The Big Short Explained

Before we understand what led to the 2008 financial crisis, it is important to understand the idea of a *bond.*

A bond is a deal between an *investor* and an *issuer (borrower)*. At the inception of the deal (the issue date), money is transferred from the investor to the issuer. In turn, the investor gets a promise that the borrower will make periodic payments (interests or coupon payments) on pre-specified future dates, and at some time in the future (between the first date on which interest was paid and the maturity date) will also repay the original amount *(principal)*. The rate of return that the original lenders get on their initial investment is called the *yield.*

(The original investor can hold on this promise or sell it someone else on the open market, if it is sold, the new owner will have all the rights of the original owner. One can thus trade *debt.* Note that debt is one of the ways in which money moves through the financial system. The other is *equity* where an investor buys an ownership stake in a corporation with the hope of price appreciation.)

Different types of bonds

Treasury bonds

These are issued by the federal government (U.S treasury) to raise funds. They are backed by the US government and are considered almost risk free and hence have lower yield. Within this category of bonds, there are different kinds of bonds depending on the length of the maturity period (2, 5, 10, 15, 30) years. Note that bonds issued by other countries may carry greater risk.

Other U.S Government bonds

These are bonds issued by federal agencies like Fannie Mae, Freddie Mac, Ginnie Mae and are slightly riskier than the treasury bonds as they are not obligations of the US government and thus have a slightly higher yield.

Investment-grade corporate bonds

The issuer of these bonds (borrowers of investors' capital) are companies or corporations with strong balance sheets. The bond is backed by the ability of the corporation to pay back, usually by money earned in future operations. Sometimes, the physical assets of the company are also used as *collateral.* Bonds carry ratings (these can be thought of as the probability of default) and these ratings are issued by ratings agencies like Moody's and Standard and Poor's. (S&P rates AAA as the healthiest bond, followed by AA and so on.) The yield on these bonds is higher than the Treasury or other US government bonds.

High Yield bonds

As the name suggests, these are issued by companies with relatively weak balance sheets where there is a possibility of default. (Ratings below BBB by S&P.) These bonds are used as a means of portfolio diversification and have historically offered similar returns to equity markets, but with lower volatility.

Municipal bonds

These are contracts issued by non-profit organizations or private sector corporations for public projects like building roads, schools hospitals etc. The default risk is low compared to corporate bonds and hence has lower yield.

Mortgage backed bonds

These are bonds that are secured by a mortgage or a pool of mortgages and are backed by real estate holdings. Mortgage backed bonds played a central role in the 2008 financial crisis. Let us take a closer look.

How exactly do mortgage based bonds work?

When you buy a property and finance it with a mortgage, the lender (your bank) rarely retains ownership of the mortgage. *Instead, they sell it to investment banks who in turn collect thousands of such mortgages and issue bonds to investors using these assets as backing*. Your monthly mortgage payments are then paid back as yield to the investors. Note that if you default, neither your bank nor the investment banks take the hit. It is the investors in the bonds who do. As long as most of the homeowners in the mortgage pool keep up with their payments, a mortgage bond is a safe and reliable income-producing security. If you default on a mortgage, the bondholders have a claim on the value of your property. As you pay down the mortgage principal early, refinance your mortgage or default, the payments to bondholders fluctuates.

The name given to these bonds that investors buy is mortgage-backed securities, or MBS for short. Finally, these MBS (each containing several hundred home mortgages) are further pooled together to form a trust that investors can buy into. The trust can sometimes be specialized so that certain tiers/ layers/ tranches include just the highest quality MBS (those with the safest mortgages issued to the least risky borrowers) and others the lowest ("subprime" mortgages issued to those with bad credit scores). Investors can then choose which tier to invest their money in. When an investor invests in a mortgage-backed security, she is essentially lending money to a home buyer or business.

Sub-prime mortgages

Note that a MBS allows a bank to get a mortgage off its books and turn it in to a security and selling it to investors which in turn frees room for more capital. In 1990's, these investment banks (Wall Street firms) began to create mortgage bonds from *subprime* mortgages, i.e. mortgages of much higher risk, but paying much higher interest rates, made to borrowers with less than stellar credit scores. Ostensibly, this was due to a huge *demand* from investors who could earn a higher yield from these bonds backed by subprime mortgages.

This in turn meant that lenders (your bank) became motivated to place ever more subprime loans (since they were no longer at risk, should the loans fail), and began to *encourage* customers with bad credit to get loans. Customers were enticed to take loans with extremely low initial interest rates which later reset to higher levels. To entice these consumers, a new type of mortgage was created — variable rate, with extremely low (even zero) initial interest rates, which later reset to higher levels. Americans took on these mortgages in big numbers and inadvertently helped form a housing bubble. (A behavioral economics term for this is the hot hand fallacy that is whatever is going to happen now will continue to happen.)

High yield bonds carry a larger risk of default. Why would investors flock to such bonds?

Because buyers of Wall Street products look to the rating agencies Moody's and Standard & Poor's for guidance through their ratings, and riskier products are supposed to receive lower ratings.

And Wall street firms pay these agencies to rate their products.

Using models provided to them by the Wall Street firms, the agencies would rate mortgage bonds based on the average borrower FICO scores which allowed Wall Street firms to structure bonds to contain mortgages from both high and low FICO borrowers, to *increase the overall bond rating.*

For instance, the risk of default of a bond consisting of 20 borrowers of score 680 is drastically different from the one consisting of 10 borrowers of 700, 5 of 680 and 5 0f 660, since only a relatively small percentage of the underlying mortgages needed to default for the bond to fail, since only a relatively small percentage of the underlying mortgages need to default for the bond to fail.

Role of CDO's

By early 2000's, Wall Street firms decided to focus on the riskiest layers of the mortgage bonds. What they did was, in essence, repackaging. They packaged hundreds of these lowest rated tiers of mortgage-backed-securities in to what are called CDOs (Collateral Debt Obligations) and with the idea of diversification, the thought that while one high risk mortgage may be a gamble, thousands of high risk mortgages are a good bet because there's safety in numbers, they convinced Moody's and S&P to give higher ratings to the collection as a whole.

<u>The rating agencies gave CDOs a rating of (AAA), which means a risk rating equivalent to US Treasuries.</u>

This was based on the supposition that if one group of Americans began to default on their mortgages, it would be unlikely that other groups would. Things can't go south at once.

These AAA ratings allowed the Wall Street Firms to sell CDOs to state and private pension funds, which by law were allowed to invest only in AAA products.

Mike Burry (and others) who were profiled in 'The Big Short'

Mike and a few others performed an in depth analysis of the underlying mortgages by studying the mortgage prospectus. (When a mortgage-backed security is created, investors want details about the underlying assets that make up that security. For MBS, this means the investor will want to assess what mortgages are being packaged together and included in the trust. This and other details are included in the prospectus.) They also realized that the *huge* demand by Wall Street for mortgages drove the lending process, which in turn artificially inflated the housing prices, creating an unsustainable real estate bubble. When that bubble would eventually burst, through massive defaults, they realized it would result in the collapse of the entire mortgage-backed financial markets.

Mike and other people concluded that it would be only a matter of time before the bubble burst and decided to *short* the CDOs. They used derivative contracts called CDS (Credit Default Swap) to bet against the CDOs. CDS is essentially an insurance contract that allows owner of CDS to protect against the risk of a CDO default. They purchased these Credit Default Swaps from Deutsche bank by paying insurance premium to insure big amounts of CDOs and mortgage bonds.

The contracts were such that as long as the CDOs and the bonds did not default, the *insurers* made profit on the premiums. If, on the other hand, they would default, then Mike and others would be paid a fortune. In other words, Mike and others bought only the insurance that the mortgages would fail without ever owning the mortgage securities or the CDOs themselves.

Other side of the bet

From 2003 – 2007, Mike and a few others built huge portfolios of Credit Default Swaps, paying regular premium and waiting for the day when the bubble would burst. But, who was on the other side of the bet? Who was selling this insurance?

It turns out that it was AIG, the world's largest insurance agency. Rather than critically analyze the internal structure of these CDOs, AIG trusted the AAA ratings of Moody's and Standard & Poor's. For them, it was essentially like insuring US Treasuries (no risk of default) and hence regular income stream of insurance premiums was deemed to be easy profits.

Around 2007, the market for mortgages was drying up but the Wall Street investment banks focused on the continued sale of CDOs. But with their source of mortgages drying up, these banks used the income from Credit Default Swaps and packed it in to CDOs, that is the banks themselves got into the business of selling Credit Default Swaps, and packaging those income streams (the insurance premiums) into new CDOs.

2008 collapse

By 2008, the Wall Street investment banks were making huge profits, but held large amounts of CDOs and mortgage bonds waiting to be sold. They were also on the liability end of huge amounts of Credit Default Swaps, often sold and exchanged between themselves. AIG was on the liability end of billions of dollars worth of Credit Default Swaps. Pension funds around the world had huge investments in CDOs and mortgage bonds.

And then the bubble burst.

Homeowners with adjustable-rate mortgages saw their rates skyrocket, they then defaulted on their loans, cash flows to CDOs dried up, CDO managers couldn't pay their bondholders, and the owners of the insurance contracts (the Credit Default Swaps) got their big payouts.

The government allowed Lehman Brothers to go bankrupt, which triggered more panic in the markets. Commercial lending froze, paralyzing businesses in American and across the globe. Many Americans lost their jobs, savings and retirement funds. With AIG and other of the world's largest financial firms facing collapse, the US government stepped in, and bailed them out, paying off their debts.