Lecture 2: Supplementary exercises.

8) Under pressure from the SEC and a whistle blower, Xerox was made to restate their earnings. Part of the problem was that they were booking revenue earlier than they should have from the copier leasing business, especially for leasing outside the U.S. This question examines the way they used the difference between U.S. and Mexican interest rates to increase their reported earnings today.

   A) Using the Mexican interest rate of 24% and a 60 month lease, show how the annual monthly lease payment of $187 was derived. You can think of a lease as like a loan. Hint: What amount is Xerox assuming it is financing.

   B) Since Xerox reports its revenue in dollars, it discounted the lease payments at the U.S. rate of 6% to figure out the present value of the lease. This is the amount it reported as revenues from its Mexican leasing operation.

   C) At a 24% interest rate, what is the total value of the lease? Think about all the cashflows which Xerox expects to receive from the leasing the equipment. Explain briefly.

   D) Why did the SEC claim that Xerox was misstating their revenues. Think about what the two rates (Mexican and U.S.) are measuring and thus why the SEC questioned the mixed use of the rates.

Lecture 2: Supplementary Exercises Answers.

8) Xerox earnings trouble and discount rates.

A) The copier costs $10,000 in the example (see article) and has an expected residual value of $3,500. Thus Xerox must have assumed they were financing $6,500.[1] This is the only way you can reproduce their numbers. If we are financing $6,500 at a 24% annual rate on a monthly basis for five years, we solve the following equation to get the monthly lease payment.

$$6{,}500 = \sum_{t=1}^{60} \frac{\text{Lease payment}}{\left(1 + \frac{0.24}{12}\right)^t} \quad \rightarrow \text{Lease payment} = 187 \tag{1}$$

This is not usually how leases are priced. This method implicitly assumes that the $3,500 residual value that Xerox will receive back in five years is worth $3,500 today (i.e. the correct discount rate is zero percent). If we instead assumed that the correct discount rate for the residual value was also 24% per year, then the correct lease payment would be seventy percent higher at 318 a month.[2]

$$10{,}000 = \sum_{t=1}^{60} \frac{\text{Lease payment}}{\left(1 + \frac{0.24}{12}\right)^t} + \frac{3500}{\left(1 + \frac{0.24}{12}\right)^{60}} \quad \rightarrow \text{Lease payment} = 318 \tag{2}$$

B) To report its revenues, Xerox reported the present value of the 60 payments of $187. Since it was a U.S. firm, it used a U.S. discount rate. Discounting the lease payments at the U.S. rate of 6% gives you a present value of 9,672 – which is almost the full value of the 10,000 copier even though we have ignored the 3,500 residual value.

$$V_{\text{Lease}} = \sum_{t=1}^{60} \frac{187}{\left(1 + \frac{0.06}{12}\right)^t} = 9{,}672 \tag{3}$$

C) The value of the lease is the present value of the cash flows which Xerox receives.

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[1] Equally likely is the WSJ didn't understand how the lease worked and just assumed for their calculation that $6,500 is being financed.

[2] In some firms, the sales people pick the residual value and then are paid a bonus for each copier, car, etc which they lease. The clever sales people have figured out that if they raise the 'assumed' residual value this lowers the lease payment they can offer to their customers. The lease is then cheaper for the customers and more items are leased. The sales people get larger bonuses. Of course at the end of the lease, the copiers, cars, etc which are returned are not worth anything close to what was (incorrectly) assumed up front and the firms then have to recognize a loss on their investment.

They receive both the lease payment of 187 for 60 months as well as the residual value of 3,500 in five years. If we use a discount rate of 24% for all cash flows, the value of the lease is 7,567, or about 25% less than the stated value of the copier (10,000).

$$10{,}000 = \sum_{t=1}^{60} \frac{187}{\left(1 + \frac{0.24}{12}\right)^{t}} + \frac{3500}{\left(1 + \frac{0.24}{12}\right)^{60}} = 7{,}567 \qquad \textbf{(4)}$$

D) Why are the U.S. and Mexican rates so different? If you invest a dollar in the U.S. for one year you receive 6%. If instead you convert it to Mexican pesos and invest in Mexico for one year you receive 24%. These investments should have the same expected return (in the absence of market frictions) only if they have the same risk. There at lease two differences in risk about which the SEC may have been concerned.

First, the default risk upon which the 24% may have been based may have been higher than the default risk upon which the 6% is based. From the article, we don't have the information. Since leases are like loans, the lease payments are like promised payments on a bond. Thus when we discount the (promised) lease payments at the promised rate on the lease, we get the value of the lease – just like with a bond.

A second difference – and probably the one with which the SEC was most concerned – is devaluation of the Mexican currency. Assume for the moment the two interest rates are free of default risk. Thus if you invest in the U.S. you will have $1.06 in one year. If instead you convert your dollar in to 10 pesos and invest in Mexico, in one year you will have 12.4 pesos (1 * 10 * 1.24). If, and this is a big if, the exchange rate has not changed this will be worth 1.24 dollars, a return of 24%. The fact that the interest rates are so different, however, suggests that the markets (Mexican and U.S. bond traders) expect the peso to depreciate. Thus the future lease payments which are worth $187 at today's exchange rate will be worth less than $187 at future exchanges rates. By using the U.S. interest rate and not adjusting for expected depreciation, the value of the lease (and revenue) are over stated. If you are interested in this issue, they discuss them in more depth in International Finance.