**Chapter 6 in class exercise solution**

* + 1. You read in *The Wall Street Journal* that 30-day T-bills are currently yielding 5.5%. Your brother-in-law, a broker at Safe and Sound Securities, has given you the following estimates of current interest rate premiums:
  + Inflation premium = 3.25%
  + Liquidity premium = 0.6%
  + Maturity risk premium = 1.8%
  + Default risk premium = 2.15%

On the basis of these data, what is the real risk-free rate of return? **(answer: 2.25%)**

**Answer:**

**For T-bills, its rate should be based on the following equation.**

**r = r\* + IP +** ~~DRP + LP + MRP~~

**r = required return on a debt security = 5.5%**

**r\* = real risk-free rate of interest =?**

**IP = inflation premium = 3.25%**

~~DRP = default risk premium~~

~~LP = liquidity premium~~

~~MRP = maturity risk premium~~

**So, r = 5.5% = r\* + 3.25% 🡺 r\* = 2.25%**

**2**The real risk-free rate is 3%. Inflation is expected to be 2% this year and 4% during the next 2 years. Assume that the maturity risk premium is zero. What is the yield on 2-year Treasury securities? What is the yield on 3-year Treasury securities?**(answer: 6%, 6.33%)**

**Answer:**

**For the 2 year Treasury security,**

**r = r\* + IP +** ~~DRP + LP~~ **+ MRP**

**r = required return on a debt security =?**

**r\* = real risk-free rate of interest = 3%**

**IP = inflation premium = (2% + 4%)/2 = 3% (two year average), (2%+4%+4%)/3=3.33%(three year average)**

~~DRP = default risk premium~~

~~LP = liquidity premium~~

**MRP = maturity risk premium = 0%,**

**r on 2 year T-notes = 3% +3% =6%  
r on 3 year T-notes = 3% + 3.33% = 6.33%**

**3** A Treasury bond that matures in 10 years has a yield of 6%. A 10-year corporate bond has a yield of 8%. Assume that the liquidity premium on the corporate bond is 0.5%. What is the default risk premium on the corporate bond? **(answer: 1.5%)**

**Answer:**

**r = r\* + IP + DRP + LP + MRP** ---- corporate bond yield = 8%

**r = r\* + IP + ~~DRP + LP~~ + MRP** ---- Treasury bond yield = 6%

So, 10 year Corporate bond yield – 10 year Treasury bond yield = DRP + LP = 8%-6%=2%

And LP = 0.5%, and DRP = 2%-0.5% = 1.5%

**4** The real risk-free rate is 3%, and inflation is expected  to be 3% for the next 2 years. A 2-year Treasury security yields 6.2%. What is the maturity risk premium for the 2-year security? **(answer: 0.2%)**

**Answer:**

**r = r\* + IP + ~~DRP + LP~~ + MRP** = 6.2% (This is T-notes, DRP=0, LP=0)

r\* = 3%

IP=3%

So, r = 3% + 3% + MRP = 6.2% 🡺 MRP = 0.2%

**5** One-year Treasury securities yield 5%. The market anticipates that 1 year from now, 1-year Treasury securities will yield 6%. If the pure expectations theory is correct, what is the yield today for 2-year Treasury securities? **(answer: 5.5%)**

**Answer:**

**Current Two year rate = (current one year rate + one year rate one year later)/2**

**Current one year rate = 5%**

**One year rate one year later = 6%**

**So current two year rate = (5%+6%)/2 = 5.5%**