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Opinions and Attitudes of Independent Auditors and  
Users of Audit Services Concerning Audit Quality

**Lerzan Kavut**

The 1994 Economic Crisis and Its Effects on  
Commercial Banks: An Empirical Investigation

**İhsan Işık**

# The ISE Review

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Phone: (0 212) 298 21 00 Fax: (0 212) 298 25 00  
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## CONTENTS

Opinions and Attitudes of Independent Auditors and Users of Audit Services Concerning Audit Quality Lerzan Kavut.....	1
The 1994 Economic Crisis and Its Effects On Commercial Banks: An Emprical Investigation İhsan Işık.....	31
<b>Global Capital Markets</b> .....	75
<b>ISE Market Indicators</b> .....	87
<b>ISE Book Review</b> .....	93
<b>ISE Publication List</b> .....	95

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# **OPINIONS AND ATTITUDES OF INDEPENDENT AUDITORS AND USERS OF AUDIT SERVICES CONCERNING AUDIT QUALITY**

Lerzan KAVUT\*

## **Summary**

The level of accuracy and reliability in financial statements, is important for various decision makers. Due to the difficulties in accessing reliable information, reliability levels should be verified and approved. Independent audit is the process of verifying the reliability of financial statements and reporting the results. Getting the expected benefit out of independent audits depends on the quality of audit services.

Opinions and attitudes of independent auditors and individuals who are the managers of audited companies, the attributes of audit quality, and differences of attitude are analyzed in this paper.

The survey covers managers of 313 publicly held companies operating in various sectors, whose operations have to be audited by independent auditors under the Capital Market Law No. 2499; as well as auditors employed at 56 audit companies under the framework of the same Law. Names of the audited enterprises were included in the list received from Istanbul Stock Exchange<sup>1</sup>.

Survey results show significant differences between the opinions and attitudes of the two groups with respect to audit quality. These differences are seen mostly in the auditors level of experience and information concerning the sector and audited companies; due professional care in all audit steps i.e. from client selection to the formation of auditor opinion; management and personnel policies of the audit firm; audit firms' technical facilities; litigation; quality of response to client expectations in areas other than the audit service; workforce planning; gathering evidence; acceptance and continuity of clients.

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\* Asst. Prof. Dr. Lerzan Kavut, Istanbul University, Faculty of Business Administration, Department of Accountancy.  
Tel: (0212) 590 14 27/320 Fax: (0212) 590 40 00 E-Mail: lerk@istanbul.edu.tr

<sup>1</sup> İstanbul Menkul Kıymetler Borsası, Halka Açık İşletmelerin Listesi, 2001, (<http://www.imkb.gov.tr/sirketet.htm>, 18.05.2001).

## **I. Introduction**

Information about the financial position and the results of operations of a business enterprise are reported through its financial statements. For the parties who are interested with the business, reliability and accuracy in financial statements which are used for various purposes, is important. To enable the stakeholders of the audited company, who relies on the data issued in the audit results, to be able to make sound decisions concerning the effective use of all resources at their disposal, it is essential that such data is reliable and accurate. For various reasons however, the availability of access to reliable information is gradually decreasing. Nowadays, it is almost impossible for data users to obtain accurate and reliable first hand information. On the other hand, it is highly probable that information obtained indirectly which is not first hand might include errors and irregularities conducted unintentionally and/or intentionally. Furthermore, important factors which constrain access to reliable and accurate information, are the differences in the intentions and objectives of providers and users of the data and the consequent conflict of interests. In addition, developments such as social and economic change, growth of enterprises, and increasing inter business trade relations bring along a numerical increment in financial data and complexity in the content of financial data, which further constrain access to reliable information (Cosserat, 2000).

One of the systems established in order to examine the impact of some of the above situations and occurrences on financial data, and to investigate the reliability level of financial statements, is independent audit. The Capital Markets Board in our country has enforced the obligation of independent audit on publicly held companies and corporations listed on the Istanbul Stock Exchange which are subject to Capital Market laws and regulations, with the aim of ensuring the effective and stable operation of the capital market; to protect the rights and benefits of investors; to preclude misleading and imperfect reporting, and to ensure that concerned parties particularly investors are able to access reliable financial information. Independent audit is “the process which involves evidence gathering and assessment performed by an independent auditor with the purposes of investigating and reporting compliance of data with designated criteria for an economic unit or period,” (Bozkurt, 1998). In the Communiqué Concerning Independent Auditing on the Capital Market (Sermaye Piyasası Kanunu No.2499, Bağımsız Denetim Hakkında Tebliğ, Seri: X, No: 16) issued by the Capital Market Board, independent auditing is defined as “activities of auditors concerning the conformity verification of

the financial statements of companies and/or capital market institutions in order to disclose them to the public or to make them available upon request by the Board, by means of employing generally accepted accounting concepts, techniques, principles and standards; alongside the verification and reporting of accurate information under every circumstance; all these activities being executed through the thorough examination of books, records and documents in accordance with auditing rules and principles”.

The indispensability of market economy enforces independent auditors the heavy responsibility of giving qualified service. An increase has been observed in the number of actions filed against independent auditors in the last decade (Frantz, 1999). The Audit Activities Panel (POB 2000, par. 3.27) has revealed that the audit profession was not able to adapt itself to the rapidly changing environment.

Expected social benefits to be provided by independent audits depend on the quality of the audit service. Compliance with the Generally Accepted Audit Standards which designates the minimum standards for quality of audit framework is imperative in order to ensure quality (Güredin, 1999). Appropriate quality control policies and procedures should be established and implemented for both audit firms and the auditing activity in order to ensure an independent audit service in accordance with audit standards, and to perform qualified audit work (Porter and et al., 1999; Kiger and Scheiner, 1997).

This paper covers a survey on the opinions and attitudes of auditors, and individuals who are managers of companies which receive independent audit services; on the attributes of audit quality, and the differences in the attitudes of these two groups. Section two of this paper includes some studies concerning audit quality; section three describes the purpose and scope of the survey; section four gives methodology of the survey; section five covers analysis of survey data and description of findings; and a general conclusion and comments based on the findings are given in the last section.

## **II. Background**

Parties who are concerned with independent auditing might be grouped under five categories (Sutton and Lampe, 1991):

- (1) **Those who prepare financial statements;** Top management, financial operations unit and internal auditing unit of the audited company.
- (2) **Those who are concerned with the audited company;** Parties exter-

nal to the company, who utilise audited financial statements. eg. current and future investors, government, credit institutions, etc.

- (3) **Auditors who implement independent audits;** The audit team and audit firm.
- (4) **Institutions concerned with the accounting and auditing profession;** e.g. the Accounting Standards Board; The Auditing Practices Board and The Union of Chambers of Certified Public Accountants of Turkey (TURMOB),
- (5) **Legal institutions which draw up regulations and implement procedures;** e.g. The Capital Market Board, courts, stock exchanges.

The common expectation of the above groups who are closely interested in the results of independent auditing, is to receive the quality of audit service. Literature mentions two criteria to measure the quality of audit services (Sutton and Lampe, 1991; Moizer, 1986):

- A) **Criteria concerning the quality of auditing process:** These criteria include professional standards and practices drawn up for both audit firms and auditors in order to ensure the reliability and quality of activities involved in the auditing process.
- B) **The criterion concerning audit results:** This criterion involves the degree of confidence which financial statements users have in auditors reports.

Factors affecting the quality of independent audits are multi dimensional. A review of studies brought up to date, reveals numerous surveys which have been carried out using several approaches to quality of independent audits. In these surveys, factors affecting the quality of independent audits have been identified both from the perspective of audit firms and auditors; and parties who benefit from the results of the audit service; after analyzing the significance of existing factors on the quality of independent audits.

Factors which affect audit quality might generally be grouped as follows: (1) attributes concerning the size of audit firms and number of auditors, (2) qualifications of the auditing team (3) proficiency competence levels and sectoral experience of auditors, (4) planning of the auditing activity, (5) gathering evidence, (6) audit fees, (7) litigation (8) effectiveness of the audit firm's quality control systems (9) sufficient investigation and assessment of the audited firm's internal auditing system (10) due professional care of auditors (Meier, Fuglister, 1992; Malone, Roberts, 1996).

According to survey results concerning the impact of audit firm's size

on audit quality, there is a direct relationship between firm size and quality; and large scale audit firms realise quality auditing because they have a wide range of potential clients, have no concern about losing their clients and wish to maintain their reputation (DeAngelo, 1981; Davidson and Neu, 1993; Becker et al., 1998). Compared to small scale firms, large scale audit firms employ more qualified and special methods and procedures for auditor performance training, which appears to be another important factor affecting the fulfilment of more quality of audit services by such companies (Reisch, 2000).

In surveys on the behavioural dimensions of audit quality, perceptions of both the auditors involved in the auditing process, and those of various groups which benefit from the audit results have been investigated. Schroeder in this survey et al. (1986), researched the perceptions of auditors and internal audit committee chairpersons of audited companies on the impact on audit quality using 15 factors which he developed, by means of examining related literature and audit practices. According to survey results, internal audit committee chairpersons of audited companies attached higher priority to factors pertaining to the qualifications of the audit team (effectiveness of the communication between the audit team and managers of the audited company; audit team planning; active participation of the partner, and senior manager at each phase of the auditing process; showing the required professional care; professional experience and ability of auditors which constitute the audit team; and frequent communication and exchange of information between internal auditors and the audit team) rather than factors pertaining to the audit firm (quality control procedures implemented by the audit firm; reputation of the audit firm; size of the audit firm; litigation; and assignment of the audit team in rotation among audited companies). Another significant survey in this respect was made by Carcello et al. (1992) where the perceptions of auditors, investors and preparers of financial statements were identified, and the differences of opinion among the groups were investigated (Kavut, 2001). According to the results of this survey, financial statements preparers, auditors and investors perceive the following as the common attributes which have an impact on audit quality:

- (1) Knowledge and experience of the audit team and audit firm in relation to the audited company,
- (2) Knowledge and experience of the audit team and audit firm in relation to the sector of the audited company,
- (3) Responding to the information requirements of the audited company

on various subjects besides the audit service,

- (4) Both the level of qualifications which the audit firm and auditors should have; and the level of compliance with general standards when performing their activities,
- (5) The requirement of auditors to adopt due professional care and skeptical attitude when performing their activities, and to work actively at every phase of the audit.

The most important attribute affecting audit quality was expressed as “the level of responding to various requirements other than the independent audit, and compliance of the audit firm and auditors with general standards” by audited companies; “compliance of audit firms and auditors with general standards” by investors; and “the requirement of adopting a due professional care and skeptical attitude, and working actively at every phase of the audit” by auditors.

Audit quality is defined as “bringing to light errors of fact, mistakes, deficiencies or irregularities in the accounting system of the audited company; and to draw up a factual contingency report” (DeAngelo, 1981). The chances to detect intentional (fraudulent) or unintentional errors and irregularities, depends on the auditor’s professional skills, competence, experience and expertise. Empirical surveys show that audit quality is directly proportional to the professional competence of auditors (Kavut, 2002). The auditor’s ability to perceive and define complex accounting matters is crucial for the audit quality (Catanach and Walker, 1999).

According to the results of some studies made in recent years, a direct relationship is observed between audit quality and the sectoral experience of auditors. The higher an auditor’s level of expertise in the sector of the client, the higher are the chances of identifying particular problems pertaining to the sector, and consequently the higher the quality of the audit (Gramling et al., 1999).

### **III. Methodology**

#### **3.1. Purpose, Scope and Restrictions of the Survey**

The purpose of the survey is to identify the opinions and attitudes of managers receiving independent audit services in various sectors; and those of the auditors employed by audit firms providing audit quality services towards the attributes of audit quality; and to inquire into differences of perception of audit quality between managers of audited company and independent auditors.

### 3.2. Data Collection and Sampling

In this survey, data was gathered by using the method of inquiry by mail with the purpose of investigating the perceptions and attitudes of audited company and auditors concerning audit quality; and return envelopes were mailed to respondents together with questionnaire forms, in order to increase the rate of responses. The questionnaire consists of three sections including demographic attributes of auditors and managers; information about audit firms, and companies receiving independent audit services; and opinions of the attributes of audit quality.

Prior to data gathering, academicians and auditors with expertise in survey techniques and independent audit were identified by voluntary sampling in order to test the clarity of questions and reliability of the questionnaire; preliminary questionnaires were sent to 30 people with these qualifications; and the questionnaire was finalised in line with the responses and suggestions received.

A five-point Likert scale was used in the answers and assessment of variables measuring quality attributes. Answer choices were scaled between one (1) and five (5); positive opinions were assessed on the scale, "1=Strongly disagree; 2=Disagree; 3=Neither agree nor disagree; 4=Agree; 5=Strongly agree"; and negative opinions on the scale, "1=Strongly agree; 2=Agree; 3= Neither agree nor disagree; 4=Disagree; 5=Strongly disagree". Thus, five (5) points reflects positive opinion, and one (1) point, negative opinion.

The survey covers 313 publicly held companies and their managers, operating in various sectors, who are obliged to have their operations audited by independent auditors under the Capital Market Law No.2499; and 56 audit firms currently giving audit services only, and auditors employed at these firms, which are subject to the same Law (firms included under Capital Market Law No.2499, Communiqué Concerning Independent Auditing, (Sermaye Piyasası Kanunu No.2499, Bağımsız Denetim Hakkında Tebliğ, Seri: X, No: 16). The names of the audited companies have been selected from the list "Istanbul Stock Exchange, publicly held companies<sup>2</sup>. Consequently, questionnaires were sent to the complete group included in the list.

Questionnaires were sent to middle or top managers employed in the accounting and finance departments of audited companies, who are knowledgeable about independent auditing and who share the responsi-

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<sup>2</sup> <http://www.imkb.gov.tr/sirket.htm>, 18.05.2001.

bility in selecting and appointing audit firms; and to 550 auditors who have 3 or more years experience in independent audit firms.

38% of the audited companies responded to the questionnaire, with 121 questionnaires eligible for analysis. 26 of the 56 independent audit firms covered, participated in the survey (46%), and 213 auditors employed in these firms responded to the questionnaire. The response rate of this survey group is 39%.

### **3.3. Research Model and Variables**

A descriptive research model was used in this research, which was carried out with the purpose of identifying the opinions and attitudes of the parties who benefit from independent audit services, and who give independent audit services; and of determining whether there are differences in these opinions and attitudes. The objective of this research is to define the variables and relations among these variables, and to make projections based on these findings (Kurtuluş, 1998). Variables in this survey consist of 40 opinions which measure at several dimensions, the attitudes towards the attributes of a qualified audit service, with the help of positive and negative expressions.

Variables were developed in line with Generally Accepted Auditing Standards which give guidance to the auditing profession; Quality Control Standards in independent auditing; previous surveys included in the related literature; and information received from auditors.

Generally Accepted Auditing Standards (GAAS) are mandatory rules for the realisation of a qualified audit, applicable to the professional adequacy level of an auditor; independence, honesty, objectivity, due professional care; scope of activities in the planning and performance of the audit (investigation and assessment of internal control, gathering a sufficient number of reliable audit evidence); formation of auditor opinion and the reporting of the audit opinion<sup>3</sup>.

Quality Control Standards are the policies and procedures which must be abided by together with GAAS, by an audit firm in the performance of its activities. These standards which were initially published by the Quality Control Standards Committee of the American Institute of Certified Public Accountants in 1979 (SQCS-1), were amended in 1997. These standards include policies and procedures on the topics of independence, objectivity, honesty; client acceptance or work continuance with

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<sup>3</sup> American Institute of Certified Public Accountants, Professional Standards, 1999.



the current client; performance of the audit commitment; and verification of the internal quality control system functionality (Konrath, 1999).

40 variables which express the attributes of audit quality, developed in the light of the above standards are categorised under the following groups:

- Independence, due professional care
- Selection, acceptance and pusuance of auditing with same clients
- Workforce and audit team planning
- Management and personnel policies
- Performance of auditing - Gathering Evidence
- Litigation
- Reputation of the audit firm
- Technical facilities of the audit firm
- Employment of an audit firm representative at professional institutions and organisations

Investigation of the relationship between audit fees and quality of audit service is excluded from the survey.

### **3.4. Research Hypothesis**

Research hypothesis based on the above model was determined as follows:

H<sub>1</sub>= Managers of companies which receive independent audit services and independent auditors have different opinions and attitudes towards the attributes of audit quality.

## **IV. Analysis and Findings**

Data obtained from the survey sampling (responses received from inquiry all participants) was analysed with the support of the SPSS 10.0 for Windows.

“Reliability is of prime importance in both theoretical and practical studies. Reliability is defined as the degree of consistency between minimum two measurements of an individual or variable. Reliable measurement denotes a completely accurate measurement freed from errors. Results to be derived out of sampling activities are dependent on the reliability of measurement; and such results might show variances for the same reason” (Firat, 1996). The reliability coefficient (Cronbach’s alpha) of the reliability analysis was calculated as 90.5%. This result indicates a very high reliability of the measurement scale which was developed to measure the quality attributes. In his studies (1978), Nunnally points to

the adequacy of a confident interval between 0.50 and 0.60. Since 90.5% Cronbach's alpha found as the result of the analysis exceeds this interval, the scale is very reliable.

Some findings of the analysis include attributes of participating respondents and their companies (Table 1 and Table 2).

Numerical and percentage frequency and degree of both audit firm and audited company respondents' agreement with the variables related to audit quality, was identified primarily in line with the objective of the survey; and frequency distributions related to the opinions and attitudes of both groups towards the matter were determined (Table 3).

A discriminant analysis was made in order to identify whether there is a meaningful difference between the opinions and attitudes of audited company management and independent auditor groups pertaining to the attributes of audit quality; and in which quality attributes such differences, if any, appear. Findings of analyses are given in the following sections.

#### **4.1. Sample Characteristics**

The survey sample consists of 121 companies which receive independent auditing and their medium and top managers; and 213 auditors employed at 26 audit firms. The total number of questionnaires analysed under the survey is 334.

##### **4.1.1. Characteristics of Audited Companies and Respondents Employed in These Companies**

Attributes of companies and their managers who have participated in the inquiry are given in Table1 and Graphs 1-7 below.

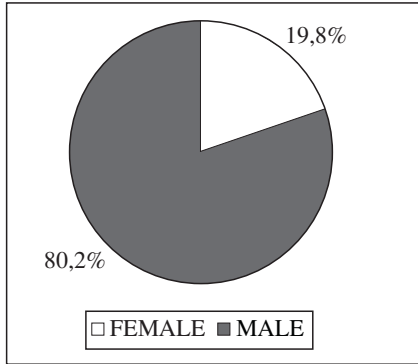
**Table 1: Attributes of Audited Companies and Their Managers**

<b>Managers</b>			<b>Audited Companies</b>		
<b>Gender</b>	<b>Frequency(n)</b>	<b>Percent(%)</b>	<b>Sector</b>	<b>Frequency(n)</b>	<b>Percent(%)</b>
Female	24	19,8	Production	74	61,2
Male	97	80,2	Services	45	37,2
Total	121	100,0	Production and Services	2	1,7
<b>Age</b>	<b>Frequency(n)</b>	<b>Percent(%)</b>	<b>Total</b>	<b>121</b>	<b>100,0</b>
25-29	11	9,1	<b>Duration of Audit</b>		
30-34	24	19,8	<b>Number</b>	<b>Frequency(n)</b>	<b>Percent(%)</b>
35-39	24	19,8	<b>of Years</b>		
40-44	26	21,5	1-4 years	19	15,7
45-49	17	14,1	5-9 years	56	46,3
50-54	13	10,8	10-14 years	33	27,3
55 and above	6	4,9	15-19 years	6	4,9
Total	121	100,0	20-24 years	3	2,5
<b>Education</b>			25 years & over	4	3,3
<b>Level</b>	<b>Frequency(n)</b>	<b>Percent(%)</b>	<b>Total</b>	<b>121</b>	<b>100,0</b>
High School	3	2,5	<b>Department of Selecting and Appointing the Audit Firm</b>		
Undergraduate	106	87,5	<b>Departments</b>	<b>Frequency</b>	<b>Percent</b>
Postgraduate	12	9,9		<b>(n)</b>	<b>(%)</b>
Total	121	100,0	Accounting and Finance	13	10,7
<b>Management</b>			<b>Board of Directors</b>	<b>108</b>	<b>89,3</b>
<b>Level</b>	<b>Frequency(n)</b>	<b>Percent(%)</b>	<b>Total</b>	<b>121</b>	<b>100,0</b>
Middle	57	47,1			
Top	64	52,9			
Total	121	100,0			

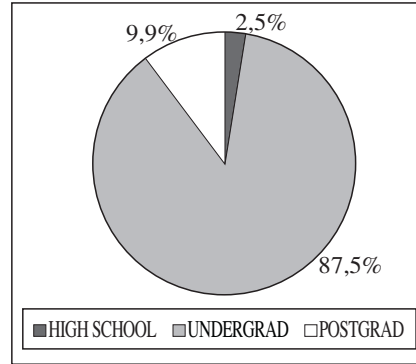
As given in Table 1, 80% of managers participating in the inquiry are male, 87.5% have had a formal education at graduate level and 52.9% are employed in the middle management group.

Out of the companies which participated in the inquiry, 61% operate in the production sector, 37.2% in the services sector and 1.7% in both sectors. The decision for selecting and appointing independent audit firms is generally (89.3%) given by the board of directors.

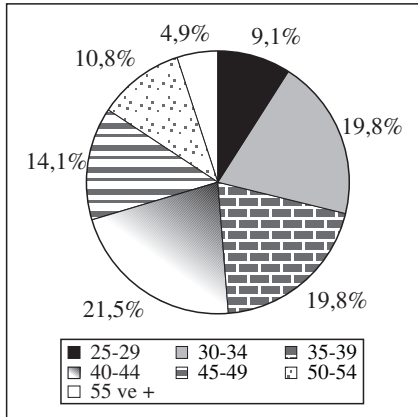
**Graph 1: Frequency Distribution of Gender of Managers**



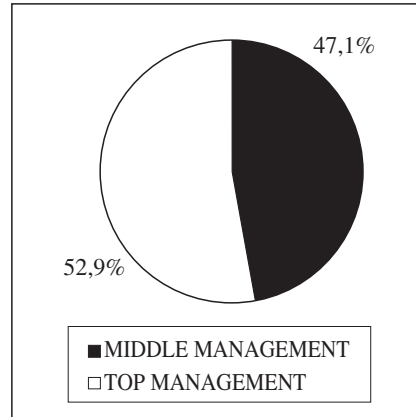
**Graph 2: Frequency Distribution of Education Level**



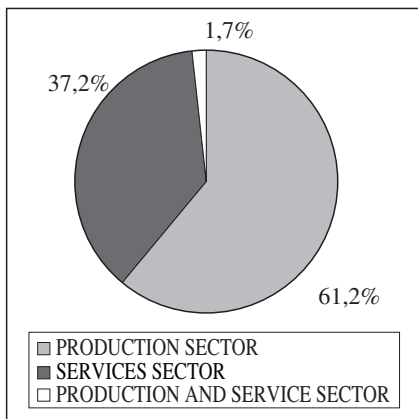
**Graph 3: Frequency Distribution of Age**



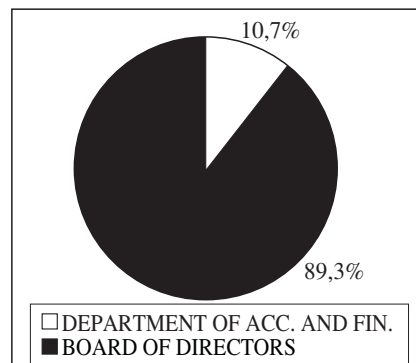
**Graph 4: Frequency Distribution of Managerial Staff**



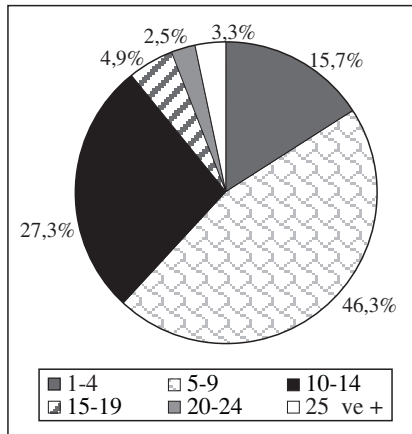
**Graph 5: Frequency Distribution of Economic Sector**



**Graph 6: Frequency Distribution According to the Department Selecting and Appointing The Audit Firm**



**Graph 7: Frequency Distribution of Duration of Auditing**



#### 4.1.2. Attributes of Audit Firms and Auditors

Attributes of audit firms and their auditors who have participated in the inquiry are given in Table 2 and Graphs 8 -12 below.

As will be seen in Table 2, 50% of audit firms participating in the survey were national and 50% international<sup>4</sup>. The majority (67.6%) of auditors participating in the survey are employed in international audit firms, and 77.5% have the title of Certified Public Accountants. A review of the distribution of auditors according to years of experience and positions in the firms they are employed shows that the majority have 3 to 5 years' experience.

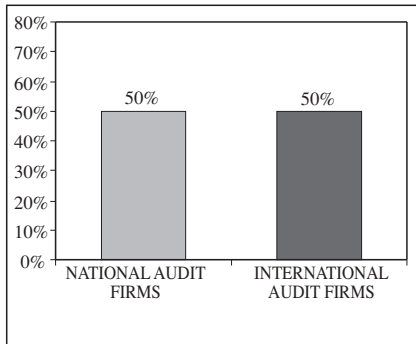
<sup>4</sup> All independent audit firms working in Turkey are national audit firms. Audit firms named as "international independent audit firms" in this survey are the firms which work under the title of audit firms operating in international markets; and utilising the international audit firm's methods, procedures and auditing technologies under a licence given by such international audit firm.

Table 2: Attributes of Audit Firms and Auditors

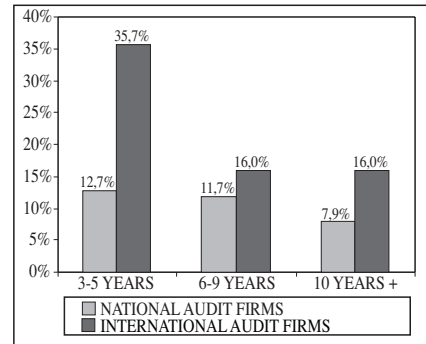
ATTRIBUTES	FREQUENCY (N)		RATIO (%)	
	National Audit Firms	International Audit Firms	National Audit Firms	International Audit Firms
Distribution of Audit Firms Responding to Questionnaire According to Firm Type	13	13	0,50	0,50
Distribution of Auditors According to Audit Firm Type	69	144	32,4	67,6
Auditors' Years of Experience in the Profession				
3 - 5 years	27	76	12,7	35,7
6 - 9 years	25	34	11,7	16,0
10 years and over	17	34	7,9	16
Total	69	144	32,4	67,6
Positions of Auditors in Audit Firms *				
Partners	30	19	14,1	8,9
Senior Managers	5	18	2,3	8,5
Managers	10	38	4,7	17,8
Auditors	24	69	11,3	32,4
Total	69	144	32,4	67,6
Professional Titles of Auditors				
Certified Public Accountants (CPA)	44	121	20,7	56,8
Sworn-in Certified Public Accountants (SCPA)	16	7	7,5	3,3
Those who are not qualified CPAs and SCPAs	9	16	4,2	7,5
Total	69	144	32,4	67,6

Note: The classification of job positions in audit companies is based on auditor job titles given in Capital Market Law No. 2499, Communiqué Concerning Independent Audits, Article 6 (Sermaye Piyasası Kanunu No. 2499, Başlımsız Denetim Hakkında Tebliğ, Seri: X, No: 16, Madde: 6). Partner is the individual who have a job title of chief auditor, who performs the audit activity on behalf of the company under his personal responsibility, with the authorisation for signing independent audit reports in the name of the firm. Minimum 10 years of professional working experience, knowledge and skill is required to earn the title of senior manager; minimum 6 years for the title of manager; and minimum 3 years for the title of auditor.

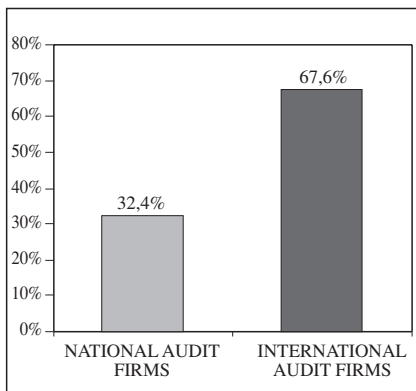
**Graph 8: Frequency Distribution of Audit Firms According to Type**



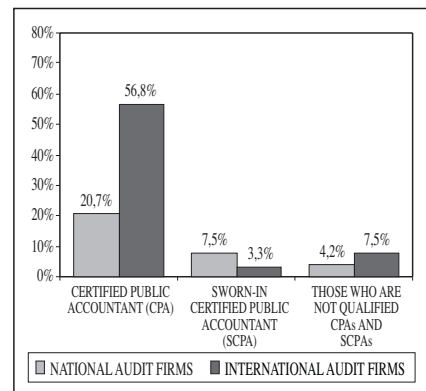
**Graph 9: Frequency Distribution of Auditors' Professional Experience**



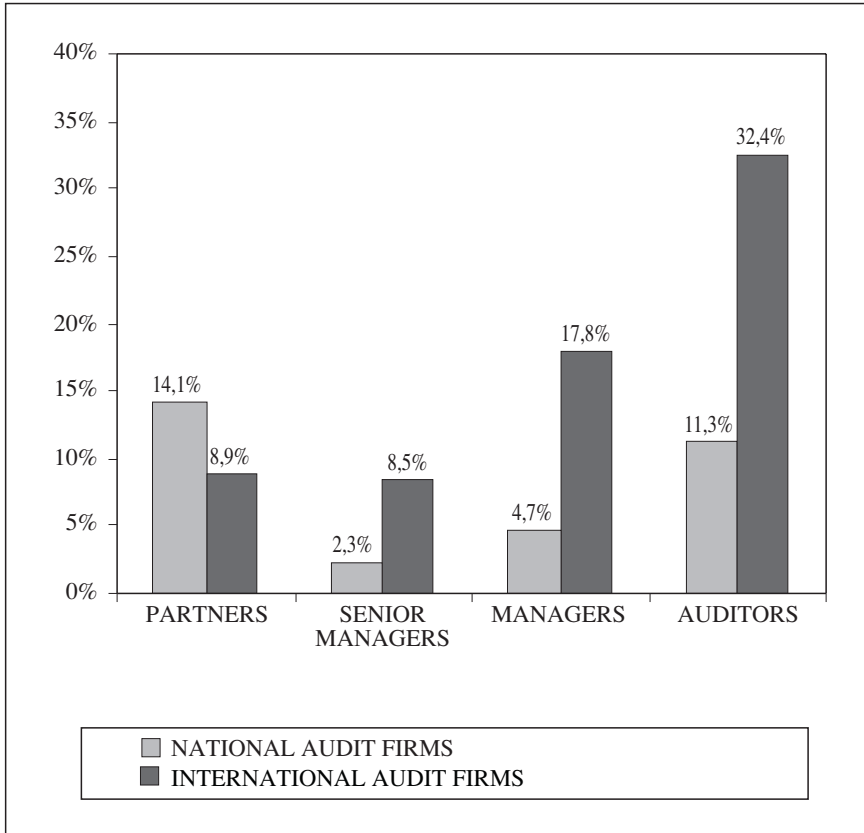
**Graph 10: Frequency Distribution of Auditors According to Audit Firm Type**



**Graph 11: Frequency Distribution of Auditors According to Professional Titles**



**Graph 12: Frequency Distribution of Auditors According to Job Positions in Audit Firms**



#### **4.2. Frequency Distribution Concerning the Attributes of Audit Quality from the Perspectives of Audited Company Managers and Independent Auditors**

An assessment was made of the responses given to 40 variables forwarded with the purpose of identifying the opinions and attitudes of auditors employed at audit firms participating in the survey; and managers of audited companies towards the quality of independent audit; the mean and standard deviations on agreement of respondents with these variables are summarised in Table 3. Table 3 also includes the different opinions and attitudes of managers and auditors towards the attributes of audit quality. Attitude profile of auditors employed in audit firms, and managers of audited companies concerning the determinant attributes of audit quality is given in Graph 12.



**Table 3: Basic Indicators of the Attitudes of Auditors Employed in Audit Firms and Managers of Audited Company Concerning the Attributes of Audit Quality**

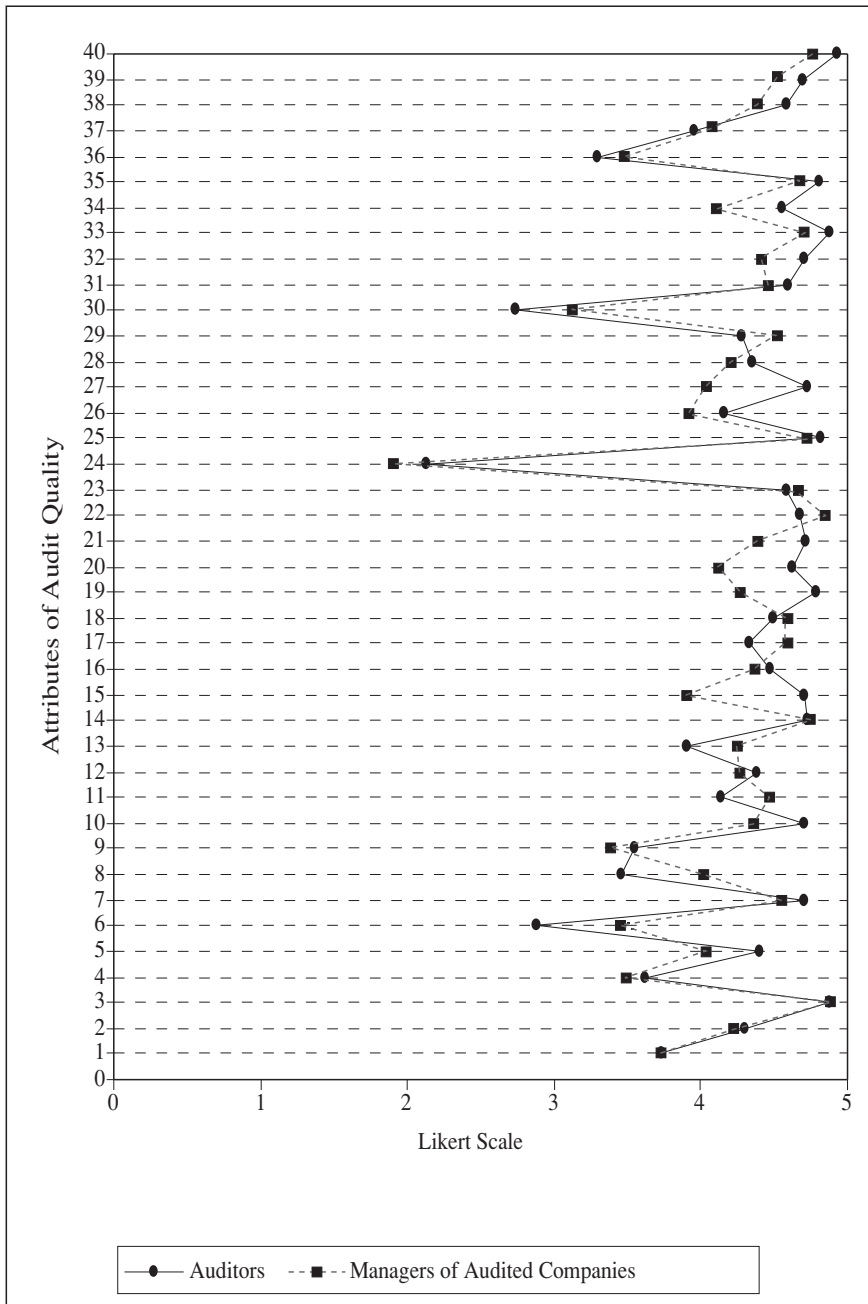
Attributes of Audit Quality	AUDITORS			MANAGERS OF AUDITED ENTERPRISE		
	N	Mean	Std. Dev.	n	Mean	Std. Dev.
(D-1)The time period in which the Engagement Partner audits the same client.	213	3,7371	1,1519	121	3,7355	1,1013
(D-2) Frequency of visits paid to the audit site by the Engagement Partner.	213	4,3052	1,0621	121	4,2314	1,0705
(D-3)The Auditors assigned to the engagement are very knowledgeable about accounting and auditing standards.	213	4,8779	0,5941	121	4,8926	0,5598
(D-4) Payment of a substantial portion of audit charges by a single client, and independence of auditors.	213	3,6197	1,5206	121	3,4876	1,2853
(D-5)Availability of a handbook for audit steps to be carried out; and no approval for incomplete work.*	213	4,4038	1,0170	121	4,0248	1,1215
(D-6)Actions filed against the audit firm.*	213	2,8826	1,5663	121	3,4380	1,8344
(D-7)Expertise level of the partner about the sector.	213	4,7042	0,7280	121	4,5537	0,7298
(D-8)The time period in which the senior auditor audits the same client.*	213	3,4554	1,3332	121	4,0165	1,0877
(D-9)No consulting service to be given to a client by an auditor who gives independent auditing services to the same client.	213	3,5493	1,4901	121	3,3884	1,5296
(D-10)Prior definition of position qualifications in the audit firm.*	213	4,7042	0,7150	121	4,3471	0,8917
(D-11)Availability of audit plans and programs for various sectors.*	213	4,1408	1,0089	121	4,4628	0,8067
(D-12)The Audit firm has a policy on the maximum number of hours per day and per week that its staff can work.	213	4,3803	1,0329	121	4,2645	0,8829
(D-13)Review of work papers and the audit report by another partner.*	213	3,9061	1,0991	121	4,2397	1,0880
(D-14)Developing of and compliance with realistic time budgets.	213	4,7277	0,6737	121	4,7438	0,5249
(D-15)Communication with the predecessor auditor for prospective clients.*	213	4,7089	0,7202	121	3,8843	1,2396
(D-16)Accepting a client statement of low reliability under time restrictions.	213	4,4742	1,0664	121	4,3636	1,09654
(D-17)The Audit firm conducts a thorough study of the client's system of internal control.*	213	4,3286	0,8981	121	4,5702	0,7051
(D-18)The Audit firm makes extensive use of micro- computers in conducting the audit.	213	4,4883	0,6910	121	4,5785	0,6292
(D-19)The Auditing firm's attitude is one of a skeptic, not one of a client advocate.*	213	4,7840	0,6372	121	4,2479	1,0900
(D-20)Availability of independent criteria and publications developed by the audit firm.*	213	4,6197	0,8132	121	4,1488	1,0852

**Table 3: Basic Indicators of the Attitudes of Auditors Employed in Audit Firms and Managers of Audited Company Concerning the Attributes of Audit Quality (Continued)**

Attributes of Audit Quality	AUDITORS			MANAGERS OF AUDITED ENTERPRISE		
	N	Mean	Std. Dev.	n	Mean	Std. Dev.
(D-21) Audit team members are rotated off the audit periodically.*	213	4,7136	0,6352	121	4,3719	0,9049
(D-22) Informing the client of developments in accounting and financial reporting issues.*	213	4,6761	0,6752	121	4,8264	0,4946
(D-23) Availability of a written employment procedure designating the minimum qualifications of auditors to be employed.	213	4,5822	0,8350	121	4,6446	0,6814
(D-24) Designation of audit completion date on the basis of laws and client requirements only.	213	2,1315	1,3001	121	1,8843	1,1633
(D-25) Participation of auditors in professional meetings and activities minimum once a year.	213	4,8169	0,5902	121	4,7107	0,5391
(D-26) Effect of managers' and owners' reputation in the selection of audited company, and work continuance.	213	4,1549	1,1973	121	3,9174	0,9966
(D-27) Impact of changes in scope on the audit in continuing engagements.*	213	4,7230	0,6682	121	4,0496	0,9648
(D-28) A substantial part of the audit firm's total billings should not depend on a single client.	213	4,3521	1,0519	121	4,1901	1,1278
(D-29) Availability of written policies and procedures for the formation of the audit team.*	213	4,2817	0,8386	121	4,5041	0,7430
(D-30) The same audit team giving service to the same client for five years or more.*	213	2,7418	1,2454	121	3,1074	1,4306
(D-31) Approval of workforce and time plans by the partner.	213	4,5915	0,8283	121	4,4463	0,6946
(D-32) Sufficing with superficial reviews of questionable transactions in order to prevent negative deviations in the time plan.*	213	4,7089	0,8901	121	4,4132	1,0853
(D-33) Active employment of partner and senior managers at all audit steps.*	213	4,8779	0,4053	121	4,6860	0,5328
(D-34) In the presence of time restriction, avoiding a detailed investigation of a technical accounting and/or auditing issue about which there is little information or the answer of which is uncertain.*	213	4,5493	1,0567	121	4,0826	1,2151
(D-35) Frequency of communications between the audit team; and managers and internal auditors of the client enterprise.*	213	4,8122	0,5515	121	4,6529	0,7154
(D-36) Employment of an audit firm's auditor as expert in professional institutions and organisations.	213	3,2911	1,6077	121	3,4628	1,2519
(D-37) Overall reputation of audit firm.	213	3,9577	1,3643	121	4,0579	0,9156
(D-38) Periodic assessment to be performed in order to see whether there is a change in the client's subject of operation.*	213	4,5869	0,9102	121	4,4105	0,9247
(D-39) The senior auditor to be knowledgeable about the audited company's sector.*	213	4,6948	0,6558	121	4,5041	0,7086
(D-40) Availability of a comprehensive archive containing legal and theoretical information.*	213	4,9296	0,3217	121	4,7603	0,5327

\* Variables which denote the different opinions and attitudes of audited company managers and auditors.

**Graph 13: Attitude Profile of Auditors Employed in Audit Firms, and Managers of Audited Companies Concerning the Attributes which Determine Audit Quality**



### 4.3. Identifying Discriminating Attitudes

A discriminant analysis was applied to test the survey hypothesis. The discriminant analysis is a multi-variable dependence analysis which is concerned with the discrimination of two or more groups (Kurtuluş, 1998). The analysis was carried out with the purpose to identify whether there is a significant variance between the opinions and attitudes of respondents about the features of audit quality; and in case such a variance exists, to see which variables are the major factors of such a variance. At the end of the analysis, the canonical discriminant functions seen in Table 4 were obtained. As will be observed from the Table, the canonical discriminant function with the base value of 0.987 represents 100% of the total variance; the canonical correlation coefficient is 0.705, and chi-square value is very significant ( $p=0.0000$ ).

The findings indicate a significant difference  $p=0,0000$  between the opinions and attitudes of audited enterprise managers and independent auditors concerning the characteristics of a audit quality. In other words, there is a significant difference between attitudes of respondents who belong to the two different groups, in relation to quality attributes. According to these results, our research hypothesis is accepted at  $p=0.0000$ .

Variables which cause this difference, and the variables which have the strongest impact on the difference of the two groups are seen on the structural matrix (Table 5) and Wilks' Lambda and F test results (Table 6).

Analysis findings show that auditors and audited company managers have different opinions and attitudes at significance levels of 0.01 and 0.05 in 22 variables out of the 40 variables which denote the features of a qualified audit in various respects (Table 2). The distribution of these 40 variables are summarised in Table 7.

**Table 4: Summary of Canonical Discriminant Functions**

#### Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	0,987	100,0	100,0	0,705

Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	Df	Significant
1	0,503	214,249	40	0,000

**Table 5: Structure Matrix**

Attributes of Audit Quality	Function
	<b>1</b>
(D-15) Communication with the predecessor auditor for prospective clients.*	-,425
(D-27) Impact of changes in scope on the audit in continuing engagements.*	-,414
(D-19) The Auditing firm's attitude is one of a skeptic, not one of a client advocate.*	-,313
(D-20) Availability of independent criteria and publications developed by the audit firm.*	-,248
(D-38) Periodic assessment to be performed in order to see whether there is a change in the client's subject of operation.*	-,237
(D-21) Audit team members are rotated off the audit periodically.*	-,223
(D-10) Prior definition of position qualifications in the audit firm.*	-,221
(D-8) The time period in which the senior auditor audits the same client.*	,218
(D-33) Active employment of partner and senior managers at all audit steps.*	-,205
(D-34) In the presence of time restriction, avoiding a detailed investigation of a technical accounting and/or auditing issue about which there is little information or the answer of which is uncertain.*	-,203
(D-40) Availability of a comprehensive archive containing legal and theoretical information.*	-,200
(D-5) Availability of a handbook for audit steps to be carried out; and no approval for incomplete work.*	-,174
(D-11) Availability of audit plans and programs for various sectors.*	,166
(D-6) Actions filed against the audit firm.*	,162
(D-32) Sufficing with superficial reviews of questionable transactions in order to prevent negative deviations in the time plan.*	-,149
(D-13) Review of work papers and the audit report by another partner.*	,148
(D-17) The CPA firm conducts a thorough study of the client's system of internal control*	,141
(D-39) The senior auditor to be knowledgeable about the audited company's sector.*	-,137
(D-30) The same audit team giving service to the same client for five years or more.*	,135
(D-29) Availability of written policies and procedures for the formation of the audit team.*	,134
(D-35) Frequency of communications between the audit team; and managers and internal auditors of the client company.*	-,126
(D-22) Informing the client of developments in accounting and financial reporting issues.*	,118
(D-26) Effect of managers' and owners' reputation in the selection of audited company, and work continuance.	-,102
(D-7) Expertise level of the Manager about the sector.	-,100
(D-24) Designation of audit completion date on the basis of laws and client requirements only.	-,096
(D-31) Approval of workforce and time plans by the partner.	-,090
(D-25) Participation of auditors in professional meetings and activities minimum once a year.	-,090
(D-28) A substantial part of the audit firm's total billings should not depend on a single client.	-,073
(D-18) The Auditing firm makes extensive use of micro- computers in conducting the audit.	,065
(D-12) The Audit firm has a policy on the maximum number of hours per day and per week that its staff can work.	-,057
(D-36) Employment of an audit firm's auditor as expert in professional institutions and organisations.	,056
(D-9) No consulting service to be given to a client by an auditor who gives independent auditing services to the same client.	-,052
(D-16) Accepting a client statement of low reliability under time restrictions.	-,050
(D-4) Payment of a substantial portion of audit charges by a single client, and independence of auditors.	-,045
(D-37) Overall reputation of audit firm.	,040
(D-23) Availability of a written employment procedure designating the minimum qualifications of auditors to be employed.	,034
(D-2) Frequency of visits paid to the audit site by the Engagement Partner.	-,023
(D-14) Developing of and compliance with realistic time budgets.	,013
(D-3) The Auditors assigned to the engagement are very knowledgeable about accounting and auditing standards.	,012
(D-1) The time period in which the Engagement Partner audits the same client.	-,001

\* Variables which denote different opinions and attitudes of audited company managers and auditors.

**Table 6: Discriminant Analysis: Tests of Equality of Group Means**

Attributes of Audit Quality	Wilks' Lambda*	F	Significant
(D-1) The time period in which the Engagement Partner audits the same client.	1,000	,000	,990
(D-2) Frequency of visits paid to the audit site by the Engagement Partner.	,999	,168	,682
(D-3) The Auditors assigned to the engagement are very knowledgeable about accounting and auditing standards.	1,000	,049	,825
(D-4) Payment of a substantial portion of audit charges by a single client, and independence of auditors.	,998	,650	,421
(D-5) Availability of a handbook for audit steps to be carried out; and no approval for incomplete work.*	,971	9,938	,002
(D-6) Actions filed against the audit firm.*	,975	8,554	,004
(D-7) Expertise level of the partner about the sector.	,990	3,292	,071
(D-8) The time period in which the senior auditor audits the same client.*	,955	15,549	,000
(D-9) No consulting service to be given to a client by an auditor who gives independent auditing services to the same client.	,997	,882	,348
(D-10) Prior definition of position qualifications in the audit firm.*	,954	16,033	,000
(D-11) Availability of audit plans and programs for various sectors.*	,974	9,037	,003
(D-12) The Audit firm has a policy on the maximum number of hours per day and per week that its staff can work.	,997	1,075	,301
(D-13) Review of work papers and the audit report by another partner.*	,979	7,159	,008
(D-14) Developing of and compliance with realistic time budgets.	1,000	,051	,821
(D-15) Communication with the predecessor auditor for prospective clients.*	,849	59,187	,000
(D-16) Accepting a client statement of low reliability under time restrictions.	,998	,813	,368
(D-17) The Audit firm conducts a thorough study of the client's system of internal control*	,981	6,484	,011
(D-18) The Audit firm makes extensive use of micro-computers in conducting the audit.	,996	1,403	,237
(D-19) The Auditing firm's attitude is one of a skeptic, not one of a client advocate.*	,912	32,205	,000
(D-20) Availability of independent criteria and publications developed by the audit firm.*	,943	20,184	,000
(D-21) Audit team members are rotated off the audit periodically.*	,953	16,276	,000
(D-22) Informing the client of developments in accounting and financial reporting issues.*	,986	4,598	,033
(D-23) Availability of a written employment procedure designating the minimum qualifications of auditors to be employed.	,999	,369	,544
(D-24) Designation of audit completion date on the basis of laws and client requirements only.	,991	3,006	,084
(D-25) Participation of auditors in professional meetings and activities minimum once a year.	,992	2,655	,104
(D-26) Effect of managers' and owners' reputation in the selection of audited company, and work continuance.	,990	3,418	,065
(D-27) Impact of changes in scope on the audit in continuing engagements.*	,855	56,299	,000
(D-28) A substantial part of the audit company's total billings should not depend on a single client.	,995	1,737	,188
(D-29) Availability of written policies and procedures for the formation of the audit team.*	,983	5,886	,016
(D-30) The same audit team giving service to the same client for five years or more.*	,982	5,963	,015
(D-31) Approval of workforce and time plans by the partner.	,992	2,658	,104
(D-32) Sufficing with superficial reviews of questionable transactions in order to prevent negative deviations in the time plan.*	,979	7,242	,007
(D-33) Active employment of partner and senior managers at all audit steps.*	,960	13,706	,000
(D-34) In the presence of time restriction, avoiding a detailed investigation of a technical accounting and/or auditing issue about which there is little information or the answer of which is uncertain.*	,961	13,478	,000
(D-35) Frequency of communications between the audit team; and managers and internal auditors of the client company.*	,985	5,164	,024
(D-36) Employment of an audit company's auditor as expert in professional institutions and organisations.	,997	1,026	,312
(D-37) Overall reputation of audit firm.	,998	,518	,472
(D-38) Periodic assessment to be performed in order to see whether there is a change in the client's subject of operation.*	,948	18,343	,000
(D-39) The senior auditor to be knowledgeable about the audited company's sector.*	,982	6,153	,014
(D-40) Availability of a comprehensive archive containing legal and theoretical information.*	,962	13,106	,000

\* Variables which denote different opinions and attitudes of audited company managers and auditors.

**Table 7: Classification Results (a)**

		Predicted Group Membership		
		Auditor	Audited Company Manager	Total
<b>Original Count</b>	<b>Auditor</b>	180	33	213
	<b>Audited Company Manager</b>	17	104	121
<b>%</b>	<b>Auditor</b>	84,5	15,5	100,0
	<b>Audited Company Manager</b>	14,0	86,0	100,0

(a) 85% of original grouped cases correctly classified

The correct classification ratio of the discriminant function is calculated as 85%. This result shows that the discriminant function has a significant contribution to the classification of respondents' group identity. The classification ratio should be tested against the random classification ratio. The random discrimination or random model is the most extensively used random classification model.

Eightyfive percent correct classification ratio of the discriminant function, compared to a 52.3% random classification ratio, indicates a significant difference or significant improvement of our discriminant function.

According to these results, it has been concluded that the discriminant function makes a much better statistical discrimination than the random discriminant at the confident limit of 99%.

#### **4.4. Research Findings**

22 variables found as the result of discriminant analysis, and denoting the varying attitudes of audited company managers and auditors concerning the features of audit quality, are discussed and interpreted in the following section also by taking into consideration the frequency distributions given in Table 3.

**Significant Variables at  $p = 0,01$** 

- Compared to the managers of client companies, auditors agree to a great extent with the opinion of making available a procedure at an audit firm, describing all the activities which should be performed at all the stages of auditing; and of reviewing and approving the rate at which the realised activities comply with this procedure and avoiding approval of incomplete work which has not been carried out in accordance with the said procedure.
- While auditors do not agree with the idea of accepting accusations made against audit firms for careless work and inadequate audit performance in actions filed against such firms as an indicator of quality, managers were indecisive in this respect.
- Managers of audited companies believe that in the selection of senior managers to be employed in the audit team, priority given to those senior managers who have been employed in the auditing of the same client during at least for the last two years, has an enhancing effect on audit quality. Auditors showed an indecisive attitude in this respect.
- Auditors decisively agreed with the requirement that auditors should have certain qualifications to be employed at various positions in audit firms and that such qualifications to be considered in the promotion process of auditors at higher rates than managers.
- Managers of audited company agreed more than auditors, with the view that an audit firm should have developed audit plans and programs for various sectors other than the sectors of existing clients.
- Managers of audited companies agree that a completed audit work should be reviewed by another partner who is not employed in the audit team as a quality enhancing factor. Auditors however, were indecisive in their views on this topic.
- Prior to accepting a new client, audit firms should discuss with the previous auditor of the client, and gather some information about the enterprise. While auditors gave their decisive agreement with such an implementation, managers of audited companies were indecisive.
- At all the stages of the audit activity, auditors should perform their job by adopting a professionally skeptical attitude, rather than working for the interest and benefit of the client. While managers partially agreed with such an attitude for the realisation of audit quality, auditors participating in the survey agreed with this view with decisiveness.
- More auditors than managers agree with the view that an audit firm should identify and implement its own criteria in addition to legal and



professional regulations concerning independent auditing.

- Managers were partly positive about the job rotation of auditors of an audit team and for assignments of auditing activities to different clients at regular intervals. Auditors attach considerable importance to job rotation in the workforce planning to be made for audit agreements, and decisively agree with the view that such implementation will enhance audit quality significantly.
- Auditors decisively agree with the requirement of reviewing and renewing the audit agreement in the case of a substantial change occurring in the scope of operations while the audit activity is continuing. Managers partly share this view.
- Auditors gave their decisive disagreement to sufficing with superficial reviews of doubtful transactions and implementations which come up in the course of the auditing activity, in order to preclude negative deviations from the scheduled. Managers partly disagree with the form of this implementation which will have a negative impact on the audit quality and the accuracy of the audit opinion to be given.
- More auditors than managers agree with the view that audit quality depends on the active participation of partner and senior managers in all the stages from audit planning to undersigning the report.
- Auditors definitely disagree with the view that when there is a time restriction, an audit activity can be performed without detailed investigation if there is a technical accounting and/or auditing issue where there is little information or where the answer is uncertain. Such an audit activity, however, is partly accepted by managers.
- Compared to managers, auditors attach more importance to assessing whether a change in the enterprise's line of activity occurred while continuing work with previous clients and during an ongoing audit work.
- Auditors attach more importance than managers, and definitely agree with the importance of maintaining a comprehensive library at audit firms, constituting theoretical information, legislation and periodical publications, for purposes of supporting the professional progress of auditors.

#### **Significant Variables at $p = 0,05$**

- Managers attach more importance than auditors to providing services to ensure effective internal control systems under the scope of independent audit activities.
- Managers gave more importance than auditors and expressed their

decisive request to be notified and informed by the audit team about issues of accounting and financial reporting under the scope of the independent auditing.

- It is observed that managers attach more importance than auditors to the formation of audit teams in accordance with previously identified criteria, policies and procedures.
- Auditors do not agree with the view that the same audit team can be employed at audit activities of the same client for a period of 5 or more years. Managers were indecisive in this respect and unable to reach a conclusive opinion.
- Auditors attach more importance than managers to the requirement and benefit of information exchange between the managers and internal auditors of the audited company.
- Adequate knowledge and experience of senior managers about the sector of the audited company has been observed as a quality attribute which is deemed important more by auditors compared to managers.

## **V. Conclusions and Interpretations**

This survey was carried out with the purpose of investigating whether variances exist in the opinions and attitudes of auditors employed in independent audit firms (audit service providers) and of managers of audited companies (audit service users) towards the attributes of a audit quality. An assessment of survey findings indicates significant variance of opinion and attitude in the two groups, concerning audit quality. Such variances generally appear in the following topics: competence, knowledge and experience of auditors concerning the sector and audited companies; due professional care in all stages from client selection to the formation of auditor opinion; management and personnel policies followed by the audit firm; technical facilities of audit firms; actions filed against auditors; level of responding to client expectations in areas other than the audit service; audit team planning; gathering evidence; getting a new audit engagement and/or continuity with the current client.

Managers of audited companies expect to receive information from the audit team about the developments on the topics of accounting and financial reporting which will have an impact on the company, and to receive support for the active functioning of the company's internal control system. Furthermore, they have emphasised that the previous employment of senior auditors to be assigned to the audit team in auditing of the same client has a significant effect on quality. They have been indecisive how-

ever, on the probable assignment of the same audit team for repeated audits covering long periods with the same client. This result shows that audited companies are aware of the fact that working with the same audit team for long years, might have a negative impact on the objectivity, integrity and the independence of auditors.

Managers share the view that a review to be made by a partner outside the team on the work documents of completed audits and on the reached audit opinion is important for quality and reliability. Furthermore, they have emphasised the importance of, and compliance with previously identified policies and procedures in the formation of the audit team for the realisation of audit quality. Managers of audited companies see as a requirement, the development of plans and programs by audit firms for all sectors in addition to the sectors of existing clients.

All the stages in the audit process, in general, and due professional care standards in such stages were the quality standards expressed as important by auditors, contrary to the managers of audited companies. Among the indispensable requirements of a qualified audit, auditors view as important, the active employment of responsible chief auditor and senior managers together in the process of audit planning, gathering evidence and reporting of findings. They have emphasised that the realisation of a skeptical performance at all stages by the employees of the audit firm and the audit team for public benefit rather than to meet the demands and interests of the client company is an important quality attribute.

They have emphasised that discussion with the previous auditor when selecting a new client and making an assessment on whether there are any changes in the line of business activity for existing and will effect the audit quality, discussion with the previous auditor when selecting a new client, and making an assessment to see whether there are any changes in the subject of operation for valid and current audit agreements,. They are of the opinion that communication and exchange of knowledge among managers and internal controllers of the audited company, at various levels has a significant part in quality of audit. Adequately informant auditors of the audit team about the audited sector, is comprehended as an important quality attribute. An indecisive attitude was exhibited concerning quality enhancement by the re-employment of senior managers in the auditing of the same client. On a par with this, they supported the view of job rotation by assigning to auditors different audit engagements in the workforce planning; and disagreed with the idea of the same audit team auditing the same client for long periods. Such implementations were

expressed as a probable blemish to the independence of auditors.

According to survey results, auditors share the common view that even in the presence of time restrictions or the risk of deviations from the time planning, the required detailed investigations must be carried out into doubtful transactions and implementations. Furthermore, auditors who have participated in the inquiry attach more importance than managers to the availability of a handbook describing the activities to be performed and rules to be complied with at every stage of the audit in order to realise of audit quality; to the development of independency rules and implementations to reinforce auditor impartiality and objectivity; to the implementation of personnel and management policies in the selection of qualified personnel for in-company promotions; and to the availability of a comprehensive library which is an effective tool in ensuring the professional development of auditors.

A general assessment of our survey results shows a parallel between the results of previous surveys carried out in this area (Carcello et al., 1992; Schroeder et al., 1986; Meier and Fuglister, 1992).

In conclusion, managers of audited companies are of the opinion that the most important attributes of a audit quality are supplying of information about effective internal control systems and operational accounting topics under the scope of the audit service; and adequate knowledge and experience of auditors about the audited company and its sector. Auditors see, as the required attributes of audit quality, information exchange with the managers of the audited company; knowledge and experience of the auditor concerning sectors; due professional care by all auditors at every level and at each stage of the audit activity; and the independence and objectivity of auditors.

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## **THE 1994 ECONOMIC CRISIS AND ITS EFFECTS ON COMMERCIAL BANKS: AN EMPRICAL INVESTIGATION**

İhsan IŞIK\*

### **Abstract**

This paper analyzes the causes and consequences of the 1994 economic crisis. Utilizing Malmquist index, it also examines productivity change in Turkish banks between 1992 and 1996 to explore its effects on banking performance. The pre and post crisis results demonstrate that bank productivity followed a V-shape pattern: hitting a dramatic level in 1994 (-17%) and bouncing back after 1994 (+15%). The major source of the productivity fall was a downward shift in production frontier (technical regress) rather than increasing distance of banks from the frontier (efficiency decrease). The further analysis by ownership indicates that foreign banks suffered the most from the crisis while state banks suffered the least.

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\* Dr. İhsan Işık, Department of Accounting and Finance, College of Business, Rowan University, 201 Mullica Hill Road, Glassboro, New Jersey, USA.

Tel: 1-856-256-4500 (ext. 3486)

Fax: 1-856-256-4439

E-mail: isik@rowan.edu.

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## I. Introduction

Turkey's continuously growing macro problems, which matured enough to threaten its economic stability in the last months of 1993, turned to a severe financial crisis in 1994. In spite of its significant effect on both real and financial economies, the 1994 economic crisis of Turkey has not been investigated yet in terms of its impact on the productivity, technology and efficiency of the financial industry.<sup>1</sup> In the wake of the 1994 crisis, the Turkish economy shrunk by 6%, a record level of annual output loss in the history of the country to that date. In the first three months of 1994, the Turkish Lira (TL) was devalued by more than 50% against the \$US, half of the reserves of the Central Bank of Turkey was lost fighting the crisis, interest rates skyrocketed, and the inflation rate reached three digit levels.<sup>2</sup> The impact of the crisis on the banking firms was also drastic, about 30% of the total banking assets in the system evaporated in 1994. The causes and development process of the crisis in Turkey are very akin to what was observed lately in the Far Eastern and Latin American countries. However, the 1994 Turkish crisis lasted relatively shorter. According to some analysts, the crisis was over, to a great extent, by 1995. The stability program designed in close collaboration and consultation with a crisis commission and IMF is believed to succeed in mitigating the adverse effects of the financial distress.

Within an era of increasing number of financial crises all over the world and in Turkey, it is worth examining the 1994 Turkish experience. The occurrence of repeated crises in Turkey calls for a detailed study of past mistakes. In particular, the analysis of the impact of such "shocks" on bank performance may shed some light on the behavior and reaction of banking firms during and after the crisis. Also such analysis may allow us to examine and assess the success of the undertaken measures and remedies in curing the "shocked" industry. The lessons from the study of 1994 crisis in regard to whether it lasted shorter compared to its counterparts elsewhere as advocated (an empirical question), and if so, how the Turkish banks bounced back sooner after a "knock out" as maintained (another empirical question) might also yield policy implications for other coun-

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<sup>1</sup> In a broad sense, both real and financial sector were subject to the consequences of the crisis. Thus, we use the mnemonics of economic crisis or financial crisis interchangeably to refer to the 1994 financial distress.

<sup>2</sup> Celasun (1998)'s case study presents stylized facts related with the 1994 crisis by analyzing the general condition of the economy before and at the time of the crisis.



tries facing a similar kind of problem. For the research side, this would be among the pioneering studies in finance literature, which link productivity and efficiency of banks with financial distress. Employing nonparametric Malmquist Total Factor Productivity (TFP) index approach, we measure productivity change and its mutually exclusive and exhaustive components (technological change and efficiency change) around the crisis to examine its influence on banking performance. The results suggest that the impact of the 1994 economic crisis on the productivity, technology and efficiency of the Turkish banks was dramatic. It took about two years for the financial system to attain its pre-crisis productivity and efficiency levels. Except for safe state banks, all types of banks, private or foreign, frontier or non-frontier, suffered immensely from the crisis.

The paper is structured as follows. Following the introduction, section 2 provides a detailed explanation of factors that tend to breed problems in the banking sector as suggested in the literature. Section 3 sets the stage for further analysis depicting an overview of the 1994 economic crisis under the light of key economic and financial indicators of Turkey before and after the crisis. Section 4 introduces the methodology, a DEA-type Malmquist Total Factor Productivity Change (TFPCH) index, utilized in constructing performance measures. In section 5, we discuss the data, and definition of bank inputs and outputs. Section 6 provides an extensive analysis of the impact of the crisis on banking productivity and efficiency. And in section 7, we conclude summarizing the key findings of our study and offering some suggestions for policy makers to encounter future banking distresses.

## **II. Literature Review**

In this section, we try to highlight a variety of mechanisms suggested in the literature that can result in a banking sector crisis. The review enriches theoretical suggestions by evidences from the banking crises that took place in a number of countries all around the world in the last two decades. Most of the studies on banking crises are case studies, while there exist a few econometric analyses.

Profit maximization goal is different from wealth maximization goal. Profit maximization objective leads a bank manager simply to invest in assets that produce the highest gross yields and to keep costs down. However, a bank must either take on increased risk or lower operating costs to generate higher yields. Greater risk manifests itself in greater volatility of net income and market value of a bank's shareholder equity.

On the other hand, wealth maximization goal requires that a manager evaluate and balance the trade-offs among the opportunity for higher returns, the probability of not realizing those returns, and the possibility that the bank might fail. Thus basic finance theory asks managers hired to maximize shareholder's wealth to be seriously concerned about the riskiness of the prospects in pursuit of higher returns because a bank that assumes too much risk may become insolvent and fail. However, as Stiglitz (1972) points out, limited liability and regulatory insurance may induce moral hazard incentives among bank managers and owners. Therefore, bank managers are likely to assume more risks than what is socially optimal.

A bank operationally fails if its cash flows from debt service payments, new borrowings, and asset sales are inadequate to meet mandatory cash outflows for operating expenses, deposit withdrawals, and maturing debt obligations. The process leading to bank failure is self-feeding. When creditors and shareholders concern that a bank has high risk, they ask a premium on bank debt and bid share prices lower. This exacerbates liquidity problems further by increasing the cost of funds and potentially creating a run on the bank if bank deposits are not insured. Bank runs can be self-fulfilling and contagious especially in banking business in which the security and soundness are vital elements for a bank's survival. Depositors might simply rush to the banks to withdraw their funds if they think that others are withdrawing, as well. A single run on an individual bank of course should not create a systemic risk, the chance that the problems of a few institutions will spread to otherwise sound institutions, so long as partially informed creditors does not interpret it as a signal that other banks are also at risk (Bhattacharya and Thakor, 1994).

Bank problems are caused by a variety of factors, some endogenous (controllable) and some exogenous (uncontrollable). Endogenous factors are those that reflect inadequate capitalization, fraud, poor management quality, poor asset quality, mismanagement of credit, liquidity, interest rate, foreign exchange, and operational risks, as well as insufficient credit analysis, loan structuring, and loan documentation, among others. On the other hand, exogenous factors typically reflect adverse economic conditions, adverse changes in regulations, environmental changes surrounding the borrower's operations, and catastrophic events. There is little that can be done to prevent exogenous problems. However, professional management practices such as effective credit-granting procedures can significantly reduce other sources of problems. Even though adherence to sound

credit analysis principles framed by a sound credit policy can reduce the frequency and depth of problem assets, it is virtually impossible to eliminate such problems entirely. The credit analysis may have been faulty because it was based on insufficient information or incomplete analytical procedures. Economic conditions may change adversely after the loan is granted so that the borrower cannot meet debt service requirements. Alternatively, a borrower may simply choose not to repay if circumstances permit. Hence, the total elimination of default risk can only be accomplished by refusing to take on credit risk, which reduces profitability (Işık et al., 2001).

Recent history suggests that proliferation of system-wide banking crisis is closely related with a deteriorated macroeconomic environment as observed in several countries worldwide in the last two decades. Also, bank failures follow patterns of regional economic difficulties as observed in the United States during the 1980s. For instance, agricultural problems in the Midwest and energy problems in the Southwest were followed by a large number of failures among all sizes of banks. Real estate problems during the early 1990s have produced a similar large scale-banking crisis. Although problems caused by economic conditions can be minimized through portfolio diversification, it is unlikely to annihilate the total risk altogether through diversification, particularly for banks that operate in small countries or regions, or that specialize in lending to a special sector.

It is obvious that firms become exposed to several problems in a deteriorating economic environment, one of which is to earn adequate profits to cover costs. Exogenous factors, such as financial or economic shocks to the whole system that cannot be diversified away, exacerbate the systematic risk of all types of firms to a great extent. This adverse case could eventually damage both real and financial sectors substantially if deteriorated performance of bank borrowers results in substantial increases in the volume of non-performing loans. In this sense, there should be a positive relationship between bank problems and economic shocks. One of the key services financial intermediaries provide is “maturity transformation”, which refers to the ability of banks to transfer short-term funds (demand and time deposits) to long-term assets (commercial and industrial loans). Therefore, banks may face survival problems, despite the impressive quality of their asset portfolio, if the maturity differential between their asset and liability items is substantial. This is simply because of the fact that banks cannot reflect interest rate changes to their

fixed rate borrowers while they have to pay current prices to collect new funds from depositors. Thus, an unanticipated large increase in short-term interest rates may bring about a large-scale banking crisis.<sup>3</sup> The failure of hundreds of savings and loan associations (S&Ls) in the late 1980s in the US is partly because of the negative spreads between the rates obtained from assets and the rates paid on liabilities. In 1979-1980, interest rates reached record highs. Most of the deposits in the S&Ls were withdrawn in pursuit of these higher rates. S&Ls were forced to replace the fleeing deposits with new funds at competitive market rates, no matter what the cost. However, most of the long-term loans of the S&Ls had originated in an era of lower interest rates. The problem of negative spreads gets worse, the longer the maturity on the long-term loans. Thus, within these high interest rate conditions, negative spreads hurt S&L's, whose most mortgage loans mature in about 30 years, more than commercial banks, whose commercial loans mature no more than 3 to 7 years utmost (Kane, 1989).

Bank sector crisis may also take place because of widespread "looting" especially in countries where the banking sector is liberalized however bank supervision is not strong and legal remedies against fraud are easy to circumvent. The "looting" can take two forms: bank managers may invest funds in too risky projects or they may invest in projects that are sure failures however from which they can divert money for personal use. According to Akerlof and Romer (1993), looting behavior was at the center of the Chilean banking crisis of the late 1970s.<sup>4</sup> Widespread bank problems may also emerge in countries where stabilization programs are enforced to fight against high inflation. Chronic inflation in these countries created typically an overblown financial industry, which profit from the float on payments (English, 1996). When inflation is substantially beaten, banks observe that one of their main sources of revenue disappear, and generalized banking problems might succeed. Lindgren et al. (1996) explain recent banking difficulties in Brazil and Russia in this way.

Large open positions of banks in foreign exchange can be also a source of systemic banking crisis if domestic currency unexpectedly and notably

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<sup>3</sup> The short-term interest rates may jump due to a variety of reasons, such as increase in the rate of inflation, a shift towards more restrictive monetary policy that raises real rates, an increase in international interest rates, the removal of interest rate controls due to financial liberalization (Pill and Pradhan, 1995), the need to defend the exchange rate against a speculative attack (Valesco, 1987; Kaminsky and Reinhart, 1996).

<sup>4</sup> Akerlof and Romer (1993) also claim that S&L crisis of the U.S. was partly due to the looting behavior.

depreciates. According to Mishkin (1996), foreign currency debt was one of the reasons underlying banking crisis in Mexico in 1995, in the Nordic countries in the early 1990s, and in Turkey in 1994. Kaminsky and Reinhart (1996) report that currency crises often precede or accompany banking crises. A sudden flight of foreign capital might also cause a bank sector crisis, as it did in a number of Latin American, Asian, and Eastern European countries in the early 1990's. These so called "hot money" funds are usually welcomed for an expansion of domestic credit (Khamis, 1996). However, foreign capital is typically too sensitive to the sudden changes in the economic environment. If domestic interest rates fall, or confidence in the economy is shaken, foreign investors quickly withdraw their funds, and the domestic banking sector may become illiquid (Calvo et al., 1994). Banking crisis can also arise in countries with a fixed exchange rate because of speculative runs to the foreign currencies. If economic agents (foreign or domestic) expect a devaluation soon, they rush to withdraw their bank deposits to convert them into foreign currency deposits abroad making domestic banks illiquid, as it occurred in Argentina in 1995 (Demirgüç-Kunt, Detragiache, 1997).

If a bank lacks deposits insurance, and if the quality of its asset portfolio worsens, depositors may hurry to withdraw their deposits before the bank goes bankrupt. With a self-fulfilling mechanism, this single run might turn to a systemic crisis, if depositors of other banks perceive the run as a tip of iceberg-size systemic problems. Explicit or implicit deposit insurance schemes can help prevent such bank runs. Banks can purchase full or partial insurance on behalf of depositors from a government agency or from a private insurer. Alternatively, the insurance can take an implicit form if depositors rightly believe that the government will prevent the bank from failing or it will step in to compensate them in case of failure. On the other hand, if the premium paid is not proportionate to the riskiness of bank portfolios, then the deposit insurance can cause moral hazard by enticing banks to take on excessive risks (Kane, 1989). As discussed below, the presence of implicit or explicit government guarantees to depositors and/or other bank claimholders exacerbates moral hazard problems more especially in a liberalized environment where opportunities for bank managers to assume excessive risk are plentiful.

In recent years, all economic agents operate in a rapidly changing financial environment. The ongoing global structural developments are frequently attributed to deregulation of financial services industries in many countries around the globe in the last two decades. Demirgüç-Kunt

and Detragiache (1998), who studied the empirical relationship between banking crises and deregulation using a panel of data for 53 countries for 1980-95, reported that banking crises are more likely to happen in liberalized financial systems.<sup>5</sup> However, they also added that the impact of the financial deregulation on banking sector fragility is weaker where the institutional environment is strong, i.e., where there is respect for the rule of law, a low level of corruption, and good contract enforcement. Among other things, their study stresses the significance of effective prudential regulation and supervision of the banking system especially in a “*lassies faire*” environment. This could sound controversial at the onset, however, if it is read in such a way that to prevent the emergence of prospective banking crises before it gets too late, it is necessary for regulators to closely supervise banks and understand the adverse developments within them and within their environments leading to the systemic crisis, then the call for prudential supervision in a liberalized environment makes sense.

To help policy-makers in their endeavor to understand the mechanisms leading to banking crises, a number of studies were conducted. However, as noted earlier, most of these studies are case studies, only a few econometric analyses exist.<sup>6</sup> For example, Gonzales-Hermosillo (1996) employed an econometric model to predict bank failures utilizing

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<sup>5</sup> The authors suggest several reasons for this positive correlation between banking crisis and deregulation. (1) In a controlled financial system, bank-lending rates are subject to ceilings, which limit the riskier ventures. Once lending rates are freed during financial liberalization, it becomes possible for banks to run after riskier opportunities in return for a higher promised return. However, portfolio of risky ventures, no matter how well diversified, is usually still vulnerable to the risk of economic and financial shocks. (2) Managing the portfolio risk is a complex task and requires expertise, and bank personnel trained in a tightly protected financial system may lack the skills and experience necessary. (3) In a liberalized financial system where interest rates are market-determined, nominal interest rates are likely to be more variable than in a controlled one. (4) When liberalization takes place before a well-developed inter-bank market develops, banks may find it difficult to deal with temporary liquidity shortages. (5) Opportunities for banks to assume more risk arise in a liberalized environment. Thus, any mechanism that may prevent bank managers from appropriately evaluating the downside risk of their lending decisions, such as limited liability, implicit or explicit deposit insurance, and the erosion of bank franchise value, becomes especially dangerous in a liberal financial environment. (6) In many countries, restrictions on international capital movements were liberalized; either reduced or removed. This increased the vulnerability of banks especially because of their open positions in foreign exchange or the flight of the foreign capital in case of large devaluation or fall in domestic interest rates.

<sup>6</sup> Caprio and Kliengebiel (1995), and Lindgren, Garcia and Saal (1996) document widespread systemic crises around the globe in their extensive studies.

Mexican data for 1991-95. Also, Kaminsky and Reinhart (1996) investigated the behavior of a set of macroeconomic variables in the months before and after a banking crisis. Using data from 20 countries, their goal was to identify variables that will serve as “early warning signals” for financial distresses. Their results suggest that a loss of foreign exchange reserves, high real interest rate, low output growth, and a decline in stock prices tend to signal an approaching crisis. A few other empirical studies (Gorton, 1988; Caprio and Klingebiel, 1995; and Lindgren et al., 1996) suggested more or less similar types of factors that precede or accompany bank sector crises: cyclical output downturns, terms of trade deteriorations, declines in asset prices such as equity and real estate.

In their another empirical study, Demirgüç-Kunt and Detragiache (1997) discuss the causes of the banking crises in depth and try to determine the features of the economic environment that prepare the stage for such a system-wide fragility. They estimate the probability of a systemic crisis econometrically, employing a multivariate logit model on data from a large panel of countries, both industrial and developing, for the period 1980-1994. Countries that never experienced banking problems are also included in the panel as controls. The authors find that crises tend to happen in a weak macroeconomic environment characterized by slow GDP growth and high inflation. When these effects are controlled for, neither the rate of currency depreciation nor the fiscal deficit is significant. In addition, vulnerability to sudden capital outflows, low liquidity in the banking sector, a high share of credit to the private sector, and fast credit growth are found to be associated with a higher probability of banking crisis. Moreover, their results suggest that the presence of explicit deposit insurance is strongly associated with increased vulnerability in the banking sector, implying that moral hazard has a major role in inducing risk-taking behavior leading to the crisis. Using estimates of the cost of banking crises from Caprio and Klingebiel (1995), the authors also test whether the set of explanatory variables used in the logit model can also account for the severity of each crisis. They find that most of the same variables that tend to make crises more likely also tend to make them more costly.

Despite a large number of macroeconomic studies of financial crises as summarized above, the author knows of no study that tries to link system-wide financial problems with bank productivity and efficiency. Fukuyama (1995) measured bank productivity growth in Japan between 1989 and 1991, a period coinciding with the bursting of the stock market bubble

that resulted in a record level of problem loans in Japan's banks (estimated to be \$500 billion by 1990). His focus however was not to determine the impact of the crisis on bank performance as he made rare references to the relevant crisis. Assessing the results in his study, it could be stated that Japan's financial crisis had limited effect on the efficiency of its banks. Turkey has experienced several financial distresses in relatively short intervals in recent years such as the November 2000 and February 2001 economic crises. These late financial problems have a lot of commonalities with the previous 1994 currency and 1982 banker crises. To address future crises much better, it is essential for regulators, bank managers and investors to understand the dynamics that led to the past crises and their impact on banks and other economic agents. Resulting bank failures, reduced profits, worsened bank efficiency and productivity can be deemed as the cost of the mistakes made by banks and policy makers that brought in financial shocks. In this sense, the measurement of bank productivity and efficiency during crisis is in one way to quantify the adverse impact of this exogenous event on banks. Therefore, the study of bank productivity and efficiency has important policy and research implications. Despite its appeal, no study has measured yet the effect of the 1994 crisis on the productivity, technology and efficiency of Turkish banks. Utilizing a DEA-type Malmquist Total Factor Productivity Change index, this study attempts to determine the consequences of the 1994 crisis, especially in terms of its impact on bank productivity. Decomposing productivity change into its independent components, technological change and efficiency change, it also aims to trace the sources of the change in bank productivity. The model we employ also enables us to decompose the efficiency change component of bank productivity into its independent constituents, pure technical efficiency change and scale efficiency change, which lets us probe the causes of change in bank performance in more detail.<sup>7</sup>

### III. Descriptive Summary of the 1994 Economic Crisis

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<sup>7</sup> In fact, Ertuğrul and Zaim (1996) made a preliminary examination of the impact of the crisis on the non-stochastic efficiency scores of Turkish banks. Their results indicate that the crisis demonstrated little effect on bank efficiency. However, efficiency measures could be misleading if the production frontier and the number of firms are changing over time. In addition, although related, efficiency and productivity concepts refer to different aspects of bank performance. As productivity increases, efficiency can decline if the frontier banks advance more than the average bank in the industry from one period to another (see Wheelock and Wilson, 1999; Işık and Hassan, forthcoming, for further discussion).



In this section, we try to portray the scene around the crisis period, 1992-1996 in the light of the key economic and financial indicators provided by DİE (State Institute of Statistics), DPT (State Planning Organization) and TBB (Bank Association of Turkey), to put the later analysis into perspective.<sup>8</sup>

### 3.1. General Economy

The cardinal source of the structural problems facing the Turkish economy for the last two decades is believed to be the high budget deficits of the state and poorly managed enterprises. While the ratio of the public sector deficit to M2 (to GNP) was 26% (5%) in 1989, it climbed to 90% (16%) in 1993. High growth policies of the recent years based on domestic demand, despite the inadequate and scarce domestic resources, caused a record level of increase in foreign trade and current account deficits and debt stock. Trade deficit widened considerably reaching \$14 billion in 1993 as a reflection of the recent import boom. The Custom Union Treaty, signed with the European Union in 1996, feeds the expectations towards a further increase in trade and current account deficits, as signaled by \$19 billion trade deficit in 1996. As the capital account balance figures reveal, there was about \$4.5 billion capital flight from the country in 1994 as opposed to \$9 billion capital entrance in 1993. While the total debt stock (internal + external) was \$74 (23+51) billion (49 % of GNP) in 1991, it climbed to \$84 (28+56) billion (53% of GNP) in 1992, and then to \$100 (33+67) billion (56% of GNP) in 1993.

Celasun (1998) presents stylized facts about the 1994 crisis. Like many analysts (e.g.; Ertuğrul and Zaim, 1996; Işık and Hassan, 2000; Ersel, 2001), she claims that uncontrollably growing internal debt stock and mistakes made in its financing were the two main underlying reasons preparing the stage for the 1994 crisis. Having firmly decided to reduce the growing cost of bulky internal debt stock by cutting interest rates on government securities, the state chose to finance its high budget deficit and growth policies through resources advanced from the Central Bank. Toward this end, the state cancelled several auctions one after another relying on monetization. However, this inflationary loose monetary poli-

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<sup>8</sup> The discussion of the 1994 crisis here draws extensively from Celasun (1998) and Işık (1999). For an overall summary of the economic indicators during the crisis, please refer to the tables in those papers.

cy consequently triggered a speculative attack against the foreign currency. Economic agents sooner realized the monetization attempt and began to switch their TL-denominated assets to foreign ones in a panicking mood (currency substitution). With continuously increasing borrowing need as implied by its high PSBRs (public sector borrowing requirement), the state that was already facing hardship to borrow for long maturities began to fail to raise funds at all from internal markets. In response, the government turned to the international loan markets to meet its borrowing needs. However, the degradation of the country's credit rating by the Moody's and Standard and Poor's in January 1994 restricted the ability of the state, to a great extent, to borrow internationally, as well. As a result of these policy errors, interest rates rose sharply while maturities shortened further. The state that was reluctant to go with market-determined interest rates around 70-80% at the end of 1993 had to accept rates around 400% in the middle of 1994, which in turn increased the service burden of the debt stock further.

At the annual rate, the economy contracted by 10% in the second quarter of 1994. Already chronic inflation, which used to be pronounced in two-digit numbers, reached a three-digit level, increasing from 71% in 1993 to 126% in 1994. Within this uncertainty, both public and private sectors reduced their fixed capital investments (by 29% and 10% of GNP, respectively). The GNP growth was about 10% in 1990, and 8% in 1993, which are just a reflection of the long-lasting trend in the recent years. The remarkable trend in GNP growth rate in recent years was significantly disrupted in 1994. The reversal was historic: the GNP loss was 6% in 1994, the highest level of output loss ever experienced in the country. Reflecting the general trend in the economy, the Istanbul Stock Exchange (ISE) index decreased by half from 833 in 1993 to 413 in 1994 in terms of US dollars. Furthermore, parallel to the fall in income per capita, from \$3,056 in 1993 to \$2,161 in 1994, total consumption of the economic units dropped by 3.2% in 1994.

Due to the increased uncertainty in the financial markets and failure in price stability, demand for the Turkish Lira (TL) decreased whereas the demand for foreign currency surged drastically. The escape from the TL exacerbated even more due to the continuous usage of the Central Bank resources by the state (monetization), speculative expectations, departure of the foreign money from the country and desperate efforts of the banks to close their large open positions. However, neither the devaluation of the TL by 50%, nor the jump in overnight interest rates from 70 % to the lev-

els as high as 1,000 % at times stopped the run away from the TL.<sup>9</sup>

### 3.2. Financial Industry

The panic atmosphere adversely affected the banking sector, as well, which is firmly linked to all other sectors in the economy. Banks faced management problems to reduce increased portfolio risks as well as liquidity problems to meet the withdrawals by the public and to pay back mountainous short term international loans called back earlier than their maturity. Three commercial banks could not manage to pass through this turbulent environment. Since they failed to meet their internal and external liabilities, the state took these three banks into receivership and liquidated their assets. Following these adverse developments, the state fully insured the TL and foreign exchange denominated savings deposits to recover the public confidence in the viability of the financial system and to prevent a possible systemic risk.

Turkish banks, which had been intensively involved in offshore borrowing during the period of 1992-1993, were mainly investing their foreign funds in TL denominated portfolio of assets, predominantly in government securities. The share of the foreign exchange liabilities in total liabilities steadily increased reaching almost half of the balance sheet in 1994 (37% in 1992, 43% in 1993, and 47% in 1994). Thus, banking sector entered 1994 with large open positions and bulky government paper stocks. Threatened by the uncertainty in the economic environment, Turkish banks spent an enormous effort to close their large open positions, which had risen to levels as high as to account for 5 and 6% of their balance sheets in 1992 and 1993, respectively. Under conditions of easy access to capital markets, this case would not be a problem for the profitable banking sector. However, following the downgrading of Turkey's credit rate, their access to the international markets was restricted to a great extent. Making things worse, in addition to the high rate of the devaluation of the TL and skyrocketed interest rates, Turkish banks had to pay over \$7 billion net foreign debts in 1994.

As a result of these adverse events, the balance sheets of the banks shrunk substantially, by 28 %, decreasing from \$72 billion (41% of GNP) to \$52 billion (38% of GNP).<sup>10</sup> Foreign branches experienced the biggest

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<sup>9</sup> The percentage depreciation of the TL was about 16, 6, 18, and 35 during the first four months of 1994, respectively (Celasun, 1998).

fall in total assets (42.1 %), followed by foreign subsidiaries (41.0 %), national private banks (31.8%), and state banks (22.5%). Reflecting the contraction in economic activities and reluctance of banks to do business in an uncertain environment, total bank loans decreased dramatically from \$30 billion in 1993 to \$20 billion in 1994. Justifying the bankers' concerns, the volume of non-performing loans more than doubled climbing to TL 32,000 billion (4.1% of total loans) in 1994 from just TL 13,000 billion (3.1% of total loans) in 1993. The total net income of the banks fell by 41% from \$1,956 million in 1993 to \$1,145 million in 1994. Consequently, the safety cushion of the banks became thinner in this turmoil: while the total equity of the banking sector was \$4,815 million (6.6% of the total assets) in 1993, it dropped to \$3,234 million (6.2% of the total assets) in 1994.

### 3.3. The Impact of the Crisis on Banking Behavior

Subsequent to the significant contraction of the bank balance sheets in 1994, there has been a substantial change in bank's attitudes toward risk and investment and funding policies. Table 1 compares the composition of the balance sheet of banking groups between 1991 and 1993 with that in 1994 and between 1995 and 1996. The figures are average fraction of major items in total assets (liquid assets and loans) and total liabilities (core deposits and purchased funds) for the relevant periods.

State and foreign banks, except for domestic private banks, appear to have increased the fraction of liquid assets and decrease the fraction of loans in their assets. The most striking observation, however, is that all groups increased the proportion of core deposits and decreased the proportion of non-deposit (purchased) funds in their liability structure after the crisis. The increase in core deposits by all groups confirms the reversal of downsizing trend in the commercial banking after 1994, as also evidenced by the upward trend in the number of bank branches and employees beginning from 1994.

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<sup>10</sup> The phrase "banks" we use here corresponds to all banks (development and investment banks as well as commercial banks) in the system.

**Table 1: Asset and Liability Structure in Turkish Banks by Group During the 1994 Crisis (% of Assets)**

<b>Groups →</b>	<b>State Banks</b>			<b>Private Banks</b>			<b>Foreign Banks</b>		
<b>Periods →</b>	92-93	94	95-96	92-93	94	95-96	92-93	94	95-96
<b>Liquid Assets</b>	0.36	0.37	0.34	0.43	0.43	0.40	0.57	0.60	0.59
<b>Loans</b>	0.41	0.38	0.42	0.40	0.38	0.41	0.33	0.26	0.27
<b>Core Deposits</b>	0.63	0.70	0.77	0.55	0.69	0.68	0.22	0.39	0.60
<b>Purchased Funds</b>	0.17	0.14	0.09	0.23	0.09	0.11	0.51	0.27	0.12

Note: Liquid assets include cash, dues from banks, central bank deposits, deposits in other financial institutions, inter-bank funds sold, reserve requirements and investment securities (treasury bills, government bonds and others). Loans contain short and long term loans as well as loans to special sectors. Core deposits encompasses the TL and foreign currency denominated demand and time deposits. Purchased funds are inter-bank funds borrowed, funds borrowed from Central Bank, domestic banks, abroad and other sources, and funds raised issuing securities.

As being the most influenced group from the 1994 crisis, the reaction from foreign banks is the most dramatic. Foreign banks seem to have reduced their financial investments in the country, as evidenced by the fall of average fraction of loans in their assets from 36% between 1991-1993 to 26% in 1994 and 27% between 1994-1996. This fact can also be observed from the drop of foreign banks' share in the loan market. As a matter of fact, Table 1 reveals another significant observation for foreign banks, a rational response to the increased risk in the business environment in the 1990s: substitution of riskier commercial and industrial loans with lucrative and less risky government securities.<sup>11</sup> Since 1992, more than half of their assets have turned to be within the category of liquid assets, which mainly consist of treasury bills and bonds of the Turkish government. This concentration in investment securities coincides with the initial motive of the foreign banks, which entered the Turkish market primarily to invest in the papers of the always fund-needy Turkish government. Moreover, after 1994, foreign banks started to use more deposit funds and less purchased funds. As the fraction of their core deposits in total liabilities increased impressively from 22% before 1994, to 39% in 1994, and 60% after 1994, the fraction of their purchased funds fell sharply from 51%, to 27% and then 12% during the relevant periods. The

<sup>11</sup> In \$ US basis, the average real interest rate in the 3-6 month and 6-9 month T-bills and government bonds were 9% and 27%, 43% in 1995, and 9%, 18% and 15% in 1996, respectively. As of the end of 1995, 82% of the banks' securities portfolio consists of public sector securities such as treasury bills, government bonds and revenue sharing certificates (source: Banks in Turkey 1996).

fact that foreign banks more than doubled the portion of core deposits in their liabilities implies that foreign banks decided to stay and pursue growth by increasing their presence in the local deposit market. To reduce the volume of their expensive purchased funds as a funding source, however, they had to strengthen their work force to compete more effectively with domestic banks for scarce transaction deposits. In order to accomplish this, foreign banks increased the number of their bank personnel by 35% in 1994 and 6% in 1996 (11% increase on average between 1994 and 1996).

Another behavioral change observed in Turkish banking is banks' efforts to issue domestic loans denominated in foreign currency to reduce their exposure to foreign exchange risk, which is "freshly proved-to-be too dangerous" in a volatile economic environment. However, it should be noted that this policy is not elimination however simply a transfer of foreign exchange risk to the borrowers. As evidenced by a large number of credit failures following the huge depreciation of the Turkish Lira in the case of a state bank's DM-denominated home loans, an increase in problem loans can still hurt bank profitability and safety to a large extent.

### **3.4. The Remedial Measures Undertaken to Stabilize the Financial System**

Throughout the crisis, the priority was given to the stabilization of the financial markets and prevention of a possible systemic risk, whose likelihood rose especially after the liquidation of three private banks. In the short-run, to "tranquilize" the system, as noted earlier, the Central Bank first insured 100% of all bank deposits (TL or Euro dollar) at the end of April 1994. Parallel to this development, the insurance premiums for bank deposits have been increased. In order to increase demand for the TL, reserve and liquidity requirement rates for banks were revised. Following the stabilization program, the IMF extended a stand-by credit of \$742 million with the condition that structural reforms would be implemented rapidly to help cure the macro-imbalances of the country with deep historic roots.

The government announced its internationally supported stabilization program in addressing the country's notorious macro-problems, which require long-term solutions. The main theme of the program was to increase government revenues and decrease government expenses, whereby to narrow its wide and chronic budget deficit. The government had frozen the prices of the goods the state economic enterprises (SEE) pro-

duce, waiting an increase for about 6 months, not to create an unfavorable impression on public, which will hurt it in the approaching elections. Just after the elections, the prices of the products manufactured by the SEEs were increased substantially by 70% to 100%. Advances of the Central Bank to the Treasury, which was the principal source of the monetization and in turn inflationary pressures in the system, were substantially constrained. The limit that was 15% of the budget in 1994 was projected to be 12% in 1995, 10% in 1996, 6% in 1997, and eventually 3% in 1998. In this line, the planned consolidated government deficit was also halved for 1994. Moreover, one-time taxes, such as taxes on the net assets of firms, supplementary real estate, transportation and economical balance taxes, were designed to create more additional revenues for the government. Public revenues increased by about 2% of GNP owing to these once-off tax measures. Also saving polices were imposed to all state institutions, which translate itself to decreasing the payroll expenses, and reducing the public investments. The state froze the wages of its public employees. As a result of this budgetary discipline, public investment fell by 28.4% while public consumption dropped by 2.8% (Celasun, 1998).

In the second half of 1994, as a result of the decisive and determined application of the urgent short-term measures by the state, the stability in the financial sector, to a great extent, has been achieved. The first positive sign was the restored ability of the state to raise funds again in May 1994 from the internal borrowing market, which indeed disappeared until then. Because of a suppression on price level and wage freeze, investment in these government securities were supra-profitable in real terms, which is no wonder they were called “super bonds”, and helped greatly to the recovery of the demand for TL.<sup>12</sup> The narrowing budget deficit, limitation of monetization through restrictions on advances from the Central Bank, meeting the state’s borrowing requirement mostly from internal markets despite the high real interest rates, as well as contraction in the economic activities because of declining purchasing power were among the consequences that served the stability in the system. Banks, badly shaken by the shock, spent the rest of the year fortifying their positions and cleaning the “mess” left behind. In spite of high cost of funding and devaluation of the TL, banks managed to meet their both internal and external obligations, mostly through liquidating their short term assets and creating new TL

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<sup>12</sup> The Treasury borrowed substantial amounts offering 3-month maturity T-bills at compounded annual rates around 400%.

resources, not to make their credit risk turn to a country risk. As a result of the common effort of the economic agents, in 1995, the economy rebounded as evidenced by impressive 8.1% GNP growth. As well, inflationary expectations mitigated as signaled by 80% inflation rate, which is still high however much lower as compared to 126% inflation rate in 1994, the funds that escaped from the financial system started to return back, reversing the shrinkage in banking business, as implied by 31% growth in total banking assets in 1995 as opposed to about 30% contraction in 1994. Similarly, there has been an apparent improvement in all other economic and financial indicators of the country in 1995 and 1996, as well (Celasun, 1998 and Işık, 2000).

The 1980s saw a series of financial reforms, some of which are the deregulation of interest rates and foreign exchange transactions, reducing entry barriers to the sector, establishment of inter-bank and stock market, etc., to liberalize the banking business and increase its competitiveness in pursuit of higher productivity and efficiency in provision of financial services. The reforms indeed succeeded to foster efficiency and productivity in banking in Turkey as evidenced by immense efforts of banks to downsize their work force and branch offices throughout the 1980s (Zaim, 1995; Denizer, 1997; Ertuğrul and Zaim, 1996; Işık and Hassan, forthcoming). It is of concern to see what happened to the positive trend in productivity and efficiency of banking business in the post-liberalization period, especially during the financial chaos of 1994. Our objective in this study is to show the magnitude of the impact of this financial fragility on the productivity of the Turkish banks. Although it looks that the whole economy suffered in 1994 and recovered in 1995, it is an empirical issue to study the influence of such a devastating exogenous factor on banking performance by examining the impact of the crisis on banking technology, whether there was a shock to the technology, and investigating the effect of the crisis on banking efficiency, whether the endeavor of the banks to catch up with the best-practice banks was disrupted. To the extent that a loss in productivity, aside from substantial asset loss, arose from the policy errors made by the state in 1994, the resulting waste of resources may be viewed as another but influential wake-up call for the policy makers to rigorously implement the medium and long-term goals of the New National Economic Policy of 1980 and the Stabilization Program of 1994, which have not been addressed yet.



#### IV. The Measurement of the Total Factor Productivity Change with Malmquist Index

There are two well-known indexes in the literature to measure total factor productivity change in decision-making units (DMUs), the Tornqvist (1936) index or the Malmquist (1953) index. In order to investigate the impact of the 1994 economic crisis on banking productivity, we choose the Malmquist productivity index, which is dubbed after Sten Malmquist, a Swedish economist and statistician. We measure productivity change as a geometric mean of two Malmquist productivity indexes. The Malmquist index is preferable to the Tornqvist index in conducting productivity analysis because the former unlike the latter uses exclusively quantity information and thus demands neither problematic price information nor a restrictive behavioral assumption in its calculation. Also, unlike the latter index, which is translog, the former index can be obtained by utilizing a nonparametric approach, which yields deterministic index numbers, yet does not necessitate a possibly unwarranted specification of production function. Furthermore, the Malmquist index has informational advantage over the Tornqvist index in the sense that it allows one to isolate catching up to the frontier (efficiency change) from shifts in the frontier (technology change).<sup>13</sup>

Within the context of consumer analysis, Malmquist (1953) used input distance functions to compare two consumption bundles, e.g., one observed in year  $t_2$  and one observed in year  $t_1$ , with respect to a reference set, e.g., indifference curve of a consumer. In this sense, his quantity index is a measure showing by what factor the quantities in year  $t_2$  should be scaled to give a consumer the same utility in year  $t_1$ . In 1982, Caves, Christensen and Diewert (henceforth, CCD) carried the Malmquist's idea to production analysis. When measuring the scale factor, CCD exploited the Shephard concept of distance functions. Unlike CCD, Fare et al. (1985) defined the Malmquist index by exploiting the relationship of distance functions to the technical efficiency measures of Farrell (1957). Also, CCD demonstrated that the Tornqvist index is equal, under certain conditions, to the geometric mean of a pair of Malmquist indexes.<sup>14</sup> However, CCD presumed that production is always efficient, an assump-

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<sup>13</sup> The only disadvantage of the Malmquist index is that it is nonstochastic and so statistical inference is precluded.

<sup>14</sup> The conditions are that all second-order terms must be constant over time and the underlying functional form for technology must be translog.

tion with which it is impossible to trace the sources of productivity growth. Fare et al. (1989) adapted the Malmquist index to the case of inefficient observations, which made it possible to decompose productivity change into its mutually exhaustive and exclusive constituents.

As in Fare et al. (1994), we adopt the output-orientated Malmquist index to measure productivity change. Consider that  $N_t$  banks employ  $p$  inputs to produce  $q$  outputs for each time period  $t = 1, 2, \dots, T$ . Transformation of the vector of inputs,  $\mathbf{x}_t \in \mathfrak{R}_+^p$ , into the vector of outputs,  $\mathbf{y}_t \in \mathfrak{R}_+^q$  during the production process is represented by the function,  $F_t$ :

$$F_t = \{(x, y): x \quad \text{can produce } y \text{ at time } t\}, \quad (1)$$

which is simply the production possibilities set, the set of all feasible combinations of inputs and outputs, at time  $t$ .<sup>15</sup> By forming the upper boundary (frontier) of  $F_t$ , the best-practices in the sample define the efficient production technology at time  $t$ . The frontier constructed, however, is not static however subject to change perhaps due to innovation, shocks (crises), changes in the market structure and regulatory treatment of banks over time, or perhaps some other factors. Letting that  $x_t$  and  $y_t$  represent the observed input and output vectors of a bank at time  $t$ , respectively, the Shephard (1970) output distance function relative to the technology existing at time  $t$  is defined as:

$$d_t(\mathbf{x}_t, \mathbf{y}_t) = \inf \{ \phi : (\mathbf{x}_t, \mathbf{y}_t / \phi) \in F_t \}. \quad (2)$$

which gives a normalized measure of the distance from the location of a bank in the input/output space to the production frontier at time  $t$  in the hyper plane, where inputs are held fixed. Thus, the distance of a combination of  $x_t$  and  $y_t$  to the frontier can be as low as zero and as high as one if measured relative to the contemporaneous technology (i.e.,  $0 \leq d_t(x_t, y_t) \leq 1$ ), however it can be higher than one if measured relative to the technology of another period (i.e.,  $0 \leq d_{t+1}(x_t, y_t) [\leq \text{or } >] 1$ ).

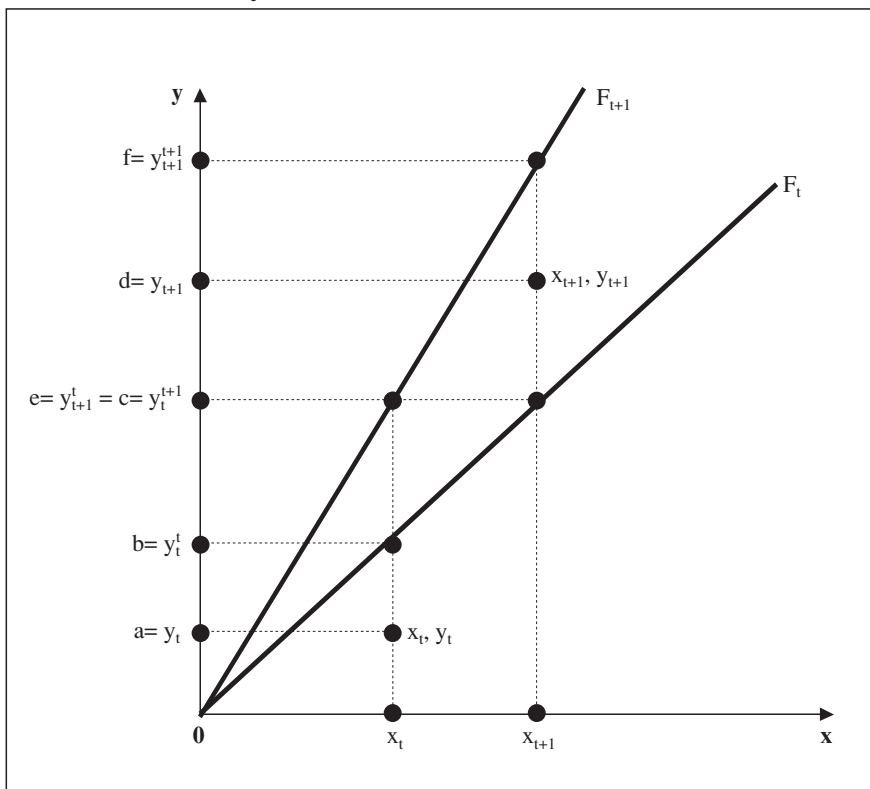
Using a simple case of single-input/single-output and constant return to scale (CRS), Figure 1 illustrates these concepts. Assume that in year  $t$ , a bank was observed at the combination  $(x_t, y_t)$ , whereas in year  $t+1$ , it was observed at the combination  $(x_{t+1}, y_{t+1})$ . In this multi-period setting,

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<sup>15</sup>  $F_t$  is assumed to satisfy certain conditions which make it possible to obtain meaningful output distance functions (see Shephard, 1970).

there are two corresponding benchmark banks for both observations. The first year observation  $(x_t, y_t)$  can be compared with either the efficient point on its contemporaneous frontier  $(x_t, y_t^1)$  or the efficient point on the next year frontier  $(x_t, y_t^{t+1})$ . Likewise, the second year observation  $(x_{t+1}, y_{t+1})$  can be assessed with respect to either the efficient point on its contemporaneous frontier  $(x_{t+1}, y_{t+1}^{t+1})$  or the efficient point on the previous year frontier  $(x_{t+1}, y_{t+1}^t)$ . When measured relative to their-own contemporaneous frontiers, both observations represent feasible but technically inefficient production points because they are interior to the frontiers. However, the bank observed at  $t+1$   $(x_{t+1}, y_{t+1})$  does better than the benchmark efficient bank at  $t$ ,  $(x_{t+1}, y_{t+1}^t)$ , i.e., the bank at  $t+1$  became able to produce more output,  $d$ , than the corresponding efficient bank at  $t$  would do in the previous year,  $e$ , with the same level of input,  $x_{t+1}$ .

**Figure 1: The Output Distance Functions and Malmquist Out-Orientated Productivity Index**



Fare et al. (1994) specifies the output-orientated Malmquist total factor productivity change (TFPC) index,  $M$ , as the geometric mean of two Malmquist productivity indexes,  $M_1$  and  $M_2$ . The first term in Equation 3 ( $M_1$ ) represents the Malmquist productivity change index obtained relative to the benchmark technology in period  $t$ , whereas the second term ( $M_2$ ) represents the Malmquist productivity change index calculated relative to the benchmark technology in period  $t+1$ . The representation of productivity change as geometric mean of these two output based Malmquist TFP indexes [ $M = (M_1 \times M_2)^{1/2}$ ] precludes arbitrariness in choosing the reference technology.  $M$  defines the productivity of the production point  $(x_{t+1}, y_{t+1})$  with respect to the production point  $(x_t, y_t)$  according to both years' technologies.  $M$  can attain a value greater than, equal to, or less than unity depending on whether the bank  $i$  experiences productivity growth, stagnation or productivity decline, respectively, between periods  $t$  and  $t+1$ .

$$M(y_{t+1}, x_{t+1}; y_t, x_t) = \left[ \frac{d_t(x_{t+1}, y_{t+1})}{d_t(x_t, y_t)} \times \frac{d_{t+1}(x_{t+1}, y_{t+1})}{d_{t+1}(x_t, y_t)} \right]^{1/2} \quad (3)$$

Fare et al. (1989, 1992) wrote the equation (3) in such a way that one could determine the sources of the productivity change:

$$\underbrace{M(y_{t+1}, x_{t+1}; y_t, x_t)}_{\text{TFPCH}} = \underbrace{\frac{d_{t+1}(x_{t+1}, y_{t+1})}{d_t(x_t, y_t)}}_{\text{EFFCH}} \times \underbrace{\left[ \frac{d_t(x_{t+1}, y_{t+1})}{d_t(x_t, y_t)} \times \frac{d_{t+1}(x_{t+1}, y_{t+1})}{d_{t+1}(x_t, y_t)} \right]^{1/2}}_{\text{TECHCH}} \quad (4)$$

When written in terms of output distances on the  $y$ -axis, the equation (4) takes the following form:

$$\underbrace{M(y_{t+1}, x_{t+1}; y_t, x_t)}_{\text{TFPCH}} = \underbrace{\left( \frac{0d}{0f} \right) \times \left( \frac{0b}{0a} \right)}_{\text{EFFCH}} \times \underbrace{\left[ \left( \frac{0b}{0d} / \frac{0e}{0f} \right) \times \left( \frac{0a}{0b} / \frac{0a}{0c} \right) \right]^{1/2}}_{\text{TECHCH}} \quad (5)$$

$$\underbrace{M(y_{t+1}, x_{t+1}; y_t, x_t)}_{\text{TFPCH}} = \underbrace{\left( \frac{0d}{0f} \right) \times \left( \frac{0b}{0a} \right)}_{\text{EFFCH}} \times \underbrace{\left[ \left( \frac{0f}{0e} \right) \times \left( \frac{0c}{0b} \right) \right]^{1/2}}_{\text{TECHCH}}$$

In the above two forms, (4) and (5), the Malmquist Total Factor Productivity change index (TFPCH),  $M$ , is defined simply as the product of efficiency change (EFFCH), how much closer a bank gets to the efficient frontier (catching up), and technological change (TECHCH), how much the benchmark production frontier shifts at each bank's observed input mix (innovation or shock). EFFCH index takes a value greater than 1 in case of efficiency increase, zero in case of no efficiency change, or less than 1 in case of efficiency decrease, between periods  $t$  and  $t+1$ . Similarly, TECHCH attains a value greater than 1 in case of technical progress, zero in case of stagnation, or less than 1 in case of technical regress, between periods  $t$  and  $t+1$ .

In order to measure the productivity change, we obtain  $M$  utilizing a mathematical (linear) programming technique, Data Envelopment Analysis (DEA). For the time being, we assume that CRS technology exists: all banks are scale efficient, however later we will relax this assumption to decompose EFFCH in addressing scale efficiency issues. To get  $M$ , we need the four component distance functions in the equation (3), which involves four linear programming (LP) problems for each bank in the sample.

First,  $d_t(x_t, y_t)$  is obtained solving the following CRS output-oriented LP:

$$\begin{aligned}
 & [d_t(x_t, y_t)]^{-1} \max_{\phi, \lambda} \phi, \\
 & \text{s.t.} \\
 & -\phi y_{it} + Y_t \lambda \geq 0, \\
 & x_{it} + X_t \lambda \geq 0, \\
 & \lambda \geq 0,
 \end{aligned} \tag{6}$$

The remaining three LP problems, (7), (8), and (9), are simple variants of (6):

$$\begin{aligned}
 & [d_{t+1}(x_{t+1}, y_{t+1})]^{-1} \max_{\phi, \lambda} \phi, \\
 & \text{s.t.} \\
 & -\phi y_{i,t+1} + Y_{t+1} \lambda \geq 0, \\
 & x_{i,t+1} + Y_{t+1} \lambda \geq 0, \\
 & \lambda \geq 0,
 \end{aligned} \tag{7}$$

$$\begin{aligned}
& [\mathbf{d}_{t+1}(\mathbf{x}_{t+1}, \mathbf{y}_{t+1})]^{-1} \max_{\phi, \lambda} \phi, \\
& \text{s.t.} \\
& -\phi \mathbf{y} \mathbf{y}_{i,t+1} + \mathbf{Y}_t \lambda \geq \mathbf{0}, \\
& \mathbf{x}_{i,t+1} + \mathbf{Y}_t \lambda \geq \mathbf{0}, \\
& \lambda \geq \mathbf{0},
\end{aligned} \tag{8}$$

$$\begin{aligned}
& [\mathbf{d}_{t+1}(\mathbf{x}_t, \mathbf{y}_t)]^{-1} \max_{\phi, \lambda} \phi, \\
& \text{s.t.} \\
& -\phi \mathbf{y} \mathbf{y}_{it} + \mathbf{Y}_{t+1} \lambda \geq \mathbf{0}, \\
& \mathbf{x}_{it} + \mathbf{Y}_{t+1} \lambda \geq \mathbf{0}, \\
& \lambda \geq \mathbf{0},
\end{aligned} \tag{9}$$

where  $\lambda$ 's represent intensity variables showing at what intensity a particular activity may be used in production. Also,  $1 \leq \phi < \infty$  and  $\phi - 1$  is the proportional increase in outputs that could be realized by the  $i$ 'th DMU, with input quantities held constant. The  $\phi$  and  $\lambda$ 's are likely to take different values in the above four LP's. Farrel technical efficiency (TE) index is given by  $1/\phi$  and attains a value between zero and one.<sup>16</sup> Finally, we can also decompose the (CRS) technical efficiency change into scale efficiency and pure technical efficiency components (EFFCH = PEFFCH x SCH). This requires the calculation of distance functions under variable returns to scale (VRS) (instead of a CRS) technology, enforcing us to solve two additional LP problems (when comparing two production points). To achieve this, we simply repeat LP's (6) and (7) with the convexity restriction ( $\sum \lambda = 1$ ) added to each. We then use the CRS and VRS values to calculate the scale efficiency effect residually.<sup>17</sup>

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<sup>16</sup> In LP's (8) and (9), where production points are compared to technologies from different time periods, the  $\phi$  parameter need not be  $\leq 1$ , as it must be when calculating Farrel efficiencies. It may be that the point could lie above the feasible production set. This will most likely arise in LP (8) where a production point from period  $t+1$  is compared to technology in period  $t$ . If technical progress has occurred, then a value of  $\phi < 1$  is possible. It could also possibly occur in LP (9) if technical regress occurred; however this is less likely.

<sup>17</sup> See Fare et al. (1994, p.75) for more on scale efficiencies.

## V. Empirical Setting

In this section, we analyze performance of banks before (1992-1993), during (1994) and after the crisis (1995-1996). More plainly, what was the productivity level before the 1994 crisis (e.g., in 1993 with respect to the 'healthy' 1992), during the crisis (e.g., in 1994 with respect to the 'healthy' 1992), after the crisis (e.g., in 1995 and 1996 with respect to the 'healthy' 1992)? As implied, the 1992 year is used as reference year when calculating the productivity and efficiency change in the later years. There is no obvious significant (positive or negative) development or event in 1992, so it could safely serve as a control year.

Fukuyama (1995) used only one year (1989) before the collapse of the bubble economy in Japan in 1990 and one year (1991) after the collapse for comparison. He also used a subsequent year technology as reference (e.g., 1990 with respect to 1989; 1991 with respect to 1990) instead of using fixed reference technology (e.g., 1990 with respect to 1989; 1991 with respect to 1989). Crisis is a fundamental event, or a natural phenomenon, whose sources and causes might have formed in a longer time period and its signals might have been sent years earlier before its realization, and whose impacts could last many years after its occurrence. Therefore, unlike Fukuyama (1995), we use a longer time period (1992-1996) and a fixed reference technology (1992) in our analysis.

### 5.1. Data

For appropriate and fair performance comparisons between different banking groups, the homogeneity of the outputs produced by each group becomes critical. Because of their rather different structure and small share in the system (about 6% in 1996), we exclude development and investment banks and instead focus on only commercial banks. We obtained the data for defining inputs and outputs of the Turkish commercial banks in constructing their productivity and efficiency indexes, from several issues of the Banks Association of Turkey, which publishes annual financial statements of the banks (foreign or domestic) operating in Turkey. Our panel data is balanced, i.e., we study the adventure of the same set of banks before and after the crisis. Thus, we exclude the observations of banks, which started or quitted their operations during the period of analysis (1992-1996). Having excluded a few bank observations due to either the above selection process, or doubtful nature of their input or output values (whether stated as zero or too low or high), our sample consists of more than 95% of the banks (54 banks) in each year.

## 5.2. Definition of Bank Inputs and Outputs

In order to compute efficiency and productivity of banking firms, one first should decide on banking technology. This boils down to understanding production process in banking: what factors of production (inputs) are employed by banks to produce various financial services and products (outputs). This study adopts the so-named intermediation approach to define the inputs and outputs of banks. Accordingly, all variables except for the input factor labor are measured in millions of U.S. dollars.<sup>18</sup>

The input vector includes (1) labor [LABOR], (2) capital, [CAPITAL], and (3) loanable funds [FUNDS]. We measure the quantity of labor by the number of full-time employees on the payroll, capital by the book value of premises and fixed assets, and loanable funds by the sum of deposit (demand and time) and non-deposit funds as of the end of the respective year.<sup>19</sup> The output vector includes (1) short-term loans [ST\_LOANS], (2) long-term loans [LT\_LOANS], (3) risk-adjusted off-balance sheet items [RA\_OFF\_B/S], and (4) other earning assets [OTHER\_EA]. Short-term loans and long-term loans comprise the loans with less than and more than a year maturity, respectively.

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<sup>18</sup> The denomination of the variables in \$U.S. is expected, to an extent, to eliminate the adverse impact of the inflation on the real magnitudes.

<sup>19</sup> Non-deposit funds include borrowed funds from inter-bank, central bank, domestic banks, abroad and others as well as funds raised by issuing securities. Special loans were peculiar to only a number of banks and significant in volume. Exclusion of special loans would probably lead to underestimation of the technical and cost efficiencies for these banks.



Table 2: Sample Statistics of Variables: Bank Outputs, Inputs and Size (Millions of U.S. Dollars)\*

Banks → Vars. ↓	Banking Industry		State Banks		Private Banks		Foreign Subsidiaries		Foreign Branches	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
<b>a. Outputs</b>										
<b>ST_LOANS</b>										
1992	279.739	429.384	632.847	563.845	375.880	470.269	57.511	64.397	24.235	28.709
1993	307.875	456.854	516.238	412.045	448.737	538.438	61.011	58.260	24.841	33.734
<b>1994</b>	<b>207.132</b>	<b>348.243</b>	<b>438.696</b>	<b>431.187</b>	<b>289.967</b>	<b>394.583</b>	<b>27.517</b>	<b>46.771</b>	<b>9.398</b>	<b>9.968</b>
1995	312.879	512.347	726.947	474.374	407.424	585.831	47.541	81.053	18.476	25.997
1996	399.620	579.651	777.464	582.936	550.939	646.778	62.558	97.519	15.920	18.313
<b>LT_LOANS</b>										
1992	27.688	80.372	99.175	89.499	30.881	97.655	3.256	7.098	0.559	0.921
1993	38.128	106.179	87.906	73.902	53.547	137.823	1.351	2.198	0.415	0.846
<b>1994</b>	<b>31.465</b>	<b>89.313</b>	<b>75.319</b>	<b>55.029</b>	<b>43.536</b>	<b>116.698</b>	<b>2.056</b>	<b>2.325</b>	<b>0.279</b>	<b>0.663</b>
1995	26.055	62.372	113.638	54.613	26.527	69.178	1.578	1.821	0.451	0.842
1996	43.940	108.539	114.006	97.241	57.615	132.014	1.755	3.239	0.397	0.825
<b>RA_OFF_B/S</b>										
1992	389.517	554.049	969.146	637.297	488.838	603.852	111.509	99.635	47.997	65.895
1993	466.122	634.341	853.394	765.135	633.453	703.656	184.557	256.882	44.108	50.773
<b>1994</b>	<b>351.300</b>	<b>508.860</b>	<b>743.540</b>	<b>601.739</b>	<b>460.861</b>	<b>571.852</b>	<b>112.298</b>	<b>143.014</b>	<b>44.052</b>	<b>53.370</b>
1995	711.775	886.582	1365.441	834.361	891.853	1002.875	314.855	202.478	143.374	201.401
1996	844.110	1112.286	13338.627	835.076	1119.251	1301.483	316.721	406.090	179.542	245.201
<b>OTHER_EA</b>										
1992	261.640	849.261	1758.808	2112.524	115.265	156.412	22.286	28.976	13.426	15.976
1993	265.601	977.111	1866.628	2598.014	106.070	124.075	30.064	44.678	5.608	4.659
<b>1994</b>	<b>187.656</b>	<b>668.781</b>	<b>1229.705</b>	<b>1795.199</b>	<b>93.144</b>	<b>151.369</b>	<b>19.709</b>	<b>25.857</b>	<b>5.993</b>	<b>9.012</b>
1995	259.233	916.950	1973.279	2650.565	129.306	178.291	24.353	17.964	7.353	9.234
1996	380.295	1252.335	2693.410	3570.886	208.931	271.220	64.567	100.873	12.734	16.503

Table 2: Sample Statistics of Variables: Bank Outputs, Inputs and Size (Millions of U.S. Dollars) (Continued)\*

Vars. ↓	Banking Industry		State Banks		Private Banks		Foreign Subsidiaries		Foreign Branches	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
<b>b. Inputs</b>										
<b>LABOR</b>										
1992	2661	6338.84	13,037	13,797.945	2231	3843.745	253	415.143	67	34.108
1993	2555	6117.234	12759	13531.530	2122	3566.055	185	211.464	67	38.990
1994	<b>2489</b>	<b>5906.359</b>	<b>12410</b>	<b>13049.107</b>	<b>2040</b>	<b>34110.034</b>	<b>278</b>	<b>461.798</b>	<b>69</b>	<b>49.422</b>
1995	2522	5760.688	14540	12772.644	1969	3141.095	308	493.754	75	72.264
1996	2620	5592.297	14057	12261.901	2194	3092.587	319	534.990	85	98.178
<b>CAPITAL</b>										
1992	55.965	171.107	304.057	445.064	41.667	68.585	2.431	1.900	0.839	1.242
1993	61.336	220.810	364.617	614.859	38.342	61.854	6.818	14.319	1.137	1.787
1994	<b>50.352</b>	<b>187.551</b>	<b>302.245</b>	<b>528.367</b>	<b>30.973</b>	<b>48.451</b>	<b>5.239</b>	<b>11.770</b>	<b>0.955</b>	<b>1.575</b>
1995	67.631	237.377	457.267	717.776	42.118	64.414	7.843	17.689	2.153	4.614
1996	74.530	260.241	494.593	782.130	46.716	69.953	11.371	25.008	2.166	4.633
<b>FUNDS</b>										
1992	857.103	1623.541	3701.637	2982.698	797.160	1131.697	119.117	90.455	61.928	75.640
1993	919.426	1683.901	3543.627	3498.828	940.546	1149.453	163.004	116.535	51.255	58.065
1994	<b>701.108</b>	<b>1376.939</b>	<b>2881.073</b>	<b>2790.809</b>	<b>696.811</b>	<b>972.009</b>	<b>87.256</b>	<b>83.458</b>	<b>25.605</b>	<b>20.110</b>
1995	921.243	1703.303	4387.788	3418.466	853.223	1089.660	130.931	102.752	46.345	52.141
1996	1207.386	2208.747	5557.033	4910.917	1149.315	1222.003	182.707	232.003	46.003	53.947
<b>c. Assets</b>										
1992	1093.046	2057.063	4627.747	3841.474	1031.521	1442.258	163.406	134.053	82.252	95.489
1993	1161.003	2134.281	4429.614	4447.707	1195.179	1480.326	201.515	159.594	73.057	79.791
1994	<b>867.110</b>	<b>1654.949</b>	<b>3430.195</b>	<b>3288.997</b>	<b>880.735</b>	<b>1221.289</b>	<b>124.387</b>	<b>131.019</b>	<b>40.826</b>	<b>36.523</b>
1995	1151.999	2080.104	5159.226	4065.453	1112.066	1474.430	178.937	160.232	65.923	68.972
1996	1444.108	2553.250	6379.214	5470.071	1406.418	1555.662	232.044	296.812	78.408	85.519

\* The input vector includes (1) labor (LABOR), (2) capital, (CAPITAL), and (3) loanable funds (FUNDS). We measure the quantity of labor by the number of full-time employees on the payroll, capital by the book value of premises and fixed assets, and loanable funds by the sum of deposit (demand and time) and non-deposit funds as of the end of the respective year. The output vector includes (1) short-term loans (ST\_LOANS), (2) long-term loans (LT\_LOANS), (3) risk-adjusted off-balance sheet items (RA\_OFF\_BSI), and (4) other earning assets (OTHER\_EA). Short-term loans and long-term loans comprise the loans with less than a year maturity, respectively. Off-balance sheet activities include guarantees and warranties (letters of guarantee, bank acceptance, letters of credit, guaranteed pre-financing, endorsements and others), commitments, foreign exchange and interest rate transactions as well as other off-balance sheet activities. These items are risk-adjusted using Basle Accord risk weights to provide conformity with directly issued loans in terms of credit risk. Other earning assets consist of loans to special sectors, inter-bank funds sold and investment securities (treasury bills, government bonds and other securities).

Off-balance sheet activities include guarantees and warranties (letters of guarantee, bank acceptance, letters of credit, guaranteed pre-financing, endorsements and others), commitments, foreign exchange and interest rate transactions as well as other off-balance sheet activities. These items are risk-adjusted using Basle Accord risk weights to provide conformity with directly issued loans in terms of credit risk. Other earning assets consist of loans to special sectors, inter-bank funds sold and investment securities (treasury bills, government bonds and other securities). Following the recent trend in banking literature (Berger and Mester, 1997; Işık, 2000; Işık and Hassan, 2002a,b), we included off-balance sheet activities of banks in our analysis. It is critical to include such activities in the efficiency studies because they are often greater than the on-balance sheet items by as high as a factor of four or five when measured by notional values (Saunders, 1993). In Turkey, off-balance sheet activities mainly exist in national and foreign private banking groups. Since some of such activities, for example currency and interest rate swaps and forwards, are complicated financial instruments, they require professional management. Such know-how typically exists in wholesale banks. In notional values, the ratio of the off-balance sheet items to the on-balance sheet items for the entire Turkish banking system are 1.95, 1.82 and 2.36 for 1988, 1992 and 1996, respectively. Thus, the exclusion of off-balance sheet items in efficiency and productivity analysis might considerably bias the performance measures of the banks that are actively engaged in these types of activities (Işık and Hassan, 2002a,b).

Table 2 gives the summary statistics of outputs, inputs and size for the industry as well as for the subgroups of banks, namely, state banks, private banks, foreign subsidiaries, and foreign branches. In order to attract attention to the crisis period, the 1994 figures are given in bold format. The shocking impact of the crisis on banking is obvious, the level of both asset and liability items drops sharply in 1994, indicating the significant shrinkage in banking business during the crisis. Total asset of the banking industry in the sample falls from \$1,161 million in 1993 to \$867 million in 1994, and bounces back to almost its 1993 level in 1995, \$1,151 million (Panel c in Table 3). Although all banks felt the impact of the shock in one way or another, the banking group, which lost the highest altitude, is foreign banks. As can also be seen from the table, about half of their assets were eradicated in 1994. It may be that foreign banks lost their appetite doing business in a turned-to-be turbulent and risky environment and intentionally reduced their business involvement in the country.

Most of the bank loans extended concentrates in short term, which is mainly attributable to the high fluctuations in the general price level in the country. However, this looks a rational behavior in terms of maturity gap management because vast majority of the deposits also lie in short term periods, as well (Banks in Turkey, 1996).<sup>20</sup> Indeed, risk adjusted off-balance sheet activities surpass the sum of short and long term loans in each year, justifying the concern about the bias they could create, unless accounted for, on the estimation of productivity and efficiency indexes. Another interesting and expressive observation is that the standard deviations of all activities are relatively very large, implying an enormous size dispersion within and between banking groups. Yet, it is note-worthy that the dispersion got narrower within each group during the crisis. This can be attributed to the increasing risk aversion of banking units in a chaotic environment. Worsening asymmetric information problems (adverse selection and moral hazard) as a result of uncertainty and instability in the environment seem to have led banks to decrease their activities, which may have resulted in little business transactions by banks and thus less discrepancy between them.

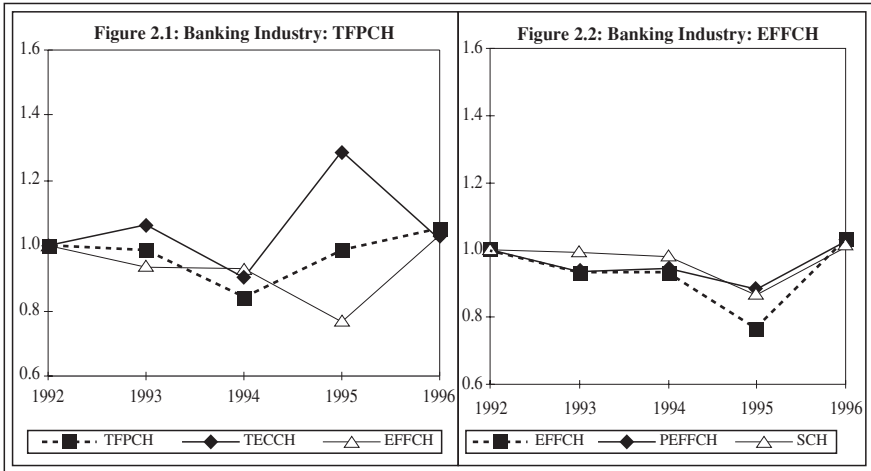
## VI. Empirical Results

Because the impact of the crisis might be different across banking groups, we detail the report of the performance indexes by groups. The objective is to study behavior of productivity, technology and efficiency changes in the Turkish commercial banking around the crisis. We try to uncover the influence of the economic crisis on bank productivity in each banking group. We also seek to identify the driving source of the changes in the calculated productivity (TFPCH) in each group changes in efficiency [EFFCH] or shifts in technology [TECCH]). The impact of scale economies on the efficiency and productivity of banks is also examined.

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<sup>20</sup> As reported in Banks in Turkey 1994, Banks Association of Turkey, majority of the time deposits in the system have maturity of 6 months or shorter (1 month: 12%, 3 months: 36%, 6 months: 12%).

**Figure 2: Productivity Growth (TFPCH) and Efficiency Change (EFFCH) in Banking Industry During the Crisis**



**6.1. The Effect of the 1994 Crisis on the Performance of the Turkish Banking System**

We constructed Figure 2 through 5 to let the reader visually grasp the pattern of productivity loss and efficiency decrease for the financial industry and banking groups within the industry during the crisis. The basis (reference) year is 1992, thus it has productivity and efficiency change scores of 1. A score greater (lower) than 1 for TFPCH and EFFCH indexes in subsequent years indicate a productivity growth (fall) and an efficiency increase (decrease), respectively. Figure 2.1 depicts the productivity changes index (TFPCH) and its components (TECCH & EFFCH), while Figure 2.2 illustrates the efficiency change index (EFFCH) along with its constituents (PEFFCH & SCH) between 1992 and 1996 for the entire Turkish financial industry. Figures 3 to 5 do the same for the subgroup of banks: state banks, private banks and foreign banks.<sup>21</sup>

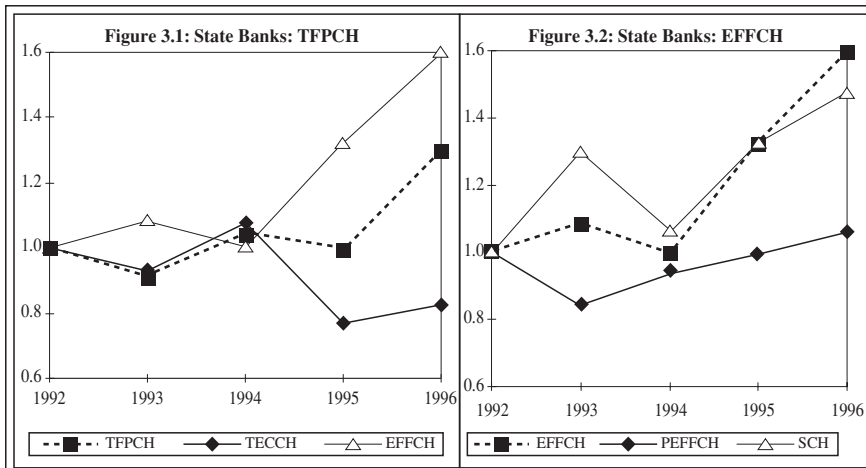
As Figure 2.1 shows, the deterioration of the banking productivity was imminent prior to the crisis and quiet dramatic during the financial shock, which is clear from declining average productivity (TFPCH) before 1994

<sup>21</sup> The underlying average annual values of the Malmquist productivity change index, and its constituents, for all banks and each banking group in the system is available from the author upon request or they can be found in the preliminary version of this paper (Işık, 1999; Işık and Hassan, 2000).

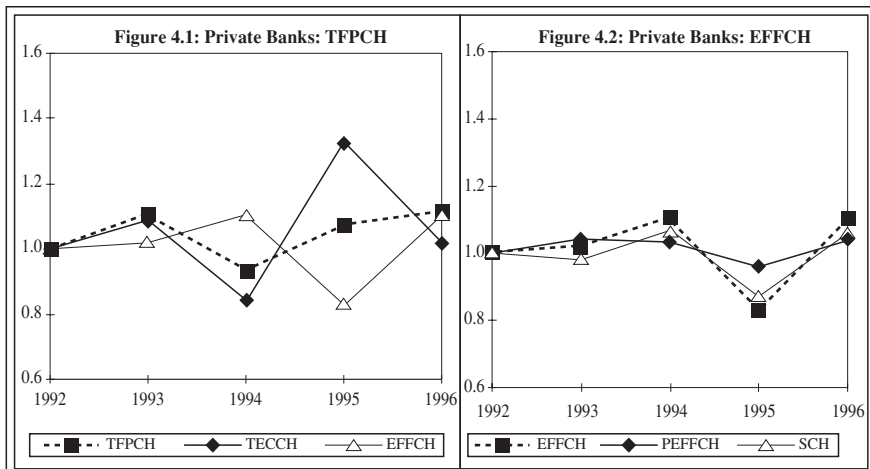
and a sharp fall in 1994 (dashed line). Figure 2.2 indicates a similar pattern for efficiency change (EFFCH) index, a significant efficiency decrease around 1994. More clearly, although the productivity of the system in 1993 fell moderately (1.1%), it dropped sharply in 1994 (17%), with respect to that in 1992. This substantial productivity loss seems to be as a result of the combination of a shock to the banking technology and decrease in banking efficiency. However, the regress of the technology (10%) seems to be more material than the decrease in technical efficiency (7%) in determining the productivity loss in the commercial banking during the 1994 crisis.

Decomposition of the efficiency change into its components in Figure 2.2 suggests that the dominant source of the decrease in efficiency in 1994 is managerial-related rather than scale-related, implying perhaps the inexperience of Turkish banks in crisis management. Although the productivity in the next year, 1995, is again lower than that in 1992 (by 1.4%), it improves considerably with respect to that in 1994 (by about 15%). This is mainly attributable to the impressive rebound (progress) in the frontier technology in 1995 (by about 39% with respect to that in 1994, and 29% with respect to that in 1992). The positive impact of the substantial recovery in technology is offset materially by the negative impact of the significant deterioration in efficiency (decrease by about 16% relative to that in 1994, and by about 23% relative to that in 1992).

**Figure 3: Productivity growth (TFPCH) and Efficiency Change (EFFCH) in State Banks During the Crisis**

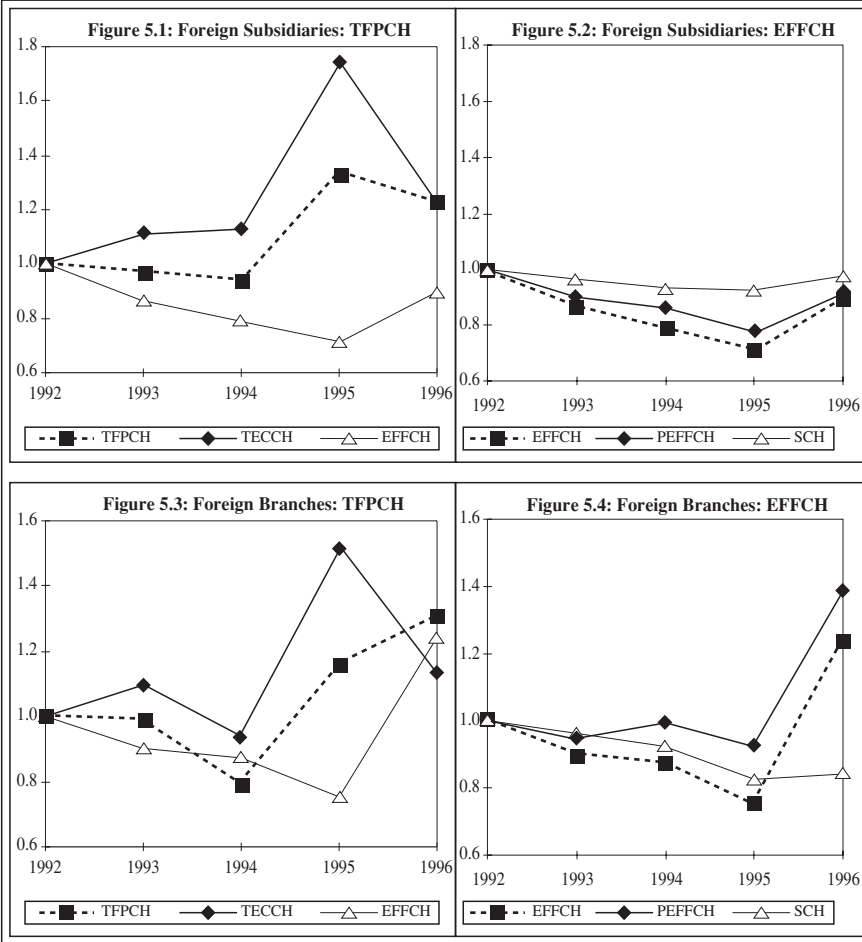


**Figure 4: Productivity Growth (TFPCH) and Efficiency Change (EFFCH) in Private Banks During the Crisis**



Efficiency change score measures catching up effect ( $EFFCH > 1$ ) or falling behind effect ( $EFFCH < 1$ ) among banks. Thus, the sharp drop in bank efficiency in 1995 could be a result of the difference in adaptability skills of banks in the system to the new environment as some banks might have recovered more quickly than the others, making some banks falling more behind. However, it appears that the banking system enters 1996 with a recovered productivity both with respect to the reference year 1992 (5%) and the previous year 1995 (6.4%). Clearly, the productivity change index follows a V-shaped behavior between 1992 and 1996.

**Figure 5: Productivity Growth (TFPCH) and Efficiency Change (EFFCH) in Foreign Banks During the Crisis**



**6.2. The Effect of the 1994 Crisis on the Performance of the State, Private and Foreign Banks**

In this section, we investigate the magnitude of the impact of the crisis on the productivity change and its components (technology and efficiency changes) in each banking group. As aforementioned, we chose the year 1992 as the basis (reference) year for the calculation of the Malmquist TFP Index and its components, thus those measures take an initial mean score of 1 for 1992. Any score greater (lower) than 1 in subsequent years



for Malmquist Index and its components indicates an improvement (worsening) in the relevant index. Different forms of banks could demonstrate different reactions and responses to the changes in their environment. Hence, the impact of the crisis could vary across banking groups as a result of the differences in banks' missions and goals (e.g.; social welfare versus profit maximization), attitude towards risk, asset and liability compositions (e.g.; carrying high level of open positions in FX), degree of support they get from the state during problem times, and possession of risk management skills and systems to cope with the consequences of the distress.

Obviously, public banks passed through the crisis literally unharmed, as evidenced by productivity growth of 4% in 1994 with respect to (wrt) that in 1992 (13% wrt that in 1993). The main source of the growth in public banks was technical change (+4% wrt 1992 and +18% wrt 1993) rather than efficiency change (+0.1% wrt 1992 and -8% wrt 1993). With respect to private banks, state banks are backed by the state against adverse outcomes while fulfilling their social and political objectives. During times of crisis, bank safety becomes much more critical, thus, public might have switched to relatively safer state banks, which might have reduced their exposure to the adverse outcomes of the crisis. The relatively less loss of total assets in public banks in 1994 as compared to other banking groups provides evidence in this regard (see Table 2).

It seems that relatively low pure efficiency change in state banks around the crisis has been somewhat offset by notable increases in their scale efficiency. Therefore, most of the productivity gain in state banks throughout the period could be attributed mainly to scale changes. This implies that shrinking balance sheets of state banks in 1994 translated itself to the right movement towards the optimal scale. This observation is consistent with Işık and Hassan (2002a & forthcoming), who showed that state banks are the group of banks that suffer the most from excess level of production (i.e.; diseconomies of scale).

On the other hand, as can be seen from Figures 4 to 5, unlike public banks, private banks, whether domestic or foreign, seem to have experienced significant productivity losses during the crisis. In 1994, the productivity loss for private banks is about 7% with respect to that in 1992 (17% wrt 1993). Productivity fall in foreign subsidiaries in 1994, on the other hand, was 7% with respect to that in 1992 (4% wrt 1993). Apparently foreign branches were hit the most in 1994, as they experienced 21% productivity loss with respect to that in 1992 (20% wrt 1993).

While the productivity loss is mainly driven by the shock to the banking technology in private domestic banks (negative 16% technical change outweighs positive 10% efficiency change), it is predominantly driven by substantial decrease in efficiency in foreign subsidiaries and foreign branches.

### **6.3. The Effect of the 1994 Crisis on the Frontier and Non-Frontier Turkish Banks**

The above analysis overall suggests that productivity growth, technological change and efficiency change in Turkish banking have been substantially interrupted as a consequence of the 1994 economic crisis. The results also imply that the major source of the productivity loss in Turkish banks during the distress was a downward shift in the production frontier (TECCH) rather than increased distance of banks from the frontier (EFFCH). This in turn indicates that impact of the 1994 chaos was much harsher for frontier banks, which define the banking technology, than for non-frontier banks, which try to catch up with the frontier banks.

To explore the above proposition, we divided our sample into two groups, frontier (efficient) banks and non-frontier (inefficient) banks, based on 1992 technical efficiency (TE) measures, as 1992 is the basis year in our analysis. Hence, the purpose is to observe whether frontier or non-frontier banks were more affected from the 1994 crisis. Those banks whose TE is equal to 1 are assigned to the former group, while those banks whose TE is lower than 1 are assigned to the latter group. As known, efficiency measures attain a value between 0 and 1 for the worst- and the best-practice banks in the sample, respectively. Thus, an efficiency score of 1 indicates that the bank is on the frontier and dominates the banks interior to the frontier in utilizing bank resources. We calculated TE measure and its pure technical efficiency (PTE) and scale efficiency (SE) components using Data Envelopment Analysis (DEA) technique. Technical efficiency (TE) measure simply indicates a proportional reduction in input usage that can be attained if the bank operates on the efficient frontier. The DEA also permits one to decompose the TE further into its distinct components, “pure” technical efficiency (PTE), a proportional reduction in input usage if inputs are not wasted, and scale efficiency (SE), a proportional reduction if the bank attains constant returns to scale (CRS).

**Table 3: Main Characteristics of Frontier (Efficient) and Non-Frontier (Inefficient) Turkish Banks\***

<b>Characteristics / Banks Forms</b>	<b>Frontier Banks</b>	<b>Non-frontier Banks</b>
<b>1. Number of observations (54)</b>	19 (35%)	35 (65%)
<b>2. Efficiency structure</b>		
Technical Efficiency (TE)	1.00	0.68
Pure Technical Efficiency (PTE)	1.00	0.83
Scale Efficiency (SE)	1.00	0.82
<b>3. Organizational Form</b>		
State Banks (6)	0 (0%)	6 (100%)
Private Banks (28)	9 (32%)	19 (68%)
Foreign Banks (20)	10 (50%)	10 (50%)
Foreign Subsidiaries (9)	4 (44%)	5 (56%)
Foreign Branches (11)	6 (55%)	5 (45%)
<b>4. Asset size (\$ million)</b>	\$ 253.213	\$1548.956

\* Frontier (efficient) banks and non-frontier (inefficient) banks, classification is based on 1992 technical efficiency (TE) measures, as 1992 is the basis year in our analysis. The purpose of the table is to show whether frontier or non-frontier banks were more affected from the 1994 crisis. Those banks whose TE is equal to 1 are assigned to the former group, while those banks whose TE is lower than 1 are assigned to the latter group. Efficiency measures attain a value between 0 and 1 for the worst- and the best-practice banks in the sample, respectively. Thus, an efficiency score of 1 indicates that the bank is on the frontier and dominates the banks interior to the frontier in utilizing bank resources. We calculated TE measure and its pure technical efficiency (PTE) and scale efficiency (SE) components using Data Envelopment Analysis (DEA) technique. Technical efficiency (TE) measure simply indicates a proportional reduction in input usage that can be attained if the bank operates on the efficient frontier. The DEA also permits one to decompose the TE further into its distinct components, “pure” technical efficiency (PTE), a proportional reduction in input usage if inputs are not wasted, and scale efficiency (SE), a proportional reduction if the bank attains constant returns to scale (CRS).

Table 3 summarizes the main characteristics of the frontier and non-frontier banks. 65% of Turkish banks were relatively inefficient in 1992, indicating that they were not fulfilling their full potential as they could save more inputs to produce the same amount of outputs or they could produce more outputs from the same amount of inputs. The frontier banks are mostly composed of foreign banks while none of the state banks registered among the frontier banks. It seems that private banks, especially foreign ones, mostly determine banking technology in Turkey. Given that foreign banks are predominantly coming from more advanced financial markets and are equipped with state of art technologies, this observation

is not surprising. Furthermore, bank size seems to be uncorrelated with better performance, as the non-frontier banks are relatively much larger than frontier banks.

Table 4 presents the Malmquist Total Factor Productivity Change Index and its components according to the frontier and non-frontier banks. As can be seen from the table, all types of banks, whether frontier or non-frontier, suffered from the 1994 crisis. However, the impact of the crisis on the frontier banks was overwhelming. Except for TECCH component, the non-frontier banks dominate the frontier banks in terms of all other components throughout the period, consistent with the prior postulation. Superiority of the frontier banks to the non-frontier banks in terms of TECCH is understandable, given that these are the banks that determine the banking technology. However, relatively lower productivity, lower technical and scale efficiency in the frontier banks are sort of expressive. Given that most of the frontier banks are foreign institutions and relatively small banks, we attribute the larger damage in the frontier banks to the over-sensitivity of foreign capital to sudden changes in financial markets and increased risk aversion of bank customers during financial disruptions.

As aforesaid, the frontier banks are relatively small commercial banks. It is widely known that small banks fail in larger numbers than huge banks (Mishkin, 1996). There are several reasons for this observation such as too-big-to-fail phenomenon and increased risk aversion among creditors. Smooth flow of financial funds is essential for the well functioning of the entire economic system. Virtually in all emerging markets, banks are the most dominant financial institution, thus, their health determines and assures the health of the general economy at large. If confidence in these institutions is somehow shaken, risk sensitive funds may leave the banking sector in a very quick manner, exposing banks to severe liquidity problems.

**Table 4: The Impact of the 1994 Crisis on Frontier (Efficient) and Non-Frontier (Inefficient) Turkish Banks\***

Indices / Banks forms	MEAN		STANDARD DEVIATION	
	Frontier Banks	Non-frontier Banks	Frontier Banks	Non-frontier Banks
<b>1. Malmquist Index (TFPCH)</b>				
1992	1.000	1.000	0.000	0.000
1993	0.959	1.082	0.270	0.331
<b>1994</b>	<b>0.870</b>	<b>0.942</b>	<b>0.584</b>	<b>0.347</b>
1995	1.065	1.145	0.732	0.515
1996	0.864	1.359	0.345	0.713
Average	0.939	1.132	0.483	0.477
<b>2. Technical Change (TECCH)</b>				
1992	1.000	1.000	0.000	0.000
1993	1.084	1.075	0.195	0.178
<b>1994</b>	<b>0.994</b>	<b>0.904</b>	<b>0.535</b>	<b>0.155</b>
1995	1.584	1.250	0.619	0.421
1996	1.024	1.062	0.230	0.341
Average	1.171	1.073	0.395	0.274
<b>3. Efficiency Change (EFFCH)</b>				
1992	1.000	1.000	0.000	0.000
1993	0.929	1.032	0.152	0.322
<b>1994</b>	<b>0.884</b>	<b>1.068</b>	<b>0.181</b>	<b>0.431</b>
1995	0.789	0.952	0.250	0.358
1996	0.895	1.326	0.205	0.708
Average	0.801	1.094	0.197	0.455
<b>4. Pure Efficiency Change (PEFFCH)</b>				
1992	1.000	1.000	0.000	0.000
1993	0.942	1.001	0.136	0.290
<b>1994</b>	<b>0.969</b>	<b>1.039</b>	<b>0.172</b>	<b>0.310</b>
1995	0.840	1.009	0.259	0.237
1996	0.919	1.202	0.170	0.619
Average	0.874	1.063	0.185	0.364
<b>5. Scale Efficiency Change (SCH)</b>				
1992	1.000	1.000	0.000	0.000
1993	0.959	1.046	0.089	0.225
<b>1994</b>	<b>0.870</b>	<b>1.040</b>	<b>0.056</b>	<b>0.269</b>
1995	1.065	0.947	0.193	0.285
1996	0.864	1.112	0.127	0.303
Average	0.917	1.036	0.116	0.270

\* Frontier (efficient) banks are the banks with technical efficiency score of 1 in 1992, i.e., those banks that are on the efficient production frontier in 1992. Whereas, Non-frontier (inefficient) banks are the banks with technical efficiency score of lower than 1 in 1992, i.e., those banks, which are inside the frontier in 1992. We chose 1992 as the basis year for the calculation of the Malmquist Index (MI) and its components, thus MI and its components have an initial mean score of 1 and standard deviation of 0 in 1992. Any score greater (lower) than 1 in subsequent years for MI and its components indicates an improvement (worsening) in the relevant index.

If public confidence is not restored, the chance of the systemic risk substantially rises. Bank runs could arise as people rush to withdraw their funds before any body else and before banks go bust. The chance of banks runs is much higher if the failing banks in question are very large banks. The impact of the failure of a large state bank on the financial system would not be the same as the failure of a tiny private bank. Therefore, to prevent system-wide banking crises, regulators usually do not allow large banks to fail, whereas they are not that concerned about the failure of small banks due to their limited impact on the system, a syndrome known in literature as too-big-to-fail. The fact that the three banks that were allowed to fail during the 1994 crisis and most of the banks that were taken to the custody of the State Fund in more recent crises were relatively small banks support this claim.

Moreover, in a crisis environment, the security and safety of banking firms becomes extremely critical because banking business is based on credibility and confidence as these institutions are highly leveraged. Because depositors that are bank creditors are aware of the fact that small banks are more likely to fail in a turbulent environment and regulators will not take measures to stop it, they usually switch to larger banks that are relatively safer and unlikely to fail. During the recent crises in Turkey, depositors favored relatively larger private banks or huge state banks to maintain their hard earned liras and dollars. As a result, the impact of the 1994 crisis on the productivity and efficiency of the small size frontier banks must have been sharper as opposed to the larger non-frontier banks because of the substantial mobility of funds away from small banks to large banks during crisis times. In normal times (like in 1992), the frontier banks outperform the non-frontier banks in terms of efficiency and productivity as they have better management practices. However, our results demonstrate that adverse macro-economic changes in business environment (exogenous factors) become much more important than internal management practices (endogenous factors) in determining bank performance during a financial chaos.

#### **6.4. Overall Results in Perspective and Policy Suggestions**

All in all, our analysis on the productivity and efficiency of the Turkey's financial institutions suggests that the measures taken by the state and efforts spent by the financial institutions to recover the system has been somewhat successful, at least in the short term. The productivity of the Turkish banks, which was significantly interrupted in 1994, has enor-

mously improved thereafter, although the recovery was not immediate. During the crisis period, priority was given to maintain stability in the markets, however structural reforms necessary for eliminating Turkey's notorious macro imbalances have not been accomplished yet. As the occurrences of November 2000 and February 2001 crises indicate, the same underlying long-term and fundamental problems that caused the 1994 crisis have prepared the stage for further shocks, and these issues still prevail and have not been addressed rigorously yet.

In order to prevent more devastating shocks in the future, the economic policies and measures, which would discipline the government budget to reduce the internal and external debt stock and diminish the high concentration in the financial and real sectors to flourish competitive forces, should be immediately implemented. Towards this end, policy-makers must launch the necessary reforms, which comprise an increase in government revenues and a contraction in government expenditures. At the onset, these involve the implementation of the privatization program, and social security and tax reforms, whose delay create heavy burdens on government budget. Moreover, the full insurance of all kinds of savings deposits, which came into life to prevent a possible systemic risk during the 1994 crisis, should be reviewed. Although deposit insurance helps to reduce the bank fragility by preventing self-feeding panics, it also entices bank managers/owners to take on excessive amount of risk, especially in a liberal financial environment. The recent failures of many banks in Turkey are partly attributed to the perverse incentives created by this full protection (Ertugrul and Zaim, 1996; Işık, 2000). Evidence from other countries as demonstrated by Demirgüç-Kunt and Detragiache (1997) supports the seriousness of this concern; moral hazard played a significant role in creating system-wide banking problems that occurred in the 1980s and early 1990s in several countries, including both developed and developing economies all around the globe. The appropriate policy action is to revise the deposit insurance scheme and increase its risk premium in a way that it will counterbalance moral hazard incentives and/or to design and implement effective prudential regulation and supervision to deter perverse managerial actions.

## VII. Conclusion

Turkey has experienced one of its deepest financial crises in 1994. The contraction of the Turkish economy was historic during the crisis period, 6% GNP loss. Month to month annual inflation in whole-sale prices reached at

about 150%, compounded annual overnight interest rates in the inter-bank rose as high as to 700%, bank lending rates increased to more than 400%, and the Turkish Lira (TL) was devalued by more than 50%. Moreover, half of the reserves of the Central Bank of Turkey were eroded in fighting with the crisis. As a result of the adverse impact of the turmoil on the economic system, about 30% of the total banking assets evaporated during the crisis. Turkish government in close collaboration with IMF designed a stabilization program to take necessary actions to recover the paralyzed economic and financial system. The main objective of the program was to increase government revenues, and decrease government spending, so that the chronic and wide government budget deficit could be closed.

Aside from descriptive analysis of the crisis, its impact on the productivity, technology, and efficiency of the Turkish banks has not been studied yet. In this study, utilizing DEA type Malmquist Total Factor Productivity Index, we examined the behavior of the productivity change and its components around the crisis. Our results suggest that there was a substantial productivity loss (17%) in 1994, which was mainly attributable to the shock to banking technology (technological regress). The foreign banks, whose asset loss was the most dramatic, were also those, which suffered the most from the crisis. The private domestic banks are the second group of banks that were injured the most. In contrast, state banks suffered the least from the distress. The relative immunity of the state-backed public banks against the adverse effect of the financial shock could be explained with their policy to carry relatively low open positions in foreign exchange and confidence of the public in those banks within an environment where the most precious asset was security.

The results also suggest that the symptoms of the crisis were imminent before the crisis, and it took some time for the system to bounce back. However, the devastating impact of the crisis on banking productivity was fully over by 1996. It appears that regulatory measures along with banks' their own efforts has been somewhat successful in the short run, however for long term success, the remaining remedies (such as carrying out unfinished privatization program, tax, and social security reforms) addressing the fundamental causes of the crisis should be immediately realized. In addition, the insurance for TL and foreign exchange deposits, which came into force in the extraordinary conditions of the 1994 crisis, is still active and should be revised in order to prevent moral hazard incentives among bank managers/owners that encourage risky behaviors, which might breed another banking fragility in the future. Future research may proceed by



studying the impacts of more recent crises experienced in Turkey to record their cost on the ailing financial system in terms of productivity and efficiency.

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## **GLOBAL CAPITAL MARKET'S**

In the last quarter of 2001, the economic activity worldwide, particularly in the United States was affected from the events that took place on September 11. Aftermath the events, consumption declined significantly and as a consequence the airlines, tourism and automotive sectors were influenced negatively. In an effort to enhance the economy, the United States initiated a programme worth 130 billion US dollars to struggle against the stagnation. In addition to such developments, the longlasting economic growth, rising stock prices, excessive investments in certain sectors and the increase in the value of over valuation of the US dollars has been signalling an economic slowdown since the last quarter of 2000. The FED prevented the economic slowdown from deepening further through decreasing interest rates by 11 times during 2001. As a result of such measures, the US economy grew by 1.3 % in 2001.

While these developments were taking place in the US, the major economies also experienced a downturn for the first time in 2001 since the petroleum crisis that had prevailed in the 1970's. Meanwhile, some of the developing countries had not yet overcome the financial crisis that had began in 1997-1998. Although Europe has been one of the least affected region from the economic slowdown, economies of Euro zone countries grew only by 1.7 % level. For the first time in the past nine-year period, the EU countries faced a decline of 0.2 % in economic activity in the last quarter of 2001. Germany, which has the largest economy in the EU was the least growing economy with 0.6 % in 2001 in the region. England, which also has one of the largest economy among the EU, grew by 2.2 % which is the highest rate among the G-8 countries.

Meanwhile, the Japanese economy, which is considered the second biggest economy after the United States, experienced a negative inflation level, contraction in investments, decline in retail sales on a continuous basis, a significant fall in foreign trade surplus in the past three years and a record level of 5.6 % in unemployment at the end of 2001. These developments coupled with negative economic growth rates in the last two

quarters successively in 2001, has obliged the authorities to announce a recession.

As a result of such developments in the major developed countries, the global economic growth rate, which had reached 4 % in 2000, declined to a level of 1.3 % in 2001. World trade volume that had been growing at 7 % on average in the 1990's also declined to almost zero level in 2001. On the other hand, direct foreign investments declined by nearly 50 %, while the amount of such investments directed to developing countries fell to 225 billion US Dollars from the previous amount of 240 billion US Dollars.

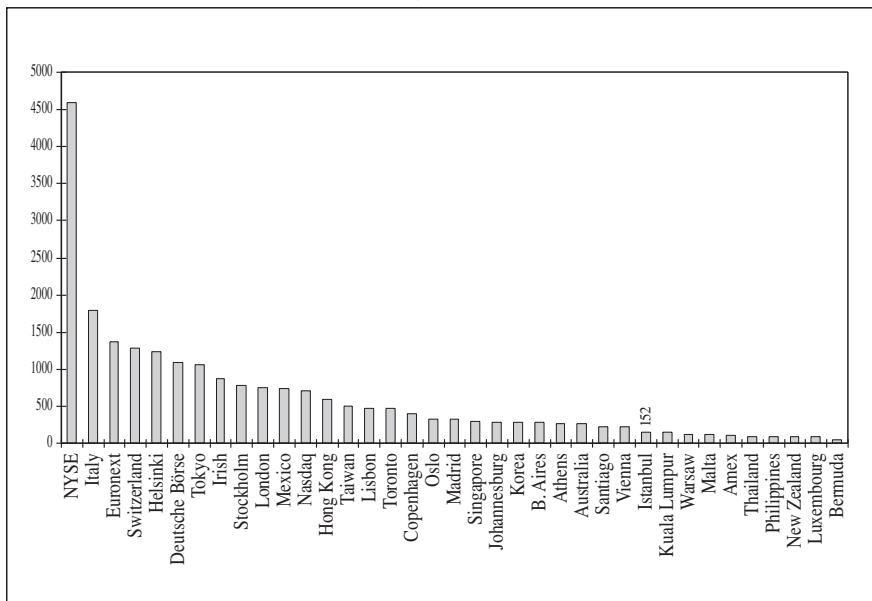
The performances of some developed stock markets with respect to indices indicated that DJI, Nikkei-225 and FTSE-100 and GDAX decreased by -12.81%, -44.3%, -24.7% and by -25.8%, respectively, at the end of 2001 in comparison with the same period of the previous year. Among the developed markets, the largest decline was realized in Japan market. When US\$ based returns of some emerging markets are compared in the period between 2000-2001, the best performer markets were: Russia (80.6%), S. Korea (38.5%), Mexico (19.7%), Taiwan (11.6%) and Thailand(11.3%). In the same period, the lowest return markets were: Egypt (-41.2%), Turkey (-30.8%), Hong Kong, Brazil and Phillipines around (-24%), Argentina and China (-22%). The performances of emerging markets with respect to P/E ratios as of end-2001 indicated that the highest rates were obtained in Turkey (69.5), Malaysia (53.2), Thailand (47.3), Argentina (38.4) and Taiwan (28.5) and the lowest rates in Indonesia (-14.1), Czech Rep.(5.6), Poland (6)and Brazil (8.9).

### Market Capitalization (USD Million, 1986-2000)

	Global	Developed Markets	Emerging Markets	ISE
<b>1986</b>	6,514,199	6,275,582	238,617	938
<b>1987</b>	7,830,778	7,511,072	319,706	3,125
<b>1988</b>	9,728,493	9,245,358	483,135	1,128
<b>1989</b>	11,712,673	10,967,395	745,278	6,756
<b>1990</b>	9,398,391	8,784,770	613,621	18,737
<b>1991</b>	11,342,089	10,434,218	907,871	15,564
<b>1992</b>	10,923,343	9,923,024	1,000,319	9,922
<b>1993</b>	14,016,023	12,327,242	1,688,781	37,824
<b>1994</b>	15,124,051	13,210,778	1,913,273	21,785
<b>1995</b>	17,788,071	15,859,021	1,929,050	20,782
<b>1996</b>	20,412,135	17,982,088	2,272,184	30,797
<b>1997</b>	23,087,006	20,923,911	2,163,095	61,348
<b>1998</b>	26,964,463	25,065,373	1,899,090	33,473
<b>1999</b>	36,030,810	32,956,939	3,073,871	112,276
<b>2000</b>	32,260,433	29,520,707	2,691,452	69,659

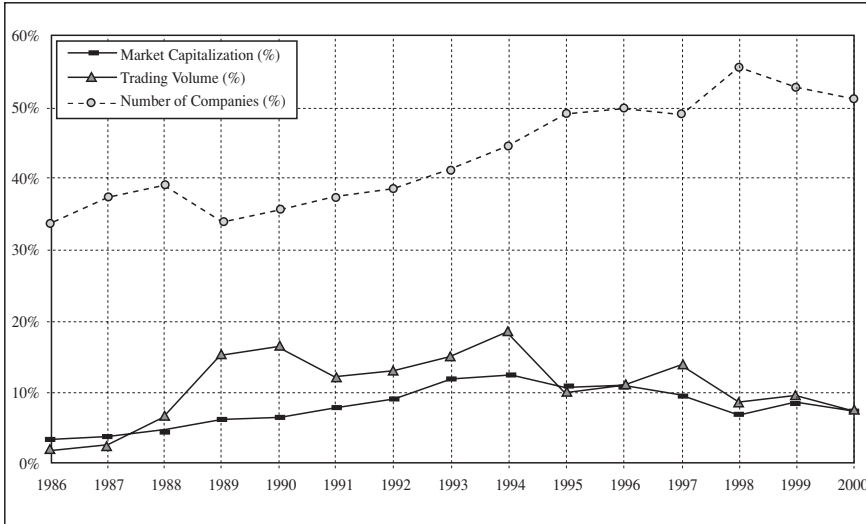
Source: IFC Factbook, 2001.

### Comparison of Average Market Capitalization Per Company (USD Million, December 2001)



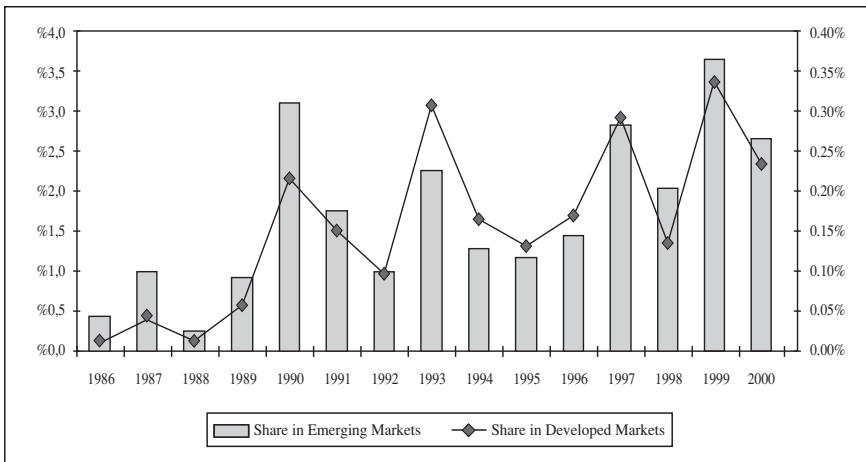
Source: FIBV, Monthly Statistics, Dec. 2001.

### Worldwide Share of Emerging Capital Markets (1986-2000)



Source : IFC Factbook, 2001.

### Share of ISE's Market Capitalization in World Markets (1986-2000)



Source: IFC Factbook 2001.

### Main Indicators of Capital Markets (December 2001)

	Market	Turnover Velocity	Market	Value of Share Trading (millions, US \$) Up to Year Total (2000/1 - 2001/12)	Market	Market Cap. of Share of Domestic Companies (millions, US \$) Dec. 2001
1	Nasdaq	359.21	Nasdaq	10,934,570	NYSE	11,026,518
2	Korea	218.68	NYSE	10,489,323	Nasdaq	2,896,856
3	Taiwan	206.77	London	4,550,504	Tokyo	2,264,528
4	Istanbul	178.80	Euronext	3,179,789	London	2,149,501
5	Madrid	175.81	Tokyo	1,660,525	Euronext	1,843,529
6	Euronext	138.44	Deutsche Börse	1,439,903	Deutsche Börse	1,071,749
7	Stockholm	119.38	Madrid	842,227	Toronto	615,266
8	Deutsche Börse	118.27	Amex	817,042	Italy	527,396
9	Italy	113.45	Şikago	723,900	Switzerland	527,356
10	Helsinki	99.22	Italy	710,218	Hong Kong	506,073
11	Thailand	91.41	Switzerland	594,019	Madrid	468,203
12	NYSE	86.90	Taiwan	544,587	Australian	375,131
13	London	83.75	Toronto	459,627	Taiwan	292,621
14	Oslo	79.24	Bermuda	436,433	Stockholm	236,514
15	Toronto	70.79	Stockholm	386,730	Korea	194,470
16	Australian	67.15	Korea	380,586	Helsinki	190,456
17	Copenhagen	66.60	Australian	244,102	Brezilya	186,238
18	Bilbao	60.33	Hong Kong	241,012	Johannesburg	147,472
19	Tokyo	60.00	Bilbao	240,380	Mexico	126,258
20	Singapore	58.66	Helsinki	181,568	K.Lumpur	118,981
21	Lisbon	53.32	Osaka	174,790	Singapore	115,688
22	New Zealand	47.57	Istanbul	78,269	CDNX	85,579
23	Hong Kong	43.92	Copenhagen	72,365	Copenhagen	85,146
24	Athens	42.13	Singapore	71,770	Athens	84,752
25	Jakarta	38.97	Johannesburg	70,056	Irish	75,298
26	Warsaw	38.49	Mexico	69,661	Oslo	69,465
27	Mexico	37.79	Sao Paulo	64,606	Amex	60,292
28	Sao Paulo	33.92	Oslo	62,355	Tel-Aviv	57,656
29	Ljubljana	30.86	Barcelona	53,237	Santiago	56,310
30	Vienna	28.48	Valencia	41,132	Istanbul	47,150
31	Johannesburg	27.60	Athens	37,732	Lisbon	46,338
32	Tel-Aviv	27.31	Thailand	31,034	Thailand	35,943
33	Irish	23.56	Lisbon	27,602	Buenos Aires	33,384
34	K.Lumpur	18.95	Irish	22,736	Warsaw	26,017
35	Valencia	18.50	K.Lumpur	21,324	Vienna	25,204
36	Buenos Aires	17.50	Tel-Aviv	15,663	Jakarta	22,998
37	Tehran	12.45	New Zealand	9,936	Luxembourg	22,710
38	Colombo	12.12	Warsaw	9,887	Philippines	21,245
39	Philippines	12.02	Jakarta	9,529	New Zealand	17,822
40	Bermuda	9.11	Vienna	7,700	Lima	9,790
41	Osaka	8.54	Buenos Aires	7,532	Tehran	7,381
42	Barcelona	7.57	Santiago	4,282	Ljubljana	3,461
43	Lima	7.45	Philippines	3,148	Bermuda	2,558
44	Santiago	7.34	CDNX	2,335	Malta	1,357
45	CDNX	3.37	Tehran	1,087	Colombo	1,332

Source: FIBV, Monthly Statistics, Dec. 2001.

### Trading Volume (USD millions, 1986-2000)

	Global	Developed	Emerging	ISE	Emerging/ Global (%)	ISE/ Emerging (%)
1986	3,573,570	3,490,718	82,852	13	2.32	0.02
1987	5,846,864	5,682,143	164,721	118	2.82	0.07
1988	5,997,321	5,588,694	408,627	115	6.81	0.03
1989	7,467,997	6,298,778	1,169,219	773	15.66	0.07
1990	5,514,706	4,614,786	899,920	5,854	16.32	0.65
1991	5,019,596	4,403,631	615,965	8,502	12.27	1.38
1992	4,782,850	4,151,662	631,188	8,567	13.20	1.36
1993	7,194,675	6,090,929	1,103,746	21,770	15.34	1.97
1994	8,821,845	7,156,704	1,665,141	23,203	18.88	1.39
1995	10,218,748	9,176,451	1,042,297	52,357	10.20	5.02
1996	13,616,070	12,105,541	1,510,529	37,737	11.09	2.50
1997	19,484,814	16,818,167	2,666,647	59,105	13.69	2.18
1998	22,874,320	20,917,462	1,909,510	68,646	8.55	3.60
1999	31,021,065	28,154,198	2,866,867	81,277	9.24	2.86
2000	47,869,886	43,817,893	4,051,905	179,209	8.46	4.42

Source: IFC Factbook, 2001.

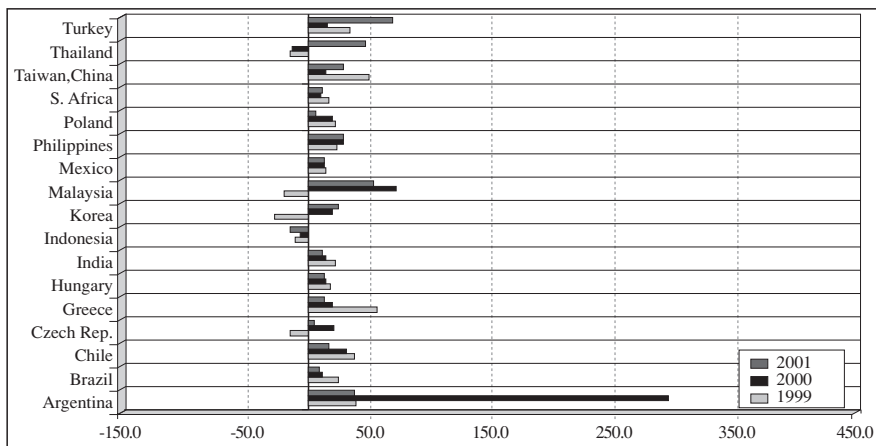
### Number of Trading Companies (1986-2000)

	Global	Developed Markets	Emerging Markets	ISE	Emerging/ Global (%)	ISE/ Emerging (%)
1986	28,173	18,555	9,618	80	34.14	0.83
1987	29,278	18,265	11,013	82	37.62	0.74
1988	29,270	17,805	11,465	79	39.17	0.69
1989	25,925	17,216	8,709	76	33.59	0.87
1990	25,424	16,323	9,101	110	35.80	1.21
1991	26,093	16,239	9,854	134	37.76	1.36
1992	27,706	16,976	10,730	145	38.73	1.35
1993	28,895	17,012	11,883	160	41.12	1.35
1994	33,473	18,505	14,968	176	44.72	1.18
1995	36,602	18,648	17,954	205	49.05	1.14
1996	40,191	20,242	19,949	228	49.64	1.14
1997	40,880	20,805	20,075	258	49.11	1.29
1998	47,465	21,111	26,354	277	55.52	1.05
1999	48,557	22,277	26,280	285	54.12	1.08
2000	49,933	23,996	25,937	315	51.94	1.21

Source: IFC Factbook, 2001.



### Comparison of P/E Ratios Performances (1999 - 2001)



Source: IFC Factbook 2001. IFC, Monthly Review, Dec. 2001.

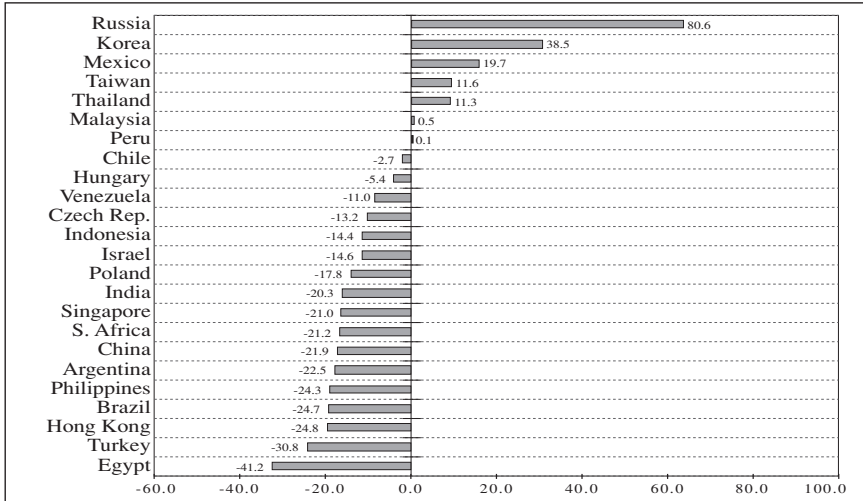
### Price-Earnings Ratios in Emerging Markets (1993-2001)

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Argentina	41.9	17.7	15.0	38.2	17.1	13.4	39.0	293.3	38.4
Brazil	12.6	13.1	36.3	14.5	15.4	7.0	25.1	11.7	8.9
Chile	20.0	21.4	17.1	27.8	15.9	15.1	37.7	31.8	17.1
Czech Rep.	18.8	16.3	11.2	17.6	8.8	-11.3	-14.8	21.0	5.6
Greece	10.2	10.4	10.5	10.5	13.1	33.7	55.6	19.2	12.5
Hungary	52.4	-55.3	12.0	17.5	25.2	17.0	18.2	14.3	13.3
India	39.7	26.7	14.2	12.3	16.8	13.5	22.0	14.8	12.3
Indonesia	28.9	20.2	19.8	21.6	11.2	-106.2	-10.5	-6.5	-14.1
Korea	25.1	34.5	19.8	11.7	11.6	-47.1	-27.7	19.3	24.9
Malaysia	43.5	29.0	25.1	27.1	13.5	21.1	-19.1	71.7	53.2
Mexico	19.4	17.1	28.4	16.8	22.2	23.9	14.1	12.5	13.2
Philippines	38.8	30.8	19.0	20.0	12.5	15.0	24.0	28.2	28.4
Poland	31.5	12.9	7.0	14.3	10.3	10.7	22.0	19.4	6.0
S.Africa	17.3	21.3	18.8	16.3	12.1	10.1	17.4	10.7	11.7
Taiwan, China	34.7	36.8	21.4	28.2	32.4	21.7	49.2	13.7	28.5
Thailand	27.5	21.2	21.7	13.1	4.8	-3.7	-14.5	-12.4	47.3
Turkey	36.3	31.0	8.4	10.7	18.9	7.8	33.8	15.2	69.5

Source: IFC Factbook, 2001; IFC, Monthly Review, Dec. 2001.

Not :Figures are taken from IFC Investable Index Profile.

### Comparison of Market Returns in USD (31/12/2000 - 2/1/2002)



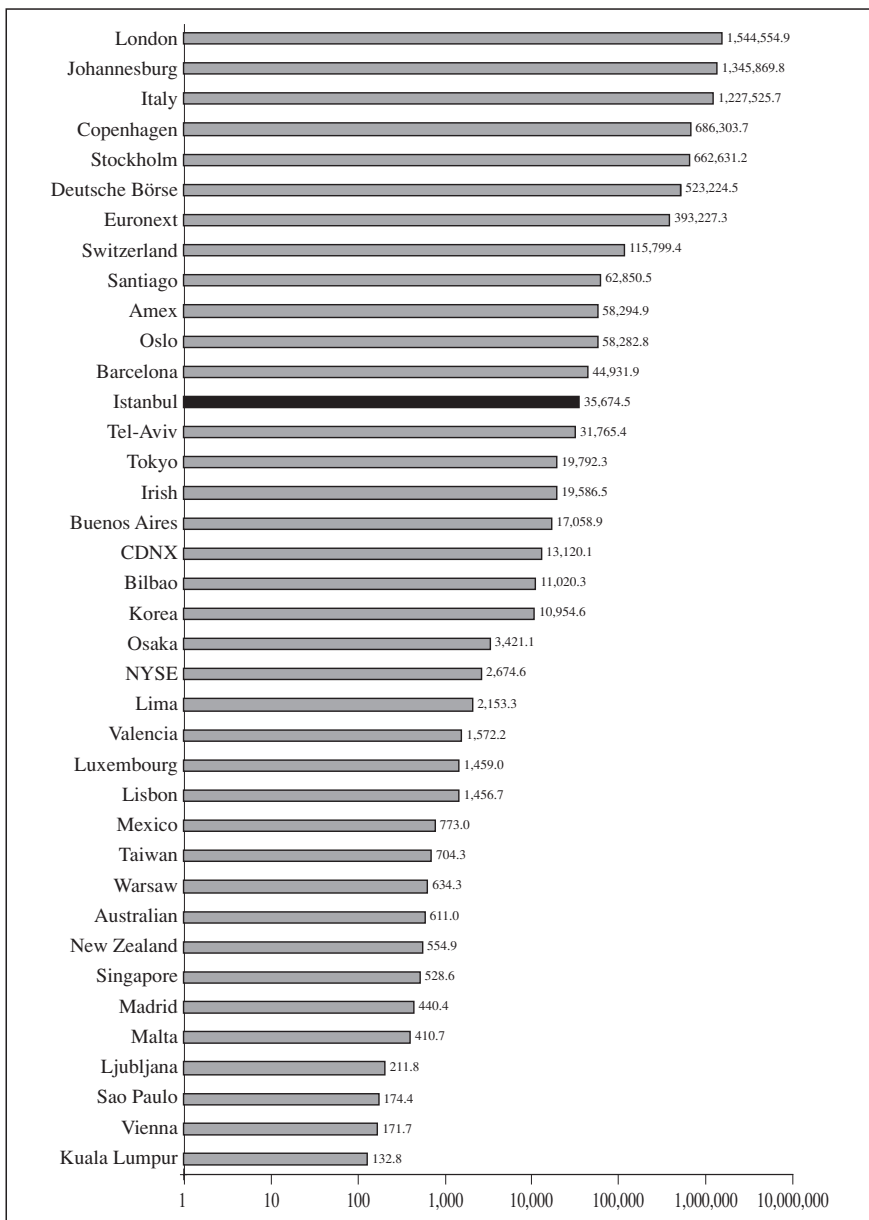
Source: The Economist, January 5<sup>th</sup>, 2002.

### Market Value/Book Value Ratios (1993 - 2001)

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Argentina	1.9	1.4	1.3	1.6	1.8	1.3	1.5	1.0	0.6
Brazil	0.5	0.6	0.5	0.7	1.1	0.6	1.6	1.4	1.2
Chile	2.1	2.5	2.1	1.6	1.6	1.1	1.8	1.5	1.4
Czech Rep.	1.3	1.0	0.9	0.9	0.8	0.7	1.2	1.2	0.8
Greece	1.9	1.9	1.8	2.0	2.9	4.9	9.4	4.0	2.1
Hungary	1.6	1.7	1.2	2.0	3.7	3.2	3.6	2.5	1.8
India	4.9	4.2	2.3	2.1	2.7	1.9	3.1	2.5	2.0
Indonesia	3.1	2.4	2.3	2.7	1.5	1.6	2.9	1.6	1.9
Korea	1.4	1.6	1.3	0.8	0.6	0.9	2.0	0.8	1.3
Malaysia	5.4	3.8	3.3	3.8	1.8	1.3	1.9	1.5	1.3
Mexico	2.6	2.2	1.7	1.7	2.5	1.4	2.2	1.7	1.7
Philippines	5.2	4.5	3.2	3.1	1.7	1.3	1.5	1.2	1.1
Poland	5.7	2.3	1.3	2.6	1.6	1.5	2.0	2.2	1.4
S.Africa	1.8	2.6	2.5	2.3	1.9	1.5	2.7	2.1	2.1
Taiwan, China	3.9	4.4	2.7	3.3	3.8	2.6	3.3	1.7	2.1
Thailand	4.7	3.7	3.3	1.8	0.8	1.2	2.6	1.6	1.6
Turkey	7.2	6.3	2.7	4.0	9.2	2.7	8.8	3.1	3.8

Source: IFC Factbook, 1996-2001; IFC Monthly Review, Dec. 2001.

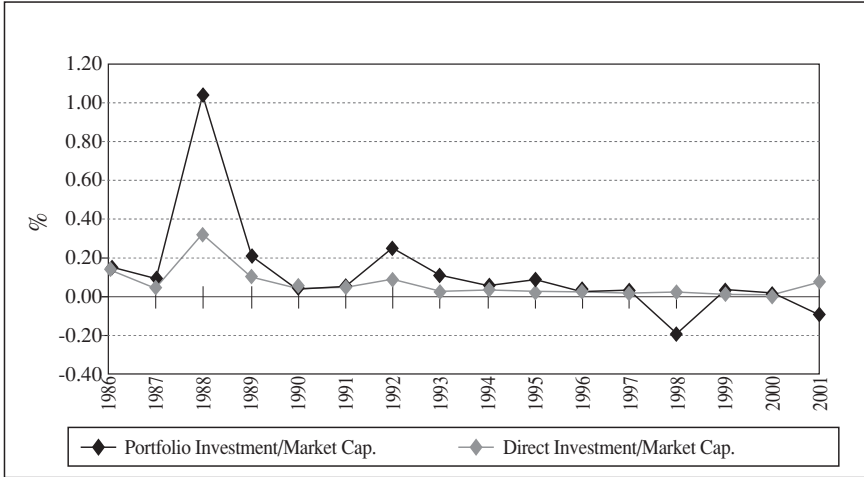
### Value of Bond Trading (Million USD. January 2001-December 2001)



Source: FIBV, Monthly Statistics, Dec. 2001.

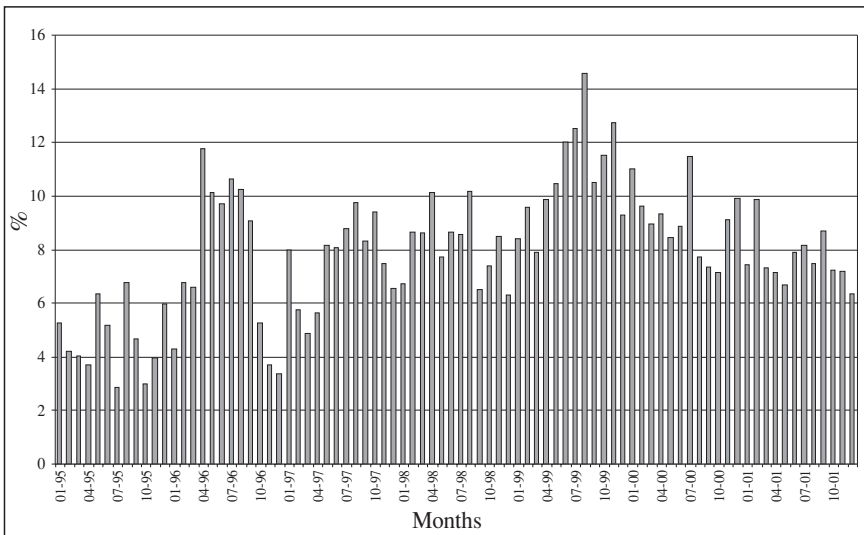
Note: The value of bonds trading pertain to Trading System View figures. For those countries which do not have Trading System View figures, the Regulated Environment figures are used.

### Foreign Investments as a Percentage of Market Capitalization in Turkey (1986-2001)



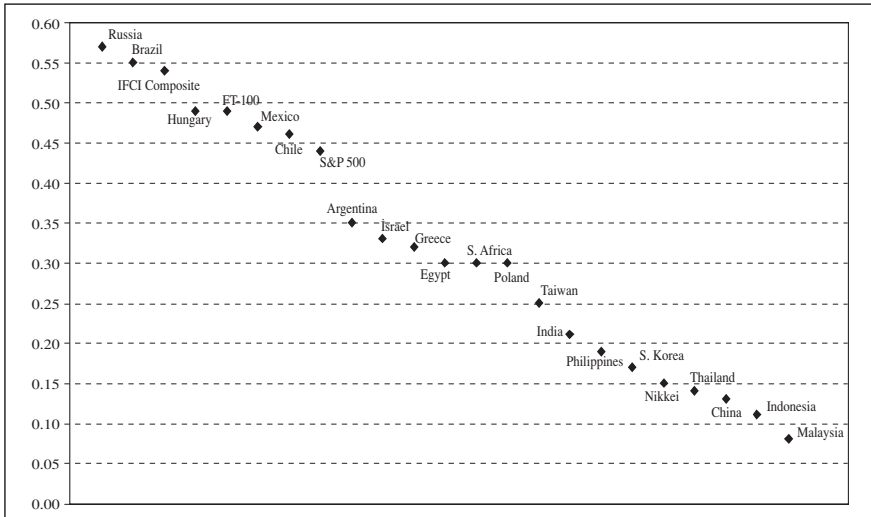
Source: ISE Data. CBTR Databank.

### Foreigners' Share in the Trading Volume of the ISE (Jan. 95-Dec. 2001)



Source: ISE Data.

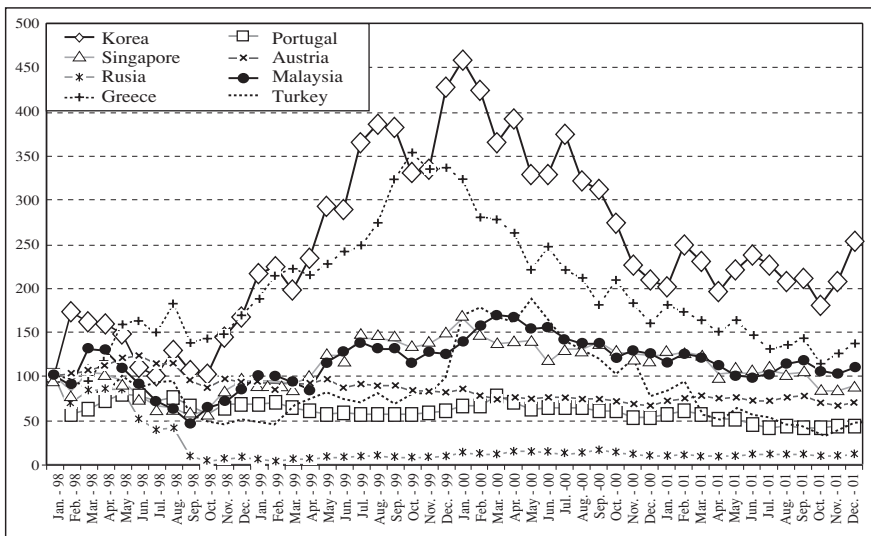
### Price Correlations of the ISE (Dec. 1997-Dec. 2001)



Source : IFC Monthly Review, Dec. 2001.

Notes : The correlation coefficient is between -1 and +1. If it is zero, for the given period, it is implied that there is no relation between two series of returns. For monthly return index correlations (IFCI) see, IFC, Monthly Review, Oct. 1999.

### Comparison of Market Indices (31 Dec. 97=100)



Source : Reuters

Note : Comparisons are in US\$.



## ISE Market Indicators

<b>STOCK MARKET</b>											
		Total Value				Market Value		Dividend Yield	P/E Ratios		
	Number of Companies	Total		Daily Average							
		(TL Billion)	(US\$ Million)	(TL Billion)	(US\$ Million)	(TL Billion)	(US\$ Million)	(%)	TL(1)	TL(2)	US \$
1986	80	9	13	—	—	709	938	9,15	5,07	—	—
1987	82	105	118	—	—	3.182	3.125	2,82	15,86	—	—
1988	79	149	115	1	—	2.048	1.128	10,48	4,97	—	—
1989	76	1.736	773	7	3	15.553	6.756	3,44	15,74	—	—
1990	110	15.313	5.854	62	24	55.238	18.737	2,62	23,97	—	—
1991	134	35.487	8.502	144	34	78.907	15.564	3,95	15,88	—	—
1992	145	56.339	8.567	224	34	84.809	9.922	6,43	11,39	—	—
1993	160	255.222	21.770	1.037	88	546.316	37.824	1,65	25,75	20,72	14,86
1994	176	650.864	23.203	2.573	92	836.118	21.785	2,78	24,83	16,70	10,97
1995	205	2.374.055	52.357	9.458	209	1.264.998	20.782	3,56	9,23	7,67	5,48
1996	228	3.031.185	37.737	12.272	153	3.275.038	30.797	2,87	12,15	10,86	7,72
1997	258	9.048.721	58.104	35.908	231	12.654.308	61.879	1,56	24,39	19,45	13,28
1998	277	18.029.967	70.396	72.701	284	10.611.820	33.975	3,37	8,84	8,11	6,36
1999	285	36.877.335	84.034	156.260	356	61.137.073	114.271	0,72	37,52	34,08	24,95
2000	315	111.165.396	181.934	451.892	740	46.692.373	69.507	1,29	16,82	16,11	14,05
2001	310	93.118.834	80.400	375.479	324	68.603.041	47.689	0,95	108,33	824,42	411,64
2001/Q1	315	18.110.652	24.208	306.960	410	40.039.488	39.260	1,46	17,07	17,23	10,42
2001/Q2	312	28.366.421	24.246	443.225	379	54.022.417	43.152	1,21	22,25	36,73	17,74
2001/Q3	310	16.161.576	11.737	256.533	186	37.952.302	25.008	1,73	62,19	64,74	24,80
2001/Q4	310	30.480.184	20.209	491.616	326	68.603.041	47.689	0,95	108,33	824,42	411,64

Q: Quarter

Note:

- Between 1986-1992, the price earnings ratios were calculated on the basis of the companies' previous year-end net profits. As from 1993,

TL(1) = Total market capitalization / Sum of last two six-month profits

TL(2) = Total market capitalization / Sum of last four three-month profits.

US\$ = US\$ based total market capitalization / Sum of last four US\$ based three-month profits.

<b>Closing Values of the ISE Price Indices</b>						
<b>TL Based</b>						
	NATIONAL- 100 (Jan. 1986=1)	NATIONAL- INDUSTRIALS (Dec. 31, 90=33)	NATIONAL- SERVICES (Dec. 27, 96=1046)	NATIONAL- FINANCIALS (Dec. 31, 90=33)	NATIONAL- TECHNOLOGY (June, 30,2000=14,466.12)	
1986	1,71	—	—	—	—	
1987	6,73	—	—	—	—	
1988	3,74	—	—	—	—	
1989	22,18	—	—	—	—	
1990	32,56	32,56	—	32,56	—	
1991	43,69	49,63	—	33,55	—	
1992	40,04	49,15	—	24,34	—	
1993	206,83	222,88	—	191,90	—	
1994	272,57	304,74	—	229,64	—	
1995	400,25	462,47	—	300,04	—	
1996	975,89	1.045,91	1.046,00	914,47	—	
1997	3.451,—	2.660,—	3.593,—	4.522,—	—	
1998	2.597,91	1.943,67	3.697,10	3.269,58	—	
1999	15.208,78	9.945,75	13.194,40	21.180,77	—	
2000	9.437,21	6.954,99	7.224,01	12.837,92	10.586,58	
2001	13.782,76	11.413,44	9.261,82	18.234,65	9.236,16	
2001/Q1	8.022,72	6.395,44	5.369,60	10.827,58	7.633,62	
2001/Q2	11.204,24	8.702,96	6.524,80	16.045,49	7.914,39	
2001/Q3	7.625,87	7.068,90	4.326,77	9.955,00	4.135,30	
2001/Q4	13.782,76	11.413,44	9.261,82	18.234,65	9.236,16	
<b>US \$ Based</b>					<b>EURO Based</b>	
	NATIONAL- 100 (Jan. 1986=100)	NATIONAL- INDUSTRIALS (Dec. 31, 90=643)	NATIONAL- SERVICES (Dec. 27, 96=572)	NATIONAL- FINANCIALS (Dec. 31, 90=643)	NATIONAL- TECHNOLOGY (Jun. 30, 00=1.360.92)	NATIONAL- 100 (Dec.31,98=484)
1986	131,53	—	—	—	—	—
1987	384,57	—	—	—	—	—
1988	119,82	—	—	—	—	—
1989	560,57	—	—	—	—	—
1990	642,63	642,63	—	642,63	—	—
1991	501,50	569,63	—	385,14	—	—
1992	272,61	334,59	—	165,68	—	—
1993	833,28	897,96	—	773,13	—	—
1994	413,27	462,03	—	348,18	—	—
1995	382,62	442,11	—	286,83	—	—
1996	534,01	572,33	572,00	500,40	—	—
1997	982,—	757,—	1.022,—	1.287,—	—	—
1998	484,01	362,12	688,79	609,14	—	484,01
1999	1.654,17	1.081,74	1.435,08	2.303,71	—	1.912,46
2000	817,49	602,47	625,78	1.112,08	917,06	1.045,57
2001	557,52	461,68	374,65	737,61	373,61	741,24
2001/Q1	457,77	364,91	306,38	617,81	435,56	607,16
2001/Q2	520,80	404,53	303,29	745,83	367,88	718,60
2001/Q3	292,41	271,05	165,91	381,71	158,56	374,68
2001/Q4	557,52	461,68	374,65	737,61	373,61	741,24

Q : Quarter



## BONDS AND BILLS MARKET

### Traded Value

#### Outright Purchases and Sales Market

	Total		Daily Average	
	(TL Billion)	(US\$ Million)	(TL Billion)	(US\$ Million)
<b>1991</b>	1.476	312	11	2
<b>1992</b>	17.977	2.406	72	10
<b>1993</b>	122.858	10.728	499	44
<b>1994</b>	269.992	8.832	1.067	35
<b>1995</b>	739.942	16.509	2.936	66
<b>1996</b>	2.710.973	32.737	10.758	130
<b>1997</b>	5.503.632	35.472	21.840	141
<b>1998</b>	17.995.993	68.399	71.984	274
<b>1999</b>	35.430.078	83.842	142.863	338
<b>2000</b>	166.336.480	262.941	662.695	1.048
<b>2001</b>	39.776.813	37.297	159.107	149
<b>2001/Q1</b>	11.798.611	16.826	196.644	280
<b>2001/Q2</b>	8.133.638	6.902	127.088	108
<b>2001/Q3</b>	8.276.359	5.938	131.371	94
<b>2001/Q4</b>	11.568.205	7.631	183.622	121

## Repo-Reverse Repo Market

	Total		Daily Average	
	(TL Billion)	(US\$ Million)	(TL Billion)	(US\$ Million)
<b>1993</b>	59.009	4.794	276	22
<b>1994</b>	756.683	23.704	2.991	94
<b>1995</b>	5.781.776	123.254	22.944	489
<b>1996</b>	18.340.459	221.405	72.780	879
<b>1997</b>	58.192.071	374.384	230.921	1.486
<b>1998</b>	97.278.476	372.201	389.114	1.489
<b>1999</b>	250.723.656	589.267	1.010.982	2.376
<b>2000</b>	554.121.078	886.732	2.207.654	3.533
<b>2001</b>	696.338.553	627.244	2.774.257	2.499
<b>2001/Q1</b>	191.773.165	249.085	3.196.219	4.151
<b>2001/Q2</b>	184.504.878	155.939	2.882.889	2.437
<b>2001/Q3</b>	185.146.835	133.697	2.892.919	2.089
<b>2001/Q4</b>	134.913.675	86.523	2.141.487	1.405

Q : Quarter

(\*) The fourth quarter includes the October-December period.

### ISE GDS Price Indices (December 25-29, 1995=100)

	TL Based			
	30 Days	91 Days	182 Days	General
1996	103,41	110,73	121,71	110,52
1997	102,68	108,76	118,48	110,77
1998	103,57	110,54	119,64	110,26
1999	107,70	123,26	144,12	125,47
2000	104,84	117,12	140,81	126,95
2001	106,32	119,29	137,51	116,37
2001/Q1	103,38	109,26	115,47	108,00
2001/Q2	106,50	119,22	135,40	118,58
2001/Q3	106,19	118,92	136,83	116,55
2001/Q4	106,32	119,29	137,51	116,37

### ISE GDS Performance Indices (December 25-29, 1995=100)

	TL Based		
	30 Days	91 Days	182 Days
1996	222,52	240,92	262,20
1997	441,25	474,75	525,17
1998	812,81	897,19	983,16
1999	1.372,71	1.576,80	1.928,63
2000	1.835,26	2.020,94	2.538,65
2001	2.877,36	3.317,83	3.985,20
2001/Q1	2.160,79	2.270,15	2.595,08
2001/Q2	2.428,18	2.724,69	3.114,67
2001/Q3	2.630,08	2.996,77	3.600,11
2001/Q4	2.877,36	3.317,83	3.985,20
	US \$ Based		
	30 Days	91 Days	182 Days
1996	122.84	132.99	144.74
1997	127.67	137.36	151.95
1998	153.97	169.96	186.24
1999	151.02	173.47	212.18
2000	148.86	169.79	213.28
2001	118.09	136.14	163.55
2001/Q1	125.36	131.71	150.56
2001/Q2	114.76	128.77	147.21
2001/Q3	102.54	116.84	140.36
2001/Q4	118.09	136.14	163.55

Q : Quarter

\* The second quarter figures are as of December 28, 2001.

### ISE GDS Price Indices (January 02, 2001=100)

	TL Based				General
	6 Months (182 Days)	9 Months (273 Days)	12 Months (365 Days)	15 Months (456 Days)	
<b>2001</b>	101,49	97,37	91,61	85,16	101,49
<b>2001/Q1</b>	88,08	82,14	76,35	70,90	81,62
<b>2001/Q2</b>	98,02	92,50	85,72	78,63	95,78
<b>2001/Q3</b>	95,18	86,44	76,77	67,56	95,17
<b>2001/Q4</b>	101,49	97,37	91,61	85,16	101,49

### ISE GDS Performance Indices (January 02, 2001=100)

	TL Based			
	6 Months (182 Days)	9 Months (273 Days)	12 Months (365 Days)	15 Months (456 Days)
<b>2001</b>	179,24	190,48	159,05	150,00
<b>2001/Q1</b>	106,09	97,04	88,65	81,53
<b>2001/Q2</b>	131,88	126,18	117,03	107,17
<b>2001/Q3</b>	153,60	146,00	136,30	121,99
<b>2001/Q4</b>	179,24	190,48	159,05	150,00
	US \$ Based			
<b>2001</b>	7,34	7,79	6,52	6,14
<b>2001/Q1</b>	6,15	5,63	5,14	4,73
<b>2001/Q2</b>	6,23	5,96	5,53	5,07
<b>2001/Q3</b>	5,99	5,69	5,31	4,76
<b>2001/Q4</b>	7,34	7,79	6,52	6,14

Q : Quarter



## Book Reviews

*“Private Equity and Venture Capital, A Practical Guide for Investors and Practitioners”*, Rick Lake and Ronald A. Lake (eds.), Euromoney Institutional Investors Plc., United Kingdom, 2000, pp. xv-297.

The book provides a wide ranging set of overviews and analyses for institutional and private investors as well as venture capital and private equity professional. The book is divided into six sections.

The first section, “Developed Markets Overview”, provides summary of the major trends and developments in the major markets. Private equity and venture capital in Europe and the United Kingdom are bound to experience significant change, as economic and monetary unification becomes more of a reality. Private equity provides capital to enterprises that are not listed on a stock market and can be used to develop new products and technologies, to expand working capital, to make acquisitions, or to strengthen a company’s balance sheet. Venture capital is a subset of private equity and refers to equity investments made for the launch, early development or expansion of a business. Among different countries, there are variations in what is meant by venture capital and private equity. In Europe, these terms includes are generally used interchangeably and venture capital thus management buy-outs (MBO’s) and buy-in’s (MBI’s). In United States MBO’s and MBI’s are not classified as venture capital.

The second section on “Emerging market perspectives”, gives a candid view of the potential and pitfalls of investing in markets as disparate as Russia, China and South East Asia. The traditional Paradigm of investing in a broad portfolio of passive minority stakes-in long-established companies has proved to be disappointing for the Asian private equity industry.

The section on “buyouts, mezzanine and specialised forms of finance” is perhaps the broadest in the book, in that it covers how private investment strategy pursued with discipline can enhance portfolio returns while reducing downside volatility. Choosing the right investment manager is crucial in a strategy where both the ethical standards of the managers, in terms of their portfolio-valuation methodology, and their business acumen, are key to their long-term success.

The “New Ventures” section emphasize that venture capital is a very serious business that has played a critical role in the development of the high growth segments of the economy. Today, the UK venture capital is second largest in the world after the United States, and accounts for around half of the total European venture capital investment.

The fifth section on “Performance Management provides information on how well private equity and venture capital have delivered on their promises to investors. In addition to a quantitative review of returns and risk characteristics, this section also includes several discussions on strategic issues and concerns that will be thought provoking for practitioners as well as investors.

The final section analyses the rationale for private investments from an institutional perspective and provides several private equity and venture capital cases.

<b>ISE PUBLICATIONS</b>		
<b>I- PERIODICALS</b>	ISSN/ISBN	DATE
Weekly Bulletin	ISSN 1300-9311	
Monthly Bulletin (Turkish)	ISSN 1300-9303	
Monthly Bulletin (English)	ISSN 1300-9834	
Annual Factbook 2000	ISBN 975-8027-82-4	2001
Newly Trading Stocks at the ISE 1998	ISSN 1301-2584 ISBN 975-8027-54-9	1999
ISE Companies-Capital Increases Dividends and Monthly Price Data (1986-1999)*	ISSN1300-929X ISBN 975-8027-74-3	2000
ISE Review	ISSN 1301-1642	
Euro Asia Economic Bulletin	ISSN 1302-3330	1999
<b>II- RESEARCH PUBLICATIONS</b>		
Taxation of Capital Market Instruments in Turkey - Sibel Kumbasar Bayraktar		1994
International Portfolio Investment Analysis and Pricing Model - Oral Erdoğan		1994
Portfolio Investments in International Capital Movements and Turkey - ISE Research Department		1994
Linkage with International Markets (ADR-GDR) and Alternative Solutions to the Turkish Capital Market-Kudret Vurgun		1994
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