THE USE OF RETAIL STRUCTURED PRODUCTS AND THEIR APPLICATIONS IN TURKEY

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Yapılandırılmış Ürünlerin Kullanımı ve Türkiye'deki Uygulamaları

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Anahtar Kelimeler (İng.)
1) Structured Products
2) Capital Protected Funds
3) Dual Currency Deposit
4) Range Accrual
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Abstract

Innovation process of the financial markets resulted in introduction of new products to the retail investors in response to these investors' different needs. First of all, derivatives were offered by the financial institutions to the retail investors as an alternative to such conventional spot products as stocks, bonds and commodities. Due to the fact that the retail investors weren't satisfied and started to seek alternative instruments again, issuers started to introduce new instruments. These instruments are called structured products and formed by the combination of several products that already exist in financial markets. These structured products have new-generation innovative, tailor made structures consisting of more than a single product in order to cater the special needs of the retail investors. This study will thoroughly examine the detailed use of these innovative products in the financial markets; especially in Turkish context. In addition to looking over their usage, their main characteristics and features will be analyzed for different types of products from different markets. Throughout the study, structured products will be analyzed in either Turkish context or in rest of the world. Findings through the chapters will be compared and discussed at the end of the study.

Özetçe

Finansal piyasalardaki yenilikçi gelişmeler sonucu, bireysel yatırımcıların farklı taleplerine cevap verebilecek yeni ürünler oluşmaya başlamıştır. Öncelikle finansal kurumlarca, hisse senedi, bono ve emtia gibi geleneksel yatırım ürünlerine alternatifi olması amaçlı türev ürünler bireysel yatırımcılara sunulmuştur. Bireysel yatırımcıların bu ürünlerden de yeteri kadar tatmin olmaması ve yeni arayışlara girmesi sonucu, bu yatırımcılara yönelik başka ürünler geliştirilmeye başlanmıştır. Bu ürünlere yapılandırılmış ürünler denilmektedir ve zaten finansal piyasalarda var olan ürünlerin bir araya getirilmesiyle oluşturulmuştur. Bu ürünler birden fazla ürünün bir araya gelmesiyle oluşarak, terzi işi ve yenilikçi yapılarıyla bireysel yatırımcıların farklı taleplerini karşılamayı amaçlar. Bu çalışma, bu yenilikçi finansal ürünlerin kullanımlarını,Türkiye piyasası başta olmak üzere ayrıntılı şekilde ele alarak incelemeyi amaçlamaktadır. İlgili ürünlerin kullanımları incelenirken, farklı piyasalardaki farklı ürünlerin başlıca özellikleri de ele alınacaktır. Çalışma boyunca tüm bu incelemeler hem Türkiye piyasayı hem de yurtdışındaki piyasalar bazında yapılacaktır. İncelemeler sonucunda elde edilen bulgular ve sonuçlar çalışmanın sonunda karşılaştırılarak ele alınacaktır.

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List of Abbreviations

BC:	Bonus Certificates
BFI:	Basic Financial Instrument
BULS:	Bullish Underlying Linked Securities
CP/CG:	Capital Protected/Capital Guaranteed
CPN:	Capital Protected Notes
DC:	Discount Certificates
DCD:	Dual Currency Deposit
DRC:	Discount Reverse Convertibles
ELC:	Endless Leverage Certificates
ELCD:	Equity-Linked Certificates of Deposit
FX:	Foreign Exchange
IPCD:	Index Powered Certificate of Deposit
IPCD:	Index Powered Certificate of Deposit
MICD:	Market Index Certificates of Deposit
OBC:	Outperformance Bonus Certificates
OC:	Outperformance Certificates
OEC:	Open End Certificates
OTC:	Over the Counter
RES:	Reverse Exchangeable Securities
RC:	Reverse Convertibles
RCB:	Reverse Convertible Bonds
SEP:	Structured Equity Products
SSPA:	Swiss Structured Products Association
SPIN:	S&P 500 Index Note
TWC:	Twin-Win Certificates

1. INTRODUCTION

The necessity of structured products arises in financial markets in order to meet different needs of the investors. Low interest rates throughout the world accelerated their usage which in returned courage more financial innovation and reshaped customer preferences.

Structured products are designed to meet investors' demands in different combinations of instruments both in spot and in options markets. There exists unlimited ways to design structured products; which enables them to be defined as "tailor-made".

The subject of structured products is comprehensive when all types of these products are considered. This study will try to focus on retail structured products, traded by the retail investors in the market, for speculative purposes. In the study, retail structured products will be examined firstly in global context and followed by Turkish market. Since the entire study will be about retail usage of the structured products, hereafter term 'structured products' will be mentioned through the study to state retail structured products.

The main purpose of the study will be to explain the usage of structured products by examining their main features and characteristics. From this perspective, study will analyze the main features of structured products including the definitions, compositions, main types, risks, advantages and the disadvantages.

Study aims to examine the usage of structured product in all financial markets, focusing in the Turkish one. In this examination, one of the most important purposes of the study will be to analyze the structured products' current situation among other financial instruments and their future

development in Turkey. As a whole, study will try to make a contribution to the literature about the use of retail structured products in financial markets, especially in Turkish market.

Study will begin with a through literature review (chapter 2) on the subject and continue by observing the main features and characteristics of structured products in chapter 3. This chapter will observe the definition, composition, main types, advantages, disadvantages and risks of structured products.

Beginning with the 4th chapter, study will start to emphasize the use of structured products in different regions such as Europe, North America, Asia & Pacific and Latin America. Within this chapter; number of products issued and volume of products sold will be determined for the European Market according to types, terms and underlying asset classes of these products. Furthermore, emphasis will be given to countries where structured products constitute a significant market share among other derivatives. Conclusions derived out of the findings will be presented at the end of the chapter.

Fifth chapter will deal with the retail structured products in Turkey by dividing them into 2 groups; structured funds and structured deposits. Firstly, current situation of Turkish market about structured products will be analyzed. Then structured funds in Turkey will be examined according to their definition, composition, advantages and disadvantages. After this examination an analysis covering 66 structured funds, introduced into market by Turkish banks between 2008 January and 2010 March will be made. After this analysis, main features, impacts and most common types of structured deposits (including Dual Currency Deposit, Range Accrual, Double No Touch and Wedding Cake); will be emphasized with simulated examples. At the end of this chapter, the conditions regarding the

development of retail structured products in Turkey in conjunction with pros and cons will be detailed.

At the final chapter, all the findings and outcomes that are abstracted through the whole study will be presented briefly, as an attempt to explain the use of retail structured products and their applications in Turkey. In this conclusion chapter, structured products market and its current situation, especially in Turkey, will be analyzed in order to discuss the extension of developments in the future.

2. LITERATURE REVIEW

In this chapter academic studies that were made in the past will be analyzed. Within the chapter these studies will be examined in 2 parts; studies made for specific markets and studies made for structured products in general.

In both parts; it can be realized that most of the academic literature deal with the pricing (valuation) of structured products. In these studies; researches were carried out in the areas of pricing and back testing of structured products in the primary and secondary markets. In this literature review, different types of products are taken into account, like discount certificates, reverse convertibles, equity linked certificates, market index certificates, index notes and etc…

Chapter will start by examining the studies that were made about some specific markets.

2.1. Studies About Regional Structured Products Markets

In this section studies that were made about different markets will be examined. Most of the studies were made about 2 regions; North America and Europe.

From North America most of the studies were made about US and Canada. From Europe most of the studies were made about Germany, Switzerland and Holland.

Until now there is not an academic study that was made about Turkish market.

2.1.1. North American Markets

2.1.1.1. US Market

Although the first structured product was seen in US market back in 1987, there are not much academic studies made for this market. Also most of the studies that are exist in the literature go back to a time when these structured products first launched. (Wohlwend et al, 2003).

Chen/Kensinger (1990) investigated Market Index Certificates of Deposit (MICD) for 2 months period in 1988 and 1989 in the US market. Structured product that they deal in their study was MICD which has characteristics of paying a guaranteed minimum interest and a variable interest that is linked to the performance of the S&P 500. In their study they used a sample of 18 MICD issued in January 1988 and 25 MICD issued in January 1989 by Chase Manhattan and Murray Savings.

After they compared the implied volatility of S&P 500 option and option component of the MICDs, they found out that; there are inconsistencies between the pricing of the same type of MICDs among issuers and there are also inconsistencies between the pricing of different types of MICDs offered by the same issuer.

Chen/Sears (1990) investigated S&P 500 Index Note (SPIN) issued by Salomon Brothers in US market. SPIN which they are investigated can be told as a similar product to the MICDs, but exchange-traded. This product is a %2 coupon bond with 4 year maturity which pays to its holder at maturity; (the principal amount + accrued interest + (((S&P 500 first level - S&P 500 last level) / (S&P 500 first level)) * Predetermined Multiplier)). In other words despite the principal and accrued interest paid by the product; this product also provides participation to its investor into the performance of S&P 500 index by a predetermined ratio. From this payoff characteristics of

the product it can be told that; this product is consisting of a low coupon bond plus long-term plain-vanilla call option on the S&P 500.

Chen/Sears (1990) focused on the market and theoretical prices of this product over three sub periods between September 1986 and December 1987. In their investigation they used ex-post, average implied and long term implied volatility and found out that; product was overpriced about %5 in the first sub period, in the second and third sub periods the product was underpriced. These results were commented by Chen/Sears (1990) as the market was going through a learning process in pricing this unique and new type of security.

Baubonis/Gastineau/Purcell (1993) investigated Equity-Linked Certificates of Deposit (ELCD) in US market which is a similar product to the MICD which was investigated by Chen/Kensinger (1990). However, unlike Chen/Kensinger (1990) and Chen/Sears (1990), they didn't deal with the pricing of the structured products. They are focused on the performance of ELCD comparing with alternative investments. In their study they compared 5 year maturity ELCD performance with S&P 500 and treasury note performances. They determined the performance of ELCD as the average return of 4 guaranteed, 1 protected product in US market. They determined S&P 500 and treasury note performances from market data relating to the 5-year overlapping periods between 1948 and 1993.

Baubonis/Gastineau/Purcell (1993) found that; 5 year ELCD have a return of %8.33, 5 year investment in S&P has a return of %9.93 and 5 year investment in a treasury note has an average annual return of %5.42. After these results, they told that structured products are more profitable than riskless products and less profitable than a direct market instrument investment. However, after examining the 5-year investment in structured products, Baubonis, Gastineau and Purcell (1993) conclude that these types of products don't involve the best investment solution for an investor

because an investor would almost always have been better off with either a straight equity investment or with a straight fixed-income investment.

Chen and Chen (1995) investigated the valuation of one structured product on the secondary market with no capital protection and offering investors high interest payments in exchange for a cap on the underlying stock's growth.

Chen and Chen (1995) found that this product is overvalued at some 5 percent.

Edwards and Swidler (2005) investigated Equity-Linked Certificates of Deposit (ELCD) in US market like Baubonis/Gastineau/Purcell (1993). They also focused on the performance of ELCD comparing with alternative investments. In their study they compared the returns of the ELCD with the returns of the S&P 500 index, the 5 year treasury note and the Index Powered Certificate of Deposit (IPCD). They calculated the return distribution of these instruments by using Monte Carlo Simulation over a period of 1981 to 2004.

Edwards and Swidler (2005) found that; investing in IPCD is better than investing in 5-year Treasury note, investing in ELCD is better than investing in IPCD for the investors. They also found that investing in ELCD do not give equity like returns, that means investing in S&P 500 index is better than investing in ELCD for the investors.

Benet, Giannetti, and Pissaris (2006) investigated Reverse-Exchangeable Securities (RES) in US market. In their study they examined the pricing of 31 RES that are outstanding in 2003. They aimed to find the right premium in terms of coupon spread in order to obtain the fair value of product.

Benet, Giannetti, and Pissaris (2006) found the coupon spread ranging from 4% to 6% and tried to explain this spread in terms of credit risk. Also they argued that RES holders are less exposed to the issuer's credit risk then the bondholders. However, at the end of their study this explanation seemed incompatible when issuer bank ABN Amro with AAA rating is analyzed because the corresponding credit spread was too low to have a significant influence on the fair values of the RES under their study.

2.1.1.2. Canadian Market

Milevsky and Kim (1997) investigated capped structured products and participating structured products in Canadian market. In their study they compared the pricing of these structured products. They explained capped structured products as the products that provide their investors to participate in any upward movement in the underlying up to a pre-specified cap, participating structured products as the products that provide their investors to participate in any upward movement in the underlying without any pre-specified cap.

Milevsky and Kim (1997) found that for short term maturities participating products are preferable to capped structured products, for long term maturities capped structured products are preferable to participating structured products. They also found that both type of products are unfairly priced for customers.

2.1.2. European Markets

2.1.2.1. Swiss Market

There have been three important studies conducted in the Swiss market so far. Schenk and Wasserfallen (1996), Burth, Kraus and Wohlwend (2001) and Grunbichler and Wohlwend (2005)

Wasserfallen/Schenk (1996) investigated 13 structured products (10 guaranteed, 3 capital protected) issued in Swiss Market between January 1991 and April 1992. In their study they examined the pricing behavior of these 13 structured products within a period of trading days spanning from 21 to 80 days. Examination of these products' valuation based on the historical and implied volatility in their study.

Wasserfallen/Schenk (1996) found that these products tend to be overvalued in primary, undervalued in secondary markets. In other words these products are sold over their theoretical values at issue and have a tendency to be undervalued then their theoretical price in the secondary market. They told that the difference between the value at issue and theoretical value corresponds to the gain of the issuing bank. In their study they also found that with relative errors generally below 10 %, these products are generally fairly priced.

Burth, Kraus and Wohlwend (2001) investigated 275 structured products (199 reverse convertibles and 76 discount certificates) without capital protection, issued in Swiss Market that was outstanding at August 1, 1999. In their study; structured products with concave payoff function (short position in a call option on same asset) analyzed for the first time. Their study depended on testing the price of these structured products.

Burth, Kraus and Wohlwend (2001) found such results from their examinations;

- At all conventional levels of confidence price differences of issuing institutions (15 issuers) are found approximately 1.91% significant
- %84 of the total products examined are found as overpriced, %16 of them as underpriced.

- Their investigations also show that these different valuations caused by depending on the issuing institution, the product category and the management of the products.
- For the product category; mispricing can be seen in structured products without a coupon payment rather than those with a coupon.
- A significant statistical bias was seen in the products price in favour of the issuing institutions.

Grunbichler and Wohlwend (2005) investigated 192 structured products without capital protection, issued in Swiss Market. In their examination they made a comparison between EUREX options and structured products that are linked to EUREX options.

Grunbichler and Wohlwend (2005) found that in primary market structured products are overvalued about %4.25, in secondary market they are overvalued about %1.65. They also found the misevaluation of these products led to the investor's disadvantage and a significant decline during the lifetime of these products.

2.1.2.2. German Market

Wilkens, Röder, and Erner (2003) investigated 906 structured products in German Market. In their examination they focused on mainly discount certificates and reverse convertibles that were linked to DAX and NEMAX stock indices and their pricing during a timeframe of 22 days.

Wilkens, Röder, and Erner (2003) found that according to the risk of redemption of shares that is given by the moneyless of the option and the lifetime of the product, issuers are orienting their pricing. The misevaluation of the products are increasing with the moneyless of the option and decreasing with time to maturity. They concluded as the differences of the

pricing of structured products can mostly be interpreted because of the issuer.

Stoimenov and Wilkens (2005) investigated plain-vanilla structured products in German Market. In their examination they focused on mainly discount certificates and reverse convertibles and their pricing. In their study they also examined the structured products embedded to barrier or rainbow options where the underlying asset is DAX index or DAX stocks.

Stoimenov and Wilkens (2005) found such results from their examinations;

- In the most of the products they found out that issuing banks charge large implicit premiums in the primary market.
- Product life cycle is determined as an important parameter for secondary market pricing according to their study.
- Structured products with exotic options generate higher premiums compared to the classic products; in other words more complex products provide more premiums.
- They conclude that because of their underlying equity the structured products on average overpriced on primary and secondary markets

Baule, Entrop and Wilkens (2006) investigated exchange traded structured products in German Market. In their examination they focused on mainly discount certificates and their pricing. They divided their study into 2 parts as; empirical and theoretical parts. In theoretical part they evaluate the pricing of discount certificates by taking the issuer's credit risk into account. In empirical part they investigated 5 major issuers' quoted prices of discount certificates on the DAX stocks.

Baule, Entrop and Wilkens (2006) found that because of the credit risk of the issuer is a material part of total margin, compared to earlier studies

(conducted for discount certificates in Germany) in their studies total margins were found lower. According to them the reason of this decline in total margin can be explained by the rising competition among the issuer institutions.

Entrop, Scholz and Wilkens (2007) investigated exchange traded structured products in German Market. In their examination they focused on mainly open-end leverage certificates and their pricing. In their study they didn't rely on the prices from primary and secondary markets because they thought these prices are determined by the issuers by applying already agreed price-setting formulas. In other words the issuers influence the market price by communicating with each other and determining a price setting formula and announcing this ex-ante formula continuously.

Entrop, Scholz and Wilkens (2007) found such results from their examinations;

- In the course of the product lifetimes, profits of the issuers are increasing.
- The price setting formula favours the issuers strongly.
- The issuers can hedge these certificates easily.
- Funding rate spread and the volatility of the underlying can be determined as key factors leading to misevaluation, compared to them interest rates and their dynamics were found negligible.

Wilkens and Stoimenov (2007) investigated leverage structured products in German Market. In their examination they focused on mainly leverage structured products on the DAX and their pricing. They divided their study into 2 parts as; empirical and theoretical parts. In theoretical part they determined the price of leverage products from model values. In empirical part they determined the price of leverage products from issuer quotes.

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Wilkens and Stoimenov (2007) found such results from their examinations;

- Value of long and short certificates exceeds theoretical values.
- The profit of issuers can be almost risk free if they have suitable conditions for hedging
- If long and short leverage products are compared, short leverage products generate higher premiums and they require more risky super hedging strategy.

2.1.2.3. Dutch Market

Szymanowska, Ter Horst and Veld (2003) investigated the pricing of 75 reverse convertibles issued between January 1999 and December 2002 on the Dutch market.

Szymanowska, Ter Horst and Veld (2003) found that Dutch reverse convertibles that were examined in their study were overpriced on average about %23. This overvaluation was determined by the difference between the market value of the product and the model value relative to the model value.

2.2. Studies About Structured Products in General

2.2.1. Studies About Anatomy of Structured Products

Wolfgang Breuer and Achim Perst (2005) investigated Discount Reverse Convertibles (DRCs) and Reverse Convertible Bonds (RCBs) as important examples of structured products.

Wolfgang Breuer and Achim Perst (2005) found that DRC and RCBs benefit from low volatility estimates and medium-level return expectation

estimates by investors. Both expected utility theory and cumulative prospect theory come to the same qualitative conclusion for these products. Also they concluded as the demand for RCBs by individual investors can only be understood against the background of hedonic framing theory.

Carole Bernard, Phelim Boyle, and Weidong Tian (2007) investigated customer's wishes so they focus in the design of structured products which meets these investors' demands rather the pricing of these products. They also declared many investors want both downside protection in bear markets and upside participation in bull markets and there is a wide variety of structured investment products that cater to such investors.

Carole Bernard, Phelim Boyle, and Weidong Tian (2007) found that optimal design of a structured product with capital protection depends on the issuer's utility function rather than the issuer's risk preferences.

Brian J. Henderson and Neil D. Pearson (2007) investigated Structured Equity Products (SEP). In their study they focused on type of SEPs which are medium-term notes with payoffs based on the prices of common stocks, baskets of stocks, or stock indices. They investigated equity-linked products which are linked to common stocks, equity indices, or multiple stocks or indices volume of over $50 billion from 1994 through the end of 2005.

Brian J. Henderson and Neil D. Pearson (2007) found that products linked to individual stocks mostly have concave payoff functions whereas products linked to equity indices mostly have convex payoff functions.

Daniel Bergstresser (2008) investigated structured notes. Unlike the earlier studies, he investigated issuance and performance patterns, using a broad sample based on more than 1,000,000 notes.

Daniel Bergstresser (2008) found that investors are looking for performance while issuers prefer to issue notes whose underlying risks are easier to hedge. Also he found out in this market, investors were getting a negative alpha over the period since 2000 (approximately 100 basis points per month).

Carole Bernard and Phelim Boyle (2008) investigated a particular design of a structural product where the investor's return is capped periodically and there is also a guaranteed minimum at maturity.
Also they examined which type of contract investor should choose. They discussed the puzzle of investor choice from simple or complex products through their investigations.

Carole Bernard and Phelim Boyle (2008) found that although the structured products are very costly for the retail investors because of pre-packaged solutions, these instruments are still attracting the investors. By the way they showed that some of the consumer choices made in this market are very puzzling from the perspective of standard finance theory. They couldn't understand why the consumers select a complex contract when a simpler one would appear preferable. Because of these 2 puzzles they come face to face with the fact that the most complicated products are the most overpriced and carry the highest sales commissions.

Nicole Branger and Beate Breuer (2008) investigated the possible solutions for retail investors with different demands. In their study they determined investment certificates as a potential solution for these retail investors. (Especially for the investors who hold their portfolio for 1 year). So they analyzed different certificates and compared them with each other.

Nicole Branger and Beate Breuer (2008) found that simple discount certificates perform better than the more complicated ones with knock-in

knock-out features. So they concluded as retail derivatives with a more sophisticated payoff structure are less attractive for the investors.

Patrick Roger (2008) investigated Capital Protected Notes (CPNs) which are very popular structured products since the internet bubble burst in 2000. In his study he also examined the convenience of these types of products to the loss averse investors.

Patrick Roger (2008) found that CPNs are attractive for loss-averse investors. However, using a simple version of cumulative prospect theory, he showed that these products are not attractive to the investors if the investor takes either the underlying index or the risk-free instrument to invest. In other words loss-averse investors never find it optimal to invest in a CPN when their reference return depends on either the underlying or the risk-free asset.

2.2.2. Studies About Pricing of Structured Products

K.C. Chen and Lifan Wu (2007) investigated equity-linked structured notes. In their study they especially focused on the pricing of Bullish Underlying Linked Securities (BULS).

K.C. Chen and Lifan Wu (2007) found that valuation of BULS was overpriced at issue according to the model they used during the seasoning period with a mean pricing error of 2.40%. However, they found also out, this overpricing was soon corrected in the following year with a mean pricing error of −0.16%, which is statistically insignificant.

Rodrigo Hernández, Wayne Y. Lee and Pu Liu (2007) investigated Reverse Exchangeable Securities (RES). In their study they used a detailed survey of the $ 45 billion US dollar-denominated market for 7,426 issues of

bonds issued between May 1998 and February 2007. They developed pricing models for four different bonds to examine the profits.

Rodrigo Hernández, Wayne Y. Lee and Pu Liu (2007) found that result of the survey suggest significant positive profits for the issuing financial institutions. They also showed that a perfect hedge can be obtained with RES and issuing of the certificates is a profitable business. In their study they examined the design, the payoff, the market, the pricing, the profitability, and the realized returns of expired issues of the RES.

Rodrigo Hernández, Wayne Y. Lee and Pu Liu (2007) investigated OCs. In their investigations they studied €43 billion market by examining 1,507 issues of the certificates issued by banks in Europe. They also developed pricing formulas to value the certificates and empirically examine the profits in the primary market for issuing the certificates.

Rodrigo Hernández, Wayne Y. Lee and Pu Liu (2007) found that the dividend yields and ex-dividend dates play an important role in the profitability of the certificates. As a further study they developed pricing models for two types of certificates 'uncapped and capped certificates' and they found out that issuance of the certificates is profitable for the issuers in their sample.

Jos van Bommel, Silvia Rossetto (2008) investigated Endless Leverage Certificates (ELC). In their study they explained ELC as structured products which are long or short positions in an underlying that are partly financed with a loan from an issuing bank.

Jos van Bommel, Silvia Rossetto (2008) found that the value of an ELC is virtually independent of the volatility of the underlying, and is at most 0.3% higher than its intrinsic value. They found that ELCs are competitively priced and traded, and on average, ELC longs and shorts are overpriced by

0.51% and 1.01% respectively relative to their intrinsic values. Also in their study they found desirable properties of ELCs. First, the lower bound value of the product, the intrinsic value, is easy to ascertain and compare with market prices. Second, bid-ask spreads in the secondary market are narrow. ELCs also have desirable 'behavioral' properties.

2.2.3. Studies About Regulation of Structured Products

Jennifer Bethel and Allen Ferrell (2006) investigated possible risks that can be involved by the usage of structured products.

Jennifer Bethel and Allen Ferrell (2006) found that first of all there is not an enough regulation for the structured products and investors are buying them at most of the times without understanding them. They suggested several possible approaches for structured products regulation such as classifying investors as accredited and no accredited investors and allow only accredited investors to invest in structured products, restructuring the distribution of structured products (preventing large denominations, enhancing suitability requirements). They suggested these kinds of possible regulations in order to reduce the probability that investors hold inappropriate structured products. They also suggested improved disclosure (containing all explicit fees and best practices) and more accessible information such as web-based memoranda.

Thorsten Hens and Marc Oliver Rieger (2008) investigated optimal design and introduction of structured products to the investors. In their study they used data from Germany and Switzerland. They focused on the reasons why structured products look so attractive for many investors.

Thorsten Hens and Marc Oliver Rieger (2008) found that attractiveness of structured products can arise as a solution for enhancing the performance of a portfolio purposes. Also they found some behavioral factors like loss

aversion or probability of misestimation can increase the attractiveness of these products in the eyes of potential investors. They suggested improving the understanding of customer instead of banning structured products completely (as it is discussed in some countries).

2.3. Overview of Literature Review

Studies that were made in the past for structured products showed that most of the studies focused on pricing and performance of the structured products like Certificates of Deposits, Reverse Exchangeable Securities, Discount Certificates, Capital Protected Notes and etc… Researchers investigated these products whether in specific markets or in general.

Findings of the studies are differed from each other. However, it can be told that according to the most of the empirical studies; pricing of these products are in investors' disadvantage when the prices in primary or secondary markets are testing according to different pricing models like Black & Scholes model. Also when the performance of the structured products are analyzed most of the studies showed that investing in risk free instrument or investing directly to the structured products' underlying asset could be better for investors.

3. STRUCTURED PRODUCTS

3.1. Definition of Structured Products

Structured products are 'tailor-made' products which aim to provide the best solution to the investors with this 'tailoring process' (Kat 2001). There is not a single definition for structured products. Different definitions can be found in different sources.

- Definitions of structured products from web;

Web site (http://www.wikipedia.org/) defined structured product as ''A structured product is generally a pre-packaged investment strategy based on derivatives, such as a single security, a basket of securities, options, indices, commodities, debt issuances and/or foreign currencies, and to a lesser extent, swaps.''

Web site (http://www.hedgefund-index.com) defined structured product as ''structured products are synthetic investment instruments specially created to meet specific needs that cannot be met from the standardized financial instruments available in the markets.''

- Definitions of structured products from well-known institutions;

Definition of SSPA (Swiss Structured Products Association) is ''structured products are investment products available to the public whose repayment value derives from the development of one or several underlying assets.''

Definition of (http://www.structuredretailproducts.com) is ''structured products are investment products that generate a pre-defined return linked to one or more underlying financial prices, rates or indices.''

- Definitions of structured products from books;

Structured products are defined as ‘‘structured products refer to combinations of individual financial instruments, such as bonds, stocks and derivatives.’’ by Oesterreichische Nationalbank (Structured Products Handbook 2004)

According to Chorafas D.N (2007) ‘‘Structured products are securities that provide investors with a redemption amount, which may be with either full or partial capital protection, and a certain type of return.’’

Das (2000) defined them as ‘‘combinations of derivatives and underlying financial instruments which exhibit structures with special risk/return profiles.’’

As it can be realized from all these definitions; although there is not a single definition for structured products, there are some certain features that can be mentioned for the structured products like;

- Mostly they consist of at least 2 products; a common bond or a deposit, plus a derivative.
- The payoffs of the structured products depend on one or more underlying assets.

According to these features it can be told that;

Structured Products are tailor made financial instruments that are composed of mostly more than one product and have a performance depending on one or more underlying assets.

3.2. Composition & Design of Structured Products

Most of the structured products consist of 2 components; basic financial instrument (BFI) component and derivative component (See figure 3.1). The payoff, risk-level and general characteristics of a structured product can be determined from these 2 components.

Figure 3.1: Composition of a Basic Structured Product

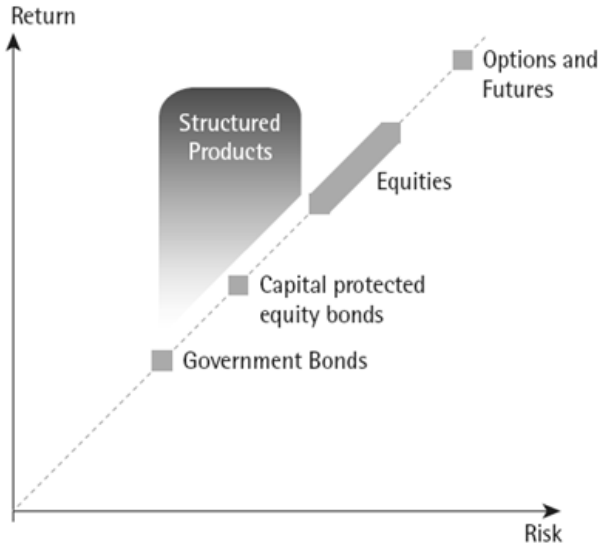
In BFI component, products like bonds, notes and deposits can be located. This component generates a fixed return to the structured product in most types of structured products.

In derivative component mostly options with different kinds of underlying instruments and different strategies are located. Options in this component can be linked to different instruments like equities (stocks, indices), commodities, foreign exchanges and interest rates. They can be linked to a single type of instrument or more than one instrument as a hybrid design. Options in derivative component can be in different types like call & put, vanilla & exotic options (barrier, lookback, asian and etc… (See Appendix A for most popular types of exotic options that are used in structured products) and these options can be in different strategies like bearish, bullish and neutral.

All the characteristics of a structured product like payoff, maturity, underlying instrument and its risk level can be determined according to;

- The type, maturity and payoff features of the instrument(s) that is located in BFI component. (e.g. if it is a bond; type of this bond (government or corporate & zero or coupon) , its interest rate and maturity affects the structured products payoff & risk level)
- The type, maturity and payoff features of the instrument(s) that is located in derivative component. (e.g. if it is an option, its underlying asset (fx, equity, interest rate, commodity or hybrid), its type (call & put, vanilla & exotic), its strategy (bearish, bullish, neutral) and its maturity affects the structured products payoff & risk level)
- The weight of these components.

Figure 3.2 illustrates structured products on risk-return graph.



Source: BNP Paribas Equities and Derivatives Handbook

Figure 3.2: Structured Products in Risk & Return Graph

As it can be realized from that graph a typical structured product locates between bonds and options on risk-return graph. In other words structured product is more risky than government bonds and less risky then options.

According to the types, characteristics and ratios of structured products' components, risk level of the structured products can move between the risk level of government bonds and options.

In order to move a structured product's risk level between the risk level of government bonds and options, components and their weight should be re-structured.

- With the identical components of 2 different structured products; the weight of these components affects the risk level of these structured products. Greater weight of bond component moves the structured product through government bond risk level, greater weight of derivative component moves the structured product through options risk level.

- With the same weight and identical BFI components of 2 different structured products, the risk level of derivative components effect the risk level of these structured products. Riskier option component moves the structured product through options risk level, less risky option component moves the structured product through government bond risk level.

- With the same weight and identical option components of 2 different structured products, the risk level of BFI components affect the risk level of these structured products. Riskier BFI component moves the structured product through options risk level, less risky BFI component moves the structured product through government bond risk level.

3.3. Types of Structured Products

Until this section we analyzed the definition and the composition of the structured products. In this section types of the structured products will be analyzed according to;

- The market that they bought & sold
- Their underlying asset
- Their risk level

3.3.1. Structured Products and Their Market

Structured products are financial instruments so they should have a market to be bought or sold. According to their trading markets they can be divided into 2 categories;

3.3.1.1. Structured Products in OTC markets

These types of structured products don't have an organized market and mostly traded between two different parties. There is not an organizer of these transactions and the parties are responsible to each other for all the liabilities that come along with the product.

For example; Dual Currency Deposit (DCD) which will be analyzed in Chapter 5, can be count as a structured product whose transaction occurs in OTC markets. In the transaction of a DCD product there are two different parties and one structured product whose specifications (maturity, strike price, underlying asset and etc…) are determined and fixed by these two parties. The possible outcomes and liabilities will be faced by these two parties only; not by another third party.

3.3.1.2. Structured Products in Organized Markets

These kind of structured products are bought and sold in organized markets, that is to say transactions of the products occur under the control of an authority and its set of rules and regulations.

The best examples of this category are the structured products which are traded in Scoach[1]. Unlike the structured products traded on OTC markets, these kinds of products bought and sold in an organized market.

3.3.2. Structured Products and Their Underlying Instrument

Another categorization of the structured products is according to their underlying instrument. Although there are unlimited strategies to compose a structured product there are some main instruments that can be considered as underlying assets when we analyze structured products.

Foreign Exchange (FX) Linked Structured Products: The payoffs of these kinds of structured products depend on the performance of the currency which is underlying. Products can be linked to one single currency pair or a basket of currency pairs. Most popular types of currency pairs can be formed between USD, JPY, EUR, CHF, GBP, CAD and AUD (Wystup 2006)

Commodity Linked Structured Products: The underlying assets of these kinds of structured products are commodities. Underlying asset can be a single commodity or a basket of commodities. Some popular types of commodities are gold, silver, oil and etc…

[1] Scoach is an exchange market for European Structured Products that is located in Germany and Switzerland. In Germany; European structured products are traded and more than 300.000 products are located in this market. In Switzerland Swiss structured products are traded and more than 22.000 products are located in this market. For further details see www.scoach.com.

Equity-Linked Structured Products: They are promoted as an alternative to directly investing in equities since the underlying assets of these kinds of structured products are equities (Chorafas 2007). There are 2 main types of equity linked structured products: Share linked and Index linked structured products. Share linked structured products can be composed of a single share or a basket of shares. Some popular types of shares are Deutsche Bank, Allianz, Bayer and etc… Index linked structured products can be composed of a single index or a basket of indices. Some popular types of indices are DJ Eurostoxx50, DAX, FTSE100 and etc…

Interest Rate Linked Structured Products: The underlying assets of these kinds of structured products are interest rates. Products can be linked to one single interest rate or a basket of interest rates. Some popular types of interest rates are LIBOR, EURIBOR and etc…

Hybrid-Linked Structured Products: In these kind, different types of underlying instruments comes together in a structured product. For example if a product has currency, commodity and equity as underlying at the same time, this structured product can be evaluated as hybrid-linked structured product.

These 5 types of underlying instruments can be classified as the major types, despite them there are other types of underlying instruments such as;

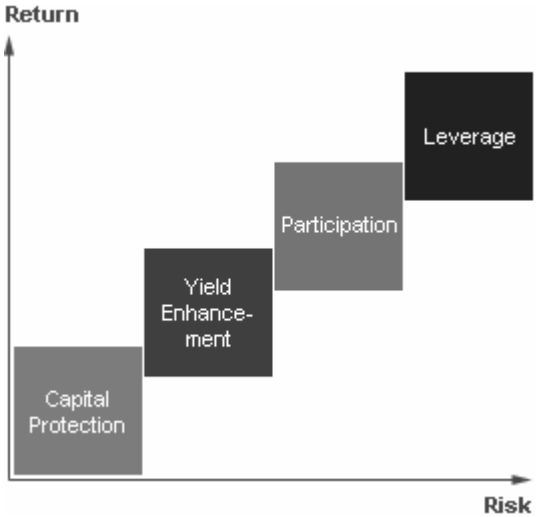
- Credit Linked Structured Products: In this kind, the underlying asset is mostly a pool of debt instruments. So the performance of the structured product linked to these debt instruments. (e.g. Asset Backed Securities, Credit Default Obligations and etc…)
- Fund Linked Structured Products: In this kind the product and its payoff is linked to the performance of a fund. Most popular type is

hedge fund linked products. They provide their investors, easy and less costly participation to the hedge funds.

- Inflation Linked Structured Products: In this kind, the product is linked to a single inflation rate of a specific country or a zone or basket of inflation rates. Most of them target to protect investors from resurgence in inflation (Chorafas 2007).

3.3.3. Structured Products and Their Risk Level

In this section structured products will be categorized according to their risk levels. Figure 3.3 shows main types of structured products when their risk levels are considered;



Source: http://www.juliusbaer.com

Figure 3.3: Structured Products and Their Risk Levels

As can be seen from figure 3.3; there are 4 main types of structured products according to their risk levels and they can be lined up from less risky to the riskier as following:

1. Capital protected products
2. Yield enhancement products
3. Participation products
4. Leverage products

At this section the categorization of structured products are made according to the classification of structured products made by Swiss Structured Products Association (SSPA) and European Structured Investment Products Association (EUSIPA). Within the following sections most popular types of products will be analyzed. (See Appendix C for all types of structured products according to SSPA and EUSIPA structured products categorization model.)

3.3.3.1. Capital Protected Products

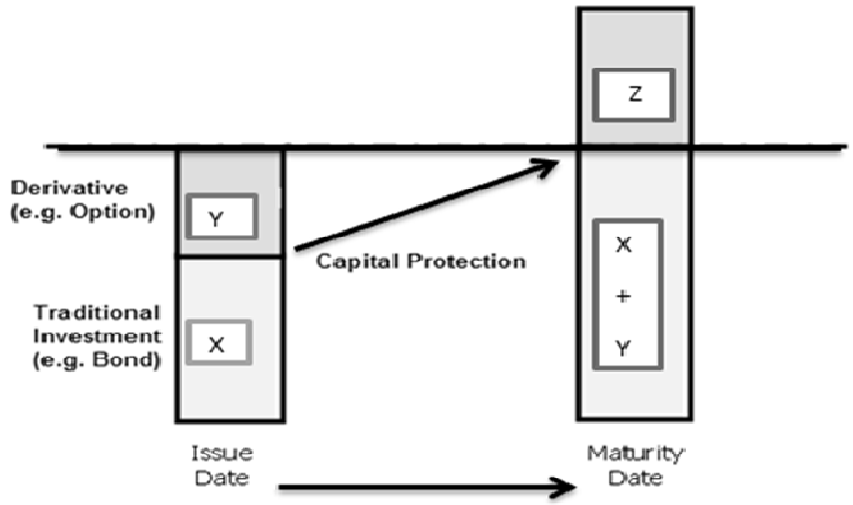
Capital protected products are structured products which protect the initial investment at the maturity. These products can also generate a return to their investors above their initial investment. These kinds of products mostly consist of a traditional bond (the part which protects the initial investment at the maturity), plus a derivative (the part which may generate a return above initial investment – mostly option.)

In these kinds of products; return of the product above the initial investment is determined by option's performance multiplied by participation rate. Participation rate is determined by dividing the remaining capital after investing in traditional bond to the price of derivative that is used to structure this capital protected product.

In capital protected products; mostly issuers set the capital protection level at 100%, but they can also set it higher or lower. In Europe today's low interest rates make it harder to provide %100 capital protection to the investors while structuring attractive products that's why %70 - %80 capital

protection started to used in most of European capital protected products. (Marray 2009)

Figure 3.4 shows composition and operating process of a basic capital protected product.



Source: http://www.investopedia.com

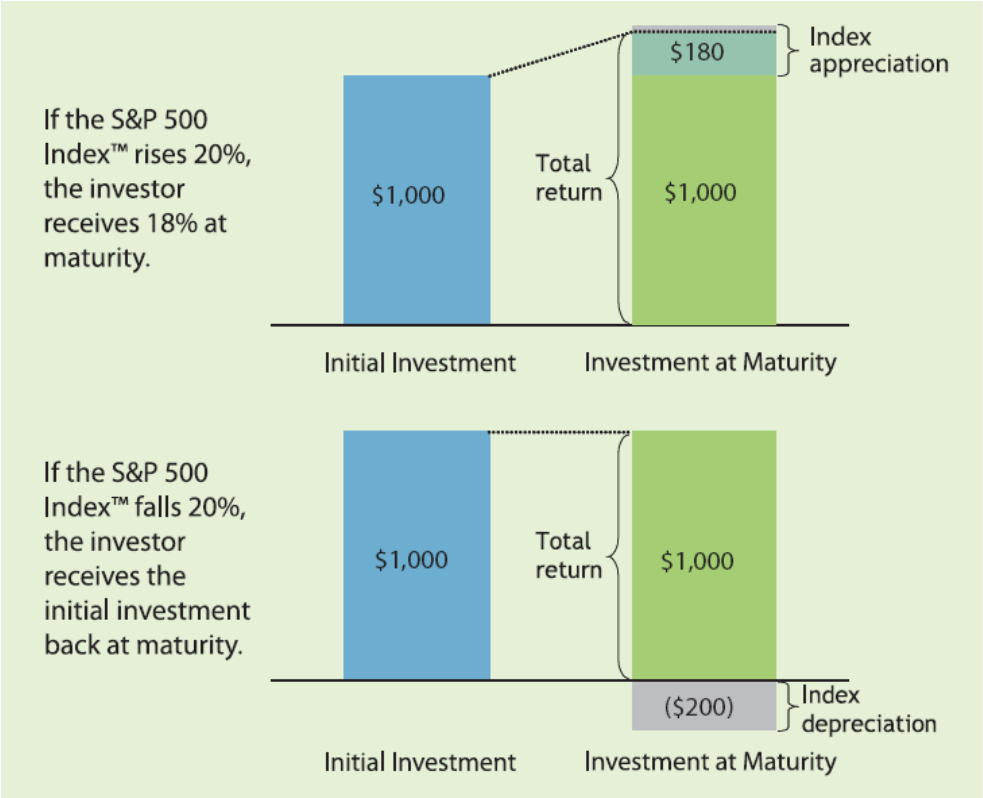
Figure 3.4: Composition of Capital Protected Products

In Figure 3.4; Y refers to value of a derivative, X refers to value of a bond. At the maturity the value of bond will reach the initial investment which is X+Y. So the capital is protected by this way. At this example Z refers to an extra yield that is generated by the option.

At the maturity X+Y generated independent from the option's performance. On the contrary, Z which represents the yield above the initial investment is dependent to the option's performance and participation rate.

Figure 3.5 shows a numerical example of a capital protected product from JP Morgan Structured Investments Solution Catalogue (2007). In this figure return of a $1000 investment to a capital protected product linked to

the S&P 500 Index with a 90% participation rate is shown in 2 different scenarios.



Source: JP Morgan Structured Investments Solution Series Volume 1

Figure 3.5: A Capital Protected Product Example

In the first scenario; if the S&P 500 Index rises to %20, then the investors receives at the maturity; initial investment * S&P performance * participation rate = 1000 * 0,20 * 0,90 = $180

In the second scenario; if the S&P 500 Index falls to %20, then the investor receives at the maturity his/her initial investment which is equal to $1000. In this scenario rather than incurring a $200 loss in the initial investment, investor receives his/her principal back at the maturity.

Capital protected products can be considered as transition products for the structured products market. As can be seen their place on risk return graph from Figure 3.3, retail investors who didn't invest in structured products before mostly choose these kinds of products if they want to try investing in structured products for the first time. In other words, it can be told that; capital protected products are the middle term between the phrases of being a conservative investor and sophisticated investor. Because of this reason as Roger (2008) reported in his study; most of the banks offer their customers these types of structured products by assuming that most of their customers are loss averse investors. Before investing in more risky structured products, loss averse investors firstly chooses capital protected structured products.

3.3.3.2. Yield Enhancement Products

Yield Enhancement products are kind of structured products which are desirable to the investors when markets are stable or moving sideways. They offer returns above the traditional bonds if the underlying assets' prices move sideways or go up (Barlocher 2009). If investors invest in these types of products their yield can be above market; however, their capital may be at risk. In these kinds of products the risk of the investor occurs when the prices of underlying assets go down. Mostly these products have a predetermined limit on the return (cap). Investors who invest in yield enhancement products mostly have following market expectations ('SSPA Swiss Derivative Map' 2009);

- Sideways market (flat market; prices of instruments are moving sideways) of underlying
- Falling volatility.

There are two main types of yield enhancement products; Discount Certificates and Reverse Convertibles. Reverse convertibles have coupon

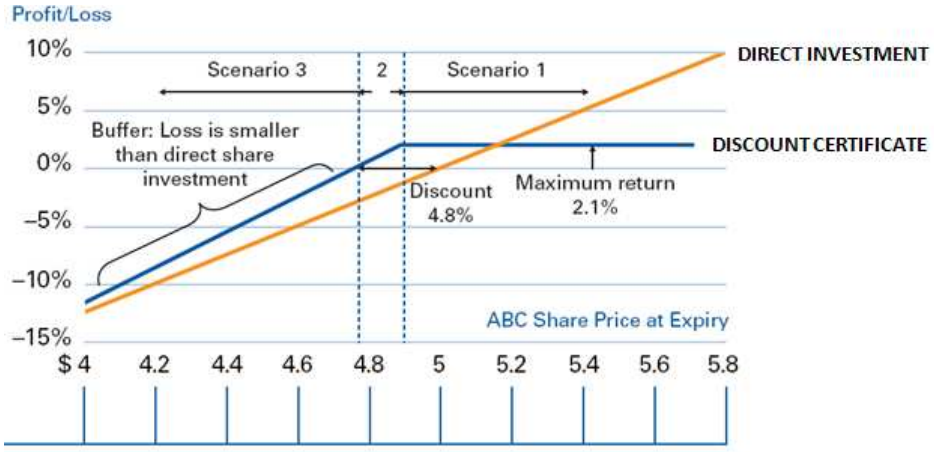
payments which are above the coupon payments of traditional bonds; however, discount certificates have no coupon payments, they are sold at prices below their underlying assets' market price (Barlocher 2009).

a. Discount Certificates

Discount Certificates (DCs) are structured products which allow investors to invest to an index, basket of securities or a certain security with a price which is lower than the market price. (That's why they known as 'discount' certificates). This discount is given to the investor in exchange for a fixed maximum return which should be accepted by the investor. This fixed maximum return is known as predetermined cap.

Each DC has its own underlying security and a maximum price which is called cap strike. At the certificate's maturity, if the price of the underlying is lower than the cap, the investor receives physical form of the underlying (if the underlying is a share). Instead of physical delivery of the underlying, for DCs that are consisted of non-traded assets like indices, cash settlement is also possible (Wilkens, Erner and Roder 2003). On the other hand, if the price of the underlying is higher or equal to the cap, the investor receives the maximum amount which is equivalent to the cap.

In Figure 3.6 an example from Deutsche Bank AG Discount Certificates Product Brochure (2006) can be found. In Figure 3.6 x axis shows the prices of underlying ABC share and y axis of the graph shows the payoff amount of discount certificate at different prices.



Source: Deutsche Bank AG Discount Certificates Product Brochure (2006)

Figure 3.6: A Discount Certificate Example

In this example it is assumed that; ABC share is trading at $5. A 1-month Discount Certificate on ABC with a cap strike at $4.86 costs $4.76. Investors may get the share at a discount of % 4.8 (of the initial share price) but in return, they have to accept a maximum payout of $4.86 which will give a maximum return of 2.1%.

Till maturity; DC's price will be depended on the ABC share but not reflect precisely. The DC tracks upward movements to the cap strike, on the other hand when the price of the share falls, the DC price also falls.

At the maturity; such possible scenarios could occur:

- **Scenario 1:** The underlying share is trading at or above the cap strike. Then the DC pays the cap strike of $4.86.
- **Scenario 2:** The underlying share is trading below the cap strike and higher than the original invested amount. Then the investor will get one underlying share. In total investor receives a return since current price of the share is higher than the original investment amount.

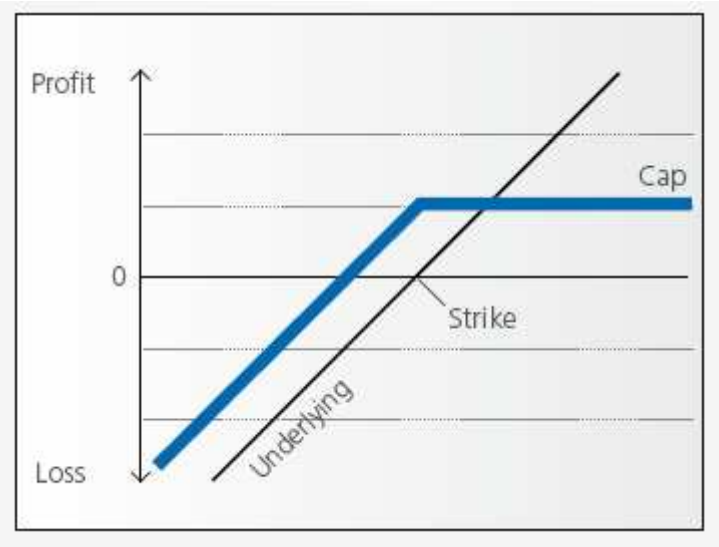
- **Scenario 3:** The underlying share is trading below the cap strike and the original invested amount. The investor will get one underlying share. The investor receives a loss in total since current price of the share is lower than the original investment amount. But this loss will always be lower than a direct investment on the underlying share.

b. Reverse Convertibles

Reverse Convertibles (RCs) are securities that are linked to an underlying stock and pay above market coupons. In return for this coupon, there is no guarantee that investors will recover the full amount of invested capital and unlike direct investment in a stock or bond, upside potential of a RC is limited to this coupon amount. ('JP Morgan Structured Investments Solution Series Volume III: Reverse Exchangeables' 2007). They are also known in the market as Reverse Exchangeable Securities (RES) and described by Benet, Giannetti and Pissaris (2003) as interest-paying, non-principal-protected structured products, offering a fixed interest rate that is higher than conventional debt securities.

At maturity the price of underlying is compared to the price at the time of issue. So the investor gets coupon payment + principal investment if the price at the maturity is equal to or greater than the initial price of the underlying. If the price at the maturity is less than the price at the time of issue then the investor gets number of shares that is found by dividing the principal investment by the share price at the time of issue.

Figure 3.7 shows payoff graph of a RC. In this figure the line which is thin represents the price change of underlying asset and the line which is thick represents the payoff of a discount certificate according to the price changes of the underlying asset. x axis shows the prices of underlying asset and y axis of the graph shows the payoff amount of RC at different prices.



Source: SSPA Swiss Derivative Map

Figure 3.7: Payoff Graph of a Reverse Convertible

As can be seen from Figure 3.7; at the prices that are above the strike price, RC pays a fixed amount of return to the investor. In the figure this amount is shown as 'cap'. At the prices that are below the strike price, payoff of RC will be affected 1 to 1 by the performance of underlying share. In other words if underlying share price will fall %a, the price of RC that is linked to this share will fall %a.

To explain how RCs work; following example is given:

Let's assume; an investor purchases $1,000 of a one-year reverse convertible linked to the price of XYZ share, price of XYZ share at issuance is $10 (strike & initial price) and the coupon rate is %10

At the maturity If the price of XYZ share is $10 or greater; investor will receive $100 (cap) in interest and the return of his principal, for a total of $1,100. If the price of XYZ share is less than $10 let's say $5, the investor receives $100 interest plus 100 shares (1,000 divided by 10) of XYZ share.

To compare investing in XYZ share directly and investing RC linked to XYZ, Table 3.2 is designed. In this table 4 different scenarios are considered as the XYZ share's price will be EUR 12, 10.8, 9 or 7 at the maturity. According to these scenarios; comparisons are made in order to show the advantages & disadvantages of investing in RC in different prices at the maturity.

Table 3.1: Direct Investment - Reverse Convertible Comparison

	Price at Maturity	Direct investment in XYZ share	Reverse Exchangeable on XYZ share
Scenario 1	EUR 12	Profit of 20%	Profit of 10% (coupon)
Scenario 2	EUR 10.8	Profit of 8%	Profit of 10% (coupon)
Scenario 3	EUR 9	Loss of 10%	Profit/loss of 0 (10% loss on share price 10% profit from coupon)
Scenario 4	EUR 7	Loss of 30%	Loss of 20% (30% loss on share 10% profit from coupon)

As can be seen from Table 3.1;

In scenario 1; at the maturity the price of XYZ share is EUR 12, direct investment to the XYZ share will lead a 20% profit for investor while investing in RC linked to XYZ share will lead a profit of %10 that is equal to the coupon amount.

In scenario 2; at the maturity the price of XYZ share is EUR 10.8, direct investment to the XYZ share will lead a 8% profit for investor while investing in RC linked to XYZ share will lead a profit of %10 that is equal to the coupon amount.

In scenario 3; at the maturity the price of XYZ share is EUR 9, direct investment to the XYZ share will lead a 10% loss for investor while

investing in RC linked to XYZ share will not lead any profit or loss to the investor.

In scenario 4; at the maturity the price of XYZ share is EUR 7, direct investment to the XYZ share will lead a 30% loss for investor while investing in RC linked to XYZ share will lead 20% loss to the investor.

3.3.3.3. Participation Products

Participation products are kind of structured products can be one to one with the prices of the underlying assets, or with some leverage and certain discontinuities. The basic difference between participation products and yield enhancement & capital protected products is; there is not a cap level in participation products (Barlocher 2009).

Most common types of participation products that are traded in the market are; Open End Certificates, Outperformance Certificates, Bonus Certificates and Outperformance Bonus Certificates.

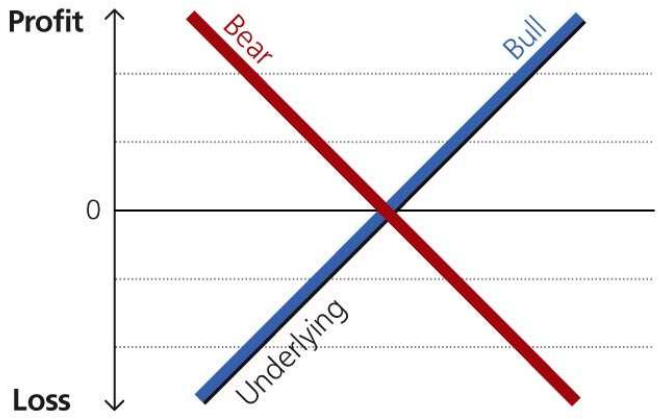
a. Open End Certificates

They are also known as 'Tracker Certificates' in the market. Open End Certificates (OECs) are suitable for investors who want to benefit from the performance of an index, a sector, a commodity or interest rates. OECs don't have fixed expiry dates, meaning that investors can pursue an investment goal of their choice for as long as they please.

According to their underlying instrument they can be classified as Open End Index Certificates, Open End Commodity Certificates and Open End Interest Rate Certificates. According to their design and market expectation they can be classified as Bull Certificates (long-tracker certificates: they are suitable for the investors whose market expectations are rising underlying)

and Bear Certificates (short-tracker certificates: they are suitable for the investors whose market expectations are falling underlying.)

Figure 3.8 shows the payoff graph of an OEC. In this figure the line which is thin represents the price change of underlying asset and the lines which are thick represent the payoff of Bear and Bull Certificates. x axis shows the prices of underlying asset and y axis of the graph shows the payoff amount of Bear and Bull Certificates at different prices.



Source: SSPA Swiss Derivative Map

Figure 3.8: Payoff Graph of an Open End Certificate

As can be seen from Figure 3.8, payoffs of Bear and Bull Certificates are affected 1 to 1 (without leverage) from the underlying assets' price movements. Also these certificates provide %100 and unlimited participation to the underlying assets' price movements both in upside and downside. Unlike discount certificates; they are traded without any discount.

To explain how OECs work; following example is given;

Maturity:	4 years
Underlying:	S&P 500
Current price of OEC:	USD 12
Current price of index:	USD 1.200
Exchange Ratio:	%1

Most OECs have an exchange ratio which converts the index level into an OEC price. In this example it is assumed that exchange ratio is 0,01; that's why current price of the OEC is 12 USD when the S&P 500 Index level is 1.200.

Since OEC reflects the performance of underlying index 1 to 1;

- At maturity the price of the OEC will be determined by
  (Index Level at maturity) * (Exchange Ratio)
- Holder of OEC will gain or lose;
  (Current Index Level – Index Level at maturity) * (Exchange Ratio)

If at maturity S&P 500 Index closes at 1.320 (representing a %10 increase), holder of this OEC will gain (1.320 – 1.200) * (0,01) = USD 1,2 and gets USD13,2 at maturity (a return on investment of %10)

If at maturity S&P 500 Index closes at 1.080 (representing a %10 increase), holder of this OEC will lose (1.200 - 1080) * (0,01) = USD 1,2 and gets USD 10,8 at maturity (a loss on investment of %10)

The question is; why investors invest in OECs instead of investing the underlying instrument directly; although they don't have capital protection and they reflect the underlying instruments' performance 1 to 1?

The answer is; OECs provide investors spreading the risks by investing inexpensively in a broadly diversified product. In other words they provide easy access for the investors to a large variety of alternative investments. For example it can be so expensive to invest in S&P 500 by purchasing each stock individually, but by investing to an open-end certificate which is linked to S&P 500 index, investor can reach S&P 500 index's performance with low transaction costs and transparent fees. Also if an investor tries to invest in each S&P 500 stock individually it will be hard to follow the performance of the whole portfolio. But by investing in an OEC which is linked to S&P 500 provides the investor to track the performance of the investment anytime.

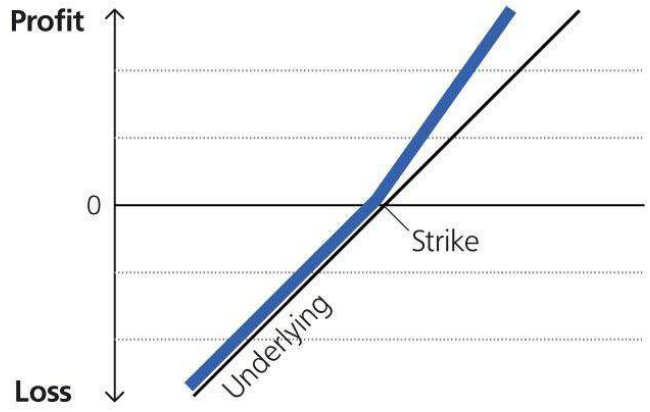
The risks that can be mentioned about these types of products are comparable to a direct investment in the underlying. In other words; if the underlying of the OEC decreases, the value of the OEC decreases. As the worst scenario, the investor can lose their entire investment. Also the OECs that are issued on international currency carry currency risk. However, there are some types of certificates that are called 'Quanto Certificates' which enable the investor to participate the product in his/her own local currency. When the certificates are 'Quanto', investors don't participate in risks or opportunities that are arising from exchange rate movements between the currencies of underlying and certificate. ('Goldman Sachs 2 Year Quanto SGD 100% Capital Protected Certificate on an Asian FX Basket Product Brochure' 2009) Unlike OEC's Quanto Certificates do have a participation ratio and provide the investors a pre-determined participation rate to the underlying performance.

b. Outperformance Certificates

Outperformance Certificates (OCs) are also known in the market as Sprint Certificates, Accelerator Certificates, or Speeders. Their payoffs are depending on tracking the underlying instrument. Unlike OECs, OCs tracks

the underlying 1 to 1 till the strike price and disproportional on the prices that are above the strike price. In other words on the prices that are above the strike price OCs offers disproportional participation to the underlying's performance. This proportional participation is determined by pre-specified multiple (known as performance factor) times the return on the underlying asset (Hernandez, Lee & Liu 2007). This performance factors is always above %100 that's why these products are known as 'outperformance' certificates.

Figure 3.9 shows the payoff graph of an OC. In this figure the line which is thin represents the price change of underlying asset and the line which is thick represents the payoff of an OC according to the price changes of the underlying asset. x axis shows the prices of underlying asset and y axis of the graph shows the payoff amount of OC at different prices.



Source: SSPA Swiss Derivative Map

Figure 3.9: Payoff Graph of an Outperformance Certificate

As can be seen from the graph till strike price holder of OC will participate to the underlying asset's performance %100 and at the prices above the strike price participation of the OC holder to the asset performance will be above %100.

To explain how OCs work; following example is given;

Maturity:	1 year
Underlying:	XYZ
Strike price:	EUR 300
Performance factor:	%150
Current price of OC:	EUR 300
Current price of stock:	EUR 300

Above the strike price of EUR 300, OC will give a return of (%150) * {XYZ (beginning) – XYZ (maturity)}

If at maturity stock closes at EUR 330 (representing a %10 increase), holder of this OC will gain (%150) * (330-300) = EUR 45 and gets EUR 345 at maturity (a return on investment of close to %15).

Below the strike price of EUR 300, holder of OC participates 1 to 1 in the losses on the stocks.

If at maturity stock closes at EUR 270 (representing a %10 decrease), holder of OC also loses EUR 30 and gets EUR 270 at maturity.

Hernandez, Lee and Liu (2007) also declared in their study that; holders of OCs don't receive cash dividends of underlying assets even the underlying assets pay dividends during OC maturity.

The investors who invest in OCs expect a rise on the underlying's price and also a rise in the volatility. The risk that can be mentioned for the investor when they purchase OCs is similar to the risk if investor invests to the underlying directly.

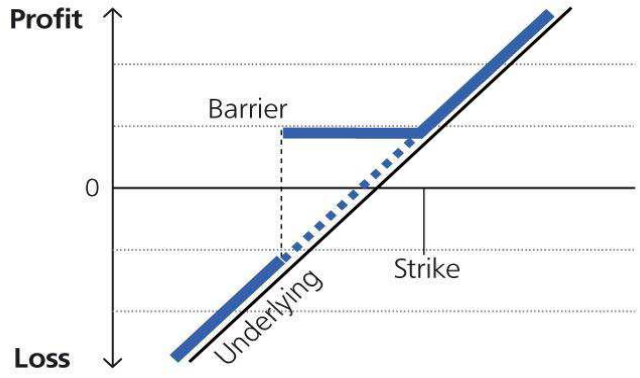
According to Hernandez, Lee & Liu (2007) returns of OCs can be divided into 2 as; capped certificates (if the returns on the certificates are

subject to a maximum limit) and uncapped certificates (if the returns on the certificates are not subject to a maximum limit).)

c. Bonus Certificates

Bonus Certificates (BCs) are types of participation products that are also known by the names of Bonus Protect Certificates, Step Up Bonus Certificate, Bonus Certificates Pro, or Certificates Plus in the market. They can be considered as a second generation of OECs with a conditional capital protection feature. This capital protection feature dependent on the underlying asset's price and as long as the underlying asset's price doesn't cross a predefined barrier, capital protection occurs (Hernandez, Brusa & Liu 2007).

Figure 3.10 shows payoff graph of a BC.



Source: SSPA Swiss Derivative Map

Figure 3.10: Payoff Graph of a Bonus Certificate

In this figure the line which is thin represents the price change of underlying asset and the line which is thick represents the payoff of a BC according to the price changes of the underlying asset. x axis shows the prices of underlying asset and y axis of the graph shows the payoff amount

of BC at different prices. Dotted line represents possible payoff of a BC if the barrier is breached downward.

As can be seen from Figure 3.10; if the barrier is never breached; at the prices between barrier and strike, the product gives a predefined 'bonus' to the investor. This bonus is equal to the amount in the y axis which is corresponded to the intersection of barrier and BC payoff line above the x axis. At the prices that are above the strike, the product becomes an OEC and reflects the underlying's performance 1 to 1. At the prices below the barrier in other words, if the barrier is breached downward then the product reflects 1 to 1 underlying's performance.

To explain how BCs work; following example is given;

Maturity:	2 years
Underlying:	ABC
Strike Price:	EUR 33
Barrier:	EUR 24
Current price of BC:	EUR 30
Current price of stock:	EUR 30

If during 2 years ABC is never traded at or below EUR 24 (barrier);

Above the strike price of EUR 33, BC will pay 1 to 1 in the increase of the stocks to the investor.

If at maturity stock closes at EUR 36 (representing a %20 increase), holder of BC will get EUR 36 at maturity.

Between strike price (EUR 33) and barrier (EUR 24), BC will pay EUR 33 which is 'bonus level' in this BC.

If at maturity stock closes at EUR 31,5 (representing a %5 increase), holder of BC will get EUR 33 at maturity.

If at maturity stock closes at EUR 27 (representing a %10 decrease), holder of BC will get EUR 33 at maturity.

If during 2 years barrier is breached in other words ABC is traded at or below EUR 24 (barrier);

At this time; investor gets the current market value of ABC stock at the maturity.

If at maturity stock closes at EUR 31,5 (representing a %5 increase), holder of BC will get EUR 33 at maturity. Investor will gain a profit in total.

If at maturity stock closes at EUR 27 (representing a %10 decrease), holder of BC will get EUR 33 at maturity. Investor will suffer a loss in total.
.

Hernandez, Brusa and Liu (2007) also declared in their study that; holders of BCs don't receive cash dividends of underlying assets even the underlying assets pay dividends during BC maturity.

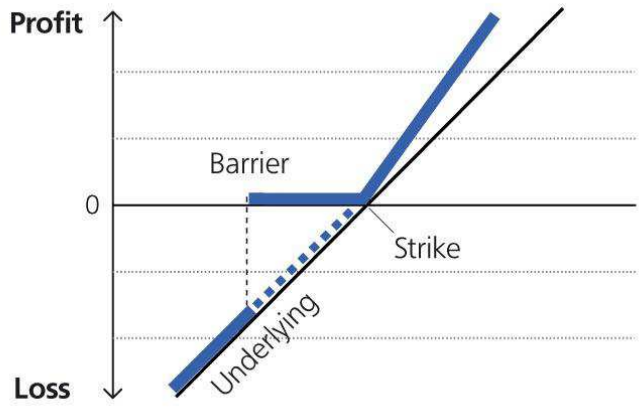
BCs are suitable products for the investors who expect the underlying's price rises or moves sideways, also doesn't breach the barrier. Risks of BCs can be mentioned as lower than investing directly to the underlying because of the conditional capital protection.

According to Hernandez, Brusa & Liu (2007) returns of BCs can be divided into 2 as; capped certificates (if the returns on the certificates are subject to a maximum limit) and uncapped certificates (if the returns on the certificates are not subject to a maximum limit).)

d. Outperformance Bonus Certificates

Outperformance Bonus Certificates (OBCs) are participation products that are formed by combination of OCs and BCs. They can be considered as a second generation of OCs with a conditional capital protection feature. This capital protection feature depends on the underlying asset's price and as long as the underlying asset's price doesn't cross a predefined barrier, capital protection occurs. Above strike price; this proportional participation is determined by pre-specified multiple (known as performance factor) times the return on the underlying asset. (Hernandez, Brusa & Liu 2007).

Figure 3.11 shows payoff graph of an OBC



Source: SSPA Swiss Derivative Map

Figure 3.11: Payoff Graph of an Outperformance Bonus Certificate

In this figure the line which is thin represents the price change of underlying asset and the line which is thick represents the payoff of an OBC according to the price changes of the underlying asset. x axis shows the prices of underlying asset and y axis of the graph shows the payoff amount of OBC at different prices. Dotted line represents possible payoff of an OBC if the barrier is breached downward.

As can be seen from figure 3.11 there is a predetermined barrier like BCs and disproportional participation at the prices that are above strike price like OCs. In other words; if the barrier is never breached; at the prices between barrier and strike, the product gives a predefined 'bonus' to the investor. This bonus is equal to the amount in the y axis which is corresponded to the intersection of barrier and OBC payoff line above the x axis. At the prices that are above the strike, the product becomes an OC and provides disproportional participation to the underlying's performance. If the barrier is breached downward then the product reflects 1 to 1 underlying's performance below strike.

To explain how OBCs work; following example is given;

Maturity:	2 years
Underlying:	abc
Strike Price:	EUR 80
Performance factor:	%150
Barrier:	EUR 68
Current price of OBC:	EUR 80
Current price of stock:	EUR 80

If during 2 years abc is never traded at or below EUR 68 (barrier);

Above the strike price of EUR 80, OBC will pay 1.5 to 1 (because of %150 performance factor) in the increase of the stocks to the investor. At maturity investor will get; (%150) * {abc (beginning) – abc (maturity)}

If at maturity stock closes at EUR 88 (representing a %10 increase), holder of this OBC will gain (%150) * (88-80) = EUR 12 and gets EUR 92 at maturity (a return on investment of %15).

Between strike price (EUR 80) and barrier (EUR 68), BC will pay EUR 80 which is 'bonus level' in this OBC.

If at maturity stock closes at EUR 76 (representing a %5 decrease), holder of this OBC will get EUR 80 at maturity.

If at maturity stock closes at EUR 72 (representing a %10 decrease), holder of this OBC will get EUR 80 at maturity.

If during 2 years barrier is breached in other words abc is traded at or below EUR 68 (barrier);

At this time; investor gets the current market value of abc stock at the prices below strike.

If at maturity stock closes at EUR 64 (representing a %20 increase), holder of this OBC will get EUR 64 at maturity. Investor will suffer a loss of 80 – 64 = 16 in total

Above strike, OBC pays; (abc performance) * (performance factor)

If at maturity stock closes at EUR 88 (representing a %10 increase), holder of this OBC will gain (%150) * (88-80) = EUR 12 and gets EUR 92 at maturity (a return on investment of %15).

The disproportionate participation rate of OBC is usually lower than disproportionate participation rate of OC. Also because of this disproportionate participation OBC's downside protection level is more modest than BC.

The investor of OBCs expects the underlying's price will rise and won't breach the barrier. Like BCs, OBCs involves a risk that is lower than

investing directly to the underlying because of the conditional capital protection.

According to their returns OBCs can be divided into 2 as; capped OBCs (if the returns on the certificates are subject to a maximum limit) and uncapped OBCs (if the returns on the certificates are not subject to a maximum limit). Holders of OBCs don't receive cash dividends of underlying assets even the underlying assets pay dividends during OBC maturity (Hernandez, Brusa & Liu 2007).

3.3.3.4. Leverage Products

Leverage products are types of structured products that magnify the price movements of the underlying instruments. This magnification is known in financial world as 'leverage'. In leverage products like the other structured products underlying instruments can be shares, indices, currencies, commodities and etc...

In these types of products investor can obtain an outsized gain with a low capital by the leverage effect. But also the same leverage effect can lead big losses if the expectation of the investor doesn't come true. The main type of leverage products that is traded in the market and issued by popular banks is warrants.

a. Warrants

Warrants are leverage products which give their holder, buying or selling right of an underlying share at a predetermined price. Warrants give their holders the right but not the obligation. They are written by a company on its own stock (Hull 1997). In financial terms, their characteristics are confused with options mostly. The main differences between options and warrants are (Ross, Westerfield & Jaffe 2005);

- Warrants are issued by the firms when options are issued by individuals.
- In order to talk about maturity, exercise period of a warrant is usually several years but exercise period of an option is usually several months.
- If an option is exercised the firm receives the exercise price from the investor and the firm simultaneously issues new shares when a warrant is exercised, a firm must issue new shares of stock.

The most important factor that attracts investors to invest in warrants is 'leverage effect'. To illustrate the meaning of leverage effect an example that is out of the financial markets can be used:

Some big burger companies like Burger King, Mc Donald's give coupons which give discounts till a predetermined date to their customers. Let's say Burger King gives a customer a coupon which enables he/she to buy a whooper menu for 5 TL instead of 8 TL till 31.12.2010 (expiry date). At this point: his/her coupon worth 3 TL (this is called intrinsic value). Let's assume Burger King decides to increase whooper menu prices to 10 TL next month. That means a %25 increase in whooper menu prices. However, he/she can still buy a whooper menu with his/her coupon for 5 TL that means now his/her coupon worth 5 TL. That means the value of his/her coupon increases about %66 while the price of whooper menu increases only %25. This is called 'leverage effect'. Besides intrinsic value, this coupon has a 'time value' which expresses the probability of this coupon's value increasing before the expiry date (Scoach Europa AG: Leverage Products – Warrants and Knock-outs 2009).

There are 2 typical types of warrants that are designed for the investors who have an expectation on the trend of any underlying;

- Call Warrants; for the investors who expect a rise of the underlying

- Put Warrants; for the investors who expect a fall of the underlying.

aa. Call Warrants

A call warrant is an instrument which gives its holder the right but not the obligation to buy a certain underlying asset at a fixed price (mostly called strike or exercise price), in a certain quantity, till a certain date (expiry date).

At expiry date, if the price of underlying asset is higher than the warrant's exercise price; then the holder of warrant will receive cash that is equal to;
{(Price of underlying asset at maturity) – (Exercise price of the warrant)} * (conversion ratio)

To explain how call warrants work; following example is given; (http://www.dbs.com)

Share price: $12.00
Exercise price: $11.50
Conversion ratio: 0.1
Call warrant price: $ 0.20

Scenario 1: In the money

If share price on the expiry date is $14.50, then this warrant holder will get (14.50 - 11.50) * 0.1 = $0.30 and make a profit of 0.30 – 0.20 = $0.10 per one warrant. This means %50 profit for the warrant holder although the share price increases 2.50/12.00 = %20.8

Scenario 2: Out of money

If the share price trades at or below $11.50 (exercise price) on the expiry date, the warrant and the investment will be worth nothing. Investor's

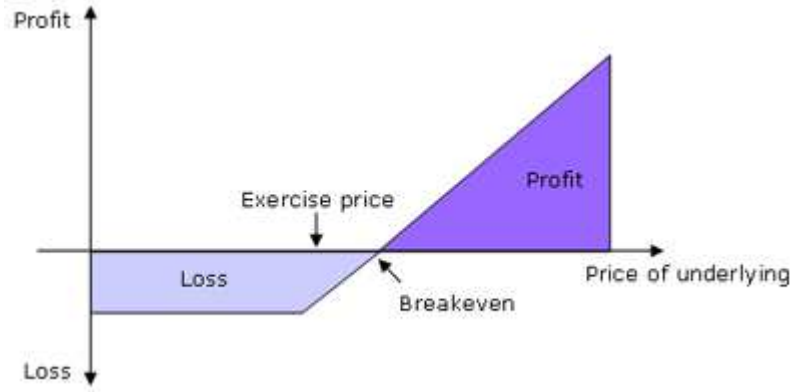
total loss will be equal to the amount he/she paid for the warrant. ($0.20 per warrant in this example)

Scenario 3: Breakeven Price (Point)

The breakeven price of a call warrant can be calculated by;
{(purchase price of the warrant) / (conversion ratio)} + (the exercise price)

$(0.20 / 0.1) + $11.50 = $13.50 is the breakeven price (point) of this example's call warrant.

Figure 3.12 shows payoff graph of a call warrant.



Source: http://www.dbs.com

Figure 3.12: Payoff Graph of a Call Warrant

In this graph payoff feature of a call warrant is shown corresponding to the different prices of the underlying stock. In this figure x axis shows the prices of underlying asset and y axis of the graph shows the payoff amount of a call warrant at different prices.

As can be seen from Figure 3.12; holder of a call warrant will be suffering a loss till the breakeven point which has been described in the example above. At the prices that are above the breakeven price, the holder

of call warrant will be making profit that will be equal to the difference between current underlying asset's price and exercise price of call warrant.

This payoff scheme shows the call warrant investor's profit – loss position at all the prices of the underlying by taking into account the predetermined exercise price. But in reality most of the investors buy call warrants in order to sell these call warrants at a higher price instead of waiting for these call warrants' expiry dates. That's why a call warrant's investor monitors the call warrant's prices in the secondary markets in order sell their call warrant at the prices they want. That also shows call warrants can be considered as a short term trading instruments since their holders do not need to hold them until their maturity.

ab. Put Warrants

A put warrant is an instrument which gives its holder the right but not the obligation to sell a certain underlying asset at a fixed price (mostly called strike or exercise price), in a certain quantity, till a certain date (expiry date).

At expiry date, if the price of underlying asset is lower than the warrant's exercise price; then the holder of warrant will receive cash that is equal to;
{(Exercise price of the warrant) - (Price of underlying asset at maturity)} * (conversion ratio)

To explain how put warrants work; following example is given; (http://www.dbs.com)

Share price: $10.00
Exercise price: $10.50
Conversion ratio: 0.1
Put warrant price: $ 0.15

Scenario 1: In the money

If share price on the expiry date is $8.50, then this warrant holder will get (10.50 - 8.50) * 0.1 = $0.20 and make a profit of 0.20 – 0.15 = $0.05 per one warrant. This means %33 profit for the warrant holder although the share price increases 1.50/10.00 = %15

Scenario 2: Out of money

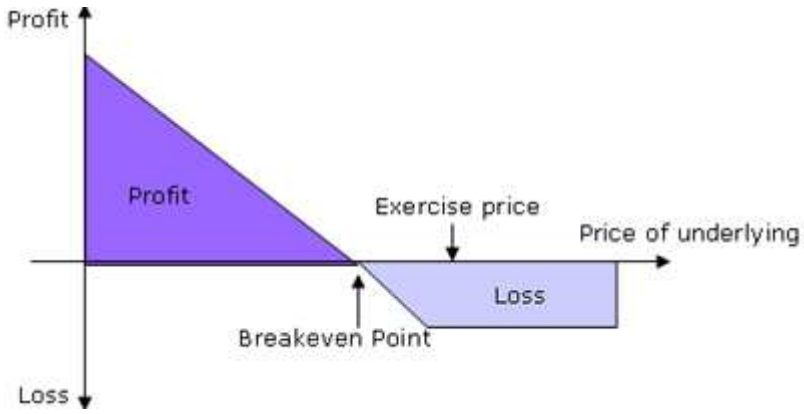
If the share price trades at or above $10.50 (exercise price) on the expiry date, the warrant and the investment will be worth nothing. Investor's total loss will be equal to the amount he/she paid for the warrant. ($0.15 per warrant in this example)

Scenario 3: Breakeven Price (Point)

The breakeven price of a put warrant can be calculated by;
(the exercise price) - {(purchase price of the warrant) / (conversion ratio)}

$10.50 - $(0.15 / 0.1) + = $9.00 is the breakeven price (point) of this example's put warrant.

Figure 3.13 shows payoff graph of a put warrant.



Source: http://www.dbs.com

Figure 3.13: Payoff Graph of a Put Warrant

In this graph payoff feature of a put warrant is shown corresponding to the different prices of the underlying stock. In this figure x axis shows the prices of underlying asset and y axis of the graph shows the payoff amount of a put warrant at different prices.

As can be seen from Figure 3.13; holder of a put warrant will be suffering a loss at the prices above breakeven price. At the prices that are below the breakeven price, the holder of put warrant will be making profit that will be equal to the difference between exercise price of put warrant and current underlying asset's price.

This payoff scheme shows the put warrant investor's profit – loss position at all the prices of the underlying by taking into account the predetermined exercise price. But in reality most of the investors buy put warrant in order to sell these put warrants at a higher price instead of waiting for these put warrants' expiry dates. That's why a put warrant's investor monitors the put warrant's prices in the secondary markets in order to sell their put warrants at the prices they want. That also shows put warrants can be considered as a short term trading instruments since their holders do not need to hold them until their maturity.

Knop (2002) divided call and put warrants into 4 categories as European, American, Bermudan and Asian warrants. Also there are some different types of warrants in the market that are designed with more or less leverage and with different features like barriers (knock out levels). Knock out call – put warrants and turbo warrants are some of the examples to these kinds of warrants.

Warrants are suitable for the investors who want to benefit from leverage effect in their investments. As the leverage effect works for both sides; the investors' risk appetite also should be higher than risk averse investors. Maximum risk for the investor of a warrant is limited to the price

that is paid to buy this warrant (Knop 2002). That means in the worst scenario; the investor of a warrant loses the all amount of money that is invested in that warrant.

3.4. Pricing of Structured Products

As can be seen from 3.3 section, there is not a single type of structured products and they can be composed from different kinds of instruments. That's because they don't have a single pricing method or formula. In other words each structured product has its own pricing formula which is determined by the components of this structured product.

As it is explained in section 3.2; structured products are composed of 2 components;

- BFI component that consists of mostly fixed income securities like zero coupon bond, coupon bearing bond, deposit and etc…
- Derivative component that consists of mostly options like call index option, put FX option, asian option and etc…

Mostly payment feature of structured products is designed by replacing the payment feature of a basic financial instrument (e.g. government bond) with payment feature of a derivative (e.g. option) that is linked to an underlying asset. In other words structured products pay to their investors according to their underlying assets' performances. That's why valuation of structured products is closely relating to option valuation. Option valuation can be made in many different methods and approaches. In most of the structured products' valuation Black & Scholes option pricing method is chosen by the market players since this model can easily be modified to any underlying asset like share, index, FX, interest rate and etc… (Choudhry 2005). That's why in this study Black & Scholes option pricing method will be firstly analyzed and then used in order to value some structured products

like reverse convertibles, discount certificates and outperformance certificates.

3.4.1. Black & Scholes Option Pricing Method

This model is developed by Fisher Black and Myron Scholes in the beginning of 1970 and since then it is used as the most popular option pricing method among market players to value European options (option that can only be exercised at its maturity). This model has some main assumptions like; (Knop 2002, Stigum 1990)

- Underlying asset of the option has a lognormal distribution.
- Short term risk-free interest rate is constant and known rate.
- The investors may lend and owe at risk-free interest rate.
- No dividends or coupons are paid by the underlying asset
- Markets are liquid enough to buy or sell any amount of stock or options anytime.
- Markets operate without transaction costs or taxes.
- There is no risk-free arbitrage opportunity.

Under these assumptions Black & Scholes developed the following model for option pricing (Fabozzi & Modigliani 1996, Chambers 2008).

$$Call = SN(d_1) - Xe^{-rt} N(d_2)$$
$$Put = Xe^{-rt} N(-d_2) - SN(-d_1)$$

$$d_1 = \ln(S/X) + (r + \sigma^2/2)\, t / \sigma\sqrt{t}$$
$$d_2 = d_1 - \sigma\sqrt{t}$$

where;

S= Underlying asset price

X= Strike price

σ^2= Variance

r= Continuously compounded risk-free interest rate

t= Time to option maturity

and,

ln= logarithm

e= A mathematical constant that is equal to 2.7183

N( )= The cumulative normal distribution

$N(d_1)$ and $N(d_2)$ are the cumulative probabilities from the normal distribution of obtaining d_1 and d_2. $N(d_1)$ is the change in the option price for a given change in the price of the underlying asset. $N(d_2)$ is the probability that the option will be exercised (Choudhry 2005).

In these formulas S, T, X and r variables are known; however, only □ variable is not known. This variable represents the standard deviation of the underlying asset's price and also means volatility. In Black & Scholes and other option pricing models this variable is the most important single variable since there are numerous methods for estimating volatility. 2 common types of volatilities that are used within the market players to estimate volatility are; historical volatility and implied volatility[2]. In historical volatility past price movements of the option's underlying asset are analyzed and future price movements of this option are being tried to be estimated from these past price movements of underlying asset. However, in implied volatility, the market's opinion about the volatility of the option through its remaining life are tried to be found in order to estimate the price movements of that option in the future. Market's opinion about that option's future volatility are tried to be found by taking the quoted price of the option in the market and working on this price (Wilmott, Howison & Dewynne 1995). According to Hull (1997); implied volatilities can be explained as the volatilities that are implied by option prices which are observed in the

[2] See Chambers (2007) pp. 109-112 for further details about historical volatility and implied volatility.

market and he said that most of the traders in the markets usually use implied volatility in their option pricing process. Since there are different types of volatilities that can be used in option pricing methods, in pricing of structured products different prices for similar structured products can be found in the market.

A numerical example for Black & Scholes option pricing model can be found below (Choudhry 2005);

The price of a European call option that is written on a non-dividend-paying stock whose current share price is 25$ and whose implied volatility is %23 when the strike price of this option is 21$, its maturity is 3 months and risk-free interest rate is %5 can be calculated according to Black & Scholes formula;

Call price is equal to = $SN(d_1) - Xe^{-rt} N(d_2)$

Where; S = 25, X = 21, r = 0.05, t = 3/12= 0.25, $\sigma = 0.23$

$Xe^{-rt} = 21e^{-0.05(0.25)} = 20.73913$

To calculate d_1 and d_2;

$d_1 = \ln(S/X) + (r + \sigma^2/2)\, t / \sigma\sqrt{t}$

$d_1 = \{\ln (25/21) + [0.05+ (0.23)^2/2] (0.25)\} / 0.23\sqrt{0.25} = 1.682313$

$d_2 = d_1 - \sigma \sqrt{t}$

$d_2 = 1.682313 - 0.23\sqrt{0.25} = 1.567313$

If d_1 and d_2 are inserted into main equation;

$C= SN(d_1) - Xe^{-rt} N(d_2)$

$C = 25N(1.682313) - 21e^{-0.05(0.25)} N(1.567313)$

If the approximation of the cumulative Normal distribution at the points 1.68 and 1.56 are used, then the price of the call option is;

$C = 25(0.9535) - 20.73913(0.9406) = 4.3303\$$

Price of a European put option for the same example is;

$Put = Xe^{-rt} N(-d_2) - SN(-d_1)$

$Put = 20.7391\ (1 - 0.9406) - 25\ (1 - 0.9535) = 0.06943\$$

As it is told in the beginning of this section, Black & Scholes option pricing method is used in most of the structured products' valuation since Black & Scholes model can easily be modified to any type of underlying asset. The pricing example which is above shows a non-dividend paying stock, also Black & Scholes model can be applied for different assets like dividend paying stock, equity-index and foreign exchanges.

Black & Scholes model for dividend paying stock options; one of the assumptions of Black & Scholes model is: no dividends are paid by the underlying asset. However, according to Chance (1989); Black & Scholes model can be used also for stocks that pay dividends. Following example shows Black & Scholes model for a dividend paying stock (Chambers 2007);

There is a European call option that is written on a dividend-paying stock whose current share price is 40$, implied volatility is %30. The strike price of this option is 40$, its maturity is 6 months and risk-free interest rate is %9. If the expected dividend payments for this share will be made 2 times (in the second and fifth month) in equal amounts which is 0.50$ then the

option price of this share can be calculated as following according to Black & Scholes formula;

Present value of dividend payments is;

$0.5e^{-0,1667(0.09)} + 0.5e^{-0,4167(0.09)} = 0.9741\$$

At this point current share price is 40$ - 0.9741$ = 39.0259$ (dividend payments are deducted from share price since dividend payments are decreasing the price of share.)

$d_1 = \ln(S/X) + (r + \sigma^2/2)\, t / \sigma\sqrt{t}$

$d_1 = \{\ln (39.0259/40) + [0.09+ (0.3)^2/2] (0.5)\} / 0.3\sqrt{0.5} = 0.2017$

$d_2 = d_1 - \sigma \sqrt{t}$

$d_2 = 0.2017 - 0.3\sqrt{0.5} = - 0.0104$

$N(d_1) = 0.5800$, $N(d_2) = 0.4959$

$C= SN(d_1) - Xe^{-rt} N(d_2)$

$C= (39.0259) (0.5800) - 40e^{-0,09(0.5)} (0.4959)$

$C= 3.67\$$

Black & Scholes model for equity-index options; In Black & Scholes model for pricing equity-index options, (S) which represents the current price of underlying is changed as (Se^{-qt}) where q represents dividend payment value that is obtained from the entire index. The Black & Scholes Model is formulated as;

$Call = Se^{-qt} N(d_1) - Xe^{-rt} N(d_2)$

$Put = Xe^{-rt} N(-d_2) - Se^{-qt} N(-d_1)$

$d_1 = \ln(S/X) + (r - q + \sigma^2/2)\, t / \sigma\sqrt{t}$

$d_2 = d_1 - \sigma \sqrt{t}$

Black & Scholes model for FX options; Black and Scholes model is designed for FX options as following; (Blake 1990)

$Call = Se^{-r\$t} N(d_1) - Xe^{-r£t} N(d_2)$

$Put = Xe^{-r£t} N(-d_2) - Se^{-r\$t} N(-d_1)$

$d_1 = \ln(S/X) + (r_£ - r_\$ + \sigma^2/2)\, t / \sigma\sqrt{t}$

$d_2 = d_1 - \sigma \sqrt{t}$

where;

S= Spot exchange rate that the domestic currency is converted to foreign currency

$r_£$= Risk free interest rate for domestic currency

$r_\$$= Risk free interest rate for foreign currency

When an option pricing model used in a structured product firstly the option's underlying and option type that is embedded to this structured product is determined; then the pricing of structured product is formulated according to this option type's pricing. For example pricing of a structured product that has an exotic option that is written on an equity-index will be different then pricing of another structured product that has a European call option that is written on a currency.

3.4.2. Pricing a Structured Product with Black & Scholes Model

As it is told in this study several times; while pricing a structured product; components of this structured product and their valuation is taken into account to formulate a single model for pricing of this particular structured product. In order to formulate the valuation method of a

structured product, it is better to obtain this structured product payoff profile. Payoff profile of a structured product can be obtained by the combinations of the payoff profiles of its components.

To value a structured product it is better to determine the positions that the issuer will hold by structuring this structured product. Following example valuations that are made for reverse convertibles, discount certificates and outperformance certificates are made according to the positions that are being held by the issuer by structuring these products.

3.4.2.1. Pricing a Reverse Convertible (Exchangeable)

The payoff for an investment in one (plain vanilla) reverse exchangeable with face value \$1000, C coupon payment, strike price of I_0, and a term to maturity T, is exactly the same as the payoff for holding the following three positions (Hernandez, Lee & Liu 2007);

1. Long position in one zero coupon bond with face value equal to \$1,000 and same maturity with reverse exchangeable.
2. Long position in zero coupon bonds that have the face values same as the reverse exchangeable's coupons payments and have the same maturity dates with the reverse exchangeable coupon payment dates.
3. A short position in put option with an exercise price of I_0, term to maturity of T, (same strike price, same time to maturity with the reverse exchangeable) and number of options of $\$1{,}000/I_0$.

Reverse exchangeable's payoff profile can be obtained from the payoff profiles of these 3 positions.

1^{st} position: it is equal to the value of a zero coupon bond with \$1000 face value = $\$1000.e^{-rT}$

2nd position: it is equal to the present value of the reverse exchangeable's coupon payments = $\sum_{i}^{n} Ce^{-rt_i}$

3rd position: it is equal to the value of \$1,000/I_0 shares of put options = (\$1,000/I_0) * P

In 3rd position's equation; each put option's (P) has a value from Black & Scholes model is I_0e^{-rt} N($-d_2$) - I_0 e^{-qt} N($-d_1$). Here strike price X from the model is equal to initial stock price which is I_0 where q represents dividend yield, r represents risk-free interest rate, T is the term to maturity and reverse exchangeable's strike price is X (≡ I_0). If □ is the standard deviation of the underlying asset return then values of d_1 and d_2 are;

$d_1 = \ln(I_0/ I_0) + (r - q + \sigma^2/2)\ T/\ \sigma\sqrt{T} = (r - q + \sigma^2/2)\ T/\ \sigma\sqrt{T}$

$d_2 = d_1 - \sigma\ \sqrt{T}$.

Since the fair value of this reverse exchangeable equals to the values of these 3 positions; then valuation of this reverse exchangeable can be formulated as;

$$(\$1000.e^{-rT}) + (\sum_{i}^{n} Ce^{-rt_i}) - (\$1,000/I_0) * [I_0e^{-rt}\ N(-d_2) - I_0\ e^{-qt}\ N(-d_1)]$$

3.4.2.2. Pricing a Discount Certificate

Discount certificate can be considered as a special case of reverse exchangeable with a zero coupon bond and only one embedded put option (Hernandez, Lee & Liu 2007). So the valuation of it can be formulated as;

$$(\$1000.e^{-rT}) + (\$1,000/X)\ (P)$$

$$\text{Where } P = Xe^{-rT} N(-d_2) - I_0 e^{-qT} N(-d_1)$$

$$d_1 = \ln(I_0/ X) + (r - q + \sigma^2/2)\, T/ \sigma\sqrt{T}$$

$$d_2 = d_1 - \sigma \sqrt{T}$$

(In this formulation X is used as strike price in order to cover all possible cases);

3.4.2.3. Pricing a Outperformance Certificate

The payoff for an investment in one (uncapped) outperformance certificate with a strike price of I_0, term to maturity T, and a performance factor of PF is exactly the same as the payoff for holding the following three positions (Hernandez, Lee & Liu 2007);

1. Long position in the underlying asset.
2. Short position in zero coupon bonds of which face values are the cash dividends to be paid by the underlying asset and have the same maturity dates with the exdividend dates of cash dividends;
3. A long position in call options on the underlying asset with an exercise price of I_0, term to maturity of T, (same strike price, same time to maturity with the outperformance certificate). Number of options can be determined by deducting 1 from performance factor and is known as additional performance factor (APF)

1st position: it is equal to the value of underlying asset = I_0

2nd position: it is equal to the present value of cash dividends to be paid by the underlying asset = PV_D

3rd position: it is equal to the value of APF shares of call options
= APF * C

In 3rd position's equation; each call option's (C) has a value from Black & Scholes model is $I_0e^{-qt} N(d_1) - Xe^{-rT} N(d_2)$. Where q represents dividend yield, r represents risk-free interest rate, T is the term to maturity and X is the strike price. If □ is the standard deviation of the underlying asset return then values of d_1 and d_2 are;

$$d_1 = \ln(I_0/ X) + (r - q + \sigma^2/2)\, T/ \sigma\sqrt{T}$$
$$d_2 = d_1 - \sigma \sqrt{T}$$

Since the fair value of this reverse exchangeable equals to the values of these 3 positions; then valuation of this reverse exchangeable can be formulated as;

$$I_0 - PV_D + APF * [I_0e^{-qt} N(d_1) - Xe^{-rT} N(d_2)]$$

As can be seen from these 3 pricing examples of different structured products; it can be realized that structured products with different components and payoff profiles have different pricing formulas. In order to value a structured product firstly this product's components should be priced. Since Black & Scholes model is very popular in the financial markets to value options, in this study Black & Scholes method is used while pricing the option component of different structured products. In every kind of structured product, as can be seen from pricing examples of reverse exchangeable, discount certificate and outperformance certificate; after obtaining each component's value of a specific structured product, these values should be combined in order to derive a single pricing formula for this specific structured product.

. 3.5. Advantages and Disadvantages (Risks) of Structured Products

Before this section, at the section 3.3 most common types of structured products, their categories, features, and characteristics were analyzed

product by product. However, at this section advantages (by the way attractions) and disadvantages (in other words risks) of structured products will be analyzed as a whole.

3.5.1. Advantages of Structured Products

Structured products became so popular within the retail investors in most of the markets. Main reason of this development is; structured products are attracting the retail investors with their advantages. Main advantages provided by structured products to their investors are;

- **Higher return:** Depending on the risk level of a structured product, it is possible to have a higher return than traditional bonds or deposits by investing in a structured product. (Structured products with higher risk levels have higher earning potential)

- **Capital protection:** Some of the structured products provide full or partial capital protection. This feature attracts mostly risk averse investors to invest in structured products. The popularity of these products increases when the volatility increases in the market since the investors seek opportunities to reduce risks (Chorafas 2007). These products are mostly popular in the slightly developing structured products markets like Turkey because they provide a transition period for the markets from traditional investment products to structured products. After financial crisis, products with capital protection become more popular among retail investors.

- **Easy access:** As can be seen from the section 3.3, structured products can be linked to many different assets. Investing directly to these assets may not be easy or investing in them can be costly for retail investors. Structured products solve this problem by providing customers easy investment at a moderate charge to these kinds of

products whose direct investment is hard and costly for retail investors.

- **Tailor-made:** Structured products are designed as 'tailor-made' products in order to meet investors' specific demands. In other words, the payoffs of the products can be tailored according to different requirements of the investors. This feature of structured products provides the investors flexibility in their investment decisions and provides diversity of products in the financial markets.

- **Diversification:** The ability to customize a variety of assumptions into one instrument is one of the principle attractions of structured products for retail investors because that provides attractive diversification properties to the investors (Lamb 2007). Also combining different types of products in a specific product provides investors spreading the market risk. In other words an investor can participate in a diversified portfolio by buying a structured product that is consisting of many different instruments. According to Hernández, Lee and Liu (2007) this combination of different instruments in structured products enhanced the capital market efficiency which also leads a reduction in transaction costs.

- **Tax benefits:** Some of the structured products are designed in order to provide tax benefits to the investors. Especially the structured products which are tailored to private banking customers have this feature.

- **Transparency of Portfolio Management:** Investing in structured products is mostly more efficient than investing in a mutual fund when transparency is the issue. While investing in a mutual fund, all the investment decisions are left to the manager of the mutual fund and the performance of the fund can be tracked in total. However,

investing in a structured product provides investors to track the performance of the structured product as a whole, or each component separately. That's why it can be told that investing in structured product provides a more transparent portfolio management than investing a mutual fund.

3.5.2. Disadvantages & Risks of Structured Products

First of all most of the structured products are designed in unique and complex forms when they are compared to other traditional instruments. That's why their compositions, payoff profile and other unique characteristics cannot be easily understood by ordinary investors. The biggest risk that leads a lot of disadvantages is the meeting of ordinary investors and extraordinary instruments when structured products are the issue.

Other risks that should be considered about structured products are;

Liquidity Risk: Since structured products are tailor-made, they are found in the market as customized products. Most of them are traded in OTC markets so they are lack of secondary markets. That's also because most of the structured products are seem as buy-and-hold investment vehicles to the investors (Lamb 2007). Addition to that, most of the structured products have longer maturities and this also leads liquidity risk to their investors.

Credit Risk: Structured products are issued by financial institutions. Although their payoff depend on their underlying instrument, their issuer and this issuer's creditworthiness is also important. That's because; as a result of the default of the issuer, investor could get nothing from the structured product he/she invested although underlying instrument of that product did well.

Pricing Risk: Another consideration is pricing risk in other words pricing transparency risk. Since there is not a uniform standard for pricing; it is hard to determine the right price for a specific product. According to Katrina Lamb (2007) most of the structured products' issuers are using their own pricing models and that's why there is not an explicit fee or other expense to the investor.

As can be seen from Chapter 2 lots of the academic works are made about the pricing subject of the structured products in order to test the pricing models of the different issuers. The aims of these academic papers were in order to find whether the products are fairly priced or not. In most of the studies; authors concluded as the structured products aren't fairly priced and the pricing is on the disadvantage of the investor. Most of these studies showed that; complexity of the products leads complex valuation methods and these methods resulted as unfavorable prices for the investors. Higher complexity of products leads higher margins in the prices of structured products on investors' disadvantage (Wilkens, Erner and Roder 2003). Especially after the banking crisis, retail investors started to worry about return of their capital so complexity in pricing became a problem for them. Retail investors started to seek products that can be easily understood by them (Wright 2008).

Entrop, Scholz and Wilkens (2008) are expecting this unfair pricing will be eliminated in the future with the increase in competition between issuers. Since the market depth of secondary markets is not sufficient of it is difficult for the investors to determine the best price for structured products.

Addition to the risks that are mentioned above there are some disadvantages of the structured products such as;

If an investor invests in X share he/she can get dividend payments of that share, but if she/he invests in a structured product whose underlying is that X share, he/she cannot get any dividend payments.

Most of the structured products fees may be much higher than the standard instruments such as mutual funds, bonds and shares. Also their cost and fee rates may be much complex then regular instruments. For example if an investor invests in X share, he/she can easily understand the commission rate because it is paid by the transaction occurs. But if he/she invests in a capital protected structured product whose underlying instrument is that X share, then the commission rate can be differ if the investor buys and holds till the maturity date or sells before the maturity date.

Because of all these risks and disadvantages, these products are subject to different regulations in different countries depending on the products' characteristics, risk level and tolerance of the country's regulatory agency. Each country has a regulatory agency or agencies which determine specific regulations about each kind of structured products.

Regulation levels change for the same type of structured products among different countries or for different types of structured products in the same country. For example Switzerland has limited regulatory restrictions for structured products compared to other countries and this leads a considerable freedom to the structurers in Swiss market (Yumusak 2007).

Especially just after Credit Crunch Crises, regulation of these products is tightened in most of the countries and these products were started to be questioning by the regulatory authorities. Even some countries thought to 'ban' these products. Instead of banning these products as Hens and Rieger (2008) implied in their study; understanding of investors about these

products should be improved to solve the complexity and other related problems.

When advantages, disadvantages and risks of structured products are considered it can be told that; a structured product can bring lots of advantages to an investor although the same structured product can bring lots of disadvantages to another investor. Here the key term for the investors is analyzing all the features and possible risks of the products in detail and choosing the right product for their needs. That means if the match of the investor and the product is right then it is possible talk about lots of advantages of this togetherness, but if not then disadvantages arise. Derivatives are essentially innocent for the right purposes (Chambers 2008), since these derivatives are created structured products; same statement can be valid for also structured products.

4. RETAIL STRUCTURED PRODUCTS IN THE WORLD

In this chapter; the use of retail structured products will be analyzed in different regions like Europe, North America, Latin America and Asia & Pacific. In these analyses more than 1.000.000 products' data that is dating back to 1995 from over 30 country databases, covering markets in Europe, Asia-Pacific, North America and Latin America is used. All of the data that will be used in this chapter will be collected from the website (www.structuredretailproducts.com). Data that are used in this chapter includes all forms of structured products which are linked to any asset classes and sold to retail investors ('The European Structured Retail Product Market' 2009).

4.1. Retail Structured Products in All Regions

In this section Europe, Asia-Pacific, North America and Latin America regions will be compared to each other according to number of products issued and volume of products sold

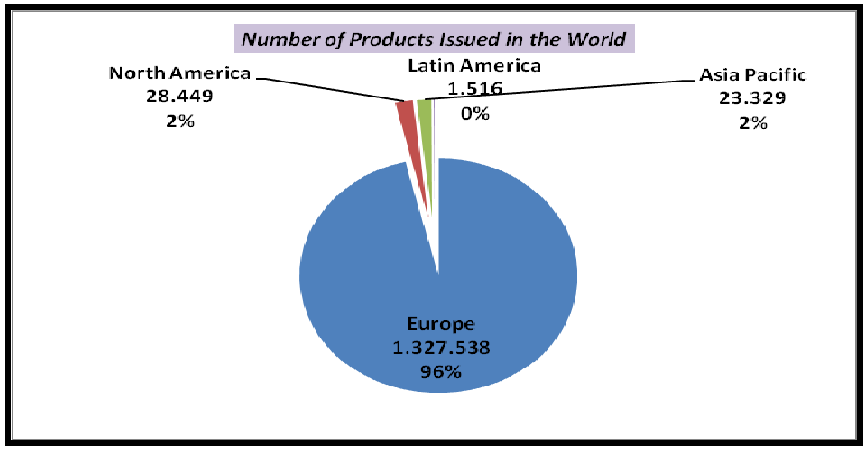
In the following pages; tables 4.2 & 4.3 and figures 4.1 & 4.2 are presented. In these tables and figures; tranche products represents the products those are available for investment during a limited period only. Continuous products represent the products that don't have a fixed maturity date and accept investments for an unlimited period. Outstanding products represent the products that are not matured yet.

In these tables and figures; total number of products issued and number of products sold between 1995 and March 2010 is shown. EURm represents millions of Euros.

Table 4.1: Total Number of Retail Structured Products Issued across the World from 1995 to March 2010

Region	*Number of Tranche Products Issued*	*Number of Outstanding Tranche Products*	*Number of Continuous Products Issued*	*Number of Outstanding Continuous Products*	*Total Number of Outstanding Products*	*Total Number of Products Issued*
Europe	964.634	265.255	362.904	35.408	300.663	**1.327.538**
North America	28.307	12.807	142	142	12.949	**28.449**
Asia Pacific	23.074	10.365	255	119	10.484	**23.329**
Latin America	1.510	188	6	6	194	**1.516**

Source: www.structuredretailproducts.com



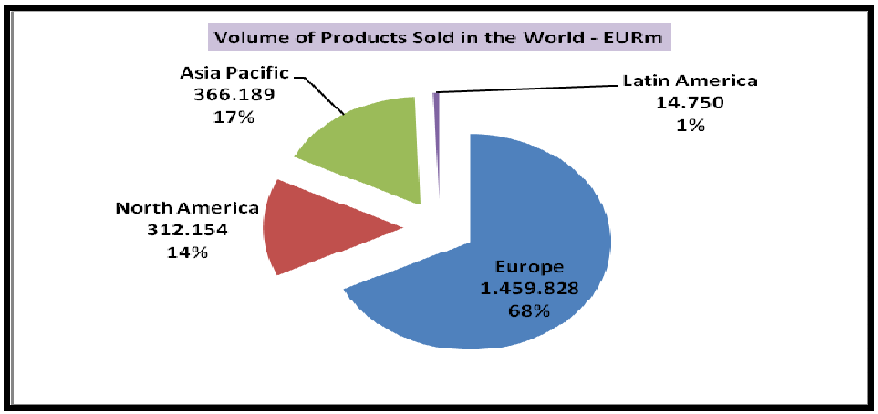
Source: www.structuredretailproducts.com

Figure 4.1: Regional Allocation of Total Number of Retail Structured Products Issued Across the World from 1995 to March 2010

Table 4.2: Total Volume of Retail Structured Products Sold across the World from 1995 to March 2010

Region	*Volume of Tranche Products Sold - EURm*	*Volume of Outstanding Tranche Products - EURm*	*Volume of Continuous Products Issued - EURm*	*Volume of Outstanding Continuous Products - EURm*	*Total Volume of Outstanding Products - EURm*	*Total Volume of Products Sold*
Europe	1.333.495	718.792	126.333	54.092	772.884	**1.459.828**
North America	163.132	92.476	149.022	149.022	241.498	**312.154**
Asia Pacific	361.233	162.030	4.956	3.138	165.168	**366.189**
Latin America	14.629	2.697	121	121	2.818	**14.750**

Source: www.structuredretailproducts.com



Source: www.structuredretailproducts.com

Figure 4.2: Regional Allocation of Total Volume of Retail Structured Products Sold Across the World from 1995 to March 2010

As can be seen from Table 4.2 – Table 4.3 and Figure 4.1 – Figure 4.2;

- European market covers the major portions in number of products issues and volume of products sold in the last 4 years. From 1995 till 2010 March; 1.380.832 products were issued and 1.327.538 products are issued in European market. That means a market share of %96. Also if the volume of products sold is considered; amount of 2.152.921 million euro (EURm) products are bought by the investors in all over the world between 2006 and 2010 March. %68 (1.459.828 EURm) of this total volume has been sold in European Market. Asia-Pacific and North America markets have %2 share, Latin America market has lower than %1 share, when number of products issued are considered. Asia-Pacific market has %17, North America market has %14 and Latin America market has %1 share, when number of products sold are considered.
- For the products issued in Europe, it can be told that; tranche products are the most popular products among the issuers because %73 of products issued in Europe is tranche products that can be traded within certain periods. Remaining part of the products are continuous products that accept investments for an unlimited period. This ratio is about %99 for the rest of the regions. In Asia-Pacific, North America and Latin America regions %99 of total products issued are tranche products.
- For the products sold in Europe, it can be told that; tranche products are the most popular products among the issuers because %92 of products issued in Europe is tranche products. Remaining part of the products are continuous products. This ratio is about %99 for Asia-Pacific and Latin America regions, however %52 for North America region.
- In Europe %23 of total products issued are matured. This ratio is %46 for North America, %45 for Asia & Pacific and %13 for Latin America.
- In Europe %53 of total products sold are matured. This ratio is %77 for North America, %45 for Asia & Pacific and %19 for Latin America.

These tables and figures show that European market is dominating the other structured product markets in both products issued and sold. Existence of organized markets like Scoach can be seen the major reason for this domination especially when number of products is considered. These organized markets allow issuers to structure and introduce new products easily then the markets that are lack of organized markets.

North America and Asia & Pacific regions have close portions in number of products issues and volume of products sold in the last 4 years. Their market share is smaller compared to European region; however, larger than Latin America region.

Especially when North America is compared with Europe, it can be told that most of the investors in North America (especially in US) prefer to invest directly in the assets via stocks or mutual funds instead of structured products in the beginning of 2000s. ('North America: time for structured products' 2004) This late adaptation of the retail investors to the structured products lead North America market to fall behind the European Market.

Latin America region has a tiny portion in number of products issues and volume of products sold in the last 4 years. This tiny portion shows that in Latin America region, most of the investors and issuers are not choosing structured products in their product portfolios.

In this section total number of products issued and sold since 1995 are considered while comparisons are being made between the regions. In addition to that; in Appendix B for all the regions; number of products issued and volume of products sold between 2006 and 2010 are shown for different product types and styles.

Because of all the reasons mentioned above rest of the section will deal with European market.

4.2. Retail Structured Products in European Market

In this section number of retail products issued and volume of retail structured sold will be analyzed in terms, underlying asset classes and important issuer countries.

4.2.1. Terms of Retail Structured Products in European Market

In this section terms of structured products in European Market will be considered according to number of products issued and volume of products sold.

Table 4.3 shows the terms of retail structured products in numbers and volumes from 2006 till march 2010 in European market. In this section short term products represent the products that have maturities lower than 2 years, medium term products represent the products that have maturities between 2 and 6 years and long term products represent the products that have maturities higher than 6 years. EURm represents millions of Euros.

Table 4.3: The Terms of Retail Structured Products in Numbers and Volumes from 2006 till March 2010 in European Market.

Number of Products Issued		
Total	**903.273**	**%**
Short Term (<=2 years)	795.998	88%
Medium Term (>2 and <=6 years)	100.301	11%
Long Term (>6 years)	6.974	1%
Volume of Products Sold (EURm)		
Total	**825.216**	**%**
Short Term (<=2 years)	189.655	23%
Medium Term (>2 and <=6 years)	415.956	50%
Long Term (>6 years)	219.602	27%

Source: www.structuredretailproducts.com

As can be seen from Table 4.3; when the terms of the products are considered in number of products issued; the products that are issued and have a maturity less than 2 years (short term products) has a share of %88 in total. Medium term products which have a maturity between 2 and 6 years have a share of %11. The products whose maturity is longer than 6 years (long term products) have a share of only %1.

When the terms of the products are considered in volume of products sold; products that are issued and have a maturity less than 2 years (short term products) have a share of %23. Medium term products which have a maturity between 2 and 6 years have a share of %50. The products whose maturity is longer than 6 years (long term products) have a share of %27.

These ratios show, short term maturity products are the most popular ones among the issuers; however medium term products are the most popular ones among the investors. In addition to that; although there are not a lot of long term products in the market, their share is %27 in volume of products sold that's mostly because they are sold in big volumes.

4.2.2. Underlying Asset Classes of Retail Structured Products in European Market

In this section retail structured products in European Market will be analyzed according to their underlying asset classes. The analysis will be made both in number of products issued and volume of products sold.

Table 4.4 shows total number of products issued and volume products sold according to asset classes between 2006 and March 2010. In these tables for single share; SS, for single index; SI, for share basket; SB and for index basket; IB is used. In the table EURm represents millions of Euros

Table 4.4: Underlying Asset Classes of Retail Structured Products in Europe between 2006 and March 2010

Underlying Asset Class	Number of Products Issued	Volume of Products Sold (EURm)	% in Products Issued	% in Products Sold
Equity (SS)	565.493	179.396	63%	22%
Equity (SI)	240.650	213.826	27%	26%
FX Rate	34.522	16.342	4%	2%
Commodities	28.548	25.037	3%	3%
Equity (SB)	13.770	133.503	2%	16%
Interest Rate	10.085	60.704	1%	7%
Equity (IB)	4.925	99.758	< %1	12%
Hybrid	2.120	42.187	< %1	5%
Fund	1.050	30.251	< %1	4%
Real Estate	810	4.813	< %1	1%
Alternatives	405	3.479	< %1	< %1
Inflation	337	11.311	< %1	1%
Credit	208	1.144	< %1	< %1
Equity (SB),Equity (SI)	139	2.456	< %1	< %1
Equity (SI),Equity (SS)	115	25	< %1	< %1
Others	75	526	< %1	< %1
Equity (IB),Equity (SS)	14	166	< %1	< %1
Equity (IB),Equity (SB)	7	292	< %1	< %1
Total	**903.273**	**825.216**		

Source: www.structuredretailproducts.com

When the analysis is made following asset classes are used;

- Equity (Index Basket): Underlying is composed of more than one equity index.
- Equity (Share Basket): Underlying is composed of shares of more than one company.
- Equity (Single Index): Underlying is composed of one equity index.
- Equity (Single Share): Underlying is composed of shares in one company.
- Commodities: Underlying is composed of physical commodities such as energy products, metals or agricultural products.

- FX Rate: Underlying is composed of foreign exchange rates.
- Interest Rate: Underlying is composed of one or more interest rates or bond prices/yields.
- Hybrid: Underlying is a mixture of different asset classes
- Fund: Underlying is a collective investment scheme called 'fund' whereby individuals typically purchase units in a fund that invests in a range of assets on behalf of the unit holders.
- Inflation: Underlying is composed of inflation rate. In other words; increase in the general price level of goods and services.
- Real Estate: Underlying is composed of either commercial or residential real estate (property) values/indices.
- Alternatives: Underlying is composed of non-traditional asset classes such as hedge funds.
- Credit: Underlying is composed of the risk of default (credit risk) associated to various companies.
- Others: Underlying is composed of non-traditional asset classes such as sport, temperature, election results, etc…

As can be seen from Table 4.4 when the number of products issued between 2006 and 2010 March is considered; %90 of the products had an underlying asset of a single share or a single index. That means equity linked products especially single share or index linked products were the most popular products among European issuers between 2006 and 2010 March.

If the volume of products sold between 2006 and 2010 March is considered; %78 of the products in the market was equity linked products. These products have an underlying asset in 4 different forms as single index, single share, index basket and share basket. Among these types of assets; single share and single index linked products were the most popular ones among investors.

Equity linked products are followed by FX-linked products, commodity-linked products, interest rate linked products and hybrid-linked products in popularity among both investors and issuers.

4.2.3. Development of Retail Structured Products Issued and Sold in European Market

In this section development of retail structured products will be analyzed in European market both in number of products issued and volume of products sold.

Table 4.5 shows retail structured products issued and sold between 2006 and March 2010 in European market. In the table EURm represents millions of Euros.

Table 4.5: Retail Structured Products Issued and Sold between 2006 and March 2010 in European Market

	2006	2007	2008	2009	2010 till March
Number of Products Issued	88.444	173.821	294.869	272.087	74.052
Volume of Products Sold (EURm)	185.699	234.673	192.910	167.480	44.454

Source: www.structuredretailproducts.com

As can be seen from Table 4.5; total number of products issued in Europe increased from 88.444 to 173.821 at 2007, from 173.821 to 294.869 at 2008 and reached its highest level in 2008. But After 2008, in 2009 the rise in the number of products issued stopped and a decline is observed from 294.869 to 272.087.

If the volume of products sold is considered; total number of products sold increased from 185.699 to 234.673 at 2007 and reached its highest level. The decline started in the volume of products sold after 2007. In 2008

volume of products sold decreased to 192.910, at 2009 they decreased to 167.480.

Decline was observed in number of products issued after 2008 but in volume of products sold after 2007. For both decline; 'Credit Crunch Crisis' can be shown as the major factor because this crisis affected investors' risk appetite and they started to behave more conservative. Decline in the volume of products sold observed firstly because investors gave earlier response to these crisis then issuers. Summer 2007 can be considered as the beginning of this crisis (Brunnermeier 2009) and within this crisis period retail investors started to be with more caution so they avoid of taking risks and they lowered their structured products demand. That led a decline in volume of products sold just after 2007. However, issuers gave their response to this crisis after 1 year and lowered their issuance after 2008.

2010 March numbers and volumes show that crisis affect in structured products market is about to be end since in 3 months number of products issued reached %25 of their highest level in the history, volume of products sold reached %20 of their highest level in the history.

4.2.4. Important Countries for Retail Structured Products in Europe

According to Arete Consulting Limited[3] till 2006, Italy and Spain have traditionally dominated the European league in terms of structured products sales, but other countries (Germany in particular, but also Belgium) have experienced strong growth in the past few years, and have in 2005 gross sales levels comparable to the ones seen in these two countries. As of 2005, the top five European markets (Italy, Belgium, Germany, Spain and France)

[3] Arete Consulting Limited is an independent research and consulting firm based in London, New York and Hong Kong, providing consulting, training and research services related to all aspects of structured products through the website www.StructuredRetailProducts.com

account for 75% of total gross sales volume across Europe ('The European Structured Retail Product Market' 2006).

In order to analyze these countries situation from 1995 to 2010 following table can be examined. Table 4.6 shows total number of products issued and volume of products sold in European countries between 1995 and 2010 March and their market shares according to these volumes and numbers. In the table EURm represents millions of Euros.

Table 4.6: Number of Products Issued and Volume of Products sold in European Countries btw. 1995 and 2010 March

Country	*Total Products Issued*	*Market Share in Products Issued*	*Total Products Sold - EURm*	*Market Share in products Sold*
Germany	1.063.443	80%	304.720	21%
Switzerland	199.131	15%	108.244	7%
Belgium	22.303	2%	130.394	9%
Italy	8.462	1%	309.314	21%
France	8.427	1%	140.798	10%
UK	6.890	1%	90.396	6%
Spain	4.607	0%	190.855	13%
European Total	**1.327.538**		**1.459.828**	

Source: www.structuredretailproducts.com

As can be seen from Table 4.6 by 2010 March; Germany have experienced very strong growth and reached first place in volume of products sold and number of products issued. Especially Germany dominates the European League when the number of products is considered with a market share of %80. Germany is followed by Switzerland with a market share of %15. The sum of these 2 countries' market shares is equal to %95. The reason of that domination is the exchange markets located in these countries. When there are exchange markets, it is easy for the issuers to structure different types of products and quote these products to these exchange markets.

Things are different when the volume of products sold is considered. Germany is sharing the first place with Italy and both countries have a market share of %21. They are followed by 5 more major players in European League, Spain, France, Belgium, Switzerland and UK with the market shares of %13, %10, %9, %7, and % 6 respectively. In volume of products sold these top 7 players have a market share of %87 in total.

Because of the traditionally secretive nature of Swiss banking system, it is hard to estimate definite volume of products sold in Switzerland. Since Switzerland's two largest banks, UBS and Credit Suisse has huge retail networks and asset management operations in Switzerland, a lot of surveys declared Switzerland is the biggest structured product market in volume of products sold across the world (Yumusak 2007).

4.3. Overview of Market Reviews

In this section the use of retail structured products across the world was analyzed in 4 main regions (Europe, Asia-Pacific, North America and Latin America). Main results that are found in this chapter are;

- European market is the most active market in products sold and issued
- Credit Crunch Crisis led a decline in both number of products issued and volume of products sold
- Tranche products (products that are sold within limited periods) are the most favorite products; equity is the most favorite underlying asset class among European investors and issuers.
- Germany and Switzerland is the most active countries in products issued in Europe. Germany and Italy is the most active countries in products sold in Europe.

5. RETAIL STRUCTURED PRODUCTS IN TURKEY

In the previous chapters, definition, composition, types, advantages & disadvantages of retail structured products and their applications in different regions were examined.

In this chapter the applications of retail structured products in Turkey will be analyzed. Chapter will start explaining the current situation about the retail structured products and their applications in Turkish market. Then types of retail structured products will be analyzed in 2 main categories; structured funds (Capital Protected/Capital Guaranteed Funds) and structured deposits.

In funds section, Capital Protected/Capital Guaranteed Funds (CP/CG funds) will be examined. In structured deposits section, types of structured deposits will be examined according to their underlying instruments.

In the final section of the chapter; the future of retail structured products in Turkey will be analyzed. At this section, conditions that influence development of structured products in positive and negative manner will be discussed.

5.1. Current Situation of Retail Structured Products in Turkey

Retail Structured Products are quite new instruments for Turkish market. Because of some reasons they were introduced to Turkish market later then the other markets. Of course there can be lined up a lot of reasons for this argument but the following 3 reasons can be considered as the major reasons.

- High interest rates: Because of high interest rates in Turkey, investors tended to seek return in time deposits of the banks and government bonds.
- Risk averse investors: As a result of higher return opportunity with moderate risk, investors' behaviors became more moderate.
- Late integration of financial system: Till 2005 Turkish financial markets could be considered as far away from globalization.

Although there were more negative situations against the development of retail structured products in Turkish financial market, structured products started to take place in the market day by day and started to become important among the retail investors.

Especially decreasing interest rates and globalization of Turkish financial system influenced this development in a positive manner. Because of decreasing interest rates, risk appetites of the retail investors started to increase and they started to seek alternative investment vehicles. At this point; structure products are introduced to the retail investors by financial institutions. In addition to that; globalization of Turkish financial system also provided a suitable climate for these products to be offered by the financial institutions. Experienced financial institutions in retail structured products, like Fortis, Unicredit, BNP Paribas, Citibank and ING started to operate in Turkish financial market. Especially know-how of these financial institutions hastens the process of introducing structured products to Turkish retail investors.

Compared to the markets in Europe, America and Asia, Turkey is in the primary stage of the period that the other regional markets have already passed. It is not possible to talk about million numbers of products issued or billion volumes of products sold like European Market. Turkish financial system just started to present retail structured products.

Next section will analyze the most common types of retail structured products in Turkish financial system.

5.2. Types of Retail Structured Products in Turkey

According to the characteristics of Turkish financial market, retail structured products were composed basically in 2 different forms.

1) Structured products that are formed as funds: Structured funds (Capital Protected/Guaranteed Funds – CP/CG Funds)
2) Structured Products that are formed as deposits: Structured deposits

Firstly structured funds (CP/CG funds) will be analyzed.

5.2.1. Structured Funds (Capital Protected/Guaranteed Funds – CP/CG Funds)

First of all; there are 2 different types of structured funds in Turkey:

- Capital Protected (CP) Funds:
- Capital Guaranteed (CG) Funds:

These 2 funds can be categorized as ‘capital protected products’ according to the structured products’ categorization of this study. They are called ‘funds’ because of their collection method of capital from investors.

There are some similarities and differences between mutual funds and these funds;

- Both in mutual funds and CP/CG funds, capital is collected by pooling money from investors.

- Mutual funds don’t have a maturity; CP/CG funds do have certain maturities like 6 months, 1 year, 2 years and etc…
- Mutual funds are managed dynamically by a fund manager within the investment period. But in CP/CG funds; a capital protected product is structured with certain features (maturity, underlying instrument, etc...) and till maturity investment strategy of this product is never changed by fund manager.
- Investors can participate to mutual funds every day, but they can participate to CP/CG funds within certain periods which are usually called public offering periods.
- In CP/CG funds there is a commitment or guarantee for the protection of the capital, but in mutual funds there is not.

5.2.1.1. Definition of CP/CG Funds

As it is told in the previous sections, there are 2 types of structured funds; capital protected (CP) and capital guaranteed (CG) funds.

CP funds are the funds; that are structured in an appropriate investment strategy with best effort in order to provide full or partial protection to the initial investment.

CG funds are the funds; in an appropriate investment strategy with the guarantee of a guarantor in order to provide full or partial protection to the initial investment.

Operating process of CP and CG funds are the same. The only difference between them is; in CG funds there is a guarantee of a guarantor in order to provide part or full capital protection; however, in CP funds, there is not a guarantor and protection of initial investment is provided by best effort. The guarantor of the CG funds can be the financial company

who issues the fund or a third party like a bank, insurance company and etc…

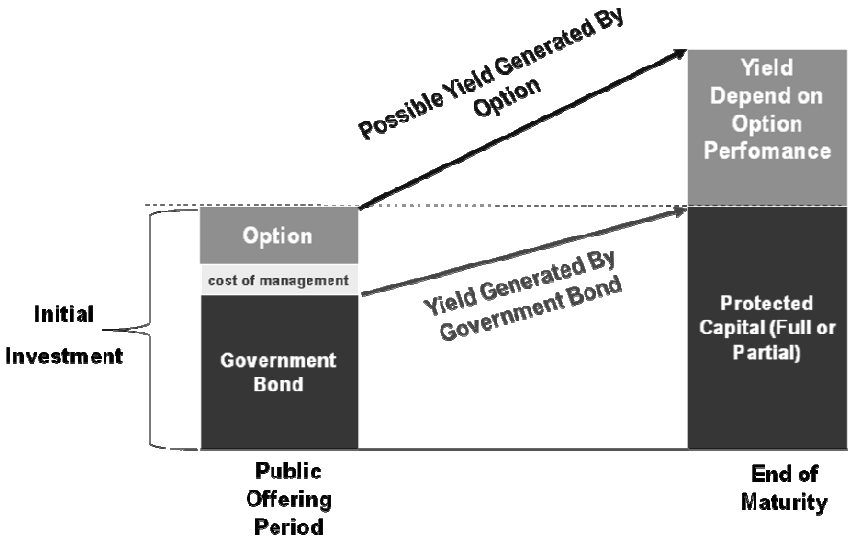
In the following chapters, CP funds and CG funds will be considered together as a single product as CP/CG funds since their composition and operating process is the same.

5.2.1.2. Composition and Operating Process of CP/CG Funds in Turkey

CP/CG funds are composed of 2 products;

- Government Bonds: This part provides the capital protection
- Options: This part provides possible yield that can be generated from the performance of an underlying instrument.

Figure 5.1 shows the components of a basic CP/CG fund



Source: TEB Asset Management

Figure 5.1: Components of Structured Funds (CP/CG Funds)

Left side of the figure represents the composition just after public offering period; at the beginning of investment period. Right side of the figure represents the composition after investment period.

As can be seen from figure 5.1; in addition to the management cost taken by the issuer, there are 2 main components of these funds;

The fund's bond component: Government bonds, treasury bills or reverse repo contracts are located in these funds in order to provide the capital protection feature. They are chosen according to their maturities and interest rates to fit the desirable capital protection rate (full or partial) at the end of these funds' maturities. Generally, in these funds 100% capital protection is available, but sometimes the rate of protection may be lower (for example %90).

The fund's option component: Besides protecting the capital, CP/CG funds also aim to generate a return. This is referred to as the fund's performance, in order to achieve this capital gain; CP/CG funds buy options ('KBC Capital Protected Funds' 2002). Option part of these funds determines the real characteristics of the product, like its risk level, payoff profile, underlying asset and etc… According to the amount and the type of options that are used in these funds, risk level of these funds changes. The payoff of these funds is also determined by the payoff of the options that are located in these funds.

In addition to the components of CP/CG funds, there are some features that should be considered in order to analyze the operating processes of these funds ('Akbank T.A.S. B Type %100 Capital Protected Sixth Mutual Fund Fact Sheet' 2009).

a. **Target of the fund:** First of all, all the CP/CG funds should have a target in order to try providing a return to their investors. If the investor's expectation is matching with the fund's target, than the

investor should invest in this fund. According to the target of the funds, suitable options are tried to be found from market. Target of the funds can be based on several expectations like; a rise or fall in the prices of the underlying, a sideway movement in the prices of the underlying, a rise or fall in the volatility of the prices of the underlying and etc… According to these expectations different option types can be used. These options types can be standard vanilla options or exotic options according to the fund's target. (See Appendix A for most common types of exotic options that are used in CP/CG funds)

b. **Underlying asset(s) of the fund**: The performance of CP/CG funds depends on the change in the value of the underlying asset(s) like stock market indices, shares, interest rates, commodities or currencies ('KBC Capital Protected Funds' 2002). These funds track the performance of the underlying asset(s) by buying an option that was issued on this asset(s).

c. **Term of the fund:** Term (maturity) of CP/CG funds depend on the risk-free interest rate (interest rate of government bonds) in the market. Since Turkish risk-free rates are higher than European risk-free rates, in Turkey terms of these products are mostly 6 months, 1 year or maximum 2 years where in Europe average terms of these funds are between 2 and 6 years.

d. **Participation Ratio of the fund:** Every option that is located in CP/CG funds has a price. In these funds; the capital that are collected from investors are used in 2 parts; one part for bond component and remaining part for option component. Ratio of the capital that is reserved for option component to the option price gives us the participation rate.

In order to give an example;

Let's say 1.000.000 TL is collected from investors. By the fund manager 900.000 TL is invested into government bond and 100.000 TL invested into an option. Let's say the call option is in European style (gives the option buyer exercise right only at the end of maturity), underlying instrument of TRY/USD exchange rate and cost of this option is 200.000TL for 1.000.000TL. At this time participation rate for this fund is calculated as 100.000/200.000 = 0.5 = %50

If the option was a more expensive option, let's say an American style option (gives the option buyer exercise right anytime during the maturity), than the price of the option would be more expensive, let's say 250.000 TL. And the participation rate will decrease to 100.000/250.000 = 0.4 = %40

Participation ratio is determined just after the public offering period and depends on the price of the option bought. Participation ratio doesn't change after it is determined.

e. **Capital protection ratio of the fund:** Most of CP/CG funds have % 100 capital protection, but also they can have partial capital protection like %90, %80. Due to the market conditions, the value of a CP/CG fund can be below its initial investment within its investment period. That's because capital protection is valid only at the end of the maturity.

f. **Management fee of the fund:** Management costs of CP/CG funds are charged from their investors under the name of management fee. In Turkey this fee is mostly charged between %2 and %2.5 (annual) from the invested capital. This fee contains registration fee, audit

fee, custody fee and other expenses that are paid by the fund. Capital protection will not be affected from this fee. This management fee will be considered at the set up process of the fund and the capital protection strategy will be structured accordingly.

g. **Purchase period of the fund:** CP/CG funds can only be purchased between some certain periods that are named public offering periods. These periods are mostly 1, 2 or 3 weeks long.

h. **Penalty/Redemption fee of the fund:** In CP/CG funds, investors can sell their fund share before maturity by paying a high-cost fee. This fee's name is penalty or redemption fee. In Turkey it is mostly charged %2 from the whole investment (Not only from the gain, from the whole investment). Unlike management fee, this fee doesn't go into issuers pocket but transferred to the fund to increase the return of the fund for the investors who will wait till maturity.

e. **Redemption frequency of the fund:** Although holders of CP/CG funds have redemption opportunity before the end of maturity by being charged of high cost fees, there are some restrictions for this redemption. Unlike mutual funds, in CP/CG funds, investors cannot sell their share anytime they want. In Turkey prices of most of the CP/CG funds are determined twice a month and investors can sell their shares twice a month according to these prices.

f. **Minimum Participation:** Minimum participation limit shows the minimum amount of money that can be invested on a CP/CG fund. It differs from bank to bank but mostly 1.000 TL in Turkey.

g. **Tax:** In Turkey 10% withholding tax is applied to CP/CG funds' option part only if option part generates a return at the end of the maturity.

In order to examine the operating process of the CP/CG funds following example is given:

Name: XYZ fund
Capital Gain Target: To generate a return that depends on a rise of IMKB 30 level, when starting date and maturity date are compared
Capital Protection Target: %100 Capital protected
Underlying: IMKB 30 Index
Term: 6 months (180 days)
Participation Ratio: %80
Public Offering Period: 17.05.2010 – 27.05.2010
Started Date: 28.05.2010
Maturity Date: 23.11.2010
Management Fee: %2 Annual
Redemption Frequency: Twice a month, every 5^{th} and 15^{th} working day
Penalty Fee: %2.5
Tax: %10 withholding tax
Minimum Participation: 1.000 TL

In Turkey all the CP/CG funds operate under the rules of Capital Markets Board of Turkey; that's why operating process of this example is tried to be examined under the rules of Capital Markets Board of Turkey by using ('Türkiye İş Bankası A.Ş. Koruma Amaçlı Şemsiye Fonu'na Bağlı B Tipi %100 Anapara Korumalı Sekizinci Alt Fon İzahnamesi' 2009)

Before investment period, establishing the product:

First of all; within public offering period that is between 17.05.2010 and 27.05.2010, money will be collected from the investors who are willing to invest in this fund. In other words investors who expect a rise of IMKB 30 level, (when 28.05.2010 and 23.11.2010 are compared) and also want

capital protection in their investment can participate in this product within public offering period.

After the capital is collected from the investors (with a minimum participation value of 1.000 TL in this example) fund manager set up the capital protection strategy which best suits the target of the fund. While establishing the strategy fund manager seek for best products both in option component and bond component.

In this fund the bond component that consists of government bonds, treasury bills or reverse repo contracts will be set in order to generate the best risk-free rate of return in 6 months. More return on this risk free part means, higher amount of capital is reserved for option part. Higher amount of capital for option part means, higher participation rate. Higher participation rate means higher return for investors.

For the option part, fund manager seeks the best suitable option to fit this product with the best price. For this example; the fund manager will ask the price of a vanilla call option that is written on IMKB 30, with strike price of 28.05.2010's spot IMKB 30 level, and maturity of 180 days (17.05.2010 – 27.05.2010) to different financial institutions to obtain the best price for this option style. Option with a low price mean higher participation rate. Higher participation rate means higher possible return to the investors.

After obtaining best suitable products for both bond and option parts, investments are made and the participation ratio is determined (%80 in this example). The IMKB 30 level on the start date is observed (28.05.2010 in this example). And then investment period of the fund starts.

During the investment period:

Before the end of maturity, investors can sell their shares by accepting a penalty fee (%2.5 of their whole investment in this example). They can sell their shares only from the prices that are determined in specific dates (every 5^{th} and 15^{th} working day in this example). If these days fall on a holiday then price of following working day is taken into account.

The fund's price is determined by adding the value of the assets that are in the fund's portfolio and deducting the expenses of the fund from this amount. In other words; during the investment period fund price will be determined as;

Price of Bond Component + Price of Option Component – Expenses

- Price of bond component can be determined from the exchange market (Turkish bond market).
- Price of option component can be determined by obtaining the bid price of the same option from the same counterparty. This obtained price is tested by option pricing models like Black & Scholes model (see section 3.4 for Black & Scholes model).
- Expenses: represents the management fee and other expenses if the management fee doesn't contain them. (Expenses like registration fee, audit fee, custody fee and other expenses that are paid by the fund.)

After the investment period: Calculating the fund's performance with possible scenarios:

The funds value at the maturity date can be calculated as the following formula;

Fund Value= Initial Investment x (1+ (calculated return x participation ratio)

Calculated Return= (IMKB30 Level maturity date / IMKB30 Level started date) - 1

First scenario: If at the end of maturity IMKB 30 level will be above its initial level then;

Let's say on the started date (28.05.2010), level of the IMKB will be 57.350 and at maturity date (23.11.2010) level of the IMKB will be 65.330 and 1.000 TL is invested to this fund;

Calculated Return= (65.330/57.350) – 1 = ~ 0.14
Fund's Share Value of Investor= 1.000 x (1+ (0.14 x 0.8)) = 1112 TL
1112-1000= 112 (gross return from the fund)
112 – (112*(0.1(tax))) = 100.8 (reel return from the fund)

Investor will invest 1000 at the beginning and get 1100.8 at the end of 6 months if this scenario happens. This means about %10 return (reel) in 6 months, in other words %20 in a year.

Second scenario: If at the end of maturity IMKB 30 level will be below its initial level then;

Let's say on the started date (28.05.2010), level of the IMKB will be 57.350 and at maturity date (23.11.2010) level of the IMKB will be 55.000 and 1.000 TL invested to this fund.

At this point because of the capital protection feature of the fund, the investor will get %100 of his/her initial investment although IMKB30 level decreases about %4 in 6 months.

5.2.1.3. Offered CP/CG Funds in Turkey

In this section 66 CP/CG funds that were offered in Turkey between 2008 January and 2010 March will be analyzed. Data used in this analysis are collected at 3th March 2010 from the web-sites of the banks, Turkey Isbank Capital Markets and Treasury Departments. Only 2 funds that don't have maturity aren't taken into account in this analysis.

Table 5.1 shows these 66 funds with following characteristics;

- Banks they are offered ,
- Their current situation (CS); whether they are matured (M) or outstanding (OST),
- Starting date of their investment periods, end date of their investment periods, their maturity (MTR),
- Their type; whether they are capital protected (CP) or capital guaranteed (CG),
- Their underlying asset and underlying asset type (UAS)
- Their option type,
- Their volume sold,
- Rate of return (RoR) of these funds – for outstanding funds 3th March mark to market values that are taken from Reuters are taken account.
- Benchmark Return (BR) – in this analysis; 1 month deposit index that is provided from Fonlab is used as benchmark return.
- Relative Return (RR) - relative return of these funds according to the benchmark return.

Table 5.1: Structured Funds (CP/CG Funds) in Turkey between 2008 and 2010 March

Bank	CS	Start Date	End Date	MTR	Type	Underlying Asset	UAS	Option Type	Volume Sold (TL)	RoR %	BR %	RR %
TEB	M	14.01.2008	13.01.2009	1 y	CP	USDTRY/EUR TRY	FX	Best Of - Asian	12.004.383	17,15	16,68	0,47
TEB	M	28.01.2008	13.01.2009	1 y	CP	IMKB-30	Equity	Asian Call Option	9.904.015	0,50	15,99	-15,49
Akbank	M	14.04.2008	05.11.2008	6 m	CP	IMKB-30 / USDTRY	Hybrid	Best Of	38.377.950	1,44	9,01	-7,57
YKB	M	18.04.2008	05.11.2008	9 m	CG	IMKB-30	Equity	Asian Call Option	19.002.030	0,00	8,83	-8,83
TEB	M	06.05.2008	06.05.2009	1 y	CP	USD/TRY	FX	Range Accrual	25.009.853	8,75	15,66	-6,91
YKB	M	09.05.2008	06.05.2009	1 y	CG	IMKB-30 / USDTRY	Hybrid	Best Of	95.973.301	10,21	15,52	-5,31
HSBC	M	20.05.2008	06.05.2009	1 y	CP	IMKB-30 / USDTRY	Hybrid	European Best Of	21.450.283	12,86	15,00	-2,14
Isbank	M	21.07.2008	04.02.2009	7 m	CP	IMKB-30	Equity	European ATM Call	4.327.140	0,00	8,90	-8,90
Isbank	M	21.07.2008	04.02.2009	7 m	CP	IMKB-30	Equity	European ATM Put	1.382.000	33,34	8,90	24,44
Fortis	M	30.07.2008	08.04.2009	9 m	CP	Best Sectors	Equity	Basket Option	6.148.962	9,50	10,72	-1,22
Fortis	M	30.07.2008	04.02.2009	6 m	CP	USD/TRY	FX	Straddle	7.800.659	24,04	8,48	15,56
TEB	M	04.08.2008	05.08.2009	1 y	CP	EUR/TRY	FX	Range Accrual	41.403.971	7,55	14,33	-6,78
Garanti	M	25.08.2008	05.08.2009	1 y	CG	IMKB-30	Equity	European Call	100.000.000	10,00	13,31	-3,31

Table 5.2(cont.): Structured Funds (CP/CG Funds) in Turkey between 2008 and 2010 March

Garanti	M	25.08.2008	05.08.2009	1 y	CP	IMKB-30 / USDTRY	Hybrid	European Best Of	10.410.742	11,65	13,31	-1,66
Finans	M	12.09.2008	09.09.2009	1 y	CP	IMKB-30 / USDTRY	Hybrid	European Best Of	4.459.778	15,30	13,44	1,86
Finans	M	12.09.2008	09.09.2009	6 m	CP	IMKB-30	Equity	European Call	2.415.330	17,17	13,44	3,73
Finans	M	12.09.2008	09.09.2009	1 y	CP	USD/TRY	FX	European Call	3.172.800	30,85	13,44	17,41
HSBC	M	01.12.2008	24.06.2009	7 m	CP	3M TRLIBOR	Interest Rate	Range Accrual	42.603.918	2,28	7,37	-5,09
TEB	M	22.12.2008	13.01.2010	1 y	CP	USD/TRY	FX	Range Accrual	18.819.356	15,33	13,26	2,07
TSKB	M	16.01.2009	13.01.2009	1 y	CG	Clean Energy	Com.	Basket Option	14.715.136	14,31	12,03	2,28
Finans	M	26.01.2009	05.08.2009	6 m	CP	USD/TRY	FX	Range Accrual	17.126.580	8,53	5,99	2,54
TEB	M	26.01.2009	13.01.2010	1 y	CP	EUR/TRY	FX	Range Accrual	15.454.502	19,20	11,54	7,66
Isbank	M	09.02.2009	05.08.2009	6 m	CP	USDTRY/EUR TRY	FX	Best Of - Asian	12.304.530	0,00	5,43	-5,43
Fortis	OST	18.02.2009	31.03.2010	1 y	CP	XAU	Com.	Asian Call	11.510.249	2,74	10,61	-7,87
YKB	OST	06.03.2009	14.04.2010	13 m	CG	IMKB-30	Equity	Asian Straddle	21.828.247	24,00	10,30	13,70
Akbank	OST	09.03.2009	03.03.2010	1 y	CP	IMKB-30	Equity	Capped Call %35	32.935.345	25,00	9,91	15,09
TSKB	OST	29.06.2009	23.06.2010	1 y	CG	Agr Com.	Com.	Basket Option	15.148.400	4,54	6,33	-1,79
Isbank	M	13.07.2009	13.01.2010	6 m	CP	USDTRY/IMKB	Hybrid	European Best Of	50.000.000	5,16	5,91	-0,75
HSBC	OST	20.07.2009	23.06.2010	11 m	CP	USD/TRY	FX	Range Accrual	6.151.928	9,42	5,70	3,72
Garanti	OST	27.07.2009	23.06.2010	11 m	CP	USD/TRY	FX	European Call	16.237.187	2,70	5,49	-2,79

Table 5.3(cont.): Structured Funds (CP/CG Funds) in Turkey between 2008 and 2010 March

YKB	OST	07.08.2009	23.06.2010	10 m	CG	USD/TRY	FX	Range Accrual	10.927.551	8,50	5,18	3,32
TEB	OST	13.08.2009	23.06.2010	9 m	CP	3M TRLIBOR	Interest Rate	Range Accrual	17.366.298	0,30	5,02	-4,72
TEB	OST	13.08.2009	23.06.2010	9 m	CP	S&P Index	Equity	Asian Call Spread	1.903.810	4,33	5,02	-0,69
Akbank	OST	24.08.2009	23.06.2010	10 m	CP	IMKB-30	Equity	Capped Call %30	45.773.010	2,50	4,72	-2,22
Akbank	OST	24.08.2009	03.03.2010	7 m	CP	USD/TRY	FX	Range Accrual	31.617.512	6,80	4,72	2,08
Finans	OST	14.09.2009	14.03.2010	6 m	CP	XAU	Com.	Range Accrual	49.541.434	0,50	4,17	-3,67
Garanti	OST	05.10.2009	23.06.2010	9 m	CP	IMKB-30	Equity	European Put	11.810.944	0,00	3,64	-3,64
TSKB	OST	12.10.2009	23.06.2010	1 y	CG	Citi Com. Index	Com.	Call Spread with P.R.	46.707.755	0,00	3,46	-3,46
Isbank	OST	12.10.2009	03.11.2010	1 y	CG	XAU	Com.	Asian Call Strip	50.000.000	3,91	3,46	0,45
TEB	OST	12.10.2009	03.11.2010	1 y	CP	EUR/TRY	FX	Range Accrual	17.167.238	4,70	3,46	1,24
YKB	OST	16.10.2009	23.06.2010	8 m	CG	3M TRLIBOR	Interest Rate	Range Accrual	15.562.974	4,50	3,36	1,14
HSBC	OST	19.10.2009	03.11.2010	13 m	CP	DJUBS Index	Com.	Asian Call Strip	21.752.093	0,00	3,29	-3,29
Garanti	OST	19.10.2009	23.06.2010	8 m	CP	JPMMCI Agr	Com.	European Call	28.036.959	0,00	3,29	-3,29
Akbank	OST	26.10.2009	03.11.2010	1 y	CP	IMKB-30	Equity	European Call	12.739.155	0,10	3,12	-3,02
Finans	OST	26.10.2009	26.04.2010	6 m	CP	USD/TRY	Fx	Wedding Cake R.A.	13.464.246	3,20	3,12	0,08
Isbank	OST	16.11.2009	23.06.2010	7 m	CP	USD/TRY	FX	European Call	11.633.120	1,49	2,60	-1,11

Table 5.4(cont.): Structured Funds (CP/CG Funds) in Turkey between 2008 and 2010 March

Isbank	OST	23.11.2009	23.06.2010	7 m	CP	IMKB-30	Equity	Asian Put Strip	10.195.250	0,00	2,43	-2,43
Isbank	OST	23.11.2009	23.06.2010	7 m	CP	IMKB-30	Equity	Asian Call Strip	9.935.470	4,98	2,43	2,55
Isbank	OST	14.12.2009	14.07.2010	7 m	CP	USD/TRY	FX	Asian Call Strip	5.971.320	0,00	1,91	-1,91
Isbank	OST	14.12.2009	14.07.2010	7 m	CP	USD/TRY	FX	Asian Put Strip	4.148.390	2,25	1,91	0,34
Akbank	OST	24.12.2009	03.11.2010	1 y	CP	XAU	Com.	European Call	44.700.626	1,80	1,67	0,13
Akbank	OST	18.01.2010	03.11.2010	1 y	CP	USD/TRY	FX	Range Accrual	33.579.818	1,60	1,06	0,54
TSKB	OST	19.01.2010	02.02.2010	1 y	CG	MSCI EM	Equity	Isovol Call	5.647.605	0,00	1,04	-1,04
TSKB	OST	19.01.2010	02.02.2010	1 y	CG	MSCI EM	Equity	Isovol Put	12.497.925	1,75	1,04	0,71
TEB	OST	25.01.2010	02.02.2011	1 y	CP	BNP Osc.Com.	Com.	Call	40.758.683	0,00	0,89	-0,89
TEB	OST	25.01.2010	02.02.2011	1 y	CP	USD/TRY	FX	Range Accrual	28.752.627	1,20	0,89	0,31
Fortis	OST	27.01.2010	02.02.2011	1 y	CP	IMKB-30	Equity	Digital Option	12.543.573	0,00	0,84	-0,84
Isbank	OST	01.02.2010	02.02.2010	1 y	CP	XAU	Com.	Asian call	42.923.550	0,60	0,72	-0,12
Akbank	OST	01.02.2010	02.02.2011	1 y	CP	DJUBS Index	Com.	European Call	45.543.070	1,70	0,72	0,98
Finans	OST	07.02.2010	02.02.2010	1 y	CP	DJUBS Index	Com.	European Call	18.231.000	4,10	0,58	3,52
Garanti	OST	15.02.2010	02.02.2011	1 y	CP	USD/TRY	FX	European Put	22.898.815	0,00	0,38	-0,38
Garanti	OST	15.02.2010	02.02.2011	1 y	CP	IMKB-30	Equity	European Put	10.112.705	0,00	0,38	-0,38
Garanti	OST	15.02.2010	02.02.2011	1 y	CP	IMKB-30	Equity	European Call	32.875.929	0,10	0,38	-0,28
Garanti	OST	15.02.2010	02.02.2011	1 y	CP	USD/TRY	FX	European Call	6.336.249	0,80	0,38	0,42
YKB	OST	19.02.2010	02.02.2011	1 y	CG	USD/TRY	FX	European Call	23.556.153	1,20	0,29	0,91
HSBC	OST	19.02.2010	02.02.2011	11 m	CP	HSCEI Index	Equity	Call Spread	24.710.281	3,07	0,29	2,78

Source: Turkey Isbank Treasury Department, Turkey Isbank Capital Markets Department, Fonlab, Reuters

According to Table 5.1 following analyses can be made for these 66 funds;

- **Current Situation of the funds;** 24 of these CP/CG funds are already matured but 42 of them are still outstanding. That's mostly because number of structured funds offered by the banks increased just after 2009. Till 2009 19 funds are offered but after 2009 till March 2010 number of offered funds is 47.

- **Maturities of the funds;** These 66 funds have different maturities starting from 6 months to 1 year. %53 of these funds have a maturity of 1 year, in other words 1 year is the most popular maturity among the banks. Since maturity is an important issue for Turkish investors, most of the banks avoid offering funds more than 1 year maturity. With the risk free interest rates of government bonds, 1 year seems the optimal maturity for most of the banks. Average maturity of these 68 funds is 9,86 months.

- **Types of the funds;** 53 of these 66 funds are capital protected and 13 of these funds are capital guaranteed. That means; banks mostly choose to issue capital protected types of funds.

- **Underlying Assets & Asset Classes of the funds;** These 66 funds have many different types of underlying assets like IMKB-30, USD/TRY, XAU, DJ-UBS and etc… These underlying assets can be classified in 5 main categories as commodity, equity, foreign exchange (FX), interest rate and hybrid. Among these asset classes; equity and FX have become the most popular ones with the portion of %32 and %35 respectively. 23 of these 66 funds have a FX type of underlying asset. From these FX asset classes; the most popular underlying FX is USD/TRY with a portion of %78. 21 of these 66 funds have an equity type of underlying asset. From these equity asset classes; the most popular underlying equity is IMKB-30 index with a portion of %76. All these numbers show that USD/TRY currency pair and

IMKB-30 index are the most popular underlying assets, because Turkish investors are familiar with these assets and banks choose these assets in most type of structured funds in order to attract the investors.

- **Option types of the funds;** CP/CG Funds in Turkey have different option strategies depening on different option types. Call options have the leading portion (%44) and it is followed by Range Accrual options (%24). That means most of the funds are issued with bullish strategies and targetted the investors who have rising expectations for underlying assets.

- **Performances of the funds;** When all 24 matured funds are analyzed according to their rate of return (ROR), 3 of them didn't generate any return to their customers. 8 of them generated a ROR between % 0-10, 10 of them generated a ROR between % 10-20, and 3 of them generated a ROR above %20. That shows most of these funds generated a moderate return to their customers. Fund which generated the highest return was Isbank's 1 year capital protected fund, that was matured at 04.02.2009 generated a return of %33,34 to its customers. This fund generated an extraordinary return when it is compared with other structured funds because this fund's underlying asset was IMKB-30, option strategy was Europen Put and fund had a participation ratio about %120. Between this fund's investment period IMKB decreases about %28 and this led a return of %33,34 for this fund's investors.

Analyzing the funds' performances according to ROR can be misleading that's why relative returns (RR)[4] of these funds should be calculated for all the funds according to a benchmark return. In this study TL deposit interest rates are taken as bencmark since most of the investors compare returns of any alternative investments with TL deposit interest rates.

[4] The relative return can be defined as the difference between the absolute return achieved by the asset and the return achieved by the benchmark.

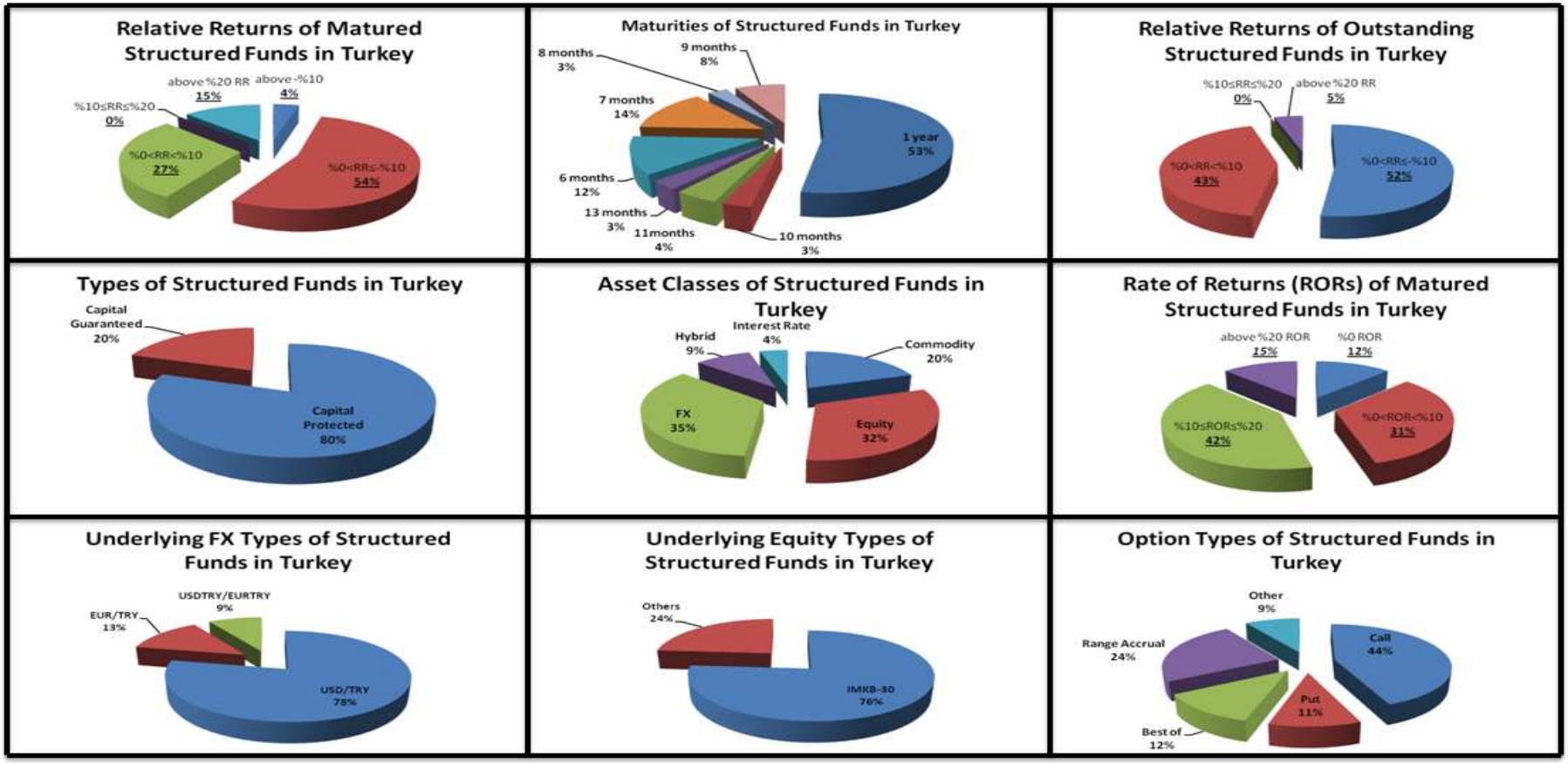
When 24 matured funds are analyzed according to their RR; 1 fund had - %15 RR. There are 13 funds that had a RR between %0 and -%10. 6 funds had a RR between %0 and %10 and finally 3 funds had the best RR with a RR higher then %20. These numbers show most of the structured funds generate a negative RR when TL deposit rate is taken into account as benchmark. Especially TEB's structured fund that is linked to IMKB 30 with Asian call option had a RR of -%15 in 1 year because during its investment period IMKB 30 has been decreasing continously.

When 42 outstanding funds are analyzed according to their RR; there are 22 funds that had a RR between %0 and -%10. 18 funds had a RR between %0 and %10 and finally 2 funds had the best RR with a RR higher then %20. Relative returns of outstanding funds are calculated according to the mark to market returns of these funds obtained from Reuters. That means structured funds are still performing with negative RR or positive RR at a moderate level when TL deposit rates are taken into account as benchmark.

In the following page; Figure 5.2 is presented. In this figure; charts of the analysis that are made in this section can be found.

Data in Figure 5.2 is derived from Table 5.1. In these charts following characteristics of the funds can be found.

- Returns (Relative returns of matured and outstanding funds, RoR of matured funds)
- Maturities
- Types (CP or CG)
- Underlying Asset Classes (Underlying FX and Equity Types)
- Option types

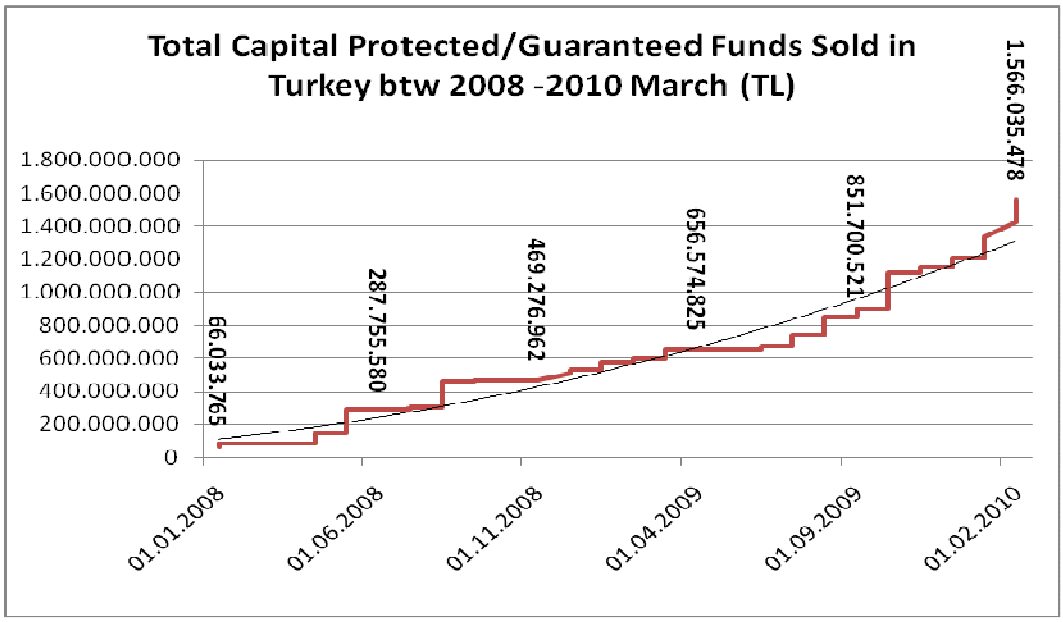


Source: Turkey Isbank Treasury Department. Turkey Isbank Capital Markets Department, Fonlab

Figure 5.2: Structured Funds (CP/CG Funds) in Turkey between 2008 and 2010 March - (derived from Table 5.1)

- **Volume of the funds sold;** If the volume of funds sold is considered; from 2008 to March 2010 volumes of CP/CG funds sold have reached about 1.5 billion TL when all the CP/CG funds that were offered in Turkey are considered regardless of their maturity ends or they are still active. At the end of 2010 February; funds that are still in investment period have a volume of 925 million TL, funds which already matured have a volume of 575 million.

Figure 5.3 shows the volume of structured funds sold between 2008 and 2010 March and variations in sales volume of these funds between these years.

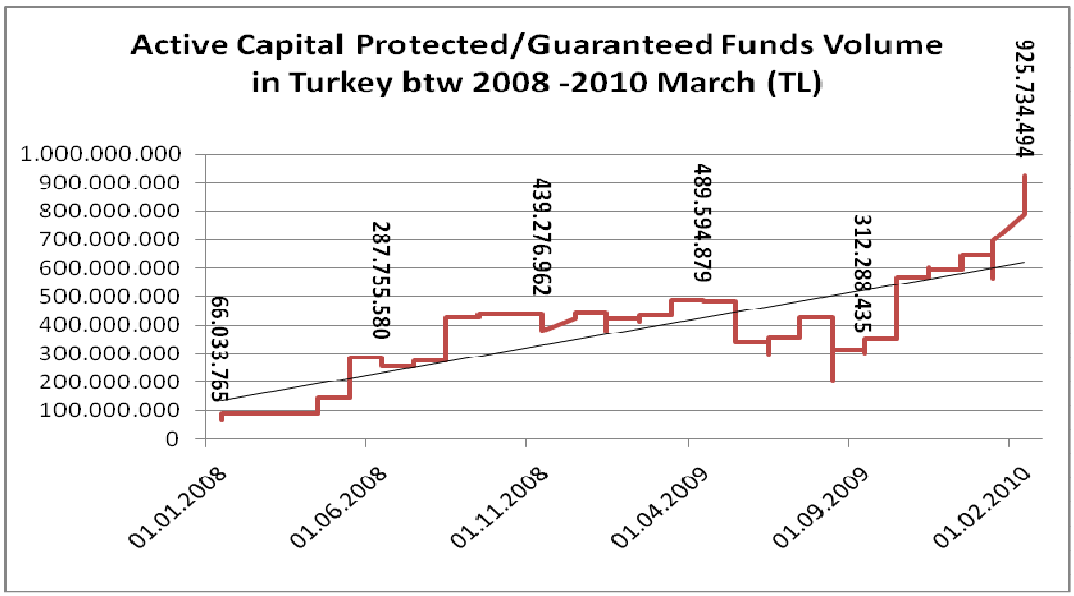


Source: Turkey Isbank Treasury Department. Turkey Isbank Capital Markets Department, Fonlab

Figure 5.3: Total Volume of Structured Funds (CP/CG Funds) Sold in Turkey between 2008 and 2010 March

As can be seen from Figure 5.3 in the beginning of 2008; at 01.01.2008 total volume of structured funds sold was 66.033.765 TL and this volume increased to 1.566.035.478 at 28.02.2010. That means in 26 months, volume of structured funds sold increased about %2272. This is a huge and a rapid growth for Turkish market compared to other regional markets especially European market in the same period. That's because in the same period other regional markets, especially European market was already a developed market in structured funds but Turkey was in the beginning period of hosting structured funds in the market.

Figure 5.4 shows the volume of active structured funds (funds that weren't matured yet) between 2008 - 2010 March.



Source: Turkey Isbank Treasury Department. Turkey Isbank Capital Markets Department, Fonlab

Figure 5.4: Structured Funds (CP/CG Funds) Volume Development in Turkey between 2008 and 2010 March

As can be seen from Figure 5.4 in the beginning of 2008; at 01.01.2008 total volume of active structured funds was 66.033.765 TL and at 28.02.2010 volume of active structured funds was 925.734.494 TL.

Between 2008 and March 2010, in some points; volume of active structured funds decreased. That was because of the funds' redemptions. Biggest decline is observed within 2009 because in 2009 volume of structured funds that were redeemed till August was about 100 mio TL higher than the volume of structured products sold. In 2009; the lowest volume observed at 05.08.2009 (204.700.254). After this point, volume of new structured funds sold always exceeded the volume of structured funds redeemed within the same periods, so volume of active structured funds increased continuously till 28.02.2010 and reach a volume of 925.734.494 at 28.02.2010.

Total volume of the mutual funds in Turkey reach about 30 billion TL[5] in March 2010, that means CP/CG funds that are still in investment period have reached about %3 of total mutual funds' volume in Turkey. Market players are expecting volume of CP/CG funds will reach %5 of total funds' volume in Turkey until 2011.

5.2.1.4. Advantages & Disadvantages of CP/CG Funds in Turkey

As it can be analyzed from the previous sections, popularity of CP/CG funds is increasing in Turkey. Despite the market conditions, advantages of the CP/CG funds are quite important on this development.

CP/CG funds have advantages such;

- CP/CG funds can generate a higher return than the deposits and bonds according to the performance of the underlying of the fund.
- CP/CG funds enable the investors to access a higher return possibility by protecting their initial investements ('Fortis Portföy: Anapara Koruma Amaçlı Fonlarda Bilmeniz Gereken 10 Şey' 2007). In other words by investing in these funds, investors get a chance to

[5] 29.917.391.086,16 TL in 18th March (source Capital Markets Board of Turkey)

reach higher returns than traditional investments while their initial investments are protected. This feature can be considered as the most important feature of these funds and attracts risk averse investors to invest in these funds.

- CP/CG funds provide easy access to different kinds of instruments from all over the world in an easier and cheaper way. These funds give chance to retail investors to invest in barely found instruments.
- CP/CG funds provide diversification in the portfolios of the investors in an easier and cheaper way. Since these funds can have hundreds of underlying instruments like shares, indices, commodities, equities, foreign currencies and etc… they enable the investors to diversify their portfolio.

Although CP/CG funds have these attractive features and advantages, at the same time they involve some disadvantages and risks such as;

- Compared to the deposits, CP/CG funds have longer maturities starting from 6 months to 2 years. Since Turkish investors get used to shorter maturities; maturities of these funds are seemed so long for them.
- Altough interest rates of TL deposits decreased from %20 levels to %10 levels in Turkey, these rates can still be considered as high opportunity costs.
- Unlike usual mutual funds, in CP/CG funds, investors couldn't sell their shares anytime they want. Also they should pay a high cost penalty fee in order to sell their shares before maturity.
- Option component of CP/CG funds are more complex compared to the instruments usual mutual funds are investing in. Sometimes investors can have diffulties to understand the investment strategy of a CP/CG fund especially if the fund's option components is an exotic option.

In addition to these disadvantages, CP/CG funds are subject to following risks during their investment period ('Türkiye İş Bankası A.Ş. Koruma Amaçlı Şemsiye Fonu'na Bağlı B Tipi %100 Anapara Korumalı Sekizinci Alt Fon İzahnamesi' 2009)

- Market Risk: Unexpected fluctuations in interest rates, commodity prices, equity prices and other financial asset's prices affect the value of the fund during the fund's investment period.
- Interest Rate Risk: Since fund's bond component is evaluated by the values of government bonds, treasury bills and reverse repo contracts unexpected fluctuations in interest rates of these fixed income securities affect the price of the fund during the fund's investment period.
- Counterparty Risk: In these funds, there is an option part and in this part, an option contract is bought from another financial institution on OTC market. Default of this option issuer means, that institution cannot fulfill its liabilities about this option contract.
- Exchange Rate Risk: Unexpected fluctuations in exchange rates affect the value of the fund during the fund's investment period.
- Concentration Risk: If the fund is investing in a specific instrument with a specific maturity, fund can be subject to concentration risk.
- Legal Risk: After the public offering period, fund is subject to legal risk if the regulations of these funds are being changed.

5.2.1.5. Taxation of CP/CG Funds in Turkey

CP/CG funds are subject to %10 withholding tax, if at the end of the maturity option part of the fund generated return. These funds are subject to %10 withholding tax from the amount of return generated by the option component. If option component didn't generate return, these funds are not subject to any tax.

5.2.1.6. Things to be Considered Before Investing In CP/CG Funds

CP/CG funds can have very different compositions and features, that's why an investor should consider if the structured fund is fitting in with his/her risk appetite, financial situation and market expectation. When choosing a structured fund, an investor should consider the followings;

- Conditions required for capital protection and the portion of that protection.
- Participation ratio
- CP/CG funds are riskier than usual time deposits so the investors should determine whether they have the risk appetite for the fund they are choosing.
- CP/CG funds are in a more complex composition than usual time deposits and mutual funds, so investors should understand the underlying and payoff mechanism of the fund they want to invest ('Türkiye'de Anapara Koruma Amaçlı ve Anapara Garantili Fonlar' 2008).
- Capital protection feature of these funds is valid only at the maturity. Investors could sell their shares within the maturity but they have to pay penalty fees. Investors should be aware of these fees and they should invest in these funds if they have sufficient savings.

5.2.2. Structured Deposits

Another popular and well-known type of structured products in Turkish financial system is structured deposits. These products are structured by deposit banks.

Following sections will firstly define structured deposits and explain their main features and composition. Then most common types of structured deposits in Turkey will be detailed with given examples. In the remaining

part of the section; advantages & disadvantages of structured deposits and things should be considered by an investor before investing in structured deposits will be analyzed.

5.2.2.1. Definition, Composition and Types of Structured Deposits

A structured deposit can be defined as a structured product that is composed of a deposit plus another financial product (mostly an option contract) where the return is depending on the performance of some underlying asset(s) ('Making Sense of Structured Deposits' 2008).

Figure 5.5 shows composition of a structured deposit.

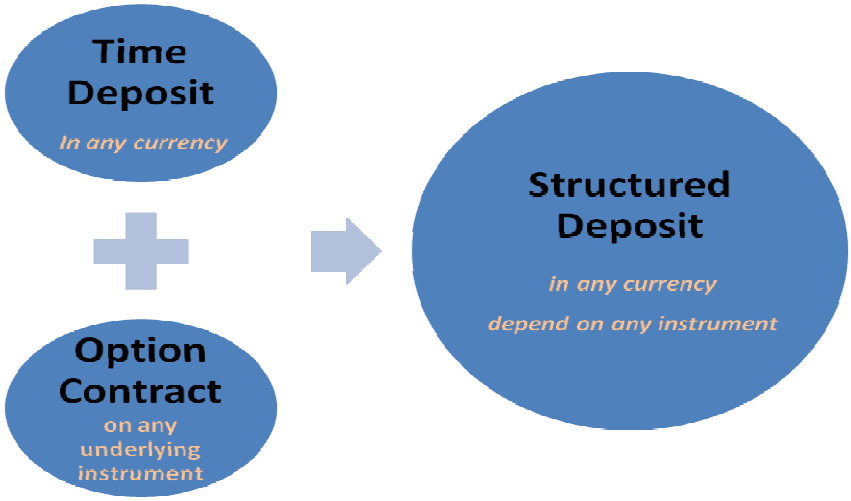


Figure 5.5: Composition of Structured Deposit

As can be seen from Figure 5.5; structured deposits are composed of a time deposit account in any currency and an option contract that is written on any underlying asset. The underlying asset can be a single share, basket of shares, index, basket of indices, commodities, equities, currencies, interest rates and etc…Combination of these 2 components structures a structured deposit account that is in any currency, depending on any instrument.

The basic difference of structured deposits and time deposits is; in time deposits the return is fixed but in structured deposits it varies. Possible return of structured deposits depends on their risk levels, riskier structured deposits provide higher return possibility and vice versa.

When structured deposits are compared to CP/CG funds;

- Structured deposits are more accessible than CP/CG funds because these funds can be bought in predetermined public offerings periods, but structured deposits can be bought anytime from deposit banks.
- Structured deposits are more tailor-made than CP/CG funds. That's because maturities of CP/CG funds are fixed by the fund manager before their public offering period; however, maturities of structured deposits can vary from weeks to months according to demands of the investors.
- Like CP/CG funds, structured deposits can provide full or partial capital protection.
- Composition of structured deposits is similar to composition of CP/CG funds. In structured deposits, there is a deposit component instead of a bond component and rest of the product is composed of an option contract written on any underlying asset.

Structure deposits can be classified in 2 different forms;

- <u>According to their underlying asset:</u> According to their underlying assets, these products be classified as; bond linked, FX(foreign exchange) linked, stock market linked, commodity linked, single stock linked, hedge fund linked, equity linked deposits.
- <u>According to their capital protection feature:</u> According to their capital protection feature, these products can be classified as; deposits with capital protection feature and deposits without capital

protection feature. In capital protected deposits, capital protection can be full or partial.

Since structured deposits are tailor-made products operating processes of these deposits change from product to product. Operating processes of most common types in Turkey will be examined later in this study (in section 5.2.2.3).

5.2.2.2. Structured Deposits in Turkey

In this section, structured deposits are categorized according to information collected from web sites of deposit banks that are operating in Turkey.

The volume of structured deposits in Turkey cannot be determined because these products aren't listed on an exchange market and traded between investors and banks on OTC markets.

It can be told that; 4 major types of structured deposit are standing in the forefront when all the banks that are operating in Turkey are analyzed.

a. Foreign Exchange(FX)-Linked Structured Deposits

FX-linked structured deposits are the most popular type among the banks and investors. Investors can obtain higher returns in FX-linked deposits compared to usual time deposits by undertaking exchange rate risk. FX-linked deposits can be structured between any currency pairs. In Turkey most popular FX-linked deposits are structured in USD-TRY, USD-EURO and EURO-USD currency pairs. Also these deposits can be structured with different option types and offer different payoff features according to these option types. In Turkey most popular FX-linked structured deposits with different option types are; Dual Currency Deposit (DCD), Range Accrual,

Double No Touch and Wedding Cake. Operating processes, compositions and features of these products will be analyzed in the next section with examples. Lastly; these products can be with or without capital protection feature.

b. Stock Market-Linked Structured Deposits

These products aren't as popular as FX-linked deposits. They are mostly linked to IMKB30 or IMKB100 indices and generate returns to their investors according to the performances of these indices. These types of structured deposits are mostly offered for the investors who cannot undertake a risk to invest in the stock market directly but would still like to obtain return on stock market movements. These products can be with or without capital protection feature.

c. Bond-Linked Structured Deposits

These deposits are structured in order to generate extra return from the price movements of Turkish government bonds, treasury bills and Eurobonds. These products can be with or without capital protection feature.

d. Commodity-Linked Structured Deposits

Thus far, only a few banks offered this type of structured deposits. Gold was the most popular commodity among banks. Like the other types of structured deposits; these products can be with or without capital protection feature.

5.2.2.3. Most Common Types of Structured Deposits in Turkey

In this section most popular structured deposits which are DCD, Range Accrual, Double No Touch and Wedding Cake will be analyzed. As it is

told in the previous section, there is not a reliable data about the volume of these products sold in Turkey. However, if these 4 products are compared with each other; DCD is leading the first place in recognition, popularity and volume sold. This is mostly because, DCD is a less complex and easier accessible product (with lower minimum participation limit) compared to other 3 products.

In Turkey, these 4 products firstly introduced to private banking customers (high net-worth individuals) because they have high minimum participation limits (approximately 100.000 $). However, recently retail customers of the banks started to open DCD accounts because minimum participation limit of DCD was lowered by the banks (till 10.000$ in some banks). On top of all this, downtrend in interest rates of time deposits (especially TL time deposits) led an increase in number and volume of DCD accounts opened.

Remaining part of the study will be examining these 4 products, starting from DCD.

a. DCD (Dual Currency Deposit)

aa. Definition, Main Characteristics and Features of DCD

Dual Currency Deposit (DCD) is the most popular type of structured deposit in Turkey. DCD can be defined as a transaction between an investor and a bank and consisting of a time deposit and an option contract. In this option contract the bank pays a premium to the investor for the FX option he/she has sold to the bank. In exchange of this premium, the investor gives the bank a right to buy a specified currency (TL, USD, EURO, GDP and etc) at a predetermined price (strike price). This option contract is combined to a time deposit account so the bank secures the deposit amount as collateral and the investor earns interest for his/her deposit within the

maturity of the option contract. The premium of the option contract is given to the investors as an extra interest to their time deposit accounts. In every DCD there is a principal currency in which the original investment is hold and there is an alternative currency which is chosen by the investor 'to play against the bank' (Chorafas 2007).

In every DCD transaction following features are found;

- A principal currency that the deposit account of the investor is held in (mostly called base currency)
- An exchange rate of a currency pair composed of base currency and another currency
- An option contract that's is written on this exchange rate (call option for base currency, put option for other currency)
- Strike price (exercise price)
- Maturity

Other important features of DCDs are;

- Like time deposits, DCDs cannot be cashed before their maturity without any penalty. Cancellation before their maturity reduces interest earned to zero and can lead a loss in principal invested ('HSBC Dual currency Deposit Product Fact Sheet 2009').
- In usual option contracts, premium is paid at the beginning of the maturity. However, most of the banks pay the premium of DCD at the end of the maturity as an extra interest to the deposit account.
- In DCD transactions, European options are used that's why options can be exercised only at the maturity.
- In DCD transactions, different minimum participation limits are applied by the banks in Turkey varying from 10.000 to 500.000 USD or equivalent currencies.

Most popular types of DCDs in Turkey are;

- USD Call / TL Put DCD: This type is structured on a USD time deposit. Investor holds USD and sells the bank a right to buy USD at a predetermined strike price. Strike price is chosen at a higher USD/TL rate from the spot rate.
- TL Call / USD Put DCD: This type is structured on a TL time deposit. Investor holds TL and sells the bank a right to sell USD at a predetermined strike price. Strike price is chosen at a lower USD/TL rate from the spot rate.
- EURO Call / TL Put DCD: This type is structured on a EUR time deposit. Investor holds EUR and sells the bank a right to buy EUR at a predetermined strike price. Strike price is chosen at a higher EUR/TL rate from the spot rate.
- TL Call / EURO Put DCD: This type is structured on a TL time deposit. Investor holds TL and sells the bank a right to sell EUR at a predetermined strike price. Strike price is chosen at a lower EUR/TL rate from the spot rate.
- USD Call / EURO Put DCD: This type is structured on a USD time deposit. Investor holds USD and sells the bank a right to sell EUR at a predetermined strike price. Strike price is chosen at a lower EUR/USD rate from the spot rate.
- EURO Call / USD Put DCD: This type is structured on a EUR time deposit. Investor holds EUR and sells the bank a right to buy EUR at a predetermined strike price. Strike price is chosen at a higher EUR/ USD rate from the spot rate.

In all these DCD types; loss of principal is possible and investors undertake exchange rate risks in order to obtain higher returns than usual time deposits. That's why DCDs can be defined as first–class instruments and they are suitable for the investors who are looking to increase their return and prepared to take a degree of exchange rate risk (Credit Suisse:

Money Market Transactions 2006'). This exchange rate risk is exist due to differentiation of foreign exchange types subject to market conditions and this risk is undertaken by the investor (depositor) since the investor is in option writer position in these transactions. ('BDDK Dual Currency Deposit Hakkında Basın Duyurusu' 2010).

If an investor wants to participate in a DCD transaction first of all he/she should choose a currency pair (for example USD/TL). Then investors should nominate one of these currencies as base currency and the other as alternate currency. Once the investor has selected currency pair, base currency and alternate currency he/she must choose strike price and buffer value (difference between strike and spot price). Here buffer value shows the permissible appreciation/depreciation value of the base currency against the alternate currency. Finally investor chooses investment amount and investment term (maturity) ('Citibank: Dual Currency Accounts 2006').

To give a case in point; let's consider an investor has an amount of ***Z USD***. This investor expects a rise in USD/TL rate and he/she expects this rise till a specific rate ***(X) USD/TL***, within a specific maturity ***(Y) days***. At this time, this investor can participate in a USD Call / TL Put DCD with a strike price of ***(X) USD/TL*** and maturity of ***(Y) days***. Investor may think USD/TL rate will not go above (X) USD/TL (strike price), or even if it does he/she finds it acceptable to convert his/her Z USD to TL at an exchange rate of (X) USD/TL after (Y) days.

In the following part, numerical examples of USD Call / TL Put and TL Call / USD Put DCDs can be found.

ab. USD Call / TL Put – TL Call / USD Put DCD Examples

In this part numerical examples of USD Call / TL Put and TL Call / USD Put DCD transactions will be presented. Rates and prices used in these

numerical examples are average prices that can be found in the market at 22th March 2010.

aba. USD Call / TL Put DCD Example

In the following table a USD Call / TL put type of DCD transaction can be found.

Table 5.2: USD Call / TL Put DCD Example

USD Call / TL Put **Date: 22.03.2010**	
Transaction Amount	100.000 USD
Underlying	USD/TL
Spot Price	1,5385
Strike Price	1,5525
Maturity	1 month – 30 Days
Deposit (%)	2,00 (gross)
Premium (%)	8,00 (gross)

Table 5.2 shows a DCD transaction that occurs between an investor and a bank. At 22.03.2010, an investor with 100.000 USD principal sells the bank a right to buy USD at 1,5525 after 1 month (30 days). In exchange for this, bank gives the investor %8,00 (gross) interest to his/her principal as premium. In addition; by participating to this DCD transaction investor earns %8,00 (premium) + %2,00 (1 month TL deposit interest rate) = %10,00 gross interest to his/her principal. In other words; normally with this amount of principal, investor could earn %2,00 (gross) interest by investing in a usual time deposit; however, by undertaking the USD/TL exchange rate risk, investor could earn %10,00 (gross) interest.

At maturity 2 scenarios can happen;

First scenario; if after 30 days, USD/TL rate is below the strike price (1,5525) for example 1,5500; the bank will not use its right to buy USD from 1,5525 because USD can be found cheaper than 1,5525 in the market. The investor's 100.000 USD principal will be protected as 100.000 USD and the investor will earn %10,00 (gross) interest to his/her principal.

At the end of the DCD transaction gross amount of interest earned by the investor will be;

Principal x {(DCD Premium Rate + Deposit Interest Rate)/100} x (Days to Maturity/365)

(100.000 x (0,08 + 0.02)) / 365 * 30 = ~ 822 USD

If the investor didn't participate to this DCD transaction and invest 100.000 USD in 30 days time deposit, he/she could earn;

(100.000 x 0,02) / 365 * 30 = ~ 164 USD

As an overview; at the end of the transaction, investor earns 822 USD for 100.000 USD he/she invests in DCD for 1 month. That means; investor earns about 658 USD more than time deposit in 30 days by undertaking the USD/TL exchange rate risk. Since taken risk doesn't come true at the end of the maturity, investor obtains 658 USD extra return by investing in DCD instead of investing in usual time deposit.

Second scenario if after 30 days, USD/TL rate is at or above the strike price (1,5525), for example 1,5700; the bank will use its right to buy USD from 1,5525 because in the market USD/TL is above 1,5525 (more expensive). The investor's 100.000 USD principal will be converted to TL from 1,5525 exchange rate. At this point; the investor will earn %10,00 (gross) interest to his/her principal, but at the end of the maturity his/her

principal is converted to TL with an unfavorable exchange rate for the investor.

At the end of the DCD transaction, gross amount of interest earned by the investor will be;

(100.000 x 0,10) / 365 * 30 = ~ 822 USD

Investor's principal loss will be;

(1,5700 – 1.5525) * 100.000 = 1.750 USD

In total investor will be making a loss of

1.750 – 822 = 928 USD

Investor earns about 822 USD in 30 days by undertaking USD/TL exchange rate risk. Furthermore, at the end of the maturity an amount of 1.750 USD principal loss occurs because the risk undertaken by the investor comes true. At the end of the transaction, investor losses 928 USD in total for 100.000 USD he/she invested in DCD for 1 month.

In this example; breakeven point (the price at which a DCD transaction produces neither a gain nor a loss) is;

1,5525 + ((100.000 x 0.10)/365*30) / 100.000 = ~ 1,5607

In other words; if the market price is ~ 1.5607 at the end of DCD's maturity, the investor will be at break-even point for that DCD transaction.

Figure 5.6 shows the payoff graph of a USD Call / TL Put DCD example. In this figure x axis of the graph represents the market price of the

underlying exchange rate and y axis of the graph represents profit/loss amount that is made by the investor according to the different market prices of exchange rate. Also in the graph (b) is equal to TL time deposit interest rate and (a) is equal to DCD premium.

Source: Isbank Treasury Department

Figure 5.6: Payoff Graph of USD Call / TL Put DCD Example

As can be seen from Figure 5.6; till strike price, investor earns a fixed amount of profit that is equal to DCD premium plus time deposit interest rate. At the prices above strike price, since the risk undertaken by the investor comes true, investor starts to lose money in every rise in the exchange rate. Till breakeven point; total interest taken by the investor (DCD premium + deposit interest rate) compensates total loss occurred, but after breakeven point; investor starts to lose from his/her principal investment.

abb. TL Call / USD Put DCD Example

In the following table a TL Call / USD put type of DCD transaction can be found.

Table 5.3: TL Call / USD Put DCD Example

TL Call / USD Put **Date: 22.03.2010**	
Transaction Amount	100.000 TL
Underlying	USD/TL
Spot Price	1,5385
Strike Price	1,5300
Maturity	1 month – 30 Days
Deposit (%)	8,75 (gross)
Premium (%)	5,25 (gross)

Table 5.3 shows a DCD transaction that occurs between an investor and a bank. At 22.03.2010, an investor with 100.000 TL principal sells bank the right to sell USD at 1,5300 after 1 month (30 days). In exchange for this, bank gives the investor %5,25 (gross) interest to his/her principal as premium. In addition, by participating to this DCD transaction; investor earns %5,25 (premium) + %8,75 (1 month TL time deposit interest rate) = %14,00 gross interest to his/her principal. In other words; normally with this amount of principal investor could earn %8,75 (gross) interest by investing in usual deposit; however, by undertaking the USD/TL exchange rate risk, investor could earn %14,00 (gross) interest.

At maturity 2 scenarios can happen;

First scenario, if after 30 days, the USD/TL rate is above the strike price (1,5300), for example 1,5350; the bank will not use its right to sell USD from 1,5300 because in the market bank can sell USD above 1,5300. The investor's 100.000 TL principal will be protected as 100.000 TL and the investor will earn %14,00 (gross) interest to his/her principal.

At the end of the DCD transaction gross amount of interest earned by the investor will be;

Principal x {(DCD Premium Rate + Deposit Interest Rate)/100} x (Days to Maturity/365)

(100.000 x (0.0875 + 0.0525)) / 365 * 30 = ~ 1.150 TL

If the investor didn't participate to this DCD transaction and invest 100.000 TL in 30 days time deposit, he/she could earn;

(100.000 x 0,0525) / 365 * 30 = ~ 431 TL

As an overview; at the end of the transaction, investor earns 1.150 TL for 100.000 TL he/she invests in DCD for 1 month. That means; investor earns about 719 TL more than time deposit in 30 days by undertaking the USD/TL exchange rate risk. Since taken risk doesn't come true at the end of the maturity, investor obtains 719 TL extra return by investing in DCD instead of investing in usual time deposit.

Second scenario; if after 30 days, the USD/TL rate is at or below the strike price (1,5300) for example 1,5150; the bank will use its right to sell USD from 1,5300 because in the market USD is below 1,5300. The investor's 100.000 TL principal will be converted to USD from 1,5300 exchange rate. At this point; the investor will earn %14,00 (gross) interest to his/her principal, but at the end of the maturity his/her principal is converted to USD with an unfavorable exchange rate for the investor.

At the end of the DCD transaction gross amount of interest earned by the investor will be;

(100.000 x (0,0875 + 0.0525)) / 365 * 30 = ~ 1.150 TL

Investor's principal loss will be;

(1,5300 – 1.5150) * 100.000 = 1.500 TL

In total investor will be making a loss of

1.500 – 1.150 = 350 TL

Investor earns about 1.150 TL in 30 days by undertaking USD/TL exchange rate risk. Furthermore, at the end of the maturity an amount of 1.500 TL principal loss occurs because the risk undertaken by the investor comes true. At the end of the transaction, investor losses 350 TL in total for 100.000 TL he/she invested in DCD for 1 month.

In this example breakeven point (the price at which a DCD transaction produces neither a gain nor a loss) is;

1,5300 - ((100.000 x 0,14) / 365 * 30) / 100.000 = ~ 1,5185

In other words; if the market price is ~ 1.5185 at the end of DCD's maturity, the investor will be at break-even point for that DCD transaction.

Figure 5.7 shows the payoff graph of a TL Call / USD Put DCD example. In this figure x axis of the graph represents the market price of the underlying exchange rate and y axis of the graph represents profit/loss amount that is made by the investor according to the different market prices of exchange rate. Also in the graph (b) is equal to TL time deposit interest rate and (a) is equal to DCD premium.

Source: Isbank Treasury Department

Figure 5.7: Payoff Graph of TL Call / USD Put DCD Example

As can be seen from Figure 5.7 till strike price; investor earns a fixed amount of profit that is equal to DCD premium plus deposit interest rate. At the prices below strike price since the risk undertaken by the investor comes true, investor starts to lose money in every fall in the exchange rate. Till breakeven point, total interest taken by the investor (DCD premium + deposit interest rate) compensates total loss occurred, however after breakeven point investor starts to lose from his/her principal investment.

In other types of DCDs; (EURO Call / TL Put, TL Call / EURO Put, USD Call / EURO Put, EURO Call / USD Put) the operating process is the same with the examples above.

ac. Taxation of DCD

In Turkey; taxation of DCD transaction can be considered in 2 parts;

Deposit Part: %15 withholding tax is applied to the deposit part of DCD.

Option Part: If investor obtains a return from option part of the DCD at the end of the maturity, then %10 withholding tax will be applied to the option part of the DCD. If investor makes a loss from option part of the DCD (capital loss exceeds the premium earned from option) at the end of the maturity, then a tax exemption will be occurred and no tax is applied to the option part of the DCD.

ad. Different Risk Levels of DCD

DCD transactions with the same underlying currency pair and option type may involve different risk levels. For example; in the USD Call / TL Put DCD example of this section, strike price is set to 1,5525 and maturity is set to 1 month. For the same amount of principal (100.000 USD), for the same underlying currency pair (USD/TL) and for the same option type (USD Call / TL Put DCD), risk level of this DCD transaction can vary according to different strike prices and maturities;

- Different maturities for the same strike price: If the maturity is determined shorter than 1 month for this DCD transaction, then risk level of the DCD will decrease so the investor will get lower premium from this DCD transaction. If the maturity is determined longer than 1 month, risk level of DCD will increase so the investor will get higher premium from this DCD transaction.

Figure 5.8 shows this relationship between risk level/premium amount of DCDs and their maturity, when the underlying currency pair and option type of these DCDs are the same.

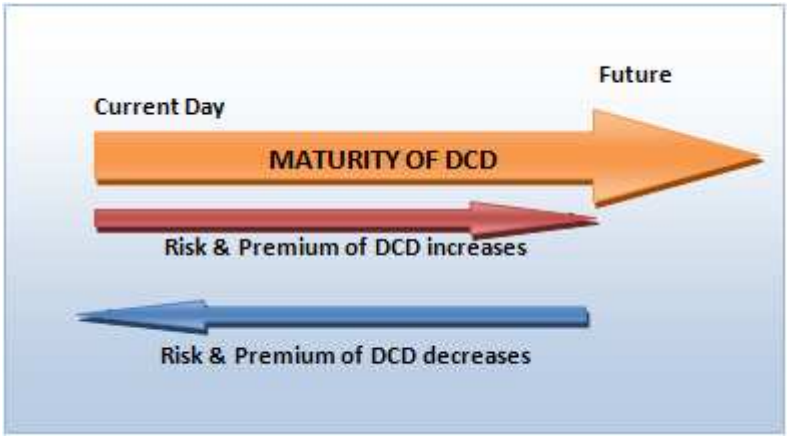


Figure 5.8: Maturity & Risk Level/Premium Relationship in DCD

As can be seen from Figure 5.8; for DCD transactions with the same underlying currency pair and option type, maturities of these DCD transactions determine their premium amount and risk level. Longer maturities lead higher risk levels and higher premium payments, shorter maturities lead lower risk levels and lower premium payments to the investors.

- For the same maturity different strike prices; If the strike price is determined at a price above 1,5525 , risk level of this DCD will decrease so the investor will get lower premium from this DCD transaction. If strike price is determined at a price below 1,5525 , risk level of the DCD will increase so the investor will get higher premium from this DCD transaction.

Figure 5.9 shows this relationship between risk level/premium amount of DCDs and their strike price, when the underlying currency pair and option type of these DCDs are the same.

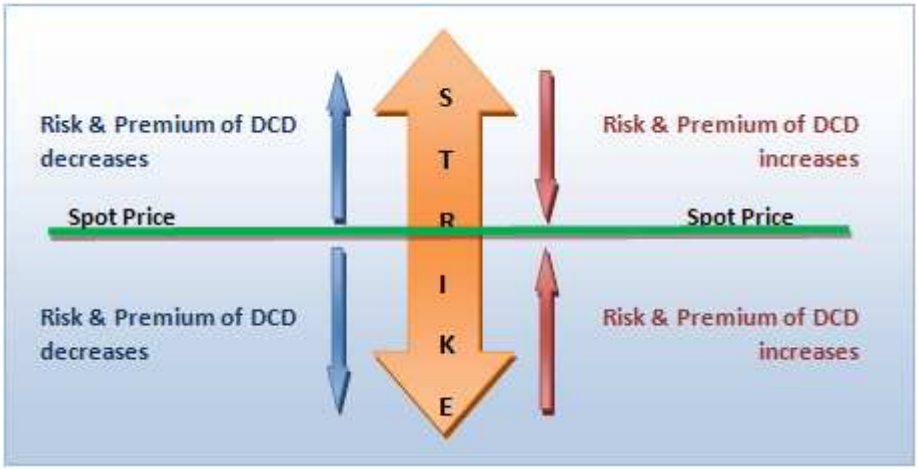


Figure 5.9: Strike Price & Risk Level/Premium Relationship in DCD

As can be seen from Figure 5.9; for DCD transactions with the same underlying currency pair and option type, strike prices of these DCD transactions determine their premium amount and risk level. Closer strike prices from spot price lead higher risk levels and higher premium payments, farther strike prices from spot price lead lower risk levels and lower premium payments to the investors. In other words; Distance of the strike price from the spot rate is determined by the investor's risk appetite ('RBC: Dual Currency Deposit' 2009).

ae. Contrary Bank Transaction of DCD

Entire banks operating in Turkey hedge their risks resulting from DCDs by making 'contrary bank transactions'. In a contrary bank transaction; bank operates in the middle of a DCD investor and a third party (a bank or any other financial institution). Bank buys DCD's option contract from the investor of this DCD and sells this option contract to a third party. In this contrary bank transaction bank tries to earn commissions without undertaking exchange rate risk.

Figure 5.10 shows a contrary bank transaction of a bank to hedge its risk resulting from a DCD transaction. In the figure ABC option contract represents the option part of this DCD transaction.

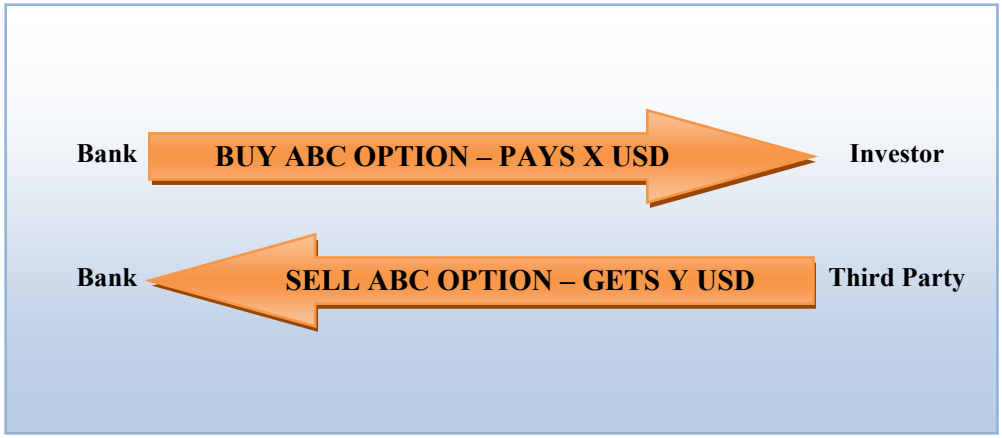


Figure 5.10: Contrary Bank Transaction

As can be seen from Figure 5.10; bank operates in the middle between an investor and a third party for an ABC option. Bank buys this ABC option from the investor and pays X amount of premium and sells this ABC option to a third party and gets Y amount of premium. Difference between Y and X shows the commission earned by the bank from this DCD transaction consisting of an ABC option.

In this example; minimum amount of an ABC option that can be sold to a third party affects the minimum amount of capital that is needed by the investor to participate in a DCD transaction consisting of this ABC option. At this point; the bank can buy this ABC option from one investor or from more than one investor. If the bank buys this ABC option from only one investor; then the minimum amount of capital that is needed by the investor to participate in a DCD transaction consisting of this ABC option will be higher, (around 100.000 USD if banks operating in Turkey and their counterparties are considered).

If the option part of a DCD is sold to one investor, then it can be told that; this DCD is tailored for a specific investor. Mostly in this kind of DCD transactions; firstly bank contacts with the investor and gets the demands of the investor about DCD's strike price and maturity. Then the bank contacts with a third party and obtains a premium according to strike price and maturity determined by the investor. After this process; bank offers the investor a premium which is equal to the difference between the premium obtained from a third party and bank's commission. If investor accepts this premium, DCD transaction will occur.

At the same time, it is possible for the same bank to buy this ABC option from more than one investor. At this point the minimum amount of capital that is needed by the investor to participate in a DCD transaction consisting of this ABC option can be lowered. For example; let's assume minimum 100.000 USD capital is needed to sell ABC option to a third party. Bank can raise this 100.000 USD from one investor or 10 different investors at an amount of 10.000 USD.

If the option part of a DCD is sold more than one investor, firstly the bank will obtain a premium for selling ABC option to a third party and then according this premium the bank will find investors to include a DCD consisting of this ABC option. In this method; unlike tailoring a DCD to a specific investor, a predetermined DCD is sold to many investors in order to lower the minimum participation limit.

In Turkey; minimum participation limits to DCD transactions differ from bank to bank and vary from 10.000 to 500.000 USD because of these different raising capital methods.

In the following part of the section other popular types of structured deposits will be analyzed.

b. Range Accrual

It is a %100 capital protected structured deposit where the investor determines a specific range (band) with upper and lower limits for the underlying exchange rate for a specific maturity. Within this maturity; investor earns premium when the exchange rate stays in the range that is determined by the investor. For each day the exchange rate stays in the range, an interest is earned by the investor. For the days that exchange rate stays out of the range, investor doesn't earn any interest. This product is %100 capital protected because in worst scenario; within the maturity exchange rate doesn't stay in the range in a single day. At this time; the investor earns no interest but takes his/her principal back at the end of the maturity.

Composition of Range Accrual is; deposit + range accrual style option. Interest that is paid to the investor for the days that exchange rate stays in the range is equal to the premium of range accrual option.

Range Accrual can be considered as a less risky product than DCD for the investors, because a loss in the principal is possible in DCD; however, in Range Accrual principal investment is %100 protected. Risk level of Range Accrual can be determined according to the investor's risk appetite. If the investor is risk averse the band of Range Accrual will be wider; if the investor risk appetite is higher band will be narrower.

In Turkey, minimum participation limit for Range Accrual is higher than DCD, about 1.000.000 USD. Range Accrual is usually structured on TL, USD and EUR deposits for USD/TRY, EUR/TRY, EUR/USD exchange rates with maturities differing from one to six months. Premium earned by Range Accrual is subject to %10 withholding tax in Turkey.

Operating process of a typical Range Accrual product can be examined by the following example in Table 5.4 (Numbers on the table do not reflect real market data; they are simulated for this example).

Table 5.4: USD/TL Range Accrual Example

USD/TL Range Accrual **Date: 22.03.2010**	
Transaction Amount	1.000.000 USD
Underlying Exchange Rate	USD/TL
Spot Price	1,5385
Determined Range	1,5200 – 1,5500
Maturity	1 month
Premium (%)	10,00 (gross)

During the transaction Market Deposit Rate for 3 months USD deposit is %2,00 (gross)

Table 5.4 shows a Range Accrual transaction that occurred between an investor and a bank. At 22.03.2010, an investor with 1.000.000 USD participates a Range Accrual transaction with underlying exchange rate of USD/TL and determines 1,5200 – 1,5500 range for 1 month (30 days). The investor deposits his/her 1.000.000 USD to the bank for 1 month and earns %10,00 interest from his principal for each day that exchange rate stays in the range determined by the investor.

At the end of the maturity investor earns [Principal x Premium Rate x T / 365] where T represents number of days that exchange rate stays in the range.

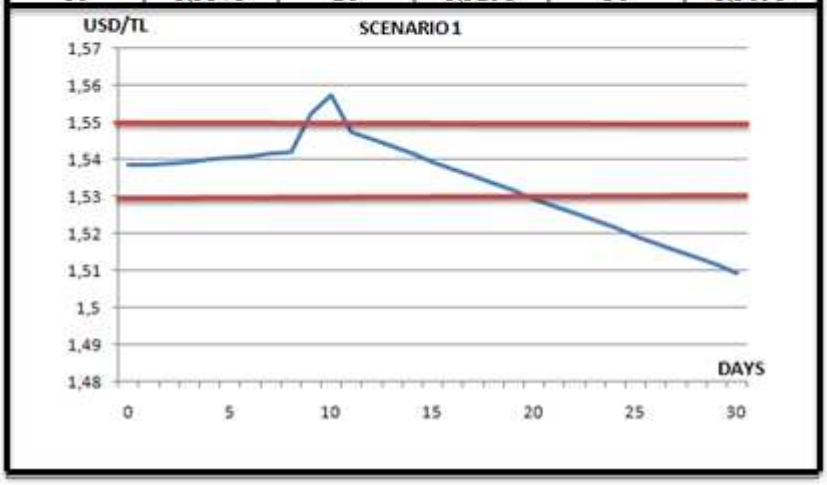
For this example investor earns; [1.000.000 x 0,10 x T /365], where T represents number of days that exchange rate stays in the range.

Let's assume 2 different scenarios will happen at the end of this Range Accrual's maturity.

Scenario 1: Let's assume the exchange rate moves like in Table 5.5 and stays 17 days in the range.

Table 5.5: USD/TL Range Accrual Example: 1st Scenario

Day	USD/TL	Day	USD/TL	Day	USD/TL
1	1,5385	11	1,5475	21	1,5275
2	1,5390	12	1,5455	22	1,5255
3	1,5395	13	1,5435	23	1,5235
4	1,5400	14	1,5415	24	1,5215
5	1,5405	15	1,5395	25	1,5195
6	1,5410	16	1,5375	26	1,5175
7	1,5415	17	1,5355	27	1,5155
8	1,5420	18	1,5335	28	1,5135
9	1,5525	19	1,5315	29	1,5115
10	1,5575	20	1,5295	30	1,5095



At the end of the maturity investor will earn from this Range Accrual transaction;

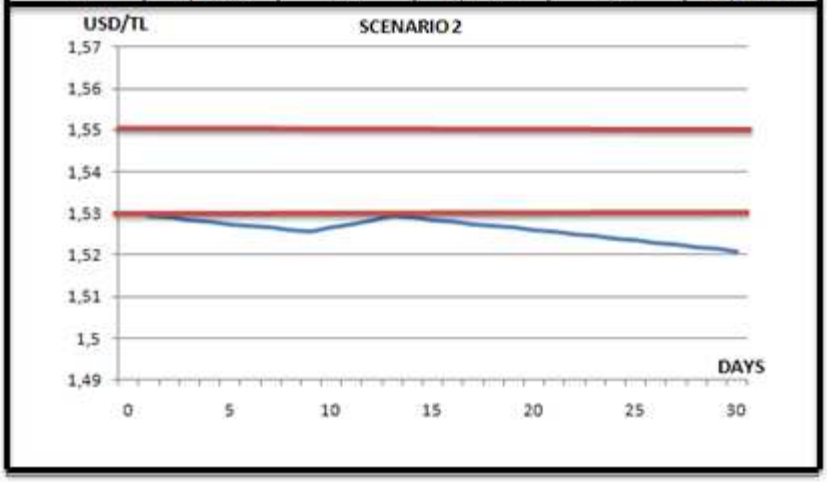
[1.000.000 x 0,10 x 17 /365] = ~ 4657 USD

Investor would earn [1.000.000 x 0,02 x 30 /365] = ~ 1.643 USD (gross) if he/she has chosen usual USD time deposit instead of Range Accrual deposit.

Scenario 2: Let's assume the exchange rate moves like in Table 5.6 and stays 0 days in the range.

Table 5.6: USD/TL Range Accrual Example: 2nd Scenario

Day	USD/TL	Day	USD/TL	Day	USD/TL
1	1,5295	11	1,5275	21	1,5255
2	1,5290	12	1,5285	22	1,5250
3	1,5285	13	1,5295	23	1,5245
4	1,5280	14	1,5290	24	1,5240
5	1,5275	15	1,5285	25	1,5235
6	1,5270	16	1,5280	26	1,5230
7	1,5265	17	1,5275	27	1,5225
8	1,5260	18	1,5270	28	1,5220
9	1,5255	19	1,5265	29	1,5215
10	1,5265	20	1,5260	30	1,5210



At the end of the maturity investor will earn from Range Accrual transaction;

[1.000.000 x 0,10 x 0/365] = 0 USD

Investor would earn [1.000.000 x 0,02 x 30 /365] = ~ 1.643 USD (gross) if he/she has chosen usual USD time deposit instead of Range Accrual deposit.

c. Double No Touch

Double No Touch is a kind of structured deposit that has very similar characteristics with Range Accrual. In Double No Touch, investor also determines a range and earns premium (interest) when the exchange rate stays in this range. However, the only and the basic difference between Double No Touch and Range Accrual is; if the exchange rate moves out of the range (any day once or many times) through the maturity, the investor couldn't earn any premium.

At the end of the maturity 2 possible outcomes can happen for Double No Touch;

1) The exchange rate stays in the range all the days through the maturity, so investor earns premium for these days.
2) The exchange rate moves out of the range (once or many times) through the maturity, so investor doesn't earn any premium.

Other characteristics of Double No Touch deposits are the followings;

- It is a %100 capital protected product.
- Composition of Double No Touch is; deposit + range accrual knocked-out style option. Interest that is paid to the investor for the days that stays in the range is equal to the premium of this knocked-out style option.
- If DCD and Double No Touch are compared about their risk levels undertaken by their investors; Double No Touch is a less risky product than DCD. That's because a loss in the principal is possible

in DCD at the end of the maturity; however, in Double No Touch principal is %100 protected.

- If Range Accrual and Double No Touch are compared about their risk levels undertaken by their investors; Range Accrual is a less risky product than Double No Touch. That's because of the Double No Touch's knocked-out feature. For this reason, for the same exchange rate range and maturity; the premium of Double No Touch is always higher than the premium of Range Accrual.
- Risk level of Double No Touch can be determined according to the investor's risk appetite. If the investor is risk averse the band will be wider; if the investor risk appetite is higher, band will be narrower.
- In Turkey minimum participation limit for Double No Touch is higher than DCD, starting from 1.000.000 USD.
- Double No Touch deposits are usually structured on TL, USD and EUR deposits for USD/TRY, EUR/TRY, EUR/USD exchange rates with maturities that are differ from one to six months.
- Premium earned by a Double No Touch deposit is subject to %10 withholding tax in Turkey.

Operating process of a typical Double No Touch product can be examined by the following example in Table 5.7

Table 5.7: USD/TL Double No Touch Example

USD/TL Double No Touch **Date: 22.03.2010**	
Transaction Amount	1.000.000 USD
Underlying Exchange Rate	USD/TL
Spot Price	1,5385
Determined Range	1,5200 – 1,5500
Maturity	1 month
Premium (%)	20,00 (gross)

During the transaction Market Deposit Rate for 3 months USD deposit is %2,00 (gross)

Table 5.7 shows a Double No Touch transaction between an investor and a bank. At 22.03.2010, an investor with 1.000.000 USD participates a Double No Touch transaction with the underlying exchange rate of USD/TL and determines 1,5200 – 1,5500 range for 1 month (30 days). Within 1 month; the investor deposits his/her 1.000.000 USD to the bank and will earn %20,00 interest to his/her principal for 1 month if the exchange rate stays in the range all the days during the maturity. However, if the exchange rate moves out of the range just even a single day, investor will not get any premium and will get his/her principal back at the end of the maturity.

At the end of the maturity; investor earns,

[Principal x Premium Rate x T / 365]

if the exchange rate stays all the days in the range through maturity. In this formula, T represents number of days that the exchange rate stays in the range.

For this example; investor earns,

[1.000.000 x 0,20 x T /365]

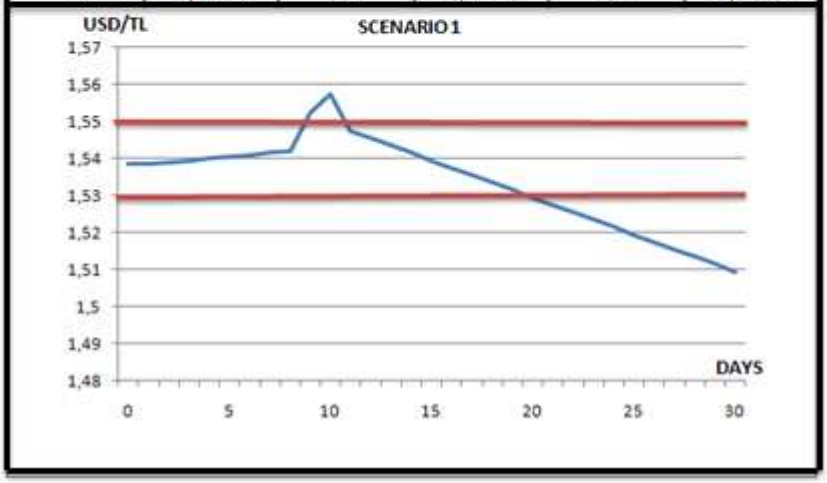
if the exchange rate stays all the days in the range through maturity. T represents number of days that the exchange rate stays in the range.

Let’s assume 2 different scenarios will happen at the end of this Double No Touch’s maturity.

Scenario 1: Let’s assume the exchange rate moves like in Table 5.8 and stays 17 days in the range.

Table 5.8: USD/TL Double No Touch Example: 1st Scenario

Day	USD/TL	Day	USD/TL	Day	USD/TL
1	1,5385	11	1,5475	21	1,5275
2	1,5390	12	1,5455	22	1,5255
3	1,5395	13	1,5435	23	1,5235
4	1,5400	14	1,5415	24	1,5215
5	1,5405	15	1,5395	25	1,5195
6	1,5410	16	1,5375	26	1,5175
7	1,5415	17	1,5355	27	1,5155
8	1,5420	18	1,5335	28	1,5135
9	1,5525	19	1,5315	29	1,5115
10	1,5575	20	1,5295	30	1,5095



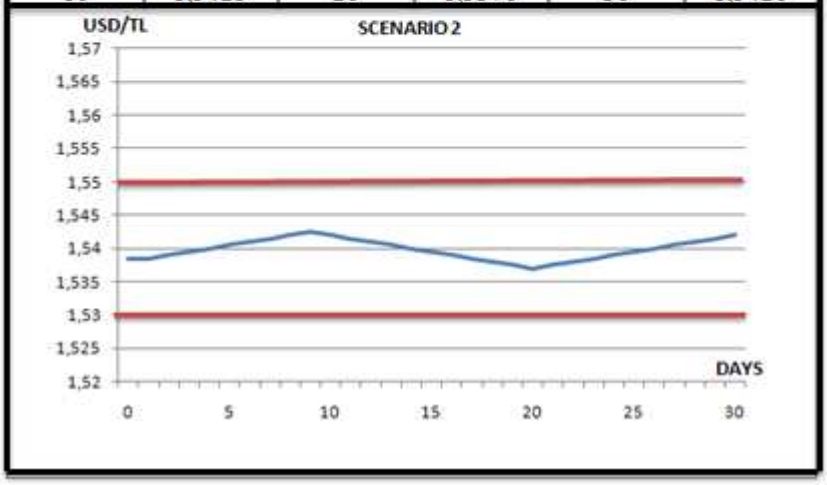
At the end of the maturity investor earns nothing from this Double No Touch transaction, because the exchange rate has moved out from the range within the maturity.

Investor would earn [1.000.000 x 0,02 x 30 /365] = ~ 1.643 USD (gross) if he/she has chosen usual USD time deposit instead of Double No Touch deposit.

Scenario 2: Let's assume the exchange rate moves like in Table 5.9 and stays 30 days (the entire maturity) in the range.

Table 5.9: USD/TL Double No Touch Example: 2nd Scenario

Day	USD/TL	Day	USD/TL	Day	USD/TL
1	1,5385	11	1,5420	21	1,5375
2	1,5385	12	1,5415	22	1,5380
3	1,5390	13	1,5410	23	1,5385
4	1,5395	14	1,5405	24	1,5390
5	1,5400	15	1,5400	25	1,5395
6	1,5405	16	1,5390	26	1,5400
7	1,5410	17	1,5385	27	1,5405
8	1,5415	18	1,5380	28	1,5410
9	1,5420	19	1,5375	29	1,5415
10	1,5425	20	1,5370	30	1,5420



At the end of the maturity investor will earn from this Double No Touch transaction;

[1.000.000 x 0,20 x 30/365] = ~ 16.438 USD (gross)

Investor would earn [1.000.000 x 0,02 x 30 /365] = ~ 1.643 USD (gross) if he/she has chosen usual USD time deposit instead of Double No Touch deposit.

d. Wedding Cake

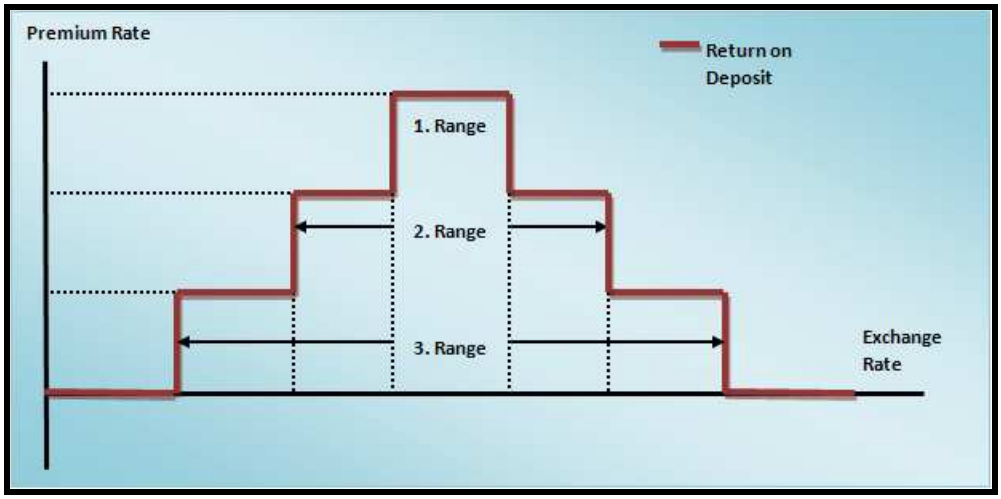
It is a %100 capital protected structured deposit where the investor determines 3 ranges (bands) with 3 upper and lower limits for the

underlying exchange rate for a specific maturity. Payoff graphs of these deposits look like 'wedding cake' (see Figure 5.11) because of their tiered payoff profile, and that's why they are called wedding cake deposits ('RBC Wedding Cake Deposit' 2009). Within the maturity investor of a wedding cake deposit earns different interests (premiums) for the days that the exchange rate stays in different ranges. Investor earns a premium with respect to first range (inner range) when the exchange rate stays in the first range during the maturity. Investors earns a premium with respect to second range (middle range), when the first range is breached through second range, but second range isn't breached through third range during maturity. Investors deserves a premium with respect to third range (outer range), when the second range is breached through third range, but third range isn't breached through outer rates. If third range is breached through outer rates, investor gets only his/her principal without any premium. (A breach occurs when the exchange rate reaches the band level on either side)

At the end of the maturity only one premium rate is applied to the investor's account and this premium will be the premium of widest range that is reached within the maturity by the exchange rate. For example for a 90 days Wedding Cake; if the exchange rate stays 15 days in first, 15 days in second, 15 days in first, 16 days in second, 13 days in third, 14 days in second and 2 days in first respectively, at the end of the maturity the premium that will be applied to the investor's account will be the third range's premium for 90 days period. Although the exchange rate stayed for 32 days in first range, 45 days in second range and 13 days in third range as total, third rage's premium is applied for 90 days because during the maturity third range was the widest range that is reached by the exchange rate.

Figure 5.11 shows payoff graph of a wedding cake deposit. In this figure x axis of the graph represents the market price of the underlying

exchange rate and y axis of the graph represents the premiums that is paid to the investors according to the different ranges.



Source: Turkey Isbank Treasury Department

Figure 5.11: Wedding Cake Payoff Graph

As can be seen from Figure 5.11; as the bands are widening, their premium rate is lowering. First range is the narrowest range with the highest premium rate. Third range is the wider range with the lowest premium rate. At the exchange rates that are out of the 3rd range, premium rate is equal to zero.

Other characteristics of Wedding Cake deposits are the followings;

- This product is also %100 capital protected, because in the worst scenario the outer range is breached by the exchange rate within the maturity and at this time the investor earns no interest but takes his/her principal back at the end of the maturity.

- If DCD and Wedding Cake is compared about their risk levels that are undertaken by their investors; Wedding Cake is a less risky product than DCD because of its capital protection feature. Risk

level of Wedding Cake can be determined according to the investor's risk appetite. If the investor is risk averse the bands will be wider; if the investor risk appetite is higher bands will be narrower

- In Turkey minimum participation limit of Wedding Cake products is higher than DCD, starting from 1.000.000 USD. These deposits are usually structured on TL, USD and EUR deposits for USD/TRY, EUR/TRY, EUR/USD exchange rates with maturities that are differ from three to six month. Premium earned by Wedding Cake product is subject to %10 withholding tax in Turkey.

Operating process of a typical Wedding Cake product can be examined by the following example in Table 5.10 (Numbers on the table do not reflect real market data, they are simulated for this example)

Table 5.10: USD/TL Wedding Cake Example

USD/TL Wedding Cake **Date: 22.03.2010**		
Transaction Amount	1.000.000 USD	
Underlying Exchange Rate	USD/TL	
Spot Price	1,5385	
Determined Ranges	First Range	1,5200 – 1,5500
	Second Range	1,5000 – 1,5700
	Third Range	1,4800 – 1.5900
Maturity	3 months	
Premiums (%)	1,5200 – 1,5500	18,00 (gross)
	1,5000 – 1,5700	7,00 (gross)
	1,4800 – 1.5900	1,00 (gross)

During the transaction Market Deposit Rate for 3 months USD deposit is %2,00 (gross)

Table 5.10 shows a Wedding Cake transaction between an investor and a bank. At 22.03.2010, an investor with 1.000.000 USD participates to a Wedding Cake transaction with the underlying exchange rate of USD/TL and determines 3 ranges for 3 months (90 days). The ranges and premiums given to these ranges are determined as; 1,5200 – 1,5500 (%18,00 gross), 1,5000 – 1,5700 (%7,00 gross), 1,4800 – 1,5900 (%1,00 gross).

At the end of the maturity investor earns;

[Principal x Premium Rate x T / 365]

Where; T represents number of days that the exchange rate stays in the ranges. Premium Rate refers the widest range's premium that is reached within the maturity by the exchange rate.

Let's assume 4 different scenarios will happen at the end of this Wedding Cake's maturity.

Scenario 1: Let's assume the exchange rate moves like in Table 5.11.

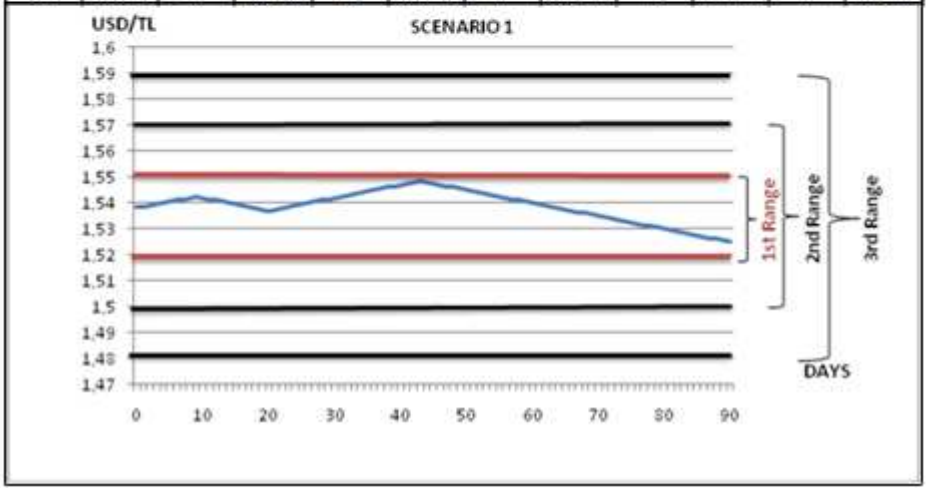
Since widest range that is reached by the exchange rate is 1st range and its premium is %18; at the end of the maturity investor will earn from this Wedding Cake transaction;

[1.000.000 x 0,18 x 90 /365] = ~ 44.383 USD (gross)

Investor would earn [1.000.000 x 0,02 x 90 /365] = ~ 4.931 USD (gross) if he/she has chosen usual USD time deposit instead of Wedding Cake deposit.

Table 5.11: USD/TL Wedding Cake Example: 1st Scenario

Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL
1	1,5385	16	1,5390	31	1,5425	46	1,5470	61	1,5395	76	1,5320
2	1,5390	17	1,5385	32	1,5430	47	1,5465	62	1,5390	77	1,5315
3	1,5395	18	1,5380	33	1,5435	48	1,5460	63	1,5385	78	1,5310
4	1,5400	19	1,5375	34	1,5440	49	1,5455	64	1,5380	79	1,5305
5	1,5405	20	1,5370	35	1,5445	50	1,5450	65	1,5375	80	1,5300
6	1,5410	21	1,5375	36	1,5450	51	1,5445	66	1,5370	81	1,5295
7	1,5415	22	1,5380	37	1,5455	52	1,5440	67	1,5365	82	1,5290
8	1,5420	23	1,5385	38	1,5460	53	1,5435	68	1,5360	83	1,5285
9	1,5425	24	1,5390	39	1,5465	54	1,5430	69	1,5355	84	1,5280
10	1,5420	25	1,5395	40	1,5470	55	1,5425	70	1,5350	85	1,5275
11	1,5415	26	1,5400	41	1,5475	56	1,5420	71	1,5345	86	1,5270
12	1,5410	27	1,5405	42	1,5480	57	1,5415	72	1,5340	87	1,5265
13	1,5405	28	1,5410	43	1,5485	58	1,5410	73	1,5335	88	1,5260
14	1,5400	29	1,5415	44	1,5480	59	1,5405	74	1,5330	89	1,5255
15	1,5395	30	1,5420	45	1,5475	60	1,5400	75	1,5325	90	1,5250



Scenario 2: Let's assume the exchange rate moves like in Table 5.12.

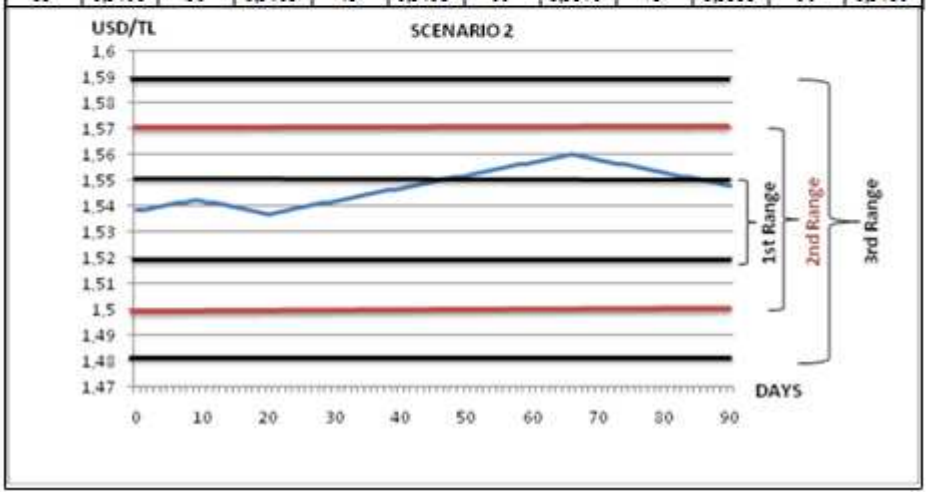
Since widest range that is reached by the exchange rate is 2nd range and its premium is %7; at the end of the maturity investor will earn from this Wedding Cake transaction;

[1.000.000 x 0,07 x 90 /365] = ~ 17.260 USD (gross)

Investor would earn [1.000.000 x 0,02 x 90 /365] = ~ 4.931 USD (gross) if he/she has chosen usual USD time deposit instead of Wedding Cake deposit.

Table 5.12: USD/TL Wedding Cake Example: 2nd Scenario

Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL
1	1,5385	16	1,5395	31	1,5425	46	1,5500	61	1,5575	76	1,5550
2	1,5385	17	1,5390	32	1,5430	47	1,5505	62	1,5580	77	1,5545
3	1,5390	18	1,5385	33	1,5435	48	1,5510	63	1,5585	78	1,5540
4	1,5395	19	1,5380	34	1,5440	49	1,5515	64	1,5590	79	1,5535
5	1,5400	20	1,5375	35	1,5445	50	1,5520	65	1,5595	80	1,5530
6	1,5405	21	1,5370	36	1,5450	51	1,5525	66	1,5600	81	1,5525
7	1,5410	22	1,5375	37	1,5455	52	1,5530	67	1,5595	82	1,5520
8	1,5415	23	1,5380	38	1,5460	53	1,5535	68	1,5590	83	1,5515
9	1,5420	24	1,5385	39	1,5465	54	1,5540	69	1,5585	84	1,5510
10	1,5425	25	1,5390	40	1,5470	55	1,5545	70	1,5580	85	1,5505
11	1,5420	26	1,5395	41	1,5475	56	1,5550	71	1,5575	86	1,5500
12	1,5415	27	1,5400	42	1,5480	57	1,5555	72	1,5570	87	1,5495
13	1,5410	28	1,5405	43	1,5485	58	1,5560	73	1,5565	88	1,5490
14	1,5405	29	1,5410	44	1,5490	59	1,5565	74	1,5560	89	1,5485
15	1,5400	30	1,5415	45	1,5495	60	1,5570	75	1,5555	90	1,5480



Scenario 3: Let's assume the exchange rate moves like in Table 5.13.

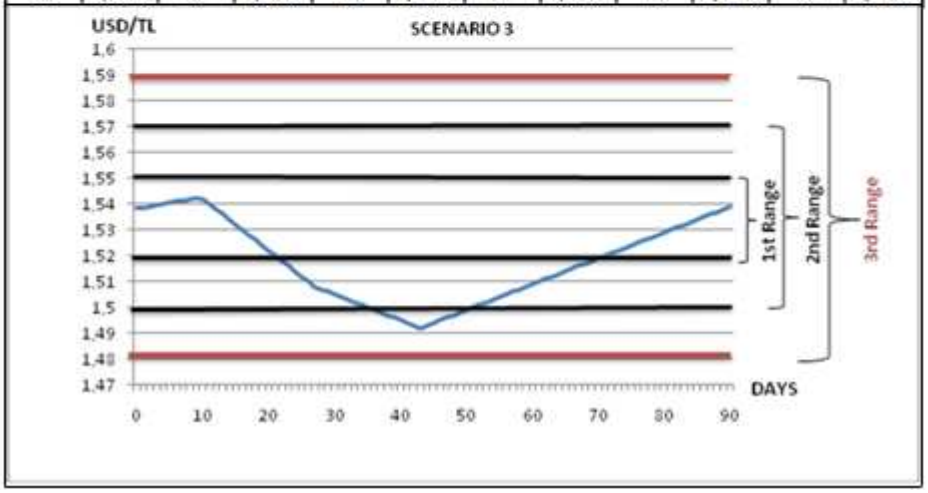
Since widest range that is reached by the exchange rate is 3rd range and its premium is %1; at the end of the maturity investor will earn from this Wedding Cake transaction;

[1.000.000 x 0,01 x 90 /365] = ~ 2.466 USD (gross)

Investor would earn [1.000.000 x 0,02 x 90 /365] = ~ 4.931 USD (gross) if he/she has chosen usual USD time deposit instead of Wedding Cake deposit.

Table 5.13: USD/TL Wedding Cake Example: 3rd Scenario

Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL
1	1,5385	16	1,5320	31	1,5040	46	1,4950	61	1,5100	76	1,5250
2	1,5385	17	1,5300	32	1,5030	47	1,4960	62	1,5110	77	1,5260
3	1,5390	18	1,5280	33	1,5020	48	1,4970	63	1,5120	78	1,5270
4	1,5395	19	1,5260	34	1,5010	49	1,4980	64	1,5130	79	1,5280
5	1,5400	20	1,5240	35	1,5000	50	1,4990	65	1,5140	80	1,5290
6	1,5405	21	1,5220	36	1,4990	51	1,5000	66	1,5150	81	1,5300
7	1,5410	22	1,5200	37	1,4980	52	1,5010	67	1,5160	82	1,5310
8	1,5415	23	1,5180	38	1,4970	53	1,5020	68	1,5170	83	1,5320
9	1,5420	24	1,5160	39	1,4960	54	1,5030	69	1,5180	84	1,5330
10	1,5425	25	1,5140	40	1,4950	55	1,5040	70	1,5190	85	1,5340
11	1,5420	26	1,5120	41	1,4940	56	1,5050	71	1,5200	86	1,5350
12	1,5400	27	1,5100	42	1,4930	57	1,5060	72	1,5210	87	1,5360
13	1,5380	28	1,5080	43	1,4920	58	1,5070	73	1,5220	88	1,5370
14	1,5360	29	1,5070	44	1,4930	59	1,5080	74	1,5230	89	1,5380
15	1,5340	30	1,5060	45	1,4940	60	1,5090	75	1,5240	90	1,5390



Scenario 4: Let's assume the exchange rate moves like in Table 5.14.

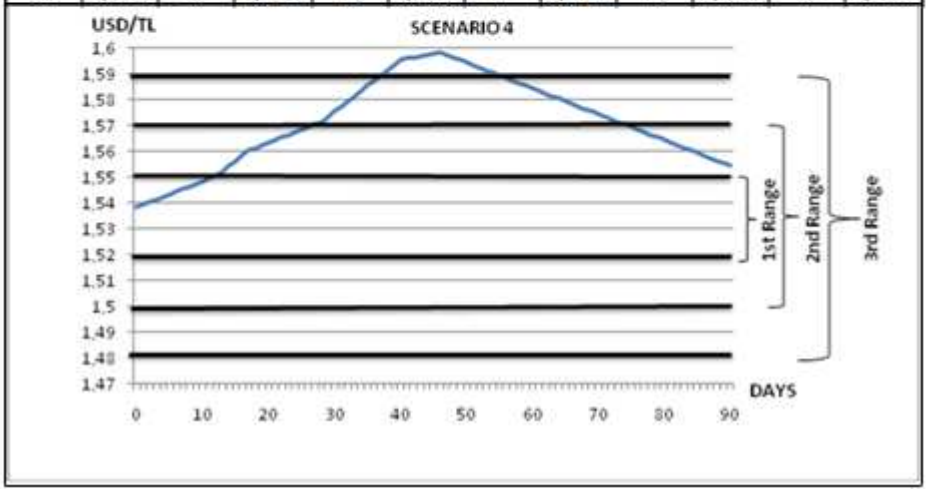
Since the exchange rate breached all the ranges during the maturity, investor couldn't earn any premium. At the end of the maturity investor will earn from this Wedding Cake transaction;

[1.000.000 x 0 x 90 /365] = 0 USD (gross)

Investor would earn [1.000.000 x 0,02 x 90 /365] = ~ 4.931 USD (gross) if he/she has chosen usual USD time deposit instead of Wedding Cake deposit.

Table 5.14: USD/TL Wedding Cake Example: 4th Scenario

Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL	Day	USD/TL
1	1,5385	16	1,5565	31	1,5775	46	1,5985	61	1,5835	76	1,5685
2	1,5395	17	1,5585	32	1,5795	47	1,5975	62	1,5825	77	1,5675
3	1,5405	18	1,5605	33	1,5815	48	1,5965	63	1,5815	78	1,5665
4	1,5415	19	1,5615	34	1,5835	49	1,5955	64	1,5805	79	1,5655
5	1,5425	20	1,5625	35	1,5855	50	1,5945	65	1,5795	80	1,5645
6	1,5435	21	1,5635	36	1,5875	51	1,5935	66	1,5785	81	1,5635
7	1,5445	22	1,5645	37	1,5895	52	1,5925	67	1,5775	82	1,5625
8	1,5455	23	1,5655	38	1,5915	53	1,5915	68	1,5765	83	1,5615
9	1,5465	24	1,5665	39	1,5935	54	1,5905	69	1,5755	84	1,5605
10	1,5475	25	1,5675	40	1,5955	55	1,5895	70	1,5745	85	1,5595
11	1,5485	26	1,5685	41	1,5960	56	1,5885	71	1,5735	86	1,5585
12	1,5495	27	1,5695	42	1,5965	57	1,5875	72	1,5725	87	1,5575
13	1,5505	28	1,5705	43	1,5970	58	1,5865	73	1,5715	88	1,5565
14	1,5525	29	1,5715	44	1,5975	59	1,5855	74	1,5705	89	1,5555
15	1,5545	30	1,5735	45	1,5980	60	1,5845	75	1,5695	90	1,5545



5.2.2.4. Advantages & Disadvantages of Structured Deposits in Turkey

Popularity and use of structured deposits are increasing in Turkey. Despite the market conditions, the advantages of these products are quite important on this development. Structured deposits have advantages such;

- If structured deposits are compared to time deposits; structured deposits can generate higher returns than time deposits according to the performance of the underlying assets.

- If structured deposits are compared with structured funds; they can be bought anytime and they do not have public offerings periods like structured funds.
- Some of the structured deposits (Range Accrual, Double No Touch, Wedding Cake and etc…) enable the investors to access a higher return possibility by protecting their initial investments.
- Structured deposits can be tailored according to the investor's demand and risk appetite. Structured deposits can be available in different maturities, risk levels and underlying instruments subject to investor's needs and demands.
- Unlike structured funds, structured deposits don't have an annual management fee or front end fees.
- Structured deposits provide easy access to different kinds of instruments across the world in an easier and cheaper way.
- Structured deposits provide diversification in the investors' portfolios in an easier and cheaper way. Since structured deposits can have hundreds of underlying instruments like shares, indices, commodities, equities, foreign currencies and etc… they enable the investors to diversify their portfolio.

Although structured deposits have these attractive features and advantages, at the same time they have some disadvantages such as;

- Composition of the structured deposits is more complex than usual time deposits. Different option strategies can be used in order to establish a structured deposit. That's why sometimes composition of a structured deposit can be hard to be understood by the investors.
- Some of the structured deposits like DCD can lead a loss in the investor's principal.
- Structured deposits must be hold till their maturity by their investors in order to earn the return that is subject to these structured deposits.

That can lead a liquidity problem for the investor because some of the structured deposits can have a maturity higher than 1 year.

5.2.2.5. Taxation of Structured Deposits in Turkey

Structured deposits are subject to 2 taxes in Turkey;

- Deposit Part: %15 withholding tax is applied to the deposit part of structured deposits if deposit part generates any return to the investor.
- Option Part: %10 withholding tax will be applied to the option part, if investor obtains a return from option part of the structured deposit at the end of the maturity. However, a tax exemption will occur and no tax is applied to the option part of structured deposit if investor is making a loss from option part of the structured deposit (capital loss exceeds the premium earned from option) at the end of the maturity.

5.2.2.6. Things to Be Considered By the Investors Before Investing In Structured Deposits:

Since structured deposits can have very different compositions and features; an investor should consider the followings before choosing a structured deposit.

- Structured deposits are riskier products than usual time deposits so the investors should determine whether they have the risk appetite for the structured deposit they are choosing.
- Structured deposits are in more complex compositions than usual time deposits so investors should understand the compositions and main features of the structured deposits before investing.
- Return of structured deposits can be obtained by their investors at the end of their maturities. Any full or partial redemption before the final maturity date may adversely affect the value of the investment and result in a substantial loss for the investors when structured

deposits are the issue ('Structured Deposits – Information for Investors' 2009). That's why investors should consider that they can obtain the return which is subject to structured deposits only at the end of the maturity and investors should organize their financial position according to that.

5.3. Conditions Regarding the Development of Retail Structured Products in Turkey

In the previous sections, structured funds (CP/CG Funds) and structured deposits are analyzed within the context of Turkish market. In this section, conditions that are influencing the development of retail structured products in positive and negative manner will be looked in detail.

5.3.1. Conditions Influencing the Development of Retail Structured in Positive Manner

As it is conveyed in the previous sections, structured products have been developing in the Turkish market in the form of structured deposits and funds. Further development of those will be influenced by many parameters. After studying the recent structure of these products in detail; it can be told that the conditions which are probable to influence the development of structured products in positive manner are as follows;

a. Decline in Interest Rates of Time Deposits

A decline in the interest rates of time deposits affects the use of structured products among retail investors in the positive direction.

Table 5.15 shows investment breakdown of Turkish investors in 2009/12.

Table 5.15: Turkish Investors' Investment Breakdown

Investors' Investment Breakdown (Million TL) - 2009/11		
	Volume	**%**
TL Deposits	287.950	48%
TL Demand Deposits	49.387	8%
TL Time Deposits	238.563	39%
FX Deposits	138.833	23%
FX Demand Deposits	30.679	5%
FX Time Deposits	108.154	18%
Participation Bank Funds	25.954	4%
Bonds/Bills	64.804	11%
Eurobonds	5.201	1%
Mutual Funds	31.409	5%
Repo	3.634	1%
Pension Funds	8.796	1%
Common Stocks	38.781	6%
Total Volume	605.362	100%

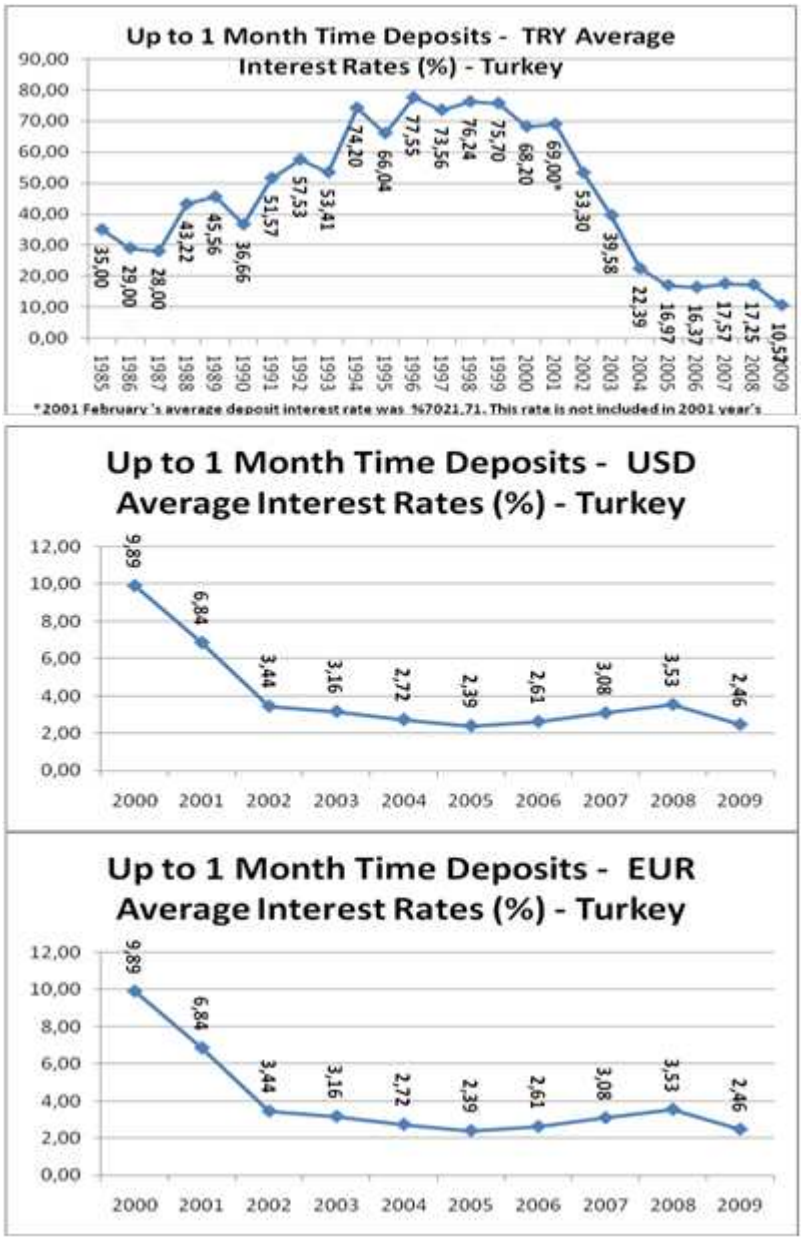
Source: The Association of Capital Market Intermediary Institutions of Turkey

As can be seen from table 5.15; investing in time deposits can be evaluated as the most popular investment among Turkish investors because the share of time deposits in all instruments is %57 (%39 TL, %18 FX). It can be told that; with %57 share of deposit, Turkey has a high share in deposit compared to Europe. For example in Switzerland (a market recognized as one of the most developed in Europe), the deposit share of the retail investors is %33.3 in March 2010 ('SSPA Market report for Structured Products' 2010).

Due to the higher share of time deposits relative to other investments; investing in time deposits can be considered as the benchmarks of Turkish retail investors.

Since investing in time deposit is a benchmark for Turkish retail investors, opportunity cost of these investors is interest rates of mentioned tools. That's why interest rates of TL/USD/EUR time deposits and their past movements should be examined in order to analyze the use of structured products in Turkey.

Figure 5.12 shows the average interest rates of TL/USD/EUR time deposits with a maturity of 1 month at most. In this table, TL rates are dating back at 1985 but USD and EUR rates are dating back at 2000. Average TL interest rates of time deposits belonging to 2001 aren't included in this figure since throughout that year, the increased recorded %7021 in average because of the 2001 financial crisis.



Source: Central Bank of Turkey

Figure 5.12: Up to 1 Month Average TL/USD/EUR Deposit Interest Rates

As can be seen from Figure 5.12; both TL and FX time deposit interest rates started to decline after 2000. Especially in 2002; opportunity cost of investing in alternative products in FX currency reached to a tolerable level for the FX investors. That's why usage structured products in FX currency like USD or EUR Call DCDs increased earlier then usage of those in TL form. Opportunity cost of investing in alternative products in TL was always higher than investing in FX products, but especially in 2005, it decreased to a relatively tolerable level. Because of this reason, usage structured products in FX currency like TL Call DCDs and CP/CG funds started to increase after 2005.

In the future; lower interest rates of TL and FX time deposits will lead to a more demand and interest in structured products and vice versa.

b. Financial Globalization

As the global players of the financial world, Fortis, Unicredit, BNP Paribas, Citibank and ING initiated their operations in Turkey, they also brought their know-how and expertise about structured products at the same time. All of these institutions were already familiar with the marketing and designing of structured products.

Without any doubt, the experience of these institutions in structured products influences the development of structured products in a positive way.

c. Heightened Competition

Since a lot of global players familiar with structured products know-how have entered Turkish market, the competition in Turkish financial system is unprecedentedly more severe than ever which in return forces all pawns in the market to seek to improve their products and discover new

ones in order to survive the competition; on the other hand, it results in an increase in product diversity and recognition of structured products among investors in Turkish market.

To conclude, heightened competition setting effects the development of structured products in a positive manner.

d. Extensive branch network;

Since structured products are complex instruments; they should be introduced to the investors face to face and for this purpose an extensive branch network is needed. At 31.12.2009 according to the data that is taken from The Banks Association of Turkey (TBB); in Turkish Banking system 45 banks are operating in 9.036 branches with 172.403 employees. According to this data it can be told that Turkey has an extensive branch network in banking system.

Turkish extensive branch network with 9.036 influences the development of structured products in positive manner.

In addition to these conditions; also following conditions are influencing the development of structured products in Turkey in positive manner (‘Société Générale: Capital Guaranteed Funds’ 2008);

- Turkish individual investors have confidence in local financial institutions.
- There is an increase in sophisticated needs of investors.
- More amount of time is being started to be spent in the financial planning activities at the corporate and the individual level.

5.3.2. Conditions Influencing the Development of Retail Structured in Negative Manner

In Turkey; although conditions influence the development of structured products positively, there may be others that have a negative impact on the development of structured products as such;

a. Conservative / Risk Averse Investors

The biggest problem facing the development of structured products is perhaps the characteristics, knowledge and risk appetite of Turkish investors. They have become conservative and risk averse investors because of high interest rates and financial instability. Furthermore, their knowledge regarding structured products is not sufficient to invest in them. That's why in comparison with the investors in EU and USA; their characteristics, risk appetite and knowledge do not suit the desirable investor profile necessary for structured products. That can be considered as a situation that has a negative impact upon development of structured products in Turkey.

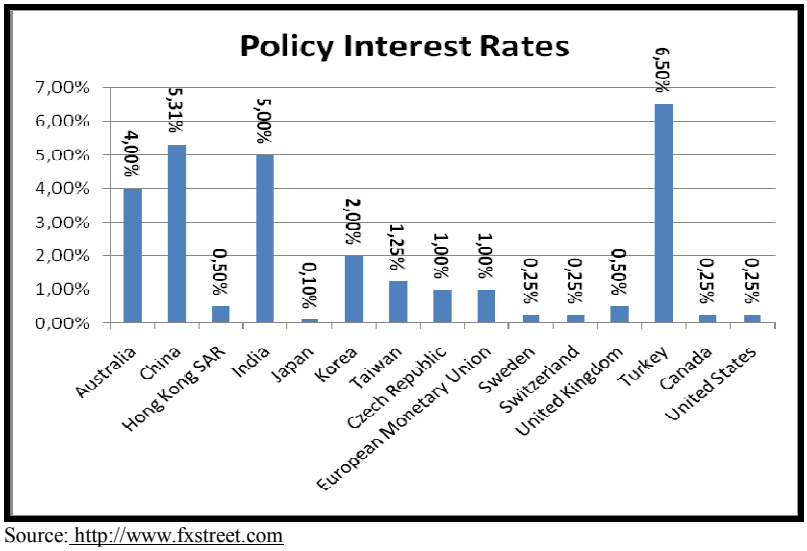
b. Complexity of Products

When the composition, payoff and other features of structured products are compared with traditional investments like bonds and deposits; structured products are more complex products than other products in the market. As explained above; knowledge of Turkish investors is not enough to understand these complex products. That's why complexity of these products influences the development of structured products in negative manner.

c. High Interest Rates Compared To Other Structured Products Market

Although interest rates (O/N, deposit, bond, policy) have been in a decreasing trend since 2004 in Turkey, those rates are still above normal levels compared to other regional markets which are already developed in structured products (Europe, North America and Asia & Pacific). To conclude; it can be told that in Turkey interest rates are still above normal levels.

Since the policy interest rates determined by Central Banks affect other interest rates in the market (O/N, bond, deposit); in Figure 5.13, policy interest rates of Turkey and some important countries in structured products sector are compared. In the figure policy interest rates of March 2010 are used.



Source: http://www.fxstreet.com

Figure 5.13: Policy Interest Rates

As can be seen from the Figure 5.13; most developed countries in structured products (EU countries, Switzerland, UK, USA, Hong Kong) have policy interest rates that are equal to or less then %1 when policy

interest rates at March 2010 are considered. Figure shows; Turkey has a higher policy interest rate (% 6,50) compared to the countries that are developed in structured products.

High interest rates mean high opportunity costs and high opportunity costs means a deterrent effect for the investors against investing in structured products. That's because relatively high level of interest rates in Turkey influences the development of structured products in negative manner.

d. Nonexistence of Organized Markets

In Turkey there is not an exchange market for structured products. In structured deposits; the transactions are occurring between investors and banks on OTC markets. Also there is not an organized market for structured funds; investors participate to these funds within the public offerings periods by applying to the banks.

Nonexistence of organized markets leads some problems for the investors and the banks. These problems are listed below:

- Nonexistence of organized markets leads lack of secondary markets for the structured products. Without secondary markets liquidity problems for structured products arise in Turkey. Illiquidity can be determined as a deterrent effect to the investors for investing in structured products.
- Nonexistence of organized markets leads lack of product diversity for the structured products. In European markets, especially in German structured products market, existence of exchange traded markets leads the product issuers to issue hundreds of new products in each day with different variations, maturities and underlying instruments ('Market Report for Structured Products' 2010). That's

why product diversity is occurred in these markets. Product diversity leads an increase in the investors' attention to structured products. Conversely, lack of product diversity leads a loss of interest to structured products for the investors.

- Nonexistence of organized markets leads lack of pricing transparency for the structured products. Without exchange markets, price of the structured products are determined by the banks. In these markets, investors cannot check whether the product is fairly priced or not. This leads lack of confidence for the investors about the prices of structured products and a loss of interest in these products.
- Nonexistence of organized markets leads lack of performance tracking platform for the structured products. Without exchange markets, performance of structured products cannot be tracked each day. This lack leads a loss of interest in structured products for the investors.

As can be realized from all these reasons, nonexistence of organized markets in Turkey influences the development of structured products in negative manner.

e. Lack of Legal Infrastructure and Legislation

There are deficiencies in the legal infrastructure and legislation of structured products in Turkey because they are quite new instruments for the market. This situation, on the other hand, does have a negative effect on the development of those structured products when both banks and investors are considered.

- From the banks' perspective; to structure these products with deficiencies in legal infrastructure and legislation will be harder in operating process.

- From the investors' perspective; investors will be doubtful to invest in these products because of their deficiencies in legal infrastructure and legislation.

Lack of legal infrastructure and legislation influences the development of structured products in negative manner.

f. Being Without Government Guarantee

In Turkey; investors compare the structured products with the bank deposits or government bonds. Since government bonds are debt instruments that are issued by the government and a portion of bank deposits are under the guarantee of government, being without government guarantee influences the development of structured products in negative manner.

g. Instability of The Turkish Economy;

Turkish economy can still be considered as unstable, because in Turkey, even unimportant social, economic and political events have a significant power of affecting rates and prices in financial system. This situation causes on investors behalf, avoiding of alternative investments such as structured products.

Instability of Turkish Economy influences the development of structured products in negative manner.

e. Other problems;

In addition to the problems mentioned above following problems also influences the development of structured products in negative manner.

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- The banks don’t have educated staff in order to introduce and advertise structured products to the investors.
- The banks don’t have sufficient technical infrastructure for the operating process of structured products. (This is true especially for structured deposits)

6. CONCLUSION

Financial innovation together with the establishment of financial engineering created a suitable environment for the rise of structured products in order to meet different investors' demands. Interest rates have been in a declining trend during the last two decades which stimulated structured products' usage among retail investors. Because these products are tailored through combination of different instruments from various risk levels, they became popular among the retail investors as to differentiate old investment habits and assess better opportunities. Thanks to the increase in retail structured products' diversity in the financial markets, retail investors have been able to find the most suitable structured product, specifically designed to address their own risk appetite.

Structured products in retail market are mostly seen in the form of risk-free traditional instruments accompanied with an option contract. Most of the time, risk-free instruments consist of traditional bonds and deposits. Within the traditional instrument and option components, options determine such critical characteristics of the structured product as its risk level, depending instrument and its price. Since the option component plays a major role in determining structured product's price, differences between the market and theoretical prices can be observed among distinct issuers in the market. That's mostly because the issuers were implying their own option pricing models while determining the value of structured products. This issue became one of the most discussed topics among many academicians. Most of them came to an agreement that issuers are pricing structured products with their own line of interest and this resulted in an undesirable outcome for the investors far from benefiting them. Lack of depth in the secondary markets and issuers' desire for the possible maximum profits supported the idea that structured products are not being fairly priced for retail investors by their issuers.

If the debate about pricing methods of structured products is put aside, portfolio diversification and easy access to different instruments in a less costly, easily accessible way can be count as the most attractive features of structured products for retail investors. When features of structured products are taken into consideration from multiple perspectives, it can be concluded that correlation between investors' risk appetite and product's risk level determine whether structured products can be regarded as either efficient and profitable or dangerous for retail investors. At the same time; accordance between an investor's expectations concerning market structure and the main target of a structured product also determines whether this product is right for this investor.

Market reviews concerning different regions show that European market is dominating world's retail structured product market in both number of products issued and volume of products sold. In this region, most of the structured products are issued as a form of tranche (products which are available for investment just for a pre-determined period of time), having a maturity of less than 2 years and having equities as underlying assets (indices and shares in the single or basket form). Within European zone, Germany and Switzerland are the most influential and dominating players of structured products market in terms of products diversity because these countries benefit from having exchange markets by offering a wide range of creative products to retail investors. On the other hand, rest of the regions' market shares remains very small in both number of products issued and volume of products sold relative to European markets. To conclude; European structured products markets are the most organized of all others. European markets are recognized as constituting the most dominant position among other regional zones not only because of their systematic structure but also because of European investors' risk profiles and investment angles.

The presence and spread of structured products in Turkey can be considered a milestone, especially in the minds of traditional Turkish investors. Although retail structured products were put on the market in Europe by 1990s, these kinds of financial tools became to be used among financial institutions in Turkey in early 2000s. The leading reason of this delay was the high interest rates and conservative & risk averse profiles of Turkish retail investors.

As the interest rates have decreased to a moderate level in Turkey, opportunity cost of investing in substitute products decreased as well. That's why Turkish investors began to look for other investment alternatives, and banks responded to deal with interest pinch by offering structured products as alternative products.

Firstly; structured deposits including DCD, Range Accrual, Double No Touch and Wedding Cake appeared in the market. Because of their minimum participation limits, these products were mostly designed to meet private banking customers' expectations. At the moment, usually, affluent and high net worth customers are interested in these products since their minimum participation limits start from 100.000 $. However, some of the banks began to offer these products by pooling method (selling the same product to many investors and combining their principals) in order to reduce minimum participation limits. DCD became the most popular one among other structured deposits. By participating in DCD products, investors undertake exchange rate risks to enhance their returns. Since banks offer DCD premiums in form of interest payments, this product attracts investors who are not satisfied with current low interest rates of time deposits and are willing to take risks to achieve higher returns.

Another type of structured product that is offered to retail investors by banks is structured funds. They are known as capital protected/guaranteed funds which have been offered by the banks since 2007. They constitute a

moderate risk compared with structured deposits since these funds provide partial or full capital protection to their investors in return for a predetermined amount of participation in their underlying assets' performances. Because of their low participating limits (about 1000 TL), products ensure easier access to the underlying assets compared to structured deposits. Unlike structured deposits, they don't have short-term maturities, their maturities are ranging from 6 months to 2 years. This feature can be regarded as the least attractive for Turkish investors because Turkish investors are normally not used to invest in maturities more than 3 months and refrain from making long-term moves.

In the study an analysis about 66 structured funds that were offered between 2008 and 2010 March is made and this analysis shows such results about structured funds; 1 year is the optimal maturity for both issuers and investors, IMKB30 and USD/TL are the most favorite underlying assets, issuers mostly choose bullish option strategies when structuring these funds, volume of structured funds increased %2272 in 2 years and most of these funds didn't generate a 'desirable' return to their investors at the end of their maturities.

When both structured funds and deposits are looked in detail, it can be considered that; these products are alternative investments for retail investors. However, before investing in them, investors should be aware of all the features of these products such as their maturities, payoff profiles, underlying assets and risk levels. If the risk levels and targets of products correspond with the risk appetites of investors and investors' market expectations, then these products would be profitable. However, before assessing structured deposits (especially DCD), investors should perceive the reality of a possible loss from their principal amount of capital due to exchange rate risk they are exposed to. Participation ratio and long maturities should also be taken into account when investing in structured funds so that investors' discontent can be avoided.

Turkish structured products market is believed to be a new market compared to other regional markets, specifically the European market. Plenty of parameters will affect the development and course of these products, one of which is the level of interest rates above all. Since Turkish investors think interest rates of fixed income securities as the benchmark level, higher interest rates will prohibit the investors from investing in structured products. On the contrary; lower interest rates will encourage investors to invest in structured products. If the level of interest rates is left aside; lack of organized structured products markets, conservative profile of Turkish investors and deficiency in educated staff in financial institutions are going to be the most significant burdens concerning the future development of structured products in Turkey. On the other hand, existence of global financial players in Turkish market with their know-how of structured products, increasing competition among banks and financial globalization will support the development of structured products in Turkish market in the near future.

Unless a huge increase takes place in interest rates as a consequence of any financial instability or an economic crisis, it seems that use of retail structured products in Turkey will continue to increase in the near future. Since these kinds of alternative products will continue to attract retail investors, financial institutions will introduce new type of structured products to the market in an attempt to compete with each other. In the wake of these developments, volumes of products sold and numbers of products issued will increase in Turkey. But that does not necessarily mean Turkey will be able to compete with European counterparts immediately due to legal deficiencies, technical and human resource infrastructure of Turkish financial system. So as to overcome these setbacks; first of all an exchange secondary market for structured products should be established and at this time, interest rates should be at a level that can cope up with the European

market. So-called plans can be accomplished only if backed by structural reforms but it is not likely to realize in the near future.

Turkey have already decided to go along with retail structured products in addition to its traditional investment tools. If the financial conjuncture remains favorable and financial infrastructure does not deteriorate further, the future of these ‘tailor-made’, ‘innovative’ and ‘unique’ products will be determined by either investors or issuers.

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APPENDIX A: MOST COMMON TYPES OF EXOTIC OPTIONS

In this part; main features and characteristics of most common types of exotic options that are used in most of the structured products are defined shortly.

1. Asian Options

These options are also known as ‘average options’ in the market. Their payoff depends on the underlying asset’s average performance during a certain period. Since they are firstly introduced in Japan, they are known as ‘asian’ options. Main benefits of these options can be considered as being cheaper than standard options and being less risky (less volatile) then underlying asset. Main disadvantage of these options is when there is a major increase in underlying asset’s price which can lead a large profit making situation for a call option, these options’ payoff is less then call options in these kind of situations.

Asian options can be divided into several categories according to following terms;

- Option type: Asian options can be found as asian call or asian put options.
- Averaging type: In an asian option entire time until the maturity or parts of it can be counted for averaging. Also the prices can be taken in different periods like at the end of weeks or months.
- Measuring type: Averaging method of an asian option can be arithmetic, geometric or weighted.

2. Compound Options

In these kinds of options the underlying asset of the option is another option, in other words; they can be defined as options on options. They are found mostly in 4 types; call on call, put on put, call on put and put on call options. Main advantage of these options can be considered as providing larger leverage then standard options. Their main disadvantage is if 2 options get exercised then the premium paid for a compound option will be more expensive than a standard option.

3. Binary Options

They are also known as all-or-nothing, bet or digital options. Basically there are 2 types of binary options;

a. Cash-or-nothing options: They can be found in call or put forms. A cash-or-nothing call option will pay a fixed amount of cash if the price at the maturity exceeds the strike price, otherwise it pays zero. Also a cash-or-nothing put option will pay a fixed amount of cash if the price at the maturity is less than the strike price, otherwise it pays zero.

b. Asset-or-nothing options: They are so similar with cash-or-nothing options. The main difference between them is; in asset-or-nothing options, the option holder receives the assets instead of cash. If the underlying asset's price is greater than the exercise price at the maturity, then the holder of asset-or-nothing call option will receive a fixed amount of asset, otherwise holder gets nothing. Also if the underlying asset's price is less than the exercise price at the maturity, then the holder of asset-or-nothing put option will receive a fixed amount of asset, otherwise the holder gets nothing.

4. Barrier Options

These options can be defined as 'path depended' options since their payoff depended on not only underlying's price but also some pre-determined levels (called barriers). Their payoff depends on whether these barriers are breached or not. There are 2 main types of barrier options:

a. **Knock-in options:** These options will only come to life (activate) if the underlying asset's price touches the predetermined barrier. After 'knocked-in' in other words touching the barrier, payoff of knock-in option is calculated like a standard option. According to the direction of the breaching barrier they can be divided into 2 as up-and-in (if the option activates when barrier is breached by price increase) and down-and-in options (if the option activates when barrier is breached by price decrease).

b. **Knock-out options:** These options will be active till a predetermined barrier and will become void if the underlying asset's price touches this barrier. Till 'knocked-out' in other words touching the barrier, payoff of knock-out option is calculated like a standard option. According to the direction of the breaching barrier they can be divided into 2 as up-and-out (if the option becomes void when barrier is breached by price increase) and down-and-out options (if the option becomes void when barrier is breached by price decrease)

Barrier options can be considered as a cheaper option than standard options if the strike price, maturity and underlying asset are the same for 2 different options.

5. Best of Options

In these types of options, there is more than one underlying asset and there are predetermined observation periods which these underlying assets'

performances are observed. At the end of maturity best performances in the observation periods are determined and their average is paid to the investors. In this manner it can be told that they are type of asian options. Their main advantage is providing participation to the best performed asset and main disadvantage is if all underlying assets perform equal, these options can provide participation to only one of them. That's why they are less costly for the investors then buying standard options for all the underlying assets of best-of-options. Best-of-options with the underlying assets that are negatively correlated are more expensive than the ones with positively correlated.

6. Basket Options

These options have all characteristics of standard options. Only difference between basket options and standard options is; standard options have a single asset as underlying when basket option have a group of assets as underlying. Composition of these asset groups can be done as tailor made according to the investor or a basket option can be linked to an index or a fund directly. For the investors; buying a basket option is less costly than buying standard options of each underlying asset of that basket option.

7. Chooser Options

These options are also known as 'as you like it' options and they can be classified as a type of compound options. These options give their holders the right to choose whether the option is a call or a put, at a specific time during their maturity. In other words; these options have a 'chooser' day in which the holder of the option choose the underlying standard option is a buy or call option at the maturity. They are cheaper then straddle strategy (buying call and put options at same strike) but more expensive than buying a single call or put option because in these options the holder has a right to

choose. They are suitable for the investors who don't have a directional view (up or down) about the underlying asset's prices.

8. Lookback Options

In lookback options, total payoff depends on not only the final price of the underlying asset but also the minimum and maximum prices during the option's maturity. If it is a call option, the payoff will be equal to the difference between the final price of the underlying asset and minimum price that is reached by the underlying asset during the maturity. If it is a put option, the payoff will be equal to the difference between maximum price that is reached by the underlying asset during the maturity and the final price of the underlying asset.

These options is more favorable then regular American options since the owner of lookback options doesn't have to worry about exercising the option at the right time. The investor can look back over option's maturity and find the most advantageous point to exercise the option. Because of this feature lookback options are more expensive than standard American options.

9. Shout Options

Holder of a shout option can lock in profits if he/she thinks the market has reached the highest (for a call) or lowest (for a put) level. The holder can 'shouts' for once and after he/she shouts, he/she can benefit further for the option if final price of the underlying asset finishes at a higher (for a call) or lower (for a put) level.

Because of this 'shout' feature they can be classified as a type of lookback options. Shout options are less expensive then lookback options but more expensive than standard options. They are favorable for the

investors who want to lock in a minimum return in volatile markets. A shout option can be structured with more than one shout features; however, more shout feature will lead a more expensive option type for the investor.

10. Range Options

These options can be classified as a combination of barrier and binary options. They are not a call or a put option but they give their holders a specific payoff if the underlying asset's price remains within a pre-determined price range. Some type of range options pay their holders a certain amount for each day the underlying asset's price stays between the price ranges, some of them becomes void when the underlying asset's price touches upper or lower boundary within the option's maturity.

Range options are suitable for the investors who believe the underlying asset's price will remain between certain price ranges. Also holder of these options knows their risk at the beginning of the issuance. The risk is equal to the premium paid to this option by the investor.

11. Ladder Options

These options are also known as Lock-in options. In these options, the strike price is periodically reset when the underlying asset reaches pre-determined trigger levels (rungs) and at the same time locking in the profit between old and new strike. Ladder options are found in the types of put and call options in the market.

A ladder call option is structured with the rungs defined above the strike and at the maturity pays out the difference between the highest rung reached during the maturity and strike. A ladder put option is structured with the rungs defined below the strike and at the maturity pays out the

difference between the strike and the lowest rung reached during the maturity.

12. Forward Start Options

These option types are not purchased on the spot, but they have a future purchase date (forward start date). However, just like all other options, their premiums are paid at the beginning of the option contract, not when the forward start date arrives. They can be a forward purchase of a standard call or put option. Their strike price is determined on the forward start date. This strike is determined as the spot value of the underlying asset on the forward start date in most of the Forward Start Options.

Forward Start Options are often combined in a serious into Cliquet (Ratchet) Options.

13. Cliquet Options

These options are also known as Ratchet or Reset Options and they can be defined as a series of Forward Start Options. First option of a Cliquet Option is active immediately with a given strike price. Second option becomes active at the maturity date of the first option and new strike is set to the market value of the underlying asset on that day.

The process continues like this for each option added to a Cliquet Option. Premium for all the options are paid at once in the beginning of the entire Cliquet Options.

APPENDIX B: STRUCTURED RETAIL PRODUCTS IN REGIONAL MARKETS

In this section all the data that are used in the following pages are obtained from Arete Consulting Ltd.'s through their web-site www.structuredretailproducts.com.

Product types in the tables are divided into 3 parts as;

- **Growth Products:** products that produces all their return at maturity without any payment during the product term.
- **Income Products:** products that provides a periodic payment.
- **Growth and Income Products:** in these kinds of products a portion of the capital is invested to a fixed rate instrument, usually a deposit paying a higher than market rate of interest. The rest of the capital is invested to a growth product.

Product styles in the tables are divided into 2 parts as;

- **Continuous Products:** They are also called open-ended products. They don't have a fixed maturity date. They accept investments for an unlimited period.
- **Tranche Products:** Products those are available for investment during a limited period only. This period which is usually around 4 to 8 weeks, is called the offer period and during this period the product is available for investment.

Volume of products sold is in millions of Euros (EURm) for European Market and millions of American Dollars (USDm) for the rest of the regions.

Table B.1: Retail Structured Products in Europe since 1995

Total number of tranche products	964.634	Total sales of tranche products (EURm)	1.333.495
Total number of outstanding tranche products	265.255	Total sales of outstanding tranche products (EURm)	718.792
Total number of continuous products	362904	Total sales of continuous products (EURm)	126333
Total number of outstanding continuous products	35408	Total sales of outstanding continuous products (EURm)	54092
Total number of outstanding products	300.663	Total sales of outstanding products (EURm)	772.884

Source: www.structuredretailproducts.com

Table B.2: Tranche Products Issues and Volumes in European Market between 2006 and 2010

Type	**2006**	**2007**	**2008**	**2009**	**2010**
Growth	82.904	168.31	291.261	268.648	73.077
Income	4.747	4.340	2.624	2.961	859
Growth and Income	793	1.171	984	478	116
Total Issues	**88.444**	**173.821**	**294.869**	**272.087**	**74.052**
Growth (EURm)	130.341	163.204	112.038	83.875	24.336
Income (EURm)	38.289	48.971	62.482	71.489	17.722
Growth and Income (EURm)	17.068	22.498	18.390	12.116	2.395
Total Volumes (EURm)	**185.699**	**234.673**	**192.910**	**167.480**	**44.454**

Source: www.structuredretailproducts.com

Table B.3: Outstanding Products Issues and Volumes at Year Ends in European Market between 2006 and 2010

	Year End 2006	**Year End 2007**	**Year End 2008**	**Year End 2009**	**As at 10 Mar 2010**
Total outstanding number of Tranche products	90.575	177.484	217.574	217.755	265.956
Total outstanding number of Continuous products	9.718	24.861	45.107	26.173	35.899
Total outstanding number of products	100.293	202.345	262.681	243.928	301.855
Total outstanding volume of sales for Tranche products (EURm)	58.470	91.752	112.577	121.242	127.502
Total outstanding volume of sales for Continuous products (EURm)	193.204	204.643	205.259	205.259	205.259
Total outstanding volume of sales (EURm)	251.675	296.394	317.837	326.501	332.761

Source: www.structuredretailproducts.com

Table B.4: Retail Structured Products in North America since 1995

Total number of tranche products	28.337	Total sales of tranche products (USDm)	225.269
Total number of outstanding tranche products	12.852	Total sales of outstanding tranche products (USDm)	127.502
Total number of continuous products	142	Total sales of continuous products (USDm)	205.259
Total number of outstanding continuous products	142	Total sales of outstanding continuous products (USDm)	205.259
Total number of outstanding products	12.994	Total sales of outstanding products (USDm)	332.761

Source: www.structuredretailproducts.com

Table B.5: Tranche Products Issues and Volumes in North American Market between 2006 and 2010

Type	2006	2007	2008	2009	2010
Growth	1.573	3.023	3.568	3.441	824
Income	1.104	3.954	4.258	3.187	1.133
Growth and Income	141	213	237	125	60
Total Issues	**2.818**	**7.190**	**8.063**	**6.753**	**2.017**
Growth (USDm)	21.332	33.756	37.269	27.132	8.107
Income (USDm)	5.173	9.832	10.074	13.757	5.066
Growth and Income (USDm)	4.972	6.023	4.828	1.783	991
Total Volumes (USDm)	**31.478**	**49.611**	**52.171**	**42.671**	**14.164**

Source: www.structuredretailproducts.com

Table B.6: Outstanding Products Issues and Volumes at Year Ends in North American Market between 2006 and 2010

	Year End 2006	Year End 2007	Year End 2008	Year End 2009	As at 10 Mar 2010
Total outstanding number of Tranche products	3.721	8.196	9.867	11.878	12.852
Total outstanding number of Continuous products	122	137	141	142	142
Total outstanding number of products	3.843	8.333	10.008	12.020	12.994
Total outstanding volume of sales for Tranche products (USDm)	58.470	91.752	112.577	121.242	127.502
Total outstanding volume of sales for Continuous products (USDm)	193.204	204.643	205.259	205.259	205.259
Total outstanding volume of sales (USDm)	251.675	296.394	317.837	326.501	332.761

Source: www.structuredretailproducts.com

Table B.7: Retail Structured Products in Asia & Pacific since 1995

Total number of tranche products	23.074	Total sales of tranche products (USDm)	497.705
Total number of outstanding tranche products	10.365	Total sales of outstanding tranche products (USDm)	222.551
Total number of continuous products	255	Total sales of continuous products (USDm)	6.826
Total number of outstanding continuous products	119	Total sales of outstanding continuous products (USDm)	4.323
Total number of outstanding products	10.484	Total sales of outstanding products (USDm)	226.874

Source: www.structuredretailproducts.com

Table B.8: Tranche Products Issues and Volumes in Asia & Pacific Market between 2006 and 2010

Type	2006	2007	2008	2009	2010
Growth	1.647	2.560	4.785	4.931	1.249
Income	576	1.199	1.219	764	214
Growth and Income	160	271	457	158	38
Total Issues	2.383	4.030	6.461	5.853	1.501
Growth (USDm)	28.223	47.767	68.642	45.817	11.830
Income (USDm)	29.029	45.109	38.648	24.030	8.505
Growth and Income (USDm)	10.276	20.362	17.733	8.318	1.081
Total Volumes (USDm)	**67.529**	**113.238**	**125.023**	**78.165**	**21.416**

Source: www.structuredretailproducts.com

Table B.9: Outstanding Products Issues and Volumes at Year Ends in Asia & Pacific Market between 2006 and 2010

	Year End 2006	Year End 2007	Year End 2008	Year End 2009	As at 10 Mar 2010
Total outstanding number of Tranche products	3.876	6.598	9.456	9.875	10.365
Total outstanding number of Continuous products	160	86	105	117	119
Total outstanding number of products	4.036	6.684	9.561	9.992	10.484
Total outstanding volume of sales for Tranche products (USDm)	121.221	190.263	234.043	222.226	222.551
Total outstanding volume of sales for Continuous products (USDm)	4.296	3.272	4.017	4.297	4.323
Total outstanding volume of sales (USDm)	125.516	193.535	238.060	226.523	226.874

Source: www.structuredretailproducts.com

Table B.10: Retail Structured Products in Latin America since 1995

Total number of tranche products	1.510	Total sales of tranche products (USDm)	20.212
Total number of outstanding tranche products	188	Total sales of outstanding tranche products (USDm)	3.711
Total number of continuous products	6	Total sales of continuous products (USDm)	166
Total number of outstanding continuous products	6	Total sales of outstanding continuous products (USDm)	166
Total number of outstanding products	194	Total sales of outstanding products (USDm)	3.877

Source: www.structuredretailproducts.com

Table B.11: Tranche Products Issues and Volumes in Latin American Market between 2006 and 2010

	2006	**2007**	**2008**	**2009**	**2010**
Growth	23	59	467	641	102
Income	4	22	120	59	3
Growth and Income	0	1	2	0	0
Total Issues	27	82	589	700	105
Growth (USDm)	350	1.035	7.413	7.558	334
Income (USDm)	104	481	2.282	447	8
Growth and Income (USDm)	0	20	11	0	0
Total Volumes (USDm)	**454**	**1.535**	**9.707**	**8.006**	**342**

Source: www.structuredretailproducts.com

Table B.12: Outstanding Products Issues and Volumes at Year Ends in Latin American Market between 2006 and 2010

	Year End 2006	**Year End 2007**	**Year End 2008**	**Year End 2009**	**As at 10 Mar 2010**
Total outstanding number of Tranche products	31	106	277	169	188
Total outstanding number of Continuous products	1	1	5	6	6
Total outstanding number of products	32	107	282	175	194
Total outstanding volume of sales for Tranche products (USDm)	621	2.081	6.970	3.987	3.711
Total outstanding volume of sales for Continuous products (USDm)	9	9	160	166	166
Total outstanding volume of sales (USDm)	631	2.090	7.129	4.153	3.877

Source: www.structuredretailproducts.com

APPENDIX C: SSPA SWISS DERIVATIVE MAP®[6]

CATEGORIZATION MODEL

CAPITAL PROTECTED PRODUCTS
Uncapped Capital Protection
Exchangeable Certificates
Capped Capital Protection
Capital Protection with Knock-Out
Capital Protection with Coupon

YIELD ENHANCEMENT PRODUCTS
Discount Certificates
Barrier Discount Certificates
Reverse Convertibles
Barrier Reverse Convertibles
Capped Outperformance Certificates
Capped Bonus Certificates
Express Certificates

PARTICIPATION PRODUCTS
Tracker Certificates
Outperformance Certificates
Bonus Certificates
Outperformance Bonus Certificates
Twin-Win Certificates

LEVERAGE PRODUCTS
Warrants
Knock-Out Warrants
Mini-Futures

[6] Swiss Structured Products Association (SSPA)'s structured products categorization model that is based on the model of European Structured Investment Products Association (EUSIPA). Main types of products are presented with their characteristics in this map. (http://www.svsp-verband.ch/download/downloads/92_SVSP_Map_Poster_EN_2009-11-03_WEB.pdf)

Table C.1: Capital Protected Products

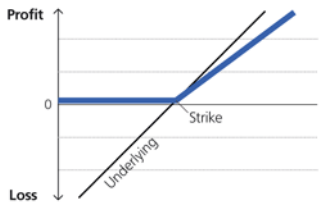
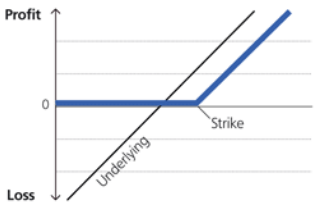
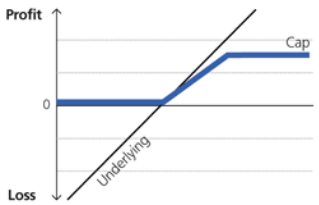
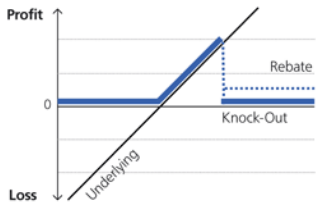
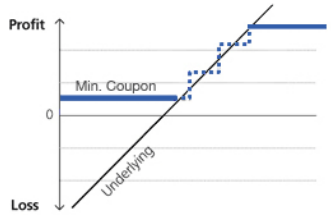
CAPITAL PROTECTED PRODUCTS				
Uncapped Capital Protection	***Exchangeable Certificates***	***Capped Capital Protection***	***Capital Protection with Knock-Out***	***Capital Protection with Coupon***
				
Market Expectation • Rising underlying • Rising volatility • Sharply falling underlying possible	**Market Expectation** • Sharply rising underlying • Rising volatility • Sharply falling underlying possible	**Market Expectation** • Rising underlying • Sharply falling underlying possible	**Market Expectation** • Rising underlying • Sharply falling underlying possible	**Market Expectation** • Rising underlying • Sharply falling underlying possible
Characteristics • Rising underlying • Rising volatility • Sharply falling underlying possible • Minimum redemption at expiry equivalent to the capital protection • Capital protection is defined as a percentage of the nominal (e.g. 100%) • Capital protection refers to the nominal only, and not to the purchase price • Value of the product may fall below its capital protection during the lifetime • Unlimited participation in a positive performance of the underlying Any payouts attributable to the underlying are used in favour of the strategy	**Characteristics** • Minimum redemption at expiry equivalent to the capital protection • Capital protection is defined as a percentage of the nominal (e.g. 100%) • Capital protection refers to the nominal only, and not to the purchase price • Value of the product may fall below its capital protection during the lifetime • Unlimited participation in a positive performance of the underlying above the Strike (Conversion Price) • Coupon payment possible • Any payouts attributable to the underlying are used in favour of the strategy	**Characteristics** • Minimum redemption at expiry equivalent to the capital protection • Capital protection is defined as a percentage of the nominal (e.g. 100%) • Capital protection refers to the nominal only, and not to the purchase price • Value of the product may fall below its capital protection during the lifetime • Participation in a positive performance of the underlying up to the Cap • Any payouts attributable to the underlying are used in favour of the strategy • Limited profit potential (Cap)	**Characteristics** • Minimum redemption at expiry equivalent to the capital protection • Capital protection is defined as a percentage of the nominal (e.g. 100%) • Capital protection refers to the nominal only, and not to the purchase price • Value of the product may fall below its capital protection during the lifetime • Participation in a positive performance of the underlying until Knock-Out • Possible payment of a Rebate following a Knock-Out • Any payouts attributable to the underlying are used in favour of the strategy • Limited profit potential	**Characteristics** • Minimum redemption at expiry equivalent to the capital protection • Capital protection is defined as a percentage of the nominal (e.g. 100%) • Capital protection refers to the nominal only, and not to the purchase price • Value of the product may fall below its capital protection during the lifetime • The coupon amount is dependent on the development of the underlying • Any payouts attributable to the underlying are used in favour of the strategy • Limited profit potential

Table C.2: Yield Enhancement Products – 1

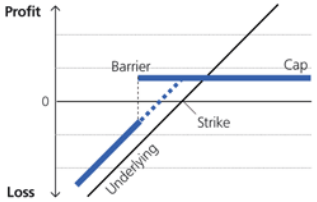
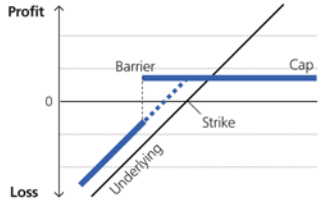
YIELD ENHANCEMENT PRODUCTS - 1			
Discount Certificates	***Barrier Discount Certificates***	***Reverse Convertibles***	***Barrier Reverse Convertibles***
			
Market Expectation • Underlying moving sideways or slightly rising • Falling volatility	**Market Expectation** • Underlying moving sideways or slightly rising, • Falling volatility • Underlying will not breach Barrier during product lifetime	**Market Expectation** • Underlying moving sideways or slightly rising • Falling volatility	**Market Expectation** • Underlying moving sideways or slightly rising, • Falling volatility • Underlying will not breach Barrier during product lifetime
Characteristics • Should the underlying close below the Strike at expiry, the underlying and/or a cash amount is redeemed • Discount Certificates enable investors to acquire the underlying at a lower price • Corresponds to a buy-write-strategy • Reduced loss potential compared to a direct investment • Larger discounts can be achieved at a greater risk if the product is based on multiple underlyings (multi-asset) • Any payouts attributable to the underlying are used in favour of the strategy • Limited profit potential (Cap)	**Characteristics** • The maximum redemption amount (Cap) is payed out if the Barrier is never breached • Barrier Discount Certificates enable investors to acquire the underlying at a lower price • A Barrier Discount Certificate turns into a Discount Certificate after breaching the Barrier • The probability of a maximum redemption is larger due to the conditional capital protection, the discount achieved however is smaller • Reduced loss potential compared to a direct investment • Larger discounts or lower barriers can be achieved at a greater risk if the product is based on multiple underlyings (multi-asset) • Any payouts attributable to the underlying are used in favour of the strategy • Limited profit potential (Cap)	**Characteristics** • Should the underlying close below the Strike at expiry, the underlying and/or a cash amount is redeemed • Should the underlying close above the Strike at expiry, the nominal plus the coupon is paid at redemption • The coupon is always paid, irrespective of the development of the underlying • Reduced loss potential compared to a direct investment • Larger coupons can be achieved at a greater risk if the product is based on multiple underlyings (multi-asset) • Any payouts attributable to the underlying are used in favour of the strategy. Limited profit potential (Cap)	**Characteristics** • Should the Barrier never be breached, the nominal plus coupon is paid at redemption • A Barrier Reverse Convertible turns into a Reverse Convertible after breaching the barrier • The probability of a maximum redemption is larger due to the conditional capital protection, the coupon achieved however is smaller • The coupon is always paid, irrespective of the development of the underlying • Reduced loss potential compared to a direct investment • Larger coupon payments or lower barriers can be achieved at a greater risk if the product is based on multiple underlyings (multi-asset) • Any payouts attributable to the underlying are used in favour of the strategy • Limited profit potential (Cap

Table C.2(cont.): Yield Enhancement Products – 2

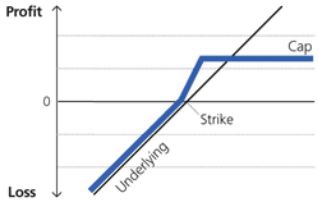
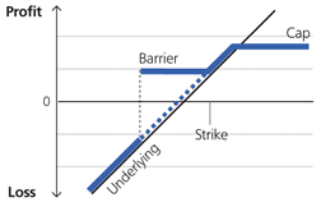
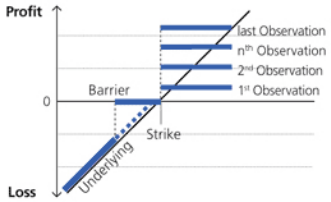
YIELD ENHANCEMENT PRODUCTS - 2		
Capped Outperformance Certificates	***Capped Bonus Certificates***	***Express Certificates***
		
Market Expectation • Rising underlying	**Market Expectation** • Underlying moving sideways or slightly rising • Underlying will not breach Barrier during product lifetime	**Market Expectation** • Underlying moving sideways or slightly rising • Underlying will not breach Barrier during product lifetime
Characteristics • Reflects underlying price moves 1:1 when below the Strike • Disproportional participation (Outperformance) in a positive performance of the underlying up to the Cap • Risk comparable to a direct investment • Any payouts attributable to the underlying are used in favour of the strategy • Limited profit potential (Cap)	**Characteristics** • Minimum redemption is equal to the Strike if the Barrier is never breached • Lower risk than a direct investment due to the conditional capital protection • Larger Bonus payments or lower barriers can be achieved at a greater risk if the product is based on multiple underlyings (multi-asset) • Any payouts attributable to the underlying are used in favour of the strategy	**Characteristics** • Should the underlying trade above the Strike on the observation date, an early redemption consisting of nominal plus an additional coupon amount is paid • Offers the possibility of an early redemption combined with an attractive yield opportunity • Lower risk than a direct investment due to the conditional capital protection • Larger coupon payments or lower barriers can be achieved at a greater risk if the product is based on multiple underlyings (multi-asset) • Any payouts attributable to the underlying are used in favour of the strategy • Limited profit potential

Table C.3: Participation Products

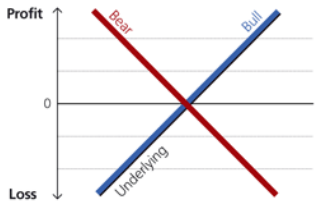
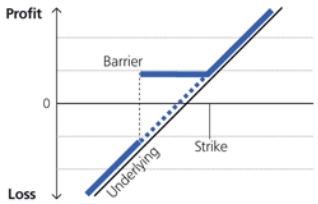
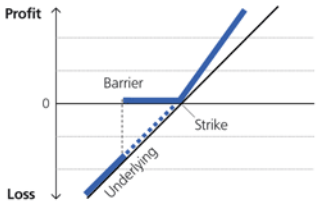
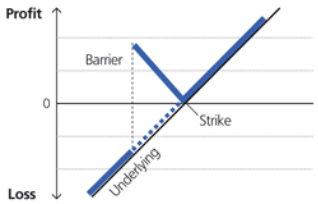
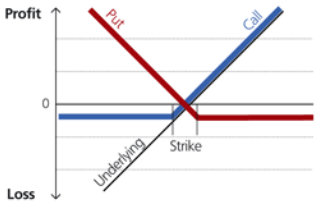
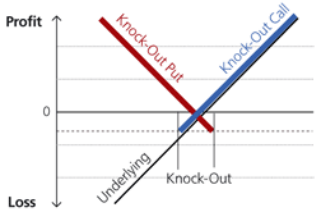
CAPITAL PROTECTED PRODUCTS				
Tracker Certificates	***Outperformance Certificates***	***Bonus Certificates***	***Outperformance Bonus Certificates***	***Twin-Win Certificates***
				
Market Expectation • Tracker Certificate (Bull): Rising underlying • Tracker Certificate (Bear): Falling underlying	**Market Expectation** • Rising underlying • Rising volatility	**Market Expectation** • Underlying moving sideways or rising • Underlying will not breach Barrier during product lifetime	**Market Expectation** • Rising underlying • Underlying will not breach Barrier during product lifetime	**Market Expectation** • Rising or slightly falling underlying • Underlying will not breach Barrier during product lifetime
Characteristics • Unlimited participation in the development of the underlying • Reflects underlying price moves 1:1 (adjusted by conversion ratio and any related fees) • Risk comparable to a direct investment • Fees generally in the form of management fees or through the retention of payouts attributable to the underlying during the lifetime of the Product.	**Characteristics** • Unlimited participation in the development of the underlying • Disproportional participation (Outperformance) in a positive performance of the underlying • Reflects underlying price moves 1:1 when below the Strike • Risk comparable to a direct investment • Any payouts attributable to the underlying are used in favour of the strategy	**Characteristics** • Unlimited participation in the development of the underlying • A Bonus Certificate turns into a Tracker Certificate after breaching the Barrier • Minimum redemption is equal to the Strike if the Barrier is never breached • Lower risk than a direct investment due to the conditional capital protection • Larger Bonus payments or lower barriers can be achieved at a greater risk if the product is based on multiple underlyings (multi-asset) • Any payouts attributable to the underlying are used in favour of the strategy	**Characteristics** • Unlimited participation in the development of the underlying • Minimum redemption is equal to the Strike if the Barrier is never breached • Disproportional participation (Outperformance) in a positive performance of the underlying • An Outperformance Bonus Certificate turns into an Outperformance Certificate after breaching the Barrier • Lower risk than a direct investment due to the conditional capital protection • Any payouts attributable to the underlying are used in favour of the strategy	**Characteristics** • Unlimited participation in the development of the underlying • Minimum redemption is equal to the Strike if the Barrier is never breached • Profits possible with rising and falling underlying • Falling underlying price converts into profit until the Barrier • A Twin-Win Certificate turns into a Tracker Certificate after breaching the Barrier • Any payouts attributable to the underlying are used in favour of the strategy

Table C.4: Leverage Products

LEVERAGE PRODUCTS		
Warrants	***Knock-Out Warrants***	***Mini-Futures***
		
Market Expectation • Warrant (Call): Rising underlying, • rising volatility • Warrant (Put): Falling underlying, • rising volatility	**Market Expectation** • Knock-Out (Call): Rising underlying • Knock-Out (Put): Falling underlying	**Market Expectation** • Mini-Future (Long): Rising underlying • Mini-Future (Short): Falling underlying
Characteristics • Small investment generating a leveraged performance relative to the underlying • Increased risk of total loss (limited to initial investment) • Suitable for short term speculation or hedging • Daily loss of time value (increases as product expiry approaches) • Continuous monitoring required	**Characteristics** • Small investment generating a leveraged performance relative to the underlying • Increased risk of total loss (limited to initial • investment) • Immediately expires worthless in case the • Barrier is breached during product lifetime • Suitable for short term speculation or hedging • Small influence of volatility and small loss of time-value • Continuous monitoring required	**Characteristics** • Small investment generating a leveraged performance relative to the underlying • Increased risk of total loss (limited to initial investment) • A residual value is redeemed following a stop loss event • Suitable for short term speculation or hedging • No influence of volatility • Continuous monitoring required