

**Excel Tutorial**  
**Session 2 Time Value of**  
**Money**

# *Overview*

- Purpose—Ensure that all finance majors have Excel skills necessary for upper div. courses.
- Session 1: Basic Excel Operations
  - spreadsheet functionality, reference cells, formatting, linking spreadsheets, paste special, equation syntax.
- Session 2: Time value of money
  - bond pricing, financial functions
- Session 3 Data Analysis Tools
  - solver, regression
- Assignments - Each session is ~30 min
  - Complete individually
  - Submit through RamCT for grading.

# *Time value of Money*

- Use F1 (help) liberally!!
  - “F1” search for “functions”
    - select “list of functions”
    - Select “financial functions”
  - Select “Formulas” then “insert function”
- Particularly useful:
  - Rate, PMT, PV – for periodic cash flows.
  - Yield, Price, Duration, Mduration – for bonds in particular.
- Open a spreadsheet
  - Save the spreadsheet as lastname\_first\_excel2.xlsx.

# *PV function – Sheet1*

- PV function - returns the present value of an investment.
  - Look up “PV” function in help.
  - Copy “PV” example from help into “Sheet1”
  - Adjust column/row widths.
  - Note optional argument “type”; and neg value.
- Use PV function to find PV of \$6000/yr for 20 yrs at 8%.

The screenshot shows the Microsoft Excel interface with the following data in the spreadsheet:

	A	B
1	<b>Data</b>	<b>Description</b>
2		500 Money paid out of an insurance annuity at the end of every month
3		8% Interest rate earned on the money paid out
4		20 Years the money will be paid out
5	<b>Formula</b>	<b>Description (Result)</b>
6		(\$59,777.15) Present value of an annuity with the terms above (-59,777.15).
7		
8		
9		(\$58,908.88) PV of annuity of \$6000 per year for 20 years at 8%.

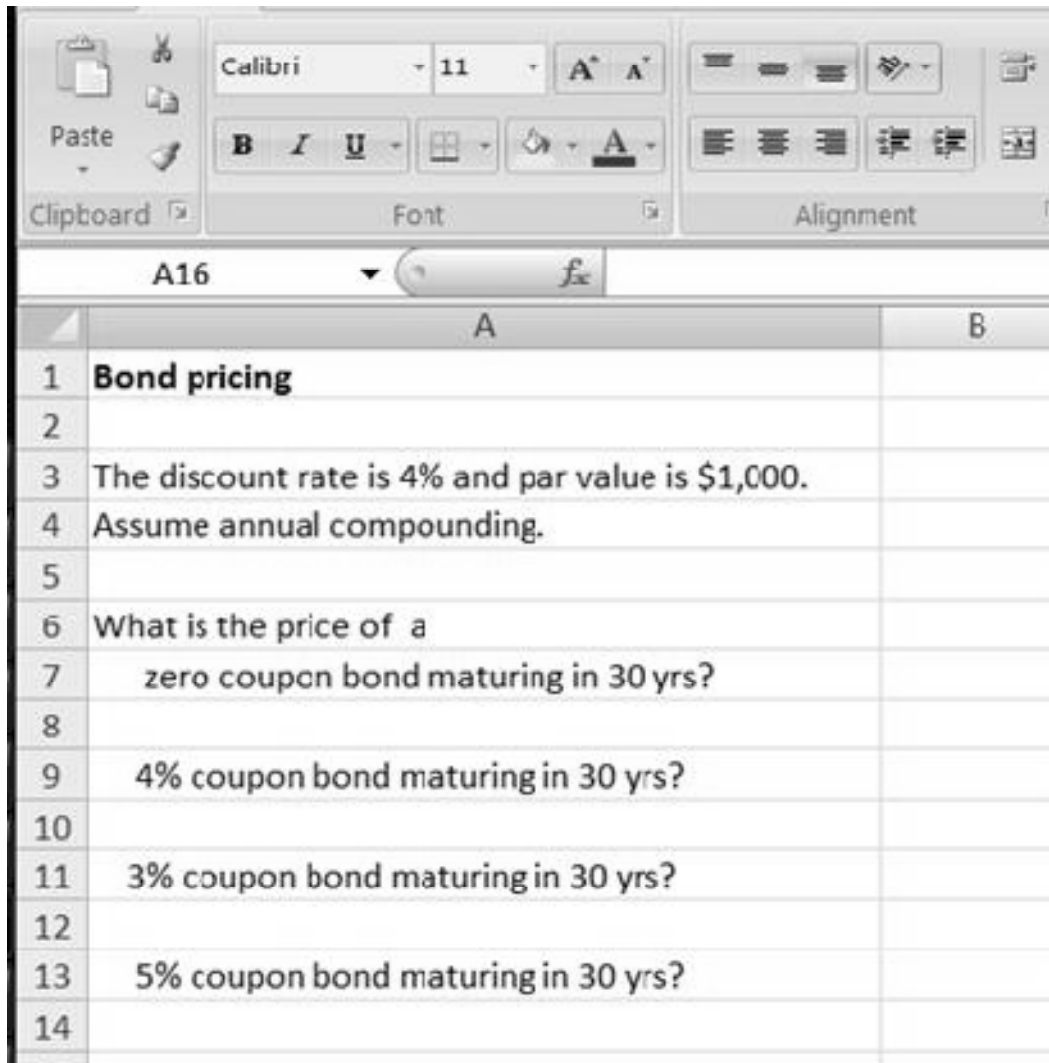
## *Rate Function – Sheet2*

- Rate function –
  - Look up “Rate” function in help.
  - Copy “Rate” example from help into “Sheet2”
  - Adjust column/row widths and format to show 4 decimals after percentage.
- Find “Rate” on \$6000/yr for 20 yrs with PV of \$58,908.88.
  - Be careful with positive and negative signs

A11		fx		=RATE(20, 6000,-58908.88)	
	A	B	C	D	
1	<b>Data</b>	<b>Description</b>			
2		4 Years of the loan			
3		-200 Monthly payment			
4		8000 Amount of the loan			
5	<b>Formula</b>	<b>Description (Result)</b>			
6		0.7701% Monthly rate of the loan with the above terms (1%)			
7		0.092418 Annual rate of the loan with the above terms (0.09241767 or 9.24%)			
8					
9					
10					
11		8.0000% "Rate" on \$6000/yr for 20 yrs with PV of \$58,908.88			

# Bond pricing with PV function – Sheet3

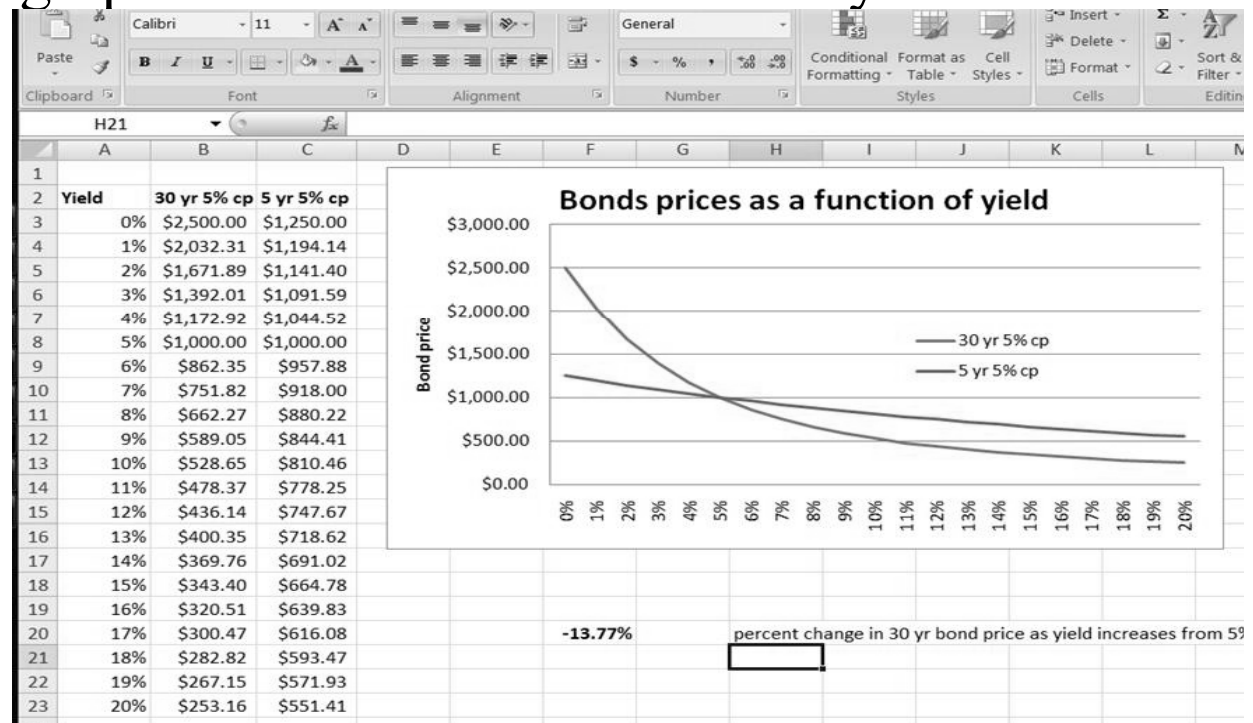
- Set up sheet3 like below.
  - Use the PV function to find answers.



# Bond price volatility – Sheet4

- For yields from 0% to 20%, find
  - PV of 30 year bond with 5% coupon (paid annually)
  - PV of 5 year bond with 5% coupon (paid annually)
  - Use negative sign in front of PV to display positive prices.
  - Which bond will have more price variability?
  - Graph the bond prices
    - right click on graph to “select data” and modify x-axis.

- Cell F20
  - find percent change in 30 yr bond price as yld increases from 5% to 6%.



# *Bond pricing – Sheet 5*

- Bond pricing – “PRICE” and “YIELD”
  - Excel has powerful bond pricing functions.
  - PV function assumes the next coupon is in exactly one period.
  - What if you buy, say, 32 days after last coupon was paid?
  - Accounts for exact timing of coupons, day count conventions.
- Copy “Price” example from help.
  - Find the price of 30-year 5% coupon bond (paid s.a.) at a yield of 6%. This is a Treasury bond (actual/actual).
  - `PRICE(DATE(2000,1,1),DATE(2030,1,1),5%,6%,100,2,1)`
  - This price includes what is known as “accrued interest”.
- Find price of bond above, settled on 3/15/2010 at yield of 3.5%.
- Note also functions for “DURATION” and “MDURATION”

# Sheet5

Ch5aa\_Excel\_Assign2.xlsx - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Developer

Clipboard Font Alignment Number Conditional Formatting

	A	B	C	D
1	<b>Data</b>	<b>Description</b>		
2	15-Feb-08	Settlement date		
3	15-Nov-17	Maturity date		
4	5.75%	Percent semiannual coupon		
5	6.50%	Percent yield		
6	\$100	Redemption value		
7	2	Frequency is semiannual (see above)		
8	0	30/360 basis (see above)		
9	<b>Formula</b>	<b>Description (Result)</b>		
10	94.63436162	The bond price, for the bond with the terms above (94.63436)		
11				
12	86.16221817	Price of 30 yr 5% coupon bond (paid s.a.) at yield of 6%		
13				
14		Price of the bond above, settled on 3/15/2010 at yield of 3.5%.		
15				
16				