Econ435 – Financial Markets and the Macroeconomy
Stoks and Bonds

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Municipal bonds

Municipal bonds (or *munis*) are exempt from taxes, meaning that their yield is not directly comparable with the yield on other bonds that are subjected to taxes. Since the interest earned on munis is equivalent to an *after-tax* earnings, while the interest earned on other bonds is a *before-tax* earning, we need to find a way to express them in a common unit. The comparison is realized through the *equivalent taxable yield*, which is the *after-tax* equivalent of the yield on a muni.

As an example, suppose you consider a municipal bond that offers an interest rate $r_m = 6\%$ and a corporate bond that offers an interest rate $r_b = 7\%$. You might be tempted to choose the corporate bond, because it gives a higher interest. However, if you face a tax rate $t = 25\%$, then the equivalent taxable yield is

$$r = \frac{r_m}{1-t} = \frac{0.06}{1-0.25} = 0.08 = 8\%.$$

This means that the muni is similar to a corporate bond with a *before-tax* interest rate of 8%. Since the corporsate bond you were considering only offers 7%, you are better off with the muni.

An alternative way to compare the two bonds is to look at the tax rate that makes the two bonds equivalent:

$$t^* = 1 - \frac{r_m}{r_b} = 1 - \frac{0.06}{0.07} = 0.1429 = 14.29\%.$$

This means that, if you were to face a tax rate of 14.29%, the *after-tax* interest from the corporate bond would be the same as the interest earned from the muni. However, you face a higher tax rate, 25%, so your interest from the corporate bond is taxed more and, after tax, is lower than the interest you earn from the muni.

In conclusion:

(i) if the equivalent taxable yield is higher than the corporate bond yield (if the "equivalent tax" is lower than the actual tax), than the muni is the better choice,

(ii) if the equivalent taxable yield is lower than the corporate bond yield (if the "equivalent tax" is higher than the actual tax), than the corporate bond is the better choice.

Stock indexes

Suppose we have the following situation on the market (note the 2-for-1 split for stock A):

	Year 0		Year 1	
	Price ($)	Number of shares	Price ($)	Number of shares
Stock A	100	20	52	40
Stock B	60	30	58	30

The *price-weighted* index in year 0 is

$$I_0 = \frac{100 + 60}{2} = 80.$$

If we were to ignore the stock split and calculate the index in the same manner, we would get that the value of the index in year 1 is $(52 + 28)/2 = 55$, which is a 31% drop in the index! However, the market doesn't seem to have dropped at all. So we need to correct somehow for the stock split. The only factor in the formula that is under our control is the denominator, and that is what we are going to change.

The idea is as follows: if nothing else were to happen in the market but the stock split, the index should not change. Since the split is 2-for-1, the price of one share after the split would be $\$100/2 = \$50$. So we need to calculate the divisor which solves

$$\frac{50 + 60}{d} = 80.$$

Solving for d yields $d = 1.375$. So now we can calculate the correct value of the index in year 1, taking into account the stock-split:

$$I_1 = \frac{52 + 58}{d} = \frac{110}{1.375} = 80.$$

Hence, the price-weighted index, calculated the right way, shows that the market did not drop, it actually stayed the same.

However, look at the total value of the shares, also called the *size* of the market: in year 0, it is $20 \cdot \$100 + 30 \cdot \$60 = \$3,800$, while in year 1 it is $40 \cdot \$52 + 30 \cdot \$58 = \$3,820$. So it looks like the market actually expanded!

Value-weighted indexes give a better image of the evolution of the market than price-weighted indexes do. In our example, supposed the value of the value-weighted index in year 0 is normalized to $I_0 = 1,000$ points. Then the index in year 1 is

$$I_1 = \frac{40 \cdot \$52 + 30 \cdot \$58}{20 \cdot \$100 + 30 \cdot \$60} \cdot 1,000 = \frac{3,820}{3,800} \cdot 1,000 = 1,005 \text{ points.}$$

The value-weighted index does show that the market expanded is does no need adjustments because of stock-splits like price-weighted indexes do.