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PROIZVODI FINANSIJSKOG INŽENJERINGA

Rezime

Finansijski inženjering predstavlja inoviranje i stvaranje novih finansijskih instrumenata. Najznačajniji proizvodi finansijskog inženjeringa su: špekulativne obveznice, obveznice bez kupona, sekjuritizacija aktive, finansijski derivati i sporazumi o reotkupu. Špekulativne obveznice su hartija od vrednosti niskog kvaliteta koje investitorima donose veći prinos. Obveznice bez kupona su nastale razdvajanjem glavnice i kamate već emitovanih hartija od vrednosti. Iz procesa sekjuritizacije nastaju hartije od vrednosti pokrivene hipotekom i drugom aktivom, kao što su obezbeđene hipotekarne obligacije (CMO), stripd hartije od vrednosti pokrivene hipotekom i obezbeđene dugovne obligacije (CDO). Finansijski derivati kao što su fjučers opcija i svop, omogućavaju upravljanje rizicima. Sporazum o reotkupu je najznačajniji kratkoročni izvor finansiranja finansijskih institucija koji kao kolateral ima hartije od vrednosti.

Ključne reči: finansijski inženjering, obveznice bez kupona, visokoprosne obveznice, sekjuritizacija aktive, hartije od vrednosti pokrivene aktivom, finansijski derivati.

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FINANCIAL ENGINEERING PRODUCTS

Summary

Financial engineering represents innovation and creation of new financial instruments. The major financial engineering products are: speculative bonds, zero coupon bonds, asset securitization, financial derivatives and repurchase agreements. Speculative bonds are low-rating securities, but they yield higher profit for investors. Zero coupon bonds were created by separating the principal and the interest on already issued securities. Asset securitization created mortgage-backed securities and asset-backed securities, such as the following: collateralized mortgage obligations (CMOs), stripped mortgage-backed securities and collateralized debt obligations (CDOs). Financial derivatives like futures, options and swap facilitate risk management. Repurchase agreement is the most important short term source of financial institutions funding, which has securities as collateral.

Key words: financial engineering, zero coupon bonds, speculative bonds, asset securitization, asset-backed securities, financial derivatives.

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Finansijski inženjering je prosek inoviranja postojećih i stvaranja novih finansijskih instrumenata. Finansijske inovacije su posledica sve veće konkurencije između finansijskih institucija, promene poreskih i drugih zakonskih propisa, tražnje za novim izvorima finansiranja, arbitražom itd. Finansijski inženjering podrazumeva kreiranje novih hartija od vrednosti putem (Bodie, Kane, Marcus, 2001):

- (a) razdvajanja (unbundling) i alokacije novčanog toka jedne hartije od vrednosti da bi se kreiralo nekoliko novih hartija od vrednosti, i
- (b) kombinacijom nekoliko postojećih hartija od vrednosti kreira se nova hartija od vrednosti (bundling).

Na razvoj finansijskog inženjeringa pozitivno su uticali (Liaw, 2006):

- upravljanje rizicima (risk management), jer fjučersi, opcije, svopovi ili hartije od vrednosti pokrivene hipotekom pružaju realokaciju rizika. Omogućavaju transfer rizika od emitenta ili investitora na druge subjekte koji su spremni da ga preuzmu,
- novi izvori finansiranja, kao što su špekulativne (junk) obveznice, omogućavaju "mladim" ili manje poznatim kompanijama pristup finansijskom tržištu i prikupljanje novčanih sredstava. Takođe, sekjuritizacija omogućava da se na osnovu datih kredita izvrši emisija hartija od vrednosti i prikupe novčana sredstva,
- niži troškovi finansiranja, koji su rezultat mogućnosti da hartije od vrednosti pokrivene aktivom ili hipotekom transformišu individualne zajmove u utržive hartije od vrednosti. Na ovaj način se ostvaruje veća likvidnost i pribavljaju potrebna novčana sredstava, jer se nelikvidni kredit pretvara u likvidne hartije od vrednosti,
- pitanja vezana za pravnu regulativu i porez. Investicione banke su nastojale da kreiraju proizvode koji će omogućiti smanjenje ili izbegavanje poreske obaveze. U SAD, obveznice bez kupona su pružale poreske olakšice emitentima, dok 1982. godine nije promenjen zakon,
- primena kompjuterske tehnologije, jer je bila veoma značajna u razvoju proizvoda finansijskog inženjeringa, na primer kod

poslovanja sa derivatima, ali i u kreiranju novih hartija od vrednosti i trgovanju sa njima.

Najznačajniji proizvodi finansijskog inženjeringa su: špekulativne obveznice, obveznice bez kupona, sekjuritizacija aktive, finansijski derivati i repo poslovi.

Špekulativne obveznice

Špekulativne obveznice predstavljaju korporativne dužničke hartije od vrednosti niskog kvaliteta (tzv. smeće (junk) obveznice). Atraktivne su jer pružaju veću zaradu investitorima i to od 3% do 4% više od visoko kvalitetnih obveznica. Dakle, to su visokoprinosne (high-yield) obveznice, sa rejtingom nižim od BBB/Baa (Standard & Poor's/Moody's).

Pionir u poslovanju sa špekulativnim obveznicama je investiciona banka Drexel Burnham Lambert (Drexel Burnham Lambert). Banka je uvidela da postoje investitori koji su spremni da preuzmu veći rizik. Tokom



Financial engineering is the process of innovation and creation of new financial instruments. Financial innovations come as a result of the ever-growing competition among financial institutions, changes in the tax-related and other legal frameworks, demand for the new sources of finance, arbitrage, etc. Financial engineering implies the creation of new types of securities by means of (Bodie, Kane, Marcus, 2001):

- (a) Unbundling and allocation of one security's cash flow in order to create several new securities, and
- (b) Bundling of several existing securities in order to create a new security.

The development of financial engineering was facilitated by (Liaw, 2006):

- Risk management, given that futures, options, swaps or mortgage-backed securities provide re-allocation of risks. They enable risk transfer from the issuer or investor to the other entities willing to take it over;
- New sources of finance, such as junk bonds, enable "young" or less renowned companies to access the financial market and to raise money funds. In addition, securitization enables issuing securities on the basis of the extended credits, and raising money funds;
- Lower finance costs, the result of the ability of asset- or mortgage-backed securities to transform individual loans into the marketable securities. Thus, higher liquidity is achieved and necessary funds raised, the illiquid credit being transformed into liquid securities;
- Tax and legal regulations related issues. Investment banks tended to create the products that will enable lowering or avoiding tax obligations. In the USA, zero-coupon bonds provided the issuers with certain tax facilities, until in 1982 the law was changed;
- Application of computer technology, since it played a significant role in the development of financial engineering products, for

instance in operations with derivatives, but also in the creation of new securities and in trading them.

The most important financial engineering products are the following: speculative bonds, zero coupon bonds, asset securitization, financial derivatives and repurchase agreements.

Speculative Bonds

Speculative bonds are corporate debt low-rating securities (so-called junk bonds). They are attractive because they yield higher profit for the investors - from 3% to 4% higher than the high-quality bonds. Thus, they are high-yield bonds, with the rating lower than BBB/Baa (Standard & Poor's/Moody's).

The investment bank Drexel Burnham Lambert is a pioneer in the speculative bonds operations. This bank realized that there are investors willing to take higher risks. In the 1980s it was the underwriter of the speculative bonds issues, but encountered two problems. The first was the low liquidity of these bonds. With a view to solving this problem, it took the role of the market maker, and thus the secondary speculative bonds market emerged. The second problem was the credit risk, i.e. the risk of issuers not honouring their obligations towards the investors. The investment bank once again took this role and gave its best to help the issuers in every possible way to honour their obligations. It assisted them in concluding the debt rescheduling agreements, procured additional funds if the issuer needed them, etc. As a result of these activities of the investment bank, the investors' interest in speculative bonds was raised.

The issuance of speculative bonds helps raise funds for financing the purchase of company's shares, especially for the so-called "hostile" take-over. In the process of speculative bonds issuance, the "shelf registration"¹ is often applied, which makes the whole process quicker and easier. The most important types of speculative bonds are the following:

¹ Rule No 415 was introduced in 1982 by the SEC, enabling the issuer to perform several securities issues on the basis of one issue registration. It is referred to as "shelf registration" because the securities "lie" on a shelf, and may be issued as soon the need for funds arises.

osamdesetih godina prošlog veka bila je potpisnik emisija špekulativnih obveznica, ali je naišla na dva problema. Prvi je niska likvidnost ovih obveznica. U cilju rešavanja ovog problema preuzima ulogu kreatora tržišta i na taj način nastaje sekundarno tržište špekulativnih obveznica. Drugi problem bio je kreditni rizik, odnosno da emitenti neće izvršiti obavezu prema investitorima. Investiciona banka je opet preuzela ulogu na sebe i nastojala da na sve načine pomogne emitentima da izvrše svoje obaveze. Pomagala im je da sklope sporazume o reprogramiranju dugova, pribavljala je dodatna novčavna sredstva ukoliko su emitentu bila potrebna itd. Kao posledica ovih aktivnosti investicione banke, povećano je interesovanje investitora za špekulativnim obveznicama.

Emisijom špekulativnih obveznica se prikupljaju novčana sredstva za finansiranje kupovine akcija preduzeća, posebno za tzv. "neprijateljsko" preuzimanje. U emisiji špekulativnih obveznica često se primenjuje "registracija sa police",¹ što ubrzava i olakšava proces. Najznačajnije vrste špekulativnih obveznica su:

- obveznice koje odlažu obavezu plaćanja kamate za određeni vremenski period (tzv. deferred coupon structure),
- konvertibilne špekulativne obveznice koje se mogu konvertovati u obične akcije,
- obveznice koje omogućavaju emitentu da resetuje kuponsku stopu i produži rok dospeća za određeni vremenski interval (extendable reset notes), i
- špekulativne municipalne obveznice - emituju ih bolnice, škole, starački domovi, aerodromi, mediji (radio i televizija), fabrike, energetski sektor, transportni sektor i sl.

Obveznice koje odlažu obavezu plaćanja kamate za određeni vremenski period mogu biti:

1. obveznice (deferred-interest bonds) koje se prodaju uz veliki diskont i uz odloženo

plaćanje kamate najčešće na period od 3 do 7 godina,²

2. obveznice koje nude različitu kamatu u početnim i kasnijim godinama (split-coupon bonds). Vrsta sa rastućom kamatom (Step-up bonds) podrazumeva da je u početku kamata niža i tokom vremena se povećava,
3. PIK obveznice (Payment-in-kind) daju emitentu opciju da plati kupon investitoru ili da mu da sličnu obveznicu. Praktično, plaćaju kamatu u drugim hartijama od vrednosti umesto u novcu. Period u toku kojeg emitent može da izabere između ove dve opcije je između 5 i 10 godina.

Najznačajniji kupci špekulativnih obveznica u SAD su zajednički i penzioni fondovi, finansijske kompanije itd. U nekim zemljama je investicionim i penzionim fondovima zabranjeno ili ograničeno ulaganje u špekulativne obveznice. Zbog sve većeg značaja ovih hartija od vrednosti finansijske institucije prate tržište i publikuju časopise iz ove oblasti.³

Obveznice bez kupona

Obveznice bez kupona (Zero coupon bonds) su dužničke hartije od vrednosti koje se prodaju uz diskont, a o roku dospeća investitor dobija nominalnu vrednost. U avgustu 1982. godine investiciona banka Meril Linč (Merrill Lynch) je emitovala prvu obveznicu bez kupona nazvanu TIGRs (Treasury Investment Growth Receipts) na osnovu obveznice Trezora. Banka je kupila obveznice Trezora i razdvojila glavnica i kupone za naplatu kamate na različite novčane tokove. Suština je da se od jedne obveznice kreira veći broj novih obveznica, jer se odvajaju kuponi i glavnica i samostalno se prodaju. Svaki kupon postaje posebna obveznica i nominalna vrednost kupona i rok dospeća postaju važeći za tu obveznicu. Emitent ovih novih hartija od vrednosti nije Trezor SAD, ali je obveznica

¹ Pravilo 415 je uvedeno 1982. godine od strane SEC-a i omogućava emitentu da na osnovu jedne registracije emisije može izvršiti veći broj emisija hartija od vrednosti. Zove se i registracija sa police (shelf registration) jer hartije od vrednosti "sede" na polici i mogu biti emitovane čim se ukaže potreba za novčanim sredstvima.

² Zovu se i visokoprinosne obveznice bez kupona (Zero-coupon high yield bonds)

³ Meril Linč (Merrill Lynch) publikuje nedeljni časopis This Week In High Yield, Salomon Braders Smit Barni (Salomon Brothers Smith Barney) izdaje mesečno High Yield Market Update, First Boston (First Boston) izdaje mesečno Montly Market Review i godišnje High Yield Handbook, Leman Braders (Lehman Brothers) nedeljno High Yield Portfolio Advisor i mesečno High Yield Bond Market Report.

- Bonds deferring the payment of interest for a set period of time (the so-called deferred coupon structure);
- Convertible speculative bonds that can be converted into common shares;
- Bond enabling the issuer to reset the coupon rate and extend the maturity date for a set period of time (the so-called extendable reset notes); and
- Speculative municipal bonds - issued by hospitals, schools, old-people's home, airports, the media (radio and television), factories, energy sector, transport sector, etc.

Bonds deferring the payment of interest for a set period of time may be the following:

1. Deferred-interest bonds which are sold with a large discount and with a deferred interest payment, most often from 3 to 7 years;²
2. Bonds offering different interest in the first years and later on (split-coupon bonds). Those with the growing interest (step-up bonds) imply that at the beginning the interest is lower, and gradually increases in time;
3. PIK bonds (payment-in-kind) provide an option for the issuer either to pay for the coupon to the investor, or to give the investor a similar bond. Basically, the interest is paid in other securities instead in money. The period in which the issuer may choose between these two options is between 5 and 10 years.

The major buyers of speculative bonds in the USA are mutual and pension funds, financial companies, etc. In some countries, the investment and pension funds are forbidden or have limited right to invest in speculative bonds. Due to the ever-increasing importance of these securities, the financial institutions monitor the market and publish magazines covering topics from this field.³

Zero-coupon Bonds

Zero-coupon bonds are debt securities sold with a discount, and upon maturity the investor receives the nominal value. In August 1982, the investment bank Merrill Lynch issued the first zero-coupon bond named TIGRs (Treasury Investment Growth Receipts) on the basis of Treasury bonds. The bank bought the Treasury bonds and separated the principal and interest payment coupons into the separate cash flows. The point is to create several new bonds out of one bond, since the coupons are separated from the principal and sold separately. Each coupon becomes a separate bond in itself, and the nominal value of the coupon and its maturity become valid for this bond. The issuer of these new securities is not the USA Treasury, but the Treasury bond is a guarantee that the claims will be collected upon maturity of the new bonds. Zero-coupon bonds are purchased with a huge discount, have no coupons, and the interest grows through the gradual increase of its value as the maturity date approaches. At the same time as Merrill Lynch, the investment banks Salomon Brothers issued similar securities called CATS (Certificates of Accrual on Treasury Securities).

In February 1985 the Treasury started to apply this system too, and introduced the so-called STRIPS (Separate Trading of Registered Interest and Principal of Securities) or, informally, the "Treasury Strips". The Treasury bond is "ripped into strips" and on the basis of the principal and interests the new bonds are formed. Each new bond has its own identification number (CUSIP number) and can be traded with. They are called zero-coupon bonds because they are paid out to the investor only upon maturity date (there is only one cash flow). In practice, it is possible to have the reverse operation, when the Treasury bond is created again out of these "strips". This process is called reconstitution. The Treasury allows these "strips" to form an original Treasury bond, but only if the bank

² They are also called zero-coupon high-yield bonds.

³ Merrill Lynch publishes a weekly magazine *This Week in High Yield*, Salomon Brothers Smith Barney publishes a monthly magazine *High Yield Market Update*, First Boston publishes a monthly magazine *Monthly Market Review*, and annually *High Yield Handbook*, Lehman Brothers publishes a weekly *High Yield Portfolio Advisor* and a monthly *High Yield market Report*.

Trezora garancija da će obaveze u roku dospeća novih obveznica biti isplaćene. Obveznice bez kupona se kupuju uz veliki diskont, nemaju kupone i kamata raste kroz postepeno povećanje njene vrednosti kako se rok dospeća približava. Istovremeno kada i Meril Linč, investiciona banka Salomon Braders (Salomon Brothers) izdaje slične hartije od vrednosti nazvane CATS (Certificates of Accrual on Treasury Securities).

U februaru 1985. godine i Trezor je počeo da primenjuje ovaj sistem i uveo je tzv. Strips (STRIPS, Separate Trading of Registered Interest and Principal of Securities) ili u žargonu "trake Trezora" (Treasury strips). Obveznica Trezora se "raspara na trake" i na osnovu glavnice i kamata se formiraju nove obveznice. Svaka nova obveznica ima svoj identifikacioni broj (CUSIP number) i sa njom se može trgovati. Zovu se obveznice bez kupona jer se investitoru isplaćuju samo u roku dospeća (ima samo jedan novčani tok). Moguća je upraksi i obrnuta operacija kada se od "traka" ponovo kreira obveznica Trezora. Proces se naziva rekonstitucija (reconstitution). Trezor dozvoljava da od "traka" ponovo nastane originalna obveznica Trezora, ali samo ako banka poseduje hartiju od vrednosti nastalu na osnovu glavnice i sve hartije od vrednosti nastale na osnovu još nedospelih kamata. Trenutno je nedospelo više od 50 milijardi dolara ovih obveznica Trezora. Obveznice bez kupona Trezora predstavljaju obligaciju Trezora, za razliku od obveznica bez kupona investicionih banaka. Mogu biti kreirane:

- (a) na osnovu kupona (coupon strips) - isplaćuje se samo kamata bez glavnice i
- (b) na osnovu od glavnice (principal strips) - isplaćuje se samo glavnica, bez kamate.

Uvođenjem "traka" Trezora obveznice bez kupona investicionih banaka gube na značaju i popularnosti.

Sekjuritizacija aktive

Sekjuritizacija aktive (Asset securitization) je proces emisije hartija od vrednosti na osnovu pula slične aktive koja služi kao kolateral. Transformiše nelikvidne kredite i druge dužničke instrumente u likvidne hartije od vrednosti. Sekjuritizacija omogućava

prikupljanje "svežih" novčanih sredstava i smanjenje izloženosti riziku. Zajmodavac može da drži kredite u svom portfoliju, ali krediti su nelikvidna aktiva i teško ih može prevremeno naplatiti. Druga mogućnost je da iskoristi kredite koje je odobrio i da formira pul na osnovu koga će emitovati hartije od vrednosti. Na ovaj način, banke i drugi zajmodavci pretvaraju kredite u hartije od vrednosti i povećavaju svoju likvidnost. Treća mogućnost je da zajmodavac proda kredite drugoj finansijskoj instituciji koja će izvršiti sekjuritizaciju. Zapravo, prodaju svoje pravo na novčani tok.

Zajmodavac prodaje kredite (aktivu) trustu (special purpose vehicle SPV) koji formira pul i emituje hartije od vrednosti. Tokom ovog procesa dolazi do razdvajanja aktive i finansijske institucije koja je kredit odobrila. Trust je često filijala neke finansijske institucije, ali mora u potpunosti biti zaštićen od mogućeg bankrota svog osnivača. Kako zajmoprimci otplaćuju kredit (glavnicu i kamatu), isplaćuju se novčana sredstva investitorima u hartije od vrednosti. Dakle, isplata obaveza po hartijama od vrednosti zavisi od isplate obaveza po kreditima.

U procesu sekjuritizacije, najveći značaj ima hipotekarno tržište, jer se ista na hipotekarnom tržištu prvi put pojavila. Danas je u SAD, 2/3 hipotekarnih kredita sekjuritizovano. Procesom sekjuritizacije nastaju dve velike grupe hartija od vrednosti:

- (a) hartije od vrednosti pokrivene hipotekom (mortgage-backed securities, MBS) i
- (b) hartije od vrednosti pokrivene aktivom (asset-backed securities, ABS).

Hartije od vrednosti pokrivene hipotekom u zavisnosti od emitenta mogu biti:

- (a) hartije od vrednosti agencija i
- (b) hartije od vrednosti privatnog sektora.

U SAD na hipotekarnom tržištu najznačajniju ulogu imaju: (1.) Nacionalna vladina asocijacija za hipoteke, Džini mej (Government National Mortgage Association, Ginnie Mae), (2.) Federalna korporacija za hipotekarne stambene kredite, Fredi mek (Federal Home Loan Mortgage Corporation, Freddie Mac) i (3.) Federalna nacionalna asocijacija za hipoteke, Fani mej (FNMA - Federal National Mortgage Association). Džini

owns the security created on the basis of the principal along with all securities created on the basis of not yet matured interests. Currently there are more than 50 billion dollars of such outstanding Treasury bonds. The Treasury zero-coupon bonds represent the Treasury's obligation, as opposed to the zero-coupon bonds of the investment banks. They can be created in the following ways:

- (a) On the basis of the coupon (coupon strips) - only the interest without the principal is paid; and
- (b) On the basis of the principal (principal strips) - only the principal, without the interest is paid.

The introduction of the Treasury "strips" made the zero-coupon bonds issued by the investment banks less important and popular.

Asset Securitization

Asset securitization is the process of issuing securities on the basis of a pool of similar assets serving as collateral. It transforms illiquid credits and other debt instruments into liquid securities. Securitization enables the raising of "fresh" funds and reduction of risk exposure. The creditors may keep the credits in their portfolios, but given that credits represent illiquid assets, it will be difficult to cash them before maturity date. The second option is to use these credits to create a pool on the basis of which they will issue securities. In this way, the banks and other creditors turn credits into securities, thus increasing their liquidity. The third option is for the creditor to sell the credits to another financial institution which will conduct securitization. Actually, they sell their right to the cash flow.

The creditor sells the credits (assets) to the trust (SPV - special purpose vehicle), which forms the pool and issues securities. In the course of this process the assets are separated from the financial institution which has extended the credit. The trust is often a branch office of some financial institution, but it has

to be completely protected from the possible bankruptcy of the founder. As the creditors repay the credit (principal and interest), the money is paid to the investors into the securities. In other words, the payment of liabilities in respect of securities depends on the payment of liabilities in respect of credits.

In the process of securitization mortgage market is of the highest importance, since it was at this market that securitization occurred for the first time. In the USA today two thirds of mortgage credits have undergone securitization. The process of securitization creates two large groups of securities:

- (a) Mortgage-backed securities, MBS; and
- (b) Asset-backed securities, ABS.

Depending on the issuer, *mortgage-backed securities* may be:

- (a) Securities issued by agencies; and
- (b) Securities of the private sector.

At the USA mortgage market the most important role is played by the following institutions: (1.) the Government National Mortgage Association, Ginnie Mae, (2.) the Federal Home Loan Mortgage Corporation, Freddie Mac, and (3.) the Federal National Mortgage Association - FNMA, Fannie Mae. Ginnie Mae guarantees for the securities issued by the private institutions which had created the pool of mortgage credits. Freddie Mac and Fannie Mae purchase mortgage credits, create the pool and issue securities. They purchase only those mortgage credits meeting the agency's standards for being integrated into the pool (the so-called confirming mortgages). The standards refer to the maximum amount of credit, maximum ration between the amount of credit and the value of the mortgage backing the credit, etc.

The private sector also performs securitization of mortgage credits, and in these cases there are no state guarantees. These non-agency securities (the so-called non-agency pass-through) were issued for the first time in 1977 by the Bank of America.⁴

The most important mortgage securities

⁴ The issuers of non-agency securities are commercial banks, investment banks, financial companies, etc. The most important are Countrywide Prudential Home Mortgage, Residential Funding Corporation, Citicorp/Citibank Housing, Chase Mortgage Finance, Prudential Home, Saxon Mortgage and GE Capital Mortgage Services.

mej garantuje za hartije od vrednosti emitovane od strane privatnih institucija koje su kreirale pul hipotekarnih kredita. Fredi mej i Fani mej kupuju hipotekarne kredite, kreiraju pul i emituju hartije od vrednosti. Kupuju samo hipotekarne kredite koji ispunjavaju agencijske standarde za uključivanje u pul (tzv. conforming mortgages). Standardi se odnose na maksimalni iznos kredita, maksimalni odnos između visine kredita i vrednosti hipoteke date za kredit itd.

Privatni sektor takođe vrši sekjuritizaciju hipotekarnih kredita, i u ovom slučaju nema garancija države. Ove neagencijske hartije od vrednosti (non agency pass through) su prvi put emitovane 1977. godine od strane Američke banke (Bank of America).⁴

Najznačajnije hipotekarne hartije od vrednosti su obezbeđene *hipotekarne obligacije* (collateralized mortgage obligation, CMOs) i *stripd hartije od vrednosti pokrivene hipotekom* (stripped mortgage - backed securities). Obezbeđene hipotekarne obligacije su prvi put emitovane od strane First Boston korporacije (First Boston Corporation) i investicione banke Salomon Braders (Salomon Brothers) 1983. godine. Stripd hartije od vrednosti pokrivene hipotekom je prvi put emitovala agencija Fani mej 1986. godine.

Obezbeđena hipotekarna obligacija je nastala podelom novčanog toka na nekoliko klasa obveznica. Izvršena je redistribucija novčanog toka (kamate i glavnice) na različite tranše. Svaka tranša ima različit rok dospeća, drugačije karakteristike novčanog toka i različitu izloženost riziku. Prednost u isplati imaju više tranše, pa zatim niže (tranša A, B, C...) sve dok ne bude isplaćena i poslednja. Postoji razlika u isplati glavnice po tranšama, dok se kamata isplaćuje svim tranšama mesečno. Dok ne bude isplaćena glavnica za višu tranšu, ne može početi isplata za nižu. Ove obveznice ne eliminišu rizik prevremene otplate, ali ga smanjuju postojanjem tranši. Takođe vrše i transfer rizika između različitih tranši.

Prva emisija stripd hartija od vrednosti pokrivenih hipotekom je obuhvatala klase B-1

i B-2, pri čemu su obe klase obezbeđivale isti iznos glavnice, ali se isplata kamate razlikovala: vlasnici klase B-1 su dobili jednu trećinu kamate, a vlasnici klase B-2 dve trećine. U narednoj emisiji, postojale su klase A-1 i A-2, koje su se razlikovale po isplati kamate i glavnice. Na primer klasa A-1 je imala isplatu glavnice u iznosu od 99%, dok je A-2 imala samo 1%. Od 1987. godine uvode se dve klase stripd hartija od vrednosti pokrivenih hipotekom:

1. hartije od vrednosti koje donose samo glavicu (principal only ili PO klasa), se prodaju uz diskont. Prinos na hartije od vrednosti i prevremena oplata kredita su u direktnoj srazmeri. Što je brža prevremena otplata kredita, veći je i prinos na ove hartije od vrednosti. Obrnuto, ako korisnici kredita iste otplaćuju do kraja (nema prevremene otplate), prinos na hartije od vrednosti je manji. Ukoliko su manje kamatne stope na hipotekarne kredite, isplate kredita se povećavaju i cena hartija od vrednosti koje donose glavicu raste. Ako kamatne stope na hipotekarne kredite rastu, prevremena otplata kredita se usporava i cena ovih hartija od vrednosti pada.
2. hartije od vrednosti koje donose samo kamatu (interest only ili IO klasa) - kamata zavisi od iznosa nepodmirenog dela glavnice hipotekarnog kredita. Što je manji iznos glavnice, manji je prihod za vlasnike ovih hartija od vrednosti. Ako kamatna stopa na hipotekarne kredite opadne, prevremena otplata kredita se povećava i pada cena hartija od vrednosti koje donose kamatu. Ako poraste kamatna stopa na hipotekarne kredite smanjuje se prevremena otplata i novčani tok se poboljšava. Ove obveznice su jedinstvene jer se njihova cena kreće u istom pravcu kao i kamatna stopa.

Hartije od vrednosti pokrivene aktivom (asset backed securities, ABS) mogu kao kolateral imati raznovrsnu aktivu. Najčešće se radi o različitim vrstama potrošačkih i studentskih kredita, zatim poraživanja po kreditnim karticama, lizing aranžmanima,

⁴ Emitenti neagencijskih hartija od vrednosti su komercijalne banke, investicione banke, finansijske kompanije itd. Najznačajniji su Countrywide Prudential Home Mortgage, Residential Funding Corporation, Citicorp/Citibank Housing, Chase Mortgage Finance, Prudential Home, Saxon Mortgage i GE Capital Mortgage Services.

are *Collateralized Mortgage Obligations - CMOs*, and *Stripped Mortgage-Backed Securities*. Collateralized mortgage obligations were issued for the first time by First Boston Corporation and the investment bank Salomon Brothers in 1983. Stripped mortgage-backed securities were first issued by the Fannie Mae agency in 1986.

Collateralized mortgage obligation was created by dividing the cash flow into several bond types. The cash flow (interest and principal) was redistributed into different tranches. Each tranche has a different maturity, different cash flow characteristics and different risk exposure. Higher-ranked tranches are paid first, then those lower-ranked (tranche A, B, C, etc.) until the last tranche gets paid. There is a difference in principal payment by tranches, whereas the interest is paid for all tranches on a monthly basis. Until the principal for the higher-ranked tranche is paid, the payment for the lower-ranked tranche cannot begin. These bonds do not eliminate the early repayment risk, but the existence of tranches reduces it. In addition, they transfer the risk among different tranches.

The first issue of stripped mortgage-backed securities included types B-1 and B-2, with both types bearing the same amount of principal, but having different ways of interest payments: the owners of type B-1 received one third of the interest, and the owners of type B-2 two thirds. In the next issue, there were types A-1 and A-2, differing in both interest and principal payment. For instance, type A-1 had principal payment amounting to 99%, whereas type A-2 had only 1%. In 1987 two types of stripped mortgage-backed securities were introduced:

1. Securities which bring only the principal (principal only or PO type) are sold with a discount. The return on securities and the early credit repayment are directly proportional. The sooner the early credit repayment, the larger the return on these securities. And vice versa, if the credit users repay their credits till the end of the repayment period (no early repayment), the return on securities is lower. If the interest rates on mortgage credits are lower, the credit repayments are higher and the price of principal-only securities goes up. If the interest rates on mortgage credits are higher,

the early credit repayment slows down, and the price of these securities goes down.

2. Securities which bring only interest (interest only or IO type) - the interest depends on the amount of outstanding part of the mortgage credit principal. The lower the amount of principal, the lower the income for the owners of these securities. If the interest rate on mortgage credits goes down, the early credit repayment increases, and the price of interest-only securities goes down. If the interest rate on mortgage credits increases, the early credit repayment slows down, and the cash flow improves. These bonds are unique because their price moves in the same direction as the interest rate.

Asset-backed Securities -ABS may have various assets as collateral. Most often those are various kinds of consumer and student credits, then receivables in respect of credit cards, leasing arrangements, speculative bonds, tax receivables, etc. the first securities of this kind were issued in 1986 by the First Boston Corp. bank, on the basis of the pool of loans for the credits extended by General Motors Acceptance Corporation. *Collateralized Debt Obligations - CDOs* are a type of asset-backed securities, but in their case the pool is diversified. Most often the pool includes: speculative bonds, domestic bank credits, emerging markets' bonds, foreign banks' credits, special credits, etc. Depending on what makes the pool of funds, collateralized debt obligations may be collateralized bond obligations - CBOs and collateralized loan obligations - CLOs. In the former case, the pool is comprised of speculative bonds, and in the latter of high-yield or investment-grade credits. In both cases, the cash flows of the collateral are used for securities payment. When it comes to CBO/CLO securities, the senior tranche has the precedence over the junior, thus the latter has lower rating and higher return.

The enhancement of the securities' credit rating is performed only for the securities issued by the private sector. Rating agency tends to identify the credit risk and potential losses for investors in securities, and to determine the extent to which their rating needs to be enhanced. The practice shows that the credit rating issuers achieve for issued securities may be higher than the rating of the

špekulativnim obveznicama, poreskim potraživanjima itd. Prve hartije od vrednosti ove vrste su emitovane 1986. godine od strane banke First Boston (First Boston Corp.), na osnovu pula zajmova za kredite odobrenih od strane Dženeral Motors-a (General Motors Acceptance Corporation). Obezbeđene *dugovne obligacije* (collateralized debt obligation, CDO) su vrsta hartija od vrednosti obezbeđenih aktivom, ali je u njihovom slučaju pul diversifikovan. Najčešće pul obuhvata: špekulativne obveznice, domaće bankarske kredite, obveznice rastućih tržišta, kredite stranih banaka, specijalne kredite i sl. Obezbeđene dugovne obligacije mogu, u zavisnosti od toga šta čini pul sredstava biti obezbeđene obligacione obveznice (collateralized bond obligation, CBO) i obezbeđene kreditne obligacije (collateralized loan obligation, CLO). U prvom slučaju pul čine špekulativne obveznice, a u drugom visokoprinosni ili investicioni (investment-grade) krediti. U oba slučaja novčani tokovi kolaterala se koriste za isplatu hartija od vrednosti. Kod CBO /CLO hartija od vrednosti, starija tranša ima prednost u odnosu na mlađe, stoga druge imaju manji rejting i viši prinos.

Poboljšanje kreditnog rejtinga hartija od vrednosti se vrši samo za hartije od vrednosti koje je emitovao privatni sektor. Rejting agencija nastoji da utvrdi kreditni rizik i potencijale gubitke za investitore u hartije od vrednosti, i određuje koliko je potrebno poboljšati njihov rejting. Praksa pokazuje da emitenti mogu ostvariti kreditni rejting za emitovane hartije od vrednosti veći od rejtinga pula koji služi kao kolateral. Hartije od vrednosti mogu imati bolji kreditni rejting nego sam emitent. Razlog tome je što rejting agencija procenjuje kreditni rejting kolaterala, a ne emitenta. Većina sekjuritizovanih hartija od vrednosti ima rejting najmanje AA/Aa.

Instrumenti koji se koriste za poboljšanje kreditnog rejtinga hartija od vrednosti su:

1. garancija emitenta/treće strane - Emitent može da da garanciju na osnovu sopstvenog kreditnog rejtinga, kako bi hartije od vrednosti koje emituje imale određeni rejting. Primenjuje se i garancija treće strane koja garantuje za potencijalne gubitke do određenog nivoa (npr. 10%);
2. kreditno pismo banke, podrazumeva da se

banka obavezuje da će isplatiti obaveze po hartijama od vrednosti (ovo je veoma skup instrument);

3. osiguranje pula od strane osiguravajuće kompanije - kupovinom polise osiguranja, emitent osigurava hartije od vrednosti, ali u ovom slučaju rejting osiguravača treba da bude isti ili veći od rejtinga kojem emitent teži;
4. starija/subordinirana struktura - hipotekarni pul je podeljen na starije i subordinirane hartije od vrednosti. Emisija se sastoji od jedne starije tranše i jedne ili više podređenih tranši hartija od vrednosti. Kreditni rizik se prenosi sa starijih tranši na podređene, jer prve imaju prednost u isplati potraživanja;
5. rezervni fondovi se formiraju izdvajanjem novčanih sredstva na posebne račune: (1.) nakon izvršene emisije hartija od vrednosti izdvaja se deo novčanih sredstava i/ili (2.) novčana sredstva se izdvajaju svakog meseca (nakon isplate usluga za servisiranje i drugih troškova na mesečnom nivou);
6. novčani račun - često se pored rezervnih fondova izdvajaju i novčana sredstva na račun kod poslovne banke pri čemu se ulažu u visokokvalitetne kratkoročne hartije od vrednosti;
7. veća vrednost kolaterala od vrednosti emisije (overcollateralization) - ako je vrednost kolaterala u pulu veća od vrednosti emitovanih hartija od vrednosti, može se ostvariti viši kreditni rejting.

Kreditno poboljšanje hartija od vrednosti je neophodno jer povećava njihovu likvidnost, ali što je poboljšanje veće, veći su i troškovi sekjuritizacije.

Finansijski derivati

Finansijski derivati su finansijski instrumenti koji omogućavaju upravljanje rizikom. Učesnicima na finansijskim tržištima omogućavaju da se zaštite od promena kamatnih stopa i valutnih poremećaja. Poslove sa finansijskim derivatima obavljaju hedžeri i špekulanti. Vrednost finansijskih derivata se izvodi iz vrednosti neke druge aktive koja se nalazi u njihovoj osnovi. Finansijski derivati su: forvord, fjučers, opcija, svop i kamatni sporazum.

pool used as collateral. Securities may have the higher credit rating than the issuers themselves. The reason behind this is that the rating agency assesses the credit rating of the collateral, not of the issuer. Most of the securitized securities have the rating AA/Aa at least.

The instruments used for the enhancement of the securities' credit rating are the following:

1. Issuer/Third party guarantee - The issuers may provide a guarantee based on their own credit rating, so that the securities they issue would have the certain rating. The third party guarantee is also applied, guaranteeing for the potential losses up to the certain level (e.g. 10%);
2. Credit letter of a bank, stating that the bank commits itself to paying the liabilities in respect of securities (this is a very expensive instrument);
3. Pool insurance by an insurance company - by purchasing an insurance policy, the issuer insures the securities, but in this case the rating of the insurer must be either the same as or higher than the rating the issuer aspires to;
4. Senior/Subordinate structure - the mortgage pool is divided into senior and subordinate securities. The issue consists of one senior tranche and one or several subordinate tranches of securities. Credit risk is transferred from senior to subordinate tranches, given that the former have precedence in the process of receivables payment;
5. Reserve funds are formed by setting aside the funds into the special accounts: (1.) after the completed issue of securities, part of the funds is set aside, and/or (2.) funds are set aside each month (after the servicing and other expenses are covered on a monthly basis);
6. Money account - apart from reserve funds, funds are also often set aside at the account with the commercial bank, being invested in the high-quality short-term securities;
7. Collateral value higher than issue value (overcollateralization) - if the value of collateral in the pool is higher than the value of issued securities, higher credit rating may be achieved.

Credit rating enhancement of securities is

necessary because it increases their liquidity. However, the greater the enhancement, the greater the securitization costs.

Financial Derivatives

Financial derivatives are financial instruments facilitating risk management. They enable the participants at the financial markets to protect themselves from the interest rates changes and currency fluctuations. Operations with financial derivatives are performed by hedgers and speculators. The value of financial derivative is derived from the value of some other underlying asset. Financial derivatives are the following: forward, futures, option, swap and interest agreement.

A forward is a term contract on the basis of which the buyer and seller agree on the price, quality and delivery of certain assets on a specific day in the future. The forward defines the price, amount, quality, date, place of delivery on the present day, whereas the delivery and payment are conducted on a specific day in the future according to the beforehand agreed price. The standardization of forward brought about the first futures, this being the basic difference between them.

A future represents the obligation to buy or sell certain security or goods on the specific day, according to the beforehand agreed price. The participants sign the contract, which is highly standardized and often the subject of trade at the futures stock exchanges. The objective of the futures contract is to protect from the unexpected price trends. The contract stipulates: the date of delivery, the price to be paid on that day, the quantity and quality of the goods mentioned in the contract. Futures enable finance gap to be filled, because in the moment of purchasing the future, the buyer does not have to possess the money funds. Futures contracts recognize two positions:

- (a) Short position or sell position; and
- (b) Long position or buy position.

Short position is the position of the sellers of futures contracts, obliging them to conduct the delivery. They yield profit in case the price of goods, i.e. of the contract goes down. Long position is the position of the buyers, obliging them to buy the subject of the contract. They

Forvord je terminski ugovor na osnovu koga se kupac i prodavac dogovaraju oko cene, kvaliteta i isporuke određene aktive određenog dana u budućnosti. U sadašnjosti se kod forvorda definišu cena, količina, kvalitet, datum, mesto isporuke, dok se na određeni dan u budućnosti vrši isporuka i plaćanje po unapred dogovorenoj ceni. Standardizacijom ugovora o forvordu nastaje prvi fjučers, što je i osnovna razlika između njih.

Fjučers predstavlja obavezu kupovine ili prodaje određene hartije od vrednosti ili robe na određeni dan, po unapred dogovorenoj ceni. Učesnici potpisuju ugovor, koji je visoko standardizovan i najčešće je predmet trgovanja na fjučers berzama. Fjučers ugovor ima za cilj da zaštiti od nepredviđenog kretanja cena. U ugovoru se navodi: dan isporuke, cena koja će biti plaćena na taj dan i kvantitet i kvalitet robe koja je predmet ugovora. Fjučersi omogućavaju savladavanje gega u finansiranju, jer u momentu kupovine fjučersa kupac ne mora da ima potrebna novčana sredstva. Kod fjučers ugovora razlikuju se dve pozicije:

- (a) kratka pozicija ili prodajna pozicija, i
- (b) duga pozicija ili kupovna pozicija.

Kratka pozicija predstavlja poziciju prodavca fjučers ugovora, koja ga obavezuje da izvrši isporuku. Profitira ako cena robe, odnosno ugovora opada. Duga poziciju je pozicija kupca i obavezuje ga da kupi predmet ugovora. Profitira ako cena robe, pa samim tim i ugovora raste. Kupac fjučersa je zauzeo dugu poziciju pošto očekuje isporuku aktive i neće ostvariti gubitak usled promene cene, jer je cenu već ugovorio. Prodavac fjučersa je zauzeo kratku poziciju, jer očekuje plaćanje.

Fjučersi mogu biti robni i finansijski. Robni fjučers u osnovi ima različite vrste roba: metale, poljoprivredne proizvode, industrijske sirovine, naftu, rude itd. Kod finansijskih fjučersa se (za razliku od robnih) najčešće se ne vrši isporuka aktive već samo isplata razlike u ceni. Finansijski fjučers ugovori imaju kao podlogu kratkoročne

ili dugoročne finansijske instrumente, kretanje berzanskih indeksa i deviznih kurseva. Finansijski fjučersi mogu biti: valutni, kamatni, fjučers na hartije od vrednosti, fjučers na tržišne indekse i sl. Valutni fjučersi su ugovori o kupovini određene količine strane valute u budućnosti. Omogućavaju zaštitu (hedžing) od promene deviznog kursa. Kamatni fjučersi štite od promena kamatne stope. Osnova su im hartije od vrednosti sa fiksnim prinomom, jer su cene ovih hartija od vrednosti pod uticajem kamatnih stopa. Kupovinom kamatnog fjučersa kupac kupuje hartije od vrednosti koje će platiti u budućnosti. Najčešće se radi o hartijama od vrednosti Trezora. Fjučers na druge hartije od vrednosti ima u osnovi korporativne obveznice, akcije itd. Kod fjučersa na tržišne indekse plaćanje se povezuje sa nivoom indeksa.

Trgovanje fjučersima se odvija na berzi, vanberzanskom tržištu i elektronskim putem. U SAD postoje fjučers berze u Čikagu, Njujorku, Filadelfiji, Mineapolisu itd. Na Čikaškoj trgovačkoj berzi (Chicago Mercantile Exchange, CME) 2/3 od ukupnog obima trgovine čine fjučers ugovori na kamatne stope državnih obveznica. Na vanberzanskom tržištu je manja likvidnost fjučersa nego na berzi. Elektronsko trgovanje se vrši preko sistema kao što su GLOBEX, Reuters, Matif, Simex sistem itd. Na berzi fjučersa, kupac ili prodavac dostavljaju naloge brokeru koji ih prosleđuje brokeru na podijumu berze. Na berzi finansijskih derivata specifično je to da ne postoji klasičan market mejker već broker na parketu koji izvršava naloge. Na ovim berzama postoje posebni ringovi u kojima se trguje sa svakim artiklom pojedinačno. Uparivanje naloga se vrši anonimno. Podaci o obavljenoj trgovini se prosleđuju klirinškoj kući. Kliring kuća je garantor, nadgleda i kontroliše isporuke, vodi evidenciju i vrši saldiranje.⁵ Berza određuje donji i gornji limit fjučers cena i limit fjučers cena u granicama, sprečavajući pri tome velike dnevne oscilacije i poremećaje u trgovini.

⁵ Berze najčešće imaju svoje klirinške kuće. Kupac i prodavac sklapaju ugovor sa klirinškom kućom, koje ima obavezu da nadoknadi štetu oštećenoj strani, ukoliko kupac ili prodavac ne izvrši svoje obaveze. Obe strane su dužne da polože depozit - inicijalnu marginu na svoje račune kod klirinške kuće. Margina iznosi od 5% do 10% od vrednosti ugovora. Depozit može biti i u hartijama od vrednosti, pre svega u obveznicama Trezora sa 50% njihove nominalne vrednosti. Ako se vrednost robe smanji, smanjuje se i vrednost margine. Ukoliko se smanji ispod potrebnog nivoa, tada je neophodna dodatna uplata novčanih sredstava (margin call)

yield profit in case the price of goods, i.e. of the contract goes up. The buyers of futures take the long position because they expect the assets delivery and will not yield any loss due to the change in price, since the price was already agreed. The sellers of futures take short position, because they expect to be paid.

Futures may be commodity contracts and financial contracts. Commodity futures can be based on different types of goods: metals, agricultural products, industrial raw materials, oil, ores, etc. In case of the financial futures (as opposed to commodity ones) the asset delivery is usually not conducted, only the difference in prices being paid out. Financial futures contracts are based on short-term or long-term financial instruments, trends in the stock exchange indices and foreign exchange rates. Financial futures may be: currency futures, interest futures, securities futures, market indices futures, etc. Currency futures are contracts on purchasing a certain amount of foreign currency in the future. They provide protection (hedging) from the changes in the foreign exchange rate. Interest futures protect from the interest rate changes. They are based on the fixed-income securities, since the prices of such securities are influenced by the interest rates. By purchasing an interest future, the buyer purchases securities that are to be paid in the future. These are usually the Treasury securities. The futures linked to other securities are based on corporate bonds, shares, etc. In case of market index futures, the payment is linked to the index level.

Trading in futures is conducted on stock exchanges, OTC markets and in electronic form. In the USA there are futures exchanges in Chicago, New York, Philadelphia, Minneapolis, etc. At the Chicago Mercantile Exchange - CME, the two thirds of the overall trade volume go to the futures contracts in respect of the state bonds' interest rates. At the OTC market, the futures are less liquid than at the exchange. The

electronic trade is conducted via systems such as GLOBEX, Reuters, Matif, Simex System, etc. At the futures exchange, the buyer and the seller submit their bids to the broker, who forwards them to the broker at the exchange floor. What is specific for the financial derivatives exchange is that there is no typical market maker, but the floor broker who handles the bids. At these exchanges there are special rings in which each item is traded separately. The call and put options are matched anonymously. The data on the conducted trade are forwarded to the clearing house. The clearing house is a guarantor, supervising and monitoring the deliveries, keeping records, and conducting the settlement.⁵ The exchange sets the caps and floors to the futures prices, limiting them, thus preventing the huge daily oscillations and disturbances in the trade.

An option is the right to buy or sell a certain item of trade at the beforehand determined price and within the beforehand determined period of time. The option seller is bound to do what the option buyer demands (either to sell or buy the assets). Therefore, only one party is under commitment - the option seller. This is the main difference between options and futures. With futures, both parties are under commitment. Options enable mitigation of risk in respect of the changes in the price of assets that are the subject of the option. Option is a highly standardized document containing the following: type of the underlying asset, agreed price (strike price) at which the financial instrument can be bought or sold, and maturity, i.e. the date by which the option can be used (Vunjak, Kovacevic, 2003). The price at which the assets are bought or sold is agreed and also called strike price. The right to the option also has to be paid for, and is called option premium. The factors influencing the value of the option are the agreed, strike option price, asset price, interest rate, maturity, market stability, and dividend (revenue) (Vunjak, Kovacevic, 2003).

⁵ Exchanges usually have their own clearing houses. The buyer and the seller conclude a contract with the clearing house, which is bound to pay the damages to the injured party, in case the buyer or the seller do not honour their obligations. Both parties are bound to pay a deposit - the initial margin for their accounts with the clearing house. The margin ranges from 5% to 10% of the contract value. The deposit may also be in securities, primarily in the Treasury securities with 50% of their nominal value. If the commodity value decreases, the margin value decreases, too. If it decreases below the required level, then the additional cash payment is necessary (the so-called margin call).

Opcija je pravo kupovine ili prodaje određenog predmeta trgovanja po unapred utvrđenoj ceni i unapred utvrđenom roku. Prodavac opcije ima obavezu da uradi ono što kupac opcije od njega zahteva (da proda ili da kupi aktivu). Dakle, postoji obaveza samo za jednu stranu, za prodavca opcije. Ovo je osnovna razlika između opcije i fjučersa. Kod fjučersa obaveza postoji za obe strane. Opcije omogućavaju smanjenje rizika promene cene aktive koja je predmet opcije. Opcija je visoko standardizovan dokument koji sadrži: tip aktive na koji se opcija odnosi, ugovorenu cenu (strajk cena) po kojoj može da se kupi ili proda finansijski instrument i rok dospeća opcije, tj. datum do kojeg se ona može iskoristiti (Vunjak, Kovačević, 2003). Cena po kojoj se aktiva kupuje ili prodaje je ugovorena i naziva se strajk cena. Tržišna cena aktive koja je predmet opcije se tokom vremena menja, ali se plaćanje vrši po strajk ceni. Pravo na opciju se takođe plaća i zove se premija (option premium). Faktori koji utiču na vrednost opcije su ugovorena (strajk) cena opcije, cena aktive, kamatna stopa, vreme dospeća, stabilnost tržišta i dividenda (prinos) (Vunjak, Kovačević, 2003).

Opcije mogu biti robne i finansijske. Predmet opcije mogu biti hartije od vrednosti (najčešće akcije i obveznice Trezora), fjučers ugovori, berzanski proizvodi, indeksi akcija, inostrane valute, roba itd.

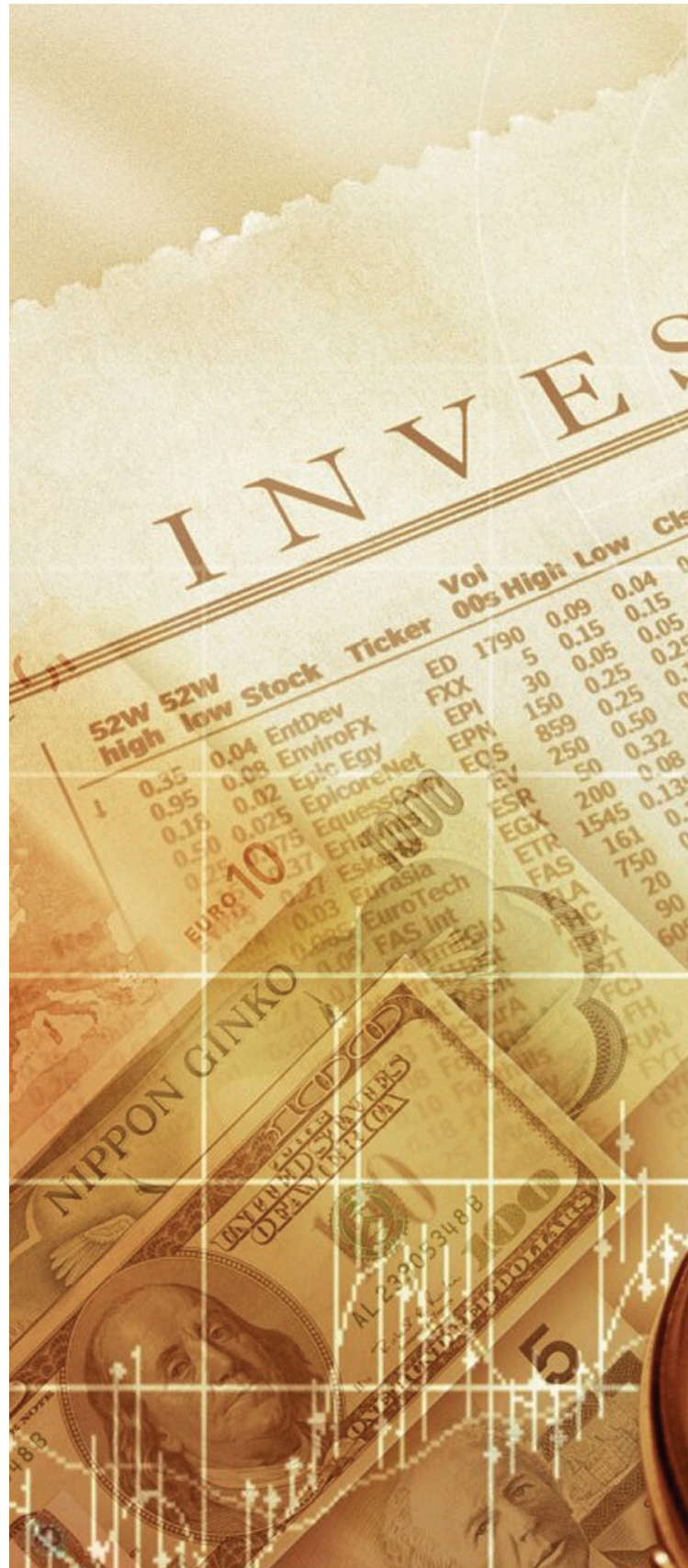
Na osnovu prirode prava koje opcija daje razlikuju se:

- (a) Kupovna opcija (call option), daje pravo vlasniku opcije da kupi predmet opcije po određenoj ceni, količini i u određenom vremenskom intervalu. Kupac opcije je zauzeo dugu poziciju, a prodavac kratku, i
- (b) Prodajna opcija (put option), daje pravo vlasniku da proda ako želi predmet opcije, po unapred dogovorenoj ceni i u određenom vremenskom periodu. On može prodati, ali nije obavezan to da učini.

Kupac opcije može ali ne mora da iskoristi opciju ili da je proda na sekundarnom tržištu. Prodavac opcije, ukoliko ne želi da izvrši obavezu, ima dve mogućnosti: da traži raskid ugovora ili da pronađe drugog kupca koji će izvršiti njegovu obavezu. I prodavac može da proda opciju na sekundarnom tržištu, što praktično znači da je drugi subjekt prihvatio

da preuzme obavezu (prema kupcu) umesto njega.

Trgovina opcijama se vrši na berzanskom i vanberzanskom tržištu. Opcije na vanberzanskom tržištu nisu standardizovane, pa im je likvidnost manja. Cene su manje transparente (manje dostupne), najčešće se vrši fizička distribucija i učesnici se poznaju međusobno. Na ovom tržištu postoji kreditni



There are commodity and financial options. The subject of the option may be securities (usually shares and Treasury bonds), futures contracts, stock exchange products, shares indices, foreign currencies, goods, etc.

Based on the nature of the right entailed by the option, there are the following option types:

(a) Call option, providing its owner with the

right to buy the subject of the option at the certain price, in the certain amount and within the certain time interval. The buyer of the option has taken long position, and the seller the short one; and

(b) Put option, providing its owner with the right to sell, if he/she wants, the subject of the option at the beforehand agreed price and within the set period of time. The owner of the option may sell, but he/she is not bound to do that.

The buyer of the option may, but does not have to use the option, or sell it at the secondary market. If the seller of the option does not want to honour his obligation, he/she has two possibilities: either to demand a breach of contract or to find another buyer who will honour it instead of him. The seller, too, may sell the option at the secondary market, which practically means that some other party accepted to assume the obligation (towards the buyer) instead of him/her.

The option trade is conducted at the stock exchange and at the OTC market. The options at the OTC market are not standardized, thus they are less liquid. The prices are less transparent (less accessible), distribution is usually physical, the participant not knowing each other. This market entails credit risk, since there is no collateral. Financial options were introduced in 1973 in Chicago, where the first exchange was also established, the Chicago Board Option exchange - CBOE. Options are also traded at the American, Philadelphian, Pacific and New York exchange. CBOE is the largest options exchange with a market share of more than 40%, whereas AMEX holds the second place with 25%. Exchange options are standardized; the trade is conducted publicly at the exchange floor, by public bidding or electronically. The prices are disclosed to the public (they are transparent), the level of liquidity is high, and, in most cases, there is no physical distribution. At the option exchange there is an official broker (the board broker), having the task to integrate the limited bids into the trading system. The call and put options are matched anonymously.

Options can be classified according to several criteria: (1.) according to the nature of the right entailed by the option, there are call and put options, (2.) according to the way they are



rizik jer nema kolaterala. Finansijska opcija je nastala 1973. godine u Čikagu, gde je osnovana i prva berza, Čikaška berza opcija (Chicago Board Option Exchange, CBOE). Opcijama se trguje i na Američkoj, Filadelfijskoj, Pacifičkoj i Njujorškoj berzi. Čikaška berza opcija je najveća berza opcija sa tržišnim učešćem od preko 40%, dok je Ameks (AMEX) drugi sa 25%. Berzanske opcije su standardizovane, trguje se javno na parketu berze javnim izvikivanjem ili elektronskim putem. Cene se javno objavljuju (cene su transparente), visok je stepen likvidnosti i u najvećem broju slučajeva nema fizičke distribucije. Na berzi opcija prisutan je i zvanični broker (board broker) i njegov je zadatak da limitirane naloge uvrsti u sistem trgovanja. Nalozi za kupovinu i prodaju se uparuju anonimno.

Opcije možemo podeliti prema većem broju kriterijuma: (1.) prema prirodni prava sadržanog u opciji razlikujemo kupovne i prodajne opcije, (2.) prema načinu njihovog korišćenja: američke, evropske i egzotične opcije, (3.) prema tipu aktive na koju se odnose: valutne opcije, opcije na kamatne stope, opcije na akcije i robne opcije, (4.) prema mestu trgovanja: berzanske i vanberzanske i (5.) prema ročnosti: kratkoročne i dugoročne opcije (Vunjak, Kovačević, 2003).

Svop je ugovor između dve strane o zameni periodičnih plaćanja u toku određenog vremenskog perioda. Svop transakcija se zaključuje između ugovornih strana i vrši se zamena isplata interesa (kamate) jednog kvaliteta i jedne vrste za isplatu interesa drugog kvaliteta i druge vrste. Ne vrši se zamena dugovanja, već isplata interesa po dotičnom dugu. Tehnologija isplate interesa podrazumeva da se vrši prebijanje interesa i isplaćuje se samo razlika učesniku koji na to ima pravo. Ugovori se zaključuju na period od 3 do 10 godina, u konvertibilnim valutama i mogu biti veoma velike vrednosti. Osnovni motiv svopa je da zajmoprimci mogu da koriste kredit po najpovoljnijim uslovima uz mogućnost zamene postojeće kamatne stope za drugu povoljniju kamatnu stopu.

Svop kamatne stope ima najveći udeo na tržištu svopova i podrazumeva zamenu fiksne za promenljivu kamatnu stopu u istoj valuti, obračunatu na bazi zajednički zamišljenog iznosa glavnice (tzv. pojmovna glavnica,

notional principal amount). Standardni svop ugovor određuje: kamatne stope koje se razmenjuju, vrstu kamatne stope (fiksna ili varijabilna), iznos nominalne glavnice, vremenski period u toku kojeg će se razmena obavljati i sl. Na osnovu ugovora, jedna strana plaća promenljivu kamatnu stopu, a druga strana plaća fiksnu kamatnu stopu. Transakcije se obavljaju preko dilera. Razmena podrazumeva da strane zamenjuju kamatne stope koje plaćaju i na ovaj način svop omogućava smanjenje troškova finansiranja. Jedna strana koja ima pristup relativno jeftinim izvorima po fiksnoj kamatnoj stopi, želi da plaća promenljivu kamatnu stopu. Kod druge strane je obrnuto, ima pristup sredstvima po promenljivoj kamatnoj stopi, a želi da plaća fiksnu kamatnu stopu. Svop im omogućava da plaćaju kamatnu stopu koja im odgovara U svop poslu strane ne obavljaju plaćanje istovremeno, na određeni dan. To je veoma retko i najčešće strana koja plaća fiksnu kamatu plaćanje vrši godišnje, a strana koja plaća fluktuirajuću kamatu polugodišnje ili kvartalno.

U praksi, emitent sa nižim kreditnim rejtingom ne može da emituje obveznice sa nižim kamatnim stopama jer investitori neće biti zainteresovani da ih kupe. Drugi emitent, sa visokim kreditnim rejtingom može da emituje obveznice sa niskom fiksnom kamatnom stopom. Svopom kamatne stope, emitent sa nižim rejtingom na osnovu ugovora se obavezuje da plaća fiksne dugoročne troškove emitenta sa višim rejtingom. U stvari, emitent sa nižim kreditnim rejtingom dobija dugoročni zajam po mnogo nižim troškovima nego bez ugovora o svopu. Emitent sa višim kreditnim rejtingom plaća kratkoročnu fluktuirajuću stopu zajma emitenta sa nižim kreditnim rejtingom. Na taj način on zamenjuje fiksnu dugoročnu kamatnu stopu za fleksibilniju i jeftiniju kratkoročnu kamatnu stopu. Dakle, emitent sa višim kreditnim rejtingom dobija dugoročni zajam po fiksnoj kamatnoj stopi, ali plaća fluktuirajuću kamatnu stopu emitentu sa nižim kreditnim rejtingom. Sa druge strane, emitent sa nižim kreditnim rejtingom dobija kratkoročni zajam sa fluktuirajućom kamatnom stopom, ali plaća fiksnu kamatnu stopu emitentu sa višim kreditnim rejtingom. Partneri u svopu prvo pozajmljuju novčana

used: American, European, and exotic options, (3.) according to the type of underlying assets: currency options, interest rates options, shares options and commodity options, (4.) according to the place of trade: exchange and OTC, and (5.) according to maturity: short-term and long-term options (Vunjak, Kovacevic, 2003).

A swap is a contract between two parties on swapping periodical payments within a set period of time. A swap transaction is concluded between the contract parties, and interest payment of one quality and one type is swapped for interest payment of another quality and another type. It is not the debt that is being swapped, but the interest in respect of the concerned debt. The process of interest payment implies that once the interests are settled, only the difference gets paid out to the participant who has the right to it. The contracts are concluded for the period ranging from 3 to 10 years, in convertible currencies and may be of a very large value. The main reason behind the swap is that the debtors may use a credit under the most favourable conditions, having the possibility to swap the existing interest rate for some other more favourable one.

The interest rate swap has the largest share at the swap market, and it implies that the fixed interest rate is swapped for the floating interest rate in the same currency, calculated on the basis of the common notional principal amount. The standard swap agreement defines the following: interest rates that are to be swapped, interest rate type (fixed or floating), nominal principal amount, time period within which the swap is to be conducted, etc. Pursuant to the contract, one party pays a floating interest rate, and the other party pays a fixed interest rate. All transactions are conducted through a dealer. The swap essentially means that the parties exchange the interest rates they are paying for, thus reducing the finance costs. One party, having access to the relatively cheap sources at a fixed interest rate, wishes to pay a floating interest rate. The other party is in the reverse situation, having access to the resources at a floating interest rate, but wishing to pay a fixed interest rate. Swap enables them to pay the interest rate which suits them. In swap operations, the parties do not conduct the payment simultaneously, at the specified date. This happens very rarely, and

usually the party paying the fixed interest rate conducts its payments annually, and the party paying the floating interest rate conducts its payments semi-annually or quarterly.

In practice, issuers with lower credit rating cannot issue bonds with lower interest rates, because the investors will not be interested in buying them. Another issuer, with high credit rating, can issue bonds with a low fixed interest rate. By means of interest rate swap, the issuer with lower credit rating commits to a contractual obligation to pay the fixed long-term costs of the high-rating issuer. In fact, the low-rating issuer obtains a long-term loan at a much lower cost than if there were no swap contract. The high-rating issuer pays the short-term floating rate on the low-rating issuer's loan. Thus he swaps his fixed long-term interest rate for a more flexible and cheaper short-term interest rate. In other words, the high-rating issuer obtains a long-term loan at a fixed interest rate, but pays the floating interest rate to the low-rating issuer. On the other hand, the low-rating issuer obtains a short-term loan at a floating interest rate, but pays the fixed interest rate to the high-rating issuer. The swap partners first borrow the cash funds at the market at which they can, and then they swap their interest rate payment obligations.

The swap partners having a lower credit rating sometimes have to accept the "trigger" clause, enabling the other partner to terminate the swap contract if the low-rating partner's credit rating gets further downgraded (Rose, Hudgins, 2005).

Swaps are traded at the secondary market. The forms of swap trade are the following (Fabozzi, Modigliani, 2003):

- (a) Swap sales, when the party wishing to leave the swap operation finds another partner willing to assume the obligations and get a certain compensation;
- (b) Reverse swap, when one party wishes to leave a swap operation and enter the new swap, in which maturity equals the time remaining till the maturity of the previous swap, the benchmark interest rate and principal being the same; and
- (c) Swap termination, when the swap gets sold to one of the swap partners, with certain compensation.

sredstva na onom tržištu na kojem mogu, a zatim zamenjuju obaveze plaćanja kamatne stope.

Partner u svopu sa nižim kreditnim rejtingom ponekad moraju da prihvate klauzulu "okidač" koja omogućava drugom partneru da raskine ugovor o svopu ukoliko dođe do dodatnog pada kreditnog rejtinga partnera sa nižim rejtingom (Rose, Hudgins, 2005).

Svopom se trguje na sekundarnom tržištu. Oblici trgovine svopa su (Fabozzi, Modigliani, 2003):

- (a) prodaja svopa, pri čemu strana koja želi da izađe iz svopa pronalazi novog partnera koji je spreman da preuzme njegove obaveze i dobija određenu kompenzaciju,
- (b) obrnuti svop gde jedna strana želi da izađe iz svopa i ulazi u novi svop u kojem je rok dospeća jednak vremenu preostalom do dospeća prethodnog svopa, a referentna kamatna stopa i glavnica su iste, i
- (c) poništavanje svopa, predstavlja prodaju svopa jednom od partnera u svopu uz određenu kompenzaciju.

U praksi se sem svopa kamatne stope primenjuju i valutni svop, svop akcija i robni svop. *Valutni svop* podrazumeva zamenu kamate po fiksnoj stopi u jednoj valuti za kamatu sa promenljivom stopom u drugoj valuti. Često dolazi i do razmene glavnica koje su denominirane u različitim valutama. Primenjuje se kada jedna strana ima pristup određenoj valuti pod povoljnijim uslovima u odnosu na drugu stranu. U valutnom svopu dolazi do razmene i kamate i glavnice. *Akcijski svop* podrazumeva da investitor ostvaruje prihod po osnovu nekog tržišnog indeksa, a u zamenu plaća svop dileru promenljivu kamatnu stopu, fiksnu kamatnu stopu ili prihod po osnovu drugog tržišnog indeksa. Nastao je u cilju rešavanja problema investiranja između različitih zemalja. Kod akcijskog svopa investitor ostvaruje prihod na osnovu određenog tržišnog indeksa i u zamenu plaća svop dileru LIBOR (ili fiksnu kamatnu stopu ili drugi tržišni indeks). Nominalna glavnica može biti fiksna ili varijabilna, ali je ista za partnere u svopu. Svop akcija omogućavaju razmenu novčanih tokova zasnovanih na dve različite stope: varijabilne dugovne kamate (npr. tromesečni LIBOR) i prihoda na akcijski

indeks (npr. S&P 500). Akcijski svopovi mogu biti strukturirani na osnovu drugih indeksa kao što su TOPIX (Japan), FT-SE 100 (Velika Britanija), DAX (Nemačka), CAC 40 (Francuska), TSE 35 (Kanada), Hang Seng (Hong Kong) i sl. U svopu, oba novčana toka mogu biti denominirana u istoj valuti ili u dve različite valute. Kod akcijskih svopova zasnovanih na indeksu, novčani tok je denominiran u valuti zemlje indeksa, ali svop može biti organizovan tako da se plaćanje automatski hedžira u drugu valutu. Razvoju akcijskog svopa je doprinelo nekoliko faktora. Ovi aranžmani omogućavaju investitorima da ostvare prednost na osnovu promena cena akcija u određenoj zemlji, bez direktne kupovine akcija. Ovo smanjuje transakcione troškove. Najčešći oblik akcijskog svopa je kada partner u svopu prima plaćanje zasnovano na indeksu, a plaća fleksibilnu kamatnu stopu drugoj strani u svopu. Svop akcija omogućava korisnicima da ostvare prihod na akcije koje nemaju u svom portfoliju, da ostvare fiksni prihod ako u portfoliju imaju samo akcije ili da drže portfolio domaćih akcija, a primaju prihod od portfolija stranih akcija. *Robni svop* podrazumeva učešće dve strane gde jedna strana plaća drugoj fiksnu cenu za određenu količinu robe, a druga plaća prvoj promenljivu cenu baziranu na ceni robe na spot tržištu za istu količinu robe. Učesnici svopa ne razmenjuju robu iz svopa.

Kamatni sporazumi (Interest rate agreements) predstavljaju dogovor između dve strane gde jedna pristaje da za proviziju nadoknadi drugoj eventualnu promenu do koje dolazi usled promene referentne kamatne stope u odnosu na određeni nivo (strike rate). Strana kojoj će biti isplaćena nadoknada (zbog promene kamatne stope) je kupac, a strana koja vrši nadoknadu je prodavac i za uslugu dobija proviziju. Strana koja želi da se zaštiti kupuje kamatni sporazum od prodavca. Kupac plaća premiju. Kamatni sporazumi obuhvataju pravo, ali ne i obavezu. Jedino prodavac ima obavezu na osnovu ugovora.

Kamatnim sporazumima se trguje na vanberzanskom tržištu. Instrumenti koji se koriste u cilju zaštite od promene kamatne stope su:

- (a) instrument za garantovanje gornje granice kamatnih stopa, "kamatni plafon" (caps),

Apart from interest rate swap, currency swap, shares swap and commodity swap can also be found in practice. Currency swap implies swapping a fixed interest rate in one currency for a floating interest rate in another currency. Frequently the principals denominated in different currencies also get swapped. This type of swap is applied when one party has access to a certain currency under more favourable conditions in comparison with another party. In the process of currency swap both interest and principal are swapped. Shares swap implies that the investor yields profit on the basis of a certain market index, in exchange paying to his/her dealer a floating interest rate, fixed interest rate, or profit on the basis of some other market index. It was established with a view to solving the problem of cross-border investments. In the process of shares swap, an investor yields profit on the basis of a certain market index, and, in return, pays LIBOR to the swap dealer (or fixed interest rate or another market index). The nominal principal can be fixed or floating, but has to be the same for the swap partners. Shares swap enables exchange of cash flows based on two different rates: floating debt rate (for instance, three-month LIBOR) and return on shares index (for instance S&P 500). Shares swaps can be structured on the basis of some other indices, such as TOPIX (Japan), FT-SE 100 (Great Britain), DAX (Germany), CAC 40 (France), TSE 35 (Canada), Hang Seng (Hong Kong), etc. In swap both cash flows can be denominated in the same currency or in two different currencies. In case of index-based shares swap, the cash flow is denominated in the currency of the index country, but swap can also be organized in such a way that the payment gets automatically hedged into another currency. Several factors contributed to the shares swap development. These arrangements enable investors to gain competitive advantage on the basis of price fluctuations in a certain country, without directly purchasing the shares. This reduces the transaction costs. The most common type of shares swap is when a swap partner receives an index-based payment, and pays back the flexible interest rate to the other swap party. Shares swap enables users to yield profit on shares they do not have in their portfolio, to yield fixed profit if they have

an only-shares portfolio, or to keep a portfolio of domestic shares while receiving profit from a foreign shares portfolio. Commodity swap implies the participation of two parties, one of which is paying to the other a fixed price for a certain amount of goods, and the other paying back a floating price based on the spot market commodity price for the same amount of goods. The swap participants do not exchange the goods from the swap operation.

Interest rate agreement represents a deal between two parties in which one party, for a fee, agrees to compensate to the other party a possible change which may occur due to the changes in the benchmark interest rate in comparison to the certain level (strike rate). The party which receives the compensation (due to the interest rate changes) is the buyer, and the party paying the compensation is the seller, who receives a fee for this service. The party wishing to protect itself buys an interest rate agreement from the seller. The buyer pays the premium. Interest rate agreements entail the right, not the obligation. Only the seller has the contractual obligation.

Interest rate agreements are traded in the OTC market. The instruments used for protection against the interest rate changes are the following:

- (a) Instruments for guaranteeing the top interest rate limit, the "interest rate caps";
- (b) Instruments for guaranteeing the bottom interest rate limit, the "interest rate floors"; and
- (c) The combination of the two, the "interest rate collars".

Instruments for guaranteeing the top interest rate limit, the "interest rate caps" provide protection against the interest rate growth, because they set the top interest rate limit for the debtor. On the other hand, instruments for guaranteeing the bottom interest rate limit, the "interest rate floors" protect the creditor from the drop in loan-based revenues if the interest rates at the market start decreasing. If the interest rate agreement seller commits to conducting a payment to the buyer if the interest rate exceeds the strike level, it is an interest rate cap agreement. If the interest rate agreement seller is to conduct a payment to the buyer if the benchmark interest rate drops

- (b) instrument za garantovanje donje granice kamatnih stopa, "kamatni pod" (floors), i
- (c) kombinacija pretodna dva, "kamatna kragna" (collars).

Instrument za garantovanje gornje granice kamatnih stopa "kamatni plafon" (caps) pruža zaštitu od rasta kamatnih stopa, jer postavlja gornju granicu stope za zajmoprimca. Sa druge strane, instrument za garantovanje najnižih kamatnih stopa "kamatni pod" (floors), štiti zajmodavca od pada prinosa po zajmu ukoliko kamatne stope na tržištu beleže pad. Ako se prodavac kamatnog sporazuma obavezuje da će izvršiti plaćanje kupcu ukoliko referentna kamatna stopa pređe utvrđeni (strajk) nivo, radi se o *sporazumu o maksimalnoj kamatnoj stopi* (interest rate cap). Ako prodavac kamatnog sporazuma plati kupcu ukoliko referentna kamatna stopa padne ispod određenog (strajk) nivoa radi sa o *sporazumu o minimalnoj kamatnoj stopi* (interest rate floor). Kupac "kamatnog plafona" dobija kompenzaciju ako kamatna stopa poraste iznad definisanog nivoa, strajk stope (strike). Kod "kamatnog poda" kupac dobija kompenzaciju kada kamatna stopa padne ispod definisanog nivoa, strajk stope.

Kombinacija ova dva instrumenta, "kragna" (collar) podrazumeva da jedna strana kupuje maksimalnu i prodaje minimalnu visinu kamatne stope kako bi se obezbedila isplata i kada kamatna stopa raste i kada pada u odnosu na utvrđeni strajk nivo. Kombinacija najviših i najnižih kamatnih stopa (collars) "zamrzava" stope po zajmu ili prinose po hartijama od vrednosti u okviru predviđenog limita koji je određen u ugovoru između zajmodavca i zajmoprimca. Kamatni sporazum definiše najznačajnija pitanja u vezi referentne kamatne stope, strajk stope, roka dospeća, vremena saldiranja (najčešće polugodišnje) i nominalne glavnice (Fabozzi, Modigliani, 2003).

Sporazum o reotkupu

Sporazum o reotkupu (repurchase agreement, REPO) je ugovor o prodaji hartija od vrednosti sa obavezom reotkupa istih u definisanom roku i po utvrđenoj ceni. Prodavac hartija od vrednosti se obavezuje da će iste otkupiti od kupca, po većoj ceni. Na ovaj način prodavac dolazi do novčanih sredstava,

kupac zarađuje i hartije od vrednosti služe kao kolateral. Dakle, repo sporazum je vrsta kredita osigurana hartijama od vrednosti koje su predmet transakcije. Repo transakcija se sastoji iz dva koraka. Prvi korak je prodaja hartija od vrednosti, a reotkup istih je drugi korak. Prodavac hartija od vrednosti o roku dospeća plaća nominalni iznos i kamatu. Kamata predstavlja troškove finansiranja.

Dileri se najčešće nalaze u ulozi prodavca kolaterala i ovo tržište je za njih najznačajniji izvor finansiranja. Na drugoj strani, kao kupci kolaterala se javljaju fondovi tržišta novca, zajednički fondovi, penzione i osiguravajuće kompanije, druge finansijske institucije i kompanije, koji imaju višak novčanih sredstava. Kolateral u repo poslu mogu biti instrumenti tržišta novca, hartije od vrednosti Trezora, državnih agencija, hartije od vrednosti pokrivene hipotekom i aktivom, akcije i korporativne dugovne hartije od vrednosti itd. Repo poslovi omogućavaju prikupljanje kratkoročnih sredstava korišćenjem dugoročnih finansijskih instrumenata kao kolateral. Repo tržište u SAD je najveće kratkoročno tržište novca na svetu.

Na repo tržištima postoje reupovna i reprodajna tržišta. Dileri kupuju hartije od vrednosti i obavezuju se da će ih prodati prodavcu, na osnovu ugovora o reprodaji (Resale Agreements). Diler prodaje hartija od vrednosti i obavezuje se da će ih kupiti na osnovu ugovora o reupovini (Repurchase Agreements).

Kada finansijska institucija pozajmljuje novac dileru kupujući hartije od vrednosti i obavezujući se da ih proda nazad dileru, to je *repo* transakcija. Ako Fed (FED) kupuje hartije od vrednosti i dilerima pozajmljuje novac sa obavezom da im proda iste to je tzv. *sistemski repo* (system repo) Ako finansijska institucija pozajmljuje novac od dilera prodajući mu hartije od vrednosti (diler kupac kolaterala) i obavezuje se da će hartije od vrednosti otkupiti transakcija se naziva *obrnuti repo* (reverse repo). Repo i obrnuti repo (reverse repo) su omogućili da dileri vrše uparivanje (tzv. *matched book*). Dileri su počeli da traže zainteresovane strane za repo poslove i da ih uparuju. Istovremeno vrše repo i obrnuti repo i zarađuju raspon (spread).

below the strike level, it is an interest rate floor agreement. The buyer of the “interest rate cap” receives compensation if the interest rate increases above the strike level. In case of the “interest rate floor”, the buyer” receives compensation if the interest rate decreases below the strike level.

The combination of these two instruments, the “collar” means that one party buys the maximum and sells the minimum interest rate level in order to provide payment both in the case when the interest rate increases and when it decreases in comparison to the strike level. The combination of the highest and the lowest interest rates (the “collar”) “freezes” the loan-related rates or revenues in respect of securities within the set limit defined by the contract between a creditor and a debtor. Interest rate agreement defines the most significant issues related to the benchmark interest rate, strike rate, maturity, settlement frequency (usually semi-annually), and nominal principal amount (Fabozzi, Modigliani, 2003).

Repurchase Agreement

The repurchase agreement (REPO) is a contract on selling securities, imposing the obligation to repurchase them within the set

period of time and at the predefined price. The securities seller is obliged to repurchase the same securities from the buyer, at the higher price. Thus the seller obtains money funds, the buyer gains profit, and the securities serve as collateral. Therefore, the repo agreement is a type of credit insured by securities which are the subject of transaction. The repo transaction has two steps. The first step is to sell the securities, and the second step is to repurchase them. Upon maturity the seller of securities pays the nominal amount and the interest. The interest reflects the finance costs.

Dealers most frequently appear in the role of collateral sellers, this market being the most significant source of finance for them. On the other side, as collateral buyers there are money market funds, mutual funds, pension and insurance companies, and other financial institutions and companies, having a surplus of money finds. Collaterals in repo operations may be the money market instruments, Treasury and state agencies’ securities, mortgage-backed and asset-backed securities, shares and corporate debt securities, etc. Repo operations enable collection of short-term funds by using long-term financial instruments as collateral. Repo market in the USA is the biggest short-term money market in the world.



Repo transakcije se najčešće izvršavaju u kratkom vremenskom periodu. Jednodnevne transakcije se nazivaju i repo preko noći (overnight repo). Ukoliko ima duži rok dospeća tada je to vremenski repo (term repo). Rok dospeća je najčešće oko 15 dana, ali i nekoliko meseci. Otvoreni repo (open basis) nema rok dospeća i transakcija se završava kada jedna od strana odluči da zatraži ispunjenje obaveza iz ugovora.

Kamatna stopa koju investitor (kupac hartija od vrednosti) dobija za pozajmljena novčana sredstva naziva se repo stopa. Repo stopa određenih hartija od vrednosti zavisi od (Fabozzi, Modigliani 2003): kvaliteta kolaterala (veći bonitet emitenta i likvidnost kolaterala niža je i repo stopa), vremenskog roka (kraći rok nosi nižu stopu), zahteva isporuke (ukoliko se hartije od vrednosti koje su kolateral isporučuju niža je repo stopa) i dostupnost kolaterala (ukoliko je teže pribaviti određene hartije od vrednosti, niža je repo stopa). Na repo stopu utiču i kreditni bonitet zajmoprimca, uslovi na tržištu i sl.

U praksi repo stopa može da bude i negativna (Liaw, 2006). Negativna repo stopa podrazumeva da investitor, odnosno kupac kolaterala ne naplaćuje repo stopu i plaća proviziju za upotrebu kolaterala. Interes kupca je pokrivanje kratke pozicije i nastojanje da ispuni obaveze po osnovu obrnutog (reverse) repoa ili fjučers ugovora ili neke druge transakcije. Spreman je da plati visoku proviziju za upotrebu kolaterala.

Obe strane u repo transakciji su izložene kreditnom riziku jer se vrednost kolaterala na tržištu može promeniti. Da bi se zaštitili od promene vrednosti kolaterala, kupci kolaterala zahtevaju *marginu (ili haircut)* koja predstavlja procenat od vrednosti kolaterala. Procenat margine zavisi od vrste kolaterala i vremenskog roka repoa. Kada se hartije od vrednosti Trezora koriste kao kolateral margina je od 1 do 2%. Veća je u slučaju hartija od vrednosti sa nižim kreditnim rejtingom (oko 3%). Veća je margina ako je kolateral manje likvidan ili ako je druga strana u repou nižeg kreditnog rejtinga. Margina se plaća iz predostrožnosti jer tržišna vrednost kolaterala može da padne. Ako se strane poznaju i kolateral ima kratak rok dospeća margina se najčešće ne koristi.

Ako cena kolaterala padne dve su mogućnosti: nadoknađuje se vrednost kolaterala ili se smanjuje vrednost kredita.

U praksi se primenjuje i repo sa tri učesnika (triparty repo) u kome se javlja kastodi banka kao posrednik između strana u repo transakciji. Kastodi banka upravlja novčanim računom i računom hartija od vrednosti. Kastodi banka je dužna da dnevno prati tržišnu vrednost kolaterala i da ukazuje na eventualne promene. Na dan dospeća repo posla, banka transferiše glavnice i kamatu sa računa dilera na račun investitora. Istovremeno banka prenosi kolateral sa računa investitora - kupca na račun dilera - prodavca.

Zaključak

Finansijski inženjering omogućava kreiranje novih hartija od vrednosti i drugih finansijskih instrumenata. Snažna konkurencije između banaka i drugih finansijskih institucija, promene poreskih i drugih zakonskih propisa, tražnje za novim izvorima finansiranja povećale su značaj finansijskog inženjeringa. Novi finansijski instrumenti imaju nove investicione karakteristike. Na razvoj finansijskog inženjeringa pozitivno su uticali: upravljanje rizicima, novi izvori finansiranja, niži troškovi finansiranja, pitanja vezana za pravnu regulativu i porez i primena kompjuterske tehnologije. Prvi proizvodi finansijskog inženjeringa su forvord, fjučersi i opcije, a kasnije su nastale i visokoprinosne obveznice, obveznice bez kupona, hartije od vrednosti pokrivene hipotekom i hartije od vrednosti pokrivane aktivom, sporazumi o reotkupu i sl. Finansijski derivati forvord, fjučers, opcija, svop i kamatni sporazumi omogućavaju upravljanje rizikom. Visokoprinosne obveznice su nastale jer je postojala zainteresovanost investitora da preuzmu viši rizik kako bi ostvarili veći prinos. Obveznice bez kupona nastaju razdvajanjem jedne hartije od vrednosti na nekoliko novih hartija od vrednosti. Obveznica Trezora se razdvoji i na osnovu glavnice i kamata se formiraju nove obveznice tzv. STRIPS ili "trake Trezora". Sekjuritizacija aktive omogućava kreiranje novih hartija od vrednosti na osnovu prepakivanja kredita i druge aktive. Procesom sekjuritizacije nastao je veliki broj različitih

Within repo markets there are repurchase and resale markets. Dealer purchases securities and commits to selling them to the seller, on the basis of a Resale Agreement. Dealer sells securities and commits to buying them on the basis of a Repurchase Agreement.

When a financial institution lends money to a dealer by purchasing securities and committing to sell them back to the dealer, this is called a repo transaction. If the Fed buys securities, lending money to the dealers, at the same time committing to sell the same securities back to them, it is a so-called system repo. If a financial institution borrows money from a dealer by selling securities (dealer as a collateral buyer) and commits to buy back the securities, the transaction is called reverse repo. Repo and reverse repo have enabled the so-called matched book for dealers. Dealers started to search for the parties interested in repo operations and to match them. They conduct repo and reverse repo simultaneously and earn spread.

Repo transactions are most often conducted in a short period of time. One-day long transactions are also called overnight repo. If the tenor is longer, then the transaction is term repo. The tenor is usually about 15 days, but may also be several months. The open-basis repo has no tenor and the transaction is finished when one of the parties decides to demand honouring of the contract obligations.

The interest rate the investor (buyer of securities) receives on the lent money funds is called repo rate. The repo rate of the certain securities depends on the following (Fabozzi, Modigliani, 2003): quality of the collateral (the higher solvency of the issuer and the collateral liquidity, the lower the repo rate), tenor (shorter tenor entails lower rate), delivery demand (if the securities serving as collateral are to be delivered, the repo rate is lower), and collateral accessibility (if certain securities are harder to obtain, the repo rate is lower). The repo rate is also influenced by the debtor's creditworthiness, market conditions, etc.

In practice, repo rate can also be negative (Liaw, 2006). The negative repo rate implies that the investor, i.e. the buyer of the collateral does not charge for the repo rate and pays a fee for the use of the collateral. It is in the buyer's interest to cover the short positions and to

tend to honour the obligations in respect of the reverse repo or the futures contract or some other transaction. The buyer is willing to pay a high fee for the use of the collateral.

Both parties in a repo transaction are exposed to the credit risk, since the market value of the collateral is changeable. In order to protect themselves from any changes in the value of the collateral, the buyers of the collateral require a margin (or a haircut), representing a percent of the collateral's value. The percent of the margin depends on the type of collateral and the repo's tenor. When the Treasury securities are used as collateral, the margin ranges from 1% to 2%. It is higher in case of the lower-credit rating securities (about 3%). The margin is higher if the collateral is less liquid, or if the other repo party has a lower credit rating. The margin is paid out of precaution, because the market value of the collateral may drop. If the parties know each other and the collateral has a short tenor, the margin is usually not used. If the price of collateral drops, there are two possibilities: either the value of the collateral gets compensated, or the amount of credit gets reduced.

In practice, the tri party repo is also applied, within which a custody bank appears as an intermediary between the parties participating in a repo transaction. The custody bank manages the cash account and the securities account. The custody bank is obliged to monitor the market value of the collateral on a daily basis, pointing to any potential changes. At the maturity date of the repo operation, the bank transfers the principal and the interest from the dealer's account to the investor's account. At the same time, the bank transfers the collateral from the buyer-investor's account to the seller-dealer's account.

Conclusion

Financial engineering enables the creation of securities and other financial instruments. The harsh competition between banks and other financial institutions, changes in tax and other legal regulations, and the demand for the new sources of finance, have increased the significance of financial engineering. The new financial instruments possess the

dugovnih hartija od vrednosti koje možemo podeliti u dve velike grupe na: hartije od vrednosti pokrivene hipotekom i hartije od vrednosti pokrivene aktivom. Repo ugovor podrazumeva da jedna strana prodaje hartije od vrednosti i dobija novac, pri čemu se obavezuje da će iste u budućnosti otkupiti po

većoj ceni. Razlikujemo ugovor o reprodukciji i ugovor o rekupovini, sistemski repo i obrnuti repo. Finansijski inženjering omogućava investicionim bankama i drugim finansijskim institucijama da kreiraju hartije od vrednosti u skladu sa zahtevima investitora.

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new investment characteristics. The positive influence was exerted on the development of financial engineering by: risk management, new sources of finance, lower finance costs, issues related to the legal regulations and tax, and application of computer technology. The first products of financial engineering are forward, futures, and options, and later on, high-yield bonds, zero-coupon bonds, mortgage-backed and asset-backed securities, repo arrangements, etc. The financial derivatives, such as forward, futures, option, swap, and interest agreements, facilitate risk management. High-yield bonds were created because the investors became interested in taking the higher risk in order to yield higher profit. Zero-coupon bonds were created by dividing one security into the several new securities. Treasury bond is divided, and

on the basis of the principal and interests, the new bonds are formed, the so-called STRIPS or "Treasury strips". Asset securitization enables the creation of new securities on the basis of repacking the credits and other assets. In the process of securitization the large number of different debt securities was formed, that can be divided into two large groups: mortgage-backed securities and asset-backed securities. Repo arrangement implies that one party sells securities and receives money, obliging to repurchase the same in the future at a bigger price. There are the following types of agreements: re-sell agreement, re-purchase agreement, system repo, and reverse repo. Financial engineering enables banks and other financial institutions to create securities according to the investors' demands.

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