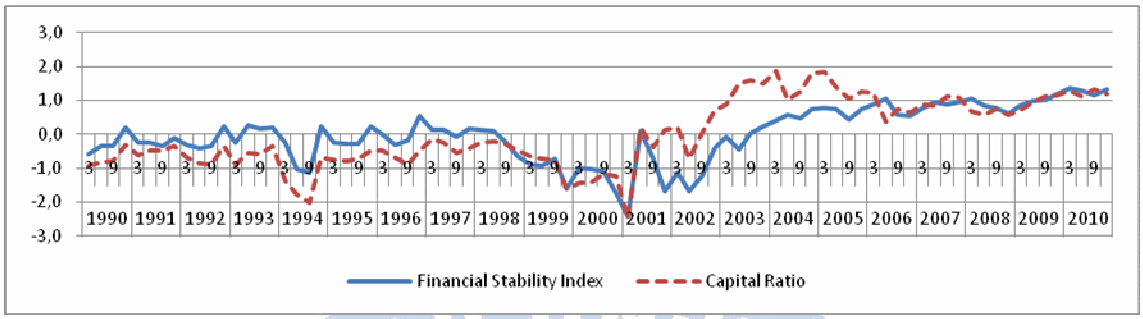
Today it is commonly expected that central banks not only aim to achieve price stability, but also they focus on financial stability. Thus, central banks should use their conventional policy tools in order to sustain financial stability with the target of price stability. Although reserve requirement for deposits actually is a monetary policy tool, it is also a banking regulation instrument because of its impacts over the financial system and balance sheet of banks. Therefore, we accept "Reserve Requirement of Deposits / Total Liabilities" Ratio as a banking regulation indicator and add to our analysis. By doing so, we try to explain the effects of reserve requirements for deposits determined by central banks over the banking system and financial stability.

4. BANKING REGULATIONS AND FINANCIAL STABILITY IN TURKEY

Background of banking regulations in Turkey commences with Interest Decree (Murabaha Nizamnamesi) published in 1865. However, the more specific banking regulations began with the establishment CBRT in 1931. Since then, Turkey always has got a separate banking law, but BRSA was set up in 2000 in order to regulate and supervise the banking sector by a single governmental agency. Before BRSA, there were different institutions, such as The Ministries Council, Finance Ministry, Treasury Undersecretary and CBRT, responsible for regulating banks; there were different special jurisdictions about banking activities in Turkey. After the establishment of BRSA, regulation and supervision of banks in Turkey gained more popularity and importance. However, the background of banking crises in Turkey is older relative to financial stability issue, since 1990's financial stability has been more popular because of severity of some financial and economic shocks. For instance establishment of BRSA in 2000 was an example of an effort toward sustaining financial stability. Thus, financial stability and banking regulations in Turkey started to be a popular economic and political agenda in 90's, these efforts gained more momentum in 2000's and after global financial crisis these efforts became a significant subject of international community worldwide.

4.1. The Relationship of Financial Stability Index and Main Banking Regulation Indicators

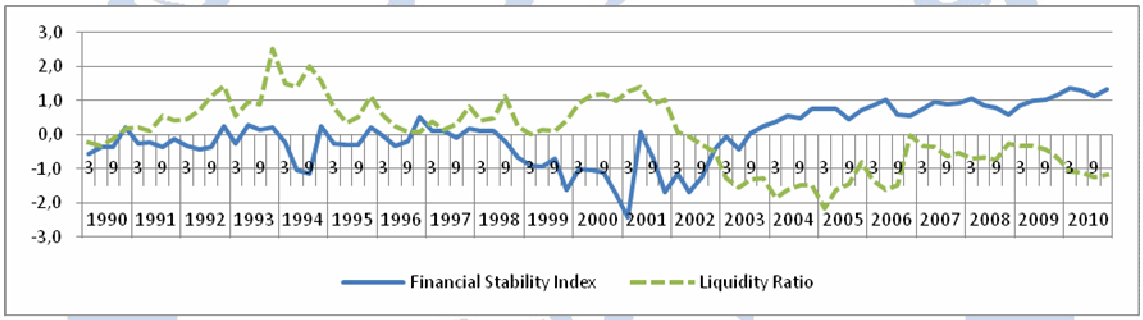
In this section of the study, essentially we analyze the relationship between Financial Stability Index and main banking regulation indicators statistically. However, before this analysis, it will be useful to look at relationship between the Index and these indicators graphically. These graphical relations may not be statistically meaningful; the trends that the Index and these main indicators exhibited can be significant for understanding financial stability concept and banking regulation perspective. Therefore, below we will display four different graphs of the index and standardized main indicators derived from 1990-2010 quarterly data.



Source: Calculated from data of CBRT and TBA

Graph 2: Financial Stability Index and Capital Ratio

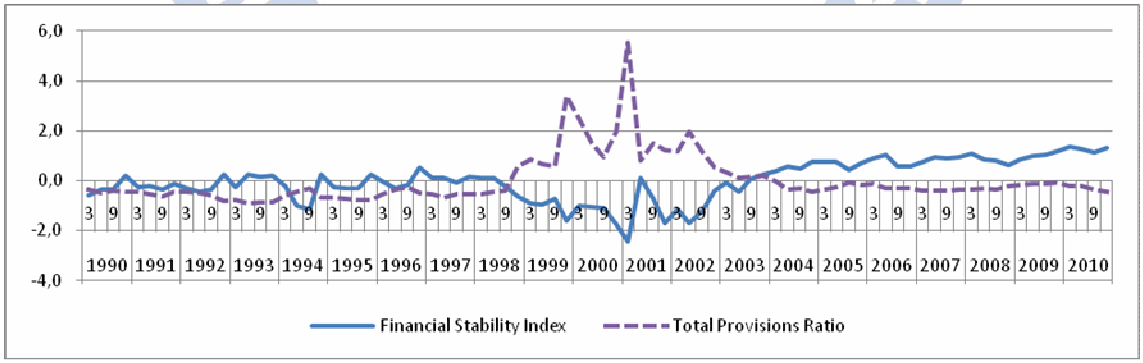
Our Index and capital ratio follow a paralel path over the 1990-2010 in Graph 2. Therefore, it is easily seen that there is a strong relation between these two parameters, but the direction and the weight of this relationship is also important. Which one is more or less affetected by the other one? We try to explain the details of this relationship by our econometric model.



Source: Calculated from data of CBRT and TBA

Graph 3: Financial Stability Index and Liquidity Ratio

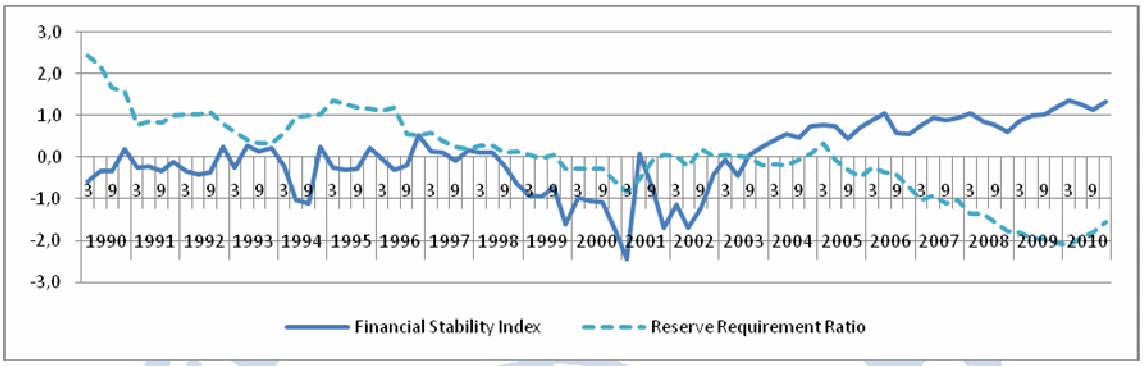
It is easily observed from Graph 3 exhibitied above that there is a reverse relationship between liquid assets ratio of banks and the Index. Actually this situation is consisten with the general liqudity approach, because it is normal that banks want to hold less liquidity in positive economic athmosphere to invest in more money and to have more liquid assets in the stressful and volatile times. The direction and the weight of this relationship will be consequently understood with the help of the results of our econometric model.



Source: Calculated from data of CBRT and TBA

Graph 4: Financial Stability Index and Total Provisions Ratio

Except for the deepest financial crisis period of Turkish History during 1999-2002, Total Provisions Ratio has a quite stable pattern in Graph 4. The details of the reverse relationship of the Index and Total Provisions Ratio particularly in 1994 and 2001 economic crises will be further explained by the results of our econometric model.



Source: Calculated from data of CBRT and TBA

Graph 5: Financial Stability Index and Reserve Requirement Ratio

Primarily, it is presented graphically (Graph 5) that there is a reverse relationship between the Financial Stability Index and Reserve Requirement Ratio, but the direction and the magnitude of the effect of reserve requirement on financial stability as a traditional monetary policy tool will be found out more explicitly in our econometric analysis.

4.2. Model Results of Financial Stability and Banking Regulations

We consider that Capital Ratio (CR), Liquidity Ratio (LR), Total Provisions Ratio (TPR) and Reserve Requirement Ratio (RRR) can affect Financial Stability Index (FSI). When we are estimating a model including time series variables, the first thing we need to do is to make sure whether all variables in the model are stationary. Since many financial and economic parameters include time series data, they are generally non-stationary series. Therefore, we need to make unit root analysis regarding time series before doing any econometric analysis with these parameters. In order to make unit root analysis, we utilize Augmented Dickey-Fuller (ADF) test with these parameters by using E-views statistical program. Since economics theory says that there is no trend in series in the form of ratios, we conduct ADF test only with intercept. We present ADF test results below in Table 3.

Table 3: Unit Root Test Results

Parameters of The Model	**ADF Test Results**
Financial Stability Index (FSI)	-1.100(2)
Difference of Financial Stability Index (d(FSI))	-10.084(1)***
Capital Ratio (CR)	-1.560(1)
Difference of Capital Ratio (d(CR))	-12.575(0)***
Liquidity Ratio (LR)	-1.923(0)
Difference Liquidity Ratio (d(LR))	-10.510(0)***
Total Provisions Ratio (TPR)	-1.774(5)
Difference of Total Provisions Ratio (d(TPR))	-3.828(4)***

Reserve Requirement Ratio (RRR)	-1.935(0)
Difference of Reserve Requirement Ratio (d(RRR))	-8.183(0)***

Lag of number is selected by Schwarz Information Criteria (SIC) and is exhibited with parenthesis sign. *, **, ***, Unit root hypotheses are rejected by %99, %95 and %90 confidence intervals.

As seen from above Table 3, all parameters have unit root, so they do not comply with being stationary rule to make a meaningful econometric analysis. However, we can make our variables stationary by taking first differences of the data. Therefore, we can say that all variables are integrated "I(1)" first degree because they become stationary after differencing from first degree. The second thing we need to check is whether or not that there is co-integration among these variables. That's why we need to conduct Johansen test, but before using this method we have to guess vector auto regressive (VAR) model among these variables. For assuming VAR model, necessary and proper number of lag is found by Schwarz Information Criteria (SIC) and it is 1.

We conduct Johansen co-integration test with 1 lag found by SIC. We present the test results together with Trace and Maximum Eigenvalue statistics in Table 4 below.

Table 4: Johansen Test Results

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.474608	106.1512	69.81889	0.0000
At most 1 *	0.354630	53.37514	47.85613	0.0139
At most 2	0.111307	17.46477	29.79707	0.6057
At most 3	0.079446	7.788500	15.49471	0.4883
At most 4	0.012128	1.000599	3.841466	0.3172
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.474608	52.77610	33.87687	0.0001
At most 1 *	0.354630	35.91037	27.58434	0.0034
At most 2	0.111307	9.676271	21.13162	0.7744
At most 3	0.079446	6.787901	14.26460	0.5145
At most 4	0.012128	1.000599	3.841466	0.3172
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

According to both Trace and Maximum Eigenvalue statistics, Johansen test shows that there is co-integration among our variables, so we can conclude that there is long term

equilibrium among these variables to show this relationship among our variables, Vector Error Correction (VEC) is estimated and the results are given below in Table 5.

Table 5: Model Results of Vector Error Correction

Cointegrating Eq.:	CointEq1
FSI(-1)	1.000000
TPR(-1)	0.791008
	(0.06527)
	[12.1190]
RRR(-1)	0.573840
	(0.07231)
	[7.93546]
LR(-1)	0.867358
	(0.11411)
	[7.60115]
CR(-1)	0.751846
	(0.13984)
	[5.37634]
C	-0.004550

(Standard Error), [T-Statistics: it shows parameters which are statistically meaningful variables]

As seen from above Table 5, there are positive correlation between Financial Stability Index and Total Provisions Ratio, Reserve Requirement Ratio, Liquidity Ratio and Capital Ratio. All the coefficients of variables are statistically significant in %99 confidence level.

Although co-integration equation displays positive correlation in long term between the Index and other variables, we need to perform Granger Causality test to demonstrate the short-term relationship among our variables. This test is conducted to check whether or not error correction term (ECT) is statistically meaningful and numbers of lags of our variables are significant. Thus, error correction equation for the Financial Stability Index is exhibited below Table 6.

Table 6: Error Correction Term

Error Correction:	D(FSI)
CointEq1*	-0.280047
	(0.12459)
	[-2.24783]
D(FSI(-1))	0.098163
	(0.16909)
	[0.58053]
D(TPR(-1))*	0.385832
	(0.10738)
	[3.59298]
D(RRR(-1))	-0.034841
	(0.26255)
	[-0.13270]
D(LR(-1))*	0.258461
	(0.11738)
	[2.20188]

	0.247869
	(0.16673)
D(CR(-1))	[1.48665]
	0.012893
	(0.04961)
C	[0.25989]

(Standard Error), [T-Statistics: it shows parameters which are statistically meaningful variables]

The error correction indicates that Total Provisions Ratio and Liquidity Ratio have an influence over the Financial Stability Index in short term and these two variables are statistically significant. The correlation between these two variables and the Index is positive. In other words, TPR and LR are Granger causes of the Index in the short term. We also found that impact of error correction term is statistically significant and its direction is negative. Although the results of error correction model indicates that TPR and LR are Granger causes of the Financial Stability Index, we also apply Granger Causality Test among our variables and test results are given below in Table 7.

Table 7: Granger Causality Test Results

Dependent variable: D(FSI)			
Excluded	**Chi-sq.**	**Df.**	**Prob.**
D(TPR)	12.90952	1	0.0003*
D(RRR)	0.017610	1	0.8944
D(CR)	2.210116	1	0.1371
D(LR)	4.848278	1	0.0277**
All	19.68603	4	0.0006

As seen from Table 7, TPR and LR variables are statistically meaningful for % 99 and % 95 confidence intervals respectively. According to this test results, Total Provisions Ratio and Liquidity Ratio have significant influences over our Financial Stability Index in short term and they are also Granger causes of the Index.

The results of our econometric model are parallel with dominant theoretical and empirical views. According to our model results, the existence of banking regulations supports and has positive effects over financial stability. Capital Adequacy, Liquidity Management, Provision Policy and Reserve Requirements are shown that they are banking regulation tools that they contribute to financial stability in long term. Hence increasing capital buffer, liquid assets, and provisions for losses and reserve requirements for deposits of banks provides positive influences over financial stability. Besides, the consequences of our model support domestic and international efforts regarding capital, liquidity, provisioning and reserve requirement regulations based on Turkish experience.

Liquidity Ratio, evaluated as a political tool for Liquidity Management, is the most influential (0,867: Liquidity Ratio's coefficient in our Model) regulation tool over financial stability in the long term. Total Provisions Ratio, estimated as a political indicator of Provision Policy is second (0,791) and Capital Ratio, assessed as a political device of Capital Adequacy is third (0,752) significant regulation tool over financial stability in the long term. Reserve Requirement Ratio, a political equipment of Reserve Requirement for Deposit, is the least (0,574) influential factor over financial stability in the long term relative to other regulation indicators in our model. Actually, Reserve Requirement for Deposits is more of a

monetary policy tool, rather than a banking regulation tool, therefore this result is consistent with the theoretical perspective.

On the other hand, only Total Provisions Ratio (0,385) and Liquidity Ratio (0,258) are statistically significant over financial stability in the short run (in the Granger Causality Context). This is very distinctive consequence, because Capital Ratio is usually accepted as the most influential banking regulation tool and its parameter is not statistically significant in our model in spite of its size (0,248). Despite its negative and relatively small (-0,035) regression coefficient, Reserve Requirement Ratio is not statistically significant factor over financial stability in the short run either. Thus, we can say that increasing provisions and liquid assets of banks boost up financial stability in the short run based on our model.

5. CONCLUSIONS

Our Financial Stability Index calculated based on the data of Turkish Banking System displays events of common economic conditions and financial shocks and distresses of Turkey throughout 1990-2010 generally. The Index not only represents the domestic economic and financial incidents but also presents the effects of important international economic and financial crisis and shocks that influenced Turkey. So we can say that we have a significant indicator regarding the tendency of financial stability in Turkey.

However our Index is not a kind of indicator which demonstrates all information related to financial stability alone. Today, there are many indicators and parameters worldwide related to measuring and evaluating financial stability. We do not expect that our Index includes whole information about all data sets of financial stability, but we anticipate observing general trends of financial stability with the help of Financial Stability Index. Thus, in terms of our analysis, these sorts of common tendencies over financial stability give us meaningful information.

How influential banking regulations are over financial stability is very important. Depend upon our research, licensing rules and restrictions on banking activities, capital requirements, positions of liquidity and exchange regulations, accounting and provisioning rules, deposit insurance and resolution of banks are principal and common regulatory fields of banking system and activities. Besides, strong and efficient supervision framework is a complementary and inseparable component of banking regulations. We determine four basic banking regulation indicators in order to see the impact of banking regulation and supervision from quarterly financial reports of The Turkish Banking System through 1990-2010 (the same period of Financial Stability Index).

Severe effects of 1994 and 2001 financial and economic crises are clearly observed from our Index. 25 bank failures are also displayed in our Index with deteriorating level of financial stability. So financial shocks, economic crises and bank failures can be inferred from our Index.

In addition, economic and political ups and downs of 90's and financially devastating 1999-2002 period in Turkey and external consequences of Asian and Russian Crises in 1998-1999, occupation of Iraq, positive worldwide liquidity environment of 2004-2007 and 2008-2009 global financial crises and healing period of 2009-2010 are observed quite distinctively from The Financial Stability Index.

Financial and economic crises melt down capital level of banks; we explicitly see this phenomenon due to 1994 and 2001 crises in Turkey. We observe that there is a severe capital inadequacy problem in the Turkish Banking System through 1990-2002 periods. However, after 2001 crisis, a significant healing period regarding capital level of banks has begun due to the great efforts in the Banking System and public debt management in Turkey. Besides, financial crisis of 2001 was a milestone in terms of liquid assets size of banks. After this crisis

period, portion of liquid assets in balance sheets of banks was generally diminishing. This is a reverse situation compared to Capital Ratio.

Except for 1999-2002 periods, share of Total Reserve Requirement for Loan Losses to capital in the Turkish Banking System follows quite stable pattern. However, the level and volatility of this ratio in 1999-2002 crisis periods is a clear indication of severity of 2001 financial crisis and great adjustment efforts of balance sheets of banks after the crisis. Also, until 2010 policy shift of CBRT, ratio of Reserve Requirement for Deposits to Total Liabilities followed a decreasing pattern since it is less important as a political tool.

To sum up, banking regulations, specifically liquidity management, capital adequacy and provision policy are meaningful and influential factors over financial stability in the long run. Also, in the short run, provision policy and liquidity management are significant banking regulation tools based on our model. Banking regulations are important tools in order to support financial stability. Therefore, banking regulations deserve attention as a popular discussion topic in terms of financial and regulatory world. To sustain financial stability effective banking regulations are needed.

Besides, our model presents strong practical and theoretical view in terms of understanding and evaluating for financial stability and banking regulations. The model comprehends quarterly periods of over 20 years and based on detailed and comprehensive ratios of financial statement of banks. These ratios represent substantially the trend of financial stability and effects of fundamental banking regulations in Turkey. Our model results and real life experiences converge to a great extent.

6. REFERENCES

AHUMADA A. C., BUDNEVICH C. L. (2001), "**Some Measures of Financial Fragility in the Chilean Banking System: An Early Warning Indicators Application",** Central Bank of Chile Working Papers, N. 117, November, 9-10

AIZENMAN Joshua (2009), **Financial Crisis and Paradox of Under- and Over-Regulation,** NBER Working Paper N. 15018, May, 1-18

ASPACHS-BRACONS O., GOODHART C.A.E., TSOMOCOS D.P., ZICCHINO L. (2006), **Towards a Measure of Financial Fragility,** LSE Financial Markets Group Discussion Paper 554, February, 3-18

BAKIROV R., GRISHAN M. (2000), **Banking Regulation and Financial Stability,** ECONOMICS EDUCATION AND RESEARCH CONSORTIUM RUSSIA, Final Report, May,2-6

BARRELL Ray, HURST Ian and KIRBY Simon (2008), **Financial Crises, Regulation and Growth,** National Institute Economic Review, N. 206, May, 56-65

BARTH J. R., CAPRIO G. J., LEVINE R. (2004), **Bank Regulation and Supervision: What Works Best?,** Journal of Financial Intermediation, 13, 205-248

BARTH J.R., CAPRIO G. Jr., LEVINE R. (2006), **Rethinking Bank Regulation Till Angels Govern,** Cambridge University Press, Cambridge UK

BCBS (2010), **The Basel Committee's Response to the Financial Crisis: Report to the G20,** October, 2, 4-10

BRSA (2010), **From the Crisis to the Stability: Turkey Experience**, Working Paper, 3. Edition, 3 September, VII-IX, 14-85

BRSA (2010), **Basel III with Questions,** Risk Management Department, December, 11

BENSTON George J., KAUFMAN George G. (1996), **The Appropriate Role of Bank Regulation,** The Economic Journal, 106, May, 688-697

BORIO C., TSATSARONIS K. (2005), **Accounting, Prudential Regulation and Financial Stability: Elements of a Synthesis,** BIS Working Papers, No 180, September, 22-23

BORIO C., DREHMANN M. (2009), **Towards an operational framework for financial stability: "fuzzy" measurement and its consequences,** BIS Working Papers, No 284, June, 3-5

CAPRIO Gerard Jr. (2010), **Safe and Sound Banking A Role for Countercyclical Regulatory Requirements?,** Policy Research Working Paper, 5198, The World Bank, February, 24-26

CHAMI R., KHAN M. S., SHARMA S. (2003), **Emerging Issues in Banking Regulation,** IMF Working Paper, WP/03/101, May, 9, 20-21

CHANT John (2003), **Financial Stability as a Policy Goal,** Bank of Canada Technical Report, No 95, Essays on Financial Stability, 3-4

CROCKETT Andrew (1997), **Why is Financial Stability a Goal of Public Policy?,** Symposium of "Maintaining Financial Stability in a Global Economy", FED of Kansas City, August, 6-7

EICHENGREEN B., ROSE A., WYPLOSZ C (1996), **"Contagious Speculative Attacaks"**, NBER Working Paper, No: 5681

FABRICE M., JENS A., RUDIGER A. (2009), **Prudential Regulation and Competition in Financial Markets,** OECD Economics Department Working Papers, No. 735, December, 1-32

Fernandez L., Kaboub F., Todorova Z. (2008), **"On Democratizing Financial Turmoil: A Minskian Analysis of the Subprime Crisis"**, The Levy Economics Institute of Bard College, Working Paper No. 548, November, 2

GENÇAY Oya (2007), **Finansal Dolarizasyon ve Finansal İstikrar Arasındaki İlişki: Türkiye Değerlendirmesi,** TCMB Uzmanlık Yeterlilik Tezi, Şubat, Ankara, 27, 51-52, 84-89

HALDANE A.G., HOGGART G.G., SAPORTA V., SINCLAIR P. (2004), **Financial Stability and Bank Solvency,** The International Banking Conference, Chicago, October, 2-3

KAMINSKY G. L., REINHART C. M. (1999), **"The Twin Crises: The Causes of Banking and Balance-of-Payments Problems",** The American Economic Review, Vol: 89, No: 3

KİBRİTÇİOĞLU Aykut (2003), **Monitoring Banking Sector Fragility,** The Arab Bank Review, Vol. 5 No. 2, October, 51-66

MISHKIN Frederic S. (2000), **Financial Stability and The Macroeconomy,** Central Bank of Iceland Working Papers, No 9, May, 2-47

MISHKIN Frederic S. (1997), **The Causes and Propagation of Financial Instability: Lessons for Policymakers,** Federal Reserve Bank of Kansas City Proceedings, 55-97

ÖZCAN Serkan (2006), **Para Politikası Tercihleri ile Finansal İstikrar Arasındaki İlişki, Enflasyon Hedeflemesi Politikasında Finansal İstikrar ve Türkiye Analizi,** TCMB Uzmanlık Yeterlilik Tezi, Mayıs, Ankara, 12-14, 80-109

PADOA-SCHIOPPA Tommaso (2002), **Central Banks and Financial Stability: Exploring a Land in Between,** Second ECB Central Banking Conference Frankfurt am Main 24 and 25 October, 3-22

ROSSI Marco (1999), **Financial Fragility and Economic Performance in Developing Economies: Do Capital Controls, Prudential Regulation and Supervision Matter?,** IMF Working Paper, WP/99/66, May, 20-21

SCHINASI Garry J (2004), **Defining Financial Stability**, IMF Working Paper, WP/04/187, October, 3-8

CBRT (2010), **Finansal İstikrar Raporu,** Sayı: 10, Mayıs, 85, 93

TİRYAKİ Göksel (2010), **Bankacılık Sektöründe -Basel Sermaye Uzlaşıları- Sermaye Yeterliliği Standart Rasyosu Gerçekten Yeterli Midir? Kaldıraç Oranı'na ve Daha Güçlü Bir Bankacılık Düzenleme Çerçevesine İlişkin Değerlendirmeler,** Vergi Dünyası Dergisi, 347. Sayı, Temmuz, 118-122

TİRYAKİ Göksel (2009), **Basel Regulations, Economic Capital And Their Implications For The Turkish Banking Industry,** Doğuş Üniversitesi Dergisi, 10. Cilt. 1. Sayı, Ocak, 119-131

TİRYAKİ Göksel (2004), **Ekonomik Suçlar, Bankacılık Suçları ve Bu Tür Suçlarla Mücadele Stratejisi,** Active Bankacılık ve Finans Dergisi, 34. Sayı, 56-76

TİRYAKİ Göksel (2009), **Küresel Bankacılık Düzenlemelerinde Yeni Dönem,** Active Bankacılık ve Finans Dergisi, 60. Sayı, 38

TİRYAKİ Göksel (2009), **Küresel Krizlerin Gölgesinde Yeni Bir Global Finansal Mimariye Doğru,** Active Bankacılık ve Finans Dergisi, 57. Sayı, 34

TYMOIGNE Eric (2011), **Measuring Macroprudential Risk: Financial Fragility Indexes,** The Levy Economics Institute of Bard College, Working Paper No. 654, March, 4-10

VANHOOSE David D. (2008), **Bank Capital Regulation, Economic Stability, and Monetary Policy: What Does the Academic Literature Tell Us?,** Atlantic Economic Journal, 36. Volume 1. Issue, March, 1-14

YÜCEMEMİŞ Tanınmış Başak (2011), **Finansal İstikrarda Para Politikasının Rolü,** Derin

Yayınları, İstanbul

Basel Committee Banking Supervision (BCBS): http://www.bis.org/bcbs/ (15.12.2011)

International Monetary Fund (IMF): http://www.imf.org/external/np/sta/fsi/eng/fsi.htm (15.12.2011)

Turkish Banking Association (TBA): http://www.tbb.org.tr/tr/Banka_ve_Sektor_Bilgileri/Tum_Raporlar.aspx(30.06.2011)

The Central Bank of Republic of Turkey (CBRT): http://evds.tcmb.gov.tr/cbt.html (30.06.2011)

Turkey Deposits Insurance Fund (SDIF): http://www.tmsf.org.tr/index.cfm?fuseaction=public.dsp_menu_content&menu_id=22 (30.07.2011)

Toronto G20 Declaration of Summit (Toronto G20): http://www.g20.utoronto.ca/2010/to-communique.html (15.12.2010)