

The Bond Market

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Course in Global Markets and Economic
Policies

WHAT IS A BOND?

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What is a Bond?

- It is a debt instrument which certifies a contract between the borrower (bond issuer) and the lender (bondholder) as spelled out in the bond indenture/contract.
- The issuer (company, government, municipality) pledges to pay the amount borrowed (the principal or par value of the bond) to the bondholder on a fixed date (maturity date) as well as a fixed/floating rate of interest (paid usually twice a year) for the life of the bond.
- Alternatively, some bonds ("zero coupon" bonds) are sold at a price lower than their par value in lieu of the periodic interest; on maturity the full par value is paid to the bondholder.

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Bonds, Stocks and Loans

- A Bond is different from a stock because it is a DEBT INSTRUMENT:
 - it does not entitle the bondholder to any ownership right concerning the issuer;
- A Bond is different from a loan because:
 - It usually carries a longer maturity;
 - It is tradable;

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What does a bond look like?

DES Msg: J. TEUTSCH

SECURITY DESCRIPTION Page 1/ 1

TURKEY REP OF TURKEY 11 % 30 142.7700/143.0200 (7.74/7.72) BGN @18:00

ISSUER INFORMATION	IDENTIFIERS	Additional Sec Info
Name REPUBLIC OF TURKEY	Zemcon 010452448	3 Allq
Type Sovereign	ISIN US900123AL40	3 Corporate Actions
Market of Issue Global	CUSIP 900123AL4	4 Cds Spreads/RED Inf
SECURITY INFORMATION	RATINGS	5 Ratings
Country TR	Currency USD	6 Custom Notes
Collateral Type Sr Unsub	Moody's Ba3	7 Covenant/Default
Calc Typ()STREET CONVENTION	S&P BB-	8 Identifiers
Maturity 1/15/2030 Series	Fitch BB-	9 Fees/Restrictions
NORMAL	Composite BB-	
ISSUE SIZE		10 Sec. Specific News
Coupon 11 % Fixed	Amt Issued/Outstanding	11 Involved Parties
S/A ISMA-30/360	USD 1,500,000.00 (M)	12 Issuer Information
Announcement Dt 1/10/00	USD 1,500,000.00 (M)	13 Pricing Sources
Int. Accrual Dt 1/18/00	Min Piece/Increment	14 Related Securities
1st Settle Date 1/19/00	1,000.00/ 1,000.00	
1st Coupon Date 7/15/00	Par Amount 1,000.00	
Iss Pr 99.60400Reoffer 99.604	BOOK RUNNER/EXCHANGE	
SPR @ FPR 525.00 vs T 5 1/4 02/29	MSDM,CITI	65 Old DES
HAVE PROSPECTUS DTC	Multiple	66 Send as Attachment
NSEC'D. SHORT INT CPN.		

uk:traj:ca:61 2 3077 6500 Brazil:11 3511 3040 4500 Europe: 44 20 7330 7500 Germany: 49 69 3504 1210 Hong Kong: 852 2377 6000 Japan: 81 3 3201 8900 Singapore: 65 4212 1000 U.S.: 1 212 519 2000 Copyright 2008 Bloomberg Finance L.P. 607-11283-02-01-1008 18 17 16

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Main Features of a Bond

- Issuer
- Maturity
- Yield
- Currency
- Amount issued
- Rating
- Legal conventions

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The issuer's perspective

- He wants to borrow as cheaply as possible;
- He wants to have a large pool of investors;
- He wants to use a reputable institution as book-runner;
- He wants bond issuance to be part of a debt-management strategy.

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The Bondholder Perspective

- A bond investor is mostly interested in getting his money back, with interest. His first preoccupation is, therefore, whether the issuer is able of meeting his obligations.
- The second issue is whether the reward (= the yield) is attractive, or not;
- The third issue is the liquidity of the bond, i.e., how easy is it to sell the bond?
- The fourth issue is legal protection: any collateral?
- Other issues (settlement...)

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The Bondholder Perspective: Main Risks

- From a bondholder's perspective the main risks are:
 - The credit/default risk;
 - The currency risk;
 - The counterparty risk;
 - The fiscal/regulation risk

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Credit Risk

- The possibility that a bond issuer will default, by failing to repay principal and interest in a timely manner is called “CREDIT RISK” or “DEFAULT RISK”.
- Defaults are not common occurrences but they happen. Sovereign states have defaulted (Argentina, Russia), local government (California), and private companies have defaulted.

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How do we assess Credit Risk?

- We do our homework
 - Outlook for the issuer?
- Ratings Agencies
 - Valuation of creditworthiness of issuer (see p. XX)
- Market Valuation
 - Spread (see p.YY)

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The Currency Risk

- Some bonds are issued in a currency which is different from the bondholder’s currency. In this case, the bondholder also has to consider the currency risk.
- How does one cope with the currency risk?
 - Hedging

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The Counterparty Risk

- It could happen that a bondholder is trading bonds with a counterparty which suddenly becomes unavailable to meet its obligations.
- In this case, there are legal procedures that safeguard the bondholder but it takes time to solve these issues and the bondholder's activity could suffer because of the counterparty's problems.

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How do we evaluate a bond?

- Once we have done the macro-homework (credit risk, currency risk etc) and concluded that the issuer is creditworthy, we have to decide whether buying that bond is a good investment, or not.
- We need to look at
 - The yield to maturity
 - Duration
 - Liquidity
 - Yield curve

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Yield to Maturity

- The Yield-to-Maturity (YTM) measures the annual return an investor would receive if he or she held a particular bond until maturity.
- YTM allows investors to compare a bond's expected return with those of other securities. Further, YTM helps investors answer questions such as whether a 10-year bond with a high yield is better than a 5-year bond with a high coupon.

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Yield to Maturity: Example

Suppose your bond is selling for \$950, and has a coupon rate of 7%; it matures in 4 years, and the par value is \$1000. What is the YTM?

The coupon payment is \$70 (that's 7% of \$1000), so the equation to satisfy is:

$$70(1+r)^{-1} + 70(1+r)^{-2} + 70(1+r)^{-3} + 70(1+r)^{-4} + 1000(1+r)^{-4} = 950$$

It is straightforward to find that $r = 8.53\%$.

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Yield to Maturity

- In the example, one thing to notice is that the YTM is greater than the current yield, which in turn is greater than the coupon rate. (Current yield is $\$70/\$950 = 7.37\%$; coupon = 7%). This will always be true for a bond selling at a discount.
- Bond Selling At . . . Satisfies This Condition
Discount Coupon Rate < Current Yield < YTM
Premium Coupon Rate > Current Yield > YTM
Par Value Coupon Rate = Current Yield = YTM

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Yield, Coupon, YTM: Recap

- **Coupon Rate:** Annual payout as a percentage of the bond's par value: 7% in the example;
- **Current Yield:** Annual payout as a percentage of the current market price you'll actually pay: 7.37% in the example;
- **The Yield-to-Maturity:** Composite rate of return off *all* payouts, coupon and capital gain (or loss): 8.53% in the example

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Duration

- Duration is the change in the value of a fixed income security that will result from a 1% change in interest rates. Duration is stated in years.
- For example, a 5 year duration means the bond will decrease in value by 5% if interest rates rise 1% and increase in value by 5% if interest rates fall 1%. Duration is a weighted measure of the length of time the bond will pay out.
- Unlike maturity, duration takes into account interest payments that occur throughout the course of holding the bond.
- Basically, duration is a weighted average of the maturity of all the income streams from a bond or portfolio of bonds.
- There are many formulae for duration, see http://en.wikipedia.org/wiki/Bond_duration for the most commonly used. The basic concept, however, is always the same, as described above.

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Duration: Example

- For a two-year bond with 4 coupon payments every six months of \$50 and a \$1000 face value, duration (in years) is:

$$0.5(50/1200) + 1(50/1200) + 1.5(50/1200) + 2(50/1200) + 2(1000/1200) = 1.875 \text{ years.}$$

- Notice that the duration on any bond that pays coupons will be less than the maturity because there is some payments that are going to come before the maturity date. In this example, the maturity was 2 years.

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Duration: Recap

- Duration is important because it allows investors to measure the volatility of the bond;
- Generally, the higher the duration (the longer an investor needs to wait for the bulk of the payments), the more its price will drop as interest rates go up;
- If an investor expects interest rates to fall during the course of the time the bond is held, a bond with a long duration would be appealing because the bond's price would increase more than comparable bonds with shorter durations.

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Liquidity

- It is the ability of an asset to be converted into cash quickly and without any price discount.
- There is no formula. As a rule of thumb: the larger the amount outstanding and the higher the frequency of transactions, the more liquid the asset.
- High liquidity is important because it means that market prices are meaningful and investor can easily sell his asset.

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The Yield Curve

- The Yield Curve is a line that plots the interest rates, at a set point in time, of bonds having equal credit quality, but differing maturity dates.
- The shape of the yield helps to give an idea of future interest rate change and economic activity. There are three main types of yield curve shapes: normal, inverted and flat (or humped).
 - A normal yield curve is one in which longer maturity bonds have a higher yield compared to shorter-term bonds due to the risks associated with time;
 - An inverted yield curve is one in which the shorter-term yields are higher than the longer-term yields, which can be a sign of upcoming recession;
 - A flat (or humped) yield curve is one in which the shorter- and longer-term yields are very close to each other, which is also a predictor of an economic transition.

For daily updates on the US yield curve, see:
<http://www.treasury.gov/offices/domestic-finance/debt-management/interest-rate/yield.shtml>
Also, check:

<http://stockcharts.com/charts/yieldcurve.htm>

To see how the US Yield curve has changed in recent years, according to different economic/financial situations.

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The US Yield Curve



As of 11 Nov 2009

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The Yield Curve

- The yield curve provides useful information on how other bondholders/traders see the market;
- If the yield of a particular bond is significantly away from the yield curve, something is “wrong” with that bond and further analysis is required.
- This distance is called “spread”

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The Spread (1)

- The spread (“credit spread”) is calculated between two bonds of the same, or very similar, maturity.
- It is expressed in “basis points” (bps), i.e. each basis point is 1/100 of a percentage point.
- The spread is calculated as the yield on the bond we are interested in minus the reference yield (US Treasuries, EURO-denominated gov’t bonds etc):

$$\text{SPREAD} = r_{xyz} - r_{us}$$

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The Spread (2)

- Credit spreads reflect the additional return investors require to take on more credit risk. Bonds with lower credit ratings have larger credit spreads. For example, a corporate bond quoted at a credit spread of 100 basis points means investors are requiring 100 basis points of additional yield to buy that bond rather than a risk-free alternative such as a government bond.

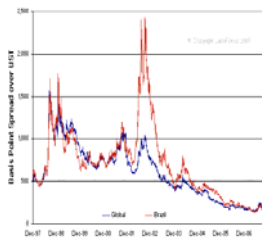
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The Spread (3)

- The larger the spread, the more the bond is yielding but...
- Higher yields mean higher risk, i.e., lower probability of being repaid;
- The spread reflects the market's evaluation of a certain bond/issuer at that time and a large spread today does not necessarily imply that the issuer is going to default.

A Tale of Two Spreads

Brazil: EMBI Spread vs Global, bps



Argentina: EMBI Spread vs Global, bps



Source: JPMorganChase, Emerging Markets Research

The “risk-reward” trade-off

- The Spread is also an indicator of the risk-reward trade-off.
- There is a direct relationship between possible risk and possible reward which holds for a particular situation. To realise greater reward one must generally accept a greater risk, and vice versa. It is also called the risk/return trade-off.
- For example, government bonds yield less than corporate bonds as governments are perceived as being more creditworthy than companies.

Ratings

A rating is a measure of the quality and safety of a bond, based on the issuer's financial creditworthiness. Credit ratings, thus, provide an opinion on the relative ability of an entity to meet financial commitments, such as interest, preferred dividends, repayment of principal, insurance claims or counterparty obligations. Credit ratings are used by investors as indications of the likelihood of receiving their money back in accordance with the terms on which they invested.

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Ratings

Moody's		S&P		Fitch		
Long term	Short term	Long term	Short term	Long term	Short term	
Aaa	P-1	AAA	A-1+	AAA	A1+	Prime
Aa1		AA+	A-1	AA+	A1	High Grade
Aa2		AA	A-2	AA-	A2	
Aa3		AA-	A-3	AA-	A3	
A1		A+	A-	A+	A-	Upper Medium Grade
A2		A	A-	A-	A-	
A3		A-	A-	A-	A-	
Baa1	P-2	BBB+	A-3	BBB+	A3	Lower Medium Grade
Baa2		BBB	A-3	BBB	A3	
Baa3		BBB-	A-3	BBB-	A3	
Ba1		BBB-	B+	BBB-	B+	Non Investment Grade Speculative
Ba2		BBB-	B+	BBB-	B+	
Ba3		BBB-	B+	BBB-	B+	
B1		BB-	B	BB-	B	Highly speculative
B2		BB-	B	BB-	B	
B3		BB-	B	BB-	B	
Caa	Not Prime	CCC+	C	CCC	C	Substantial risk
Ca		CCC	C	CCC	C	
C		CCC-	C	CCC-	C	In default, with little prospect for recovery
D		D	D	D	D	
D		D	D	D	D	In default
D		D	D	D	D	

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Ratings: Good and Bad

- Ratings are useful as they provide independent, standardised benchmarks to group different bonds;
- However, ratings are no guarantee of future performance. Also, ratings can change very quickly in a rapidly deteriorating environment.
- As a matter of fact, rating agencies are often accused of lowering ratings after the market has already assessed its negative view on an issuer, thus further increasing the negative sentiment towards that issuer.

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Rating Agencies: The Good and the Bad. An Example

- Issuer X suffers from an external shock (say, an increase in raw material prices) and its profit outlook deteriorates;
- The market has a negative view on “X” and the share price falls while the provision of credit dries up;
- “X” is downgraded by the rating agencies since its creditworthiness has deteriorated and access to finance is now more difficult;

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Rating Agencies: The Good and the Bad. An Example

- “X” needs to refocus its business and restructure;
- Case A: Restructuring is painful but successful, market cheers, “X” is upgraded;
- Case B: “X” needs a lot of money to restructure. Since it has been downgraded, financing is very expensive and maybe not available. Crisis deepens.

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What Determines the Price of a Bond in the Open Market?

- Bonds can be traded in the open market after they are issued. When listed on the open market, a bond's **price** and **yield** determine its value.
- The key to understanding this critical feature of the bond market is to recognize that a bond's price reflects the value of the income that it provides through its regular coupon interest payments.
- When prevailing interest rates fall—notably rates on government bonds—older bonds of all types become more valuable because they were sold in a higher interest-rate environment and therefore have higher coupons. Investors holding older bonds can charge a “premium” to sell them in the open market. On the other hand, if interest rates rise, older bonds may become less valuable because their coupons are relatively low, and older bonds therefore trade at a “discount.”

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Bond Prices: Recap

- Put simply, rising interest rates are considered “bad” for bond investors because new bonds will pay investors a higher interest rate than old ones, so old bonds tend to drop in price. Falling interest rates, however, mean that older bonds are paying higher interest rates than new bonds, and therefore older bonds tend to sell at premiums in the market.

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The Role of Bonds in a Portfolio

- Investors have traditionally held bonds in their portfolio for three reasons:
 - Income;
 - diversification;
 - protection against economic weakness or deflation.
- Let’s look at each of these in more detail.

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WHY ARE BONDS SO POPULAR AMONGST INVESTORS?

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The Role of Bonds in a Portfolio: Income

- Most bonds provide the investor with “fixed” income. On a set schedule, perhaps quarterly, twice a year or annually, the bond issuer sends the bondholder an interest payment—a check that can be spent or reinvested in other bonds. Stocks might also provide income through dividend payments, but dividends tend to be much smaller than bond coupon payments, and companies make dividend payments at their discretion, while bond issuers are obligated to make coupon payments.

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The Role of Bonds in a Portfolio: Diversification

- Diversification means not “putting all of your eggs in one basket.” A stock market investor faces the risk that the stock market will decline and take the portfolio along for the ride. To offset this risk, investors have long turned to the bond market because the performance of stocks and bonds is often non-correlated: market factors that are likely to have a negative impact on the performance of stocks historically have little to no impact on bonds and in some cases can actually improve bond performance. For example, an investor who purchases a blue-chip stock and a government bond may offset a downward market cycle in either asset class because a drop in a particular company’s share price and a government’s ability to repay a bond are usually unrelated. Although diversification does not ensure against loss, an investor can diversify a portfolio across different asset classes that perform independently in market cycles to reduce the risk of low, or even negative, returns.

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The Role of Bonds in a Portfolio: Protection Against Economic Slowdown or Deflation

- Bonds can help protect investors against an economic slowdown for several reasons. Recall that the price of a bond depends on how much investors value the income that bonds provide. Most bonds pay a fixed income that doesn’t change. When the prices of goods and services are rising, an economic condition known as “inflation,” a bond’s fixed income becomes less attractive because that income buys fewer goods and services. Inflation is usually caused by faster economic growth, which increases demand for goods and services. On the other hand, slower economic growth usually leads to lower inflation, which makes bond income more attractive. An economic slowdown is also typically bad for corporate profits and stock returns, adding to the attractiveness of bond income as a source of return. If the slowdown becomes bad enough that consumers stop buying things and prices in the economy begin to fall—a dire economic condition known as “deflation”—then bond income becomes even more attractive because you can buy more goods and services (due to their deflated prices) with the same bond income. As demand for bonds increases, so do bond prices and bondholder returns.

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Bond Investment Strategies

- One option is to invest with an “active” bond manager that will employ various strategies in an effort to maximize the return on a bond portfolio and outperform the market’s return as measured by a selected benchmark (Total Return Fund).
- A second option is to invest with a “passive” manager whose goal is to replicate (rather than outperform) the returns of the bond market or a specific sector of the bond market (Benchmarked Fund).
- A third option is to invest in a “laddered” bond strategy, in which maturing bonds are passively reinvested in new bonds without any attempt to maximize returns.

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Pros and Cons of Different Strategies

- Investors have long debated the merits of active management versus passive management and laddered strategies.
- The key contention in this debate is whether the bond market is too efficient to allow active managers to consistently outperform the market itself.
- An active bond manager would counter this argument by noting that both size and flexibility enable active managers to optimise short- and long-term trends in order to outperform the market.

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Active Strategies (1)

- Active bond managers commonly adjust a bond portfolio’s duration (the weighted average duration of all the bonds in the portfolio) based on an economic forecast. For example, in anticipation of declining interest rates an active manager may lengthen a portfolio’s duration because the longer the duration, the more price appreciation the portfolio will experience if rates decline. To lengthen duration, the bond manager might sell shorter-term bonds and buy longer-term bonds. On the other hand, a bond manager expecting interest rates to rise would normally shorten the bond portfolio’s duration by buying shorter-term bonds and selling longer-term bonds. In the event of rising interest rates, the price of a shorter-duration portfolio should fall less than that of a longer-duration portfolio.

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Active Strategies (2)

- Another active bond investment strategy is to adjust the credit quality of the portfolio. For example, when economic growth is accelerating, an active manager might add bonds with lower credit quality in hopes that the bond issuers will experience credit improvement with the positive change in the economy and the bond prices will rise. In some cases, active managers take advantage of strong credit analysis capabilities to identify sectors of the market that seem likely to improve, therein potentially increasing a portfolio's return.

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Active Strategies (3)

- A third active bond strategy is to adjust the maturity structure of the portfolio based on expected changes in the relationship between bonds with different maturities, a relationship illustrated by the “**yield curve**.” While yields normally rise with maturity, this relationship can change, creating opportunities for active bond managers to position a portfolio in the area of the yield curve that is likely to perform the best in a given economic environment.

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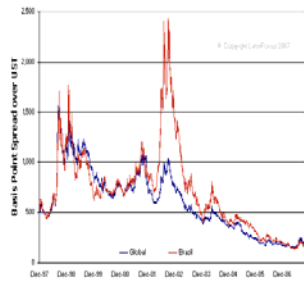
Benchmarked Bond Funds (1)

- A bond investors might want to consider investing in a BENCHMARKED bond fund;
- Such a fund can invest in bonds that are included into a bond index (the Benchmark) and the manager's performance is evaluated in reference to the benchmark

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Benchmarked Bond Funds (2)

- Consider the EMBI, Emerging Market Bond Index.
- Think of having invested in Brazil only...
- A benchmarked fund is less volatile



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Benchmarked Funds: Pros and Cons

- Pros:
 - Lower volatility (deviation from market);
 - Performance easy to evaluate;
- Cons:
 - Little flexibility (Argentina);
 - Good performance when market is strong; poor performance when market is weak...

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Other Types of Bonds

- So far, we have been dealing with fixed-income only.
- There are many other types of bonds:
 - Floating rate
 - Zero coupon
 - Step-up/Step-down coupon
 - Collateralised
 - Callable
 - Convertible

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Hedge Funds

Hedge Funds: A Primer (1)

- Hedge funds are generally privately-owned investment funds, and so are not regulated like mutual funds whose owners are public corporations. Furthermore, hedge fund managers are compensated as a percent of the returns they earn. This attracts many investors who are frustrated by mutual fund fees that are paid regardless of fund performance.

Hedge Funds: A Primer (2)

- Thanks to this compensation structure, hedge fund managers are driven to achieve above market returns. Since they get zero no matter how much money they lose, they are also very risk tolerant. This makes the funds very risky for the investor, who can lose much more than zero.

Hedge Funds: A Primer (3)

- Hedge fund managers are very good at using sophisticated derivatives, such as futures contracts, options and puts. Basically, these products all do two things: they use small amounts of money, or leverage, to promise large amounts of stocks or commodities. Secondly, they all say they will deliver this stock or commodity at a particular point in time. In that sense, hedge fund managers are trying to time the market, which some would say is very difficult if not impossible to do.

Who invests in Hedge Funds?

- The primary investors are wealthy individuals and institutions. They typically have a great deal of funds to invest, and can weather significant downturns in their portfolio in their quest for higher returns.
- In addition, many pension funds are realizing they may not have the capital needed to cover the mass of retiring baby boomers, and are trying to outperform the market to cover these obligations.
- Unfortunately, the risky nature of hedge funds, and their lack of regulation, means these pension funds could be less likely to cover their commitments.

Leveraging (1)

- *"He then relates the case of a typical hedge fund, two times levered. That looks modest until you realise it is partly backed by fund of funds' money (which is three times levered) and investing in deeply subordinated tranches of collateralised debt obligations, which are nine times levered. "Thus every €1m of CDO bonds [acquired] is effectively supported by less than €20,000 of end investors' capital - a 2% price decline in the CDO paper wipes out the capital supporting it. " Gillian Tett, FT, 19 Jan 2007)*

Leveraging (2)

- Just to clarify this credit pyramid that looks like a Ponzi Game: you start with 20,000 euros invested by some investors into a hedge fund of funds; this is all equity. Then, this fund of funds borrows - at a leverage ratio of three - and invests the initial capital and the borrowed funds into an hedge fund. Then this hedge fund takes this fund of funds investment and borrows - at a leverage ratio of two - and invests the raised capital and the borrowed funds into a deeply subordinated tranches of Collateralized Debt Obligations (that are themselves highly levered instruments with a leverage ratio of nine). So the final investment of 1 million has behind it 20,000 of equity capital and 980,000 of debt. So, if the value/price of the final investment falls by only 2% the entire capital behind it is wiped out.

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Leveraging (3)

- This is a credit house of cards where a dollar of capital is turned into 49 dollars of additional debt to finance an investment of 50. The systemic dangers/risks of this fragile credit house of cards are complicated to assess as they depend on how much of this debt/credit accumulation is concentrated or spread among many financial intermediaries. But, at face value, this kind of leverage ratios looks scary.

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Leveraging (4)

- In a nutshell, this is the best way of describing the objective function of a hedge fund:

$$r_{\text{equity}} = r_{\text{assets}} + L(r_{\text{assets}} - r_{\text{debt}})$$

where r_{equity} is the rate of return on equity capital, r_{assets} is the rate of return on overall capital, r_{debt} is the interest rate on debt and L , the leverage ratio, is the ratio of debt capital to equity capital.

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Leveraging (5)

$$r_{\text{equity}} = r_{\text{assets}} + L(r_{\text{assets}} - r_{\text{debt}})$$

The equation shows that the rate of return on overall capital is augmented by an amplified difference between the rate of return on overall capital and the interest rate on debt. If the leverage is high and capital earns a rate of return greater than the interest rate on debt then all is well, but leverage is a two-edged sword. If the rate of return on overall capital falls below the interest rate on debt then high leverage can turn a mildly bad year into a catastrophe.
