TEXPERS

Pre-conference Workshop

Interest Rates & Stagflation

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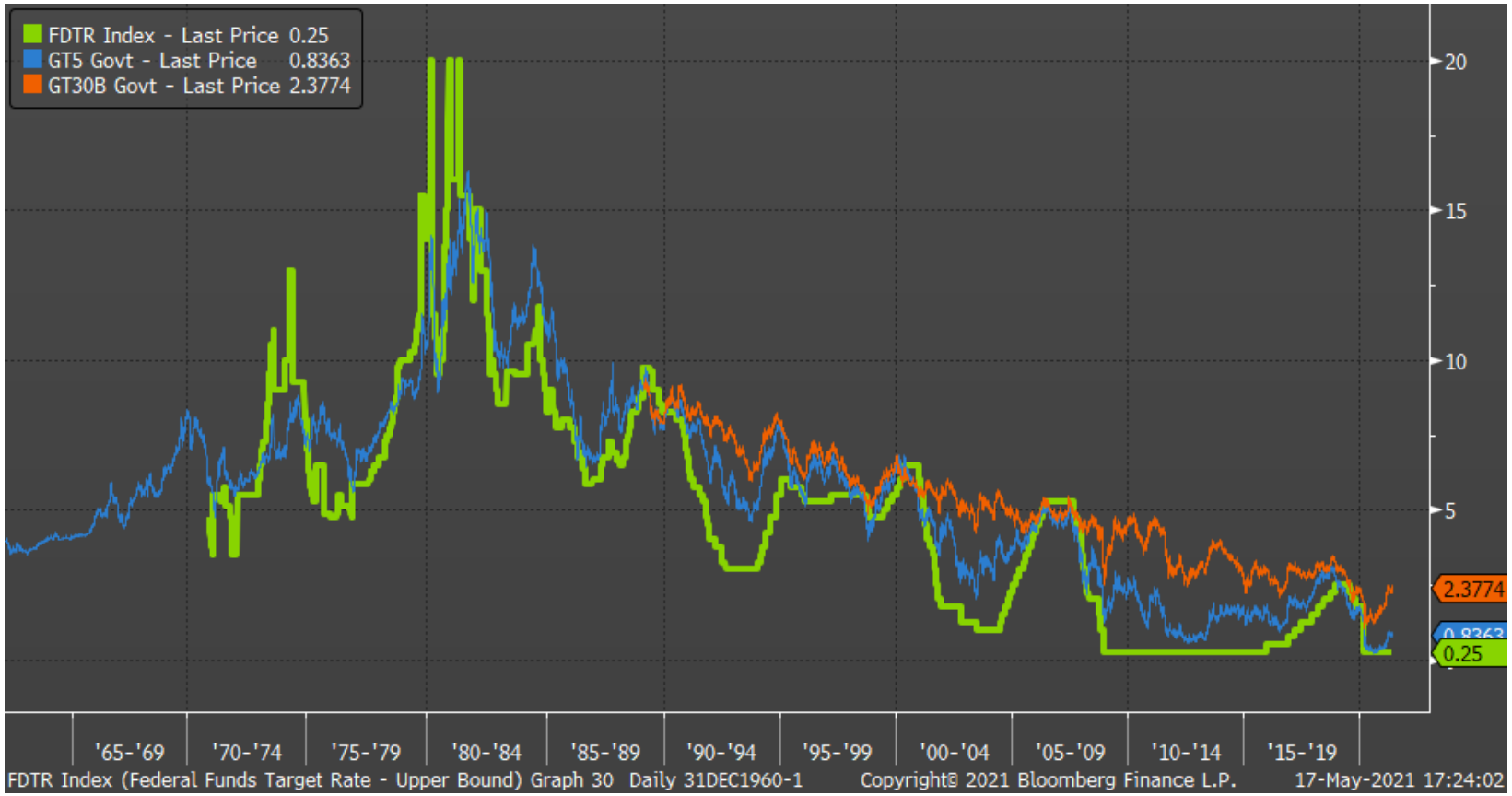
INTEREST RATES AND STAGFLATION

Impact on Portfolios and Retirement

NOMINAL RATES: BOND YIELDS

FEDERAL FUNDS RATE AND TREASURY BOND YIELDS



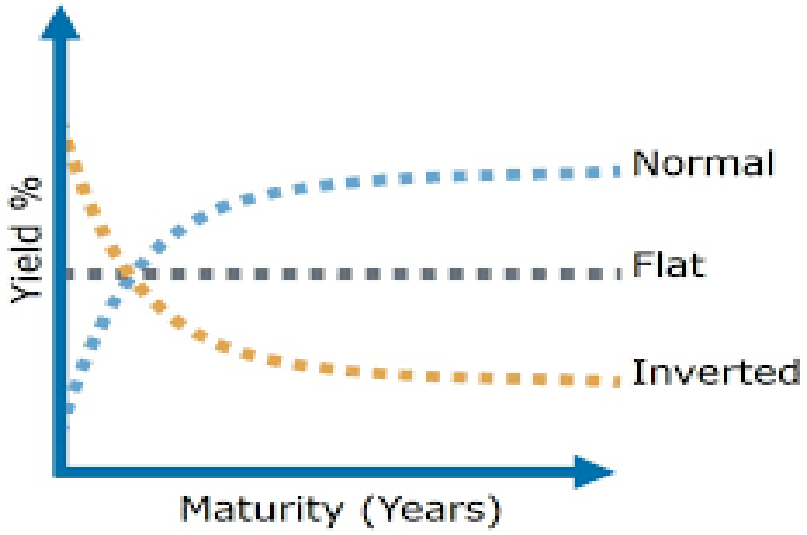
NOMINAL RATE: COMPONENTS

NOMINAL RATE = REAL RATE + RATE OF INFLATION

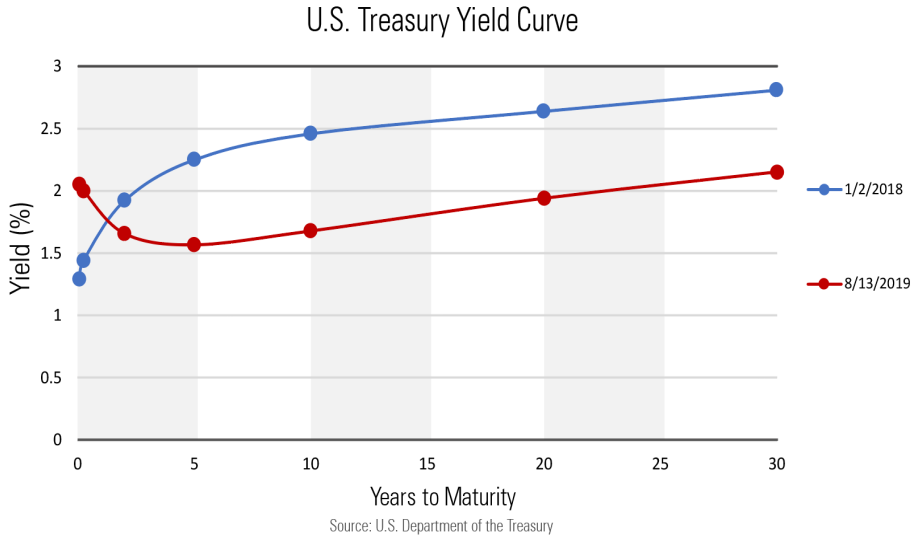
- Nominal Rates/yields include
  - Bond yields
  - Fed Funds rate
  - High yield bond coupon/yield
  - Home mortgage yields
  - Credit card interest rate
- Real Rate
  - Nominal Rate/yield – Rate of Inflation
- Rate of Inflation
  - CPI YOY

NOMINAL RATES/TREASURY YIELDS

YIELD CURVATURES



US TREASURY YIELD CURVE



REAL RATE OF INTEREST

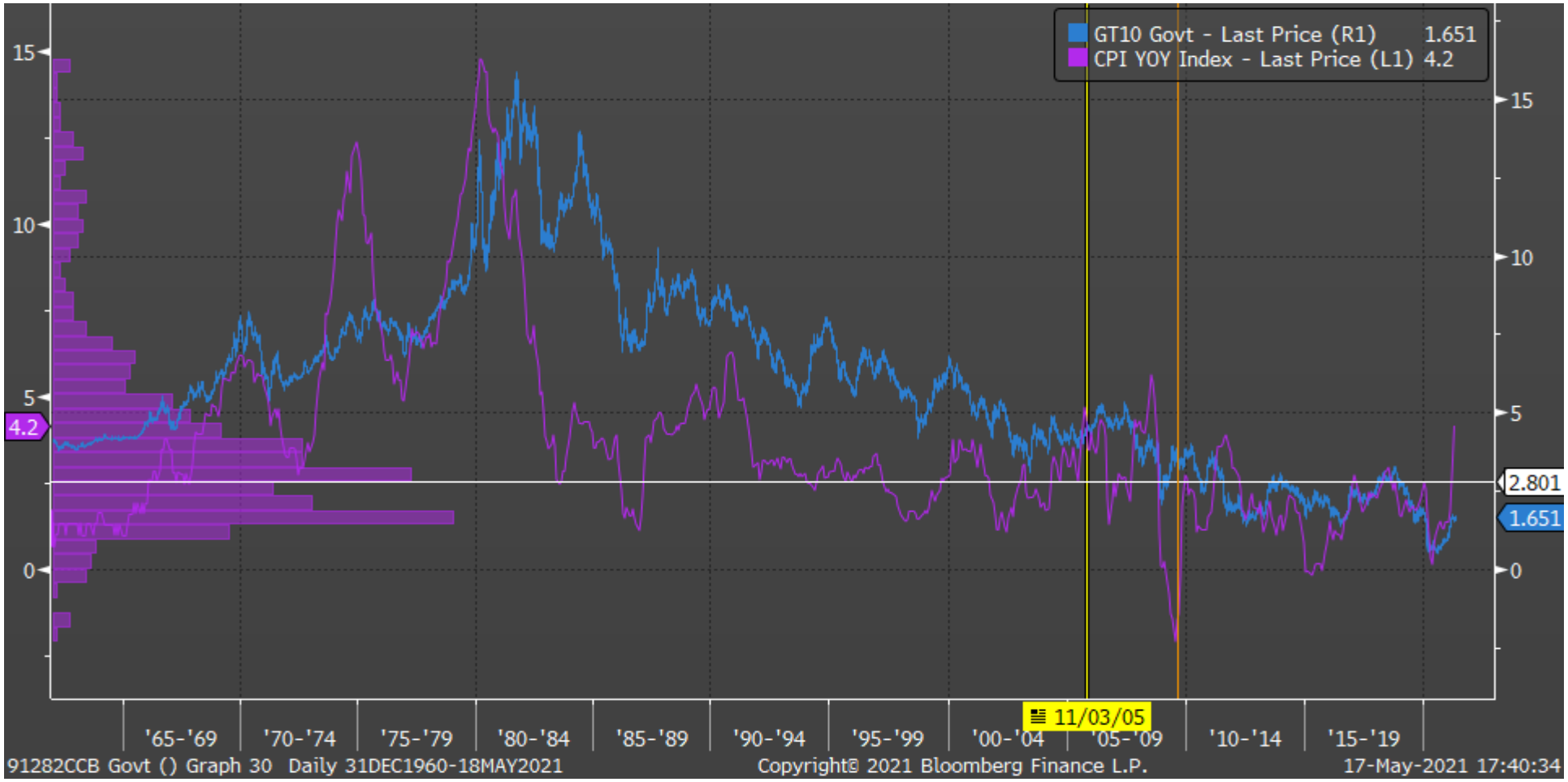
(10 YR US TSY YIELD MINUS(–) INFLATION RATE)

TRUE OR FALSE

1. Real rates of interest are high when the economy is good, low when bad (demand);
2. Real rates of interest are high when savings are scarce, low when plentiful (supply).
3. Business cycle theory expects the real rate of interest to be the rate that equilibrates the supply and *demand for* money/loanable funds/ *capital.*

1. The demand for capital (labor, machines, loanable funds) is high causing real rates, or price of money, to rise;
2. The value of money rises when there is less of it and falls when there is more. Supply and demand;
3. A well functioning economy uses capital efficiently by generating goods and services.

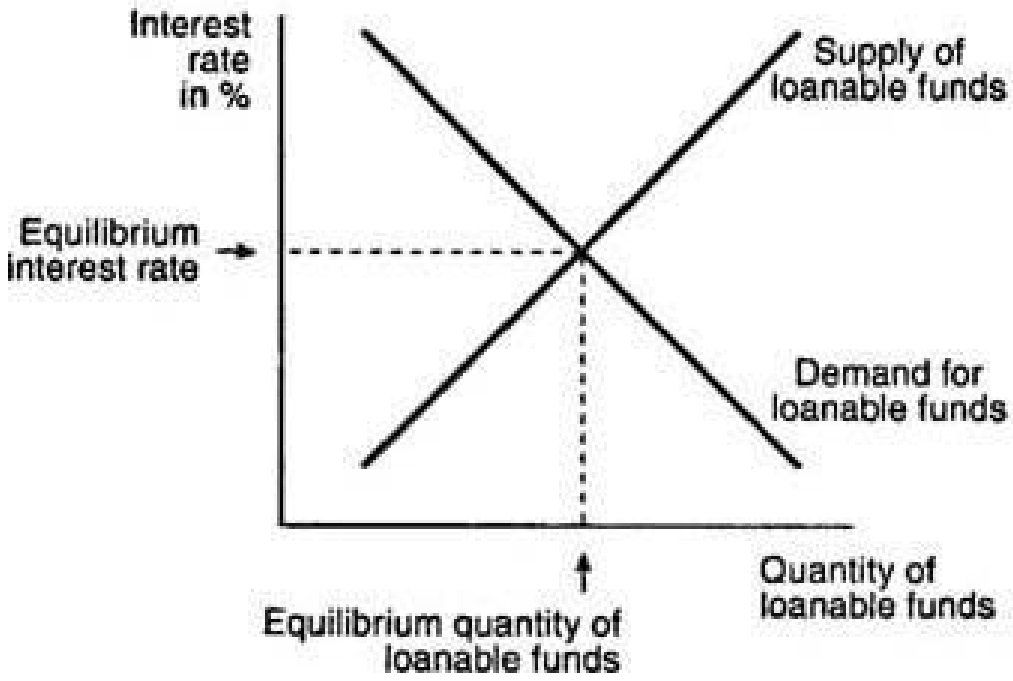
REAL YIELDS: 10YR TSY VS INFLATION



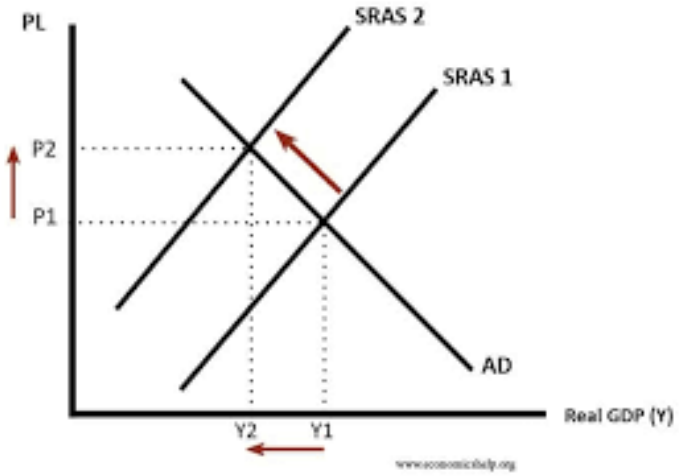
REAL RATE OF INTEREST

(NOMINAL RATE OF INTEREST – INFLATION RATE)

- The business cycle kicked in as a powerful determinant of real rate of interest in the Global Financial Crisis.
- *Demand for capital* was suddenly weak, causing the real rate of interest to be low/negative.
- Real rates of interest probably would have been low without quantitative easing and zero rate policy.
- Central-bank policies pushed rates down below a "equilibrium rate", the rate at which the supply of capital equals the demand for capital.



"COST-PUSH" INFLATION AND STAGFLATION



- Stagflation can be caused by "cost-push" inflation
- Cost-push inflation occurs when some force or condition changes/increases the costs of production
- An adverse shock to aggregate supply can give rise to stagflation
  - sudden increase in prices, oil, lumber, food
- Stagflation occurs when the central banks/governments cause money supply to be expanded at the same time supply is constrained
  - gov't policies create credit increasing money supply

STAGFLATION - IS NOT GOOD

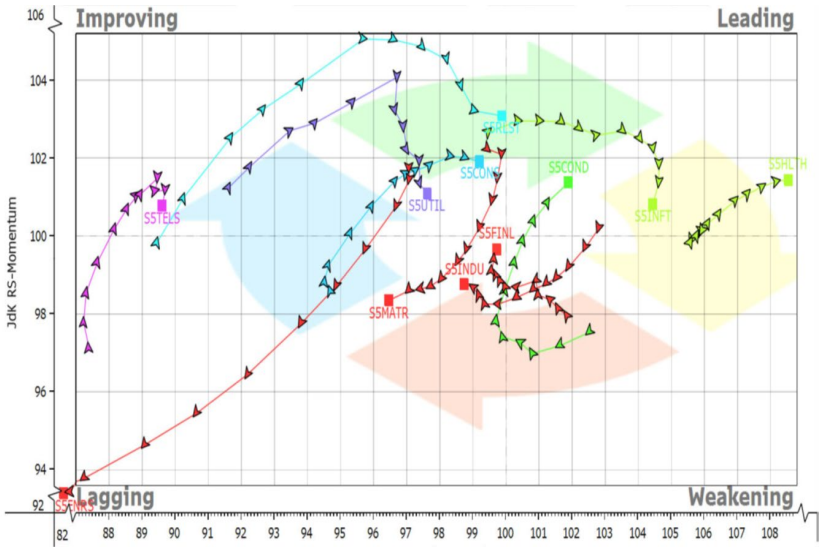
1. High unemployment
2. Slow economic growth
   - Causes the **real interest rate** to fall
   - Can be associated with high nominal interest rates
3. High rate of inflation

STAGFLATION = INFLATION RISING + SLOW ECONOMIC GROWTH

WHAT ABOUT THOSE CAPITAL MARKET ASSUMPTIONS?

2021 Capital Market Assumptions	Median		Extremes		Inflation 4.20%	
Asset Class/EQUITY	Exp. Return	Risk	Exp. Return	Risk	Real	Exp. Return
Large Cap	4.10%	16.20%	5.70%	16.80%		-0.10%
Small/Mid Cap	4.60%	19.70%	6.60%	22.60%		0.40%
Developed International	5.00%	18.40%	6.70%	19.00%		0.80%
Emerging Markets	5.40%	21.70%	8.50%	25.50%		1.20%
FIXED INCOME						
US Fixed Income	1.30%	4.20%	2.50%	5.90%		-2.90%
Cash/Short Duration	0.40%	0.00%	1.10%	1.50%		-3.80%
Long Duration	0.60%	11.00%	1.70%	12.80%		-3.60%
TIPS	1.45%	5.80%	2.00%	6.00%		
High Yield	4.20%	8.00%	5.40%	10.20%		0.00%
Non-US Fixed	1.00%	4.00%	1.70%	10.20%		-3.20%
Emerging Market Debt	3.15%	8.76%	4.10%	13.30%		-1.05%
Real Estate	5.90%	16.60%	9.50%	18.80%		1.70%

Persistent inflation might cause investors to become more exposed to ***commodities, cyclical stocks, inflation-protected securities, emerging market assets and even dividend-paying stocks*** as part of a tactically diversified portfolio.



PORTFOLIO IMPLICATIONS

DIRECT AND INDIRECT

Rapidly rising real rates pose a substantial risk to the whole portfolio, through both fixed income and equity assets.

Although the risk posed to fixed income is direct and mechanical, the risk posed to equities and alternative assets is complex and subtle.

This asset-side risk may be offset, to a greater or lesser degree, depending on the real interest rate duration of the liability, by a decrease in liability valuation due to rising real rates (again, depending on duration).

The risk of a decline in real interest rates comes from the opportunity-cost of being out of a rising bond market.

Investors shortened the duration of holdings thus would not participate if a bond rally were to occur due to rates falling further.

SHORT AND LONG RUN

Pension liabilities typically contain a significant component of long-dated obligations that induces a large (*and, sadly, often unrecognized*) economic exposure to changes in the level of interest rates.

Lower discount rates increase the present values of long-dated liabilities. Managing asset duration relative to liability duration is thus a first-order risk issue for pension funds (Litterman 2005).[2]

DURATION: LIABILITIES AND ASSETS

Face Value = 1000 — Each Cash flow = 10% of 1000

Maturity = 3 yrs — Market Rate/Discount Rate = 7%

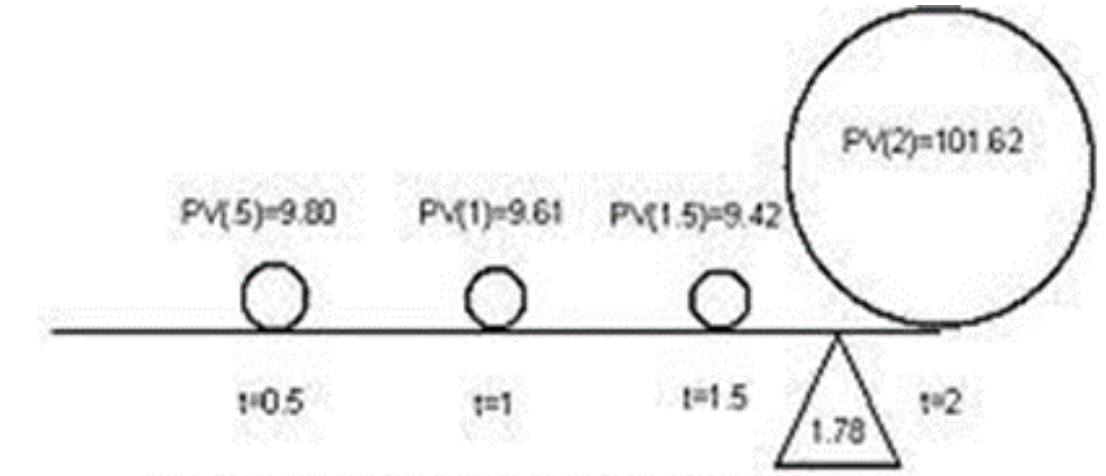
Duration = $\frac{100}{(1.07)^1} + \frac{100}{(1.07)^2} + \frac{1100}{(1.07)^3}$ (Maturity = 1000, Coupon = 100)

$= 93.46 + 87.34 + 897.93$ (Sum of all is "1078.73")

Now, dividing by 1078.73

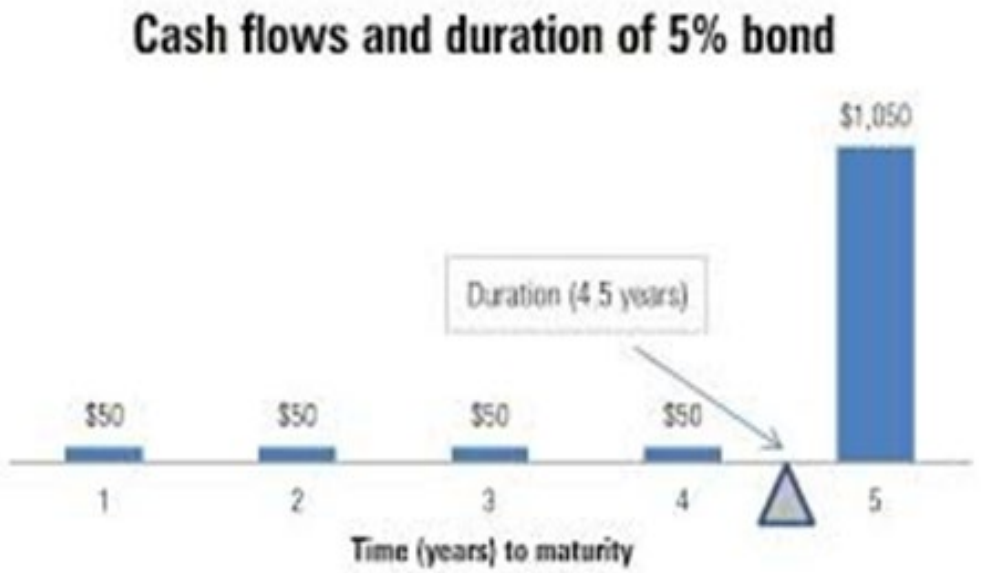
$= \frac{93.46}{1078.73} * 1 + \frac{87.34}{1078.73} * 2 + \frac{897.93}{1078.73} * 3$ (Assigning weight, i.e. corresponding no. of yrs)

$= 2.7452$ yrs



Macaulay duration for 2 year 20% bond = 1.78yrs
(semi-annual coupon 20%, yield 3.9605% continuously-compounded)

RATE OF INTEREST AND DURATIONS



Questions?