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The Privatization of Stock Exchanges:
The Case of Stockholm Stock Exchange
Bengt Ryden

Stock Market Volatility and Its Term Structure:
Empirical Evidence From the Turkish Market
Mustafa K. Yılmaz

The Long Run Performances of Turkish Industrial IPOs:
1990-1995 Experience
Halil Kıymaz

An Empirical Investigation of the Determinants of Capital Structure:
Evidence From the Istanbul Stock Exchange Firms
M. Banu Durukan

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CONTENTS

Articles

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The Privatization of Stock Exchanges: The Case of Stockholm Stock Exchange

by Bengt RYDEN[1]

Summary

Stock exchanges will soon have to face a much more complex, demanding and competitive environment in the financial sector which undergoes a transformation at a rapid pace. The main driving forces of this development will be the growing power of fund managers of large institutions managing the pension capital of the world, the continuing financial deregulation and the widespread use of sophisticated technology. In such an environment, stock exchanges will initiate efforts towards privatization in order to strengthen their competitive powers as we will witness mergers of stock exchanges. As a pioneer in this respect, the Stockholm Stock Exchange provides a good example due to its high performance. The present article covers the development process of the Stockholm Stock Exchange, in particular, the privatization phase of it. The developments which led to the decision to privatize, the steps towards privatization and the results thereof are examined in this article in detail.

I. Background[2]

It is in a surprisingly short period that the Stockholm Stock Exchange transferred itself from a small national market in a remote

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[2] The present article wasprepared on the basis of a speech Mr. Ryden delivered at the ISE Conference Hall on April 28, 1997.

corner of Europe to a modern, medium-sized market of international attraction and standing. Since 1990, the trading volume increased by 20-fold and the market capitalization by five-fold. The present article covers the reasons for and the process of the conversion of the Stockholm Stock Exchange from a small, non-profit and heavily-regulated exchange to a limited liability company.

In order to understand the considerations and the different steps for evolution that the Stockholm Stock Exchange has gone through recently, this change should be examined in a broader perspective since it is not possible to comprehend the privatization completely, without a more complete picture of the Swedish market and other steps taken in order to strengthen the position of the Exchange.

II. Brief History of the Stockholm Stock Exchange

Established in 1863, the Stockholm Stock Exchange remained as an inactive, small domestic market for a long time. Today, the market capitalization is about 250 billion US dollars, which represents a volume more than the gross national product generated in 1996. This is a clear indication of the fact that the role of the stock market in Sweden has grown to be a very important one. In consideration of the market capitalization of the stock market, compared to the size of the economy, Great Britain and Switzerland are the only two countries in Europe, which have the same important roles for the stock market in relative terms. No European country, other than Switzerland, has a market capitalization of more than 100% of GNP. What is more, this has happened in five years, which is a very short period of time. The total market capitalization has increased three-fold in the previous four years.

The trading volume remained at very low levels, mainly due to the turnover tax applied in the 1980s, which was eventually abolished in 1991. Today, the daily trading volume is about 700 million dollars. In 1996, the total average trading volume was 125 billion dollars. In terms of market capitalization and trading volume, the Stockholm Stock Exchange ranks seventh among the European exchanges and 17th on a global scale, which indicates that it is a medium-size exchange. The trading volume in the Stockholm

Stock Exchange increased by about ten times since 1990. The turnover rate, which represents how fast the market capitalization is being traded in one years' time, is 70%, up from 15% in 1990. So, 70% of the market value is being traded during one year. These statistical data reflect the dramatic increase in the activity of the market. The trading takes place in one session, starting at 10:00 a.m. and ending at 17:00. The closing time of the session has been extended from 14:30 to 16:00 and from 16:00 to 17:00 during the previous three years.

The trading is decentralised. Upon introduction in 1989 of an electronic trading system, whereby the brokers can enter their bids and offers from PCs in their own offices, the trading floor was closed. So, there was no demand any longer for trading in the Stock Exchange building. However, the offices of the Stockholm Stock Exchange are still located in the building, which dates from the 1770s. This is an attempt to combine a sense of history and a sense of tradition as we strive to structure a very modern and forward-looking exchange.

The members of the Stockholm Stock Exchange consist of banks and brokerage houses. The activities of the Exchange are dominated by equity trading. Currently, 235 companies are listed on the Stockholm Stock Exchange, which are divided into three categories on the basis of their sizes. These include the Main List, a Small Company List, and a category which could be regarded as an entry list to become eligible for acceptance on the Main Market. Ten foreign companies are listed on the Stockholm Stock Exchange. While many European exchanges follow a policy of foreign companies for listing, since this requires a lot of resources, the Stockholm Stock Exchange instead aims at being the preferred market for trading in Swedish equities.

Some Swedish companies, such as Ericsson and Volvo, are truly international. About 20 Swedish companies are listed on exchanges outside Sweden, particularly in the U.K., the United States and some other European exchanges.

The fact that about 1/3 of the ownership of the listed companies is in foreign hands, mostly US and UK investors, is a clear indication of the international quality of the Swedish market. Considering also

the fact that the proportion of foreign ownership in the market was less than 10% about 10 years ago, it is possible to say that the degree of internationalization has increased dramatically within a decade. This is also reflected in the structure of the members. While the members of the Stockholm Stock Exchange included no foreign bank or brokerage house 10 years ago, today about half of 60 member firms of the Swedish market are foreign-owned. And 13 of the 23 are "Remote Members" which means that they are trading from facilities outside the country. Remote members can trade on the Stockholm Stock Exchange without possessing physical facilities in the Swedish jurisdiction, which is possible through the combination of a new law based on a Directive of the European Union and the use of electronic information and communication technology. In other words, for a member firm wanting to trade, it makes no difference between sitting in the Exchange or just outside the Exchange building or sitting in London, or sitting in Istanbul. Remote members can trade on the Stockholm Stock Exchange regardless of where their facilities are located physically.

The foreign investors, particularly US and UK fund managers, have become increasingly important for both trading and ownership. For the daily trading, the needs of foreign investors and foreign intermediaries are escalating and becoming more important. The reactions, demands and requirements of foreign participants of the market are becoming more crucial in determining the Exchange's policies as this represents an enormous challenge for a small exchange. Thanks to the participants, the market because more active, not just on a local but also on an international scale.

The structure of stock ownership in Sweden reflects a heavy institutionalization. Some 85% of ownership is in the hands of funds, investment companies, closed-end funds, insurance companies and other non-private institutions while 15% is held by private individuals. Although this proportion of 15% may appear as little, it represents a relatively large sum of money. The people investing in shares are about 4 million, out of a total population of a little less than 9 million. They hold shares directly, or through funds. The increase in investments in the stock market by private individuals is enormous, since the early 1980s because of tax

incentives. Many average people deduct a certain amount of money monthly from their salary which is invested in the stock market, whereby stability and growth are created in the stock market.

The last decades witnessed two very important take-offs in the market growth. The first one was in 1980, when tax incentive funds were created, enabling private individuals to switch their savings from bank accounts to investment funds; that is, the Stock Exchange. The other was a new interest by foreign investors. That take-off levelled out in the mid- or late 1980s because of certain political decisions, including a turnover tax of 1% on each side. This moved the trading in Swedsh stocks, to a large extent, from Stockholm to London. The tax was abolished again in 1991 and a range of other changes happened, creating a new take-off in 1993. Since then, a substantial growth in market values and trading sophistication continues. This growth pattern coincided with the privatization of the Exchange, which took effect on Jan. 1, 1993.

III. The Process of Change

The privatization of the Stockholm Stock Exchange must be understood and analyzed in the light of a general strategy of transformation that took place during the previous 10 years. This strategy can be described as a change in four different steps. The first one was the modernization of the trading itself; that is, to create a decentralized electronic trading system. Called the Stockholm Automated Exchange (SAEX), this system proved to be very successful. Then, in the second step, the Exchange was privatized. The third step was the internationalization of the market. Today, the Stockholm Stock Exchange is going through the fourth step of integrating the market vertically and horizontally. The basic reason lying behind the implementation of this four-phase change is to be and to remain competitive.

As stock exchanges have usually worked in a very domestic and a highly-protected environment, subject to heavy regulations, they have not had to face competition from other exchanges or from other providers of exchange services. However, it is not possible for this state of non-competition and protection to continue forever. Today, in a world which is becoming more and more international,

efficient and technology-driven, an exchange cannot be excluded from the driving forces of competition.

Prior to the implementation of the change, the London market was taking trades from the Stockholm market. It was clear that the foreign exchange regulations in force at the time could not be maintained any longer in a liberal country like Sweden; the country would have to open up its capital market. Although this impending reality was clearly understood, the abolishment of the existing foreign exchange regulation took about five years, step by step. The analysis was based on political decisions, which had not yet been taken and was, therefore, a "qualified guess" but it happened to be exactly what turned out to be the case during the period to come.

The driving trends of competition were internationalization, de-regulation of capital markets, the intensive use of modern technology in information and communication fields and the increasing demands of professional Swedish and non-Swedish fund managers who work in a competitive environment because they perform for the benefit of the investors. Competition, until then unheard of in most of the exchanges outside North America, encompasses all of the above-mentioned trends. The Stockholm Stock Exchange became competitive by converting itself into a business enterprise in an increasingly competitive world where stock exchanges no longer enjoy historical privileges and are no longer protected by national boundaries.

The conclusions for a medium-sized exchange, like the Stockholm Stock Exchange, is that it must be more modern, more efficient, more business-oriented and more customer-oriented than the big exchanges. The Stockholm Stock Exchange's business strategy rests on a few basic pillars: customer orientation, market segmentation, high quality-low cost services, efficient use of information technology, open access to the market, a high level of transparency and a reasonable return on the equity of the Exchange.

3.1 Automation

The first step was to modernize the trading mechanism to create an electronic trading system with automatic matching. In 1986, the

Stockholm Stock Exchange decided to develop an automated electronic trading system with automated matching. The production started in June 1989 and 12 months later, the trading floor was closed after all listed securities had been entered into the system. The floor-based manual system had a physical capacity of executing 2,000 trades daily, which was increased to 5,000 with the new automated system. The Stockholm Stock Exchange regularly runs 20,000 trades per day at an average value of 40,000 dollars and at an average exchange fee of 2 dollars per trade, which corresponds to 1/3 of the average fee in the old system. This economic benefit has been very efficient in persuading the originally reluctant floor brokers about the benefits of the automated system.

The automation for trading was a natural supplement of the book-entry operation in a dematerialized settlement system which started to be implemented in 1990. The services provided by the automation of trading and settlement allowed the intermediaries to reduce their office staff significantly. Ultimately, as reflected by the declining commissions, this induced brokers to compete with lower margins.

The early years of the automated system were characterized by productivity gains. Services remained largely unchanged while they were produced at a lower cost. However, once the productivity gains were taken, the members started to look for new ways to use the system. As a result, trading practices changed far more than was originally anticipated. Members are increasingly adding advanced software that give them access to real-time analysis, automated arbitrage trades and combination trades between the cash and the derivatives markets. Competition between the intermediaries increased to the benefit of investors.

Today, the Stockholm Stock Exchange envisages a third generation of trading system that, among other things, will enable the intermediaries to function as a "concentrator" of customer orders. Small orders may be dealt with on a do-it-yourself basis in closed sub-systems. Ultimately, the big customers may ask for direct access to the market using the intermediary only as a legal and electronic gateway to the CPU's of the Exchange.

Automation was successfully implemented in 1990. The brokers

did not like it in the beginning and cooperated with journalists who criticized the idea. Everything that happened in other places, where floor trading had been abandoned to the benefit of electronic trading, happened at the Stockholm Stock Exchange as well. But today, there is no criticism whatsoever. On the contrary, all brokers express their satisfaction with the system. One good example of the effects is that the trading fees, i.e. the Exchange fees charged to the members, have been reduced by 2/3. The average fee for a trade today is about 1/3 of a trade with the old system and the average fee for a standard trade is less than 2 dollars, which is very competitive. The Exchange fee is important because some of the large banks, including investment banks, have the possibility of trading Swedish securities on other markets. And the price is important for the competitiveness. The modernization process of the system is still in progress and the trading system will meet increased trading demands for the next millennium.

3.2 Transparency

As the moves towards automated trading gained momentum, the reporting requirements have sometimes turned out to be an issue, since the system itself may offer a very high level of transparency. This, in fact, is rather an issue related to whether the market is order- or quote-driven and the extent to which it is dominated by very large block trades.

The Stockholm Stock Exchange's order-driven market has a high level of pre- and post-trade transparency. The management deliberately capitalized on this issue. The most modern technology available was implemented to disseminate post-trade information to the investors as soon as it is available. For the last 10 years, important elements in the pre-trade information have also been distributed via electronic monitors to both market participants and investors. Investors have been able to see the order-book with the best buy and sell prices offered in a given security at any time, while only members have access to the information that reveals the complete order-book with the identity of the brokers involved.

In the automated trading system, further important elements of the order-book were disseminated, notably the order volumes at the

five best price levels on the buy and sell side. Again, the authorized brokers will have the full picture. This openness serves many purposes. Firstly, it generates more business since a significant part of the trading is directly initiated by the momentary market situation. More information to the investors will make some of them trade more than if information were restricted. Furthermore, transparency is an important tool in fighting insider trading. The joint observation power of a large number of other players significantly increases the risk of exposure and can be expected to match many sophisticated surveillance systems or persons monitoring the market.

While reforming the market, special emphasis was placed on the notions of open access to the market; that is, free competition and for a maximum level of transparency in the interest of a dynamic but fair and orderly market. Traditionally, the Stockholm Stock Exchange members have had the right to trade on or off the exchange. Automated trades that are matched in the electronic system are reported real time and the information is disseminated at once. While this is implemented for 95% of all trades, large trades can also be matched off the system during the trading day. Such trades must be reported to the system and disseminated within five minutes and the execution price must be within the prevailing spread in the order-book at that time. Only very large block trades are allowed to be executed outside of the prevailing price spread.

3.3 Privatization

The second step was the privatization, which was made possible from a legal point of view, by the introduction of a new Stock Exchange Law. The law under which the Stock Exchange had been working since the 1970s was created when nobody understood what will happen with the securities business and the word "competition" was never mentioned in the old law. With the new law, the infrastructure of change was created. When the new law came to the agenda, the Board of the Exchange discussed what it wanted to do with the Exchange in the future. One of the fundamentals of the law was to end the legal monopoly under which the Stock Exchange in Stockholm had been working for many years. The Board wrote a

letter to the Government and requested them to consider their demands and wishes about the future of the Stockholm Stock Exchange. The Exchange had to become a public company, a joint-stock company, because in this new international environment, business-oriented and competitive, it required economic incentives and needed a business attitude to become efficient.

A body which has no owners is a body looking for its soul. An exchange must have owners who have an interest in it. Without owners putting demands on the management of an organization, it is very difficult to put targets. A more flexible organization and a smoother and faster decision-making process in the Board and in the staff were required. And last, but not least, the Exchange had to have an equity. Under the old law, the Exchange was not for profit and did not even have the right to build up a capital. The costs were covered by levying fees on members and on issuers but the fees must not exceed the costs. While in an industry, where you have to make investments and take other types of risks, you need to have a capital in order to cover risks, the system prevented the Exchange from building capital.

In late 1992, a prospectus was prepared with the help of the four leading advisers who analyzed the Exchange in great detail. The Stockholm Stock Exchange followed the same procedure as a company that wants to present an IPO has to do. This was a very interesting exercise which led the management to get a better understanding of what the listed companies have to do. This prospectus was published and reviewed in the press, and it was regarded as a very qualified prospectus. The subscription of the new shares was directed to all members and issuers at the end of 1992. This coincided with a financial crisis in the Swedish banking system. So, the need for capital of the Exchange was relatively low and an equity of 4 million dollars was determined to be sufficient. A total of 150 members subscribed to the new issue. While 400 institutions were invited to participate, 250 did not participate because many of them would be entitled to subscribe to one or two shares. Some of them also used the opportunity of selling their subscription rights, which created a market for such rights. And the leading issuing bank took the role of creating that market. So, there was a little

concentration of ownership.

While there was the idea of listing shares of the Stockholm Stock Exchange, 150 shareholders was not enough for that. The minimum demand for distribution of shares of the Exchange is about 300 shareholders, on the lowest list, and about 2,000 shareholders, on the Main List. The shares, after one year of transition, became freely transferable. In spite of intensive debates on this issue, the new law did not bring any restrictions to the ownership of the Swedish Stock Exchange. When the Board that was creating the statutes of the new company discussed the statutes, it concluded that no restrictions must be imposed. This coincided with a period of time in Sweden when the general view was very market liberal, and this is a very good example of market liberalism. After some changes of ownership, the main owners today are the banks as a group with 30% share. As a result of the concentration of the banking industry in Sweden, there are currently five banks. The other Swedish exchange, the Derivatives Exchange, did not get many subscription rights, but they bought from others so today they are the largest single shareholder with about 20% of the shares.

The old Exchange had a Board of 22 members, representing different interests, political parties, labour unions, members, issuers and investors. There was also a tradition of taking decision by voting. The new Board consists of nine members, all of them elected by the shareholders at the Annual General Meeting. And they do not represent any interest other than that of the Stockholm Stock Exchange itself. Three of the Board members are working with member firms, while the others are from the listed companies or investors. These people, whose main quality is competence, are chosen and proposed to the Annual General Meeting by the Annumination Community, consisting of high-level people with no specific interest, identified after consultations with the main, largest owners.

This has evidently led to an increase in the efficiency of the staff and also in the work of the Board. The decision-making process is faster, the productivity of the Exchange have improved and the services of the Exchange have increased dramatically. This improvement has been achieved with a very little increase in the

number of employees and many services are outsourced. Almost 50% of the staff are technology-oriented people, and therefore, the Stockholm Stock Exchange is now a heavily technological company. The importance of the knowledge of information and communi-cation technology is of strategic importance for an Exchange who wants to survive and prosper.

A new business strategy was developed, which took quite a long time, like a couple of years because it was not just the written strategy in itself which was important, but also the work required to arrive at that goal. A written strategy was developed with the efforts of all the staff and the Board and it turned out that it was well accepted. The most important feature of this strategy is customer orientation, the attitude of looking on what the Exchange is doing from a client perspective. The clients of the Exchange include the members, the issuers, and the investors. The needs of all of these categories must be well analyzed because failure to understand the needs of the issuers or the needs of the investors brings out the risks of providing services which would not be demanded in the long term. This idea was quite controversial when it first came to the agenda. Some of the members objected to the change, stating that they are the only customers of the Exchange. Today, the importance of understanding the totality of the demands of the Exchange and the market is generally accepted.

Another important part of the strategy is to concentrate on high quality in everything we do. A very intensive quality improvement program is being implemented for the purpose of improving the quality of the services of the Exchange, from technology to individual services. This program will probably end up with an ISO certification. Low cost services is another important aspect. An Exchange must not only offer high quality services, but also at a competitive cost.

Another very important aspect is to offer free access to the market. The best example of this is the case of the remote members. This was also debated at the first stage. Some of the local members objected to the idea of providing free access to the Exchange, stating that it would only mean more competition for them. However, they soon realized that, as an international marketplace,

the Stockholm Stock Exchange could not be closed to competition and the new business brought to the Exchange by new members was beneficial for all participants. The new members did not only lead to a significant increase in the trading volume, but they also attracted some business from the other markets.

Two of the largest Swedish companies were listed on the New York Stock Exchange in the previous year. These were Astra, a pharmaceutical company, which is about the same size as Ericsson, and the truck producer, Scania which was re-listed on the stock market, after having been delisted for many years because of a merger. These two companies have been traded on the New York Stock Exchange for one year. Today, between 90% and 95% of the trading on these companies is being done in Stockholm and between 5% and 10% in New York. But the ownership of Astra and Scania is, to a relatively large extent, in the hands of U.S. investors so they could easily go to the New York Stock Exchange, but they have preferred to go to the Stockholm Stock Exchange because of the low cost services, and because of the transparency of the market. A U.S. investor can always see, in real time, what is happening on the market. So, open access to the market is not necessarily to the detriment of the local brokers. It will increase the competition, but it will also increase the size of the pie at the same time.

The Stockholm Stock Exchange's business strategy emphasizes that, for a successful stock exchange, the importance of a transparent market in both pre- and post-trading, disclosure of company information and presenting a market which is regarded as fair and orderly in every respect of crucial factors. This business strategy states a number of financial objectives which will have a good return on equity. In financial terms, the return on equity in 1996, after tax, was about 40%, which is the lowest at the Stockholm Stock Exchange. So, from a pure mathematical point of view, it is more or less necessary for the return on equity to decrease. There was a return of 80% in 1993, which dropped down to 40%. It is expected to stabilize at somewhere between 20% and 30%. The equity itself has grown from the original 4 million dollars to thirty million dollars in four years' time. The dividend to the shareholders during these four years has been two times larger than the

subscription price.

At a time when the integration of the Stockholm Stock Exchange is discussed, the valuation of the Exchange by financial advisers showed that the value they put on the Exchange was 40 times higher than it was when the privatization process started. A profit-sharing scheme for the staff, giving a share of the so-called excess profit, was implemented. This amount may not exceed the dividends paid to the shareholders or four monthly salaries to any employee. With this method, balancing the costs and profits, as well as creating incentives for the staff, every employee has received four extra salaries during the first two years. Also, as clearly indicated by the financial statements, the program led the staff to be very cost-conscious.

There have been and are certain disagreements between owners. For example, some of the large banks object to the merging of the Stockholm Stock Exchange with the Derivatives Exchange. So, this open ownership has created a tension between different owners, which, if continues, will not be good for the Exchange. Some types of restrictions of ownership or influence of ownership could be thought about and that is also a conclusion that some of the other exchanges in and outside of Europe have come to implement during their privatization process. There has also been a certain debate about the possible conflicts of interest between the business objectives of the Exchange and the role of the Exchange to regulate the markets. There is a view that, as a business-oriented body, the Exchange should leave the regulation of the capital markets to the government. It is extremely important for an Exchange to create confidence in the market and, therefore, more resources are devoted to the regulatory role of the Exchange. But there has been a debate about how it would be possible to combine a business role and a regulatory role in the same company. Some organizational solutions were devised, including the creation of a special committee consisting of completely impartial people to take decisions about possible sanctions against companies and members if they breach the rules and the contracts with the Exchange.

A third area with potential problems would be the determining the fees and prices. The Stockholm Stock Exchange did not attempt

to maximize its profits while minimizing the fees. Of course, the fees could be lowered dramatically if much lower profits were accepted. It is a quite difficult balance to strike between profit maximization and fee minimization. A new fee structure, based on the old one, was created in order to obtain about the same income. The fees were lowered virtually every year, but because of the growth of the values and of the volumes in the market, income exploded more or less so the Exchange has been much more profitable than expected.

During the first couple of years of privatization, the Exchange was converted into an ownership organization from a cooperative or a membership organization. There were some problems concerning the difference, from the beginning, between the role of the owners and the role of the members. Members can express their criticism in two different roles, namely, as a customer or as an owner. In their role as owners, members may take action in the General Assembly or ask the Board to oust the management. The radical change in the structure of the Stockholm Stock Exchange allowed the acceptance of the different roles of the members and of the owners.

Another problematic area was that there have been a lot of new members and a lot of new issuers since 1993 but they have not had the opportunity of becoming owners of the Exchange because no new shares have been issued since no need for more capital had arisen. So, those who would like to have an ownership influence over the Exchange have just one opportunity, which is to find shares somebody is willing to sell. However, this does not seem to be very probable.

The last area of a possible problem is to find ways of keeping the benefits of the traditional organization of an exchange as a cooperative. Especially when the members are trading from a distance, when they are not coming to the Exchange every day, it is necessary to find forms and ways of a close communication with the members. This is part of a general communications policy where ways and forms of communication with all the customers, investors, and also with the issuers, are sought. On the membership side, it must be admitted that it is not easy to find efficient ways of communicating with a lot of remote members. The Exchange officials have to visit the Exchange members in London, Zurich,

Frankfurt, Helsinki and Copenhagen, which puts demands on the language proficiency of the Exchange staff and also the understanding of the different environments in all these places.

There is not one single recipe of going public and the unique conditions of each exchange must be well analyzed. Privatization of the Stockholm Stock Exchange was realized at a time when there were very special conditions in Sweden. The market virtually exploded in 1993, the same year as was the first year of the privatization. There were also some special conditions which facilitated the transition, the decision to privatize. Both the government and the members thought they had too little influence on the Stock Exchange prior to privatization. There were good conditions and a strong pretext for privatization which accelerated the process. Particularly, the loss of trading to London helped significantly for the recognition of the need.

A relatively long period of time was needed for preparation, in both mental and practical terms. I started to discuss it openly about three to four years before it came into effect. The success of privatization is contingent upon the support of members, the government, the staff, and the public. Without such support, as we have seen in other countries, privatization will take a very long time and it will be difficult to obtain political support.

It is important to create a broad ownership of a new company, without restricting the ownership with one group, such as the members. It is important to have a broad ownership including the issuers and also the institutional investors if you can find practical solutions, which we did not. Instead, at the Stockholm Stock Exchange, we chose to have transferable shares which had the effect that some of the institutions have bought into the Exchange afterwards. Some of the listed companies, for example, insurance companies, are big institutions, investing in stocks. It would be wise to consider to have some type of restrictions of ownership. Otherwise, there would be the risk of somebody starting to buy up the shares of the Exchange and taking over its management. If a group buys the majority of the shares and puts some demand on the board of the Exchange, other members or owners, there might be a fight over the Exchange which would damage the confidence. An

exchange, which is a social institution which demands credibility and confidence, should not jeopardize such features.

Another conclusion was that it is important to separate membership from ownership. It is important to define the mission of a business-oriented exchange and develop a business strategy for the strengthening of the competitiveness of the exchange. It is also important to find ways of cutting costs and lower the trading fees so that the members can see the benefits of the change.

Unless the privatization idea is accepted by the investors and the issuers, it will be a very risky project. Accordingly, it is vitally important to be modern, open, and transparent and to communicate with all relevant parties prior to privatization.

3.4 Structuring a Corporate Status

The old Exchange was a semi-public, self-owned, non-profit body with a legal monopoly heavily regulated by law. This form of organization was judged to be unsuitable to meet the looming competitive challenges. With the support of the new law, enacted in 1992, the Exchange was converted into a limited liability company, run for profit and owned by its members and issuers. The monopoly was abolished and, after a year, the shares became freely transferable.

From a business point of view, the advantages of assuming a corporate status have been obvious. The Stockholm Stock Exchange has been able to build up an unimaginable financial strength in just a few years' time. The subscribers to the share issue have been rewarded with dividends of more than double the size of the subscription price and with more than a 10-fold increase of the value of the share in four years of operation.

The main effect of the corporate status was a very evident business orientation of every aspect of the activities of the Exchange. The needs of the customer always came first, the quality aspect has been added to the cost aspect of the services, the decision- making process has become more efficient and the awareness of what we are and what we want to become had been reinforced. All this has been supported by a profit-sharing scheme for all of the staff of 65.

3.5 Internationalization

The third step in our strategy was the internationalization of trading. International deregulation and the Investment Services Directive of the European Union aim at removing the barriers to cross-border trading and competition. Today, only a few exchanges remain protected by a legal monopoly. Competition brings better service to the customer for a smaller charge.

The new legal regime of the Investment Services Directive of the European Union and the development of the securities markets in Europe have created a return to the concept of the home market as the basis. In the late 1980s, many observers thought that the mega markets in New York, Tokyo and London would attract the lion's share of cross-border trading in blue chips. However, events have taken another turn. In many more cases than expected, the revived home market has demonstrated the upper hand in attracting trade volumes. In Stockholm, we have witnessed how foreign investors chose to trade on the Swedish securities on the Stockholm Stock Exchange rather than on the London Stock Exchange. This is attributed to the low costs in Stockholm, measured as spread and two-way communications, and a high level of pre- and post-trade transparency. Also, the Stockholm Stock Exchange offers a better liquidity on a permanent basis than abroad.

The most important part of internationalization was the introduction of the remote membership idea which has proved to be very successful. We were two years in front of any other exchange which helped us quite a lot. No other European exchange has as many remote members as we have and this is something of great importance for the future, especially for a smaller, medium-sized exchange which is not in the center of the big financial markets. And, I think there are some similarities between Istanbul and Stockholm from that perspective. If the Istanbul Stock Exchange could invite brokers from other parts of Europe to trade its stocks without having to set up facilities in Istanbul, that could be the first step of becoming really internationalized.

I see upcoming competition and struggle between the European exchanges of having the largest well-known international investment banks as remote or local members. With such

companies, I mean the Salomon Brothers, the Lehman Brothers, the J.P. Morgan's, the Moores, and so forth. We have some of them today, but not all of them.

3.6 Remote Members

Stockholm is ahead of other stock exchanges, with the implementation, during 1993, of a remote member policy for electronic equity trading. Remote members are foreign intermediaries with direct access to the Swedish automated trading system from a location abroad. At present, 13 out of 46 equity trading participants are foreign remote members and there are new applications. By lowering the entry cost, the remote member policy increases the competition between intermediaries. However, it more than compensates the loss arising from the lowered cost by bringing new business and adding liquidity to the market.

Today, remote members trading from London, Zurich, Copenhagen, Berlin and Helsinki account for up to 10% of total trading. We anticipate to have close to 20 remote members at the end of next year. This is a clear demonstration of the attractiveness of the Swedish market but also of the strong competitiveness that our strategy has created.

Remote members may also be seen in the light of the added importance of foreign investors. In 1996, foreign customers accounted for 35% of the trading volume in Stockholm and more than 10% of the net capital for new issues and initial public offerings.

With such a large volume of cross-border transactions, the efficiency of cross-border services for clearing and settlement, as well as for registration and custody will be of highest importance. Systems that have their roots in the days of security certificates and foreign exchange regulations are still widely used. With this system, it is feasible to have some kind of sub-custody arrangements for foreign shareholders to make sure that the share certificates would be available at once if a sale was ordered.

Today, no investor will demand physical delivery if it can be avoided. So, we are striving towards the G30 recommendation of keeping the shares in one CSD only; that of the home market.

Trading on other markets will ultimately settle against the master file of shares and shareholders in the home country.

On the other hand, improved technology for back-office functions will also make stock exchanges more vulnerable to the threats from other types of trading systems. Some members already route big institutional orders straight to the trading system as part of their business idea. If they are denied this option, they may choose to intermediate the trades without the assistance of the Stockholm Stock Exchange, to the detriment also of the members who will see market liquidity and transparency being eroded.

While developing the future strategy, the Stockholm Stock Exchange focused on the needs of the investors as much as the needs of the intermediaries. In the end, this will also benefit intermediaries since they will be induced to a swifter adaptation to the new market.

Electronic and automated trading has significantly reduced the cost for trade execution, resulting in closer price spreads. Both changes have been to the advantage of end users. Intermediaries have benefited from the reduced costs but indirectly also from the smaller spreads since trading volumes have increased dramatically. The intermediaries who opposed the changes are among the obvious winners due to increased volumes, more efficient back-office production, a reduced portion of trading errors and new options to introduce sophisticated trading strategies.

However, this is only the beginning; the major changes are still ahead of the Stockholm Stock Exchange. Rapid development in data communication will change two cornerstones for the organization of stock exchanges of today.

Stock exchanges have traditionally been constrained by the limitations of how many floor brokers can be accommodated in one place and the physical distance to this location. Modern technology has removed both of these constraints. We can already witness how "interconnected networks" will offer quite other options for the organization of exchange trading. One example is the agreement, in early 1996, between Tradepoint and Bloomberg which will offer direct access to an exchange by thousands of users. As soon as Internet installs the technology for a secure identification of

end-users and guaranteed transfer of "virtual cash," it will doubtlessly revolutionize securities trading.

3.7 Integration of Markets

The integration of markets horizontally and the integration of technology in the transaction chain are important in the privatization process. We are discussing with the Derivatives Exchange the possibilities of integrating cash trading with derivative s trading, not just on the market but also under one system. This would be to the benefit of the exchanges as well as the customers of the exchanges. We are also discussing with the Swedish Central Securities Depository to integrate not only technically but also from an ownership point of view. In the event that the Ministry of Finance intends to sell its half of ownership in the Central Depository, the obvious buyer would be the Stock Exchange.

The third aspect of integration is geographical. Each of the four Nordic exchanges; Stockholm, Oslo, Copenhagen and Helsinki are relatively small. Stockholm is medium-sized, while the others are small. Of the total trading and market capitalization of the Nordic exchanges, the Stockholm Stock Exchange has 80% while the others share the remaining 40%. A much more harmonized Nordic market is necessary in order to make this part of Europe more attractive as a market and to facilitate access to the market. The fact that the Stockholm Stock Exchange is relatively large, compared to the other Nordic markets, makes the integration a little difficult, so it must demonstrate to them that it shall not misuse its size by claiming advantages. The Stockholm Stock Exchange is very close to reaching an agreement with the Copenhagen Stock Exchange for creating a common market, their members already trading on our systems. Members of the four Nordic exchanges should trade on one centralized and the same trading system and having one PC entry point to that system, displaying harmonized trading rules and harmonized listing rules, from the users' perspective, one single market. This is the future for a market that is too small to really attract the big enthusiasm in the world.

The increasing competition in the financial markets leads stock exchanges to restructure in accordance with the changing

conditions. So, for a stock exchange which wants to be a successful participant on the international markets, it is very important to accept the demands of increased competition, which comes mainly from abroad. It is necessary to monitor and interpret well what is happening on the leading markets and especially what is happening from the institutional investors' point of view, in what is called in the international jargon, "the buy-side". The demands of the buy-side and of the intermediaries, particularly the large intermediaries will continue to increase on lower exchange fees and higher quality.

The future, from the point of view of the stock exchanges and brokers, may also entail what is called disintermediation. The Swedish government is going to propose an amendment to the Stock Exchange Law to the effect that institutions will be allowed to trade directly at the Exchange, not through in members. This is really a challenge for the industry. The weak hopes of yesterday now become reality. This development examples of which are clearly demonstrated in the United States and the United Kingdom, are expected to lead to an enormous debate. In London, we saw a couple of years ago, the establishment of a new exchange which offered its services to members but also to non-member institutions trading there. In the U.S. you have a lot of examples of the same phenomenon. So, if you, as an Exchange, do not watch up and catch up, you may risk losing customers.

IV. Conclusion

Stock exchanges will have to face a more complex, demanding and competitive environment than ever before. The main driving forces are the growing power of fund managers of the large institutions, managing the pension capital of the world, the continuing financial deregulation, and the widespread use of sophisticated technology.

Disintermediation will make life difficult for traditional stockbroking and market-making, while narrowing spreads will squeeze out many market-makers. Capital requirements will increase. Especially the medium-size firms will suffer. The structure of the securities trading industry will be deeply affected, as has already been the case with so many other industries under competition and international trade.

Customers will demand and get more value for money. The quality of services will increase while the prices will decrease. We will see more concentration but also fragmentation, segmentation and other similar policies. Cash and derivatives markets will become more and more integrated to form hybrid markets and so will sophisticated securities trading to create hybrid systems. Some stock exchanges will, therefore, forcefully broaden their product portfolio into all sorts of financial derivatives. Others may choose to stay with their core products but instead integrate vertically in order to cover the whole transaction value chain. Others will set up horizontally and vertically integrated full-service intermediaries and connect with systems in other countries and regions. This development will necessarily make some exchanges to compete with some of their own members.

Stock exchanges will have to accept to compete not only with each other, but also with an increasing number of often innovative transaction service providers outside the domain of traditional exchanges. So, there is one solution: become and stay business-oriented and organized and as customer-focused as your worst competitor. "Stay close to your friends but closer to your enemies," as an old saying goes. Innovation, quality and flexibility will be instrumental for success.

Stock exchanges have a valuable asset that the outsiders lack: the goodwill of integrity and institutional authority that history has given them. They must not miss the opportunity of capitalizing on this goodwill.

In this adjustment process, the mere concept of the traditional stock exchange may sooner or later become obsolete, and eventually, even anachronistic. As it may sound, this is not a pessimistic scenario. On the contrary, it is the beginning of a new era that opens up a variety of new and promising avenues for stock exchanges and their different constituents in their efforts for a successful future.

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Stock Market Volatility and Its Term Structure: Empirical Evidence From the Turkish Market

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Summary

This paper focuses on the informational efficiency of an emerging stock market of a developing country namely Turkey and also on stock market volatility studied from two different, but complementary perspectives. In the first part, the volatility trend and its term structure throughout the time is analysed. In this context, the realized volatility and the expected volatility are calculated and compared under the Random Walk theory by using the relevant ISE Composite Index closing values ranging between January 4, 1988 and December 27, 1996. In the second part, the structure of the stock market volatility in Turkey has been investigated, both for the 1988-1996 period as a whole and on a yearly basis so as to come up with some conclusion about one of the main parameters used in option pricing, namely volatility. Moreover, in this part, the volatility, starting from January 2, 1997, when two digits have been removed from the index, is analyzed by using ISE-100 and ISE-30 Indices closing values realized between the period of January 2, 1997 – June 18, 1997.

I. Introduction

Informational efficiency is an important factor to enhance overall efficiency in the capital markets. In this respect, the analysis of the trend that market returns show in the capital markets throughout the time provide hints to various parties under the efficient market hypothesis. For instance, the fact that whether stock prices follow a random walk or not in the market is often used as a main indicator in evaluating market efficiency.

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Increases or decreases in stock prices are defined as "volatility" in the market. The volatility in the financial markets always play a vital role in investment decisions and modelling financial markets. Increase in stock price volatility makes both investment in stocks as well as the stock market itself more risky. Here, risk refers to the loss that the investor may bear while expecting to earn high return in the market. In other words, volatility affects the buy-sell decisions of investors, to a large extent. Most of the time, main players of volatile markets are speculators. Short-term capital gains are important for them. Rational investors, on the other hand, usually prefer markets with lower volatility. The reason is that not only the capital gains but dividend gains as well are important for these investors. In other words, if the aim is to attract rational investors into the market, then the volatility should be decreased and the stock prices should be stabilized. In this sense, the introduction of futures market and option markets and the relevant financial instruments, especially during periods of high stock volatility, would most likely help stabilizing the stock returns in the market.

The analysis of price volatility in the financial markets has received considerable attention in the world during the last decade. In Turkey, especially Balaban (1996) has produced some researches to estimate price volatility in the Turkish stock market. The term structure of volatility in the stock market, which will be covered in the first part of this paper, was searched first by Balaban (1996) by using the ISE Composite Index values as a data base. This paper carries this investigation forward and investigates the price volatility in the stock market, by using the ISE Composite Index closing values between January 1988–December 1996.

In the second part of this paper, based on the ISE Composite Index closing values daily, weekly and monthly volatility of the index has been calculated by dividing the end of the day, week (last trading day of the week) or month (last trading day of the month) values to the the previous day, week, or month values, taking their natural logarithm (ln) so as to make them convenient in terms of a normal distribution parameter and using their standard deviation. Furthermore, in this part, the effect of moving two digits from the index on stock volatility is analysed by using the ISE-100 and ISE-30

indices' daily closing values recorded between January 2, 1997 and June 18, 1997.

II. Data and Methodology

In this paper, daily observations of the Istanbul Stock Exchange Composite Index (ISECI) closing prices between January 4, 1988 and June 18, 1997 are employed as a data base[1]. The returns received by investors on the index in predetermined time periods are organized and index data base is made ready for the analysis[2].

2. 1. Term Structure of Volatility

The concept of volatility aims to show the frequent stock price fluctuations in a sensitive market, changing up and down in an uncertain manner. Therefore, when a comparison is to be made in terms of time, percentage changes instead of absolute values should be used. Percentage changes here refers, to the stock rate of return (one stock rate of return or the rate of return of the whole stock portfolio). In this paper, market portfolio (ISE Composite Index) rate of return is used.

This part of the paper is based on Balaban's (1996) work on the investigation of Turkish stock market weak-form efficiency, based on Peters' (1994) work on the term structure of volatility in the U.S. stock market. Balaban (1996), in his paper, tests volatility as measured by standard deviation scales according to the square root of time. This scaling of volatility is derived from the "Brownian motion," a primary model for a random walk process[3]. Einstein's (1908) work on the Brownian motion finds that the distance that a random particle covers increases with square root of time used to measure it. In Peters' (1994) work, this is formulated as follows:

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[1] With a base period of January, 1986, the ISE Index was initially calculated on a weekly basis and has been calculated on a daily basis since October 26, 1987.

[2] Value-weighted index, using closing prices of stocks, the ISE Index ignores the dividend gains paid in cash throughout the calculation.

[3] It all started in the 1830s, when a Scottish scientist, Robert Brown, observed the motions of pollen dust suspended in water. Brown noticed that the movements followed no distinct pattern, moving essentially randomly, independent of any current in the water. This phenomenon came to be known as the *"Brownian motion."*

$$R = T^{0.5} \quad (1)$$

where R and T denote the distance covered and a time index, respectively. The so called T to the one-half rule is extensively used in financial economics, especially in option pricing, to find, say, annual volatility given the standard deviation of, say, daily, weekly and monthly returns. Annualized risk is simply found by multiplying the standard deviation of daily, weekly and monthly returns by square root of 252, 52 and 12. In the second part of the paper, the development of price volatility will be discussed by using this approach.

Daily ISECI observations range between January 4, 1988 and December 27, 1996. Natural logarithmic returns on the ISECI, amounting to 2,249 observations, are calculated as follows:

$$R_t = \ln (I_t / I_{t-1}) \quad (2)$$

where I_t and R_t denote the index number and return of day t, respectively. ${}_iY_T$ refers to the ith series where the sub-periods have a length of T. Thus, total observations reaching 2,249, 16 different series are constructed; i = 1, 2, 3, ..., 16. In these series, the associated T values are as follows: 1, 2, 4, 5, 8, 10, 16, 20, 25, 32, 40, 50, 64, 80, 100 and 160 day. Note that these T values can also be considered as investment horizons. The T-day returns for the consecutive sub-periods are also calculated in the same way. Upon completion of the returns, series in the way described above, descriptive statistics is calculated for each ${}_iY_T$. The special emphasis is put on the standard deviation. Note that the calculated standard deviations for each investment horizon indicate realized volatility for that horizon.

Expected volatility under random walk theory is derived according to the T to the one-half rule as follows:

$$SD_T = SD_1 * T^{0.5} \quad (3)$$

where SD_T, refers to the standard deviation of T-day returns. SD_1 is daily volatility; i.e., T is equal to one. For each series, expected

volatility is calculated in the same way.

The percentage difference between realized volatility and expected volatility for each T-day series is computed to emphasize deviation, if any. In addition, coefficient of variation is calculated to see how standardized volatility changes through time. Finally, the following regression is run to test whether the realized volatility increases by the square root of time:

$$\ln SD_{TG} = A + B * \ln T \qquad (4)$$

where SD_{TG} refers to the realized price volatility for each T-day series.

2. 2. Historical Volatility Estimation

It is often difficult to have a healthy estimation about the price volatility. In a sensitive market, where there are frequent upward and downward price movements, out of many investment decisions, option pricing model stands to be very sensitive to these estimations. Usually two approaches are pursued to calculate price volatility: 1) historical volatility and 2) implied volatility. In this paper, since there is no actively operating futures and options market in Turkey yet, only historical volatility approach will be discussed. In order to calculate the implied volatility, there should be an actively operating options market and the price volatility should be calculated from the option prices realized in the market.

The historical volatility estimate is based on the assumption that the volatility that prevailed over the recent past will continue to hold in the future. For this purpose, a sample of returns on the stock over a recent period (daily, weekly or monthly) is taken and the standard deviation of the continuously compounded returns are computed.

The returns can be daily, weekly, monthly or at any desired time interval[4]. If daily returns are used, the result will be a daily standard

[4] There is an important issue concerned with whether time should be measured in calendar days or trading days when volatility parameters are being estimated and used. Empirical research carried out to date indicates that trading days should be used. In other words, days when the exchange is closed should be ignored for the purposes of the volatility calculation.

deviation. To obtain the annualized standard deviation, the model requires the variance to be multiplied by the number of trading days in a year, which is about 252, or the standard deviation by $\sqrt{252}$. If weekly or monthly returns are used, in this case, the result will be weekly or monthly variance (or standard deviation) and must be multiplied by either 52 (or $\sqrt{52}$) or 12 (or $\sqrt{12}$) to obtain an annualized figure.

In this part of the paper, daily, weekly and monthly index observations, ranging between January 4, 1988 and December 27, 1996 is used. By the help of the Equation (1), the natural logarithm of returns are calculated and the rate of changes in the index are made available for the use of normal distribution parameters. From the equality of Equation (1), I_t, for each t value (t = 1, 2, n), the following formula may be written;

$$I_t = I_{t-1} e^{R_t} \tag{5}$$

In this case, R_t is the continuously compounded return (not annualized) in the tth interval. Then, the average of all returns are calculated by using the following equation:

$$\bar{R}_t = \sum_{t=1}^{n} R_t / n \tag{6}$$

n = number of observations
R= daily, weekly or monthly continuously compounded return of the relevant return obtained at time t
$\bar{R}_t$= mean of the daily, weekly and monthly compounded returns
I_t = index value at the end of tth interval (t = 0, 1, 2, 3, ..., n)
τ = length of time interval in years

The standard deviaton of R_t, σ^*, is calculated as follows:

$$\sigma^* = \sqrt{1/n-1}\sum_{t=1}^{n}(R_t - \bar{R}_t)^2 \quad \text{or} \quad \sigma^* = \sqrt{(1/n-1)\sum_{t=1}^{n} R_t^2 - 1/n(n-1)(\sum_{t=1}^{n} R_t)^2} \tag{7}$$

In this case, the annualized standard deviation of R_t would be;

$$\sigma_Y = \sigma^* * \sqrt{\tau} \quad (8)$$

The standard error of this estimation can be shown to be approximately as;

$$\text{Standard Error} = \sigma^* / \sqrt{2n} \quad (9)$$

Choosing an appropriate value for *n* is not easy. *Ceteris paribus*, more data generally lead to more accuracy. However, changes over time and data that are too old may not be relevant for predicting the future. A compromise which seems to work reasonably well is to use closing prices from daily data over the most recent 90 to 180 days.

The ISE Stock Market return on a daily, weekly and monthly basis, referring to the investment made on the index, is calculated separately for each day, week and month and the daily, weekly and monthly changes in return are covered in a time series approach. The probability distribution, upon which the investors base their risk preferences and expectations for price estimations, is provided by drawing the histogram of returns in the market on a daily, weekly and monthly basis.

In the second section of this part, 114 observations are used to calculate the price volatility for 1997. The limited number of the observations stem from the fact that two digits were removed from the ISE-100 index as well as the introduction of a newly-designed index, namely the ISE-30, which went into effect on January 2, 1997.

III. Empirical Results

3. 1. Term Structure of Volatility

Table 3.1 provides summary statistics concerning different investment horizons. Note that the mean returns increase proportionally with risk, as expected. In other words, higher return is obtained in a higher risk environment, which is one of the well-known phenomenon in the financial literature. If volatility is measured by standard deviation, realized volatility shows an up-trend throughout the investment horizons (from 2.91% to 49.88%). Figure 3.1 depicts the trend that mean and standard

deviation has followed throughout the investment horizons.

When summary statistics are analysed in Table 3.1, the trend that the skewness and kurtosis has followed may offer investors some insight[5]. As every one knows, skewness shows how far the distribution is from being symmetric. If the distribution is not symmetric, as in the case of normal distribution, it skews either to the left (negative) or to the right (positive). The findings in Table 3.1 point out that skewness has shown a considerable increase between T_1-T_{32} (from -0.06 to 0.50), moving from the right to the left, and then displayed a decrease between T_{40}-T_{80} (from 0.50 to 0.12), and then took on an upward movement in the following investment horizons. This refers to the fact that the distribution of returns increases up to a point (investment horizon), then decreases and becomes symmetric in a certain time span, and then increases again. As to the kurtosis, which provides a measure of the weight in the tails of a probability density function, it follows a decreasing trend after the investment horizon T_4. This may be interpreted as an increase in the standard deviation of returns over time[6].

[5] Skewness and kurtosis of a distribution are calculated as follows:

$$\text{Skewness}_x = \sum_i^n \frac{(x_i - \bar{x})^3}{\sigma^3} \qquad \text{Kurtosis}_x = \sum_i^n \frac{(x_i - \bar{x})^4}{\sigma^4}$$

$\bar{x}$ = mean of returns
σ = standard deviation of returns

[6] The skewness and kurtosis are expected to be "0" for distributions, such as the normal, that are symmetric about their mean.

Table 3.1: Summary Statistics (*)

	T-1	T-2	T-4	T-5	T-8	T-10	T-16	T-20
Mean	0.22	0.44	0.88	1.09	1.75	2.17	3.44	4.29
Standard Error	0.06	0.10	0.14	0.16	0.21	0.24	0.31	0.35
Median	0.13	0.36	0.78	0.86	1.19	1.27	2.29	2.56
Standard Deviation	2.91	4.54	6.67	7.55	9.84	11.15	14.78	16.68
Variance	0.08	0.21	0.44	0.57	0.97	1.24	2.18	2.78
Kurtosis	1.40	1.62	1.71	1.51	1.40	1.27	0.95	0.82
Skewness	-0.06	-0.01	0.06	0.08	0.13	0.21	0.26	0.33
Range	22.86	38.33	61.18	66.93	84.99	89.78	122.16	139.90
Minimum	-12.59	-19.27	-28.98	-33.98	-41.42	-43.45	-66.75	-72.64
Maximum	10.27	19.06	32.20	32.95	43.57	46.33	55.41	67.26
Count	2.249	2.248	2.246	2.245	2.242	2.240	2.234	2.230
Confidence L. (95%)	0.12	0.19	0.28	0.31	0.41	0.46	0.61	0.69

	T-25	T-32	T-40	T-50	T-64	T-80	T-100	T-160
Mean	5.36	6.87	8.64	10.86	13.96	17.61	22.17	36.95
Standard Error	0.40	0.45	0.51	0.57	0.64	0.71	0.83	1.09
Median	3.33	3.99	6.73	9.01	11.08	16.53	20.77	31.75
Standard Deviation	18.83	21.33	23.88	26.73	29.81	33.28	38.27	49.88
Variance	3.54	4.55	5.70	7.14	8.89	11.08	14.65	24.88
Kurtosis	0.70	0.83	0.73	0.31	-0.55	-0.82	-0.35	-0.18
Skewness	0.44	0.50	0.47	0.40	0.26	0.12	0.29	0.40
Range	129.20	152.58	179.11	182.76	155.05	163.62	215.42	245.88
Minimum	-53.56	-67.44	-74.36	-72.80	-56.20	-59.39	-68.73	-73.18
Maximum	75.64	85.14	104.75	109.96	98.85	104.23	146.69	172.70
Count	2.225	2.218	2.210	2.200	2.186	2.170	2.150	2.090
Confidence L. (95%)	0.78	0.89	1.00	1.12	1.25	1.40	1.62	2.14

(*) Statistical results, other than kurtosis, skewness and count, are calculated as percentages.

Table 3.2 compares realized and expected volatilities across investment horizons and presents such standardized measures of dispersion as coefficient of variation[7]. As noted from Table 3.2, the coefficient of variation inversely changes with the length of

[7] Coefficent of variation, which is a statistical indicator used to compare the risk of different distribution functions, is calculated as follows:
Coefficient of variation = $\sigma / \overline{X}$

investment horizon; i.e., it decreases as investment horizons become longer (from 13.21 to 1.35). Therefore, long-term investors face less risk per unit of return compared to short-term investors. Although this may seem as a conflicting issue when compared with the continuous increase in standard deviation throughout the investment horizons, it may be used as a relative indicator in the market. Maybe another point that may deserves attention in Table 3.2 is that realized price volatility is always high than expected price volatility for all investment horizons. The calculated deviation of the difference between these two price volatility estimates varies between 10.58% and 35.69%.

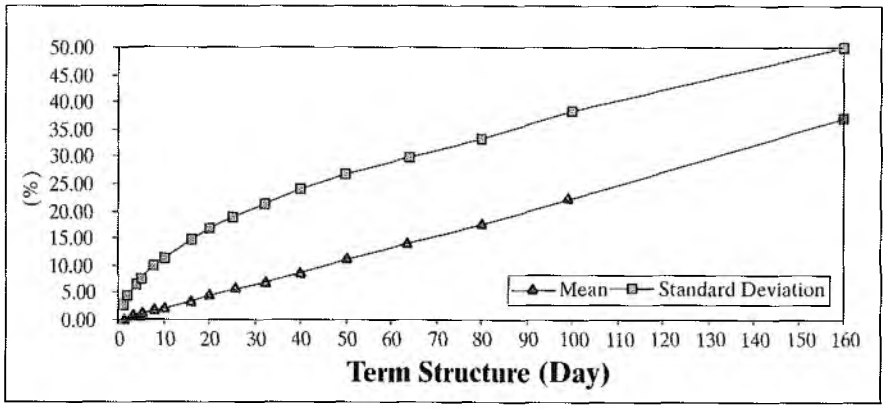
Table 3.2: The Term Structure of Volatility Between 1988-1996

Term Structure (Day)	Mean (A)	Realized Volatility (B)	Expected Volatility (C)	Difference (D)= (B-C)	Coefficient of Variation (E)= (B/A)
1	0.22	2.91	-	-	13.21
2	0.44	4.54	4.11	10.58	10.35
4	0.88	6.67	5.81	14.69	7.61
5	1.10	7.55	6.50	16.23	6.90
8	1.75	9.84	8.22	19.74	5.63
10	2.17	11.15	9.19	21.33	5.13
16	3.44	14.78	11.62	27.12	4.29
20	4.29	16.68	13.00	28.31	3.88
25	5.36	18.83	14.53	29.57	3.51
32	6.87	21.33	16.44	29.76	3.10
40	8.64	23.88	18.38	29.91	2.76
50	10.86	26.73	20.55	30.05	2.46
64	13.96	29.81	23.25	28.22	2.14
80	17.61	33.28	25.99	28.03	1.89
100	22.17	38.27	29.06	31.70	1.73
160	36.95	49.88	36.76	35.69	1.35

Table 3.3 presents regression results for the so-called t to the one-half rule. Note that volatility increases by the 1.81 (1/0.5513) root of time in the Turkish stock market. Therefore, it is found that volatility increases faster than the square root of time. Although this

is in conflict with the random walk theory, derived from the Brownian motion, it is a good indicator showing that the returns obtained in the market move in a certain scale proportional with respect to the time, which may be interpreted as an adjusted version of the random walk theory.

Figure 3.1: The Mean and Term Structure of Volatility Between 1988-1996



3. 2. Historical Volatility Estimation

Table 3.4 provides summary statistics concerning the daily, weekly and monthly calculations of price volatility. The latter, following an up trend in the market, figures out to be 46.13% on a daily, 54.09% on a weekly, 55.95% on a monthly and 59% on a 2- and 3-month basis. Another important point that may be noted in Table 3.4 is that the skewness, being very low (-0.05%) on a daily and weekly basis leading almost to a normal distribution, stands to be about 40% on a monthly basis (1, 2 and 3 month). This means that the figure that shows the probability distribution of returns has skewed to the left throughout the time.

Table 3.3: Regression Results

Multiple R	0.9994167
R Square	0.9988337
Adjusted R Square	0.9987504
Standard Error	0.0283872
Observations	16

ANOVA	*df*	*SS*	*MS*	*F*	*Significance F*
Regression	1	9.661698877	9.661699	11.989.68	6.15239E-22
Residual	14	0.011281682	0.000806		
Total	15	9.67298056			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1.1287121	0.016220721	69.58458	3.47E-19	1.093922088	1.163602122
X Variable 1	0.5513704	0.005035466	109.4974	6.15E-22	0.540570411	0.56217043

Table 3.4: Daily, Weekly and Monthly Summary Statistics Between 1988-1996 (*)

	Daily	Weekly	1 Month	2 Months	3 Months
Mean	0.0022	0.0107	0.04425	0.09038	0.13753
Standard Error	0.00061	0.00349	0.01561	0.02353	0.02905
Median	0.00132	0.00881	0.02302	0.07015	0.13473
Standard Deviation	0.02906	0.07501	0.16152	0.24225	0.29765
Variance	0.00084	0.00563	0.02609	0.05869	0.0886
Annualized Standard Deviation	0.46133	0.54094	0.55951	0.59339	0.5953
Kurtosis	1.39767	2.12069	0.34235	0.39184	-0.6098
Skewness	-0.0571	-0.0491	0.40709	0.40898	0.15825
Range	0.2286	0.66929	0.86006	1.32738	1.30977
Minimum	-0.1259	-0.3398	-0.3388	-0.4455	-0.4459
Maximum	0.10268	0.32951	0.52125	0.88185	0.86386
Count	2,249	462	107	106	105
Confidence L. (95%)	0.0012	0.00686	0.03096	0.04665	0.0576

(*) Statistical results, other than kurtosis, skewness and count, are calculated as percentages.

Table 3.5 shows the histogram of the distribution of returns on a 1, 2 and 3-month basis in the market. Column "Bin" shows the rate of return whose range is automatically (or manually, if necessary) set; "Frequency" column shows the number of observations at each range and "Cumulative %" column reflects the probability that the expected returns would be realized. Figures 3.2 to 3.6 provide the realized probability distribution of the market. "Cumulative" column in Table 3.5 specifies the area that this probability distribution

occupies according to the relevant returns in the table.

When the histogram table is referred to, for instance, while the probability of getting a return over 0.05% on a daily basis is 51.45%, the probability of getting a return over 9.12% (21.8%), on a monthly (2-month basis) is 35.51% (31.13%). Figures 3.2 to 3.6 show this fact clearly in all dimensions. In this sense, the introduction of options contracts that would be traded in the futures and options market with a 1-month expiry cycle would be more suitable to reduce the uncertainty in the stock market. However, since this paper is an ex-ante study, the initiation of an options market with 3-month cycle option contracts may reduce more effectively the skewness in the probability distribution.

Table 3.5: Frequency Distribution of the ISE Composite Index According to 1, 2 and 3-Month Returns

1 Month			2 Months			3 Months		
Bin	Freque.	Cumula. %	Bin	Freque.	Cumula. %	Bin	Freque.	Cumula. %
-0.33882	1	0.93	-0.44553	1	0.94	-0.4459	1	0.95
-0.25281	2	2.80	-0.31279	4	4.72	-0.3149	4	4.76
-0.1668	3	5.61	-0.18005	7	11.32	-0.1839	10	14.29
-0.0808	18	22.43	-0.04732	26	35.85	-0.0529	19	32.38
0.00521	24	44.86	0.08542	17	51.89	0.078	15	46.67
0.09122	21	64.49	0.21816	18	68.87	0.20898	10	56.19
0.17722	16	79.44	0.3509	18	85.85	0.33996	17	72.38
0.26323	11	89.72	0.48363	12	97.17	0.47093	15	86.67
0.34923	7	96.26	0.61637	0	97.17	0.60191	8	94.29
0.43524	2	98.13	0.74911	2	99.06	0.73289	3	97.14
More	2	100.00	More	1	100.00	More	3	100.00

Figure 3.2: Frequency Distribution of Daily Returns

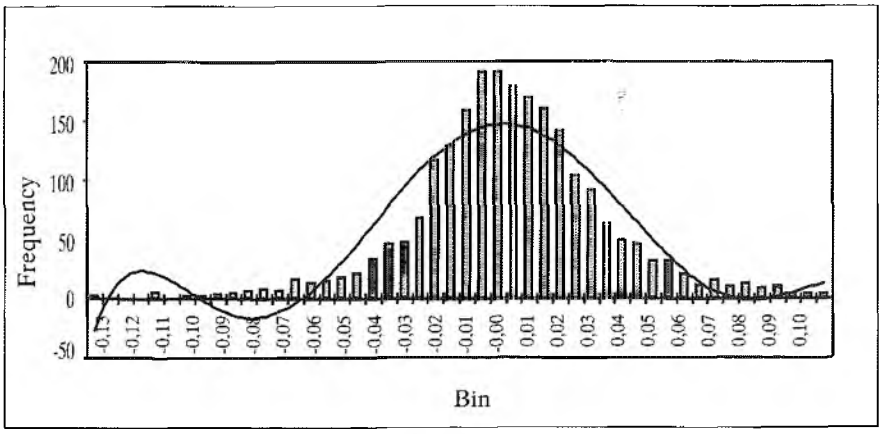


Figure 3.3: Frequency Distribution of Weekly Returns

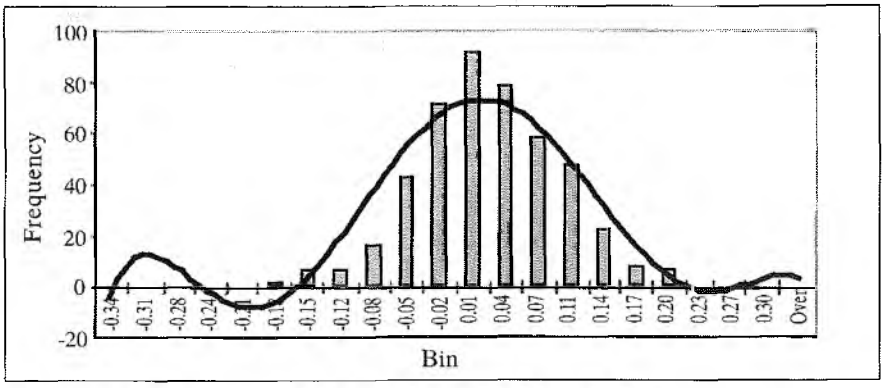


Figure 3.4: Frequency Distribution of 1-Month Returns

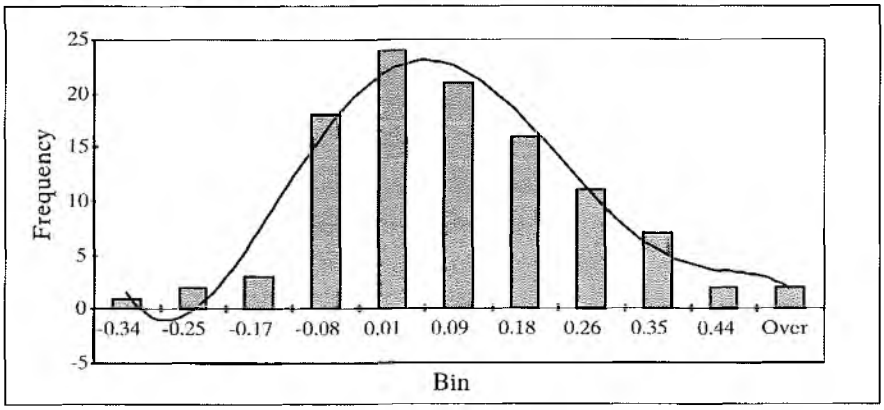


Figure 3.5: Frequency Distribution of 2-Month Returns

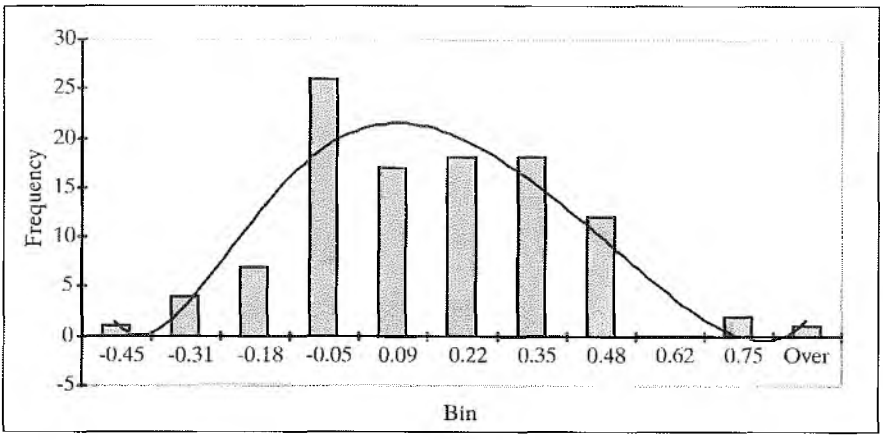
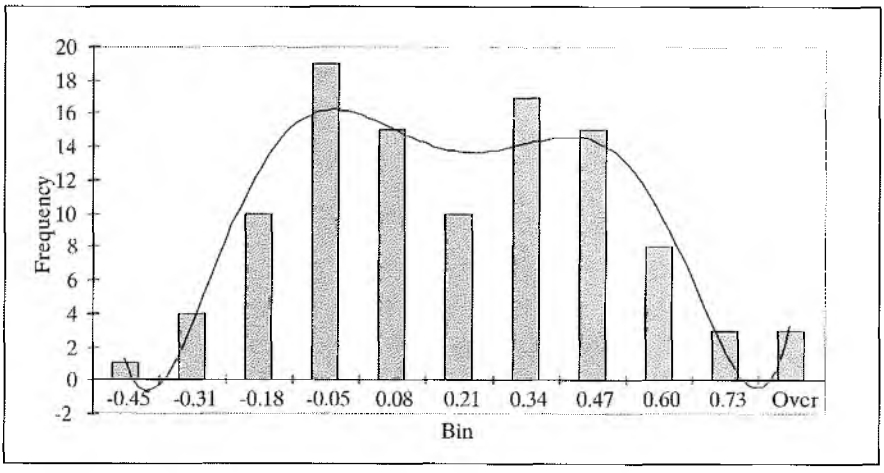


Figure 3.6: Frequency Distribution of 3-Month Returns

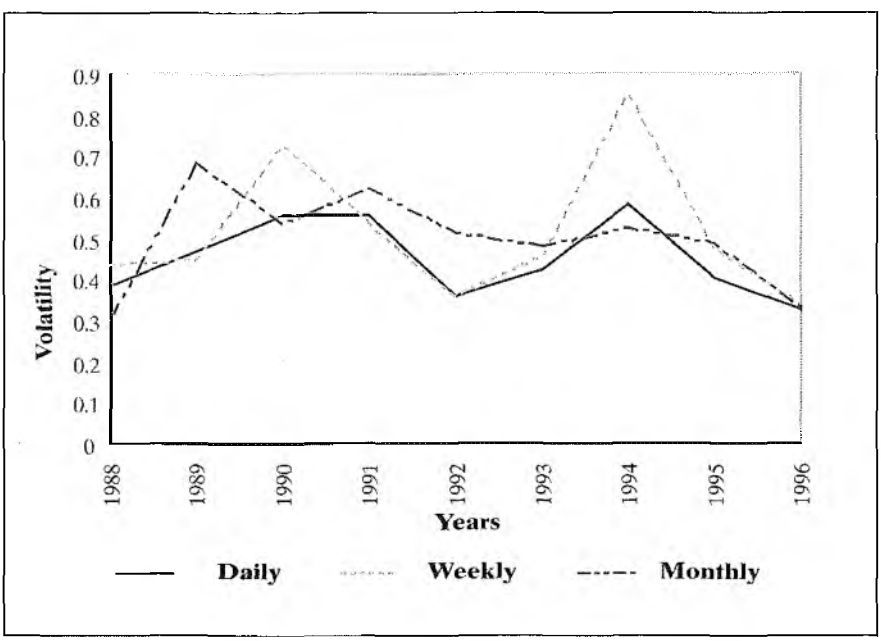


When the period of 1988-1996 is scrutinized on a yearly basis (Table 3.6), the result is that the annualized standard deviation varies over years and reaches its peak level in 1994 (58.16% on a daily basis) during which the economy has witnessed a serious financial crisis. On the other hand, when the year 1996 is considered, one can note that the volatility, on a daily, weekly and monthly basis, almost converges and comes to a certain level, at 32%-34% (Figure 3.2). This may be interpreted as a good point for Turkey.

Table 3.6: Mean, Variance and Annualized Volatility Between 1988-1996

	Daily Basis			Weekly Basis			Monthly Basis		
Years	Mean	Variance	Annual Standard Deviation	Mean	Variance	Annual Standard Deviation	Mean	Variance	Annual Standard Deviation
1988	-0,002423	0,000591	0,38576	-0,01218	0,003617	0,43369	0,07548	0,00766	0,30314
1989	0,006973	0,000857	0,46469	0,034417	0,003831	0,44635	0.160429	0,03895	0,68363
1990	0,001392	0,001237	0,5584	0,00577	0,010146	0,72634	-0,01017	0,02369	0,5332
1991	0,001375	0,001216	0,55359	0,003726	0,005583	0,53882	0.003298	0,03194	0,61914
1992	-0,000309	0,000506	0,35704	-0,00147	0,002494	0,36012	-0,01884	0,02178	0,51122
1993	0,006633	0,000698	0,41953	0,032181	0,003996	0,45586	0,141052	0,01914	0,47923
1994	0,000889	0,001343	0,58166	0,002755	0,013901	0,85021	0,027669	0,02297	0,52503
1995	0,001869	0,000646	0,40353	0,00791	0,004261	0,47069	0,041955	0,01963	0,48534
1996	0,003752	0,000425	0,3274	0,017655	0,002225	0,34011	0,061727	0,00907	0,32983

Figure 3.7: Annualized Volatility Between 1988-1996



The last drawing of this part is related to the effects created by the removal of two digits from the index and the introduction of the ISE-30 index has on volatility. The study, conducted by using the same methodology applied in the fist part, reveals the fact that the mean of the daily compounded return of the ISE-100 and ISE-30 index returns figures out to be 0.41% and 0.51%, respectively, in the first half of 1997. The price volatility for the first half of the year 1997 stands to be 3.14% (49.91%) and 3.5% (55.56%) on a daily basis (annualized basis) for the ISE-100 and the ISE-30 indices, respectively. In other words, the new approach led to a considerable increase in price volatility in the stock market. Although it is early to make comments on this issue, the continuation of high price volatility would prompt a higher setting of a "volatility parameter" in theoretical option pricing in the futures market. One solution may be to add two decimals to the index value that is computed and announced to the public so as to keep upward and downward movements in stock prices to a comparatively lower extent.

IV. Conclusion

The first major finding of this study is that, although the term structure of volatility in the Turkish stock market is not totally consistent with the "Brownian motion" approach, it somehow shows a random walk with the square root of time (1.81); i.e., investment horizons. In other words, while the ISE Composite Index returns change proportionally with time, the risk, measured as the standard deviation of returns, increases faster than the square root of time.

One interesting result is that the skewness of returns decreases between 40-80 days' (2-4 months) time period and follows a steady trend. There are some reasons to support the 3-month investment horizon of Turkish investors. First, Turkey is a high-inflationary developing country. Inflation, which disturbs the entire economic activity, has dramatically increased uncertainty in the Turkish financial markets. As such, economic agents have obviously prevented to make long-term plans. Second, the financial markets have been dominated by the public sector securities to finance budget deficits. It should be noted that the government borrowing in Turkey was heavily concentrated on the 3-month maturity. Third, financial intermediaries

have generally announced a 3-month period for portfolio management. The last conclusion involves the financial statements which provide useful information for investors and decision-makers which are published quarterly.

Another finding of the study is revealed when daily, weekly and monthly probability distribution of returns are examined. The probability distribution becomes skewed to the left, starting from a 1-month investment horizon.

Another important outcome is the fact that on, a yearly basis, daily, weekly and monthly volatility that follows a fluctuating trend, between 1988-1995, converges and becomes almost the same (32%-34%) in 1996, displaying a slight difference. This may be interpreted as a signal of improving efficiency in the stock market through time.

The last finding of the study is related to the two-digit removal issue concerning the index. By the end of the first half of 1997, the daily (annualized) volatility figures out to be 3.14 % (49.91%) and 3.5% (55.56 %) for the ISE-100 and the ISE-30 indices, respectively. This is a considerably high figure, especially when compared with volatility figures experienced in the past. One solution may be to add two decimals to the index value so as to keep the upswings in stock prices to a restricted range.

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The Long Run Performances of Turkish Industrial IPOs: 1990-1995 Experience

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Abstract

This study empirically analyzes the long-run performances of Turkish industrial IPOs and the factors influencing their performances. The sample consists of 88 firms listed and traded on the Istanbul Stock Exchange during the period of 1990-1995. The event study methodology is employed to analyze the long-run performances in the 36 months following the initial trading day. The performance results indicate that the industrial group, as a whole, experiences a cumulative abnormal returns of 41.33% at the end of the 36-month period. During the same period, the abnormal return of the sub-groups range from -4.27% to 76.23%. The second part of the study investigates the factors influencing the long-run performances of industrial IPOs. The factors influencing these returns include the post-listing return variation, self-issuance and privatization variables. Additionally, firms performing well on the initial trading day have poor performances in the long run.

1. Introduction

Several studies have examined the performances of Initial Public Offerings (IPOs) in different markets. The performances of IPOs are generally investigated with both short- and long-run approaches. The results of short-run performance studies, in general, indicate the existence of positive initial returns. This is known as the underpricing

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of IPOs. On the other hand, the studies on the long-run performances of IPOs report mixed results.

The short-run performances of Turkish IPOs are investigated by Kıymaz (1996a) and Kıymaz (1996b). The results indicate the existence of positive abnormal returns in the short-run. For example, the market-adjusted initial day abnormal returns are reported to be 15.3% for financial IPOs and 12.2% for industrial IPOs.

Although the use of IPOs, as a source of financing in Turkey, has been very popular in recent years and is a positive development for the Turkish Capital Market, the question of whether individual investors are better off with these developments remains unanswered. Capital markets are the place where the long-term supply of and demand for funds meet. So, the investors may have to adopt an investment strategy with a longer horizon before they invest in these markets. Speculators in less-developed markets may have a chance to influence stock prices by changing their positions in the market in the short-run. But in the long-run, these participants may have less room to influence the stock prices, hence the long-run performance may reflect the true performance of a firm. This issue is especially important for small investors.

The main purpose of this paper is to investigate the long-run performances of Turkish industrial IPOs. First of all, the performances of 88 IPOs at the Istanbul Stock Exchange, during the period of 1990-1995, are investigated in the long-run (up to 36 months). Then, the factors influencing these performances are investigated in different time-frames.

The remainder of the paper proceeds as follows. In section 2, the prior long-run international evidences on IPOs are reviewed. Then, the data and methodology are described. The analysis of the long-run performances of IPOs and the factors influencing the long-run performances are reported in the following section. Finally, the last section summarizes and concludes the paper.

2. International Studies

The performances of IPOs are investigated extensively in several markets and these studies report the existence of underpricing on the initial trading day (Ritter (1991), McGuiness (1992), Lewis (1993),

Kunz and Aggarwal (1994), Kim, Krinsky and Lee (1995), Lee Taylor and Walter (1996), Kıymaz (1996a) and Kıymaz (1996b)). However, there exists disagreement among studies with respect to performances of IPOs in the long-run. While some studies report the persistence of underpricing in the long-run as well, others report no significant positive abnormal returns or, in some cases, negative abnormal returns in the long-run.

The performances of IPOs are widely investigated in the U.S. Among these studies, Ritter (1991) investigated 1,526 IPOs of common stocks during the period of 1974-1985. While the initial underperformance was found to be 14.3%, three-year control sample-adjusted returns were reported to be -29.1%. These results indicate that, in the long-run, IPOs underperformed. The results of Aggarwal and Rivoli (1990) study are also in line with Ritter (1991) and show an initial underpricing of 10.7% and an average underperformance of -13.7% in the long-run for a sample of 1,598 firms.

Dawson (1987) investigates both short- and long-run performances of IPOs in Hong Kong, Singapore and Malaysia during the period of 1978-1983. While there exists an initial underperformance in Hong Kong and Singapore, the long-run performances are negative relative to market returns. Only Malaysian IPOs have underpricing both in short- and long-run.

Lewis (1993) reports average first day return of 14.3% for 712 UK IPOs during the period of 1980-88 and long-run underperformance of -11.4% after three years.

Aggarwal, Leal and Hernandez (1993) examine the performances of IPOs in both short- and long-run terms on a sample of 62 Brazilian IPOs, 36 Chilean IPOs and 44 Mexican IPOs. Results indicate that initial one-day returns are found to be 78.5%, 16.3% and 2.8% for Brazil, Chile and Mexico, respectively. Long-run mean market-adjusted returns are -47.0% in Brazil and -23.7% in Chile and -19.6% in Mexico.

Kunz and Aggarwal (1994) examine the IPOs at the Swiss stock market by examining a sample of 42 firms going public between 1983 and 1989. The result indicates an average initial return of 35.8%. The long-run return, inclusive of initial returns, remain well above 30%,

up to three years following the IPOs.

Kim, Krinsky and Lee (1995) investigates Korean initial public offerings of 169 firms during the period of 1985-89. The results reveal that the Korean IPOs outperform seasoned firms with similar characteristics. The average underpricing was found to be 57.5% on the initial day and 59.1% in the long-run.

Lee, Taylor and Walter (1996) analyze both initial underpricing and post-listing returns of 266 Australian industrials during the period of 1976-1989. The results show that the Australian IPOs significantly overperformed the market initially by 11.8%, but underperformed the market movements in the three-year period subsequent to listing by -51%. Lee, Taylor and Walter (1996) also investigate initial and long-run returns for Singaporean IPOs. They report initial returns of 31.4% in the short-run and 8% in the long-run.

Studies on Turkish IPOs' performances have the following findings: Kıymaz (1996a) and Kıymaz (1996b) investigate the short-run performances of Turkish financial and industrial IPOs, respectively, in the period of 1990-1995. Kıymaz (1996a) reports an initial market-adjusted abnormal return of 15.3% for financial IPOs. The market-adjusted abnormal return for the sub-groups of financials were reported as 20.9% for banks, 10% for insurance, 5.5% for leasing/factoring and 18.5% for holding/investment trust sub-groups. All results are statistically significant with the exception of banks .

Kıymaz (1996b) reports an initial market-adjusted return of 12.2% for industrial IPOs. The market-adjusted initial returns for sub-groups of industrials were found as 11.4% for food/beverage, 8.7% for textile/apparel, 18.8% for paper/publishing, 16.4% for chemical/petroleum, 12.9% for mineral products, 13.1% for basic metals and 8.2% for machinery/equipment groups. All results are statistically significant.

Kıymaz (1997) analyses the factors affecting the performances of Turkish financial IPOs. The results indicate that the rising stock market between the fixing of the offering price and the first trading day, the standard deviation of market-adjusted returns of IPOs during the first 30 day- period of trading days are highly significant determinants of initial underpricing. Furthermore, the size of

proceeds generated form the public offerings and the self-issued offering variables are found to be weak determinants of initial underpricing.

In summary, international studies on IPOs report mixed results for the long-run performances of IPOs. While studies done for Korea, Switzerland and Malaysia report the overperformance of IPOs in the long-run, the studies on U.S., Australia, UK, Brazil, Chile, Mexico and Hong Kong markets show that IPOs underperform market or other benchmark returns. Two studies on Singapore give conflicting results with respect to long-run performances but the time periods employed differ in these studies. In short, while the initial underpricing of IPOs is confirmed internationally, the long-run performance results are mixed. This paper contributes to literature by examining the long-run performances of industrial IPOs at the ISE as a rapidly developing emerging market case.

3. Data And Methodology

3.1. Data

The sample of this study consists of 88 industrial firms listed and subsequently traded at the Istanbul Stock Exchange during the period of January 1, 1990 and December 31, 1995. These firms are further classified into seven sub-groups. These are; food/beverage (9), textile/apparel (16), paper/publishing (12), chemical/petroleum (10), mineral products (16), basic metals(5) and machinery/equipment (20). All share price data, date of going public, offer price, offer size and other firm specific information are obtained from the Istanbul Stock Exchange and its publications.

During the period of 1990-1995, 15.5 trillion TL was raised by 88 industrial firms.[1] This is equivalent to 1.2 million dollars. When we look at the distribution of the gross proceeds in sub-groups, the highest portion is obtained by machinery/equipment with 372.2 million dollars (%30.1), followed by chemicals/petroleum with 261.1 million dollar (%21.1), mineral products with 239.3 million dollars

[1] This amount reflects the nominal value of the proceeds. It may be more meaningful to express gross proceeds in terms of U.S. dollars.

(%19.4), and textile/apparel with 144.8 million dollars (%11.7). While paper/ publishing and food/beverage group, raised 95.2 million dollars (%7.7) and 88.5 million dollars (%7.2), respectively, the basic metal group has the lowest share in raised funds, with 34.9 million dollars (%2.8). Also during this period, the average percentage of equity offered to the public was 18.01% and the highest percentage of equity was offered to the public by the mineral products, with 30.53%.

3.2. Methodology

The long after-market return assesses stock performance during the 36 months following the first day of trading. Following Ritter (1991), the initial return period is defined as month 0, and the long-term after-market period includes 36 months where months are defined as successive 21-day trading periods relative to the initial public offering date. Accordingly, month one consists of event day 2-22, month 2 consists of event day 23-43, month 3 consists of event day 44-64 etc. Monthly market-adjusted abnormal returns for stock i in event month t is defined as; [2]

$$AR_{i,t} = R_{i,t} - R_{m,t} \quad (1)$$

Similarly, the average market-adjusted return of return on a portfolio of *n* stocks for event month is the equally weighted average of the market-adjusted returns.

$$AR_t = (1/n) \Sigma AR_{i,t} \quad (2)$$

In order to test whether the mean returns are statistically different from zero, the following *t* statistics are calculated.

$$t = \frac{\overline{AR_t}}{\overline{\sigma(AR_t)}} \quad (3)$$

where $\sigma(AR_t)$ is the standard deviation of abnormal returns in

[2] Here, the return of firm i is calculated by using $R_{i,t}=(P_{i,t}/\Delta P_{i,t})-1$. Similar calculation was utilised for the ISE Composite Index.

month t and calculated by $\sigma(AR_t)=\sigma(AR_t)/(n)^{1/2}$ formula. Here $\sigma(AR_t)$ is the cross-sectional standard deviation in month t.

Also the cumulative abnormal returns in the period of t_1 and t_2, following the going public are calculated. The cumulative average abnormal returns, at time t_2, relative to t_1, are computed by using the following equation.

$$CAR_{t1}^{t2} = \Sigma_{t1}^{t2} AR_t \qquad (4)$$

In order to test whether the cumulative abnormal returns are statistically different from zero, the equation 3 is calculated for CARs. The basic assumption here is that the returns are independently distributed in the event time.

4. Long-Run Performances Of Industrial IPOs

First of all, the performances of IPOs in the 36 month period, following the initial trading day, are investigated. Table 3 reports the performances of both all industrial IPOs and the sub-groups. Accordingly, the first-month average abnormal returns are found as 4.35% for all industrials. This result shows that initial underpricing seems to continue in the first month. However, in the following six-month period the abnormal returns are constantly negative. After the eighth month, the abnormal returns are positive, indicating a performance above the market returns.

When we look at the average abnormal returns of sub-groups in the first month, mineral products group has the highest abnormal return of 21.7% and paper/publishing group has the lowest abnormal return of -13.5%. For the food/beverage group, the highest abnormal returns are obtained in the 35th month with 22.57%, the lowest abnormal returns are realized in the 30th month with -14.43%. Both results are statistically significant. For the textile/apparel group, the highest abnormal returns are obtained in the 7th month with 17.42%, the lowest abnormal returns are realized in the 19th month with -13.19%. None of these results is statistically significant. The highest abnormal returns for the paper/publishing group are realized in the 29th month with 30.01%, for chemical/petroleum group in the third month with 14.34%, for mineral products in the first month with

21.72%, for basic metals group in the 24th month with 45.52% and for the machinery/equipment group in the 34th month with 10.09%. On the other hand, the lowest abnormal returns for each group were as follows: the paper/publishing group in the 31st. month with -14.92%, for the chemical/petroleum group in the eighth month with -5.36%, for mineral products in the 29th month with -15.29%, for the basic metals group in the 28th month with -12.02% and for the machinery/equipment group in the fourth month with -12.73%.

These results show that the monthly average abnormal returns, with respect to groups and months, give mixed results. In order to find out what returns the investors can have with a buy-and-hold strategy, the cumulative abnormal returns following the first day of trading are calculated. These cumulative abnormal returns of both all industrials and the sub-groups are calculated and reported in Table 4.

Accordingly, at the end of the first year following the initial trading day, all industrials experience a 7.11% abnormal return. During the same period, while the food/beverage group had an abnormal return of 31.61%, the textile/apparel group 5.37%, the paper/publishing group -40.46%, the chemical/petroleum group 37.42%, the mineral products group 36.43%, the basic metals group 5.19% and the machinery/equipment group had -10.38% cumulative abnormal returns. Among these, the results of the paper/publishing and the mineral products group were statistically significant. Generally, at the end of the first year, all sub-groups, with the exception of the paper/publishing and machinery/equipment groups, had overperformed the market.

The performances of these IPOs are also investigated in the two years following the initial trading day. For all industrials, the cumulative abnormal returns for two years are found to be 37.99%. During the same period, while the food/beverage group had an abnormal return of 40.8%, textile/apparel group 17.61%, paper/publishing group -33.77%, chemical/petroleum group 55.3%, mineral products group 87.5%, basic metals group 88.32% and machinery/equipment group had 8.14% cumulative abnormal returns. Among these, the results of all industrials, chemical /petroleum and the basic metals group were statistically

significant. Generally, at the end of the first year, all groups had cumulative abnormal returns above the market.

Finally, the results of the longest (36 months) performance investigation period were reported. Accordingly, the industrial group, as a whole, provided an abnormal return of 41.33% over the three- year period. When we look at the sub-groups of industrials, we have a 58.14% cumulative abnormal return for the food/beverage group, 29.52% for the textile/apparel group, 71.25% for the paper/publishing group, 76.23% for the chemical/petroleum group, 73.3% for the mineral products group, 48.92% for the basic metals group and -4.27% for the machinery/equipment group. All industrial chemical/petroleum and mineral products groups are found to be statistically significant. At the end of three years, all industrials and sub-groups, with the exception of machinery/equipment, provided cumulative abnormal returns above market returns. When we compare the performances of groups at the end of third year and the first year, the largest increase was realized by the paper/publishing group from -13.52% to 71.25%.

The empirical results generally indicate that the industrial IPOs have provided positive abnormal returns to investors. When we investigate the sub-groups of industrials, the machinery/equipment group has performed below the market. The best performance was realized by the chemical/petroleum group, followed by the mineral products and the paper/publishing groups.

5. Factors Influencing The Long-Run Performances Of IPOs

5.1. Description of Variables

Table 5 reports the long-run performance statistics of industrial IPOs during 1990-1995 and the independent variables employed in the analysis. The cumulative abnormal returns found in the previous section (1 month, 12 months, 24 months and 36 months) are employed as dependent variables in the regression analysis.

A series of variables have been suggested as potential explanators of cross-sectional differences in the long-run. The long-run performances of stocks are closely related to the expected uncertainty. Generally, stocks with higher uncertainty would have

higher expected returns.

The following variables are employed to explain the cross-sectional differences in the abnormal returns of industrial IPOs.

Initial Underpricing (INITIAL)

This variable intends to test the relationship between the first trading day performance and the long-run performances. The returns, essentially, on the first trading day, show whether there exists underpricing. The offer price of the stock to the public may not reflect the true potential of the firm. In order to influence the investors or leave a good impression on investors, the offer price may be determined lower intentionally. This relationship would show whether the initial performance may reflect the true performance of the firm. There is no pre-expectation regarding the sign of this variable.

Privatization (PRIV):

The privatization of government-owned enterprises has been taking place in Turkey in the last 10 years. Some of these enterprises were privatized by going public. In order to analyze the effect of privatization on the IPOs' performances, a dummy variable was employed. Since the proceeds, of privatized firms will go to the government instead of firms, funds provided by the investor are not used by privatized firms, which may cause a lower performance. On the other hand, generally, public enterprises are managed poorly and the main purpose of the privatization is to increase the productivity of such firms. Hence, investors may expect a higher performance. Accordingly, a direct relationship between the privatization variable and the long-run performance is expected. This variable takes value of one, if the IPO is taking place under the privatization program of government and zero, otherwise.

Standard Deviation (STDDEV):

The expected return from a stock is closely related to the expected uncertainty of stock or the risk level of that stock. The variability of stock prices may increase uncertainty and the expected returns would be higher. The standard deviation of the daily stock price return is

considered during the first 30 trading days to measure uncertainty of IPOs. Higher standard deviation implies higher volatility, hence a direct relationship between this variable and the long-run performance is expected.

Self- Offered IPOs (SELF-IPO):

Baron's (1982) model proposes that investment bankers have more information about demand for securities than the issuer. In his model, an investment banker may profit from an information advantage by setting its issue price too low. Muscarella and Vetsuypen (1989) tests this model for U.S. firms, in which the issuer acted as an underwriter for its own IPOs. In this case, no information asymmetry should be expected and any underpricing should disappear. They find no significant differences in their two samples and provide evidence against an information advantage of investment bankers. To test this explanation for the long-run Turkish IPOs, a dummy variable is employed. This variables takes the value of one, if the investment bankers underwrite one of family-firms' IPOs and zero, otherwise.[3]

Method of Going Public (METHOD):

The IPOs can be classified as either offering of new issues (i.e. primary) or the sales of previously-issued outstanding shares (i.e. secondary). In the latter case, previously-issued shares are offered to the public. The proceeds will go to the existing shareholders and these funds may not be used for the firms' growth strategies. Investors may drift from their investment purposes. This may suggest a higher level of uncertainty.

In the former case, the public offering is done through issuing new shares. Since the purchasing rights of existing shareholders are restricted, the proceeds will go to firms and will be used for the growth strategies of the firms. The offering of new issues seems to be a better alternative for investors because the funds provided by the

[3] The Turkish private sector consists mainly of family-owned groups of companies which commonly include a financial institution, and hence they may use their family-controlled financial institution as an investment banker. When a family-owned financial institution is used as an investment banker in the process of going public, these IPOs are considered as a self-offering group.

investor will be used for their firms. This may reduce the uncertainty. The institutional structure may provide an opportunity for testing the impact of the issuers' motives for going public. A dummy variable is employed and takes the value of one, if the offering is new issue and zero, otherwise.

Offer Rate (RATE):
The percentage of equity offered to the public may signal the quality of IPOs to the investor. According to Leland and Pyle (1977), the private information of the pre-offering firm value was signaled to the potential investor through the percentage of equity retained. They hypothesized that the value of the firm is positively related to the percentage of equity retained in the firm by the owners. Keasey and Short (1992) argue that a relatively high percentage of equity retention may reduce investors' uncertainty because the firms' owners have signaled their faith in the business. On the other hand, the greater percentage of equity retained by the owners may also be perceived by the market as less marketability of the shares, which may increase the uncertainty. In order to test the effect of the percentage of equity offered to the public, the offer rate variable is employed. There is no pre-expectation regarding the sign of this variable.

Total Asset (ASSET):
The larger firms may have less uncertainty in regard to the performances of firms. The size variable is employed to capture the possibility that small IPOs are more speculative than larger IPOs. Hence, larger IPOs are expected to have lower uncertainty as compared to the smaller IPOs. This variable is measured as the natural logarithm of the total asset value at the end of the year prior to the year of going public. The purpose of this variable is to test the relationship between the firm size and the long-run performance.

Operating History (AGE):
The operating history of a firm, prior to going public, is also employed as a proxy for ex-ante uncertainty. Since older firms have more public information available than younger firms, the older firms are

expected to have lower ex-ante uncertainty compared to younger firms. Hence, expected returns would be lower for older firms. The age of the firm in years on flotation is used as a variable.

5.2. Methodology

In order to analyze the factors influencing the long-run performances of industrial IPOs, a multiple variable regression analysis is employed. The model has the following specifications.

$$LONGRUNPER = \beta_0 + \beta_1(INITIAL) + \beta_2(PRIV) + \beta_3(STDDEV) + \beta_4(SELF\text{-}IPO) + \beta_5(METHOD) + \beta_6(RATE) + \beta_7(ASSET) + \beta_8(AGE) + E$$

where:

LONGRUNPER	= market-adjusted long-run cumulative abnormal returns,
INITIAL	= the first day trading performances of stocks (Initial Underpricing),
PRIV	= a dummy variable, taking value of one, if IPO is done under the government's privatization program, and zero, otherwise,
STDDEV	= the standard deviation of the market-adjusted returns during the first 20 trading days,
SELF-IPO	= a dummy variable, taking on the value of one, if the investment bankers underwrite their own IPOs, or one of family-firms' IPOs and zero, otherwise,
METHOD	= a dummy variable taking on the value of one if the firm issues primary shares and zero, otherwise,
RATE	= the percent of equity offered to the public,
ASSET	= the natural logarithm of the total assets of the firm prior to the offering,
AGE	= the number of years in operation (operating history) before the offering.

6. The Cross-Sectional Regression Results Of Long-Run Performances

The variables described above are used as proxies to explain the future price performances of industrial IPOs. Accordingly, the expected returns would increase as uncertainty accelerates.

Initially a univariate regression analysis was performed with long-run cumulative abnormal returns as a dependent variable. The factors influencing the long-run performances of IPOs are investigated in four different time-frames. These are the first month returns, as 12-month, 24-month and 36-month cumulative abnormal returns.

First month abnormal returns are used as a dependent variable and a univariate regression analysis was performed initially. The results indicate that RATE, STDDEV and PRIV variables are statistically significant at 1%, 1% and 5% levels, respectively. Accordingly, firms with a higher level of uncertainty are found to have higher returns and firms going public under privatization program experienced lower returns. Additionally, firms offering to the public higher percentage of equity show better performance. The regression results by running all variables give an R^2 of 0.424 and a statistically significant (1%) F-value. STDDEV and INITIAL variables have a coefficient of 5.157 and -0.668, respectively, and both are statistically significant at the 1% level. The SELF-IPO variable has coefficients of 0.232, which is statistically significant at the 10% level.

These results show that firms with a higher uncertainty level performed better in the first month following IPOs than others. Furthermore, the statistically significant inverse relationship between the INITIAL and the first-month returns may suggest that firms intentionally keep their offer prices low in order to give a good impression about the firm. On the other hand, the positive relationship between the SELF-IPO and returns may indicate that self-IPOs are better than the others.

Then, the first-year (12-month) cumulative abnormal returns are used a dependent variable and a univariate regression analysis was performed. The results indicate that ASSET, RATE, STDDEV, SELF-IPO and PRIV variables are statistically significant, at least at

the 5% level.

The regression results obtained by running all variables give an R^2 of 0.382 and a statistically significant (1%) F-value. STDDEV and SELF-IPO variables have coefficients of 3.62 and 0.676, respectively, and both are statistically significant at the 1% level. PRIV and ASSET variables have coefficients of 0.421 and 0.108, which are statistically significant at the 10% and 5% levels respectively. These results indicate that firms with a higher level of uncertainty are found to have higher returns at the end of first year. Additionally, the positive coefficient of SELF-IPO variable shows that firms, going public through a related investment banking firms perform better than the others. Also, firms with higher asset size and firms going public under the privatization program experienced higher returns than others. This result is in line with the expectations that the main purpose of privatization is to improve corporate performance.

In the third and fourth regressions, the cumulative abnormal returns, obtained during the months 1-24 and 1-36, are used as dependent variables while a univariate regression was applied initially. During the period of 1-24 months, RATE, STDDEV and PRIV variables were found to be significant at the 1%, 5%, 5% levels, respectively. These results were in line with the previous period findings. The regression results obtained by running all variables give an R^2 of 0.2095 and a statistically significant (5%) F-value. Although none of the variables is statistically significant, the signs of variables are in line with the expectations.

Finally, the three-year (36 months) cumulative abnormal returns are used as dependent variables and only AGE and PRIV variables are found to be significant at 5% and 1%, respectively, in a univariate regressions analysis. Accordingly, firms going public under privatization programs are found to be performing better than the others. Similarly, firms with longer operating history have performed better than the others. The regression results, accomplished by running all variables, give an R^2 of 0.2329 and a statistically significant (5%) F-value. Only the PRIV variable was found to be statistically significant at the 10% level.

These results generally show that firms with higher uncertainty

perform better in the long-run while firms with high performance on the initial day performed poorly in the long-run. There seems to be an inverse relationship between the initial underpricing and the long-run performance. This may indicate that initially offer prices may be intentionally kept lower. Additionally, firms going public under the government privatization program, firms offering higher percentage of equity to the public and firms going public through a related investment banker have performed better than the others in the long-run.

7. Conclusion

The evidences on the performances of IPOs in the literature suggest that investors purchasing IPOs at the offer price earn abnormal returns in the short-run after-market period. Studies on Turkish IPOs (Kıymaz (1996a) and Kıymaz (1996b)) show that there exists underpricing on the initial trading day. For example, market-adjusted abnormal returns are found to be 15.3% for financials and 12.2% for industrial IPOs. However, there exists disagreement in the literature in regard to the long-run performances of IPOs.

The purpose of the paper is two fold: first, the long-run performances of Turkish industrial IPOs during the period of 1990-1995 are measured. Second, the factors influencing the performances of Turkish industrial IPOs are investigated. For the performance measurement, the event study approach is employed. The performance measurement period includes three years (36 months) following the initial trading day. Results indicate that the industrial IPOs, as a whole, provided a cumulative abnormal returns of 41.33%. At the same period, the cumulative abnormal returns provided by the sub-groups of industrials range between 76.23% and -4.27%. The abnormal returns for each of the sub-groups are found to be 58.14% for food/beverage, 29.52% for textile/apparels, 71.25% for paper/publishing, 76.23% for chemical/petroleum, 73.3% for mineral products, 48.92% for basic metals and -4.27% for the machinery/equipment groups.

The second part of the study investigates the factors influencing the long-run performances of IPOs. Among the variables employed, STDDEV, SELF-IPO, and PRIV are found to be important

determinants of long-run performances. ASSET, RATE and INITIAL variables seem to be important in some periods. The empirical results generally suggest that the firms with higher uncertainty have performed better in the long-run and the firms with higher initial day returns have performed worse in the long-run. Additionally, firms going public under a government privatization program and firms going public through a related investment banking firm perform better than the others. Also, firms offering a higher percentage of equity to the public experiences higher cumulative abnormal returns.

In summary, the long-run performances of IPOs in international studies show mixed results and this study has investigated the performances of Turkish industrial IPOs. The results indicate that the industrial IPOs perform better than the market and initial underpricing seems to continue in the long-run for industrial IPOs. Additionally, the investigation of factors influencing the performances of industrial IPOs reveal that firms going public under a government privatization program and the firms going public through a related investment banking firm perform better than the others. Furthermore, the initial underpricing and the standard deviation of market-adjusted returns of IPOs during the first 30 trading days are found to be highly significant determinants of long-run performances.

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Table 1: Summary of Previous Studies on Long-Run Performances of IPOs

Study	Country	Study Period	Sample Size	Long-Run Returns[a]
Lee, Taylor and Walter (96)	Singapore	1973-92	132	%8.0
Lee, Taylor and Walter (96	Australia	1976-89	266	-51.0*
Kim, Krinsky and Lee (95)	Korea	1985-89	169	91.6*
Kunz and Aggarwal (94)	Switzerland	1983-89	42	32.5
Lewis (93)	UK	1980-88	712	-11.4*
Aggarwal, Leal and	Brazil	1980-90	62	-47.0*
Hernandez (93)	Chile	1982-90	36	-23.7
	Mexico	1987-90	44	-19.6
Ritter (91)	US	1975-84	1,526	-29.1*
Aggarwal and Rivoli (90)	US	1977-87	1,598	-13.7*
Dawson (87)	Hong-Kong	1978-83	21	-9.3
	Singapore	1978-83	39	-2.7
	Malaysia	1978-83	21	18.2*

a: Long-run returns are exclusive of initial returns and usually cover three-year returns.
*: Statistically significant at least at the 5% level.

Table 2: Summary Statistics for Industrial IPOs During the Period of 1990-1995

Groups:	Firms	Equity Offer Rate (%)	Gross Proceeds (TL Million)	Gross Proceeds* (US$000)	($) as %
Food/Beverage	9	19.43	2,150,587	88,535	7.2
Textile/Apparels	16	16.13	3,396,293	144,861	11.7
Paper/Publishing	12	14.83	1,152,826	95,168	7.7
Chemical/Petrol.	10	15.16	1,182,130	261,479	21.1
Mineral Prod.	16	30.53	3,458,712	239,278	19.4
Basic Metals.	5	12.31	958,306	34,901	2.8
Mach./Equipm.	20	17.72	3,276,068	372,255	30.1
Total	88	18.01	15,574,922	1,236,477	100.0

*Gross proceeds are converted into US$ by using the average TL/$ Central Bank exchange rate for the year.

Table 3: Monthly Average Abnormal Returns (%)

Month	All Industrials n=88		Food/Bev. n=9		Text./Apparels n=16		Paper/Publish n=12	
	AAR	t-val.	AAR	t-val.	AAR	t-val.	AAR	t-val.
1	4.35	0.97	14.34	1.46	5.60	0.67	-13.52	-1.88*
2	-1.21	-0.62	-3.18	-0.43	-2.16	-0.55	2.15	0.49
3	-1.47	-0.64	-8.35	-1.58	6.21	1.44	-13.72	-1.94*
4	-3.26	-1.61	-1.86	-0.37	-7.97	-1.75*	6.07	1.17
5	-1.50	-0.79	6.63	1.12	3.61	0.97	-12.89	-1.86*
6	-0.09	-0.04	12.31	1.95	-10.42	-1.40	-9.99	-1.56
7	-1.90	-0.76	3.01	0.41	-10.81	-2.49**	-8.39	-1.32
8	3.14	1.50	3.45	0.45	2.72	0.72	10.56	1.80*
9	0.02	0.01	2.73	0.41	-4.91	-0.77	-5.31	-0.87
10	2.69	1.05	5.54	1.01	0.19	0.02	1.81	0.38
11	2.70	0.86	-2.21	-0.55	17.32	1.10	-0.21	-0.05
12	3.70	2.03**	-0.78	-0.13	5.98	1.60	2.96	0.66
13	0.35	0.16	-8.56	-1.60	8.01	1.86*	-4.42	-0.53
14	0.56	0.25	3.26	0.99	-12.57	-2.11**	10.59	1.70
15	3.62	1.37	4.29	0.58	9.21	1.02	10.49	1.20
16	7.11	2.82***	-2.86	-0.67	10.14	1.75*	20.09	2.01*
17	5.43	1.99**	0.31	0.12	13.44	1.22	2.28	0.76
18	1.44	0.58	1.51	0.22	-5.38	-0.98	-4.08	-0.66
19	-1.20	-0.47	4.98	0.87	-13.19	-1.68	-1.97	-0.26
20	1.74	0.57	-8.26	-1.61	-5.36	-0.50	8.64	1.05
21	4.11	1.50	2.76	0.48	1.94	0.27	4.69	0.48
22	5.64	1.59	2.40	0.30	12.59	0.89	3.49	0.37
23	2.47	0.83	10.90	4.94***	-8.49	-1.31	5.95	0.55
24	-0.38	-0.13	-1.54	-0.27	1.91	0.25	18.47	2.84**
25	-1.49	-0.76	6.92	1.00	-7.26	-2.34**	1.32	0.32
26	-2.48	-1.09	3.38	1.28	-4.91	-1.02	-5.21	-0.64
27	0.79	0.27	-7.56	-1.37	8.03	0.81	0.77	0.14
28	2.09	0.67	-6.96	-0.59	11.11	1.31	3.48	0.41
29	0.47	0.15	-6.53	-1.31	-8.37	-1.03	30.01	3.42***
30	-0.56	-0.23	-14.43	-9.89***	4.48	0.55	-13.45	-3.45***
31	2.15	0.63	2.43	0.12	15.65	1.42	-14.92	-2.10*
32	-2.33	-0.87	-1.27	-0.14	3.40	0.49	-1.77	-0.23
33	4.26	1.22	11.66	0.73	5.54	1.08	18.39	1.34
34	6.65	1.97**	4.22	0.31	-8.42	-2.44**	17.06	1.71
35	-2.31	-0.70	22.57	10.29***	-2.86	-0.25	-6.24	-0.83
36	-3.90	-1.15	2.91	0.41	-4.47	-0.28	8.05	0.72

*, ** and*** are statistically significant at 10%, 5% and 1%, respectively.

Chem./Petr. n=10		Mineral Prod. n=16		Basic Metals n=5		Mach./Equip. n=20	
AAR	t-val.	AAR	t-val.	AAR	t-val.	AAR	t-val.
-4.98	-0.66	21.72	1.31	-8.39	-1.82	3.52	0.38
3.98	0.56	-9.49	-2.38**	8.82	1.51	-0.08	-0.02
14.34	2.30**	1.87	0.44	-2.00	-0.24	-7.61	-1.58
10.82	1.61	-2.66	-0.84	-5.26	-0.73	-12.73	-3.03***
0.57	0.10	-1.26	-0.46	5.06	0.48	-5.50	-1.92*
9.33	1.72*	5.13	1.29	-0.64	-0.09	-0.48	-0.13
5.23	0.48	-3.05	-0.68	7.98	2.43*	1.12	0.21
-5.36	-1.15	7.31	1.45	-1.01	-0.22	1.51	0.31
2.42	0.46	2.04	0.54	-5.04	-0.98	3.76	1.22
-2.34	-0.52	1.62	0.38	15.03	3.45**	3.84	0.63
-2.65	-0.43	4.53	0.95	-3.47	-1.67	-0.27	-0.08
6.08	2.51**	8.69	2.06*	-5.89	-1.56	2.55	0.52
7.35	1.37	6.56	1.77*	3.09	0.80	-6.81	-1.91*
3.56	0.56	1.21	0.24	-8.27	-0.81	1.98	0.46
-1.13	-0.20	4.10	1.10	-0.54	-0.07	-1.14	-0.27
6.17	0.85	4.31	1.01	3.84	1.25	5.14	1.15
-1.06	-0.27	11.09	1.21	8.98	1.08	4.38	0.86
2.90	0.93	8.80	2.21	-10.67	-30.80***	5.56	0.84
-0.99	-0.23	1.91	0.36	-4.83	-2.61**	2.66	0.49
-3.84	-1.43	8.16	0.81	2.29	3.79 **	3.99	0.84
7.96	1.18	-0.43	-0.11	1.03	0.79	6.60	1.15
7.59	0.78	4.45	0.84	22.79	3.08**	0.82	0.17
-5.27	-0.74	5.32	1.19	19.91	2.87 **	6.17	1.02
-5.34	-0.82	-4.39	-1.68	45.52	1.68	-10.81	-3.63***
2.15	0.36	0.64	0.11	-4.12	-0.75	-4.03	-1.20
-0.55	-0.10	-1.66	-0.36	-3.37	-2.60**	-2.37	-0.49
8.42	0.99	-6.10	-1.52	5.82	0.57	-2.03	-0.39
8.13	0.92	-7.73	-1.78*	-12.03	-30.44***	3.12	0.53
5.33	2.63**	-15.29	-2.81**	-6.05	-1.28	2.42	0.47
-5.31	-1.38	-0.75	0.14	-6.40	-7.42**	9.69	2.59**
6.08	0.69	3.00	0.83	-6.20	-1.92	1.43	0.25
-2.63	-0.34	-1.39	-0.26	-5.09	-0.44	-6.83	-1.38
-4.57	-0.53	11.36	1.50	0.59	0.12	-5.66	-1.02
10.91	0.81	6.11	1.11	-0.10	-0.02	10.09	1.56
-6.12	-0.62	1.87	0.44	-1.46	-0.15	-5.90	-0.88
-0.92	-0.22	-4.27	-1.03	-0.99	-0.30	-12.34	-3.06***

Table 4: Monthly Cumulative Abnormal Returns (%)

Month	All Industrials n=88		Food/Bev. n=9		Text./Apparels n=16		Paper/Publish n=12	
	CAR	t-val.	CAR	t-val.	CAR	t-val.	CAR	t-val.
1	4.50	0.96	14.34	1.46	5.60	0.67	-13.52	-1.88*
2	3.09	0.68	11.12	0.92	3.44	0.40	-11.35	-1.38
3	1.62	0.32	2.78	0.21	9.65	1.01	-25.06	-2.32**
4	-1.64	-0.31	0.91	0.07	1.68	0.16	-18.99	-1.59
5	-3.15	-0.56	7.55	0.51	5.29	0.48	-31.88	-2.32**
6	-3.24	-0.53	19.86	1.23	-5.13	-0.39	-41.88	-2.76**
7	-5.14	-0.78	22.87	1.28	-15.94	-1.15	-50.26	-3.05***
8	-2.00	-0.29	26.32	1.36	-13.22	-0.92	-39.70	-2.27**
9	-1.98	-0.27	29.05	1.42	-18.12	-1.16	-45.01	-2.43**
10	0.71	0.09	34.59	1.64	-17.93	-1.01	-43.21	-2.27**
11	3.41	0.42	32.39	1.52	-0.62	-0.03	-43.41	-2.24**
12	7.11	0.85	31.61	1.43	5.37	0.25	-40.46	-2.04*
13	7.46	0.86	23.05	1.01	13.37	0.60	-44.87	-2.10*
14	8.02	0.90	26.31	1.15	0.80	0.03	-34.29	-1.54
15	11.64	1.25	30.60	1.28	10.02	0.41	-23.80	-1.00
16	18.75	1.94*	27.74	1.14	20.15	0.80	-3.70	-0.15
17	24.18	2.41**	28.06	1.16	33.59	1.24	-1.42	-0.06
18	25.62	2.48**	29.57	1.18	28.21	1.02	-5.50	-0.21
19	24.42	2.29**	34.54	1.34	15.02	0.52	-7.47	-0.27
20	26.15	2.36**	26.28	1.00	9.66	0.32	1.17	0.04
21	30.27	2.66***	29.04	1.08	11.60	0.37	5.86	0.20
22	35.90	3.02***	31.44	1.12	24.18	0.72	9.35	0.30
23	38.38	3.13	42.33	1.52	15.69	0.46	15.30	0.47
24	37.99	3.02***	40.80	1.44	17.61	0.50	33.77	1.01
25	36.50	2.87***	47.72	1.64	10.35	0.30	35.09	1.05
26	34.02	2.63**	51.10	1.75	5.43	0.15	29.88	0.87
27	34.81	2.63**	43.54	1.47	13.46	0.37	30.65	0.88
28	36.90	2.72***	36.58	1.17	24.58	0.66	34.13	0.95
29	37.37	2.68***	30.05	0.95	16.21	0.42	64.14	1.74
30	36.81	2.60**	15.62	0.50	20.69	0.53	50.68	1.37
31	38.96	2.68***	18.05	0.52	36.34	0.90	35.76	0.95
32	36.63	2.48**	16.78	0.47	39.75	0.97	34.00	0.89
33	40.89	2.70***	28.44	0.75	45.28	1.10	52.38	1.30
34	47.55	3.06***	32.66	0.82	36.86	0.89	69.44	1.68
35	45.23	2.85***	55.23	1.40	34.00	0.80	63.20	1.51
36	41.33	2.55**	58.14	1.45	29.52	0.66	71.25	1.65

*, ** and*** are statistically significant at 10% and 1% respectively.

Chem./Petr. n=10		Mineral Prod. n=16		Basic Metals n=5		Mach./Equip. n=20	
CAR	t-val.	CAR	t-val.	CAR	t-val.	CAR	t-val.
-4.98	-0.66	21.72	1.31	-8.40	-1.82	3.52	0.38
-1.02	-0.10	12.21	0.84	0.42	0.06	3.42	0.37
13.32	1.10	14.08	0.98	-1.58	-0.15	-4.18	-0.40
24.13	1.74	11.42	0.82	-6.84	-0.53	-16.91	-1.52
24.70	1.65	10.16	0.74	-1.78	-0.11	-22.41	-2.00*
34.03	2.15*	15.28	1.08	-2.42	-0.13	-22.90	-1.95*
39.26	2.09*	12.23	0.83	5.57	0.31	-21.77	-1.69
33.90	1.76	19.55	1.25	4.56	0.25	-20.26	-1.47
36.33	1.83	21.59	1.35	-0.48	-0.03	-16.50	-1.18
33.99	1.68	23.21	1.40	14.55	0.75	-12.66	-0.83
31.34	1.48	27.74	1.61	11.08	0.58	-12.93	-0.83
37.42	1.78	36.43	2.06*	5.19	0.27	-10.38	-0.64
44.77	2.07*	42.99	2.39**	8.28	0.42	-17.19	-1.03
48.33	2.14*	44.20	2.36**	0.01	0.00	-15.21	-0.88
47.19	2.03*	48.29	2.54**	-0.53	-0.02	-16.36	-0.92
53.36	2.19*	52.60	2.70**	3.30	0.14	-11.22	-0.61
52.30	2.13*	63.69	3.01***	12.29	0.50	-6.84	-0.36
55.20	2.25**	72.49	3.38***	1.62	0.07	-1.28	-0.06
54.21	2.17**	74.39	3.37***	-3.21	-0.14	1.37	0.07
50.37	2.02*	82.55	3.47***	-0.92	-0.04	5.36	0.25
58.33	2.26**	82.12	3.41***	0.11	0.01	11.97	0.54
65.92	2.42**	86.56	3.51***	22.89	0.96	12.79	0.57
60.64	2.15*	91.89	3.66***	42.80	1.73	18.95	0.81
55.30	1.91*	87.50	3.49***	88.32	2.96**	8.14	0.35
57.45	1.95*	88.14	3.42***	84.20	2.78**	4.11	0.17
56.90	1.90*	86.48	3.31***	80.83	2.70**	1.74	0.07
65.32	2.11*	80.38	3.04***	86.66	2.76**	-0.29	-0.01
73.46	2.29**	72.65	2.71***	74.63	2.42*	2.83	0.11
78.79	2.47**	57.36	2.10**	68.58	2.20*	5.25	0.20
73.48	2.29**	56.61	2.03*	62.18	2.01*	14.94	0.57
79.56	2.40**	59.61	2.12**	55.98	1.81	16.37	0.61
76.93	2.26**	58.22	2.04*	50.89	1.57	9.54	0.35
72.36	2.07**	69.58	2.36**	51.48	1.57	3.88	0.14
83.27	2.26**	75.69	2.53**	51.38	1.55	13.97	0.49
77.15	2.03*	77.57	2.57**	49.91	1.45	8.07	0.28
76.23	2.00*	73.30	2.40**	48.92	1.42	-4.27	-0.15

Table 5: Descriptive Statistics of Variables Employed

Panel A: Long-Run Return Statistics

	First Month	Months 1-12	Months 1-24	Months 1-36
Statistics	(n=88)	(n=77)	(n=55)	(n=45)
Mean	0.043	0.036	0.402	0.389
Standard Dev.	0.422	0.663	0.905	0.953
Maximum	2.455	0.440	2.439	2.337
Minimum	-0.710	-1.709	-1.782	-1.739

Panel B: Statistics for Independent Variables Employed

Variables[a]	n	Mean	Std. Dev.	Minimum	Maximum
INITIAL	88	0.122	0.198	-0.105	1.318
PRIV	88	0.125	0.332	0.000	1.000
STDDEV	88	0.076	0.088	0.015	0.693
SELF-IPO	88	0.091	0.289	0.000	1.000
METHOD	88	0.273	0.447	0.000	1.000
RATE	88	0.197	0.144	0.021	0.998
ASSET[b]	88	5.444	1.492	2.163	8.562
AGE	88	22.85	10.229	4.000	50.000

a: These statistics are for 88 firms. When the longer time period is investigated, the sample size is naturally reduced and, hence, statistics regarding these variables change. The changing statistics are not reported here but may be available from the author upon request.

b: The natural log of total asset is utilized as a variable and these statistics belong to logarithmic values.

Table 6: The Results of Multiple Regression for Long-Run Performances of IPOs

Variables	First Month	Months 1-12	Months 1-24	Months 1-36
Constant	-0.424	-1.030	0.015	-0.246
	(-2.64)**	(-3.77)***	(0.02)	(-0.41)
INITIAL	-0.668	-0.432	-0.542	-0.809
	(-2.87)***	(-1.05)	(-0.75)	(-1.05)
PRIV	-0.079	0.421	0.462	0.764
	(-0.61)	(1.87)*	(1.20)	(1.80)*
STDDEV	5.157	3.620	3.074	2.373
	(6.86)***	(2.83)***	(1.44)	(1.051)
SELF-IPO	0.232	0.676	0.159	0.365
	(1.74)*	(2.71)***	(0.39)	(0.75)
METHOD	-0.017	0.068	-0.321	0.273
	(-0.21)	(0.44	(-0.97)	(0.63)
RATE	0.285	0.456	0.489	-0.347
	(1.02)	(0.92)	(0.577)	(-0.38)
ASSET	0.016	0.108	0.018	0.002
	(0.66)	(2.29)**	(0.22)	(0.02)
AGE	0.002	0.002	-0.001	0.014
	(0.68)	(0.41)	(-0.01)	(0.99)
R^2	0.4771	0.3827	0.2095	0.2329
Adj R^2	0.4242	0.3101	0.0721	0.0625
F-Value	8.19***	4.72***	2.65**	2.10**

*,**,*** are statistically significant at the 10%, 5% and 1% levels.

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An Empirical Investigation of the Determinants of Capital Structure: Evidence From the Istanbul Stock Exchange Firms

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Abstract

One of the most contentious issues in the theory of finance during the past decades has been the capital structure "puzzle." The genesis of this controversy was the seminal work of Modigliani and Miller (1958) which pointed the direction of research on this issue by showing under what conditions capital structure is irrelevant. The theoretical and empirical studies, following Modigliani and Miller (1958), concentrated on the issue of capital structure from the viewpoint of such issues as taxes, bankruptcy costs and financial distress, agency costs and information asymmetry, and emphasized the existence of an optimum capital structure.

This paper aims to investigate the relationships between a firm's capital structure and its size, business risk, profitability, non-debt tax shield, tax rate and growth rate. The cross sectional data of 68 Istanbul Stock Exchange firms were analyzed over the 1990-1995 period by the ordinary least squares method (OLS). Evidence obtained by this research confirmed the existence of strong relations between capital structure and profitability and non-debt tax shield. The decline in the long-term debt opportunities for the Turkish firms, due to the instability caused by inflation, was also reflected in the results.

I. Introduction

Modern theory of capital structure began with the pioneering paper of Modigliani and Miller (1958), which pointed the direction that capital structure theories must take by showing under what conditions capital structure is irrelevant. In this seminal paper,

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Modigliani and Miller (1958) argued that, in a world of perfect markets and no taxes, a firm's capital structure does not influence its cost of capital, and, consequently, there is no relevance of capital structure for maximizing the value of the firm. In the finance literature, this proposition is called the "irrelevance theory" and the theoretical setting created by their assumptions is named as the "M&M World".

The "M&M World," due to its conceptual significance, has stimulated a substantial interest among academicians to examine critically the theoretical foundations upon which such a world was based. Consequently, considerable research energy has been expended to bring the M&M World nearer to the "real world." From an analytical standpoint, the studies succeeding Modigliani and Miller (1958) have placed emphasis on such crucial determinants of the capital structure as i) tax effect, ii) bankruptcy costs and financial distress, iii) agency costs, and iv) information asymmetry. As a result of the research efforts on the issue of capital structure, the following four approaches, based upon the above determinants, are developed in the field of finance:

i. Tax Effect Approach

Following Miller (1977), Taggart (1980), Pozdena (1987), Titman and Wessels (1988) and Diamond (1994), it can be argued that, since interest payments are tax-deductible expenses whereas dividends are not, firms prefer raising capital by issuing debt. The tax advantage gained by issuing debt is known as the "debt tax shield" in the finance literature.

In addition to the effect of corporate tax on the capital structure (debt-equity) choice, the personal tax also has an impact on capital structure decisions. More specifically, interest income is taxed only at the personal level, whereas equity income may be taxed at both corporate and personal levels.[1] It can, therefore, be stated that a substantial weight will be given to debt financing, if and only if, after-tax income of debt to the investor exceeds the income that is

[1] It is instructive to note that interest income is tax deductible until 1999 (Income Tax Law Article 75 and Provisional Article 39). On the other hand, dividend payments are taxed at both corporate and personal levels. (Income Tax Law Article 75).

offered to the equity investor. Consequently, leverage is positively associated with the increase in the difference between the personal tax rate and the corporate tax rate.

ii. Bankruptcy Costs and Financial Distress Approach

The bankruptcy costs and financial distress approach deals with such costs of debt in contrast to the advantage of debt financing. According to Stiglitz (1972), Haugen and Senbet (1978) and Diamond (1994), this approach suggests that as the debt/equity ratio rises, the ability of the firm to cover its fixed charges, such as interest payments, declines and, in turn, the probability of bankruptcy increases. In determining the optimum capital structure, the tax advantages of debt and the direct and indirect costs of the financial distress, caused by increased debt, should be balanced.

iii. Agency Costs Approach

The agency costs approach developed by Jensen and Meckling (1976), Myers (1977), Fama (1980) and Harris and Raviv (1990) focuses on the conflict of interests in the corporation between the shareholders and managers, and shareholders and bondholders. Conflicts between the shareholders and managers arise because managers do not receive the entire gain from their profit enhancement activities, whereas they assume personally the entire risk of such activities. As a result, the managers may invest less effort in managing corporate resources and may be able to transfer them to their own personal benefits.

The second type of conflict occurs between the shareholders and bondholders. This conflict arises because debt contracts give shareholders an incentive to invest sub-optimally (i.e., to invest in risky projects). That is, more risky investment projects will benefit shareholders at the expense of bondholders. This approach states that the costs, arising due to these conflicts of different interest groups of firm, have an impact on the determination of optimal capital structure.

iv. Information Asymmetry Approach

Leland and Pyle (1977), Myers and Majluf (1984), and Noe (1988)

developed the information asymmetry approach, based on the fact that corporate managers/insiders possess private information about the characteristics of the firms' returns stream or investment opportunities. From the viewpoint of outsiders, the choice of the firm's capital structure signals such private information of insiders. The proponents of this approach suggest that debt issues have a positive price effect on equity, since they are considered to be good news.[2]

The studies in the contemporary finance literature, following Modigliani's and Miller's seminal work, emphasize the existence of an optimum capital structure by highlighting the roles of such factors as tax, bankruptcy costs and financial distress, agency costs, and information asymmetry in the determination of the optimum capital structure. The optimum capital structure is, on the other hand, crucially important for the success of the firm, due to its association with the cost of capital, the capital budgeting decisions and the firm's market value. It is, therefore, assessed that a firm, in order to register a sound operational success in the market, must empirically single out the factors that determine its optimum capital structure.

In the light of the above explanations, the aim of this study is stated as follows: to investigate empirically the determinants of capital structure of the firms whose stocks are traded at the Istanbul Stock Exchange (ISE) by analyzing the cross-sectional, firm specific data compiled over the 1990-1995 time period.

This paper is organized into three distinct sections. In the first section where the statistical method employed is defined, the variables and the functional structure of the model will be formulated, based on the studies on capital structure in the financial literature. Consequently, the empirical findings, derived from the analysis, will be summarized in the second section. The evaluation of the results and the conclusion will be presented in the last section.

[2] Investors interpret the debt issue of a firm as a signal of accepting a project with a positive net present value (NPV). This is due to the assumption that firm managers prefer to finance a positive NPV project by issuing debt. Moreover, firms with high quality, meaning the ones which have the ability to cover fixed charges, have higher debt levels. This situation can be explained by the preference of equity holders of having more of high-risk shares (Harris and Raviv, 1990, pp. 322-329).

II. Model: Optimum Capital Structure Determination

To fulfill its aim, the present study unequivocally follows the methodological direction provided by Myers (1977), Ferri and Jones (1979), Bradley, Jarrel and Kim (1984), Taggart (1984), Pozdena (1987), Titman and Wessels (1988), Joshi (1992), Mohamad (1995) and Saa Requejo (1996)[3]. Specifically, these studies, as a whole, have guided this paper in a) determining the theoretical measures of the determinants of capital structure, b) determining the functional structure of the model to be used in the analysis and selection of the testing method, and c) formulating the standards to be used for evaluating the empirical results of the analysis.

II. 1. Measures of Capital Structure

In the empirical finance literature, leverage ratios are widely used as a measure of capital structure in the studies in the finance literature. The debt level to be used in leverage ratios employed in this study will be classified as total debt, short-term debt and long-term debt. The leverage ratios used in the analysis can, consequently, be listed as follows:

a) Debt to assets ratio: Average Total Debt/Average Total Assets (μ_{TB} / μ_{TA}), Average Short-term Debt/Average Total Assets (μ_{KVB} / μ_{TA}), Average Long-term Debt/Average Total Assets (μ_{UVB} / μ_{TA})[4].

b) Debt to equity ratio: Average Total Debt/Average Equity (μ_{TB} / μ_{OS}), Average Short-term Debt/Average Equity (μ_{KVB} / μ_{OS}), Average Long-term Debt/Average Equity (μ_{UVB} / μ_{OS}).

II.2. Theoretical Determinants of Capital Structure

Based upon the theoretical formulations and empirical findings of the studies mentioned before, the determinants of capital structure and their expected theoretical relationships with capital structure can be explained as follows:

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[3] It is believed that the theoretical formulations and empirical findings of these studies which have used the data generated by the firms operating in the developed economies, still provide vitally important methodological guidance for studies conducted by using data generated by the firms operating in less-developed economic settings.

[4] The symbol μ denotes the arithmetic mean. In this study, it represents the six-year average of the values of balance sheet and income statement items.

i) The Firm Size Variable: Ferri and Jones (1979), Titman and Wessels (1988), Joshi (1992) and Mohamad (1995) provide strong empirical evidence to confirm the notion that the firm's size is positively related to the firms' use of debt capital. The rationale for this relationship lies in the evidence that larger firms enjoy easier access to the capital markets, pay lower interest rates on borrowed funds, face lower bankruptcy costs and achieve less volatility in their earnings. This variable can conveniently be represented by average total assets (μ_{TA}).

ii) The Business Risk Variable: Business risk and capital structure are, as empirically confirmed by Ferri and Jones (1979), Titman and Wessels (1988), Joshi (1992) and Saa Requejo (1996), negatively correlated. In other words, as the business risk of a firm increases, the percentage of debt in a firm's capital structure is expected to decline. The reason is that the business risk, concerning the variability in the firm's future income, is the chief indicator of its ability to meet its fixed charges.

Most widely used measures of business risk are a) coefficient of variation in sales, σ_{SA} / μ_{SA}, (Ferri and Jones, 1979; Joshi, 1992), and b) standard deviation of the percentage changes in earnings before interest and taxes, $\sigma_{\%FVOK}$ (Titman and Wessels, 1988; Joshi, 1992).

iii) The Profitability Variable: Citing evidence from Myers (1977) and Taggart (1984), it can be stated that capital structure and profitability are negatively correlated. The underlying reason for such a relationship is the preference order of the firm in regard to raising capital; that is, firms prefer raising capital first from retained earnings, second from debt, and third from issuing new equity. The two measures,which can be utilized for profitability, are the ratio of average net income to average sales (μ_{NK} / μ_{SA}) and the ratio of average net income to average total assets (μ_{NK} / μ_{TA}).

iv) The Non-Debt Tax Shield Variable: As mentioned before, the tax advantage of debt is called the "tax shield." On the other hand, depreciation, investment tax credits and incentives, which have the same effect as the tax shield on the firm's end of period tax liability, are named as the "non-debt tax shield." Based on the empirical findings of Bradley, Jarrel and Kim (1984), Pozdena (1987), Joshi (1992) and Saa Requejo (1996), the opportunity to raise the

non-debt tax shield has a negative impact on the debt level of the firm's capital structure. The measure employed for this variable is the ratio of average depreciation to average total assets (μ_A / μ_{TA}).

v) The Tax Rate Variable: This variable can be measured by the ratio of the tax paid to earnings before taxes. On the basis of the existing empirical evidence, it can strongly be suggested that the tax rate and the capital structure are positively correlated due to the increasing effect of tax rate on the tax shield (Bradley, Jarrel and Kim, 1984; Pozdena, 1987; Titman and Wessels, 1988; Saa Requejo, 1996).

vi) The Growth Rate Variable: Although the empirical evidence on the effect of growth rate on capital structure is inconclusive, it is generally suggested that these two variables are positively correlated (Myers, 1977; Titman and Wessels, 1988; Joshi, 1992). Thus, rapidly growing firms usually rely more on debt due to high financial requirements that cannot be met from their internal sources. Therefore, such firms lean more on debt capital as compared to slower growing firms. The indicator of the growth rate employed in this study is the average percentage change in total assets ($\mu_{\%\Delta TA}$).

II.3. Model

The functional structure of the model, employed in the present study, for the *i*th firm, is formulated as follows:

$$Y_i = a + b\,BY_i + c\,IR_i + d\,KR_i + e\,BVK_i + f\,VO_i + g\,GR_i + \varepsilon_i \qquad (1)$$

The variables in the above formula can be defined under two headings as follows:

Dependent Variable

$\mathbf{Y_i}$: Capital Structure Variables

(μ_{TB} / μ_{TA}), (μ_{KVB} / μ_{TA}), (μ_{UVB} / μ_{TA})

(μ_{TB} / μ_{OS}), (μ_{KVB} / μ_{OS}), (μ_{UVB} / μ_{OS})

Independent Variable

BY_i : Firm Size (μ_{TA})
IR_i : Business Risk (σ_{SA}/μ_{SA}), ($\sigma_{\%FVOK}$)
KR_i : Profitability (μ_{NK}/μ_{SA}), (μ_{NK}/μ_{TA})
BVK_i : Non-Debt Tax Shield (μ_A/μ_{TA})
VO_i : Tax Rate (μ_{VO})
GR_i : Growth Rate ($\mu_{\%\Delta TA}$)
a : Constant
b, c, d, e, f, g : Parameters
ε_i : The Error Term

Since the capital structure variable is measured by six different ratios, and the profitability and business risk variables each of which have two different measures, the adopted model yields 24 regression equations in different functional forms. These forms for the Y_i variable can be classified as follows:

$$Y_i = a_1 + b_1(\mu_{TA})_i + c_1(\sigma_{SA}/\mu_{SA})_i + d_1(\mu_{NK}/\mu_{SA})_i + e_1(\mu_A/\mu_{TA})_i + f_1(\mu_{VO})_i + g_1(\mu_{\%\Delta TA})_i + \varepsilon_1 \quad (2)$$

$$Y_i = a_2 + b_2(\mu_{TA})_i + c_2(\sigma_{SA}/\mu_{SA})_i + d_2(\mu_{NK}/\mu_{TA})_i + e_2(\mu_A/\mu_{TA})_i + f_2(\mu_{VO})_i + g_2(\mu_{\%\Delta TA})_i + \varepsilon_2 \quad (3)$$

$$Y_i = a_3 + b_3(\mu_{TA})_i + c_3(\sigma_{\%\Delta FVOK})_i + d_3(\mu_{NK}/\mu_{SA})_i + e_3(\mu_A/\mu_{TA})_i + f_3(\mu_{VO})_i + g_3(\mu_{\%\Delta TA})_i + \varepsilon_3 \quad (4)$$

$$Y_i = a_4 + b_4(\mu_{TA})_i + c_4(\sigma_{\%\Delta FVOK})_i + d_4(\mu_{NK}/\mu_{TA})_i + e_4(\mu_A/\mu_{TA})_i + f_4(\mu_{VO})_i + g_4(\mu_{\%\Delta TA})_i + \varepsilon_4 \quad (5)$$

Equations (2), (3), (4) and (5) are tested utilizing six alternative definitions of capital structure separately, against cross-sectional data obtained from a sample of 68 ISE firms for the period of 1990-1995. The ISE Yearbook of Companies (1993) and (1996) provided the main source of data for this investigation. It should be reiterated that the collected data are averaged out over the study period.

III. Empirical Results

The empirical results of the regression analysis of the 24 equations

[5] The degrees of freedom required for the determination of the t-statistic used in statistical analysis - $(n_s - k) = 61$.
n_s = number of observations in the sample set.
k = number of variables in the regression equation + constant
$t_{61, 0.05} = 1{,}671$; $t_{61, 0.01} = 2{,}390$.

are presented in Tables 1, 2, 3, 4 in Appendix A. The following criteria, as a whole, are used to evaluate the empirical findings:

i) The theoretical and empirical plausibility of the estimated coefficients of the variables in the regression equations presented in the tables (sign, size and statistical significance levels[5]); ii) The compatibility of the obtained summary statistics (R^2, coefficient of determination; F statistic; q, standard error of estimates) with those in the studies cited.

The following can be stated as a result of the evaluation of the empirical findings (Table 1-4) based on the above performance criteria:

a) In all equations, the corporate size variable displays the sign suggested by the existing theoretical and empirical studies estimated in all equations. This empirical evidence supports the hypothesis that as firms get larger, their debt levels increase. However, the size of the estimated coefficients of this variable is quite small. These findings suggest that firm size is not effective in determining the capital structure of the firms. In addition, the firm size variable is statistically significant at the 5% level in the equations where the dependent variable is the (μ_{UVB} / μ_{OS}) ratio. This can be interpreted to state that, as firms get larger, they have the tendency to use long-term debt financing.

b) The estimated business risk ratios, (σ_{SA} / μ_{SA}) and ($\sigma_{\%\Delta FVOK}$), confirm the anticipated negative correlation between the capital structure and business risk. However, when the business risk variable is represented by the (σ_{SA} / μ_{SA}) ratio and the dependent variable has the forms of (μ_{TB} / μ_{OS}) or (μ_{KVB} / μ_{OS})ratios, the estimated coefficient of business risk variable has a positive sign. This result may be due to the reflection of the positive correlation between the sales item in the independent variable and the equity component of the dependent variable. The same reflection is also registered when the measure of profitability employed is (μ_{NK}/ μ_{SA}) ratio.

Besides having the expected sign, coefficients of the business risk variable are statistically significant at the 5% level in the regression equations where ($\sigma_{\%\Delta FVOK}$) is employed as the measure of business risk and (μ_{TB} / μ_{TA}) or (μ_{KVB} / μ_{TA}) ratios appear alternatively as the

dependent variable.

c) The profitability variable has the expected negative sign in all regression equations except the ones containing (μ_{NK} / μ_{SA}) ratio as the profitability measure and the (μ_{TB} / μ_{OS}), (μ_{KVB} / μ_{OS}) ratios as the alternative dependent variable. Moreover, the coefficients of the profitability variable are significant at the 1% level in all equations with the exception of equations (2.4), (2.5), (4.4) and (4.5). These empirical findings suggest a strong relationship between the capital structure and profitability.

d) The expected inverse relation between the non-debt tax shield variable and capital structure is confirmed by all regression equations tested, except those formulated by using long-term debt. Moreover, the coefficients of the non-debt tax shield variable is statistically significant at the 1% level in all the equations with the exception of equations (2.3), (2.6), (3.3) and (3.6). Consequently, it can be stated that the relationship between the non-debt tax shield and capital structure is undeniably a strong one.

e) The positive correlation expected to exist between the tax rate and capital structure is confirmed by the overall results of the regression analysis. The coefficient of the tax rate variable in all equations has a positive sign. On the other hand, the coefficient of the tax rate variable is statistically significant at the 5% level only in those equations where the dependent variable is (μ_{TB} / μ_{OS}) or (μ_{KVB} / μ_{OS}) .

f) The test results show that the performance of the growth rate variable is not a consistent one. However, it should be pointed out that its sign is positive and is statistically significant at the 5% level in the equations where the dependent variable is (μ_{TB} / μ_{OS}) or (μ_{KVB} / μ_{OS}). Therefore, the obtained results can be interpreted to suggest that, as the growth rate increases, the debt level of a firm goes up.

g) The obtained coefficients of the determination, R^2, of the estimated equations, where the dependent variable is (μ_{TB} / μ_{TA}) or (μ_{KVB}/ μ_{TA}), are greater than 60%. R^2 values in the other equations are in the range of [0,1103 - 0,4143]. The value of the F statistic is found statistically significant at the 1% level in all equations.

IV. Conclusion

The present study empirically investigated the role of firm size, business risk, profitability, non-debt tax shield, tax rate and growth rate in determining capital structure by analyzing the cross-sectional, firm specific data pertaining to 68 firms, whose stocks are traded on the Istanbul Stock Exchange (ISE), over the period of 1990 to 1995. This study used the ordinary least squares (OLS) method to test its model to fulfill its aim. The following points are concluded on the basis of the overall empirical results of this investigation:

i) The profitability and non-debt tax shield variables are the most important factors determining the capital structure of the ISE firms. The relationship between profitability and capital structure confirms the existence of a preference order in financing.[6]

ii) As expected, the impact of the non-debt tax shield on capital structure is negative, whereas the effect of the tax rate is positive. However, the statistical significance level of 1% for the coefficient of the non-debt tax shield implies that the incentives and investment tax credits offered to ISE firms play an important role in capital structure decisions.

iii) On the basis of the positive sign of the firm size variable, it can be argued that, as ISE firms grow in terms of their total assets, they rely more on debt financing. However, such argument requires further empirical support since the values of the coefficients of the size variable are quite small and they are not statistically significant.

iv) The contradictory findings on the growth rate variable also require additional research by utilizing different types of statistical methods than the one employed by this study.

v) Since the equations, where the capital structure variables are (μ_{TB} / μ_{TA}) or (μ_{KVB}/ μ_{TA}), perform better, judged by the values of the summary statistics, it can be concluded that the capital structure of ISE firms can best be represented by these ratios. On the other hand, the explanation of the relatively poor performance of the equations, where the dependent variable is (μ_{UVB}/ μ_{TA}), can be made in terms of the following fact: the instability created by the high inflation rate in the Turkish economy limits the opportunities for long-term debt

[6] In the finance literature, this order is formally named as the "pecking order."

financing, decreasing the portion of long-term debt within the total debt to marginal levels.

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Appendix A: Results of the Cross-Sectional Regression Analysis

Table 1: Results of the Regression Analysis: Equation 2

EQUATION NO:	DEPENDENT VARIABLE	INDEPENDENT VARIABLES							SUMMARY STATISTICS		
		CONSTANT	μ_{TA}	σ_{SA}/μ_{SA}	μ_{NK}/μ_{SA}	μ_A/μ_{TA}	μ_{VO}	$\mu_{\%\Delta TA}$			
	1	2	3	4	5	6	7	8	R^2	q	F
2.1	μ_{TB}/μ_{TA}	0,6506	0,0007	-0,1466	-1,1399	-0,6071	0,0273	0,2353	0,6697	0,1164	20,6146
		(5,740)	(1,723)*	(1,605)	(9,001)**	(4,031)**	(0,546)	(2,355)*			
2.2	μ_{KVB}/μ_{TA}	0,5048	0,0003	-0,1155	-0,9045	-0,6890	0,0204	0,2450	0,6650	0,1003	20,1778
		(5,169)	(0,893)	(1,466)	(8,289)**	(5,317)**	(0,473)	(2,846)**			
2.3	μ_{UVB}/μ_{TA}	0,1491	0,0004	-0,0347	-0,2321	0,0816	0,0063	-0,0084	0,2017	0,0713	2,5685
		(2,148)	(1,54)	(0,620)	(2,992)**	(0,886)	(0,205)	(0,137)			
2.4	μ_{TB}/μ_{OS}	0,9998	0,0009	0,8418	1,0714	-5,4047	1,2825	-0,5289	0,1985	1,3909	2,5171
		(0,738)	(1,733)*	(0,771)	(0,708)	(3,007)**	(2,145)	(0,443)			
2.5	μ_{KVB}/μ_{OS}	0,9172	0,006	0,4887	0,8334	-5,2568	1,0138	-0,0979	0,2007	1,2365	2,5529
		(0,762)	(1,308)	(0,503)	(0,619)	(3,290)**	(1,907)*	(0,092)			
2.6	μ_{UVB}/μ_{OS}	0,4281	0,0001	-0,1967	-1,2383	0,1054	0,0292	0,1367	0,3530	0,2354	5,5479
		(1,867)	(2,088)*	(1,064)	(4,835)**	(0,346)	(0,289)	(0,671)			

* Statistically significant at the 5% level.
** Statistically significant at the 1% level.

Table 2: Results of the Regression Analysis: Equation 3

EQUATION NO:	DEPENDENT VARIABLE	INDEPENDENT VARIABLES							SUMMARY STATISTICS		
		CONSTANT	μ_{TA}	σ_{SA}/μ_{SA}	μ_{NK}/μ_{TA}	μ_A/μ_{TA}	μ_{VO}	$\mu_{\%\Delta TA}$			
	1	2	3	4	5	6	7	8	R^2	q	F
3.1	μ_{TB}/μ_{TA}	0,6447	0,0005	-0,0471	-1,1928	-0,6207	0,0334	0,1597	0,6334	0,1226	17,5685
		(5,386)	(1,077)	(0,486)	(8,183)**	(3,919)**	(0,633)	(1,952)*			
3.2	μ_{KVB}/μ_{TA}	0,5055	0,0001	-0,0392	-0,9109	-0,7067	0,0252	0,1781	0,6083	0,1085	15,7856
		(4,775)	(0,362)	(0,457)	(7,066)**	(5,046)**	(0,540)	(1,957)*			
3.3	μ_{UVB}/μ_{TA}	0,1418	0,0003	-0,0114	-0,2829	0,0867	0,0075	-0,0160	0,2303	0,0700	3,0421
		(2,076)	(1,309)	(0,207)	(3,399)**	(0,956)	(0,249)	(0,273)			
3.4	μ_{TB}/μ_{OS}	0,8097	0,0009	0,8456	-0,1679	-5,1401	1,2764	-0,2079	0,1920	1,3966	2,4158
		(0,594)	(1,667)	(0,766)	(0,101)	(2,850)**	(2,126)*	(0,177)			
3.5	μ_{KVB}/μ_{OS}	0,7838	0,0006	0,4845	-0,0353	-5,0696	1,0091	0,1333	0,1957	1,2403	2,4158
		(0,647)	(1,333)	(0,494)	(0,024)	(3,165)**	(1.893)*	(0,128)			
3.6	μ_{UVB}/μ_{OS}	0,3963	0,0001	-0,0759	-1,4626	0,1232	0,0357	0,0869	0,3949	0,2276	6,6353
		(1,783)	(1,751)*	(0,422)	(5,405)**	(0,419)	(0,365)	(0,455)			

* Statistically significant at the 5% level.
** Statistically significant at the 1% level.

Table 3: Results of the Regression Equation: Equation 4

EQUATION NO:	DEPENDENT VARIABLE	INDEPENDENT VARIABLES							SUMMARY STATISTICS		
		CONSTANT	μ_{TA}	$\sigma_{\%FVOK}$	μ_{NK}/μ_{SA}	μ_A/μ_{TA}	μ_{VO}	$\mu_{\%\Delta TA}$			
	1	2	3	4	5	6	7	8	R^2	q	F
4.1	μ_{TB}/μ_{TA}	0,5689	0,0006	-0,0197	-1,1947	0,5522	0,0478	0,1672	0,6930	0,1122	22,9519
		(6,896)	(1,422)	(2,721)**	(9,644)**	(3,772)**	(1,132)	(1,882)*			
4.2	μ_{KVB}/μ_{TA}	0,4356	0,0002	-0,0131	-0,9407	-0,6524	0,0389	0,1921	0,6758	0,0987	21,1925
		(6,007)	(0,628)	(2,064)*	(8,638)**	(5,069)**	(1,049)	(2,460)**			
4.3	μ_{UVB}/μ_{TA}	0,1338	0,0003	-0,0067	-0,2509	0,1002	0,0091	-0,0251	0,2241	0,0703	2,9368
		(2,590)	(1,372)	(1,470)	(3,233)**	(1,093)	(0,342)	(0,451)			
4.4	μ_{TB}/μ_{OS}	1,7976	0,0009	-0,0487	0,9168	-5,2686	0,9978	-0,1876	0,1945	1,3944	2,4552
		(1,754)	(1,674)*	(0,542)	(0,596)	(2,896)**	(1,902)*	(0,170)			
4.5	μ_{KVB}/μ_{OS}	1,3908	0,0006	-0,0334	0,7287	-5,1634	0,8431	0,0986	0,1997	1,2372	2,5369
		(1,529)	(1,334)	(0,419)	(0,533)	(3,199)**	(1,812)*	(0,101)			
4.6	μ_{UVB}/μ_{OS}	0,3128	0,0001	-0,0236	-1,3037	0,1713	0,0595	0,0462	0,3668	0,2329	5,8889
		(1,827)	(1,890)*	(1,575)	(5,071)**	(0,564)	(0,679)	(0,251)			

* Statistically significant at the 5% level.
** Statistically significant at the 1% level.

Table 4: Results of the Regression Analysis: Equation 5

EQUATION NO:	DEPENDENT VARIABLE	INDEPENDENT VARIABLES							SUMMARY STATISTICS		
		CONSTANT	μ_{TA}	$\sigma_{\%\Delta FVOK}$	μ_{NK}/μ_{TA}	μ_A/μ_{TA}	μ_{VO}	$\mu_{\%\Delta TA}$			
	1	2	3	4	5	6	7	8	R^2	q	F
5.1	μ_{TB}/μ_{TA}	0,6423	0,0003	-0,0164	-1,2401	-0,5758	0,0286	0,1329	0,6583	0,1184	19,5869
		(7,487)	(0,829)	(2,166)**	(8,796)**	(3,735)**	(0,640)	(1,431)			
5.2	μ_{KVB}/μ_{TA}	0,4959	0,0007	-0,0103	-0,9423	-0,6781	0,0247	0,1577	0,6211	0,1067	16,6667
		(6,416)	(0,166)	(1,512)	(7,419)**	(4,883)**	(0,616)	(1,885)*			
5.3	μ_{UVB}/μ_{TA}	0,1464	0,0004	-0,0062	-0,2997	0,1035	0,0039	-0,0237	0,2543	0,0689	3,4663
		(2,933)	(1,143)	(1,415)	(3,653)**	(1,154)	(0,150)	(0,439)			
5.4	μ_{TB}/μ_{OS}	1,6613	0,0008	-0,0589	-0,1639	-5,0162	0,9807	0,0819	0,1103	1,3983	2,3843
		(1,639)	(1,604)	(0,657)	(0,098)	(2,755)**	(1,858)*	(0,075)			
5.5	μ_{KVB}/μ_{OS}	1,2882	0,0006	-0,0410	-0,0503	-4,9796	0,8318	0,2955	0,1960	1,2401	2,4781
		(1,434)	(1,281)	(0,516)	(0,034)	(3,084)**	(1,777)*	(0,304)			
5.6	μ_{UVB}/μ_{OS}	0,3805	0,0001	-0,0213	-1,5264	0,1820	0,0336	0,0465	0,4143	0,2240	7,1912
		(2,344)	(1,673)*	(1,484)	(5,723)**	(0,624)	(0,398)	(0,265)			

* Statistically significant at the 5% level.
** Statistically significant at the 1% level.

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ISE Market Indicators

STOCK MARKET

Number of Companies		Traded Value				Market Value		Dividend Yield	P/E Ratios
		Total		Daily Average					
		TL Billion	US$ Million	TL Billion	US$ Million	TL Billion	US$ Million	%	
1986	80	9	13	0.03	0.05	709	938	9.15	5.07
1987	82	105	118	0.42	0.47	3,182	3,125	2.82	15.86
1988	79	149	115	0.59	0.45	2,048	1,128	10.48	4.97
1989	76	1,736	773	6.81	3.03	15,553	6,756	3.44	15.74
1990	110	15,313	5,854	61.99	23.70	55,238	18,737	2.62	23.97
1991	134	35,487	8,502	143.67	34.42	78,907	15,564	3.95	15.88
1992	145	56,339	8,567	224.46	34.13	84,809	9,922	6.43	11.39
1993	160	255,222	21,770	1,037.49	88.50	546,316	37,824	1.65	25.75
1994	176	650,864	23,203	2,572.58	91.71	836,118	21,785	2.78	24.83
1995	205	2,374,055	52,357	9,458	209	1,264,998	20,782	3.56	9.23
1996	228	3,031,185	37,737	12,272	153	3,275,038	30,797	2.87	12.15
1997/Q1	233	1,831,881	15,520	30,031	254	5,661,686	44,891	3.40	15.25

*Q=Quarterly

Closing Values of the ISE Price Indices

TL Based

	National-100 (Jan. 1986=1)	National-Industrials (Dec. 31, 90=33)	National-Services (Dec. 27, 96=1,046)	National-Financials (Dec. 31, 90=33)
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	1,045.91	914.47
1997/Q1	1,613	1,602	1,451	1,769

US$ Based

	National-100 (Jan. 1986=100)	National-Industrials (Dec. 31, 1990=643)	National-Services (Dec. 27, 1996=572)	National-Financials (Dec. 31, 1990=643)
1986	132	—	—	—
1987	385	—	—	—
1988	120	—	—	—
1989	561	—	—	—
1990	643	643	—	643
1991	501	570	—	385
1992	273	335	—	166
1993	833	898	—	773
1994	413	462	—	348
1995	383	442	—	287
1996	534	572	572	500
1997/Q1	744	739	669	816

*Q= Quarterly

BONDS AND BILLS MARKET

Traded Value

Outright Purchases and Sales Market

	Total		Daily Average	
	TL Billion	*US $ Million*	*TL Billion*	*US $ Million*
1991	1,476	312	11	2
1992	17,977	2,406	72	10
1993	122,858	10,728	499	44
1994	269,992	8,832	1,067	35
1995	739,942	16,509	2,936	66
1996	2,710,973	32,737	10,758	130
1997/Q1	1,172,033	9,893	19,214	162

Repo-Reverse Repo Market

Outright Purchases and Sales Market

	Total		Daily Average	
	TL Billion	*US $ Million*	*TL Billion*	*US $ Million*
1993	59,009	4,794	275.74	22
1994	756,683	23,704	2,990.84	93
1995	5,781,776	123,254	22,943.56	489
1996	18,340,459	221,405	72,779.60	878
1997/Q1	9,191,669	78,194	150,683	1,282

*Q=Quarterly

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/Q1	103.93	112.24	124.53	112.40
US $ Based				
1996	57.09	61.13	67.19	61.01
1997/Q1	48.76	52.66	58.42	52.73

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/Q1	259.97	284.76	317.11
US $ Based			
1996	122.84	132.99	144.74
1997/Q1	121.96	133.59	148.77

*Q= Quarterly

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Global Capital Markets

It was in 1996 when the debate surrounding the capital markets intensified on the structure and organization in terms of self-regulation and/or co-operative regulation. Following these legal discussions, the most interesting development in 1997 involved the Japanese capital markets. By the introduction of the "Big Bang," full liquidation and fair competition emerged as the expected values in this huge market as well.

Global capital markets are monitoring and observing the trends in the US economy, somewhat as it reached the lowest unemployment rate for the last 23 years.[1] Furthermore, since the consumer price inflation was about 2.2% annually in May, it is inferred that the economy during a stabilized growth cycle, increases optimism. On the other hand, there are some dubious arguments whether the economy will be able to sustain this growth in the mid- and long-term period.

International stock markets have been developing dramatically so far in 1997. In the first quarter, total sales reached 17.81 billion dollars, with an increase of 13.3%.[2] While the capitalization of global markets was increasing, emerging markets provided satisfactory gains to investors with respect to an effective composition of foreign portfolio investments.

In a ranking of global capital markets, in terms of market indicators, the NYSE is keeping the first place with its liquidity and capitalization. Since the market capitalization, relative to the trading volume is so low in Warsaw, Istanbul, Buenos Aires, Oslo, Korean and Thailand stock exchanges, their turnover ratios are notably high. While the Taiwan market and Nasdaq are forerunners, in terms of turnover ratios, the NYSE is in the 12th place and the Tokyo Stock Exchange in the 33rd. As a significant proxy for market depth,

[1] The unemployment rate in May was 4.4%; monthly consumer price inflation in May was 0.1%. See Reuters News Service, June 17, 1997, U.S.

[2] World Equity, No. 42, May 1997, p. 16

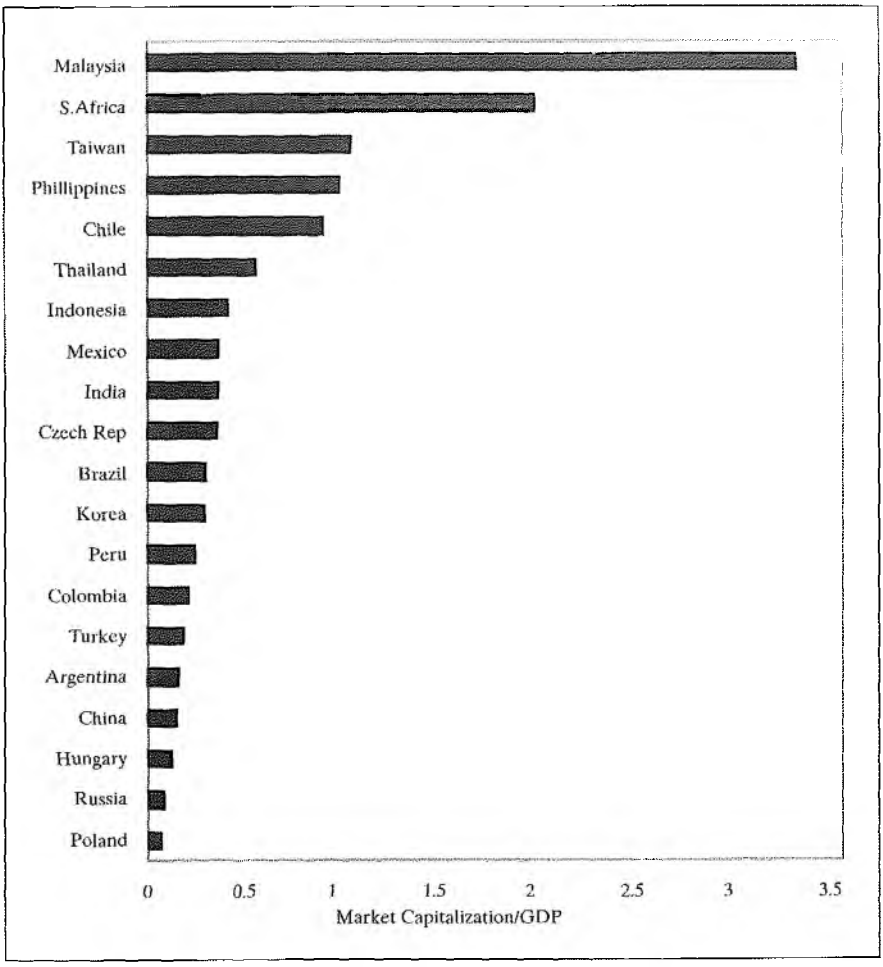
market capitalization of the ISE decreased in April, in parallel to the decline in the turnover in comparison to that in January. However, the rises in P/E and P/B values imply that there were positive expectations over this market.

In the first half of 1997, Turkey had an unclear political atmosphere until June, when the coalition resigned. During this period, Turkey continued to grow with high inflation. Under the pressure of general economic developments and the political events, the ISE was almost stable in February and March, after posting an outstanding performance in January. However, the ISE National-100 Index decreased to the 1,427 level in April. The ISE, with a higher volatility than most of the other markets, has been welcoming more IPOs and, in any case, showing a high trade volume and increasing information-technology. This obviously means that it is on the right path to becoming a developed market.

By offering higher interest rates to compete with the deeper bond markets, emerging markets do not yet have enough bonds listed on their markets. The nominal value of bonds listed on the Korean bond market, the biggest among the emerging bond marketplaces, was only 208.2 billion dollars while it was 2.86 trillion dollars on the NYSE as of 1996-end. The bond market on the ISE has attracted more attention by an increasing number of investors. The public sector-dominated market reached 47.15 billion dollars at year-end of 1996.

Following the establishment of the derivatives market, such as the futures markets witnessed in the developed markets in the 1980s, the emerging markets have also given priority to establish such markets. In this respect, the ISE is planning to begin forward trades, with index futures and options prior to the end of 1997.

Emerging Stock Markets' Importance in the National Economy (1996)



Source: Emerging Markets Investor, Vol. 4, No. 3, March 1997, pp. 49, 56.

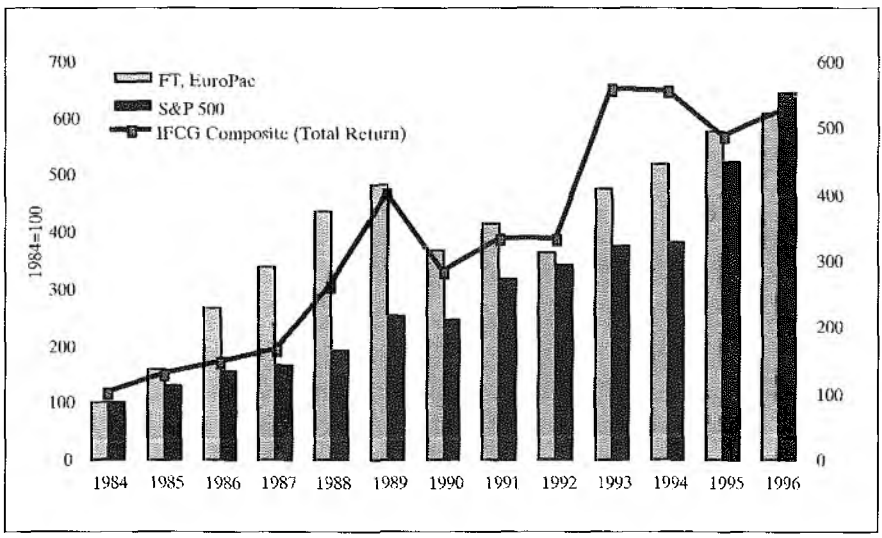
Note: The capitalization of the stock market as of December 1996 was the total market value of the listed and trading companies in the country's stock exchange or exchanges. GDP/GNP values are estimated by the Emerging Markets Investor.

Market Capitalization ($ million, 1986-1995)

	Global	Developed Markets	Emerging Markets	ISE
1986	6,514,199	6,275,582	238,617	938
1987	7,830,778	7,511,072	319,706	3,125
1988	9,728,493	9,245,358	483,135	1,128
1989	11,713,683	10,975,62	2738,061	6,756
1990	9,393,545	8,782,267	611,278	18,737
1991	11,290,494	10,435,686	854,808	15,564
1992	10,833,177	9,949,721	883,456	9,922
1993	13,963,831	12,377,034	1,586,797	37,824
1994	15,154,292	13,241,841	1,912,451	21,785
1995	17,787,883	15,892,174	1,895,709	20,782
1996	20,158,845	17,932,888	2,225,957	30,792

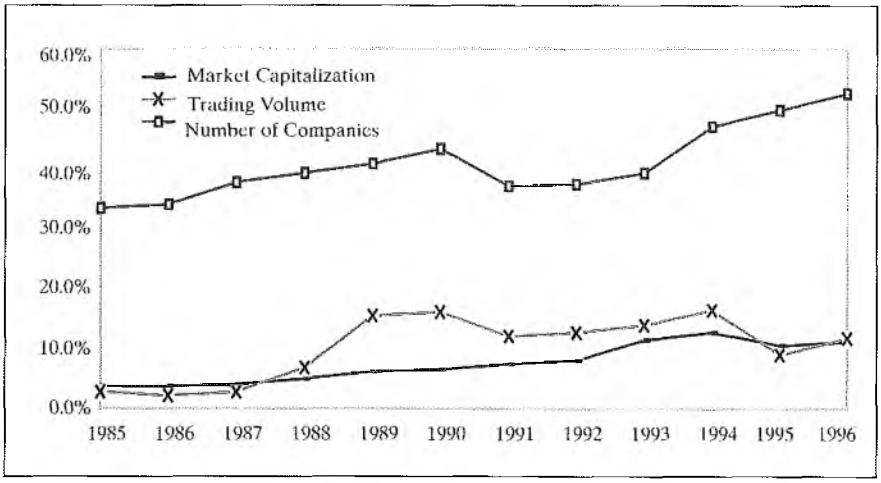
Source: IFC Factbook 1996, pp. 16-17; ISE Monthly Bulletin, January 1997.

Comparison of Markets' Indices (1984-96)



Source: IFC Factbook, 1996, p. 43; IFC Monthly Review, December 1996, IFC, January 1997.

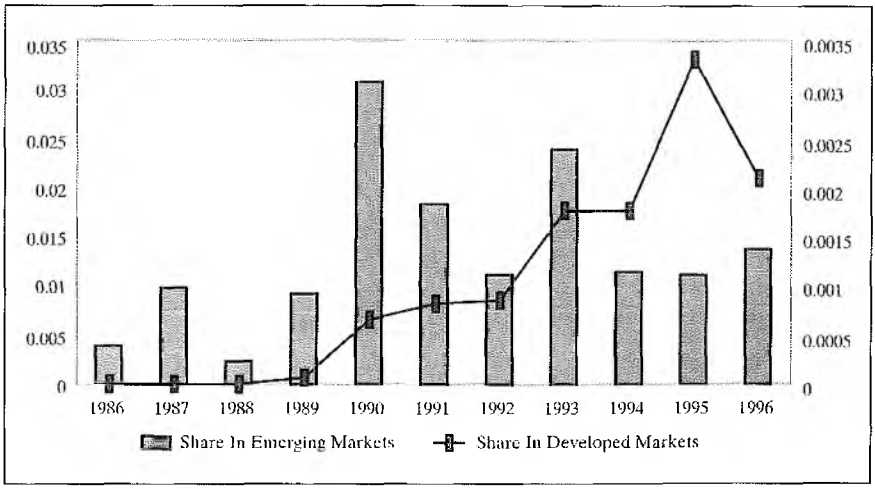
Worldwide Share of Emerging Capital Markets (1985-1996)



Source: IFC Factbook, 1996-1997, pp. 16-23.

Note: Number of trading companies in emerging markets dramatically increased until 1996 and the worldwide share reached above 50%. On the other hand, their share in the global capitalization was relatively very low, since the average sizes of the companies are significantly smaller.

The ISE's Share in World Markets (1986-1996)



Source: IFC, 1996-1997.

Main Indicators of Capital Markets (April 1997)

	Markets	Turnover Velocity (Monthly)	Markets	Value of Share Trading (US$ million, 1997 Jan.-April)	Markets	Market Capitalization of Shares of Domestic Companies (US$ million, April 1997)
1	Taiwan	472%	NYSE	1752,112.1	NYSE	7,272,283.2
2	Nasdaq	268%	Nasdaq	1350,195.9	Tokyo	2,690,106.2
3	Paris	202%	London	465,168.8	Osaka	2,212,759.3
4	Madrid	151%	Taiwan	419,589.7	London	1,732,410.4
5	Korea	143%	Paris	411,271.2	Nasdaq	1,392,430.2
6	Germany	125%	Germany	349,540.6	Germany	710,335.3
7	Switzerland	105%	Tokyo	281,445.8	Paris	596,193.2
8	Warsaw	86%	Switzerland	177,942.1	Toronto	497,660.1
9	Oslo	78%	Madrid	130,402.5	Hong Kong	462,180.5
10	Buenos Aires	71%	Osaka	102,466.2	Switzerland	449,806.7
11	Istanbul	70%	Toronto	98,652.7	Amsterdam	399,439.4
12	NYSE	66%	Hong Kong	93,455.5	Taiwan	330,910.1
13	Hong Kong	63%	Amsterdam	88,719.4	Australia	318,729.9
14	Stockholm	63%	Kuala Lu.	71,349.6	Kuala Lu.	288,375.6
15	Kuala Lu.	62%	Korea	59,398.8	Johann.	270,945.3
16	Vancouver	61%	Stockholm	56,348.4	Rio de Ja.	269,450.1
17	Amsterdam	53%	Italy	55,110.0	Italy	264,939.1
18	Toronto	51%	Australia	53,313.9	Madrid	251,975.6
19	Australia	50%	Barcelona	50,172.2	Stockholm	235,976.8
20	Bilbao	49%	Bilbao	40,983.2	Bilbao	192,339.5
21	Lisbon	48%	Singapore	27,220.9	Barcelona	186,704.3
22	Copenhagen	46%	Istanbul	17,119.5	Korea	143,138.4
23	Singapore	46%	Copen.	16,289.5	Singapore	133,773.2
24	Jakarta	45%	Oslo	16,285.2	Brussels	126,412.8
25	London	45%	Jakarta	15,335.2	Mexico	114,077.3
26	Helsinki	44%	Mexico	13,378.2	Jakarta	93,973.0
27	Barcelona	42%	Johann.	13,100.5	Santiago	75,566.5
28	Italy	42%	Buenos A.	12,316.3	Thailand	75,445.4
29	Athens	41%	Thailand	11,920.3	Copenhag.	74,568.2
30	Vienna	39%	Helsinki	11,224.2	Philippines	72,094.1
31	Philippines	34%	Brussels	9,982.9	Helsinki	66,801.3
32	Thailand	33%	Philippines	9,924.2	Oslo	57,845.9

Main Indicators of Capital Markets (April 1997)

	Markets	Turnover Velocity (Monthly)	Markets	Value of Share Trading (US$ million, , 1997 Jan.-April)	Markets	Market Capitalization of Shares of Domestic Companies (US$ million, Apr. 1997)
33	Tokyo	33%	Rio de Ja.	5,205.8	Buenos A.	1,193.7
34	Mexico	29%	Athens	4,765.6	Tel-Aviv	42,090.3
35	Lima	24%	Tel-Aviv	4,303.8	Ireland	38,239.8
36	New Z.	24%	Lisbon	4,088.2	Istanbul	36,576.7
37	Tel-Aviv	19%	Vienna	3,526.7	New Zea.	35,573.9
38	Ireland	19%	New Ze.	3,439.2	Luxem.	34,034.0
39	Brussels	18%	Warsaw	2,995.6	Athens	31,912.7
40	Johann.	17%	Vancouver	2,953.0	Vienna	31,765.4
41	Santiago	11%	Santiago	2,557.3	Lisbon	27,529.8
42	Rio de Ja.	5%	Ireland	2,168.6	Tehran	17,631.2
43	Osaka	4%	Lima	1,281.9	Lima	13,142.9
44	Tehran	3%	Tehran	395.5	Warsaw	9,825.8
45	Luxem.	3%	Luxem.	379.9	Vancou.	9,329.1

Source: FIBV, Focus, May 1997.

Trading Volume (US$ billion, 1986-96)

	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	0.02
1989	7,468,215	6,302,687	1,165,528	773	15.61	0.07
1990	5,512,129	4,617,688	894,441	5,854	16.23	0.65
1991	5,016,379	4,410,855	605,524	8,502	12.07	1.42
1992	4,778,429	4,165,501	612,928	8,567	12.83	1.34
1993	7,702,502	6,633,684	1,068,818	21,770	13.88	2.17
1994	10,085,703	8,445,585	1,640,118	23,203	16.26	1.32
1995	11,666,260	10,632,763	1,033,497	52,357	8.86	4.97
1996	13,580,050	11,993,232	1,586,818	37,737	11.7	2.38

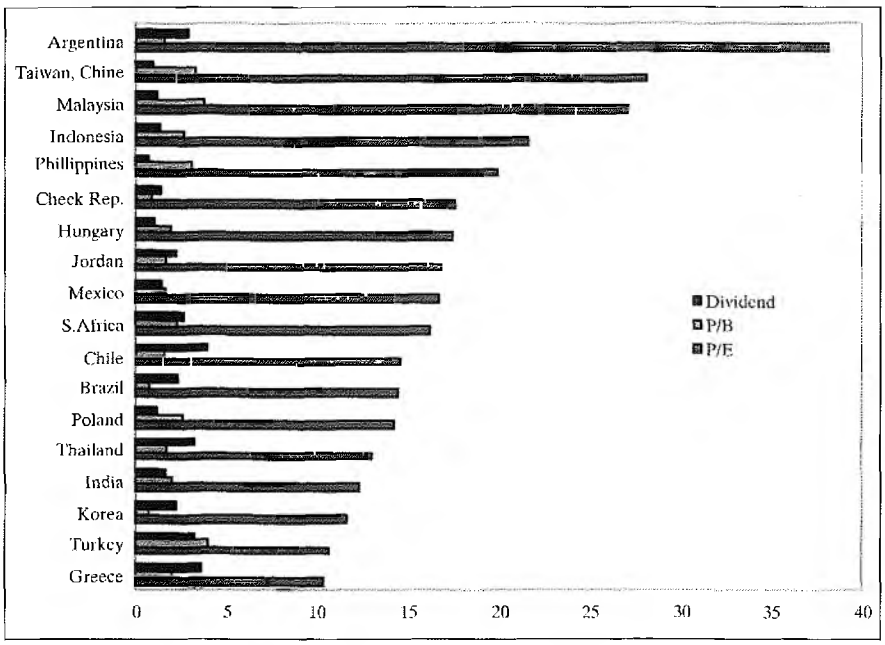
Source: IFC Factbook 1996-1997, pp. 20-21.

Number of Traded Companies (1986-96)

	Global	Developed	Emerging	ISE	Emerging/ Global (%)	ISE /Emerging(%)
1986	28,173	18,555	9,618	40	34.14	0.42
1987	29,278	18,265	11,013	50	37.62	0.45
1988	29,270	17,805	11,465	50	39.17	0.44
1989	29,486	17,478	12,008	50	40.72	0.42
1990	28,918	16,403	12,515	110	43.28	0.88
1991	25,951	16,315	9,636	134	37.13	1.39
1992	27,586	17,227	10,359	145	37.55	1.40
1993	28,768	17,431	11,337	152	39.41	1.34
1994	36,078	19,064	17,014	176	47.16	1.03
1995	38,864	19,467	19,397	205	49.91	1.06
1996	42,351	20,088	22,263	228	52.60	1.36

Source: IFC Factbook 1996-1997, pp. 22, 23.

Comparison of Markets' Performances (December 1996)



Source: IFC, 1996-1997.

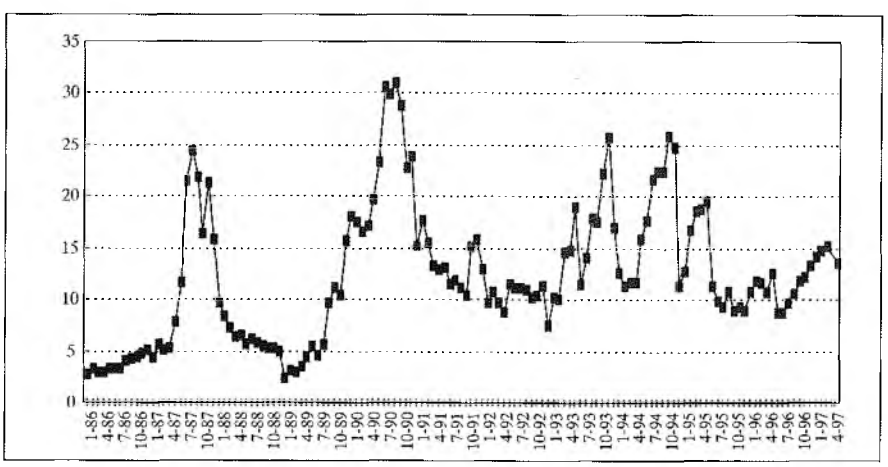
Notes: P/B= Market Value (Price)/Book Value; P/E = Price/Earnings.

Price-Earnings Ratios in Emerging Markets (1992-1997)

Markets	1992	1993	1994	1995	1996	Jan. 1997
Argentina	38	41.9	17.7	15	38.21	39.81
Taiwan	16.6	34.7	36.8	21.4	28.16	29.45
Malaysia	21.8	43.5	29	25.1	27.11	27.46
Indonesia	12.2	28.9	20.2	19.8	21.62	24.34
Hungary	-	52.4	-55.3	12	17.48	23.75
Philippines	14.1	38.8	30.8	19	19.99	20.69
Turkey	6.9	36.3	31	8.4	10.74	17.99
Mexico	12.3	19.4	17.1	28.4	16.79	16.73
S. Africa	13.2	17.3	21.3	18.8	16.27	16.24
Poland	-	31.5	12.9	7	14.3	16.15
Chile	13	20	21.4	17.1	27.76	15.85
Brazil	-24.4	12.6	13.1	36.3	14.5	15.49
Jordan	14.5	17.9	20.8	18.2	16.89	14.93
Czech Rep.	-	18.8	16.3	11.2	17.62	14.67
Thailand	13.9	27.5	21.2	21.7	13.06	13.84
India	33.7	39.7	26.7	14.2	12.32	13.76
Greece	6.9	10.2	10.4	10.5	10.45	13.13
Korea	21.4	25.1	34.5	19.8	11.69	12.57

Source: IFC Factbook 1996, pp. 129-233; IFC, January 1997.

ISE's Price-Earnings Ratio (1986-1997/May)



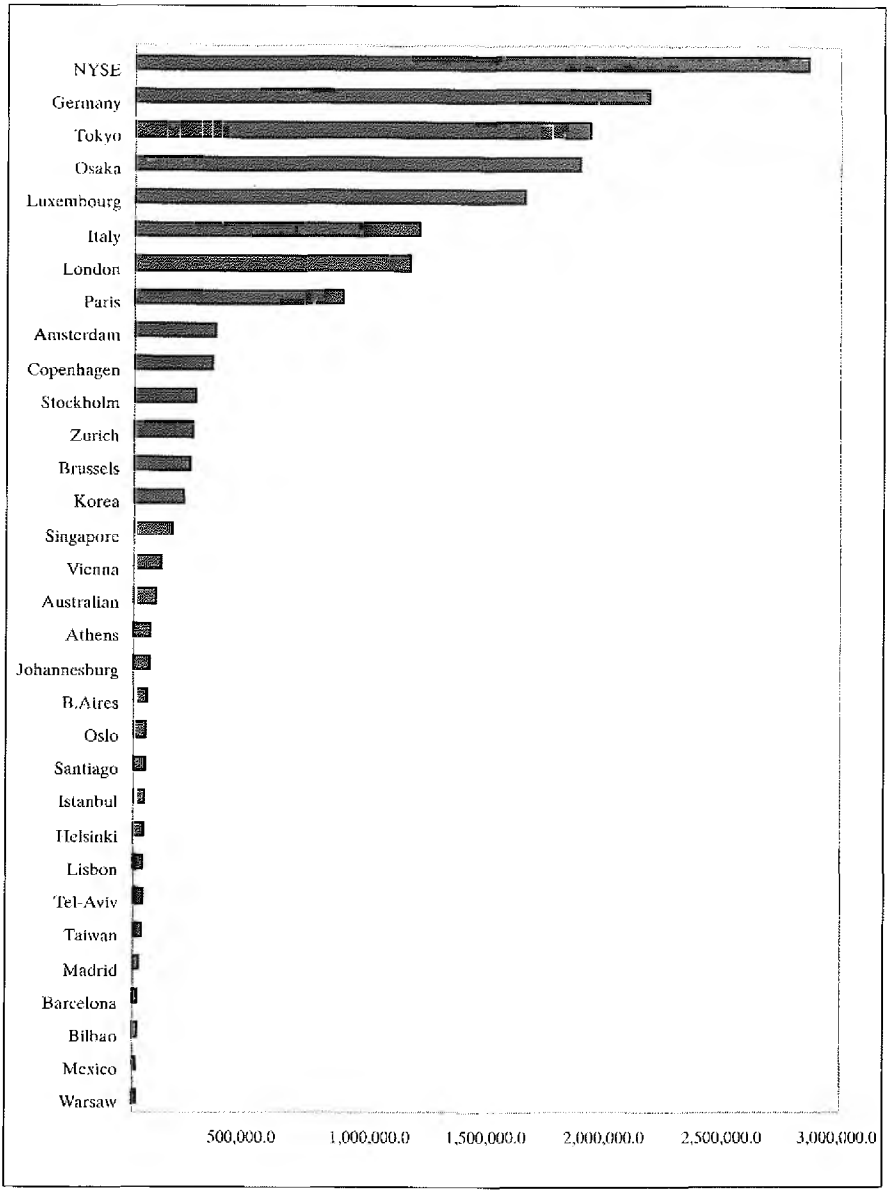
Source: ISE Monthly Bulletin, December 1996, May 1997.

Market Value/Book Value Ratios (1992-Jan. 1997)

Markets	1992	1993	1994	1995	1996	Jan. 1997
Turkey	1.30	7.20	6.30	2.70	3.98	6.64
Malaysia	2.50	5.40	3.80	3.30	3.78	3.98
Taiwan	2.10	3.90	4.40	2.70	3.31	3.48
Philippines	2.40	5.20	4.50	3.20	3.14	3.24
Indonesia	1.60	3.10	2.40	2.30	2.66	3.01
Poland	-	5.70	2.30	1.30	2.59	2.93
S. Africa	1.40	1.80	2.60	2.50	2.34	2.60
India	4.70	4.90	4.20	2.30	2.07	2.58
Greece	1.70	1.90	1.90	1.80	2.01	2.45
Hungary	-	1.60	1.70	1.20	1.97	2.33
Thailand	2.50	4.70	3.70	3.30	1.78	1.90
Jordan	1.60	2.00	1.70	1.90	1.71	1.88
Mexico	2.00	2.60	2.20	1.70	1.68	1.76
Argentina	1.20	1.90	1.40	1.30	1.62	1.73
Chile	1.70	2.10	2.50	2.10	1.59	1.72
Czech Rep.	-	1.30	1.00	0.90	0.89	0.97
Korea	1.10	1.40	1.60	1.30	0.76	0.80
Brazil	0.40	0.50	0.60	0.50	0.73	0.79

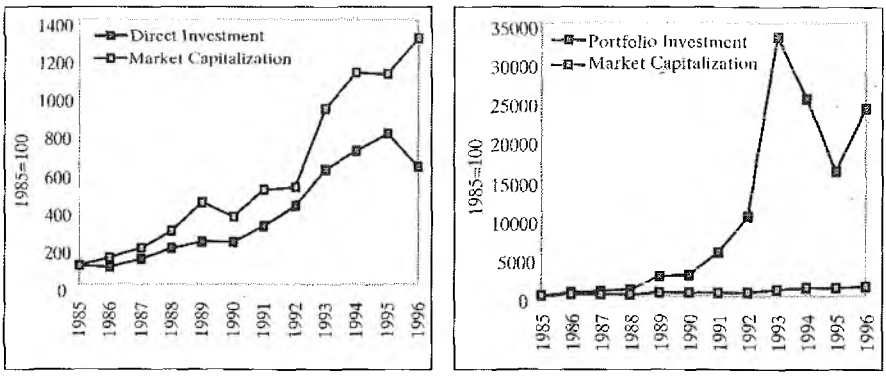
Source: IFC Factbook 1996-1997, pp. 129-233.

Market Values of Bonds (31.12.1996)



Source: FIBV, Annual Report 1996, p. 78; ISE Monthly Bulletin, May 1996.

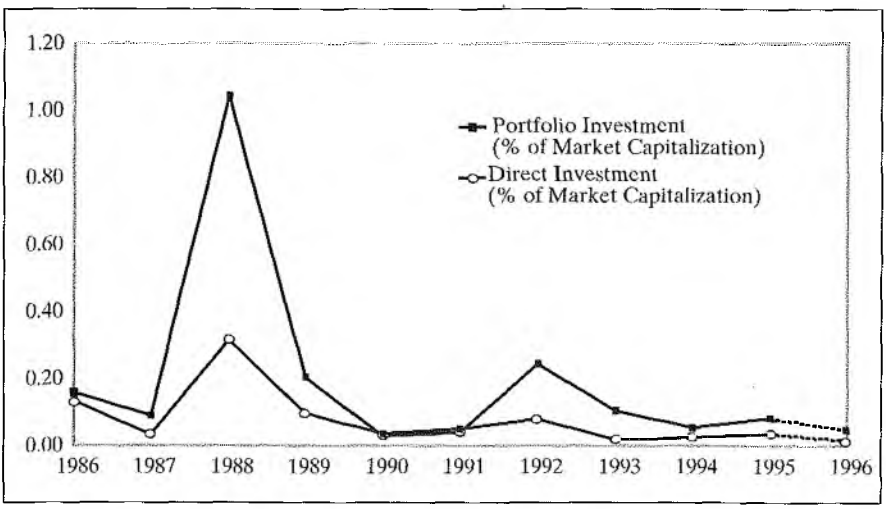
Foreign Investments and Market Capitalization in Emerging Markets (1985-1996)



Source: IFC Factbook 1996, pp. 6-23.

Notes: The portfolio investments as of 1996 were 33.1 billion dollars; and the foreign direct investment was 70.4 billion dollars. See Emerging Markets Investor, Vol. 4, No. 3, March 1997, p. 8.

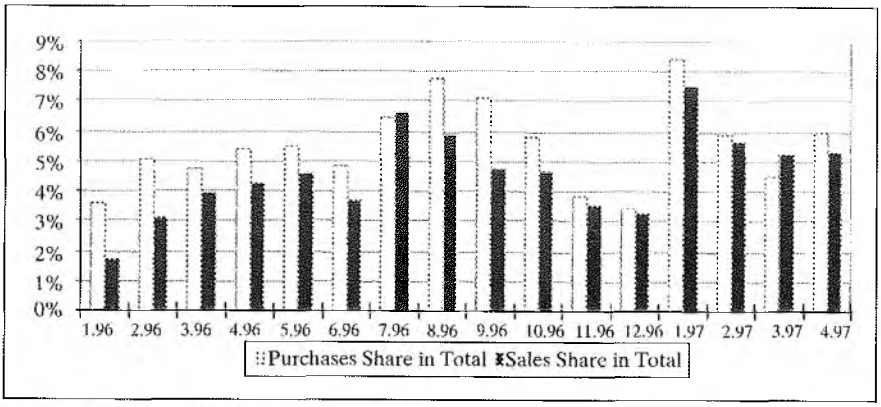
Foreign Investment as a Percentage of Market Capitalization in Turkey (1986-1996)



Source: SPO (DPT), Main Economic Indicators, July 1996, p. 47; January 1997; SPO, Economic and Social Indicators, 1950-1995, p. 36; ISE's Monthly Bulletins.

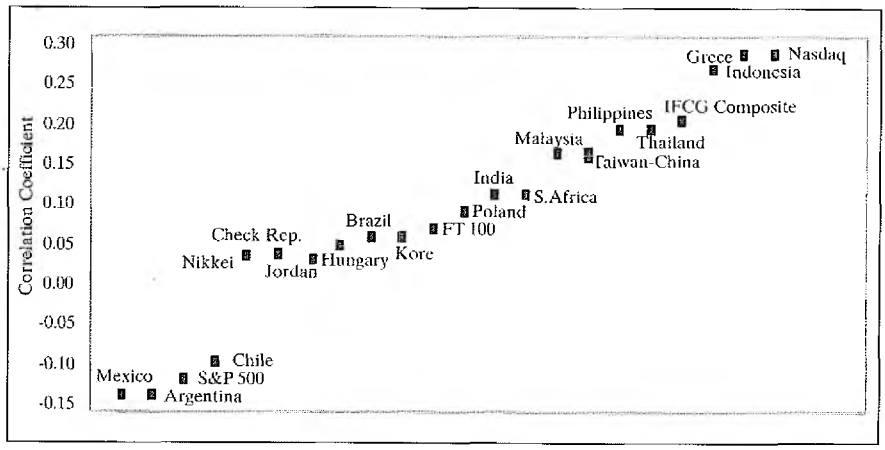
Notes: Foreign investment values pertaining to 1996 are temporary.

Foreigners' Share in the ISE's Trading Volume (Monthly, 1996-1997)



Source: ISE Monthly Bulletin, May 1997.

Return Index Correlations of the ISE (December 1990-December 1995)



Notes: The correlation coefficient is between -1 and +1. If it is zero, for the given period, it is implied that there is no linear relation between the two series of returns. For monthly return index correlations, see IFC, Factbook 1996,

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Book Reviews

Financial Markets and Monetary Policy, Jeffrey A. Frankel, The MIT Press, Cambridge, 1995, pp. xiii+321.

Finance, in the modern world, is the driving force of economics with an undeniable impact on the society's economic, social and political fabric. Savings trends constitute the basic elements of financial sector within economics. It is the monetary policy, at the macro level, that presents the most effective solution in the process of determining the direction of the savings trend.

This book by Jeffrey A. Frankel, the "Financial Markets and Monetary Policy," is composed of the author's 15 well-known articles. The incisive articles include a thorough expose of monetary policy as applied in the financial markets.

According to the topics covered in the essays, the book is divided into three sections. The articles cover, respectively, optimal portfolio diversification, the indicators of expected inflation and the choices of a model for a monetary policy in the face of uncertainty. An introductory chapter for each section enables the reader to get a brief review of the analysis and the methods tackled in the essays.

The papers in the first section propose a new econometric technique for imposing the constraints of mean variance optimization on the shares of the investors' portfolios. This new technique, dubbed as the CASE (Constrained Asset Share Estimation) method adds value to macroeconomic applications of the optimal portfolio diversification theory. The CASE method, providing an important attribute for macroeconomic practices by allowing expected returns to fluctuate freely, is used as the basic method for all theoretical works in the first section.

Chapter 1 applies the CASE method to analyze the effects of the increase in the government debt supply on the required rate of return on capital. It is concluded in this chapter that portfolio effects are extremely small when conventional levels of risk aversion are assumed. Chapter 2 shows that small portfolio effects seem to follow

from the constraints of optimal portfolio diversification by applying the CASE method on the term structure composition of debt.

The next three chapters could be fitted into the finance literature that tests the Capital Asset Pricing Model (CAPM). The constraints of mean-variance optimization are tested explicitly by using the CASE econometric technique. Chapter 3 tests the CAPM in an intuitive way by using a data set composed of short-term assets. Consisting the assets of six major industrialized countries, CAPM is internationalized in Chapter 4 which is co-authored with Charles Engel. The constraints imposed by mean-variance optimization are rejected in Chapter 3 and Chapter 4. The last essay of the first section tests the conditional mean-variance efficieny of the U.S. stock market and concludes that it is necessary to develop a CAPM model.

Part 2 of the book includes the articles, concentrating on two monetary indicators: commodity prices and the interest rate term structure. When nominal interest rates are determined by a conventional demand-for-money equation, then the constant real interest rate would require that commodities market would have to adjust as quickly as asset markets. Chapter 6 develops a model for determining the prices of rapidly adjusting commodities and crops, which are named as "auction goods" composed of agricultural and metal products. On the basis of the theoretical model developed by Dornbusch in 1976, this chapter shows that high real commodity prices are indicators of inflationary monetary policy. An empirical application of this model to the weekly monetary data of the Federal Reserve Board for the late 1970s and early 1980s is presented in Chapter 7, which was co-authored with Gikas Hardouvelis. Chapter 8 offers a model for deriving a measure of inflation expectations from the term structure of interest rates. Chapter 9, which is co-authored with Cara Lown, applies the framework of Chapter 8 to the problem of forecasting the inflation rate changes and concludes that the framework works better than the strategy of looking at the spread between the one-year interest rate and a very short-term interest rate. The term structure's ability to predict interest rates is examined in Chapter 10.

The last section of the book focuses on the determination of

monetary policy in the presence of uncertainty. The essays of this section focus on uncertainty, policy coordination and nominal GDP targetting. Chapter 11 covers theoretical ambiguities under the influence of monetary and fiscal policies, and then analyzes the predictions of the effects for 12 established econometric models of the world economy.

The policymakers have the potential to increase the economic welfare by setting their policy instruments in coordination, as compared to the Nash non-cooperative equilibrium in which policies are set independently. Chapter 12 analyzes the implications of conflicting models for coordination between the U.S. monetary and the U.S. fiscal authorities. In chapter 13, co-authored with Katherine Rockett, the existence of conflicting models for coordination between the U.S. government and foreign governments are examined. Chapter 14 deals with the main obstacles concerning a successful coordination. These obstacles cover mainly the problems related to the lack of compliance, credibility and certainty. The final chapter scrutinizes the nominal Gross Domestic Product target by comparing four possible rules: money, nominal GDP, price level, and the exchange rate.

This book, also incorporating Frankel's studies, will be useful for researchers and the layman wishing to have a broad view of the financial markets and the monetary theory.

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Dornbusch, Rudiger, "Expectations and Exchange Rate Dynamics," *Journal of Political Economy*, 84, pp. 1161-1176.

Fiscal Policies in Economies in Transition, Vito Tanzi (Ed.), IMF Publ., Washington D.C., March 1995, pp. v + 359.

As a result of the severe economic problems which occurred in Central and East European countries experiencing a substantial transition from socialist to market economy, this region has increasingly become poor and unstable. The hypothetical suggestions and applications aiming to solve the available and

expected problems have usually been unsuccessful because the inherent conditions of the countries in question and the nature of the transition period have not been understood adequately. However, in order to create a well-functioning market economy in these countries, it is necessary to identify the circumstances properly, determine the realistic solutions and apply them in a decisive manner. The faulty and misguided policies, incorrect and unstable applications will not only delay the establishment of the market economy but also inflict serious damage to the economic system.

The book, "Fiscal Policies in Economies in Transition," whose editor is Vito Tarzi, is made up of 16 valuable articles, prepared in the light of the experiences about the countries related to the International Monetary Fund. This profound exclusive study, published in the field of financial politics in the economies faced with a transition period and the necessary reforms, has a great importance in the realm of providing the opportunity of informing large masses, specifically the decision-makers about IMF's specific recommendations and technical assistance.

The book, written by 23 authors charged in the Central and East European countries in relation to the financial affairs services responsible for IMF's technical assistance, is arranged in three parts. In the first part, general information is provided about the existing fiscal structure and financial politics of the countries in question; while, in the second part, public income and in the last part, public expenses are detailed out. All articles examine fields such as privatization, tax revenues, public debts, budget deficits, foreign investment incentives and the rehabilitation of the social security system in detail.

While problems such as budget deficits, devaluation of the local currency, crises of social security services, distortion of income distribution were quite rare in planned and controlized economies in the past; today, they become the primary problems. Efforts by some leaders precipitated more complex and complicated problems. As it was seen in some transitional economies, meeting requirements, applications such as giving more privileges to foreign investors than the local investors, installing a narrow-based tax

system deductions complicated by investment incentives and exceptions, increasing the income cuts to meet social security expenses are not the practices which are accepted by the propaganda of free market principles. In these fields, it is more convenient for an economic system leaning towards a market environment, faces to apply uniform, stable and transparent regulations to all investors, including foreign and domestic ones, establish a simple, broad-based tax system providing allocation of resources according to the market regulations, increase the age of retirement while applying rational arrangements in pension funds and make the public social security system operate according to the funding system.

When we consider that, in central economies, a great part of financial institutions and mechanisms, necessary for a market-driven economy to function, do not exist, it gains a special importance and priority to create the above-mentioned environment and mechanisms. In transitional economies, establishing modern tax administrations, capital markets and self-control mechanisms of market economy; generating added value, foreign trade and income taxes, privatization and budgeting techniques appear as the reform subjects that have to be achieved at the first stage. To be able to collect taxes from the private sector, who lack self-imposed willingness to pay taxes to the state, the tax collectors who perceive collection process as a routine wiring from one state economic enterprise to another, have to realize certain conceptual, institutional and administrative reforms. On the other hand, if effective secondary markets should be established, then resource allocation, privatization and investments would be more successful in such countries. Briefly, transformation in countries which are experiencing transition necessitates a redefinition of the roles and functions of the state.

Considering that each economy in the transition phase experiences different sets of problems with different characteristics and dimensions, this work has an objective and an ultimate aim; so it ranks as an important guide for economists, financiers, academicians and market researchers who are interested in the Central and East European countries' unique economic ingredients and financial reforms needed during the swift transformation from planned to a market economy.

Market Shocks, Mark Fadiman, John Wiley & Sons Publ., 1994, pp. xix+ 219.

Owing to the accelerating globalization and rapid technological inventions, the financial services industry has begun to change radically since the early 1970s. The introduction of electronic trading systems, facilitating a faster movement of funds in an unprecedented manner, and the integration of the financial markets, have made the markets more sensitive to each other, as the effects of market-shocks enhanced as response capabilities have been strengthened. As a result of these developments, investment strategies in the financial market industry have begun to assume a fairly complex structure. Mark Fadiman's book, titled "Market Shocks," aims at explaining this complex structure to non-specialists in the financial markets, in an elaborate and easy-to-read manner. The journalist Fadiman's book, to a great extent reflecting the ideas and thoughts of more than 50 experts and managers in the financial markets whom he had interviewed, cannot be considered as a compilation. Each of the six chapters ends with a part summarizing the stances of experts and managers as well as the writer's own reaction, in brief, enabling the reader to understand the primary thesis of the chapter easily.

Chapter 1, titled "Market Shocks," focuses mainly on technology, financial regulations, central banking and international funds. Stressing that the financial crisis or the market shock phenomenon is not a new concept, it has begun to assume a new meaning along with the rapid technological improvements. The crisis of 1987 is mentioned as the first example of this new type of market shocks. Then, the 1992 crisis, that started with the Fed's increasing of interest rates, is examined in brief.

Chapter 2, titled "Regions," contains useful information for investors interested in international funds. Fundamental structures of emerging markets, as well as Europe, the Eastern Europe and Russia, Japan, the Pacific Rim, South America and Africa are elaborated in summary in order to make it possible for the international investors to evaluate the general economic environment and the conditions prevailing in these countries.

Chapter 3, carrying the title of "Big Money," sheds light on the strategies of big fund managers. Not only the importance of international investments in fund management but also the vitality of joining big funds investing internationally to achieve a better diversification are mentioned. Investors should bear in mind that they can diversify by directing their funds to several funds. But this corresponds to a diversification within a single big fund as from an investor's perspective a genuine diversification cannot be achieved by commitment to a sole country that features a steadily expanding market cap (like the U.S.).

Although Fadiman believes that it is possible for individual investors to structure efficiently-diversified portfolios via big international funds, he describes them as "one-dimensional" and "rigid vehicles." That is why chapter four, sifting through funds using new techniques in investment strategies and tactics such as options and futures, is called the "New Money." After evaluating the pros and cons of investing through these new instruments, the differences between the Big Money and New Money and the disadvantages of old type of investment choices in a market shock era are investigated. Big Money funds are being described as funds investing in long-run, poorly leveraged and poorly hedged risks, whereas the New Money is a better-hedged, highly-leveraged investment style. These funds provide better international diversification, but the investors must examine the local regulations as this type of investment is not avaliable in every country.

Chapter 5, slugged "Hot Money," touches on basic information about derivatives, futures and currency markets. In this chapter, in which the futures markets and instruments are examined more specifically, it is mentioned that they have a stronger leverage effect. Another emphasis is that the number of such new vehicles, used in the financial markets, are increasing along with rapid technological innovations, leading to more competitive markets that reduce the fees.

In the last chapter, the ideas about the future of the U.S. and international markets are discussed, with a conclusion that regulations of the U.S. financial markets should be changed and modified. The interviews with the managers and experts show that

the market shocks are not random events, but occur due to wrong policies such as burdensome taxes and interest rate interventions. A Market Shock is the collision of regulation with the advanced technology.

As a conclusion, the book systematically reflects the ideas of the managers and experts, operating in the financial markets, to the non-specialists in this field and will be a source of inspiration and insight not only for the individual investors who want to learn how the markets operate and their structure but also for investors seeking to survive in and profit from today's global revolution.

The Pension Fund Revolution, Peter F. Drucker, Transaction Publishers, U.S., 1996 (originally published in 1976), pp. ix+232.

"The Pension Fund Revolution" by Peter F. Drucker, originally published in 1976, was almost ignored until the 1990s when fundamental developments took place in the pension funds in the U.S. The rapid institutionalization of pension funds and the increasing control of employees in America's large companies encouraged the author to re-emphasize his opinion with a second and revised edition of the book. In this respect, Drucker appended an epilogue to the original edition titled, "The Governance of Corporations," that attempts to discuss the increasing dominance of pension funds in economic history, aiming also to review their current impact.

Peter Drucker, one of the fore-runners of social sciences, ponders particularly on the "people's capitalism" in his book and then concluding that pension funds gain priority in capital mobilization.

In the first chapter of the book, a relationship between the pension funds revolution and the basic tenets of socialism is established. With this respect, the development of pension fund corporations and the related legal environment, from the beginning of the 1950s to 1974, are evaluated. The most subtle and controversial approach in the book is offered with the statement of "...The USA is the first truly socialist country."

Chapter two presents the problems described in the pension fund "socialism" in contrast to its success. In addition to the basic problems related to the economic infra-structure, economic policy and the theory of economics, the drawbacks of restructuring of the institutions of governance and the obsolescence of social security are accentuated. For instance, "financial trouble and the technical insolvency of the social security system," expanded by Feldstein (1975), is also discussed here.

The more the center of demographic gravity shifts, the more the society and its values, as well as its institutions, change. Chapter three discusses the connection between the demographic structure and the development of pension funds in the 1950s and the 1960s. According to the estimation in this section, unless there were another baby boom as happened during the period of 1948-1959 in the U.S., the percentage of people over 60 would increase beyond 2010; and, therefore, the center of demographic gravity would rise. Furthermore, there would be certain changes in the structures of social institutions to respond to the new economic and social requirements of the society. Above all, it is specifically stressed in this chapter that the thinkers of our time, such as writers, politicians and scholars, could have noticed neither the importance of pension funds development nor the aspects of any shift in the center of the demographic gravity even until the 1970s.

In chapter four, political lessons and consequences about the pension fund socialism are stated. While the socialist practice of the Marxist theory, which found a base through pension fund in the U.S. is compared with capitalism, "individualism" and "collectivism" are criticized in terms of the periods, countries and the political issues. Besides, the assumption of "affluence" and "squalor" by Galbraith are evaluated regarding the pension fund socialism.

Chapter five discusses the possible changes in the American society and the politics due to the pension fund revolution. It is the main point brought in debate that a new interest group with the application of the pension funds is formed, signifying that it has a sound and stable power in economy. Although the pension fund

[1] This "Epilogue" is first printed in the Harvard Business Review in March-April 1991.

groups are very instrumental in economic performance, efficiency and financial stability, there is inevitably a conflict of interest with others. Not only does this cause bureaucratic and transfer payments, but it also contributes to the development of the U.S. political economy.

In the epilogue, appended to the first edition, increasing importance of the pension funds during the 1980s and 1990s is reviewed by also offering some related statistics.[1] The pension funds, ignored in the 1960s and the 1970s, gained importance in the first half of the 1980s. So, they have become the most popular financial instruments in the world capital markets.

In summary, the unpredicted revolution in the pension funds in the 1970s has now become a stark reality. The re-issuance of this classic would be useful for sociologists, economists and scholars focusing on political history.

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