APPLICATIONS OF STRUCTURAL DERIVATIVE INSTRUMENTS & HEDGING TECHNIQUES FOR CORPORATE INSTITUTIONS ON TURKISH FINANCIAL MARKETS

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Abstract

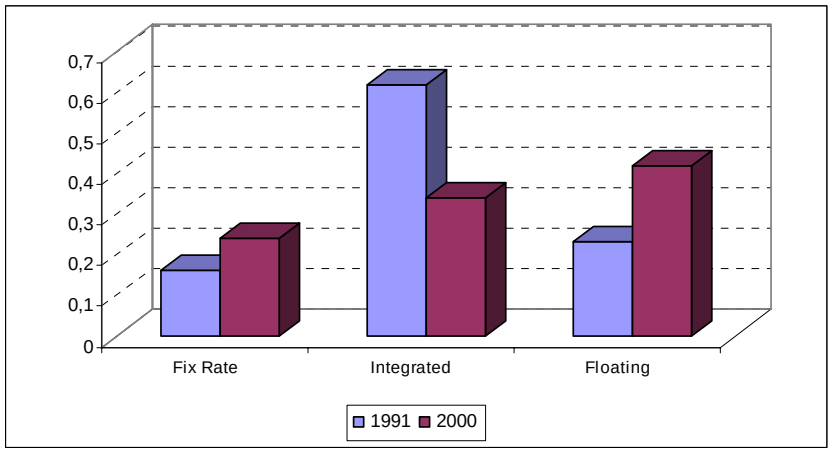
Organised futures exchange market has started in Turkey with high expectations but it is not clear that do we have to wait for a while or not for widespreadly preferrence by the corporates if these new tools doesn't known in detail. Under the new financial and inflation targeting environment, working conditions has shrunk profit margins of the institutions. However financial conditions has been changing so quickly as it's clear that institutions must be more proactive and allow more derivative applications in their businesses in order to get protected from the financial risks. Especially in last 20 years the financial derivative products of importance has been increased a lot. Futures & option contracts are traded in several international derivative markets but structural design option strategies are coming more common used instruments by the help of investment banks, fund managers and multinational companies after the financial crises. The aim of this paper is to apply some of these structural designed financial derivative instruments such as; FRAs, Structural Option Strategies in the Turkish FX markets that gives us a quick decision in terms of hedging cash flow needs. By the help of this financial derivative applications corporate demand will enhance the transaction volumes of the financial markets in the coming years. As we know today that, international institutional players acts by a full design of complex derivative strategies which are linked with in different country based financial instruments.

Keywords: Financial Risk Management, Financial Derivatives, Option Strategies, Hedging Techniques

1.Introduction

In the beginning of 1970s Bretton Woods system was quitted and during the years of 1980 in the developed countries financial crises increased. Besides current financial environment has been bringing new financial solutions. After financial risk management applications of international businesses has been developed the risk applications had been started to develope by over nation qualify. Especially during 1990's in this point appeared to be used a period as beginning of a quick developing financial condition. As for last years known as the financial risks appeared with rather variety and created damages on firm values also rather higher.

Table 1.Currency Regime Preferences



Source: TCMB

According to the Table 1 above, it can be understood that without the small country applications it is possible to say lived a common tendency directed towards floating exchange rate system in the last years. The direction of this selection, expressed markets as presented to corporates protection instruments from different risks by a wider selection contrary to floating of exchange rate.

1.1. Psychology, Risk and Investment Attitute

Financial risks located basically every point of daily life, periodically within taked many financial decisions. In Turkey for years the greatest rate of economical discussions constituted by exchange rate, interest rate, and stock price risks with leaving at one point when we required examples from the point of financial risk perception we may construct more easily an introduction. Lets assume that in the end of next year for you how much would be an increase in the TL/$ exhange rate? While you are searching the answer to one classic question of this style, because of possibly higher estimation you needed to be sure in 95% of confidence interval. On the other hand in the end of next year for you how much would be a decrease at most in the TL/$ exchange rate? Also for this question while you are searching an answer similarly must the estimation needed to be sure by 95% of confidence interval. While financial desion of a person decided rational expectations with an over self confidence emotion in last years has been researched with all aspects in the studies of "Behavioral Finance" concept. Consequently when we turned to the problem to reach together also with your expectation, be sure by 95% confidence interval rate because of to become a reality in your determined one trust level of appeared result. As a result needed also a possibility by 5% rate to consisted a deviation by 5% rate. In applied researches 20% of these kind of participants amazed rather to the deviation situation becomed by 5% rate afterwards. Between 10%-15% of studied participants confronted with the confused results in spite of their express of they are certainly to be sure while they make decisions. Basically lived experiences are not different from reality of

higher possibility against us with not estimated shapes of becomed suprises in financial markets. Indefiniteness and risk factors now are the most important one in reality seriously required.[1]

Investor's in financial decisions relucted from to loose with an extremely rational shape. We assumed that we have an one financial investment decision. By giving this decision, we have a risk of losing USD 1.000 by 50% and chance to win USD X by 50%. Given these circumstances, what should "X" be in the gain section? The researches so made generally show that the answers are varying between USD2.000 to USD2.500. In line with the answers from the investors, it could well be said that the risk avoidance coefficient was about 2.5. In the end, the narrow thought forms stimulate prejudices of 2 types. Optimistic prejudice (brave estimations) shaped with avoided risk. In this way people could make easily mistakes and trusted own more than necessary. But while people undercontrolled with any shape, while avoiding from risk, if loosing is inevitable then they ranked to following risks.

Before protection from financial risks effected financial decisions on basic risk groups shaped by operational, credit, market, liquidity risks and it will be also rather useful with the begining of evaluation these decisions by a window of behavior psychology.

If viewed to events by shape of matters protection from financial risks and management, basically corporate managers must consider risk control, insurance, avoiding from risk, learning and management levels in a whole case and measured with help of definite plan, strategy & politics supported models by shape of institution speciality required going towards to future.

From the view point of strategy of financial risk administration applications we observed that developed with the tools of statistical risk measure methods that accepted commonly worldwide in last years and with the aid of portfolio variety methods and individual risk decreasing technics (hedging) between on a large scale different financial products. Here if the financial poverty improved than also produced alternative risk transfer tools and with the different financial engineering applications corporates carried out financial protection technics.

1.2. Basic Risk Indicators

In spite of the change of financial science in last years presented some basic risk indicators without difference. With the determination of shapes of financial derivative products such as; 1.Generation, 2.Generation and 3.Generation classified, however constructed intensively duration & convexity analyses, delta & gamma analysis in option portfolios and risk analyses with different methods of all financial instruments with Beta, Alfa analysis, financial instruments by fixed & changeable interest rate on stock portfolios. In financial markets the risk concept examined with Sigma(σ) or Volatility expression. Probable financial damages appeared from combination of these two factors. These are the volatility of financial variable and from risk connected positions appeared on portfolio alterations. Financial institutions naturally with don't founded any one control capability on volatilities of financial variables owned management possibility of their risk uncovered positions. [2]

Financial instruments exposed to risk related to price movements of risk factors. In stable profited securities market discussed one risk related with interest rate and term structure risk of position expressed with "Duration". Duration produced one value that is primary degree approximation to price change, nevertheless 'Convexity' expressed secondary degree interest-price rate. In stock market the risk examined with 'Systematic Risk or Beta' (β). In derivative markets the movements on value of related financial existence measured with 'Delta' (Δ) equivalent. Delta defined with alteration of constituted in option premium of one unit change at price of related existence writed option. Call option changed between 0 and 1 delta values. Clearly, options at loss don't affected too much from the related existence and deltas becomed close 0. Option premiums related nearby with related existence price and delta values

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[1] Kahneman, Daniel.(2000); Psikoloji,Risk ve Yatırım,Princeton Üniversitesi, A.B.D.

[2] Bolgün K.Evren, Akçay M.Barış.(2005); Risk Yönetimi, 2.Basım, Scala Yayıncılık, İstanbul,s.272

becomed close 1. The deltas of at par options becomed 0.5 level. The delta of one call option, if the option is profitable increased and as for loose decreased. 'Gamma' is one measurement of change according to price of option related existence of delta of option. Given secondary derivation according to existence price of option premium. Options by little period to term and loss are acquired most high gamma. But if closed to term then the gamma closed to 0 without a difference of profit or loss of option. The premium of option in term will be equalized to real value of option and if the option in loss the delta will be become 1 when the profit become 0 profit. From the view point of option seller one option with higher gamma is not attractive. It is expressed that if one option with higher gamma become profitable then the delta increased more quickly and increasing loss of seller on the other hand if the option becomes loss the delta decreasing quickly and decreasing the profit of seller. Lamda is the alteration of one unit alteration in volatility of existence supported option in option price or premium. Lamda decreasing directly to term by one value between zero and infinite. If the lamda is high then the value of option is very sensitive against little changes of its variation. Also on the other hand, if little one lamda discussed can be said than the volatility changes don't effected too much on option premium. Theta is the measurement of change according to term of option premium. The value of theta altered between zero and the total value of option. For near the time of term of option theta acquired value. Rho is the measurement of alteration constituted at option price of percent change in interest rates. Consequently with above mentioned basic risk measurements the financial risks could be defined as appearing probability of unestimated changes at value of financial beings located in active or passive of firms are each inevitable fact of finance markets. From these markets affected all institution's will be meeted risk definitions, measurements and control process constituted most basic steps of risk management.

Table 2. Risk-Return & Time Relation

	Time	Avg.Return	Risk %	Risk /Avg.Return	Loss Probability
Year	1,000	5,000	5,000	1,000	15,87%
3 M	0,250	1,250	2,500	2,000	30,85%
1 M	0,083	0,417	1,443	3,464	38,64%
1 W	0,019	0,096	0,693	7,211	44,49%
1 D	0,004	0,020	0,315	15,875	47,49%

Source: Bolgün K.Evren, Akçay M.Barış.(2005); Risk Yönetimi, 2.Basım, Scala Yayıncılık, İstanbul,s.273

As for the Table 2 above, much as basic risk indicators also an important point, is the activity of time factor located in risk-profit relation on loss probability. Especially in the situation of modelled under normal distribution assumption of financial profit distribution the loss probability moved reverse balanced with the shrink of time period. With the expression on above example, in 1 year 5% profit and 5% risk level average becomed one financial being loss probability is 15.87% in 1 years and on daily based loss probability will increase to 47.49%. This approach style is a result that we must not target daily investment trades on classical stock exchange markets more which is supported the basic opinion of constituted long term investment strategy.

In financial risk management expressed analysis technics and methods included for determining portfolio risks also an other important factor. The 'Correlation effect', connection level between financial instruments is dependent upon relation difference. Different protection strategies become basic subjects entered interest field of financial risk management in last years. If considered whole correlation between two financial being then variation effects don't become one benefit. If the correlation between financial instruments decreased from 1 (minimum -1) the benefit of variation effect also increased. If considered whole negative correlation between 2 financial instruments constituted one portfolio without risk.

1.3. The Development of Derivative Markets in Turkey

In Turkey at the beginning of 2005 contrast to the activity of organised futures exchange market before the increasing of economical activity volume in this field and for a widespreadly use of corporates it is clear

that we have to wait by for a while. Because of financial markets future livable under wavy situations in Turkey perform motion of spot-derivative market will be become an rather important subject.
However while watching to foreign applications, according to an research in Japan determined applications of financial derivative processes at 41% of 2.065 unfinancial small business quoted to Japan exchange rate market. In USA have been applicated one research also resulted similar. In United Kingdom between 500 firms rate of derivative tool application useage is about 90%. Consequently while firms and markets growing we have seen increased use rate of financial derivative tools and the variety of used derivative tools.
Beginning of 2001 crisis as a result of quickly alteration tendencies showed in Turkish banking sector we proceed rapidly towards to a new one period will be applicated of Basel-II criterias directed towards corporate sector now prepared of capital management by risk based indeed. Under declining interest rates and inflation environment shrinked profit margins oriented institutions to a new financial product searches. However under financial conditions have been changed in near time of corporate sectors it's clear that institutions must behave more proactive and allow more applications of financial protection to pursue a goal from price variation. Under the condition of decrease profit margins of shrinking investment alternatives and increasing competition institutions must constitute alternatives and opportunities included higher profit and disappeared indefiniteness with the aid of structured financial products. Also the main goal of us in this part is to provide more ready processing that will be performed with institutions in finance sector becomed knowledge with the application examples of various daily financial derivative product of corporate sector firms in this stage.
According to the Table 3 below, with the decreasing of interest rate while the forward price will be approach to spot price also risk perceptions and result the needs of institutions use with the aim of hedging of fixed term processes market.

Table 3. Forward FX Price Change

3M TL Int.Rate	50%	25%	10%
3M USTL Fwd. Rate	1,6790	1,5848	1,5283

Spot USTL: 1,5000
3M US Int.Rate:%3

On the other hand with the aim of becoming widespreaded in Turkey of derivative processes the establishing of Futures & Option Exchange and becoming one stock exchange by completely feature of distant arriving is an important step for a rapid development of markets in Turkey. With the extend of term of yield curve by category of TL and the development of credit markets by kind of most long term Turkish lira will be increased also the volumes of interest rate originated products. In this condition firstly should be expected development of markets of interest swap and interest options. At the same time possible preparing of long term foreign money will be processed. While the Trlibor interest rates are an good indicator has been raised also an important barrier for development of forward interest contracts and interest swap markets. In Turkey the volume of foreign trade increasing rapidly. For insurance of exchange rate risk by appearing from trade processes lived to increase is an possible development in future period. By the condition of decreasing inflation and interest, profit margins and financial income decreased firms will be becoming more sensitive then now about the subject of protection of activity profits. By the protection aim wanted performing firms needed also strategies belonging to institution presented more possible solutions from the point of view of benefit-cost to firms and used in developed markets rather besides simple forward or options (Risk Reversal, Barrier Options, Exotic Options, etc.).
From the conditions of high inflation and interest rate to low interest rate harmony the procedures will be presented different opportunities to investments that they wanted to perform with the aim of speculation (Dual Currency Deposits, Digital Deposits, Range Accruals, etc.). The difficultiness of confronted with developing of market can be arranged briefly: While the market will be used by firms, they don't know accounting and tax applications sufficiently, system insufficient in banks, the kinds and application shapes of instruments by subject to procedures, human source insufficient by disciplined to matters, by basis the

instrument volatility's occasionally highness resulted becoming higher guarantee amounts, the decreasing between banks overcounter market liquidity so as factors restricted the development of procedures on interest based product lacks.

By the application with speculative aimed besides protection aimed of derivative products, in the last years like Barings, Orange Country, Procter & Gamble showed causing very high damages. While this reason procedures will be operational firms setted up interior control mechanisms are very important. By procedures becoming widespread of banks carried out operations for insurance of operation's risk with themselves customers increased also liquidity of markets. Increased liquidity of markets and protection necessity reactioned to each other of different firms besides by speculative aim operationed of investors togethering in market produced positive effect to decreasing volatility of basis being.

Also markets helped of firms to make more true estimates about the expectations of markets and to make more true decisions. So arriving to equilibrium prices of markets could be with more small time. At the same time together with increased volatility also decreased the cost of to turn of financial risk. Thus the risks of firms could be transfer to opposite side by more cheaper. Separately procedures used firms by the result of becoming more protectioned to financial risks, the mobility will be decreased at decisions, consequently could be arrived more efficient an financial structure.

Table 4. Volatility Effect

Volatility	30%	20%	10%
ATMF Option Premium(3M)	6%	4%	2%
Forward (3M) Margin Rate	35%	23%	12%

* Margin rate is given in %99 confidence interval

* In margin rate calculations USTL probability distribution is taken as log-normal

In the Table 4 above mentioned showed us that by the rather positive affected option premium of decreased volatility environment on sample bring out higher an cost advantages against forward cost. Beginning from 2005 February activated of VOB of local market volume while arrived the amount to 400 millionYTL by rather more term becomed the procedures in order to 84% rate of foreign money, 14,5% rate of index, 1,45% of interest rate in stock exchange. Here essentially a development is also against becomed dense by stock and interest rate procedures of stock exchange in the world, the common tendency of VOB by the first months had been different. Here especially rather lowerity in last months of indefiniteness on short termed interest rate also becomed a great portion.

At this point the financial derative products traded in Turkey currently we can summarized them as if in the below:

- Forward Products
- Futures Products
  - VOB Contracts (Indices Interest Rate, Foreign Money, Stock)
- Swap
  - Interest Rate Swaps
  - Foreign Exchange Swaps
- Options
  - Foreign Currency Options
  - Interest Rate Options
- Exotics and Structured Financial Products
  - Barrier & Spread Options, DCD, Range Acruals

Financial crisis from 2001 as known on a large scale performed on spot markets in Turkey. Markets solely from 2004 had been beginning to give development signals. Opening of VOB, beginning & establishing concept of risk management applications in banks and the shrinking of profit possibilities in other financial instruments are the messages that financial derivative markets will be increased recently.

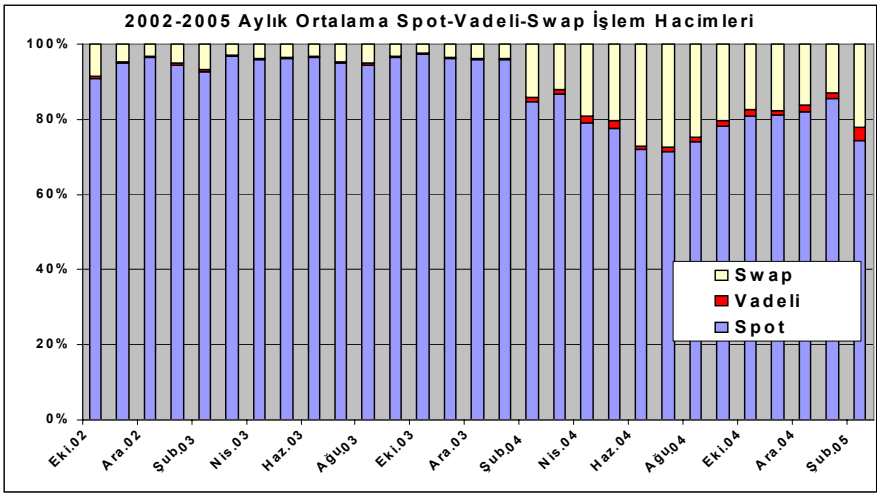


Figure 1. Total Spot/Forward Transaction Amounts Between 2002/2005

Banking sector before 2001 crisis by increased to $20billion then in the last years about $1-$2billion foreign currency open positions, from the view of Turkey's economy with becoming without a threat the eyes turned to foreign currency risk transfer to the corporate sector currently. In 2005, foreign exchange risk of corporate sector is estimated around $30billion total. By the differentation between corporate sector's foreign money assets and foreign money liabilities could be called as of foreign money position to the compeletely calculation explained that there are not full data in the hand of publicly. But from Central Bank and Treasury periodically reports to public opinion declared as credit-deposits, payment balance and foreign debt from statistics of corporate sector by relating foreign money wealth and it's responsibilities founded a possibility to one estimation. While in the end of 2003 the open currency position of sector has near $23billion calculated that in last year could be increased around $30billion. The corporate sector's foreign money responsibilities constituted debts by middle-long termed credits used from outlands and short term trade and foreign money credits. As for this corporate sector's also the SME's total foreign money liabilities constituted an greatness by nearby $63billion in respect to last year end.

As for the estimation of wealths of corporate sector considered that foreign deposits accounts, foreign and foreign money indexed public indebt papers, outland founded deposits and from outland claimed commercial claims. As for an important foreign money wealth of corporate sector as known is commercial claims for outland. Sector's in the end of 2003, $5.2billion becomed commercial claims in according to payment balance statistics, in last year growed in addition by $1.6billion. Without in view of differents, accross rate of exchange differentation resulted differentations, the sector's commercial claims estimated about $6.7billion. Also corporate sectors are more difficult determined foreign money kind constituted the deposits holded in outland foreign banks. Central Bank's in respect to end of 2003 calculated study related to international investment position of Turkey founded the deposits at outland of sectors without banks about $11.4billion. Also one parts to real person must be required under considered number in the end of 2004 also by supposing not differented too much the sector's total foreign money wealths also calculated at least approximately $35billion shown on Table 5 below.

Table 5. Non-Financial Sector FX Deficit

(Bio$)	2005	2004	2003
Liability	83,5	63,5	52,5
Middle&Long Term Ex.Debt	45,4	34,5	29,3
Short Term Ext.Debt	19,5	14,8	10,5
Local FX Credits	18,7	14,2	12,7
Assets	47,6	35,6	29,9
Time Deposits(FX)	21,2	16,1	12,4
FX Origin and/or Indexed KBS	2,6	2	0,9
International Time Deposits	15,0	11,4	11,4
Receivables	8,8	6,7	5,4
Deficit	**-35,9**	**-27,9**	**-22,6**

Reference: Anka Bulletin,2005

Turkey mentioned as above, numbers similarity with risk and risk management concepts acquainted with banking crises in 2000. Before then in several banks when said 'risk management' then understood things that is not differenced from frequently check-voucher pursuit and from credits taked, mostly also insufficient and unliquid guarantees. After crises established banking authority, 'BRSA'[3], emphasized risk management in banks, put in order and bring out by obligatory. Today us banks confronted or will be confronted of risk for determining, limiting and managing obtained knowledge, experience and developed methods background included such as an constraint. But this constraint not spread out whole of financial sector. For example for banks with far too much different and strong risks confronted insurance sector of Turkey, risk management related arrangement and applications are fairly behind of developed markets.

This situations, against the constraint and exemples at finance sector just in respect to crawling period, whichever without one arranging authority in the corporate sector the risk management is definite by more amateur and unconscious.[4] Banking sector's openness position closing one of the successed methods becomed also creating foreign money activity with transforming from credit by TL to credit by foreign money of given credits. Besides also the corporate sector, with the higher real interest rate on TL and because of extreme value pained debt with foreign money. From crises in banking sectors frequently expressed also the very increased transaction costs in Turkey. Therefore whether reaching opportunity debting by kind of foreign money from outland of corporate sector or creating active in outland of Turkish banks, in other words pained creating credit by kind of foreign money. Because of foreign money debt in financial markets of corporate sector produced open position in foreign money, consequently constituted rate of exchange is the basic problem. And also must seen other active and passive conditions at balance sheet of corporate sector. Corporate sector on a large scale performed important business. With the way of created debt by foreign money in passive and also with the sells claim by Turkish money in active. Although in the base of real interest rate with the term differences and imports sells created exchange rate while decreased rate risks because of every corporate sector institutions is not great important and long term differences in market and the deeper discounts the rate of exchange protected its whole seriousess. About the subject of rate of exchange risk of corporate sector defining this two threats are useful. There are not one arrangement authority corporate sector and consequently must adapted regulations about the foreign money risk of an institutions. As for banking there are limits of banking according to structure of capital, active and passive. As for one corporate sector institution the determinator of limit are the risk knowledge and desire of owner or upper administrator. Consequently the limit may be 'sky'. Seconds, before hand the tools of rate of exchange management of institutions are not difference and flexible as finance sector. For corporate sector institutions managing the crise is fairly diffucult in both approached crises and lived crises.

On the other hand the risk management consept constituted an active-passive adaptation risk also becomed an important risk to corporate sector as knowing an important risk to banking sector from 'Treasury'. In

[3] Banking Regulation & Supervision Agency

[4] İlkorur Korkmaz.(2005); Reel Sektör Riskleri, Radikal Gazetesi

Turkey, commonly, ‘levered’ debt of corporate sector is higher than in respect to self wealth. Group banking, ‘moral hazard’, in spite of being expensive, present credit wideness and flexible credit applications also encouraged the desired work with ‘small capital-high credit’ of corporate sector of Turkey. The higher levered effect created most higher problem also resourced from shortness of credit terms. As known, in Turkey the greatest portion of investments financed with short termed credits. Some production processes are long. The transform of sells to cash also especially extended in the period of decreased economy. Consequently presented an evident lack of harmony between fund using in active and passive and investment terms. For earning money must overly meticuloused the corporate sector of Turkey becomed knowing that Turkey must be thinking more then before.

As known after 2001 crises in banks of Turkey sinked billion of dollars. When only this developments resulted only in banking sector? These results in time reflected also to self credit relations of corporate sector. As for how the banks of Turkey now overly meticulous to credit and managed the credit risks by binding account and book, also the corporate sector nowadays must enter to same effort. The capital responsibility of banks arranged by Basel-II clearly determined that; banks must well control the operational & credit risks by separating capital contrary to these risks. Will be becomed also in corporate sector, now processed in banking sector as becomed theft, fire, collapse of computer systems or other operational mistakes caused damage. It is acceptable... Why corporate sector looked distantly to matter as if these risks had never related with them? On the other hand also the credit risks by the Basel-II frame determined methods bounded will be given the credits in future measuring by bounding to credit level grades of firms, the possibility of credit sinking and capital requirement based on risk based credit measurement. We can easily express that the relations of corporate sector with financial sector will be developed by the base of rather transparent, measurable and objective criterias in future. There are rather more risks to corporate sector. For example as known ‘business risk’ the ‘work risk’ is important than other risk groups. Our work goes today perfectly, but meanwhile an newness appeared than our work killed. Technology risk. While you are producing an product, an service with definite technology, you earned satisfying money. But in technology becomed such as change, you can’t change your technology and it is not on your hand also. On the other hand there is an other risk: Arrangement risk, that meeted in Turkey very frequently and it is a very troubled risk factor. You have been established your work, you make production and sell, and you are earning money. You look out, in one day, government, bureaucracy, with that or this reason, also most time with the unadviced reasons had been performed one or several arrangement and drag your work to hill. Here with all reasons the sector by extremelly carefully movement to risks will be become useful for future of firm.

2. Protection from Financial Risk

In Turkey rate of exchange risk, interest rate risk and stock prices related living financial risks could be arranged in order to fit risk categories while the corporates meeted most frequently. When these risks not trully managed than occasionally can be appear by the losing possibility in short time that losing earning amount while producing in one year period. In USA and Europe nearby all firms are used different financial tools intensively to protect from financial risk.

As known the international financial markets in 1980 and 1990 experienced important as transition period. In one hand side appeared complex and changeable procedures increased the indefineteness in markets and on the other hand the dynamic and competitional approaches leaved face to face great financial risks then older risks to the market participants in finance sector. Certainly, this changes become many reasons. But most basic reason is globalization of international markets. Markets, in the last years with the step by step raised obstacles at free circulation of capital that had been transformed to rather wider an market condition. This development had been bring out together a result as the reflection of appeared problems in one region in world to markets and investors in the other region. As for the other reason is so far increased volatility in international markets. The volatility in markets by the meaning of following an hilly road of market prices and financial ratios becomed a basic source from financial risks. While the volatility in the market increased, market participants remained face to face with greater indefineteness and risks. Also on

the other hand one reason is the appearing of complex structured new investment alternatives resulted from the changes of conditions in international markets. The variety of investment tools directed to development the other investment tools as like hedging aimed derivative instruments. Derivative instruments, together with the increased most wide using to decrease risk in financial markets, because of lower procedural structure from these sourced damages also beginning to increase.[5]

Financial derivatives provided possibility to pricing by decomposing present risks and transfering. The value of derivative products moved by bounding to value of basic investment tools (stocks,bond, foreign money, etc.)

At first for active a risk management by markets;

- Selection of suitable financial deritave product type,
- Required contract number must be determined.

Then for determining the required contract number (hedge ratio);

- Nominal value of contract,
- Tthe effect of spot price changes to futures price,
- Regresion coefficient producted with cash position.

At this point we take risk in the market with becoming the reverse of positions in derivative markets, we can protect from risks. But to closing a big risk by little possibility we must pay little a cost. With the result of protection might be avoided from possible risks, on the other hand we leave possible profit. As result the protection procedures must not evaluated like an investment tool but must be thinked being an insurance procedure. In Turkey an higher potential has founded for using both protection and speculative aim of strategy.

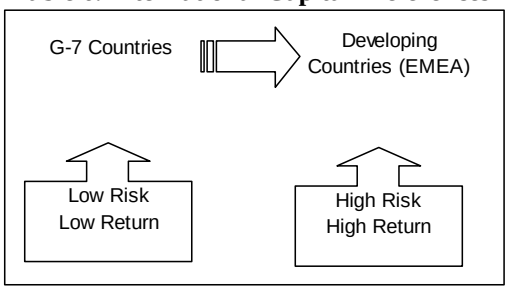
At the same time with the aim of protection from financial risks we can think protection procedures needed groups as the following:

- From stable rate lended or borrowed debt of corporates
- From floating interest rate lended or borrowed debt of corporates
- Importers
- Exporters
- Commodity producers or users

2.1. Risk Based Pricing in Financial Products

From the beginning of 2000 the rules of international finance markets writed repeat from the view of risk management. Especially in developed countries together with the construction of profit margins and also with the aid of developed communication technologies, the capital by becoming international qualified free entry and exit have been beginning investment to the developing markets. At the same time with the result of lived crisis, financial scandals and the step to step increasing of performed investment, the developed coountries for guaranteing the return of investments with the determining of rules of game in all world maked pressure to conforming to rules shown on Table 6. The Basel decisions today against as becoming recommendation attribute included also an indirect coerciveness between financial and corporate sector.

Table 6. International Capital Preferences



[5] Bolgün K.Evren, Akçay M.Barış.(2005); Risk Yönetimi, 2.Basım, Scala Yayıncılık, İstanbul,s.204

2.2. Measuring Risk by Duration Analysis

Financial products related with interest rate by constituting 80% rate of finance markets volume, risk based measuring is very important matter. Because of on this kind of products realized applications will be become informative to institutional managers. Interest rate for discounting of bond cash flow formed with two part:

- minimum output
- risk spread

Minimum output is equal to output of a bond included same maturity and coupon rate. Also the risk spread included risks as not back payment risk, liquidity risk and option risk. For suitable pricing a bond with coupon must evaluated as a package of bonds formed without coupons. Also this bring out the meaning that not discounting with only one interest rate of cash flow of bond on the contrary with interest rate portion suitable own term of each cash flow. While decomposed procedure of bonds provided equality to total prices of bonds without coupon constituted this bond of prices of a bond with coupon in markets. For this kind of pricing required becoming for user term structure bounded to interest rate.

Ex.1. Suppose that in our portfolio we have bonds with coupon rates of zero that have features mentioned bottom:

- Nominal value of bonds; F = $100
- Interest rate; r =10%, (compounded yoy)

Under these assumptions on Table 7:

Table 7. Bond Yield & Price Relation

Discount Rate %10/Annual	Bond 1	Bond 2	Bond 3
Maturity/Bond Price	$90,91	$75,13	$62,09
1	100	0	0
2		0	0
3		100	0
4			0
5			100

Supposing that the bond yield rate suddenly decreased to 9% or increased to 10% rate. How prices will be affected to this interest change?

Table 8. Bond Price Change

Yield Rate	Bond 1	Bond 2	Bond 3
	1 Year	3 Year	5 Year
10%	$90,91	$75,13	$62,09
9%	$91,74	$77,22	$64,99
% change	0,91%	2,70%	4,46%
11%	$90,09	$73,12	$59,35
% change	-0,91%	-2,75%	-4,63%

Price reaction is more strong in long term. Long term bonds are more sensitive against to changes of interest rate in comparison to short term bonds.

Duration increased dependent upon term, but with a decrasing rate. Duration decreased while increasing of yields, higher yields more discounted with decreasing the today value weights of future cash flows.

Ex.2. Bond with 4 years of maturity with a coupon payment in 6 months, by 8% coupon rate yearly and nominal value by 100.00TL. If we have an amount of 50,000TL in our portfolio, how much price risk exposed to increasing against the interest rates by 3.5%. (yield rate = %7.5)

Duration(year) = 3.51

Modify Duration = 3.51 / (1+0.075/2) = 3.38

Duration by TL = (-3.38x101.7) / 100 = -3.44

Price risk = -3.44 x (3.5) x (50,000/101.7)

= -5,914TL

3. Hedging Strategy Applications in Financial Derivative Instruments

Financial derivative products are the financial instruments that changed supporting by other simple products with the value by writing upon it. Especially in last 20 years, the derivative products's importance had been increased. Futures & option contracts are traded in several derivative markets but structural option strategies are coming more common instruments by investment banks, fund managers and multinational companies within the OTC markets after 2001. On the other hand Turkish financial players introduced with the new futures market in 2005. Market transaction performance is going to be increasing in FX & Indices related financial futures but for the previous international experiences we know that future markets can be widespreaded by the commodity oriented intstruments at first which is uncommon in Turkish futures market now. By the help of academic financial applications in the financial markets market participitants demands will increase transaction volumes on local derivative markets in the coming years. As we know today that, international intstitutional players acts by a full setup derivative strategies which are linked with in a different country oriented financial instruments. As the profit function on the derivatives belongs to the spot intruments futures performance, arbitrage strategies can be figured out in different products depending on the current prices.

3.1.Optimum Hedge Ratio Determination in Futures Instruments

Hedge instrument written by on the same instrument consisting from a *h* amount of futures contract portfolio variance can be determined as the following formula:

$$v = \sigma_s^2 + h^2\sigma_f^2 - 2h\rho\sigma_s\sigma_f$$

If the portfolio variance can be minimized according to the hedge ratio *h*, optimium hedge ratio can be calculated as:

$$h^* = \rho\frac{\sigma_s}{\sigma_f}$$

σ_s : spot variance

σ_f : futures variance

ρ : spot-futures correlation

Ex.3.A firm willing to purchase 5000tonnes of aluminium alloy within 2 months forward, would like to hedge its position by commodity futures. Lets assume that one tone aluminium alloy spot price standart deviation is 0.032, futures price standart deviation is 0.04 and price variation correlation between spot and futures market is 0.83 then;

0.83 * (0.032/0.040) = 0.64

0.64 * (5000/20)

= 160 futures contract must be hold

Note:1contract = 20 tonnes

Ex.4.A financial manager holds $10million amount of bond portfolio for the hedging perspectives for 3 months with a 6.8years of modify duration. Current interest futures price is 93.03 and contract nominal amount is $100.000. We know that bond duration is 9.2years. According to these financial parameters financial manager can calculate the nominal amount of futures contract & exact contract amount for the optimum hedging purpose of the bond portfolio.

Nominal Amount:

(93 + 2/32) / 100 × $100,000 = $93,062.5

Optimium offering amount

$$N^* = -\frac{D_S^* \times S}{D_F^* \times F} = -\frac{6.8 \times \$10{,}000{,}000}{9.2 \times \$93{,}062.5} = -79.4$$

Futures contract DVBP amount: 9.2 × $93,062 × 0.01% = $85

DVBP: Futures contract dollar value per 1 basis point

FRA's

Forward Rate Agreement (FRA) is a forward contract where the parties agree that a certain interest rate will apply to a certain principal during a specified future time period. Actually it helps to make a fixing opportunity in the future interest costs of fixed or floating interest liabilities. Basic FRA calculation depends on the yield curve of the instrument on a specified time period. Forward for a (T_2-T_1) time period can be defined as:

$$R_F = \frac{R_2T_2 - R_1T_1}{T_2 - T_1}$$

Consider the FRA where it is specified that an interest rate R_K will be earned for the time between T_1 and T_2 on a principal of L.

L : Principal

R_K : Fixed interest rate with FRA

R_F : The forward interest rate for the period between times T_1 and T_2

V : FRA value

FRA contract value can be calculated as the following formula:

$$V = L(R_K - R_F)(T_2 - T_1)e^{-R_2T_2}$$

Table 9. Forward Rate

Year (n)	Zero Coupon Int.Rate/annual(%)	Forward Int.Rate
1	10	-
2	10,5	11
3	10,8	11,4
4	11	11,6
5	11,1	11,5

Ex.5.According to the parameters Table 9 above we can figure out that the current yield curve depending on the spot zero coupon bonds in the market. In that case 1 year zero coupon interest rate is %10 and 2 year zero coupon rate is %10.5. Lets assume that a financial manager wants to make a FRA deal between 1st and 2nd year for a $1million principal amount with a %12 compound interest rate of earning. Forward interest rate is; %11 (continuous compounding), %11,627(yearly compounding) As the 2 year zero coupon interest rate with continuous compounding ia %10.5, FRA contract value can be calculated by the following formula:

FRA: $1{,}000{,}000 * (0.1200 - 0.11627) * 1 * e^{-0.105*2} = \$3{,}017$

3.2.Structured FX Option Strategies

Options give a choice to the holders for exercising the position or mostly they are traded in order to eliminate the FX, Interest, Commodity, Stock Risks on the balance sheets. Internal market applications we can see that they are preferred for FX Risk elimination mostly with in the OTC markets. In the option contract calculations we should give more emphasis on these following issues:

- Volatility Calculation: Volatility shouldn't depend only on a historical type calculations. Implied volatility type model calculations are more common parameters in the international markets.
- Yield Curve Modelling: It must show us %100 exact interest rate behaviour in the market depending on the longest maturity.
- Exact Model Preferrence: There are lots of option value calculation models in the market but some of them shouldn't give an accurate result depending on the local market conditions, market liquidity,.etc.

Exotic Options (Knock-In,Knock-Outs)

Structured financial products are getting more common on the international markets within the corporates and financial institutions after 2000, as the financial risks are more common disasters and financial risk

transferring needs are going to eliminate balance sheet risks by the help of these strategies efficiently. In our local markets we can determine that there is a broad investor participation in the FX derivatives market. For example banks are entering these markets with hedging purposes, corporates are willing to a yield enhancement for short term deposits for investment purposes and hedging balance sheet FX risks, private banks are especially on a volatility sellers side, hedge funds are trading relative volatility value and hedging local market currency position, funds are targeting a yield enhancement for medium term local currency investments.

In this section, special structured FX hedging strategies will be applied which will directly demanded by the exporters/importers in Turkey. After the elimination of previous FX regime with the 2001 financial crises, most of the local players couldn't get familiar with the floating FX regime as the hedging strategies are not used in common.

In all of the structure option strategy applications, there are main parameters in our assumptions;

Importers USD Buy / TL Sell Position Holders

Exporters USD Sell / TL Buy Position Holders

Maturity: 1 year

Spot USTL: 1.3500

12 month Forward USTL: 1.6800 [+3300] Forward Rate

12 month TL Benchmark Interest Rate: %19.75

12 month US Benchmark Interest Rate: %5.50

Note: Out-of-Money US Call options within the same exercise price are more valuable then Out-of-Money US Put options.

Dynamic Hedging (Risk Reversal)

Holding an upside FX price risk of importer corporates, with a purchase of Call option upside movement potential can be advanced on the other hand a Put Sell position will determine a FX cost level which will be taken by the importer. If spot FX rate will be between the two option strike price with in the option maturity, corporates shouldn't give any additional fund. According to this strategy the advantages are, having known the worst hedging ratio, zero cost but if spot FX rate movement will be with in our expectations, position profit potential will be limited also and on the other hand purchasing an USD Call option value is expensive.

Position Details:

- Buy 12 month USD Call TL Put at 1.7600 strike price
- Sell 12 month USD Put TL Call at 1.6500 strike price
- Zero cost

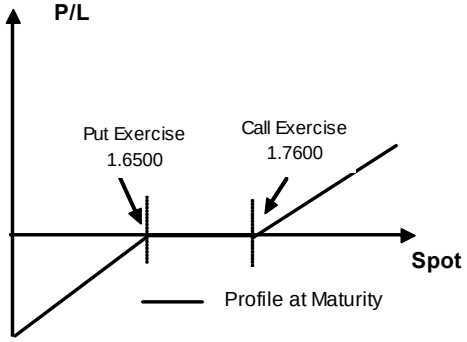


Figure 2. Risk Reversal Option P/L Position

Dynamic Hedging (Knock-Outs)

Knock-Out level will terminate the option position if the spot FX level touches the pre-determined knock-out levels before the option maturity expires. Option will exist if the spot rates will be with in the knock-

out levels. Corporates should examine the FX implied & historical volatility very well before determining the option knock-out levels.
According to this strategy, exercise price depends on out of money at knock-out level condition and a continuous knock-out exercise strategy is assumed.
Position Detail:

- 12 month USD Call TL Put at 1.6800 exercise price
- One way (Vanilla) Option Premium Cost %8.11 USD
- If there is a knock-out at 1.2750 level, %7.23USD premium
- If there is a knock-out at 1.3000 level, %6.16USD premium

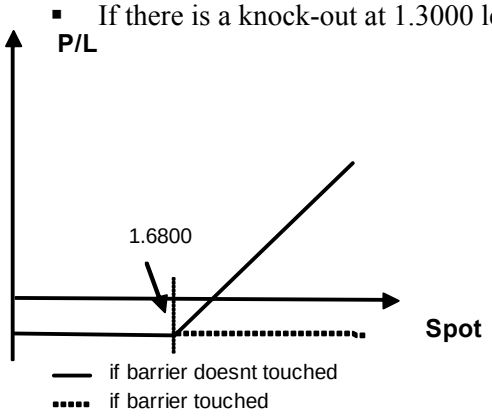


Figure 3. Knock-Out Option P/L Position

Dynamic Hedging (Knock-In)

According to this option strategy, pre-determined option barrier levels can exist at the maturity only or a continuous barrier existence choice. If knock-in value is in the money correponding to the exercise price, position structure will turn to a classical vanilla option position. Option premium enhancement will depend on to the closeness of the spot value to the knock-in levels.
According to this strategy, exercise price depends on out of money at knock-in level condition and a continuous knock-in exercise is assumed.

- 12 month USD Call TL Put at 1.6800 exercise price
- One way (Vanilla) Option Premium Cost %8.11 USD
- If there is a knock-in at 1.2750 level, %1.91USD premium
- If there is a knock-out at 1.3000 level, %2.93USD premium

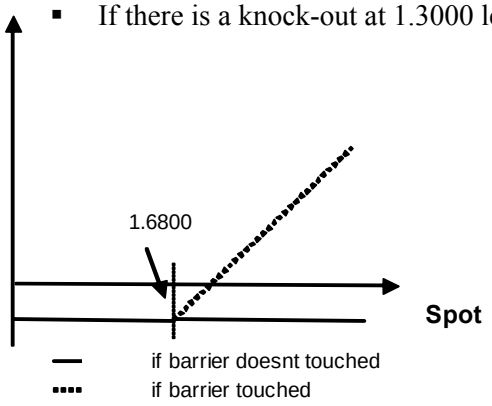


Figure 4. Knock-In Option P/L Position

Dynamic Hedging (One Way Expected Position)

For the exporters having hold downside FX risk, one way an easy option position can be a choice of financial manager. In that case, the position holder can run the strategy of USD Put/TL Call for a definite strike price in a determined maturity. In order to be on the safe side for the appreciation of TL versus USD in the investment term, the advantages of holdings this type of strategy is, being known the worst case situation, position profitability can be thougt as an indefinite if the spot FX rate decline is sharp. On the other hand because of taking an one way position strategy in terms of risk-return relation based thinking option premium cost can be an obstacle.

Position Detail:

- 12 month USD Put TL Call at 1.6800 strike price condition
  - %8.11 USD Premium Cost
- 12 month USD Put TL Call at 1.6300 strike price condition
  - %6.23 USD Premium Cost

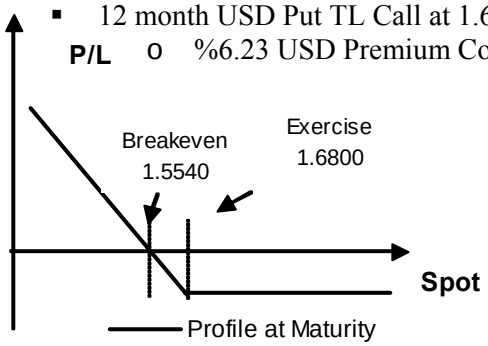


Figure 5. P/L Position

Dynamic Hedging (Risk Reversals)

For the position of exporters carrying downside FX risk in the long term, buying a Put Option position eliminates FX risk & gives full profit opportunity of a FX rate decline on the other hand by selling Call Option position gives a cost starts from the exact strike price level in the strategy. If the spot FX rate holds down between the same strike price level of positions, exporters doesn't have to pay any fund to the market. The advantages of this option strategy is, being known the worst case scenario, zero cost option strategy. On the other hand as the USD Call options can be traded in the market as a premium, there could be sell opportunity easily. But thinking on the other side of the position strategy, taking the benefit of spot FX rate downside movement will be limited.

Position Details:

- 12 month USD Put TL Call buy at 1.6500 strike price
- 12 month USD Call TL Put sell at 1.7200 strike price
- Zero Cost

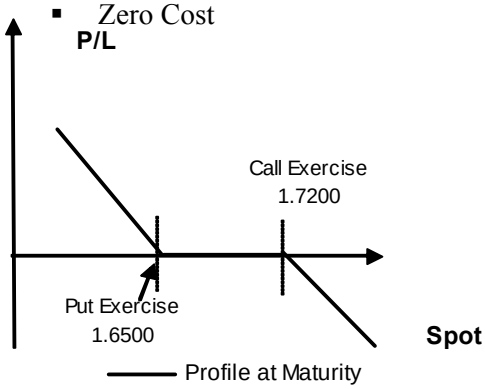


Figure 6. P/L Position

Dynamic Hedging (Spread Position)

Again for the position of exporters carrying downside FX risk in the long term, we can set up a different type option position such as; USD Put TL Call buying position added with a lower strike price of USD Put TL Call selling position strategy. This multi option position gives us an opportunity of USD Sell TL Buy for an expectation of downside FX rate movement. But in that case, position hedge effectiveness starts from under the strike price level of the option sell. In this type of strategy builds, corporates can benefit corresponding to one way type option strategy in terms of option premium cost, if the spot FX rate movement goes on the same as the expectations, position profits can be valuable but hedging level will be again limited between the two option strike price levels.

Position Details:

- 12 month USD Put TL Call buy at 1.6800 strike price
- 12 month USD Put TL Call sell at 1.4500 strike price
- %6.01 USD Premium Cost

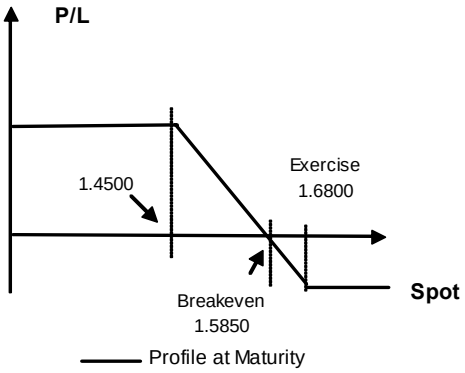


Figure 7. P/L Position

Dynamic Hedging (Seagull Position)

In this type option position generation by the finance managers, Put Spread position zero cost financing will be covered by a USD Call sell off. In case of the FX rate downside movement, Put Spread strategy is targeted but if the spot FX rate upside movement occurs, loss occurance starts from the strike level of Call sell off. According to the whole strategy evaluation, this type of hedge position origination can be better than a Risk Reversal type position starter. But hedging again will be limited between the strike price levels of the spread and profit margin amount will be limited in case of spot FX rate movement is on the same side of our expectations.

Position Details:

- 12 month USD Put TL Call buy at 1.6800 strike price
- 12 month USD Put TL Call sell at 1.4500 strike price
- 12 month USD Call TL Put sell at 1.7700 strike price
- Zero Cost

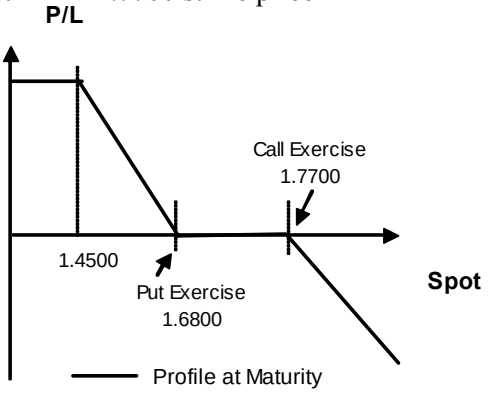


Figure 8. P/L Position

Dynamic Hedging (Knock-Out Position)

Finance managers can lower the whole position cost below one way spread option position cost when building USD Put TL Call Spread buying strategy by putting a barrier above the previous option strike levels. Hedging level will be again between the difference of strike prices and the disadvantage can be an option of hedging position strategy cutoff by a barrier touch before the option maturity. In that case an new hedging position should be originated by a new cost.

Position Details:

- 12 month USD Put TL Call buy at 1.6800 strike price
- 12 month USD Put TL Call sell at 1.4500 strike price
- In case of one way position: %6.01 USD Premium Cost
- If a 1.8000 exercise price level knock-out exists : %5.79 USD Premium Cost
- If a 1.7500 exercise price level knock-out exists : %5.59 USD Premium Cost

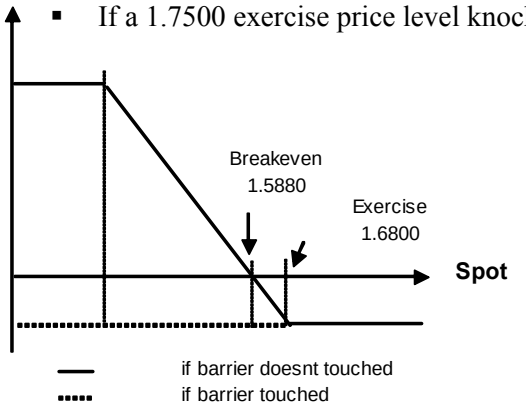


Figure 9. P/L Position

4.Concluding Remarks

According to the financial risk management applications shown, financial managers can build up different hedging strategies with a lot of combinations by eliminating the interest, FX, commodity risk with an insurance premium payout. As everybody knows very well indeed, there is a common phrase in the financial literature; "If you don't manage your risk, risk will manage you" After 2000 with a different type of financial disasters occurs in the international markets, most of the financial managers know the financial risk costs that changes balance sheet picture easily in the short term. High commodity price risks, international terrorism risks, macro economic imbalances in some regions give us more emphasis in thinking about risk management tools.

By turning our face to our local markets and players, after a tramendous financial crises occurred in 2001, corporate sector holds FX risk above $30billion which is quite more than banks as the restructuring standarts give some governance opportunity by BRSA. As the new financial rules coming with Basel-II to the banks, old type market position strategy generations are not existing anymore. But this doesn't completes the whole picture as FX risks turn to a maturity mismatch which is also an important risk factor that can bring a liquidity problem if the wind turns sometime in the future. In case of local interest rate upside movement will increase the cost of banks short term borrowing adding a problem to the long term credit portfolio revaluation with short term deposits.

In case of analysing the corporate financial environment risk appetite is still quite high. Corporates can use FX type credits more as the local currency appreciation lowers the TL correspondence of the whole credit value. With holding these type of FX originated credits, corporates are trying to finance the fixed capital investments and working capitals. We can say that behind FX risk in the corporate sector, maturity, interest and liquidity risks are the other important risk factors that should be think in a detail way. In most of the corporate sectors, maturity extands brings us liquidity risk also. More working capital

needs in the corporates also bring us FX & liquidity risk in the future. If these type of risks occurs in the short term, with the increase of credit costs, high international competition will also hit the commodity costs upside movement with a market share loose easily. When the receivables time period extends more, working capital needs stucks corporates more and as the financial risks are always leave as it is in the market, the reverse market condition movements affects profit margins quickly. The corporates working totally for the local markets can struggle with the decline of inventory cycle speed which opens short term credit useage demand for financing inventory problem. According to the new interest rate declining period corporates should get prepare themselves to the reverse market conditions by hedging instruments that can fixed their cost levels.

Besides these problems corporates should also start to work in risk based strategic planning and management type working plans. When we look at to the international corporate experiences internal fund management strategies are totally correlated with financial risk management & hedging strategies which are ruled by firm level corporate governance direction.

All of the financial risk management applications shown could be designed and managed with in the finance departments by a short plan and control system. Corporates should be aware of their unique financial risks at first step which is the most important part for building a risk appetite strategy also. Afterwards preparing business plans and risk matrices within the corporate will be the preliminary steps. The other main issue is originating a proper database that consists of all periodic upgrade opportunity with in the market. As we know that may be the most important part is affecting high level decisions of the upper management by these type rules inside. In order to manage an integrated risk management plan & project easily, management take part of all the change & culture management in this new financial term.

Finally by the help of this type financial tools, as all the risks are defined, risk groups can be quantified, economic capital can be measured, revenues can be managed in terms of risk bases, alternative risk strategies can be designed easily which will help to direct efficent capital management. By hedging the financial risks dynamically for the reverse conditions in the corporates, asset quality will be better, profit potentials should be higher which will affect the shareholder expectations in a positive way. Common value basis corporate strategies will rule the macro economic conditions with a positive trend eventhough a financial condition downturn occurs.

References

BIS.(2005); International Banking,Securities & Derivatives Markets Tables, Quarterly Review Statistical Annex,s.A99,A105

Bolgün K.Evren, Akçay M.Barış.(2005); Risk Yönetimi, 2.Basım, Scala Yayıncılık, İstanbul,pg.27,153,204,272

Bolgün K.Evren, Akçay M.Barış.(2005); Finansal Türevlerde Kullanıcı Kaynaklı Model Seçiminin Bilgi Asimetrisi Yoluyla Fiyatlama Süreçlerine Etkisi, M.Ü.BSE Uluslararası Finans Sempozyumu,İstanbul.

Cinemre Kubilay.(2004); Türkiye'de Vadeli İşlem Piyasalarının Gelişmesi Konusunda Beklentiler, Garanti Bankası

Derviş Kemal & Özer Ceren.(2005); A Better Globalization, Legitimacy, Governance and Reform, Center for Global Development,Washington D.C.,pg.105-136

Hull George.(2003); Options, Futures & Other Derivatives, Prentice Hall

IMF.(2003); World Economic Outlook Report

İlkorur Korkmaz.(2005); Reel Sektör Riskleri, Radikal Gazetesi

Kahneman, Daniel.(2000); Psikoloji,Risk ve Yatırım,Princeton Üniversitesi, A.B.D.

Sezgin Cüneyt.(2005); Risk Yönetimi Bilinci ve Uygulama Açısından Türk Şirketlerindeki Durum, Risk Yöneticileri Derneği Başkanı.

OECD.(2004); Small and Medium Sized Enterprises in Turkey-Issues and Policies

VOB Vadeli İşlem ve Opsiyon Borsası.(2004); Türev Araçlarlar Lisanslama Rehberi