

So, what happened?

4

We Got Rates Up ...

Fed Funds up 500 bps over the last two years



Source: Bloomberg
Past performance does not guarantee future results and there is no assurance this trend will continue.

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5

Yield Curve: January 2022 - 2024

We are up ~300 - 540bps since January 2022



Source: Bloomberg
Past performance does not guarantee future results and there is no assurance this trend will continue.

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What Actually Happened?

For banks, 2022 has been a year of shocks and



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7

State of the Market TODAY:

- COFs is still high today
- Inverted curve accelerates NIM challenges
- If we cannot continue to put on loans in volume AND at high rates, our margins will compress

An objective, repeatable process that incorporates multiple scenarios can provide clarity in evaluating capital allocation decisions.

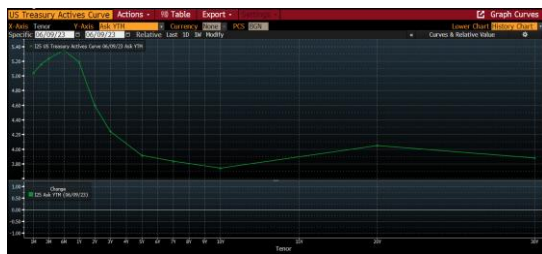
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8

How Could this Impact Us
and our Peers?

9

Now... How do we Approach THIS Situation?



Source: Bloomberg
Past performance does not guarantee future results, and there is no assurance that we will achieve the same results.

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10

The Current Dilemma in Banking:

Banks added longer fixed rate CRE/Resi Loans and Investments when rates were lower. As a result, the industry experienced record margins in 2022 as funding increases lagged the rate increases.

- The corresponding consequence today:
 - ...if we experience any increase on our Cost of Funds...
 - ...our margins will compress.
- We need some way to mitigate lower earnings in the future.

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11

Asset Repricing Lag → Margin Compression¹

Loan Repricing Information				
Repriced	1-3 Months	3-6 Months	6-12 Months	12+ Months
Fixed %	100%	100%	100%	100%
Total %	25%	45%	20%	10%

As we experience a lag on legacy loans repricing, our margins will compress as rates unchanged and rates up.

2024-2025				
Period	2024	2025	2026	2027
Fixed %	100%	100%	100%	100%
Total %	25%	45%	20%	10%
Fixed %	100%	100%	100%	100%
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¹Legacy loan yield of 4.00% (net of COI). Assuming 5% loan growth and with new originations at 7% in rates unchanged, projecting loan yield to be 5.00% at the end of year 1.

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12

So... Why Does This Impact a Course on Investments

- Every decision you make in the investment portfolio is going to have an impact of the performance of the bank (Example: SVB)
- In order to evaluate asset allocation in the portfolio, we should first understand the needs of the bank and consider how the investment portfolio may be used to manage risk exposure and support shareholder return objectives.
- This means understanding what we are buying and why we are buying it

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13

III. So How Does it all Work?

PERFORMANCE
TRUST capital management

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14

The Status Quo

A Portfolio Manager

Like my peers, I came from the loan or accounting side of the institution. Most of us inherited oversight of the investment function and have never had any real formal training in fixed-income analytics.



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15

The Status Quo

A Broker

Like my peers, I was taught how to sell a bond. We figured that portfolio managers knew what they needed. As long as we stuck to high credit quality all we needed to figure out was, "What will he/she buy?"



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16

Definition

What is a bond?

- A certificate of debt issued by a government, agency, or corporation where the borrower agrees to pay back the original principal plus interest by a specified future date.

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17

What are Bonds?

They're a security!

- Security: Fungible, negotiable financial instrument that holds some type of monetary value.
 - Fungible: a good/asset's interchangeability with other individual goods or assets of the same type
- Can represent ownership, a creditor relationship, or option rights to ownership as represented by an option



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18

What are Bonds?

- Bonds represent an obligation to make future payments.
 - Debt for the Issuer
 - Asset for the Borrower



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19

Components of Fixed Income Securities

- **Coupon:** A negotiable rate attached to a bond that represents a sum of interest due. The rate that the issuer pays for the life of the bond (loan).
- **Maturity:** The stated final date at which all the principal and accrued interest will be repaid to the buyer from the issuer.
- **Par Value:** The stated amount of the bond issued or bought. The face or principal amount of the loan.

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20

Other Bond Features

- **Call Feature** - allows the issuer to call in the bonds and repay them at a predetermined price before maturity, (in essence an option to RE-finance.)
- **Put Option** - similar to the call option but gives the bond holder the right to redeem the bond prior to maturity

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21

Basis Points

- 100 Basis Points = 1 percentage point.
- So, 25 BP = $\frac{1}{4}$ of 1%,
- 31 BP = 31/100 of a percent etc...

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22

Bond Price

- Bonds are priced on a percentage basis, where par is considered to be 100, and issued in increments of \$1000. Price is usually quoted in decimal form, but formerly was quoted in fractions of 32nds. Municipal bonds were quoted in 1/8th's.
- Discount Price: If the bond sells or trades below the par amount, it is trading at a discount.
- Premium Price: If the bond sells or trades above the par amount, it is trading at a premium.

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23

Price / Yield Relationship

- If you own a bond at par (you pay a dollar price of \$100 for the security), then your yield is the same as the stated coupon. If the bond is purchased at a discount or premium, the accretion or amortization of that amount influences your return.

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24

Bond Spread or Rate

- The bond's coupon, or interest rate is determined by a spread-positive or negative- to a benchmark, such as a specified U.S. treasury note. E.G: in order to underwrite a 5 yr corporate bond at par, the issuer would usually have to offer a coupon or rate with a positive spread to the 5 yr treasury.

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25

U.S Treasury Obligations

- U.S. Treasury securities are generally considered to have among the lowest perceived credit risk of any sovereign or corporate debt issuers. Other bond issuers may offer higher interest rates than comparable Treasuries to reflect additional risks, depending on market conditions.

Note: U.S. Treasury securities are subject to interest rate, inflation, and market risk and are not risk-free. Yield differentials across securities may vary based on market conditions, liquidity, tax considerations, and other factors.

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26

SOFR

- In the U.S. we adopted a rate based on overnight repurchase agreements using U.S. Govt debt as collateral that is known as the Secured Overnight Financing Rate, or SOFR.
- This rate is administered and maintained by the Federal Reserve Bank of New York.
- On June 22, 2017, the Alternative Reference Rates Committee of the Federal Reserve selected the Secured Overnight Financing Rate as their final choice to replace U.S. dollar LIBOR implemented in 2023.
- Get used to hearing it...

Note: SOFR is a secured-based reference rate that may fluctuate over time based on underlying market conditions. It is not an investment and does not reflect returns on any portfolio or strategy.

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27

Risks Associated With Bonds

- Credit Risk
- Interest Rate Risk
- Call Risk
- Reinvestment Risk
- Liquidity Risk
- Political Risk
- Counterparty Risk

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28

How do They Know ?

- The function of setting rate/price relies on:
 - 1. Benchmarking of rates and current rate structures
 - 2. Relation of price/yield to other opportunities
 - 3. Pricing of risk.

(Sounds like a loan to me...)

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29

Risk Factors that Influence Spreads

- Type of issuer
- Issuer's perceived credit worthiness
- Term or maturity of the security
- Provisions that grant either the issuer or the investor embedded options
- Taxability of the interest received by the investor
- Liquidity of the issue
- Just like a loan!

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30

Why a Spread?

- Because... investors may compare yields to U.S. Treasury obligations as a reference point when evaluating additional risk. As a result, securities are often evaluated on a "spread to Treasuries" basis, also called the nominal spread.

Note: U.S. Treasury securities are subject to interest rate, inflation, and market risk and are not risk-free. Yield differences across securities may vary based on market conditions, liquidity, tax considerations, and other factors.

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31

Price to Yield Relationship

- Assuming the bond is held to maturity and the issuer meets all payment obligations, there exists an **INVERSE** relationship between the price of the bond and the return, or yield, of the bond.
- At par, you will receive the stated return, or coupon, of the security to maturity.
- At a discount, you will receive a higher rate of return than the stated coupon.
- At a premium, you will receive a lower rate of return than the coupon over the life of the security.

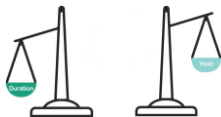
Note: Bond prices and yields are subject to market conditions and may fluctuate.

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32

Most are Taught to Model Risk and Reward on Separate Scales

Bonds



This raises two questions. Should we be using separate scales that make it very difficult to measure the trade-off between risk and reward? Also are we using the correct measurements for risk and reward?

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33

Bloomberg Definition of Yield

Definitions - Bloomberg Help

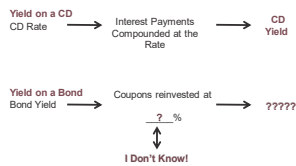
Yield To Maturity (YTM)

The percentage rate of return paid if the security is held to its maturity date. The calculation is based on the coupon rate, length of time to maturity, and market price. It assumes that coupon interest paid over the life of the security is reinvested at the same rate.

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34

For Bonds, Yield is Not What You Get



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35

In the bond world, yield is *not* what you actually get.

We have been educating investors on this topic for decades!

36

In 1626, Peter Minuit bought Manhattan Island from the Canarsee tribe for an alleged fee of \$24 in goods.

Future Value



Source: LOC.gov

37

Manhattan Island Interesting Facts

- 22.96 Square Miles
- Population of 1.6 Million
- Population Density of 70,595 per square mile
- Per Capita Income of over \$100,000
- Only 12% of Voters registered Republican
- Last time the island voted Republican... 1920

Source: LOC.gov. As of Q4 2024

38

Manhattan Island Interesting Facts

- New York was originally called New Amsterdam
- The Vaults 80 feet beneath the Federal Reserve Bank on Wall St
- The Dur for the tin exchange



Source: MorningStar. As of Q4 2024

39

Did the Canarsee Tribe make a
good or bad deal?

40

$$FV = \$24 \times (1 + i)^n$$

$$FV = \$24 \times (1.05)^{383}$$

3 Billion Dollars

41

**Compound interest
is the most
powerful force in
the Universe.**

ALBERT EINSTEIN
(Maybe)



@ 5% would be \$3 Billion
@ 6% would be \$118 Billion
@ 7% would be \$18 Trillion
@ 8% would be \$152 Trillion

42

It Gets Better...

- According to many historians, the Indians who sold the island did not even live on the island.
- The Canarsee tribe lived on Long Island, the Weckquaesgeek tribe lived on Manhattan and were never consulted on the trade.
- The Indians did not believe that anyone could own the land.

Source: LOC.gov

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43

The Time Value of Money*Price is the present value of the future cash flows.*

$$FV = PV \times (1 + i)^n$$

$$PV = FV / (1 + i)^n$$

Where:**PV** = Present Value**n** = Number of Periods**i** = Discount Rate Per Period**FV** = Future Value**NOTE:** Since bond calculations conventionally use 2 periods per year, $i = \text{yield} / 2$.

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44

Definitions**1. Price**

The sum of the present value of future cash flows, given a yield (discount rate).

2. Yield

The discount rate which, when used to present value the future cash flows, results in the sum of those present valued cash flows being equal to the price.



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45

Price and Yield

$$\text{PRICE} = \frac{\text{CF}_1}{(1 + y/2)^1} + \frac{\text{CF}_2}{(1 + y/2)^2} + \dots + \frac{\text{CF}_n}{(1 + y/2)^n}$$

For bonds whose cash flows don't change when interest rates change (bullets), once the yield is given, the price can be solved for. Conversely, if the price is given, the yield can be solved for.

In a real sense, yield is price and price is yield.

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46

Exercise 2.1: Calculate the Price of a 3-Yr. Bond

3-yr Bond, 2.00% Coupon, 3% Yield

$$\text{PRICE} = \frac{CF_1}{(1+y/2)^1} + \frac{CF_2}{(1+y/2)^2} + \dots + \frac{CF_n}{(1+y/2)^n}$$



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47

Exercise 2.2: Calculate Using a Higher Yield

3-yr Bond, 2.00% Coupon, 5% Yield



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48

Exercise 2.3: Calculate Using a 1% Yield*3-yr Bond, 2.00% Coupon, 1% Yield*

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49

Other Yields Produce Other Prices*3-yr Bond, 2% Coupon*

- For bonds whose cash flows don't change with changes in interest rates, there is only one price for each yield.
- Likewise, there is only one yield for each price.
- Or to put it another way, there is only one price yield relationship since there is only possible cash flow.

Yield	Price
0%	\$106.00
1%	\$102.95
2%	\$100.00
3%	\$97.15
4%	\$94.40
5%	\$91.74
6%	\$89.17
7%	\$86.68
8%	\$84.27
9%	\$81.95
10%	\$79.70

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50

Let's Graph the Relationship Between Yield and Price*3-Yr Bond, 2% Coupon*

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51

Definition

- **Spread:** The difference between two yields – commonly between the yield on the instrument in question and some benchmark rate (such as the similar maturity U.S. Treasury rate).

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52

Components of Spread?

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53

Definition

Duration sounds like a measure of what?

Macaulay's Duration Defined 1938

The weighted average maturity of a bond's cash flows, where the present values of the cash flows serve as the weights. The greater the duration of the bond, the greater its percentage price volatility.

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54



In general, duration measures the price sensitivity of a bond to a small change in interest rates. For securities such as MBS, duration measures such as "Modified Duration" and another well known formula "Macaulay Duration" have little meaning when it comes to interest risk management. The formulas are limited since they assume cash flows do not change if interest rates change. In this case these formulas are inappropriate.

— IVAN BANDIC, MANAGING DIRECTOR
RBC CAPITAL MARKETS



55

Academics, however, like to define investment 'risk' (differently)... In their hunger for a single statistic to measure risk... they forget a fundamental principle: *It is better to be approximately right than precisely wrong.*

— WARREN BUFFETT
American Business Magnate,
Investor and Philanthropist



56

Duration

- Duration is a measure of a bond's price sensitivity.
- *** **The LONGER the duration, the MORE price sensitive the bond...*****
- (Remember our Inverse Relationship....?)

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57

Effective Duration

- In general, we refer to duration as the sensitivity of the bond's price to yield changes.
- **Modified Duration** measures the price responsiveness assuming the *changes in yield do not change the cash flow*. This measure is appropriate for option-free bonds and bonds with embedded options where the option is not likely to be exercised.
- In contrast, **Effective Duration** assumes that *changes in yield can affect the cash flow* and takes this into account.
- Types of bonds where effective duration is most important:
 - **Bonds with Embedded Options (e.g. Callable or Puttable bonds)** – Takes into account the probability that an option will be exercised, whether or not the option is currently likely to be exercised.
 - **Floating Rate Bonds** – Takes into account the time to the next reset versus cashflow (modified duration). The resetting of the coupon to a market level will serve to decrease the price volatility (sensitivity) of a bond.

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58

Effective Duration Example

- Floating rate bond example:
 - Maturity: 08/15/2014
 - Average life: 5.0 Years
 - Modified Duration: 4.5 Years
 - Reset Frequency: Quarterly
 - Effective Duration: 0.25 Years
- Bond will reset to the market level of interest rates in three months and therefore not be as price volatile.

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59

Why Use Duration?

- Duration can be used to measure the potential change in market value of a financial instrument.
- It can be used to compare instruments with different characteristics (maturities, cashflows, etc.).
- Duration can be used to evaluate overall portfolio interest rate risk for bonds AND loans.....that's right, loans!!

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60

Break-Even Analysis

- Break-Even is the future rate required by selecting a shorter-term investment vs. a longer-term investment

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61

IV. Types of Investments

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62

Types of Bonds

- Debentures - issued by a corporation or government and backed by their general creditworthiness and reputation of the issuer
 - Senior, Secured and Subordinated Bonds
 - Generally, periodic coupon payments with principal paid at maturity
- Asset-Backed – issued by a special purpose vehicle (e.g. a trust) backed specifically by the pool of income-generating assets (loans)
 - Payment of principal and interest defined by and dependent on the underlying loans
 - Loan Types include: Mortgage, Student Loans, Small Business Loans, Auto Loans, Credit Card Debt, Accounts Receivables, etc.

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63

Review: Bond Characteristics*When do I get paid, and how much do I get paid?*

- **Face Value:** amount typically paid to the holder at maturity. Commonly \$1,000, aka principal or par value
- **Coupon:** contractual interest rate that is paid to holder, as a % of par.
- **Maturity:** contractual date at which principal is returned
- **Issuer:** entity that issued the bond and making the contractual payments

Coupon: 5%
Maturity: 5 Years
Issuer: UST
Face Value: \$1,000

	Principal (%)	Coupon (%)	Actual Payments
Year 1	0.0	5.0	\$50
Year 2	0.0	5.0	\$50
Year 3	0.0	5.0	\$50
Year 4	0.0	5.0	\$50
Year 5	100.0	5.0	\$1,050
Total	125.0	25.0	\$1,250

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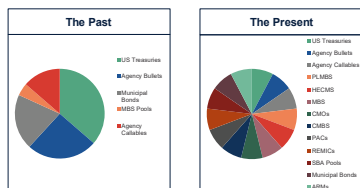
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Vocab*Residential and Commercial Key Words*

- **Loan** – the lending of money by one or more individuals – the borrower incurs a debt, and is typically required to pay interest on that debt until it is repaid, and also to repay the principal amount borrowed.
- **Lien** – a legal claim or right against a property that allows a creditor to secure the repayment.
- **Amortizing** – paying off of debt with a fixed repayment schedule in regular installments over time. MORT = Latin for death [of debt].
- **Balloon Payment** – A repayment of the outstanding principal sum made at the end of a loan term.

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65

#1: The World Is Far More Complex Today Than In The Past

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66

Debentures

Unsecured Debentures

- Treasury Notes, Bonds, Bills
- Municipal General Obligation (GO) bonds
- Corporate Bonds
- Agency "Bullet" Bonds
- Agency Callable Bonds

Secured Debentures

- Municipal Revenue Bonds (Limited Obligation Bonds)
- Asset Backed Corporate Bonds

"In a sense, all debentures are bonds, but not all bonds are debentures. Whenever a bond is unsecured, it can be referred to as a debenture." -Investopedia

Is every square a rectangle?

YES

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67

Unsecured Debentures

Treasuries

- Debt issued by the US government
- Generally considered to be low-risk assets by investors
- A Government Guarantee is the strongest there is (as we saw earlier)



U.S. Treasury securities are subject to interest rate, inflation, and market risk and are not FDIC-insured.

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68

Treasuries

US Treasury

Fixed Principal Treasuries

Inflation-Indexed Treasuries (TIPSs)

Treasury Strips (Created by the Private Sector)

Treasury Bills

Treasury Notes

Treasury Bonds

Tenor: A few days to 52 Weeks (0 Coupon)

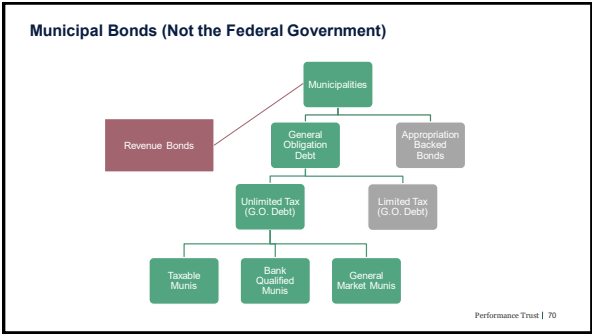
Tenor: 2, 3, 5, 7, or 10 years (Fixed Coupon)

Tenor: Greater than 10 years (Fixed Coupon)

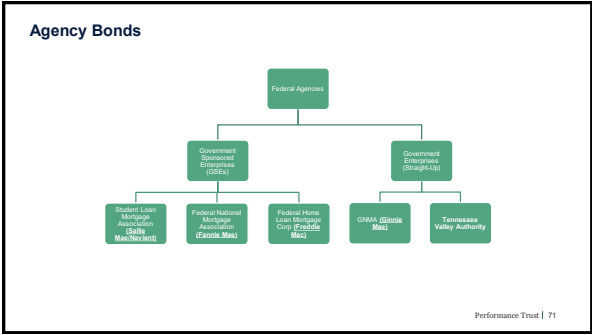
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69

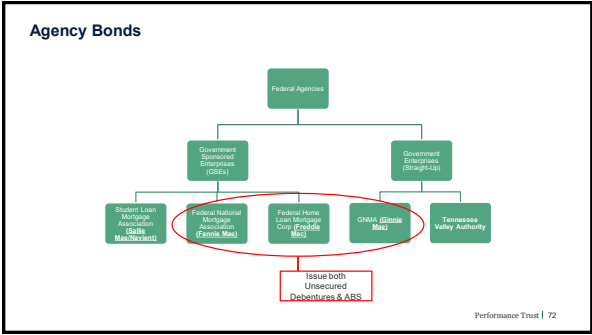
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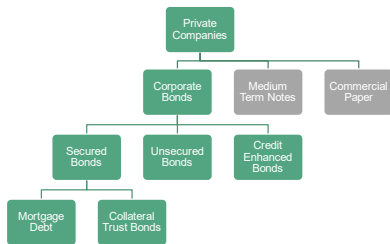


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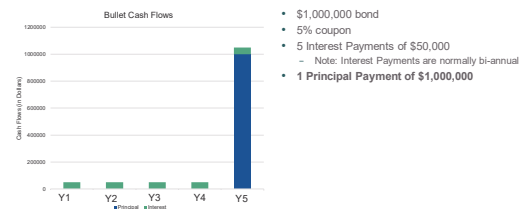
Corporates



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73

These Bonds have "Bullet-Like Cash Flows"



Source: Performance Trust Analytics

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74

When Bullets are Called...

Call Feature

- Embedded Call Option: Callable Bond
- Issuer has the right to retire the bond before the stated maturity at a designated price
- Call Date: May be structured as a single exercise date (European-style) or multiple/continuous exercise dates (Bermuda or American-style)
- Call Price: May be at par (100), at a specified premium (e.g., 101), or based on prevailing U.S. Treasury rates (make-whole call)
- Bonds may be called in whole (the entire issue) or in part (partial redemption). For example, an issuer may redeem a portion of an outstanding amount rather than the entire issue. If the issuer sold 5,000,000 of a specific bond, in-whole would be paying off the full 5,000,000, in part would be paying off only 2,500,000.

The issue refers to the total amount of bonds issued under a single security, typically identified by a CUSIP

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75

Asset Backed Securities

Can be Agency (issued or guaranteed by U.S. government-related entities)** or Private Label (not government guaranteed)

- RMBS: Residential Mortgage-Backed Securities
- CMBS: Commercial Mortgage-Backed Securities
- ABS: Asset Backed Securities (Consumer Loans)

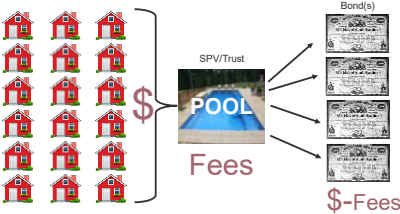
**GSEs don't have an explicit U.S government guarantee and rely on credit of the issuing entity, but are tied closely to government intervention.

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76

Asset Backed Securities

The cash flows of an ABS are determined by the underlying collateral (loans).

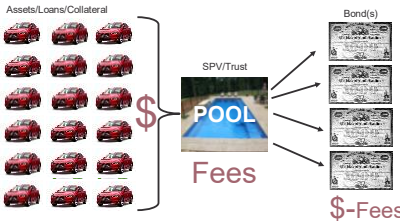


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77

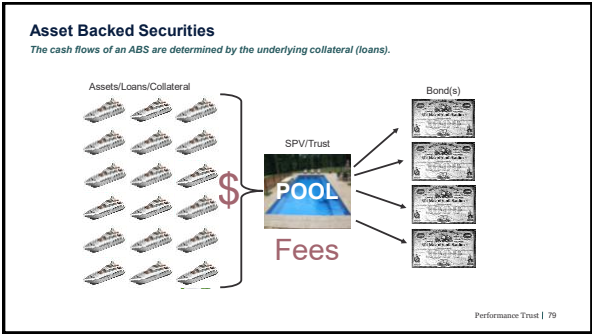
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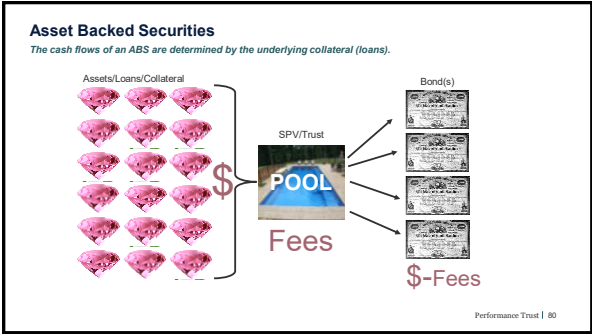


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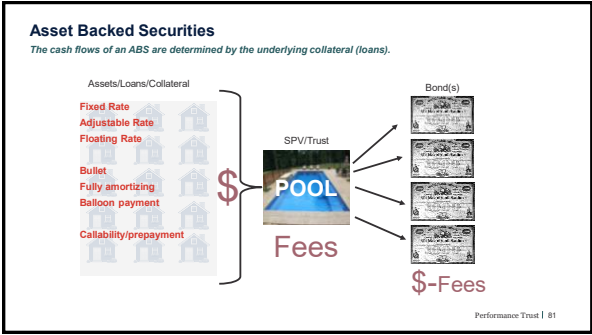
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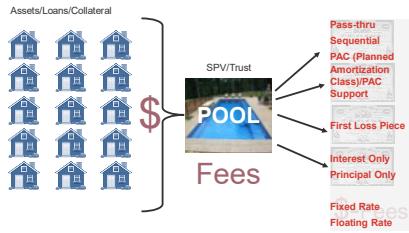
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81

Asset Backed Securities

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82

Asset Backed Securities

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- **CMBS: Commercial Mortgage-Backed Securities**
- **ABS: Asset Backed Securities (Consumer Loans)**

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83

Residential Mortgage-Backed Securities



84

Understanding Loans: RMBS

- **Residential Mortgages** – 1-4 Family homes (a stand alone home, a home with a basement apartment rented out, a condo...)
 - 15, 20, 30 year terms, usually fully amortizing
 - Fixed Rate, Adjustable Rate (ARM)
 - Reverse mortgages



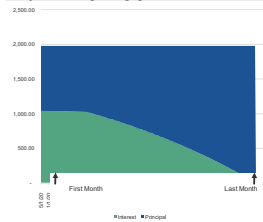
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85

Understanding Loans: RMBS

Residential Mortgage Backed Securities: fully amortizing loans

Fully Amortizing Mortgage



Source: Performance Trust Analytics

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86

Asset-Backed Securities

Can be Agency (issued or guaranteed by U.S. government-related entities) or Private Label (not government guaranteed)

- **RMBS:** Residential Mortgage-Backed Securities
- **CMBS:** Commercial Mortgage-Backed Securities
- **ABS:** Asset Backed Securities (Consumer Loans)

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87

Understanding Loans: CMBS

- Commercial Mortgages: Multi-family buildings like an apartment building or office space.
 - 5, 7, 10 year
 - usually amortizing with a balloon payment



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88

Who Takes out These Loans?

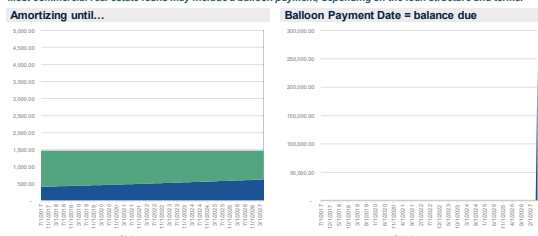
- When the borrower takes out a balloon commercial real estate loan, they are given a term typically ranging from 5 to 10 years. The borrower will have fixed monthly payments through that term, but those payments aren't set up to cover the entire loan repayment. Instead, the monthly payments are calculated as if the loan is a traditional 25- or 30-year mortgage—like a residential mortgage. At the end of the 5- to 7-year term, the borrower will have paid off only a portion of the principal balance, so the remaining principal balance is due at maturity.
- Borrowers sign for a balloon loan if they know that they'll have the cash on hand when it comes time to make the final payment. If they don't, they may have to refinance their loan, restructure, or sell their business property to make the balloon payment.

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89

Understanding Loans: Amortization

Most commercial real estate loans may include a balloon payment, depending on the loan structure and terms.

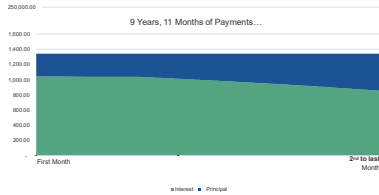


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90

Understanding Loans: CMBS

- Many secured loans for businesses or for apartment buildings (commercial real estate) may have an amortizing period...
- Borrowers may have outstanding principal at maturity depending on loan terms
- Example: JP Morgan Buys an Office Building in NYC



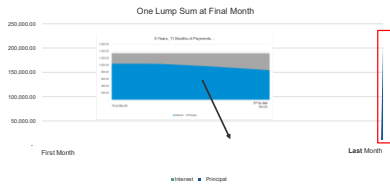
Source: Performance Trust Analytics

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91

Understanding Loans: CMBS

- Many secured loans for businesses or for apartment buildings (commercial real estate) may have an amortizing period...
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- Example: JP Morgan Buys an Office Building in NYC



Source: Performance Trust Analytics

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92

Asset-Backed Securities

Can be Agency (issued or guaranteed by U.S. government-related entities) or Private Label (not government guaranteed)

- RMBS: Residential Mortgage-Backed Securities
- CMBS: Commercial Mortgage-Backed Securities
- ABS: Asset Backed Securities (Consumer Loans)**

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93

Understanding Loans: Types of Loans

- **Student loans:** fixed and floating rate, typically 10-40 year terms, amortizing but with deferments
- **Auto Loans:** typically 3, 5, 6-year terms, fixed rate, fully amortizing
- SBA, Project Finance Loans, and more



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94

Asset-Backed Securities

Can be Agency (issued or guaranteed by U.S. government-related entities) or Private Label (not government guaranteed)

- **RMBS:** Residential Mortgage-Backed Securities
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- **ABS:** Asset Backed Securities (Consumer Loans)

All of these involve amortization of debt borrowers making periodic payments of principal and interest to their lender over time.

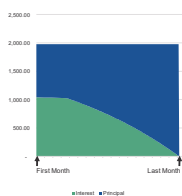


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95

Borrowers Don't Always Follow the Plan

The Plan



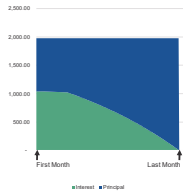
Source: Performance Trust Analytics

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96

Borrowers Don't Always Follow the Plan

The Plan



Reality

- Death
- Divorce
- Dislocation
- Default

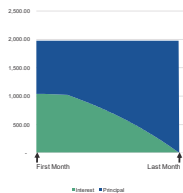
Source: Performance Trust Analytics

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Borrowers Don't Always Follow the Plan

The Plan



Reality

- The 4 D's
- Meaning: People don't follow the scheduled payments.
- Either they don't pay quick enough, or they pay too quickly, or they don't pay at all.
- The 4 D's set the baseline for how much is pre-paid, on average, during the life of a loan.

Source: Performance Trust Analytics

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Shifting To Mortgages.

- What is a mortgage? How do they work?
- In a typical 30-year Mortgage, the borrower pays a **fixed amount** every month
 - (The principal and interest **ratio changes** but the **total amount is the same**)
- However, borrowers may have the ability to make additional principal payments, subject to the terms of the loan. For example, a borrower may prepay a portion of the balance earlier than scheduled.

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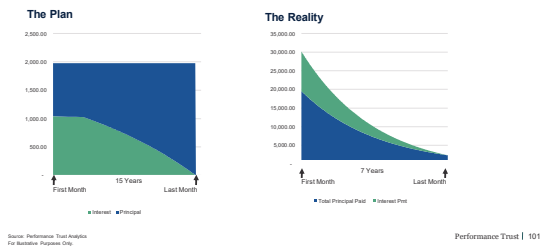
Why This Matters

- The amount of interest received over the life of the loan may change if repayment occurs earlier than scheduled
- Imagine a 15-Year mortgage where someone pays off the whole thing on day 1:
 - How much interest is received over the life of that loan?
- Early return of principal may result in reinvestment risk, where funds may need to be reinvested at prevailing market rates.
- Is this good or bad? What does this depend on? The impact may vary depending on interest rate conditions and borrow behavior.

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Plan vs. Reality



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101

Pre-Payments Pose a Risk to the Lender

Prepayment risk primarily impacts two things:

- The length of Time the lender gets cash flow (life of the loan):
 - If the borrower followed the plan perfectly, the lender would have that money coming in over the full term (e.g. 15 years).
 - When the borrower doesn't follow the plan, that money can come in sooner, and the bond could "mature" sooner than planned (~7 years)
- The amount of Cash Flow the lender receives (interest payments):
 - If the borrower followed the amortization perfectly, the total interest received may be higher (e.g. ~\$106K in interest payments).
 - If prepayment occurs earlier (say, 7 years), the total interest received may be lower (the lender will get ~\$40K in interest payments)

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102

Understanding Loans: Pre Payments

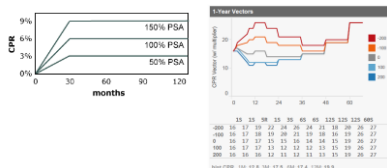
- Many loans allow the borrower to prepay all or a portion of their outstanding balance.
- This means that Homeowners may "refinance" (take out new loans to pay off their existing ones) depending on the prevailing market rates and credit conditions. They could also sell their homes, and use the proceeds of that home to pay off their loan.

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103

You should hypothesize and model prepayments

PSA is a specific CPR vector – PT runs these vectors to see how fast people will pay in different rates.

Source: Bloomberg
For Research Purpose Only

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104

Asset-Backed Securities

Can be Agency (issued or guaranteed by U.S. government-related entities) or Private Label (not government guaranteed)

- RMBS: Residential Mortgage-Backed Securities
- CMBS: Commercial Mortgage-Backed Securities
- ABS: Asset Backed Securities (Consumer Loans)
- CMOs: Collateralized Mortgage Obligation
- HECM: Home Equity Conversion Mortgage

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105

Asset-Backed Securities

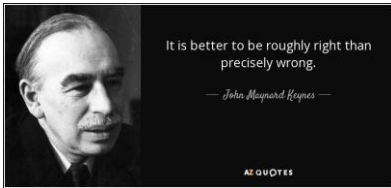
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 - CMOs: Collateralized Mortgage Obligation
 - HECM: Home Equity Conversion Mortgage
- } All in good time...

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106

There Are Tons of Decisions to Be Made in Bonds!



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107

Coupon Rates

- Floating Rate Coupon: You do not entirely know what your cash flows are going to be... it depends on where your reference rate or index goes
 - Reset Frequency
 - Lifetime Cap/Floor
 - Interim Cap/Floor

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108

Coupon Rates

- Fixed Rate: Fixed coupon payment rate
- Zero Coupon: no coupon payments are made
- Step-up: Scheduled change in the coupon rate
- Floating Rate: Coupon is fixed relative to an index that moves (SOFR+ e.g. 50bps) and may vary over time based on movements in that index.

	Fixed Rate		Zero Coupon		Step-Up		Floating Rate	
Price	5%	\$90	0%	\$0	2.5%	\$25	1.5%	\$15
Year 1	5%	\$90	0%	\$0	2.5%	\$25	2.5%	\$25
Year 2	5%	\$90	0%	\$0	6.5%	\$65	1.0%	\$10
Year 3	5%	\$90	0%	\$0	6.5%	\$65	2.0%	\$20
Year 4	5%	\$90	0%	\$0	6.5%	\$65	1.0%	\$10
Year 5	5%	\$1,090	0%	\$1,000	6.5%	\$1,065	2.0%	\$1,020

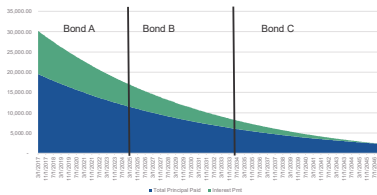
For Illustrative Purposes Only

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109

CMOs: Making new bonds out of pools of loans

There are lots of ways to carve up the pool of loans into different bonds, called CMOs – collateralized mortgage obligations

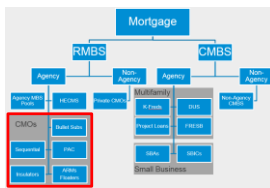


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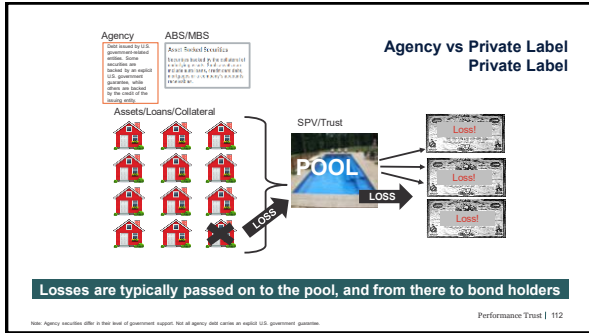
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Agency ABS/MBS 'Mortgages'

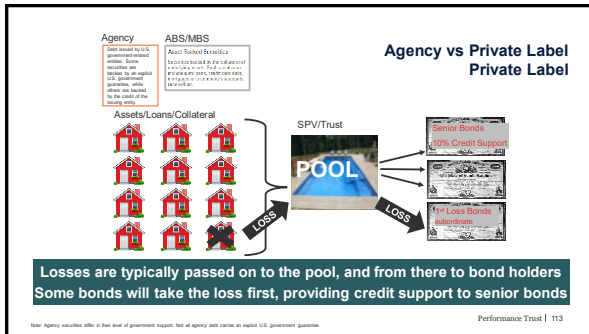


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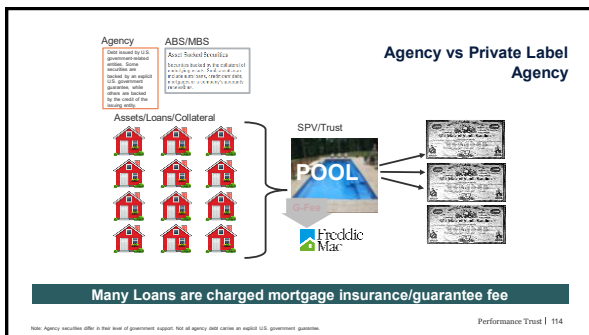
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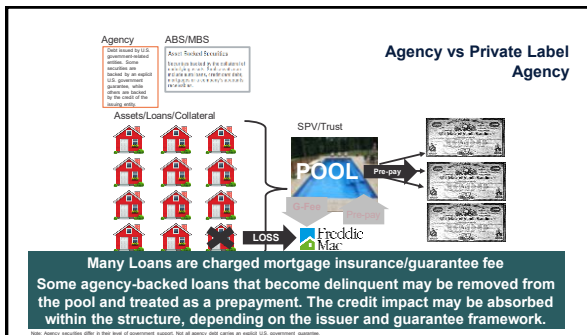
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113



114



115

V. Does it Really Matter?

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116

Is It Worth It?

TRADE-OFF

Is there enough potential reward to warrant the effort needed?

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117

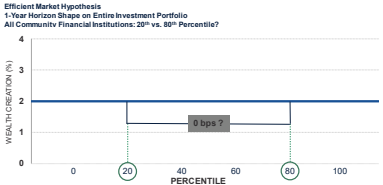
Are You Ready to Face the Competition?



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118

Wealth Creation Differential



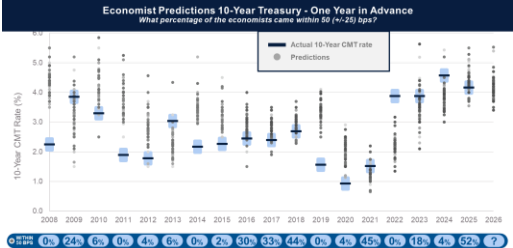
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119

Why the Difference? Is it Rate Guessing?

What percentage of the economists came within 50 (+/-25) bps? (from Module 1)



Source: Wall Street Journal, U.S. Treasury

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120

Why the Difference? Is It Luck?

Luck Versus Skill



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121

Why is the Market So Inefficient?

1. Lack of education
2. Restrictive investment policy
3. Lack of focus
4. Investment decisions based on accounting versus economic factors
5. Flawed asset liability models
6. Fear of regulators
7. Guessing interest rates



122

In Pursuit of Strong Risk-Adjusted Performance

Principles of Performance™

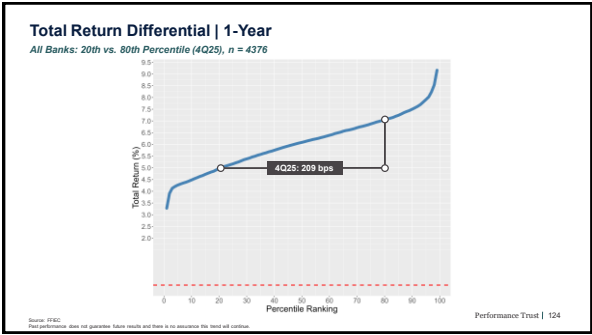
THREE CORE PRINCIPLES



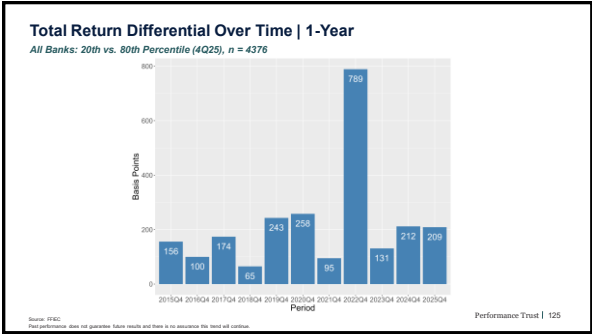
Note: Subject to prevailing conditions.

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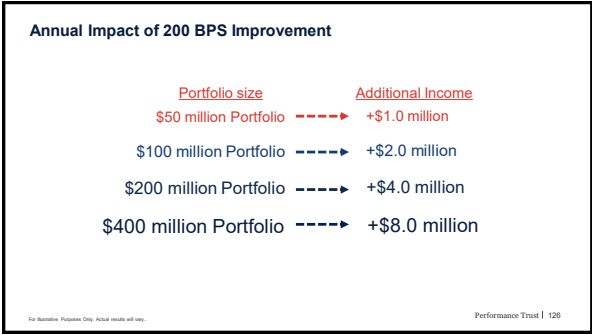
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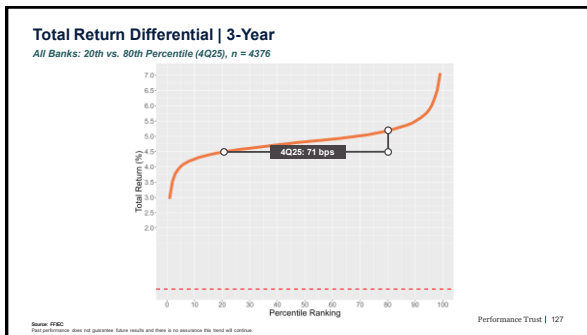
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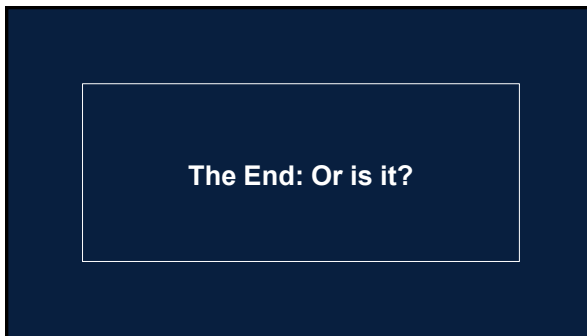
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126



127



128

Questions?

- Bond prices move inversely to interest rate changes. Your portfolio value therefore should increase as rates fall.
 - True
 - False

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129

Questions?

2. Yield is:

- a. Not what you get
- b. The discount rate to present value future cash flows
- c. A bad barometer for reward
- d. All of the above

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130

Questions?

3. CMO is a bond market acronym for:

- a. Contingent Market Obligations
- b. Customized Mortgage Options
- c. Collateralized Mortgage Obligations
- d. Count Me Out

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131

Questions?

4. MBS stands for:

- a. Mortgage-Backed Securities
- b. Moms' Best Snacks
- c. Massive Bond Sales
- d. Mortgage Bond System

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132

Questions?

5. Duration is a measure of:

- a. Price sensitivity
- b. Price appreciation potential
- c. Time to maturity
- d. The temperature

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133

Questions?

6. A portfolio managed for total return will reflect:

- a. Yield only
- b. Realized gains only
- c. Unrealized gains and losses only
- d. Income, and all gains and losses, both realized and unrealized

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134

Questions?

7. GSE is an acronym for:

- a. Greater Security Entity
- b. Government Stifles Entrepreneurs
- c. Global Swaption Evaluation
- d. Government Sponsored Enterprise

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135

Questions?

8. The price sensitivity of a bond with a duration of ten is greater than a bond with a duration of five.
- a. True
 - b. False

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136

Questions?

9. Once issued, a bond cannot decline in value.
- a. True
 - b. False

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137

Questions?

10. Unlike loans, most bonds have no default risk.
- a. True
 - b. False

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138

Home Study Problems

- How should a bank executive team think about the role of the investment portfolio within the bank? What are the four main purposes of the investment portfolio?
- What are the shortcomings of "yield" and why is it a bad barometer for return for a bank?
- What are the shortcomings of "duration" and why is it a bad metric for evaluating risk for a bank?
- If you were given the responsibility of the investment portfolio tomorrow, what would you do first?
- What (if any) were major takeaways for you personally from the class?

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139

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140