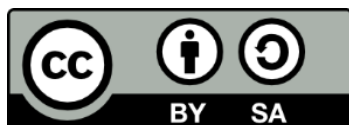


Χρηματοοικονομική II

Ενότητα 5: Πιστωτικά Παράγωγα (Credit derivatives)

Ιωάννης Ταμπακούδης

Τμήμα Οργάνωσης και Διοίκησης Επιχειρήσεων



Ευρωπαϊκή Ένωση
Ευρωπαϊκό Κοινωνικό Ταμείο



ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ ΚΑΙ ΘΡΗΣΚΕΥΜΑΤΩΝ
ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΔΙΑΧΕΙΡΙΣΗΣ

Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης



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επένδυση στην κοινωνία της γνώσης
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Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης



ΕΣΠΑ
2007-2013
πρόγραμμα για την ανάπτυξη
ΕΥΡΩΠΑΪΚΟ ΚΟΙΝΩΝΙΚΟ ΤΑΜΕΙΟ

Credit derivatives & Structured Products



Introductory observations

- A fundamental issue that financial institutions and corporates face is credit risk:
- The risk that a counterparty to a financial transaction will fail to fulfill its obligation.
- The risk of borrower default can impair the lender's capital structure and trigger similar effects upon the entire organization.
- During the last few years credit risk management experienced a revolution, which primarily generated by the emergence of credit derivatives.
 - The traditional risk transfer techniques (such as syndication, securitization, asset back securities and loan sales) proved to be insufficient.
- However, these new innovative instruments have raised serious concerns, deriving mainly from the collapse of the U.S. subprime mortgage crisis.

No Title

- “In bypassing barriers between different classes, maturities, rating categories, debt seniority levels and so on, credit derivatives are creating enormous opportunities to exploit and profit from associated discontinuities in the pricing of credit risk”.
- Blythe Masters, global head of credit derivatives marketing at J.P. Morgan

What are credit derivatives?

- Credit derivatives are bilateral financial contracts that isolate specific aspects of credit risk from an underlying instrument and transfer that risk between two parties.
 - In so doing, credit derivatives separate the ownership and management of credit risk from other qualitative and quantitative aspects of ownership of financial assets.
 - Thus, credit derivatives share one of the key features of historically successful derivatives products, which is the potential to achieve efficiency gains through a process of market completion.
- By separating specific aspects of credit risk from other risks, credit derivatives allow even the most illiquid credit exposures to be transferred from portfolios that have but don't want the risk to those that want but don't have that risk.
- Credit derivatives are fundamentally changing the way banks price, manage, transact, originate, distribute, and account for credit risk.

Significant characteristics

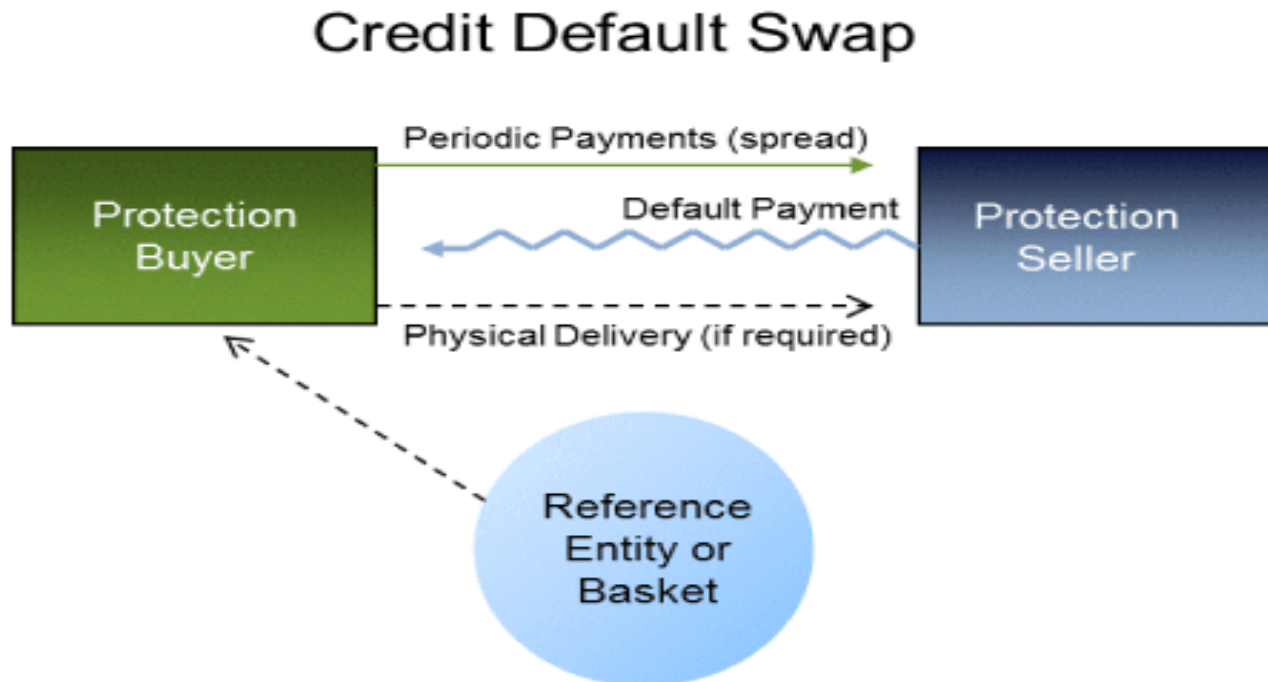
- There are several distinct arguments that make a strong case for increasing use of credit derivatives by banks and by all institutions that routinely carry credit risk as part of their day-to-day business:
 - The Reference Entity, whose credit risk is being transferred, need neither be a party to nor aware of a credit derivative transaction.
 - The absence of the Reference Entity at the negotiating table also means that the terms (tenor, seniority, compensation structure) of the credit derivative transaction can be customized to meet the needs of the buyer and seller of risk, rather than the particular liquidity or term needs of a borrower.
 - Credit derivatives are the first mechanism via which short sales of credit instruments can be executed with any reasonable liquidity and without the risk of a short squeeze.
 - It is more or less impossible to short-sell a bank loan, but the economics of a short position can be achieved synthetically by purchasing credit protection using a credit derivative.
 - Credit derivatives are off-balance sheet instruments, offering considerable flexibility in terms of leverage.

Basic credit derivatives

- The most highly structured credit derivatives transactions can be assembled by combining three main building blocks:
 - Credit (Default) Swaps (CDS)
 - Total Return Swaps (TRS)
 - Credit Options
 - Credit linked notes (CLN)
 - Collateralized Debt Obligations (CDOs) and Synthetic CDOs

Credit Default Swaps (CDS)

- A CDS is a bilateral financial contract in which one counterparty (the Protection Buyer) pays a periodic fee, typically expressed in basis points per annum, paid on the notional amount, in return for a Contingent Payment by the Protection Seller following a Credit Event with respect to a Reference Entity.



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What is a Credit Default Swap?

A credit default swap is an agreement between two parties that works like a side bet on a football game. Swap sellers promise swap buyers a big payment if a company's bonds or loans default. In return for the promise they get quarterly payments. Neither needs to hold the underlying debt when entering into a swap.



Credit Default Swap Seller
Promises to pay swap buyer a set amount if Widgets "R" Us defaults, often \$10 million

- Receives annual payments from swap buyer in return for "insurance"
- Can include banks, insurance companies, hedge funds or others



Widgets "R" Us Corp.
Borrows money from banks or issues bonds to finance operations.

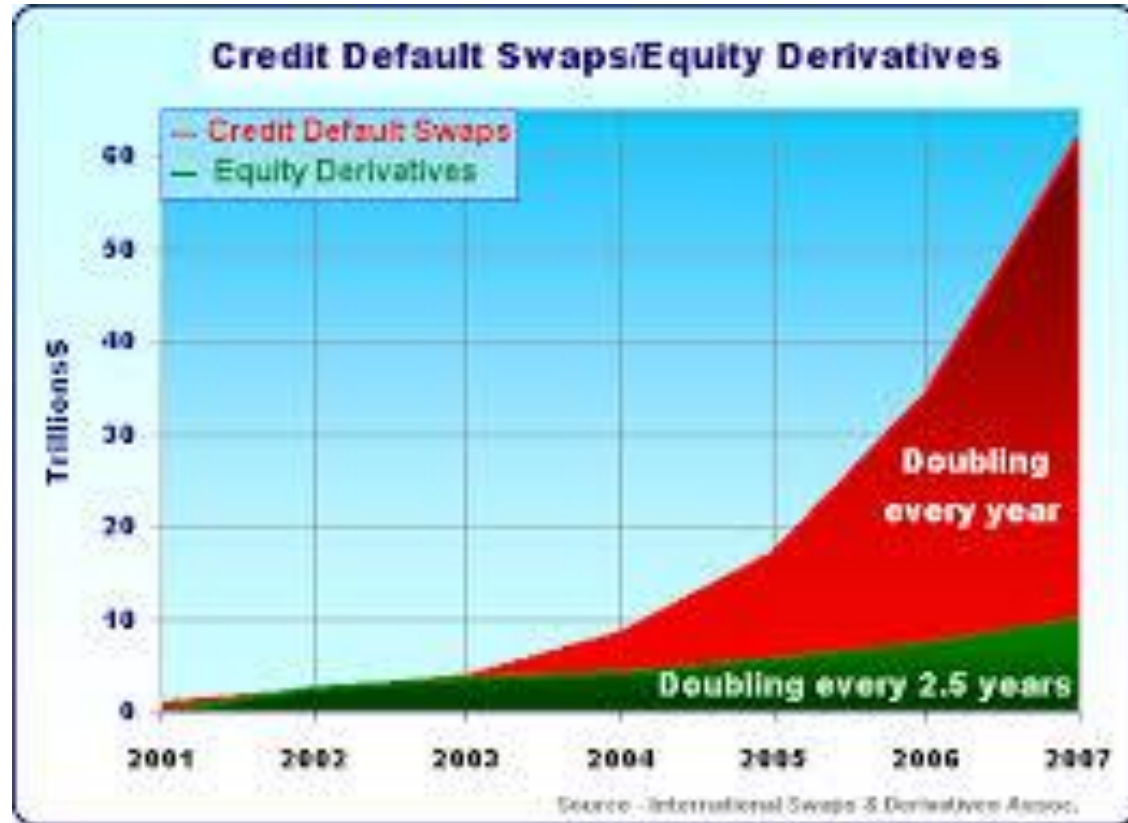


Credit Default Swap Buyer
Promises quarterly payments to swap seller

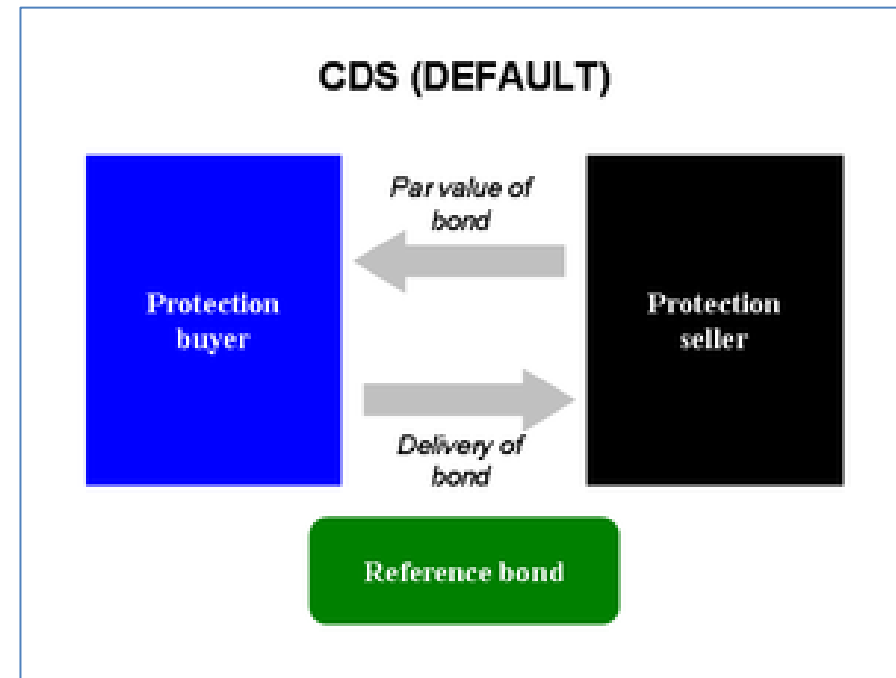
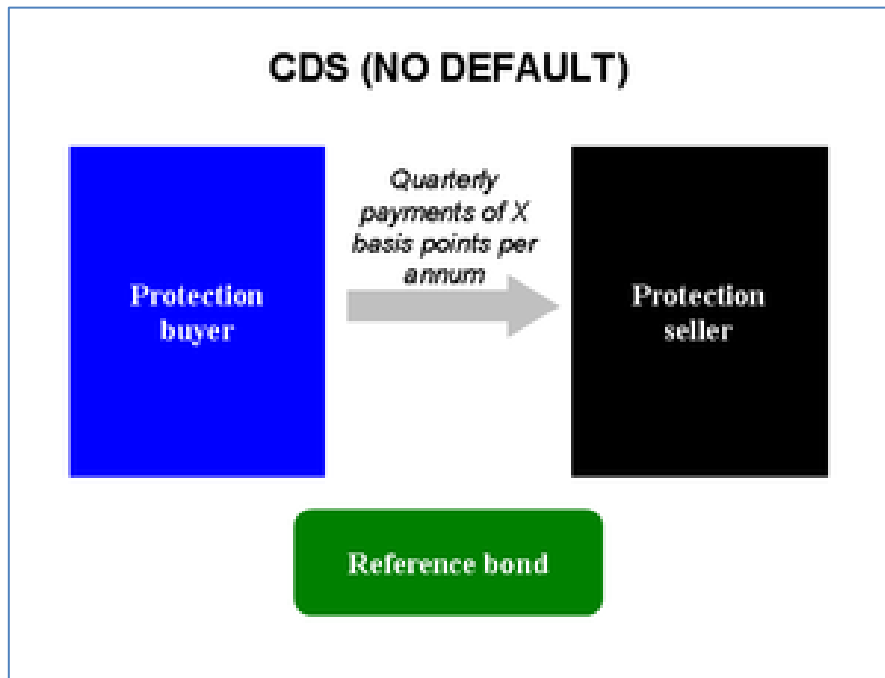
- Receives promise of large payout if bond defaults
- Can include banks, insurance companies, hedge funds or others
- If Widget's financial fortunes turn sour, the swap becomes more valuable. A swap holder can resell it and get high payments in return

Scott Pollack

No Title



Performance of reference entity



The role of ISDA

<https://www2.isda.org/>

- The International Swap and Derivatives Association (ISDA) has made available a standardized letter confirmation allowing dealers to transact CDS under the umbrella of an ISDA Master Agreement.
 - The standardized confirmation allows the parties to specify the precise terms of the transaction from a number of defined alternatives.
- The evolution of increasingly standardized terms in the credit derivatives market has been a major development because it has reduced legal uncertainty that, at least in the early stages, hampered the market's growth.
 - This uncertainty originally arose because credit derivatives, unlike many other derivatives, are frequently triggered by a defined (and fairly unlikely) event rather than a defined price or rate move.

Credit Event and Contingent Payment

- A “Credit Event” is most commonly defined as the occurrence of one or more of the following:
 - Bankruptcy (for non-sovereign entities) or Moratorium (for sovereign entities only)
 - Failure to meet payment obligations when due
 - Repudiation
 - Material adverse restructuring of debt
 - Obligation Acceleration or Obligation Default
- If a credit event occurs then CDS contracts can either be physically settled or cash settled.
 - Physical settlement: The protection seller pays the buyer par value, and in return takes delivery of a debt obligation of the reference entity.
 - Cash settlement: The protection seller pays the buyer the difference between par value and the market price of a debt obligation of the reference entity.

The market of CDS

- CDS, and indeed all credit derivatives, are mainly inter-professional (meaning non-retail) transactions.
 - Averaging \$25 to \$50 million per transaction, they range in size from a few million to billions of dollars.
- Reference Entities may be drawn from a wide universe including sovereigns, semi-governments, financial institutions, and all other investment or sub-investment grade corporates.
- Maturities usually run from one to ten years and occasionally beyond that, although counterparty credit quality concerns frequently limit liquidity for longer tenors.
- For corporates or financial institutions credit risks, five-year tends to be the benchmark maturity, where greatest liquidity can be found.
 - Market statistics at: http://www.bis.org/publ/otc_hy1311.pdf,
http://www.bis.org/publ/otc_hy1311.htm
 - Market data at: http://online.wsj.com/mdc/public/npage/2_3023_creditdervs.html

Uses of CDS

- Speculation

- Credit default swaps allow investors to speculate on changes in CDS spreads of single names or of market indices entering into a basis trade.
- An investor might speculate on an entity's credit quality, since generally CDS spreads increase as credit-worthiness declines, and decline as credit-worthiness increases.
- A CDS in which the buyer does not own the underlying debt is referred to as a naked credit default swap (estimated to be up to 80% of the CDS market).

- Hedging

- Credit default swaps are often used to manage the risk of default that arises from holding debt (loans, bonds, etc.).
- Another kind of hedge is against concentration risk.
- A bank buying protection can also use a CDS to free regulatory capital.

- Arbitrage

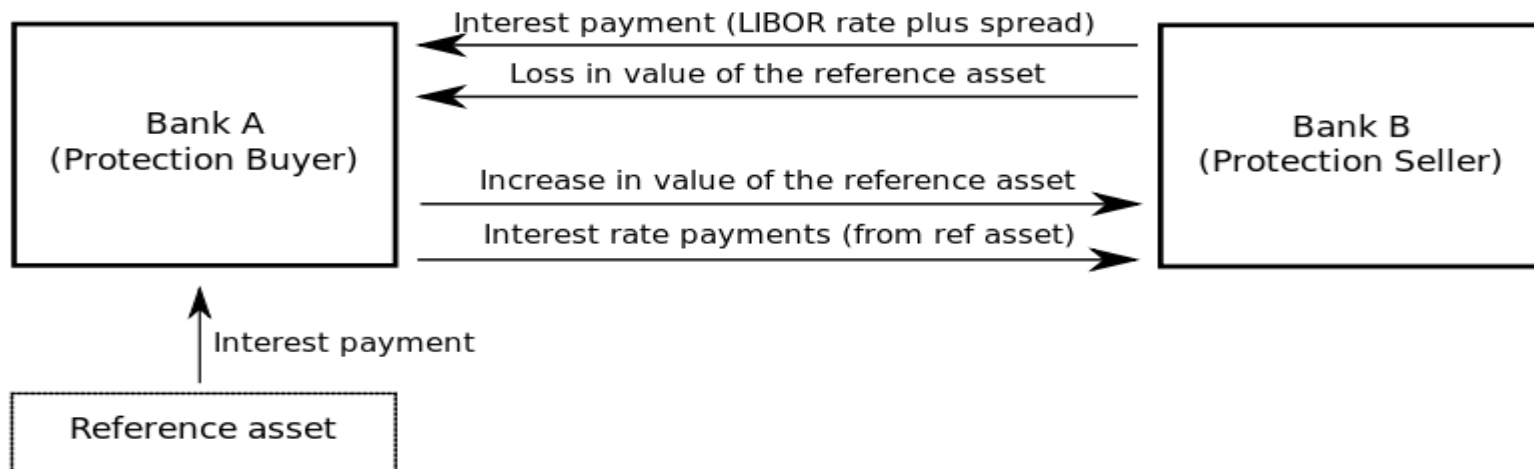
- Capital Structure Arbitrage (a company's stock price and its CDS spread should exhibit negative correlation)

Examples

- A hedge fund believes that Risky Corp will soon default on its debt. Therefore, it buys \$10 million worth of CDS protection for two years from AAA-Bank, (Risky Corp as the reference entity), at a spread of 500 basis points (5%) per annum.
 - If Risky Corp does indeed default after, say, one year, then the hedge fund will have paid \$500,000 to AAA-Bank, but then receives \$10 million (assuming zero recovery rate, and that AAA-Bank has the liquidity to cover the loss), thereby making a profit. AAA-Bank, and its investors, will incur a \$9.5 million loss minus recovery unless the bank has somehow offset the position before the default.
 - However, if Risky Corp does not default, then the CDS contract runs for two years, and the hedge fund ends up paying \$1 million, without any return, thereby making a loss. AAA-Bank, by selling protection, has made \$1 million.
- Note that there is a third possibility in the above scenario; the hedge fund could decide to liquidate its position after a certain period of time in an attempt to realize its gains or losses. For example:
 - After 1 year, the market now considers Risky Corp more likely to default, so its CDS spread has widened from 500 to 1500 basis points. The hedge fund may choose to sell \$10 million worth of protection for 1 year to AAA-Bank at this higher rate. Therefore, over the two years the hedge fund pays the bank $2 * 5\% * \$10 \text{ million} = \1 million , but receives $1 * 15\% * \$10 \text{ million} = \1.5 million (a total profit of \$500,000).

Total Return Swaps (TRS)

- A TRS is also a bilateral financial contract designed to transfer credit risk between parties, but it is importantly distinct from a CDS in that it exchanges the total economic performance of a specified asset for another cash flow.
 - That is, payments between the parties to a TRS are based upon changes in the market valuation of a specific credit instrument, irrespective of whether a Credit Event has occurred.



Advantages of TRS

- When entering into a TRS, the Protection Buyer has effectively removed all economic exposure to the underlying asset.
 - This risk transfer is effected with confidentiality and without the need for a cash sale.
- The maturity of a TRS does not have to match the maturity of the underlying asset.
 - Therefore, the Protection Buyer may benefit from being able to purchase protection for a limited period without having to liquidate the asset permanently.
- The TRS allows one party (Protection Seller) to derive the economic benefit of owning an asset without putting that asset on its balance sheet, and allows the other (Protection Buyer) to buy protection against loss in its value.
 - Hedge funds are using TRS to obtain leverage on the Reference Assets: they can receive the return of the asset, without having to put out the cash to buy the Asset.
- TRS can be categorized as a type of credit derivative, although the product combines both market risk and credit risk, and so is not a pure credit derivative.

Credit Default Options

- A Credit default option is an option on a credit default swap (CDS). It gives its holder the right, but not the obligation, to buy (call) or sell (put) protection on a specified reference entity for a specified future time period for a certain spread.
- The option is knocked out if the reference entity defaults during the life of the option.
 - This knock-out feature marks the fundamental difference between a CDS option and a vanilla option. Most commonly traded CDS options are European style options.

Credit linked notes (CLN)

- A CLN is structured as a security with an embedded CDS allowing the issuer to transfer a specific credit risk to credit investors.
 - The issuer is not obligated to repay the debt if a specified event occurs.
- It is issued by a special purpose company or trust, designed to offer investors par value at maturity unless the referenced entity defaults.
 - In the case of default, the investors receive a recovery rate.
- The trust will also have entered into a CDS with a dealer. In case of default, the trust will pay the dealer par minus the recovery rate, in exchange for an annual fee which is passed on to the investors in the form of a higher yield on their note.
 - The purpose of the arrangement is to pass the risk of specific default onto investors willing to bear that risk in return for the higher yield it makes available.

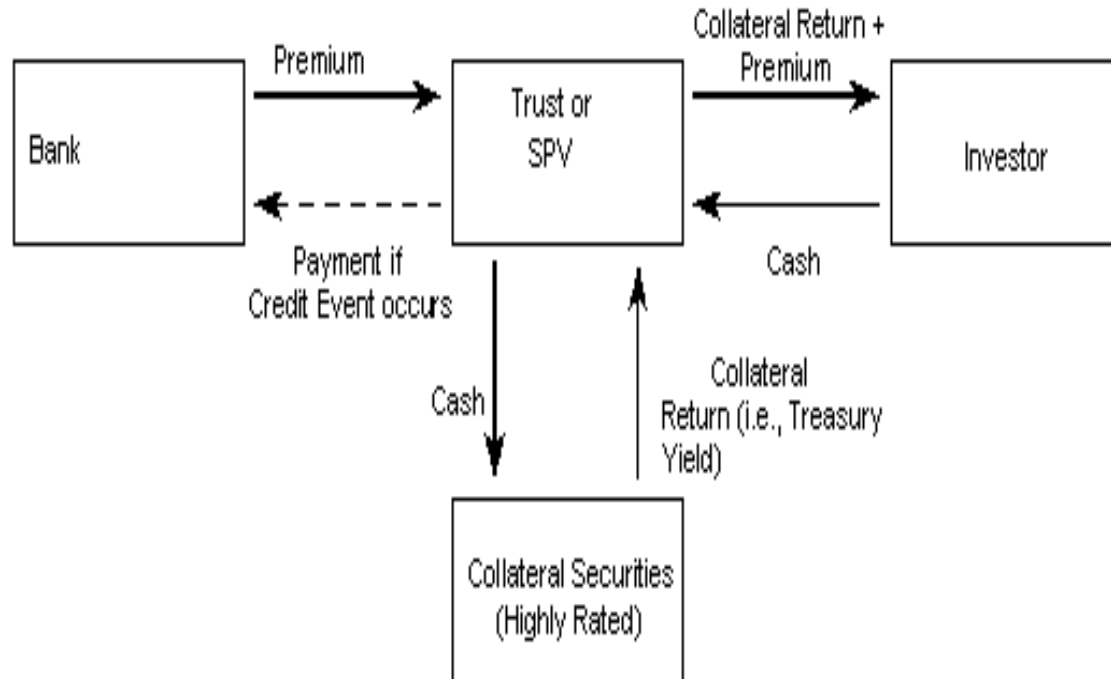
A four-step process for a CLN

- Step 1: A Loan Is Made
- The first step in the creation of a CLN is the issuance of credit (any type of loan). Once the lending institution has issued a loan, it can either wait for the borrower to repay the loan or to pass the loan onto another institution.
- Step 2: The Loan Is Sold
- If the bank decides to pursue the second option, it begins by shopping the loan to different trusts or SPCs. Typically, the bank must pay an annual fee to these institutions in exchange for the risk it is passing on.
- Step 3: A Special Purpose Company Divides up the Loan
- Instead of selling the loan as one entity, though, the SPC will divide the loan into multiple parts. Each of these parts can become its own security. Similarly, each of these parts could potentially be bundled up with other loan parts or other types of securities.
- Step 3: Investors Purchase the Divvied up Loan
- Over the life of the CLN, the investor receives a coupon rate plus par value at maturity. If a default occurs, however, the investor receives back a recovery rate. The SPC loses money as well, since it has to pay back the original lender.

Explanation of CLN

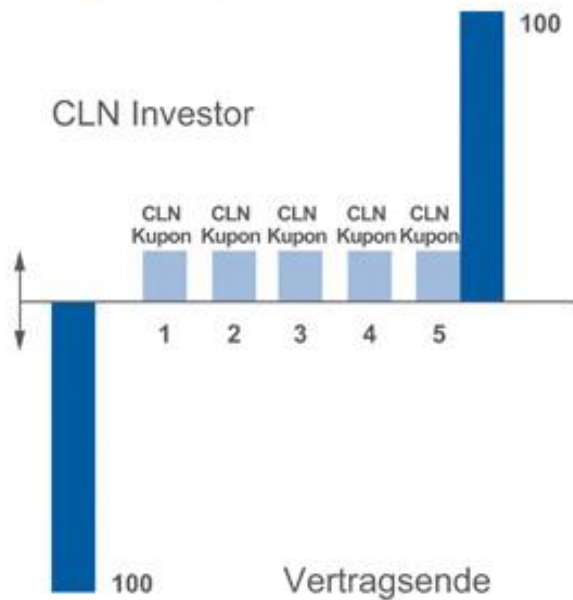
- There are four parties involved in order for a CLN to come into being: the borrower, the lender, a trust and an investor.
 - The borrower takes a loan from a lender. The lender engages in a default swap with a trust. The trust sells the default swap to an investor. This eliminates the need for an insurer on the loan.
- If the borrower defaults, the trust will pay the lender whatever amount it fails to recover on the debt and the investors lose everything.
 - The trust has no obligation to repay the investors the sum. They are repaid only the recovery rate plus a small annual fee.
- In a market of creditworthy borrowers, very few will default, leaving the investor with plenty of opportunities to make money in exchange for only a few losses.
 - However, in a market of borrowers who are not creditworthy, the situation rapidly changes. This is what occurred prior to the credit market crash of 2007.
- Systemic risk due to heavy investment in CLNs is a key reason many investors, including large institutions, lost large sums in the credit crash.

A typical CLN

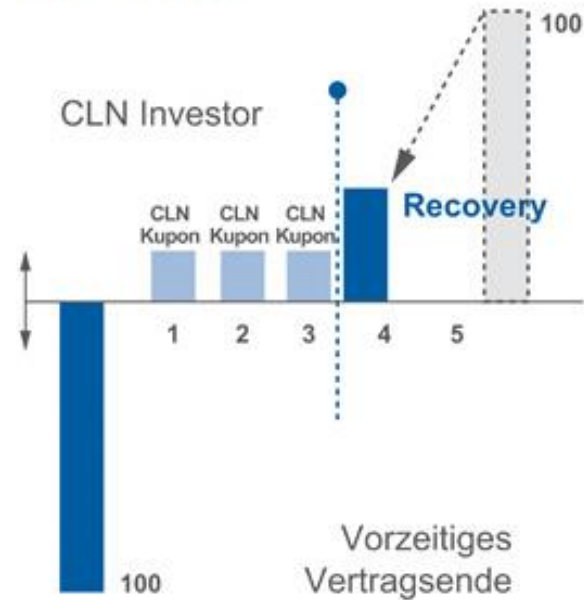


Payments for investors

Kein Credit Event



Credit Event



Collateralized Debt Obligations (CDOs)

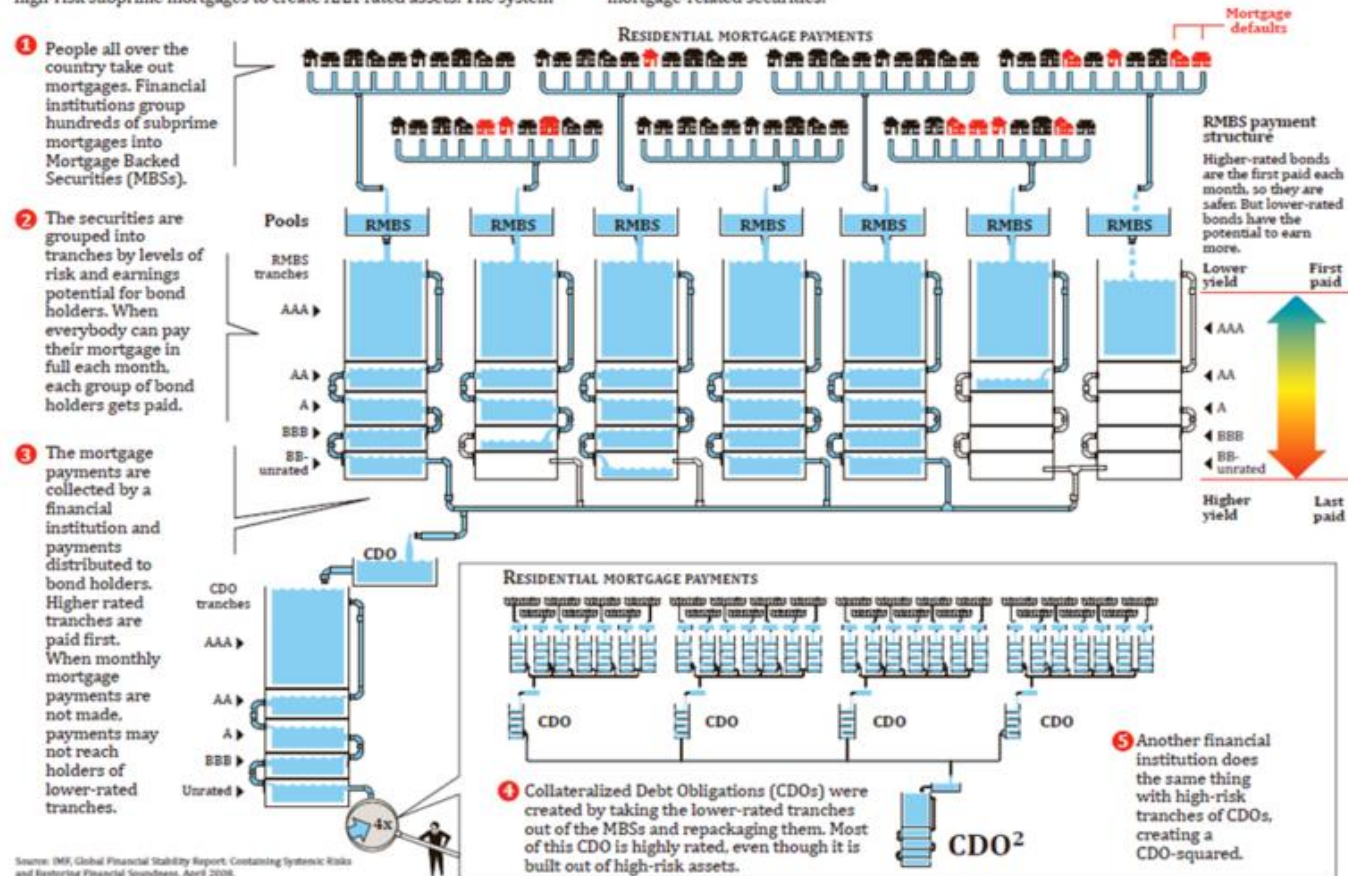
- A collateralized debt obligation (CDO) is a type of structured asset-backed security (ABS).
 - An ABS is a security whose income payments and hence value is derived from and collateralized (or "backed") by a specified pool of underlying assets (credit cards, auto loans, mortgages, aircraft leases, royalties).
- A CDO pay investors in a prescribed sequence, based on the cash flow it collects from the pool of assets it owns.
 - The CDO is "sliced" into "tranches", which "catch" the cash flow of interest and principal payments in sequence based on seniority.
 - Coupon payments (and interest rates) vary by tranche with the safest/most senior tranches paying the lowest and the lowest tranches paying the highest rates to compensate for higher default risk.
- Separate special purpose entities-rather than the parent investment bank-issue the CDOs and pay interest to investors.
- As CDOs developed, some sponsors repackaged tranches into yet another iteration, known as "CDO-squared" or "CDOs of CDOs."

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THE THEORY OF HOW THE FINANCIAL SYSTEM CREATED AAA-RATED ASSETS OUT OF SUBPRIME MORTGAGES

In the financial system, AAA-rated assets are the most valuable because they are the safest for investors and the easiest to sell. Financial institutions packaged and re-packaged securities built on high-risk subprime mortgages to create AAA-rated assets. The system

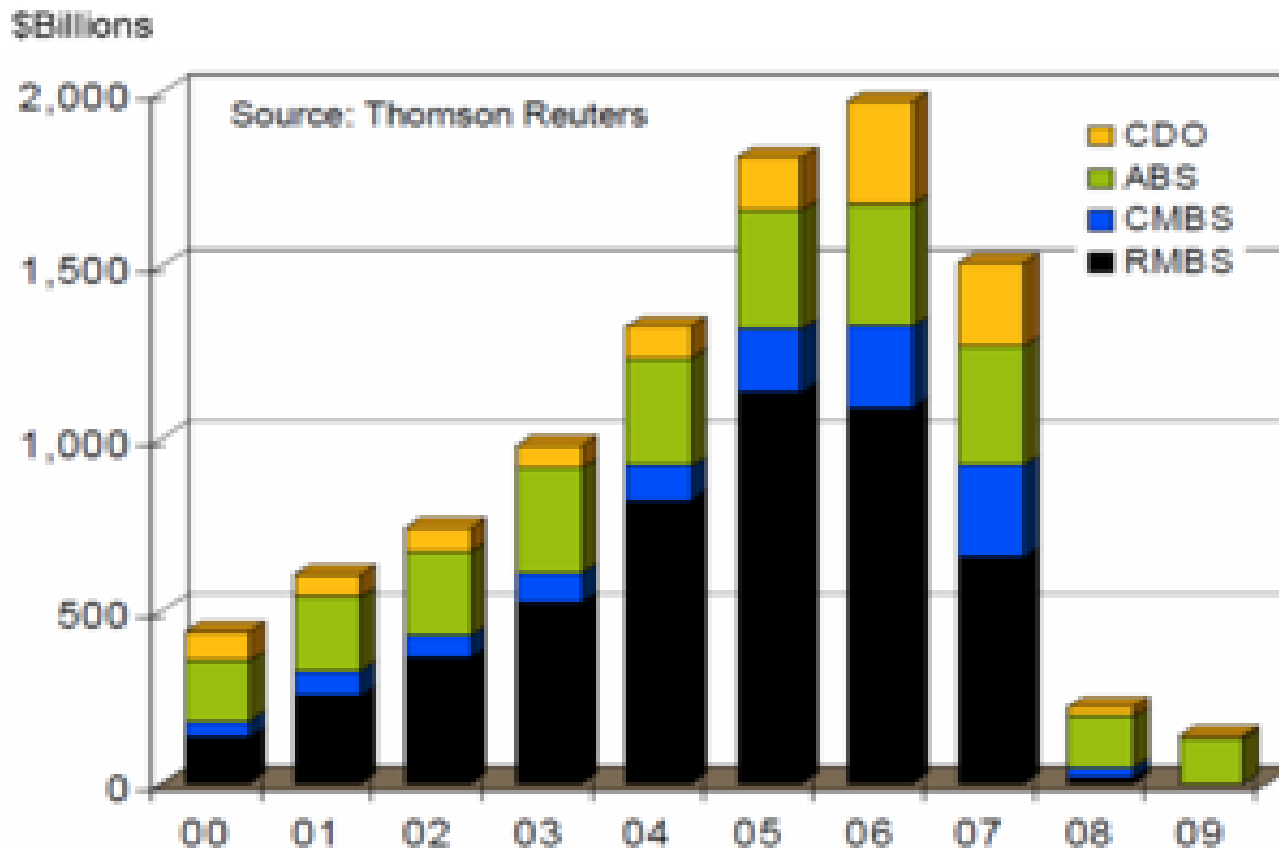
worked as long as mortgages all over the country and of all different characteristics didn't default all at once. When homeowners all over the country defaulted, there was not enough money to pay off all the mortgage-related securities.



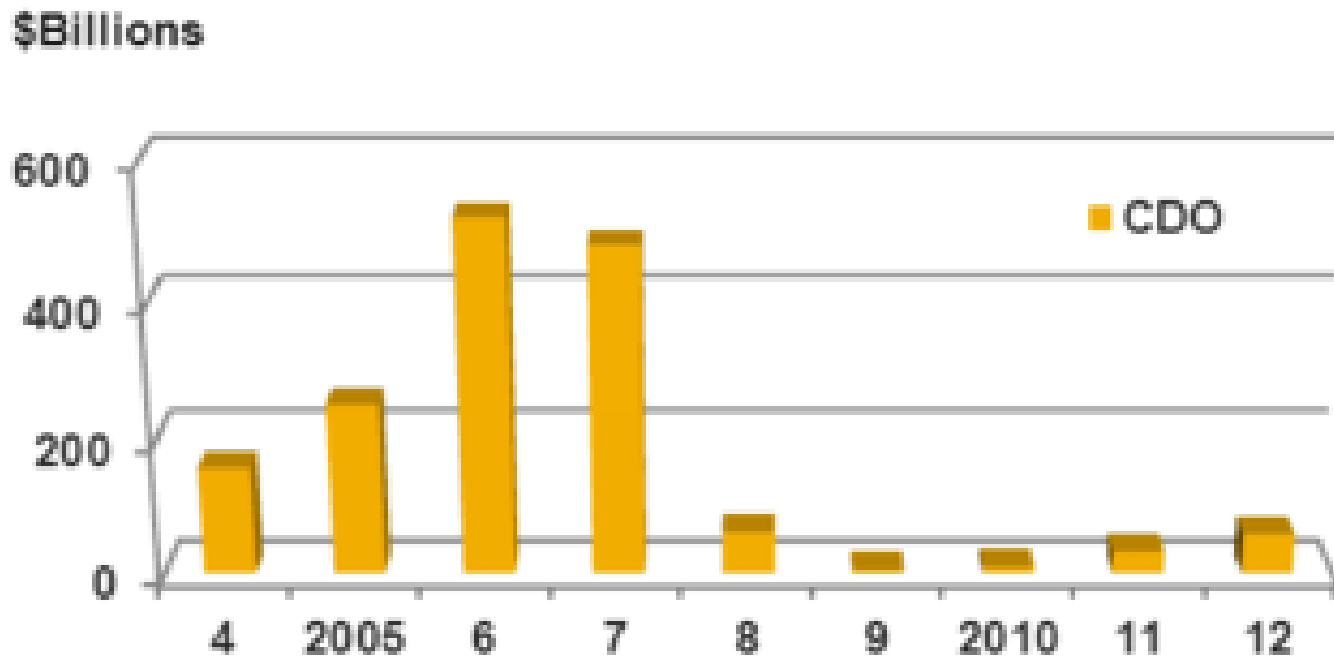
Source: IMF, Global Financial Stability Report, Containing Systemic Risks and Restoring Financial Soundness, April 2008.

Securitization market activity

Securitization Market Activity



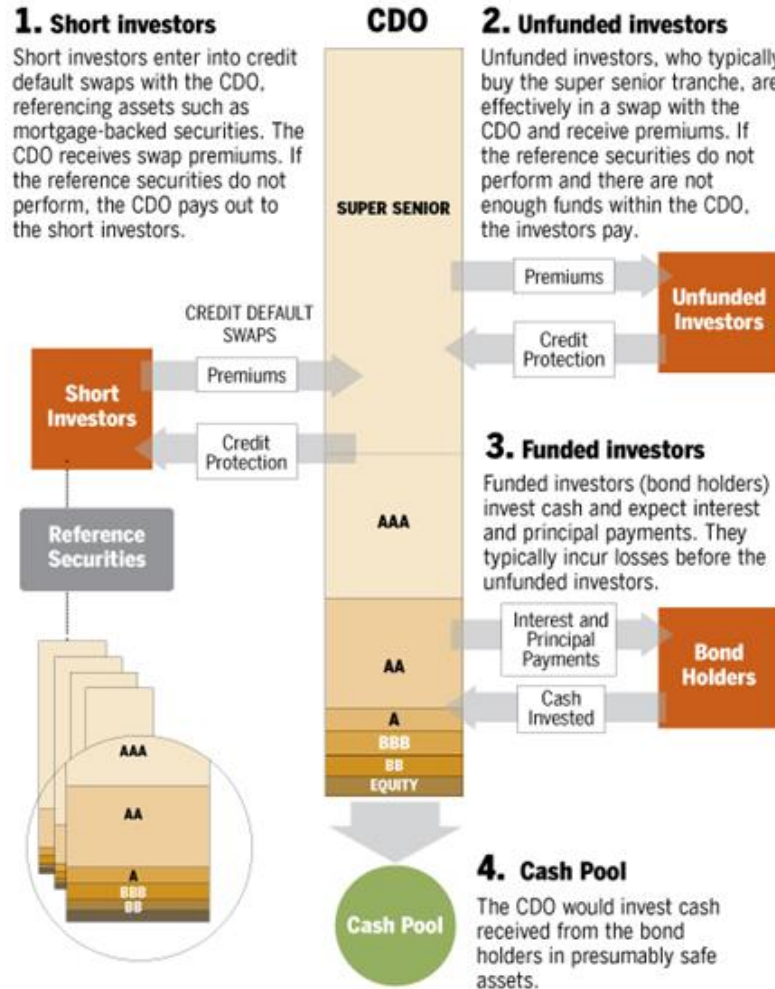
The volume of CDOs issued globally



Synthetic CDO

- A Synthetic CDO is a variation of a CDO that generally uses CDS. The value and payment stream of a synthetic CDO is derived not from cash assets, as in the case of a regular CDO but from premiums paying for CDS.
 - They generate income selling insurance against bond defaults in the form of CDS, typically on a pool of 100 or more companies.
- One counterparty typically pays a premium to another counterparty in exchange for a large payment if certain events related to the reference securities occur.
 - The insurance-buying "counterparties" may own the "reference" securities and be managing the risk of their default, or may be speculators who've calculated that the securities will default.
 - It represents a leveraged bet, meaning it may result in a potentially large payout without requiring that a large amount of funds (collateral) be set aside.
- Synthetic issuance jumped from \$15 billion in 2005 to \$61 billion in 2006, valued "notionally" at \$5 trillion by the end of the year. By 2012 the total notional value of synthetics had been reduced to a couple of billion.

A Synthetic CDO



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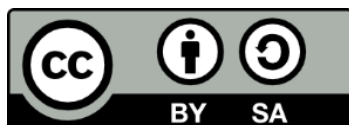
Derivative language

A guide to the jargon

Term	Meaning
ABX	Index of subprime mortgage loans (see below)
CDX	Index of US credit-default swaps
Credit Default Swap (CDS)	Agreement whereby one party makes a series of payments to another in return for compensation in the event of a bond default
Collateralised Debt Obligation (CDO)	Portfolio of bonds, divided into tranches, giving investors different rights
Collateralised Loan Obligation (CLO)	Equivalent of CDO using loans, not bonds
Continuous Proportion Debt Obligation (CPDO)	Specialist vehicle that uses borrowed money to insure a broad portfolio of bonds or loans
Credit Derivative Product Company (CDPC)	Specialist vehicle in the CDS market
Equity	Riskiest part of a CDO
iTRAXX	Index of European credit-default swaps
Mezzanine	Tranches of a CDO that lie between the equity and the senior tranches
Residential Mortgage Backed Security (RMBS)	Bond backed by home loans
Subprime mortgages	Housing loans made to borrowers with poor credit ratings
Synthetic CDO	Equivalent of a CDO, except the underlying portfolio is based on credit-default swaps

Source: *The Economist*

Τέλος Ενότητας



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