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Dear Reader,

ISE Review No: 5, a special issue, which is dedicated to derivatives and mainly composed of papers presented in the "Workshop on Financial Derivatives" held between September 18-19, 1997 at the ISE. This special issue aims at providing a theoretical base for derivatives as well as offering not only quotes from the experiences of countries with newly structured derivatives markets but also general information and developments related to the theoretical and technical works implemented by the "ISE Derivatives Markets Department" for the construction of the first national derivatives market on financial instruments since May 1994.

Managing Editor

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The Impact of Financial Innovation and Risk Management on Economic Performance

Vedat AKGİRAY*

Abstract

The last 25 years have witnessed extensive financial innovation and this has led to revolutionary changes in the international financial system. It is true that financial innovation has been going on since the 17th century and most of the products developed during the last two decades, although mentioned as new, are only versions of much older products. When the history of financial innovation is studied, it is seen that the seemingly new instruments, such as options and futures, are not entirely new. For example, organized futures exchanges were established in Chicago, Frankfurt and London in the 19th century. Options and futures-like contracts in Amsterdam and forward contracts in rice in Japan were traded in the 17th century. However, the proliferation of organized markets in derivative securities around the world during the last two decades is unparalleled in history. Miller (1992) describes the 1970-1990 period as unique in history, in that "no 20-year in financial history has witnessed an even remotely comparable burst of innovative activity." The development of such standardized markets has subsequently led to the design and implementation of a wide range of new financial products, some for everyone to use and some custom-made to meet the specific needs of investors and corporations. To take a very small sample out of the range of products developed in this period, it is sufficient only to mention financial futures, options and option-like products, swaps, exchangeable bonds, junk bonds, asset-based securitized investments and hybrids of these and others.

Introduction

No innovation in any area of social life can happen in a vacuum by itself. It is possible to establish strong links between the rapid pace of financial

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innovation during the last two decades and the developments in technology during the same time period. Unprecedented advances in computing technology, telecommunications and financial theory have certainly helped the pace of financial innovation. It is true that, without these technological advances, much of the new financial products could not have found much practical use, or they certainly could not nearly have the economic impact that they now have. As a result, financial markets, previously segmented both spatially and intertemporally, have become almost fully integrated, with the round-the-clock-trading, over New York - London - Tokyo, being a well-known case in point. Today, an investor in Istanbul can trade in almost any financial instrument in any market of the world at any time of the day. All of these changes have resulted in a huge explosion of trading activity and volume in all of the financial markets. It is yet to be seen how the Internet will eventually shape the functional and institutional aspects of the international financial system.

To make intelligent guesses about the future of financial innovation, it is necessary to identify the reasons for these developments and also to estimate the impact of financial innovation on economic and social performance. This question is relevant for all parties involved: issuers, intermediaries, investors and regulators. There are some who view the history of financial innovation as a process of experimentation and learning. Consequently, at least for some new financial products, failure for at least one of the parties involved is more likely than success. If this view is adopted, a broad "functional" analysis (as opposed to a static institutional analysis) of financial innovation is called for, to learn better from the experiments. Institutional structures and products change in time but the social and economic functions served by the financial system and its products do not.

The paper proceeds as follows. In the next section, the motives for financial innovation and its relation with changes in the institutional infrastructure are discussed. In the third section, the impact of innovation on the micro- and macro-economy are identified. This is done largely in the form of a literature survey. The social value of innovation is also discussed. The final section presents some "largely imaginary" predictions of the future of innovation.

The Evolution of New Financial Products

A financial system consists of security markets and a payments system through which all contractual financial transactions clear. Using a textbook approach, the basic function of the financial system may be defined as the allocation and use of economic resources (both geographically and across time) in order to improve the performance of the real economy under conditions of uncertainty. An efficient allocation and deployment of resources would seem to depend on the functional efficiency of the financial system, which in turn depends on:

* An efficient payments system for the exchange of goods and services, which includes electronic funds transfer, checking accounts, credit cards, cash cards, draft accounts offered by not only banks but also mutual funds and even non-financial institutions,

* Efficient pooling of small savings to finance large indivisible investments and moving of these pooled funds spatially and across time, which is done through security markets and financial intermediaries,

* Efficient allocation of risk-bearing vehicles between investors and issuers of securities by providing tools to manage and control risk,

* Efficient dissemination of price information to all sectors of the economy and, as a by-product, provision of a mechanism to help solve the problem of informational asymmetries.

The institutional structure and products may change over time but the above functions of the financial system do not. Therefore, it is more appropriate to study the impact of financial innovation from a functional viewpoint. Consequently, the motives for financial innovation may be discovered more easily and its impact on economic performance may be assessed more accurately within this functional framework. As a simplified rule, a new product is more likely to add economic value if it facilitates the performance of one or more of the core functions of the financial system. Similarly, the motive behind the development of a new product may be researched in regard to its effect on the functioning of the system.

Motives for Developing New Products

A commonly held view (for example, Miller (1986) and Finnerty (1988)) is that the primary motivation behind financial innovation is cost reduction or "regulatory arbitrage." Attempts to reduce the costs

associated with changes in regulation and taxes and also the high costs of designing custom-made portfolios with standard equity and debt instruments lead to the development of new instruments. However, a new product designed for the sole purpose of regulatory arbitrage (such as tax avoidance) can at best result in a zero-sum game of resource transfer and hence it cannot have a positive social value. Therefore, pure regulatory arbitrage cannot fully account for the process of financial innovation in the long-run and cannot explain the developments over the past quarter century. (It is still plausible that new products may be designed solely for the purpose of circumventing regulation but such products are bound to phase out in a short time.)

Silber (1983) characterizes financial innovation as attempts to lessen the financial constraints they face. These constraints may be imposed not only by regulation but also by market conditions such as high price volatility and by the firm itself. Silber's explanation seems to be only partial in that it focuses only on the issuer's side and ignores the investor side. Van Horne (1985) takes a more functional approach to explain the motives for financial innovation and points out that, for a new product to be truly innovative, it must lead to increased efficiency of the financial system or make the markets "more complete." This results in the differentiation between non-trivial innovations that persist and trivial innovations that are merely excesses for the system.

Financial innovation is more likely to persist and continue if it improves the efficiency of the financial system in one or more of its functions. For example, ATM's have certainly improved the payments system in several aspects and they represent one of the major new financial products of the period. Similarly, futures and options have made risk management, one of the major functions of the financial system, much easier and more efficient and they have directly improved the system. All of these products are still around and their use is ever expanding.

Merton (1992), largely in line with Van Horne's approach, very succinctly explains the conditions for financial innovation to improve economic performance as:

1. It must meet demands for "completing the markets." This may be in the form of new opportunities (products, institutions) for risk management or a new or better mechanism for the transfer of resources

spatially or across time,

2. It must lower transaction costs or increase liquidity,

3. It must lower "agency costs" by either removing or lessening informational asymmetries or, more generally, by resolving principal-agent conflicts.

Of course, financial innovation is itself a costly activity. These costs include: (a) Costs of identifying and educating issuers and investors; (b) Costs of financial engineering; and (c) Costs of accompanying or follow-up regulatory changes. Theoretically, the improvement in economic performance, net of these costs, has to be positive for the innovation to persist in the long-run. The above three conditions are to be viewed as the real motivating forces behind financial innovation. If existing institutions and markets cannot meet the demands of traders, new products are to be developed and, if they meet the above conditions, they are likely to cherish for as long as they are needed.

To illustrate, consider the case of exchange-traded futures contracts on stock indexes, which are soon to be available in the Istanbul Stock Exchange. As noted before, one of the core functions of the financial system is to provide efficient tools for risk management, and the primary uses of futures in the financial system are in this function. There are three methods of managing risk: (1) Diversification; (2) Hedging; and (3) Insurance. Futures contracts are efficient and low-cost tools of hedging and diversification (options would be needed for insurance). Consider the case of managing a large portfolio of common stocks. Without futures contracts, to obtain a certain risk-return combination and dynamically change this combination over time, the fund manager has to make a very large number of small-sized transactions in individual securities. This spot market activity is both costly and often not fully implementable in practice. However, using futures contracts, any risk-return profile can be established at much lower start-up and adjustment costs. Clearly, as a financial innovation, index futures satisfy all of the three conditions to improve economic performance.

To continue the example, consider an internationally diversified portfolio, which is planned to be expanded to include a new emerging equity market for the purpose of better risk-return performance. Many international funds shy away from smaller markets because of either regulatory barriers such as capital controls and high transaction costs or

because of low liquidity in these markets. To handle the liquidity and cost problems, index futures are clearly superior alternatives to spot transactions. In this regard, the availability of futures contracts in an emerging market will help the globalization process to a great extent, which is by itself a tremendous economic value.

Finally, as an empirical support for the ideas in this section, the changing stochastic structure of financial prices during the last quarter century have also contributed to new product innovation. The volatility of interest rates, exchange rates and commodity prices have dramatically increased after the early 1970's (see Rawls and Smithson (1989) for a satisfactory documentation) and this has given rise to new sources and levels of risk. Since the increased volatility has been worldwide, standard risk management tools such as diversification were bound to be insufficient and costly. Hence, the need for new products and a wide range of derivative securities to follow.

Financial Innovation and Institutional Structure

As a result of financial innovation, the basic functions of the financial system do not change but the way these functions are performed change. In other words, markets, institutions and products change but the social and economic functions they serve remain the same. Studying the pattern of change over the last quarter century, a clear innovative process is observed, characterized by "commodization" and "securitization."

Commodization refers to the process of special custom-designed products developed by financial intermediaries eventually becoming market-traded securities ("commodities"). To give some examples, the development of markets for junk bonds in the US markets makes it possible for small "unseasoned" corporations, who previously had to depend solely on bank credit, to obtain debt funds directly from investors. Similarly, liquid money market instruments, such as commercial paper-have become substitutes for commercial bank deposit accounts. (As a more basic example for emerging economies, the development of stock markets allows corporations to obtain equity financing directly from the market in place of bank credit.)

Securitization refers to the packaging of a financial intermediary's non-traded assets (short-term receivables, leases, etc.) in the form of a

security and selling the security in the market. This process effectively reduces the size of the intermediary's assets and transfers them to the financial markets. Asset securitization is a widespread activity.

As a result of commodization and securitization, markets gradually replace intermediaries and a new institutional structure emerges. Ross (1989) describes this change as institutions becoming more "transparent." If a spectrum of institutions is visualized along Ross's classification, the following summary may be obtained:

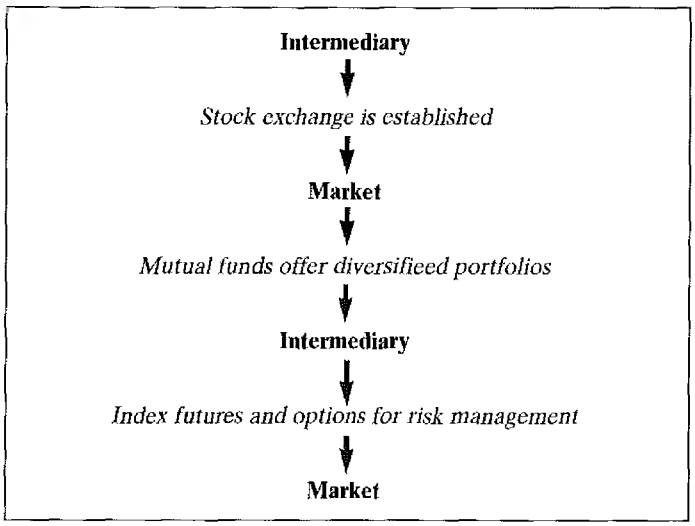
Less Transparent						*More Transparent*
←						→
Banks	**Insurance Companies**	Mutual Funds	**Investment Trusts**	Derivative Markets	**Stock Markets**	Government Bonds

Less transparent intermediaries, such as commercial banks, may seem to be declining in importance and more transparent institutions, such as organized exchanges, are moving forward. In this regard, intermediaries and markets are competitors in producing new financial products, to gain customers. In the above pattern (see also Finnerty (1992)), products initially designed by intermediaries, eventually become market-traded securities. However, this cannot be the end of the story because, if the process continues, financial intermediaries will ultimately disappear! This will also mark the end of financial innovation! Clearly, this cannot be.

Financial intermediaries are equipped with the necessary technology and expertise to design new custom-made products and can afford to produce specialized low-volume high-margin products. As such, intermediaries are almost always the design engineers of financial innovation. As products become easily understandable, standardized in terms and of interest to a large number of investors, they move from intermediaries to markets, where they reach high volume and low transaction costs. At this stage, intermediaries may lose some customers. But then, intermediaries can use these low-cost market-traded products to combine them into more complex products to serve the ever-changing needs of customers and to gain some new customers.

This whole process of chain relationship is best illustrated by the story of an emerging market. Suppose the function of the financial system to be considered here is the provision of portfolio diversification to investors and management of their risks. The story starts with only

commercial banks and stock brokers. Investors buy and sell equity shares through banks and brokers at relatively high transaction costs. At this stage, the institutions providing the function of diversification are the financial intermediaries. Then, a stock exchange is established where shares are now traded in the exchange at much lower transaction costs and higher operational efficiency. Now the institutional server of the function is the market. Then, mutual funds come about, offering a variety of means of indirect diversification for the investor. Now, diversification is both easy and at low cost. Liquidity is also increased as fund shares become tradable. The function provider is again financial intermediaries (mutual funds). Finally, index futures and options are introduced and traded in the exchange. Now, it is possible to obtain almost any risk-return profile and degree of diversification with appropriate spot and futures positions. The institution providing the function is now the market. And, the story will go on, probably with financial intermediaries offering new products leading to improved performance of the function and so on. This cyclical pattern of changing institutional structure to provide a specific financial function is illustrated in the following diagram:



In this cyclical process of financial innovation, intermediaries and markets are clearly more complementary than competitive. Of course, not all the products developed by the intermediaries and subsequently

migrated to the financial markets become successful in the market. For example, it is well known that more than half of the new futures products fail in the market. This is probably a validation of the claim that only non-trivial innovations (that complete the markets or improve economic performance through other means) can survive in the long-run. The failures are then to be classified as (trivial) excess products with no real economic value.

The Impact of New Financial Products

Having described the process of financial innovation over the last quarter century, it is now appropriate to study the resulting impact of new products on economic performance. Is the financial world "better" now after all these developments? A theoretical answer has already been offered. If a new financial product helps complete the markets, then it is non-trivial and necessarily improves economic performance. A new product is non-trivial if its payoff structure cannot be identically generated by some combination of existing products. Are derivative securities, for example, non-trivial? As expected, the answer is yes and it is elaborated at different levels below. (Almost all of the studies mentioned in this section are on the US data and span sections of the period from 1970 to 1990.)

The Impact on Individual Firms

In several books on financial engineering and, in particular, on risk management via derivative securities (for example, Smith and Smithson (1990) is a useful reference book in the subject), it is stated that risk management can increase the value of a firm in three ways:

1. If the tax function is convex, risk management can add value by decreasing taxes. This is possible because the volatility of taxable income will be decreased by risk management, leading to a reduction in future tax bills (holding the expected level of revenues constant).

2. If there is a positive probability of financial distress when risks are not managed, then risk management will reduce this probability and hence decrease the expected value of costs associated with distress. This, in turn, will increase the firm's current value. The increase in value is positively related to the probability of distress and the level of distress costs.

3. If the firm's ownership structure encourages conflicts between

shareholders and creditors, risk management can increase the firm's value by avoiding wrong investment decisions. When equity is viewed as a call option on the value of the firm, it is not difficult to imagine situations where equity holders will choose not to invest in certain projects with positive net present values and this will be done at the expense of the creditors. Proper risk management can prevent the firm from such situations and thus improve the investment decision process.

Several researchers have found empirical evidence supporting the above theoretical arguments. In particular, Nance et al (1993) provide strong empirical support that risk management does indeed add to firm value. Their sample consists of 169 firms of the Fortune 500, actively using derivative securities to manage financial price risk. Thus, it seems that, by hedging, these firms can provide for their shareholders better risk-return profiles than they can on their own via diversification only. Indeed, Damodaran and Subrahmanyam (1992) report evidence that, after the introduction of derivatives, the CAPM betas of the involved firms have declined. This means that these firms have become less risky even in a fully diversified investor's portfolio. Nevertheless, before definitive conclusions may be drawn, more empirical evidence from further studies is required.

The Impact on Markets

In contrast to the scarcity of studies on the impact of risk management on firm value, there is abundant evidence on the impact of new financial products on the market microstructure. In particular, there are numerous empirical studies on the impact of financial derivatives on market volatility, the speed prices adjust to new information, trading volume and bid-ask spreads.

Discussions of the impact of derivatives on price volatility have been particularly sounded. People with a regulatory background tend to claim that the introduction of derivative securities has increased the volatility of the prices of the underlying assets. After the October 1987 crash of world stock markets, this view was very widely voiced by almost all governmental agencies in the United States. However, numerous studies have very clearly shown that just the opposite is true. Indeed, derivative markets have led to increased stability in the equity and bond markets.

It would take pages to list all of the empirical studies on derivatives and market microstructure. Instead, the following summary table is

presented and interested readers are referred to Damodaran and Subrahmanyam (1992) for further details:

Aspects of the Underlying Asset	Options on Com. Stocks	Futures on Stock Indexes	Futures on Bonds	Futures on Commodities
Volatility of price	**decrease**	**decrease**	**decrease**	**decrease**
Speed of adjust.	**increase**			
Bid-ask spread	**decrease**			
Trading volume	?	?		

These findings are to be interpreted as improvements in market microstructure.

The Impact on the Economy

Invalidating all concerns raised in the early years of derivative security markets, the empirical evidence summarized above shows that the presence of derivative products has had a positive impact on investors, corporations and markets. This is only natural because derivative markets provide investors with effective tools to manage and control risk through hedging, efficient diversification and investment insurance. The evidence shows that derivative markets have improved economic performance by bettering one or more of the functions of the financial system outlined earlier in the paper.

In the derivatives market, the seller's loss is the buyer's profit, or vice versa. However, it is not really a zero-sum game because efficient risk-sharing can reduce the aggregate risk faced by all investors, resulting in positive value-added for the whole economy. For example, hedging is actually the selling of part or all of the price risk faced by the hedger. The buyer of the risk is either a diversified portfolio that can further benefit from this additional component or another market participant whose payoff is oppositely affected by the same source of risk. In any case, everyone gains. It is a well-documented fact in the United States that the new products of interest rate risk management (futures, options, swaps, and securitized assets) of the last quarter century have enabled local financial intermediaries, such as banks and thrifts, to reduce the credit and mortgage rates. This has been possible through transferring their interest rate risk to national and recently to

international markets as well. In addition to the obvious benefits of lower interest costs, increased efficiency of risk-sharing also lessens the fragility of the financial system as a whole.

Derivative markets not only improve the risk management function but also increase liquidity and lower the costs of risk management. The remarkable and continued growth of derivative markets is itself an adequate testimony to their positive impact on economic performance. It is against basic economic logic for a "trivial" non-contributing market to continue growth and expansion.

The Future of Financial Innovation

The last quarter century has witnessed the fastest process of financial innovation in history but it will probably not be recorded as such after another decade passes. Innovative activity is very likely to continue at a faster pace in the future. There are some very good reasons for this expectation:

* The experience of the period has shown that, while the functions of the financial system stay the same, the institutional infrastructure changes. Rigid institutions focusing on inflexible products and services that cannot adapt to innovation cannot compete and eventually drop out of the game. Innovative capability, organizational flexibility and global mobility are the new prerequisites. Only those that can innovate will win. More and more institutions are now well aware of this fact.

* Computing technology, in general, and trading technology, in particular, is advancing at a rate to support and encourage faster and more profound financial innovation,

* Technology is accessible globally and this promotes international competition more now than ever before. Geographical and time constraints are no longer effective,

* Advances in financial theory and application is very much keeping up and even collaborating with computing technology.

Increased global competition and advancing trading technology will necessarily speed up innovation, which, in turn, will increase both the level and also the frequency of changes in the institutional structures. As institutions compete to develop new products to attract customers, trading volume in all sectors of the system will grow. The intermediaries will develop and issue more and more "package" and custom-designed

products. In response, individual investors will prefer to deal with package products because it will be easier to find a package that fits a given investor's preference function. As a result, the trading volume and liquidity of package securities (mutual funds, index securities etc.) will increase and those of stock and bond markets will probably stay behind.

Everything said above for financial institutions also applies to governmental and regulatory institutions. The inevitable continuing change in the institutional structure of the financial system and rapid globalization constitute major challenges for regulation now and in the future. Financial innovation and structural change may not always proceed at the same rate and it is plausible that there will sometimes be imbalances between the two, threatening the safety of the financial system. This gives rise to the necessity of regulation to protect the system.

Traditionally, regulation takes, as given, the existing institutional structure and aims at ensuring its safety and integrity. This approach, however, may turn out to be a barrier to innovation because the economic benefits of financial innovation are realized only when the implied new institutional structure is easily attainable. Consequently, a better approach to financial regulation will be function-oriented rather than institution-oriented, very much in accordance with the general theme of this paper. How this can be done without jeopardizing any existing structure is a challenging problem for regulation and policy-makers. But a functional perspective to regulation will be definitely needed in the future. New job opportunities for financial engineers? Maybe!

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A Note on the Relationship Between the Spot and Futures Markets for Common Stock

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Abstract

The concern over how trading in futures contracts affects the spot market for the underlying assets has been an interesting subject for investors, market-makers, academicians and regulators alike. With the introduction of futures contracts in the financial markets, the desirability of such derivative instruments for the efficient functioning of those markets was questioned. Existence of futures contracts in any market is expected to provide the investors in spot (cash) markets with the means of hedging risk. In addition, the futures markets should be the vehicle for price discovery in the spot market for the underlying assets. Yet, over years, especially with the experience in the financial derivative instruments, there seems to be some concern for the undesirable impact of these markets on spot markets. The critics argue that introduction of futures contracts in the financial markets has increased the volatility in spot markets and attracted more speculators than hedgers so as to destabilise cash markets in some instances. The impact on liquidity, according to the critics, may not be favorable either. The stock market crash of October 1987 intensified the criticisms, as the rapid and persistent decline in prices, in a very short time period, were, at least partially, blamed on program trading strategies such as portfolio insurance and index arbitrage. These strategies are well known for their dependence on derivative instruments like stock index futures and options.

The objective of this Note is to review the literature on the impact of stock index futures on stock markets. Specifically, the evidence for change in overall volatility and liquidity after the introduction of stock index futures is reviewed. In addition, theoretical pricing of index futures and arbitrage opportunities, as well as the lead-lag relationship between spot and futures markets, are addressed.

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Stock Index Futures and Stock Market Volatility

The immediate evidence for increased volatility in cash markets is the large swings in stock prices on expiration days of the futures contracts. If investors in futures contracts simultaneously hold positions in the underlying stocks, they would liquidate their stock holdings on expiration days. Occasionally, there may be imbalances in the types of orders issued by those investors. For example, sell orders may outweigh buy orders due to larger long positions compared to the short positions. In this case, market makers cannot fulfil the imbalance and prices decline sharply to clear the market. Such price fluctuations are known as the "expiration date volatility." Edwards (1988) finds out that standard deviation of the changes in the index values towards the end of the expiration days are two to three times larger than the non-expiration days. However, the expiration day volatility is a short-term phenomenon, and should not concern the stock market investor. What really makes a difference is whether or not the stock index futures cause higher volatility in the long-run, a subject that is taken up now.

With low margins and transaction costs, it is no secret that futures markets are speculators' paradise. As margin requirements can be fulfilled with interest-earning bonds, the cost of investing in futures is indeed very low. Very high leverage associated with futures investing is the main reason behind attracting the speculators. The emphasis, placed on the role played by speculators, implicitly assumes that it is the speculator who introduces volatility, hence destabilising the spot market. The logical result of this inference is that high volatility is essentially bad and undesirable. The primary source of concern due to high volatility is the possibility that normal investors, individual and institutional, will shy away from the stock market trying to escape from excess volatility. However, this line of logic misses the important link between volatility and the flow of information. As the principal function of a market is to find the correct price for the asset by reflecting all the relevant information, any change in the information set should be captured by changing the prices. Ross (1989) demonstrates that, under conditions of no arbitrage, variance of price change must be equal to the variance of information flow. Hence increased volatility, if there is any, can be the natural consequence of the reflection of expanding information set on prices. If the existence of futures on the stock index results in better and

improved use of new information about fundamentals, the overall volatility in the spot market is expected to increase. Whether trading of stock index futures has actually led to an increase in volatility is an empirical question and will be reviewed below.

In order to empirically measure the impact of futures trading on the volatility of the spot market, volatilities before and after the introduction of the derivative instruments must be compared. As there might be other factors responsible for changes in observed volatility, one has to take these factors, with potential to influence volatility, into account. In most empirical investigations surrounding this issue, the following model is estimated:

$$VS_t = \beta_0 + \beta_1 VM_t + \beta_2 D_t + e_t$$

where VS_t is a measure of volatility in the spot market in period t; VM_t is a proxy measure of market-wide volatility in period t; D_t is a dummy variable which takes a value of 1 if t is a post-futures time period, 0 for pre-futures; β_0, β_1 and β_2 are regression parameters and e_t is the error term. The parameters of the above equation are estimated and if β_2, coefficient of the dummy variable, turns out to be significantly different from zero, it is taken as an evidence for different volatilities in the two sub-periods, before and after the futures. For the case of stock index futures, VS_t is the volatility measure for the index on which futures contracts are defined and VM_t is the volatility of another stock market indicator that does not include the component securities in the original index.

The results of empirical tests are mixed. While some studies, like Edwards (1988) find no change in volatility, others such as Harris (1989) observe increased volatility after the introduction of the index futures. However, the increase in volatility is a common phenomenon in different markets and index futures, by themselves, may not bear the sole responsibility. Harris (1989) points out to other index-related instruments and developments such as growth in the index funds and the increase in foreign ownership of equity as possible explanations of higher volatility in the stock markets. Antoniou and Holmes (1995) examined the relationship between information and volatility in the FTSE-100 index in the UK, using the GARCH technique. Although they find that introduction of the FTSE-100 index futures has changed

volatility in the spot market, they attribute this to a better and faster dissemination of information flow due to trading in the stock index futures.

Stock Index Futures and Liquidity in the Stock Market

Liquidity of the market for securities is critical for their efficient functioning. It has been shown that the presence of futures trading can affect liquidity in several ways. In the literature, the bid-ask spread has been used as a proxy for liquidity: lower the spread, the higher is the liquidity in that market. The spread itself arises from three major sources: adverse selection due to trading with informed investors, fixed costs associated with market making and risk premium for bearing the inventory risk (Jegadeesh and Subrahmanyam, 1993). Existence of futures contracts on stock market indices is hypothesized to increase adverse selection by diverting uninformed traders from the cash market to the futures market. Uninformed traders have better access to information in futures market instruments, i.e. stock index futures, compared to information on individual stocks in the spot market. Their diversion to the futures market increases the proportion of informed traders in the cash market, and reduces the total number of traders, at the same time. Increased adverse selection and higher per trade fixed costs force market makers to enlarge the spreads. The opposite impact on the spread comes from reduced inventory risk of market makers. Futures contracts enable market makers with an opportunity to hedge risk for their securities inventory. Lower inventory risk then translates into lower spreads in the spot market.

Jegadeesh and Subrahmanyam (1993) compare the spread in the NYSE before and after the introduction of futures on the S&P 500 index. They find that average spread has increased subsequent to the futures. When they repeat their test by controlling for factors like the price, return variance and the volume of trade, they still find higher spreads during the post-futures period. However, although statistically significant, higher spreads lack economic significance. When spreads between the S&P 500 and other stocks are compared, the former had slightly higher spreads in the post-futures period, but the difference between the index and non-index stocks were not statistically significant. Overall results of Jegadeesh and Subrahmanyam (1993) suggest that introduction of index

futures did not reduce spreads in the spot market, and there is weak evidence that spreads might have increased in the post futures period.

The Relationship between Spot and Futures Markets

The argument that futures contracts may eventually destabilize the spot markets, by attracting speculators who would gamble in futures without paying any attention to the spot market and its fundamentals, has a serious shortcoming. The futures and spot markets are indeed related and any futures pricing that ignores this relationship will result in significant arbitrage opportunities. Hence, arbitrageurs will prevent the two markets from drifting apart. The relationship between the spot and futures markets is usually analyzed in one of the two approaches. The first approach investigates the difference between the actual futures price and the theoretically correct price. Alternatively, the lead-lag relationship between the spot and futures markets can be examined.

The theoretical price of a futures contract, F^*_t, is the spot value of the asset, *St*, carried at the risk free rate, *r*, minus the dividend foregone, d, on the underlying asset:

$$F^*_t = St\ (1 + r - d)$$

As the dividend rate is usually smaller than the risk free rate, futures price is above the current spot price. In other words, the difference between futures price and current spot price, known as the basis, is positive. The actual value of the futures contract, F_t, can only differ from the theoretical value, F^*_t, by transaction cost. Otherwise there will be arbitrage opportunities. For example, if the actual price is greater than the theoretical value plus transactions costs, it means the futures contract is overvalued. In this case, an arbitrageur can simultaneously take a long position in the underlying asset and sell futures at the same time. It can be shown that, by doing so, the investor can earn risk-free profits with zero investment. A similar arbitrage opportunity exists when the futures contract is undervalued. Hence, the futures price cannot go beyond an upper and lower bound around the theoretical value.

Both index futures and the market index represent valuation of a basket of stocks and they are related through the theoretical relationship outlined above. Therefore, changes in the value of the futures contract

and the index must be perfectly correlated in a world of perfect markets. However, various frictions impede perfect contemporaneous correlation, as the futures markets usually lead the cash markets. One obvious reason for this lead-lag relationship between the two markets is the so- called nonsynchronous trading in the stock market. Not all of the component stocks of an index is traded at the end of every trading interval, so the measured index does not necessarily represent the most recent value of all component stocks. Moreover, when information arrives at the market, it is easier for a trader to take a position in the futures market rather than dealing with individual stocks due to lower transaction costs, better liquidity and the lower margin requirements in the former.

Apart from the nonsynchronous trading, other frictions may also induce a lead-lag relationship. For example, restrictions on short sales in the cash market is a major obstacle for traders in reacting to adverse news in the cash market, slowing down the adjustment to new information. Intensity of trading activity is also an important factor in the lead-lag relationship. Less frequent trading results in lags in adjusting to new information.

Empirical evidence on the lead-lag relationship between the futures market and the spot market supports the view that the futures markets lead cash markets due to market imperfections. Kawaller, Koch and Koch (1987) find that the S&P 500 futures returns lead the S&P 500 index returns by 20 to40 minutes, during the day in the 1984-85 period and the relationship is stable throughout the period. In a more recent study, Chan (1992) confirms earlier findings that the futures markets lead the cash market. By working with MMI, an index composed of 20 very active stocks, Chan (1992) tries to see if it is nonsynchronous trading that is responsible for the futures' lead over the spot market. By disclosing a similar lead-lag relationship, he concludes that trading frequency cannot account for the observed lead. Rather, it is the speed of price adjustment to information in the futures markets that makes investors to trade in futures first as they receive new market-wide information. Lower costs of trading in the futures market determine the choice of the investor.

Concluding Remarks

Introduction of futures contracts had an impact on the spot market for

common stock. The interaction between the two markets is clearly quite complex so as to make simple statements nearly impossible. The spot and futures markets are linked and they move, more or less, together within reasonable bounds. Arbitrage opportunities are very few and, when they are present, arbitrageurs eliminate them instantly. However, there were occasions when the link between the two markets were broken, such as during the crash in October 1987 (see Harris, 1989; and Antoniou and Garret, 1993). Even during that period, the adverse effect of futures trading is not clearly established.

One potential risk in introducing futures contracts in an emerging market, like the Istanbul Stock Exchange (ISE), is the possibility of speculative attacks on some stocks in the underlying index. As it has been documented for the ISE (e.g. Tezcanlı, 1996) such moves by speculators are a source of serious concern, especially in thinly traded stocks. However , setting up a new index based on stocks with high capitalisation and trading volume would clearly reduce such potential risks for futures contracts written on that index. Recently created ISE-30 Index , with its features, may indeed limit speculators' ability to exploit the derivative instrument.

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When to Start Financial Derivatives Trading? The Example of the Istanbul Stock Exchange

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Abstract

A fundamental step in the development of financial markets is the introduction of derivative products, which are structured to facilitate hedging. By integrating the expectations on the future prices of securities into the market transactions, the resultant liquidity increases the trust-worthiness of the exchange for the individual traders.

Emerging rapidly since the 1970's, the subject of derivatives markets has been attracting much debate both in the markets that currently host derivatives trading and financial centers that are on the verge of launching such market segments.

In this paper, the choice of financial instruments and the timing for the initiation of derivatives trading in the securities markets are briefly assessed and the compatibility of a derivatives market to the ISE's spot market is evaluated in terms of volatility, the representative aspect of the systematic risk as well as the market depth within Ederington's (1979) portfolio approach. In conclusion, futures and/or options, based on stock indices, are deemed as necessary for hedging purposes in the capital markets. However, since the basic risk factor is a result of interest rate volatility, it should be adequately discussed if there should be a priority for derivative instruments based on interest rates.

1. From Spot to Derivatives Markets

Products in the financial markets can be classified in several ways because of the different economic scales and diverse requirements. The

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main points in the classification approach are provided below, based on considerations on how the product is structured and how the market is organized:

Table 1: A Grouping of the Financial Products

Financial Products by Structure			
A. Non-Derived	B. Derived		
	1. Main	2. Hybrid	3. Composite
Equity shares	Forwards	Varrants	Value sharing certificates
Bonds	Futures	Swaps	Pre-emptive rights coupons
	Options (plain vanilla-flexible)		Depository receipts
Financial Products by Organizational Structure of Markets			
A. Over-the-Counter		B. Organized	
Spot	Derivatives	Spot	Derivatives
Equity shares	Forwards	Equity shares	Futures
Bonds	Swap	Bonds	Options (plain vanilla-flexible)
Value sharing certificates	Options varrants	Value sharing certificates	Warrants
	Other	Depository receipts	
		Pre-emtive rights coupons	

When derivatives are formed, prices are explained by the systematic risk and the maturity, compared to the systematic and unsystematic risk factors for financial instruments in spot markets, within the boundary of the capital market theory.[1] When such explanations are taken into consideration; the fundamental factors for a derivatives market, by definition, will be; the market, transaction hours, size of the agreement, months of the transaction, price margin and prices of the first and last days of transaction.

Derivatives markets, as a supporter and an inducer instead of an

[1] Risks can be grouped into four broad categories: market risk (delta risk), credit risk, liquidity risk, and operational and legal risk [Sinkey 1998]. With respect to capital market theory, as the market risk representation and the maturity are taken into consideration, these two measurable risks are perceived to include other risks.

alternative to spot markets, are definitely formed on the basis of some economic indications and/or their derived values in relation to their existing market products. Having just synthesis characteristics, however, again differing from the derived products (warrants and so on) of the spot market, derivatives and options agreements transform uncertainty about future expectations into a definable manner and present a maturity-dependent protective environment by hedging. Given the price of futures contract F and the spot price of the underlying asset S, the expected return or required rate of return of the hedged portfolio can be defined as follows:[2]

$$E(R) = k_S E(S_t - S_{t-1}) + k_f E(F_t - F_{t-1}) - C(k_f) \quad (1)$$

Unlike the classic model and Working's (1962) model of hedging with derivatives, the model proposed by Ederington (1979) has made the effectiveness of the risk reduction measurable.[3] In measuring the portfolio performance, Ederington's model is based on the measurement of hedging effectiveness, not only taking merely returns as the measure. The rate of hedging is basically defined in terms of the decrease in the variance when a futures agreement is added to the portfolio. Therefore, when a derivative is added to the portfolio, the performance *(e)*, as the measurement of hedging effectiveness, is as follows:[4]

$$e = \frac{\sigma_{sf}^2}{\sigma_S^2 \sigma_f^2} = r^2 \quad (2)$$

[2] Hedging ratio, related to portfolios including both spot market instruments and futures contracts, can be derived from the regression below:
$S_t - S_{t-1} = a + b(F_t - F_{t-1}) + u_t$
With respect to the determination of the formulations in portfolio risk management with futures contracts, see Ederington (1979) and Chou, Dennis & Lee (1996).

[3] See Lien (1990) for a criticism of a single product hedging model of Ederington (1979).

[4] As Sinkey (1998) defines interrogatory with 'IS MORC ILL?' capturing the risks that the Group of Thirty (1993) considers, the first letter in the mnemonic 'I' denotes covariance risk, that is, the correlation coefficient that also confirms with the Ederington (1979). This model, however, does not concern with the systemic risk..

where $\sigma_S^2, \sigma_f^2, \sigma_{Sf}^2$ represent the subjective variances and the covariance of the price changes during the period. According to Ederington's model, the performance of launching a futures market can be estimated by using the sample coefficient of determination. To apply the model (2), the variances for an unhedged portfolio, as well as a portfolio containing both spot and futures, and their covariance should be measured. Shortly, from spot to the futures markets, it is possible to explain volatility reduction theoretically and empirically.[5]

Forward and futures markets provide risk neutralization by transferring partly certain expected futures risk at the spot market to opposite positions and to speculators.[6] For example, while the farmer is taking price risk in the spot market of commodity trade, he can transfer that risk to the opposite positions and/or to the speculators via forwards or futures markets. As a matter of fact, he protects himself from volatility and passes it to the futures markets' investors. Moreover, those who deal in a commodity are willing to be involved in forwards or futures trading so as to enjoy guarantee of making or taking delivery and to increase their competitiveness in trade.

2. First Derivatives Products in Developed and Developing Markets

Trading in derivative products has a long history. The first recorded accounts of derivative contracts can be traced back to philosopher Thales of Miletus, who, during winter, negotiated what is similar to the contemporary call options on oil presses for the spring olive harvest. On the other hand, De la Vega reported in 1688 that options and futures, which were known as "time bargains," were trading on the Amsterdam Bourse soon after it was opened. Evidences also suggest that futures contracts for rice were traded in Japan in the 17th and 18th centuries, as "Rice Tickets" in the Yadoya Rice Market in Osaka and also in the Dojima Rice Market .[7]

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[5] Although here the variance is thought of as constant through time, Akgiray (1989) and Chu&Freund (1996), showing that the variance changes by the time, argue that the GARCH approach is more reliable and meaningful in ex-post variance estimation.

[6] Even though speculation might be perceived as gambling on price movements, speculators have crucial influence in financial markets by providing liquidity at least.

[7] For a chronological order of the commencement of derivative products, see Chance (1995).

As the first regulated futures exchange in the United States, the Chicago Board of Trade was opened in 1848 with 82 members. In March 1851, the first futures contracts were recorded and they were called for the delivery of 3,000 bushels of corn in June at a price of one cent per bushel. Listed stock options began trading in April 1973 on the Chicago Board Options Exchange (CBOE). Other exchanges began offering stock call options in 1975 and put options in 1977. Today, options on more than 1,000 stocks trade on five U.S. exchanges.

As it is seen in Table (2), the factors to be mentioned in the process of launching futures market throughout the world are based on the level of development and product preference. Additionally, it has been understood that a derivatives market was built in developed countries prior to the developing ones while future and option markets on interest and currency are mostly preferred.

Table 2: First Derivatives Markets

Country	Name of the Exchange	Types of Derivative Instruments	First Derivatives Tradings
Argentina	Buenos Aires Future Market; Buenos Aires Stock Exchange; Cordoba Stock Exchange; Rosario Futures Exchange; Futures and Options Market.	- forwards - futures - options	1907 May 1992
Australia	Sydney Futures Exchange Ltd.	-forwards (commodity, interest rate, currency) -futures (commodity, interest rate, currency) -options (commodity, interest rate, currency, shares, index) - swap.	1960: futures (commodity: greasy wool)
Austria	The Austrian Futures and Options Exchange (ÖTOB)	-futures (public bond, index); -options (index, shares)	10.4.1991; Options (shares).
Belgium	Belgian Futures and Options Exchange (BELFOX)	-futures (index, p. bond, BIBOR) -options (shares, index, public bond, USA dollar)	12.6.1991; Futures agreement (notional public bond with 9% coupon rate and 2.5 million Bel.francs nominal value); April 1993: Futures (Bel 20 index)
Brazil	Rio de Janeiro Stock Exchange The Commodities and Futures Exchange (BM&F); Over-the-Counter	-forwards (interest rate, currency ABD$/R$, Yen/R$, DM/R$, shares) -futures (interest rate, currency, shares, Ibovespa index);	1845 1890 1979: Buy options (shares) 1984: Sell options (shares)

Country	Name of the Exchange	Types of Derivative Instruments	First Derivatives Tradings
	The Sao Paulo Stock Ex.; The Brazilian Stock Exchange.	-options (interest rate, currency ABD$/R$, shares, Ibovespa futures);	
Canada	Toronto Futures Exchange, Vancouver Stock Exchange	- futures - options	1984: futures, options (index)
Colombia	Banco Andino Colombia.	- forwards (currency C.Peso/USA$); - options (currency, in. rate)	Options (currency); 1995.
Denmark	Denmark Futures and Options Market (FUTOP).	- futures (shares, public bonds, index and so on) - option(shares, public bonds)	September 1988; First futures and options agreements (Mortgage bonds with 9% coupon rate, maturing in 2006)
Ecuador	Over-the-Counter.	- forwards (currency, interest rate, shares)	1996: Forward (currency sucre/USA$)
England	International Petroleum Exchange(IPE); London Commodity Exchange (LCE); London International Financial Futures and Options Exchange (LIFFE); London Metal Exchange (LME); London Stock and Derivatives Exchange (OMLX).	*IPE - futures (gas, etc.) - options (gas, Brent unrefined petroleum) *LIFFE - futures (long term public bonds of various countries and so on) - options (shares, bonds and so on) *OMLX - futures (various indexes, shares) - options (various indexes, shares)	*IPE-April 1981 futures (gas) *LIFFE-9.30.1982 Futures (Currency, public bond), *LME-1877 *OMLX-12.12.1989 First derivatives trading of Swedish shares with a line connecting to OM Stockholm.
Finland	Finnish Options Market (SOM); Finnish Options Exchange Ltd. (SOP).	*SOM - futures (index, shares, Sterling, DM, USA dollar) - options (index, Sterling, DM, USA $, Shares) *SOP - forwards (public bond, and so on.) - futures (FIM/currency)	*SOP: 1986; Derivatives agreements (Standardized currency and interest rate) *SOM: November 1987-Buy and sell options
France	Paris Options Exchange (MONEP); France International Futures Exchange (MATIF); Potatoes Futures Market (MTPT).	*MATIF - futures (public bond, ECU bond, public bond) *MONEP - options (securities, index) *MTPT - futures (potatoes)	*MATIF 2.20.1986; Futures (public bonds with maturity of 7-10 years) *MONEP 9.10.1987; Options (shares)
Germany	German Futures and Options Exchange (DTB).	- futures (interest rate-FIBER, BOBL, BUND, BUXL-, shares) - options (interest rate, shares, index)	1.26.1990; Options(14 shares)

Country	Name of the Exchange	Types of Derivative Instruments	First Derivatives Tradings
Hong Kong	Hong Kong Futures Exchange Ltd.; Stock Exchange of Hong Kong (SEHK).	- options (shares, warrant) - warrants	*HKFE 1976 agricultural products; 1980 gold; 1986 first futures agreement; 1990 first derivative on warrant. *SEHK 1995 First stock options.
Ireland	Ireland Futures and Options Exchange (IFOX).	- futures (long, medium, short term Irish public bond and DIBOR)	5.29.1989; Futures agreements (Long term public bonds with maturity of 20 years, DIBOR of 3 months, Irish Pound/US $)
Israel	Tel Aviv Stock Exchange.	- futures (index, currency) - options (index, currency)	August 1993; TA-25 index options. October 1995: index futures. October 1994 NIS/$ options
Italy	Italian Financial Futures Market (MIF); BIF.	*MIF - futures (public bonds with maturity of 5 and 10 years) - options (public bonds with maturity of 10 years) *BIF - futures (10000 ITL*Index point)	*MIF 9.11.1992; Futures (Italian public bonds with 250 million Italian lirets nominal value and 12% coupon rate, with maturities of 8-10 years) *BIF 11.27.1994; Futures (MIB 30 index)
Japan	Tokyo Stock Exchange; Tokyo International Financial Futures Exchange.	- futures - options - warrant	1988: futures (currency); 1989: Options (currency)
Malaysia	Kuala Lumpur Commodity Exchange; Kuala Lumpur Options and Financial Ex.	- futures - options - warrants	*KLOPFE December 1995; futures-options
Mexico	Mexico Stock Exchange.	- derivatives market (Mexder)	1977 petrobond (Mexican Government)
Netherlands	European Options Exchange (EOE) ; Financial Futures Exchange (FTA); Rotterdam Energy Futures Exchange (ROEFEX); Amsterdam Agricultural Products Futures Market (ATA).	*EOE - futures (public bond, index, currency) - options (shares, bond, currency, and so on.) - warrants *FTA - futures (public bond, index, USA Dollar) *ROEFEX - futures (unrefined petroleum, etc.) *ATA - futures	1958: Futures (potatoes) *EOE 4.4.1978 call options *FTA 6.19.1987 Futures (on bonds) *ROEFEX 10.31.1989
Peru	Lima Stock Exchange.	- forwards market (currency) - derivatives market	1991
Poland	Warsaw Board of Trade; Warsaw Stock Exchange.	- forwards - futures (index WIG20) - options (currency, interest rate, index, shares)	1994: futures (index)

Country	Name of the Exchange	Types of Derivative Instruments	First Derivatives Tradings
Portugal	OPORTO.	-futures (index, interest rate)	1995 : Futures (Fixed yield public bond with a maturity of 10 years) 1996: Futures (shares of 'blue-chip' in.)
Singapore	Singapore International Monetary Exchange Ltd. Singapore Commodity Exchange; Over-the-Counter	- futures (commodity) - company warrants - third party warrants - futures (index, interest rate, currency) - options - swap	1984 1992; futures (tobacco)
South Korea	Korean Stock Exchange.	- futures (index)	May 1996: Futures (Kospi 200 index)
Spain	Spanish Financial Futures Market (MEFF); Over-the -Counter.	- futures (interest rate) - options (interest rate) - swap	1990
Sweden	Swedish Futures and Options Market (OM STOCKHOLM AB) .	- forwards (shares) - futures (shares, bond, public bond) - options (shares, bond)	6.12.1985; Standard buy options on six listed Swedish shares.
Switzerland	Swiss Options and Financial Futures Exchange (SOFFEX).	- forwards - futures (index, conf) - options (shares, index, conf) - swap	1988 SMI futures.
Taiwan	Taiwan Stock Exchange.	- options - swap - warrant	March 1977
USA	Chicago Board of Trade; Kansas City Board of Trade; MidAmerica Commodity Exc.; NYSE; The Pacific Stock Exchange.	- forwards - futures - options - swap	1851: Forward (corn); 1973: Options (securities) 1982: Options (Value Line, S&P500, NYSE Compound).

Sources: The Euromoney Derivatives Handbook 1997, London 1997;
The IFR Handbook of World Stock and Commodity Exhanges, IFR Pub, London 1997.

As a similar example to the ISE case, in which the future contract would be based first on the stock market index, the South Korean experiment put emphasis on volatility in order to launch derivative products on the KOSPI 200 index. For the sake of comparison on that matter, exchange volatilities have been considered and it has been perceived that the futures market is vital to reduce that volatility.[8] But,

[8] Korea Securities and Exchange Commission Securities Supervisory Board, Annual Report 1995, Seoul 1996, 62.

the decision regarding whether the market is furnishing the required conditions has been assessed according to the market capitalization and the size of market participants. On the other hand, the pace of data dissemination and the level of the internationalization of the market also were major criteria. Although the absence of a self-regulating structure seemed disadvantageous for the Korean Stock Exchange, it reveals importance for setting right the security component in the market gradually.

As the finance theory and information technology advanced, the size and complexity of derivative instruments offered by the banks and exchanges have increased. For example, both the futures and options markets in London and the world-wide swap market have grown over 10-fold between 1988 and 1994 [Grant & Marshall, 1997].

3. The Advantages and Risks of Financial Derivatives

The advantages and risks of financial derivatives may be evaluated under two different perspectives. While the first perspective applies to a financial derivatives market that has recently started its activities, the second perspective relates to the advantages and risks of a market which has gained a certain level of maturity and where, say, the future contracts market has been operating. In a new market, the investors will not be acquainted with the securities and therefore will incur the cost of failure to exploit the possible advantages, rather than incurring risks. Foster & Viswanatahan (1994) suggest that less knowledgeable investors will benefit from the advantages of the market less in the beginning compared to those that are more knowledgeable. On the other hand, investors that trade on the market without sufficient knowledge will try to stay in the market either obliviously or by following the leading investors.

Corporations use derivatives instruments for hedging purposes for a number of reasons, including the volatility in the financial markets, tax exemptions, increasing the borrowing capacity and reducing the cost of borrowing. Another view suggests that the insufficiency of the bond and stock markets leads corporations to use derivatives in order to arrange their cash flow.

Another advantage provided by the financial derivatives is related to the market participants' changing perspective of the prices of financial

derivatives since the real return and risk definitions are used after an initial experience is gained in the derivatives market. Grant & Marshall (1997) assert that the basic motive for the use of financial derivatives is to manage the interest rate and currency risks; although limited, the use of derivatives for managing the risks surrounding the goods and securities is spreading as exotic derivatives are viewed more cautiously due to liquidation difficulties in the underlying markets. The use of derivatives requires a high degree of control within corporations and the risks of derivatives are measured using complex methods before being submitted to the boards or top executives of the corporations.

The pricing method for derivatives is more complex than the basic calculation methods applied to the financial reporting in the spot markets. Banks and derivative traders have more and more recourse to complex models such as value at risk (VAR) analysis for risk management and measurement. The studies carried out in 1995 show that the most widely-used risk measurement method for derivatives is simply determining the position at risk [Grant & Marshall (1997)]. Some corporations use a method which analyze the profit, loss and new risk parameters in accordance with market criteria and variable data, within the framework of the sensitivity analysis.

Do derivatives lead to a significant increase in the spot market risks? As derivatives are contracts, they carry legal risks. In addition, they have credit risk as one of the parties may fail to fulfill the due obligations. Liquidating derivatives may also introduce problems [Sill (1997)]. Consequently, all the risks inherent in financial instruments are also valid for derivatives.

Derivatives markets lead to a decline in the volatility of spot markets and enhance the organizational efficiency of the units within the market. An example is the decline in the volatility of the spot market in South Korea following the launch of the derivatives market[9]. Futures prices provide a signpost for spot market prices since the price expectations for the relevant date are taken under control through the derivatives market. However, studies about whether the launch of the derivatives market affects the volatility in the spot market may be

[9] Reports and seminar notes submitted by the Korea Stock Exchange officials during the ISE delegation's visit in April 1997.

influenced by the period taken into consideration. To illustrate, after the S&P futures contract was introduced in the U.S. in 1982, volatility in the spot market declined, if we consider the period until 1987, while it increased between 1982-1989 [Maberly et al (1989)]. On the other hand, in their studies concerning the spot market volatility following the launching of the derivatives market in the U.S., Gerety & Mulherin (1991) showed that no systematic increase was noted in the volatility, including intra-day prices, with the exception of the 1987 October crisis.[10] Subrahmanyam (1996) points to the relationship between volatility and the behavior as well as the knowledge of investors and states that the launching of an index-tracking futures market may lead to an increase in the number of misinformed speculators, a phenomenon which will increase liquidity and lead to a fluctuation of stock prices. To conclude, the basic aspects to be considered in the studies concerning the effects of the derivatives markets on the volatility in the spot market are the periods under scrutiny and the level of knowledge of the market participants.

Considering that the price of futures contracts F can be used in the closed-form formula with partial derivatives ($F=f(St\ ,t)$), the discount rate or simply the interest rate effect in pricing is included by integrating the "cost of carry."[11] Thus, the total differential in the futures prices will be given by

$$dF=\left[\frac{\delta F(S_t\ ,t)}{\delta S_t}\right] dS_t+\left[\frac{\delta F(S_t\ ,t)}{t}\right]dt \qquad (3)$$

The first term on the right side in the equation represents the effect of the change in the price of the underlying asset on the futures price while the second term measures the time effect. Given the holding period, the equation is simplified as the following model for the futures price:[12]

[10] See Gerety & Mulherin's (1991) on a study on the intra-day prices of the stocks in USA during the 1933-1989 period which aimed at finding out the spot market volatility trend following the launch of a derivatives market.

[11] See Hemler&Longstaff (1991) for a constructive criticism of the Cost of Carry Model in pricing futures. It is noteworthy that an introductory explanation of derivatives pricing models can be found in several books. For example see Ingersoll (1987); Neftçi (1996).

[12] This equation is intended to be used for pricing the ISE 30 index futures contract.

$$F=f(S_t,t)= S_t + S_t \,.\, r.\, (T\text{-}t)/365 \qquad (4)$$

Where T denotes the end of period and so, $(T\text{-}t)$ denotes the time until maturity, and r represents the interest on a riskless asset.

When the model is generalized, the futures price is dependent on the return and risk levels of the underlying asset and the interest rate risk prior to maturity. By viewing the classic CAPM under the theory of efficient markets as an effective pricing in the spot markets, we can explain the futures price with the market risk and the risk-free rate.[13] Kolb (1996) supports the view that investors are not awarded for the systematic risk in the derivatives markets. The market risk already represents the price for the index futures. As understood by the futures pricing function, any change at the interest rates is the main factor that causes a change in the futures prices. At this point, it is obvious that derivative instruments such as index futures are considered to hedge investors against the systematic risk.

Not only are the changes in the market characteristics and in time, commonly viewed as fundamental in measuring company's risk, but also its management affect the pricing. Therefore, the marked-to-market principle is stimulated in observing the risk in derivatives trading. Many findings provide evidence that the monthly valuation is most suitable. In fact, frequency of valuation depends on the related derivative instruments and the risk and so marking-to-market can also be used daily and weekly as well. On the other hand, some firms are using derivatives for hedging and do not need marking-to-market since they do not speculate.

In the financial system, it is logical to introduce index futures and/or options for the purpose of proving the advantages of derivatives markets. Considering a prominent paper of Markowitz (1952), efficient portfolios can be obtained by accepting the market composite index as the measurement of the systematic risk. Many analysis, concerning the capital markets, choose the market index to represent notionally the market portfolio according to the CAPM of Sharpe (1964). Brenner (1989) argues that the index futures and options can provide a risk

[13] Kolb (1996), finds a negative linear relationship between systematic risk and the returns for futures contracts.

avoidance against the changes in volatility and the interest rate changes but not to the changes in volatility. Obviously, in pricing financial derivatives, besides the spot price and interest rates, their volatility should be taken into consideration.

The easier the valuation of spot market portfolios by using the derivative instruments is, the more efficient the dynamic portfolio analysis is. From these points of view, derivatives markets would be helpful to increase the efficiency levels of the spot markets.

On the other hand, as other components exist in markets, risks are being globalized and made more systemic by the reason of both the reverberation of advanced stage of technology to markets and also the smoothing and removing effect of every newly-structured product towards differences in terms of time and location among markets. As the Group of Thirty (1997) mentioned that these events, which are causing the systemic risk, may be defined as a risk type, what is sudden, unanticipated and damaging all the financial system, once emerged the normal functioning of the financial markets, would be obstructed by destroying the mutual trust that is the most striking component lubricating the financial transactions flow.

Especially in the stock market crash of October 1987, portfolio insurance strategies that used futures markets partially have been blamed and also large losses associated with the use of derivatives by firms such as Procter&Gamble ($157 million)[14], Metalgesellschaft ($1.3 billion)[15] and by public institutions such as Orange County ($1.7 billion)[16] and financial market intermediaries such as Baring Futures Pte. Ltd. ($1.4 billion)[17], Sumitomo Bank ($1.8 billion)[18] have led to fear

[14] With respect to the losses of $157 million of Procter &Gamble, one of the biggest US firms, by the reason of using interest rate swap, see Dimartino&Ward&Stevens&Sargisson (1996).

[15] With respect to the realisation and effects of the losses of $1.3 billion of Metallgeselschaft AG which is a German firm, by the reason of using derivative products, see. Kuprianov (1995).

[16] With respect to the losses of $1.7 billion of Orange County which is a local managerial unit in California, USA, after investing its funds with the help of derivative products, see Sill (1997, 22).

[17] With respect to the reasons and effects to financial markets, of the losses of $1.4 billion of Barings Bank Plc. Ltd., which is Britain's oldest merchant bank, while its intensified using of derivative instruments, see Kuprianov (1995) and also for an official view and finding about Barings Bank Crises, see inquiry report prepared by inspectors, on behalf of Singapore Ministry of Finance, San&Kuang (1995).

[18] With respect to cornering the market (short squeeze) as a strategy resulted $1.8 billion losses and transactions realised by the use of derivative instruments based on copper, of Sumitomo Bank, which is one of the largest Japanese bank, see Kooi (1996).

among some market participants that derivatives trading could lead to a widespread disruption of the financial system.

In order to investigate those crises with more detail, which were mentioned respectively above, on the basis of claims that they are disturbing users and intermediaries within the system, various studies on a national scale have been carried out and abundant facts and figures have been gathered by international organizations. Thus, various recommendations, which were covering lessons derived from findings regarding the reason of the crises and important points to be considered with utmost care, have been designed.[19] According to those findings, the failure of internal control of the intermediary institutions, the complexity of the existing rules in regard to derivatives accounting and the existing non-standardization of such rules, unawareness of the end users' top management about the leverage effect of the derivatives and, as a result of that, the accumulated financial risk could be explained as major reasons of the above mentioned financial crises.

When it comes to the mutual utilization of the relevant information among national exchanges, harmonization of national rules according to international standards and, therefore, the removal of the systemic risk effect, it seems that there are important gaps in terms of both mechanisms and also the legal environment. Especially, as it is seen within the Barings case, the intermediary institutions, which might take positions in various countries' derivatives markets at the same time, could have the ability to misuse the system. International meetings and working groups established, in relation to derivatives products and the systemic risk, consented on various recommendations. Following international announcements and much publishing on the subject, the

[19] For an example of inquiry and studies regarding to derivative products prepared by international community through various organisations, see "Derivatives: Practices and Principles" (1993) by the Group of Thirty, "Financial Integrity Recommendations" (1995) by Future Industry Association. Adding to that the results of those inquiry and studies regarding to derivative products announced under the name of "Windsor Declaration " in Windsor Meeting in which member countries of IOSCO gathered in May 1995 and it was open to sign under the name of "Declaration on Cooperation and Supervision of International Futures Exchanges and Clearing Organisations" and also as a complementary to this document "Memorandum of Understanding and Agreement" for supervisors in Boca Raton, USA in March 1996, then these documents has been signed by 55 future and option exchanges and clearing institutions from 18 country and 15 supervisors respectively.

consensus to be reached on the mutual utilization of all information regarding the derivative products and a trigger-mechanism has been formed, which is planned to act upon some risk levels predetermined under the auspices of the Global Task Force structured within FIA.[20]

4. Proper Timing for the Start of Financial Derivatives at the ISE

Equities cash market transactions have started since 1986 at the ISE, tracing back to 11 years. While most of the developed exchanges launched derivative products in the 1980's, the ISE was realizing well-designed attempts towards structuring an organized market in terms of legal and technical dimensions. In this process, primary aim at the ISE markets was steps regarding the promotion of the capital markets and the enhancement of liquidity as well as the depth of the cash market. In developed markets, following the launching of forward contracts on commodities, warrants, futures and options markets, based on financial products, have begun to be structured and, therefore, the existing cash market risks were spread upon maturity. Thus, the aim of catching the average rationality for customers under the existing market conditions were reached appropriately.

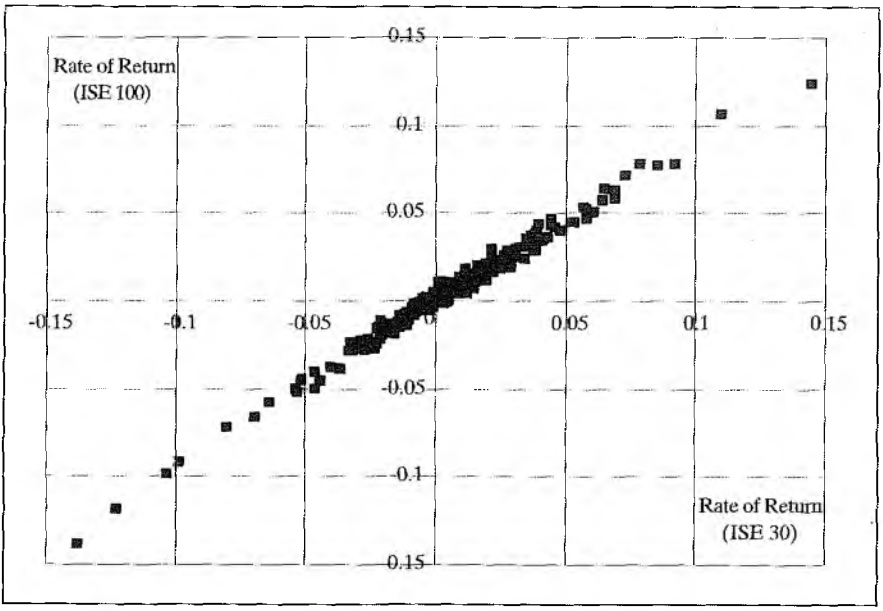
On the other hand, risk management issues are interconnected with valuation and pricing. Thus, weakness in approaches of valuation are likely to carry over weaknesses in hedging. As it is mentioned by Grant&Marshall (1997), inappropriate valuation will mislead companies themselves, users or regulators regarding the long term gains and losses on their derivatives activity. At the same time, it is obvious that inappropriate valuation will cause important losses when its short term risk reverberations are considered.

In this study, introduction of the first derivatives market, with index futures, is evaluated with respect to the risk analysis. Accepting that a market composite index represents systematic risk according to the finance theory, it might be expected that those derivatives instruments could be used for facilitating hedging against the systematic risk. In trading of the ISE-30 futures contracts, interest rates, inflation and

[20] With respect to the report covering summarised results of implications in terms of national institutions, joined to the Windsor Meeting(May 1995) and recommendations regarding last situation, see World Securities Law Report (1996, 36-40).

currency risks could be avoided by the investors. In order to extend the number of the observations, it is examined, first of all, whether the ISE-100 can be used to represent the ISE-30. For this purpose, daily returns by the ISE-30 and the ISE-100 in 1997 are regressed. At the 1% level, it was found that the ISE-100 can be significantly used to represent the ISE-30.[21]

Figure 1: Correlations Between the Returns of the ISE-100 and the ISE-30



Notes: Returns are logarithmic.
Data: Daily closings of 1997.

Table 3: Regression Results (Dependent Variable: Return of the ISE-100)

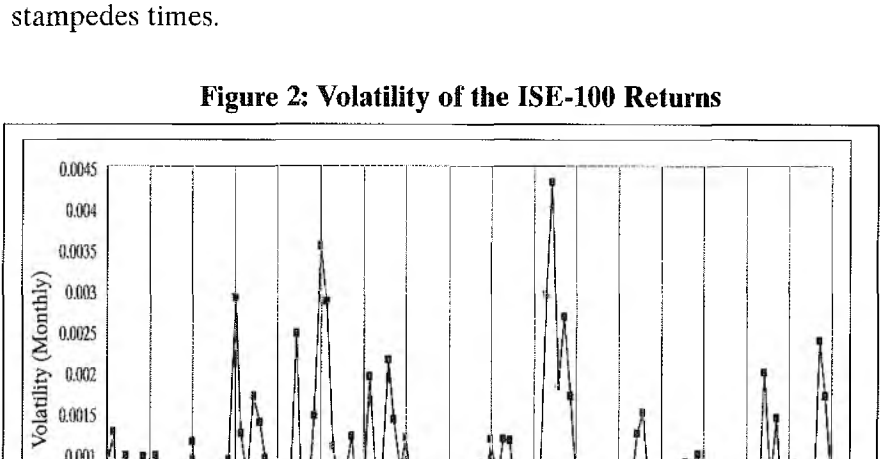
	Coefficient	*Standard Deviation*	*t Stat*
Constant	0	-	-
Return ISE 30	0.1	0.005	1

Notes: R=0.9937; Adj.R2=0.987; Standard Dev.: 0.0034; N: 249; F: 19534.

[21] A similar regression results based on the simulated data for the period of April 3rd 1995 to August 22nd 1996, gives 98.56% correlation coefficient. See (ISE, The Report by The Adhoc Committee of Futures Trading Index, 09.17.1996).

In order to determine the estimated volatility of the ISE-100, we also compute the daily return variances for each month for the period from 1988 to 1997. It is noteworthy that the variance is changing from month to month and year to year. Accordingly, although introducing a futures market to facilitate hedging would decrease the volatility, it would be still debatable if that is the solution around the shock and stampedes times.

Figure 2: Volatility of the ISE-100 Returns



Notes: Daily returns are used to calculate the monthly variances. Period: Jan. 1988 - Dec.1997.

Following the determination of high volatility in the Istanbul Stock Exchange; the correlation coefficients between interest rates, inflation, currency returns and index returns for the period from January 1993 to May 1997 are given in Table 4.

The results of regressions between monthly interest rates (IR) and index returns for the period from January 1993 to May 1997 and between the interest rate sensitivity (ΔIR) and the returns are given in Table 5. Interest rate itself explains the monthly market return at 5% significant level (Panel A). More importantly, the findings of Panel B implies that the 1% change in the interest rates can cause a 4.2 basis-point decrease in the market return. This result complies with

Table 4: Correlations

	Interbank Interest Rates	*Inflation*	*Currency Return ($)*
Inflation	0.644*	1	
Currency	0.657*	0.914*	1
Index Change (TL)	-0.287*	-0.099	-0.150

Notes: January 1993 - May 1997. Interbank overnight interest rates are weighted by the transaction volumes. See. CB, Quarterly Bulletins. Wholesale Price Indices are taken as the indicator of inflation by the State Institute of Statistics. Index (ISE-100) change is calculated to represent returns on market portfolio.
*: Determination coefficients are significant at 5% level to F test.

some studies[22] that find a negative and significant correlation between the interest rate changes and the market returns. Excluding the interest rate effect, the market expectation is positive. Significance of the result, based on *f* and *t* statistics (1% level) suggests that, in the Turkish capital markets, the interest rates are the dominant factor in securities pricing. Finally, as both the derivatives trading is related to the systematic risk while the market index returns seem very sensitive to interest rates, the prior requirement to structure futures or options on interest rates should rigorously be considered.

Table 5: Interest Rate Sensitivity of the Market

Panel A
R_m=0,2015 - 2,3571 IR *(t) (3.40)** (-2.14)** **Notes:** R=0.287; Adj. R^2:0.065; Standard Deviation: 0.155 F.: 4.59; Obs: 53.
Panel B
R_m=0,2015 - 2,3571 ΔIR *(t) (3.40)** (-2.98)*** **Notes:** R=0.39; Adj.R^2:0.065; Standard Deviation: 0.15 F.: 18.9; Obs: 52. * and ** indicates statistically significant at the 5% and 1% levels, respectively.

The dominance of interest rates in the financial markets shows that it may have a striking impact on developments regarding the derivatives market. But,

[22] Chen & Chan (1989) calculates the coefficient of linear relationship -0,049 between the portfolio and interest rates of T-Bills; Schrand (1997), calculates that -0,041 for the period of 1984-1988 for 57 financial institutions. It is noteworthy that there is negative correlation according to many findings.

the obvious dominance of the public sector in defining the interest rates in Turkey may create confusion in the completion of the markets.[23]

As it is seen in Table 6, the public sector has dominance as near to almost 100% in terms of both the accumulated amount of fixed-income securities and the secondary market transactions. For that reason, it is evident that the reduction in the size of the public sector and the free formation of the interest rates in the markets are obligatory for effectiveness of the derivatives market, which is a complementary part of the capital markets.

Table 6: Public Share in the Fixed-Income Securities Market

Outstanding Fixed Income Securities (TL Million)									
Year	Government Bonds	Treasury Bills	Public Sec. Total	Company Bonds	Com. Papers	Private Sec.Total	Total	Public Share %	Priv. Share %
1990	18,801.20	5,468.60	24,269.80	1,391.30	208.6	1,599.90	25,869.70	93.82	6.18
1991	24,678.40	18,258.00	42,936.40	1,635.60	532.3	2,167.90	45,104.30	95.19	4.81
1992	86,387.60	42,246.70	128,634.30	1,670.80	756.3	2,427.10	131,061.40	98.15	1.85
1993	189,713.20	64,488.10	254,201.30	1,667.60	1,197.70	2,865.30	257,066.60	98.89	1.11
1994	232,825.40	304,229.70	537,055.10	1,411.90	213.2	1,625.10	538,680.20	99.7	0.3
1995	511,769.00	631,298.00	1,143,067.00	2,354.40	1,533.00	3,887.40	1,146,954.40	99.66	0.34
1996	987,106.00	1.,745,350.00	2,732,456.00	2,718.70	2,880.00	5,598.70	2,738,054.70	99.8	0.2
1997/9	3,223,827.00	1,620,798.00	4,844,625.00	2,812.00	2,280.00	5,092.00	4,849,717.00	99.9	0.1
Secondary Market Trading Volume (TL Million)									
Year	Government Bonds	Treasury Bills	Public Sec. Total	Company Bonds	Com. Papers	Private Sec.Total	Total	Public Share %	Priv. Share %
1990	61,802.90	32,044.80	93,847.70	3,006.20	670.8	3,677.00	97,524.70	96.23	3.77
1991	142,192.60	131,825.20	274,017.80	12,428.80	512.8	12,941.60	286,959.40	95.49	4.51
1992	208,709.40	375,972.90	584,682.30	11,301.80	1,150.10	12,451.90	597,134.20	97.91	2.09
1993	657,639.60	1,027,528.00	1,685,167.60	7,858.00	761.2	8,619.20	1,693,786.80	99.49	0.51
1994	1,678,731.50	3,478,468.40	5,157,199.90	9,090.60	719.7	9,810.30	5,167,010.20	99.81	0.19
1995	4,580,106.00	14,831,095.80	19,411,201.80	42,650.80	11.7	42,662.50	19,453,864.30	99.78	0.22
1996	12,889,759.20	57,192,959.90	70,082,719.10	152,835.5	0.0	152,835.50	70,235,554.60	99.78	0.22
1997/9	52,372,740.00	49,397,011.20	101,769,751.2	101,53,783.9	0.0	153,783.90	101,923,535.10	99.85	0.15

Source: Treasury, 1997; Capital Market Board, Monthly Bulletins, 1997.

[23] The obvious dominance of public sector has been embodied under the case, in which behaving insensitive to free market interest rates. Though public sector has important share in some developed country markets as similar to USA, sensitive approach of Treasuries toward interest rates set by free market, has been the smoothing component of the problem.

4. Conclusion

This paper examines the advantages and risks of the introduction of derivative products, and discusses the suitability in timing for the initiation of derivatives trading in the securities markets, and then evaluates the compatibility of a derivatives market to the ISE's spot market in terms of volatility, systematic risk representation as well as the market depth in the light of Ederington's (1979) portfolio approach.

The widespread launching of derivatives markets all over the world corroborates that those markets are helpful for and welcomed in the existing spot markets. While futures and options markets have been launched and grown dramatically in most countries since the second half of 1970's; markets, lacking a derivatives product for transaction, are just the hot debate of discussions on how to initiate.

In this paper, the preference for the financial instrument and timing in initialization of derivatives trading in the securities market have been studied in terms of Ederington's hedging approach, finding out that the derivative products on the equity market index is necessary. But there are some pre-conditions, which are the maintenance of the required depth and liquidity in the underlying market and the institutionalization of investors. When it is considered that derivatives products based on an index are providing hedging against the systematic risk according to the risk management point of view, it is so obvious that the derivatives market, based on interest and currency rates in which systematic risks have a direct impact, will have the priority for launching purposes.

Moreover, as experienced by the developed markets so far, the systemic risk should be taken into consideration during the introduction of derivatives instruments in any capital market. This concern for the systemic risk is actually a worldwide diffusion of a problem occurred either in a company or in a market and is causing the collapse of the financial system. For that reason, it seems that exploiting from the real experiences classified by international organizations against the systemic risk, derived results and mutually-established preventive practices and mechanisms within the countries, in which the derivative products will be considered for introduction, is the underlining condition for a success.

In summary, it is accepted that futures and/or options based on stock

indices are necessary for hedging in the capital markets. However, with respect to the experiences of the developed markets, certain rules and techniques should be established in the course of time. Furthermore, especially in Turkey, as the basic risk factors can be explained with the interest rate sensitivity and the high concentration of public borrowing instruments and their short-term maturity, it is discussed if there is a priority for the futures and options markets based on fixed-income securities and interest rates.

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ISE Derivatives Market Trading System

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Introduction

The Turkish capital markets have shown a considerable growth in the last decade, both in terms of quality and quantity, and have become more internationalized by offering new markets and financial instruments to the investors. The Istanbul Stock Exchange (ISE), being the only securities exchange of Turkey, is now about to launch a new market, namely the "Futures and Options Market" and introduce new financial products to both domestic and foreign ingvestors so as to provide new opportunities for hedging the risks borne on the Turkish financial markets.

1. Financial Instruments to be Traded

The Futures and Options Market to be launched at the ISE will be fully automated and fully integrated with the clearing system. The ISE will implement the Futures and Options Market in three consecutive stages: 1) Futures, 2) Options and 3) Deliverable Futures and Options. Initially, the ISE plans to launch the market of futures and options contracts for the following instruments:

* Index Futures
* Index Options
* Stock Options
* Interest Rate Futures
* Interest Rate Options

In time, the ISE will introduce other futures and options markets, such as futures on single equity stocks and futures on foreign currency

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denominated bills and bonds taking into consideration the preferences of the market participants to the extent allowed by the legal framework.

The ISE will initially introduce a futures market on the ISE-30 Index which has been calculated and announced since January 2, 1997. It is composed of 30 blue-chip companies chosen on certain criteria and will be revised biannually. The specifications of this index futures contract, such as contract size, contract months and the minimum price change will be determined and announced by the ISE Executive Council taking the applications of developed securities exchanges into consideration.

At the initial stage, the settlement of futures contracts will be in cash. In the cash settlement system, the difference between the futures price and the market price of the futures contract is reflected in the relevant account and the settlement is done in cash. The physical delivery process in the settlement will be introduced in the forthcoming stages.

2. Membership Types

The preparatory operations in the ISE Futures and Options Market have been handled in two different categories and two different types of membership have been established:

* Market membership
* Clearing membership

While a financial intermediary may be both a market member and a clearing member in the market, it may prefer to be only a market member or a clearing member. There are three different types of clearing members in the Futures and Options Market:

* General Clearing Members: These are the ISE Members who, with respect to all futures and options contracts stipulated by the ISE Executive Council, undertake to perform, confirm and finalize, against a certain fee, the futures and options contracts realized by the ISE Members who do not have the authorization or privilege to become a clearing member, in addition to those contracts they execute to their own or their customers' account.

* Direct Clearing Members: These are the ISE Members who, with respect to all futures and options contracts stipulated by the ISE Executive Council, are authorized to execute only the futures and options contracts which are on their own or their customers' accounts.

* Independent Clearing Members: These are the non-Market Clearing Members who, with respect to all futures and options contracts stipulated by the ISE Executive Council, undertake to perform, confirm and finalize, against a certain fee, the futures and options contracts realized by the ISE Members who do not have the authorization or privilege to become a clearing member.

While the general standards for the clearing membership and market membership have already been regulated in detail by the relevant regulations, the detailed selection criteria for those membership types will be set by the ISE Executive Council.

The clearing of the futures and options transactions will be carried out by the ISE Settlement and Custody Bank (Takasbank). Actually, clearing membership is a new application and aims at efficiently controlling the risks stemming from the clearing process. General Clearing Members, in addition to the clearing of their own transactions, when they play role in the clearing of the transactions of other market members, should be responsible for following up the risk of these market members. The ISE Settlement and Custody Bank, on the other hand, will follow up the risk of both clearing members and market members at the same time.

There are two types of market membership, namely,

* Market making members
* Other market members

Market making membership requires more qualified characteristics than the regular market membership. Therefore, the members to be assigned as market makers, besides having the necessary technical capability and qualified personnel, should have a more sound financial background, i.e. the capital structure, and higher spot market transaction volume compared to the other market members.

3. The Trading System

The ISE Futures and Options Trading System is a fully-automated screen trading system, where the brokers and dealers will enter their orders/quotes in the Trading Floor. In further stages, it will also be possible to enter orders from brokerage firms' headquarters.

The system is designed in such a way that the addition of other

futures and options markets will require minimum modification. The only modification will be to include new parameters to that market, and an interface to the underlying spot market.

4. Sessions

There will be two different trading sessions with different buy-sell methods in the Futures and Options Market. These are the pre-opening/fixing session and normal session.

i) Pre-opening/Fixing Session is the session where orders are collected and matched at the equilibrium price at the end of the session.

ii) Normal session is the market maker-based normal trading session where there is a continuous matching of orders according to price and time priority.

The pre-opening session will be held before the beginning of the normal session. The aim is to determine an opening or equilibrium price and inform the market participants about the direction of the market. The ISE may also have a fixing session any time during trading.

The market making system will be applicable only in the normal session. Therefore, the market makers may not enter quotes during sessions where a single price is determined.

4.1 Pre-Opening Session

The market members or their representatives enter the customer orders or portfolio orders during the pre-opening session. After all orders have been entered, an equilibrium price will be determined. The orders will match and thus trades will occur at a single equilibrium price. An example is provided below to demonstrate the price determining mechanism during pre-opening or any fixing session at the ISE.

Price	Buy Orders	Sell Orders
50,000	28	-
51,000	21	-
52,000	15	-
53,000	17	7
54,000	8	11
55,000	1	18
56,000	-	29
57,000	-	52

In order to find the equilibrium price, the following table should be prepared:

Aggregate Buy	Buy Orders	Price	Sell Orders	Aggregate Sell	Poss. Trade	Residual Orders
90	28	50,000				
62	21	51,000				
41	15	52,000				
26	17	53,000	7	7	7	19
9	8	54,000	11	18	9	9
1	1	55,000	18	36	1	35
	-	56,000	29	65		
	-	57,000	52	117		

Assume that the following orders are entered into the system.

From the above table, it can be seen that the price at which the traded volume is the largest is 54,000. At 54,000, a quantity of nine contracts will match, one of them being one buy order at TL 55,000 and eight buy contracts at TL 54,000. Among the sell orders, the sell order with a price of TL 53,000 and the sell order with a price of TL 54,000 will match. The method to be used in determining the equilibrium price, as well as the matching process have been specified in detail.

While market and limit orders will be accepted during these sessions, only limit orders will be used to determine the equilibrium price. Moreover, all orders are session orders and will be withdrawn at the end of the session. Also "Limit Good Till Date" and "Limit Good Till Canceled" orders from any previous sessions may be included in the session.

4.2 Other Fixing Sessions

Other than the pre-opening session, there will be fixing sessions where the same matching mechanism will work. The ISE may prefer to hold fixing sessions for all or a set of securities (futures and options contracts).

4.3 Normal Session

This session is a market-maker based continuous trading session with a

lunch break. The normal session will start after the pre-opening session and there are many types of orders including strategy orders available for applying different trading strategies. The market makers will also enter quotes to provide liquidity during the normal session.

At the end of the normal session, the settlement price algorithm will use trades in the closing period, specified by the ISE to calculate a settlement price. The ISE allows some time to examine and finalize the settlement price. The settlement price is calculated by using either the average price or the weighted average price method is used to perform clearing and settlement.

After calculating the settlement prices, the system will compare them with the current bid and offer prices. If the settlement price is within the range of the bid and the offer price, then it takes the calculated price as the settlement price. Otherwise, it takes the nearest one as the settlement price.

There is also a separate board for matching orders with huge values among themselves during the normal session. Large orders will match first, and then executed subject to the approval of the ISE.

5. Market Making

5.1 The Concept of Market Making

Market making is a mechanism developed for and integrated with the Futures and Options Market so as to provide liquidity and stability in the market. The market maker member may assign one or more of its representatives for market making and other representatives for order entry during a normal session. Therefore the role of the market maker member is not limited to market making. The representative assigned as the market maker has to give two-sided quotes within the range defined by the ISE. The performance of market makers will be measured by both the intermediary institution and the ISE periodically. The market maker member may, at any time, replace its representative who is assigned as the market maker.

5.2 Market Making Mechanism

Members' applications to become market makers are evaluated by the ISE. A Member, whose application is accepted, assigns a representative

as the market maker. The representative assigned as the market maker has to give two-sided quotes within the range defined by the ISE for every expiration date and for each contract type that they are responsible for, continuously during the normal session. The two-sided quotes should be within the market price range specified by the ISE. When the market maker reaches a position limit or the price changes at a certain percentage, the quotation range is extended, and the market maker is allowed to give quotations in a flexible range. Market makers may not enter ordinary orders, but may trade in the Negotiated Deals. At certain times, the ISE may allow the market makers to trade among themselves. A parameter will be defined on the security basis, indicating whether market makers can trade among themselves.

The market making mechanism allows investors trading in the Futures and Options Market to work in a liquid environment. If market makers do not enter any quotes and they are signed onto the system, then the system will generate quotes on their behalf automatically in the broadest range. This automatic quotation generating meckanism acts as an automatic pilot system so as to help market makers. As the ISE does not allow market makers to keep positions over a certain limit, market makers are not allowed to keep limitless position. Position limits for the market makers are set by analyzing their financial positions as well as their previous performances. The position limit of each market maker should not be the same. Market makers are given a discount on exchange commissions and fees and the ratios used for portfolio margining.

While the ISE may choose not to assign a market maker for certain types of contracts, it may prefer to assign more than one market maker for a number of contracts.

6. Order Types Available in the Trading System

There are various and multi-purpose order types in the Futures and Options Market. They can broadly be divided into two:

* Order types available during the pre-opening/fixing sessions where the matching of orders takes place by determining the equilibrium price.
* Orders available during the normal trading session.

The Member representatives may only give one of the two following order types to the system in a pre-opening/fixing session:

* Limit orders
* Market orders

Although only market and limit orders will be accepted during these sessions, only limit orders will be used to determine the equilibrium price. The price creating the highest trading volume will be the equilibrium price.

The ISE may decide to override or manually enter the equilibrium price for one or more securities. Therefore, before the order matching takes place, the ISE will have a certain period of time to change the price. This will be a parameter of x seconds and is set prior to the scheduling of the session. If $x = 0$, then there will be no delay and matching will proceed immediately.

In the normal session, where there is continuous matching of orders, a broader order range is offered to the member representatives. Order types available in the normal session may be grouped under two categories:

1. Simple orders
2. Strategy orders

Simple orders include all order types actually available in the ISE Stock Market and also some new order types. The most remarkable order types among them is the "On Close Orders" and "Market Contingent Orders". The "On Close Orders" can be entered during the normal session, but activated after the day's settlement price is set and is to be matched against other "On Close Orders," where a remainder is to be matched against the normal session orders. The "Market Contingent Order," on the other hand, is an order type to be activated when a trade occurs in the market at a specified price. The other order types include "Fill or Kill," "Fill and Kill," "Keep Remainder" and "Open Quantity."

Traders will also be able to enter strategy orders into the system. These types of orders allow investors to execute various strategies under a single order entry. The following types of strategy orders may be given in the market:

1. All or None: A batch of orders is to be executed simultaneously or not at all. These orders may be for different securities. This order type

may include up to a predefined number of orders. For example, an investor who would like to have N long position on May Index Futures Contract at price X and M short position on July Index Futures Contract at price Y, may enter the order into the system as a single order, namely "All or None," rather than as two separate orders.

2. One Cancels the Other: Two orders in any security are activated, where the fulfillment of one removes the second one from the order book. For example, an investor would like to have a short position on the May Index Futures Contract, if not, to have a put option on the May Index Futures Contract. Therefore, the execution of one of these orders is satisfactory for the investor, since the latter would not like to make both of these transactions at the same time. In this case, he may enter "One Cancels the Other" order to the system.

3. One Activates the Other: In this type of order, there are two orders one of which has the priority to be activated. Completion of the primary order activates the second one. For example, the strategy of purchasing N contracts on the May Index Futures Contract at price X, and then selling it at X+K price could be accomplished by the help of this order type.

Both strategy orders and simple orders may be given as either "Good Till Cancel" type or "Good Till Date" type. While the "Good Till Cancel" order is valid until it is canceled by the trader, the "Good Till Date" order is valid until a specified date unless filled.

Order cancellation is possible almost at any time. The right of withdrawal is not expected to affect the liquidity of the market to a great extent since the market makers are obliged to give two-sided quotations for the contract types for which they are assigned as market maker.

7. Trader Types

There are four different types of traders in the system.

* Firm Manager Representative
* Traders (Normal Representative)
* Market Maker Representative
* Representative Making Only Inquiry

As the orders will be entered an account basis, normal representatives may enter orders for all the sub-accounts of the intermediary institution, except for the market maker account, for which

they work. But one of the important enhancements in the system is that firm managers may allot customer trade accounts among various representatives i.e.the firms own traders. For example, a firm manager may allot among 30 sub-accounts, e.g. 5 of them to the representative 1, 15 of them to the representative 2 and 10 of them to the representative 3. In this case, representative 1 may enter orders only for the five accounts, and representative 2 and 3 may enter orders for the 15 and 10 accounts to which they are assigned, respectively.

Market makers, on the other hand, may trade only on one account, i.e. their own. They cannot enter ordinary customer orders into the system.

While representatives, other than the firm managers, have access to the detailed information of the account on which they trade only, firm managers have access to all the sub-accounts of the firm.

Inquiry screens are also available for inexperienced traders to get them accustomed to the system.

8. Account Types

Intermediaries may have the following four types of trading accounts in the system:

1- House (Portfolio) Account: Firm does its own trading through this account.

2- Customer Account: Firm may have any number of customer accounts. These are, generally institutions or individuals, with a large volume.

3- Market Maker Account: A firm may have one or more accounts through which its market makers must trade.

4- Global Account: It is the account representing a group of customers. Intermediaries use this account for all small value trades.

9. Communication of System Users

While all member representatives making transactions in the Futures and Options Market may send messages to the ISE staff, some representatives may send messages to all the system users. ISE Futures and Options Market floor specialists may send messages to all of system users.

Besides the messages sent from users to users, the trading system may send alert messages to all users, if specific conditions occur in the

market. Besides these, in case of order entry, cancellation, amendment and matching of orders, messages are transmitted to the relevant member representatives by the trading system.

10. Risk Management

Member representatives must enter their account numbers while transmitting their orders to the trading system. All transactions that are handled in the market must be followed up on account basis.

Investors intending to trade and take positions in the Futures and Options Market must place the required amount of collateral in terms of Treasury bills, foreign currency, cash etc. in the account to be opened at the ISE Settlement and Custody Bank (Takasbank).

The Futures and Options Market Trading System has a special risk management module. Therefore, each time a transaction is executed, the risks related to the relevant account are evaluated and the amount of the required collateral is calculated. If the TL amount of the collateral in the relevant accounts is sufficient, then the system allows the transaction to be conducted. Otherwise, the order is canceled.

The required collateral amount for the positions taken in the Futures and Options Market is calculated by the following two main methods:

* Contract based margining
* Portfolio based margining

The first method will allow only time spreads for contracts on the same underlying asset while the second method allows both time spreads and inter-commodity spreads among contracts traded on the ISE Futures and Options Market. In other words, the Contract Based Margining Method requires a higher amount of collateral to the Portfolio Based Margining. These two different margining methods will be applied to the accounts depending on their types.

In portfolio based margining, on the other hand, the positions taken in the Futures and Options Market are evaluated on account basis, the total risk of the relevant account is calculated, and the collateral is taken accordingly.

The portfolio based margining is a highly sophisticated method which is very popular in the Futures and Options Markets operating in developed countries and leads to a considerable decline in the transaction costs of

intermediary institutions by collecting a lower margin.

Although the contract based margining is an easy method to learn for those operating in this market, it increases the cost and is not to the advantage of the institutional investors. The contract based margining is a margining method more often used for small investors. The applicable method for margining the accounts shall be decided by the ISE Executive Council.

Moreover, to prevent one single individual or firm from constraining the Futures and Options Market, position limits will be established an account and firm basis in the system.

11. Trading System and Communication with the Clearing Center

The Futures and Options Market Trading System will be fully integrated with the ISE Settlement and Custody Bank (Takasbank) on line. With the help of this connection, the collateral placed in the accounts opened at Takasbank will be revalued on the basis of the market price and will be sent to the trading system on line. Newly deposited collateral will be reflected to the relevant account immediately, providing the opportunity of taking more positions for the account owner. On the other hand, the total margin amount is marked-to-market when a new transaction is executed and this information is transmitted to Takasbanks system on a real time basis.

Besides the daily marking to market of collateral account during the execution of transactions, total profit and losses of all accounts are calculated by taking into consideration the relevant trade price and settlement price and then are added to or subtracted from the margin account. With this method, it is possible to acquire additional position, if the intra-day account is on the credit side, or reduce the number of position, if the intra-day account is on the debit side.

The profit gained in the Futures and Options Market may be withdrawn from the accounts at T+1. If the losses cause a margin call, then the initial margin should be reinstated prior to the first session of the following day. The ISE may occasionally make intra-day margin call to the accounts trading in the market, taking their profit/loss positions into account.

The total profit and loss of investors having positions in the Futures and Options Market are calculated by comparing the trading price and

settlement price. The settlement price will be determined by calculating either the average price ((minimum trade price+maximum trade price)/2) or weighted average price of at least n trades realized during the last x minutes of the normal session. After calculating the settlement prices, the system will compare them to the current best bid and offer prices. If the settlement price falls within the range of bid and offer prices, then the calculated price is taken as settlement price. Otherwise, the nearest one is taken as the settlement the price.

12. Data Accessible by Member Representatives

Member representatives and market makers have access to information about the transactions in the market, as well as the information about the accounts for which they make transactions through the screens that they enter orders and quotes.

The batch of information that the member representatives have access about a special futures or option contract through their screens may include the following:

* Current market price
* Best bid price
* Best ask price
* Maximum price
* Minimum price
* Weighted average price
* Settlement price
* Transaction amount
* Transaction volume
* Number of open positions
* Total number of orders at each price interval
* Unexecuted waiting orders (without seeing the codes of other members)
* Executed transactions
* The features of the underlying asset (e.g. dividend payment date, dividend amount, the transaction initiation date, etc.).

With respect to the whole market;

* Total number of orders entered
* Total transaction amount

* Total transaction volume
* Total number of contracts
* The number of futures and options contracts with a price increase
* The number of futures and options contracts with a price decrease
* The number of futures and options contracts with no price change
* The number of contracts not traded

Moreover, each member representative may see all the details concerning their own orders as well as the transactions which may stem from these orders. As the orders are entered on an account basis, some of the inquiries may be made on a account basis. Each representative may also reach the following data concerning the accounts for which they enter orders through the trading system:

* The amount of total collateral in the account
* The amount of the initial margin
* The amount of the maintenance margin
* Blocked margin amount
* Free margin amount
* Total profit/loss
* Margin to be deposited
* The amount of collateral placed as cash and securities separately

On the other hand, each representative may reach the following information pertaining to all accounts for which they make transactions through the PCs in the trading room:

* The number of open positions
* Maximum positions that they may take
* Their market share relative to the open position
* Total profit/loss

As it may be noticed, the futures and options trading system offers a very large opportunity for inquiries.

13. Additional Features of the System

The Futures and Options Market member representative screen works under "Windows." Therefore, the information that may come up with a Windows program, such as Excel, may be linked or transferred to

another program. These transferred data may be used by the representatives, both during, as well as after the session for analysis or database formation purposes.

Another advantage offered by the workstations working under Windows is that any information or table may be printed any time (Printscreen facility). Through this facility, member representatives may, for example, take the daily Futures and Options Market closing bulletin or "temporary transaction book" themselves.

The price analysis of derivatives instruments is more difficult compared to the price analysis of other financial instruments. Taking this fact into consideration, the system will provide a "theoretical price calculation screen" to the representatives operating in the market. The theoretical price calculation screen will show the theoretical price with the current values of various parameters. The users may also adjust the parameters to calculate a new theoretical price. This is a useful tool for traders to perform "what if" investigations. This screen will become more important especially after the initiation of the Options Market.

14. Interaction of the Futures and Options Market Trading System with the Other Markets Operating within the ISE

The futures and options contracts traded in the Futures and Options Market are based on financial instruments and financial indicators traded on the capital markets. For example, the indicator in the stock index futures is the spot value of the index. The same is true for the stock options. Here, the spot price of the underlying stock plays an important role. Therefore, the member representatives operating in the Futures and Options Market should be aware of the spot prices available in other markets.

The ISE Futures and Options Market has been designed in such a way that it will be connected on-line to the ISE Stock Market as well as to the ISE Bonds and Bills Market during the trading session. Representatives trading in the Futures and Options Market may see the spot price of the stocks, index and fixed-income securities immediately (on a real-time basis) and execute their orders accordingly. This data will also be used in the aforementioned "Theoretical Price Calculation Screen" and the changes in the spot prices will immediately be reflected on to the theoretical price.

With the help of on-line communication with other markets operating in the ISE, it will be possible to evaluate the deposited collateral immediately.

15. Reports

The following reports concerning the executed transactions in the Futures and Options Market will be produced by the trading system and provided to the member representatives:

* Trades Report (Transaction Book)
* Open Positions Report on account type basis
* Collateral Breakdown Report on account type basis
* Futures and Options Market Daily Bulletin
* Profit and Loss Report on account type basis

The above mentioned reports will also be provided to the member representatives in a magnetic environment.

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Launching Markets for Stock Index Futures and Options: Case of Korea

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Abstract

This paper discusses experiences on launching Korea's first-ever regulated derivatives market, namely stock index futures, on May 3, 1996, and sub- sequent opening of a stock index options market on July 7, 1997. It illustrates what went on as the Korea Stock Exchange was making a decision on its opening and describes the current status of the derivatives market.

1. Introduction

Competition among financial markets and securities exchanges is no longer bounded by national boundaries. Exchanges, especially in Europe and Asia, are already facing competition from outside their continents as well as across borders. For example, while Taiwan has recently passed the law relating to starting a futures market in March 1997, foreigners are snapping up the opportunity to create a lucrative business. In January 1997, both the Singapore International Monetary Exchange (SIMEX) and the Chicago Mercantile Exchange (CME) have started trading futures and options based on Taiwan stock indices. Obviously, these actions were not widely embraced by Taiwan's financial authorities.

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Contrary to the experiences of most other countries, the newly-created Securities and Futures Commission (SFC) will oversee both the underlying cash market and the futures market. However, futures products will be traded not at the stock exchange but at the Taiwan International Mercantile Exchange (TIME), which was expected to be open for business at the end of 1997. Moreover, a similar experience can be found between the United Kingdom's London International Financial Futures and Options Exchange (LIFFE) and Germany's Deutsche Terminbörse (DTB). LIFFE launched Deutsche Mark denominated German-government bond (Bund) futures and three-month interest rate futures ahead of DTB in late 1988. DTB was one step too late in accommodating Bund futures trading, and, as a result, it is still behind LIFFE in trading volumes of the country's interest rate futures. The lesson we can derive from these recent developments is that if one country cannot determine whether its equity market is developed enough or its size is large enough to introduce a derivatives market, its global competitors will.

2. Study on Feasibility of Introducing a Derivatives Market

As far as the Korean experience is concerned, we, at the Korea Stock Exchange (KSE), started to look into a feasibility of establishing an equity index futures and options market in the mid-1980's, not long after the first stock index futures market was opened at the Kansas City Board of Trade. We investigated and analyzed other countries' financial futures and options trading activities and regulatory environments.

In the early part of 1989, the Korea Composite Stock Price Index for the first time recorded 1,000 points and, soon after, it started to turn southward. As the market movement became volatile, there was a need to equip investors with tools to control market risk. To meet such a need, we formed an independent blue-ribbon committee whose make-up was mostly university professors. Its task was to study whether our financial market was ready to deal with exchange-listed derivatives products including financial and commodity futures and options.

The committee's in-depth analysis indicated that derivatives, based on commodities such as grains, livestock, meat and metals, were not economically feasible. Their reasoning was that some of the products were monopolized, had inefficient distribution channels, were under government control and were lacking clear-cut pricing mechanisms.

Additionally, these products were difficult to standardize in terms of quality and trade unit, and many producers were too small in scale to utilize the derivatives market. If one is in dire need to access the market, several foreign markets were available. Therefore, the committee's recommendation was that financial derivatives were more feasible to introduce in comparison to commodity products.

In the area of financial derivatives, the committee investigated whether long-term and, short-term interest rates, currency and equity index could fulfill the following criteria: market size, price volatility, standardization requirements and the degree of market liberalization. Out of the four financial product types, the stock index was most close to satisfying the necessary conditions.

As far as interest-rate related products were concerned, both primary and secondary markets for bonds were not yet in mature stage and a market for government bonds had not been developed. Additionally, the short-term bond market was closed to foreigners and under heavy influence from the government. The market for currency-related products was too small in size and too heavily regulated under the Foreign Exchange Act.

Contrary to the fixed-income and currency markets, the Korean stock market fulfilled the above mentioned necessary conditions. According to the 1989 year-end figures, the market capitalization stood at $119 billion, which represented 68% of the GNP, and the total number of shares outstanding and the trading value were 4.2 billion and $102 billion, respectively. In comparison to some of the countries which were already operating stock index derivatives markets, these quantitative figures indicated that the Korean market had as good of a chance to succeed as the benchmark countries, which were Australia, Finland, New Zealand and Sweden. Additionally, the investor base was steadily increasing. 14% of total population owned at least one stock while the comparable figures for the U.S. and Japan were 20% and 17%, respectively. It should be noted that the Korean stock market experienced a significant rise in share prices in the latter half of the 1980s.

In order to have a successful equity derivatives market, a fair amount of stock volatility is a must. As table 1 demonstrates, the Korean stock market volatility in 1990, as measured by the standard deviation of monthly returns, was also higher than the ones of the U.S. and Japan. In conclusion, Korean stock market had sufficiently large size and

volatility and had a good number of market participants, which strongly suggests that there would be strong demand for equity derivatives on the part of institutional investors and individual investors with large portfolios.

The final area of concern was the regulatory environment of the stock market. In many aspects, the equity market was still under strong influence of the government. The view of the Ministry of Finance was that while the market had grown quantitatively, the qualitative aspect of the market was still some years behind those of the advanced markets. However, the speed of information dissemination had been quickened, the numbers of professional investors and investment advisory firms had increased, and the market had been rapidly internationalized. All of

Table 1: Summary Statistics for Monthly Changes in US, Japan and Korea Indices (%)

	Changes in absolute value			Changes		
	Mean	Std. Dev.	C.V.	Mean	Std. Dev.	C.V.
Korea	4,885	4,526	92.64	2,014	6,361	315.74
US	3,584	3,249	90.67	1,067	4,729	443.06
Japan	3,341	3,037	90.88	1,626	4,221	259.53

Source: Korea Stock Exchange, Aug., 1990.
The indices used are KOSPI for Korea, S&P 500 for U.S., and TOPIX for Japan. The statistics are based on monthly holding-period returns on indices. Std. Dev. and C. V. stand for standard deviation and coefficient of variation, respectively.

these changes were forcing the market to be more efficient and self-sustained without government's strong-arm tactics. Given these analyses, the committee's recommendation was that the stock index was at the best position to succeed in comparison to other financial derivatives.

The next step was determining which stock index-related derivatives product should be introduced, futures or options. We did not consider the choice of introducing two products at the same time. Instead, we decided to introduce one product at a time allowing market participants enough time to be familiar with the derivatives market. The first criterion we employed was how conveniently the new product could be used as a hedging tool and the second criterion was how flexible the new product

was in helping to manage stock portfolios.

According to the first criterion, the pricing of futures is more sensitive to the changes in underlying cash prices than options. While there are initial and maintenance margin and marking-to-the-market requirements for all futures trades, only option writers are required to put down margin payments. In terms of settlement, both futures and options positions can be canceled by offsetting trades or by cash settlement on the expiration date. Therefore, the committee's opinion was that, while futures were more convenient tools in hedging market risk, options had simpler margin and settlement systems.

In the area of flexibility comparison, the futures market has a low transaction cost feature and has excellent liquidity due to its large trading volume. The options market, on the other hand, has a variety of expiration dates and also has excellent liquidity. After reviewing other countries' experience in introducing derivatives products and given the committee's own investigation criteria, the committee recommended that the order of equity derivatives products to be introduced was, first, index futures, then index options and individual stock options.

Having decided on what would be the first-ever exchange-traded derivatives product, it was now time to convince and educate the government authority on how beneficial it would be to have a stock index futures market in our financial system. The points we emphasized were that stock index futures were important tools in managing systematic risk of stock portfolio investment that, they could be used as new investment products in correctly predicting future movements of the overall market portfolio, and their prices would allow market participants to anticipate the direction of future cash prices. Therefore, having stock index futures would enrich the overall quality of the stock market by providing a hedging vehicle and, subsequently, would enhance marketability and liquidity in the cash market. In turn, it would augment the quality of primary market and the overall financial system.

3. Basic Policy Guidelines and Legal Aspects of Establishing a Futures and Options Market

3.1. Basic Policy Guidelines

As the Brady Report in 1987 pointed out, stocks, stock index futures and

stock index options all together compose one single market. They are closely linked by their price discovery mechanism, market participants and trading strategies. This means that the underlying cash market and derivatives market are not two separate and distinct markets but one market.

Based upon this single market philosophy, we placed top priorities on minimizing any possible side effect that futures might have on the underlying cash market. At the same time, we emphasized on ensuring the operation of the futures and options market to be consistent and harmonized with that of the underlying cash market, while conforming institutional framework to the international norms. As a result, the trading and settlement rules were modeled after those of the underlying cash market.

It should be noted that, originally, the Korean futures market was designed to be institutional investor-oriented. For example, the high trading unit and minimum margin requirement were established to discourage individual investors' excessive participation in the market. But with the opening of the options market in July 1997, we lowered the minimum margin requirement to KRW 10 million from the original KRW 50 million to further encourage a variety of market participants to take part in the derivatives market. Additionally, realizing the importance of educating the public, we have developed a number of programs for market participants as well as the public. As a part of the education programs, we held a series of international seminars with distinguished academics and renowned practitioners.

3.2. Legal Framework

The legal framework of the Korean derivatives market is prescribed in the Futures Trading Act, which became effective on July 1, 1996. However, according to the addenda to the Act, equity-linked derivatives are subject to the Securities and Exchange Law for the time being. The Ministry of Finance and Economy (MOFE) regulates the stock index futures market as the ultimate government regulatory organization. And, the Securities and Exchange Commission has the power and responsibility to approve the listing of new derivatives products, supervise unfair trading and control foreign investment. As a self-regulatory organization, the KSE's role is maintaining a fair and orderly market, and it is solely responsible for implementing clearing and settlement operations.

4. Institutional Aspects

4.1. KOSPI 200

The underlying asset of stock index futures and options contracts is KOSPI 200. This index is composed of 200 leading stocks listed on the KSE. The KOSPI 200 accounts for about 70% of the total market capitalization, and represents all industrial groups in the Korean economy. The selection criteria we used are each firm's market value and trading volume relative to its industry averages. To maintain the index component selection process fair and independent, a Steering Committee was formed. It is composed of 11 academics and practitioners, and reviews the content of the index in June of every year so that if a firm no longer meets the predetermined survival criteria, it can be replaced with other qualified firms.

4.2. Market Participants

As of September 1997, equity-related futures brokerage business is limited to securities companies. In order to participate in the futures market, securities companies are required to be licensed from the MOFE. They should meet capital requirements of KRW 50 billion or US$ 55 million for domestic companies and KRW 15 billion or US$ 16.7 million for foreign ones. Currently, brokerage is done by 48 licensed securities companies, in which 33 are domestic firms and foreign companies take up the other 15.

One particular aspect of the Korean derivatives market is that it has an upper ceiling on foreign participation. It is true that, from the perspective of the futures market, the restriction not only dampens potential liquidity in the market but also leave domestic companies without proven competitors.

The primary reason why the Korean market limits the foreign participation is that there is a large gap between the domestic and international interest rates, and the bond market is yet to be fully open to foreigners. Discarding the entry barrier in the futures market will have an effect of opening the bond market through creation of a synthetic short-term fixed-income instrument by trading cash and futures products in combination. Another aspect of restricting foreign participation is to be consistent with the restricted foreign investment environment in the

cash market. Coinciding with the opening of the options market, the aggregate ceiling was raised to 100% from 30% of the average daily open interest of the preceding three months, but the per individual ceiling of 5% still remains the same. In terms of the number of the contracts, for the month of September 1997, they are 18,909 and 945, respectively. Initially the figures were 15% and 3%, respectively. It is expected that these limits will be further raised as the ceiling on the cash market eases.

4.3. Safety Features

The KSE established some built-in stabilization measures in order to ensure stable operation of both derivatives and underlying cash markets. The daily price fluctuation in the futures market is limited to 5% of the previous day's closing price but there is no limit for options contracts. As the new computerized trading system was put in operation in November 1996, the so-called Side Car and "Circuit-Breaker" were introduced. For the "Side Car" to be kicked in, futures price must fluctuate by 3% or more relative to the previous day's closing price and such deviation must last for five minutes or longer. Then, program trading orders are executed after a five-minute of cooling-off period. For the Circuit-Breaker to be triggered, the futures price must fluctuate by 5% or more from the previous day's closing price and such fluctuation must last for one minute or more. Then, futures and options trading are halted for five minutes.

5. Market Activities Up To Date

As the KOSPI 200 futures and options markets were opened on May 6, 1996 and July 7, 1997, respectively, available data are limited especially for the options contracts, which have been traded only for two months. Considering that the futures market has been in existence for 16 months, the consensus in the market is that it has a potential to be a successful market. As Table 2 and Table 3 indicate, the average daily trading volume for August 1997 was 11,117 contracts, or equivalently, around KRW 435 billion. This notional trading value represents around 86% of the underlying stock market's daily average. The total trading volume for the month was 277,924 contracts which was the highest figur since the introduction, and the daily average open interest was around 11,449 contracts.

As shown in Table 2 and 3, the trading volume, daily open interest and the ratio of futures to stock trading value have been increasing steadily. Market participants are increasingly employing a wide variety of investment techniques such as position trading and hedge trading. However, as Table 4 indicates, they have been overwhelmingly concentrated by, namely, securities companies and individual investors.

Table 2: Average Daily Trading Volume of Futures and Open Interest (Unit: Contracts)

	'96.5	'97.1	2	3	4	5	6	7	8	Average Daily (97)
Tra. Vol.	3,473	5,790	6,427	6,380	5,963	7,706	7,193	8,743	11,117	7,436
Open Int.	2,054	6,594	8,444	8,558	11,561	11,076	7,725	9,441	11,449	9,369

Figures for trading volume and open interest are average daily trading volumes and average daily open interest for each month, respectively. The record volume of 19,800 contracts was reached on August 29, 1997.

Table 3: Size of Futures Market Relative to Stock Market (Unit : Billion Won, %)

	'96.5	'97.1	2	3	4	5	6	7	8	Average Dail. (97)
Stock Market	805	478	551	519	608	721	727	586	508	586
Futures Market	182	201	229	206	204	280	294	350	435	276
Ratio	22	42	42	40	34	39	40	60	86	49

Size of the each market is measured by an average daily trading value of the market for each given month. The ratio is computed by dividing the size of futures market by that of stock market. On September 1, 1997 a record ratio was hit at 157%.

Table 4: Futures Trading Activities by Market Participating Groups (%)

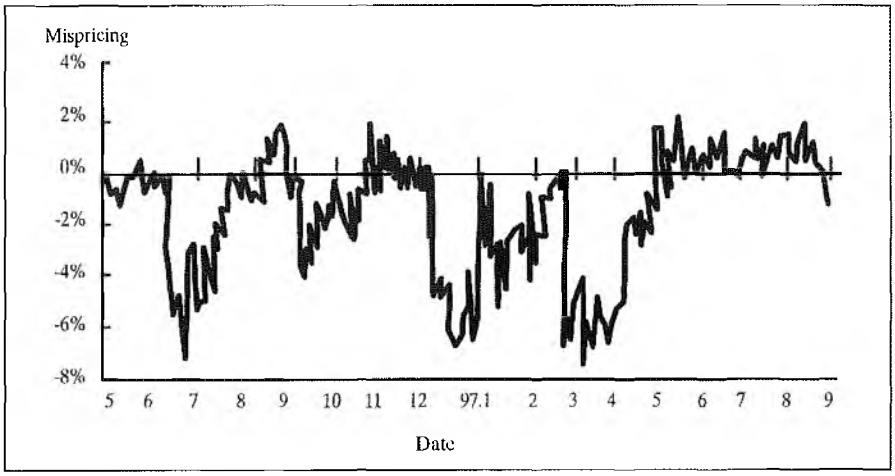
	'96.5	'97.1	2	3	4	5	6	7	8	Ave. (97)
Securities Co.	90	66	73	71	71	72	72	64	63	69
Individuals	3	26	21	20	23	21	20	30	33	24
Institutions	6	4	4	5	3	4	4	3	3	4

Percentage shares by each group are based on the number of futures contracts bought and sold by the group.

These two groups together accounted for more than 90% of the total trading volume. In particular, individual investors have shown a growing interest in the futures market with their share increasing to more than 30%. Furthermore, as the minimum margin requirement was lowered from KRW 50 million to KRW 10 million, with the opening of the options market, participation by retail investors in the futures and options market is expected to increase continuously.

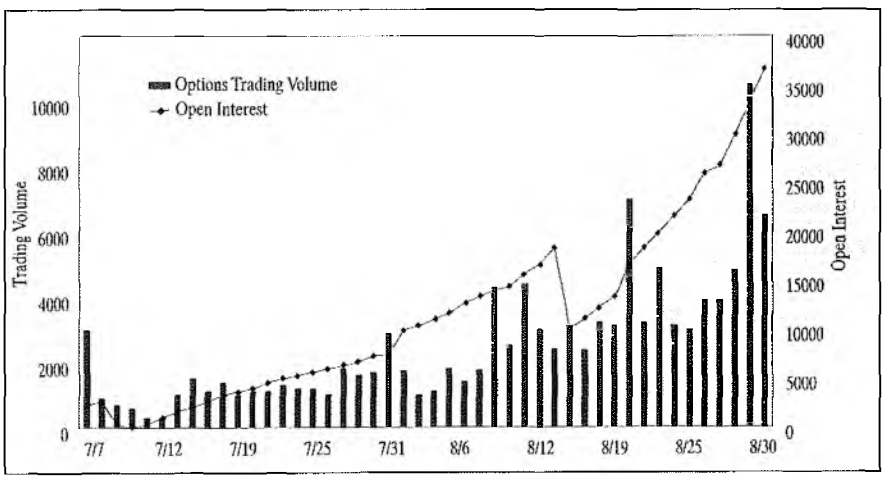
To have a successful futures market, the market needs different types of players; speculators, hedgers and arbitrageurs. Until recently, most trades were made for speculative purposes while arbitrage trading accounted for less than 1% of the total trading volume. It is not to criticize that speculative trading is a bad thing or it is a disturbance to the market. But, what is important is, having a right balance of different traders participating in the market. Arbitrage trading plays a very important role in the futures market, that it makes sure the futures and cash prices do not wander off into different directions. Since April 1997, the volume of arbitrage trading has been picked up as the fiscal year of most securities companies ended at the end of March, which has resulted in more aggressive investment behavior on the part of these companies. Their rationale is, that if they make unprofitable trades, there is some time to make up the differences. Also, these securities companies started to adopt an employee compensation scheme that is linked to the employee's contribution to the firm's bottom-line. As a result, the deviation between futures price and its theoretical price has narrowed significantly as shown in Figure 1.

Figure 1. Futures Mispricing : Percentage Deviation from Theoretical Price. Mispricing is Calculated as (Closing Price - Theoretical Price) / Theoretical Price



The trading activities of the KOSPI 200 options market have been very sluggish in the beginning but they have been picked up recently, as shown in Figure 2. The average daily trading volume for the first month was around 1,250 contracts or, equivalently, around KRW 10 billion and

Figure 2. Options Trading Volume and Open Interest



the trading value relative to the underlying stock market's daily average was about 3.5%. The average daily open interest was 8,290 contracts. However, in August 1997, the average daily trading volume and open interest increased to 3,730 and 38,720 contracts, respectively.

The trading activities of the options market have been far below our expectation. It will take some time to develop as a successful market. The reasons for the sluggishness of the market can be found by analyzing the depth and breadth of the market. It is not an exaggeration to say that a measure of a market's maturity can be determined by its liquidity. A liquid market brings investors and more investors make the market more liquid. When a market lacks liquidity, it is difficult to draw investors to the market. The KSE need to step up its effort in providing continuous education on derivatives to both institutional investors and retail investors.

We need to find ways to bring major institutional investors, such as investment trust companies, insurance companies, and banks, to the derivatives market. It might be that the reason why these players are reluctant to actively participate in the market could be due to their cautious and conservative wait-and-see approach, which is influenced by a torrent of derivatives disasters such as the Barings and Sumitomo Bank.

6. Challenges Ahead and Conclusion

It may be too early to say that the Korean futures market is a success and trading activities of the options market are not going to be the same as the futures market, even after considering the fact that the options market is at an introductory stage. We have a long way to go before our market can be known as a full-fledged derivatives market. Above all, we should encourage major institutional investors to actively participate in the market by removing legal and regulatory impediments to futures and options trading and by educating top management for their better understanding of the derivatives market. At the same time, the foreign investment limit should be gradually raised so that foreign investors may roll over their futures and options positions freely for their hedging purposes. In order to promote hedge trading and encourage broad participation in the futures and options market by institutional investors, we should improve accounting standards by adopting market-based accounting rules and hedge accounting standards.

Coinciding with the opening of the options market, we have made a few rule changes in the futures market. In order to increase the efficiency in the risk management capability of member firms and to conform our trading and clearing rules with international practices, we have introduced the risk-based margin system in both the futures and options markets and shorten the settlement period to T+1 from the current T+2. Investors are now allowed to withdraw excess funds in the accounts after marking to market.

As far as the future prospects of the Korean derivatives market is concerned, the KSE is expected to offer individual stock options in the near future. By the end of 1998, a new futures exchange is scheduled to be established and traded products are most likely to be interest rate and currency futures.

The KSE has enjoyed over 40 years of monopoly but it seems that, for the first time, we will have a competitor in the domestic market. As prescribed in the Securities and Exchange Law, currently, the KSE has the exclusive right on equity-linked derivatives products. Obviously, a right always accompanies a responsibility. On that account, the KSE will do its best to establish itself as a pacesetter in stock, bonds and derivatives markets.

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The Right Time To Introduce A Derivatives Market

Moema UNIS*

In recent years, we have witnessed a profound change taking place in the capital markets worldwide. This process began in the early 1970s when exchange rates were left to float and capital markets entered a new phase.

Indeed, the 1970s brought many changes. Exchange rates became volatile; inflation rose worldwide following the "oil crisis"; interest rates became erratic. The world became more unpredictable and the economic agents learned the importance of a factor to which little attention had thus far been paid: the risk associated with price and market instability. The existence of this risk led to a demand for hedge instruments. This was the birth of the so-called financial derivatives two decades ago, when they represented an innovation in financial technology in relation to the traditional commodities futures markets. Starting in the form of currency and interest rate futures markets, derivatives extended to the stock market with the development of the options and stock index markets.

The trend toward the globalization of capital markets, which accelerated in the 1980s with the development of electronic trading systems, favored the derivatives markets, causing them to grow significantly and to become a market phenomenon.

The Brazilian experience with derivatives started in 1979, when the Sao Paulo Stock Exchange launched a call options market, in a pioneering initiative in the country's stock markets. The stock exchange realized the great potential, at that time, for growth in standard options

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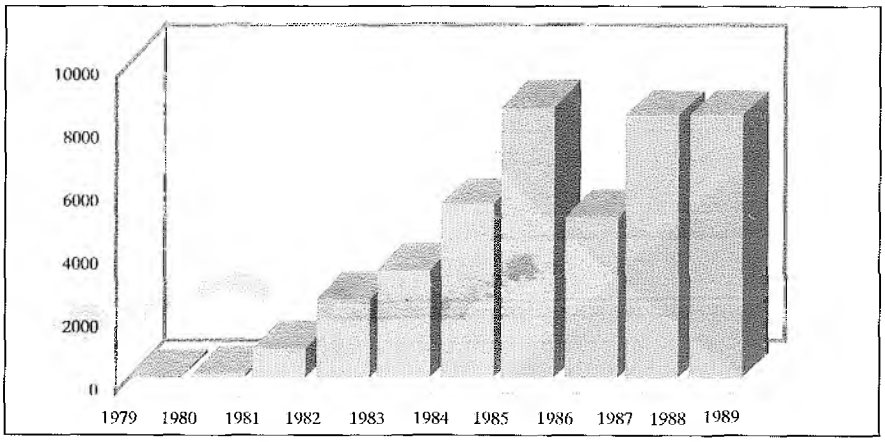
contracts, since similar, yet not standardized, operations were already being offered unsystematically in the over-the-counter market.

Once the new market was launched, the stock exchange took upon itself the technical training of intermediaries and investors, and the task of clarifying and informing the regulatory bodies. In this way, various training programs were sponsored for participants and, as early as 1982, options trading was well established in Brazil.

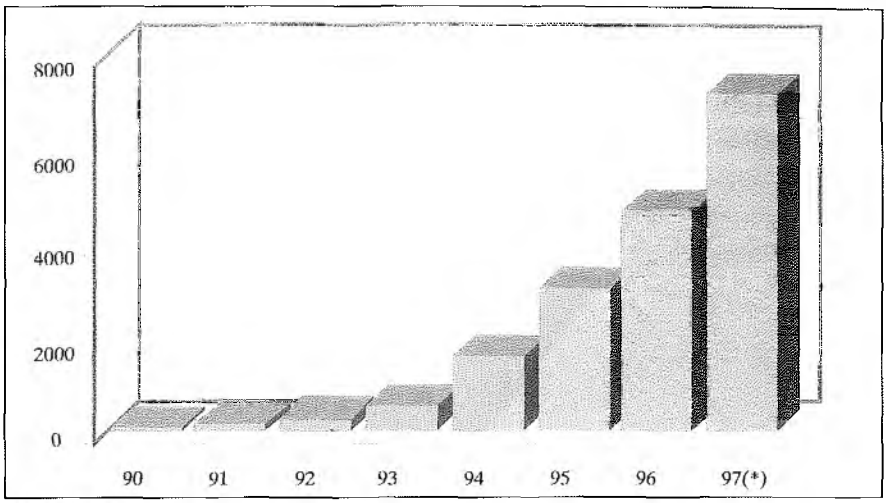
Figure 1: Options Daily Average Trading Value (US$ Thousand- 1979 to 1989)



In 1984, the stock put options market was launched. Still in that period, the Sao Paulo Stock Exchange identified a broad demand for hedging products in various segments of the market and thus decided to create a new exchange, exclusively for the trading of derivatives on the financial and capital markets and also on the commodities market. Founded in 1986, the Commodities and Futures Exchange (BM&F) is today the world's fourth largest futures exchange, in terms of the number of contracts traded. At present, the BM&F trades futures contracts on the Bovespa Index, currencies, exchange rates, gold and commodities, such as coffee, soya, corn and cattle. It also trades put and call options on gold, options on currencies and coffee futures contracts.

More recently, the BM&F has been introducing typical OTC products in its electronic trading system, bringing interest rate swaps for trading on the exchange and flexible options on indices. In these cases,

Figure 2: BM&F Trading Value in US$ Billion



(*) Annualized

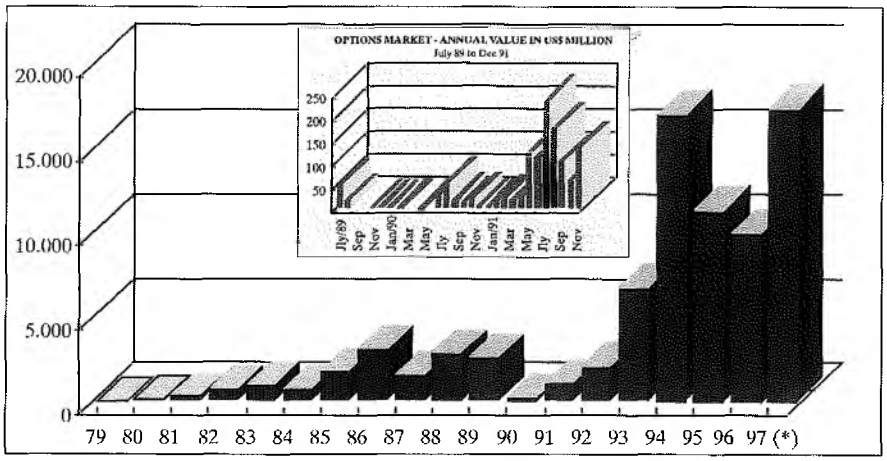
the advantage of the stock exchange system compared with the OTC market became clear, whether in terms of risk control or in terms of trading transparency.

Bovespa's experience also lets us observe this duality of the trading systems. If investors are seeking "tailor-made" or "customized" products, the natural avenue would be the OTC market. If the concern is the guarantee of settlement and risk control, then the choice will certainly be to stick with trading on the exchanges.

With regard to the stock options market, it is important to describe here its development in the 1980s and the substantial fall-off in options trading in Brazil in the two years 1989/90. In June 1989, a major market investor defaulted, with negative impact on some institutions and on the credibility of the stock market as a whole. The official regulatory body (the Brazilian Securities and Exchange Commission - CVM), under heavy pressure from the event, introduced severe restrictions on options trading immediately after the episode, practically extinguishing the market at that time. Only a year later were the restrictions relaxed, allowing the resurgence of trading. This is a good example of the care required by a capital markets regulatory body. Its prerogatives in the market must have as, an overriding limit and reference, the preservation

of the conditions under which the market can work on an ongoing basis.

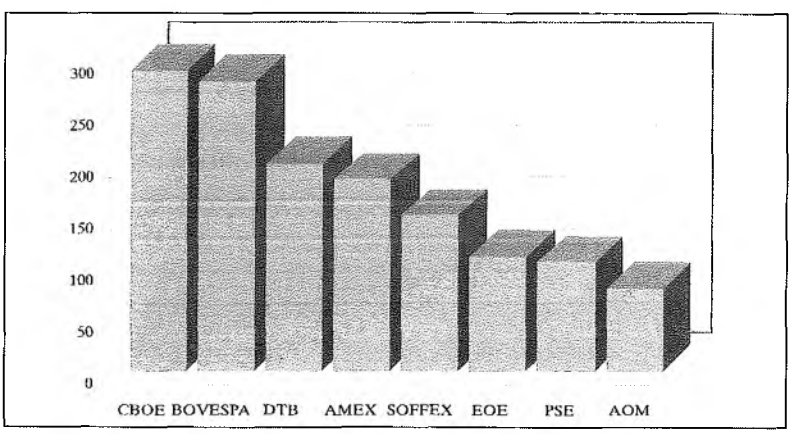
Figure 3: Options Market Annual Value in US$ Million (1979 to 1997)



(*)Annualized

In recent years, with the remarkable expansion of operations involving stock options on Bovespa, the options market has been going through a phase of great vitality in Brazil. In 1996, the Bovespa options market was the second largest in the world in terms of stock options notional value.

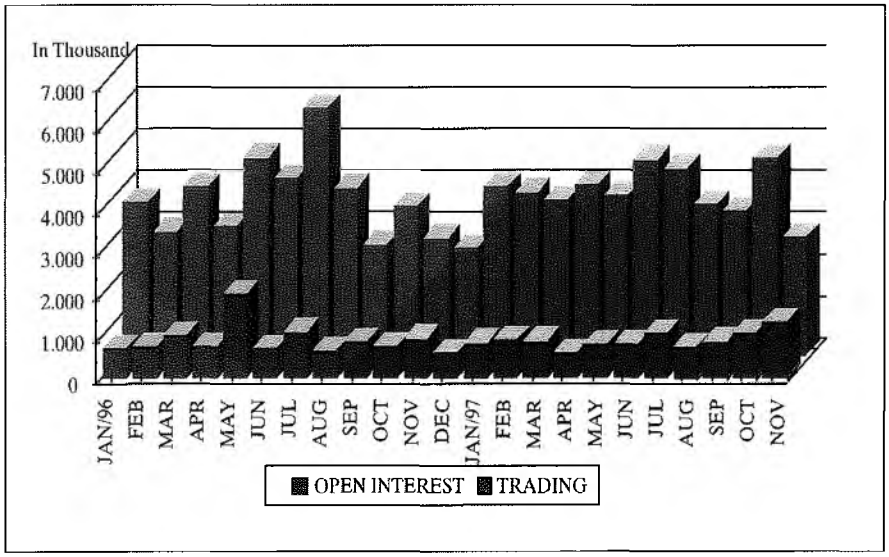
Figure 4: Top Eight Exchanges Ranked by Stock Options Notional Value (1996, in US$ Million)



Source: IOMA

The following figure shows the recent growth of our options market, giving the open positions month by month and the volume of contracts traded for 1996/97:

Figure 5: Options Market Number of Contracts (January/96 to August/97)

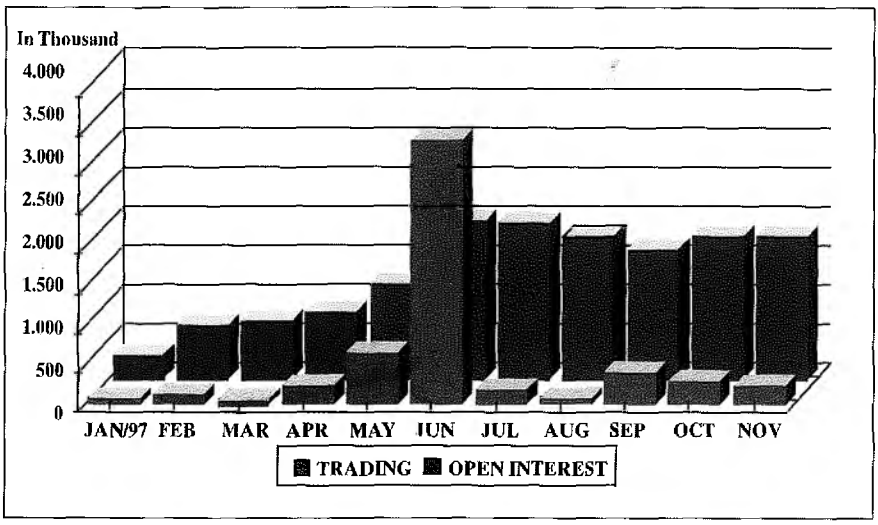


In 1993, Bovespa developed an innovative example of the use of stock options for international investors operating in the Brazilian stock market to cover exchange rate risks. In the middle of that year, we noticed that many overseas investors were staying away from the options market, as this market did not offer long-term maturities.

This derived from the extreme instability of the Brazilian economy, especially the chronic inflation that had marked the country between 1980 and 1993.

In response, the stock exchange launched dollar-denominated options contracts with maturities of no less than one year. The results were an immediate success, far more so than we expected:

Figure 6: US Dollar Denominated Options Market
Number of Contracts (January to August/97)



This experience -certainly still modest- by the Sao Paulo Stock Exchange in the derivatives world has provided some important lessons for capital market professionals in Brazil. For example, we observed that the derivatives markets were very successful in Brazil because the respective cash or spot markets were relatively big in terms of participants and the volume of trading. In other words, there were risks waiting to be covered. There were participants seeking cover for these risks and speculators willing to take them on.

We concluded too that the assimilation of technically sophisticated products like derivatives, in general, and options, in particular requires a substantial effort to familiarize and train participants, from employees of the stock exchange to brokers and even potential investors, university students and technical staff in the regulatory bodies. In an initial phase, while the industry is developing, it is to be expected that the stock exchange and the other leading capital markets institutions take the lead in this educational process.

We observed finally that the development of these markets depends on relatively advanced technological support, in terms of trading systems, custody of securities and settlement of operations.

As a condition for successful development, these three factors form the supporting base for the derivatives markets.

At the same time, we observe that the vertiginous growth of derivatives round the world has produced considerable concern on the part of regulatory bodies and governmental authorities, showing that we need more information on these exotic products.

The recent Asian crisis gives evidence of the need to know more about the nature of each product and the risks to which they subject the market participants. In Brazil, the capital markets proved to have acquired a considerable level of maturity. In response to the crisis, the stock and future exchanges interacted rapidly and, using their regulatory power, adopted coordinated procedures to preserve market conditions, such as fixing oscillation limits and increasing margin calls. These measures led the markets to have a less damaging performance during that disturbing period.

Today, the concern on the part of regulators, in respect of these markets, lies in the need to maintain an adequate relationship between derivatives instruments and their respective underlying markets. As derivatives markets grow, we must not lose sight of this relationship, otherwise, we shall have a situation where the derived element is more important than its object.

With regard to the controversy of stock exchanges versus OTC markets, we can say that each segment has its own characteristics and serves a particular niche in the search for derivative products. Whoever is seeking more personalized products will find them in the over the counter market. In this case, however, the investor's security and risk control may not be up to what is considered as acceptable.

If, on the other hand, the investor is seeking standardized products and a background of greater trading transparency, the stock exchanges offer a better alternative. In this case, the investor has the additional degree of comfort in having the stock exchange itself, or its respective clearing-house as the counterpart to the contract, giving this system a superior degree of risk control.

With regard to trends, we have been able to see, for some time now, a certain degree of overlapping between market segments. In this way, for example, the over the counter markets offer long-term options (warrants) on international stock exchange indices, as well as options,

warrants and other derivatives instruments on debt and stocks of developing countries. At the same time, some stock exchanges have been successfully launching the so-called flex options, reducing the degree of standardization of traditional options.

This is a new phase in the competition between the two markets, and it may set a trend from now on. This competition may well be healthy for the development of the capital markets, in so far as investors will have available a range of new and sophisticated products for their hedging or speculative operational needs.

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ISE Market Indicators

STOCK MARKET

Year	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	—	—	709	938	9.15	5.07
1987	82	105	118	—	—	3,182	3,125	2.82	15.86
1988	79	149	115	1	—	2,048	1,128	10.48	4.97
1989	76	1,736	773	7	3	15,553	6,756	3.44	15.74
1990	110	15,313	5,854	62	24	55,238	18,737	2.62	23.97
1991	134	35,487	8,502	144	34	78,907	15,564	3.95	15.88
1992	145	56,339	8,567	224	34	84,809	9,922	6.43	11.39
1993	160	255,222	21,770	1,037	89	546,316	37,824	1.65	25.75
1994	176	650,864	23,203	2,573	92	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	258	9,048,720	58,103	35,908	231	12,654,308	61,879	1.56	24.39
1997/Q1	233	1,831,881	15,520	30,031	254	5,661,686	44,891	3.40	15.25
1997/Q2	240	1,223,592	8,852	20,393	148	6,423,060	43,846	3.01	17.09
1997/Q3	250	1,892,461	11,651	28,674	177	9,614,242	55,702	2.06	18.60
1997/Q4	258	4,100,786	22,080	63,089	340	12,654,308	61,879	1.56	24.39

*Q=Quarterly

Closing Values of the ISE Price Indices

TL-Based

Year	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	3,451	2,660	3,593	4,522
1997/Q1	1,613	1,602	1,451	1,769
1997/Q2	1,857	1,729	1,874	2,011
1997/Q3	2,593	2,432	2,569	2,884
1997/Q4	3,451	2,660	3,593	4,522

US$-Based

Year	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	982	757	1,022	1,287
1997/Q1	744	739	669	816
1997/Q2	738	687	744	799
1997/Q3	874	820	866	972
1997/Q4	982	757	1,022	1,287

*Q= Quarterly

BONDS AND BILLS MARKET

Traded Value

Outright Purchases and Sales Market

Year	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	5,503,632	35,472	21,840	141
1997/Q1	1,172,033	9,893	19,214	162
1997/Q2	609,769	4,469	10,163	74
1997/Q3	1,431,871	8,836	21,695	134
1997/Q4	2,289,959	12,274	35,230	189

Repo-Reverse Repo Market

Outright Purchases and Sales Market

Year	Total		Daily Average	
	TL Billion	US$ Million	TL Billion	US$ Million
1993	59,009	4,794	276	22
1994	756,683	23,704	2,991	94
1995	5,781,776	123,254	22,944	489
1996	18,340,459	221,405	72,780	879
1997	58,192,072	374,384	230,921	1,486
1997/Q1	9,191,669	78,194	150,683	1,282
1997/Q2	11,481,548	83,560	191,359	1,393
1997/Q3	15,217,903	94,088	230,574	1,426
1997/Q4	22,300,952	118,542	343,092	1,824

*Q=Quarterly

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

	30 Days	91 Days	182 Days	General
TL-Based				
1996	103.41	110.73	121.71	110.52
1997	102.68	108.76	118.48	110.77
1997/Q1	103.93	112.24	124.53	112.40
1997/Q2	103.32	110.65	122.03	119.23
1997/Q3	102.94	109.33	119.09	113.27
1997/Q4	102.68	108.76	118.48	110.77
US$-Based				
1996	57.09	61.13	67.19	61.01
1997	29.71	31.47	34.28	32.05
1997/Q1	48.76	52.66	58.42	52.73
1997/Q2	41.73	44.69	49.29	48.16
1997/Q3	35.29	37.48	40.82	38.83
1997/Q4	29.71	31.47	34.28	32.05

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

	30 Days	91 Days	182 Days
TL-Based			
1996	222.52	240.92	262.20
1997	441.25	474.75	525.17
1997/Q1	259.97	284.76	317.11
1997/Q2	305.53	332.68	370.48
1997/Q3	364.86	395.03	436.98
1997/Q4	441.25	474.75	525.17
US$-Based			
1996	122.84	132.99	144.74
1997	127.67	137.36	151.95
1997/Q1	121.96	133.59	148.77
1997/Q2	123.40	134.37	149.64
1997/Q3	125.07	135.42	149.80
1997/Q4	127.67	137.36	151.95

*Q= Quarterly

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Book Reviews

Managing Derivative Risks: The Use and Abuse of Leverage, Lilian Chew, John Wiley & Sons Ltd., England, 1996, pp. xviii+313.

Methods of managing derivative risks and practices are still evolving. Thanks to the painful lessons inflicted by the "market shock" events in the last decade, the application of mathematical models in designing and managing the risks of new products and strides in the computer technology have grown more rapidly than at any time. This book by Lillian Chew, the "Managing Derivative Risks," provides a non -technical introductory of the inherently complex structures; concerning derivatives and explores the subject of managing derivative risks in the context of examples drawn from actual cases.

Generally, there is a polarization between decision makers who only see the advantages and not the risks and those who only see the risks. The author tries to bridge the gap by giving examples of misuse with cases on the ineffective conclusions uses. Drawing cocnlusions from those well-publicized management failures increases the improvements in efficiency from risk management.

The book is composed of three main parts. First part deals with the efficient trade-off between risk and return. The topics discussed in the second part examine three types of risk spot, forward and option - by copious examples from a qualitative standpoint. The third part focuses on the importance of management information and the internal control systems in a firm that trades derivatives.

Chapter 1 explains the most efficient means of eliminating unwanted financial risks with the various types of derivative instruments -forwards, swaps or options, either seperately or together. Because only a small amount of money is needed to reach large exposure, investors have used this leverage to protect themselves against downside risks. Thanks to investment technology, leverage can be incorporated into almost all instruments, most obviously bonds and swaps. This synthetic leverage is illustrated by inverse floating-rate notes bought by

California's Orange County.

After explaining examples of how derivatives can be put to good use in Chapter 1, the author shows how the same instruments can be put to inappropriate use in Chapter 2. Because of embedding of both options and leverage into bonds and swaps, end-users can take on more risks than they had intended. Leverage and selling options must be consistent with the objectives and the risk profile of the firm.

Chapter 3 examines the gap between a company's actual position and perception. As derivatives are off-balance sheet instruments, it is difficult to understand whether they are used properly or improperly. Firms are required to inform shareholders on the objectives and details of their derivative transactions and the attendant risks.

Topics covered in the second part examine the risks of derivatives. Chew provides the essentials of risk types by keeping mathematical formulas to a minimum. Relating technical and mathematical concepts to familiar objects makes it easy for everyone to understand derivatives.

Spot risks of spot instruments, forward-based instruments and option-based instruments are explained in Chapter 4. As derivatives derive their value from the spot markets, they have significant price risk. For a forward-based instrument such as a future, a forward or a swap, delta shows how sensitive is the price of the underlying asset. This chapter also focuses on hedging the price risks of derivatives.

Chapter 5 covers the risks associated with forward-based instruments such as swaps, forward rate agreements, forwards and futures. As a forward-based instrument is an agreement to buy or sell an asset in the future, the price of a forward is the future value of an asset in today's terms. Thus, the additional risk of a forward over price risk is interest-rate risk. The author shows the pitfalls of assuming stable overnight rates by the European Exchange Rate Mechanism crisis of September 1992.

Chapters 6 and 7 analyze specific option risks. Chapter 6 describes curvature and time decay since both are directly but negatively related. Gamma (curvature) measures how the price sensitivity of an option will be affected given a change in the price of the underlying. Time decay of an option is known as theta.

Chapter 7 deals with the various aspects of volatility. Option values are not only affected by price changes in the underlying assets but also

by the volatility of those prices. The more volatile an underlying asset, the higher the option price. Volatility risk, which is unique to options, is defined as the risk of an option position, changing in value as a result of changes in the underlying asset's volatility. This chapter also explains that volatility risk can only be hedged by going long or short on similar options.

Chapter 8 discusses the fact that reverse engineering cash instruments, swaps, forwards and options is essential if an end-user is to understand all the camouflaged risks. In addition to this, there is a checklist composed of 10 Commandments about derivative transactions at the end of the chapter.

Strong corporate governance remains critical to managing derivative activities. In the last part of the book, Chew discusses the importance of the firm's risk measurement and control system. Every firm that trades derivatives should provide adequate resources devoted to controlling the risk resulting from derivative activities. From a risk management point of view, presenting a whole series of numbers under Greek letter headings to profile a firm's currency or equity exposure is not helpful to the top management. One number summation of all these risks representing the firm's total potential market risk provides effective means for controlling systematic risk exposures to interest rates, currencies, commodities and equity markets. This can only be achieved by a strong management information and internal control systems. This chapter covers the Value at Risk, which is a statistical estimate based on historical data. This number shows the amount of money an institution could lose or make due to price changes in the underlying market. Three main approaches to calculating value-at-risk, namely the correlation method, historical simulation and Monte Carlo simulation are also introduced in this chapter.

The last chapter of the book analyses the disastrous consequences of inadequate control and risk management. The chain of events which led to the collapse of Barings, Britain's 200 year-old bank, shows the importance of integrating the risks into the derivative trading firm's risk measurement and control system. The crux of Baring's collapse lies in the lack of senior management involvement. Barings' capital position, being not sufficiently strong to support all derivative risks on a fully consolidated basis and operating without any position limits imposed on

trading activities in Japan and Singapore, led to the downfall of the bank. The collapse of Britain's oldest merchant bank was the result of a total lack of risk measurement and control system.

In this book, Lillian Chew gives the basic risk management calculations of exposures for derivatives by well-known and actual derivative cases by a minimum level of stochastic calculus. At the end of the book, a glossary of derivative terms is also provided. This approach enables a lay reader to grasp the essentials of various types of derivative risks as well as broadening the view for both the private-sector practitioner and public policy-maker.

Derivative Securities, Robert Jarrow & Stuart Turnbul, South-Western College Publishing Ohio, 1996, pp. xxi+686.

Derivative securities, generally defined as a financial contract written on an underlying asset, have an important role in the development process of the financial markets and are being extensively used in the developed markets since the early 1970s. These securities, whose values and names are derived from the underlying asset, hence, called derivatives, are much more complex, difficult to understand and highly-leveraged instruments. The high leverage effect which implies a small change in the price of the underlying asset, causes large price swings in the derivative's price and is the culprit behind huge corporate financial losses at firms like Gibson, Procter and Gamble and Barings. In this respect, derivatives, though mainly used for hedging purposes, can be excellent instruments for speculation which is the flip side of the same coin.

Written in a text book format, advisable for the advanced undergraduates and MBA students, Jarrow and Turnbul's book, titled "Derivative Securities," handles such a complex subject broadly, in a simple and detailed manner, both from theoretical and practical perspectives. The book consists of 20 parts, focusing mainly on the conceptual definitions an introduction to the derivative securities, pricing models, and then a further detailed inquiry of the derivatives on foreign exchange, market indices, commodity and interest rates, swaps,

credit risk, exotic-options and hedging techniques by using derivatives. At the end of each chapter, there is a part summarizing the subject, and there are also questions to make the student deal with the practical issues. Presentation of a unified approach to pricing and hedging derivative securities of all kinds is one of the most important characteristics of this book that distinguishes it from others focusing on options or futures separately. Moreover, derivatives on foreign exchange, stock market indices or interest rates are examined including the exotic-options which is a fairly new subject. Another new concept, the credit risk, is also included in the pricing and hedging and there are many numerical exercises that enable the reader to understand the subject. The book also supplies a user-friendly software that allows pricing equity, foreign currency, and interest rate derivatives, as well as many types of exotic options.

In the first, part entitled "Introduction to Derivative Securities," forward, futures and options are described briefly and it is mentioned that there are four main differences between a futures and a forward contract. The futures contract is standardized and traded in organized exchanges, while a forward contract is not standardized and traded in over-the-counter, where options are traded in both. The second part focuses on the simple arbitrage relationships for futures and forward contracts and the relationships between the spot and forward prices, usually called cash-and-carry. The conclusion of the part is that: forward and futures prices are, generally, not equal, due to the randomness of short-term interest rates and the reinvestment risk inherent in marking-to-market, but only equal when there is no uncertainty about future interest rates. The same subject is examined in the subsequent chapter that sheds light on the price relationships for put and call options.

Chapter four, devoted to asset price dynamics, forms a key step for pricing all kinds of derivatives using a binomial model which assumes a lognormal distribution. The binomial model and the martingale pricing constitute the subject of the next two chapters. American option forms the subject examined in Chapter 7 as they differ from others in many ways. To give an example: for American call options, if there is no dividend on the underlying stock, it is not optimal to prematurely exercise the option unless the presence of discrete dividends, which only

occur just before the stock goes ex-dividend. However, this is not valid for American put options as the potential gains for waiting to exercise it are bounded by the strike price. Due to the fact that a "forward option" can be considered as a standard option on the spot, with a changing strike price due to the increases at the interest rate, it is always sub-optimal to prematurely exercise not only the American call options but also the American put options.

Chapter 8 introduces the Black-Scholes Model for pricing options that is used mainly because of its mathematical simplicity. For this model to implement, one should know the stock price, the strike price, time to maturity, the risk free interest rate and volatility which is the only variable that cannot be directly observed. Volatility should be estimated by using historic data or be inferred using traded options prices. The next chapter extends the Black-Scholes model by taking the dividend into account, and goes through the "Known Dividend Model," "Pseudo-American Model," and "Roll Model."

Chapter 10 offers a guide for model specification, and different hedging techniques, (such as Delta, Beta and Gamma) to reduce its effects. Chapter 11 focuses on the pricing and hedging of derivative securities written on foreign currency. The pricing of such derivatives is actually analogous to the pricing of derivatives written on a stock with a known constant dividend yield. American valuation procedures and the construction of synthetic options using futures contracts for both the binomial and continuous time models are other subjects discussed in the chapter. The following chapter sheds light on the pricing and hedging of derivatives written on stock indices and commodity. Interest rate contracts are discussed in the following chapter. The term structure of interest rates, Treasury bond futures option known as the "wild card options," duration, FRA and Eurodollar futures are the other issues of the chapter. Chapter 14 is devoted to swaps and Chapter 15 to interest rate derivatives.

Pricing Treasury bills, Treasury bonds, Treasury futures and hedging with model misspecification are the subjects of Chapter 16, in which the Heath, Jarrow and Morton model is used. The continuous model of Heath, Jarrow and Morton to pricing the interest rate derivatives is introduced in the following chapter. Black model for Caps and Floors, options on Treasury bill futures and options on Treasury bond futures

are also included in Chapter 17.

The analyses are extended in Chapter 18, in a way including a fairly new concept, the credit risk. Pricing credit risky bonds, pricing options on credit risky bonds, pricing vulnerable derivatives, valuation of a swap and credit default swap, regulation are all new concepts in literature. Another new and difficult-to-understand subject is the exotic options. European binary options (gap options), paylatter options, compound options (options on put or call), chooser options, options on the minimum and maximum of two risky outcomes are all types of exotic options examined in the chapter. These exotic options are considered "path-independent," implying that their values at maturity do not change upon the path taken by the spot exchange rate prior to maturity. The pricing of such options is easier than that of path-dependents which are examined in the last chapter.

"Valuation of Fixed-Income Securities and Derivatives," Frank J. Fabozzi, Frank J. Fabozzi Associates Publishing USA, 1995, pp. xiii+282.

Along with the introduction of many new derivative securities, financial markets force the participant to take more sophisticated investment decisions. In parallel with this development, diversified fixed-income securities markets, supply investors a wide-range of risk-return opportunities with complex structured securities including derivatives. The traditional valuation methods have become insufficient for the valuation of these new instruments as they use a single discount rate for the expected cash flows to be received from a security. Thus, the term structure of interest rates are not taken into account and they fail to value option embedded securities. The book, written by Yale University Professor Frank Fabozzi, provides a framework for the valuation of any type of fixed-income securities that takes into account the term structure of interest rates and includes option embedded securities. To achieve the goal, two methods - the "Binomial Method" and the "Monte Carlo Simulation Method" -are illustrated. First, these methods

and their applications are given in a way to value callable an putable bonds, step-up notes, range notes, mortgage-backed securities, inverse floating rate securities and convertible bonds, then, they are extracted to interest rate futures, interest rate options and interest rate swaps.

The book contains 12 chapters. Each chapter begins with a part specifying its objectives of the chapter and ends with a section summarizing the subject in brief citing the key points, enabling the reader to understand the primary thesis. It is also very practical and useful for an overview of the chapter instead of reading.

The first chapter begins with the fundamental valuation principles and the valuation features with the estimation of the theoretical Treasury spot rates or equally zero-coupon rate for various maturity. The reason that the process begins with this estimation is that these rates are assumed to be the benchmark or minimum interest rate to discount a security's estimated cash flow. Chapter 2 examines the role of the theoretical Treasury spot rates in the valuation process in detail. It focuses on the difference between the Treasury yield curve and the Treasury spot rate curve, how the theoretical spot rate curve for Treasury securities is constructed from the Treasury yield curve, what the discount function is and how it is determined. Then, one can find how to price any Treasury security by using the Treasury spot rate curve which is simply the graphical depiction of the relationship between the yield on Treasury securities of different maturities.

Chapter 3 entitled "Forward Rates and Term Structure Theories," emphasizes that the theoretical spot rates are related to forward rates which are viewed as the future rates that the market acquiesces on. Later on it focuses intensely on what the forward rates are, how they are determined, and the relationship between spot rates and forward rates. The model to be used in determining the future interest rates is essential for valuing fixed-income securities with embedded options as the future rates have an influence on the cash flows. The two fundamental theories, namely the "Expectation Theory" and the "Market Segmentation Theory," aim at explaining the shape of the yield curve and are also discussed in Chapter 3. The short-term interest rates that are assumed to follow a stochastic process are mainly used in most of the valuation models. This subject is palpated in the appendix to the chapter.

Chapter 4 sheds light on the techniques to measure the price sensitivity

of a fixed- income security to interest rates changes, a by-product of the valuation process, which is dubbed as duration. Two most commonly used measures of duration the "Modified Duration or Macaulay Duration" and the "Effective Duration," are discussed, with an argument that, as the former is a worthless measure for securities with embedded options, it is not recommended for the investors to use it.

Chapter 5 accommodates useful information to value a fixed-income security with an embedded option. As the value of such securities depends on the value of the embedded option, the factors affecting this value gains importance. Sifting through these factors, the two valuation methods to value fixed-income securities with embedded options, the "Binomial Method," the "Monte Carlo Method" and the option-adjusted spread (OAS) (albeit a by-product of these methods in essence, but often confused to be a new technology for valuing securities by market participants) are mooted. These two methods are canvassed at the following chapters. The Chapter 6 in which the binomial method is focused on also contains application of this method to corporate bond valuation. The Monte Carlo Simulation Method, which is mostly used for the valuation of mortgage-backed securities, is the subject of Chapter 7. In addition to an illustration of the method to value such securities, for each method, the procedure for calculating the OAS, effective duration and effective convexity are explained in Chapter 7.

In Chapter 8, the principles for valuing inverse floating rate securities, which are quite popular in collateralized mortgage-backed securities market and in the municipal securities market, are explained. As to provide a reminder of the near past, these securities were the culprit behind the US$ 1,7 billion bankruptcy of California's Orange County in December 1994. The state-of-the-art technology for valuing convertible securities constitutes the subject of the next chapter.

The last three chapters are devoted to financial derivatives, consecutively futures on interest rates, options on interest rates and swaps on interest rates. First, a basic description of each contract and then the framework for valuation process are provided.

The book, shedding light on the valuation of all types of fixed -income securities and handling the subject by all the aspects and written by a well-known expert in the field, is an excellent guide for those who specifically want to focus on fixed income securities and their derivatives.

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