

TURKISH BANKING SECTOR PERFORMANCE ANALYSES

AFTER THE 2001 CRISIS

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PLAGIARISM

I hereby declare that all information in this thesis has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work; otherwise I accept all legal responsibility.

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ABSTRACT

TURKISH BANKING SECTOR PERFORMANCE ANALYSES

AFTER THE 2001 CRISIS

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This thesis contributes to the weaknesses and strengths of the banking sector in Turkey. Performance analyses (DuPont analysis, CAMELS rating and Data Envelopment Analysis) are done by using quarterly data from 2001 to 2015. The effects and results of policies implemented after the 2001 crisis are investigated in line with solid banking sector construction for the European Union membership procedure; goals and targets of 10th Development Program and for the Istanbul International Finance Center project. In general, due to financial recovery maintained after the 2001 economic crisis, banking industry has shown improvements and has become stronger from the beginning of the millennium. In order to maintain more solid and sound sustainable system, successful policies must continue, especially in the banking sector asset quality and liquidity management areas. Also, supervisory transparency should be increased, even if it may embrace negative effects on financial actors. Even so, traditional ratio analyses are found to be consistent with advanced models. Managerial positions of banks in the sector are found in a good state, but it is observed that a requirement for adequate risk management department still continues as strong is an evidence on skimping hypothesis of NPL's. State owned deposit banks in the Turkish banking sector are performing better than their competitors but they are not in their best state in all measures. This should not mean that

crowding out foreign banks out of the system would result in better overall assessment. Although the performance gap between the analyzed units have converged in time. Turkish banks are observed to have a lower performance in managing asset quality as well as vulnerability to market risk than foreign banks.

Keywords: DuPont, CAMELS, DEA, Performance, Bank



ÖZET

2001 KRİZİ SONRASINDA

TÜRK BANKACILIK SEKTÖRÜNDE PERFORMANS ANALİZLERİ

DAVER, Gizay

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Bu tez Türk bankacılık sektörünün güçlü ve zayıf yönlerine katkıda bulunmaktadır. 2001 yılından 2015 yılına kadar çeyreklik veriler kullanarak performans analizleri (DuPont analizi, CAMELS reyting analizi ve Veri Zarflama Analizi) yapılmıştır. İstanbul Uluslararası Finans Merkezi Projesi, 10'uncu Kalkınma Planı amaç ve hedefleri ve Avrupa Birliği üyeliği amelleriyle uyumlu olarak 2001 krizi sonrasında uygulanan politikaların sonuçları ve etkileri güçlü bankacılık sektörü oluşturulması açısından incelenmiştir. Analiz edilen birimler arasındaki performans farklılıkları zaman içinde azalmıştır. 2001 ekonomik krizi sonrası finansal düzelmeye genel olarak sağlanmış ve bankacılık sektörü ilerlemiş ve milenyumun başına göre daha güçlü hale gelmiştir. Daha sağlam ve daha güçlü sürdürülebilir bir sistem için, özellikle bankacılık sektörü varlık kalitesi ve likidite yönetimi alanlarında başarılı politikalar devam ettirilmeli ve geliştirilmelidir. Ayrıca finansal aktörler üzerine negatif etkiler içerebilse de, denetimsel şeffaflık artırılmalıdır. Bu durumda dahi geleneksel oran analizleriyle gelişmiş model analizleri tutarlıdır. Sektördeki bankaların denetimsel kalitelerinin iyi durumda olduğu gözlemlenmiştir; ancak donuk alacaklarda gözlemlenen, eksik sağlama hipotezini (skimping hypothesis) destekleyici bulgular risk yönetim departmanlarının yeterli düzeyde olmadığına yönelik güçlü kanıtlar sağlamaktadır. Türk bankacılık sektöründe yer alan, devlet sahipliğindeki mevduat

bankaları rakiplerinden daha iyi performans sergilemekte; ancak sahip olabilecekleri en iyi performans seviyesinde bulunmamaktadır. Bu bulgu sektörün daha iyi duruma getirilmesi için yabancı bankaların sistem dışına çıkarılması gerektiği anlamına gelmemelidir. Türk bankaları varlık kalitesi yönetiminde ve piyasa riskine daha duyarlı olma konusunda yabancı bankalardan daha düşük performans sergilemektedir.

Anahtar Kelimeler: DuPont, CAMELS, DEA, Performans, Banka



DEDICATION

Kraligem, Sultanuma

To my family...

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LIST OF SYMBOLS AND/OR ABBREVIATIONS

BAKIS: BAKred Information System, 52
BRSA: Bank Regulation And Supervision Agency, 4, 5, 8, 9, 10, 54
BSRP: Banking Sector Restructuring Program, 6
CAEL: Capital Asset Earnings Liquidity, 51
CBRT: The Central Bank of the Republic of Turkey, 3, 4, 5, 9, 10
CMB: Capital Markets Board of Turkey, 9, 10
CRS: Constant Returns to Scale, 75, 76
DEA: Data Envelopment Analysis, 75, 76, 77, 79, 80
DEAP: Data Envelopment Analysis Program, 76
DMU: Decision Making Unit, 75, 76, 77, 78, 80, 82
EMS: Efficiency Measurement System, 76
ETAKDS: Etkinlik Analizi Karar Destek Sistemi, 76
FC: Foreign Currency, 55, 57, 59
FDIC: Federal Deposit Insurance Corporation, 50, 51
FX: Foreign Exchange, 3, 4, 5
GMS: Growth Monitoring System, 51
IDEAS: Integrated Data Envelopment System, 75
IMF: International Monetary Fund, 5
ISE: Istanbul Stock Exchange, 4
OCC: The Office of the Comptroller of the Currency, 49, 51
ORAP: Organisation and Reinforcement of Preventive Action, 51
PATROL: PATrimonio, Redditivita, Rischiosita, Organizzazione, Liquidita, 52
RAST: Risk Analysis Support Tool, 52
RATE: Risk Assessment, Tools of Supervision and Evaluation, 52
SAABA: Système d'Aide à l'Analyse BANcaire, 49, 51
SCOR: Statistical CAMELS Off-site Rating, 51
SDIF: Savings and Deposits Insurance Fund, 4, 5, 6, 7, 9, 10
SEER: The System to Estimate Examinations Ratings, 50, 51
TC: Turkish Currency, 57, 58, 59
TL: Turkish Lira, 4, 5, 7, 22, 77
TRAM: Trigger Ratio Adjustment Mechanism, 52
TURKSTAT, 5; Turkish Statistical Institute, 5
UFIRS: The Uniform Financial Institutions Rating System, 9, 53, 176
UoT: Undersecretariat of Treasury, 4, 5, 10
VRS: Variable Returns to Scale, 75, 76
WB: World Bank, 3

1. INTRODUCTION

In the history of Turkish Banking System, 1990's were the years of excessive risk taking in a highly volatile environment. Banks were increasingly investing in government bonds, taking huge currency mismatches and opening substantial amounts of credit lines to their holding companies. The high and volatile inflation rates of 1990s, the boom-bust cycles of economic growth and the fragility of external capital inflows all contributed to uncertainties and led to a domination of "short-term" behaviors. This excessive risk taking costed a lot to the system where the Turkish economy experienced two major crises in 1994 and 2001. The effects of the crisis, coupled with other structural problems in the banking system resulted in;

- Inadequate capital base
- Small and fragmented banking structure
- Dominance of state banks in total banking sector
- Weak asset quality (concentrated credits, group banking and concentrated risks, mismatch between loans and provisions)
- Extreme exposure and fragility towards market risk (maturity mismatch, FX open position)
- Inadequate internal control systems, risk management and corporate governance
- Lack of transparency

(BRSA, 2001)(p.5)

In those times, the regulation and supervision of the banking system had a fragmented structure. The Undersecretariat of Treasury (UoT) was responsible for issuing banking regulations, carrying out on-site supervision and enforcement. On the other hand, Central Bank of Turkey was responsible for off-site supervision and was managing Savings Deposit Insurance Fund (SDIF), which provided insurance to saving deposits (BRSA / Institutional Communication and Foreign Relations Department, 2015)(p.5).

In the year 2000, Turkish Government decided to remove the fragmented structure in banking regulation and supervision, and establish an independent body, which would act as the sole authority in the banking sector (BRSA / Institutional Communication and Foreign Relations Department, 2015)(p.5).

Banking Regulation and Supervision Agency of Turkey (BRSA) was established in June 1999 and began to operate in August 2000.

In the year 2000, the total number of banks in Turkish banking sector was 79 and 11 of these were under the management of SDIF and 18 were development and insurance banks. Excluding these, this brings the total number of deposit banks to 50. Of these 50 deposit banks, 4 were state owned banks, 28 were privately owned banks and 18 were foreign banks. As of 2014, the number of banks in Turkish banking sector has decreased to 47, and there is currently only 1 bank under the management of SDIF. There is also a decline in the number of development and insurance banks which stands at 13. By 2014, the number of deposit banks were 34 and 3 of these were state owned banks, 11 were privately owned banks and 19 were foreign banks. Compared with the 2000s only the number of foreign banks has increased in the Turkish banking sector.

Since the year 2000, the banking sector in Turkey faced a multi dimensional expansion. Banks gradually adapted to a new environment. From 2000 to 2014, total assets of the sector multiplied more than 17 times, shareholders equity multiplied by nearly 30 times, total loans multiplied by more than 34 times. Also the composition of their balance sheets changed. Details the number of banks, their total asset, shareholders' equity and total loans are given in Appendix J.

Within this study, a milestone in the Finance industry started in the same year as the Banking Law Nr. 4389 in June 1999. The rehabilitation of the Turkish banking sector was being discussed prior to the crisis by the coalition government. With the Banks Act. Nr. 4389, several moves were done with the aim of strengthening the banking sector, starting with the establishment of BRSA. BRSA is a public legal entity with autonomy in three main areas, which are autonomy in supervision and regulation, autonomy in BRSA administration and autonomy in using financial resources.

With the Banking Law, a framework parallel to the Basle Committee and Bank of International Settlements was designed. Minimum capital amount for continuing and establishing new banks were defined. A risk weighted capital adequacy ratio was introduced. Credit classification was made parallel to international standards. Cash credits and noncash credits were defined and clearly separated. Lending limits of banks were

hardened. Consolidations of banks' financial statements were implemented according to the international standards. Ownership and personnel responsibilities and liabilities were increased. Also amount and number of fines were increased and BRSA were empowered to impose administrative fines.

After the 2001 crisis Kemal DERVIŞ from WB was transferred to Turkey to develop and implement an economic recovery program.

2001 crisis started in the November of 2000 and BRSA and CBRT played key roles during the crisis and post crisis period.

In the literature, functions of banking are considered with three general statements. First one is financial intermediation, in which banks channel depositor's savings to borrowers; the second is asset transformation, which is creates loans from deposits, and the last one is money creation, by functions of financial intermediation and asset transformation. Prior to the 2001 crisis, some factors that weakened the efficiency of the financial intermediation function can be summarized by macroeconomic instability, high public sector deficits, distorting effects of state owned banks, poor risk perception and risk management, deficiencies and delays in the enforcement of international standards for banking regulation and supervision. Nowadays, current regulations are classified under four main groups, which are laws, main regulations, comminiqués and best practice guidelines given in Appendix K displaying an institutional framework. BRSA takes these powers on and uses them in regulation activities, supervision activities, licensing and enforcement activities, research and development activities, data and information system activities, and within external relationships.

At the beginning of 2000, predetermined exchange rate path was being used as a nominal anchor in Turkey. The adopted comprehensive disinflation program had important effects on banks' balance sheets. Fragility increased with the effects of adverse international capital market conditions and outflows of foreign funds.

Liquidity deficit of private and public banks were manipulated by the market actors and the speculative movements increased demand for FX. Banking sector was aware of liquidity deficit, and due to this situation confidence between banks decreased. These developments unveiled very high levels of overnight interest rates. In order to sustain stability in markets,

CBRT undertook the risk of FX reserve loss and funded the banks that were in need of liquidity. Some fragile and vulnerable banks were transferred to SDIF and CBRT's reserve losses stopped.

While these were on going BRSA was trying to regain confidence to sector and improve reputation by implementing principles and procedures related to risk management system of banks. In these periods, Turkish banking sector was hit by three shocks:

- Increased funding costs due to maturity mismatch and exposure to interest rate increases.
- Capital losses due to FX rate fluctuations and open FC positions
- Capital losses arising from treasury securities mark to market decline.

On the 21st of February 2001, Turkey experienced political tension between the President Ahmet Necdet SEZER and Prime Minister Mustafa Bülent ECEVİT in the meeting of the National Security Council, which caused fluctuations. This date is known as “Black Wednesday”. In order to prevent reserves, CBRT tried to limit TL liquidity released to market but they were not able to protect the exchange rate regime. ISE fell down rapidly and demand for FX increased. Also overnight interest rates exceeded 1000 percent after these developments. Public banks could not fulfill their obligations and capital market and money market transactions stopped, which meant the collapse of payment systems. These factors adversely affected CBRT's liquidity management and monetary policy efficiency. FX regime was not adequate to deal with these developments, hence in February 2001 Turkey met the floating exchange rate regime.

After the introduction of the new regime, policy updates were made by CBRT. A new three step strategy of CBRT followed these developments.

The first step priority was reestablishing stability in money and capital markets in the floating exchange regime, by ensuring uninterrupted operation of payment systems. Actions for this goal were direct funding through reverse repo transactions, announced interest rates for overnight and weekly borrowing and lending, not letting money market interest rates beyond the band announced, by actively taking positions on interbank money and ISE market transactions.

Strategy's second step was carrying out a coordinated operation with UoT. According to this plan, government bonds issued by UoT were used to cover public banks and banks transferred to SDIF. From these mentioned banks most of the bonds were purchased by CBRT, by this way permanent elimination of liquidity necessity was provided. According to the agreement made with IMF, funds borrowed from them were used for the financing of debt roll over problems in domestic market. Liquidity level of TL was ensured by cooperation of the Turkish Treasury and CBRT. FX position vulnerabilities were taken under control by planned auction method sales of CBRT.

The third step of the strategy was domestic debt swap operations of UoT. Banking system was still fragile because of the maturity problem of debts. In order to eliminate this problem, maturity extension was provided in mid-June 2000 by UoT's operation of trading short term TL denominated bonds with long term bond packages. These packages included long term USD indexed bonds and long term TL denominated bonds.

The three stage strategy, taught step by step above remarkably reduced negative expectations on the Turkish economy. The cooperated movements of BRSA, CBRT and UoT allowed the economy to function again, but there was a long way to go in order not to face similar problems. After the 2001 crisis, reform studies were made on macro policies and in the banking sector. In order to eliminate financial instability and lack of confidence, the government introduced a transition to a strong economic program.

On the 3rd of May 2001, a letter of intention for 2002 was given to IMF for the continuation of the stand-by arrangement and the support program. The main goals were determined as completely removing negative effects of the crisis, and maintaining a sustainable growth environment by decreasing inflation level in the long term. Targets were about restructuring the banking sector to have a strong relationship with the real sector, solid and sound public finance balance, and a framework that allowed structural reforms. As stated in the goals and targets, key features of the following period can be summarized as structural reforms supporting free market economy and budget discipline, price stability oriented Monetary policies, architecture for building a solid and sound banking system, decreasing inflation and decreasing real interest rates, high growth and lowered fragility to external shocks. Figure 1 Macroeconomic Indicators CPI, Labor, GDP

summarizes some important ratios of the Turkish economy after 2004, with data gathered from CBRT and UoT. Consumer Price Index is based on TURKSTAT's 2003 monthly data; Labor force participation ratio is from UoT statistics and GDP is expenditure based on the 1998 fixed prices, quarterly, TRY thousand, new series data from TURKSTAT.

By remembering the liquidity crisis of November 2000 and the following period is importance of clearing the banking sector from weak banks can be understood better. To do so BSRP was announced on the 15th of May 2001 which focuses on intermediation function and aimed at establishing a solid and sound global banking sector. Within the BSRP, public banks had been financially and operationally restructured with the ultimate goal of privatization; SDIF banks were resolved through mergers, transfers, sales and liquidation. The method chosen depended on how the related bank was transferred to SDIF. Table 1 presents the resolution method of aforementioned banks. Other things done to get a sound banking sector are as follows; a three step audit system for controlling the soundness of commercial private banks is used and according to results, supports are established. Capital increases are done by planned letters of guarantees from bank owners. Bad asset resolution is done according to the İstanbul Approach. Tax incentives for restructuring the banks are done. In order to have a more efficient and competitive structure to better regulate and supervise the banking sector, several legal arrangements are done, such as, transparent balance sheets and strong shareholders equity encouragement, obligation for an enforcement of internal audit and risk management systems. Another implication is a single database for reporting financial information set up, data of which are available in the format of international audit standards.

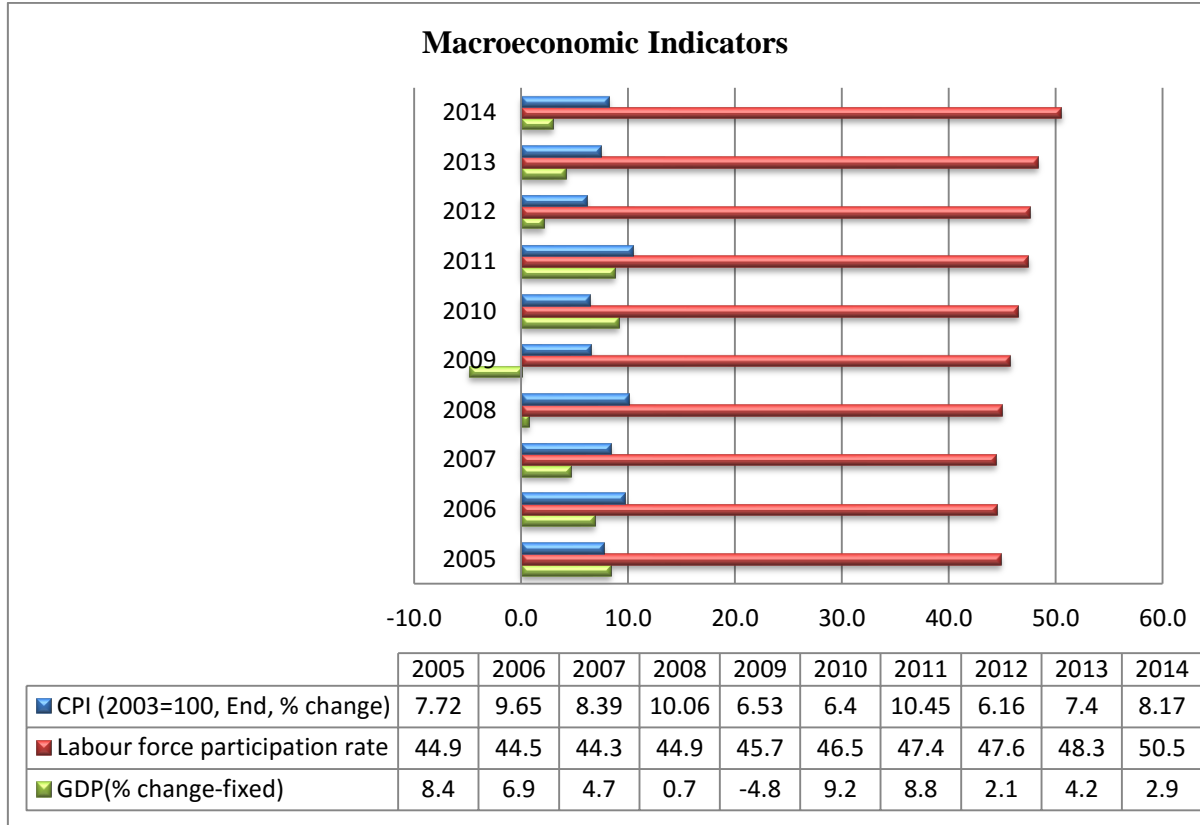


Figure 1 Macroeconomic Indicators CPI, Labor, GDP

While labour force participation rate increases, CPI changes around 6% to 10%. GDP change decreases until 2008, turns to negative in 2009 after this time it reverts to positive again.

Table 1 Resolution of Banks Transferred to the SDIF

	Banks	Type of Transaction	Assets(**)		Personnel(**)		Duty Loss	Resolution Period
			TL Million	%	Number	%	USD Million	Month
	Banks Merged							
1	EgebankA.Ş.(*)	Merger	795	0,8	1990	1,2	1220	13
2	YurtbankA.Ş.(*)	Merger	332	0,3	563	0,3	656	13
3	YaşarbankA.Ş.(*)	Merger	823	0,8	1626	1,0	1149	13
4	BankKapitalT.A.Ş.(*)	Merger	89	0,1	538	0,3	393	3
5	UlusalBankA.Ş.(*)	Merger	312	0,3	251	0,1	524	2
6	InterbankA.Ş.	Merger	1112	1,1	1320	0,8	1269	29
7	EsbankA.Ş.	Merger	948	0,9	1898	1,1	1113	18
8	İktisatBankasıT.A.Ş.	Merger	685	0,7	1339	0,8	1954	9
9	KentbankA.Ş.	Merger	899	0,9	1766	1,0	681	6
10	EtibankA.Ş.	Merger	826	0,8	2035	1,2	698	14
11	EGSBankA.Ş.	Merger	510	0,5	1004	0,6	545	6
12	ToprakbankA.Ş.	Merger	3541	2,0	2458	1,7	880	10

Banks	Type of Transaction	Assets(**)		Personnel(**)		Duty Loss	Resolution Period	
		TL Million	%	Number	%	USD Million	Month	
Banks Transferred to Public Banks								
13	PamukbankT.A.Ş.	Transfer	4942	1,9	4040	3,2	3618	29
Transition Banks								
14	BayındırbankA.Ş.	Transition B.	259	0,2	486	0,3	116	-
Banks Sold								
15	BankEkspresA.Ş.	Sales	311	0,3	629	0,4	435	30
16	DemirbankT.A.Ş.	Sales	2503	2,3	4225	2,4	648	10
17	SümerbankA.Ş.(*)	Sales	447	0,4	1407	0,8	470	20
18	SitebankA.Ş.	Sales	25	0,0	97	0,1	53	6
19	TarişBankA.Ş.	Sales	185	0,1	526	0,4	74	16
Banks under Liquidation								
20	KıbrısKrediİstanbulŞubesi	Bankruptcy	1	0,0	22	0,0	0	
21	T.İmarBankasıT.A.Ş	Bankruptcy	1158	0,5	1521	1,2	5933	-
22	TürkTicaretBankasıA.Ş.	Voluntary Liquidation	677	0,6	3664	2,1	778	
Total			21380	15,5	33405	21,0	23207	14

(*) Merged under Sümerbank A.Ş.and sold to Oyak Group in 2001.

(**) Reflects the year-end balance-sheet value in the previous year before resolution and the shares in total of the aforementioned year.

Therefore, amounts belonging to the total shows the total of values and ratios belonging to different years.

(The Banking Regulation And Supervision Agency / Department of Strategy Development, 2009)(p.8)Recalculated/Revised

In 2005, a new banking law had been introduced. With the Banking Law Number 5411 and other regulations, BRSA's working area had been widened. Financial holding companies, factoring companies, financial leasing companies and financing companies were integrated in to BRSA's supervision and regulation area so consolidated supervision ability had increased. To get better and sustain stability, starting from June 2006, BRSA started strategic management activities. Within the strategic management approach, thirteen strategic targets related to five strategic goals according to BRSA's mission and vision were set for the following three years. These goals and targets stated in the Strategic Plan 2006 – 2008 of BRSA are exactly given in Appendix L.

In the same direction with the goals and targets, on site and off site examinations are done. Regulation drafts are made available to related parties. Regulations' effect on sociocultural environment is analyzed. Acts towards market efficiency are done. Bank Cards and Credit Cards Law and other regulations on this topic are done. Risk focused supervision approach

is integrated to processes. UFIRS or publicly known name CAMELS is started. Administrative fines are given to some sector companies due to lack of reporting. The Financial Sector Commission is established with the members from representatives of the BRSA, CBRT, Ministry of Finance, Undersecretariat of Treasury, CMB, SDIF, and Competition Authority, Ministry of Development, Borsa İstanbul, the Banks Association of Turkey and Participation Banks Association of Turkey. This commission is responsible for the cooperation and coordination among institutions, information exchange, proposal of joint policies and expressing views on topics related to the future of the financial sector. The Financial Sector Assessment Program is run, and the results are used by auditors and auditees. Fundamental structural indicators are measured closely. Binding of financial sector improvements to real sector are done by the Anatolian Approach. According to this approach, insolvent debts of SMEs are restructured.

Meanwhile the World, especially the USA was struggling with mortgage and subordinated debt based fluctuations. In the October of 2008, measures to defend the global crisis are announced by CBRT. The crisis' effects on the Turkish economy can be seen on Figure 1 Macroeconomic Indicators CPI, Labor, GDP

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Within strategic management approach, twenty seven strategic targets related to five strategic goals according to BRSA's mission and vision were set for the following three years. These goals and targets stated in the Strategic Plan 2010 – 2012 of BRSA are exactly given in Appendix L.

In the same direction with the goals and targets, BRSA took an active role for a financial stability by coordinating and cooperating with other economy management institutions inside and outside of Turkey. BRSA became a member of Basel Committee on Banking Supervision in 2009. The most important change in the period was integrating Basel II regulations into the Turkish Financial Sector. With the 6361 numbered Financial Leasing, Factoring and Financing Companies Law, financial sector was set to be in a better condition.

In 2010, BRSA became a member of the Islamic Financial Services Board. Also memorandums of understandings were signed with foreign supervisory authorities.

Within strategic management approach, fifteen strategic targets related to four strategic goals according to BRSA's mission and vision were set for the following three years. These goals and targets stated in the Strategic Plan 2013 – 2015 of BRSA are exactly given in Appendix L.

In 2013, asset size of the banking sector passed GDP's size. BRSA's working area was widened once more, covering Payment and Security Settlement Systems, Payment Services and Electronic Money Institutions with the 6493 numbered Law on Payment and Security Settlement Systems, Payment Services and Electronic Money Institutions.

In 2014, an electronic grievance system and a web site were launched for financial literacy and awareness.

Nowadays, in Turkey, the authorities responsible for financial stability take policy measures as part of their duties, mandates and responsibilities, taking into account the macro prudential policies, which are as follows:

CBRT is a relevant authority for the implementation of monetary policy and exchange rate regime to achieve price stability and financial stability, as well as for the management and supervision of payment and settlement systems. BRSA is a relevant authority for the supervision of all banks, financial holding companies, leasing companies, factoring companies and consumer finance companies, and regulations involving their activities. UoT is a relevant authority for public finance, the implementation of fiscal policy, and supervision and regulation of insurance companies. CMB is a relevant authority for the supervision and regulation of securities brokers. SDIF is a relevant authority for the protection of rights and interests of deposit holders, and resolution of banks. The Memorandum of Understanding, which is the relevant authority meetings between the Treasury, BRSA, CMB, SDIF and the CBRT, contribute to the coordination, information sharing, and cooperation between them and thereby maintaining financial stability and monitoring and managing systemic risk. The Financial Stability Committee and the Financial Sector Commission are institutional structures related to systemic risk and macro prudential policies. Financial Sector Commission has a broader representational structure than Financial Stability Committee (BRSA / Institutional Communication and Foreign

Relations Department, 2015; BRSA, 2001; Central Bank Of The Republic Of Turkey Head Office, 2015; Keskin & Alparslan, 2000).

In the analyses period, three presidents ruled the Republic of Turkey. During the 2001 crisis Ahmet Necdet SEZER was the president and during the 2008 crisis Abdullah GÜL was the president. During the course of the study The Justice and Development Party (AKP) was the leading and governing party of the Turkey. Under the political environment, two phenomena dominate in election systems. The first one is justice in representation and the second one is stability in governance. In the 1995 and 1999 elections, justice in representation phenomenon ruled in Turkey, but after these periods election results shows that stability in governance phenomenon ruled (Tuncer, 2006). Financial market development is affected by the regulatory system type of a country (Aysan & Ceyhan, 2007). The main aim of political parties is to win elections. Political parties getting close to victory for a period of time, make strategic plans covering the next election periods. A design of political and economic environment is done according to these plans. After the 2002 elections, a single party rule in Turkey, the President of the Grand National Assembly of Turkey, Minister of Finance, Minister of Economy, Minister of State Responsible for Economic Coordination and/or Vice Prime Minister for Economic Coordination became members of this party. A background from the same political party emphasizes similar visions. Therefore, close relationship results in strong motivation aimed towards strategic plans.

A strong institutional framework including strong law enforcement, strong legislative environment, a rationale organizational scheme and transparency have positive effects on a financial system (Demirgüç-Kunt & Detragiache, 1998). Banking systems' stability and effective functionality are essential for development and economic growth. Therefore, a relationship between bank performance and economic stability is an important topic to be investigated (Aysan & Ceyhan, 2007). Political parties, governing with the stability in governance phenomenon have an advantage in maintaining economic stability by close coordination with key actors of economy. The study period involves several governments in Turkey. There were three presidents of the Republic of Turkey in the office during the analysis period. At the same time, three chairmen were in the BRSA and three were in the governors of the CBRT office. This also emphasizes stability in governance in key

economic actors during the analysis period. In short, economic and politic stability are favorable for financial development.

BRSA functioning as a safeguard in the economy needs instruments to reach and fulfill its mission, vision, goals and priorities. One of these instruments is performance measurement.

Empirical research on the banking sector performance topic is one of the attraction points of academicians and practitioners through the evolvement processes. Some studies can be given as, (Akıncı, Matousek, Radic, & Stewart, 2012; Albayrak & Erkut, 2005; Aygün, Taşdemir, & Çavdar, 2010; Aysan & Ceyhan, 2008; Bakan, Doğan, Erşahan, & Eyitmiş, 2012; Çağıl, 2011; Çinko & Avcı, 2008; Dinçer & Görener, 2011; Fukuyama & Matousek, 2011; George Assaf, Matousek, & Tsionas, 2013; Isik & Hassan, 2002, 2003; Ozkan-Gunay & Tektas, 2006; Seyrek & Ata, 2010; Taşkın, 2011) who examine bank performances in the Turkish banking sector. Most of these studies were prior to the 2001 period. Each evolvement stage, which has its own special conditions and changes in these stages should be discussed considering these factors. The most recent studies mentioned above covers until the 2010 period by using annual data. There are many studies on the Turkish banking sector, although, they do not capture the effects of policies implemented after the 2001 Crisis, till the most recent period by using quarterly data. In the last quarter of 2000, the Turkish banking sector was hit by a liquidity crisis, which deepened in 2001 and in 2008. Turkey struggled with the global crisis. Hence, if the policies implemented after the 2001 crisis had expected recovery and long term strengthening of the sector, effects of these crises should have had a limited impact on the Turkish banking sector. In addition to these, three hypotheses associated with non-performing loans, bad luck, bad management and skimping (Berger & Mester, 1997) are not addressed and there is also a gap in the Turkish banking sector literature at this point. Addressing the reason of NPLs could lead to a right treatment of this important problem. There also lays another important topic on the banking sector, which is about the ownership of banks and their effects on the system. Bank ownership as foreign or domestic and the impacts on performance results are widely discussed in many studies, for example, in (Berger, Deyoung, Genay, & Udell, 2000; Das & Ghosh, 2006; Fries & Taci, 2005; Sarkar, Sarkar, & Bhaumik, 1998). Particularly in Turkey, limited to their analyses periods (Akıncı et al., 2012) amongst

others, defends domestic banks are better than their foreign competitors. Their study does not cover the most recent period, hence I extended the period and searched for confirmatory evidence on state banks' dominance. As a result, my findings are in line with Akıncı et. al. (2012), suggesting state banks are performing better than foreign banks in Turkey on average performance. I extended my study to show that, although foreign banks' overall performance is not better than state owned banks they are found to manage their assets better than domestic competitors. Also, foreign banks are found less vulnerable to market risks. From these points foreign banks are required for the overall stability of the financial system. Within the 1990's, the Turkish economy and especially the banking sector in Turkey was in poor condition with fragilities. By the implementation of an economic recovery program and the banking sector restructuring program after the 2001 crisis policy makers aimed to form a solid and sound financial system. Together with the European Union membership procedure and the goals and targets of the 10th Development Program, stability of the Turkish economy is considered important. In particular with the İstanbul International Finance Center project, bank performances are key indicators for being in the top twenty five international finance centers. Shortcomings of performance evaluation with only a traditional ratio analyses are addressed in several studies (Aysan & Ceyhan, 2008; Bowlin, Charnes, Cooper, & Sherman, 1985; Mercan, Reisman, Yolalan, & Emel, 2003; Ozkan-Gunay & Tektas, 2006). Therefore, I conducted a three stage analysis methodology. At first DuPont Analysis schema is implemented to quarterly data gathered from the Turkish Banking Association of Turkey for the periods between 2001 to 2015. ROE, ROA and lower breakdowns are analyzed as usual and suitably for the banking sector (Koch & MacDonald, 2015). Another contribution of my study is implementing CAMELS analysis with all available data important for the banking sector rather than the selected ratios implied in (Çinko & Avcı, 2008; Türker Kaya, 2001). In the third and the last stage, I implemented DEA methodology, by using input oriented radial super efficiency model for the assessment of banking sector units and internal ranking of efficient units is used. I broke DEA down into four scenarios following (Cinca & Molinero, 2004), but by using input factor correlations for scenario building, which makes my study unique and makes it available to study principal component analysis, which is not discussed in this study. The literature part of the thesis will be given in chapter 2. In chapter 3, ratio analyses will be explained and findings from the analyses will be given. In

chapter 4, CAMELS ratings will be introduced and findings from the analyses will be given. In chapter 5, DEA will be explained and findings of the analyses will be presented. In chapter 6, conclusions will be drawn and future studies will be addressed.



2. LITERATURE

By the 7th of November 2015, from 1922 to 2016 according to Scopus; “Performance” title, abstract or keyword search results in 3658995 documents. Documents are under life sciences, health sciences, physical sciences, social sciences and humanities subject areas. The search results increase significantly after 1960’s. 97129 of these documents are under business management and accounting subject area ranked 18th of 28 groups. 42621 of these documents are under economics, econometrics and finance area ranked 22nd of 28 groups. This implies that the performance topic is relatively younger in these areas.

Refining “Performance” title, abstract or keyword search limited to business management and accounting, economics, econometrics and finance subject areas results in 122145 documents. The search results increase significantly after 1990’s. Top ten countries in this research are United States, United Kingdom, China, Australia, Germany, Canada, Taiwan, India, Spain and Italy. According to the classification of the World Bank, there are only two middle income countries in the top ten, which are China and India. Turkey is classified under upper middle income countries as China. Chinese authors published 9405 documents, whereby Turkish authors published 1267 documents during this period.

Lack of generally accepted industry standard for performance evaluation was mentioned before. In order to capture researchers’ aspects towards the topic, some information will be provided here. One study’s statement from the comprehensive review of the use of operational research and artificial intelligence techniques through 196 studies is finding DEA to be the most common methodology. Most of the inspected studies are found to be aiming at technical and operational efficiency measures (Duygun Fethi & Pasiouras, 2010).

Efficient frontier estimation studies start with the Debrau (1951) and Koopmans (1951). Later, Shephard (1953), Farrel (1957) and Shephard (1970) lay the foundations of DEA studies, which were shaped after Charnes, Cooper and Rhodes (1978) (Daraio & Simar, 2007). The first implementation of DEA was to observe the efficiency of decision making units and to evaluate public programs in schools (A. Charnes, Cooper, & Rhodes, 1978). After this study by working on same data DEA measure of Charnes, Cooper and Rhodes is extended by assuming variable return to scale (A. R. D. Banker, Charnes, & Cooper, 1984). These two studies are named after their authors by CCR and BCC models in DEA

literature. In the following years, DEA was argued, developed and applied to other areas. Examples from, more than 500 cited studies, according to Scopus are given to demonstrate arguments on DEA, development progress and various applications of DEA. Parametric models and non-parametric models are the most well-known performance measures. A classification is given in Appendix G. Between these models, semi-parametric models were studied for data generating processes arguments and DEA efficiency score correlations (Simar & Wilson, 2007). Another argument was DEA limitations and advantages. These were studied with methodical extensions and transformation of models (Seiford & Thrall, 1990). On a sample of electricity plants, non-parametric models were studied with the bootstrapping methodology which is showing another proof of DEA development in time (Simar & Wilson, 1998). Another counter-view rose from the proportional change requirements of factors used as input and output in DEA models. A contrasting study to both CCR and BCC measures of DEA was a slack based measure of efficiency, which was dealing with excessive input and shortcoming output was proposed to literature (Tone, 2001). Noticing managements' restricted control on some input or output factors, DEA was applied to the fast food sector with special treatments to the limited controlled factors (R. D. Banker & Morey, 1986). It is possible to extend this literature on DEA studies, but it is out of the scope of this study to explain the whole development of DEA. Just to mention, many variations of DEA studies are done in the literature using VRS, CRS or both in many different sectors to many application areas, such as accounting, auditing firms, airports, bank branches, bankruptcy predictions, benefit and cost analysis, community and rural health care, credit risk evaluations, education, elections, environment, financial statements, hotels, hospitals, gas distribution, macro economy, military, municipal services etc., by using several input and output factors (Fried, Lovell, & Schmidt, 2008).

Performance literature is not limited to DEA, so studies related to financial institutions performance and bank performances are going to be addressed here, regardless of the methodology and/or approach they employed.

The IMF programs supporting the effect on East Asian economies' banking sector were studied for the years between 1991 to 2005 in Thailand, Indonesia, Korea and the Philippines. Input oriented DEA was applied using both the CRS and VRS. Also the CRS

super-efficiency model and Tobit regression model were used in this study. The 1997 – 1998 Asia crises found to affect Indonesian banks the most. Thai banks were the most efficient, and the efficiency scores listed Filipino banks as second, Korean banks as third and Indonesian banks as the last. Even though the Asian crisis had a long lasting negative effect, in the post IMF period banks reverted to pre IMF period levels. Another important finding is a insignificant efficiency difference related to restructured and non-restructured banks. “Bank restructuring during a financial crisis is required and justified on efficiency restoration grounds; but importantly, well designed measures are vital to ensure its success.” (Ariff & Can, 2008) (p.185). The study is important for Turkey because, IMF policies are strongly coordinated with the World Bank policies. Kemal Derviş was transferred from World Bank to Turkey, right after 2001 crisis to develop and implement a crisis recovery program.

In the study of Türker Kaya (2001), Turkish banking sector was analyzed with CAMELS analysis for the periods between 1997 and 2000. A worsening of all the components of composite rating is observed from 1997 to 2000. Data set was obtained from the Bank Association of Turkey, which is disclosed to the public. Within the scope of CAMELS analysis, situation of banks are executed with all available criteria important for the banking sector. With this study, rationale of CAMELS analysis is prescribed by a BRSA specialist (Türker Kaya, 2001). BRSA of Turkey utilizes CAMELS rating system, but neither the rating notes nor the methodology is disclosed to the public (Banking Regulation and Supervision Agency, 2011). This situation remains as a gap for the evaluation of performance with CAMELS rating. Another study searching CAMELS analysis support for bank failures and their transfers to SDIF fact found that a prediction of these events are impossible (Çinko & Avcı, 2008). The aim of my study is not finding supportive conclusions for the use of CAMELS rating in the bank failure detection, but my consistent results of ratio analyses and CAMELS rating scores indicate CAMELS rating may signify weaknesses. My study makes difference with the usage of all available data important for the banking sector. Tendency in the use of CAMELS is guesstimated, due to not using all available data because of the structural differences of the banks in the sector with regard to Türker Kaya(2000).

Albayrak and Erkut (2005), studied the financial and non-financial criteria in the Turkish banking sector for the year 2002, by applying analytic hierarchy process approach. Due to banks' classification, service sector firm's evaluation of their performances with only ratio analyses are found to be inadequate (Albayrak & Erkut, 2005).

Macroeconomic and bank specific factors of efficiency in the Turkish banking industry for the 1995 to 2009 period is discussed in line with Demirgüç-Kunt (1999)'s model. The performance criteria of the banking sector are stated as NIM, ROA and ROE. Results show that micro factors are relatively more explanatory than macro factors in the assessment of bank performances (Taşkın, 2011).

For the periods between 2003 - 2008, CRS-DEA and data mining techniques are deployed to the Turkish banking sector data. Total deposits, interest expenses, non-interest expenses are the input factors and total loans, interest income, non-interest income are defined as the output factors. For the data mining analyses financial ratios are defined under clusters. Analyses results showed that total loans to total deposit ratio was found the key determinant of bank performance (Seyrek & Ata, 2010)

By the means of DEA input and output factors, financial sector studies can be listed but they do not fall under a category to be classified as standard input – output factors for the assessment of efficiency. Some studies falling under the efficiency search before 2001 are listed first. Favero and Pappi (1995) used labor, capital and loanable funds as input and loans, securities and non-interest income as output factors for 1991 in Italy. Leaven (1997) used interest expense, labor expense and other operating expenses as input. Output factors were loans and securities for the years between 1992 – 1996 in Korea, Philippines, Thailand and Korea. Saha and Ravishankar (1999) chose to use number of branches, number of staff, establishment expenditure and non-establishment expenditure as input factors, and, deposits, advances, investments, total income are used as output factors for the 1991 – 1995 period in India. Casu and Moleynaux (2000) studied the EU countries, France, Germany, Italy, Spain and UK for the 1993 – 1997 period by using total costs, total deposits as input and loans and other earning assets as output factors. Rezitis (2006) used input factors of labor, capital expenses, deposits and output factors of loans and investment assets for Greece in order to analyze the 1982 – 1997 period. The efficiency search after 2001 and till 2009 are listed secondly. Sing, Sing, Munisamy (2008) studied Asia Pacific

Countries for the year 2006, by using input factors deposits and assets and output factors loans and interest income. Sufian (2009) used deposits, labor and fixed assets as input factors with loans and total income as output factors for Malaysia during the 2001 to 2004 period. Andreis (2010) studied Bulgaria, Czech Republic, Poland, Romania, Slovakia, Slovenia and Hungary for the 2004 – 2008 period by using deposits, fixed assets, operational expenses as input factors and loans, total investments and other incomes as output factors (Diler, 2011).

Particularly in Turkey, Zaim and Etuğrul (1996) study covers the 1981 – 1990 period and input factors are the number of employees, total interest expenses, amortization costs, other expenses, where output factors are the volume of short and long term deposits in Turkish Lira and short and long term loans in Turkish Lira. Jackson, Fethi and İnal (1998) study uses two input factors, which are the number of employees and non-labor operating expenses with output factors loans and deposits for the periods between 1992 - 1996. Işık and Hassan (2003) used loanable funds, labor and capital as input factors and short term loans, long term loans, off balance sheet items and other earning assets as output factors from 1981 to 1990 (Diler, 2011). BRSA uses financial ratios as input and output factors for the purpose of DEA (BDDK/Strateji Geliştirme Daire Başkanlığı, 2010).

In my DEA study, the difference from other studies is made in two dimensions. First by using quarterly data and secondly by selection of data. Input factors are labor, deposits, fixed assets and bank capital; output factors are non-performing loans net, securities, off balance sheet assets and loans. Within the output side, non-performing loans are the undesired ones. There are three hypotheses associated with non-performing loans, bad luck, bad management and skimping (Berger & Mester, 1997). If the reasons of these are impacts of negative shocks, they are assumed as exogenous factors and named with “bad luck”. If non-performing loans are the result of bank’s loan portfolios wrong construction, than it is “bad management”. In the analysis period, political and economic environment are favorable for development and CAMELS rating score associated with management component does not represent any trouble. These two hypotheses are eliminated so that the remaining problem is skimping hypothesis. According to skimping hypothesis, non-performing loans are related to not giving enough effort in control and monitoring of loans.

This may be due to lack of adequate number of trained employees in risk departments in the Turkish banking sector. However, this statement remains unconfirmed.

Shortcomings of performance evaluation with only traditional ratio analyses are addressed in several studies (Aysan & Ceyhan, 2008; Bowlin et al., 1985; Mercan et al., 2003; Ozkan-Gunay & Tektas, 2006), but ratio analyses as a part of performance studies are thought to be irreplaceable either in raw, in supporting format or as a part of a regression like analyses. As an example; ROE, ROA and NIM can be given for profitability and/or efficiency searches (Ariff & Can, 2008; Aygün et al., 2010; Aysan & Ceyhan, 2008; Barros, Managi, & Matousek, 2012; BDDK/Strateji Geliştirme Daire Başkanlığı, 2010; Berger et al., 2000; Berger & Mester, 1997; Bhaumik & Dimova, 2004; Fukuyama & Matousek, 2011; Mester, 1996; Park & Weber, 2006; Sarkar et al., 1998; Tabak & Langsch Tecles, 2010; Taşkın, 2011). Another study includes financial performance index construction to observe ownership mode and effect of scale. This study is done by applying DEA to fundamental financial ratios (Mercan et al., 2003).

Under the performance topic one of the questions addressed is the foreign banks performance amongst others. Around the globe, some studies suggest foreign banks are worse regardless of the period and the country being studied (Berger et al., 2000; Claessens & van Horen, 2011; Das & Ghosh, 2006; Fukuyama & Matousek, n.d.; Sanyal & Shankar, 2011; Sensarma, 2006), and some suggest foreign banks are better (Berger, 2007; Duygun Fethi & Pasiouras, 2010; El-Gamal & Inanoglu, 2005; Fries & Taci, 2005; Fujii, Managi, & Matousek, 2014; Qayyum, Khan, & Ghani, 2006; Sarkar et al., 1998; Staikouras, Mamatzakis, & Koutsomanoli-Filippaki, 2008). Some state that there is no evident performance difference between banks in some cases (Aysan & Ceyhan, 2008; Berger, 2007; Ozkan-Gunay & Tektas, 2006). Some studies link their findings to global banking theories, such as global advantage hypothesis and home field advantage hypothesis, but this study's aim is not to state an opinion for supporting evidence on any of the global banking theories. According to the foreign banks perform better than domestic ones criteria, Austria, Egypt, Italy, Panama, Singapore, Tunisia, Algeria, Indonesia, Kenya, Poland, Slovenia and United States are found to be significantly better. Domestic banks perform better than foreign banks statement found support from Croatia, Luxemburg, Hong Kong and Thailand by being significantly efficient where others are considered as

insignificant. Turkey is not used in this study (Chen & Liao, 2011). Domestic and foreign banks' comparative performance differences are also addressed in other studies. According to Classens et al. (2000), profitability of foreign banks is stated better than domestic banks in developed countries where in developing countries it is not so. According to Hassan and Hunter (1996), in the US foreign banks are observed less efficient than domestic banks. Vennet (1996) and Hassan and Lozani-Vivas (1998) stated efficiency of domestic banks and foreign banks were nearly the same in developed countries, except the US. Yildirim and Philippatos (2002) studied Central and Eastern Europe's transitional economies and found domestic owned private banks and state owned private banks more efficient than foreign banks. Bajaras et al. (2000) stated that domestic banks are less productive than foreign banks in Latin America. Another Latin American case was studied by Crystaletal (2001) and the performance gap between domestic and foreign banks are found very little (Sensarma, 2006). Particularly in Turkey, foreign banks are observed to be less efficient than domestic banks for the years between 1991 to 2007, contrasting with some of the previous studies (Akıncı et al., 2012). Study covering the 1987 – 1990 period stated that foreign banks were performing with better efficiency scores than the state owned banks (Isik & Hassan, 2003). Study covering the 1988 – 1996 period, also declares that domestic banks are outperformed by their competitors foreign banks (Isik & Hassan, 2002). 1989 – 1999 period of study states that the lowest performance in the banking sector belongs to state owned banks (Mercan et al., 2003). My results are in line with Akıncı et al. (2012) and contrasting with others for the updated period between 2001 and 2015.

Classification of the country or countries being studied, reforms in the analysis period, the analysis period, methodology used in the study and the political and historical background of the study environment change performance results significantly (Berg, Forsund, & Jansen, 1992; Berger, 2007; Bhattacharyya, Lovell, & Sahay, 1997; Bhaumik & Dimova, 2004; Das & Ghosh, 2006; Demir, Syed, & Babuşçu, 2005; Denizler, Dinc, & Tarimcilar, 2007).

3. RATIO ANALYSES

The data source of the banking system in Turkey, which consists of deposit banks, development and investment banks, state owned deposit banks, privately owned deposit banks, foreign banks and banks under the management of fund is the Banks Association of Turkey. Related quarterly data downloaded for 2001 to 2014 period to construct the bare bones of DuPont analysis. Yearly grand averages are calculated from these data. While conducting ratio analyses, average of balance sheet data is used. Reason for this is that a balance sheet data is a photo in time, whereas income statement covers a period. By using averages I tried to create a more representative figure for the period. Secondly, accounting data used in the analyses may not follow all the same procedures, but using cumulative data of a branch avoids this threat. The nature of DuPont analysis makes it possible to compare ratios one by one and this leads to a safer decision making. By seeing ratios individually reason for the changes can be observed in a better way. Data collection in the study is large and complex so for the ratio analyses, in order to increase functionality and the readability, a codebook is developed which allows extension and integration to future software programs. For the construction of this codebook same rationale behind Guide to Codebooks (ICPSR/University of Michigan, 2011) is followed. For the ratio analyses, in order to increase readability the codebook is given as follows:

Table 2 Codebook

Code	Definitions
I	Income Statement - Total Interest (Profit Share Income) Income (million TL)-Total
J	Income Statement - Total Interest (Profit Share Paid) Expenses (million TL)-Total
K	Income Statement - Total Non Interest (Other) Income (million TL)-Total
L	Income Statement - Provision for General Loan Losses (million TL)-Total
M	Income Statement - Taxes, Duties, Charges and Funds (million TL)-Total
N	Income Statement - Total Non Interest (Other) Expenses (million TL)-Total
O	Income Statement - Capital Market Transactions Profits (Losses) (Net) (million TL)-Total
P	Balance Sheet - Total Assets (million TL)-Total
Q	Balance Sheet - Total Shareholders' Equity (million TL)-Total
1	The Banking System in Turkey Or Sector
2	Deposit Banks or Deposit

Code	Definitions
3	Development and Investment Banks or Development & Investment
4	State-owned Deposit Banks or Deposit-State
5	Privately-owned Deposit Banks or Deposit-Domestic Private
6	Foreign Banks or Foreign
7	Banks Under the Deposit Insurance Fund
#	Number
v	Monetary
@	Average

According to this table; “vO1” represents Turkish banking sectors’ capital market transactions profits (losses) in Turkish Lira, code shows that the data is monetary with “v” and it’s about capital market transactions with “O” and it’s about the banking system in Turkey with “1”. Another example, “vP2” represents Deposit banks total assets in Turkish lira form, code shows that the data is monetary with “v” and it represents total assets with “P” and it represents the deposit banks with “2”. Further examples can be given by the combinations of these. v, # are used first; letters come second and numbers come in the third place to make a meaningful code of three. If average data is used @ comes between the first and second codes and a code of four is made.

3.1. Introduction to Ratios

In this part ratios are shown to demonstrate the analyses:

$$ROE = \frac{NI}{AverageTE} \quad (3.1.1)$$

The most well-known and generally used performance measures are return on equity and return on assets. However, without looking into details of these measures one may not know why these ratios differ from other firms. In finance, risk and return are key features and by only looking at these measures decision makers cannot see the risk side as well as the return side. To have a complete insight, return on equity, which is calculated by dividing net income to average total equity, as in equation (3.1.1), should be composed into its components.

$$ROE = ROA \times EM = \frac{NI}{AverageTA} \times \frac{AverageTA}{AverageTE} \quad (3.1.2)$$

Also, return on equity is calculated by multiplying return on assets with equity multiplier. Return on assets is calculated by dividing net income to average total assets. This ratio shows the income generated over firms' assets. Equity multiplier is calculated by dividing average total assets to average total equity. Equity multiplier reflects debt financing to shareholders equity in such a way that total equity is formed with the combination of either with debt financing or stockholders financing. Therefore, equity multiplier is the sign of financial leverage and it does not only show profitability but also shows risk. See equation (3.1.2). There is no generally accepted definition for all of the ratios in finance. In this study in order to ignore the income that a firm has generated for debt investors, net income is divided to average total assets. If I wanted to observe this feature, earnings before interests and taxes (EBIT) should be divided to total assets.

$$NI = NII - Burden - PLL + SG - T \quad (3.1.3)$$

Net income is calculated by subtracting burden, provision for loan losses (PLL) and taxes(T) and adding realized security gains or losses(SG) to net interest income (NII). This calculation is shown in equation (3.1.3).

$$NI = (II - IE) - (OE - OI) - PLL + SG - T \quad (3.1.4)$$

In equation (3.1.4), net interest income is calculated by subtracting interest expenses(IE) from interest incomes(II). Burden is calculated by subtracting non-interest income(OI) from non-interest expenses(OE). By this expression we mean that net income is related to assets and liabilities. This implies that the composition of assets and liabilities affects net income. There may be many assets and liabilities in the portfolio, so they are noted with "i" and "j" respectively. With the notions, y_i , yields of earning assets before taxes and c_j , interest costs of liabilities, A_i , monetary values of assets and the L_j , monetary values of liabilities, we can express net income to show the importance of portfolio composition as follows:

$$NI = \sum_{i=1}^n y_i A_i - \sum_{j=1}^m c_j L_j - Burden - PLL + SG - T \quad (3.1.5)$$

If one needs a detailed research about reasons of net income fluctuations of a firm, expression given in equation (3.1.5) can be used. I prefer to use equation (3.1.4) in this study, because using consolidated data limits the usage of expression in equation (3.1.5).

$$NI = Total\ Revenue - Total\ Operating\ Expense - Taxes \quad (3.1.6)$$

Net income can be expressed as in equation (3.1.6) to show further decomposition of return on equity and return on assets. Total Revenue(TR) is the summation of interest income, operating income and realized security gains or losses. Total operating expenses(EXP) is the summation of interest expenses, non-interest expenses and provision for loan losses. This expression implies decomposition of return on assets. Return on assets is a function of expense ratio(ER), asset utilization(AU) and tax ratio.

$$ER = \frac{EXP}{AverageTA} = \frac{IE}{AverageTA} + \frac{OE}{AverageTA} + \frac{PLL}{AverageTA} \quad (3.1.7)$$

Expense ratio can be calculated as in equation (3.1.7). It's the combination of three ratios, which are interest expense ratio, non-interest expense ratio and provision for loan losses ratio. A higher ratio shows a harder situation to control expenses, therefore less efficiency in controlling them. Vice versa is applicable.

$$AU = \frac{TR}{AverageTA} = \frac{II}{AverageTA} + \frac{OI}{AverageTA} + \frac{SG}{AverageTA} \quad (3.1.8)$$

Asset utilization can be calculated as in (3.1.8). This ratio shows how much income a firm generates from its assets.

$$Tax\ Ratio = \frac{Applicable\ Income\ Taxes}{AverageTA} \quad (3.1.9)$$

Tax ratio can be calculated as in equation (3.1.9). If I rearrange equation (3.1.6) to express ROA in terms of equation (3.1.7), (3.1.8) and (3.1.9); equation (3.1.10) can be obtained.

$$ROA = \frac{NI}{AverageTA} = \frac{TR}{AverageTA} - \frac{EXP}{AverageTA} - \frac{Taxes}{AverageTA} \quad (3.1.10)$$

$$ROA = AU - ER - Tax\ Ratio \quad (3.1.11)$$

Simpler design of equation (3.1.10) is shown in equation (3.1.11)

Burden ratio shows non-interest expenses coverage by non-interest income as a ratio of average total assets and its calculation is in equation (3.1.12). This ratio is important, because it shows service charges, fees, security gains etc., which generates an income to cover the non-interest expenses.

$$\text{Burden Ratio} = \frac{(\text{Noninterest expense} - \text{Noninterest income})}{\text{AverageTA}} \quad (3.1.12)$$

Efficiency ratio(EFF) shows how a bank controls non-interest expenses relative to net interest incomes and non interest incomes. Calculation of an efficiency ratio is in equation (3.1.13)

$$\text{Efficiency ratio} = \frac{\text{Non interest expenses}}{\text{Net interest income} + \text{Non interest income}} \quad (3.1.13)$$

Important notice about ratio analyses: First of all, I must mention a type of DuPont analysis is made with minor touches to fit the system to banking sector data. While conducting ratio analyses, average of balance sheet data is used. Reason for this is that a balance sheet data is a photo in time, whereas income statement covers a period. By using averages, I tried to create a more representative figure for the period. Secondly, accounting data used in the analyses may not follow all the same procedures but using cumulative data of a branch ignores this threat. The nature of DuPont analysis makes it possible to compare ratios one by one and this leads to a safer decision making. By seeing ratios individually, reason for the changes can be observed in a better way.

3.2. Ratio Analyses Data and Methodology

After this introduction, it is time to explain how code book is used to calculate these ratios in my analyses. Data are available in Appendix A. Ratio analyses in banking sector play a vital role on performances. Data source of the banking system in Turkey, deposit banks, development and investment banks, state owned deposit banks, privately owned deposit banks, foreign banks and banks under the management of fund is the Banks Association of Turkey. A type of DuPont analysis is made with minor touches to fit the system to banking sector data as seen in the Figure 2 (Koch & MacDonald, 2015). Related quarterly data downloaded for the 2001 to 2014 period to construct the bare bones of DuPont analysis.

Yearly grand averages are calculated from these data. A graphical illustration of DuPont scheme is given as follows:

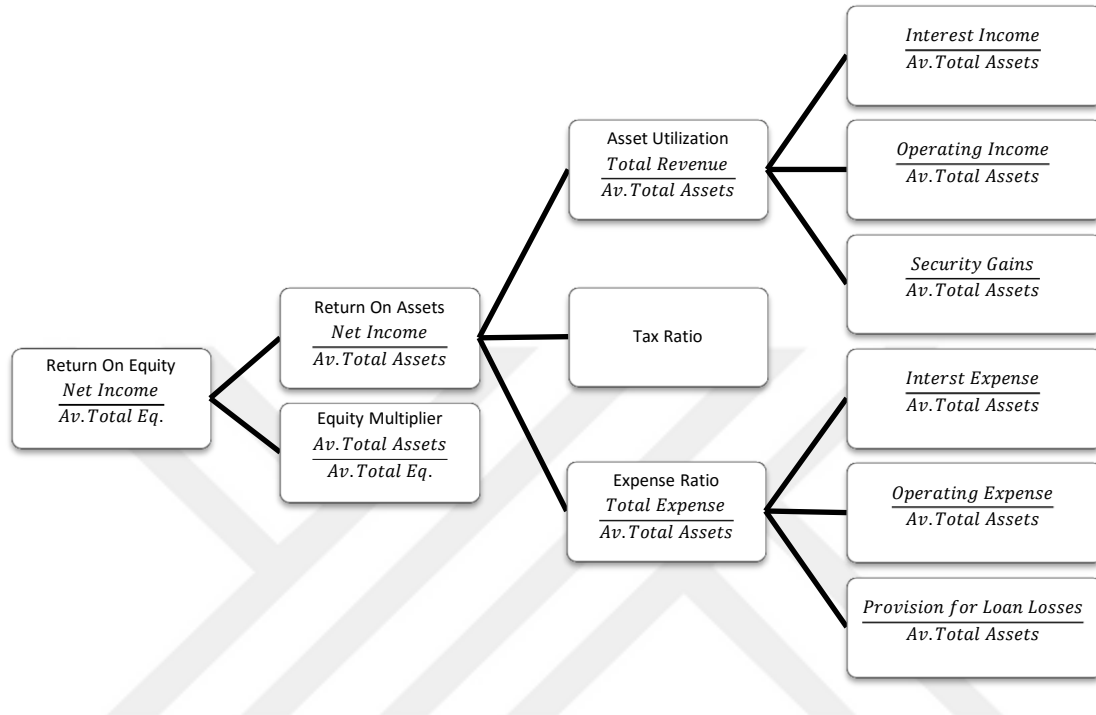


Figure 2 DuPont Scheme

According to illustration calculations are given below.

For the Banking sector in Turkey analyses are done according to the following pattern.

$$ROE1 = [vI1 + vK1 + vO1 - (vJ1 + vN1 + vL1) - vM1] / v@Q1$$

$$ROA1 = [vI1 - vJ1 - (vN1 - vK1) - vL1 + vO1 - vM1] / v@P1$$

$$EM1 = v@P1 / v@Q1$$

$$NI1 = vI1 - vJ1 - (vN1 - vK1) - vL1 + vO1 - vM1$$

$$NII1 = vI1 - vJ1$$

$$\text{Burden1} = vN1 - vK1$$

$$PLL1 = vL1$$

$$SG1 = vO1$$

$$T1 = vM1$$

$$AU1 = (vI1 + vK1 + vO1)/v@P1$$

$$ER1 = (vJ1 + vN1 + vL1)/v@P1$$

$$TR1 = vI1 + vK1 + vO1$$

$$EXP1 = vJ1 + vN1 + vL1$$

$$BURDEN\ RATIO1 = (vN1 - vK1)/v@P1$$

$$EFF1 = vN1/[(vI1-vJ1)+vK1]$$

For the Deposit banks in Turkey analyses are done according to the following pattern.

$$ROE2 = [vI2 + vK2 + vO2 - (vJ2 + vN2 + vL2) - vM2]/v@Q2$$

$$ROA2 = [vI2 - vJ2 - (vN2 - vK2) - vL2 + vO2 - vM2]/v@P2$$

$$EM2 = v@P2/v@Q2$$

$$NI2 = vI2 - vJ2 - (vN2 - vK2) - vL2 + vO2 - vM2$$

$$NII2 = vI2 - vJ2$$

$$Burden2 = vN2 - vK2$$

$$PLL2 = vL2$$

$$SG2 = vO2$$

$$T2 = vM2$$

$$AU2 = (vI2 + vK2 + vO2)/v@P2$$

$$ER2 = (vJ2 + vN2 + vL2)/v@P2$$

$$TR2 = vI2 + vK2 + vO2$$

$$EXP2 = vJ2 + vN2 + vL2$$

$$\text{BURDEN RATIO2} = (\text{vN2} - \text{vK2})/\text{v@P2}$$

$$\text{EFF2} = \text{vN2}/[(\text{vI2}-\text{vJ2})+\text{vK2}]$$

For the development and investment banks in Turkey analyses are done according to the following pattern.

$$\text{ROE3} = [\text{vI3} + \text{vK3} + \text{vO3}-(\text{vJ3}+\text{vN3}+\text{vL3})-\text{vM3}]/\text{v@Q3}$$

$$\text{ROA3} = [\text{vI3}-\text{vJ3}-(\text{vN3}-\text{vK3})-\text{vL3}+\text{vO3}-\text{vM3}]/\text{v@P3}$$

$$\text{EM3} = \text{v@P3}/\text{v@Q3}$$

$$\text{NI3} = \text{vI3}-\text{vJ3}-(\text{vN3}-\text{vK3})-\text{vL3}+\text{vO3}-\text{vM3}$$

$$\text{NII3} = \text{vI3} - \text{vJ3}$$

$$\text{Burden3} = \text{vN3} - \text{vK3}$$

$$\text{PLL3} = \text{vL3}$$

$$\text{SG3} = \text{vO3}$$

$$\text{T3} = \text{vM3}$$

$$\text{AU3} = (\text{vI3} + \text{vK3} + \text{vO3})/\text{v@P3}$$

$$\text{ER3} = (\text{vJ3} + \text{vN3} + \text{vL3})/\text{v@P3}$$

$$\text{TR3} = \text{vI3} + \text{vK3} + \text{vO3}$$

$$\text{EXP3} = \text{vJ3} + \text{vN3} + \text{vL3}$$

$$\text{BURDEN RATIO3} = (\text{vN3} - \text{vK3})/\text{v@P3}$$

$$\text{EFF3} = \text{vN3}/[(\text{vI3}-\text{vJ3})+\text{vK3}]$$

For the state owned deposit banks in Turkey analyses are done according to the following pattern.

$$\text{ROE4} = [\text{vI4} + \text{vK4} + \text{vO4}-(\text{vJ4}+\text{vN4}+\text{vL4})-\text{vM4}]/\text{v@Q4}$$

$$\text{ROA4} = [\text{vI4}-\text{vJ4}-(\text{vN4}-\text{vK4})-\text{vL4}+\text{vO4}-\text{vM4}]/\text{v@P4}$$

$$EM4 = v@P4/v@Q4$$

$$NI4 = vI4-vJ4-(vN4-vK4)-vL4+vO4-vM4$$

$$NII4 = vI4 - vJ4$$

$$Burden4 = vN4 - vK4$$

$$PLL4 = vL4$$

$$SG4 = vO4$$

$$T4 = vM4$$

$$AU4 = (vI4 + vK4 + vO4)/v@P4$$

$$ER4 = (vJ4 + vN4 + vL4)/v@P4$$

$$TR4 = vI4 + vK4 + vO4$$

$$EXP4 = vJ4 + vN4 + vL4$$

$$BURDEN RATIO4 = (vN4 - vK4)/v@P4$$

$$EFF4 = vN4/[(vI4-vJ4)+vK4]$$

For the privately owned deposit banks in Turkey analyses are done according to the following pattern.

$$ROE5 = [vI5 + vK5 + vO5-(vJ5+vN5+vL5)-vM5]/v@Q5$$

$$ROA5 = [vI5-vJ5-(vN5-vK5)-vL5+vO5-vM5]/v@P5$$

$$EM5 = v@P5/v@Q5$$

$$NI5 = vI5-vJ5-(vN5-vK5)-vL5+vO5-vM5$$

$$NII5 = vI5 - vJ5$$

$$Burden5 = vN5 - vK5$$

$$PLL5 = vL5$$

$$SG5 = vO5$$

$$T5 = vM5$$

$$AU5 = (vI5 + vK5 + vO5)/v@P5$$

$$ER5 = (vJ5 + vN5 + vL5)/v@P5$$

$$TR5 = vI5 + vK5 + vO5$$

$$EXP5 = vJ5 + vN5 + vL5$$

$$BURDEN\ RATIO5 = (vN5 - vK5)/v@P5$$

$$EFF5 = vN5/[(vI5-vJ5)+vK5]$$

For the foreign banks in Turkey analyses are done according to the following pattern.

$$ROE6 = [vI6 + vK6 + vO6 - (vJ6 + vN6 + vL6) - vM6]/v@Q6$$

$$ROA6 = [vI6 - vJ6 - (vN6 - vK6) - vL6 + vO6 - vM6]/v@P6$$

$$EM6 = v@P6/v@Q6$$

$$NI6 = vI6 - vJ6 - (vN6 - vK6) - vL6 + vO6 - vM6$$

$$NII6 = vI6 - vJ6$$

$$Burden6 = vN6 - vK6$$

$$PLL6 = vL6$$

$$SG6 = vO6$$

$$T6 = vM6$$

$$AU6 = (vI6 + vK6 + vO6)/v@P6$$

$$ER6 = (vJ6 + vN6 + vL6)/v@P6$$

$$TR6 = vI6 + vK6 + vO6$$

$$EXP6 = vJ6 + vN6 + vL6$$

$$\text{BURDEN RATIO6} = (vN6 - vK6)/v@P6$$

$$\text{EFF6} = vN6/[(vI6-vJ6)+vK6]$$

3.2.1. Ratio Analyses Findings:

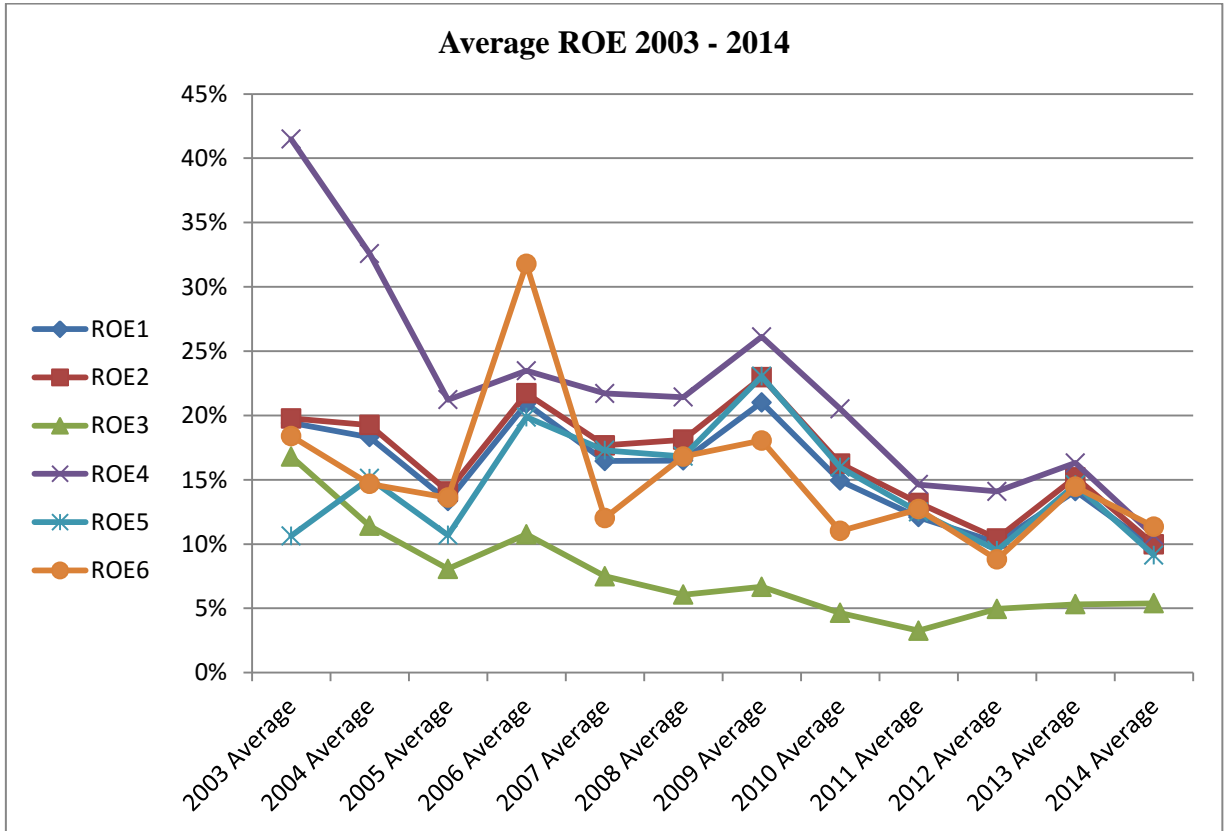


Figure 3 Average ROE in 2003 - 2014

The sector has a declining trend line with $y = -0.0074x + 0.2038$ equation throughout the analysis period. Deposit banks have the same slope with the equation $y = -0.0074x + 0.2137$. Development and investment banks fall more than the sector and the deposit banks with the equation $y = -0.0087x + 0.1319$. When we look at the break of deposit banks, state owned banks ROE fall more than privately owned deposit banks and foreign banks. State owned deposit banks, privately owned deposit banks and foreign banks equations are sequentially found as follows. $y = -0.0202x + 0.3517$; $y = -0.0022x + 0.1604$; $y = -0.0074x + 0.2009$. The main reason of this step fall is, because at the beginning of the analyses state owned deposit banks have ROE higher than any compared unit. There is a step rise in 2006 following a steep fall in ROE of foreign banks. Table 12 shows changes in ROE from period to period by comparing the same period from the year before.

Table 3 Changes in ROE

	deltaROE1	deltaROE2	deltaROE3	deltaROE4	deltaROE5	deltaROE6
2007/12	-0.1814	-0.1763	-0.1470	-0.1171	-0.0917	-0.5516
2007/9	-0.2345	-0.2126	-0.2687	-0.1265	-0.1298	-0.7042
2007/6	-0.2981	-0.2450	-0.4576	0.0010	-0.2021	-0.7319
2007/3	-0.0284	0.0323	-0.4555	0.1541	-0.0774	0.4629
2006/12	0.5646	0.5837	0.0842	0.1373	1.0629	1.0166
2006/9	0.7830	0.7884	0.2144	0.1725	1.4331	1.4439
2006/6	0.6141	0.5095	0.8494	0.0899	0.5849	2.7144
2006/3	0.0438	-0.0025	0.7316	-0.1690	0.1364	-0.2570
2005/12	-0.3482	-0.3502	-0.3118	-0.3982	-0.4007	-0.2420
2005/9	-0.3801	-0.3847	-0.3201	-0.3891	-0.4975	0.0065
2005/6	-0.1428	-0.1329	-0.2161	-0.3070	-0.0639	-0.0975
2005/3	0.2220	0.2603	-0.2632	0.0440	0.3997	0.5454

An example to deltaROE calculations in Table 3 is, 2007/3 ROE1 is subtracted from 2006/3 ROE1 and the result is divided to 2006/3 ROE1. Each of the compared units have a similar rise and fall trend through 2005 – 2007, but it is visually sharp for foreign banks. Ratio calculations are sensitive to last period values. ROE is calculated as in equation (3.1.1). In 2006, ROE6 component NI6 increased about 4 times the 2005 average value whereas in the same period ROE1 to ROE5 components NI1 to NI5 values increased about 1.2 times to 2 times the value, generating this sharp visual. Another important determinant is $v@Q6$ which represents average total equity. $v@Q1$ to $v@Q5$ increased 1.06 to 1.20 times in 2006 and in 2007 1.11 to 1.21 times, whereas $v@Q6$ increased 1.7 times in 2006 and about 2 times in 2007.

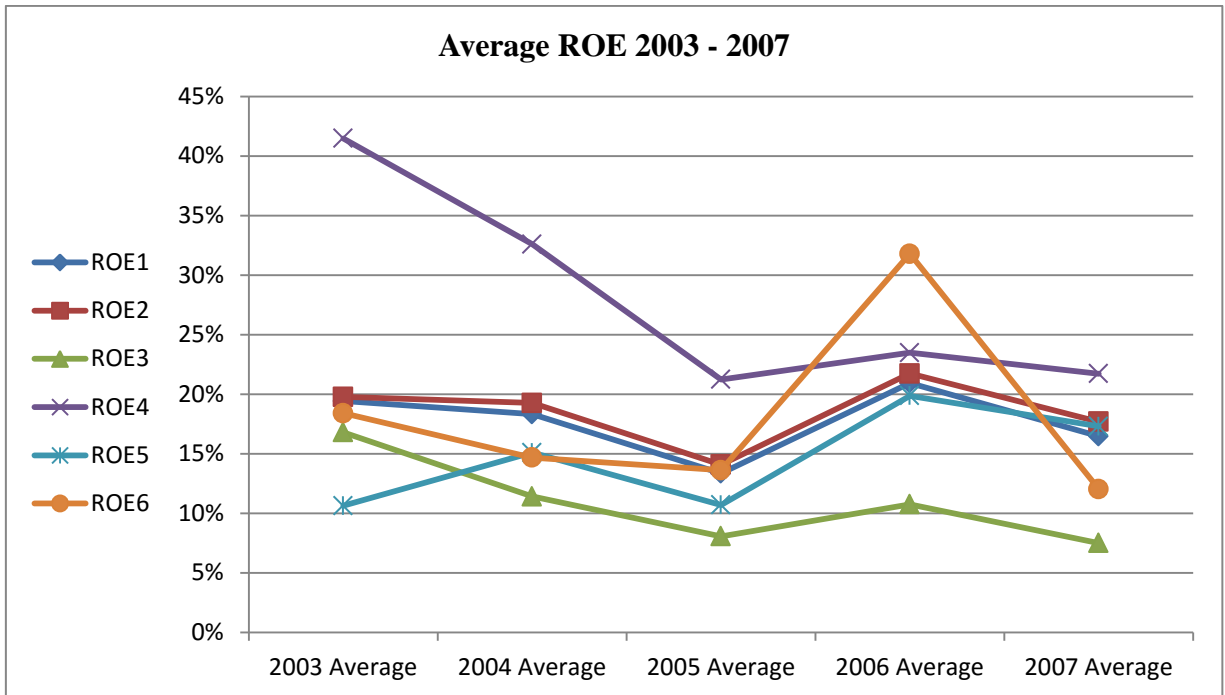


Figure 4 Average ROE in 2003 - 2007

In order to capture the effects of the 2008 crisis' pre-crisis period, crisis and post crisis periods are given. Before the 2008 crisis, the banking sectors' trend line equation is $y = -0.0033x + 0.1868$. Deposit banks trend line equation is $y = -0.0017x + 0.1901$. Development and investment banks' trend line equation is $y = -0.0193x + 0.1669$. State owned deposit banks' trend line equation is $y = -0.0486x + 0.4269$. Privately owned banks' trend line equation is $y = 0.0181x + 0.0929$. Foreign banks' trend line equation is $y = 0.0044x + 0.1679$. Pre-crisis period decline in the sector is lower than the overall period decline. In specific, development and investment banks decline in this pre-crisis period is significantly higher than the post crisis period. The steep rise and fall in 2006 are explained above, so it is not going to be repeated here again.

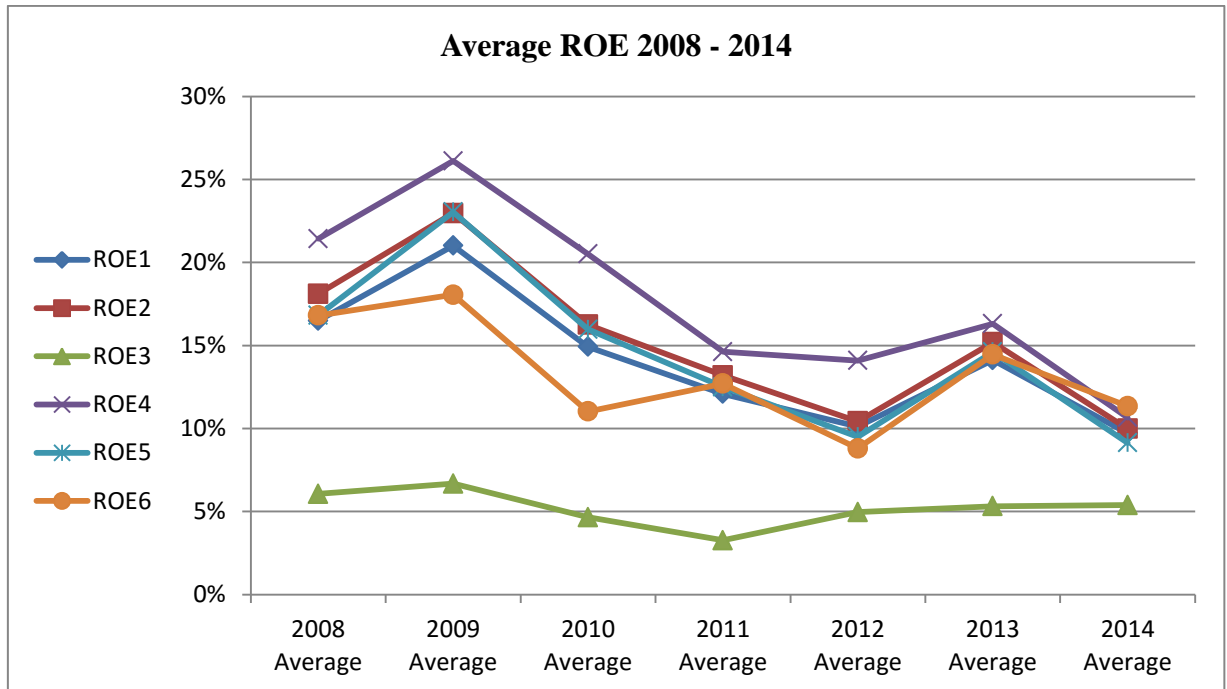


Figure 5 Average ROE in 2008 - 2014

After the 2008 crisis, the banking sectors' trend line equation is $y = -0.0139x + 0.1963$. Deposit banks' trend line equation is $y = -0.0163x + 0.217$. Development and investment banks' trend line equation is $y = -0.0016x + 0.0582$. State owned deposit banks' trend line equation is $y = -0.0208x + 0.2601$. Privately owned banks' trend line equation is $y = -0.0166x + 0.2114$. Foreign banks' trend line equation is $y = -0.0092x + 0.17$. Development and investment banks' ROE shows almost a stable trend in this period at about 5%. At the beginning of this sub period other ROE's are about 20% and sub period is ending about 10%.

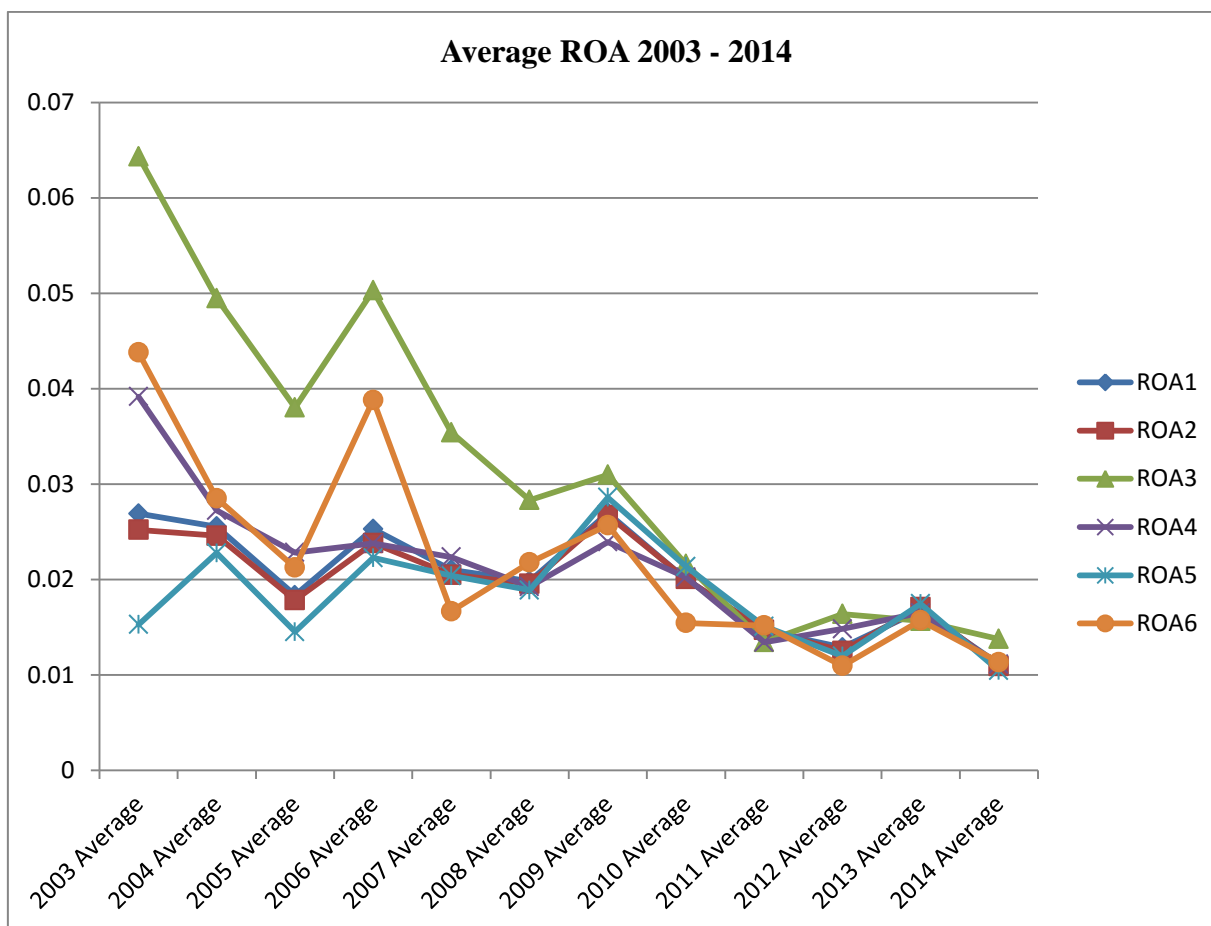


Figure 6 Average ROA in 2003 - 2014

The sector has a declining trend with the equation $y = -0.0012x + 0.0277$ throughout the period. Trend line equations of deposit banks, development and investment banks, state owned deposit banks, privately owned deposit banks and foreign banks are sequentially $y = -0.0011x + 0.0263$; $y = -0.0043x + 0.0596$; $y = -0.0018x + 0.0329$; $y = -0.0005x + 0.0215$; $y = -0.0023x + 0.0372$. According to these findings, development and investment banks fall more than the banking sector with foreign banks and state owned deposit banks. Privately owned deposit banks have declined less than the banking sector average and therefore covering the deposit banks' overall fall. Development and investment banks have the highest ROA in the beginning period, so effect of the decline can be seen clearer than others. As in ROE's ROA's have a steep rise and fall between 2005 and 2007. One of the ROA calculations is given in equation (3.1.10). In 2006, ROA6 component NI6 increased about 4 times the 2005 average value, whereas in the same period ROA1 to ROA5 components NI1 to NI5 values increased about 1.2 times to 2 times the value, generating this sharp visual. From the denominator side development and investment banks have about 1/30th of the banking sector assets resulting in a relatively small change in the value

of average assets, causing higher volatility in the ROA. This explains the development and investment banks' change in the graph clearly.

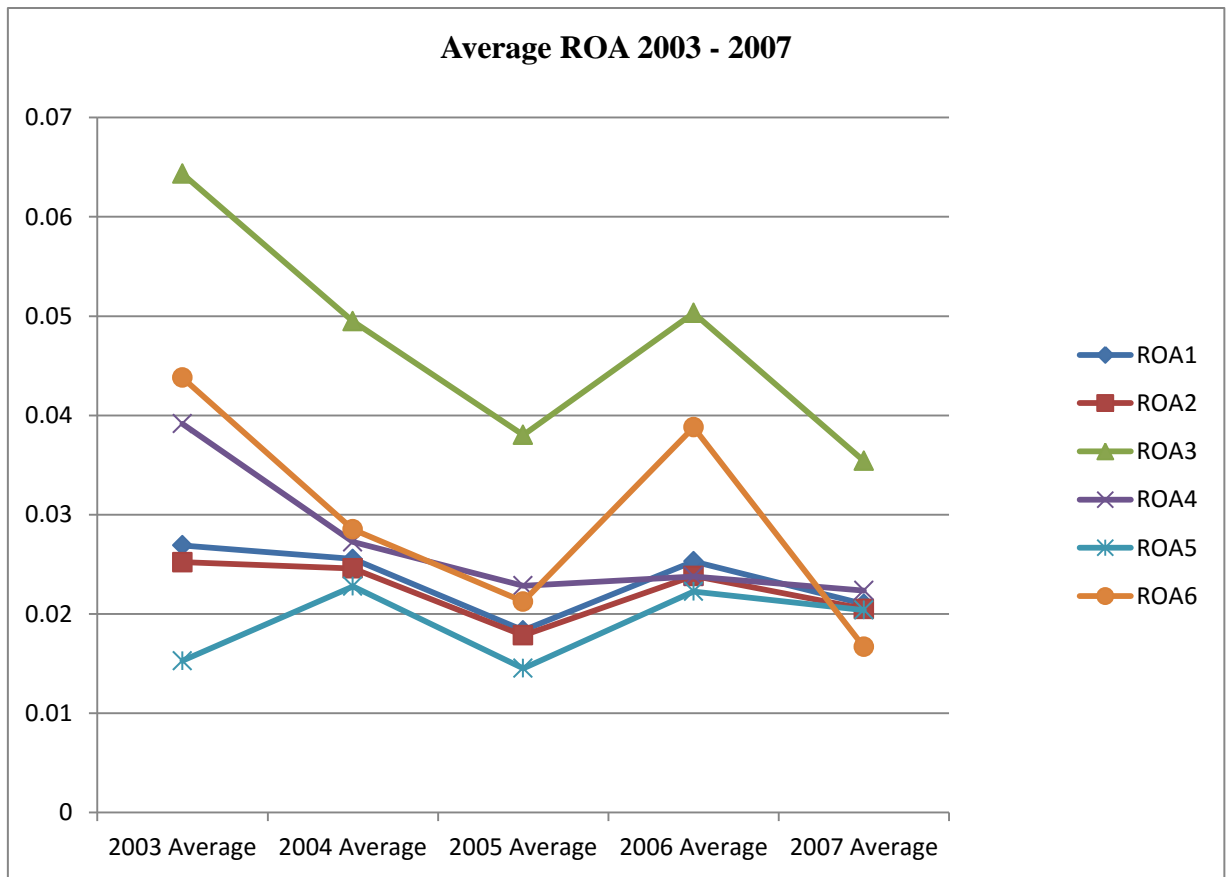


Figure 7 Average ROA in 2003 - 2007

Before the 2008 crisis, the banking sectors' trend line equation is $y = -0.0012x + 0.027$. Deposit banks' trend line equation is $y = -0.001x + 0.0255$. Development and investment banks' trend line equation is $y = -0.0057x + 0.0646$. State owned deposit banks' trend line equation is $y = -0.0037x + 0.0382$. Privately owned banks' trend line equation is $y = 0.001x + 0.0161$. Foreign banks' trend line equation is $y = -0.0044x + 0.043$.

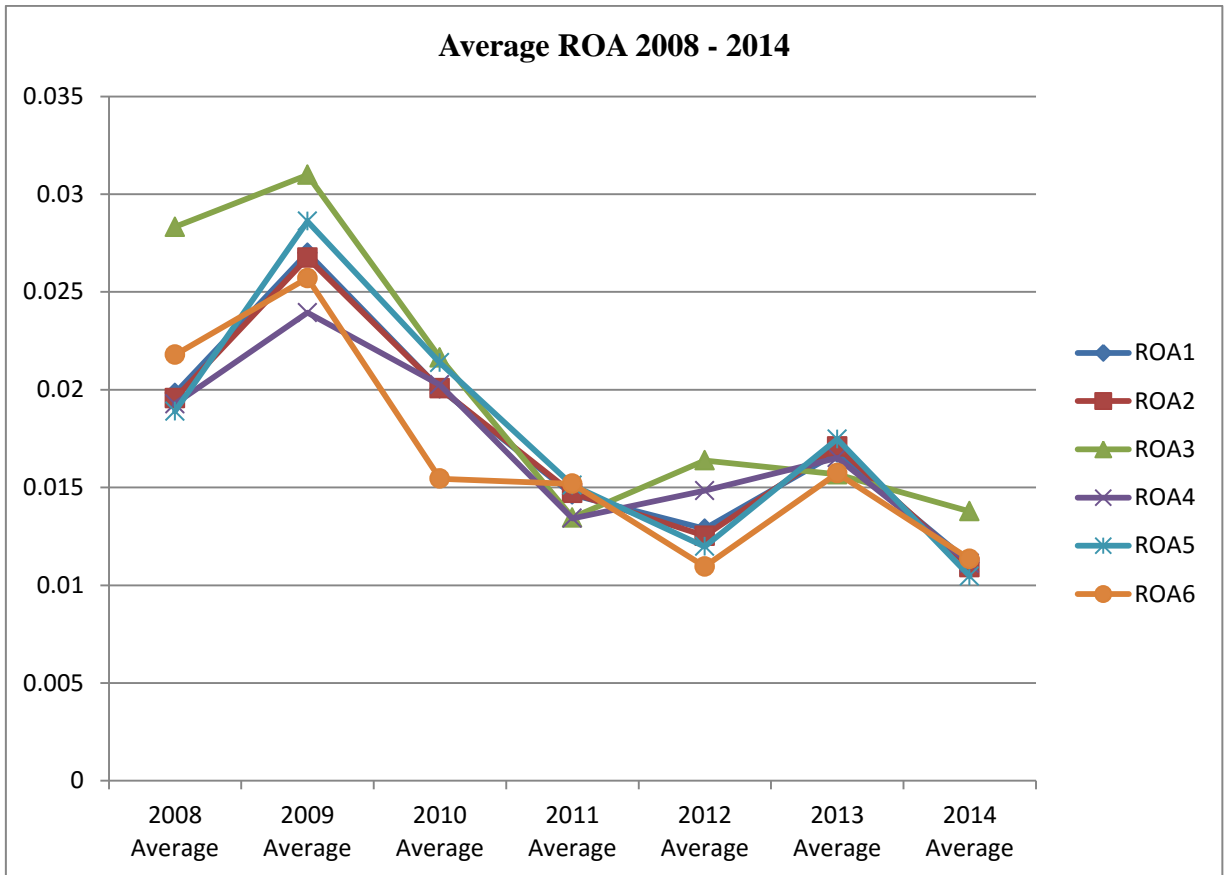


Figure 8 Average ROA in 2008 - 2014

After the 2008 crisis, the banking sectors' trend line equation is $y = -0.0019x + 0.0251$. Deposit banks' trend line equation is $y = -0.0019x + 0.0249$. Development and investment banks' trend line equation is $y = -0.0028x + 0.0314$. State owned deposit banks' trend line equation is $y = -0.0016x + 0.0234$. Privately owned banks' trend line equation is $y = -0.002x + 0.0258$. Foreign banks' trend line equation is $y = -0.002x + 0.0246$. Average decline is higher in the sector after the 2008 crisis.

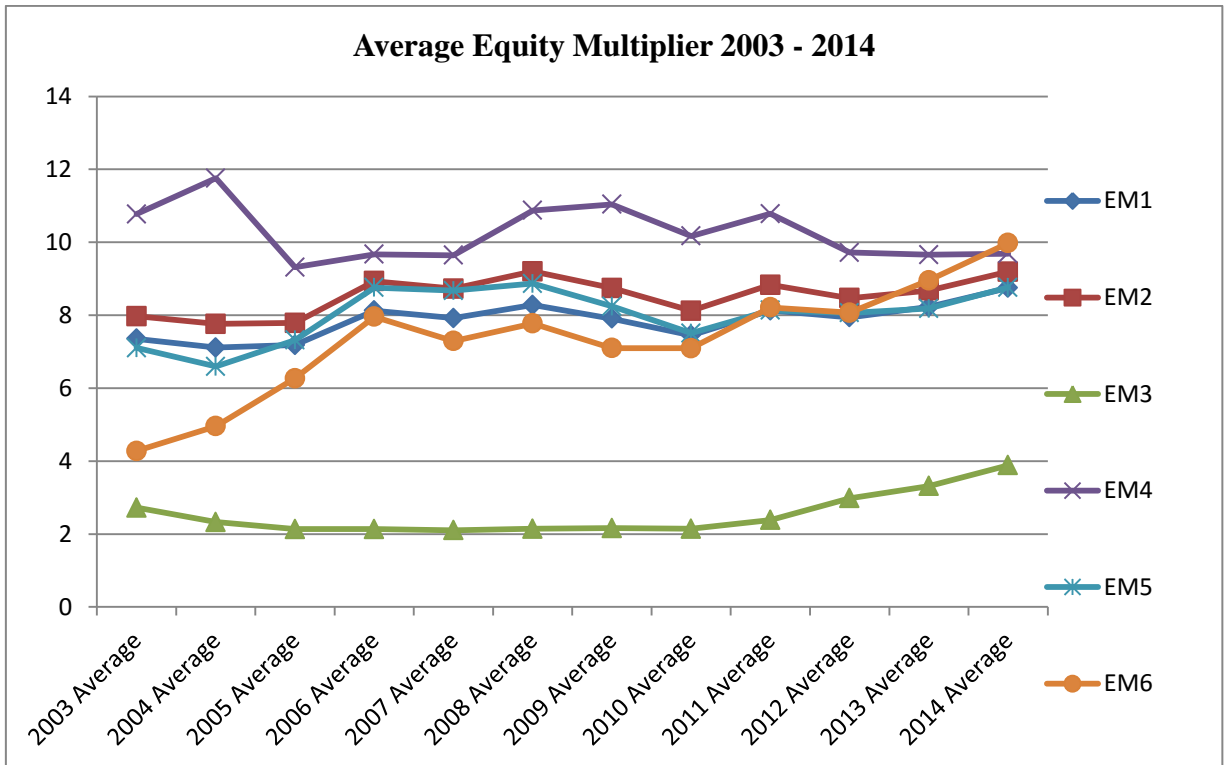


Figure 9 Average EM in 2003 - 2014

Equity multiplier calculation is given in equation (3.1.2). Both the numerator and the denominator rose in the period, but when the ratio is considered state owned deposit banks follow a declining trend line, whereas the others are in increasing trends. Sector has an increasing trend with the equation $y = 0.1012x + 7.2066$ throughout the period. Trend line equations of deposit banks, development and investment banks, state owned deposit banks, privately owned deposit banks and foreign banks are sequentially $y = 0.0825x + 7.9983$; $y = 0.1014x + 1.8774$; $y = -0.0724x + 10.727$; $y = 0.1068x + 7.3222$; $y = 0.3891x + 4.7984$. According to findings, in average the equity multiplier of foreign banks increased the most.

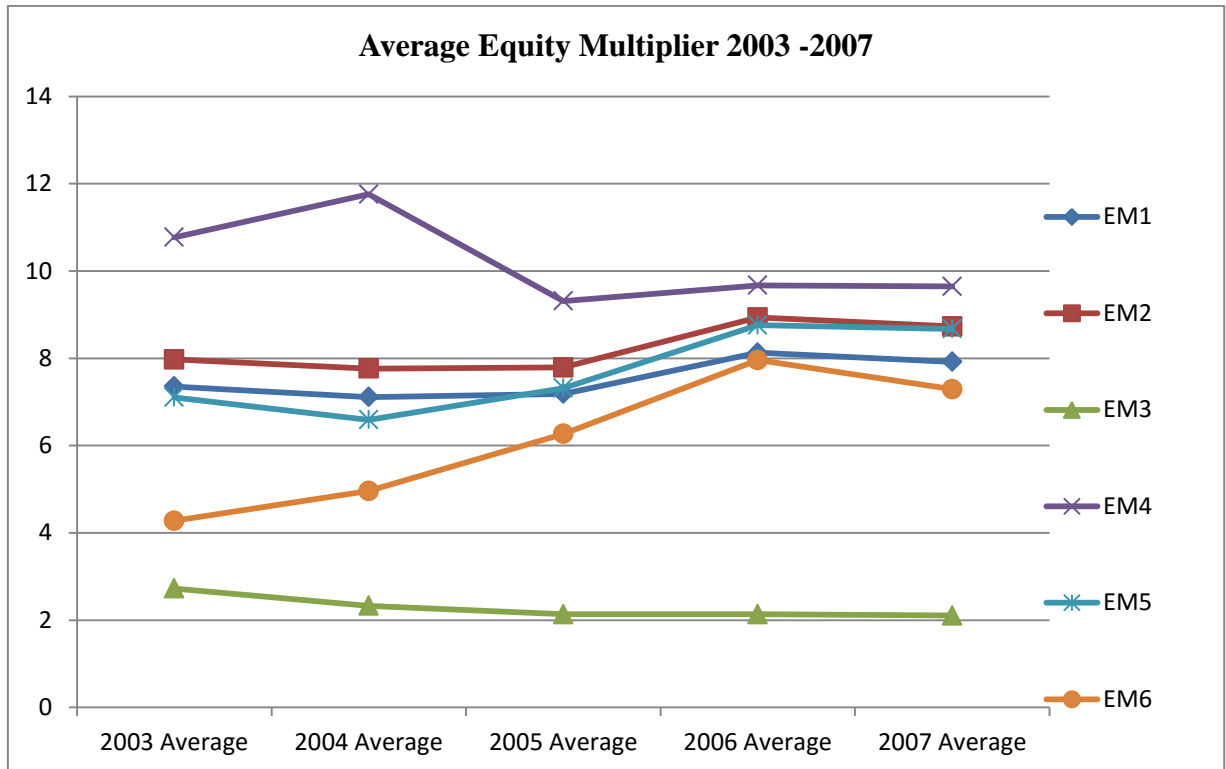


Figure 10 Average EM in 2003 - 2007

Before the 2008 crisis, the banking sectors' trend line equation is $y = 0.2142x + 6.896$. Deposit banks' trend line equation is $y = 0.2679x + 7.4332$. Development and investment banks' trend line equation is $y = -0.1434x + 2.7145$. State owned deposit banks' trend line equation is $y = -0.4335x + 11.532$. Privately owned banks' trend line equation is $y = 0.5304x + 6.0967$. Foreign banks' trend line equation is $y = 0.9031x + 3.4411$. In this period, an increase in average total assets with respect to average total equity was lower for development and investment banks, resulting in a declining trend.

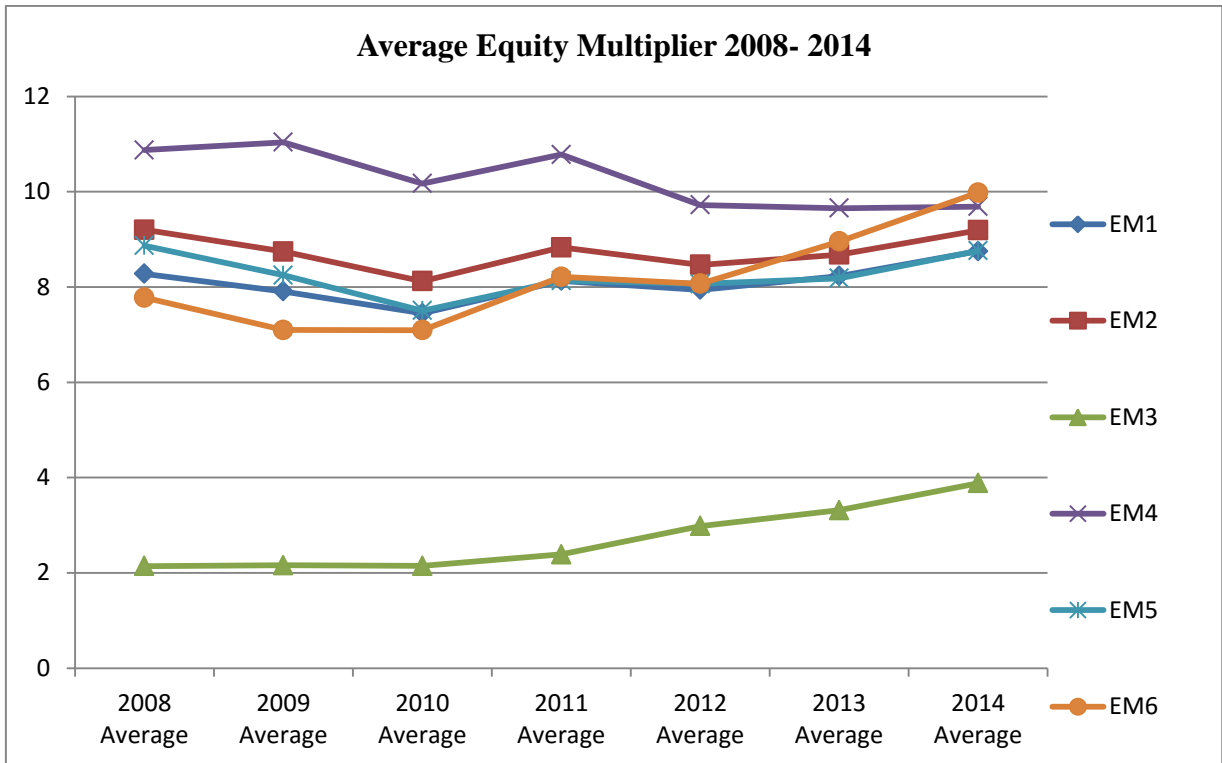


Figure 11 Average EM in 2008 - 2014

After the 2008 crisis, the banking sectors' trend line equation is $y = 0.0911x + 7.7328$. Deposit banks' trend line equation is $y = 0.0068x + 8.7201$. Development and investment banks' trend line equation is $y = 0.2989x + 1.5209$. State owned deposit banks' trend line equation is $y = -0.242x + 11.243$. Privately owned banks' trend line equation is $y = 0.0041x + 8.235$. Foreign banks' trend line equation is $y = 0.4034x + 6.555$. Pre-crisis periods increase in average total assets with respect to average total equity changed for the development and investment banks, resulting in an increasing trend. State owned deposit banks' equity multiplier decline slows down in this period.

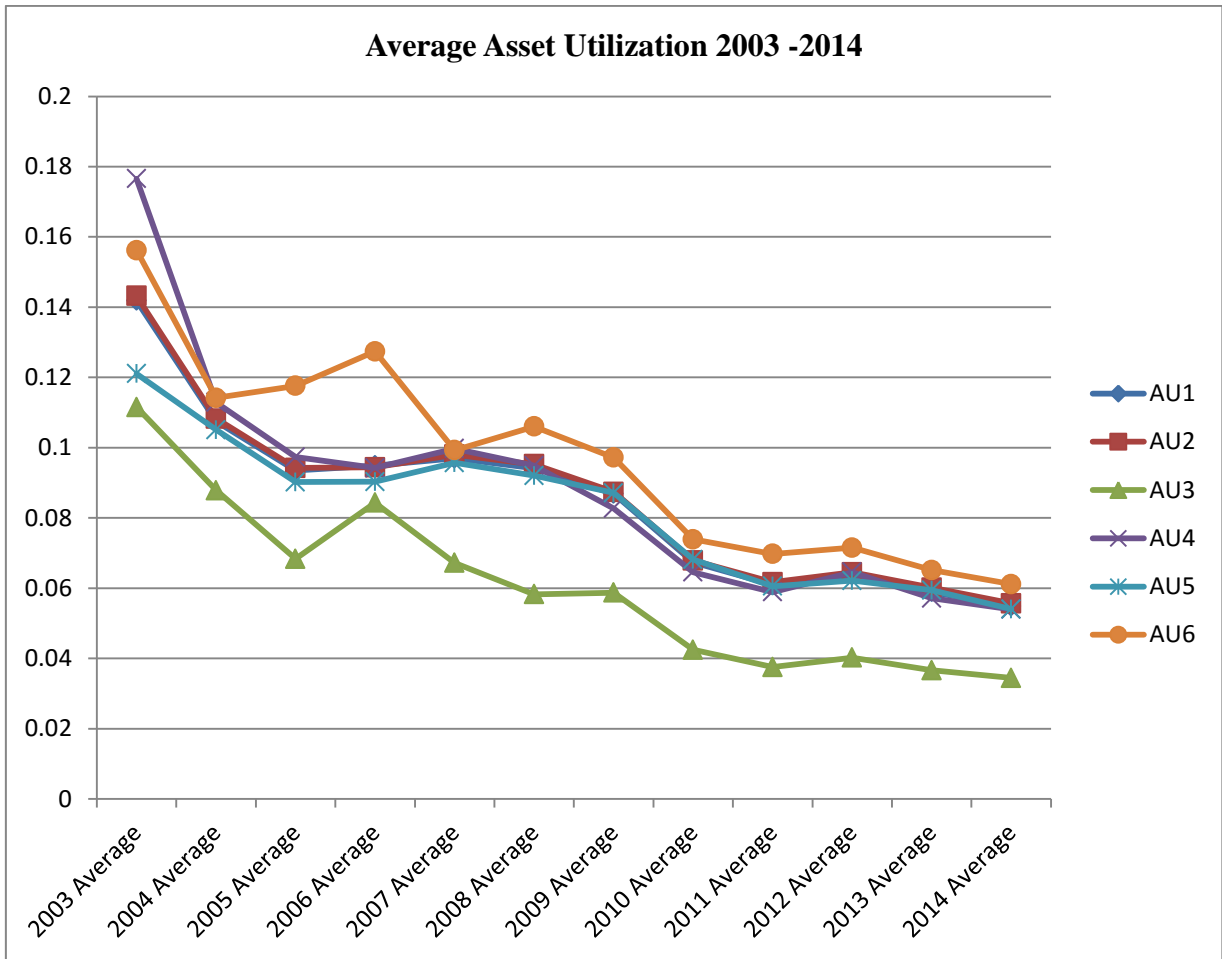


Figure 12 Average AU in 2003 - 2014

Both the total revenue and average total assets increased in time, but a declining trend of asset utilization shows that assets create lower proportions of revenues than before. Calculation of the asset utilization is given in equation (3.1.8). The sector has a declining trend with the equation $y = -0.0065x + 0.1276$ throughout the period. Trend line equations of deposit banks, development and investment banks, state owned deposit banks, privately owned deposit banks and foreign banks are sequentially $y = -0.0065x + 0.1283$; $y = -0.0063x + 0.1019$; $y = -0.0063x + 0.1019$; $y = -0.0083x + 0.1421$; $y = -0.0055x + 0.1181$; $y = -0.0076x + 0.1462$. State owned deposit banks starts with about 18% income generation from its assets, ending with about 5%.

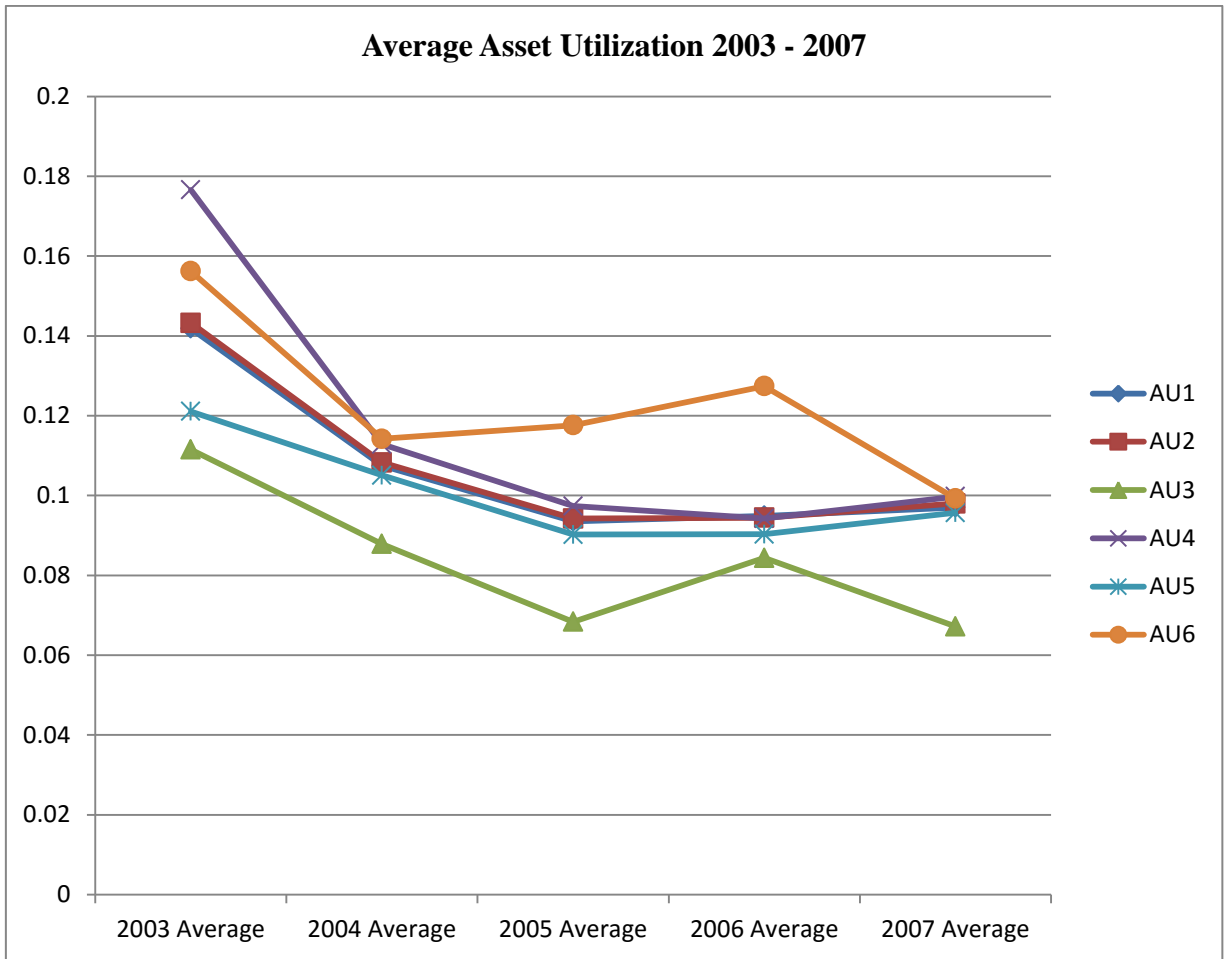


Figure 13 Average AU in 2003 - 2007

Before the 2008 crisis, the banking sectors' trend line equation is $y = -0.0102x + 0.1376$. Deposit banks' trend line equation is $y = -0.0104x + 0.1389$. Development and investment banks' trend line equation is $y = -0.0092x + 0.1115$. State owned deposit banks' trend line equation is $y = -0.0172x + 0.1678$. Privately owned banks' trend line equation is $y = -0.0066x + 0.1201$. Foreign banks' trend line equation is $y = -0.0101x + 0.1531$.

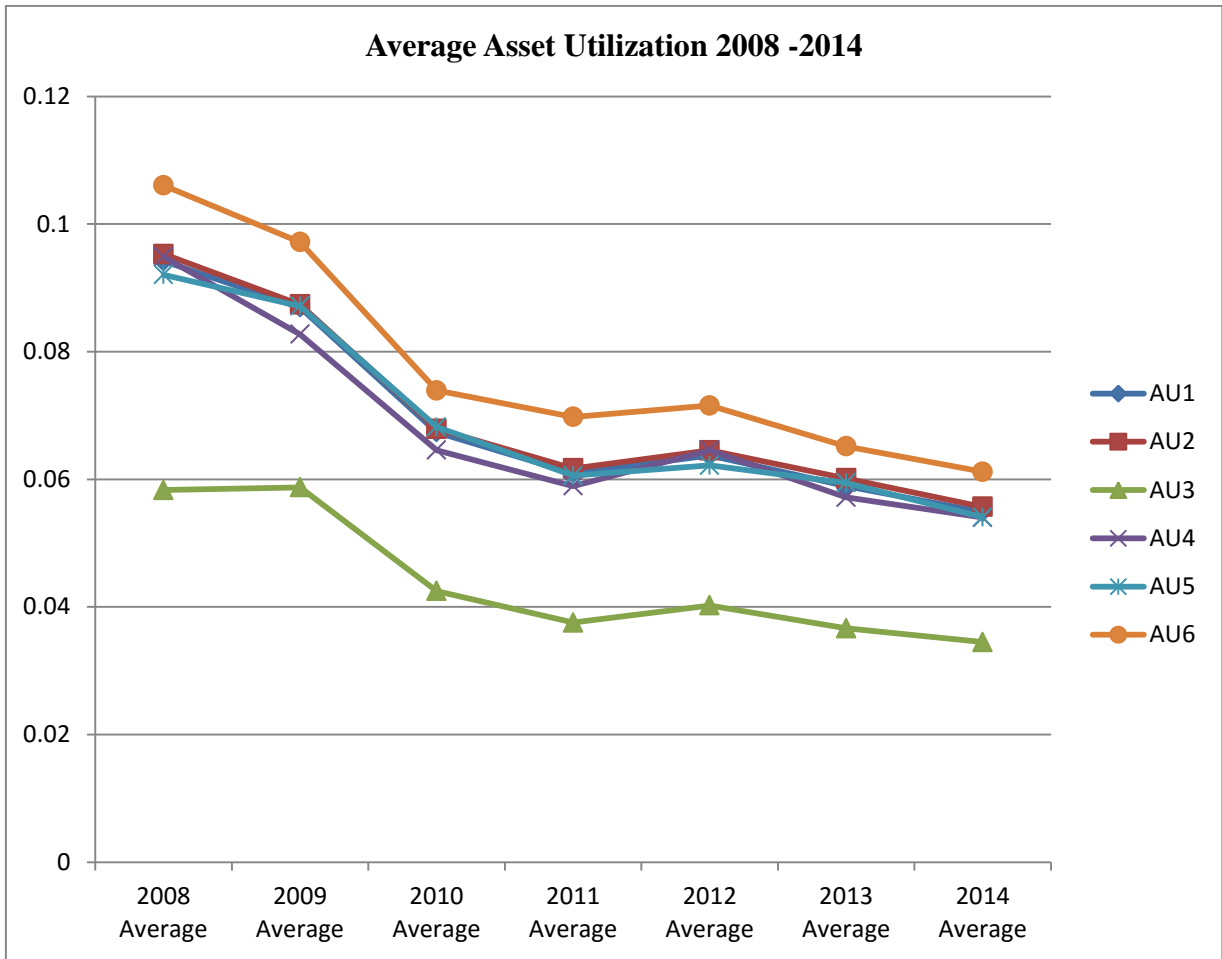


Figure 14 Average AU in 2008 - 2014

After the 2008 crisis, the banking sectors' trend line equation is $y = -0.0063x + 0.0949$. Deposit banks' trend line equation is $y = -0.0063x + 0.0956$. Development and investment banks' trend line equation is $y = -0.0042x + 0.0609$. State owned deposit banks' trend line equation is $y = -0.0062x + 0.0929$. Privately owned banks' trend line equation is $y = -0.0063x + 0.0941$. Foreign banks' trend line equation is $y = -0.0072x + 0.1065$.

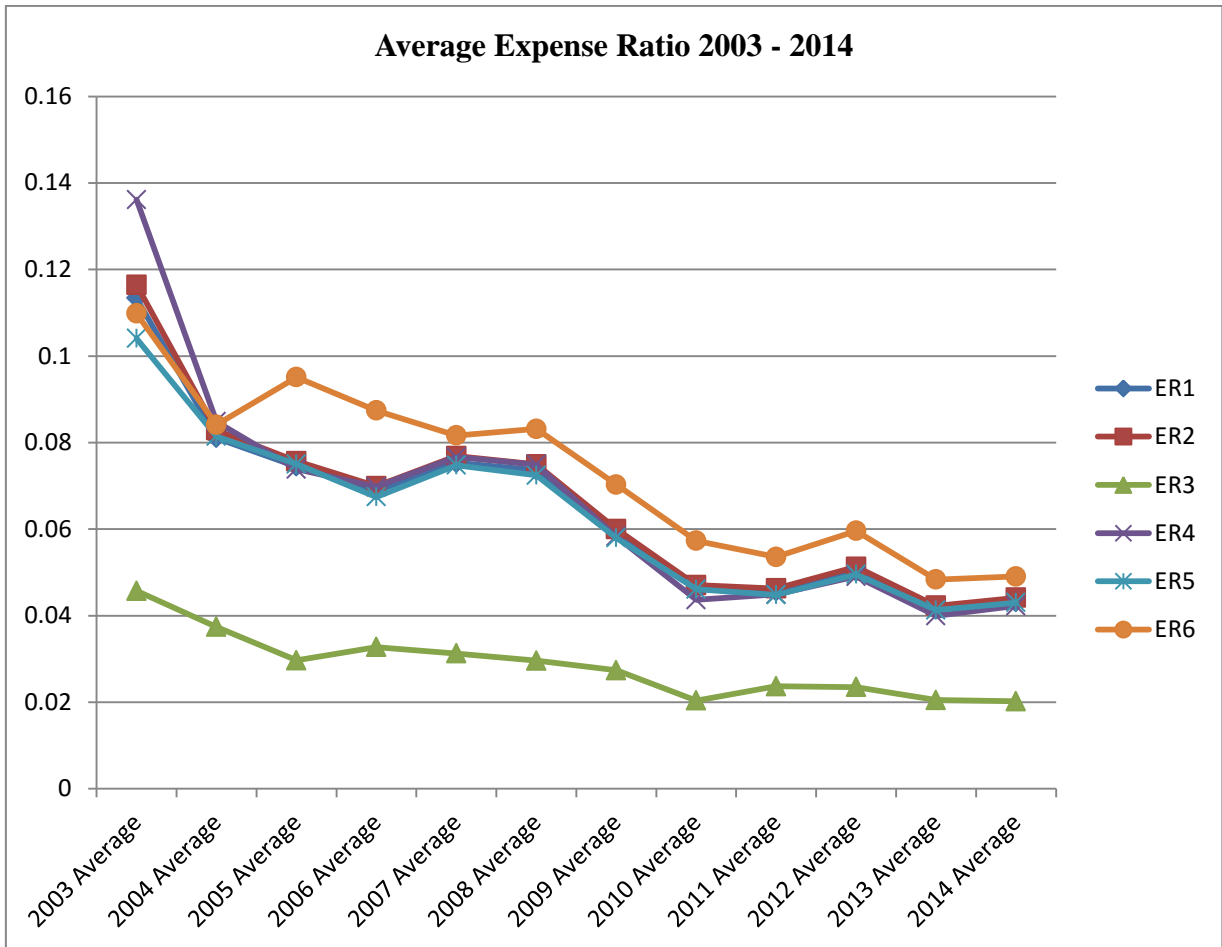


Figure 15 Average ER in 2003 - 2014

Calculation of expense ratio is given in equation (3.1.7). The sector has a declining trend with the equation $y = -0.0053x + 0.0989$ throughout the period. Trend line equations of deposit banks, development and investment banks, state owned deposit banks, privately owned deposit banks and foreign banks are sequentially $y = -0.0054x + 0.101$; $y = -0.0019x + 0.0411$; $y = -0.0065x + 0.1082$; $y = -0.005x + 0.0955$; $y = -0.0052x + 0.1072$. A higher ratio shows a harder situation to control expenses, therefore less efficiency in controlling them. During the analysis period, the trend lines show that as time goes by banks get better.

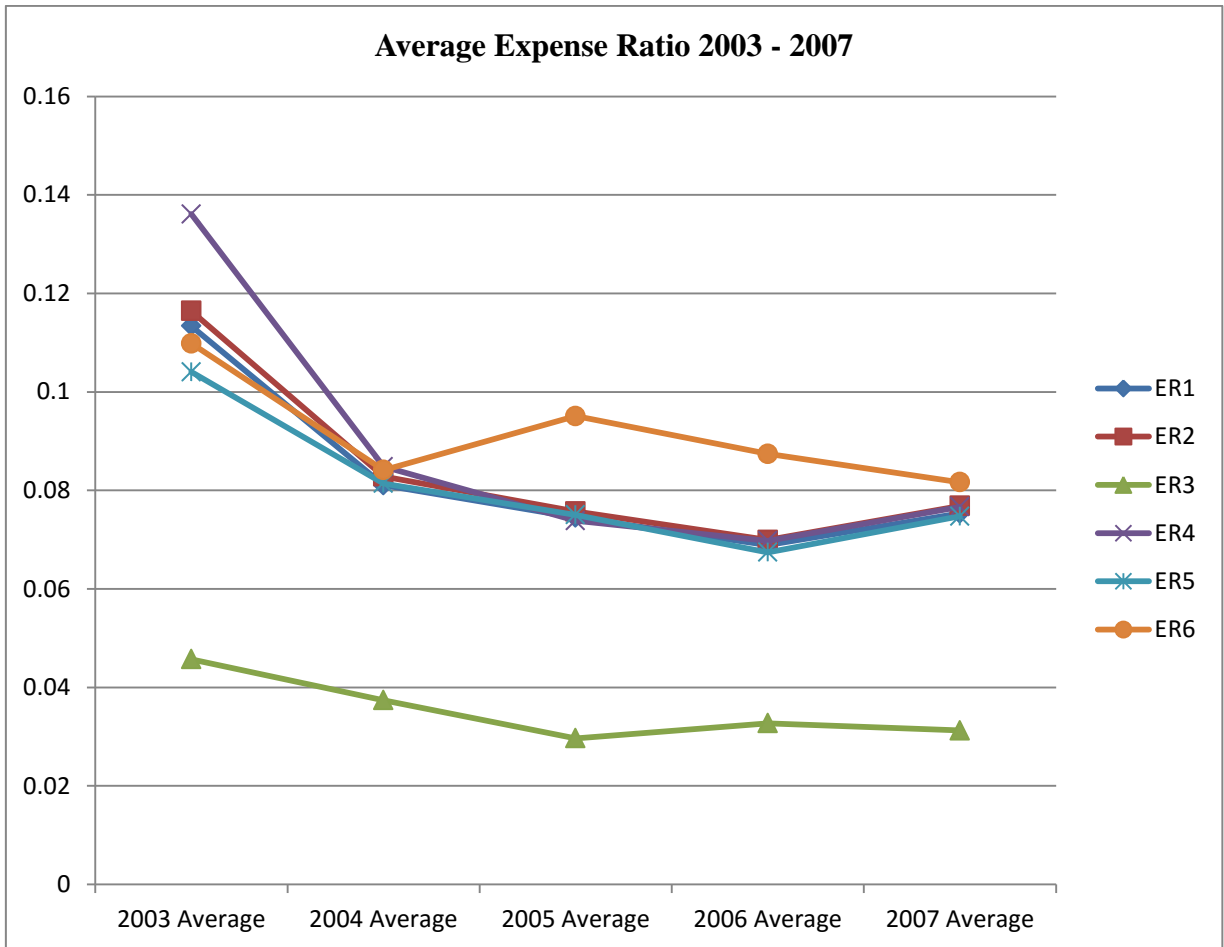


Figure 16 Average ER in 2003 - 2007

Before the 2008 crisis, the banking sectors' trend line equation is $y = -0.0088x + 0.1091$. Deposit banks' trend line equation is $y = -0.0092x + 0.112$. Development and investment banks' trend line equation is $y = -0.0034x + 0.0454$. State owned deposit banks' trend line equation is $y = -0.0134x + 0.1284$. Privately owned banks' trend line equation is $y = -0.0073x + 0.1023$. Foreign banks' trend line equation is $y = -0.0053x + 0.1075$.

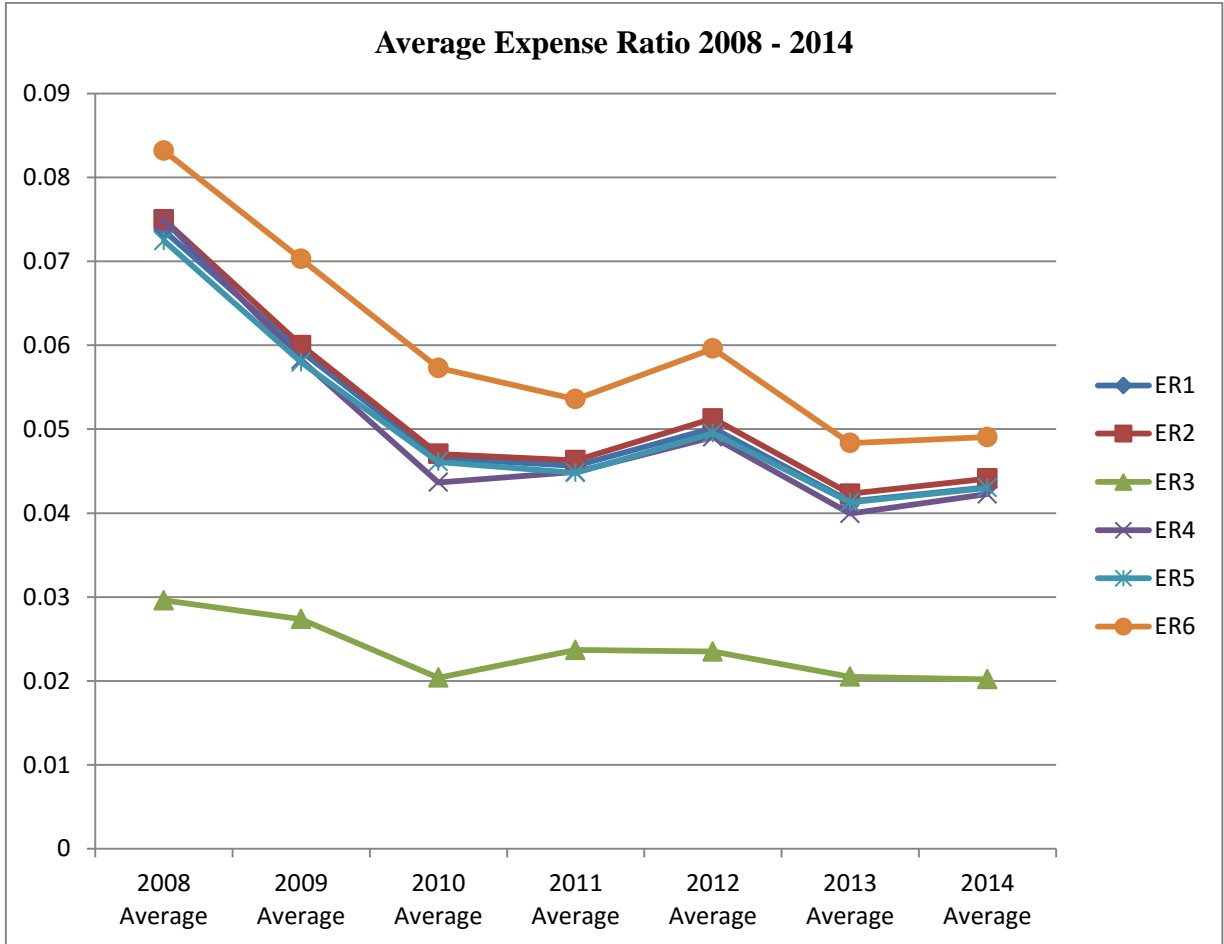


Figure 17 Average ER in 2008 - 2014

After the 2008 crisis, the banking sectors' trend line equation is $y = -0.0044x + 0.0691$. Deposit banks' trend line equation is $y = -0.0044x + 0.07$. Development and investment banks' trend line equation is $y = -0.0014x + 0.0292$. State owned deposit banks' trend line equation is $y = -0.0046x + 0.0689$. Privately owned banks' trend line equation is $y = -0.0042x + 0.0676$. Foreign banks' trend line equation is $y = -0.0051x + 0.0807$.

4. CAMELS RATING

In the banking sector for the evaluation of performance and detecting warning signals there is not a generally accepted industry standard. Researchers use very large scales of measures to monitor and supervise the banks. In Turkey, the supervisory assessment process of financial institutions are conducted by macro prudential tools, both on-site examination and off-site reviews, contacting other sources of information and supervisory evaluation systems.

A quick reference for some supervisory risk assessment and early warning systems can be found on Table 5, and some models and their comparative features can be found on Table 4, which are rearranged from Sahajwala & Van den Bergh's(2000) study of Supervisory risk assessment and early warning systems for Basle Committee on Banking Supervision. Tables are given to show where Turkey is amongst others.

Table 4 Models and their comparative features

Model	Objective	Time horizon	Frequency	Inputs	Methodology	Use of human judgement	Output	Uses of output
Bank Calculator – failure prediction model OCC, US	Identify banks at risk of failure, and overall risk of failures before any other indication of risk is available. The identification should precede examiner downgrades	1 year (3 years also being tested)	Annual	Annual data Other information – county unemployment rate	Assessment of 3 main risk categories: Bank portfolio risk (liquidity, troubled loans, prior CAMELS) Bank condition risk (earnings and capital) Bank environment risk (county/state unemployment rate, bank size, age of bank charter, regulatory regime shifts)	No	List of banks at risk for examination staff Overall risk of bank failures	Greater surveillance
SAABA – expected loss model Banking Commission, France	Assessing future solvency based on potential losses in credit portfolio	3 years	Every 6 months	Regulatory reporting data Internal assessments of legal, country and sector risks Bank of France database and analysis of corporate risk and default External rating agencies	Assessment of expected losses in credit portfolio over 3 years Adjustment of potential losses from current capital and future profitability Assessment of management and shareholder commitment	Yes, for assessment of management quality and shareholder commitment in the final analysis	Listing of all institutions under 5 categories Detailed analysis of each institution	Supervisory department for surveillance On-site examination department to plan exams Banking System General Supervision Department for aggregations for banking sector trends

Model	Objective	Time horizon	Frequency	Inputs	Methodology	Use of human judgement	Output	Uses of output
SEER risk rank – failure prediction model Federal Reserve System, US	Predicting probability of failure	2 years	Every 3 months	Quarterly call report data	Bivariate probit regression Assessing current characteristics of bank financial variables for similarities with model variables (estimation period 1985–91)	No	Exception listing of banks that fail criteria - risk rank of 2– 3% or more Risk profile analysis of each bank giving “change analysis” and “peer analysis”	Greater surveillance of exception banks Observe general movement and trend of exception listed banks
Growth Monitoring System – growth tracking model FDIC, US	Identification of potentially risky banks	4–5 years	Every 3 months	Quarterly call report data	Identification of banks with loan growth rate of more than 5%, based on 4 ratios and 5 growth rates	No	Flagging of high growth banks	Greater surveillance of banks flagged

(Sahajwala & Van den Bergh, 2000)(p.25)Reedited.

Table 5 Supervisory risk assessment and early warning systems

Country	Supervisory Authority	System	Year of implementation	System type
Turkey	Banking Regulation and Supervision Agency	CAMELS	2006	On-site examination rating
United States	All three supervisory authorities	CAMELS	1980	On-site examination rating
	Federal Reserve System	Individual Bank Monitoring Screens	1980s	Financial ratio analysis
		SEER Rating (System for Estimating Exam Ratings)	1993	Early warning model -Rating estimation
		SEER Risk Rank	1993	Early warning model-Failure prediction
	FDIC	CAEL	1985 (withdrawn December 1999)	Off-site supervisory bank rating system
		GMS – Growth Monitoring System	mid 1980s (refined recently)	Simple early warning model -tracking high growth banks
		SCOR (Statistical CAMELS Off-site Rating)	1995	Early warning model -Rating downgrade estimation
OCC	Bank Calculator	Planned	Early warning model Failure prediction	
France	Banking Commission	ORAP (Organisation and Reinforcement of Preventive Action)	1997	Off-site Supervisory bank rating system
		SAABA (Support System for Banking Analysis)	1997	Early warning model -Expected loss

Country	Supervisory Authority	System	Year of implementation	System type
Germany	German Federal Supervisory Office	BAKIS (BAKred Information System)	1997	Financial ratio and peer group analysis system
Italy	Bank of Italy	PATROL	1993	Off-site Supervisory bank rating system
		Early Warning System	Planned	Early warning model - failure and timing to failure prediction
Netherlands	Netherlands Bank	(RAST) Risk Analysis Support Tool	1999	Comprehensive bank risk assessment system
		Observation system	Planned	Financial ratio and peer group analysis system
United Kingdom	Financial Services Authority	RATE (Risk Assessment, Tools of Supervision and Evaluation)	1998	Comprehensive bank risk assessment system
	Bank of England	TRAM (Trigger Ratio Adjustment Mechanism)	Developed 1995 – not implemented	Early warning model

(Sahajwala & Van den Bergh, 2000)(p.5)Reedited.

4.1. CAMELS Introduction

CAMELS is the abbreviation made of six letters, which is the publicly referred name of Uniform Financial Institutions Rating System (UFIRS). C represents capital adequacy, A represents asset quality, M represents management, E represents earnings, L represents liquidity and S represents sensitivity to market risk components of a multi factor discriminant analysis system used for monitoring and supervising the financial system in Turkey. This model is not developed in Turkey, but it is adopted to fit Turkish financial system. Composite rating CAMELS is assessed to monitor the soundness of financial institution as a whole and the component analysis signals the weakness and possible risks being faced. According to systems scale, composite score one is given to best performing banks and five is given to the worst. After this brief information, in order to better understand the details is to look at the systems origins, which can be found on the Federal Register of United States given in the appendix I.

4.2. CAMELS Data and Methodology

When the text announced in appendix I read in depth, scope of CAMELS analysis will clearly be seen covering both qualitative and quantitative analyses. In Turkey, CAMELS rating notes are not available to the public.(Banking Regulation and Supervision Agency, 2011)

By using only the publicly available data gathered from The Banks Association of Turkey, CAMELS ratings are calculated. Data source for CAMELS is Selected Ratios under statistical reports, which are found in the web site of The Banks Association of Turkey. Data covers the 2001 – 2014 period. The banks functioning by the end of 2014 and the groups they are in at this time are used for the study. In order not to cause any confusion, name and structural changes are not considered within these years. The bank names and groups on 31.12.2014 are used to fill data series till 2001. 66 ratios of 59 variables (including individual banks, bank groups and sector) for 14 years are used to calculate composite CAMELS ratings. In order to inspect whether there is possibility to reduce the data being used correlation analyses are done. According to findings, no deduction is made, because usage of a few closely correlated data wouldn't affect conclusion by using same weights in the calculations. For the CAMELS ratings, 66 ratios are classified under

the most related component ratings. 14 for capital adequacy, 9 for asset quality, 11 for management, 11 for earnings, 6 for liquidity and 15 for sensitivity to market risk. Each component is weighted equally and also each ratio under each component is weighted equally. Rationale behind this decision is not having the same information over data as BRSA had. Index values for each ratio, each year are calculated by using 10% trim mean, in order to eliminate extreme value effects. By assuming index value 100, each variable is indexed to hundred. By looking at the effect on the group, where the ratio is in, performance score calculation is done. If there is a positive relationship between the ratio and group then 100 is deducted from indexed value; but if there is a negative effect, indexed value is deducted from 100. By this rationale performance values are calculated. CAMELS rating uses 1, 2, 3, 4 and 5 as a scale, where one represents best performance and 5 shows the worst. If performance value calculated for a ratio is below -30 then it gets score 5; if performance value calculated for a ratio is between -10 and -30 then it gets score 4; if performance value calculated for a ratio is between -10 and 10 then it gets 3; if performance value calculated for a ratio is between 10 and 30 then it gets 2 and if the performance value is above 30 then it gets score 1 from the CAMELS scale. An overall CAMELS rating is the average of 6 component ratings. Step by step calculation is given as follows:

4.2.1. Information on ratios gathered from the Banks Association of Turkey

For 2001, 2002 – 2005, 2006 – 2012 and 2012 – 2014 there are important notices about ratios (The Banks Association of Turkey, 2014)(p.61). They are grouped and given one by one.

4.2.1.1. CAMELS Ratios for 2001:

Financial assets (net) = Securities Portfolio (net) + Affiliated Securities (net)

Interest Expenses = Interest on (Deposits + Non-Deposits Funds Borrowed) + Other Interest Expenses

Interest Income = Interest on (Loans + Securities Portfolio + Deposits in other Banks + Interbank Funds Sold) + Other Interest Income

Liquid Assets = Cash + Due From Banks + Central Bank + Other Financial Institutions + Interbank + Securities (net) + Reserve Requirements

Loans Under Follow-up (net) = Loans Under Follow-up (gross) - Specific Provisions

Net Interest Income After Specific Provisions = Interest Income - Interest Expenses - Provisions for Loan Losses

Non-deposits Funds = Interbank Money Market takings + Loans Borrowed + Funds + Securities Issued

Non-Interest Expenses = Salary and Employee Benefits+ Resources for Retirement Payments + Other Provisions + Taxes and Duties + Rental Expenses + Depreciation and Amortization + Other

Non-Interest Income = Income from Commissions (net) + Inc.from Fx Transac.(net) + Inc.from Capital Market Transac.(net) + Other Non-interest Income

Other Operating Expenses = Non-Interest Expenses

Permanent Assets = Non-performing Assets(net) + Equity Participations + Affiliated Companies + Fixed Assets

Total Expenditures = Interest Expenses + Non-Interest Expenses

Total Income = Interest Income + Non-Interest Income

Total Loans = Short Term Loans + Medium and Long Term Loans

Total Operating Income = Interest Income - Interest Expenses - Provisions for Loan Losses + Income from Commissions (net) + Income from FC Transactions (net) + Income from Capital Market Transactions (net) + Other Operating Income

4.2.1.2. CAMELS Ratios for 2002 – 2005:

Consumer Loans : Used the sum on the table "Consumer Loans, Individual Credit Cards, Personnel Loans and Personnel Credit Cards" from "Information and Disclosures Related to Assets" section of Accounting Standard 17-Financial Statements and Related Explanation and Footnotes to be Disclosed to the Public-

FC = Foreign Currency

FC Position = FC Liabilities - FC Assets

Financial assets (net) = Trading Securities (net) + Investment Securities Available for Sale (net) + Investment Securities held to Maturity (net)

Liquid Assets = Cash and Balances with the Central Bank of Turkey + Trading Securities (Net) + Banks and Other Financial Institutions + Money Market Securities + Investment Securities Available for Sale (Net) + Reserve Deposits

Loans Under Follow-up (net) = Loans Under Follow-up (gross) - Specific Provisions

Net Interest Income After Specific Provisions = Interest Income - Interest Expenses - Specific Provisions for Loan and Other Receivables

Net Off Balance- Sheet Position: Used from the "Information on currency risk of the bank" table from "Financial Position" section of Accounting Standard 17-Financial Statements and Related Explanation and Footnotes to be Disclosed to the Public.

Net On Balance- Sheet Position: Used from the "Information on currency risk of the bank" table from "Financial Position" section of Accounting Standard 17-Financial Statements and Related Explanation and Footnotes to be Disclosed to the Public.

Non-Deposit Funds = Interbank Money Market Takings + Loans Borrowed + Funds + Marketable Securities Issued

Non-interest Income = Net Fees and Commissions Income + Dividend Income + Net Trading Income + Other Operating Income

Permanent Assets = Investments and Associates (net) + Subsidiaries (net) + Property and Equipment (net) + Intangible Assets (net) + Loans Under Follow-up - Specific Provisions

Personnel Expenses: Used from the table from "Information and Disclosures related to Income Statement" section of Accounting Standard 17-Financial Statements and Related Explanation and Footnotes to be Disclosed to the Public-

Shareholders' Equity / (Total Risk Weighted Assets + Amount Subject to Market Risk) (Capital Adequacy Ratio): Prepared in the "Financial Position" section of Accounting

Standard 17-Financial Statements and Related Explanation and Footnotes to be Disclosed to the Public-

Short-term Liabilities: "Demand" and "1 Month" columns of the "Liquidity Risk" table from "Financial Position" section of Accounting Standard 17-Financial Statements and Related Explanation and Footnotes to be Disclosed to the Public-

TC = Turkish Currency

Total Expenditures = Interest Expenses + Other Operating Expenses

Total Income = Interest Income + Net Fees and Commissions Income + Dividend Income + Net Trading Income + Other Operating Income

Total Loans = Short-term Loans + Medium and Long term Loans + Loans Under Follow-up (gross) - Specific Provisions

4.2.1.3. CAMELS Ratios for 2006 – 2012:

Consumer Loans : Used the sum on the table "Consumer Loans, Individual Credit Cards, Personnel Loans and Personnel Credit Cards" from "Information and Disclosures Related to Assets" section of the Communique-Financial statements and related explanation and footnotes of the banks that is disclosed to the public-

FC = Foreign Currency

FC Position = FC Liabilities - FC Assets

Financial assets (net) = Financial Assets where fair value change is reflected to income statement (net) + Financial Assets Available for Sale (net) + Investments held to Maturity (net) + Derivative Financial Assets Held for Hedging

Liquid Assets = Cash and Balances with the Central Bank of Turkey + Financial assets where fair value change is reflected to income statement (net) + Banks and Other Financial Institutions (changed as "Banks after 2007") + Money Market Placements + Financial Assets Available for Sale (net)

Loans Under Follow-up (net) = Loans Under Follow-up (gross) - Specific Provisions

Net Interest Income After Specific Provisions = Interest Income - Interest Expenses - Specific Provisions for Loan and Other Receivables

Net Off Balance-Sheet Position: Used from the "Information on currency risk of the bank" table from "Financial Position" section of the Communique-Financial statements and related explanation and footnotes of the banks that is disclosed to the public-

Net On Balance-Sheet Position: Used from the "Information on currency risk of the bank" table from "Financial Position" section of the Communique-Financial statements and related explanation and footnotes of the banks that is disclosed to the public-

Non-Deposit Funds = Interbank Money Market Takings + Loans Borrowed + Funds + Marketable Securities Issued

Non-interest Income (net) = Net Fees and Commissions Income + Dividend Income + Trading Profit/Loss + Other Operating Income

Operational Expenses = Salaries and Benefits + Reserve for Retirement + Rental Expenses + Depreciation and Amortization

Permanent Assets = Investments and Associates (net) + Subsidiaries (net) + Joint Ventures (net) + Property and Equipment (net) + Intangible Assets (net) + Property and Equipment Held for Sale Purpose ("and from Terminated Operations" after 2007) (net) + Loans Under Follow-up - Specific Provisions

Personnel Expenses: Used from the table from "Information and Disclosures related to Income Statement" section of the Communique-Financial statements and related explanation and footnotes of the banks that is disclosed to the public-

Shareholders' Equity / (Amount subject to credit risk + Amount Subject to Market Risk + Amount subject to operational risk) (Capital Adequacy Ratio): Prepared in the "Financial Position" section of the Communique-Financial statements and related explanation and footnotes of the banks that is disclosed to the public-

Short-term Liabilities: "Demand" and "1 Month" columns of the "Liquidity Risk" table from "Financial Position" section of the Communique-Financial statements and related explanation and footnotes of the banks that is disclosed to the public-

TC = Turkish Currency

Total Expenditures = Interest Expenses + Other Operating Expenses

Total Income = Interest Income + Net Fees and Commissions Income + Dividend Income + Trading Profit/Loss + Other Operating Income

Total Loans (changed as "Total Loans and Receivables after 2008") = Loans (changed as "Total Loans and Receivables after 2008") + Loans Under Follow-up (gross) - Specific Provisions

4.2.1.4. CAMELS Ratios for 2012 – 2014:

Shareholders' Equity / ((Capital to be Employed to credit + market + operational risk)*12.5)*100 : Prepared in the "Financial Position" section of the Communique-Financial statements and related explanation and footnotes of the banks that is disclosed to the public-

Other notices about data:

Group ratios are calculated by aggregating the data of banks that are operating under that group, in the related period.

Capital Adequacy ratio were not sent to the Banks' Association of Turkey at the end of 2001.

TC-FC distribution did not exist for the year 2001. Therefore, ratios including TC and FC could not be calculated in 2001.

"Net On Balance-Sheet Position", "Net Off Balance-Sheet Position", "Short-term Liabilities" and "Consumer Loans" did not exist for the year 2001. Therefore, ratios including these accounts could not be calculated in 2001.

4.2.2. Calculations for CAMELS analysis:

4.2.2.1. Identification of ratios:

67 ratios provided by the Banks Association of Turkey are held to correlation analysis in order to identify usage of ratios. Excel's built in correlation analysis tool is used to provide

an output table, a correlation matrix, that shows the value of correlation applied to each possible pair of measurement variables. The results are given in appendix B. According to findings no deduction from data is made, because usage of a few closely correlated data would not affect conclusion by using the same weights in the calculations.

4.2.2.2. Index value for year X (Reference value):

Index values for each ratio, each year are calculated by using Excel's built in trimmean function. In the study 10% trim mean is chosen in order to eliminate extreme value effects. How Excel trimmean function works is, 10% is the fractional number of data points to exclude from the calculation. For example, percent = 0.1, 2 points are trimmed from a data set of 20 points (20 x 0.1): 1 from the top and 1 from the bottom of the set. Trimmean rounds the number of excluded data points down to the nearest multiple of 2. If percent = 0.1, 10 percent of 30 data points equals 3 points. For symmetry, TRIMMEAN excludes a single value from the top and bottom of the data set.

4.2.2.3. Index value of a bank for year X:

Each ratio of a bank is indexed according to the calculation given below:

Index value of a bank for year X = (Bank's ratio at year X / Reference value of the ratio at year X)*100

4.2.2.4. Performance ratio(note) calculations:

Indexed bank values for any ratio at year X is converted to performance ratios according to the relationship signs. Relationships and effects are given in appendix C. For a positive relationships performance note it is calculated as; "Index value – 100"; for a negative relationships performance note it is calculated as, "100 – Index value".

4.2.2.5. CAMELS component and composite calculations:

Each component of the analysis has more than one ratio. Some ratios may be found more valuable than others according to managerial decisions, past performance or macroeconomic cycle, etc. Therefore weights are assigned to ratios. For the purpose of my analysis equal weights for each components and equal weights for ratios constructing each component are chosen. In the fractional form weight 1/6 for "C", weight 1/6 for "A" and so

on are used. “C” has 14 ratios for calculation so weights of each ratios are assigned as 1/14 and “A” has 9 ratios under it therefore weight 1/9 is assigned for each ratio and so on. Excel’s built in sumproduct function is used, which multiplies all the components of the two arrays and then adds the products. In the component performance note calculation, first array is the performance notes of each components’ ratios, and the second array is the weights assigned to ratios in equation (3.1.14). In the composite performance note calculation, first array is the component performance notes, and the second array is the weights assigned to components in equation(3.1.15).

$$\text{Component Performance Note} = \sum_{i=1}^n w_i \cdot \text{RatioNote}_i \quad (3.1.14)$$

$i = (1, 2, \dots, n)$

$w_i =$ weight of the i^{th} ratio

$\text{RatioNote}_i =$ calculated performance ratio for the i^{th} ratio

$$\text{Composite Performance Note} = \sum_{i=1}^n w_i \cdot \text{ComponentNote}_i \quad (3.1.15)$$

$i = (1, 2, \dots, 6)$

$w_i =$ weight of the i^{th} component

$\text{ComponentNote}_i =$ calculated component performance note for the i^{th} component.

After all calculations are done, last step is to assign CAMELS rating notes for each component and calculating composite CAMELS rating note according to the Uniform Financial Institutions Rating System standards. For conversion Table 6 is used.

Table 6 Performance Note CAMELS Rating Conversion

Performance Note	CAMELS Rating
$-\infty$ - $-30]$	5
$(-30$ - $-10]$	4
$(-10$ - $10]$	3
$(10$ - $30)$	2
$[30$ - ∞	1

4.2.3. CAMELS Findings:

Table 7 2001 – 2014 CAMELS Results

[2001-2014]	C	A	M	E	L	S	Comp.
	Av.	Av.	Av.	Av.	Av.	Av.	Av.
Banking System in Turkey	3,57	5,00	1,00	2,86	4,36	4,00	2,93
Deposit Banks	3,64	5,00	1,00	2,64	4,29	4,00	1,29
State-owned Banks	2,93	5,00	1,00	1,21	3,86	4,00	2,14
Privately-owned Banks	3,50	5,00	1,00	2,86	4,21	3,64	2,71
Foreign Banks	3,71	4,29	2,43	3,64	4,57	3,50	3,71
Foreign Bank Founded in Turkey	3,64	4,29	2,50	3,64	4,71	3,50	3,86
Foreign Banks Having Branches in Turkey	3,71	1,43	4,43	2,50	2,43	3,07	3,36
Development and Investment Banks	1,43	5,00	1,00	2,00	4,79	2,64	2,43
State-owned Banks	1,36	5,00	1,57	1,86	4,21	2,21	2,71
Privately-owned Banks	3,14	3,00	4,57	1,93	4,86	3,14	3,79
Foreign Banks	2,50	2,21	4,14	3,29	4,71	3,64	3,14

During the full period, CAMELS component averages are sequentially; 3.01; 4.11; 2.24; 2.58; 4.27; 3.40; 2.92. Capital adequacy of state owned deposit banks, overall development and investment banks, state owned development and investment banks, foreign development and investment banks are better than the average of the whole sample. Asset quality component of foreign banks having branches in Turkey, privately owned development and investment banks and foreign development and investment banks are outperforming the others, but overall sight implies, asset quality is in the worst case. Management component has an average of 2.24 but the overall composition is in the best case excluding foreign banks. Average earnings component is 2.58 and state owned deposit banks are the best with an average of 1.21. Liquidity component average is 4.27 where foreign banks having branches in Turkey have the best grade with 2.43 followed by 3.86 points. Sensitivity to market risk component, the average is 3.40, and excluding foreign banks having branches in Turkey all deposit banks perform worse than this. Composite average calculated from components has an average of 2.92 points, and Turkish banking sector deposit banks' average, state owned deposit banks, privately owned deposit banks have performed better than average. Also development and investment banks' average is better than the overall average. Only state owned development and investment banks performed better than the average in development and investment banks group.

Table 8 2008 – 2014 CAMELS Results

[2008-2014]							
	C	A	M	E	L	S	Comp.
	Av.	Av.	Av.	Av.	Av.	Av.	Av.
Banking System in Turkey	3,29	5,00	1,00	3,00	4,14	4,43	3,14
Deposit Banks	3,43	5,00	1,00	2,86	4,14	4,29	1,43
State-owned Banks	3,14	5,00	1,00	1,43	3,71	4,43	2,29
Privately-owned Banks	3,29	5,00	1,00	3,14	4,14	4,14	3,14
Foreign Banks	3,71	3,57	3,86	3,29	4,43	3,00	3,43
Foreign Bank Founded in Turkey	3,57	3,57	3,86	3,29	4,71	3,00	3,71
Foreign Banks Having Branches in Turkey	4,00	1,43	5,00	2,71	2,86	2,86	3,57
Development and Investment Banks	1,14	5,00	1,00	1,71	4,86	2,29	2,00
State-owned Banks	1,29	5,00	1,57	1,57	4,29	1,71	2,29
Privately-owned Banks	2,71	2,86	4,86	2,00	5,00	3,29	3,86
Foreign Banks	2,71	1,71	5,00	3,00	4,71	3,29	2,86

After the 2008 crisis, the overall composite average got better, but the banking systems composite average fell to 3.14 from 2.71 and it also fell below the 2008 – 2014 periods' overall composite average score of 2.88. In this period, asset quality of foreign banks are better than others and the average asset quality is 3.92 points. The management quality of foreign banks are worse than others and the average asset quality is 2.65 in this period. Liquidity component rating is better than the 2001 – 2008 period.

Table 9 2008 – 2001 CAMELS Results

(2001-2008)							
	C	A	M	E	L	S	Comp.
	Av.	Av.	Av.	Av.	Av.	Av.	Av.
Banking System in Turkey	3,86	5,00	1,00	2,71	4,57	3,57	2,71
Deposit Banks	3,86	5,00	1,00	2,43	4,43	3,71	1,14
State-owned Banks	2,71	5,00	1,00	1,00	4,00	3,57	2,00
Privately-owned Banks	3,71	5,00	1,00	2,57	4,29	3,14	2,29
Foreign Banks	3,71	5,00	1,00	4,00	4,71	4,00	4,00
Foreign Bank Founded in Turkey	3,71	5,00	1,14	4,00	4,71	4,00	4,00
Foreign Banks Having Branches in Turkey	3,43	1,43	3,86	2,29	2,00	3,29	3,14
Development and Investment Banks	1,71	5,00	1,00	2,29	4,71	3,00	2,86
State-owned Banks	1,43	5,00	1,57	2,14	4,14	2,71	3,14
Privately-owned Banks	3,57	3,14	4,29	1,86	4,71	3,00	3,71
Foreign Banks	2,29	2,71	3,29	3,57	4,71	4,00	3,43

In the overall average concept, each component and composite rating note in the period is equal or worse than the 2008 – 2014 period except management scores. Foreign banks, either deposit or development and investment, were better in the 2001 – 2008 period.

Table 10 Yearly Capital Adequacy Ratings

C	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Banking System in Turkey	5	2	4	4	3	5	4	3	3	4	5	3	1	4
Deposit Banks	5	2	4	4	3	5	4	3	3	4	5	4	1	4
State-owned Banks	2	1	3	3	3	4	3	3	3	3	2	2	5	4
Privately-owned Banks	5	2	4	4	3	5	3	3	3	3	5	4	1	4
Foreign Banks	5	2	5	3	5	1	5	4	5	5	5	3	1	3
Foreign Bank Founded in Turkey	5	2	5	3	4	2	5	4	5	5	3	4	1	3
Foreign Banks Having Branches in Turkey	1	5	2	5	5	1	5	5	4	5	5	1	5	3
Development and Investment Banks	2	2	3	1	1	2	1	1	1	1	1	1	1	2
State-owned Banks	2	2	2	1	1	1	1	1	1	1	1	1	2	2
Privately-owned Banks	2	1	5	4	4	5	4	3	4	3	1	2	4	2
Foreign Banks	2	2	3	1	2	1	5	4	2	5	1	5	1	1

Capital adequacy level of an institution is important, especially for external shocks. Minimum total capital is considered to be at 8% level according to BASEL regulations. Foreign banks ratings impose the biggest vulnerability to external shocks is in this group.

Table 11 Yearly Asset Quality Ratings

A	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Banking System in Turkey	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Deposit Banks	5	5	5	5	5	5	5	5	5	5	5	5	5	5
State-owned Banks	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Privately-owned Banks	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Foreign Banks	5	5	5	5	5	5	5	5	5	4	4	3	3	1
Foreign Bank Founded in Turkey	5	5	5	5	5	5	5	5	5	4	4	3	3	1
Foreign Banks Having Branches in Turkey	1	1	3	2	1	1	1	2	1	1	1	2	2	1
Development and Investment Banks	5	5	5	5	5	5	5	5	5	5	5	5	5	5
State-owned Banks	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Privately-owned Banks	3	3	3	4	3	3	3	3	3	3	3	3	3	2
Foreign Banks	3	2	1	3	3	4	3	3	2	1	1	1	2	2

Asset quality is mostly associated with the credit risk of a bank, and the credit risk is composed of expected loss and unexpected loss. According to BASEL II standard approach, the minimum capital requirement for credit risk is in a main part of risk weighted assets, according to the counterparty type and rating. According to rating scores, foreign banks seem to manage credit risk the best amongst all.

Table 12 Yearly Management Ratings

M	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Banking System in Turkey	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Deposit Banks	1	1	1	1	1	1	1	1	1	1	1	1	1	1
State-owned Banks	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Privately-owned Banks	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Foreign Banks	1	1	1	1	1	1	1	1	2	4	5	5	5	5
Foreign Bank Founded in Turkey	1	1	1	2	1	1	1	1	2	4	5	5	5	5
Foreign Banks Having Branches in Turkey	5	5	5	1	1	5	5	5	5	5	5	5	5	5
Development and Investment Banks	1	1	1	1	1	1	1	1	1	1	1	1	1	1
State-owned Banks	2	2	2	2	1	1	1	2	2	1	2	1	1	2
Privately-owned Banks	4	4	4	4	4	5	5	4	5	5	5	5	5	5
Foreign Banks	5	2	2	2	3	4	5	5	5	5	5	5	5	5

Management ratings are perhaps the most subjective ratings amongst others, and foreign banks are found to be the worst performing ones along with privately owned development and investment banks.

Table 13 Yearly Earnings Ratings

E	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Banking System in Turkey	3	2	3	3	2	3	3	3	3	4	2	3	4	2
Deposit Banks	3	2	3	2	2	2	3	2	3	4	2	3	4	2
State-owned Banks	1	1	1	1	1	1	1	1	1	1	1	1	2	3
Privately-owned Banks	3	2	3	2	2	3	3	3	3	5	3	4	3	1
Foreign Banks	4	4	4	4	4	4	4	4	3	3	2	3	4	4
Foreign Bank Founded in Turkey	4	4	4	4	4	4	4	4	2	3	2	3	4	5
Foreign Banks Having Branches in Turkey	1	3	2	2	3	2	3	3	4	2	2	3	3	2
Development and Investment Banks	3	2	3	2	2	2	2	2	1	1	2	2	1	3
State-owned Banks	3	2	3	2	2	2	1	1	1	1	2	2	1	3
Privately-owned Banks	2	1	2	1	2	3	2	2	2	2	1	2	2	3
Foreign Banks	5	4	2	4	3	3	4	4	5	3	5	1	2	1

Earnings ratings according to CAMELS system are given to reflect how much earning is there and whether it is sustainable. According to findings, the best rated banks in the system are state owned deposit banks.

Table 14 Yearly Liquidity Ratings

L	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Banking System in Turkey	5	5	5	4	4	4	5	4	4	4	4	4	4	5
Deposit Banks	5	5	4	4	4	4	5	4	4	4	4	4	4	5
State-owned Banks	4	4	4	4	4	4	4	3	3	3	4	3	5	5
Privately-owned Banks	5	5	4	4	3	4	5	4	4	4	4	4	4	5
Foreign Banks	5	5	5	4	4	5	5	5	5	4	4	4	4	5
Foreign Bank Founded in Turkey	5	5	5	4	4	5	5	5	5	5	4	4	5	5
Foreign Banks Having Branches in Turkey	3	3	1	1	3	2	1	3	2	2	2	3	3	5
Development and Investment Banks	5	5	5	5	3	5	5	4	5	5	5	5	5	5
State-owned Banks	5	5	5	5	2	3	4	3	4	4	4	5	5	5
Privately-owned Banks	5	5	5	5	3	5	5	5	5	5	5	5	5	5
Foreign Banks	5	5	4	5	4	5	5	5	4	5	5	4	5	5

Liquidity rating is given according to institutions ability to fulfill its obligations in all conditions. Foreign deposit banks having branches in Turkey are the ones scored the best.

Table 15 Yearly Sensitivity to Market Risk Ratings

S	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Banking System in Turkey	3	3	3	4	4	4	4	4	4	4	4	5	5	5
Deposit Banks	3	4	3	4	4	4	4	4	4	4	4	4	5	5
State-owned Banks	3	3	3	4	4	4	4	4	4	4	4	5	5	5
Privately-owned Banks	3	3	3	3	3	4	3	4	4	4	4	4	4	5
Foreign Banks	4	4	4	4	4	4	4	4	3	4	3	3	3	1
Foreign Bank Founded in Turkey	4	4	4	4	4	4	4	4	3	4	3	3	3	1
Foreign Banks Having Branches in Turkey	5	3	4	3	3	2	3	3	4	3	3	3	3	1
Development and Investment Banks	3	3	3	3	3	3	3	3	2	2	3	3	2	1
State-owned Banks	3	3	3	3	3	2	2	2	2	2	2	2	1	1
Privately-owned Banks	3	3	3	3	3	3	3	3	3	3	3	3	3	5
Foreign Banks	5	4	4	4	4	3	4	4	5	4	5	2	2	1

Sensitivity to market risk component is monitored to capture market conditions, such as FX rates, interest rates, etc. changes the effect on institutions' earnings. Foreign banks are found to be the worst performing among others.

Table 16 Yearly Composite Ratings

COMP	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Banking System in Turkey	3	2	3	3	2	3	3	3	3	3	3	3	2	5
Deposit Banks	2	1	1	1	1	1	1	1	1	1	1	2	1	3
State-owned Banks	2	2	2	2	2	2	2	2	2	1	1	2	3	5
Privately-owned Banks	3	2	2	2	2	3	2	2	3	3	4	3	2	5
Foreign Banks	5	4	4	4	4	3	4	4	4	5	4	3	3	1
Foreign Bank Founded in Turkey	5	3	4	4	4	4	4	4	4	5	4	4	1	4
Foreign Banks Having Branches in Turkey	3	5	3	1	5	1	4	4	4	3	5	3	5	1
Development and Investment Banks	3	3	3	3	2	3	3	3	3	2	2	2	1	1
State-owned Banks	4	4	4	3	2	3	2	2	3	1	3	2	1	4
Privately-owned Banks	3	3	4	4	3	5	4	3	4	4	3	4	4	5
Foreign Banks	5	3	3	3	3	2	5	4	4	5	1	4	1	1

In the yearly composite ratings, deposit banks and state owned deposit banks are found to be performing the best whereas foreign banks are performing the worst. Bigger graphs are on appendix F.

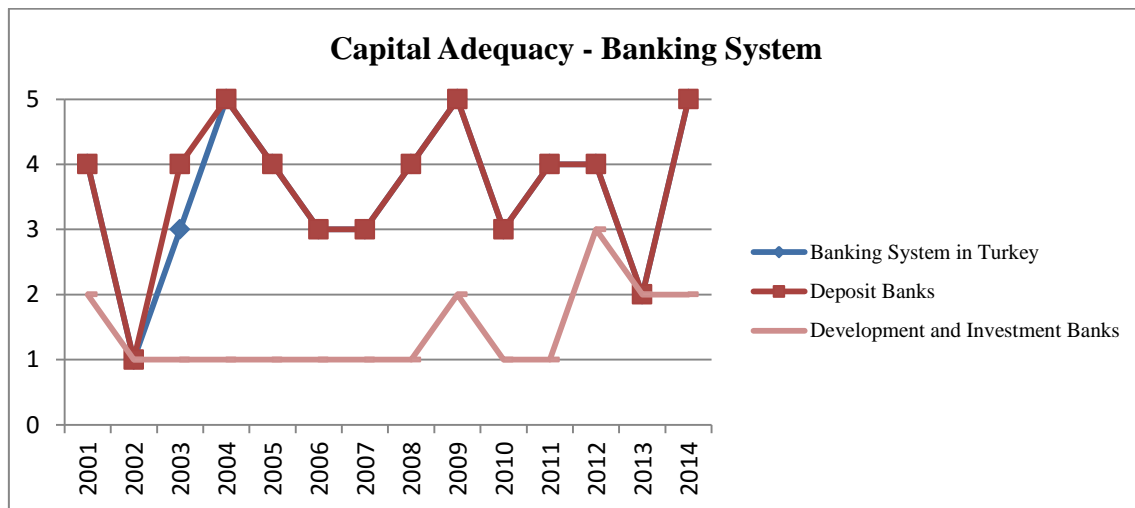


Figure 18 CAMELS components: C for Banking System

Banking system followed nearly the same path with deposit banks in the capital adequacy rating notes. Development and investment banks are in a better condition than both the system and deposit banks. Effect of the 2008 crisis is seen by the worsened ratings.

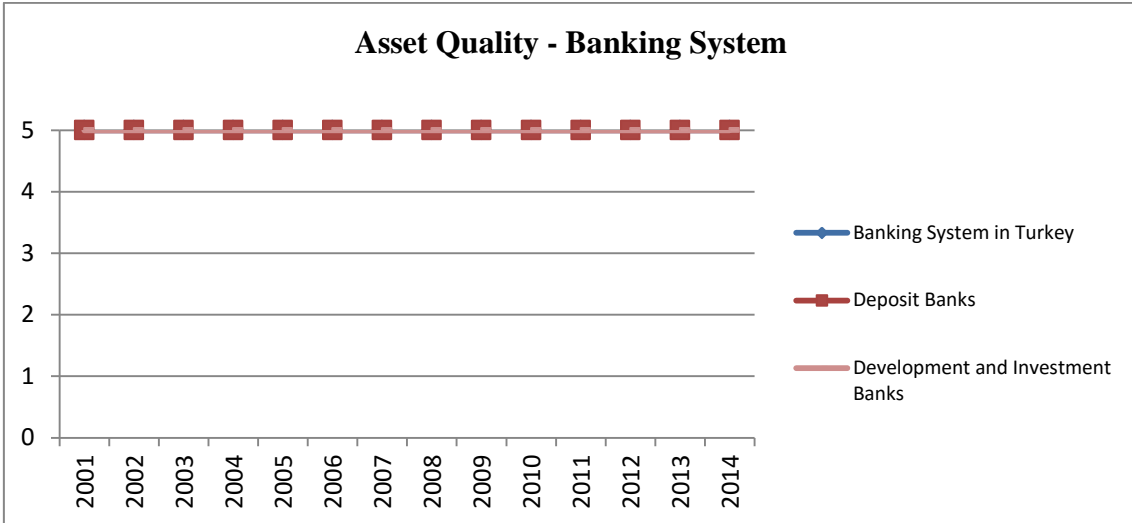


Figure 19 CAMELS components: A for Banking System

During the analysis period, the asset quality of Turkish banking sector whether components are deposit or development and investment banks are found to be performing badly. This gives rise to a challenging question when it is compared to management quality.

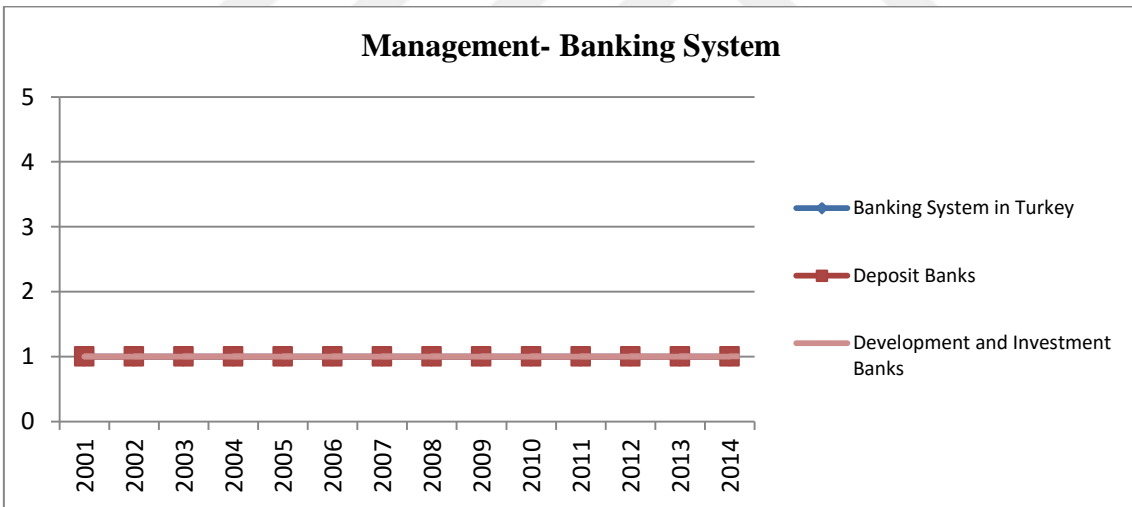


Figure 20 CAMELS components: M for Banking System

During the analysis period, the asset quality of Turkish banking sector whether components are deposit or development and investment banks are found to be performing perfectly. How can a top rated management have poor quality assets under the management control? (Berger & DeYoung, 1997), in page 851, states “banks' management ratings were more strongly related to their asset quality ratings than to any of their other examination ratings”. Findings seem conflicting, but asset quality is considered very strict

in the analysis and management quality is evaluated just according to ratios, answer to arising question lies here.

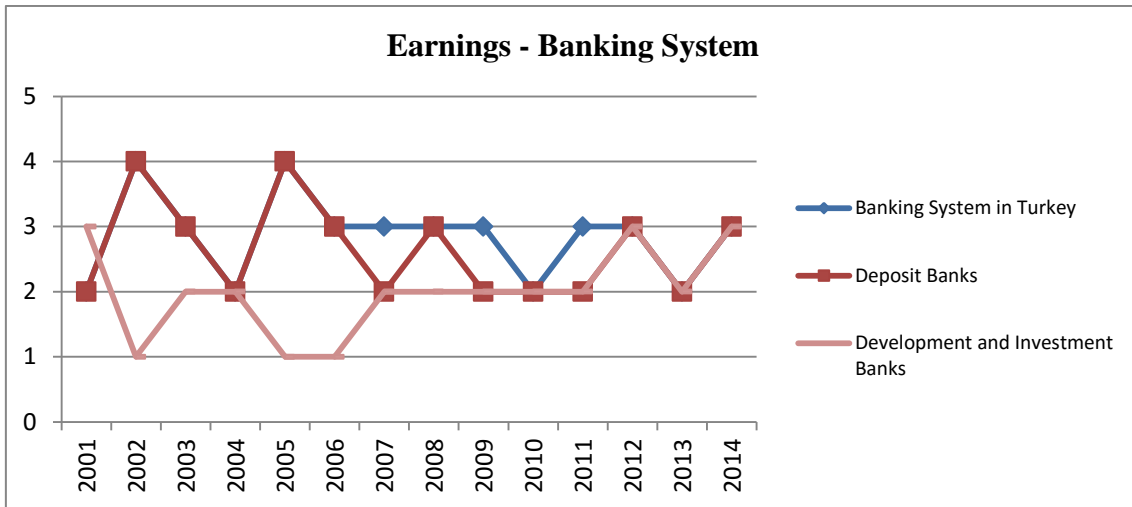


Figure 21 CAMELS components: E for Banking System

After 2008, deposit banks follow the same pattern with development and investment banks. Before the 2008 crisis period, one was getting better the other was getting worse according to graph.

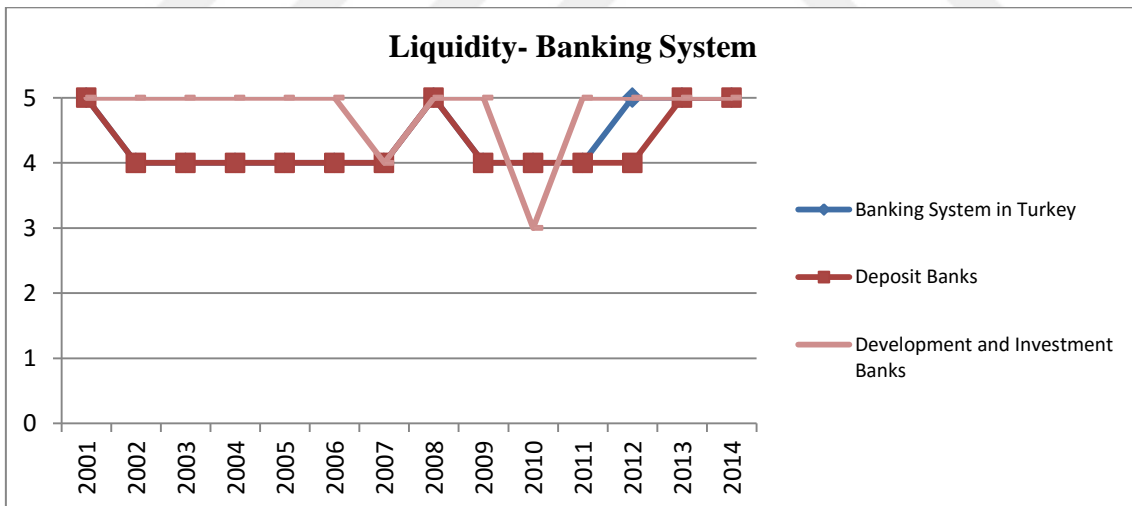


Figure 22 CAMELS components: L for Banking System

Liquidity ratings of deposit banks are generally better than development and investment banks. In 2013, sector and main breaks get the same in the worst rating note.

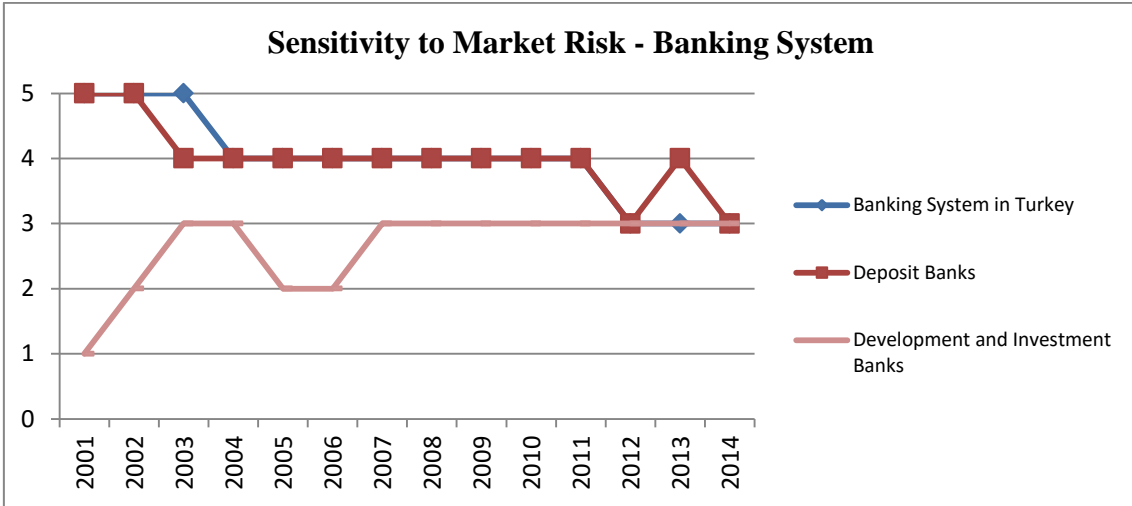


Figure 23 CAMELS components: S for Banking System

In the sensitivity to market risk component, development and investment banks seem to manage the FX exchange, interest rate change like effects better than deposit banks.

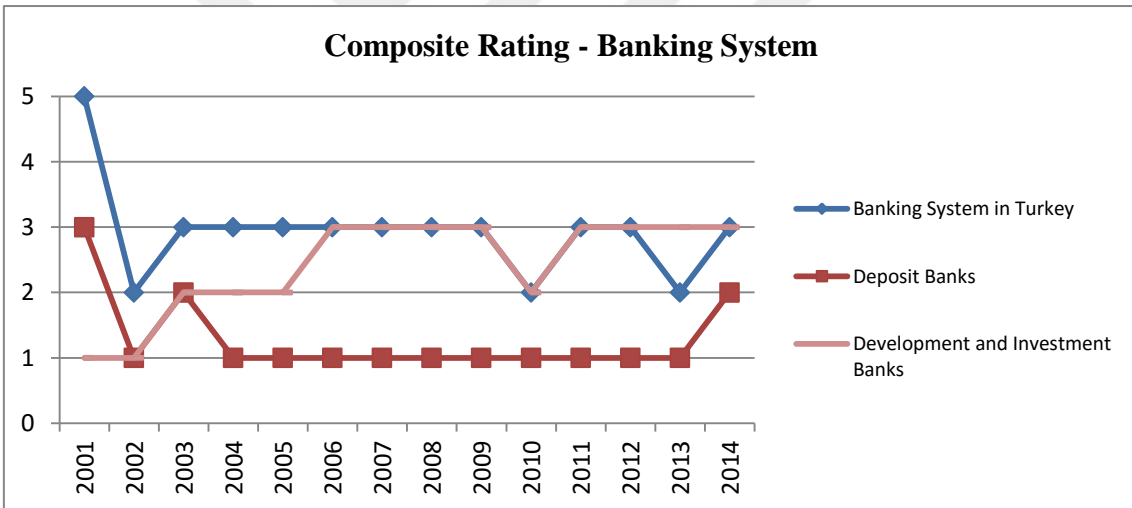


Figure 24 CAMELS composite for Banking System

Overall ratings are represented by composite ratings and when this is inspected, deposit banks are found to be the best performers in the Turkish banking sector. Capturing deposit banks from a closer point, breaks deposit banks into state owned, privately owned and foreign bank nodes.

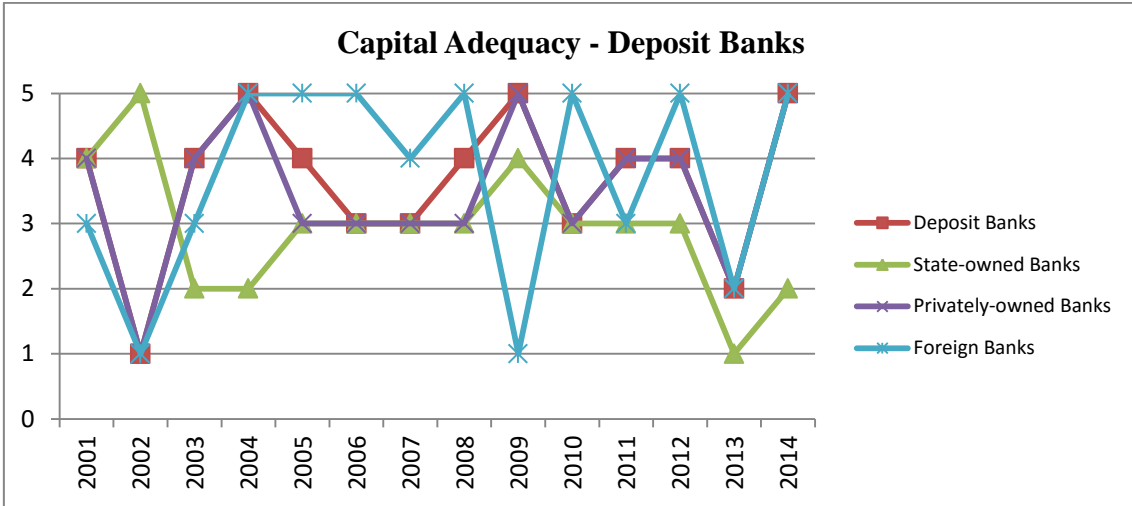


Figure 25 CAMELS components: C for Deposit Banks

State owned deposit banks are the riders of the deposit banks, followed by privately owned banks. Foreign banks are found to be the worst performers amongst all.

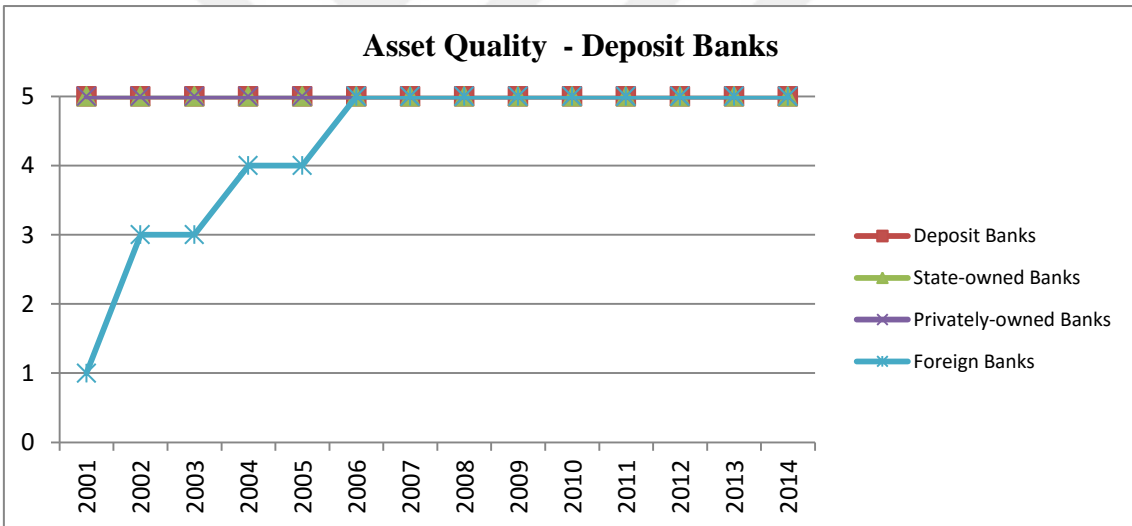


Figure 26 CAMELS components: A for Deposit Banks

Foreign banks asset quality rating declined gradually and after 2006 it got equal with others.

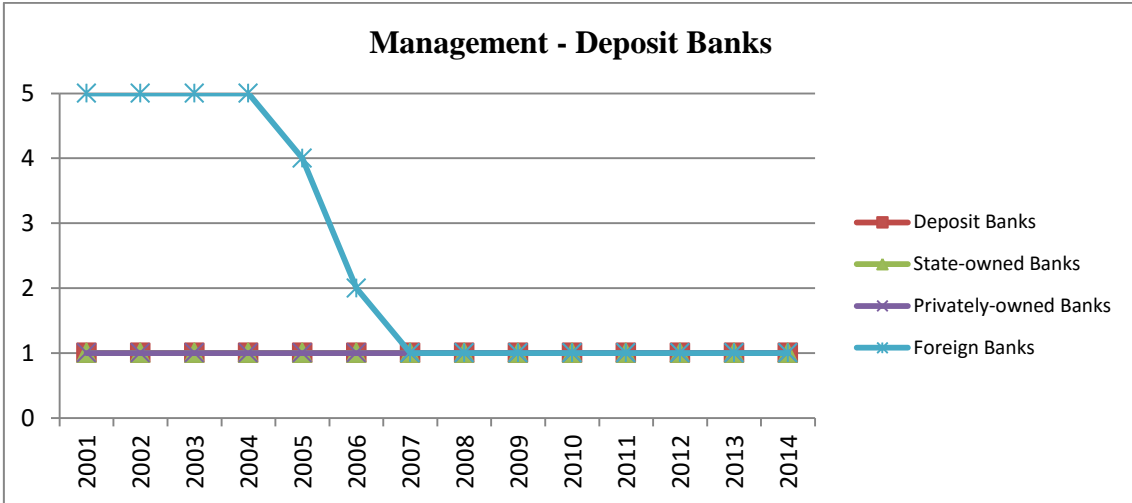


Figure 27 CAMELS components: M for Deposit Banks

Foreign banks management ratings were in the worst scenario from 2001 to 2004. Then it gradually got better and in 2007 it got equal to others in the best state.

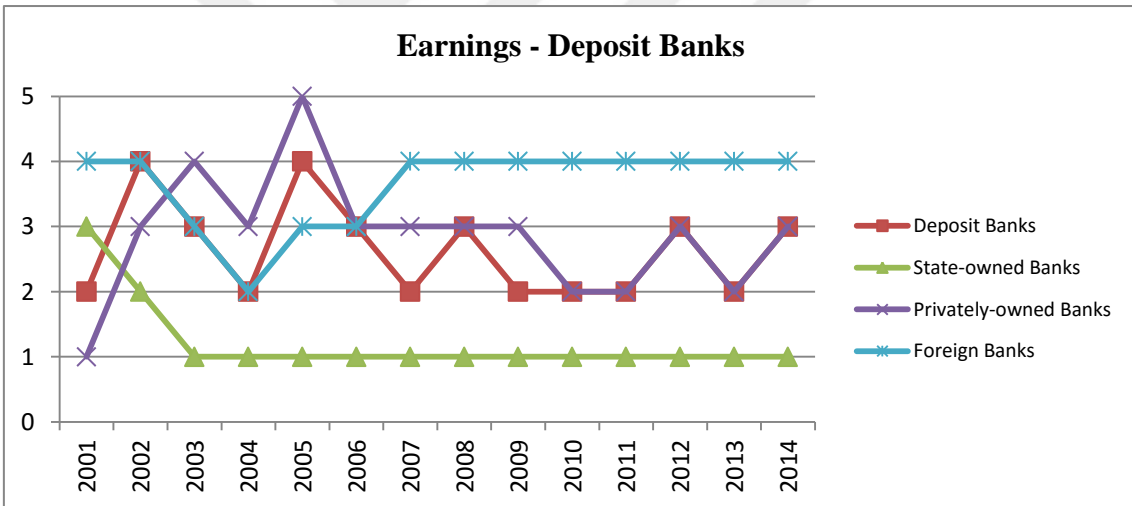


Figure 28 CAMELS components: E for Deposit Banks

Best rating in the earnings component is in state owned banks. Foreign banks are in a worse state than the deposit banks after 2006. Privately owned banks were better than the deposit banks in 2001 and in 2002, but after that they would not get a better grade than deposit banks.

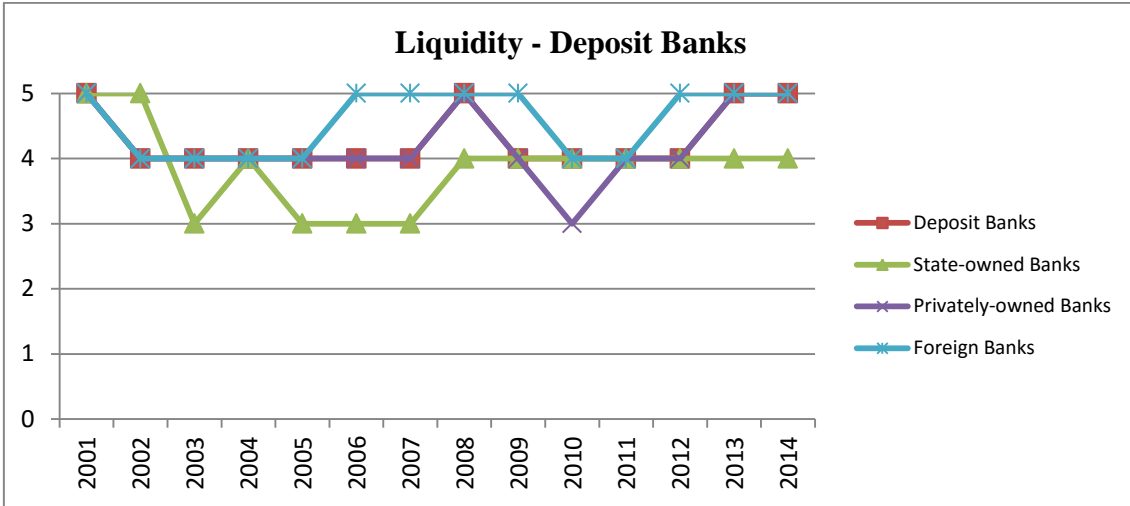


Figure 29 CAMELS components: L for Deposit Banks

None of the banks have well developed management practices or strong liquidity levels about funds, and all of the banks must improve either their management practices or liquidity levels according to these results. This is consistent with the asset quality rating notes.

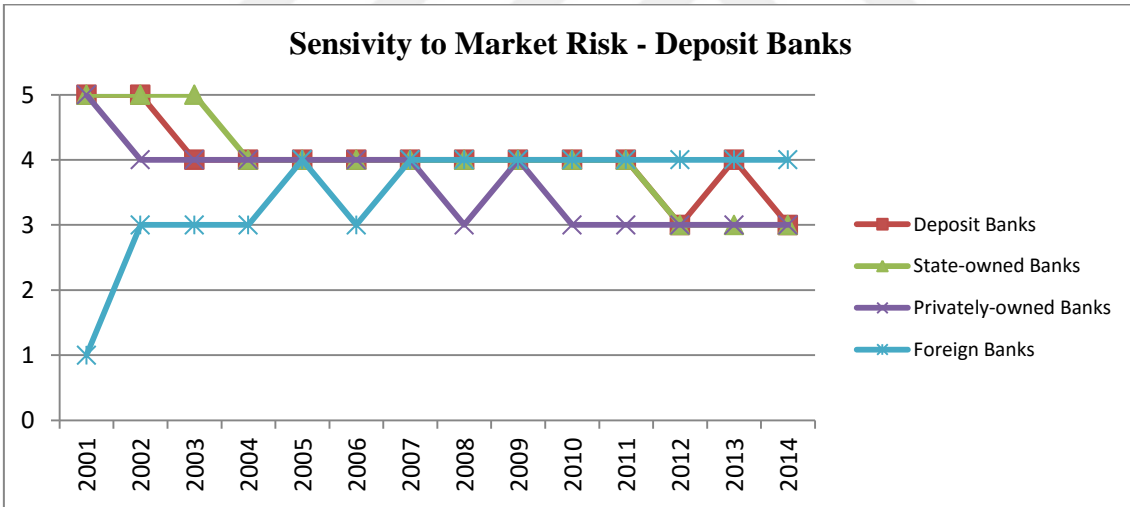


Figure 30 CAMELS components: S for Deposit Banks

In the UFIRS (1996), sensitivity to market risk is defined by “management’s ability to identify, measure, monitor, and control market risk; the institution’s size; the nature and complexity of its activities, and the adequacy of its capital and earnings in relation to its level of market risk exposure.” Findings state that improvement must be made in order to get to a better state, as most other components indicate.

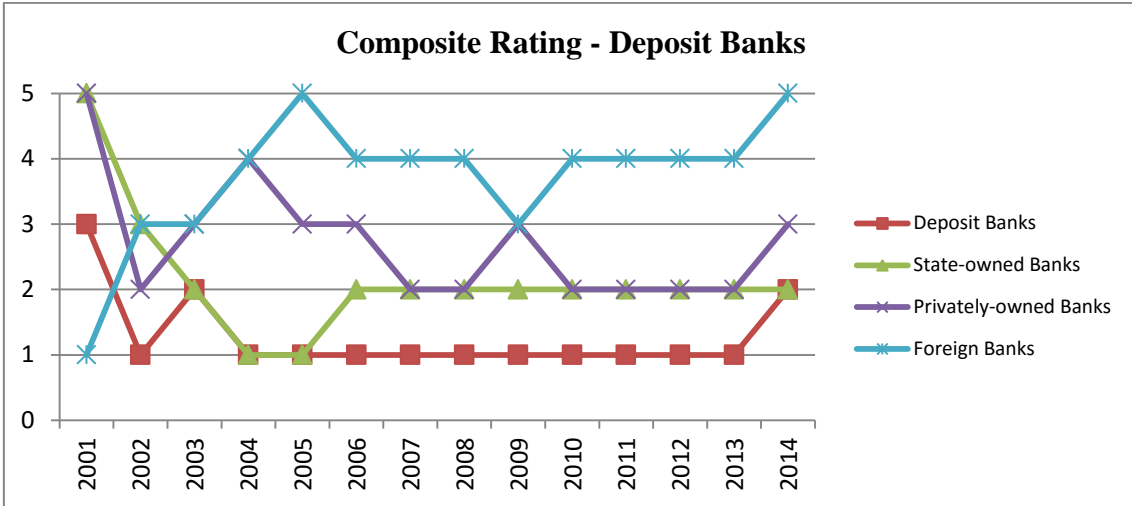


Figure 31 CAMELS composite for Deposit Banks

According to composite rating scores deposit banks as a whole seem to do well, but foreign banks must be monitored closer because they are the most fragile ones under deposit banks node.

5. DATA ENVELOPMENT ANALYSES

In the banking sector for the evaluation of performance, there is not a generally accepted industry standard. Researchers use very large scales of measures, such as ratio analyses to frontier models.

In this part, a data envelopment analysis which is going to be used as DEA in abbreviated form will be introduced. Then the DEA method used in the study will be introduced.

5.1. DEA Introduction

DEA is a mathematical programming method, which compares alike competitors which are defined as decision making units (DMU's), and represents which performs the best or in other words which is the most efficient among others. Efficiency is a wide topic, it may mean allocative efficiency, price efficiency, scale efficiency, structural efficiency, technical efficiency, total economic efficiency, overall efficiency etc. according to the author and research area. By using DEA methodology, researchers search for one or more of these efficiency measures. In order to investigate specific kinds, there are various kinds of DEA methodologies built, but the main idea is similar, making more by using the same or making the same by using less. From this point, it can be seen that DEA focuses on inputs and output at first glance. Aim of the analyses can be summarized as using minimum input to get maximum desired output or getting the desired output set by using minimum input. According to the environment studied, input oriented or output oriented methodology is chosen. At this point, control on the data is considered important for the decision, but it is not like the regression model. The situation is not this easy, one must decide which option should be used, variable returns to scale (VRS) or constant returns to scale(CRS), and the DEA calculation methodology, such as one stage, two stage, multi stage, Malmquist DEA, etc. Malmquist total factor productivity index is calculated to add time factor and make analysis dynamic in addition to DEA, which is a static measure that uses a single year. Besides the complex mathematical procedure of DEA, the improvement of computer technology and software packages makes it is easier for researchers to apply DEA to their studies. Even with the general purpose spreadsheet application Microsoft Excel's solver package includes integration to DEA. The most used specialized applications for DEA are IDEAS, which is the abbreviation of Integrated Data

Envelopment System, DEAP, which is the abbreviation of Data Envelopment Analysis Program and Warwick DEA. This study started with ETAKDS, which is coded in Turkey and the abbreviation of Etkinlik Analizi Karar Destek Sistemi (Effectiveness Analysis Decision Support System) and completed with EMS (Efficiency Measurement System) due to usage of super efficiency.

Output orientation is defined with “a DMU is not efficient if it is possible to augment any output without increasing any input and without decreasing any other output”. And the input orientation is defined with “a DMU is not efficient if it is possible to decrease any input without augmenting any other input and without decreasing any output”. (A. A. Charnes, Cooper, & Rhodes, 1981)

Extended Pareto Koopmans definition of efficiency implies that the hundred percent efficiency or full efficiency can only be reached under the situation that zero improvement in decision making units input or output without changing its input or output in a worse matter. If all information is available, this definition is suitable to use, but by using only the available information, relative efficiency term is better to use. According to relative efficiency definition, full efficiency is reached by a decision making unit by looking at the evidence of the performances of other decision making units. If other decision making units show no available improvement in input or output of the decision making unit under investigation without changing its input or output in a worse way, then the investigated decision making unit is said to be fully efficient. (Cooper, Seiford, & Zhu eds., 2011)

Further decomposition of efficiency continues with scale, allocative, technical and structural efficiency measures. Scale efficiency which can also be composed into variable returns to scale and constant returns to scale has a three dimensional development. Farrell in 1957 and later Charnes, Cooper and Rhodes in 1978 set a framework having constant returns to scale, which is known as CRS models. In 1984 Banker, Charnes and Cooper break CRS model in to product of a technical efficiency and a scale efficiency measures. They relaxed the CRS assumption, which resulted in a variable returns to scale, which is known as VRS models. Both models and measures above assume linear programming methodology. As Sengupta mentioned the details in 1994, the third dimension has a nonlinear sight and direct computation of the scale measure, which can be a translog function or a function like Cobb-Douglas production function is available with this.

Allocative efficiency or price efficiency in economic theory is related to the decision of choosing optimal input set with known or predefined input prices. Technical efficiency is another concept, which is about production frontier that tries to measure maximum output production of a firm with known or predefined inputs, and therefore, technical efficiency gives information about how successful the firm is when using input to produce output. Farrell in 1957 defines structural efficiency as an industry level topic concentrated on the short length search of optimal allocation of industry production level through best practice firms to all firms. When two industries are compared, if best practice firms of the first industry is closer to the efficient frontier than the second industry, then according to the distribution, the first industry is assumed to be more efficient than the second one. Vice versa is also applicable. (Daraio & Simar, 2007)

In DEA, all efficient DMU's get a score of one or hundred percent, while the inefficient ones are ranked. By using super efficiency systematic introduced by Per Andersen and Neils Christian Petersen in 1993, it is also available to rank efficient DMU's. (Andersen & Petersen, 1993)

5.2. Model and Methodology

Four inputs and four outputs are used in my main model. Banks use personnel, fixed assets, bank capital and deposits to create the desired and undesired output throughout their intermediation function. Securities, off balance sheet assets and loans are the ones that are favorable. The non-performing loans are the unfavorable ones (BRSA, 2006). Data set is gathered from the Banks Association of Turkey. Personnel data is from statistical reports; bank, branch and employees reports, which show a number of employees in the period. All other data are given in 1000 TL format. Twenty nine banks functioning in the Turkish banking sector by the end of 2014 are used in this study, which are DMU's and coded as B1 to B29. Refer to Table 17. These banks are chosen from deposit banks that have data till the beginning period of the analyses. There are statue and/or name changes through the period, last known name and statue are used for the purpose of the analyses. The Turkish banking sector is not eligible to develop DEA model used in the study as a whole by only looking at main groups, which are the whole banking system, deposit banks, development and investment banks, yielding three DMU's where one contains both of the other two. When they are detailed as state owned, privately owned and foreign, this result would not

even be enough for the analyses. Eight input/output variables require a minimum of sixteen DMU's to result in reasonable efficiency scores, whereby the data in this study has more than triple the variables. Another issue is according to the chosen input and output variables. Development and investment banks are automatically excluded from the analyses. From an input oriented approach, three more models are developed by looking at the last available quarters input factor correlations. This has resulted in four models coded as M1, M2, M3 and M4. Correlation matrix and these models input and output variables are on Table 18.

Table 17 Codebook 2

Deposit Bank		
Type	Name	Code
Private	Adabank A.Ş.	B1
Private	Akbank T.A.Ş.	B2
Foreign	Alternatifbank A.Ş.	B3
Private	Anadolubank A.Ş.	B4
Foreign	Arap Türk Bankası A.Ş.	B5
Foreign	Bank Mellat	B6
Foreign	Burgan Bank A.Ş.	B7
Foreign	Citibank A.Ş.	B8
Foreign	Denizbank A.Ş.	B9
Foreign	Deutsche Bank A.Ş.	B10
Private	Fibabanka A.Ş.	B11
Foreign	Finans Bank A.Ş.	B12
Foreign	Habib Bank Limited	B13
Foreign	HSBC Bank A.Ş.	B14
Foreign	ING Bank A.Ş.	B15
Foreign	JPMorgan Chase Bank N.A.	B16
Foreign	Société Générale (SA)	B17
Private	Şekerbank T.A.Ş.	B18
Private	Tekstil Bankası A.Ş.	B19
Foreign	The Royal Bank of Scotland Plc.	B20
Private	Turkish Bank A.Ş.	B21
Foreign	Turkland Bank A.Ş.	B22
Private	Türk Ekonomi Bankası A.Ş.	B23
State	Türkiye Cumhuriyeti Ziraat Bankası A.Ş.	B24
Private	Türkiye Garanti Bankası A.Ş.	B25
State	Türkiye Halk Bankası A.Ş.	B26
Private	Türkiye İş Bankası A.Ş.	B27
State	Türkiye Vakıflar Bankası T.A.O.	B28
Private	Yapı ve Kredi Bankası A.Ş.	B29

Table 18 Input Correlations for Scenario Building

		1	2	3	4	5	6	7	8
		Labor {I}	Deposits {I}	FixedAssets {I}	BankCapital {I}	NPL-net {O}	Securities {O}	OffBSAssets {O}	Loans {O}
<hr/>									
	Labor								
1	{I}	1.00							
	Deposits								
2	{I}	0.97	1.00						
	FixedAssets								
3	{I}	0.85	0.85	1.00					
	BankCapital								
4	{I}	0.95	0.99	0.82	1.00				
	NPL-net								
5	{O}	-0.76	-0.74	-0.69	-0.67	1.00			
	Securities								
6	{O}	0.91	0.97	0.85	0.97	-0.61	1.00		
	OffBSAssets								
7	{O}	0.79	0.79	0.56	0.78	-0.51	0.77	1.00	
	Loans {O}								
8		0.97	0.99	0.81	0.99	-0.71	0.94	0.80	1

	Inputs				Output			
	1	2	3	4	5	6	7	8
model 1 (M1)	x	x	x	x	x	x	x	x
model 2 (M2)	x	-	x	-	x	x	x	x
model 3 (M3)	-	x	x	-	x	x	x	x
model 4 (M4)	-	-	x	x	x	x	x	x

Some data in the analyses can either be used in a number format or in a monetary form, such as personnel number or personnel expense. In such conditions, decision is made according to the availability of data and its suitability to the analyses. Personnel expense is a datum gathered from an income statement and it's made available to the public in a yearly cumulative form. Until 2007 banks were free to send quarterly data. Therefore, all banks do not have data on this topic. Also, each available data for the purpose of the analyses could not be found ready for analysis. Therefore, some transformations are made. When making these changes information provided by Subhash C. Ray in 2004 is considered. Scale invariant models and translation invariant models. Definition of scale invariant is given as DEA efficiency measure doesn't change with the change in the input and/or output quantities unit of measurement. The definitions of translation invariant models are given as, not affected optimal solution due to change of origin. BCC input and output oriented DEA models are given as scale invariant models. Input oriented BCC models are given as invariant to input translation and output translation. Because of the sum of λ 's, self generated pre-requisite for this situation is given as, "if each δr equals zero(i.e., if there is no translation of output)" for the input translation of input oriented BCC model and similar for output translations. Also additional information is provided with input oriented BCC model being a translation invariant with respect to output in the following discussions of the author. (Ray, 2004)

As the nature of banking activities, some loans are classified under non performing group and this is like emissions of air polluting gases due to energy production. They are there but they are the not favored ones. There are several ways so treat this kind of data or result.(Fried et al., 2008) In this study, subtracting the undesirable output from a large number to transform into a desirable output systematic, which is classified under indirect methodologies is used with respect to invariance specification of the model.

Basic DEA models assume real positive numbers in input and output, meaning negative data or zero data cannot be in the set. How to treat zero data depends on the data specifications. Input side zero data are treated different than output side zero data. Also the reason for zero data should be considered before making any edits. Zero output is not considered a problem in standard variable returns to scale model regardless of models orientation, because of the $\sum_j \lambda_j y_{rj} \geq \alpha y_{ro}$ constraints feasibility (Fried et al., 2008). An

input oriented model has alpha equal to one, and if the output is zero constraint turns to equal to or bigger than zero.

The input oriented BCC model technical efficiency of DMU t is stated as follows:

$$\begin{aligned}
 & \min \theta \\
 & \text{s.t. } \sum_{j=1}^N \lambda_j x^j \leq \theta x^t; \\
 & \sum_{j=1}^N \lambda_j x^j \geq y^t; \\
 & \sum_{j=1}^N \lambda_j = 1; \\
 & \lambda_j \geq 0 (j = 1, 2, \dots, N).
 \end{aligned} \tag{3.1.16}$$

Let $(\theta^*; \lambda_1^*, \lambda_2^*, \dots, \lambda_N^*)$ be the optimal solution. Define $x_*^t = \theta^* x^t$ then (x_*^t, y^t) is the efficient input oriented projection of (x^t, y^t) on to the frontier and

$$TE_1^V(x^t, y^t) = \theta^* \tag{3.1.17}$$

(Ray, 2004)

Per Andersen and Neils Christian Petersen in 1993 defined X, as an m-dimensional input vector and Y_j as an s-dimensional output vector for the jth unit, E, as a scalar defining the share of the jth DMUs input vector required to produce the yth DMUs output vector within the reference technology, Z as an intensity vector, Z_k denoting the intensity of the kth unit, δ is a non-Archimedean infinitesimal, and e' is the row vector (1, . . . , 1) of appropriate dimension and stated their model (3.1.18)(equation 1.3).

$$\begin{aligned}
 & \min E_j - \delta e' s^- - \delta e' s^+ \\
 & \text{s.t.} \\
 & E_j X_j = \sum_{\substack{k=1 \\ k \neq j}}^n z_k X_k + s^-, \\
 & Y_j = \sum_{\substack{k=1 \\ k \neq j}}^n z_k Y_k + s^+, \\
 & Z, s^+, s^- \geq 0
 \end{aligned} \tag{3.1.18}$$

Their model is stated identical to BCC, except the unit being evaluated is taken out of the reference set.(Andersen & Petersen, 1993)

Efficiency measurement system software uses Andersen & Petersen’s procedure in super efficiency procedure, and big yielding results mean the DMU remains efficient under a large arbitrary increased input. (Scheel, 2000)

5.2.1. Findings:

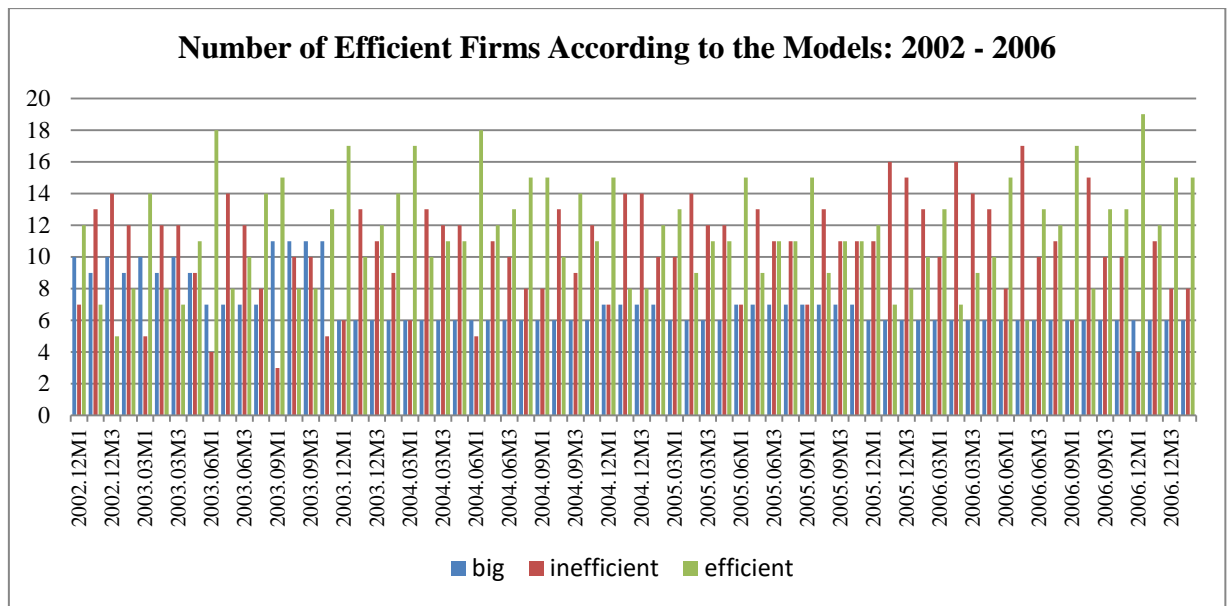


Figure 32 DEA results M1 - M4 2002 - 2006

According to Model 1, the total number of efficient firms slightly declines till 2005.12 and then it increases. According to Model 2, the total number of efficient firms seems stable except some fluctuations in 2004 till 2006.06 and then it increases. According to Model 3, the total number of efficient firms increases till 2004.09, it declines rapidly, and then it recovers. According to Model 4, the total number of efficient firms increases with fluctuations till 2004.06 then it drops down and shows a relatively stable figure till 2006.03, but afterwards it increases. A general statement for each model is that the number of efficient firms increase after 2006 in period 2002 to 2006.

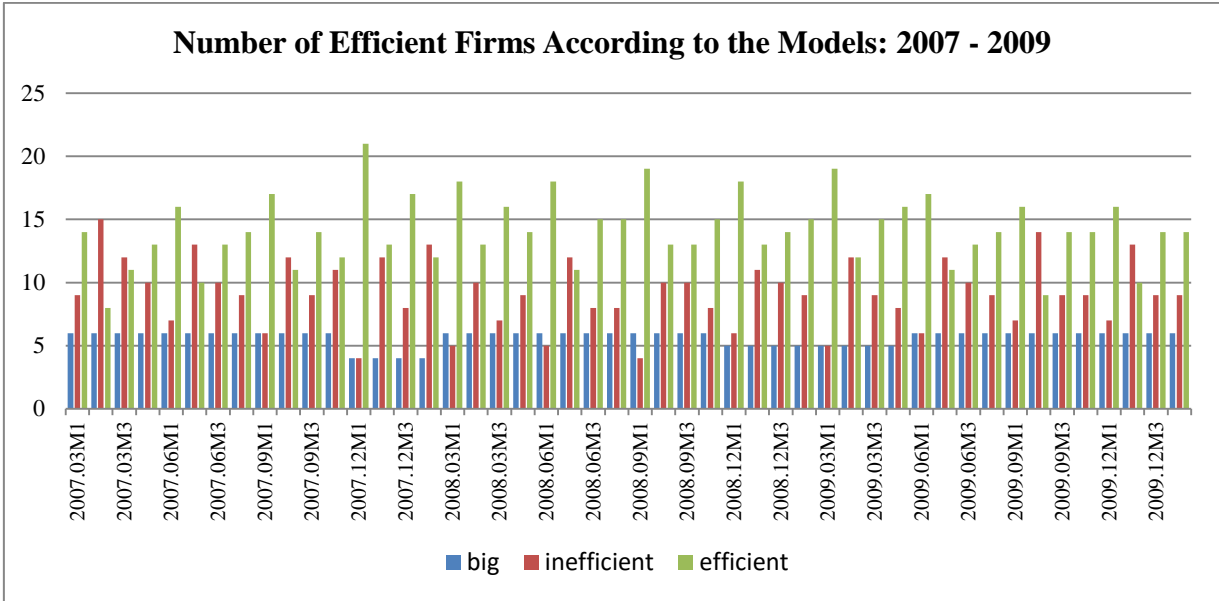


Figure 33 DEA results M1 - M4 2007 - 2009

During the pre-crisis period, crisis period and post crisis period of 2008, according to all models, beyond some exceptions the number of efficient firms seems stable.

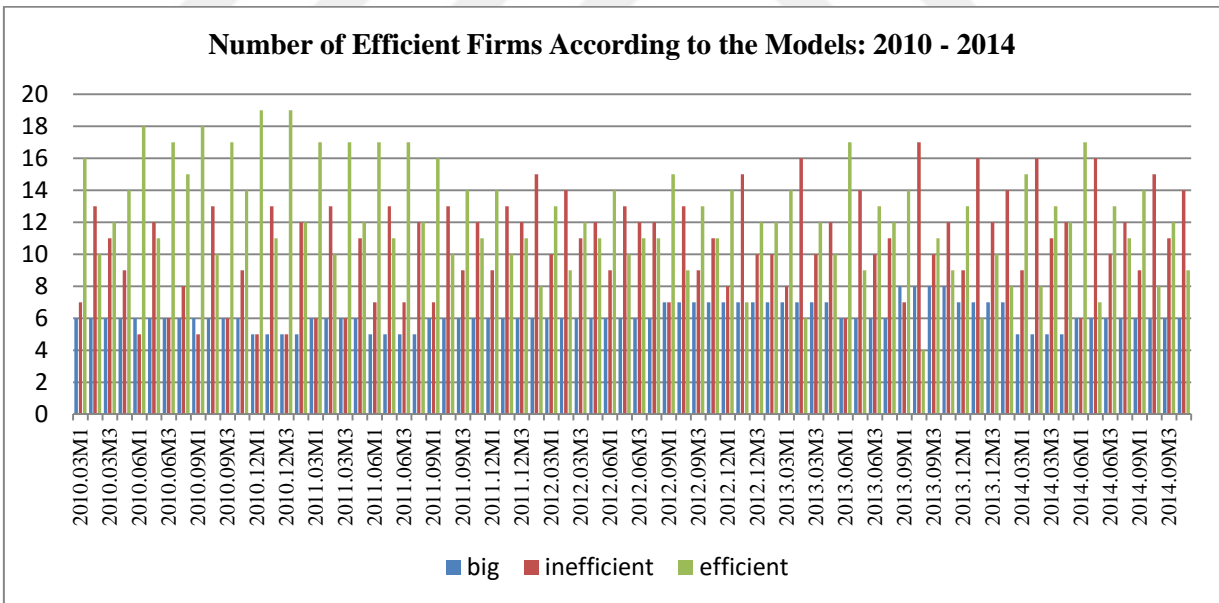


Figure 34 DEA results M1 - M4 2010 - 2014

According to Model 1, after 2010 the number of inefficient firms doubles by 2012.03 and slightly declines towards 2015. According to Model 2, especially after 2012 the number of inefficient firms increases, whereas number of efficient firms drops to about half the values seen in 2010 and 2011. Model 3 shows the number of efficient and inefficient firms are

about the same after 2011.12. Model 4 draws the worst scenario showing more inefficient number of firms most of the time after 2011.09 to 2015's.

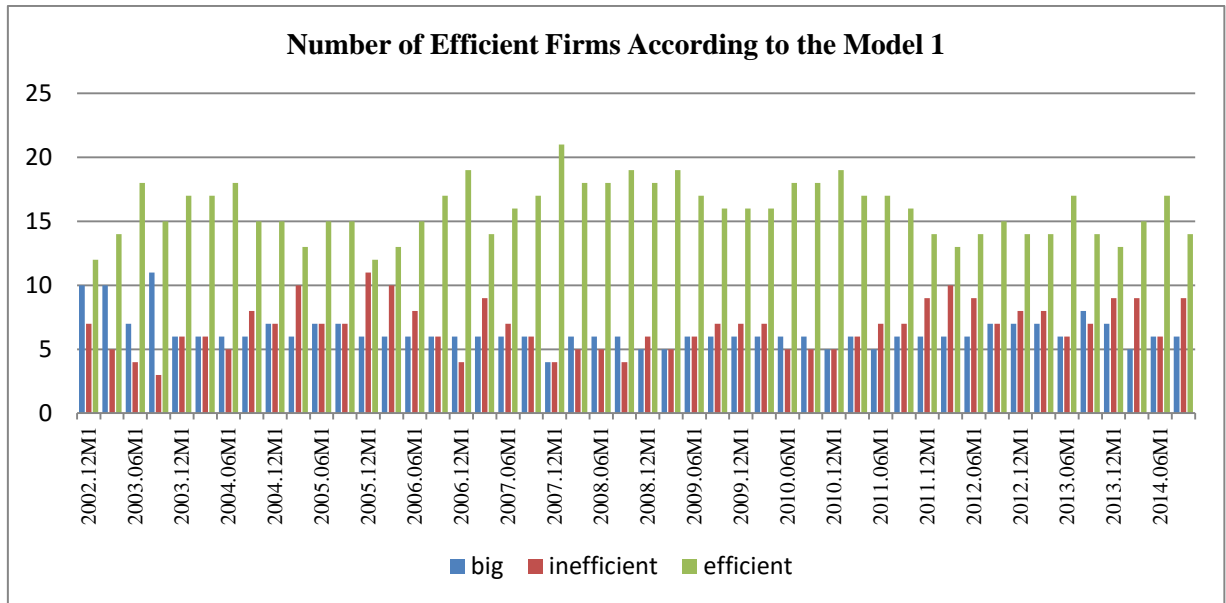


Figure 35 DEA results M1 2002 - 2014

Excluding big yielding data, when the number of efficient firms are set on a scatter graph linear trend shows a declining efficiency in the period with the “ $y = -0.0046x + 16.028$ ” line. According to Model 1, the average efficiency throughout the period is found 3.7792(377.92%) with the maximum value of 348.767(34876.73%).

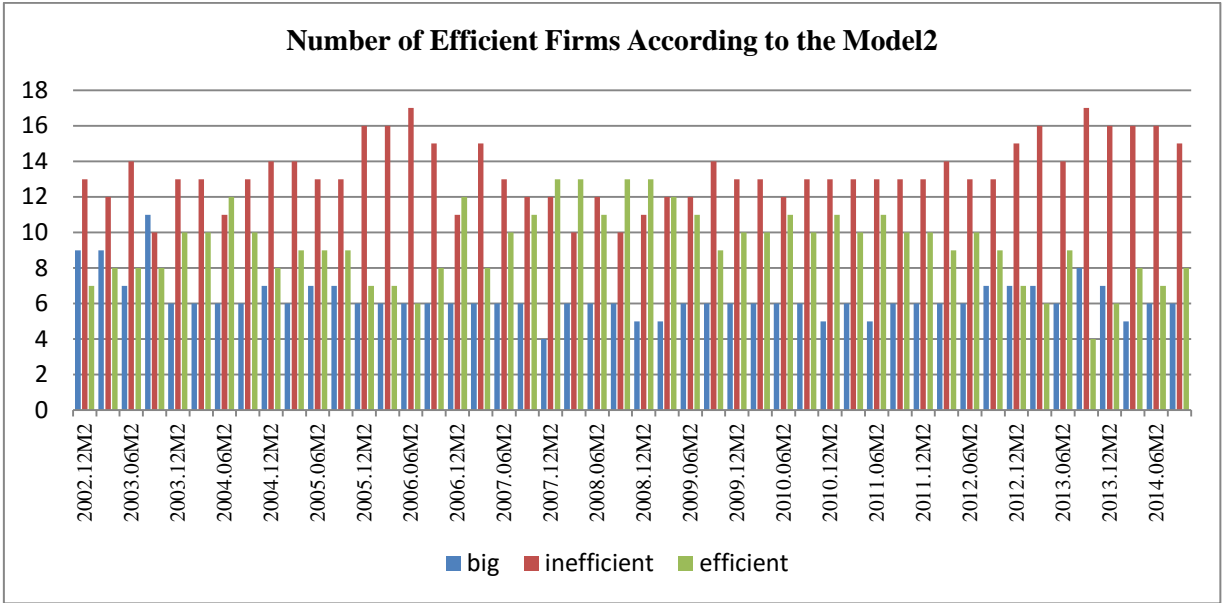


Figure 36 DEA results M2 2002 - 2014

Excluding big yielding data, when the number of efficient firms is set on a scatter graph linear trend shows a declining efficiency in the period with the “ $y = -0.0179x + 9.7722$ ” line. According to Model 2, the average efficiency throughout the period is found 1.89813(189.81%) with the maximum value of 50.4337(5043.37%).

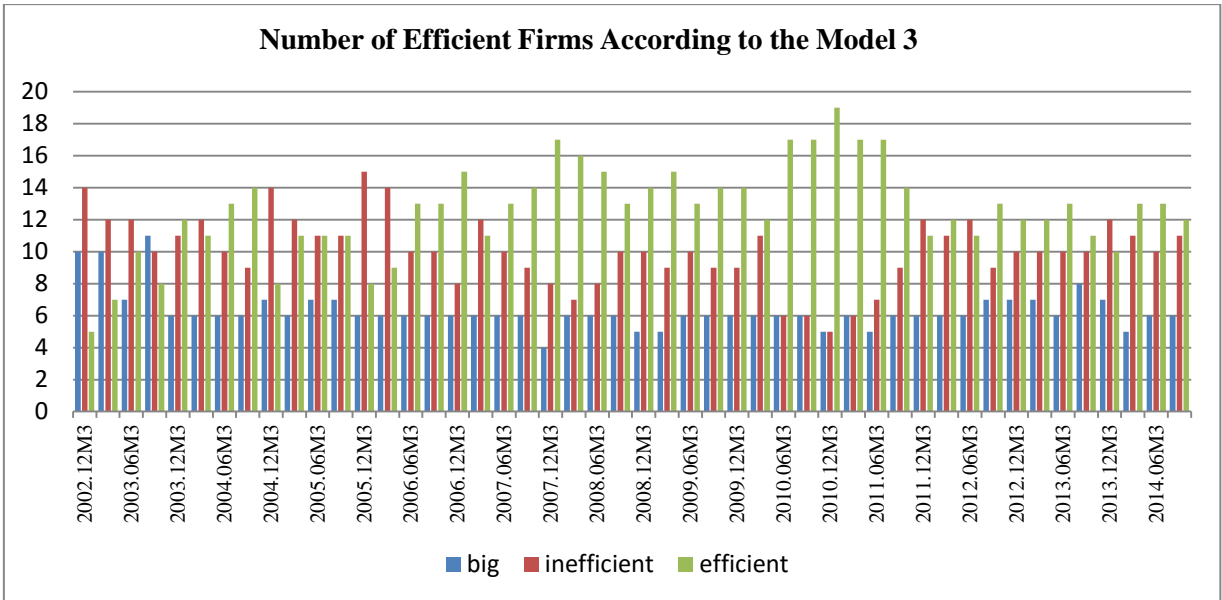


Figure 37 DEA results M3 2002 - 2014

Excluding big yielding data, when the number of efficient firms is set on a scatter graph linear trend shows an increasing efficiency in the period with the “ $y = 0.0799x + 10.626$ ” line. This is the only model stating increase in the number of efficient firms throughout the models used in this study. According to Model 3, the average efficiency throughout the period is found 3.22953(322.95%) with the maximum value of 348.767(34876.73%).

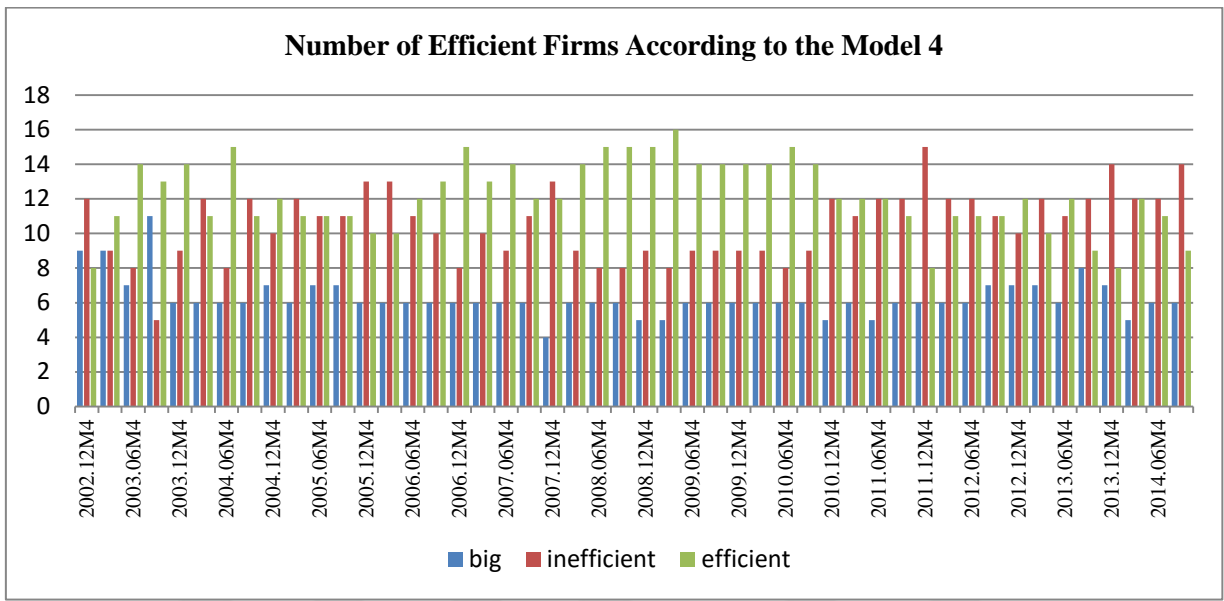


Figure 38 DEA results M4 2002 - 2014

Excluding big yielding data, when the number of efficient firms is set on a scatter graph linear trend shows a declining efficiency in the period with the “ $y = -0.0302x + 12.906$ ” line. According to Model 4, the average efficiency throughout the period is found 1.54112(154.11%) with the maximum value of 19.4063(1940.63%).

6. CONCLUSION

When analysis periods' grand averages are investigated, ROE of state owned deposits banks are the highest with about 22 percent, whereas the lowest ones are the development and investment banks with about 8 percent. However, when we look at the ROA concept, development and investment banks get a 3 percent return, where the state owned banks have a 2 percent. Even the deposit banks have higher ROE with respect to development and investment banks, get lower return on their assets. Indeed all the nodes observed except development and investment banks have about 2 percent return on their assets. State owned deposit banks have about 9 percent asset utilization ratio, whereas deposit and investment banks have only about 6 percent but expense ratios of development and investment banks are lower than the state owned banks, which are sequentially about 3 percent and 7 percent. When foreign banks are compared to the banking sector of Turkey, ROE of the sector is about 16 percent and foreign banks have a slightly lower ratio with about 15 percent. About a 2 percent return on assets can be observed for both of them, showing that foreign banks are functioning similar to the sector. In the asset utilization ratio, the highest result belongs to foreign banks with about 10 percent when the sector average is about 9 percent. In the expense ratio foreign banks have about 7 percent where the sector has about 6 percent, stating that foreign banks are less efficient in controlling their expenses while generating higher income from its assets. As equity multiplier is a sign of financial leverage and shows risk, foreign banks are expected to have lower equity multiplier to compensate their risk stated above. As expected, foreign banks have about 7 percent equity multiplier ratio, whereas the sector has about 8 percent. Development and investment banks have about 3 percent equity multiplier ratio and state owned deposit banks have about 10 percent. This is consistent with the ROE results and reveals that state owned banks manage the leverage better than development and investment banks and also better from the others. DuPont analysis results show that according to the best well known performance measure ROE, state owned deposit banks can be given as examples to be the best practice firms in the sector, and the gap between the units analyzed converged in time. During the analysis period, the overall assessment of DuPont analysis states my point of view that the foreign banks perform the worse tellers.

According to CAMELS results, grand averages of ratings also supports that foreign banks perform worse statement for deposit banks. However, an important notice arises here. Due to asset quality and sensitivity to market risk components, even when the foreign banks are in a bad state they are slightly better than privately owned and state owned banks, but these component results are not enough to dominate privately owned and state owned banks. Another important finding is where management and asset quality of deposit banks and development and investment banks are the same, development and investment banks are dominated in earnings and liquidity components, even when they manage capital adequacy and sensitivity to market risk components better, they were beaten on the overall composite assessment. CAMELS rating calculating methodology should be tailored to development and investment banks, in order to give more valuable and sensible information. In the development and investment banks group, state owned banks outperform others. CAMELS composite rating developments in years can be summarized as follows; deposit banks started with a bad rating and got better in time. In 2002 and 2014, rating note gets worse. In development and investment banks, the period started with best rating note and ended with the bank sector average rating showing a worse performance than the beginning period. CAMELS notes for the banking system, deposit banks and development and investment banks were sequentially 5, 3 and 1 in the beginning and at the end of the period they are 3, 2 and 3 showing the gap is closing between them. Unfortunately, in the last period the banking system and deposit banks got worse. When deposit banks are broken into state owned, privately owned and foreign nodes, foreign banks get worse in time but both the state owned and privately owned banks get better. The same conclusion for all nodes in the last period can be observed, which is the worsening of the composite rating notes. State owned deposit banks are found to be the best and this is consistent with the DuPont results. CAMELS rating score used in the study does not include human judgement, because it's done according to ratios, which are publicly available. Including surveys into the CAMELS system, may yield different results but this is a point that should be tackled in other studies. DuPont results are similar to CAMELS rating notes.

In 2007 and 2008 Turkey got through a big crisis. According to CAMELS, results state owned, privately owned and foreign banks rating notes did not change in these years, but in 2009 foreign banks got better and privately owned banks got worse. They turned to the 2007 – 2008 states in 2010. Excluding 2014, implementation of an economic recovery

program strengthened the sector and the 2007 – 2008 crisis effects were not persistent in the sector. These findings can also be observed from DuPont scheme. Also, model 1 DEA results, clearly support this finding.

Appendix H summarizes DEA model results in time. From model 1 nearly no change in the efficiency trend in selected deposit banks is observed, from model 2 and model 4 efficiency decline is observed but in model 3, a result contrasting to other models is observed stating the efficiency increase. DEA results with different models using different input but the same output yield different results. When all inputs, such as labor, deposits, fixed assets and bank capital are used statement of nearly no efficiency change in the analysis period is possible. However, model 2 and model 4 state efficiency decline in labor and fixed asset usage and similar but sharper efficiency decline in fixed asset and bank capital usage in time.

As a result, DuPont analysis results are consistent with the CAMELS analysis results and by using quarterly data, my findings are in line with Akıncı et. al. (2012), suggesting that state banks perform better than foreign banks in Turkey on average performance. State owned deposit banks can be given to the best practice firms in the sector, but my study extended this result to the fact that, foreign banks overall performance is not better than state owned banks they are found to manage their assets better than domestic competitors. Also, foreign banks are found less vulnerable to market risks. From these points, foreign banks are required for the overall stability of the financial system.

Three hypotheses associated with non-performing loans are bad luck, bad management and skimping (Berger & Mester, 1997). If the reasons of these are impacts of negative shocks, they are assumed as exogenous factors and named with “bad luck”. If non-performing loans are the result of bank’s loan portfolios wrong construction, than it is “bad management”. In the analysis period, political and economic environment is favorable for development and CAMELS rating score associated with management component does not represent any problem. These two hypotheses are eliminated so that the remaining problem is skimping hypothesis. According to skimping hypothesis, non-performing loans are related to not giving enough effort in control and monitoring of loans. This may be due to lack of adequate number of trained employees in risk departments in the Turkish banking sector. However this statement remains unconfirmed, for a further study.

With the new financial and economic design by the implementation of an economic recovery program and the banking sector restructuring program after the 2001 crisis, the banking sector in Turkey shows better performance and lower fragility than the beginning of the millennium. This can be observed from the 2008 global crisis period. The performance gap between the groups in the Turkish banking sector have declined in time. Together with the European Union membership procedure and the goals and targets of the 10th Development Program, stability of Turkish economy is considered important. In particular of the İstanbul International Finance Center project, investigated bank performance indicators for being in the top twenty five international finance centers are in a better state. As an example, asset size of the Turkish banking sector passed GDP value in 2013, weak banks are moved out of the sector. Rather than the number, quality is considered important. Also, it must be noted that an increase in the number of strong firms is important for İstanbul International Finance Center project. Relative weaknesses stated in this study for the Turkish banking sector are mainly related to asset quality and liquidity management. Other actions for improvement in these areas should be implemented. For the transparency, financial institution tailored performance measures should be developed and results should be disclosed to the public, even if they have an influence on the perceptions of financial actors, because, performance assessment method results in changing results. The total sterilization of the effects of 2001 crisis cannot be stated; as weak asset quality, lack of transparency and ambiguity on bank risk departments adequacy still persist.

REFERENCES

- Akıncı, D. A., Matousek, R., Radic, N., & Stewart, C. (2012). *Monetary Policy And Banking Sector: Lessons from Turkey* (No. 31/12). Retrieved from <http://eprints.hud.ac.uk/16665/>
- Albayrak, Y. E., & Erkut, H. (2005). Banka performans değerlendirmede analitik hiyerarşi süreç yaklaşımı. *İtÜdergisi Mühendislik*, 4(6), 47–58.
- Andersen, P., & Petersen, N. C. (1993). A Procedure for Ranking Efficient Units in Data Envelopment Analysis. *Management Science*, 39(10), 1261–1264. doi:10.1287/mnsc.39.10.1261
- Ariff, M., & Can, L. (2008). IMF Bank-Restructuring Efficiency Outcomes: Evidence from East Asia. *Journal of Financial Services Research*, 35(2), 167–187. doi:10.1007/s10693-008-0047-2
- Aygün, M., Taşdemir, A., & Çavdar, E. (2010). Banka Performansı Üzerinde Yönetim Kurulu Büyüklüğünün Etkisi. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 24(3), 67–78.
- Aysan, A. F., & Ceyhan, Ş. P. (2007). *Globalization of Turkey's banking sector: the determinants of foreign bank penetration in Turkey* (No. ISS/EC 2007-21). İstanbul. Retrieved from http://www.econ.boun.edu.tr/content/wp/ISS_EC_07_21.pdf
- Aysan, A. F., & Ceyhan, Ş. P. (2008). What determines the banking sector performance in globalized financial markets? The case of Turkey. *Physica A: Statistical Mechanics and Its Applications*, 387(7), 1593–1602. doi:10.1016/j.physa.2007.11.003
- Bakan, İ., Doğan, İ. F., Erşahan, B., & Eytmiş, A. M. (2012). Bankalarda Performans Değerleme Ve Ücretleme İlişisine Dair Çalışanların Algılamaları: Yerli Ve Yabancı Menşeli Banka Uygulamalarının Karşılaştırılmasına Yönelik Bir Alan Araştırması. *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 17(1), 1–26.
- Banker, A. R. D., Charnes, A., & Cooper, W. W. (1984). Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis Some Models For Estimating Technical And Scale Inefficiencies In Data Envelopment Analysis *. *Management Science*, 30(9), 1078–1092.
- Banker, R. D., & Morey, R. C. (1986). Efficiency Analysis for Exogenously Fixed Inputs and Outputs. *Operations Research*, 34(4), 513–521. doi:10.1287/opre.34.4.513
- Banking Regulation and Supervision Agency. (2006). *Strategic Plan 2006 - 2008*. Retrieved from http://www.bddk.org.tr/WebSitesi/english/About_Us/Strategic_Plan/467StrategicPlan.doc
- Banking Regulation and Supervision Agency. (2010). *Strategic Plan 2010-2012*. Retrieved

- from
[http://www.bddk.org.tr/websitesi/english/About_Us/Strategic_Plan/8047SP\(2010-2012\)\(ENG\).pdf](http://www.bddk.org.tr/websitesi/english/About_Us/Strategic_Plan/8047SP(2010-2012)(ENG).pdf)
- Banking Regulation and Supervision Agency. (2011). BDDK Tarafından Bankalara İlişkin Herhangi Bir Derecelendirme Yapılmakta Mıdır? Retrieved from https://www.bddk.org.tr/websitesi/turkce/Kurum_Bilgileri/SSS/10482denetim3.pdf
- Banking Regulation and Supervision Agency. (2013). *Strategic Plan 2013-2015*. Retrieved from https://www.bddk.org.tr/WebSitesi/english/About_Us/Strategic_Plan/12452strategicplan2013_2015final.pdf
- Barros, C. P., Managi, S., & Matousek, R. (2012). The technical efficiency of the Japanese banks: Non-radial directional performance measurement with undesirable output. *Omega*, 40(1), 1–8. doi:10.1016/j.omega.2011.02.005
- BDDK/Strateji Geliştirme Daire Başkanlığı. (2010). *Bankacılıkta Yapısal Gelişmeler*.
- Berg, S. A., Forsund, F. R., & Jansen, E. S. (1992). Malmquist Indices of Productivity Growth during the Deregulation of Norwegian Banking, 1980-89. *The Scandinavian Journal of Economics*, 94(supplement), 211–228. Retrieved from <http://www.jstor.org/stable/3440261> .
- Berger, A. N. (2007). International Comparisons of Banking Efficiency. *New York University Salomon Center, Financial Markets, Institutions & Instruments*, 16(3), 119–144.
- Berger, A. N., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking & Finance*, 21(6), 849–870. doi:10.1016/S0378-4266(97)00003-4
- Berger, A. N., Deyoung, R., Genay, H., & Udell, G. F. (2000). Globalization of Financial Institutions : Evidence from Cross-Border Banking Performance. *Brookings-Wharton Papers on Financial Services*.
- Berger, A. N., & Mester, L. J. (1997). Inside the black box: What explains differences in the efficiencies of financial institutions? *Journal of Banking & Finance*, 21(7), 895–947. doi:10.1016/S0378-4266(97)00010-1
- Bhattacharyya, A., Lovell, C. A. K., & Sahay, P. (1997). The Impact Of Liberalization On The Productive Efficiency Of Indian Commercial Banks. *European Journal of Operational Research*, 98, 332–345.
- Bhaumik, S. K., & Dimova, R. (2004). How Important Is Ownership In A Market With Level Playing Field? *Journal of Comparative Economics*, 32(1), 165–180. doi:10.1016/j.jce.2003.12.001
- Bowlin, W. F., Charnes, A., Cooper, W. W., & Sherman, H. D. (1985). Data Envelopment Analysis And Regression Approaches To Efficiency Estimation And Evaluation*.

Annals of Operations Research, 2, 113–138.

BRSA. (2001). *Towards a Sound Turkish Banking Sector*. Retrieved from http://www.bddk.org.tr/WebSitesi/english/Reports/Other_Reports/2642annex_report_towards_a_sound_turkish_banking_sector.pdf

BRSA. Bankalarca Kredilerin Ve Diğer Alacakların Niteliklerinin Belirlenmesi Ve Bunlar İçin Ayrılacak Karşılıklara İlişkin Usul Ve Esaslar Hakkında Yönetmelik, Resmi Gazete 26333 (2006). Turkey. Retrieved from <http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.10734&MevzuatIliski=0&sourceXmlSearch=BANKALARCA KREDİLERİN VE DİĞER ALACAKLARIN NİTELİKLERİNİN BELİRLENMESİ VE BUNLAR İÇİN AYRILACAK KAR%>

BRSA / Institutional Communication and Foreign Relations Department. (2015). *BRSA Information Booklet*. Ankara. Retrieved from http://www.bddk.org.tr/websitesi/english/About_Us/About_BRSA/5804brsa_booklet_nov2015.pdf

Çağıl, G. (2011). 2008 Küresel Kriz Sürecinde Türk Bankacılık Sektörünün Finansal Performansının ELECTRE Yöntemi ile Analizi. *Maliye Finans Yazıları*.

Central Bank Of The Republic Of Turkey Head Office. (2015). Institutional Framework. Retrieved October 18, 2015, from <http://www.tcmb.gov.tr/wps/wcm/connect/TCMB+EN/TCMB+EN/Main+Menu/MO NETARY+POLICY/FINANCIAL+STABILITY/Institutional+Framework>

Charnes, A. A., Cooper, W. W., & Rhodes, E. (1981). Program Follow Through Evaluating Program And Managerial Efficiency: An Application Of Data Envelopment Analysis To Program Follow Through *. *Management Science*, 27(6), 668–697.

Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring The Efficiency Of Decision Making Units. *European Journal of Operational Research*, 2(6), 429–444. doi:10.1016/0377-2217(78)90138-8

Chen, S.-H., & Liao, C.-C. (2011). Are Foreign Banks More Profitable Than Domestic Banks? Home And Host Country Effects Of Banking Market Structure, Governance, And Supervision. *Journal of Banking & Finance*, 35(4), 819–839. doi:10.1016/j.jbankfin.2010.11.006

Cinca, C. S., & Molinero, C. M. (2004). Selecting DEA Specifications and Ranking Units Via PCA. *Journal of the Operational Research Society*, 55(5), 521–528.

Çinko, M., & Avcı, E. (2008). CAMELS Dereceleme Sistemi ve Türk Ticari Bankacılık Sektöründe Başarısızlık Tahmini. *BDDK Bankacılık ve Finansal Piyasalar*, 2(2), 25–48. Retrieved from http://www.bddk.gov.tr/WebSitesi/turkce/Raporlar/BDDK_Dergi/6079makale 2.pdf

Claessens, S., & van Horen, N. (2011). Foreign Banks: Trends, Impact and Financial Stability. *SSRN Electronic Journal*. doi:10.2139/ssrn.1977446

- Cooper, W. W., Seiford, L. M., & Zhu eds., J. (2011). *Handbook on Data Envelopment Analysis*. Second edition.
- Daraio, C., & Simar, L. (2007). Chapter 2 - The Measurement of Efficiency. In *Advanced Robust and Nonparametric Methods in Efficiency Analysis - Methodology and Applications*.
- Das, A., & Ghosh, S. (2006). Financial Deregulation And Efficiency: An Empirical Analysis Of Indian Banks During The Post Reform Period. *Review of Financial Economics*, 15(3), 193–221. doi:10.1016/j.rfe.2005.06.002
- Demir, N., Syed, F. M., & Babuşçu, Ş. (2005). The Technical Inefficiency Effects Of Turkish Banks After Financial Liberalization. *The Developing Economies*, XLIII(3), 396–411.
- Demirgüç-Kunt, A., & Detragiache. (1998). *Financial Liberalization and Financial Fragility* (No. WP/98/83). Retrieved from <https://www.imf.org/external/pubs/ft/wp/wp9883.pdf>
- Denizer, C. A., Dinc, M., & Tarimcilar, M. (2007). Financial Liberalization And Banking Efficiency: Evidence From Turkey. *Journal of Productivity Analysis*, 27(3), 177–195. doi:10.1007/s11123-007-0035-9
- Diler, M. (2011). Efficiency , Productivity and Risk Analysis in Turkish Banks : A Bootstrap DEA Approach. *BDDK Bankacılık ve Finansal Piyasalar*, 5(2), 71–133.
- Diñçer, H., & Görener, A. (2011). Analitik Hiyerarşi Süreci Ve Vikor Tekniği İle Dinamik Performans Analizi: Bankacılık Sektöründe Bir Uygulama. *Istanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi*, 10(19), 109–127.
- Duygun Fethi, M., & Pasiouras, F. (2010). Assessing Bank Efficiency And Performance With Operational Research And Artificial Intelligence Techniques: A Survey. *European Journal of Operational Research*, 204(2), 189–198. doi:10.1016/j.ejor.2009.08.003
- El-Gamal, M. a., & Inanoglu, H. (2005). Inefficiency and Heterogeneity in Turkish Banking: 1990-2000. *Journal of Applied Econometrics*, 20(5), 641–664. doi:10.1002/jae.835
- Federal Financial Institutions Examination Council. (1996, December). Uniform Financial Institutions Rating System. *Federal Register*, pp. 67021–67029.
- Fried, H. O., Lovell, C. A. K., & Schmidt, S. S. (2008). *The Measurement of Productive Efficiency and Productivity Change*. Oxford University Press. Oxford University Press, Inc. doi:10.1093/acprof:oso/9780195183528.001.0001
- Fries, S., & Taci, A. (2005). Cost Efficiency Of Banks In Transition: Evidence From 289 Banks In 15 Post-Communist Countries. *Journal of Banking & Finance*, 29(1), 55–81. doi:10.1016/j.jbankfin.2004.06.016
- Fujii, H., Managi, S., & Matousek, R. (2014). Indian Bank Efficiency And Productivity

- Changes With Undesirable Outputs: A Disaggregated Approach. *Journal of Banking & Finance*, 38, 41–50. doi:10.1016/j.jbankfin.2013.09.022
- Fukuyama, H., & Matousek, R. (n.d.). *Efficiency of Turkish Banking: Two-stage Network System* (No. 05/10).
- Fukuyama, H., & Matousek, R. (2011). Efficiency of Turkish banking: Two-stage Network System. Variable Returns to Scale Model. *Journal of International Financial Markets, Institutions and Money*, 21(1), 75–91. doi:10.1016/j.intfin.2010.08.004
- George Assaf, a., Matousek, R., & Tsionas, E. G. (2013). Turkish Bank Efficiency: Bayesian Estimation With Undesirable Outputs. *Journal of Banking & Finance*, 37(2), 506–517. doi:10.1016/j.jbankfin.2012.09.009
- ICPSR/University of Michigan. (2011). *Guide to Codebooks*.
- Isik, I., & Hassan, M. K. (2002). Technical, Scale And Allocative Efficiencies Of Turkish Banking Industry. *Journal of Banking & Finance*, 26(4), 719–766. doi:10.1016/S0378-4266(01)00167-4
- Isik, I., & Hassan, M. K. (2003). Financial Deregulation And Total Factor Productivity Change: An Empirical Study Of Turkish Commercial Banks. *Journal of Banking & Finance*, 27(8), 1455–1485. doi:10.1016/S0378-4266(02)00288-1
- Keskin, E., & Alparslan, M. (2000). *The Turkish Banking System*. Retrieved from www.tbb.org.tr/english/Turkish.doc
- Koch, T. W., & MacDonald, S. S. (2015). *Bank Management* (8th Editio.). Cengage Learning. Retrieved from <http://instructors.coursesmart.co.uk/9781133494683#extendedisbn>
- Mercan, M., Reisman, A., Yolalan, R., & Emel, A. B. (2003). The Effect Of Scale And Mode Of Ownership On The Financial Performance Of The Turkish Banking Sector: Results of a DEA-Based Analysis. *Socio-Economic Planning Sciences*, 37(3), 185–202. doi:10.1016/S0038-0121(02)00045-9
- Mester, L. J. (1996). A Study Of Bank Efficiency Taking Into Account Risk-Preferences. *Journal of Banking & Finance*, 20, 1025–1045.
- Ozkan-Gunay, E. N., & Tektas, A. (2006). Efficiency Analysis of the Turkish Banking Sector in Precrisis and Crisis Period: a Dea Approach. *Contemporary Economic Policy*, 24(3), 418–431. doi:10.1093/cep/byj028
- Park, K. H., & Weber, W. L. (2006). A Note On Efficiency And Productivity Growth In The Korean Banking Industry, 1992–2002. *Journal of Banking & Finance*, 30(8), 2371–2386. doi:10.1016/j.jbankfin.2005.09.013
- Qayyum, A., Khan, S., & Ghani, E. (2006). X-efficiency, Scale Economies, Technological Progress, and Competition: The Banking Sector in Pakistan [with Comments]. In *X-efficiency, Scale Economies, Technological Progress, and Competition: The Banking Sector in Pakistan - Papers and Proceedings PARTS I and II Twenty-second Annual*

- General Meeting and Conference of the Pakistan Society of Development Economists Lahore, De* (Vol. 45, pp. 733–748). The Pakistan Development Review - Pakistan Institute of Development Economics, Islamabad. Retrieved from <http://www.jstor.org/stable/41260648>
- Ray, S. C. (2004). *Data envelopment analysis: Theory and techniques for economics and operations research*. New York: Cambridge University Press.
- Sahajwala, R., & Van den Bergh, P. (2000). *Supervisory Risk Assessment And Early Warning Systems*. Basle Committee on Banking Supervision. Retrieved from http://www.bis.org/publ/bcbs_wp04.pdf
- Sanyal, P., & Shankar, R. (2011). Ownership, Competition, And Bank Productivity: An Analysis Of Indian Banking In The Post-Reform Period. *International Review of Economics & Finance*, 20(2), 225–247. doi:10.1016/j.iref.2010.05.002
- Sarkar, J., Sarkar, S., & Bhaumik, S. K. (1998). Does Ownership Always Matter?—Evidence from the Indian Banking Industry. *Journal Of Comparative Economics*, 26, 262–281.
- Scheel, H. (2000). EMS: Efficiency Measurement System User's Manual. Retrieved from <http://www.holger-scheel.de/ems/ems.pdf>
- Seiford, L. M., & Thrall, R. M. (1990). Recent developments in DEA. *Journal of Econometrics*, 46(1-2), 7–38. doi:10.1016/0304-4076(90)90045-U
- Sensarma, R. (2006). Are Foreign Banks Always The Best? Comparison Of State-Owned, Private And Foreign Banks In India. *Economic Modelling*, 23(4), 717–735. doi:10.1016/j.econmod.2006.04.002
- Seyrek, İ. H., & Ata, H. A. (2010). Veri Zarflama Analizi ve Veri Madenciliği ile Mevduat Bankalarında Etkinlik Ölçümü. *BDDK Bankacılık ve Finansal Piyasalar*, 4(2), 67–85.
- Simar, L., & Wilson, P. W. (1998). Sensitivity Analysis of Efficiency Scores: How to Bootstrap in Nonparametric Frontier Models. *Management Science*. Retrieved from <http://pubsonline.informs.org/doi/abs/10.1287/mnsc.44.1.49>
- Simar, L., & Wilson, P. W. (2007). Estimation and inference in two-stage, semi-parametric models of production processes. *Journal of Econometrics*, 136(1), 31–64. doi:10.1016/j.jeconom.2005.07.009
- Staikouras, C., Mamatzakis, E., & Koutsomanoli-Filippaki, A. (2008). Cost Efficiency Of The Banking Industry In The South Eastern European Region. *Journal of International Financial Markets, Institutions and Money*, 18(5), 483–497. doi:10.1016/j.intfin.2007.07.003
- Tabak, B. M., & Langsch Tecles, P. (2010). Estimating A Bayesian Stochastic Frontier For The Indian Banking System. *International Journal of Production Economics*, 125(1), 96–110. doi:10.1016/j.ijpe.2010.01.008
- Taşkın, F. D. (2011). Türkiye ' de Ticari Bankalann Performansini Etkileyen Faktörler.

- EGE Akademik Bakış*, 11(2), 289–298. Retrieved from http://www.onlinedergi.com/MakaleDosyalari/51/PDF2011_2_9.pdf
- The Banking Regulation And Supervision Agency / Department of Strategy Development. (2009, April). From Crisis to Financial Stability: Turkey Experience. BRSA Documentation Center. Retrieved from https://www.bddk.org.tr/WebSitesi/english/Reports/Working_Papers/7018crisistostability_Turkey.pdf
- The Banks Association of Turkey. (2014). *Statistical Reports - Selected Ratios*. Retrieved from <http://www.tbb.org.tr/en/banks-and-banking-sector-information/statistical-reports/20>
- Tone, K. (2001). A slacks-based measure of efficiency in data envelopment analysis. *European Journal of Operational Research*, 130(3), 498–509. doi:10.1016/S0377-2217(99)00407-5
- Tuncer, E. (2006). Türkiye’de Seçim Uygulamaları/ Sorunları Işığında Temsilde Adalet-Yönetimde İstikrar İlkelerinin İşlevselliği. *Anayasa Dergisi*, 23, 167–182. Retrieved from http://www.anayasa.gov.tr/files/pdf/anayasa_yargisi/anyarg23/tuncer.pdf
- Türker Kaya, Y. (2001). *Türk Bankacılık Sektöründe CAMELS Analizi. Bankacılık Düzenleme ve Denetleme Kurumu MSPD Çalışma Raporu*. Retrieved from http://www.bddk.org.tr/websitesi/turkce/Raporlar/Calisma_Raporlari/12732001-6.pdf

APPENDICES



1. APPENDIX A - RATIOS

DATA	ROE1	ROE2	ROE3	ROE4	ROE5	ROE6
2014/12	0.1522	0.1573	0.0848	0.1516	0.1475	0.1909
2014/9	0.1210	0.1245	0.0701	0.1233	0.1155	0.1513
2014/6	0.0775	0.0792	0.0396	0.0963	0.0721	0.0737
2014/3	0.0378	0.0385	0.0211	0.0553	0.0302	0.0381
2014 Average	0.0971	0.0999	0.0539	0.1066	0.0913	0.1135
2013/12	0.2232	0.2397	0.0831	0.2573	0.2298	0.2312
2013/9	0.1717	0.1848	0.0676	0.1930	0.1801	0.1745
2013/6	0.1171	0.1268	0.0405	0.1397	0.1195	0.1224
2013/3	0.0529	0.0562	0.0214	0.0622	0.0551	0.0502
2013 Average	0.1412	0.1519	0.0532	0.1630	0.1461	0.1446
2012/12	0.1669	0.1735	0.0751	0.2245	0.1633	0.1406
2012/9	0.1200	0.1234	0.0605	0.1675	0.1130	0.1017
2012/6	0.0776	0.0796	0.0423	0.1120	0.0696	0.0713
2012/3	0.0399	0.0406	0.0205	0.0596	0.0344	0.0383
2012 Average	0.1011	0.1043	0.0496	0.1409	0.0951	0.0880
2011/12	0.1862	0.2032	0.0488	0.2239	0.1924	0.1987
2011/9	0.1435	0.1572	0.0346	0.1764	0.1426	0.1685
2011/6	0.1005	0.1096	0.0301	0.1212	0.1074	0.0945
2011/3	0.0531	0.0577	0.0170	0.0633	0.0578	0.0466
2011 Average	0.1208	0.1319	0.0326	0.1462	0.1250	0.1271
2010/12	0.2282	0.2481	0.0709	0.3159	0.2407	0.1711
2010/9	0.1748	0.1899	0.0567	0.2381	0.1917	0.1157
2010/6	0.1262	0.1381	0.0382	0.1747	0.1327	0.1028
2010/3	0.0677	0.0740	0.0201	0.0918	0.0738	0.0513
2010 Average	0.1492	0.1625	0.0465	0.2051	0.1597	0.1102
2009/12	0.3038	0.3294	0.1002	0.3867	0.3288	0.2495
2009/9	0.2520	0.2746	0.0827	0.3181	0.2779	0.2025
2009/6	0.1865	0.2046	0.0583	0.2254	0.2110	0.1548
2009/3	0.0983	0.1100	0.0259	0.1141	0.1038	0.1153
2009 Average	0.2102	0.2297	0.0668	0.2611	0.2304	0.1805
2008/12	0.2519	0.2754	0.1003	0.3355	0.2351	0.2941
2008/9	0.1917	0.2096	0.0747	0.2604	0.2045	0.1561

DATA	ROE1	ROE2	ROE3	ROE4	ROE5	ROE6
2008/6	0.1425	0.1575	0.0469	0.1783	0.1539	0.1336
2008/3	0.0736	0.0821	0.0203	0.0827	0.0793	0.0885
2008 Average	0.1649	0.1811	0.0606	0.2142	0.1682	0.1681
2007/12	0.2398	0.2551	0.1185	0.3245	0.2483	0.1621
2007/9	0.2004	0.2155	0.0906	0.2727	0.2111	0.1349
2007/6	0.1462	0.1586	0.0617	0.1845	0.1591	0.1076
2007/3	0.0718	0.0780	0.0291	0.0868	0.0730	0.0764
2007 Average	0.1646	0.1768	0.0750	0.2171	0.1729	0.1203
2006/12	0.2929	0.3097	0.1389	0.3675	0.2734	0.3615
2006/9	0.2618	0.2738	0.1239	0.3122	0.2426	0.4561
2006/6	0.2083	0.2100	0.1138	0.1843	0.1994	0.4014
2006/3	0.0739	0.0755	0.0535	0.0752	0.0791	0.0522
2006 Average	0.2092	0.2172	0.1075	0.2348	0.1986	0.3178
2005/12	0.1872	0.1955	0.1281	0.3231	0.1325	0.1793
2005/9	0.1468	0.1531	0.1020	0.2662	0.0997	0.1866
2005/6	0.1291	0.1391	0.0615	0.1691	0.1258	0.1081
2005/3	0.0708	0.0757	0.0309	0.0905	0.0696	0.0703
2005 Average	0.1335	0.1409	0.0806	0.2123	0.1069	0.1361
2004/12	0.2872	0.3009	0.1861	0.5369	0.2211	0.2365
2004/9	0.2369	0.2488	0.1500	0.4358	0.1985	0.1854
2004/6	0.1506	0.1605	0.0785	0.2441	0.1344	0.1197
2004/3	0.0580	0.0601	0.0419	0.0867	0.0497	0.0455
2004 Average	0.1831	0.1926	0.1141	0.3259	0.1509	0.1468
2003/12	0.2956	0.3007	0.2575	0.5776	0.1902	0.2315
2003/9	0.2145	0.2162	0.2019	0.4547	0.1136	0.2119
2003/6	0.1358	0.1345	0.1453	0.3295	0.0471	0.1707
2003/3	0.1307	0.1390	0.0672	0.2974	0.0745	0.1217
2003 Average	0.1941	0.1976	0.1680	0.4148	0.1063	0.1840
Grand Average	0.1558	0.1655	0.0757	0.2202	0.1460	0.1531

DATA	ROA1	ROA2	ROA3	ROA4	ROA5	ROA6
2014/12	0.0175	0.0173	0.0213	0.0160	0.0169	0.0190
2014/9	0.0140	0.0137	0.0180	0.0130	0.0133	0.0151
2014/6	0.0089	0.0086	0.0102	0.0100	0.0082	0.0074
2014/3	0.0042	0.0041	0.0056	0.0054	0.0034	0.0038
2014 Average	0.0111	0.0109	0.0138	0.0111	0.0105	0.0113
2013/12	0.0252	0.0257	0.0229	0.0247	0.0263	0.0238
2013/9	0.0202	0.0206	0.0200	0.0194	0.0212	0.0189
2013/6	0.0147	0.0151	0.0128	0.0150	0.0150	0.0141
2013/3	0.0070	0.0070	0.0069	0.0070	0.0073	0.0061
2013 Average	0.0168	0.0171	0.0157	0.0165	0.0175	0.0157
2012/12	0.0218	0.0215	0.0244	0.0247	0.0212	0.0176
2012/9	0.0152	0.0147	0.0196	0.0176	0.0141	0.0126
2012/6	0.0097	0.0093	0.0141	0.0113	0.0085	0.0089
2012/3	0.0049	0.0046	0.0074	0.0057	0.0041	0.0046
2012 Average	0.0129	0.0125	0.0164	0.0148	0.0120	0.0110
2011/12	0.0219	0.0221	0.0187	0.0205	0.0223	0.0232
2011/9	0.0171	0.0172	0.0144	0.0158	0.0169	0.0199
2011/6	0.0126	0.0126	0.0132	0.0112	0.0136	0.0116
2011/3	0.0070	0.0070	0.0076	0.0062	0.0076	0.0061
2011 Average	0.0146	0.0147	0.0135	0.0134	0.0151	0.0152
2010/12	0.0308	0.0309	0.0328	0.0317	0.0326	0.0236
2010/9	0.0234	0.0234	0.0265	0.0233	0.0256	0.0162
2010/6	0.0168	0.0169	0.0178	0.0170	0.0175	0.0145
2010/3	0.0091	0.0091	0.0094	0.0090	0.0097	0.0074
2010 Average	0.0201	0.0201	0.0216	0.0202	0.0214	0.0154
2009/12	0.0403	0.0398	0.0468	0.0368	0.0426	0.0362
2009/9	0.0327	0.0324	0.0384	0.0289	0.0352	0.0295
2009/6	0.0232	0.0230	0.0268	0.0200	0.0250	0.0218
2009/3	0.0118	0.0118	0.0120	0.0100	0.0116	0.0153
2009 Average	0.0270	0.0267	0.0310	0.0239	0.0286	0.0257
2008/12	0.0302	0.0296	0.0469	0.0296	0.0263	0.0388
2008/9	0.0230	0.0225	0.0352	0.0227	0.0230	0.0205
2008/6	0.0169	0.0168	0.0217	0.0163	0.0170	0.0166

DATA	ROA1	ROA2	ROA3	ROA4	ROA5	ROA6
2008/3	0.0092	0.0093	0.0094	0.0085	0.0092	0.0113
2008 Average	0.0198	0.0196	0.0283	0.0193	0.0189	0.0218
2007/12	0.0314	0.0304	0.0560	0.0339	0.0305	0.0228
2007/9	0.0257	0.0251	0.0422	0.0272	0.0253	0.0192
2007/6	0.0182	0.0179	0.0292	0.0189	0.0180	0.0149
2007/3	0.0088	0.0086	0.0143	0.0094	0.0078	0.0098
2007 Average	0.0210	0.0205	0.0354	0.0224	0.0204	0.0167
2006/12	0.0353	0.0337	0.0669	0.0382	0.0297	0.0436
2006/9	0.0305	0.0289	0.0566	0.0295	0.0265	0.0542
2006/6	0.0255	0.0234	0.0521	0.0187	0.0230	0.0501
2006/3	0.0099	0.0093	0.0257	0.0087	0.0099	0.0073
2006 Average	0.0253	0.0238	0.0503	0.0238	0.0223	0.0388
2005/12	0.0247	0.0237	0.0613	0.0359	0.0163	0.0261
2005/9	0.0196	0.0188	0.0478	0.0275	0.0129	0.0285
2005/6	0.0185	0.0185	0.0287	0.0181	0.0182	0.0178
2005/3	0.0106	0.0105	0.0142	0.0098	0.0107	0.0126
2005 Average	0.0183	0.0179	0.0380	0.0228	0.0145	0.0213
2004/12	0.0411	0.0395	0.0834	0.0485	0.0337	0.0446
2004/9	0.0314	0.0301	0.0634	0.0315	0.0291	0.0339
2004/6	0.0211	0.0206	0.0332	0.0205	0.0205	0.0248
2004/3	0.0085	0.0081	0.0179	0.0085	0.0077	0.0107
2004 Average	0.0255	0.0246	0.0495	0.0272	0.0228	0.0285
2003/12	0.0424	0.0396	0.1045	0.0565	0.0281	0.0570
2003/9	0.0307	0.0285	0.0792	0.0445	0.0168	0.0530
2003/6	0.0183	0.0168	0.0517	0.0306	0.0066	0.0394
2003/3	0.0162	0.0160	0.0219	0.0250	0.0096	0.0258
2003 Average	0.0269	0.0252	0.0643	0.0392	0.0153	0.0438

DATA	EM1	EM2	EM3	EM4	EM5	EM6
2014/12	8.6966	9.1053	3.9751	9.4770	8.7068	10.0585
2014/9	8.6713	9.1007	3.8969	9.4703	8.7065	10.0139
2014/6	8.7104	9.1560	3.8620	9.5826	8.7597	9.9060
2014/3	8.9202	9.4045	3.8033	10.2208	8.8682	9.9335
2014 Average	8.7496	9.1916	3.8843	9.6876	8.7603	9.9780
2013/12	8.8405	9.3343	3.6253	10.4073	8.7275	9.7318
2013/9	8.5049	8.9914	3.3821	9.9687	8.4808	9.2398
2013/6	7.9663	8.4006	3.1550	9.3012	7.9516	8.6625
2013/3	7.6006	7.9891	3.0969	8.9437	7.5652	8.1873
2013 Average	8.2280	8.6788	3.3148	9.6552	8.1813	8.9553
2012/12	7.6528	8.0755	3.0741	9.0991	7.7086	7.9878
2012/9	7.8849	8.3741	3.0842	9.5109	8.0172	8.0419
2012/6	8.0118	8.5620	2.9929	9.9012	8.1665	7.9895
2012/3	8.2190	8.8530	2.7789	10.3708	8.3719	8.2480
2012 Average	7.9421	8.4661	2.9825	9.7205	8.0660	8.0668
2011/12	8.4947	9.2041	2.6142	10.9162	8.6273	8.5800
2011/9	8.4076	9.1434	2.4115	11.1991	8.4148	8.4681
2011/6	7.9987	8.7055	2.2844	10.8521	7.9083	8.1341
2011/3	7.6165	8.2668	2.2363	10.1511	7.5846	7.6707
2011 Average	8.1294	8.8300	2.3866	10.7796	8.1338	8.2132
2010/12	7.3983	8.0245	2.1622	9.9621	7.3755	7.2389
2010/9	7.4584	8.1245	2.1448	10.2266	7.4745	7.1343
2010/6	7.4941	8.1923	2.1427	10.2718	7.5915	7.0741
2010/3	7.4430	8.1455	2.1311	10.2174	7.5803	6.9287
2010 Average	7.4484	8.1217	2.1452	10.1695	7.5054	7.0940
2009/12	7.5452	8.2725	2.1424	10.5093	7.7099	6.8820
2009/9	7.7068	8.4854	2.1549	10.9956	7.9026	6.8681
2009/6	8.0295	8.9051	2.1720	11.2853	8.4353	7.1060
2009/3	8.3426	9.3119	2.1688	11.3642	8.9332	7.5360
2009 Average	7.9060	8.7437	2.1595	11.0386	8.2453	7.0981
2008/12	8.3334	9.3037	2.1375	11.3388	8.9217	7.5858
2008/9	8.3427	9.3067	2.1211	11.4766	8.9064	7.5989

DATA	EM1	EM2	EM3	EM4	EM5	EM6
2008/6	8.4296	9.3696	2.1610	10.9388	9.0318	8.0688
2008/3	8.0069	8.8186	2.1544	9.7423	8.6068	7.8475
2008 Average	8.2782	9.1996	2.1435	10.8741	8.8667	7.7753
2007/12	7.6327	8.3786	2.1142	9.5593	8.1334	7.0954
2007/9	7.8058	8.5837	2.1478	10.0178	8.3447	7.0238
2007/6	8.0280	8.8579	2.1144	9.7583	8.8587	7.2290
2007/3	8.2016	9.0914	2.0393	9.2482	9.3536	7.8172
2007 Average	7.9170	8.7279	2.1039	9.6459	8.6726	7.2913
2006/12	8.3064	9.1938	2.0763	9.6231	9.1956	8.2892
2006/9	8.5718	9.4751	2.1899	10.5787	9.1575	8.4197
2006/6	8.1798	8.9709	2.1827	9.8378	8.6868	8.0084
2006/3	7.4493	8.0904	2.0840	8.6481	7.9868	7.1190
2006 Average	8.1268	8.9325	2.1332	9.6719	8.7567	7.9591
2005/12	7.5803	8.2625	2.0886	8.9892	8.1367	6.8778
2005/9	7.4983	8.1622	2.1329	9.6765	7.7280	6.5398
2005/6	6.9725	7.5227	2.1420	9.3507	6.9036	6.0617
2005/3	6.6799	7.2084	2.1713	9.2353	6.4949	5.5906
2005 Average	7.1827	7.7889	2.1337	9.3129	7.3158	6.2675
2004/12	6.9930	7.6213	2.2303	11.0776	6.5549	5.2982
2004/9	7.5338	8.2664	2.3661	13.8155	6.8156	5.4754
2004/6	7.1268	7.7796	2.3656	11.9174	6.5430	4.8193
2004/3	6.7950	7.3818	2.3458	10.2170	6.4530	4.2364
2004 Average	7.1121	7.7623	2.3269	11.7569	6.5916	4.9573
2003/12	6.9785	7.5902	2.4635	10.2249	6.7625	4.0656
2003/9	6.9759	7.5784	2.5486	10.2094	6.7473	3.9979
2003/6	7.4164	8.0285	2.8082	10.7730	7.1708	4.3306
2003/3	8.0436	8.6967	3.0755	11.8760	7.7315	4.7130
2003 Average	7.3536	7.9734	2.7239	10.7708	7.1030	4.2768
Grand Average	7.8645	8.5347	2.5365	10.2570	8.0165	7.3277

DATA	AU1	AU2	AU3	AU4	AU5	AU6
2014/12	0.0857	0.0870	0.0546	0.0828	0.0849	0.0961
2014/9	0.0663	0.0673	0.0422	0.0645	0.0656	0.0741
2014/6	0.0450	0.0456	0.0268	0.0457	0.0442	0.0487
2014/3	0.0225	0.0228	0.0143	0.0230	0.0215	0.0257
2014 Average	0.0549	0.0557	0.0345	0.0540	0.0540	0.0612
2013/12	0.0900	0.0920	0.0548	0.0870	0.0913	0.0986
2013/9	0.0704	0.0719	0.0443	0.0681	0.0709	0.0786
2013/6	0.0499	0.0510	0.0315	0.0490	0.0501	0.0554
2013/3	0.0253	0.0257	0.0159	0.0244	0.0255	0.0280
2013 Average	0.0589	0.0601	0.0366	0.0571	0.0594	0.0652
2012/12	0.1004	0.1019	0.0618	0.1018	0.0988	0.1108
2012/9	0.0763	0.0772	0.0478	0.0774	0.0744	0.0855
2012/6	0.0522	0.0527	0.0336	0.0527	0.0503	0.0603
2012/3	0.0260	0.0262	0.0177	0.0264	0.0251	0.0297
2012 Average	0.0637	0.0645	0.0402	0.0646	0.0622	0.0716
2011/12	0.0956	0.0971	0.0559	0.0948	0.0939	0.1093
2011/9	0.0721	0.0729	0.0431	0.0693	0.0708	0.0858
2011/6	0.0500	0.0505	0.0336	0.0473	0.0507	0.0556
2011/3	0.0261	0.0263	0.0176	0.0243	0.0268	0.0283
2011 Average	0.0610	0.0617	0.0375	0.0589	0.0606	0.0698
2010/12	0.1045	0.1055	0.0660	0.1014	0.1055	0.1132
2010/9	0.0802	0.0808	0.0509	0.0766	0.0816	0.0868
2010/6	0.0555	0.0559	0.0346	0.0530	0.0559	0.0627
2010/3	0.0292	0.0294	0.0185	0.0273	0.0297	0.0329
2010 Average	0.0674	0.0679	0.0425	0.0646	0.0682	0.0739
2009/12	0.1296	0.1303	0.0873	0.1236	0.1301	0.1445
2009/9	0.1043	0.1049	0.0707	0.0988	0.1052	0.1156
2009/6	0.0741	0.0744	0.0504	0.0705	0.0745	0.0813
2009/3	0.0396	0.0399	0.0266	0.0381	0.0386	0.0473
2009 Average	0.0869	0.0874	0.0587	0.0827	0.0871	0.0972
2008/12	0.1483	0.1499	0.0930	0.1496	0.1427	0.1705
2008/9	0.1116	0.1128	0.0711	0.1135	0.1098	0.1199

DATA	AU1	AU2	AU3	AU4	AU5	AU6
2008/6	0.0763	0.0772	0.0466	0.0764	0.0758	0.0838
2008/3	0.0406	0.0412	0.0225	0.0400	0.0399	0.0500
2008 Average	0.0942	0.0953	0.0583	0.0949	0.0920	0.1060
2007/12	0.1525	0.1541	0.1060	0.1557	0.1501	0.1521
2007/9	0.1167	0.1180	0.0807	0.1201	0.1163	0.1187
2007/6	0.0791	0.0800	0.0545	0.0815	0.0783	0.0829
2007/3	0.0396	0.0399	0.0277	0.0416	0.0380	0.0435
2007 Average	0.0970	0.0980	0.0672	0.0997	0.0957	0.0993
2006/12	0.1473	0.1473	0.1213	0.1523	0.1381	0.1817
2006/9	0.1134	0.1130	0.0958	0.1136	0.1085	0.1685
2006/6	0.0811	0.0797	0.0804	0.0743	0.0770	0.1158
2006/3	0.0380	0.0376	0.0399	0.0367	0.0377	0.0435
2006 Average	0.0949	0.0944	0.0844	0.0942	0.0903	0.1274
2005/12	0.1407	0.1417	0.1088	0.1480	0.1351	0.1647
2005/9	0.1118	0.1128	0.0833	0.1166	0.1085	0.1523
2005/6	0.0793	0.0803	0.0531	0.0815	0.0766	0.0954
2005/3	0.0422	0.0422	0.0283	0.0433	0.0407	0.0579
2005 Average	0.0935	0.0942	0.0684	0.0973	0.0902	0.1176
2004/12	0.1676	0.1686	0.1461	0.1761	0.1628	0.1845
2004/9	0.1289	0.1298	0.1030	0.1376	0.1252	0.1283
2004/6	0.0881	0.0890	0.0677	0.0910	0.0877	0.0910
2004/3	0.0453	0.0457	0.0345	0.0467	0.0446	0.0530
2004 Average	0.1075	0.1083	0.0878	0.1129	0.1051	0.1142
2003/12	0.2153	0.2170	0.1777	0.2625	0.1870	0.2374
2003/9	0.1707	0.1725	0.1322	0.2113	0.1464	0.1869
2003/6	0.1163	0.1175	0.0900	0.1474	0.0973	0.1301
2003/3	0.0651	0.0660	0.0463	0.0850	0.0535	0.0704
2003 Average	0.1419	0.1432	0.1115	0.1766	0.1211	0.1562
Grand Average	0.0851	0.0859	0.0606	0.0881	0.0822	0.0966

DATA	ER1	ER2	ER3	ER4	ER5	ER6
2014/12	0.0672	0.0687	0.0325	0.0658	0.0670	0.0760
2014/9	0.0516	0.0529	0.0235	0.0508	0.0517	0.0581
2014/6	0.0356	0.0365	0.0162	0.0352	0.0355	0.0406
2014/3	0.0180	0.0184	0.0086	0.0173	0.0178	0.0216
2014 Average	0.0431	0.0441	0.0202	0.0423	0.0430	0.0491
2013/12	0.0636	0.0652	0.0312	0.0613	0.0640	0.0734
2013/9	0.0494	0.0504	0.0237	0.0480	0.0488	0.0585
2013/6	0.0346	0.0352	0.0184	0.0333	0.0344	0.0403
2013/3	0.0180	0.0183	0.0087	0.0172	0.0180	0.0213
2013 Average	0.0414	0.0423	0.0205	0.0399	0.0413	0.0484
2012/12	0.0775	0.0793	0.0369	0.0761	0.0766	0.0916
2012/9	0.0602	0.0617	0.0278	0.0590	0.0596	0.0716
2012/6	0.0419	0.0428	0.0192	0.0408	0.0413	0.0505
2012/3	0.0209	0.0213	0.0101	0.0204	0.0207	0.0246
2012 Average	0.0501	0.0513	0.0235	0.0491	0.0495	0.0596
2011/12	0.0727	0.0739	0.0366	0.0734	0.0707	0.0846
2011/9	0.0542	0.0549	0.0283	0.0529	0.0531	0.0647
2011/6	0.0369	0.0373	0.0200	0.0356	0.0366	0.0432
2011/3	0.0188	0.0190	0.0098	0.0178	0.0189	0.0218
2011 Average	0.0456	0.0463	0.0237	0.0449	0.0448	0.0536
2010/12	0.0725	0.0734	0.0325	0.0686	0.0718	0.0878
2010/9	0.0559	0.0565	0.0239	0.0525	0.0551	0.0692
2010/6	0.0381	0.0384	0.0163	0.0354	0.0378	0.0472
2010/3	0.0197	0.0199	0.0088	0.0181	0.0196	0.0250
2010 Average	0.0465	0.0470	0.0204	0.0436	0.0461	0.0573
2009/12	0.0884	0.0895	0.0399	0.0860	0.0867	0.1065
2009/9	0.0709	0.0718	0.0319	0.0692	0.0694	0.0847
2009/6	0.0503	0.0509	0.0232	0.0500	0.0490	0.0584
2009/3	0.0276	0.0278	0.0145	0.0278	0.0268	0.0315
2009 Average	0.0593	0.0600	0.0274	0.0583	0.0580	0.0703
2008/12	0.1169	0.1191	0.0455	0.1190	0.1153	0.1302
2008/9	0.0878	0.0894	0.0355	0.0900	0.0860	0.0981

DATA	ER1	ER2	ER3	ER4	ER5	ER6
2008/6	0.0588	0.0598	0.0245	0.0595	0.0581	0.0664
2008/3	0.0310	0.0315	0.0129	0.0313	0.0303	0.0379
2008 Average	0.0736	0.0750	0.0296	0.0749	0.0724	0.0832
2007/12	0.1200	0.1225	0.0491	0.1206	0.1186	0.1277
2007/9	0.0903	0.0922	0.0379	0.0920	0.0904	0.0983
2007/6	0.0604	0.0616	0.0248	0.0621	0.0599	0.0672
2007/3	0.0306	0.0311	0.0132	0.0320	0.0301	0.0333
2007 Average	0.0753	0.0769	0.0313	0.0767	0.0747	0.0817
2006/12	0.1109	0.1126	0.0529	0.1130	0.1074	0.1362
2006/9	0.0820	0.0833	0.0379	0.0833	0.0812	0.1129
2006/6	0.0550	0.0558	0.0270	0.0550	0.0535	0.0648
2006/3	0.0278	0.0280	0.0131	0.0278	0.0275	0.0357
2006 Average	0.0689	0.0699	0.0327	0.0698	0.0674	0.0874
2005/12	0.1150	0.1170	0.0466	0.1110	0.1178	0.1370
2005/9	0.0914	0.0932	0.0347	0.0882	0.0948	0.1222
2005/6	0.0603	0.0613	0.0237	0.0629	0.0578	0.0765
2005/3	0.0313	0.0314	0.0136	0.0333	0.0297	0.0447
2005 Average	0.0745	0.0757	0.0297	0.0738	0.0750	0.0951
2004/12	0.1251	0.1277	0.0612	0.1264	0.1276	0.1376
2004/9	0.0964	0.0987	0.0384	0.1051	0.0951	0.0928
2004/6	0.0663	0.0676	0.0338	0.0699	0.0664	0.0648
2004/3	0.0363	0.0372	0.0161	0.0379	0.0365	0.0413
2004 Average	0.0810	0.0828	0.0374	0.0848	0.0814	0.0841
2003/12	0.1704	0.1748	0.0710	0.2039	0.1561	0.1761
2003/9	0.1381	0.1421	0.0512	0.1653	0.1275	0.1309
2003/6	0.0967	0.0995	0.0371	0.1158	0.0894	0.0886
2003/3	0.0483	0.0494	0.0235	0.0594	0.0433	0.0436
2003 Average	0.1134	0.1164	0.0457	0.1361	0.1041	0.1098
Grand Average	0.0644	0.0656	0.0285	0.0662	0.0632	0.0733

	vI1-vJ1-(vN1- vK1)-vL1+vO1- vM1	vI2-vJ2-(vN2- vK2)-vL2+vO2- vM2	vI3-vJ3-(vN3- vK3)- vL3+vO3- vM3	vI4-vJ4-(vN4- vK4)-vL4+vO4- vM4	vI5-vJ5-(vN5- vK5)-vL5+vO5- vM5	vI6-vJ6-(vN6- vK6)- vL6+vO6- vM6
	NI1	NI2	NI3	NI4	NI5	NI6
2014/12	34325.1790	30665.9990	1777.8320	8816.8070	15858.5140	7182.6720
2014/9	26240.8560	23249.1520	1429.8550	6834.9410	11928.1790	5447.3890
2014/6	16142.4430	14176.5010	780.8960	5118.5070	7131.2780	2547.0570
2014/3	7477.2260	6539.7930	404.8650	2683.1770	2871.0100	1263.3370
2013/12	42684.4640	39275.0190	1552.4340	11577.2160	21540.1840	7399.2200
2013/9	32069.2270	29598.2860	1229.5410	8405.0810	16629.0110	5389.4200
2013/6	21716.3670	20278.7030	712.1160	6050.0190	11105.4760	3657.9770
2013/3	9731.6360	8952.2050	367.1650	2665.4510	5127.0160	1471.6840
2012/12	29210.8990	26212.9800	1261.3160	9056.0430	14393.2980	3955.3140
2012/9	19643.2390	17352.4870	985.8730	6245.4830	9266.5340	2695.3690
2012/6	12113.4180	10645.6020	673.7390	3946.7540	5429.1330	1815.0750
2012/3	5943.8690	5146.2460	319.9160	1976.8060	2554.8210	926.3160
2011/12	26650.2850	24746.2530	742.6780	7052.5430	13818.4270	4577.4370
2011/9	20142.8590	18786.4070	516.3740	5420.4800	10135.7440	3729.0190
2011/6	13777.3190	12794.3650	440.9930	3634.2280	7477.8230	2020.7940
2011/3	7150.6110	6637.8670	243.5090	1893.1950	3893.3030	1016.6020
2010/12	29827.3390	27700.8490	972.9530	9190.5980	15575.8020	3742.3430
2010/9	21509.4680	19895.2010	756.6920	6445.2300	11649.0870	2390.6540
2010/6	14894.2120	13832.9370	506.2670	4540.0160	7662.4400	2044.0710
2010/3	7707.3110	7140.2290	259.0330	2301.0640	4082.4540	994.0900
2009/12	32856.9800	30138.7360	1234.6050	9048.2810	17228.0900	4721.5790
2009/9	25606.7380	23525.7150	974.2540	6835.6670	13580.2790	3734.7070
2009/6	17678.7400	16254.4900	664.3050	4502.7580	9448.1540	2732.1270
2009/3	8759.7380	8179.0540	283.5010	2146.7190	4341.6800	1916.5290
2008/12	21343.3410	19516.9990	1039.0320	5918.9850	9436.2060	4644.9860
2008/9	15354.3640	14057.3880	737.1540	4263.9430	7785.4360	2351.7850
2008/6	10908.7550	10126.3130	444.5870	2964.9830	5531.2340	1821.8450

	vI1-vJ1-(vN1- vK1)-vL1+vO1- vM1	vI2-vJ2-(vN2- vK2)-vL2+vO2- vM2	vI3-vJ3-(vN3- vK3)- vL3+vO3- vM3	vI4-vJ4-(vN4- vK4)-vL4+vO4- vM4	vI5-vJ5-(vN5- vK5)-vL5+vO5- vM5	vI6-vJ6-(vN6- vK6)- vL6+vO6- vM6
	NI1	NI2	NI3	NI4	NI5	NI6
2008/3	5586.3200	5281.5320	185.7270	1459.8450	2815.5570	1058.3120
2007/12	17670.8360	16005.3630	1027.3560	5450.5960	8848.2700	1777.9530
2007/9	13826.8880	12654.4820	740.0520	4213.9380	7202.4340	1390.4790
2007/6	9554.0840	8805.0840	490.5340	2875.0870	5009.1830	1012.6870
2007/3	4445.4150	4094.2260	225.8790	1390.1460	2106.3370	641.6850
2006/12	17161.8590	15441.5240	1004.3380	5429.8850	7864.8450	2516.7210
2006/9	14371.2090	12809.2360	834.5660	4041.6610	6944.2820	2258.3340
2006/6	11337.2390	9827.1830	735.7920	2503.5930	5791.7120	1552.2780
2006/3	4117.2320	3655.8080	337.0290	1124.4160	2380.3200	198.1880
2005/12	9633.4360	8708.2300	773.7900	4363.3610	3681.4030	656.4970
2005/9	7035.8710	6350.5860	578.7240	3132.9890	2645.2790	572.1830
2005/6	6169.8410	5806.7640	330.8670	1988.1400	3442.1860	268.5530
2005/3	3327.3770	3138.9800	160.1910	1065.1470	1921.8360	159.2830
2004/12	12334.1710	11401.7200	932.4510	5131.4000	5831.8590	477.8190
2004/9	8945.2680	8217.7410	703.5470	3154.6520	4767.6320	347.2900
2004/6	5607.5840	5255.1090	352.4750	1979.1960	3084.0700	216.2470
2004/3	2156.7240	1975.0570	181.6670	790.8350	1097.6830	81.5660
2003/12	10054.0030	9008.8650	1045.1380	4893.8990	3771.9970	407.0690
2003/9	6712.6030	5955.4730	757.1300	3599.8080	2048.1440	358.7680
2003/6	3952.9220	3456.9430	495.9790	2432.5340	790.5750	275.4670
2003/3	3517.2490	3307.1020	210.1470	1972.9780	1169.2210	184.7960
2002/12	10826.9540	9580.7390	1246.2150	3525.8950	5551.3980	538.2940

	vI1 - vJ1	vI2 - vJ2	vI3 - vJ3	vI4 - vJ4	Vi5 - vJ5	vI6 - vJ6
	NII1	NII2	NII3	NII4	NII5	NII6
2014/12						
2014/9	65575.8040	59705.2780	2689.0850	17670.8530	30880.7360	13793.6010
2014/6	47256.3730	42951.2130	2011.7790	12685.5610	22345.2280	9793.5690
2014/3	30337.7890	27544.0770	1303.3930	8118.2660	14408.2650	6218.3170
2013/12	14740.0180	13365.2010	625.0620	3988.6600	6979.6340	2962.8700
2013/9	57343.7350	52353.0940	2107.2590	16626.0860	26395.8640	11415.4470
2013/6	43066.2170	39430.9370	1530.8460	12348.1170	19970.7210	8625.1320
2013/3	29440.2130	27078.5090	986.8690	8451.1220	13986.7620	5645.9260
2012/12	14951.0540	13785.4330	488.1410	4286.5340	7138.4570	2869.3160
2012/9	52253.8370	47836.5350	1943.0250	14873.8560	24220.2640	10557.9750
2012/6	37305.0880	34045.3170	1460.9360	10466.8300	17157.6310	7755.5450
2012/3	24556.2710	22422.9140	977.7210	6887.2330	11258.6570	5137.7510
2011/12	11877.9450	10831.0640	481.7500	3265.8550	5476.5190	2518.1110
2011/9	39329.6590	36055.7540	1452.3340	11012.5740	18634.5090	7749.1350
2011/6	27582.3530	25220.6870	1049.4410	7718.0360	12997.8360	5452.1890
2011/3	18085.0390	16590.8630	683.3910	5058.3270	8581.1200	3541.3020
2010/12	9107.8710	8379.8480	335.9680	2554.5620	4352.2230	1758.6110
2010/9	38666.9360	35894.9620	1262.7670	10729.0070	18266.8620	7984.6610
2010/6	28550.9750	26512.0870	935.0630	7916.8480	13479.7950	5923.0420
2010/3	20161.5530	18804.4160	620.8100	5523.0360	9797.7570	4026.7010
2009/12	10607.9270	9927.2590	321.1580	2811.6960	5283.7340	2101.3060
2009/9	41802.8730	38758.2230	1494.6880	11682.2740	19702.9050	8516.0960
2009/6	31098.6830	28804.2490	1150.1800	8641.7910	14598.5290	6405.7100
2009/3	20400.0050	18894.7870	755.5620	5764.3140	9460.5930	4213.0440
2008/12	9895.7520	9131.9460	384.6920	2741.7710	4537.3880	2123.6330
2008/9	30982.4970	28245.2670	1503.6900	8053.8910	14168.9230	6948.4250
2008/6	22872.0270	20937.0370	1080.0450	5932.9270	10676.9950	4976.7440
2008/3	15117.8120	13898.1050	684.6330	3954.4050	7118.0050	3237.3890
2007/12	7594.6630	6980.8230	353.9170	1972.9860	3582.9970	1545.3360
2007/9	26049.4010	23977.9520	1161.2970	7156.7630	12291.7680	4309.3060
2007/6	18941.8360	17429.8630	843.1100	5335.2320	9245.0790	3112.8990

	vI1 - vJ1	vI2 - vJ2	vI3 - vJ3	vI4 - vJ4	Vi5 - vJ5	vI6 - vJ6
	NII1	NII2	NII3	NII4	NII5	NII6
2007/6						
	12334.5610	11377.1280	537.5650	3582.4150	5954.5640	2003.5120
2007/3						
	6063.8760	5597.0650	259.2690	1787.4910	2912.2330	968.4100
2006/12						
	21236.5660	19607.4870	974.0200	6562.2090	10078.1480	3230.9940
2006/9						
	15398.6240	14240.0020	696.0150	4580.0200	7907.2570	1928.0590
2006/6						
	9939.1760	9203.0970	453.1910	2755.4660	5306.3190	806.5340
2006/3						
	4728.1940	4370.7910	223.1270	1319.4510	2736.6000	365.2770
2005/12						
	18749.9570	17458.5420	842.7200	5256.7120	11021.8580	1344.5260
2005/9						
	14114.7390	13179.5250	627.4070	4015.3140	8317.7510	949.7950
2005/6						
	9446.1340	8844.6100	403.6800	2760.5840	5540.9090	421.8880
2005/3						
	4690.7160	4363.3970	206.2130	1355.9970	2837.2920	229.9310
2004/12						
	17628.5120	16615.9820	1012.5300	6455.8840	9533.3590	662.4070
2004/9						
	12529.6110	11839.5420	712.9040	4420.0940	6929.3120	500.6210
2004/6						
	7897.9830	7414.6770	483.3060	2707.4660	4387.4840	332.7020
2004/3						
	3619.5140	3378.0980	241.4160	1181.9730	2021.2360	179.3860
2003/12						
	11257.4450	10066.8340	1190.6110	5035.9200	4396.7700	650.6340
2003/9						
	7738.6580	6878.5620	860.0960	3660.2930	2776.4890	453.3760
2003/6						
	4621.7510	4058.0310	563.7200	2350.1620	1387.8210	331.0190
2003/3						
	3427.0240	3120.9270	306.0970	1474.1530	1443.1420	214.8890
2002/12						
	12800.0550	11630.7880	1169.2670	4948.1760	5953.6820	741.1670

	vN1 - vK1	vN2 - vK2	vN3 - vK3	vN4 - vK4	vN5 - vK5	vN6 - vK6
	Burden1	Burden2	Burden3	Burden4	Burden5	Burden6
2014/12	17858.4740	16185.5910	590.1190	4880.8430	8134.7790	4378.3530
2014/9	11720.4310	10799.3560	284.2050	3411.0870	5299.2230	2862.0280
2014/6	6713.9950	6275.3240	222.1190	2098.0810	2998.0670	1684.8470
2014/3	3903.2090	3527.1610	132.7230	1109.3390	1656.8920	1021.4130
2013/12	16512.5710	15021.4320	537.8780	4766.4660	6469.4190	4521.1030
2013/9	11694.1290	10670.5320	318.5860	3603.1620	4314.2650	3304.0440
2013/6	8523.0790	7800.9330	235.7260	2399.1550	3729.3930	2032.2920
2013/3	4317.6640	3973.2200	93.5700	1229.0700	1859.5800	1059.3250
2012/12	15842.4990	14525.2760	530.6510	5037.2970	6587.0350	3492.2940
2012/9	10832.3370	9928.2160	361.1550	3377.3870	4594.4970	2387.6250
2012/6	6589.0100	6017.5230	215.0040	2153.6890	2707.4780	1416.6990
2012/3	2909.0260	2640.9490	119.3770	1037.0150	1209.1930	505.3000
2011/12	9671.2970	8643.8220	387.6810	3367.5430	3473.2730	2331.3280
2011/9	6026.5040	5278.4920	259.3610	2084.8820	2206.4360	1360.3470
2011/6	3519.0870	3084.1130	148.4060	1262.4850	905.3820	1134.8310
2011/3	1849.0890	1651.8860	62.4430	564.6730	682.2350	505.1650
2010/12	6296.2570	5630.1670	225.4480	1605.2780	1527.7100	2843.3110
2010/9	4355.8490	3851.1050	173.9240	1220.2690	949.2170	1954.9450
2010/6	2565.8730	2277.8540	101.5320	743.7320	484.9010	1198.4480
2010/3	1600.5510	1470.0870	57.6120	453.3560	384.0570	690.3360
2009/12	8675.9230	8041.3290	301.5340	2429.1770	3542.0660	2424.4570
2009/9	5977.3510	5506.7660	215.2260	1750.9370	2287.7730	1737.9810
2009/6	3550.7060	3260.1970	124.9080	1162.6020	1212.1170	1055.0100
2009/3	1711.7030	1529.0600	83.7330	636.4390	531.2510	453.0890
2008/12	9170.4170	8440.7410	350.6200	2021.3180	3923.4550	2898.1040
2008/9	6161.3430	5670.7740	241.5620	1305.4670	2490.3920	2146.5800
2008/6	3547.1190	3231.3210	153.0520	709.2050	1310.2660	1394.6320
2008/3	1704.2920	1510.8570	97.9820	451.7250	394.6420	724.5430
2007/12	6193.0000	5807.8790	174.1390	1219.9730	2635.0880	1826.8810
2007/9	3778.5120	3434.3480	167.1870	780.5750	1511.8820	1252.5440

	vN1 - vK1	vN2 - vK2	vN3 - vK3	vN4 - vK4	vN5 - vK5	vN6 - vK6
	Burden1	Burden2	Burden3	Burden4	Burden5	Burden6
2007/6	1977.9430	1764.9010	95.9150	497.0700	605.8160	734.2650
2007/3	1385.3430	1271.0910	52.6880	313.8790	712.9590	271.7590
2006/12	4078.5050	4169.8510	4.9580	992.6790	2261.3120	897.9340
2006/9	1554.3300	1917.6740	-76.6710	487.7380	1249.3260	14.4960
2006/6	-163.1250	501.9210	-158.0320	239.5960	146.8090	-121.4780
2006/3	873.1490	993.9330	-125.6150	207.9820	574.5930	219.4300
2005/12	9423.5340	9109.7000	38.2570	1158.2380	7076.7960	1031.7060
2005/9	7323.9580	7086.5950	50.2470	1100.6320	5399.3300	708.9110
2005/6	3483.2470	3269.3610	55.6520	806.4690	2062.2090	377.3740
2005/3	1610.2190	1478.1380	43.8610	323.8460	1026.3800	190.5990
2004/12	6366.7870	6280.2390	86.5480	1327.9070	4446.2500	517.7980
2004/9	4474.1750	4478.7780	-9.2100	1281.6460	2899.8610	310.7380
2004/6	2713.8360	2575.2300	138.6060	747.5230	1648.1290	190.2100
2004/3	1729.6810	1675.9910	53.6900	413.6060	1146.0170	123.0680
2003/12	5493.8120	5248.9980	244.8140	1021.5840	3782.3380	463.1320
2003/9	3660.2530	3488.5690	171.6840	555.4520	2690.1710	256.6680
2003/6	2144.3640	2020.3040	124.0600	198.7550	1669.3120	162.6800
2003/3	492.8270	383.7100	109.1170	-312.3820	626.4200	73.0480
2002/12	4414.1130	4470.4310	-56.3180	1992.2780	2172.2310	323.0620

	vL1	vL2	vL3	vL4	vL5	vL6
	PLL1	PLL2	PLL3	PLL4	PLL5	PLL6
2014/12	3369.5770	3142.5070	46.3300	891.1630	1790.7670	626.7640
2014/9	2395.9870	2244.4430	35.7730	515.3720	1350.3430	497.2590
2014/6	1367.1040	1256.7370	18.3030	317.8730	694.6530	325.2870
2014/3	781.5280	733.8840	8.9810	128.2440	351.2890	287.6170
2013/12	4297.7380	4122.7300	82.6000	1318.9320	2088.5660	788.9840
2013/9	3644.6340	3402.4610	71.4780	1082.4260	1711.4590	727.4890
2013/6	2523.1680	2315.0940	85.6590	706.2440	1205.3570	488.7900
2013/3	1017.3830	929.9260	24.6620	290.3990	475.6500	205.2620
2012/12	3397.2720	3116.0530	115.5000	827.4500	1681.7770	715.3140
2012/9	2277.9820	2063.1230	96.6690	517.6310	1123.7580	506.4340
2012/6	1680.9820	1502.3830	80.7650	355.6550	849.9670	367.8770
2012/3	712.1520	640.5140	34.0320	158.4300	355.7270	152.8150
2011/12	3291.7780	3090.1000	103.8880	975.2880	1671.8070	534.8440
2011/9	2536.1750	2386.5720	77.7260	717.5130	1284.1610	447.1030
2011/6	1541.3540	1444.6000	52.3590	460.3750	784.8920	239.4370
2011/3	626.9300	576.3890	23.4950	186.2450	322.6480	89.8890
2010/12	1196.4200	1100.0070	22.4590	221.0450	682.7090	249.4400
2010/9	721.4780	657.0530	7.0310	147.6150	396.8460	159.1390
2010/6	606.0520	555.1160	7.0310	106.4430	365.6750	116.1680
2010/3	306.0190	282.6460	3.2220	37.9740	211.9160	47.6370
2009/12	780.5260	715.0030	14.9470	272.3810	365.0340	117.4400
2009/9	575.1490	520.5350	14.2880	180.8940	261.0770	111.6280
2009/6	412.6400	372.0900	13.0140	144.6510	177.4210	70.6370
2009/3	233.6010	200.8100	14.0830	32.1100	147.9070	33.3580
2008/12	1151.3620	1064.0490	28.8950	274.8130	639.3200	195.9610
2008/9	907.6860	845.4650	15.1800	206.1640	492.5880	183.5880
2008/6	715.9570	659.0710	12.5070	157.6650	377.3400	148.5460
2008/3	478.7030	434.5360	10.4320	128.5380	213.7340	109.6440
2007/12	760.2850	693.9060	12.2180	163.2470	408.2460	134.9990
2007/9	454.7640	404.3260	8.4250	83.2380	256.3200	83.6660

	vL1	vL2	vL3	vL4	vL5	vL6
	PLL1	PLL2	PLL3	PLL4	PLL5	PLL6
2007/6	324.3520	290.3240	6.0710	63.1680	186.7180	52.9060
2007/3	174.6220	158.1240	4.4960	61.6250	77.1650	25.6650
2006/12	632.5780	598.7390	13.5430	127.7480	354.1650	124.9590
2006/9	433.8040	414.1940	7.2520	80.7700	288.6390	49.2270
2006/6	342.7150	325.4410	6.8290	57.9490	233.9810	24.3530
2006/3	102.5940	97.6830	2.6870	20.7120	71.5050	6.0520
2005/12	658.6560	637.4320	5.1370	56.5860	526.2980	60.7180
2005/9	510.7490	496.2350	3.5860	34.2320	436.7110	26.5700
2005/6	284.2210	275.3350	1.9540	113.1830	143.4400	8.8650
2005/3	130.2040	125.0090	1.2070	81.6750	39.6400	3.8860
2004/12	346.6820	341.7150	4.9670	93.3710	231.3160	17.4460
2004/9	259.7240	254.0310	5.6930	39.5380	198.0740	17.2040
2004/6	155.9410	152.1080	3.8330	19.2090	124.0240	8.8920
2004/3	49.9440	49.3340	0.6100	6.4670	41.7920	1.2410
2003/12	194.0590	184.3090	9.7500	36.6260	140.8220	7.7790
2003/9	119.8010	112.1780	7.6230	17.9170	89.7590	5.2850
2003/6	68.9030	62.8660	6.0370	6.0590	55.1750	2.5460
2003/3	53.0360	47.7930	5.2430	16.9200	29.1040	1.7690
2002/12	290.4520	285.4840	4.9680	85.3740	194.3640	5.7460

	vO1	vO2	vO3	vO4	vO5	vO6
	SG1	SG2	SG3	SG4	SG5	SG6
2014/12	-8108.9940	-7975.6340	-205.5420	-2539.0770	-4276.9880	-1150.0460
2014/9	-5487.1550	-5382.8730	-205.1470	-1528.9370	-3159.7260	-654.0390
2014/6	-5180.9720	-4977.8820	-260.5590	-320.3910	-3171.6740	-1438.4460
2014/3	-2121.7640	-2146.3150	-67.2870	61.4670	-1898.2570	-284.3250
2013/12	8020.3040	7792.8440	113.3100	1534.4520	4535.1510	1762.1270
2013/9	5761.0960	5554.7860	125.1290	1105.2130	3324.0750	1160.8470
2013/6	4293.5620	4223.1290	66.1030	941.3510	2512.1180	779.9750
2013/3	555.7730	479.0390	7.7710	13.0540	502.2310	-0.4530
2012/12	-2351.5450	-2634.5350	-8.1210	439.2960	-895.8410	-2042.1930
2012/9	-3467.2430	-3690.9650	2.9170	-41.4290	-1661.7340	-1908.6400
2012/6	-3431.8440	-3565.4670	5.9680	-241.1110	-1916.6720	-1363.6700
2012/3	-1930.1180	-2043.4030	-1.4430	-3.1740	-1158.4750	-850.1250
2011/12	1565.9870	1623.4990	-195.3640	714.9920	931.7960	7.8920
2011/9	2057.4430	2104.7500	-179.9290	750.5980	1068.4540	309.0610
2011/6	1395.0600	1334.1250	-30.2130	463.8860	900.8570	0.6140
2011/3	856.9380	803.8070	-0.3710	172.9600	716.6060	-71.2260
2010/12	-216.7270	-402.4900	-22.3420	607.2810	14.9740	-864.9290
2010/9	-1129.8600	-1325.7180	17.5220	114.6760	-96.8680	-1212.6810
2010/6	-1515.8540	-1594.6800	5.3610	13.8790	-1009.4740	-526.9180
2010/3	-696.6540	-754.7740	4.5390	42.8890	-446.1440	-301.9860
2009/12	1275.1560	859.7900	72.8680	259.8650	1756.5940	-1025.4860
2009/9	1653.9470	1311.9890	64.0440	271.5780	1784.4140	-641.5400
2009/6	1682.6510	1410.6240	54.6700	148.8440	1566.7510	-217.4070
2009/3	1001.0500	957.7620	0.3870	121.9550	557.1410	344.3400
2008/12	1501.1600	1554.1770	-72.0930	370.2030	228.1220	981.0140
2008/9	117.4200	171.5130	-76.8720	-6.1680	354.0550	-158.3600
2008/6	455.2090	498.4900	-67.9350	-19.6620	304.2960	211.7500
2008/3	408.4170	469.1270	-56.4020	113.1350	-56.9150	424.8840
2007/12	-811.4590	-894.7230	67.5720	-137.8950	-125.6010	-453.3930
2007/9	-477.7640	-560.0340	83.3320	-124.0050	-104.9360	-304.9310

	vO1	vO2	vO3	vO4	vO5	vO6
	SG1	SG2	SG3	SG4	SG5	SG6
2007/6	-216.4980	-273.6610	62.4470	-58.8760	-46.0550	-150.6140
2007/3	63.4830	40.0080	27.0280	18.5190	33.4570	-3.3300
2006/12	1174.5280	1099.8070	72.8840	144.1250	639.9500	420.8730
2006/9	1347.0560	1255.6370	88.6900	138.7320	765.6650	454.9660
2006/6	1841.6990	1689.1420	149.1990	117.3470	997.2120	674.5560
2006/3	484.2520	478.0120	5.4350	65.4100	349.3270	69.9370
2005/12	1380.9990	1389.6730	-13.7920	452.0330	488.2610	446.3120
2005/9	1052.3280	1033.7720	13.9400	346.0380	321.9230	389.7940
2005/6	682.0870	685.6600	-8.0470	205.4140	207.0250	249.1560
2005/3	469.7560	463.5160	4.5540	141.3590	201.6280	132.1020
2004/12	1839.4030	1810.9570	28.4460	230.3440	1222.0840	375.3230
2004/9	1435.6500	1383.3180	0.0290	151.1640	1097.7030	191.6930
2004/6	772.7270	753.4700	19.2570	101.6000	580.7650	94.3080
2004/3	415.6960	415.8650	-0.1690	58.3030	321.9100	33.5390
2003/12	5095.0740	4964.7310	130.3430	1105.8590	3669.7020	258.0260
2003/9	3162.8810	3069.8190	93.0620	632.0790	2306.0410	187.4330
2003/6	1811.2450	1737.8990	73.3460	366.5520	1290.0330	124.4830
2003/3	766.9470	740.3030	26.6440	244.4970	457.1460	51.2860
2002/12	3268.5960	3211.3480	57.2480	817.5990	2276.1060	161.1210

	vM1	vM2	vM3	vM4	vM5	vM6
	T1	T2	T3	T4	T5	T6
2014/12	1913.5800	1735.5470	69.2620	542.9630	819.6880	455.7660
2014/9	1411.9440	1275.3890	56.7990	395.2240	607.7570	332.8540
2014/6	933.2750	857.6330	21.5160	263.4140	412.5930	222.6800
2014/3	456.2910	418.0480	11.2060	129.3670	202.1860	106.1780
2013/12	1869.2660	1726.7570	47.6570	497.9240	832.8460	468.2670
2013/9	1419.3230	1314.4440	36.3700	362.6610	640.0610	365.0260
2013/6	971.1610	906.9080	19.4710	237.0550	458.6540	246.8420
2013/3	440.1440	409.1210	10.5150	114.6680	178.4420	132.5920
2012/12	1451.6220	1347.6910	27.4370	392.3620	662.3130	352.8600
2012/9	1084.2870	1010.5260	20.1560	284.9000	511.1080	257.4770
2012/6	741.0170	691.9390	14.1810	190.0240	355.4070	174.4300
2012/3	382.7800	359.9520	6.9820	90.4300	198.3030	83.5550
2011/12	1282.2860	1199.0780	22.7230	332.1920	602.7980	313.4180
2011/9	934.2580	873.9660	16.0510	245.7590	439.9490	224.7810
2011/6	642.3390	601.9100	11.4200	165.1250	313.8800	146.8540
2011/3	338.1790	317.5130	6.1500	83.4090	170.6430	75.7290
2010/12	1130.1930	1061.4490	19.5650	319.3670	495.6150	284.6380
2010/9	834.3200	783.0100	14.9380	218.4100	387.7770	205.6230
2010/6	579.5620	543.8290	11.3410	146.7240	275.2670	141.0960
2010/3	297.3920	279.5230	5.8300	62.1910	159.1630	67.2570
2009/12	764.6000	722.9450	16.4700	192.3000	324.3090	227.1340
2009/9	593.3920	563.2220	10.4560	145.8710	253.8140	179.8540
2009/6	440.5700	418.6340	8.0050	103.1470	189.6520	137.8630
2009/3	191.7600	180.7840	3.7620	48.4580	73.6910	64.9970
2008/12	818.5370	777.6550	13.0500	208.9780	398.0640	190.3880
2008/9	566.0540	534.9230	9.2770	151.1850	262.6340	136.4310
2008/6	401.1900	379.8900	6.5520	102.8900	203.4610	84.1160
2008/3	233.7650	223.0250	3.3740	46.0130	102.1490	77.7210
2007/12	613.8210	576.0810	15.1560	185.0520	274.5630	116.0800
2007/9	403.9080	376.6730	10.7780	133.4760	169.5070	81.2790

	vM1	vM2	vM3	vM4	vM5	vM6
	T1	T2	T3	T4	T5	T6
2007/6	261.6840	243.1580	7.4920	88.2140	106.7920	53.0400
2007/3	121.9790	113.6320	3.2340	40.3600	49.2290	25.9710
2006/12	538.1520	497.1800	24.0650	156.0220	237.7760	112.2530
2006/9	386.3370	354.5350	19.5580	108.5830	190.6750	60.9680
2006/6	264.0460	237.6940	17.8010	71.6750	131.0290	25.9370
2006/3	119.4710	101.3790	14.4610	31.7510	59.5090	11.5440
2005/12	415.3300	392.8530	11.7440	130.5600	225.6220	41.9170
2005/9	296.4890	279.8810	8.7900	93.4990	158.3540	31.9250
2005/6	190.9120	178.8100	7.1600	58.2060	100.0990	16.2520
2005/3	92.6720	84.7860	5.5080	26.6880	51.0640	8.2650
2004/12	420.2750	403.2650	17.0100	133.5500	246.0180	24.6670
2004/9	286.0940	272.3100	12.9030	95.4220	161.4480	17.0820
2004/6	193.3490	185.7000	7.6490	63.1380	112.0260	11.6610
2004/3	98.8610	93.5810	5.2800	29.3680	57.6540	7.0500
2003/12	610.6450	589.3930	21.2520	189.6700	371.3150	30.6800
2003/9	408.8820	392.1610	16.7210	119.1950	254.4560	20.0880
2003/6	266.8070	255.8170	10.9900	79.3660	162.7920	14.8090
2003/3	130.8590	122.6250	8.2340	41.1340	75.5430	6.5620
2002/12	537.1320	505.4820	31.6500	162.2280	311.7950	35.1860

	vI1 + vK1 + vO1	vI2 + vK2 + vO2	vI3 + vK3 + vO3	vI4 + vK4 + vO4	vI5 + vK5 + vO5	vI6 + vK6 + vO6
	TR1	TR2	TR3	TR4	TR5	TR6
2014/12	168105.3710	154363.7110	4553.4960	45637.5130	79431.5590	36391.8420
2014/9	124653.7700	114346.3250	3350.6020	33871.3410	58986.0600	26723.9860
2014/6	81605.7940	74846.8790	2039.8350	23296.0140	38295.9160	16686.0770
2014/3	39667.7640	36349.2630	1045.0440	11380.3330	18120.7000	8470.2170
2013/12	152120.9840	140759.7690	3710.1570	40764.0950	74698.0890	30713.6510
2013/9	111879.4070	103556.8050	2726.1720	29587.9390	55490.5190	22437.6900
2013/6	73810.0700	68456.0470	1750.1290	19715.0620	37015.0970	14345.2670
2013/3	35376.6100	32692.4770	841.2020	9375.4900	17967.0030	6711.9470
2012/12	134535.3870	124392.1940	3190.8010	37362.4760	67101.5620	24888.2950
2012/9	98501.1820	90981.3200	2404.6600	27442.2110	48956.6650	18215.1590
2012/6	65264.2610	60337.3260	1603.2360	18382.3360	32053.3410	12275.4530
2012/3	31852.7050	29411.6850	766.9970	9071.0750	15607.1350	5915.5580
2011/12	116278.5100	108806.2220	2223.3230	32615.8960	58221.4440	21613.8790
2011/9	85009.2670	79681.9160	1551.1170	23855.8270	42337.0890	16085.8920
2011/6	54856.6200	51312.8170	1123.2160	15373.2250	27932.4250	9679.0880
2011/3	26754.3120	24989.1320	561.1740	7370.6750	13703.6840	4736.1020
2010/12	101080.1680	94501.8200	1956.4930	29394.6380	50342.9140	17928.4020
2010/9	73620.0540	68733.5220	1456.6300	21203.6350	37086.3440	12796.2210
2010/6	49134.8500	45892.3130	980.5140	14137.6340	24499.0580	8826.2440
2010/3	24725.1930	23076.7450	507.5990	6987.8950	12467.4720	4417.6150
2009/12	105780.1560	98630.4190	2303.1640	30394.0380	52574.4760	18822.3660
2009/9	81708.3400	76263.0760	1795.9490	23333.4830	40640.2470	14650.4980
2009/6	56365.3620	52652.0850	1247.2300	15884.8110	28163.0160	10191.4100
2009/3	29456.6040	27641.9960	630.2360	8135.8000	14412.5640	5924.2420
2008/12	104691.7850	98842.6010	2059.5680	29922.6630	51108.0550	20432.3580
2008/9	74577.4310	70397.9340	1488.4030	21320.6970	37209.4820	13721.9410
2008/6	49230.1580	46529.4380	953.1560	13890.4450	24600.9350	9219.6870
2008/3	24671.3060	23379.5660	443.1790	6880.0010	12191.9170	4690.9070
2007/12	85766.6710	81012.6190	1943.4090	25002.2220	43494.0010	11835.4360
2007/9	62876.4130	59474.2170	1415.5070	18591.2490	33109.5530	8590.7580

	vI1 + vK1 + vO1	vI2 + vK2 + vO2	vI3 + vK3 + vO3	vI4 + vK4 + vO4	vI5 + vK5 + vO5	vI6 + vK6 + vO6
	TR1	TR2	TR3	TR4	TR5	TR6
2007/6	41508.9230	39346.8880	915.0370	12397.7080	21823.9320	5636.3720
2007/3	20098.0240	19065.8520	438.1390	6162.1710	10271.4270	2856.2500
2006/12	71692.6000	67551.3000	1822.1060	21651.8180	36519.0100	10486.3800
2006/9	53346.8520	50104.1570	1413.1180	15553.2680	28430.4630	7024.6120
2006/6	36076.8690	33471.4710	1134.9500	9928.7000	19432.1680	3586.1560
2006/3	15764.9850	14738.7840	523.9300	4750.0120	9051.4970	1174.9970
2005/12	54892.1280	52139.2080	1373.3140	17969.4030	30533.1710	4148.1290
2005/9	40161.0730	38185.6450	1007.9000	13273.5470	22235.7720	3054.2720
2005/6	26445.6110	25220.6580	611.0440	8954.7380	14460.6270	1437.2430
2005/3	13235.1750	12606.6830	318.9870	4706.5790	7306.7980	733.9280
2004/12	50322.2230	48689.2400	1632.9830	18643.1920	28138.8260	1975.2600
2004/9	36670.7240	35449.5850	1142.7700	13759.5620	20500.5790	1315.7450
2004/6	23393.6410	22674.2010	719.4400	8792.6140	13162.9290	791.9560
2004/3	11442.6240	11091.6450	350.9790	4355.2830	6354.7210	402.5410
2003/12	51106.6700	49330.6730	1775.9970	22744.7610	25071.7840	1696.8140
2003/9	37278.7910	36015.6620	1263.1290	17082.6810	17810.6770	1265.1740
2003/6	25103.9890	24240.9240	863.0650	11724.8360	11718.1330	909.4550
2003/3	14092.9290	13648.1100	444.8190	6693.9970	6500.5420	503.6310
2002/12	55396.0950	53325.1860	2070.9090	25170.2670	26439.2330	1853.2760

	vJ1 + vN1 + vL1	vJ2 + vN2 + vL2	vJ3 + vN3 + vL3	vJ4 + vN4 + vL4	vJ5 + vN5 + vL5	vJ6 + vN6 + vL6
	EXP1	EXP2	EXP3	EXP4	EXP5	EXP6
2014/12	131866.6120	121962.1650	2706.4020	36277.7430	62753.3570	28753.4040
2014/9	97000.9700	89821.7840	1863.9480	26641.1760	46450.1240	20943.7430
2014/6	64530.0760	59812.7450	1237.4230	17914.0930	30752.0450	13916.3400
2014/3	31734.2470	29391.4220	628.9730	8567.7890	15047.5040	7100.7020
2013/12	107567.2540	99757.9930	2110.0660	28688.9550	52325.0590	22846.1640
2013/9	78390.8570	72644.0750	1460.2610	20820.1970	38221.4470	16683.2440
2013/6	51122.5420	47270.4360	1018.5420	13427.9880	25450.9670	10440.4480
2013/3	25204.8300	23331.1510	463.5220	6595.3710	12661.5450	5107.6710
2012/12	103872.8660	96831.5230	1902.0480	27914.0710	52045.9510	20580.1210
2012/9	77773.6560	72618.3070	1398.6310	20911.8280	39179.0230	15262.3130
2012/6	52409.8260	48999.7850	915.3160	14245.5580	26268.8010	10285.9480
2012/3	25526.0560	23905.4870	440.0990	7003.8390	12854.0110	4905.6870
2011/12	88345.9390	82860.8910	1457.9220	25231.1610	43800.2190	16723.0240
2011/9	63932.1500	60021.5430	1018.6920	18189.5880	31761.3960	12132.0920
2011/6	40436.9620	37916.5420	670.8030	11573.8720	20140.7220	7511.4400
2011/3	19265.5220	18033.7520	311.5150	5394.0710	9639.7380	3643.7710
2010/12	70122.6360	65739.5220	963.9750	19884.6730	34271.4970	13901.4210
2010/9	51276.2660	48055.3110	685.0000	14539.9950	25049.4800	10199.9440
2010/6	33661.0760	31515.5470	462.9060	9450.8940	16561.3510	6641.0770
2010/3	16720.4900	15656.9930	242.7360	4624.6400	8225.8550	3356.2680
2009/12	72158.5760	67768.7380	1052.0890	21153.4570	35022.0770	13873.6530
2009/9	55508.2100	52174.1390	811.2390	16351.9450	26806.1540	10735.9370
2009/6	38246.0520	35978.9610	574.9200	11278.9060	18525.2100	7321.4200
2009/3	20505.1060	19282.1580	342.9730	5940.6230	9997.1930	3942.7160
2008/12	82529.9070	78547.9470	1007.4860	23794.7000	41273.7850	15596.9840
2008/9	58657.0130	55805.6230	741.9720	16905.5690	29161.4120	11233.7250
2008/6	37920.2130	36023.2350	502.0170	10822.5720	18866.2400	7313.7260
2008/3	18851.2210	17875.0090	254.0780	5374.1430	9274.2110	3554.8740
2007/12	67482.0140	64431.1750	900.8970	19366.5740	34371.1680	9941.4030
2007/9	48645.6170	46443.0620	664.6770	14243.8350	25737.6120	7119.0000

	vJ1 + vN1 + vL1	vJ2 + vN2 + vL2	vJ3 + vN3 + vL3	vJ4 + vN4 + vL4	vJ5 + vN5 + vL5	vJ6 + vN6 + vL6
	EXP1	EXP2	EXP3	EXP4	EXP5	EXP6
2007/6	31693.1550	30298.6460	417.0110	9434.4070	16707.9570	4570.6450
2007/3	15530.6300	14857.9940	209.0260	4731.6650	8115.8610	2188.5940
2006/12	53992.5890	51612.5960	793.7030	16065.9110	28416.3890	7857.4060
2006/9	38589.3060	36940.3860	558.9940	11403.0240	21295.5060	4705.3100
2006/6	24475.5840	23406.5940	381.3570	7353.4320	13509.4270	2007.9410
2006/3	11528.2820	10981.5970	172.4400	3593.8450	6611.6680	965.2650
2005/12	44843.3620	43038.1250	587.7800	13475.4820	26626.1460	3449.7150
2005/9	32828.7130	31555.1780	420.3860	10047.0590	19432.1390	2450.1640
2005/6	20084.8580	19235.0840	273.0170	6908.3920	10918.3420	1152.4380
2005/3	9815.1260	9382.9170	153.2880	3614.7440	5333.8980	566.3800
2004/12	37567.7770	36884.2550	683.5220	13378.2420	22060.9490	1472.7740
2004/9	27439.3620	26959.5340	426.3200	10509.4880	15571.4990	951.3730
2004/6	17592.7080	17233.3920	359.3160	6750.2800	9966.8330	564.0480
2004/3	9187.0390	9023.0070	164.0320	3535.0800	5199.3840	313.9250
2003/12	40442.0220	39732.4150	709.6070	17661.1920	20928.4720	1259.0650
2003/9	30157.3060	29668.0280	489.2780	13363.6780	15508.0770	886.3180
2003/6	20884.2600	20528.1640	356.0960	9212.9360	10764.7660	619.1790
2003/3	10444.8210	10218.3830	226.4380	4679.8850	5255.7780	312.2730
2002/12	44032.0090	43238.9650	793.0440	21482.1440	20576.0400	1279.7960

	v@P1	v@P2	v@P3	v@P4	v@P5	v@P6
	aTA1	aTA2	aTA3	aTA4	aTA5	aTA6
2014/12	1961946.6440	1775168.2190	83361.8735	551295.6405	935963.8450	378524.8115
2014/9	1879944.1075	1699003.3780	79445.8715	524827.3945	898842.5955	360606.4105
2014/6	1813788.1025	1639640.8420	76192.2990	509337.9275	866275.5040	342458.6850
2014/3	1764872.2400	1596187.7850	72891.3265	495787.3070	843910.8415	329297.8080
2013/12	1690725.7145	1529581.6385	67723.9680	468349.3680	817919.0700	311456.4640
2013/9	1588380.8730	1439982.7970	61491.5985	434173.3800	783124.4885	285328.3865
2013/6	1477683.5080	1343302.8300	55499.4180	402670.8615	739261.2890	258966.4430
2013/3	1399172.9875	1273633.0360	53042.7360	383513.3920	704012.8245	240066.8325
2012/12	1339585.8930	1220336.5880	51595.7125	367047.6300	679405.6165	224632.0885
2012/9	1291110.1845	1177782.2870	50299.4930	354563.7610	657620.0280	213121.2625
2012/6	1251338.9910	1144688.9920	47690.1140	348897.1870	636650.0860	203496.7745
2012/3	1223317.3040	1123372.0555	43425.6995	343806.1090	622269.6110	199496.3370
2011/12	1215677.7105	1121034.6070	39782.4190	343894.1705	619770.5495	197684.7370
2011/9	1179817.7570	1092923.4185	35966.9435	344136.4390	598204.4225	187397.7550
2011/6	1096193.6765	1016070.7440	33473.2495	325334.3320	550598.1110	173938.9895
2011/3	1026539.5005	950411.9425	31949.4035	303598.1910	511113.2960	167482.4420
2010/12	967009.3365	895920.6575	29663.7720	289872.7180	477237.1955	158354.3045
2010/9	917983.6220	851116.9765	28605.0890	276773.3690	454285.8575	147370.8700
2010/6	884523.4835	820345.7335	28367.5160	266970.3530	438194.3165	140728.7300
2010/3	847222.6725	785642.6435	27461.7755	256113.6780	419559.7925	134256.9420
2009/12	816030.0755	756909.4420	26394.2705	245894.1670	404017.3365	130250.8290
2009/9	783138.1755	727012.2170	25395.7700	236272.1035	386156.8330	126680.8455
2009/6	761006.1475	707295.4255	24754.8955	225453.7205	377788.9445	125429.3130
2009/3	743159.1230	692425.7135	23710.3640	213799.0400	373651.5315	125302.6260
2008/12	706164.7240	659396.9000	22147.7570	200023.7295	358119.3990	119822.8105
2008/9	668314.0935	624038.0805	20921.6395	187912.0610	339035.1730	114484.3580
2008/6	645370.5520	602527.7490	20470.7550	181881.5280	324536.5755	110065.9110
2008/3	607756.0610	567611.1755	19669.5455	171944.8030	305589.1610	93801.0970
2007/12	562564.7190	525768.3120	18336.9265	160578.8530	289790.7370	77820.5175
2007/9	538614.3440	503939.4125	17543.5080	154821.7900	284654.5415	72401.2650

	v@P1	v@P2	v@P3	v@P4	v@P5	v@P6
	aTA1	aTA2	aTA3	aTA4	aTA5	aTA6
2007/6	524481.3590	491856.8695	16802.3750	152033.1985	278882.1315	68024.4220
2007/3	507494.1980	477366.8190	15824.0785	148079.6565	269981.2640	65640.5335
2006/12	486702.4775	458457.5285	15017.2715	142181.5890	264531.0690	57701.3150
2006/9	470597.6205	443352.6110	14752.1720	136964.7665	262101.1740	41691.5520
2006/6	445112.4575	419740.5485	14112.0125	133604.9195	252296.8840	30966.3825
2006/3	414806.3475	391576.6385	13138.0490	129264.6945	240356.6415	27009.6240
2005/12	390078.4980	367983.9415	12618.4395	121385.4005	226024.6735	25185.0950
2005/9	359340.1095	338634.7720	12099.4190	113872.6980	205002.9940	20051.3435
2005/6	333284.5060	313957.5355	11517.2120	109907.4480	188871.4555	15062.3990
2005/3	313787.9200	298814.2830	11266.3940	108668.5355	179333.5300	12665.8295
2004/12	300323.2960	288765.5850	11174.1765	105874.4645	172869.9960	10703.5740
2004/9	284523.5185	273045.2465	11094.7375	100003.9130	163729.3375	10255.4140
2004/6	265406.7495	254785.1145	10621.6350	96629.6525	150131.9030	8702.9370
2004/3	252830.8220	242660.8655	10169.9565	93184.2355	142445.6385	7595.1945
2003/12	237362.8280	227365.6765	9997.1515	86634.3255	134097.5400	7147.8065
2003/9	218333.0975	208778.0155	9555.0820	80829.1710	121656.8840	6768.8115
2003/6	215936.5265	206349.3255	9587.2010	79525.0825	120374.0825	6988.0080
2003/3	216462.8000	206846.8015	9615.9985	78796.4320	121415.3125	7156.3355
2002/12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	v@Q1	v@Q2	v@Q3	v@Q4	v@Q5	v@Q6
	aTE1	aTE2	aTE3	aTE4	aTE5	aTE6
2014/12	225600.2665	194960.7095	20971.1350	58172.1850	107498.5230	37632.1475
2014/9	216801.0595	186689.2015	20387.1835	55418.2400	103237.5640	36010.4825
2014/6	208232.6045	179078.9795	19728.7770	53152.6095	98893.0660	34570.7405
2014/3	197851.7810	169725.5985	19165.2960	48507.7890	95161.4190	33150.1875
2013/12	191248.5820	163867.5070	18680.9445	45001.8625	93717.5370	32003.8405
2013/9	186761.1825	160151.1635	18181.3985	43553.8040	92340.9870	30880.4215
2013/6	185492.5335	159906.3390	17590.9495	43292.3635	92970.5885	29895.2270
2013/3	184088.2840	159421.9930	17127.4560	42880.6635	93058.8790	29321.8950
2012/12	175045.3905	151116.7665	16784.0785	40338.9950	88135.7325	28122.0470
2012/9	163745.5435	140646.5485	16308.7635	37279.7915	82026.6445	26501.2610
2012/6	156187.6380	133694.1850	15934.3135	35237.7695	77958.7840	25470.4795
2012/3	148840.4785	126891.5630	15627.0495	33151.5100	74328.4840	24187.2815
2011/12	143110.5225	121796.7055	15217.8490	31503.1665	71837.9815	23040.2960
2011/9	140326.7790	119531.1280	14914.5450	30728.9455	71089.7905	22129.8365
2011/6	137046.2270	116715.9905	14653.2835	29978.9980	69622.9760	21383.9295
2011/3	134777.7585	114967.3830	14286.8380	29907.8785	67387.9225	21834.0505
2010/12	130707.7285	111647.7785	13718.9575	29097.4110	64705.8285	21875.4535
2010/9	123081.1315	104759.7090	13336.8430	27064.1250	60778.1550	20656.7730
2010/6	118029.6385	100136.5045	13239.3550	25990.6035	57722.0165	19893.5870
2010/3	113828.8465	96451.3885	12886.0235	25066.5460	55348.4925	19376.9955
2009/12	108152.0615	91497.5335	12319.9385	23397.7210	52402.5220	18926.2675
2009/9	101616.9405	85678.4545	11784.9155	21487.9260	48864.6445	18444.6840
2009/6	94776.6385	79426.2250	11397.3940	19977.7180	44786.4545	17651.1175
2009/3	89080.1885	74358.9175	10932.5495	18813.3030	41827.2195	16627.1685
2008/12	84738.6045	70874.3155	10361.7550	17640.6965	40140.1135	15795.6450
2008/9	80107.2435	67052.5825	9863.4865	16373.5125	38066.5200	15065.8950
2008/6	76559.6930	64306.9845	9472.9645	16627.2310	35932.8045	13640.8820
2008/3	75904.0045	64365.5510	9129.9090	17649.3810	35505.6670	11953.0185
2007/12	73704.8110	62751.2405	8673.0445	16798.1125	35629.8660	10967.7500
2007/9	69002.1145	58709.0085	8168.2680	15454.6630	34112.0215	10307.9645

	v@Q1	v@Q2	v@Q3	v@Q4	v@Q5	v@Q6
	aTE1	aTE2	aTE3	aTE4	aTE5	aTE6
2007/6	65331.1190	55527.1865	7946.7400	15579.8880	31481.1830	9409.9885
2007/3	61877.5540	52507.2845	7759.4365	16011.7300	28863.8600	8396.9095
2006/12	58593.4670	49865.8380	7232.6710	14774.9635	28767.0455	6961.0340
2006/9	54900.5010	46791.4590	6736.3665	12947.1615	28621.4465	4951.6565
2006/6	54416.0440	46789.2890	6465.2465	13580.8110	29043.6740	3866.7505
2006/3	55683.9550	48400.1785	6304.2975	14947.1655	30094.1285	3794.0055
2005/12	51459.8415	44536.8460	6041.5985	13503.4995	27778.3750	3661.7905
2005/9	47922.7410	41487.9820	5672.8230	11767.9880	26527.3610	3066.0700
2005/6	47799.8590	41734.7675	5376.8250	11753.9270	27358.5610	2484.8305
2005/3	46974.7540	41453.8995	5188.6720	11766.7050	27611.2390	2265.5510
2004/12	42946.3495	37889.3790	5010.1965	9557.5275	26372.4435	2020.2275
2004/9	37766.4715	33030.6570	4689.0405	7238.5160	24022.8790	1872.9955
2004/6	37240.6315	32750.5105	4490.1210	8108.2685	22945.5180	1805.8465
2004/3	37208.3440	32872.9875	4335.3565	9120.5100	22074.2570	1792.8400
2003/12	34013.2470	29955.1535	4058.0935	8472.8910	19829.4975	1758.1385
2003/9	31298.2460	27549.0820	3749.1640	7917.1490	18030.3955	1693.0725
2003/6	29116.2220	25702.2180	3414.0040	7381.8890	16786.8115	1613.6250
2003/3	26911.2825	23784.6330	3126.6495	6634.9290	15703.9385	1518.4375
2002/12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	(vN1 Vk1)/v@P1	(vN2 Vk2)/v@P2	(vN3 Vk3)/v@P3	(vN4 Vk4)/v@P4	(vN5 Vk5)/v@P5	(vN6 Vk6)/v@P6
	BURDEN RATIO1	BURDEN RATIO2	BURDEN RATIO3	BURDEN RATIO4	BURDEN RATIO5	BURDEN RATIO6
2014/12	0.0091	0.0091	0.0071	0.0089	0.0087	0.0116
2014/9	0.0062	0.0064	0.0036	0.0065	0.0059	0.0079
2014/6	0.0037	0.0038	0.0029	0.0041	0.0035	0.0049
2014/3	0.0022	0.0022	0.0018	0.0022	0.0020	0.0031
2013/12	0.0098	0.0098	0.0079	0.0102	0.0079	0.0145
2013/9	0.0074	0.0074	0.0052	0.0083	0.0055	0.0116
2013/6	0.0058	0.0058	0.0042	0.0060	0.0050	0.0078
2013/3	0.0031	0.0031	0.0018	0.0032	0.0026	0.0044
2012/12	0.0118	0.0119	0.0103	0.0137	0.0097	0.0155
2012/9	0.0084	0.0084	0.0072	0.0095	0.0070	0.0112
2012/6	0.0053	0.0053	0.0045	0.0062	0.0043	0.0070
2012/3	0.0024	0.0024	0.0027	0.0030	0.0019	0.0025
2011/12	0.0080	0.0077	0.0097	0.0098	0.0056	0.0118
2011/9	0.0051	0.0048	0.0072	0.0061	0.0037	0.0073
2011/6	0.0032	0.0030	0.0044	0.0039	0.0016	0.0065
2011/3	0.0018	0.0017	0.0020	0.0019	0.0013	0.0030
2010/12	0.0065	0.0063	0.0076	0.0055	0.0032	0.0180
2010/9	0.0047	0.0045	0.0061	0.0044	0.0021	0.0133
2010/6	0.0029	0.0028	0.0036	0.0028	0.0011	0.0085
2010/3	0.0019	0.0019	0.0021	0.0018	0.0009	0.0051
2009/12	0.0106	0.0106	0.0114	0.0099	0.0088	0.0186
2009/9	0.0076	0.0076	0.0085	0.0074	0.0059	0.0137
2009/6	0.0047	0.0046	0.0050	0.0052	0.0032	0.0084
2009/3	0.0023	0.0022	0.0035	0.0030	0.0014	0.0036
2008/12	0.0130	0.0128	0.0158	0.0101	0.0110	0.0242
2008/9	0.0092	0.0091	0.0115	0.0069	0.0073	0.0187
2008/6	0.0055	0.0054	0.0075	0.0039	0.0040	0.0127
2008/3	0.0028	0.0027	0.0050	0.0026	0.0013	0.0077
2007/12	0.0110	0.0110	0.0095	0.0076	0.0091	0.0235

	(vN1 Vk1)/v@P1	(vN2 Vk2)/v@P2	(vN3 Vk3)/v@P3	(vN4 Vk4)/v@P4	(vN5 Vk5)/v@P5	(vN6 Vk6)/v@P6
	BURDEN RATIO1	BURDEN RATIO2	BURDEN RATIO3	BURDEN RATIO4	BURDEN RATIO5	BURDEN RATIO6
2007/9	0.0070	0.0068	0.0095	0.0050	0.0053	0.0173
2007/6	0.0038	0.0036	0.0057	0.0033	0.0022	0.0108
2007/3	0.0027	0.0027	0.0033	0.0021	0.0026	0.0041
2006/12	0.0084	0.0091	0.0003	0.0070	0.0085	0.0156
2006/9	0.0033	0.0043	-0.0052	0.0036	0.0048	0.0003
2006/6	-0.0004	0.0012	-0.0112	0.0018	0.0006	-0.0039
2006/3	0.0021	0.0025	-0.0096	0.0016	0.0024	0.0081
2005/12	0.0242	0.0248	0.0030	0.0095	0.0313	0.0410
2005/9	0.0204	0.0209	0.0042	0.0097	0.0263	0.0354
2005/6	0.0105	0.0104	0.0048	0.0073	0.0109	0.0251
2005/3	0.0051	0.0049	0.0039	0.0030	0.0057	0.0150
2004/12	0.0212	0.0217	0.0077	0.0125	0.0257	0.0484
2004/9	0.0157	0.0164	-0.0008	0.0128	0.0177	0.0303
2004/6	0.0102	0.0101	0.0130	0.0077	0.0110	0.0219
2004/3	0.0068	0.0069	0.0053	0.0044	0.0080	0.0162
2003/12	0.0231	0.0231	0.0245	0.0118	0.0282	0.0648
2003/9	0.0168	0.0167	0.0180	0.0069	0.0221	0.0379
2003/6	0.0099	0.0098	0.0129	0.0025	0.0139	0.0233
2003/3	0.0023	0.0019	0.0113	-0.0040	0.0052	0.0102
2002/12	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

	$vN1/[(vI1-vJ1)+vK1]$	$vN2/[(vI2-vJ2)+vK2]$	$vN3/[(vI3-vJ3)+vK3]$	$vN4/[(vI4-vJ4)+vK4]$	$vN5/[(vI5-vJ5)+vK5]$	$vN6/[(vI6-vJ6)+vK6]$
	EFF1	EFF2	EFF3	EFF4	EFF5	EFF6
2014/12	0.5373	0.5356	0.4228	0.4993	0.5395	0.5912
2014/9	0.5295	0.5302	0.3724	0.4976	0.5331	0.5822
2014/6	0.5278	0.5297	0.3958	0.5021	0.5292	0.5866
2014/3	0.5491	0.5484	0.4318	0.5046	0.5430	0.6340
2013/12	0.5504	0.5509	0.4390	0.5016	0.5447	0.6373
2013/9	0.5407	0.5410	0.4036	0.5037	0.5302	0.6266
2013/6	0.5423	0.5411	0.4351	0.4921	0.5443	0.6111
2013/3	0.5327	0.5310	0.4054	0.4772	0.5356	0.6052
2012/12	0.5405	0.5413	0.4275	0.5039	0.5438	0.5872
2012/9	0.5380	0.5399	0.4052	0.5002	0.5481	0.5744
2012/6	0.5331	0.5347	0.3849	0.5014	0.5401	0.5681
2012/3	0.5190	0.5199	0.4042	0.4985	0.5321	0.5238
2011/12	0.5498	0.5485	0.4628	0.5229	0.5426	0.6069
2011/9	0.5501	0.5488	0.4492	0.5118	0.5504	0.6009
2011/6	0.5403	0.5384	0.4515	0.5031	0.5297	0.6189
2011/3	0.5389	0.5373	0.4276	0.4804	0.5403	0.6120
2010/12	0.4826	0.4796	0.3829	0.4091	0.4735	0.5977
2010/9	0.4754	0.4719	0.3767	0.4019	0.4674	0.5851
2010/6	0.4522	0.4479	0.3754	0.3792	0.4423	0.5639
2010/3	0.4525	0.4490	0.3881	0.3777	0.4381	0.5743
2009/12	0.4571	0.4567	0.3453	0.3818	0.4698	0.5281
2009/9	0.4475	0.4467	0.3326	0.3764	0.4561	0.5214
2009/6	0.4444	0.4433	0.3302	0.3793	0.4514	0.5141
2009/3	0.4558	0.4536	0.3534	0.4086	0.4576	0.5098
2008/12	0.5494	0.5548	0.3354	0.4604	0.5766	0.6177
2008/9	0.5383	0.5428	0.3306	0.4443	0.5568	0.6301
2008/6	0.5276	0.5296	0.3432	0.4262	0.5418	0.6334
2008/3	0.5262	0.5254	0.3683	0.4439	0.5172	0.6574
2007/12	0.5281	0.5337	0.3190	0.4050	0.5592	0.6386
2007/9	0.5011	0.5036	0.3345	0.3900	0.5230	0.6253

	$vN1/[(vI1-vJ1)+vK1]$	$vN2/[(vI2-vJ2)+vK2]$	$vN3/[(vI3-vJ3)+vK3]$	$vN4/[(vI4-vJ4)+vK4]$	$vN5/[(vI5-vJ5)+vK5]$	$vN6/[(vI6-vJ6)+vK6]$
	EFF1	EFF2	EFF3	EFF4	EFF5	EFF6
2007/6	0.4893	0.4907	0.3268	0.3936	0.5033	0.6154
2007/3	0.5059	0.5079	0.3482	0.4097	0.5399	0.5752
2006/12	0.5221	0.5313	0.3329	0.4108	0.5669	0.6153
2006/9	0.4965	0.5096	0.2976	0.3937	0.5467	0.5478
2006/6	0.4761	0.4976	0.2753	0.4291	0.5151	0.5246
2006/3	0.5234	0.5386	0.2410	0.4285	0.5558	0.7704
2005/12	0.6779	0.6904	0.3140	0.4449	0.7768	0.8574
2005/9	0.6807	0.6936	0.3119	0.4533	0.7787	0.8440
2005/6	0.5814	0.5832	0.3311	0.4632	0.6057	0.9339
2005/3	0.5557	0.5550	0.3845	0.4362	0.5868	0.8872
2004/12	0.5631	0.5760	0.3379	0.3791	0.6637	0.8598
2004/9	0.5570	0.5720	0.2766	0.4354	0.6302	0.7525
2004/6	0.5528	0.5605	0.4074	0.4307	0.6131	0.7200
2004/3	0.6498	0.6664	0.3620	0.5074	0.7330	0.7933
2003/12	0.6875	0.7179	0.3071	0.4604	0.9293	0.8084
2003/9	0.6880	0.7200	0.2835	0.4364	0.9854	0.7151
2003/6	0.7094	0.7417	0.3076	0.4413	1.0792	0.6622
2003/3	0.4887	0.4933	0.4151	0.3192	0.6712	0.5390
2002/12	0.5915	0.6212	0.2476	0.5865	0.6483	0.5908

	vI1	vI2	vI3	vI4	vI5	vI6
2014/12	138668.841	128329.782	3811.538	40305.702	65190.456	28306.677
2014/9	101870.687	94242.586	2814.737	29626.395	47982.971	20581.629
2014/6	67094.506	62143.642	1814.055	19643.969	31642.03	13376.675
2014/3	32494.664	30075.217	870.841	9494.866	15350.578	6412.498
2013/12	110631.034	102197.247	2906.632	32062.484	52788.796	21358.313
2013/9	80883.21	74773.124	2099.231	23209.279	38814.869	15651.418
2013/6	53253.127	49302.792	1341.095	15309.992	25978.233	9919.697
2013/3	27019.246	25076.973	657.956	7800.446	13235.248	4997.622
2012/12	109895.967	102245.16	2674.946	31969.811	53569.275	20370.346
2012/9	81971.493	76305.239	2013.801	23766.476	39975.187	15268.06
2012/6	54766.678	51066.501	1335.052	16017.675	26635.449	10160.597
2012/3	27014.214	25226.703	642.027	7895.702	13122.164	5057.382
2011/12	88158.917	82530.061	1889.241	26890.352	42777.939	15572.025
2011/9	62624.961	58604.565	1346.03	19283.472	30263.419	10976.832
2011/6	39859.904	37311.844	861.376	12328.047	19290.652	6905.009
2011/3	19263.79	18025.673	419.639	5922.803	9356.267	3335.427
2010/12	77395.953	72646.444	1560.613	24076.512	36799.763	13998.35
2010/9	57182.47	53664.026	1152.949	17809.774	27137.102	10368.988
2010/6	38693.443	36356.083	764.569	11948.66	18607.206	6895.23
2010/3	19579.261	18409.936	393.526	5966.841	9477.562	3506.537
2009/12	85290.629	79995.101	1902.641	26848.338	40039.383	15454.675
2009/9	65685.415	61648.067	1481.226	20653.208	30820.782	11944.84
2009/6	44758.964	42050.792	1006.577	14086.307	21020.706	8122.253
2009/3	23311.805	21900.787	549.085	7195.92	11007.528	4295.764
2008/12	85768.133	81051.611	1900.299	26426.325	40850.838	15804.991
2008/9	61134.587	57773.291	1392.705	18932.936	29061.057	11206.162
2008/6	39397.826	37251.254	896.322	12209.346	18740.02	7218.683
2008/3	19426.351	18366.472	448.333	6004.434	9228.293	3415.449
2007/12	70552.761	66922.334	1587.534	22319.858	34003.033	9730.008
2007/9	51904.615	49272.512	1159.634	16583.264	26248.854	7043.972
2007/6	33781.48	32124.852	734.076	10951.342	17055.625	4490.67
2007/3	16629.495	15832.439	353.42	5434.685	8370.482	2187.89
2006/12	55848.397	53125.092	1270.626	18617.152	27909.223	7231.876
2006/9	39904.253	37963.415	920.338	13244.436	20883.704	4266.127

	vI1	vI2	vI3	vI4	vI5	vI6
2006/6	24893.18	23666.857	595.574	8160.227	13100.572	1766.244
2006/3	11920.92	11312.264	282.122	4059.195	6571.32	835.087
2005/12	43304.243	41238.727	1057.066	15390.584	23388.093	2851.954
2005/9	31956.459	30447.52	782.561	11611.029	17043.861	2070.617
2005/6	20966.287	20003.398	502.45	7869.328	10972.288	937.017
2005/3	10522.674	10023.345	256.875	4090.412	5559.462	483.133
2004/12	40336.924	39118.425	1218.499	16609.468	21323.563	1231.157
2004/9	29580.706	28705.985	857.386	12470.062	15435.175	857.508
2004/6	18925.409	18323.631	601.778	7955.981	9889.795	521.417
2004/3	9249.75	8951.426	298.324	3919.146	4776.167	275.936
2003/12	38823.046	37351.789	1471.257	19235.443	17106.93	1110.625
2003/9	28784.808	27715.482	1069.326	14601.89	12352.209	840.564
2003/6	19390.851	18672.36	718.491	9857.655	8260.353	617.624
2003/3	11014.471	10627.003	387.468	5299.451	5002.464	359.545
2002/12	44396.538	42842.423	1554.115	22152.858	19363.438	1411.676

	vJ1	vJ2	vJ3	vJ4	vJ5	vJ6
2014/12	73093.037	68624.504	1122.453	22634.849	34309.72	14513.076
2014/9	54614.314	51291.373	802.958	16940.834	25637.743	10788.06
2014/6	36756.717	34599.565	510.662	11525.703	17233.765	7158.358
2014/3	17754.646	16710.016	245.779	5506.206	8370.944	3449.628
2013/12	53287.299	49844.153	799.373	15436.398	26392.932	9942.866
2013/9	37816.993	35342.187	568.385	10861.162	18844.148	7026.286
2013/6	23812.914	22224.283	354.226	6858.87	11991.471	4273.771
2013/3	12068.192	11291.54	169.815	3513.912	6096.791	2128.306
2012/12	57642.13	54408.625	731.921	17095.955	29349.011	9812.371
2012/9	44666.405	42259.922	552.865	13299.646	22817.556	7512.515
2012/6	30210.407	28643.587	357.331	9130.442	15376.792	5022.846
2012/3	15136.269	14395.639	160.277	4629.847	7645.645	2539.271
2011/12	48829.258	46474.307	436.907	15877.778	24143.43	7822.89
2011/9	35042.608	33383.878	296.589	11565.436	17265.583	5524.643
2011/6	21774.865	20720.981	177.985	7269.72	10709.532	3363.707
2011/3	10155.919	9645.825	83.671	3368.241	5004.044	1576.816
2010/12	38729.017	36751.482	297.846	13347.505	18532.901	6013.689
2010/9	28631.495	27151.939	217.886	9892.926	13657.307	4445.946
2010/6	18531.89	17551.667	143.759	6425.624	8809.449	2868.529
2010/3	8971.334	8482.677	72.368	3155.145	4193.828	1405.231
2009/12	43487.756	41236.878	407.953	15166.064	20336.478	6938.579
2009/9	34586.732	32843.818	331.046	12011.417	16222.253	5539.13
2009/6	24358.959	23156.005	251.015	8321.993	11560.113	3909.209
2009/3	13416.053	12768.841	164.393	4454.149	6470.14	2172.131
2008/12	54785.636	52806.344	396.609	18372.434	26681.915	8856.566
2008/9	38262.56	36836.254	312.66	13000.009	18384.062	6229.418
2008/6	24280.014	23353.149	211.689	8254.941	11622.015	3981.294
2008/3	11831.688	11385.649	94.416	4031.448	5645.296	1870.113
2007/12	44503.36	42944.382	426.237	15163.095	21711.265	5420.702
2007/9	32962.779	31842.649	316.524	11248.032	17003.775	3931.073
2007/6	21446.919	20747.724	196.511	7368.927	11101.061	2487.158
2007/3	10565.619	10235.374	94.151	3647.194	5458.249	1219.48
2006/12	34611.831	33517.605	296.606	12054.943	17831.075	4000.882
2006/9	24505.629	23723.413	224.323	8664.416	12976.447	2338.068

	vJ1	vJ2	vJ3	vJ4	vJ5	vJ6
2006/6	14954.004	14463.76	142.383	5404.761	7794.253	959.71
2006/3	7192.726	6941.473	58.995	2739.744	3834.72	469.81
2005/12	24554.286	23780.185	214.346	10133.872	12366.235	1507.428
2005/9	17841.72	17267.995	155.154	7595.715	8726.11	1120.822
2005/6	11520.153	11158.788	98.77	5108.744	5431.379	515.129
2005/3	5831.958	5659.948	50.662	2734.415	2722.17	253.202
2004/12	22708.412	22502.443	205.969	10153.584	11790.204	568.75
2004/9	17051.095	16866.443	144.482	8049.968	8505.863	356.887
2004/6	11027.426	10908.954	118.472	5248.515	5502.311	188.715
2004/3	5630.236	5573.328	56.908	2737.173	2754.931	96.55
2003/12	27565.601	27284.955	280.646	14199.523	12710.16	459.991
2003/9	21046.15	20836.92	209.23	10941.597	9575.72	387.188
2003/6	14769.1	14614.329	154.771	7507.493	6872.532	286.605
2003/3	7587.447	7506.076	81.371	3825.298	3559.322	144.656
2002/12	31596.483	31211.635	384.848	17204.682	13409.756	670.509

	vK1	vK2	vK3	vK4	vK5	vK6
2014/12	37545.524	34009.563	947.5	7870.888	18518.091	9235.211
2014/9	28270.238	25486.612	741.012	5773.883	14162.815	6796.396
2014/6	19692.26	17681.119	486.339	3972.436	9825.56	4747.848
2014/3	9294.864	8420.361	241.49	1824	4668.379	2342.044
2013/12	33469.646	30769.678	690.215	7167.159	17374.142	7593.211
2013/9	25235.101	23228.895	501.812	5273.447	13351.575	5625.425
2013/6	16263.381	14930.126	342.931	3463.719	8524.746	3645.595
2013/3	7801.591	7136.465	175.475	1561.99	4229.524	1714.778
2012/12	26990.965	24781.569	523.976	4953.369	14428.128	6560.142
2012/9	19996.932	18367.046	387.942	3717.164	10643.212	4855.739
2012/6	13929.427	12836.292	262.216	2605.772	7334.564	3478.526
2012/3	6768.609	6228.385	126.413	1178.547	3643.446	1708.301
2011/12	26553.606	24652.662	529.446	5010.552	14511.709	6033.962
2011/9	20326.863	18972.601	385.016	3821.757	11005.216	4799.999
2011/6	13601.656	12666.848	292.053	2581.292	7740.916	2773.465
2011/3	6633.584	6159.652	141.906	1274.912	3630.811	1471.901
2010/12	23900.942	22257.866	418.222	4710.845	13528.177	4794.981
2010/9	17567.444	16395.214	286.159	3279.185	10046.11	3639.914
2010/6	11957.261	11130.91	210.584	2175.095	6901.326	2457.932
2010/3	5842.586	5421.583	109.534	978.165	3436.054	1213.064
2009/12	19214.371	17775.528	327.655	3285.835	10778.499	4393.177
2009/9	14368.978	13303.02	250.679	2408.697	8035.051	3347.198
2009/6	9923.747	9190.669	185.983	1649.66	5575.559	2286.564
2009/3	5143.749	4783.447	80.764	817.925	2847.895	1284.138
2008/12	17422.492	16236.813	231.362	3126.135	10029.095	3646.353
2008/9	13325.424	12453.13	172.57	2393.929	7794.37	2674.139
2008/6	9377.123	8779.694	124.769	1700.761	5556.619	1789.254
2008/3	4836.538	4543.967	51.248	762.432	3020.539	850.574
2007/12	16025.369	14985.008	288.303	2820.259	9616.569	2558.821
2007/9	11449.562	10761.739	172.541	2131.99	6965.635	1851.717
2007/6	7943.941	7495.697	118.514	1505.242	4814.362	1296.316
2007/3	3405.046	3193.405	57.691	708.967	1867.488	671.69
2006/12	14669.675	13326.401	478.596	2890.541	7969.837	2833.631
2006/9	12095.543	10885.105	404.09	2170.1	6781.094	2303.519

	vK1	vK2	vK3	vK4	vK5	vK6
2006/6	9341.99	8115.472	390.177	1651.126	5334.384	1145.356
2006/3	3359.813	2948.508	236.373	625.407	2130.85	269.973
2005/12	10206.886	9510.808	330.04	2126.786	6656.817	849.863
2005/9	7152.286	6704.353	211.399	1316.48	4869.988	593.861
2005/6	4797.237	4531.6	116.641	879.996	3281.314	251.07
2005/3	2242.745	2119.822	57.558	474.808	1545.708	118.693
2004/12	8145.896	7759.858	386.038	1803.38	5593.179	368.78
2004/9	5654.368	5360.282	285.355	1138.336	3967.701	266.544
2004/6	3695.505	3597.1	98.405	735.033	2692.369	176.231
2004/3	1777.178	1724.354	52.824	377.834	1256.644	93.066
2003/12	7188.55	7014.153	174.397	2403.459	4295.152	328.163
2003/9	5331.102	5230.361	100.741	1848.712	3152.427	237.177
2003/6	3901.893	3830.665	71.228	1500.629	2167.747	167.348
2003/3	2311.511	2280.804	30.707	1150.049	1040.932	92.8
2002/12	7730.961	7271.415	459.546	2199.81	4799.689	280.479

	vL1	vL2	vL3	vL4	vL5	vL6
2014/12	3369.577	3142.507	46.33	891.163	1790.767	626.764
2014/9	2395.987	2244.443	35.773	515.372	1350.343	497.259
2014/6	1367.104	1256.737	18.303	317.873	694.653	325.287
2014/3	781.528	733.884	8.981	128.244	351.289	287.617
2013/12	4297.738	4122.73	82.6	1318.932	2088.566	788.984
2013/9	3644.634	3402.461	71.478	1082.426	1711.459	727.489
2013/6	2523.168	2315.094	85.659	706.244	1205.357	488.79
2013/3	1017.383	929.926	24.662	290.399	475.65	205.262
2012/12	3397.272	3116.053	115.5	827.45	1681.777	715.314
2012/9	2277.982	2063.123	96.669	517.631	1123.758	506.434
2012/6	1680.982	1502.383	80.765	355.655	849.967	367.877
2012/3	712.152	640.514	34.032	158.43	355.727	152.815
2011/12	3291.778	3090.1	103.888	975.288	1671.807	534.844
2011/9	2536.175	2386.572	77.726	717.513	1284.161	447.103
2011/6	1541.354	1444.6	52.359	460.375	784.892	239.437
2011/3	626.93	576.389	23.495	186.245	322.648	89.889
2010/12	1196.42	1100.007	22.459	221.045	682.709	249.44
2010/9	721.478	657.053	7.031	147.615	396.846	159.139
2010/6	606.052	555.116	7.031	106.443	365.675	116.168
2010/3	306.019	282.646	3.222	37.974	211.916	47.637
2009/12	780.526	715.003	14.947	272.381	365.034	117.44
2009/9	575.149	520.535	14.288	180.894	261.077	111.628
2009/6	412.64	372.09	13.014	144.651	177.421	70.637
2009/3	233.601	200.81	14.083	32.11	147.907	33.358
2008/12	1151.362	1064.049	28.895	274.813	639.32	195.961
2008/9	907.686	845.465	15.18	206.164	492.588	183.588
2008/6	715.957	659.071	12.507	157.665	377.34	148.546
2008/3	478.703	434.536	10.432	128.538	213.734	109.644
2007/12	760.285	693.906	12.218	163.247	408.246	134.999
2007/9	454.764	404.326	8.425	83.238	256.32	83.666
2007/6	324.352	290.324	6.071	63.168	186.718	52.906
2007/3	174.622	158.124	4.496	61.625	77.165	25.665
2006/12	632.578	598.739	13.543	127.748	354.165	124.959
2006/9	433.804	414.194	7.252	80.77	288.639	49.227

	vL1	vL2	vL3	vL4	vL5	vL6
2006/6	342.715	325.441	6.829	57.949	233.981	24.353
2006/3	102.594	97.683	2.687	20.712	71.505	6.052
2005/12	658.656	637.432	5.137	56.586	526.298	60.718
2005/9	510.749	496.235	3.586	34.232	436.711	26.57
2005/6	284.221	275.335	1.954	113.183	143.44	8.865
2005/3	130.204	125.009	1.207	81.675	39.64	3.886
2004/12	346.682	341.715	4.967	93.371	231.316	17.446
2004/9	259.724	254.031	5.693	39.538	198.074	17.204
2004/6	155.941	152.108	3.833	19.209	124.024	8.892
2004/3	49.944	49.334	0.61	6.467	41.792	1.241
2003/12	194.059	184.309	9.75	36.626	140.822	7.779
2003/9	119.801	112.178	7.623	17.917	89.759	5.285
2003/6	68.903	62.866	6.037	6.059	55.175	2.546
2003/3	53.036	47.793	5.243	16.92	29.104	1.769
2002/12	290.452	285.484	4.968	85.374	194.364	5.746

	vM1	vM2	vM3	vM4	vM5	vM6
2014/12	1913.58	1735.547	69.262	542.963	819.688	455.766
2014/9	1411.944	1275.389	56.799	395.224	607.757	332.854
2014/6	933.275	857.633	21.516	263.414	412.593	222.68
2014/3	456.291	418.048	11.206	129.367	202.186	106.178
2013/12	1869.266	1726.757	47.657	497.924	832.846	468.267
2013/9	1419.323	1314.444	36.37	362.661	640.061	365.026
2013/6	971.161	906.908	19.471	237.055	458.654	246.842
2013/3	440.144	409.121	10.515	114.668	178.442	132.592
2012/12	1451.622	1347.691	27.437	392.362	662.313	352.86
2012/9	1084.287	1010.526	20.156	284.9	511.108	257.477
2012/6	741.017	691.939	14.181	190.024	355.407	174.43
2012/3	382.78	359.952	6.982	90.43	198.303	83.555
2011/12	1282.286	1199.078	22.723	332.192	602.798	313.418
2011/9	934.258	873.966	16.051	245.759	439.949	224.781
2011/6	642.339	601.91	11.42	165.125	313.88	146.854
2011/3	338.179	317.513	6.15	83.409	170.643	75.729
2010/12	1130.193	1061.449	19.565	319.367	495.615	284.638
2010/9	834.32	783.01	14.938	218.41	387.777	205.623
2010/6	579.562	543.829	11.341	146.724	275.267	141.096
2010/3	297.392	279.523	5.83	62.191	159.163	67.257
2009/12	764.6	722.945	16.47	192.3	324.309	227.134
2009/9	593.392	563.222	10.456	145.871	253.814	179.854
2009/6	440.57	418.634	8.005	103.147	189.652	137.863
2009/3	191.76	180.784	3.762	48.458	73.691	64.997
2008/12	818.537	777.655	13.05	208.978	398.064	190.388
2008/9	566.054	534.923	9.277	151.185	262.634	136.431
2008/6	401.19	379.89	6.552	102.89	203.461	84.116
2008/3	233.765	223.025	3.374	46.013	102.149	77.721
2007/12	613.821	576.081	15.156	185.052	274.563	116.08
2007/9	403.908	376.673	10.778	133.476	169.507	81.279
2007/6	261.684	243.158	7.492	88.214	106.792	53.04
2007/3	121.979	113.632	3.234	40.36	49.229	25.971
2006/12	538.152	497.18	24.065	156.022	237.776	112.253
2006/9	386.337	354.535	19.558	108.583	190.675	60.968

	vM1	vM2	vM3	vM4	vM5	vM6
2006/6	264.046	237.694	17.801	71.675	131.029	25.937
2006/3	119.471	101.379	14.461	31.751	59.509	11.544
2005/12	415.33	392.853	11.744	130.56	225.622	41.917
2005/9	296.489	279.881	8.79	93.499	158.354	31.925
2005/6	190.912	178.81	7.16	58.206	100.099	16.252
2005/3	92.672	84.786	5.508	26.688	51.064	8.265
2004/12	420.275	403.265	17.01	133.55	246.018	24.667
2004/9	286.094	272.31	12.903	95.422	161.448	17.082
2004/6	193.349	185.7	7.649	63.138	112.026	11.661
2004/3	98.861	93.581	5.28	29.368	57.654	7.05
2003/12	610.645	589.393	21.252	189.67	371.315	30.68
2003/9	408.882	392.161	16.721	119.195	254.456	20.088
2003/6	266.807	255.817	10.99	79.366	162.792	14.809
2003/3	130.859	122.625	8.234	41.134	75.543	6.562
2002/12	537.132	505.482	31.65	162.228	311.795	35.186

	vN1	vN2	vN3	vN4	vN5	vN6
2014/12	55403.998	50195.154	1537.619	12751.731	26652.87	13613.564
2014/9	39990.669	36285.968	1025.217	9184.97	19462.038	9658.424
2014/6	26406.255	23956.443	708.458	6070.517	12823.627	6432.695
2014/3	13198.073	11947.522	374.213	2933.339	6325.271	3363.457
2013/12	49982.217	45791.11	1228.093	11933.625	23843.561	12114.314
2013/9	36929.23	33899.427	820.398	8876.609	17665.84	8929.469
2013/6	24786.46	22731.059	578.657	5862.874	12254.139	5677.887
2013/3	12119.255	11109.685	269.045	2791.06	6089.104	2774.103
2012/12	42833.464	39306.845	1054.627	9990.666	21015.163	10052.436
2012/9	30829.269	28295.262	749.097	7094.551	15237.709	7243.364
2012/6	20518.437	18853.815	477.22	4759.461	10042.042	4895.225
2012/3	9677.635	8869.334	245.79	2215.562	4852.639	2213.601
2011/12	36224.903	33296.484	917.127	8378.095	17984.982	8365.29
2011/9	26353.367	24251.093	644.377	5906.639	13211.652	6160.346
2011/6	17120.743	15750.961	440.459	3843.777	8646.298	3908.296
2011/3	8482.673	7811.538	204.349	1839.585	4313.046	1977.066
2010/12	30197.199	27888.033	643.67	6316.123	15055.887	7638.292
2010/9	21923.293	20246.319	460.083	4499.454	10995.327	5594.859
2010/6	14523.134	13408.764	312.116	2918.827	7386.227	3656.38
2010/3	7443.137	6891.67	167.146	1431.521	3820.111	1903.4
2009/12	27890.294	25816.857	629.189	5715.012	14320.565	6817.634
2009/9	20346.329	18809.786	465.905	4159.634	10322.824	5085.179
2009/6	13474.453	12450.866	310.891	2812.262	6787.676	3341.574
2009/3	6855.452	6312.507	164.497	1454.364	3379.146	1737.227
2008/12	26592.909	24677.554	581.982	5147.453	13952.55	6544.457
2008/9	19486.767	18123.904	414.132	3699.396	10284.762	4820.719
2008/6	12924.242	12011.015	277.821	2409.966	6866.885	3183.886
2008/3	6540.83	6054.824	149.23	1214.157	3415.181	1575.117
2007/12	22218.369	20792.887	462.442	4040.232	12251.657	4385.702
2007/9	15228.074	14196.087	339.728	2912.565	8477.517	3104.261
2007/6	9921.884	9260.598	214.429	2002.312	5420.178	2030.581
2007/3	4790.389	4464.496	110.379	1022.846	2580.447	943.449
2006/12	18748.18	17496.252	483.554	3883.22	10231.149	3731.565
2006/9	13649.873	12802.779	327.419	2657.838	8030.42	2318.015

	vN1	vN2	vN3	vN4	vN5	vN6
2006/6	9178.865	8617.393	232.145	1890.722	5481.193	1023.878
2006/3	4232.962	3942.441	110.758	833.389	2705.443	489.403
2005/12	19630.42	18620.508	368.297	3285.024	13733.613	1881.569
2005/9	14476.244	13790.948	261.646	2417.112	10269.318	1302.772
2005/6	8280.484	7800.961	172.293	1686.465	5343.523	628.444
2005/3	3852.964	3597.96	101.419	798.654	2572.088	309.292
2004/12	14512.683	14040.097	472.586	3131.287	10039.429	886.578
2004/9	10128.543	9839.06	276.145	2419.982	6867.562	577.282
2004/6	6409.341	6172.33	237.011	1482.556	4340.498	366.441
2004/3	3506.859	3400.345	106.514	791.44	2402.661	216.134
2003/12	12682.362	12263.151	419.211	3425.043	8077.49	791.295
2003/9	8991.355	8718.93	272.425	2404.164	5842.598	493.845
2003/6	6046.257	5850.969	195.288	1699.384	3837.059	330.028
2003/3	2804.338	2664.514	139.824	837.667	1667.352	165.848
2002/12	12145.074	11741.846	403.228	4192.088	6971.92	603.541

	vO1	vO2	vO3	vO4	vO5	vO6
2014/12	-8108.994	-7975.634	-205.542	-2539.077	-4276.988	-1150.046
2014/9	-5487.155	-5382.873	-205.147	-1528.937	-3159.726	-654.039
2014/6	-5180.972	-4977.882	-260.559	-320.391	-3171.674	-1438.446
2014/3	-2121.764	-2146.315	-67.287	61.467	-1898.257	-284.325
2013/12	8020.304	7792.844	113.31	1534.452	4535.151	1762.127
2013/9	5761.096	5554.786	125.129	1105.213	3324.075	1160.847
2013/6	4293.562	4223.129	66.103	941.351	2512.118	779.975
2013/3	555.773	479.039	7.771	13.054	502.231	-0.453
2012/12	-2351.545	-2634.535	-8.121	439.296	-895.841	-2042.193
2012/9	-3467.243	-3690.965	2.917	-41.429	-1661.734	-1908.64
2012/6	-3431.844	-3565.467	5.968	-241.111	-1916.672	-1363.67
2012/3	-1930.118	-2043.403	-1.443	-3.174	-1158.475	-850.125
2011/12	1565.987	1623.499	-195.364	714.992	931.796	7.892
2011/9	2057.443	2104.75	-179.929	750.598	1068.454	309.061
2011/6	1395.06	1334.125	-30.213	463.886	900.857	0.614
2011/3	856.938	803.807	-0.371	172.96	716.606	-71.226
2010/12	-216.727	-402.49	-22.342	607.281	14.974	-864.929
2010/9	-1129.86	-1325.718	17.522	114.676	-96.868	-1212.681
2010/6	-1515.854	-1594.68	5.361	13.879	-1009.474	-526.918
2010/3	-696.654	-754.774	4.539	42.889	-446.144	-301.986
2009/12	1275.156	859.79	72.868	259.865	1756.594	-1025.486
2009/9	1653.947	1311.989	64.044	271.578	1784.414	-641.54
2009/6	1682.651	1410.624	54.67	148.844	1566.751	-217.407
2009/3	1001.05	957.762	0.387	121.955	557.141	344.34
2008/12	1501.16	1554.177	-72.093	370.203	228.122	981.014
2008/9	117.42	171.513	-76.872	-6.168	354.055	-158.36
2008/6	455.209	498.49	-67.935	-19.662	304.296	211.75
2008/3	408.417	469.127	-56.402	113.135	-56.915	424.884
2007/12	-811.459	-894.723	67.572	-137.895	-125.601	-453.393
2007/9	-477.764	-560.034	83.332	-124.005	-104.936	-304.931
2007/6	-216.498	-273.661	62.447	-58.876	-46.055	-150.614
2007/3	63.483	40.008	27.028	18.519	33.457	-3.33
2006/12	1174.528	1099.807	72.884	144.125	639.95	420.873
2006/9	1347.056	1255.637	88.69	138.732	765.665	454.966

	vO1	vO2	vO3	vO4	vO5	vO6
2006/6	1841.699	1689.142	149.199	117.347	997.212	674.556
2006/3	484.252	478.012	5.435	65.41	349.327	69.937
2005/12	1380.999	1389.673	-13.792	452.033	488.261	446.312
2005/9	1052.328	1033.772	13.94	346.038	321.923	389.794
2005/6	682.087	685.66	-8.047	205.414	207.025	249.156
2005/3	469.756	463.516	4.554	141.359	201.628	132.102
2004/12	1839.403	1810.957	28.446	230.344	1222.084	375.323
2004/9	1435.65	1383.318	0.029	151.164	1097.703	191.693
2004/6	772.727	753.47	19.257	101.6	580.765	94.308
2004/3	415.696	415.865	-0.169	58.303	321.91	33.539
2003/12	5095.074	4964.731	130.343	1105.859	3669.702	258.026
2003/9	3162.881	3069.819	93.062	632.079	2306.041	187.433
2003/6	1811.245	1737.899	73.346	366.552	1290.033	124.483
2003/3	766.947	740.303	26.644	244.497	457.146	51.286
2002/12	3268.596	3211.348	57.248	817.599	2276.106	161.121

	R51	R52	R53	R54	R55	R56	R57	R58	R59	R60	R61	R62	R63	R64	R65	R66
R51	1.0000															
R52	0.6122	1.0000														
R53	0.0965	-0.1138	1.0000													
R54	-0.1039	0.0490	-0.0017	1.0000												
R55	-0.0697	0.0876	0.0039	0.9131	1.0000											
R56	-0.1199	0.0016	-0.0073	0.9109	0.6635	1.0000										
R57	0.1480	-0.0755	0.9368	-0.0704	-0.0628	-0.0657	1.0000									
R58	0.2865	-0.1457	0.5796	-0.0685	-0.0716	-0.0533	0.4471	1.0000								
R59	0.0840	-0.1161	0.8847	0.1171	0.1316	0.0815	0.7557	0.4942	1.0000							
R60	-0.2025	-0.1332	-0.0324	-0.0857	-0.0868	-0.0694	-0.0604	-0.0832	-0.0445	1.0000						
R61	-0.1886	-0.1931	-0.0518	-0.1163	-0.1395	-0.0722	-0.0627	-0.0236	-0.0849	0.6649	1.0000					
R62	-0.0684	-0.1655	0.1937	-0.0337	-0.0501	-0.0117	0.0634	0.1983	0.1955	0.3853	0.2619	1.0000				
R63	-0.0468	-0.2146	0.1615	-0.0187	-0.1260	0.0929	0.1227	0.1172	0.1378	0.3645	0.1221	0.1967	1.0000			
R64	-0.2299	-0.1297	-0.0530	-0.0765	-0.0739	-0.0656	-0.0833	-0.1014	-0.0674	0.9808	0.6395	0.3767	0.2349	1.0000		
R65	-0.2152	-0.1291	0.0337	-0.1345	-0.1489	-0.0960	-0.0161	-0.0442	0.0135	0.8651	0.6071	0.3992	0.1563	0.9140	1.0000	
R66	-0.0166	-0.0535	0.1595	-0.1471	-0.1949	-0.0724	0.1272	0.0855	0.2260	0.1605	0.1724	0.0183	-0.0407	0.2222	0.5363	1.0000

3. APPENDIX C – CAMELS RATIO CODEBOOK

CODE	RATIO
R1	Shareholders' Equity / ((Capital to be Employed to credit + market + operational risk)*12.5)*100
R2	Shareholders' Equity / Total Assets
R3	(Shareholders' Equity-Permanent Assets) / Total Assets
R4	Shareholders' Equity / (Deposits + Non-Deposit Funds)
R5	On Balance-sheet FC Position / Shareholders' Equity
R6	Net on Balance-sheet Position / Total Shareholders' Equity
R7	N(on+off) Balance-sheet Position / Total Shareholders' Equity
R8	TC Assets / Total Assets
R9	FC Assets / Total Assets
R10	TC Liabilities / Total Liabilities
R11	FC Liabilities / Total Liabilities
R12	FC Assets / FC Liabilities
R13	TC Deposits / Total Deposits
R14	TC Loans and Receivables* / Total Loans and Receivables*
R15	Total Deposits / Total Assets
R16	Funds Borrowed / Total Assets
R17	Financial Assets (Net) / Total Assets
R18	Total Loans and Receivables* / Total Assets
R19	Total Loans and Receivables* / Total Deposits
R20	Loans under follow-up (gross) / Total Loans and Receivables*
R21	Loans under follow-up (net) / Total Loans and Receivables*
R22	Specific Provisions / Loans under follow-up (gross)
R23	Permanent Assets / Total Assets
R24	Consumer Loans / Total Loans and Receivables*
R25	Liquid Assets / Total Assets
R26	Liquid Assets / Short-term Liabilities
R27	TC Liquid Assets / Total Assets
R28	Liquid Assets / (Deposits + Non-Deposit Funds)
R29	FC Liquid Assets / FC Liabilities
R30	Net Profit (Losses) / Total Assets
R31	Net Profit (Losses) / Total Shareholders' Equity
R32	Income Before Taxes / Total Assets
R33	Net Profit (Losses) / Paid-in Capital
R34	Net Interest Income After Specific Provisions / Total Assets
R35	Net Interest Income After Specific Provisions / Total Operating Income
R36	Non-Interest Income (Net) / Total Assets
R37	Non-Interest Income (Net) / Other Operating Expenses
R38	Other Operating Expenses / Total Operating Income
R39	Provision For Loan or Other Receivables Losses / Total Assets

R40	Interest Income / Interest Expense
R41	Non-Interest Income / Non-Interest Expense
R42	Total Income / Total Expense
R43	Interest Income / Total Assets
R44	Interest Expense / Total Assets
R45	Interest Income / Total Expenses
R46	Interest Expense / Total Expenses
R47	Total Assets
R48	Total Loans and Receivables*
R49	Total deposits
R50	Total Assets
R51	Total Loans and Receivables*
R52	Total Deposits
R53	Total Assets / No. of Branches
R54	Total Deposits / No. of Branches
R55	TRY Deposits / No. of Branches
R56	FX Deposits / No. of Branches
R57	Total Loans and Receivables* / No. of Branches
R58	Total Employees / No. of Branches (person)
R59	Net Income / No. of Branches (Personnel Expenses + Reserve for Employee Termination Benefit) / Total
R60	Assets (Personnel Expenses + Reserve for Employee Termination Benefit) / Number of
R61	Personnel (Thousand TRY) Reserve for Employee Termination Benefit / Number of Personnel (Thousand
R62	TRY)
R63	Personnel Expenses / Other Operating Expenses
R64	Other Operating Expenses / Total Asset
R65	Total Operating Income / Total Assets
R66	Net Operating Income(Loss) / Total Assets

4. APPENDIX D – CAMELS RATIO COMPONENT EFFECT RELATIONS

RATIO	COMPONENT	EFFECT
Shareholders' Equity / ((Capital to be Employed to credit + market + operational risk)*12.5)*100	C	+
Shareholders' Equity / Total Assets	C	+
(Shareholders' Equity-Permanent Assets) / Total Assets	C	+
Shareholders' Equity / (Deposits + Non-Deposit Funds)	C	+
On Balance-sheet FC Position / Shareholders' Equity	C	-
Net on Balance-sheet Position / Total Shareholders' Equity	C	-
N(on+off) Balance-sheet Position / Total Shareholders' Equity	C	-
TC Assets / Total Assets	C	+
FC Assets / Total Assets	C	-
TC Liabilities / Total Liabilities	C	+
FC Liabilities / Total Liabilities	C	-
TC Loans and Receivables* / Total Loans and Receivables*	C	+
Total Deposits / Total Assets	C	-
Permanent Assets / Total Assets	C	+
Financial Assets (Net) / Total Assets	A	+
Total Loans and Receivables* / Total Assets	A	-
Total Loans and Receivables* / Total Deposits	A	+
Loans under follow-up (gross) / Total Loans and Receivables*	A	-
Loans under follow-up (net) / Total Loans and Receivables*	A	-
Specific Provisions / Loans under follow-up (gross)	A	-
Consumer Loans / Total Loans and Receivables*	A	-
Total Loans and Receivables*	A	-
Total Loans and Receivables*	A	-
Total Assets	M	+
Total deposits	M	+
Total Assets	M	+
Total deposits	M	+
Total Assets / No. of Branches	M	+
Total Deposits / No. of Branches	M	+
TRY Deposits / No. of Branches	M	+
FX Deposits / No. of Branches	M	+
Total Loans and Receivables* / No. of Branches	M	+
Total Employees / No. of Branches (person)	M	-
Net Income / No. of Branches	M	+
Net Profit (Losses) / Total Assets	E	+
Net Profit (Losses) / Total Shareholders' Equity	E	+
Income Before Taxes / Total Assets	E	+
Net Profit (Losses) / Paid-in Capital	E	+

RATIO	COMPONENT	EFFECT
(Personnel Expenses + Reserve for Employee Termination Benefit) / Total Assets	E	-
(Personnel Expenses + Reserve for Employee Termination Benefit) / Number of Personnel (Thousand TRY)	E	+
Reserve for Employee Termination Benefit / Number of Personnel (Thousand TRY)	E	+
Personnel Expenses / Other Operating Expenses	E	+
Other Operating Expenses / Total Asset	E	-
Total Operating Income / Total Assets	E	+
Net Operating Income(Loss) / Total Assets	E	+
Liquid Assets / Total Assets	L	+
Liquid Assets / Short-term Liabilities	L	+
TC Liquid Assets / Total Assets	L	+
Liquid Assets / (Deposits + Non-Deposit Funds)	L	+
FC Liquid Assets / FC Liabilities	L	+
Funds Borrowed / Total Assets	L	-
Net Interest Income After Specific Provisions / Total Assets	S	+
Net Interest Income After Specific Provisions / Total Operating Income	S	+
Non-Interest Income (Net) / Total Assets	S	+
Non-Interest Income (Net) / Other Operating Expenses	S	+
Other Operating Expenses / Total Operating Income	S	-
Provision For Loan or Other Receivables Losses / Total Assets	S	-
Interest Income / Interest Expense	S	+
Non-Interest Income / Non-Interest Expense	S	+
Total Income / Total Expense	S	+
Interest Income / Total Assets	S	-
Interest Expense / Total Assets	S	-
Interest Income / Total Expenses	S	-
Interest Expense / Total Expenses	S	-
FC Assets / FC Liabilities	S	-
TC Deposits / Total Deposits	S	+

5. APPENDIX E – DEA RESULTS

Period	2003.03	2003.03	2003.03	2003.03	2003.06	2003.06	2003.06	2003.06	2003.09	2003.09	2003.09	2003.09	2003.12	2003.12	2003.12	2003.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	big	big	big	big	0.1127	0.0327	0	0.1127	big	big	big	big	0.3787	0.1356	0.0178	0.1759
B2	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B3	1.323	1.159	1.0905	1.323	2.0343	2.0167	2.0167	2.0343	1.8954	1.8954	1.8954	1.8954	1.7673	1.7673	1.7673	1.7673
B4	1.769	0.7226	0.7009	1.769	2.0279	0.9355	0.9355	2.0279	1.7714	0.871	0.8746	1.7714	2.0079	1.9336	1.9336	2.0079
B5	0.8275	0.4578	0.6906	0.6998	3.2572	0.7098	3.2572	0.9369	big	big	big	big	2.4411	0.3919	2.4411	0.7142
B6	Big	big	big	big	4.3727	0.7755	0	4.3727	10.6819	10.6819	2.235	4.7405	big	big	big	big
B7	0.6736	0.2894	0.3551	0.5805	0.7698	0.436	0.6324	0.7207	0.6965	0.4199	0.5336	0.6467	0.5925	0.3348	0.4191	0.4963
B8	1.6005	1.5941	1.6005	1.5909	1.7334	1.6347	1.7334	1.6214	1.8373	1.74	1.8373	1.74	2.5396	2.5369	2.5396	2.5369
B9	0.8675	0.7141	0.7816	0.8038	0.9579	0.8432	0.914	0.9187	1.0252	0.8127	0.9835	0.9747	0.937	0.8564	0.8956	0.937
B10	Big	5.1641	big	0.7453	big	big	big	big	big	big	big	big	big	big	big	big
B11	1.2287	0.1414	0	0.5425	36.6894	0.2696	36.6894	0.4913	0.4274	0.1108	0.0247	0.4274	0.9428	0.1441	0.0051	0.6403
B12	1.5772	1.1758	1.2997	1.5772	1.5548	1.1814	1.2692	1.5548	1.5088	1.0952	1.215	1.5088	3.7266	3.7266	3.7266	3.7266
B13	6.2279	2.1429	0	3.4027	7.4624	2.2857	0	6.3357	7.332	2.2143	0	5.6272	9.7628	2.1429	0	6.5033
B14	2.252	0.6321	2.252	0.925	1.761	0.6212	1.761	0.9653	big	big	big	big	1.227	0.7064	1.227	0.6001
B15	1.057	0.5668	0.7907	1.057	1.1571	0.5854	0.817	1.1571	1.7754	0.8477	1.1085	1.7754	1.1626	0.6861	0.9042	1.1394
B16	144.6062	17.4846	144.6062	15.1825	18.7434	15.9778	18.7434	13.1782	big	big	big	big	70.142	19.4851	70.142	11.4486
B17	1.4418	0.5401	0.6577	1.4418	1.3167	0.4669	0.6717	1.3167	1.3575	0.4302	0.7186	1.3575	1.2253	0.3918	0.6902	1.2253
B18	19.9337	2.3657	19.9337	2.3657	1.8515	1.8348	1.8348	1.8515	big	big	big	big	2.5773	1.9681	2.5773	1.0677
B19	1.1721	0.5932	0.6487	0.9401	1.2518	0.7608	0.8242	1.2518	1.8416	0.6628	0.7745	1.8416	1.1511	0.6315	0.7667	0.8967
B20	0.2699	0.2607	0.064	0.151	0.5261	0.4209	0.2459	0.1586	0.5229	0.4992	0.2616	0.2279	0.4883	0.4396	0.244	0.2869
B21	1.6202	1.5333	1.5333	1.6202	1.7657	1.7319	1.7319	1.7657	1.7798	1.7798	1.7798	1.7798	1.414	1.414	1.414	1.414
B22	Big	big	big	big	big	big	big	big	big	big	big	big	1.1185	0.1402	0	1.1185
B23	Big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	Big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	Big	big	big	big	1.5486	1.22	1.22	1.5486	1.6983	1.2427	1.2427	1.6983	2.01	2.01	2.01	2.01
B26	Big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	1.2687	0.6118	0.7496	1.2687	1.4504	0.6872	0.781	1.4504	1.3022	0.7225	0.7896	1.3022	2.7335	1.2665	1.2227	2.7335
B28	0.7443	0.4087	0.3261	0.4973	1.0566	0.5847	0.896	0.5183	1.1251	0.7609	0.994	0.6456	0.9913	0.6581	0.9223	0.5763
B29	Big	big	big	big	big	big	big	big	1.3902	1.1383	1.2411	1.3902	1.2851	0.8667	1.2851	1.1426

Period	2004.03	2004.03	2004.03	2004.03	2004.06	2004.06	2004.06	2004.06	2004.09	2004.09	2004.09	2004.09	2004.12	2004.12	2004.12	2004.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	0.1815	0.0393	0	0.139	0.1788	0.0329	0	0.1784	0.2177	0.0391	0.0121	0.2177	0.631	0.0788	0.3908	0.3307
B2	big	big	big	big	3.3461	3.3461	3.3461	3.3461	3.0509	3.0509	3.0509	3.0509	big	big	big	big
B3	1.7846	1.7846	1.7846	1.7846	2.3252	2.3252	2.3252	2.3252	2.1875	2.1875	2.1875	2.1875	2.5517	2.5517	2.5517	2.5517
B4	1.8456	1.5999	1.5999	1.8456	5.1032	5.1032	5.1032	5.1032	2.0015	2.0015	2.0015	2.0015	1.2561	1.0505	1.0518	1.2561
B5	0.6754	0.2362	0.4212	0.5667	0.6073	0.2915	0.3285	0.4648	1.2878	0.4374	1.2172	0.4294	0.849	0.2895	0.8438	0.4964
B6	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B7	0.6263	0.346	0.5145	0.4917	0.7478	0.3533	0.5956	0.5968	0.8578	0.4078	0.8578	0.5616	0.5735	0.3396	0.5735	0.5323
B8	3.269	3.269	3.269	3.269	2.6818	2.6818	2.6818	2.6818	3.2856	3.2856	3.2856	3.2856	3.5925	3.5925	3.5925	3.5925
B9	0.9526	0.736	0.8978	0.9213	0.9288	0.835	0.8956	0.9046	0.7957	0.6908	0.7867	0.7298	0.7925	0.7671	0.7827	0.7754
B10	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B11	1.1009	0.1489	0.0872	0.8138	1.0471	0.2243	0.0878	1.0228	0.9234	0.5926	0.9206	0.5089	1.3628	0.7013	0.8353	1.0364
B12	3.1235	3.1235	3.1235	3.1235	1.474	1.0549	1.2605	1.474	2.9527	2.9527	2.9527	2.9527	3.3208	3.3208	3.3208	3.3208
B13	7.2531	2	0	4.0406	7.7635	2.4286	0	5.979	56.0551	5.1646	56.0551	6.0812	big	big	big	big
B14	1.2854	0.6514	1.2854	0.6751	1.6501	0.8254	1.6501	1.0842	1.1363	0.824	1.1363	0.7796	1.0095	0.8373	1.0095	0.7227
B15	1.1906	0.7534	0.9823	1.1846	1.1892	0.8103	1.0132	1.1892	1.1707	0.8102	0.9453	1.1707	1.077	0.7991	0.86	1.077
B16	12.6665	5.494	12.6665	2.8915	348.7673	16.4139	348.7673	6.1535	0.4869	0.4869	0.0006	0.3704	1.3767	1.0234	0.0409	1.374
B17	1.0516	0.4224	0.6794	1.0516	1.0247	0.4376	0.7309	1.0247	2.5981	2.3275	2.3275	2.5981	2.7816	2.3467	2.3467	2.7816
B18	1.1512	1.149	0.935	0.7419	12.5183	1.126	12.5183	1.0509	0.8477	0.8477	0.0593	0.7395	1.1051	0.7263	0.0739	0.9805
B19	1.1721	0.6558	0.9364	0.8762	1.0949	0.6108	0.9402	0.8984	1.1976	0.6303	1.1356	0.9125	1.0797	0.5994	0.8584	1.0797
B20	1.1047	0.7535	1.0699	0.3068	1.0643	1.0574	0.6698	0.4034	0.6831	0.6831	0.2394	0.3398	0.5826	0.5023	0.3361	0.3201
B21	1.73	1.73	1.73	1.73	1.4056	1.4056	1.4056	1.4056	1.377	1.377	1.377	1.377	1.3144	1.3144	1.3144	1.3144
B22	0.8188	0.129	0	0.8188	big	big	big	big	big	big	big	big	0.4736	0.4139	0.2403	0.3886
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	1.5372	1.3921	1.3921	1.5372	1.7009	1.4512	1.5294	1.7009	1.6491	1.4158	1.4101	1.6491	1.2697	0.9375	0.9885	1.2697
B26	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	2.6437	1.2101	1.1987	2.6437	2.8365	1.3973	1.3973	2.8365	2.6583	1.3308	1.0892	2.6583	2.2347	1.423	0.9999	2.2347
B28	0.8572	0.5252	0.8002	0.5027	0.9073	0.5122	0.9073	0.5185	0.6587	0.5139	0.6526	0.4987	0.6668	0.4239	0.5583	0.5088
B29	1.2411	0.8521	1.2411	0.9773	1.2034	0.8424	1.2034	0.7964	1.0666	0.7908	1.0666	0.711	1.0076	0.7673	1.0076	0.6516

Period	2005.03	2005.03	2005.03	2005.03	2005.06	2005.06	2005.06	2005.06	2005.09	2005.09	2005.09	2005.09	2005.12	2005.12	2005.12	2005.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	0.8879	0.1374	0.6031	0.4229	2.4	0.1912	2.4	0.5445	3.2782	0.6143	3.2782	0.8372	4.4073	0.6667	4.4073	0.5626
B2	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B3	2.5851	2.5851	2.5851	2.5851	3.39	3.39	3.39	3.39	3.7014	3.7014	3.7014	3.7014	4.9882	4.9882	4.9882	4.9882
B4	1.6862	1.6862	1.6862	1.6862	1.6592	1.6592	1.6592	1.6592	1.4216	1.4216	1.4216	1.4216	1.3432	1.3143	1.3143	1.3432
B5	0.7326	0.2297	0.7326	0.4283	2.3726	0.3494	2.3726	0.5107	0.9406	0.2432	0.7379	0.4467	0.7709	0.2579	0.7709	0.7235
B6	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B7	0.5319	0.2654	0.5105	0.5114	0.552	0.2844	0.5462	0.5167	0.5761	0.3074	0.572	0.5317	0.5198	0.2711	0.4089	0.5141
B8	1.6908	1.6908	1.6908	1.6908	1.4766	1.3031	1.4766	0.9782	1.1432	1.0649	1.1432	0.7784	0.6597	0.6147	0.6597	0.5357
B9	0.8976	0.7654	0.8976	0.7872	0.962	0.8571	0.962	0.94	0.8662	0.8208	0.8662	0.8469	0.8463	0.8396	0.8463	0.8396
B10	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B11	0.9779	0.5131	0.493	0.918	0.9741	0.5111	0.456	0.9735	1.2404	0.5561	0.5034	1.2303	1.5163	0.6409	0.5021	1.5163
B12	2.0504	1.3126	1.7234	2.0504	1.3937	1.0054	1.3185	1.3937	1.8591	1.0251	1.8591	1.5116	1.7595	1.0168	1.7595	1.5309
B13	24.2058	2.6	24.2058	7.3028	22.2664	2.5625	22.2664	6.4311	28.7103	3.5719	28.7103	2.4967	8.8257	2.487	8.8257	2.1301
B14	1.1358	0.8667	1.1358	0.7576	1.4315	0.849	1.4315	1.1073	1.0459	0.8448	0.8881	0.8503	0.9644	0.7604	0.8624	0.7854
B15	0.9735	0.752	0.8852	0.9735	1.0185	0.7679	0.9119	1.0185	0.9492	0.7602	0.908	0.9336	0.9295	0.6802	0.8744	0.8993
B16	4.0365	1.0541	4.0365	1.7707	1.8199	1.8199	1.5397	1.7947	2.9697	2.9479	1.5802	2.6254	1.2686	1.1892	0.1312	0.8468
B17	1.7801	1.2844	1.3094	1.7801	2.0946	1.4436	1.8027	2.0773	2.047	1.3908	2.0083	2.047	big	big	big	big
B18	0.7461	0.7234	0.1067	0.5554	1.1506	0.8869	0.7213	1.1506	1.2173	0.7732	0.1867	0.8802	0.8783	0.7437	0.1675	0.8509
B19	1.0016	0.5598	0.9912	1.0009	1.0825	0.4987	0.9486	0.9794	1.1754	0.5589	1.0402	1.1366	1.1843	0.5473	0.8732	1.1238
B20	0.4458	0.3798	0.0978	0.3656	0.5672	0.5553	0.3603	0.3559	0.4835	0.3431	0.1174	0.3433	0.7162	0.4363	0.1677	0.599
B21	2.435	2.435	2.435	2.435	2.573	2.573	2.573	2.573	3.3298	3.3298	3.3298	3.3298	3.316	3.316	3.316	3.316
B22	0.4413	0.2902	0.2766	0.3856	0.469	0.2583	0.3481	0.3968	0.5664	0.4003	0.3462	0.4247	0.4243	0.2483	0.1571	0.4243
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	2.0257	1.3479	1.3065	2.0257
B25	2.4274	2.4274	2.4274	2.4274	big	big	big	big	big	big	big	big	1.1065	0.8928	1.0886	1.1065
B26	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	1.5046	0.9428	0.7057	1.5046	1.693	1.1408	0.7935	1.693	1.9402	1.4317	1.0096	1.9402	0.8819	0.8819	0.7054	0.8146
B28	0.6512	0.4263	0.5715	0.5781	0.8378	0.4294	0.8329	0.638	0.6297	0.4127	0.5013	0.5651	0.7607	0.4886	0.626	0.6728
B29	1.0084	0.7445	1.0084	0.5883	0.906	0.6668	0.906	0.5871	1.0744	0.5546	0.7268	1.0744	1.4665	0.5602	0.7804	1.4665

Period	2006.03	2006.03	2006.03	2006.03	2006.06	2006.06	2006.06	2006.06	2006.09	2006.09	2006.09	2006.09	2006.12	2006.12	2006.12	2006.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	3.8985	0.7097	3.8985	0.5868	5.1767	0.8033	5.1767	0.6242	5.3069	0.8232	5.3069	0.9728	0.3507	0.3507	0.3507	0.3507
B2	big	big	big	big	2.6215	2.6215	2.6215	2.6215	2.5039	2.5039	2.5039	2.5039	big	big	big	big
B3	5.7384	5.7384	5.7384	5.7384	6.3789	6.3789	6.3789	6.3789	6.5087	6.5087	6.5087	6.5087	4.0732	4.0732	4.0732	4.0732
B4	1.4428	1.4335	1.4335	1.4428	0.8403	0.5094	0.745	0.8364	0.8745	0.4631	0.7035	0.8385	1.7523	1.7523	1.7523	1.7523
B5	0.4913	0.2397	0.1699	0.4368	0.4188	0.2667	0.4187	0.3765	0.9007	0.2969	0.9007	0.6571	1.6485	0.3587	1.6485	0.5199
B6	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B7	0.612	0.3011	0.5234	0.6118	0.6317	0.3444	0.5939	0.5638	0.7057	0.4036	0.6102	0.5889	1.3483	0.4845	0.9446	1.2319
B8	0.8081	0.5948	0.8081	0.5503	0.9627	0.846	0.9627	0.846	1.2914	1.2183	1.2914	1.2183	2.0345	2.0345	2.0345	2.0345
B9	0.9864	0.9273	0.9864	0.9504	1.0548	0.8631	1.0548	0.9135	1.0336	0.9166	1.0336	0.9201	1.0782	1.0782	1.0782	1.0782
B10	big	big	big	big	big	big	big	big	big	big	big	big	6.2743	6.2743	6.2743	6.2743
B11	1.2021	0.7214	0.4376	1.0334	2.0958	0.8954	0.6166	1.9351	2.3904	0.8854	0.5423	2.3792	1.4114	0.9388	0.8769	1.2279
B12	1.5139	0.9601	1.5139	1.4046	1.4065	0.9486	1.3982	1.3948	1.6389	0.9363	1.6389	1.2374	1.2753	1.073	1.1747	1.2753
B13	4.2812	2.6124	4.2812	2.2219	6.8486	2.5721	6.8486	2.3542	6.0144	2.5159	6.0144	3.4853	8.6308	2.646	8.6308	4.2205
B14	0.9979	0.7596	0.9515	0.859	0.9272	0.7467	0.8728	0.8211	1.0056	0.7613	0.9685	0.8566	1.2745	0.704	1.2745	0.8041
B15	0.9778	0.6971	0.8447	0.9754	1.1035	0.7434	0.9111	1.1035	1.089	0.7894	0.9136	1.089	1.0139	0.7791	0.9251	1.0028
B16	1.2168	1.1282	0.1324	0.8336	1.7776	1.1876	1.7776	1.2204	12.3038	2.1883	12.3038	2.4175	3.4929	2.4841	3.4929	2.4841
B17	0.6392	0.1903	0.4247	0.6392	1.6005	0.6824	1.0656	1.6005	2.1449	1.2881	1.65	2.1449	2.3581	1.2212	1.7489	2.3581
B18	4.8421	0.7859	4.8421	0.6663	4.4423	0.8421	4.4423	1.6867	1.2021	0.8708	0.3252	1.2021	1.079	1.0139	1.0086	0.8144
B19	1.2275	0.5	1.055	1.1503	0.9778	0.4926	0.9778	0.5418	1.1664	0.5254	1.1664	0.5484	1.2002	0.5625	1.2002	0.5861
B20	0.3953	0.3489	0.2325	0.3553	1.2812	0.3853	1.2812	0.7451	0.9716	0.5377	0.649	0.8178	0.8437	0.8094	0.7876	0.6419
B21	4.1502	4.1502	4.1502	4.1502	3.0512	3.0512	3.0512	3.0512	2.8764	2.8764	2.8764	2.8764	1.7837	1.5848	1.5848	1.7837
B22	0.4535	0.3222	0.1875	0.4535	0.4692	0.3229	0.3137	0.4665	0.7146	0.2606	0.2759	0.7146	0.5141	0.3709	0.5052	0.4002
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	2.6421	2.1132	2.1132	2.6421	big	big	big	big	big	big	big	big	big	big	big	big
B26	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	1.4556	1.348	0.9395	1.4556	1.3326	1.3326	1.0567	1.1889	1.3728	1.3728	1.0812	1.2707	1.4413	1.4413	1.0902	1.2059
B28	0.59	0.4168	0.5081	0.571	0.6379	0.4504	0.5315	0.6316	0.8426	0.5812	0.6921	0.7356	0.8974	0.7305	0.8224	0.7828
B29	1.3491	0.5443	0.8504	1.3491	1.6775	0.8693	1.4287	1.6775	1.658	0.7275	1.1582	1.658	1.1803	0.7196	0.7983	1.1803

Period	2007.03	2007.03	2007.03	2007.03	2007.06	2007.06	2007.06	2007.06	2007.09	2007.09	2007.09	2007.09	2007.12	2007.12	2007.12	2007.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	0.9264	0.3048	0.9264	0.7602	0.7626	0.3037	0.5514	0.7626	0.743	0.3409	0.4087	0.7401	1.5415	0.4468	1.217	0.7712
B2	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B3	4.7456	4.7456	4.7456	4.7456	2.7977	2.7977	2.7977	2.7977	2.0167	2.0167	1.9578	1.9578	1.5302	1.5302	1.3579	1.43
B4	0.7794	0.5407	0.7631	0.7131	1.8469	1.8469	1.8469	1.8469	1.4501	1.4501	1.4501	1.4501	1.3707	1.2833	1.3707	1.2833
B5	0.4332	0.2726	0.2951	0.4254	0.5279	0.326	0.5279	0.4131	0.4707	0.3739	0.4125	0.3731	0.7092	0.5688	0.6607	0.3372
B6	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B7	1.671	0.5714	0.9706	1.671	2.2559	1.0707	2.2559	1.6723	2.2938	1.086	2.2938	0.9189	1.4618	1.2053	1.4618	0.9719
B8	1.385	1.385	1.385	1.385	1.8997	1.8997	1.8997	1.8997	2.369	2.369	2.369	2.369	2.5602	2.5602	2.5602	2.5602
B9	1.1197	1.0659	1.0659	1.1197	1.2101	1.1377	1.1377	1.2101	1.3143	1.2015	1.2065	1.3143	1.4098	1.1991	1.2153	1.4098
B10	7.0037	7.0037	7.0037	7.0037	7.9306	7.9306	4.1588	4.1588	6.554	6.554	3.3466	0.63	7.6372	7.6372	7.1458	0.758
B11	1.1863	0.9265	0.4647	1.0354	1.3721	0.9255	0.6045	1.0917	1.3103	0.9254	0.6619	1.1409	1.5499	1.0458	0.7959	1.4159
B12	1.4731	1.0003	1.4731	1.3188	1.416	0.9186	1.4052	1.3378	1.3818	0.8959	1.3158	1.3614	1.2961	0.7893	1.2092	1.0688
B13	3.7292	3.0086	2.3551	1.2971	4.0514	3.3364	3.047	1.3108	3.9053	3.2122	3.5741	1.1693	3.5055	3.0679	3.1087	1.1808
B14	1.0527	0.6327	1.026	0.742	1.0076	0.6293	0.993	0.7511	1.0671	0.6564	1.0607	0.65	1.0748	0.6104	1.0748	0.6401
B15	0.9475	0.7438	0.8569	0.8756	0.9438	0.8018	0.8578	0.867	0.9911	0.8807	0.9911	0.8956	1.0022	0.978	0.9917	0.9934
B16	0.9803	0.9803	0.7746	0.6358	0.9991	0.9991	0.7827	0.7391	1.9911	1.9911	1.0625	0.6686	2.4533	1.5381	2.4533	0.5572
B17	1.5065	0.5971	1.1336	1.5065	2.5339	0.9744	1.5261	2.5339	1.4017	0.8611	1.4017	1.182	1.1195	0.5102	1.1039	0.7895
B18	19.3293	0.9062	19.3293	1.6318	13.7928	2.0084	13.7928	4.8756	66.5604	1.0405	66.5604	2.1535	34.268	1.1305	34.268	3.1912
B19	0.9941	0.5124	0.9941	0.6499	1.0532	0.5226	1.0532	0.7717	1.1531	0.546	1.1531	0.7197	1.1694	0.4981	1.1694	0.7371
B20	0.7059	0.6885	0.6708	0.5099	0.9085	0.908	0.8346	0.4221	0.9594	0.9014	0.5861	0.4569	0.8821	0.8394	0.6773	0.4575
B21	1.7035	1.5045	1.5045	1.7035	1.5158	1.1334	1.1334	1.5158	1.6375	1.2171	1.2171	1.6375	1.3757	1.0017	1.1484	1.3757
B22	0.447	0.3281	0.2432	0.4425	0.4624	0.3525	0.2823	0.4445	0.3579	0.2245	0.1714	0.3488	0.4	0.2631	0.226	0.3884
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	big	big	big	big	big	big	big	big	big	big	big	big	1.689	1.5043	1.689	1.5804
B26	big	big	big	big	big	big	big	big	big	big	big	big	0.8899	0.7341	0.8899	0.8651
B27	1.3247	1.3087	1.0627	1.2815	1.3277	1.3277	1.0217	1.233	1.3217	1.2235	0.9683	1.3002	1.1923	1.0494	0.9368	1.0171
B28	0.7756	0.4428	0.5139	0.7756	0.9781	0.9781	0.9781	0.9781	0.9245	0.7815	0.8864	0.9145	1.2227	0.8027	1.2227	0.9298
B29	1.0871	0.6823	0.8274	1.0871	1.1113	0.7075	0.7641	1.1113	1.1336	0.7297	0.7996	1.1336	1.0441	0.7478	0.9083	1.0441

Period	2008.03	2008.03	2008.03	2008.03	2008.06	2008.06	2008.06	2008.06	2008.09	2008.09	2008.09	2008.09	2008.12	2008.12	2008.12	2008.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	11.2066	0.8919	11.2066	1.1921	9.8821	1.2653	9.8821	3.1417	11.5973	1.1277	11.5973	3.2545	12.3717	1.1277	12.3717	3.5188
B2	big	big	big	big	big	big	big	big	big	big	big	big	2.2938	2.2938	2.2938	2.2938
B3	1.5939	1.5939	1.3308	1.3308	1.5919	1.5919	1.2921	1.2921	1.4718	1.4581	1.1841	1.3345	1.3796	1.3771	1.1225	1.2853
B4	1.5872	1.5872	1.5872	1.5872	1.5935	1.5935	1.5935	1.5935	1.7793	1.7793	1.7793	1.7793	1.8177	1.8177	1.8177	1.8177
B5	2.5929	0.625	2.5929	0.7712	3.3848	0.7996	3.3848	0.5666	3.9391	0.8962	3.9391	0.5917	3.271	0.9308	3.271	0.6077
B6	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B7	1.4425	1.1227	1.4425	1.0583	1.6098	1.2755	1.5924	1.0256	1.3797	1.1366	1.331	1.0186	1.0388	0.9618	1.0167	0.9365
B8	2.2203	2.2203	2.2203	2.2203	2.3733	2.3733	2.3733	2.3733	1.5593	1.5593	1.5593	1.5593	1.5082	1.5082	1.5082	1.5082
B9	1.3513	1.2366	1.2789	1.3513	1.3598	1.1296	1.3096	1.3077	1.2662	1.0209	1.2662	1.0747	1.2157	1.1179	1.2157	1.1635
B10	27.0246	27.0246	2.7797	1.5926	26.6947	26.6947	4.7622	1.8533	33.8427	33.2736	33.7577	4.7988	32.8745	32.1717	32.8745	4.1717
B11	1.7867	1.0431	0.7368	1.7804	1.5293	0.8587	0.7226	1.5293	1.0338	1.003	0.7248	0.9697	1.2365	1.1997	0.8864	1.1613
B12	1.4905	0.7902	1.2562	1.4905	1.3555	0.7313	1.2107	1.3555	1.4218	0.7433	1.1613	1.4218	1.4153	0.8265	1.3083	1.3954
B13	4.3314	3.1384	4.3314	1.3477	3.5847	3.0871	3.4696	1.3618	3.0173	3.0173	2.4891	1.3794	2.9962	2.9962	2.7916	1.6502
B14	0.8951	0.5794	0.879	0.6044	0.8312	0.4878	0.8132	0.5604	0.8989	0.5032	0.8989	0.6326	0.8256	0.4909	0.8256	0.6309
B15	1.0594	0.9997	1.0594	0.9893	0.9753	0.9044	0.9613	0.8623	1.1211	1.004	0.9922	1.1151	1.1186	1.0082	1.031	1.1186
B16	3.3223	3.3223	3.0288	3.0288	2.8803	2.2884	2.8803	2.2348	2.1549	2.1549	1.8494	1.8494	1.6856	1.6856	1.6856	1.6856
B17	1.6256	1.0844	1.5821	1.6256	1.9067	1.3293	1.8376	1.9067	1.0075	0.6108	0.9166	0.878	0.971	0.6659	0.8733	0.8706
B18	2.2853	1.1182	1.2191	2.2853	2.2062	0.6999	1.5011	1.7571	1.0786	0.2516	0.5288	1.0786	1.182	0.1449	0.1607	1.182
B19	0.9938	0.4794	0.9938	0.6727	0.7995	0.4714	0.7656	0.6955	0.9861	0.5094	0.9555	0.7666	0.8055	0.3726	0.7792	0.5589
B20	0.9352	0.8306	0.6863	0.7422	0.9201	0.8652	0.7072	0.6513	0.9304	0.9304	0.6837	0.6824	0.6574	0.6574	0.5719	0.4614
B21	1.46	1.2127	1.2127	1.46	1.7248	1.6166	1.6166	1.7248	1.9778	1.9778	1.9778	1.9778	2.3996	2.3996	2.3996	2.3996
B22	0.3567	0.2556	0.3013	0.3419	0.528	0.3295	0.4944	0.4096	0.419	0.2935	0.3432	0.3957	0.4423	0.2537	0.3364	0.4185
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B26	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	1.0614	1.0073	0.7993	0.9058	1.0773	0.9767	0.7727	0.9821	1.1821	1.104	0.8415	1.0223	1.1675	1.0739	0.8915	0.9761
B28	1.3962	0.7648	1.3962	0.7524	1.122	0.5682	1.122	0.5968	1.0562	0.6124	1.0084	0.7072	0.7921	0.5576	0.7713	0.5825
B29	0.913	0.7443	0.8774	0.913	1.0331	0.7622	0.8498	1.0331	1.1285	0.8051	0.9442	1.1285	1.036	0.8397	0.9542	1.0289

Period	2009.03	2009.03	2009.03	2009.03	2009.06	2009.06	2009.06	2009.06	2009.09	2009.09	2009.09	2009.09	2009.12	2009.12	2009.12	2009.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	4.1389	1.0638	4.1389	3.6463	15.5967	1.0833	15.5967	3.8118	12.7613	0.5156	12.7613	1.1195	3.979	1.0208	1.1844	3.979
B2	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B3	1.4967	1.4967	1.245	1.3815	1.4749	1.4665	1.0568	1.3327	1.523	1.5221	1.0587	1.3311	1.7195	1.711	1.3106	1.4985
B4	1.7478	1.7478	1.7478	1.7478	2.0099	2.0099	2.0099	2.0099	2.0865	2.0865	2.0865	2.0865	2.1691	2.1691	2.1691	2.1691
B5	3.7379	0.9764	3.7379	0.5248	3.5201	1.0575	3.5201	0.5954	3.1914	0.9632	3.1914	0.7326	2.953	0.9141	2.953	0.6944
B6	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B7	1.0324	0.8968	1.0077	0.6691	1.0427	0.9344	0.9925	0.677	0.9492	0.8383	0.9042	0.6565	0.9417	0.7337	0.8307	0.6668
B8	1.0478	1.0478	1.0472	1.0472	1.1449	1.1449	1.1449	1.1449	1.1601	1.1601	1.1601	1.1601	1.3699	1.3699	1.3699	1.3699
B9	1.2792	1.1953	1.2789	1.2455	1.2255	1.1891	1.2255	1.2235	1.2749	1.2161	1.2749	1.2594	1.2087	1.075	1.2087	1.1572
B10	28.6184	28.6184	14.3461	3.3895	32.6307	32.6307	20.29	4.2131	26.9043	26.9043	10.2521	3.3806	41.8295	41.8295	20.9903	5.5635
B11	1.0812	1.0297	0.8701	1.0794	1.094	0.9515	0.85	1.094	1.105	0.9022	0.8251	1.105	1.128	0.8471	0.6783	1.1032
B12	1.0327	0.6595	0.9574	1.0231	1.1425	0.6633	1.1124	1.0021	1.2115	0.7135	1.2097	1.0484	1.1103	0.8045	1.0567	1.1019
B13	3.0406	3.0195	2.9234	1.4384	3.1686	3.0444	3.0231	1.4629	3.7814	3.7454	3.7454	3.7814	3.0223	3.0223	2.3997	1.5029
B14	0.8062	0.4735	0.8062	0.6242	0.8185	0.4745	0.8185	0.6227	0.8355	0.4765	0.8355	0.6134	0.8009	0.4993	0.8009	0.6147
B15	1.0693	0.952	1.0581	1.0207	1.094	0.9726	1.0617	1.0658	1.0735	0.9041	1.0274	1.0486	1.1103	0.8816	1.1103	1.0209
B16	2.4305	1.7322	2.4305	1.6322	1.5006	1.5006	1.5006	1.5006	1.9587	1.9587	1.9587	1.9587	41.6826	7.9003	41.6826	7.9003
B17	1.1386	0.843	1.1386	1.0093	0.9504	0.6898	0.899	0.7656	0.9228	0.651	0.884	0.7429	0.9192	0.6235	0.8838	0.7458
B18	1.2564	0.1248	0.5441	1.2564	1.7852	0.2423	0.6636	1.6485	2.2431	0.2678	1.0032	2.1594	2.9552	0.2011	0.7314	2.9552
B19	0.7237	0.3737	0.6884	0.5059	0.8209	0.3929	0.7922	0.5014	0.8382	0.4058	0.8198	0.4986	0.8534	0.5033	0.8246	0.5348
B20	0.7798	0.7798	0.6115	0.3475	0.517	0.517	0.3618	0.3522	0.5102	0.5102	0.3275	0.2245	0.5131	0.5131	0.3003	0.3413
B21	2.781	2.781	2.781	2.781	2.3001	2.3001	2.3001	2.3001	2.4986	2.4986	2.4986	2.4986	2.4437	2.4437	2.4437	2.4437
B22	0.5381	0.2655	0.3776	0.4364	0.4546	0.2418	0.3527	0.3984	0.4382	0.2315	0.3936	0.3622	0.4248	0.2512	0.2928	0.3833
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	1.7793	1.0997	1.2004	1.7793	big	big	big	big	big	big	big	big	big	big	big	big
B26	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	1.0553	1.0553	0.8498	0.9796	1.1756	1.1519	0.8742	1.0518	1.262	1.2162	0.9117	1.0562	1.3082	1.2124	1.0089	1.1089
B28	0.7284	0.495	0.7112	0.5594	0.7579	0.5517	0.7514	0.5937	0.8288	0.5356	0.8288	0.5852	0.8178	0.6489	0.7858	0.7887
B29	1.0433	0.8288	1.0386	1.0143	1.0863	0.7971	1.0863	0.9882	1.0546	0.7712	1.0181	0.9546	1.1398	0.8093	1.1197	0.9824

Period	2010.03	2010.03	2010.03	2010.03	2010.06	2010.06	2010.06	2010.06	2010.09	2010.09	2010.09	2010.09	2010.12	2010.12	2010.12	2010.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	4.1776	1.0426	1.7121	4.1776	53.0438	1.1739	53.0438	4.2773	36.7578	1.1304	36.7578	4.2282	76.3754	1.1522	76.3754	4.4194
B2	big	big	big	big	big	big	big	big	big	big	big	big	1.8594	1.8594	1.8594	1.8594
B3	1.5855	1.5837	1.1393	1.369	1.7496	1.7424	1.4083	1.5255	1.5998	1.5961	1.2813	1.4704	1.131	1.1162	1.131	1.1113
B4	2.0357	2.0357	2.0357	2.0357	1.8044	1.8044	1.8044	1.8044	1.862	1.862	1.862	1.862	1.3239	1.3094	1.3239	1.3094
B5	2.9747	0.6752	2.9747	0.5237	1.6695	0.3191	1.6695	0.3074	2.6264	0.7624	2.6264	0.6729	1.0657	0.1944	1.0419	0.3862
B6	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B7	0.9029	0.8188	0.7772	0.8446	1.0265	0.8255	1.025	0.832	1.0436	0.6731	1.0436	0.7745	1.0524	0.5568	1.0524	0.8196
B8	2.5188	2.5188	2.5188	2.5188	3.1378	3.1378	3.1378	3.1378	3.7386	3.7386	3.7386	3.7386	3.1043	3.1043	3.1043	3.1043
B9	1.2111	1.0673	1.2111	1.1217	1.1684	1.0431	1.1684	1.1002	1.1491	1.0437	1.1491	1.1181	1.1174	0.8249	1.1001	0.9467
B10	35.5718	35.5718	14.4716	6.4017	35.079	35.079	10.3181	6.2482	37.501	37.501	12.4177	7.7344	37.9713	37.9713	7.9482	7.2132
B11	1.2555	0.9052	0.82	1.2552	1.193	0.8202	0.7793	1.193	1.1697	0.6899	0.8178	1.1697	1.414	0.9279	1.0877	1.414
B12	1.2177	0.8366	1.1287	1.198	1.1839	0.8814	1.1839	1.1278	1.1301	0.8674	1.1091	1.1241	0.9905	0.7958	0.9905	0.8747
B13	2.9688	2.9688	2.3843	1.5689	2.9088	2.9088	2.8552	1.5951	2.9063	2.9063	2.8202	1.6629	2.9113	2.9113	2.7669	1.7153
B14	0.8381	0.524	0.8381	0.6235	0.8438	0.4897	0.8438	0.5854	0.7962	0.508	0.7962	0.5954	0.7457	0.518	0.7457	0.556
B15	1.374	1.0911	1.374	1.1365	1.4094	1.0244	1.4094	1.0879	1.4077	0.9921	1.4077	1.0768	1.403	0.743	1.403	0.9418
B16	82.8204	7.5995	82.8204	7.5995	5.5393	5.5393	5.5393	5.5393	5.1275	5.1275	5.1275	5.1275	9.3621	9.3621	9.3621	9.3621
B17	0.9508	0.6373	0.9508	0.7633	1.0571	0.7047	1.0488	0.8154	1.1943	0.7488	1.1861	0.9162	1.1778	0.6253	1.1778	0.9475
B18	1.5726	0.1607	0.706	1.5726	2.5029	0.1573	1.9767	1.5524	1.9311	0.1433	1.6758	1.1781	3.081	0.1362	3.081	0.924
B19	0.9115	0.4341	0.8895	0.5132	0.7487	0.3821	0.7157	0.4723	0.7861	0.339	0.7708	0.5018	0.5948	0.2674	0.5948	0.4459
B20	0.4933	0.442	0.4095	0.3307	0.4407	0.3667	0.3962	0.2934	0.8869	0.4322	0.7231	0.3287	1.504	1.504	1.218	0.8954
B21	1.0851	0.9978	0.9978	1.0851	1.0934	1.0286	1.0286	1.0934	1.2259	1.0388	1.143	1.1433	1.4097	1.3136	1.4097	1.3448
B22	0.4946	0.2242	0.4535	0.4194	0.4765	0.2116	0.3631	0.4433	0.4759	0.1858	0.3972	0.472	0.4501	0.179	0.3352	0.4501
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B26	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	1.1755	1.1244	0.8756	0.9859	1.3588	1.2009	1.024	1.1673	1.3266	1.1336	1.0607	1.2059	1.4111	1.2846	1.2285	1.34
B28	0.7746	0.6688	0.7602	0.7543	0.7471	0.632	0.6884	0.7224	0.7745	0.5525	0.7557	0.7519	0.7328	0.497	0.7302	0.6857
B29	1.1631	0.8424	1.1396	1.0088	1.1904	0.9057	1.1619	1.0345	1.1308	0.8764	1.1245	0.9658	1.1131	0.9195	1.0886	1.0761

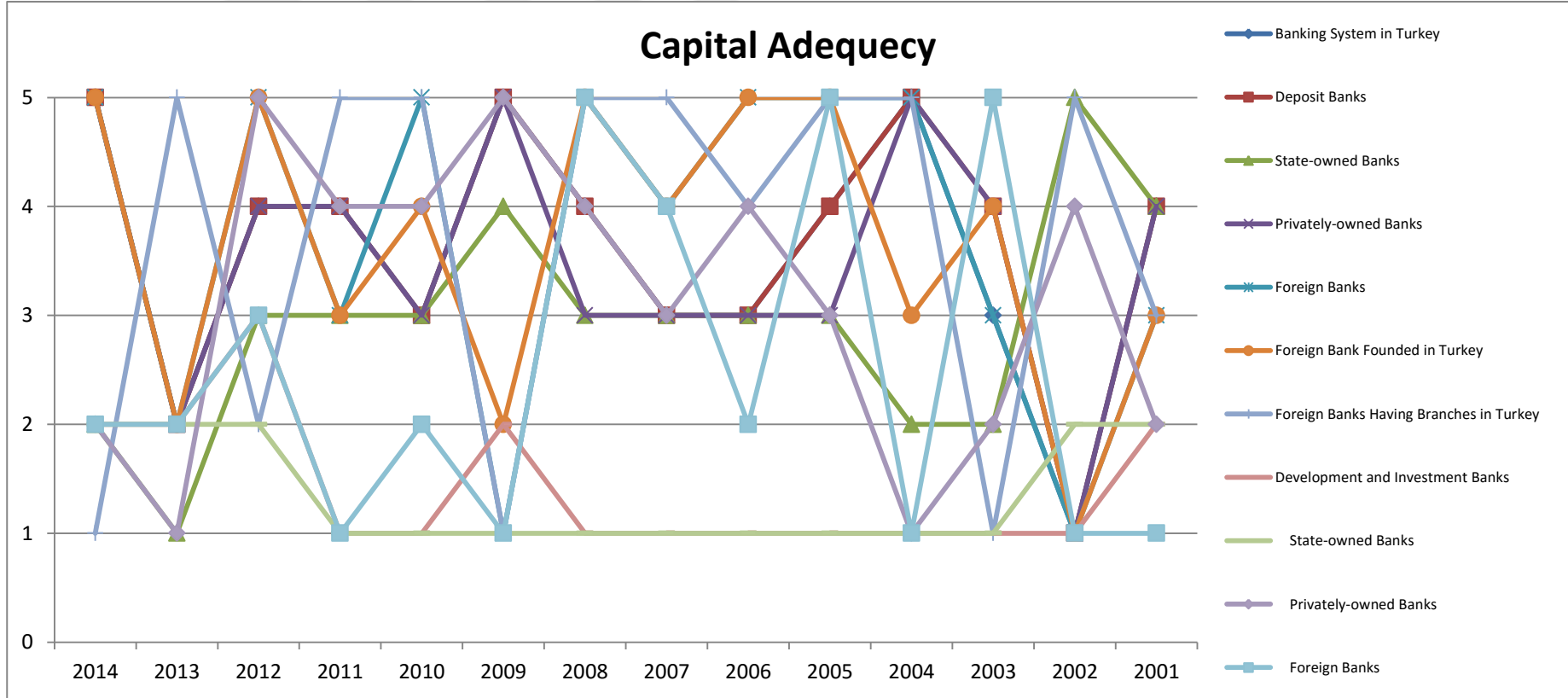
Period	2011.03	2011.03	2011.03	2011.03	2011.06	2011.06	2011.06	2011.06	2011.09	2011.09	2011.09	2011.09	2011.12	2011.12	2011.12	2011.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	45.1951	1.0217	45.1951	4.4725	71.6193	1.0909	71.6193	4.6776	62.0384	1.2093	62.0384	5.1045	51.0264	1.2093	51.0264	5.356
B2	big	big	big	big	2.2479	2.2479	2.2479	2.2479	big	big	big	big	big	big	big	big
B3	1.2273	1.18	1.0625	1.2266	1.5982	1.4128	1.1395	1.5931	1.5531	1.3095	1.1399	1.5531	1.5603	1.3315	1.1628	1.5603
B4	1.4182	1.4182	1.4182	1.4182	1.6413	1.5675	1.6413	1.5675	1.7294	1.7294	1.7294	1.7294	1.8543	1.8543	1.8543	1.8543
B5	0.402	0.1765	0.1637	0.363	0.7121	0.7085	0.4398	0.5778	0.8074	0.8032	0.5021	0.6463	1.05	1.05	0.8341	0.834
B6	10.1818	10.1818	5.8876	4.9959	5.6279	5.6279	2.0427	2.5664	4.2875	4.2875	0.5781	1.0574	2.2522	2.2522	0.4742	0.6791
B7	0.8714	0.5343	0.8013	0.7456	0.871	0.4752	0.871	0.5531	0.7978	0.5041	0.7959	0.5044	0.7825	0.51	0.7825	0.4897
B8	3.3867	3.3867	3.3867	3.3867	2.991	2.991	2.991	2.991	3.1635	3.1635	3.1635	3.1635	2.7107	2.7107	2.7107	2.7107
B9	1.1292	0.9062	1.0946	1.0581	1.0893	0.8373	1.0708	0.9645	1.0405	0.8247	1.0179	0.9432	0.9864	0.6694	0.9708	0.8784
B10	48.103	48.103	18.6859	9.0117	50.4337	50.4337	18.226	10.3172	47.4729	47.4729	19.3266	9.2368	52.4157	41.8916	52.4157	8.138
B11	1.4241	1.3558	1.4241	1.1849	1.6185	1.4789	1.5935	1.4113	1.583	1.3133	1.3037	1.4829	1.7386	1.5554	1.1862	1.7386
B12	1.0041	0.8388	1.0041	0.9092	0.9616	0.7855	0.9508	0.8815	1.0102	0.7695	0.9888	0.9167	0.9832	0.703	0.9613	0.883
B13	3.0618	2.9106	3.0065	2.727	3.1101	2.8596	3.0541	2.7127	3.0085	2.8859	2.9823	2.6951	3.0334	2.8236	2.8398	2.5367
B14	0.8735	0.652	0.8735	0.6787	0.8478	0.6883	0.8478	0.6985	0.8554	0.696	0.8554	0.7346	0.9384	0.69	0.9384	0.7945
B15	1.0321	0.778	1.0321	0.9646	1.1962	0.7217	1.1962	1.0232	1.228	0.6856	1.228	0.9257	1.2991	0.709	1.2991	0.9557
B16	9.5054	9.5054	9.5054	9.5054	19.4063	19.4063	19.4063	19.4063	3.0687	3.0687	3.0687	3.0687	15.6142	15.6142	15.6142	15.6142
B17	1.0249	0.6003	1.0249	0.9663	1.0096	0.5709	1.0096	0.9213	0.9905	0.5814	0.9371	0.9618	1.0073	0.5494	0.9496	0.9485
B18	4.8064	0.2197	4.8064	1.1299	4.7477	0.2226	4.7477	0.7321	3.6365	0.2487	3.6365	0.877	3.2215	0.3042	3.2041	0.7858
B19	0.3001	0.1507	0.2743	0.3001	0.7832	0.3046	0.6923	0.5	0.7793	0.3365	0.7009	0.5326	0.8184	0.5003	0.6853	0.5435
B20	1.3349	1.3349	1.3349	1.3349	1.7608	1.7608	1.7608	1.7608	2.4912	2.4912	2.4912	2.4912	0.9888	0.6741	0.9888	0.4859
B21	1.0586	0.4764	1.0586	0.7866	1.1425	0.5552	1.1425	0.8496	1.0486	0.5472	1.0486	0.8981	0.9824	0.5527	0.9582	0.9103
B22	0.4013	0.2075	0.2414	0.4013	0.4493	0.2147	0.3508	0.4325	0.4798	0.2454	0.3445	0.4788	0.4472	0.2615	0.3764	0.4472
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B26	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B28	0.7818	0.5339	0.5801	0.7818	0.8555	0.5766	0.6843	0.8369	0.8785	0.7117	0.7802	0.8785	0.8592	0.8547	0.8592	0.8062
B29	1.0756	0.8974	1.0646	0.9747	1.1279	0.9618	1.1103	0.9763	1.0923	0.9279	1.029	1.0476	1.0974	0.9121	1.0617	0.9975

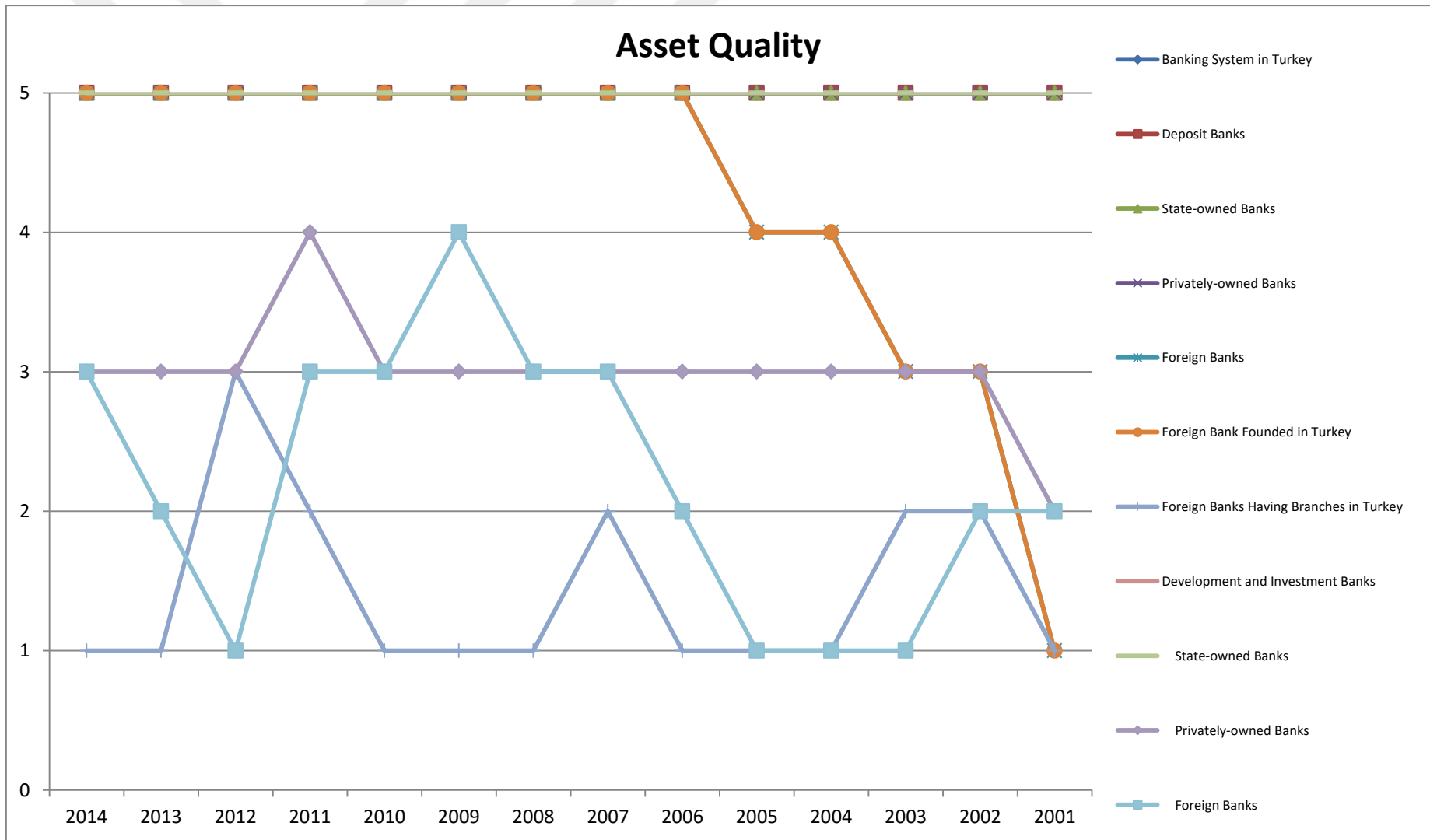
Period	2012.03	2012.03	2012.03	2012.03	2012.06	2012.06	2012.06	2012.06	2012.09	2012.09	2012.09	2012.09	2012.12	2012.12	2012.12	2012.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	9.2698	1.3095	9.2698	3.9421	41.5403	1.2381	41.5403	6.0159	83.585	1.3333	83.585	6.2862	1.5669	0.5315	1.5669	1.057
B2	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B3	1.4825	1.0054	1.1313	1.4825	1.5244	1.0547	1.1927	1.5244	1.5713	1.077	1.1533	1.5713	1.4136	1.0364	1.1171	1.4136
B4	1.9461	1.9461	1.9461	1.9461	1.802	1.802	1.802	1.802	1.8099	1.8099	1.8099	1.8099	big	big	big	big
B5	0.7549	0.5089	0.7549	0.3874	0.7305	0.5631	0.7305	0.4291	big	big	big	big	0.8988	0.8778	0.6536	0.5511
B6	2.1398	2.1398	1.0926	1.1721	0.7181	0.7181	0.217	0.3445	0.428	0.428	0.1719	0.3551	0.4957	0.4936	0.4642	0.4151
B7	0.7465	0.5186	0.74	0.5554	0.7336	0.5953	0.7208	0.5461	0.7659	0.5937	0.7537	0.5614	0.8006	0.5657	0.747	0.7097
B8	2.3113	2.3113	2.3113	2.3113	2.2088	2.2088	2.2088	2.2088	3.2375	3.2375	3.2375	3.2375	2.4828	2.4828	2.4828	2.4828
B9	0.9561	0.6749	0.9145	0.9234	0.9611	0.6509	0.923	0.9268	0.9839	0.6334	0.9129	0.9804	1.0037	0.6442	0.9028	1.0036
B10	43.2317	43.2317	32.0229	8.4645	36.7512	36.7512	17.529	7.509	big	big	big	big	big	big	big	big
B11	1.6325	1.588	1.2652	1.5438	1.6151	1.5038	1.4096	1.5841	1.5792	1.4166	1.2929	1.5792	1.8464	1.5531	1.3509	1.8464
B12	0.9711	0.6585	0.9619	0.9201	0.9906	0.6476	0.9901	0.9438	1.0295	0.627	1.0248	0.9667	0.9797	0.6216	0.9696	0.9438
B13	2.97	2.9345	2.8602	2.551	3.2223	2.8237	3.2223	2.5915	3.809	2.826	3.809	2.4972	3.5471	2.7283	3.5471	2.5173
B14	0.9098	0.6881	0.9098	0.8645	0.9208	0.681	0.9208	0.9045	0.9612	0.6689	0.9612	0.9153	0.9203	0.6274	0.9094	0.9176
B15	1.2747	0.7605	1.2623	1.0104	1.3022	0.8286	1.3022	1.0216	1.2487	0.8068	1.2487	1.0305	1.2389	0.722	1.2386	1.0157
B16	6.5924	6.5924	6.5924	6.5924	5.3721	5.3721	5.3721	5.3721	13.1065	13.1065	13.1065	13.1065	0.635	0.635	0.6092	0.6092
B17	1.0554	0.5293	0.9853	1.0235	1.1218	0.5615	1.1139	1.0028	1.1018	0.5872	1.095	1.0198	1.1013	0.6049	1.0549	1.0579
B18	2.8003	0.3423	2.8003	0.9537	0.7812	0.3014	0.5237	0.7812	1.7955	0.3355	1.7955	0.8879	2.4123	0.3056	2.4123	0.9667
B19	0.7779	0.5174	0.7211	0.5413	0.7927	0.5848	0.7707	0.5434	0.8245	0.5835	0.7673	0.5579	0.7717	0.6017	0.6937	0.5902
B20	0.8809	0.8809	0.7035	0.5413	1.1078	1.1078	0.973	0.7412	0.7755	0.7755	0.6568	0.3775	1.0992	1.0992	1.0685	1.0099
B21	0.9825	0.5763	0.9562	0.9516	1.0117	0.6097	0.9551	0.9925	1.0235	0.6049	0.8905	1.0235	1.0438	0.5957	0.8766	1.0438
B22	0.4804	0.2822	0.3831	0.4804	0.4747	0.2837	0.3716	0.4747	0.4773	0.3022	0.4508	0.4697	0.5463	0.357	0.4971	0.545
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B26	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	big	big	big	big	big	big	big	big	1.1364	1.0058	1.0863	1.1241	1.1819	1.0184	1.0634	1.1819
B28	0.9662	0.9662	0.8904	0.908	1.0772	1.0772	0.9459	1.0004	1.0295	1.0288	0.8924	0.9886	1.1801	1.1801	1.0889	1.1455
B29	1.1156	0.9252	1.0944	0.9808	1.0662	0.9431	1.0644	0.9131	1.0828	0.9353	1.0776	0.9326	1.0495	0.9573	1.0495	0.8322

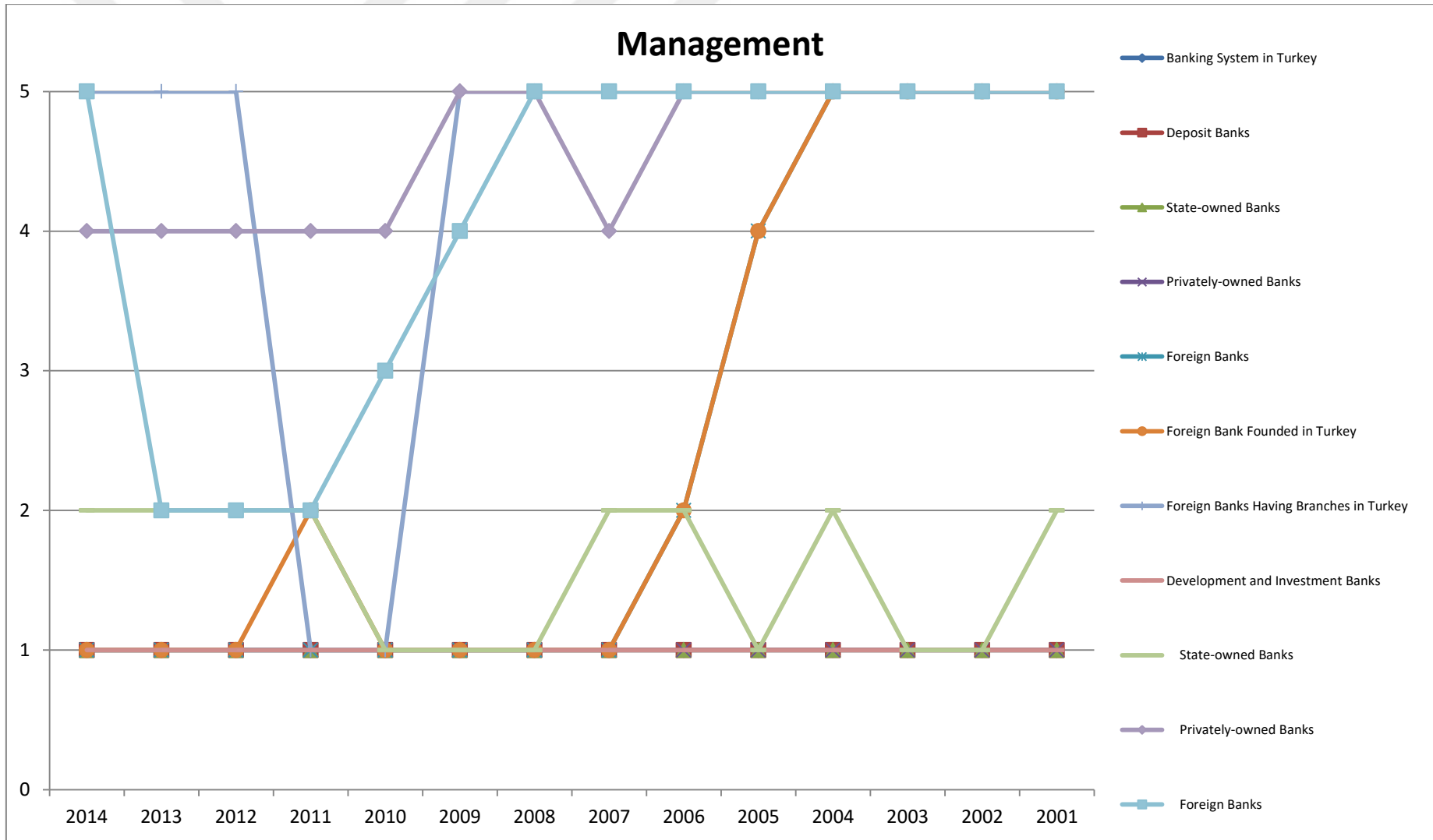
Period	2013.03	2013.03	2013.03	2013.03	2013.06	2013.06	2013.06	2013.06	2013.09	2013.09	2013.09	2013.09	2013.12	2013.12	2013.12	2013.12
Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	1.6645	0.5667	1.6645	1.0755	1.5192	0.5667	1.0599	1.0937	1.5578	0.5484	1.5578	1.1149	1.7776	0.5484	1.4906	1.1248
B2	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B3	1.4968	1.0626	1.2582	1.4123	1.4907	1.0279	1.1903	1.4775	1.468	0.9864	1.1982	1.4582	1.3441	0.9974	1.116	1.3441
B4	big	big	big	big	1.1575	1.1575	1.1575	1.1575	big	big	big	big	big	big	big	big
B5	1.4719	0.9558	1.4719	0.6311	0.8638	0.7175	0.7384	0.4106	1.0813	1.0813	0.6438	0.7332	1.1575	1.1575	0.5056	0.6996
B6	0.6909	0.4964	0.6909	0.442	1.0546	0.6637	0.5274	0.4084	1.1018	0.8441	1.0562	0.4145	0.7278	0.6344	0.7225	0.4302
B7	0.7471	0.5578	0.7471	0.6391	0.8483	0.613	0.8448	0.6906	0.8532	0.6699	0.8427	0.6626	1.0115	0.8145	0.9985	0.7516
B8	4.5633	4.5633	4.5633	4.5633	3.7335	3.7335	3.7335	3.7335	4.1931	4.1931	4.1931	4.1931	3.5708	3.5708	3.5708	3.5708
B9	1.0732	0.6807	0.8974	1.0732	1.068	0.6875	0.9011	1.068	1.1002	0.6462	0.9149	1.1002	1.1001	0.629	0.871	1.1001
B10	big	big	big	big	6.4649	6.4649	4.4628	1.4611	big	big	big	big	big	big	big	big
B11	1.8916	1.5181	1.3735	1.8916	1.7027	1.4477	1.2717	1.7027	1.622	0.9939	1.233	1.622	1.6984	1.0083	1.2255	1.6984
B12	0.9851	0.5712	0.982	0.8938	0.8972	0.5205	0.8875	0.816	0.908	0.5186	0.9024	0.7829	0.9342	0.6966	0.9342	0.8071
B13	3.2635	2.6764	3.2635	2.5994	3.1244	2.6771	3.1244	2.6751	3.4473	2.7684	3.4473	2.48	3.1934	2.6769	3.1934	1.9123
B14	0.9585	0.6273	0.9585	0.8604	big	big	big	big	0.9311	0.7197	0.9046	0.9112	0.9155	0.7041	0.886	0.8975
B15	1.1818	0.6992	1.1818	0.996	1.3106	0.6951	1.3106	0.9562	1.2819	0.6773	1.2819	0.9319	1.2526	0.6909	1.2526	0.9537
B16	0.5083	0.5083	0.5083	0.5083	2.0326	0.4181	2.0326	0.4181	1.8833	0.5188	1.8833	0.4988	1.4829	0.3046	1.4829	0.2564
B17	1.7606	0.812	1.7606	1.5101	1.5557	0.7903	1.5557	1.4386	1.6033	0.7926	1.6033	1.5584	1.905	1.0509	1.8823	1.8886
B18	1.927	0.8935	1.927	0.7432	3.3001	2.5594	3.1921	2.6955	1.7626	1.0602	1.7626	1.1295	1.7673	1.7309	1.7673	1.7309
B19	0.7328	0.5579	0.7187	0.511	0.761	0.5172	0.7037	0.5288	1.0968	0.9628	1.0861	1.0185	1.0573	0.9945	1.0176	0.9459
B20	0.9656	0.9656	0.9489	0.9107	1.5718	1.553	1.0321	0.9804	0.8693	0.8693	0.6498	0.6351	0.9942	0.9942	0.8553	0.7532
B21	1.1001	0.5942	0.8839	1.1001	1.0136	0.5784	0.8447	1.0136	0.9675	0.5524	0.8638	0.9338	0.976	0.5583	0.8737	0.9312
B22	0.4738	0.3009	0.4033	0.4691	0.569	0.3982	0.5476	0.5448	0.7931	0.4875	0.7651	0.706	0.727	0.4435	0.6618	0.7216
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	big	big	big	big	big	big	big	big	big	big	big	big	0.8886	0.8414	0.7725	0.9482
B26	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	1.1289	1.0048	1.0943	1.0805	1.1367	1.0248	1.0569	1.1296	big	big	big	big	big	big	big	big
B28	1.0958	1.0958	1.0418	1.0612	0.8812	0.7217	0.7284	0.7022	0.8405	0.6738	0.6481	0.7362	0.8598	0.7066	0.6808	0.7049
B29	1.0343	0.9521	1.0276	0.843	1.0237	0.9455	0.9992	0.7969	1.029	0.9013	0.9914	0.8151	0.9996	0.8989	0.9757	0.8501

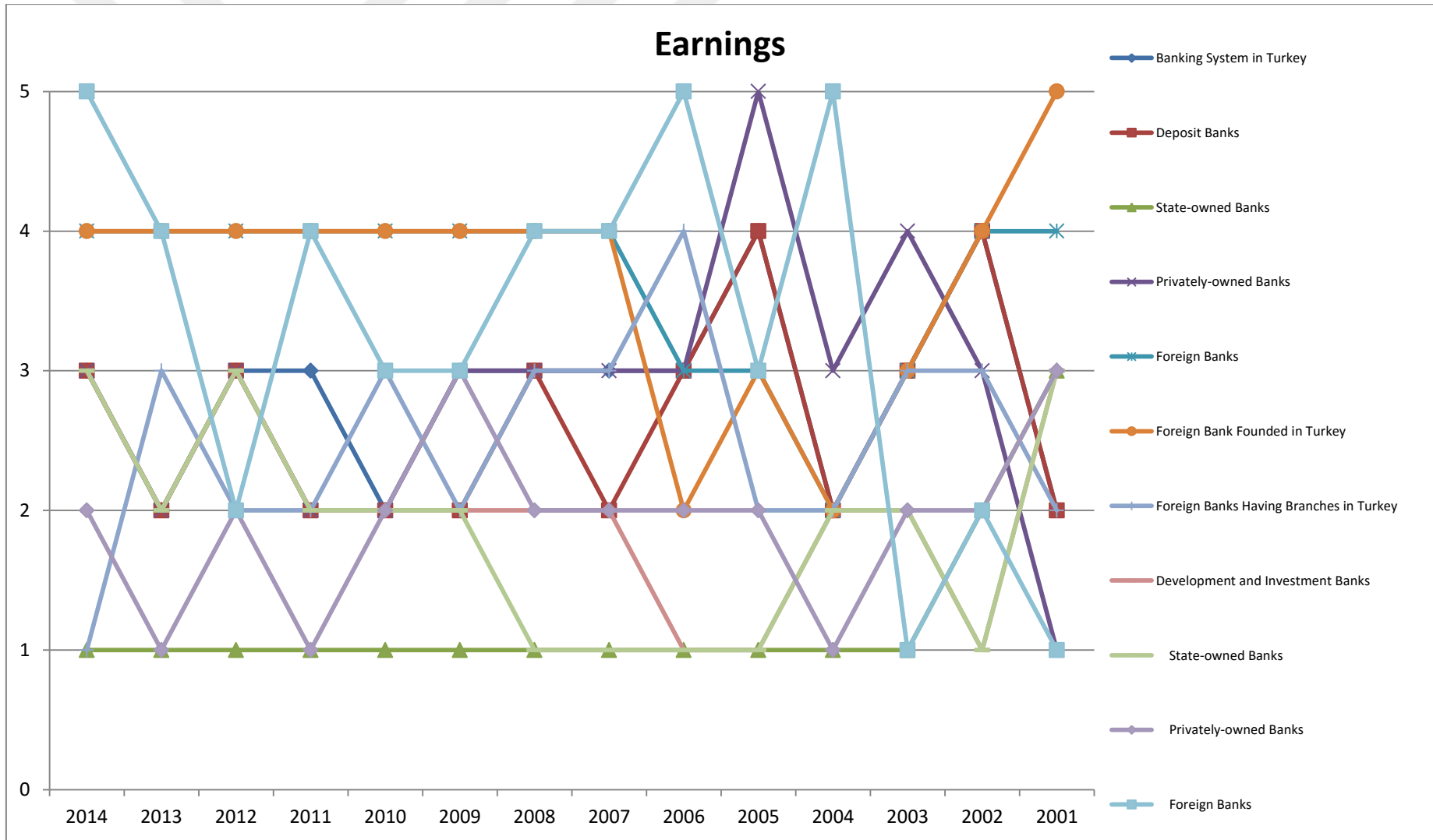
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Model	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4	M1	M2	M3	M4
B1	12.5094	2.0645	12.5094	2.8192	7.6203	2.0645	1.7784	7.6203	7.67	2.0323	1.9143	7.67	1.1709	0.3894	1.1709	0.3208
B2	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B3	1.2021	0.977	1.1018	1.2021	1.2624	1.0157	1.1182	1.2624	1.1801	1.0742	1.1334	1.1801	1.5135	0.8456	0.7642	1.4919
B4	1.5438	1.5438	1.5438	1.5438	1.3858	1.3858	1.3858	1.3858	1.4186	1.4186	1.4186	1.4186	big	big	big	big
B5	0.782	0.7431	0.433	0.607	0.6977	0.6753	0.4942	0.6018	0.6489	0.6407	0.4409	0.53	0.8549	0.4846	0.7536	0.4248
B6	1.3282	0.8941	1.3282	0.5229	1.2412	0.6643	1.2152	0.5425	1.6097	0.9122	1.3849	0.5454	1.9112	1.0591	0.5281	0.9944
B7	0.9551	0.7545	0.9171	0.8563	1.0296	0.792	1.0222	0.9001	1.051	0.9215	0.9744	0.9961	0.6476	0.3513	0.512	0.5054
B8	3.1104	3.1104	3.1104	3.1104	2.7555	2.7555	2.7555	2.7555	2.9977	2.9977	2.9977	2.9977	2.013	2.013	1.9995	1.9976
B9	1.1203	0.6387	0.8384	1.1203	1.0716	0.6458	0.8596	1.0716	1.106	0.6344	0.8357	1.106	0.8182	0.6581	0.8094	0.7444
B10	17.1604	11.6555	17.1604	3.9458	big	big	big	big	big	big	big	big	big	6.6699	big	0.3826
B11	1.4775	0.9508	1.1573	1.4775	1.636	0.9896	1.1791	1.636	1.6738	1.0775	1.26	1.6738	0.6375	0.1443	0	0.3082
B12	0.892	0.5009	0.892	0.7744	0.9831	0.5114	0.9831	0.7954	0.974	0.554	0.974	0.8008	1.2941	1.036	1.0919	1.2941
B13	2.6907	2.4124	2.6907	2.0476	2.834	2.1715	2.834	2.1715	2.3727	2.2149	2.3727	2.2149	5.4663	2	0	2.651
B14	0.8414	0.6555	0.8333	0.8177	0.8488	0.6587	0.8337	0.8384	0.7777	0.6021	0.7709	0.7541	big	big	big	big
B15	1.3264	0.6868	1.3264	0.9563	1.3148	0.6431	1.3102	1.0185	1.2629	0.6454	1.2544	0.9969	1.2783	0.7468	0.7774	1.2783
B16	0.5704	0.5704	0.5111	0.4051	1.8122	0.6187	1.8122	0.6187	1.415	0.6176	1.415	0.6176	big	big	big	big
B17	1.9788	1.0681	1.9188	1.9603	2.3973	1.2649	2.328	2.3765	2.5588	1.3003	2.5588	2.3603	1.4238	0.4763	0.7622	1.4238
B18	2.5007	2.5007	2.5007	2.5007	1.249	0.2357	1.2415	0.7554	2.2063	0.2398	2.2063	0.8152	15.9573	2.4007	15.9573	0.4811
B19	0.8761	0.5842	0.8761	0.6459	0.8488	0.5423	0.8488	0.5967	0.8539	0.6301	0.8539	0.607	1.0089	0.633	0.7135	0.678
B20	1.4484	1.4484	1.2792	1.1432	1.6234	1.6234	1.6234	1.6234	1.644	1.644	1.644	1.644	0.3009	0.2358	0	0.1394
B21	0.9882	0.5815	0.8957	0.9557	1.0074	0.5637	0.8385	0.9911	0.9946	0.5661	0.8545	0.9846	1.6416	1.6314	1.6339	1.6416
B22	1.0787	0.7926	0.8099	1.0787	1.126	0.5951	0.7821	1.126	0.8952	0.5766	0.829	0.8846	0.5809	0.136	0	0.3714
B23	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B24	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B25	0.9032	0.907	0.7998	0.9537	0.9966	0.8812	0.8646	0.9816	0.9167	0.8454	0.8206	0.9477	big	big	big	big
B26	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
B27	big	big	big	big	big	big	big	big	big	big	big	big	1.407	0.5792	0.8649	1.407
B28	0.8385	0.6189	0.5997	0.8075	0.8408	0.6233	0.6506	0.7684	0.8439	0.7309	0.6569	0.7202	0.8533	0.4423	0.7364	0.3776
B29	1.0293	0.8845	1.0209	0.8681	1.0114	0.8263	0.994	0.9517	0.9857	0.8419	0.9542	0.9379	big	big	big	big

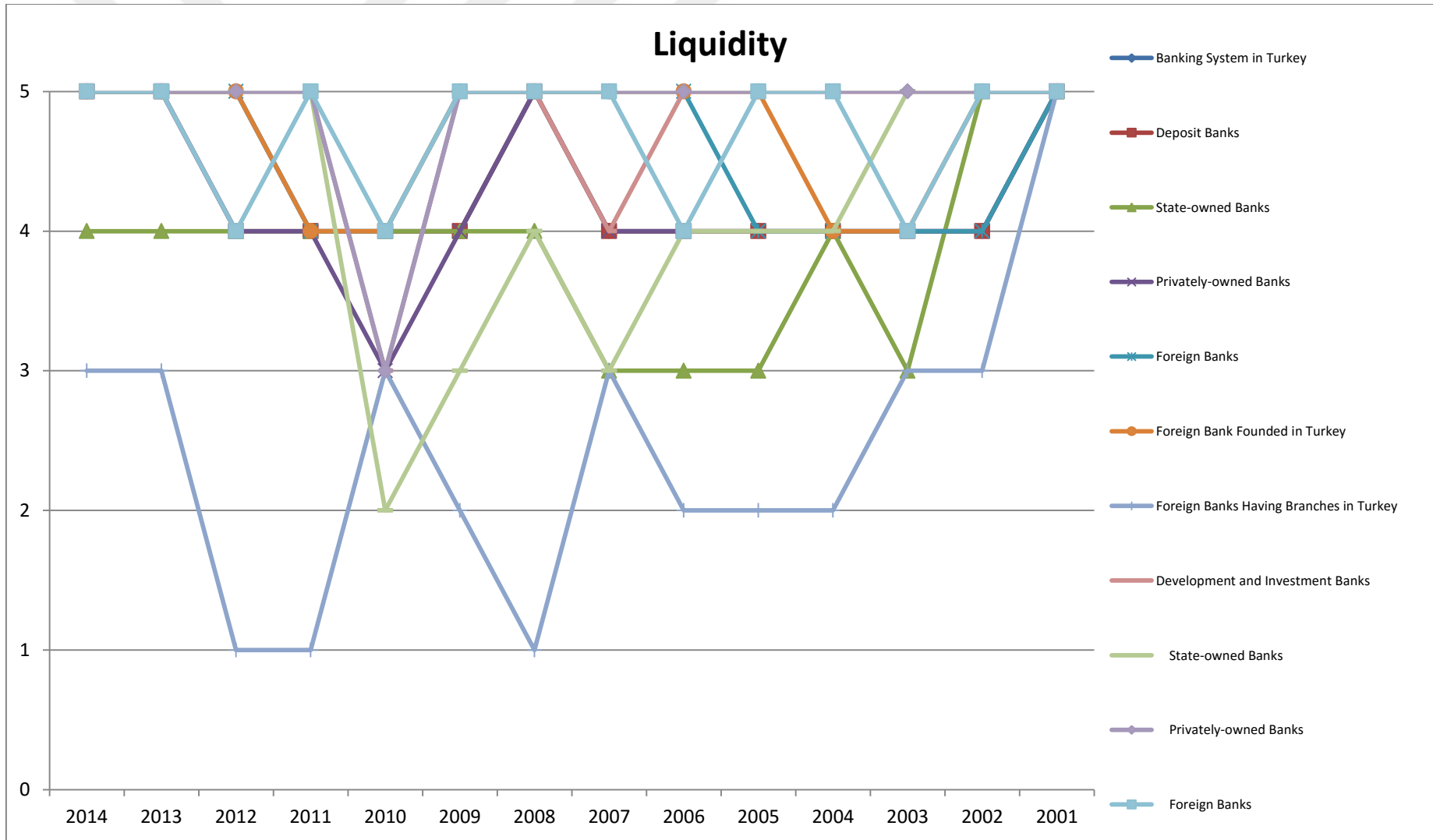
6. APPENDIX F – CAMELS GRAPHS



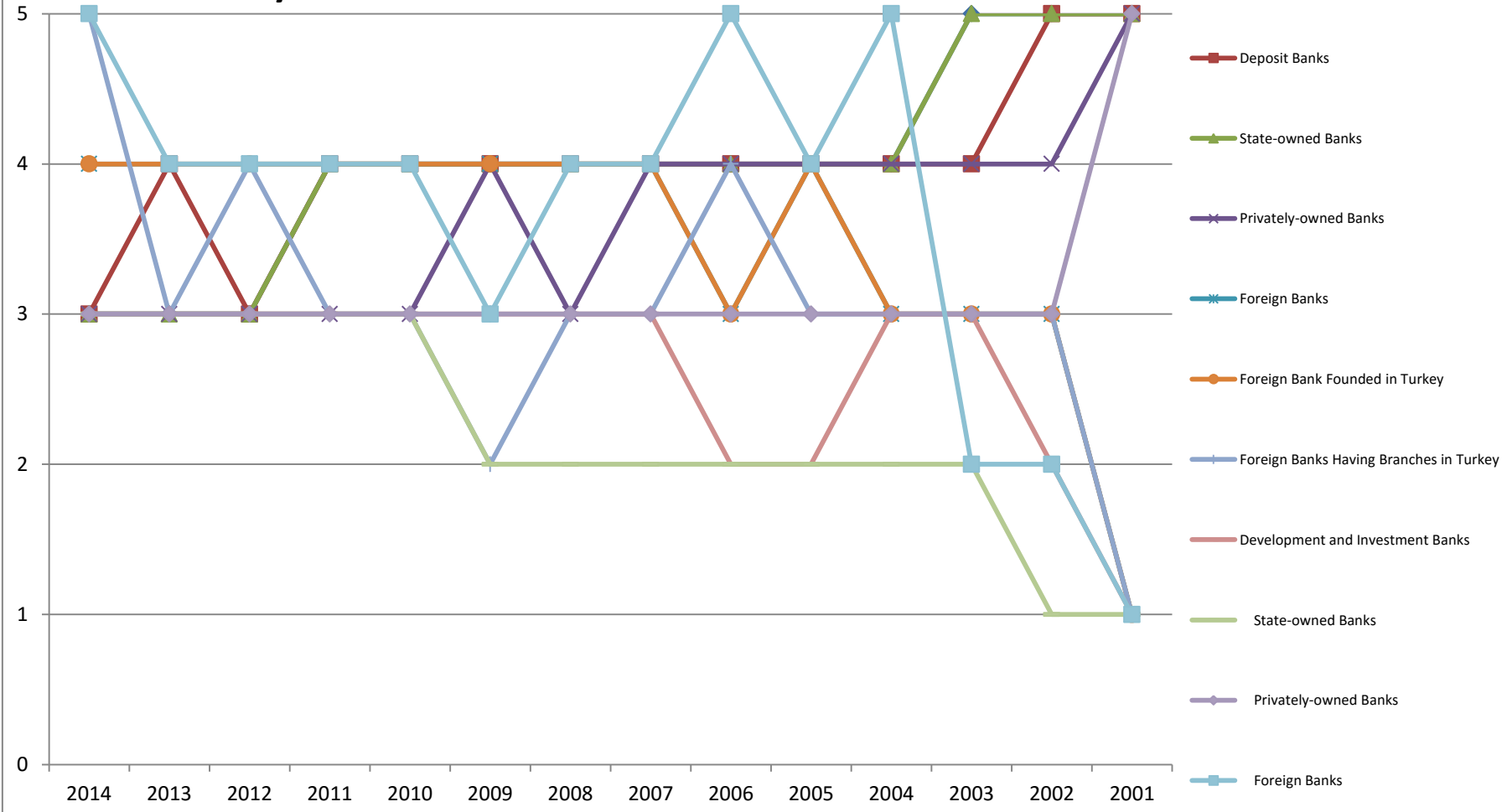




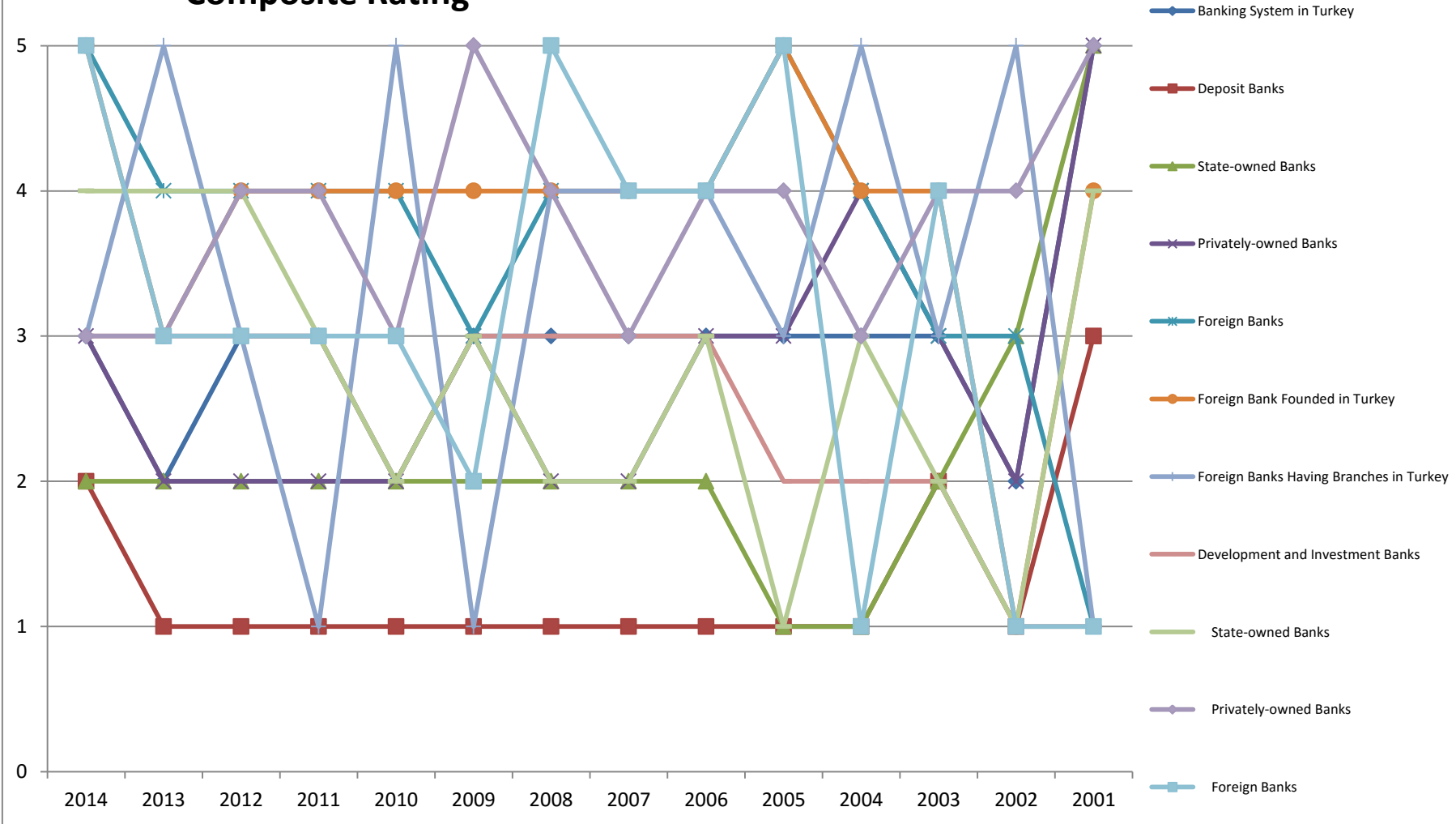




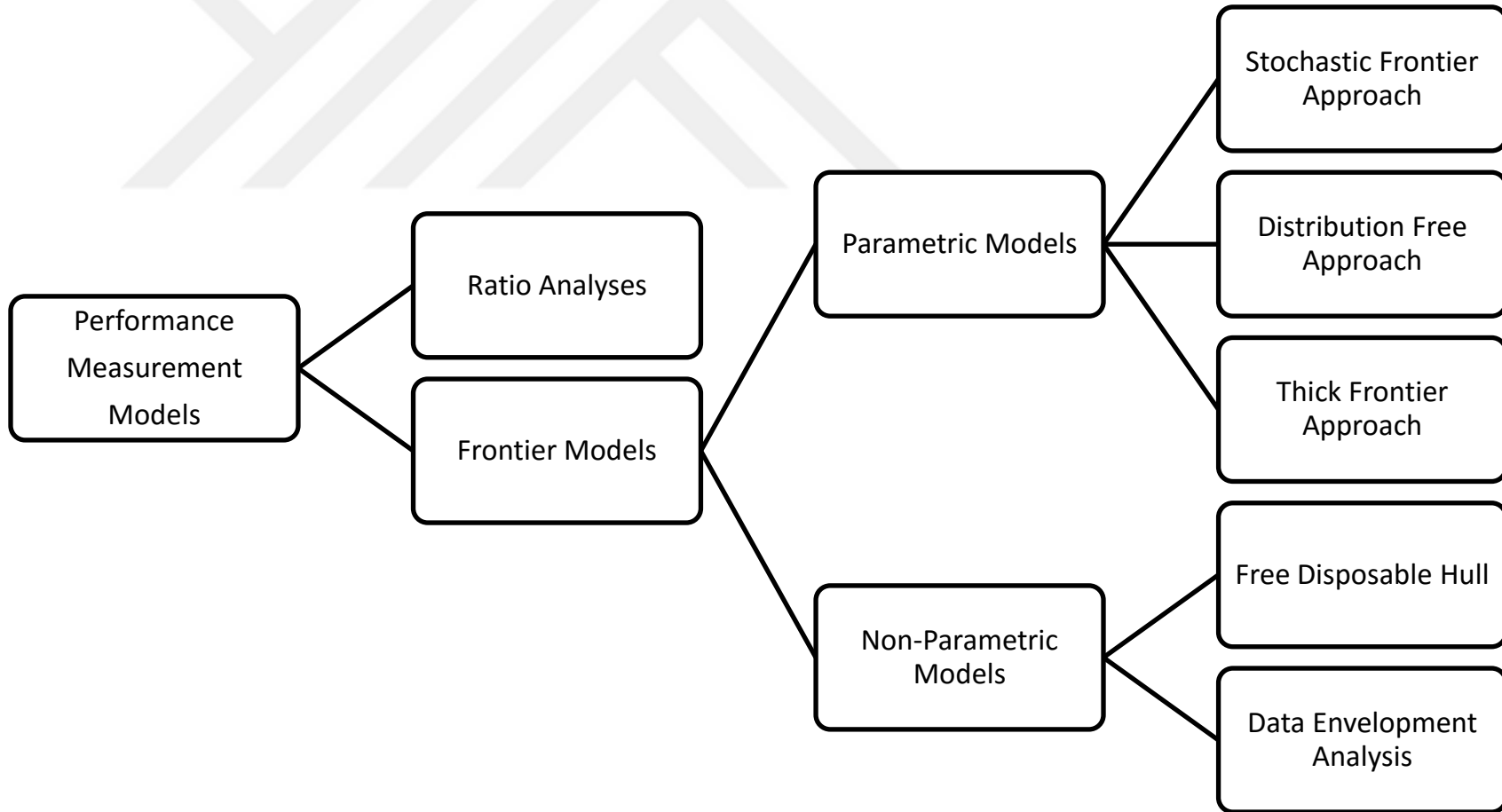
Sensitivity to Market Risk



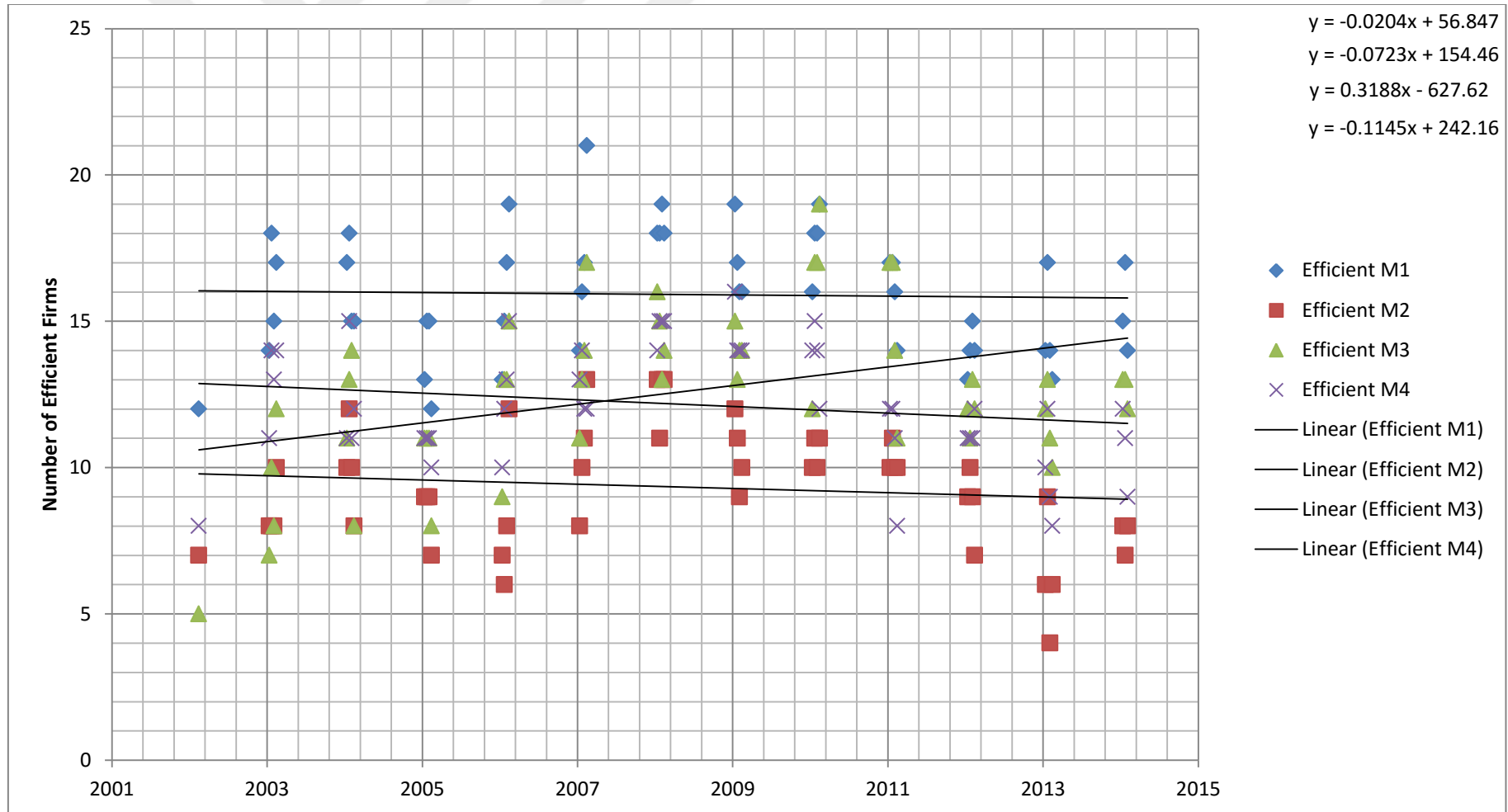
Composite Rating



7. APPENDIX G – PERFORMANCE MEASUREMENT MODELS



8. APPENDIX H – DEA SCENARIO GRAPH



9. APPENDIX I – CAMELS SYSTEM

Under the UFIRS, each financial institution is assigned a composite rating based on an evaluation and rating of six essential components of an institution's financial condition and operations. These component factors address the adequacy of capital, the quality of assets, the capability of management, the quality and level of earnings, the adequacy of liquidity, and the sensitivity to market risk.

Evaluations of the components take into consideration the institution's size and sophistication, the nature and complexity of its activities, and its risk profile. Composite and component ratings are assigned based on a 1 to 5 numerical scale. A 1 indicates the highest rating, strongest performance and risk management practices, and least degree of supervisory concern, while a 5 indicates the lowest rating, weakest performance, inadequate risk management practices and, therefore, the highest degree of supervisory concern.

The composite rating generally bears a close relationship to the component ratings assigned. However, the composite rating is not derived by computing an arithmetic average of the component ratings. Each component rating is based on a qualitative analysis of the factors comprising that component and its interrelationship with the other components. When assigning a composite rating, some components may be given more weight than others depending on the situation at the institution. In general, assignment of a composite rating may incorporate any factor that bears significantly on the overall condition and soundness of the financial institution. Assigned composite and component ratings are disclosed to the institution's board of directors and senior management. The ability of management to respond to changing circumstances and to address the risks that may arise from changing business conditions, or the initiation of new activities or products, is an important factor in evaluating a financial institution's overall risk profile and the level of supervisory attention warranted. For this reason, the management component is given special consideration when assigning a composite rating. The ability of management to identify, measure, monitor, and control the risks of its operations is also taken into account when assigning each component rating. It is recognized, however, that appropriate management practices vary considerably among financial institutions, depending on their size, complexity, and risk profile. For less complex institutions engaged solely in traditional banking activities and whose directors and senior managers, in their respective roles, are actively involved in the oversight and management of day-to-day operations, relatively basic management systems and controls may be adequate. At more complex institutions, on the other hand, detailed and formal management systems and controls are needed to address their broader range of financial activities and to provide senior managers and directors, in their respective roles, with the information they need to monitor and direct day-to-day activities. All institutions are expected to properly manage their risks. For less complex institutions engaging in less sophisticated risk taking activities, detailed or highly formalized management systems and controls are not required to receive strong or satisfactory component or composite ratings. Foreign Branch and specialty examination findings and the ratings assigned to those areas are taken into consideration, as appropriate, when assigning component and composite ratings under UFIRS. The specialty examination areas include: Compliance, Community Reinvestment, Government Security Dealers, Information Systems, Municipal Security Dealers, Transfer Agent, and Trust. The

following two sections contain the composite rating definitions, and the descriptions and definitions for the six component ratings.

Composite Ratings

Composite ratings are based on a careful evaluation of an institution's managerial, operational, financial, and compliance performance. The six key components used to assess an institution's financial condition and operations are: capital adequacy, asset quality, management capability, earnings quantity and quality, the adequacy of liquidity, and sensitivity to market risk. The rating scale ranges from 1 to 5, with a rating of 1 indicating: the strongest performance and risk management practices relative to the institution's size, complexity, and risk profile; and the level of least supervisory concern. A 5 rating indicates: the most critically deficient level of performance; inadequate risk management practices relative to the institution's size, complexity, and risk profile; and the greatest supervisory concern. The composite ratings are defined as follows:

Composite 1

Financial institutions in this group are sound in every respect and generally have components rated 1 or 2. Any weaknesses are minor and can be handled in a routine manner by the board of directors and management. These financial institutions are the most capable of withstanding the vagaries of business conditions and are resistant to outside influences such as economic instability in their trade area. These financial institutions are in substantial compliance with laws and regulations. As a result, these financial institutions exhibit the strongest performance and risk management practices relative to the institution's size, complexity, and risk profile, and give no cause for supervisory concern.

Composite 2

Financial institutions in this group are fundamentally sound. For a financial institution to receive this rating, generally no component rating should be more severe than 3. Only moderate weaknesses are present and are well within the board of directors' and management's capabilities and willingness to correct. These financial institutions are stable and are capable of withstanding business fluctuations. These financial institutions are in substantial compliance with laws and regulations. Overall risk management practices are satisfactory relative to the institution's size, complexity, and risk profile. There are no material supervisory concerns and, as a result, the supervisory response is informal and limited.

Composite 3

Financial institutions in this group exhibit some degree of supervisory concern in one or more of the component areas. These financial institutions exhibit a combination of weaknesses that may range from moderate to severe; however, the magnitude of the deficiencies generally will not cause a component to be rated more severely than 4. Management may lack the ability or willingness to effectively address weaknesses within appropriate time frames. Financial institutions in this group generally are less capable of withstanding business fluctuations and are more vulnerable to outside influences than those institutions rated a composite 1 or 2. Additionally, these financial institutions may be in significant noncompliance with laws and regulations. Risk management practices may be

less than satisfactory relative to the institution's size, complexity, and risk profile. These financial institutions require more than normal supervision, which may include formal or informal enforcement actions. Failure appears unlikely, however, given the overall strength and financial capacity of these institutions.

Composite 4

Financial institutions in this group generally exhibit unsafe and unsound practices or conditions. There are serious financial or managerial deficiencies that result in unsatisfactory performance. The problems range from severe to critically deficient. The weaknesses and problems are not being satisfactorily addressed or resolved by the board of directors and management. Financial institutions in this group generally are not capable of withstanding business fluctuations. There may be significant noncompliance with laws and regulations. Risk management practices are generally unacceptable relative to the institution's size, complexity, and risk profile. Close supervisory attention is required, which means, in most cases, formal enforcement action is necessary to address the problems. Institutions in this group pose a risk to the deposit insurance fund. Failure is a distinct possibility if the problems and weaknesses are not satisfactorily addressed and resolved.

Composite 5

Financial institutions in this group exhibit extremely unsafe and unsound practices or conditions; exhibit a critically deficient performance; often contain inadequate risk management practices relative to the institution's size, complexity, and risk profile; and are of the greatest supervisory concern. The volume and severity of problems are beyond management's ability or willingness to control or correct. Immediate outside financial or other assistance is needed in order for the financial institution to be viable. Ongoing supervisory attention is necessary. Institutions in this group pose a significant risk to the deposit insurance fund and failure is highly probable.

Component Ratings

Each of the component rating descriptions is divided into three sections: an introductory paragraph; a list of the principal evaluation factors that relate to that component; and a brief description of each numerical rating for that component. Some of the evaluation factors are reiterated under one or more of the other components to reinforce the interrelationship between components. The listing of evaluation factors for each component rating is in no particular order of importance.

Capital Adequacy

A financial institution is expected to maintain capital commensurate with the nature and extent of risks to the institution and the ability of management to identify, measure, monitor, and control these risks. The effect of credit, market, and other risks on the institution's financial condition should be considered when evaluating the adequacy of capital. The types and quantity of risk inherent in an institution's activities will determine the extent to which it may be necessary to maintain capital at levels above required regulatory minimums to properly reflect the potentially adverse consequences that these risks may have on the institution's capital.

The capital adequacy of an institution is rated based upon, but not limited to, an assessment of the following evaluation factors:

- The level and quality of capital and the overall financial condition of the institution.
- The ability of management to address emerging needs for additional capital.
- The nature, trend, and volume of problem assets, and the adequacy of allowances for loan and lease losses and other valuation reserves.
- Balance sheet composition, including the nature and amount of intangible assets, market risk, concentration risk, and risks associated with nontraditional activities.
- Risk exposure represented by offbalance sheet activities.
- The quality and strength of earnings, and the reasonableness of dividends.
- Prospects and plans for growth, as well as past experience in managing growth.
- Access to capital markets and other sources of capital, including support provided by a parent holding company.

Ratings

1. A rating of 1 indicates a strong capital level relative to the institution's risk profile.
2. A rating of 2 indicates a satisfactory capital level relative to the financial institution's risk profile.
3. A rating of 3 indicates a less than satisfactory level of capital that does not fully support the institution's risk profile. The rating indicates a need for improvement, even if the institution's capital level exceeds minimum regulatory and statutory requirements.
4. A rating of 4 indicates a deficient level of capital. In light of the institution's risk profile, viability of the institution may be threatened. Assistance from shareholders or other external sources of financial support may be required.
5. A rating of 5 indicates a critically deficient level of capital such that the institution's viability is threatened. Immediate assistance from shareholders or other external sources of financial support is required.

Asset Quality

The asset quality rating reflects the quantity of existing and potential credit risk associated with the loan and investment portfolios, other real estate owned, and other assets, as well as offbalance sheet transactions. The ability of management to identify, measure, monitor, and control credit risk is also reflected here. The evaluation of asset quality should consider the adequacy of the allowance for loan and lease losses and weigh the exposure to counterparty, issuer, or borrower default under actual or implied contractual agreements. All other risks that may affect the value or marketability of an institution's assets, including, but not limited to, operating, market, reputation, strategic, or compliance risks, should also be considered. The asset quality of a financial institution is rated based upon, but not limited to, an assessment of the following evaluation factors:

- The adequacy of underwriting standards, soundness of credit administration practices, and appropriateness of risk identification practices.
- The level, distribution, severity, and trend of problem, classified, nonaccrual, restructured, delinquent, and nonperforming assets for both on and off-balance sheet transactions.
- The adequacy of the allowance for loan and lease losses and other asset valuation reserves.

- The credit risk arising from or reduced by off-balance sheet transactions, such as unfunded commitments, credit derivatives, commercial and standby letters of credit, and lines of credit.
- The diversification and quality of the loan and investment portfolios.
- The extent of securities underwriting activities and exposure to counterparties in trading activities.
- The existence of asset concentrations.
- The adequacy of loan and investment policies, procedures, and practices.
- The ability of management to properly administer its assets, including the timely identification and collection of problem assets.
- The adequacy of internal controls and management information systems.
- The volume and nature of credit documentation exceptions.

Ratings

1. 1 A rating of 1 indicates strong asset quality and credit administration practices. Identified weaknesses are minor in nature and risk exposure is modest in relation to capital protection and management's abilities. Asset quality in such institutions is of minimal supervisory concern.
2. 2 A rating of 2 indicates satisfactory asset quality and credit administration practices. The level and severity of classifications and other weaknesses warrant a limited level of supervisory attention. Risk exposure is commensurate with capital protection and management's abilities.
3. 3 A rating of 3 is assigned when asset quality or credit administration practices are less than satisfactory. Trends may be stable or indicate deterioration in asset quality or an increase in risk exposure. The level and severity of classified assets, other weaknesses, and risks require an elevated level of supervisory concern. There is generally a need to improve credit administration and risk management practices.
4. 4 A rating of 4 is assigned to financial institutions with deficient asset quality or credit administration practices. The levels of risk and problem assets are significant, inadequately controlled, and subject the financial institution to potential losses that, if left unchecked, may threaten its viability.
5. 5 A rating of 5 represents critically deficient asset quality or credit administration practices that present an imminent threat to the institution's viability.

Management

The capability of the board of directors and management, in their respective roles, to identify, measure, monitor, and control the risks of an institution's activities and to ensure a financial institution's safe, sound, and efficient operation in compliance with applicable laws and regulations is reflected in this rating. Generally, directors need not be actively involved in day-to-day operations; however, they must provide clear guidance regarding acceptable risk exposure levels and ensure that appropriate policies, procedures, and practices have been established. Senior management is responsible for developing and implementing policies, procedures, and practices that translate the board's goals, objectives, and risk limits into prudent operating standards. Depending on the nature and scope of an institution's activities, management practices may need to address some or all of the following risks: credit, market, operating or transaction, reputation, strategic, compliance, legal, liquidity, and other risks. Sound management practices are demonstrated by: active oversight by the board of directors and management; competent personnel; adequate policies, processes, and controls taking into consideration the size and sophistication of the institution; maintenance of an appropriate audit program and internal

control environment; and effective risk monitoring and management information systems. This rating should reflect the board's and management's ability as it applies to all aspects of banking operations as well as other financial service activities in which the institution is involved. The capability and performance of management and the board of directors is rated based upon, but not limited to, an assessment of the following evaluation factors:

- The level and quality of oversight and support of all institution activities by the board of directors and management.
- The ability of the board of directors and management, in their respective roles, to plan for, and respond to, risks that may arise from changing business conditions or the initiation of new activities or products.
- The adequacy of, and conformance with, appropriate internal policies and controls addressing the operations and risks of significant activities.
- The accuracy, timeliness, and effectiveness of management information and risk monitoring systems appropriate for the institution's size, complexity, and risk profile.
- The adequacy of audits and internal controls to: promote effective operations and reliable financial and regulatory reporting; safeguard assets; and ensure compliance with laws, regulations, and internal policies.
- Compliance with laws and regulations.
- Responsiveness to recommendations from auditors and supervisory authorities.
- Management depth and succession.
- The extent that the board of directors and management is affected by, or susceptible to, dominant influence or concentration of authority.
- Reasonableness of compensation policies and avoidance of self-dealing.
- Demonstrated willingness to serve the legitimate banking needs of the community.
- The overall performance of the institution and its risk profile.

Ratings

1. A rating of 1 indicates strong performance by management and the board of directors and strong risk management practices relative to the institution's size, complexity, and risk profile. All significant risks are consistently and effectively identified, measured, monitored, and controlled. Management and the board have demonstrated the ability to promptly and successfully address existing and potential problems and risks.
2. A rating of 2 indicates satisfactory management and board performance and risk management practices relative to the institution's size, complexity, and risk profile. Minor weaknesses may exist, but are not material to the safety and soundness of the institution and are being addressed. In general, significant risks and problems are effectively identified, measured, monitored, and controlled.
3. A rating of 3 indicates management and board performance that need improvement or risk management practices that are less than satisfactory given the nature of the institution's activities. The capabilities of management or the board of directors may be insufficient for the type, size, or condition of the institution. Problems and significant risks may be inadequately identified, measured, monitored, or controlled.
4. A rating of 4 indicates deficient management and board performance or risk management practices that are inadequate considering the nature of an institution's activities. The level of problems and risk exposure is excessive. Problems and

significant risks are inadequately identified, measured, monitored, or controlled and require immediate action by the board and management to preserve the soundness of the institution. Replacing or strengthening management or the board may be necessary.

5. A rating of 5 indicates critically deficient management and board performance or risk management practices. Management and the board of directors have not demonstrated the ability to correct problems and implement appropriate risk management practices. Problems and significant risks are inadequately identified, measured, monitored, or controlled and now threaten the continued viability of the institution. Replacing or strengthening management or the board of directors is necessary.

Earnings

This rating reflects not only the quantity and trend of earnings, but also factors that may affect the sustainability or quality of earnings. The quantity as well as the quality of earnings can be affected by excessive or inadequately managed credit risk that may result in loan losses and require additions to the allowance for loan and lease losses, or by high levels of market risk that may unduly expose an institution's earnings to volatility in interest rates. The quality of earnings may also be diminished by undue reliance on extraordinary gains, nonrecurring events, or favorable tax effects. Future earnings may be adversely affected by an inability to forecast or control funding and operating expenses, improperly executed or ill-advised business strategies, or poorly managed or uncontrolled exposure to other risks. The rating of an institution's earnings is based upon, but not limited to, an assessment of the following evaluation factors:

- The level of earnings, including trends and stability.
- The ability to provide for adequate capital through retained earnings.
- The quality and sources of earnings.
- The level of expenses in relation to operations.
- The adequacy of the budgeting systems, forecasting processes, and management information systems in general.
- The adequacy of provisions to maintain the allowance for loan and lease losses and other valuation allowance accounts.
- The earnings exposure to market risk such as interest rate, foreign exchange, and price risks.

Ratings

1. A rating of 1 indicates earnings that are strong. Earnings are more than sufficient to support operations and maintain adequate capital and allowance levels after consideration is given to asset quality, growth, and other factors affecting the quality, quantity, and trend of earnings.
2. A rating of 2 indicates earnings that are satisfactory. Earnings are sufficient to support operations and maintain adequate capital and allowance levels after consideration is given to asset quality, growth, and other factors affecting the quality, quantity, and trend of earnings. Earnings that are relatively static, or even experiencing a slight decline, may receive a 2 rating provided the institution's level of earnings is adequate in view of the assessment factors listed above.
3. A rating of 3 indicates earnings that need to be improved. Earnings may not fully support operations and provide for the accretion of capital and allowance levels in relation to the institution's overall condition, growth, and other factors affecting the quality, quantity, and trend of earnings.

4. A rating of 4 indicates earnings that are deficient. Earnings are insufficient to support operations and maintain appropriate capital and allowance levels. Institutions so rated may be characterized by erratic fluctuations in net income or net interest margin, the development of significant negative trends, nominal or unsustainable earnings, intermittent losses, or a substantive drop in earnings from the previous years.
5. A rating of 5 indicates earnings that are critically deficient. A financial institution with earnings rated 5 is experiencing losses that represent a distinct threat to its viability through the erosion of capital.

Liquidity

In evaluating the adequacy of a financial institution's liquidity position, consideration should be given to the current level and prospective sources of liquidity compared to funding needs, as well as to the adequacy of funds management practices relative to the institution's size, complexity, and risk profile. In general, funds management practices should ensure that an institution is able to maintain a level of liquidity sufficient to meet its financial obligations in a timely manner and to fulfill the legitimate banking needs of its community. Practices should reflect the ability of the institution to manage unplanned changes in funding sources, as well as react to changes in market conditions that affect the ability to quickly liquidate assets with minimal loss. In addition, funds management practices should ensure that liquidity is not maintained at a high cost, or through undue reliance on funding sources that may not be available in times of financial stress or adverse changes in market conditions. Liquidity is rated based upon, but not limited to, an assessment of the following evaluation factors:

- The adequacy of liquidity sources compared to present and future needs and the ability of the institution to meet liquidity needs without adversely affecting its operations or condition.
- The availability of assets readily convertible to cash without undue loss.
- Access to money markets and other sources of funding.
- The level of diversification of funding sources, both on- and off balance sheet.
- The degree of reliance on short term, volatile sources of funds, including borrowings and brokered deposits, to fund longer term assets.
- The trend and stability of deposits.
- The ability to securitize and sell certain pools of assets.
- The capability of management to properly identify, measure, monitor, and control the institution's liquidity position, including the effectiveness of funds management strategies, liquidity policies, management information systems, and contingency funding plans.

Ratings

1. A rating of 1 indicates strong liquidity levels and well-developed funds management practices. The institution has reliable access to sufficient sources of funds on favorable terms to meet present and anticipated liquidity needs.
2. A rating of 2 indicates satisfactory liquidity levels and funds management practices. The institution has access to sufficient sources of funds on acceptable terms to meet present and anticipated liquidity needs. Modest weaknesses may be evident in funds management practices.
3. A rating of 3 indicates liquidity levels or funds management practices in need of improvement. Institutions rated 3 may lack ready access to funds on reasonable terms or may evidence significant weaknesses in funds management practices.

4. A rating of 4 indicates deficient liquidity levels or inadequate funds management practices. Institutions rated 4 may not have or be able to obtain a sufficient volume of funds on reasonable terms to meet liquidity needs.
5. A rating of 5 indicates liquidity levels or funds management practices so critically deficient that the continued viability of the institution is threatened. Institutions rated 5 require immediate external financial assistance to meet maturing obligations or other liquidity needs.

Sensitivity to Market Risk

The sensitivity to market risk component reflects the degree to which changes in interest rates, foreign exchange rates, commodity prices, or equity prices can adversely affect a financial institution's earnings or economic capital. When evaluating this component, consideration should be given to: management's ability to identify, measure, monitor, and control market risk; the institution's size; the nature and complexity of its activities; and the adequacy of its capital and earnings in relation to its level of market risk exposure. For many institutions, the primary source of market risk arises from nontrading positions and their sensitivity to changes in interest rates. In some larger institutions, foreign operations can be a significant source of market risk. For some institutions, trading activities are a major source of market risk. Market risk is rated based upon, but not limited to, an assessment of the following evaluation factors:

- The sensitivity of the financial institution's earnings or the economic value of its capital to adverse changes in interest rates, foreign exchange rates, commodity prices, or equity prices.
- The ability of management to identify, measure, monitor, and control exposure to market risk given the institution's size, complexity, and risk profile.
- The nature and complexity of interest rate risk exposure arising from nontrading positions.
- Where appropriate, the nature and complexity of market risk exposure arising from trading and foreign operations.

Ratings

1. A rating of 1 indicates that market risk sensitivity is well controlled and that there is minimal potential that the earnings performance or capital position will be adversely affected. Risk management practices are strong for the size, sophistication, and market risk accepted by the institution. The level of earnings and capital provide substantial support for the degree of market risk taken by the institution.
2. A rating of 2 indicates that market risk sensitivity is adequately controlled and that there is only moderate potential that the earnings performance or capital position will be adversely affected. Risk management practices are satisfactory for the size, sophistication, and market risk accepted by the institution. The level of earnings and capital provide adequate support for the degree of market risk taken by the institution.
3. A rating of 3 indicates that control of market risk sensitivity needs improvement or that there is significant potential that the earnings performance or capital position will be adversely affected. Risk management practices need to be improved given the size, sophistication, and level of market risk accepted by the institution. The level of earnings and capital may not adequately support the degree of market risk taken by the institution.

4. A rating of 4 indicates that control of market risk sensitivity is unacceptable or that there is high potential that the earnings performance or capital position will be adversely affected. Risk management practices are deficient for the size, sophistication, and level of market risk accepted by the institution. The level of earnings and capital provide inadequate support for the degree of market risk taken by the institution.
5. A rating of 5 indicates that control of market risk sensitivity is unacceptable or that the level of market risk taken by the institution is an imminent threat to its viability. Risk management practices are wholly inadequate for the size, sophistication, and level of market risk accepted by the institution.”
(Federal Financial Institutions Examination Council, 1996)(67025-67029)



10. APPENDIX J – TURKISH BANKING SECTOR

Year	Number of banks		State-owned banks	Privately-owned banks	Banks in the fund	Foreign banks	Development & Inv.
	Sector	Deposit banks					
2000	79	61	4	28	11	18	18
2001	61	46	3	22	6	15	15
2002	54	40	3	20	2	15	14
2003	50	36	3	18	2	13	14
2004	48	35	3	18	1	13	13
2005	47	34	3	17	1	13	13
2006	46	33	3	14	1	15	13
2007	46	33	3	11	1	18	13
2008	45	32	3	11	1	17	13
2009	45	32	3	11	1	17	13
2010	45	32	3	11	1	17	13
2011	44	31	3	11	1	16	13
2012	45	32	3	12	1	16	13
2013	45	32	3	11	1	17	13
2014	47	34	3	11	1	19	13

(1000 TL)	Total assets								
	Sector	Deposit banks	State-owned banks	Privately-owned banks	Banks in the fund	Foreign banks	Development & Inv.		
2000	104088037.00	99451277.00	35706807.00	49401705.00	8697949.00	5644816.00	4636760.00		
2001	166392917.00	158589601.00	53831379.00	93673349.00	6031375.00	5053498.00	7803316.00		
2002*	212675488.00	203237339.00	67831493.00	119471361.00	9310137.00	6624348.00	9438149.00		
2003*	249749773.00	239485102.00	83134383.00	142270851.00	7136470.00	6943398.00	10264671.00		
2004*	306451565.00	295124640.00	106902774.00	175936582.00	1938400.00	10346884.00	11326925.00		
2005	396970059.00	384103452.00	124485923.00	237043151.00	1858478.00	20715900.00	12866607.00		
2006	484857262.00	469516373.00	143362423.00	265614996.00	1215345.00	59323609.00	15340889.00		
2007	561171879.00	542293125.00	163585241.00	293529719.00	842749.00	84335416.00	18878754.00		
2008	705870774.00	682936916.00	207701884.00	369603091.00	834387.00	104797554.00	22933858.00		
2009	798532678.00	771511791.00	249976260.00	413241040.00	806819.00	107487672.00	27020887.00		
2010	961875772.00	930947266.00	298063780.00	496520351.00	790748.00	135572387.00	30928506.00		
2011	1160711796.00	1119118825.00	340989268.00	619118960.00	822725.00	158187872.00	41592971.00		
2012	1298142527.00	1245416298.00	375729656.00	694564518.00	806178.00	174315946.00	52726229.00		
2013	1635370077.00	1565257906.00	482969504.00	831319965.00	815150.00	250153287.00	70112171.00		
2014	1888308478.00	1803779798.00	561241056.00	950147462.00	2059273.00	290332007.00	84528680.00		

* The figures of each period between 2002-2004 are corrected according to purchasing power parity of the currency of that period.

(1000 TL)	Shareholders' Equity**							Development & Inv.
	Sector	Deposit banks	State-owned banks	Privately-owned banks	Banks in the fund	Foreign banks		
2000	7200744.00	6070608.00	1093341.00	6786050.00	-2352859.00	544076.00	1130136.00	
2001	11934910.00	10356586.00	4548981.00	5244410.00	-446569.00	1009764.00	1578324.00	
2002*	25698378.00	22702831.00	6747145.00	15193748.00	-625899.00	1387837.00	2995547.00	
2003*	35537885.00	31349780.00	9573955.00	20958180.00	-848010.00	1665655.00	4188105.00	
2004*	45962658.00	40822704.00	10067906.00	27399353.00	1272563.00	2082882.00	5139954.00	
2005	53736044.00	47482231.00	13253924.00	29396020.00	1532008.00	3300279.00	6253813.00	
2006	57977531.00	50409209.00	14846677.00	27586310.00	862152.00	7114070.00	7568322.00	
2007	73485931.00	64533482.00	16827458.00	35896051.00	665180.00	11144793.00	8952449.00	
2008	82695699.00	72060575.00	17321062.00	40900281.00	658878.00	13180354.00	10635124.00	
2009	106467441.00	93832584.00	23494615.00	53895307.00	632941.00	15809721.00	12634857.00	
2010	129086925.00	114978956.00	29461268.00	66498235.00	580440.00	18439013.00	14107969.00	
2011	138452253.00	123007322.00	31115654.00	72464345.00	617114.00	18810209.00	15444931.00	
2012	174563417.00	157553013.00	41408599.00	92325273.00	615613.00	23203528.00	17010404.00	
2013	184892217.00	165954392.00	45128773.00	94518781.00	615305.00	25691533.00	18937825.00	
2014	222331543.00	201116452.00	59847836.00	110505609.00	602567.00	30160440.00	21215091.00	

* The figures of each period between 2002-2004 are corrected according to purchasing power parity of the currency of that period.

** Included current year income and current year loss

(1000 TL)	Total loans							
	Sector	Deposit banks	State-owned banks	Privately-owned banks	Banks in the fund	Foreign banks	Development & Inv.	
2000	34205860.00	31048011.00	9221482.00	18636019.00	2224221.00	966289.00	3157849.00	
2001	40982498.00	35653624.00	8803646.00	24988695.00	505844.00	1355439.00	5328874.00	
2002*	56370271.00	50305355.00	9358944.00	36799716.00	1898403.00	2248292.00	6064916.00	
2003*	69990148.00	63383795.00	12731939.00	46962693.00	916900.00	2772263.00	6606353.00	
2004*	103241145.00	95976160.00	21537540.00	69622046.00	26554.00	4790020.00	7264985.00	
2005	153059052.00	145344421.00	31548884.00	103304662.00	17873.00	10473002.00	7714631.00	
2006	218063925.00	208174819.00	47060279.00	127700545.00	20013.00	33393982.00	9889106.00	
2007	280453091.00	269028874.00	63195215.00	153041168.00	17850.00	52774641.00	11424217.00	
2008	366900914.00	351928028.00	87174791.00	200005978.00	15788.00	64731471.00	14972886.00	
2009	381012568.00	364539631.00	103755293.00	196505908.00	11761.00	64266669.00	16472937.00	
2010	508862117.00	489916185.00	146600959.00	261887192.00	2870.00	81425164.00	18945932.00	
2011	664289489.00	636718484.00	184955611.00	358518556.00	1986.00	93242331.00	27571005.00	
2012	768939362.00	733518487.00	205453356.00	417705302.00	1734.00	110358095.00	35420875.00	
2013	1015524202.00	963337696.00	282648480.00	525879932.00	1530.00	154807754.00	52186506.00	
2014	1209686009.00	1146202810.0	348265103.00	614062005.00	2873.00	183872829.00	63483199.00	

* The figures of each period between 2002-2004 are corrected according to purchasing power parity of the currency of that period.

** The content of "Loans" are changed after 2002. "Loans under follow-up (net)" is evaluated under the total loans account after 2002.

11. APPENDIX K – CURRENT REGULATIONS

A. Laws

Banking Law (Nr. 5411)

Law on Bank Cards and Credit Cards (Nr. 5464)

Financial Leasing, Factoring and Financing Companies Law (Nr. 6361)

Law on Payment and Security Settlement Systems, Payment Services and Electronic Money Institutions (Nr. 6493)

B. Main Regulations

B.1. Regulations on Establishment and Operation of Banks

Regulation on Operation of Banks Subject to Permissions, and Indirect Share Ownership

Regulation on the Merger, Acquisition, Division and Exchange of Shares of Banks

Regulation on the Voluntary Liquidation of Banks

B.2. Regulations on Corporate Governance

Regulation on Corporate Governance Principles of Banks

Regulation on Evaluation Process of Banks' Internal Systems and Internal Capital Adequacy

Regulation on the Procedures and Principles for Notices for Officers to Be Appointed for Top Management in Banks, Executing the Oath of Office and Declaration of Property and Keeping the Records of Resolutions

B.3. Regulations on Protective Provisions

Regulation on Own Funds of Banks

Regulation on Credit Transactions of Banks

Regulation on Measurement and Assessment of Capital Adequacy of Banks

Regulation on Capital Protection and Cyclical Capital Buffer

Regulations on Measurement and Evaluation of Liquidity Adequacy of Banks

Regulation on Banks' Liquidity Coverage Ratio Calculation

Regulation Concerning the Calculation and Implementation of the Standard Ratio of the Foreign

Currency Net General Position to Own Funds on A Consolidated and Non-Consolidated Basis by Banks

Regulation on Measurement and Evaluation of Interest Rate Risk in the Banking Book under the Standard Shock Method

Regulation on Determination of the Principles and Procedures by Banks Related to the Qualifications of the Loans and Other Receivables and on the Loan Loss Provisions

Regulation on the Grants to be Extended by Banks and Institutions Subject to Consolidated Supervision

Regulation on the Procedures and Principles for Trading of Precious Metal and the Disposal of Properties and Commodities that Have Been Acquired Due to Receivables by Banks

Regulations on Measurement and Evaluation of Leverage Levels of Banks

B.4. Regulations on Financial Reporting

Regulation on the Procedures and Principles for Accounting Practices and Retention of Documents by Banks

Regulation on Preparing and Publishing the Annual Report by Banks

Regulation on External Audit of Banks

B.5. Regulations on Non-Bank Financial Institutions

Regulation on Authorization and Operations of Appraisal Agencies for the Banks

Regulation on Authorization and Operations of the Institutions that will Perform External Audit of the Banks

Regulation on Authorization and Operations of Rating Agencies
Regulation on the Establishment and Operations of Financial Leasing, Factoring and Financing Companies
Regulation on the Accounting Practices and Financial Statements of Financial Leasing, Factoring and Financing Companies
Regulation on Procedures and Principles to be applied in Factoring Operation
Regulation on the Banks' Receiving Outsourcing Services and Authorization of those Outsourcing Institutions
Regulation on Financial Holding Companies
Regulation on Establishment and Operations of Asset Management Companies
Regulation on Payment Services, Electronic Money Issue, Payment Institutions and Electronic Money Institutions
B.6. Regulation on Deposits
Regulation on Acceptance and Withdrawal of Deposits and Participation Funds, and on Unclaimed Deposits, Participation Funds, Bailed Goods and Receivables
B.7. Regulation on Information Systems
Regulation on Supervision of Banks' Information Systems and Banking Processes that will be Executed by Independent Audit Firms
B.8. Regulation on Cards
Regulation on Bank Cards and Credit Cards

C. Communiqués

C.1. Communiqués on Capital Adequacy

Communiqué on Credit Risk Mitigation Techniques
Communiqué on Calculation of Amount Subject to Credit Risk by Internal-rating Based Approaches
Communiqué on Calculation of the Amount Subject to Operational Risk by Advanced Measurement Approach
Communiqué on Calculation of Risk Weighted Asset Amounts for Securitisation Exposures
Communiqué on Use and Assessment of Risk Models to Calculate Capital Requirements for Market Risk
Communiqué on Calculation of Capital Requirement for Market Risk Stemming from Options
Communiqué on Structural Position

C.2. Communiqués on Financial Reporting

Communiqué on Preparation of Consolidated Financial Statements of Banks
Communiqué on Financial Statements to be Announced to the Public by Banks, and Related Disclosures
Communiqué on Uniform Chart of Account and Explanation
Communiqué on Uniform Chart of Account and Explanation thereof for Participation Banks

C.3. Communiqués on Information Systems

Communiqué on Principles for Management of Banks' Information Systems
Communiqué on Principles for Management of Information Systems of Information Exchange, Clearing and Settlement Institutions and Audit of their Information Systems and Work Processes
Communiqué on Supervision of Bank's Information Systems and Banking Processes that will be Executed by Independent Audit Firms

C.4. Other Communiqués

Communiqué on Operation of Branches of Foreign Banks Established outside of Turkey
Communiqué on Administrative Fines Related to Regulatory Reporting Requirements

D. Best Practice Guideline

Guideline for Concentration Risk Management

Guideline for Liquidity Risk Management

Guideline for Country Risk Management

Guideline for Market Risk Management

Guideline for Operational Risk Management

Guideline for Counterparty Credit Risk Management

Guideline for Interest Rate Risk Management

Guideline for Stress Testing to be Used by Banks in Capital and Liquidity Planning

Guideline for Credit Management of Banks

Guideline for ICAAP Report

(BRSA / Institutional Communication and Foreign Relations Department, 2015) (p.20-24)



12. APPENDIX L – STRATEGIC PLANS

STRATEGIC PLAN			
YEARS	GOALS	TARGETS	
2006 - 2008	1. A safe, stable, efficient and competitive financial market	1.1 The safety and stability in financial markets to be strengthened, a healthier environment to be achieved	
		1.2 Developing the efficiency and competition in the financial markets	
	2. An effective and efficient supervisory system	2.1 For a well-organized and secure banking system, supervisory system to be strengthened through risk focused approach	
		2.2 Implementation of licensing and supervision results in a consistent and prudent manner for a well-organized and secure banking system.	
		2.3 Preparations regarding Capital Requirement Directive/Basel- II to be continued actively	
	3. Flexible regulatory framework	3.1 The regulations envisaged in the Banking Law to be prepared by taking opinions of related parties	
	4. Transparent, fair and encouraging practices regarding customer rights	4.1 The customers to be informed, their rights and benefits to be protected, protective practices to be developed	
		4.2 The Customers' denunciations and complaints to be resolved	
	5. A sufficient and effective corporate governance	5.1 The activities to be realized in a professional, open and efficient way	
		5.2 The activities regarding public illumination to be increased	
		5.3 High- qualified and productive personnel working efficiently to be employed and to be trained	
		5.4 The management of the physical and financial resources to be activated in order to increase the institutional capacity	
		5.5 Projects to improve the institutional skills to be prepared and to be implemented	
	2010 - 2012	1. Enhancing the Administrative Capacity	1.1. Developing human resources in accordance with the changing financial and economic environment.
			1.2. Improving corporate governance.
1.3. Enhancing the capacity for research and analysis.			
1.4. Improving physical resources.			
1.5. Increasing the cost efficiency in the Agency's activities.			
1.6. Developing the institutional culture.			
1.7. Strengthening the communication with public.			
1.8. Improving the financial and social means of the Agency.			
2. Establishing a Flexible, Effective and Comprehensive Regulatory Framework		2.1. Reviewing the regulations according to actual conditions, within the framework of the principle of good regulation.	
		2.2. Making all institutions, markets and instruments within the scope of the Agency's authority subject to regulation and supervision with a prudential approach.	
		2.3. Increasing the efficiency and effectiveness of supervision in the light of new approaches and instruments.	
		2.4. Increasing the efficiency of enforcement processes.	
3. Increasing the Confidence and Stability in Financial Markets		3.1. Monitoring the risks in household and corporate sectors and in asset markets.	

STRATEGIC PLAN		
YEARS	GOALS	TARGETS
2013 -2015		3.2. Monitoring financial markets more effectively.
		3.3. Monitoring policies concerning financial markets.
		3.4. Increasing the efficiency of systemic risk management.
	4. Developing Financial Sector	3.5. Increasing the collaboration with related domestic and foreign authorities.
		4.1. Increasing the competition power of financial system
		4.2. Evaluating efficiency in transaction and intermediation costs regularly.
		4.3. Increasingly maintaining the collaboration and dialogue between the related parties of financial sector.
		4.4. Supporting the common projects among the institutions within the scope of regulation
	5. Monitoring Consumer /Customer Rights	4.5. Increasing the capacity of financial sector.
		5.1. Giving weight to programs for increasing the consciousness of consumers/ customers.
		5.2. Regarding that the consumer / customers benefit from financial services in a fair way and that they receive equal treatment.
		5.3. Increasing the sensitivity in protecting the information concerning consumers / customers.
		5.4. Improving the solution process for consumer denunciations and complaints.
	1. Corporate Structure Will be Strengthened	5.5. Extensification of the professional principles.
		1.1. Administrative efficiency will be enhanced for reaching at corporate goals.
1.2. Human, financial and physical resources will be enhanced.		
1.3. Structures towards efficient and safe usage of information will be enhanced.		
1.4. Research and analysis capacity will be developed.		
1.5. Communication capacity will be enhanced.		
2. The Efficiency of Regulation, Supervision and Implementation Activities Will be Enhanced	1.6. Corporate culture will be improved.	
	2.1. Regulation infrastructure will be strengthened.	
	2.2. Supervision function will be strengthened in light of new approaches and instruments.	
3. Studies Will be Made Towards The Maintenance of Reliance and Stability in Financial Markets	2.3. Maintenance of efficiency and effectiveness of implementation function will be provided.	
	3.1. The capacity of analyzing the systemic fragilities will be increased.	
	3.2. Financial market policies of the institutions with which we are in cooperation will be followed-up.	
4. Implementations towards those getting benefit from financial products and services will be strengthened	3.3. The efficiency of crisis management will be enhanced.	
	4.1. Administrative capacity and regulatory frame towards protection of those getting benefit from financial products and services will be strengthened.	
	4.2. Studies will be made for enhancing the financial awareness level concerning the issues needed.	

STRATEGIC PLAN		
YEARS	GOALS	TARGETS
		4.3. Required studies will be made for enhancing the financial access concerning the issues under the Agency's duty and power field.

(Banking Regulation and Supervision Agency, 2006, 2010, 2013)(p.12; p.19-20)



13. APPENDIX M – CURRICULUM VITAE

PERSONAL INFORMATION

Gizay DAVER

10 July 1984

gizaydaver@gmail.com

EDUCATION

Institution	Degree	Year of Graduation
Yıldırım Beyazıt University Banking and Finance	PhD	2015
Ankara University Business Administration - Finance	MS	2011
Karadeniz Technical University Business Administration	BS	2007

ACADEMIC APPOINTMENTS

2012 - Lecturer, Giresun University

ACADEMIC STUDIES

Daver, G., Karacaer, M., & Ünlü, H. (2013a). Testing of BIST and TURKDEX: Random Walk and Market Efficiency. *International Journal of Economics and Finance Studies*, 5(2), 10–22. Retrieved from http://www.sobiad.org/ejournals/journal_ijeF/archieves/2013_2/Gizay-DAVER.pdf

Daver, G., Karacaer, M., & Ünlü, H. (2013b). Testing of ISE and TurkDEX: Random Walk and Market Efficiency. In *Istanbul International Conference on Business and Economics*. İstanbul. Retrieved from <http://www.icbeconference.net/>

CAPITAL MARKET BOARD OF TURKEY LICENSES

License Name	License Number
Capital Market Activities Level 3 License	206717
Capital Market Activities Advanced Level License	
Derivatives License	304080

14. APPENDIX N – TURKISH SUMMARY

Bu tez 2001'den 2015 yılına kadar Türk bankacılık sektöründe DuPont analizi, CAMELS analizi ve Veri Zarflama Analiziyle performans değişimlerini, farklı modellerin performansla ilgili sağladığı bilgileri, modeller arası performans sonuçlarının tutarlılığını, sektördeki bütün bankaların aynı performans ölçütleriyle değerlendirilmelerini, yabancı bankaların yerel bankalardan daha iyi olup olmadığını, 2001 krizi sonrasında uygulanan ekonomik programların kalıcı düzelme sağlayıp sektörü güçlendirdiğini sorgulamaktadır. Analizler temel olarak Türkiye Bankalar Birliği'nden elde edilen verilerle yapılmış, makroekonomik durumdaysa Türkiye Cumhuriyet Merkez Bankası verilerinden faydalanılmıştır. Bulgular, geleneksel oran analizi sonuçlarının CAMELS notlarıyla tutarlı olduğunu göstermektedir. Analiz dönemi içinde birimlerin performans farklılığı azalmıştır. Genel olarak 2000'li yılların başına göre sektörün daha sağlam bir yapıda olduğu gözlemlenmiş; ancak hala geliştirilebilecek alanların varlığı tespit edilmiştir. Özel durumlardaki bankalara özel uygulamaların gerektiği ve verilere uygulanan modele göre sonuçların farklılaşabileceği gözlemlenmiştir. Türkiye bankacılık sektöründe devlet bankalarının rakiplerine göre daha iyi durumda oldukları; ancak olabilecekleri en iyi halde bulunmadıkları gözlemlenmiştir. Yabancı bankalar varlık kalitesi ve piyasa riskine duyarlılık bileşenlerinde daha iyi performans sergilemekle beraber totalde yerli bankalardan iyi değildir. Buradan hareketle sektörün iyileştirilmesi için yabancı bankaların sistem dışına çıkarılması sonucu çıkarılmamalıdır. Özetin bundan sonraki bölümünde, Scopus sonuçlarına kadar Şenol ALTAN(2015)'in ders notlarından faydalanılmıştır.

Özel sektörde performansın tek ölçütü kar olgusudur. Fakat ilgili muhasebe düzenleri dönemi, uzun yatırımlar, amortismanlar, vergi ve açık borçlar için ihtiyaçlar gibi faktörlerin davranışlarına bağlı olduğu zaman karın hesaplanması oldukça karmaşıklaşır. Kar, dönemsel olarak finansal ve başka gelirlere de bağlıdır. Dolayısıyla yönetim, performansı daha geniş bir açıdan izlemek durumundadır. Karın çoğu zaman bir amaç olmadığı kamu sektöründeki performans değerlendirmede kullanılacak sonuç ölçümleri üzerinde derinlemesine inceleme yapmak gerekir. Performans değerlendirmesi yönetim aktivitelerinin temelini oluşturur. Hizmet sektöründe performans iyileştirmesi öncelikli olarak tanımlanmış olmakla birlikte, henüz organizasyonlarını değerlendirecek ve nasıl geliştireceklerini gösterecek teknikler, uygulayıcıların kullanımında değildir.

Performans ölçümleri için performans oranları ve regresyon analizleri gibi kullanılan çeşitli yöntemler vardır. Bu tür geleneksel yöntemlerle karşılaştırıldığında, performans analizi açısından Veri Zarflama Analizi (VZA) olarak bilinen teorik olarak oldukça güçlü olan bir analiz daha vardır.

Son yirmi yıl süresince ekonomide, mühendislikte ve işletmede yapılan disiplinlerarası araştırmaların sonuçları, performans verisini analiz etmenin ve görsel hale getirmenin yeni ve etkin yolu olarak Veri Zarflama Analizini tanımlamıştır. Bu analiz, üretim birimlerinin göreceli etkinliğini değerlendirmek ve ampirik üretim sınırları oluşturmak için kullanılan parametrik olmayan doğrusal programlama tekniklerini temsil etmektedir.

Veri Zarflama Analizi özellikle karmaşık işlemleri ele almada faydalı olmaktadır. Bu işlem birimleri, geleneksel olarak Karar Verme Birimleri (KVB) olarak adlandırılır ve çoklu çıktı üretmek için çoklu girdi kullanır.

PERFORMANS BOYUTLARI

Stratejik planlama ve stratejik karar alma sürecinde etkin kaynak kullanımı ve kullanılacak kaynakların zamanında temini performans ölçümleri ile olanak bulabilmektedir.

Etkinlik

Etkinlik kavramı verimlilikte yer almakta olup performansın boyutları arasında kabul edilmektedir. Farklı disiplinlerde anlamı farklılık göstermekle beraber literatür kullanımlarında etkililik, verimlilik, kalite, performans, karlılık kavramlarıyla aynı anlamda kabul edilebilmektedir. Etkinlik tanımı iktisadi anlamda verildiğinde, maksimum sonuçları en az masrafa katlanarak veya en az çaba harcayarak elde etme kapasitesi anlatılmaktadır.

Etkinliğin, önceden tanımlanmış bir faaliyet alanındaki karar birimlerinin üretim sonuçlarının göreceli karşılaştırması anlamına gelmesi bu birimlerin süreçte kullandıkları girdiler ve ürettikleri çıktıları incelemekle olur. Kamu kesimi firmaları etkinlik kavramını, kurumun faaliyet alanındaki işlerinde yani etkinlikte elde ettiği sonuçların niteliği manasında kullanmaktadır. Etkinlik kavramı için belirtilenler haricinde çeşitli tanımlamalar yapmak mümkündür, bunlar:

“Etkinlik işletme faaliyetlerinin başarısının bir göstergesidir.”

“Etkin olmaktan amaç mevcut teknoloji çerçevesinde çıktıları olası en az kaynakla (girdi) üretebilme yeterliliğidir.”

“Etkinliğin ölçümleri en basit açıklama ile işletmenin gerçekleştirmeyi amaçladıkları ile elde ettikleri arasında yapılan bir karşılaştırmadır.” şeklinde sıralanabilir. Etkinlik kavramı aşağıdaki denklemle ifade edilebilir.

$$\text{Etkinlik} = \frac{\text{Gerçekleşen Çıktı}}{\text{Beklenen Çıktı}}$$

Etkinlik Türleri

Farklı işletmelerin farklılaşan amaçları, etkinlik ölçümü için gösterge alınacak ölçütlerin de farklılaşmasını sağlamaktadır. Ekonomik ve teknik etkinlik ölçümleri için en yaygın uygulanan hesaplamalar şöyledir: Ekonomik Etkinlik = Gerçekleşen kar / Beklenen kar

Üretim Etkinliği = Gerçekleşen üretim / Beklenen (planlanan) üretim

Hangi hesaplama yöntemi kullanılırsa kullanılsın elde edilen sonuç eğer ‘1’den büyükse, olması beklenenden daha etkin bir örgüt performansı gözlenirken, ‘1’den küçükse beklenenden daha düşük performans gösteren bir örgüt varlığı anlaşılmalıdır.

İncelenen kurumun faaliyet sonucunun istendiği gibi gerçekleştirilmediğini etkinlik oranının ‘1’ değerinin altında kalması ifade etmektedir. Temelde istenilen durum etkinlik oranının ‘1’ değerine ulaştırılması konusudur.

Etkinlik ölçümünde kullanılan iki yöntemden söz etmek gerekir:

Etkinlik Ölçümleri

Teknik Etkinlik ve Etkinlik Sınırı

Girdilerin işlenerek çıktılara dönüştürülmesi sürecine üretim adı verilmektedir. Hali hazırdaki erişilebilen mevcut teknolojiyle, zamandan bağımsız bir incelemede, üretim adı verilen sürecin etkin olabilmesi için belirli bir girdi birleşimi kullanımıyla maksimum çıktı elde edilmesi veya belirli bir çıktı bileşiminin, kullanılacak minimum girdiyle elde

edilebilmesi gerekmektedir. Girdi bileşiminin en verimli kullanımıyla ulaşılabilecek en üst düzey çıktıyı üretme başarısı teknik etkinlik olarak adlandırılmaktadır.

İncelenen KVB'nin üretim sınırına olan uzaklığı o birimin teknik etkinlik derecesini belirler. Performans kötüleşirse teknik etkinlik de azalır dolayısıyla teknik etkinlik sıfıra yaklaşır.

Performansı artınca teknik etkinlik bire yaklaşır. Teknik etkinlik bu nedenlerle sıfır ile bir arasında bir ölçü olarak şekillenmektedir.

Ölçek Etkinlik

Ölçek etkinliği kavramı bir başka performans ölçüm kriteri olup en verimli ölçek büyüklüğüne yakınlık olarak tanımlanmaktadır.

Ölçeğe göre artan getiri durumundan sözedebilmek için üretim sürecindeki girdilerin arttırılma miktarından daha yüksek seviyede çıktı artışı gerçekleşmesi gerekmektedir. Eğer çıktılardaki artış seviyesi girdilerdeki artıştan daha az gerçekleşiyorsa ölçeğe göre azalan getiriden sözedilir. Her iki seviyedeki artış miktarı eşit ise böylesi bir durumda ölçeğe göre sabit getiriden söz edilir.

Etkililik (Effectiveness)

Firmanın tanımlanmış amaçlarına ulaşması için bir takım etkinlikler gerçekleştirilmesi gerekir. Gerçekleştirilen etkinliklerin firmayı amaçlarına ulaştırma derecesi etkililiktir. Literatür kullanımında etkililik ve etkinlik kavramlarının eş anlamlı kullanımları gözlenmektedir. Etkililik kavramı çıktılarla ilgilidir. Sonuçları minimum kaynakla elde etme başarısı etkinlikle tanımlanmakta olup, etkililikle ise amaçların başarıma dereceleri tanımlanmaktadır.

Planlanan çıktılara uzak ya da yakın olmayı etkililik kavramı göstermektedir. Aşağıdaki

şekilde gösterilebilir:

$$\text{Etkililik} = \frac{\text{Gerçekleşen Çıktı}}{\text{Planlanan Çıktı}}$$

Verim

Performansın boyutları arasında yer alan kavramlardan verim ve girdilerden yararlanma, üretim kaynaklarının üretim sürecinde nasıl kullanıldığını veya üretim kaynaklarından yararlanılma derecesini gösterir.

Verim ve verimlilik arasındaki ilişki doğrusaldır. Verim arttırıldıkça verimlilik artar. Verim ve verimliliğin inceledikleri ilişkilerde fark bulunmaktadır. Verim kavramı firmanın mevcut kaynak potansiyeliyle bu potansiyelin kullanılan bölümü üzerine odaklanır. Verimlilik kavramı kullanılan veya tüketilen kaynaklara karşılık elde edilen çıktılar ilişkisine odaklanır; yani kaynakların üretim gücünü değerlendirir. Verim kavramı girdilere odaklanmıştır, etkinlik kavramı ise çıktılara odaklanmıştır. Verim kavramı bu nedenle kaynak tüketimiyle ilgilidir. Araçlara yönelik olup; işletme amaç ve hedeflerine yönelmemiştir.

Etkinlik başarının temelidir, verimse bu başarıyı sağlamaştırıcı unsurdur. Bir firmanın önceliği sürdürülen her faaliyetin etkinliğini sağlamaktır. Öncelik, sürdürülen faaliyetler içinden, yüksek verimlilikte olsa dahi etkin olmayan faaliyetleri azaltmak veya ortadan kaldırmaktır. Özetle “doğru olan işleri doğru yapmak” tır.

$$\text{Verim} = \frac{\text{Tüketilmesi Beklenen Kaynaklar (Yararlı Girdi)}}{\text{Tüketilen Kaynaklar}} \times 100$$

Verimlilik (Productivity)

Verimlilik kavramı, çeşitli anlamlarda kullanılabilir. Verimlilik geniş anlamda; verilen çıktının minimum maliyetle üretilmesi olarak tanımlanır. Dar anlamda verimlilik; üretim odaklı bir kavramdır. Etkinlik ve etkililik bileşenlerinden oluşan verimlilik, randıman, yenilik, kalite gibi çeşitli performans boyutlarını da içermektedir. Ekonomik açıdan verimlilik, üretim süreci içinde, hazır girdilerle mümkün olan maksimum çıktının üretilmesini tanımlar. Mühendislik açısından verimlilik, istenilen çıktılarla gerçekleşen çıktının karşılaştırılması anlamına gelmektedir. Ayrıca, girdi faktörlerinin üretim sürecinde kullanımının iyi olup olmadığının da bir ölçüsü olarak tanımlanmaktadır.

Verimlilik, ürün üretimi için harcanan veya tüketilen kaynaklarla bu üretimi gerçekleştirerek elde edilen mal ve hizmet demetinin oransal ilişkisi olarak da

tanımlanabilmektedir. Verimlilik, performans ölçümü için statik bir durum tespiti aracı görünümünde olsa ve böyle kullanılsa da, özünde ekonomik bağlamda, tüm üretim sürecini kapsayan ve baştan sona kadar kaynak kullanımında akılcı bir yolun izlenmesi için dinamik bir ölçüttür.

Performans ölçütleri olan etkinlik ve verimlilik farkları anlaşılmadan kullanıldığında yanlış kullanımlar ortaya çıkabilmektedir. Çıktının girdiye oranlanması en basit formda verimliliği veya eş anlamlıları üretkenlik ve produktivite kavramlarını vermektedir.

$$\text{Verimlilik} = \frac{\text{Çıktı}}{\text{Girdi}}$$

Yukarıdaki denklemden, verimliliğin bir faaliyet veya üretim dönemi sonucunda elde edilen çıktıların bu dönemin üretimi için kullanılan girdilere oranının sonucu elde edilen bir katsayı olduğu söylenebilir.

Firma etkinliğine kara vermek için rakiplerin verimlilikleriyle kendi verimliliğin kıyaslanması gerekmektedir. Dolaylı yoldan bakıldığında etkinliğin ve etkililiğin, bireysel ve örgütsel performansta verimliliğin kapsamına girdiği anlatılmaktadır. Sonuçları minimum kaynakla elde etme başarısı etkinlikle tanımlanmakta olup, etkililikle ise amaçların başarıma dereceleri tanımlanmaktadır. Tanımlar dahilinde çıktıların girdilere oranlanmasından bahsedildiğinde verimlilik kavramı, çıktılarının minimum kaynakla elde edilme başarısından bahsedildiğindeyse etkinlik kavramı kullanılmalıdır.

Verimlilik Çeşitleri

Teknik (technical) verimlilik ve tahsis (allocative) verimliliği genel anlamda verimliliğin alt kollarıdır.

Teknik verimlilik: Önceden belirlenmiş girdilerden, mevcut koşullar altında maksimum çıktı düzeyi elde edilmesidir. Bir başka deyişle sabit bir çıktı düzeyinin, daha az girdi kullanılarak elde edilmesidir..

Tahsis verimlilik: Önceden tanımlanmış çıktıları elde edebilmek için, girdi maliyetlerini dikkate alarak optimal girdi faktörleri bileşiminin seçilme başarısıdır. Verimliliğin alt kollarının ilişkisi;

Genel Verimlilik = Teknik verimlilik X Tahsis verimlilik

şeklinde verilebilir.

Ekonomiklik

Ekonomiklik ölçüsü performans yönetim süreçlerinde her zaman önemlidir; çünkü kurumun özel sektör, devlet veya hayır kuruluşu niteliğinden bağımsız olarak performansın temel ölçütüdür. Ekonomiklik ölçütü kurum amacı değil aracıdır. Kamu hizmetlerinde verimli olmakla ekonomik olmak aynı anlamda kullanılmamalıdır.

PERFORMANS ÖLÇÜM MODELLERİ

Karar birimlerinin incelenmekte olan faaliyet döneminde gerçekleştirdiği etkinliklerin, üretim sürecinde kullandığı kaynaklarla elde ettikleri sonuçların, çeşitli verimlilik ölçüm yaklaşımlarıyla değerlendirilmesi örgütsel performansın iyileştirilmesine olanak sağlar.

Performansın çok boyutlu oluşu, performans ölçümünün etkinlik ve verimlilik gibi çeşitli ölçüm yöntemleriyle yapılmasını gerektirir. Performans ölçümü analizleri oran analizi, parametrelili yöntemler ve parametresiz yöntemler olarak genel anlamda üç ana başlıkta toplanabilir.

Etkinlik analizi için kullanılan ölçüm sistemleri; oran analizleri, parametrelili ve parametresiz yöntemlerdir.

Oran Analizi

Oran analizi, birden çok girdi ve çıktının söz konusu olduğu ve tüm girdi ve çıktıların ortak bir birime dönüştürülemediği durumlarda, etkinlik ölçme sürecine konu olan girdilerin ve çıktıların ayrı ayrı değerlendirilmesi gereken ve bu nedenle de çoğunlukla yorumlanması imkansız sonuçların ortaya çıkmasına sebep olan bir yöntem olup, esas olarak “tek bir çıktının tek bir girdiye oranı” olarak tanımlanabilir.

Yalnızca bir girdi ve bir çıktıyla sınırlı olan oran analiz yönteminin, halen yaygın bir yöntem olarak kullanılmasının nedeni, kolay uygulanabilmesinden ve gereksinim duyduğu bilginin çok az olmasındandır.

Oran analizi yaklaşımda kullanılan oranların herbiri, performans boyutlarından yalnızca birini göz önüne alıp diğer boyutları ihmal etmektedir. Örneğin; mali analizlerdeki likidite, mali yapı, karlılık gibi oranlar, incelenen dönemdeki olayların yorumunu sadece kullanılan orana konu olan bileşenler açısından yapabilir.

Oran analizinde ölçek olarak oran ölçeği kullanılır. Oran ölçeğinde başlangıç noktası sabit olmakla birlikte ölçek üzerindeki noktalar birbirinin katı olarak ifade edilebilirler. Bu nedenle bu ölçekle ölçülmüş verilere tüm matematiksel işlemler uygulanabilir. Ağırlık, uzunluk, miktar ve kişi sayısı gibi değişkenler oran ölçeğinde ifade edilebilirler.

Oran analizi, genel performans ölçümündeki birçok yetersizliklerine rağmen tek girdili ve tek çıktılı durumlar için sadeliği ve basitliği nedeniyle en uygun değerlendirme yöntemi olarak görülebilir.

Ancak oran analizindeki oranlama, göreceli de olsa en iyiye göre değildir. Sonuçlar, var olan değerlerin birbirlerine bölümüyle elde edilir, ki bu haliyle performans iyileştirilmesine yönelik bir teknik olamaz; ancak bir durum belirlemesi olabilir.

Etkinlik ölçümlemesinde kullanılan sınır fonksiyonlarının veya teknolojilerinin tahmini için faydalanılan teknikler arasında en önemli fark “parametrik” kavramından kaynaklanmaktadır. Bu kavram yöntemlerin parametrik programlama ve parametrik olmayan programlama sınıflandırılmasına neden olmaktadır.

Parametrelili Programlama

Parametrelili programlamada, etkinlik ölçümü gerçekleştirilecek olan endüstri dalına ilişkin üretim fonksiyonunun analitik bir yapıya sahip olduğu kabul edilir ve bu fonksiyonun parametrelerinin belirlenmesine çalışılır. Performansla ilgili yazında çok yaygın bir şekilde kullanılan “Cobb-Douglas” tipi üretim fonksiyonuna ilişkin parametrelerin belirlenmesi bu tür yöntemlere örnek olarak gösterilebilir. Parametrelili yöntemlerle performans ölçümünde, genel olarak regresyon teknikleri ile tahminlerde , üretim fonksiyonu çoğunlukla, tek bir çıktı birçok girdi ile ilişkilendirilerek tanımlanır. Ayrıca, birçok girdi ile birçok çıktının ilişkilendirildiği parametrelili yöntemlerin de geliştirilmiş olmasına karşın, konuyla ilgili yazında yaygın kullanım alanı bulamamıştır.

Regresyon analizi, parametrelilik etkinliđi ölçüm yöntemlerinden en yangın bilineni olup, aralarında neden sonuç ilişkisi olduđu bilinen, bağımlı ve bağımsız deđişkenler arasındaki ilişkinin nedensel yapısını belirlemeye yönelik bir yöntemdir.

Regresyon analizinde bağımsız deđişken ile bağımlı deđişken arasındaki nedensel ilişkinin, kuramsal olarak var olması ve deđişkenler arasındaki ilişkinin fonksiyonel yapısının bilinmesi gerekmektedir. Fonksiyonel yapıyı öğrenmek için de, deđişkenler arasındaki ilişkiyi gösteren nokta grafiklerinden yararlanır.

Regresyon analiziyle performans deđerlendirmesi regresyon doğrusuna göre yapılır. Regresyon doğrusunun üzerindeki KVB'ler göreceli olarak verimli, altında kalan KVB'lerse verimsiz olarak deđerlendirilir. Göreceli teknik verimlilik, regresyon çıktılarının artıklarıyla ifade edilmektedir. Pozitif artıklar KVB'lerin verimliliđini, negatif artıklar ise verimsiz KVB'leri tanımlamaktadır.

İkiden fazla deđişkenle deđerlendirme yapabilme bakımından oran analizine göre daha kapsamlı ve daha gerçekçi olan regresyon tekniđiyle ölçüm yapmanın da temelde üç tane sakıncası vardır. Birincisi, bir tek eşitlik denkleminde dayanan bir fonksiyonu kullanan birden çok bağımsız (girdi) deđişkenine karşın ancak bir bağımlı (çıkıtı) deđişkeninin analizini yapabilmektedir. İkincisi, regresyon analizi en iyi performansa göre verimlilik analizi yerine ortalama performansa göre göreceli performansı ölçmektedir. Bu ise, en iyi karar birimlerine göre iyileştirmeye olanak tanımaz ve hatta onları bile ortalamaya çekme gibi bir sonuca götürür. Bu da performans iyileştirme deđil, en iyi performansı ortalama performans olarak kabul etmek anlamına gelir. Hiç şüphesiz bunun da akılcı ve yeterli bir yöntem olduđu söylenemez. Üçüncüsü ise, regresyon analizi, bir eşitlikte bulunan çıktılarıyla girdilerin nasıl ilişkilendirildiđine ilişkin parametrik bir üretim fonksiyonunun tanımlanmasını gerektirmekte ve verimsiz birimleri tanımlayamamaktadır. Özellikle yapısal üretim fonksiyonunun tanımlanmasının güç olduđu örgütlerde regresyon analizi performans ölçümünde oldukça yetersiz kalmaktadır.

Parametresiz Yöntemler

Parametrelilik yöntemlere alternatif olan parametresiz yöntemler, genelde matematiksel programlamayı çözüm tekniđi olarak benimsemiştir. Bu yöntemler, üretim fonksiyonunun yapısıyla ilgili olarak herhangi bir analitik formun bulunduđunu varsaymaz. Bu nedenle de

parametrelili yöntemden daha esneklerdir. Ayrıca yapıları çoklu girdili ve çoklu çıktılı üretim ortamlarında performans ölçümüne elverişlidir.

Parametresiz etkinlik ölçüm yöntemlerinin büyük çoğunluğu girdi ve çıktı ölçüm birimlerinden bağımsızdır. Bu özellikleriyle, ölçümü yapılan örgüt ya da işletmelerin farklı boyutlarının aynı anda ölçülebilmesine imkan tanımaktadırlar. Kullanılan ölçütler her bir KVB için göreceli etkinliği hesaplarken amaç fonksiyonlarının herbirini en iyiler ve KVB'lerin herbiri için optimal amaç kümesini belirlerler.

Parametrik programlama önceleri Farrell(1957) tarafından geliştirilen, daha sonra Charnes, Cooper ve Rhodes(1978) tarafından geliştirilen, veri zarflama analizine verilen bir isimdir.

Veri zarflama analizi, bir sınır teknolojisi oluşturmak için kullanılan, deterministik bir doğrusal programlamadır. Veri zarflama analizinin parametrik olmaması, tahmin etmeye çalıştığı üretim teknolojisinin, belirli bir forma sahip ve sonlu sayıdaki parametrelere bağlı olan herhangi bir fonksiyonel gruba örneğin Cobb-Douglas üretim fonksiyonuna dahil olmasıyla ilgili bir varsayım taşımamasından kaynaklanmaktadır. Bir diğer önemli nokta ise, veri zarflama analizinin etkinlik hata terimleri ile ilgili herhangi bir açık olasılık dağılımı yapmamasıdır.

VZA, homojen KVB'lerin göreceli etkinliğini ölçmeye yarayan çok faktörlü verimlilik ölçüm modelidir. Tek girdi ve tek çıktı yerine çoklu girdi ve çoklu çıktı boyutu olan bir etkinlik skoru denklemde verilmiştir:

$$\text{Etkinlik} = \frac{\text{Ağırlıklandırılmış Çıktı}}{\text{Ağırlıklandırılmış Girdi}}$$

VZA her bir KVB'nin göreceli etkinliğini, gözlemlenen girdi ve çıktılarından faydalanarak, ağırlıklı çıktıları ağırlıklı girdilere oranlayarak hesaplar. Her KVB'nin her bir girdi ve çıktısı için, simpleks metodun tekrarlanması olarak ifade edilen optimizasyon prensibine göre ağırlıklar seçilir.

VZA parametresiz etkinlik ölçütü olarak sınıflandırılır. Verimlilik analizindeki sınırlamaları ortadan kaldırma amacıyla öncelikle kar amacı gütmeyen birimlerin etkinliklerinin karşılaştırılması için geliştirilmiş bu yöntem, zaman içerisinde kar amacı güden sektörlerde geniş bir biçimde kullanılmaya başlanmıştır.

Veri Zarflama Analizi, karar verme birimlerinin teknik etkinliğini hesaplayacak parametresiz bir yöntemdir.

Performans konusuyla ilgili bu temel arka plandan sonra literatürde performans konusunun nasıl yer bulduğuna bakmakta fayda vardır.

7 Kasım 2015 itibariyle 1922 den 2016 yılına kadar Scopus üzerinde yapılan performans konusu arama sonuçlarına göre; işletme yönetimi, muhasebe, ekonomi, ekonometri ve finans alanında yapılan çalışma alanlarının göreceli olarak yeni alanlar olduğunu göstermektedir. Bölgesel olarak baktığımızda ise bu alanlarda en çok çalışmanın Amerika Birleşik Devletleri, Birleşik Krallık, Çin, Avustralya, Almanya, Kanada, Tayvan, Hindistan, İspanya ve İtalya'dan çıktığı ve bu ülkelerin Dünya Bankası'nın sınıflamasına göre sadece ikisinin orta gelirli sınıfına dahil edildiği gözlenmektedir. İlk ona giren ülkelerden sadece Çin, ilk onda yer almayan Türkiye ile aynı sınıfa dahil edilmektedir. Bu periyotta Türkiye'den çıkan yayınların Çin'den çıkan yayınların yaklaşık sekizde biri kadar olduğu gözlenmektedir.

Banka performansı ile konu sınırlandırıldığında 1973 yılı başlangıç olarak belirlenmekte olup milenyumdan sonra konunun popülerliğinin arttığı gözlenmektedir. Yapılan yayınların 80%'si makale türünde olup bunların çoğunluğunun Journal of Banking and Finance dergisinde yayınladığı tespit edilmiştir. Banka performansı konusundaki çalışmalarda Türkiye dokuzuncu sırada olup ilk üçte yer alan ülkeler Amerika Birleşik Devletleri, Birleşik Krallık ve Çin'dir. Banka performansı ve veri zarflama analizi konusunda yapılan çalışma sonuçları banka performansı ve CAMELS analizi konusunda yapılan çalışmalardan daha fazladır.

Performans ölçümü için endüstri genelini kapsayacak bir standart henüz oluşmuş değildir. Araştırmacıların konuya yönelik tutumlarını anlamak için literatürü incelemek fayda sağlayacaktır. Duygun Fethi ve Pasiouras(2010)'ca yapılan 196 yöneylem ve yapay zeka çalışması incelemelerinde en yaygın metodoloji olarak VZA kullanıldığı tespit edilmiştir. Bu çalışmaların da çoğunun teknik ve operasyonel etkinliğe yoğunlaştığı görülmektedir. Bu noktadan hareketle VZA üzerine yapılan çeşitli çalışmalar incelenmiştir. VZA'nın çeşitli girdi ve çıktı faktörlerinden faydalanıp, ölçüğe göre sabit getiri, ölçüğe göre değişken getiri veya her iki metodolojiyi birlikte kullanarak; askeriye, belediye hizmetleri,

makro ekonomi, gaz dağıtımı, hastaneler, turizm sektörü, mali tablolar, çevre, seçimler, eğitim, kredi riski değerlendirmeleri, fayda maliyet analizleri, iflas tahminleri, banka branşları, muhasebe ve denetim firmaları gibi çeşitli sektörlerin değişik uygulama alanlarında kullanıldığı gözlemlenmiştir. Literatür dahilinde incelenmiş olan bazı çalışmalar sadece oran analizleri kullanmanın yetersizliğinden söz etmektedir. Ancak bazı çalışmalar geleneksel oran analizlerini vazgeçilmez olarak değerlendirmekte ve bir şekilde çalışmaya dahil etmektedir. Bu dahil etme aşaması, regresyon modelinin bir parçası olarak kullanma, sadece oranlarla analiz etme, oranları destekleyici olarak kullanma gibi vuku bulmaktadır. Örneğin bir çalışma VZA'yı temel finansal oranlara uygulamak yoluyla finansal performans endeksi oluşturmuştur.

Performans başlığı altında yabancı bankaların diğerlerinden farklı olup olmadığı tartışılan bir konudur. Bazı çalışmalar yabancı bankaların iyi performans gösterdiğini, bazıları rakiplerine kıyasla daha kötü performans sergilediğini, bazıları banka performansları arasında yerel yabancı ilişkisi kurulmadığını, bazılarıysa yabancı bankaların rakiplerinden farklı bir performans sergilemediğini iddia etmektedir. Literatürdeki çalışmaların bazıları yabancı ve yerel banka performansı ile ilgili bulgularını uluslararası bankacılık teorileriyle ilişkilendirmektedir. Chen ve Liao(2010)'ya göre yabancı bankaların yerel bankalardan belirgin şekilde iyi performans gösterdiği ülkeler Avusturya, Mısır, İtalya, Panama, Singapur, Tunus, Cezayir, Endonezya, Kenya, Polonya, Slovenya ve Amerika'dır. Yerel bankaların yabancı bankalardan daha iyi performans gösterdiği ülkelerse Hırvatistan, Lüksemburg, HongKong ve Tayland'dır. Çalışmada Türkiye kullanılmamıştır. Bu çalışmanın amacı bulguları uluslararası bankacılık teorileriyle ilişkilendirmek değildir ancak Türk bankacılık sektöründe yabancı bankaların performansının nasıl olduğu ortaya konacaktır. Gelişmiş ve gelişmekte olan ülkelerdeki yerel ve yabancı bankaların karşılaştırmalı performansları ve zaman içerisinde performans değişiklikleri çalışmalarda araştırılan bir başka alandır.

Literatür araştırması sonuçlarına göre, çalışılan ülkenin sınıflandırmadaki yeri, analiz periyodu içerisindeki reformlar, politik ve tarihi arka plan, analiz periyodu, uygulanan metodoloji yapılacak çalışma sonuçlarını ve beklentileri belirgin şekilde etkilemektedir.

Bu çalışmada incelenen çalışma periyodu boyunca Türkiye’de analizi ve beklentileri etkileyecek çeşitli gelişmeler olmuştur. Kurumsal yönetim performansı incelemesi için değil, arkaplan bilgisi olması için bunlar verilmektedir.

4389 sayılı Bankacılık Kanunu 1999 yılında uygulamaya konmuştur. Cumhurbaşkanı bu dönemde Süleyman Demirel’dir. 2000, 2007 ve 2014 yıllarında Türkiye Cumhuriyeti cumhurbaşkanları değişmiştir, bu değişim Süleyman Demirel’den sonra sırasıyla, Ahmet Necdet Sezer, Abdullah Gül ve Recep Tayyip Erdoğan şeklinde gerçekleşmiştir. Türkiye Cumhuriyeti 2001 krizini Ahmet Necdet Sezer cumhurbaşkanlığında, 2008 krizini ise Abdullah Gül’ün cumhurbaşkanlığı zamanında atlattır. Tablo 2’de verilen 1995 yılından itibaren 2011 yılındaki seçimlerin sonuçlarına göre, Türkiye Büyük Millet Meclisi’ne giren milletvekilleri, bağımsız ve partili aday sayılarıyla ilgili özet bilgiler yer almaktadır. Tablo 3’de yasama yılı için TBMM başkanları ve görevde bulunduğu süreler verilmektedir. Tablo 4’te kurulan hükümet sayıları ve tarihleri, başbakan, maliye bakanı, ekonomi bakanı ve ekonomik koordinasyondan sorumlu bakan/bakan yardımcılar verilmektedir. BDDK organizasyon yapısında kilit rollere sahip olan çalışanlar Tablo 5’te verilmektedir. Türkiye Cumhuriyet Merkez Bankası başkanları ise Tablo 6’da verilmiştir. Türkiye ekonomisi ile ilgili temel göstergelerden GDP, TÜFE ve işgücüne katılım oranları Figür 1’de sunulmuştur. Tasarruf Mevduat Sigorta Fonu’na devredilen bankalar ve devir şekilleriyle ilgili bilgiler Tablo 7’de verilmiştir. Tablo 8, 9 ve 10’da BDDK’nın 2006-2008, 2010-2012 ve 2013-2015 stratejik planları ve bu planlara ulaşmak için uygulanacak hedef ve amaçları listelenmektedir.

2000, Enflasyonla Mücadele Programını takiben analiz dönemi içerisinde Güçlü Ekonomiye Geçiş Programı, AB ile uyum ve koordinasyon çalışmaları çerçevesinde çeşitli değişiklikler gerçekleştirilmiş ve/veya gerçekleştirilmeye çalışılmıştır. Bu çalışmalar Güçlü Ekonomiye Geçiş Programında belirtildiği haliyle, mali sektörün yeniden yapılandırılması, devlette şeffaflığın artırılması ve kamu finansmanının güçlendirilmesi, ekonomide rekabetin ve etkinliğin artırılması ve sosyal dayanışmanın güçlendirilmesi alanlarındadır. Tez dahilinde programın uygulamalarının Türk bankacılık sektöründeki düzeltici ve iyileştirici sonuçları incelenmeye çalışılacaktır.

DuPont Analizi

DuPont şemasına göre gerçekleştirilen oran analizi çalışması için ROE öncelikle ROA ve EM bileşenlerine ayrıştırılmış; ardından ROA, AU ve ER alt bileşenlerine ayrılmış ve incelenmiştir. Buna göre, $ROE = \frac{NI}{AverageTE}$ şeklinde veya

$$ROE = ROA \times EM = \frac{NI}{AverageTA} \times \frac{AverageTA}{AverageTE} \quad \text{şeklinde hesaplanmaktadır. Oran}$$

analizinde hesaplamalarda sadece ilgili oran bileşenlerine bağlı olarak yorum yapılabildiği için yorumlamayı detaylandırabilmek için alt kırılımlara inmek gerekmektedir. EM ya da özkaynak çarpanı veya genel adlandırmayla kaldıraç oranı, firmanın borç ve özkaynak bileşiminden oluştuğunu ve ne kadar borç ne kadar öz kaynak kullanıldığını ifade etmektedir. Bu doğrultuda firmanın riski ile ilgili bilgi de vermektedir.

$$NI = NII - Burden - PLL + SG - T \quad \text{olduğundan} \quad NI = (II - IE) - (OE - OI) - PLL + SG - T$$

şeklinde ayrıştırılabilmektedir. EBIT yerine NI kullanmanın altındaki neden firmanın borç verenlere yarattığı nakit akımı ile ilgilenilmemesinden kaynaklanmaktadır. Net faiz geliri NII, faiz geliri II ve faiz gideri IE ile ilişkilendirilerek hesaplanmakta, Burden ise faiz dışı gelirlerle faiz dışı giderler ilişkilendirilerek hesaplanmaktadır. Dolayısıyla NI, varlık ve yükümlülüklerle ilişkilendirilmektedir. Varlık ve yükümlülüklerin detaylarıyla ilgilenen bir

$$\text{analizci, firmanın portföy detaylarını} \quad NI = \sum_{i=1}^n y_i A_i - \sum_{j=1}^m c_j L_j - Burden - PLL + SG - T$$

denklemini yardımıyla inceleyebilmektedir. Portföyde birçok varlık veya yükümlülük olabilir bunlar sırasıyla “i” ve “j” ile ifade edilmektedir. y_i , gelir getirici varlıkların faiz öncesi getirisini ve c_j , yükümlülüklerin faiz giderlerini, A_i , varlıkların parasal değerini ve L_j , yükümlülüklerin parasal değerini ifade etmektedir.

$$ER = \frac{EXP}{AverageTA} = \frac{IE}{AverageTA} + \frac{OE}{AverageTA} + \frac{PLL}{AverageTA} \quad \text{şeklinde,}$$

$$\text{Tax Ratio} = \frac{\text{Applicable Income Taxes}}{AverageTA} \quad \text{ve}$$

$$AU = \frac{TR}{AverageTA} = \frac{II}{AverageTA} + \frac{OI}{AverageTA} + \frac{SG}{AverageTA} \quad \text{şeklinde}$$

hesaplanabilmektedir. Bu bileşenlere baktığımızda $ROA = AU - ER - Tax Ratio$ biçiminde hesaplanabildiğini görmekteyiz.

Yani, $ROA = \frac{NI}{AverageTA} = \frac{TR}{AverageTA} - \frac{EXP}{AverageTA} - \frac{Taxes}{AverageTA}$ bileşenleriyle de ifade edilebilmektedir.

Bütün periyodu kapsayan DuPont analizinde, trend doğrularına göre yapılan yorumlarda, sektörün ROE'si 20% ile başlayıp yıllık yaklaşık 1% düşüş sergilemiştir. Bu düşüş sektörün ROE'sinin zaman içinde azalma gösterdiğine işaret etmektedir. Mevduat bankaları sektör ile paralel düşüş sergilemekte olup, 21% ROE ile başlayıp yaklaşık 1% düşüş sergilemiştir. Yatırım ve kalkınma bankaları 13% ROE ile başlayıp sektörün biraz üzerinde ancak 1% civarında düşüş sergilemektedir.

Mevduat bankaları içerisinde en büyük ROE düşüşü 2% civarıyla devlet bankalarında, en küçük düşüş ise özel bankalarda gözlenmiştir. Yabancı bankalar 1% civarında düşerek sektörü takip etmektedir. Devlet bankaları analiz periyodu başında 35% civarında ROE'te sahip olduğundan en fazla düşüş bu birimde gözlenmiştir. Özel bankaların nisbi olarak ihtiyatlı görünen politikaları 16% civarında başlayan ROE'nin %0,5 civarında düşüşüne etmemdir.

Oranlar bireysel olarak incelendiğinde 2006 yılı ve 2009 yılında sıçramalar gözlenmektedir. Bu sıçramaların sebebi ROE'nin bileşenleri olan NI ve @TE'den kaynaklanmaktadır. Oran analizi çalışmalarında sadece bir orana bakarak nedenin detaylarını söyleyemeyiz. Alt kırılımları incelemek için DuPont analizini yapmaktayız. Bu çalışmada ROE hesabı için ROA ve EM çarpımı kullanılmaktadır.

Trend doğrularından ROA'lar incelendiğinde sektörün yaklaşık 2% ROA ile başlayıp düşüş yönünde ancak 0% civarında bir trendle hareket ettiği bu nedenle stabil bir görünüm çizdiği gözlenmektedir. En belirgin ROA düşüşü yatırım ve kalkınma bankalarında 0,5% civarında olup diğer gruplardaysa neredeyse yok denecek kadar küçük düşüş eğilimi gözlenmektedir. Yatırım ve kalkınma bankalarında düşüşün gözlemlenebilmesinin nedeni başlangıç ROA değerinin yaklaşık 6% ile en yakın birimin iki katı civarında olmasıdır. Yatırım ve kalkınma bankaları, Türkiye bankacılık sektörünün toplam varlıklarının

yaklaşık otuzda birine sahiptir. Sahip olduğu varlıklar nedeniyle göreceli olarak küçük bir oynaklık büyük ROA değişikliğine neden olmaktadır.

EM'deki trende göre zaman içinde, EM'nin bileşenleri @TA ve @TE'de artış gözlenmektedir. Devlet bankalarının EM'si hariç @TA/@TE oransal olarak diğer birimler için artış göstermiştir. Devlet bankalarının EM'sindeyse düşüş gözlenmektedir.

ROA hesabı için kullanılan alt kırılımlardan biri olan AU'nun bileşenleri Total Revenue ve @TA'dır. Zaman içinde her iki bileşende de artış gözlenmiş ancak Total Revenue/@TA oransal olarak düşüş sergilemiştir. Bu bulgulara göre başlangıç dönemine göre varlıklardan daha düşük oranda gelir yaratıldığını söyleyebiliriz.

ROA'nın bir diğer kırılımı olan ER, Total Expense/@TA bileşenlerinin oranlanmasıyla hesaplanmaktadır. Analiz periyodu boyunca oransal olarak düşüş gözlemlenmiştir. Yüksek oran harcamaların kontrolünde zor durumu gösterdiğinden, zaman içerisinde harcamaların yönetiminde daha etkin olduğu önermesi yapılır.

CAMELS analizi bankacılık sektöründe kullanılan çeşitli performans gözetim sistemlerinden biridir. Türkiye'de Bankacılık Denetleme ve Düzenleme Kurumu tarafından yürütülen bankacılık sektörü gözetim faaliyetleri kapsamında, uluslararası sistemlerle uyumlu bir denetim ve gözetim sistematiğidir. CAMELS aslında Tekdüzen Finansal Kurumlar Dereceleme Sisteminin bilinen adıdır. CAMELS analizi sonucunda elde edilen bileşik reyting notları 1, 2, 3, 4, 5 olabilmekte olup; 1 en iyi skor 5 ise en kötü skor olmak üzere reyting notları arasında kademeli bir geçiş vardır. Bileşik not olarak alınan 1 skoru bankanın çok güçlü olduğunu, 2 skoru bankanın genel görünümünün güçlü olduğunu, 3 skoru bazı sorunların olduğunu ve bu sorunların bankayı etkilediğini, 4 skoru bankanın ciddi sorunları olduğunu ve performansının kötü olduğunu, 5 skoru ise çok ciddi sorunlar olduğunu ve bankanın batma riski içerdiğini ifade etmektedir. CAMELS özünde, tek tek kendisini oluşturan bileşenlerinin akrostişidir. CAMEL olarak başlayan sistematik zaman içindeki ihtiyaç gereği CAMELS'e dönüşmüştür. Bu dönüşüm 1996 yılında gerçekleşmiştir. C(capital adequacy) sermaye yeterliliğini, A(asset quality) varlık kalitesini, M(management) yönetimi, E(earnings) kazançları, L(liquidity) likiditeyi, S(sensitivity to market risk) ise piyasa risklerine duyarlılığı temsil etmektedir. Bileşik not verilirken, bileşenlerin altlarında yer alan oranlar kullanılır, hangi oranın hangi bileşen

altında sınıflandırılması gerektiği tespit edilmelidir. Aynı oran etki mekanizmasına göre birden çok bileşen altında sınıflandırılabilirken bu çalışmada böyle bir uygulamaya gidilmemiştir. Türkiye Bankalar Birliği'nce yayımlanan, istatistiki raporlar, seçilmiş rasyolarından 2014 – 2001 yılları için kamuya açık datalar kullanılarak analiz gerçekleştirilmiştir. 59 banka birimi için 66 oran her bir oran tek bir bileşen altında sınıflandırılacak şekilde sınıflandırılmıştır. Analiz dahilinde kullanılacak oranları azaltma ve veri tanıma maksadıyla korelasyon analizleri yapılmıştır. Analiz sonucunda herhangi bir veri azaltımı yapılmamıştır. 14 oran sermaye yeterliği başlığı altında, 9 oran varlık kalitesi başlığı altında, 11 oran yönetim başlığı altında, 11 oran kazançlar başlığı altında, 6 oran likidite başlığı altında ve 15 oran piyasa riskine duyarlılık başlığı altında sınıflandırılmıştır. Bileşen ağırlıklandırmaları konusu ve her bir bileşenin altında yer alan oranların ağırlıklandırılması konusu için eşit ağırlıklı yöntem benimsenmiştir. CAMELS analizinin nitel ve nicel içeriği gözönünde bulundurulması sonucu sadece halka açık veriler üzerinden farklı bir ağırlandırma sistematigi uygulamanın objektifliği etkileyeceği düşünülmektedir. CAMELS reyting notları hesaplanması için performans skorları hesaplanmıştır. Her bir oranda her yıl için endeks değeri 10% trimmean kullanılarak hesaplanmıştır. Bu sayede uç değerlerin etkisinin azaltıldığı düşünülmektedir. Herbir değişkenin endeks değeri 100 kabul edilerek, her bir oranın altında bulunduğu bileşene olan etkisi incelenerek ilişkinin durumuna göre işleme tabi tutulmuş ve 100'e göre endekslenmiştir. Oran ve bileşen arasında pozitif ilişki varsa endeks değerden 100 çıkarılmıştır. Oran ve bileşen arasında negatif ilişki varsa 100'den endeks endeks değer çıkarılmıştır. Bu sistematik performans skorları elde edilmiştir. CAMELS reyting notlarına çevrim için Tablo 15 kullanılmıştır. Buna göre -30 ve daha düşük performans skorlarının CAMELS reyting sistemi karşılığı 5'tir. -30 hariç, -10 dahil olan performans skorlarının CAMELS reyting sistemi karşılığı 4'tür. -10 hariç, +10 dahil olan performans skorlarının CAMELS reyting sistemi karşılığı 3'tür. +10 hariç, +30 hariç olan performans skorlarının CAMELS reyting sistemi karşılığı 2'dir. +30 ve daha yüksek olan performans skorlarının CAMELS reyting sistemi karşılığı 1'dir. Bileşik CAMELS reyting notu her bir bileşenin ağırlıklı ortalamasıdır.

Analiz periyodu boyunca bileşik ortalamaya baktığımızda ortalama 2,92 oran gözlüyoruz.

Türk bankacılık sektörü, Devlet ve Özel Mevduat bankaları ortalamadan daha iyi performans sergilemektedir.

Yatırım ve kalkınma bankaları grubu ortalamadan daha iyi performans sergilemekte olup, alt kırılımlarında ise yalnızca devletin yatırım ve kalkınma bankalarının ortalamadan daha iyi performans sergilediği gözlenmektedir.

2008 Krizi öncesi ve sonrası olarak analiz periyodunu ayırdığımızda, 2008 krizi sonrası için ortalama bileşik averajın daha iyi hale geldiğini gözlemliyoruz.

Ortalamadaki iyileşmeye rağmen bankacılık sektörüne ait reyting notunun ortalamadan daha kötü performans sergilediği dikkat çekmektedir.

Yabancı Bankaların Asset Quality(varlık kalitesi) bileşeni karşılaştırılan birimlerden daha iyi durumdadır

Yabancı Bankaların Management(yönetim) bileşeni 2,52 olan ortalamadan ve diğer bütün birimlerden kötüdür.

Liquidity(likidite) bileşeni reytingi 2001 – 2008 periyodundan daha iyi durumdadır.

2008 krizi öncesi Management hariç bütün bileşik ve bileşen notları 2008 – 2014 periyodundan kötü durumdadır.

Yabancı Bankalar ister mevduat ister yatırım ve kalkınma olsun 2001 – 2008 periyodunda 2008 – 2014 periyoduna göre daha iyi durumdadır.

Ortalamalar üzerinden Bileşik CAMELS reytingi devlet mevduat bankalarında en iyi, Yabancı Bankalarda en kötü bulunmuştur. Tek tek bileşenlere bakacak olduğumuzda:

Capital Adequacy(sermaye yeterliliği)

Sermaye yeterliliği standart rasyosu BASEL e göre 8% olup incelenen birimler bunun üzerinde olmasına rağmen Yabancı Bankalarda reyting en kötü durumdadır.

Yatırım ve kalkınma bankaları, mevduat bankalarından ve bankacılık sistemden daha iyi durumdadır.

Mevduat bankaları içerisinde devlet bankaları en iyi konumdadır.

Asset Quality(varlık kalitesi)

Yabancı Bankalar en iyi nota sahiptir.

Sistem, yatırım ve kalkınma bankaları, mevduat bankaları 5 reyting notuyla son yıllarda en kötü performans kategorisindedir.

Management(yönetim)

Genel ortalamada Yabancı Bankalar en kötü durumdadır. Son yıllarda tüm analiz birimleri 1 reyting notunu almış durumdadır.

Earnings(kazançlar)

En iyi durumda olan devlet mevduat bankalarıdır. İnceleme süresini 2008 öncesi ve sonrası olarak ayırmak analiz yorumları için faydalıdır. Yabancı bankalar 2006 sonrası 4 reyting notu almıştır.

Liquidity(likidite)

Genelde Türkiye’de şubesi olan yabancı bankalar en iyi durumdadır. 2013 sonrası reyting notu 5 olup tüm birimlerde 2011 sonrası reyting notları 4 ve 5 düzeyindedir.

Sensitivity to market Risk(piyasa risklerine duyarlılık)

En kötü performans Yabancı Bankalardadır.

Yatırım ve kalkınma bankaları bu bileşeni mevduat bankalarından daha iyi yönetmektedir. Tüm birimler reyting notu olarak 3 ve 4 almıştır

Veri zarflama analizi dahilinde analiz periyodu boyunca faaliyet gösteren 29 mevduat bankası, 4 senaryoya göre analize tabi tutulmuştur. Türkiye Bankalar Birliği’nden sağlanan verilerden sadece personel sayısı yayınlanmış istatistiklerden temin edilmiş ve çalışan personel sayısını göstermektedir, diğer tüm veriler veri sorgulama sistemi üzerinden temin edilmiş ve 1000TL cinsinden ifade edilmektedir. Modellerin girdi tarafında işgücü, mevduat, duran varlıklar ve banka sermayesi faktörlerinden oluşan bir bileşim ve çıktı tarafında ise net donuk alacaklar, menkul kıymetler, bilanço dışı varlıklar ve krediler faktörlerinden oluşan bir bileşim kullanılmıştır. Donuk alacaklar BDDK’nın “Bankalarca Kredilerin ve Diğer Alacakların Niteliklerinin Belirlenmesi ve Bunlar İçin Ayrılacak Karşılıklara İlişkin Usul ve Esaslar Hakkında Yönetmelik” gereğince “Donuk Alacaklar” başlıklı Madde 5’te 4’üncü maddeye atıfta bulunularak bankaca verilmiş olan kredilerden

üçüncü, dördüncü ve beşinci gruplarda sınıflandırılan tüm alacaklar şeklinde sınıflandırılmaktadır. Aynı yönetmelik ayrılması gereken karşılıklarla ilgili düzenlemeleri de içermektedir. Alacağın sınıflandırıldığı gruba göre uygulanması gereken asgari özel karşılıklar üçüncü, dördüncü ve beşinci gruplar için sırasıyla 20%, 50% ve 100% olarak düzenlenmiştir. Diğer düzenlemelerle ters düşmemek ve yönetimin takdiri doğrultusunda asgari miktarın altında kalmamak üzere serbestçe karşılıklar belirlenmektedir. Donuk alacaklar istenmeyen çıktılardır ve bunlarla ilgili karşılıklarda yasal düzenlemeler gereği yapılmakta olup bankacılık faaliyetleri doğası gereği aslında olması istenmeyen çıktılardır. Senaryoların oluşturulması için yakın ilişkide bulunan faktörlerin çıkarılması yöntemi kullanılmış, bu amaçla faktörler korelasyon analizine tabi tutulmuştur. Oluşturulan senaryolarda, girdiler üzerinde kontrolün daha kolay ve uygun olacağı düşüncesiyle, çıktılarının hepsi kullanılmış olup girdiler farklı seçilmiştir. Birinci senaryoda işgücü, mevduat, duran varlıklar ve banka sermayesi faktörlerinden oluşan bütün girdiler model oluşturulmasında kullanılmıştır. İkinci senaryoda mevduat ve banka sermayesi çıkarılarak işgücü ve duran varlıklar faktörleri model oluşturmada kullanılmıştır. Üçüncü modelde işgücü ve banka sermayesi çıkarılarak, mevduat ve duran varlıklar faktörleri kullanılarak model oluşturulmuştur. Dördüncü senaryoda işgücü ve mevduat çıkarılarak duran varlıklar ve banka sermayesi faktörleri ile model oluşturulmuştur. Senaryolarda kullanılan modeller sırasıyla M1, M2, M3 ve M4 olarak adlandırılmıştır. Senaryolarda kullanılan faktörler gereği, ölçek değişmez modeller ve öteleme değişmez modeller dikkate alınmıştır. Ölçek değişmez modeller VZA açısından etkinlik ölçümünün girdi ve/veya çıktı biriminin değişiminden etkilenmediğini ifade etmektedir. Öteleme değişmez modeller ise optimal çözümün orijin değişiminden etkilenmediğini ifade etmek için kullanılmaktadır. BCC girdi yönelimli ve çıktı yönelimli VZA modelleri ölçek değişmez modeller olarak sınıflandırılmaktadır. Girdi yönelimli BCC modelleri girdi dönüştürümüne ve çıktı dönüştürümüne imkan sağlar. Ayrıca girdi yönelimli BCC modeli çıktılarına göre öteleme değişmez model olarak sınıflandırılmaktadır. Veri zarflama analizi dahilinde kullanılan girdi ve çıktı datasının reel pozitif olması esas olup, negatif veya sıfır olan datalara nasıl davranılması konusu uygun metodoloji ile datanın özelliğine göre incelenmektedir. Girdi tarafındaki sıfır dataya çıktı tarafındaki sıfır datadan farklı davranılması gerekmektedir. Negatif dataya ise nasıl yaklaşılacağı ile ilgili çeşitli yöntemler bulunmaktadır. Çalışmanın veri zarflama analizi için standart girdi yönelimli BCC modelin geliştirilmiş bir versiyonu

olan Per Andersen ve Neils Christian Petersen'in geliřtirmiş olduđu süper etkinlik modeli kullanılmıştır. Bu modelin seçilmesinin nedeni girdi yönelimli BCC modelin artıları yanısıra etkin birimlerin de kendi içlerinde sıralanmasına imkan sağlamasıdır. Per Andersen ve Neils Christian Petersen'in geliřtirmiş olduđu süper etkinlik modeli big(büyük) sonuçlar verebilmektedir. Bu sonucun anlamı etkinliğin girdilerin rastgele ve/veya çok büyükçe arttırıldığında bile gözlemin etkinliđinin korunduđunu ifade etmektedir.

M1'e göre etkin firma sayısı 2015 sonlarına kadar yavaşça azalmış ve sonra artış sergilemiştir. Etkin firma sayısı M2'ye göre 2004'ten 2006 ortalarına kadar görülen ufak dalgalanmalar haricinde stabil bir görünüm sergilemekte ve sonrasında artış gözlenmektedir. M3'e göre toplam etkin firma sayısı 2004 yılının üçüncü çeyređine kadar artış göstermekte olup bundan sonra hızlı bir düşüşü takip eden toparlanma sergilemektedir. Bütün modeller için varılabilecek genelleme etkin firma sayısının 2002'den 2006 sonuna kadar olan periyotta 2006 dan sonra etkin firma sayısının arttıđı yönündedir.

2008 yılı kriz öncesi, kriz ve kriz sonrası periyotta bazı istisnalar haricinde etkin firma sayısının her modelde stabil bir görünüm sergilediđi gözlemlenmektedir.

M1'e göre 2010 yılından sonra etkin olmayan firma sayısının 2012 ilk çeyređine kadar ikiye katlandıđı ve 2015 yılına dođru azaldıđı gözlenmektedir. M2'ye göre özellikle 2012 yılından sonra etkin olmayan firma sayısının artıđı ve etkin firma sayılarının 2010 ve 2011 yıllarında gözlenen sayıların yarısına düştüđü gözlenmektedir. M3'e göre 2011 yılının dördüncü çeyređinden sonra etkin ve etkin olmayan firma sayısının neredeyse aynı olduđu gözlenmektedir. M4 ile hazırlanan senaryo modeller arasında en kötü senaryoyu oluşturmakta olup 2011 yılının üçüncü çeyređinden sonra 2015 yılına kadar en fazla etkin olmayan firmayı göstermektedir. M1'e göre analiz periyodu boyunca ortalama etkinlik yaklaşık olarak 3,77; M2'ye göre 1,90; M3'e göre 3.22 ve M4'e göre 1.54 olarak gerçekleşmektedir. Analiz dönemi içinde etkinsizlik gözlenirse dahi analiz periyodu boyunca analize tabi tutulan birimlerin etkin olduđu sonucu çıkarılmaktadır.

Çalıřma sonucunda Türk bankacılık sisteminin 2001 krizi sonrası genel durum tespiti yapılmış ve detaylı incelemeler yapılacak alanlar belirlenmiştir.