

# The Bond Market

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Lecture 2

Course in Global Markets and Economic  
Policies

*I used to think if there was reincarnation, I wanted to come back as the president or the pope or a .400 baseball hitter. But now I want to come back as the bond market. You can intimidate everybody.*

James Carville in 1993, frustrated over the way fear of rising interest rates was crimping the Clinton agenda

# WHAT IS A BOND?

# 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.

# 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;

# What does a bond look like?

SECURITY DESCRIPTION		Page 1/ 1
TURKEY REP OF TURKEY 11 $\frac{7}{8}$ 30 142.7700/143.0200 (7.74/7.72) BGN @18:00		
ISSUER INFORMATION	IDENTIFIERS	<ol style="list-style-type: none"> <li>1) Additional Sec Info</li> <li>2) ALLQ</li> <li>3) Corporate Actions</li> <li>4) Cds Spreads/RED Inf</li> <li>5) Ratings</li> <li>6) Custom Notes</li> <li>7) Covenant/Default</li> <li>8) Identifiers</li> <li>9) Fees/Restrictions</li> <li>10) Prospectus</li> <li>11) Sec. Specific News</li> <li>12) Involved Parties</li> <li>13) Issuer Information</li> <li>14) Pricing Sources</li> <li>15) Related Securities</li> </ol>
Name REPUBLIC OF TURKEY	Common 010652448	
Type Sovereign	ISIN US900123AL40	
Market of Issue Global	CUSIP 900123AL4	
SECURITY INFORMATION	RATINGS	
Country TR Currency USD	Moody's Ba3	
Collateral Type Sr Unsub	S&P BB-	
Calc Typ( 1)STREET CONVENTION	Fitch BB-	
Maturity 1/15/2030 Series	Composite BB-	
NORMAL	ISSUE SIZE	
Coupon 11 $\frac{7}{8}$ Fixed	Amt Issued/Outstanding	
S/A ISMA-30/360	USD 1,500,000.00 (M)	
Announcement Dt 1/10/00	USD 1,500,000.00 (M)	
Int. Accrual Dt 1/18/00	Min Piece/Increment	
1st Settle Date 1/18/00	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 $\frac{1}{4}$ 02/29	MSDW,CITI	65) Old DES
HAVE PROSPECTUS DTC	Multiple	66) Send as Attachment
<b>NSEC'D. SHORT 1ST CPN.</b>		
<small>           Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000            Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2008 Bloomberg Finance L.P.            G675-1263-0 02-Oct-2008 18:17:10         </small>		

# Main Features of a Bond

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

# 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.



# 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...)

# 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

# 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 do happen. Sovereign states have defaulted (Argentina, Russia), local government (California), and private companies have defaulted.

# How do we assess Credit Risk?

- We do our homework
  - Outlook for the issuer?
- Market Valuation
  - Spread (see p. 27)
- Ratings Agencies
  - Valuation of creditworthiness of issuer (see p. 32)

# 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

# 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.

# 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

# 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.



# 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  $r = 8.53\%$ .

# 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

# 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

# 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](http://en.wikipedia.org/wiki/Bond_duration) for the most commonly used. The basic concept, however, is always the same, as described above.

# 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.

# 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.

# 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.

# 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>

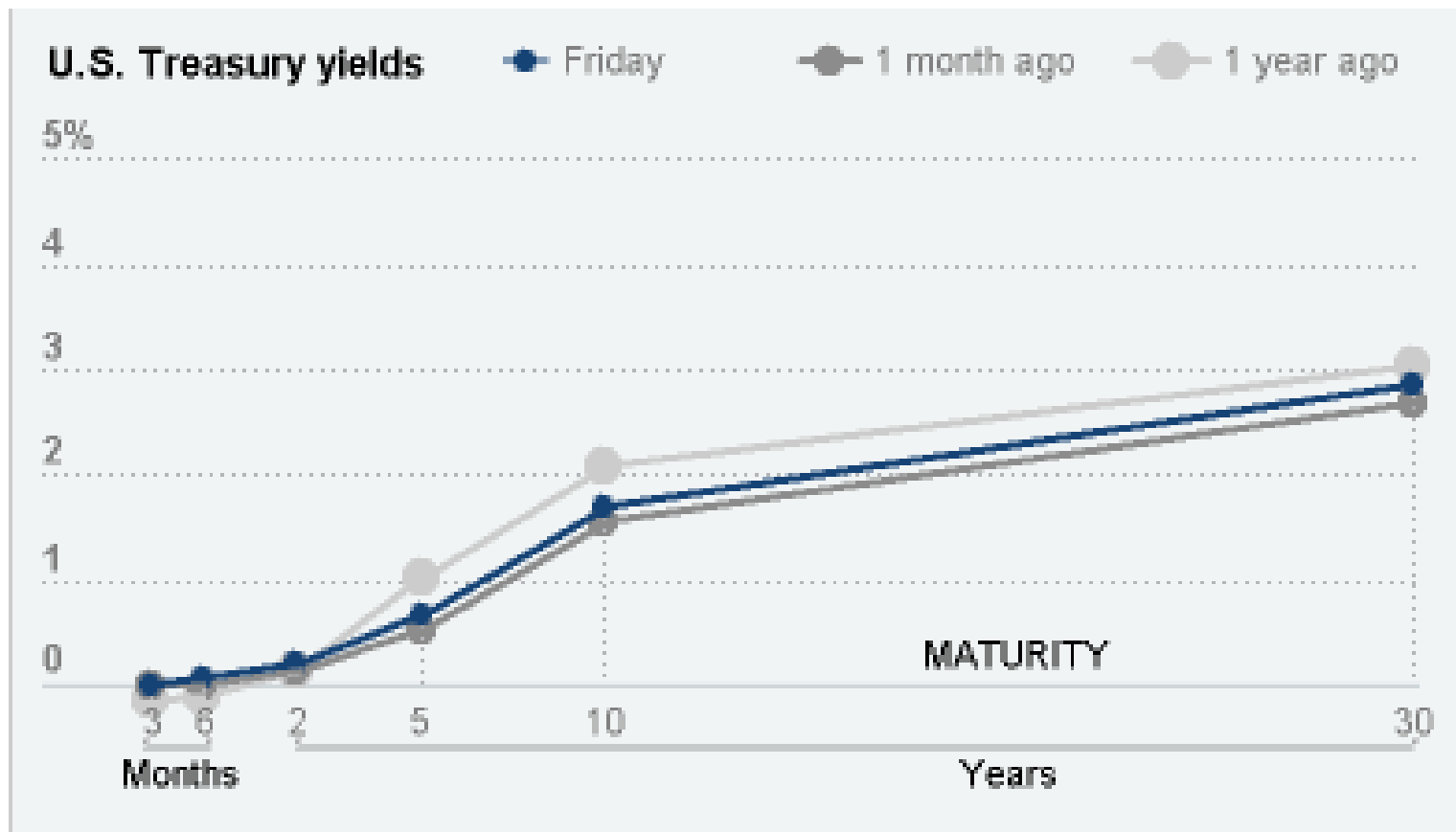
Also, check:

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

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



# The US Yield Curve



As of 21 Oct 2012

# 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”

# 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):

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

# The Spread (2)

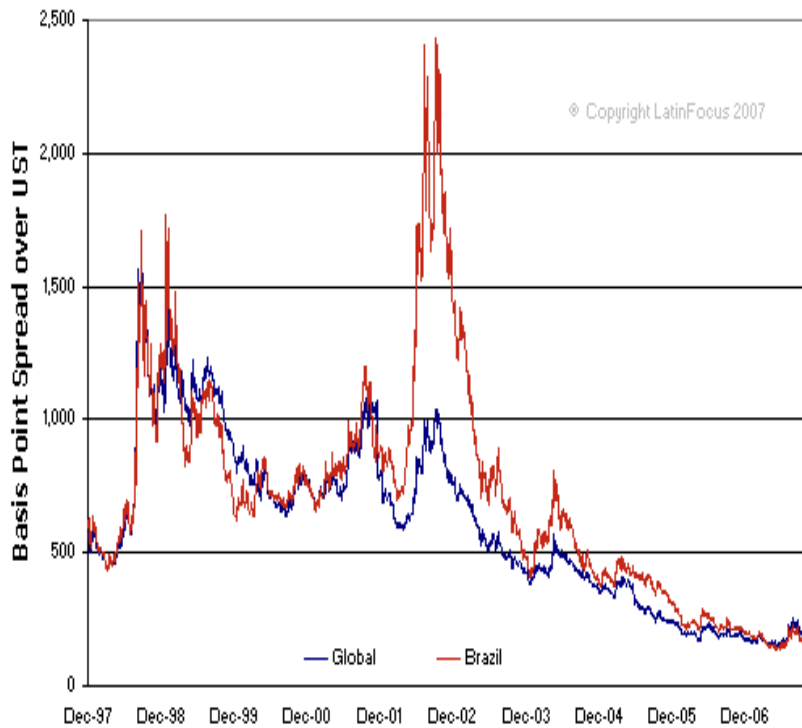
- Credit spreads reflect the additional return investors require to take on more credit risk. Bonds with lower credit ratings have larger credit spreads. For example, a corporate bond quoted at a credit spread of 100 basis points means investors are requiring 100 basis points of additional yield to buy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

# The Spread (3)

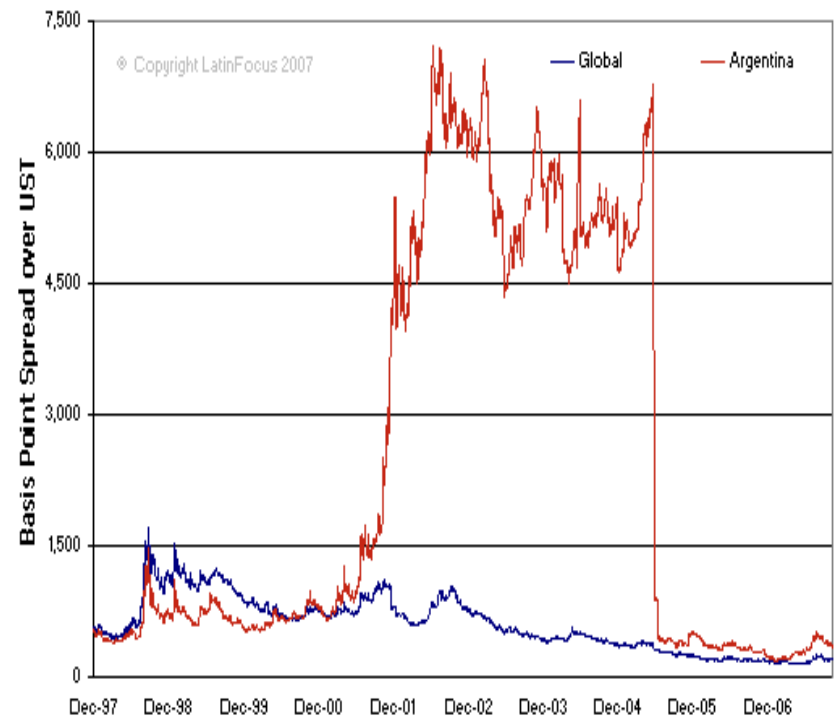
- The larger the spread, the more the bond is yielding but...
- Higher yields mean higher risk, i.e., lower probability of being repaid;
- The spread reflects the market's evaluation of a certain bond/issuer at that time and a large spread today does not necessarily imply that the issuer is going to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



# Rating Agency Statements on What Their Ratings Are Designed to Measure

- Fitch: “Credit ratings express risk in relative rank order, which is to say they are ordinal measures of credit risk and are not predictive of a specific frequency of default or loss. Fitch Ratings’ credit ratings do not directly address any risk other than credit risk, ratings do not deal with the risk of a market value loss on a rated security due to changes in interest rates, liquidity and other market considerations.”
- Moody’s: “There is an expectation that ratings will, on average, relate to subsequent default frequency, although they typically are not defined as precise default rate estimates. Moody’s ratings are therefore intended to convey opinions of the relative creditworthiness of issuers and obligations...Moody’s ratings process also involves forming views about the likelihood of plausible scenarios, or outcomes—not forecasting them, but instead placing some weight on their likely occurrence and on the potential credit consequences. Normal fluctuations in economic activity are generally included in these scenarios, and by incorporating our views about the likelihood of such scenarios, we give our ratings relative stability over economic cycles and a sense of horizon.”
- Standard & Poor’s: “Standard & Poor’s credit ratings are designed primarily to provide relative rankings among issuers and obligations of overall creditworthiness; the ratings are not measures of absolute default probability. Creditworthiness encompasses likelihood of default and also includes payment priority, recovery, and credit stability.”

# 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+		AA+		High Grade
Aa2		AA		AA		
Aa3		AA-		AA-		
A1	P-2	A+	A-1	A+	A1	Upper Medium Grade
A2		A		A		
A3		A-		A-		
Baa1	P-3	BBB+	A-3	BBB+	A3	Lower Medium Grade
Baa2		BBB		BBB		
Baa3		BBB-		BBB-		
Ba1	Not Prime	BB+	B	BB+	B	Non Investment Grade Speculative
Ba2		BB		BB		
Ba3		BB-		BB-		
B1		B+		B+		Highly speculative
B2		B		B		
B3		B-		B-		
Caa				CCC+		C
Ca	CCC-		Extremely speculative			
C	CCC-		In default, with little prospect for recovery			
/	D		/	DDD	/	
/		DD				
/		D				

# 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.

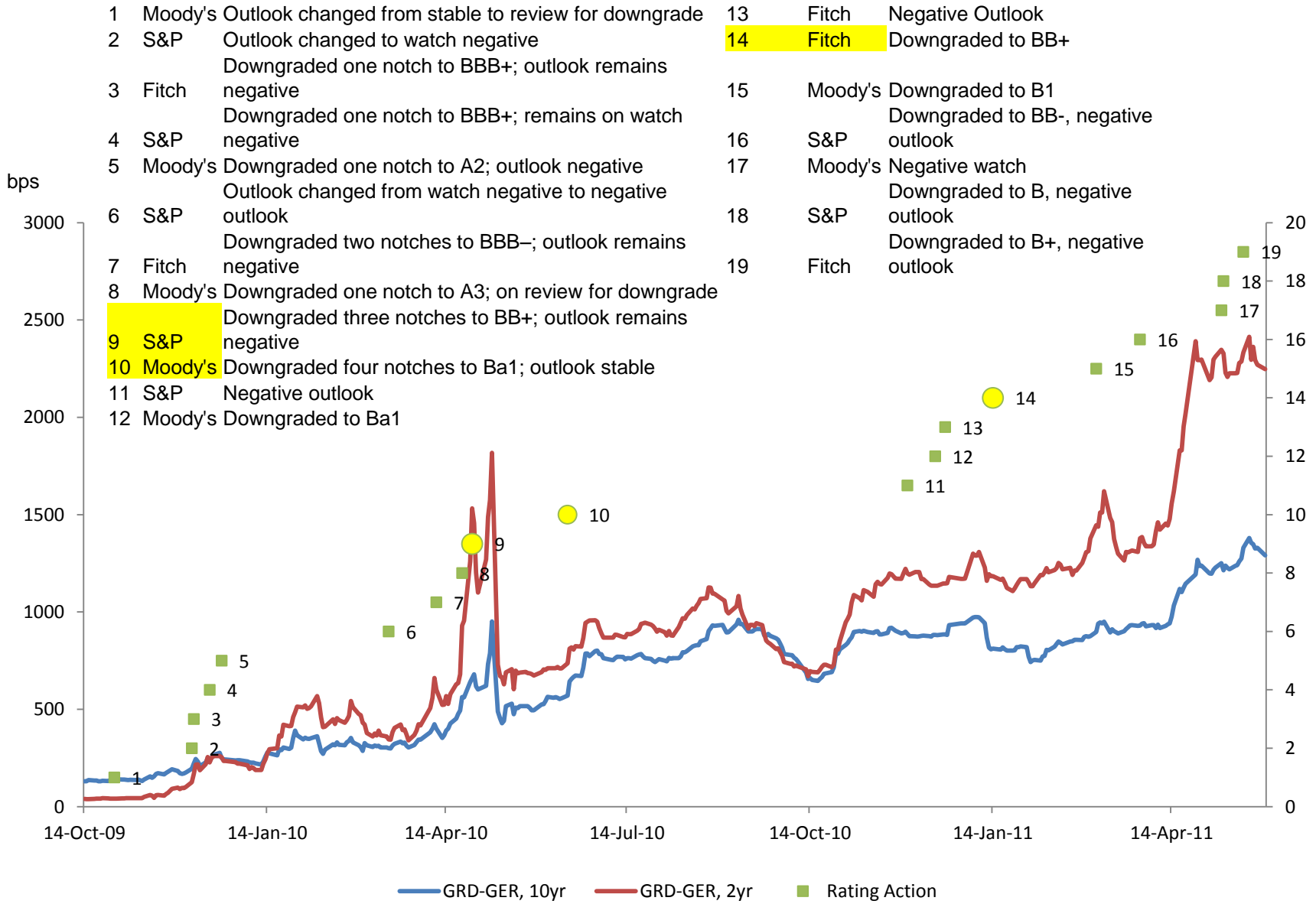
# Rating Agencies: The Good and the Bad. An Example

- 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;

# 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.

# Do Rating Changes Lead or Follow the Market? The Case of Greece



# In conclusion...

Credit ratings can play an important and positive role in capital markets, primarily by using their economies of scale **to provide cost-effective information services** that increase the pool of potential borrowers and promote liquid markets. For the most part, they have been a positive force in fixed-income markets, particularly in their traditional corporate markets, as well as in the markets for sovereign bonds. However, the structured finance rating crisis has exposed **some flaws in the system (rating overreliance)**, and some concerning aspects of the CRAs' own rating philosophies (**rating smoothing**). However, these flaws can be rectified, although admittedly it will not be easy. In particular, reducing rating overreliance will require finding appropriate replacements, and it will be important that the authorities remain wary of **unintended adverse consequences**.

# What Determines the Price of a Bond in the Open Market? (1)

- 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.
- First, 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.”



# What Determines the Price of a Bond in the Open Market? (2)

- Second, other issues contribute to determine prices/yields, i.e., the probability of being repaid.
- An open market bond yield can be written as:

$$\text{Yield}(t) = \text{Yield}_{\text{Government}}(t) + \text{Spread}(t)$$

$$\text{Spread} = f(\text{country/company outlook})$$

# Bond Prices: Recap

- In general, 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.
- Country/company specific factors then determine the spread over the “risk-free” yield

**WHY ARE BONDS SO POPULAR  
AMONGST INVESTORS?**

# 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.

# 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.

# 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.

# 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.

# 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.



# 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.

# 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.

# 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.

# Active Strategies (3)

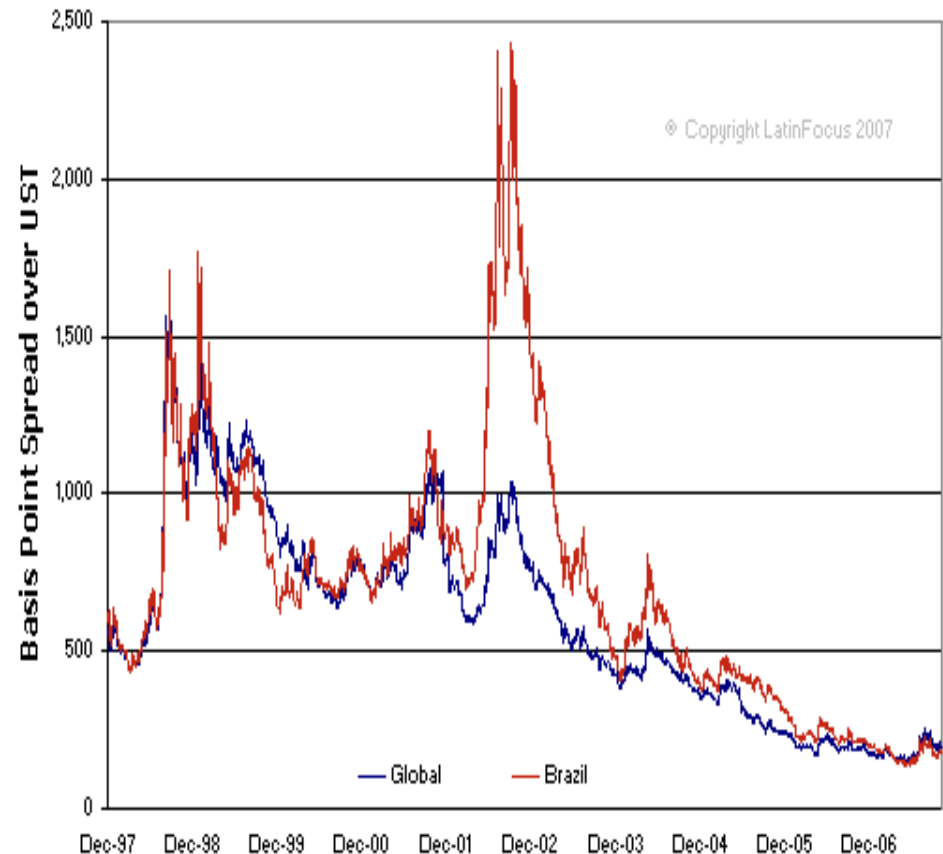
- A third active bond strategy is to adjust the maturity structure of the portfolio based on expected changes in the relationship between bonds with different maturities, a relationship illustrated by the “**yield curve.**” While yields normally rise with maturity, this relationship can change, creating 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.

# 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

# Benchmarked Bond Funds (2)

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



# 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...

# 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