ECON 4515 Finance theory 1 Diderik Lund, Fall 2004

Exercises for seminars 27 – 28 September

Instructions:

(Repeated from previous exercises, except the *emphasized part.*)

For all students: Please try to solve these exercises before the seminar. It is generally a better idea to work a little with all questions than to work a lot with only a few of them.

For those who have volunteered to present a written suggested solution: You are asked please to make copies of your solution for all participants in your seminar group. *There are currently about 15 students in each group. Make 18 copies.* You can borrow a copy card for this purpose in the department reception office, room 1241 ES. The intention is that all students as well as the lecturer should have the opportunity to read your answers before the seminars. For the Monday group this means that the copies should be available before noon on the preceding Friday. For the Tuesday group it means that the copies should be available before noon on the preceding Monday. There are boxes, one for each seminar group, in the shelves in the students' area on the 12th floor. You are free to come and ask me (Diderik Lund) about the problems before you produce your solution. But please, try for yourself first!

An answer can be hand written or computer typed. The problem with typing is that many of you are not familiar with producing formulae and diagrams on a computer. This is the main reason why we do not encourage electronic submissions, although you will have to learn some of this for writing a master's thesis.

(1)

Norwegian newspapers have recently reported that the shares in the two largest Norwegian oil companies show larger relative responses to changes in the oil price than shares in (almost all) other oil companies. The question is whether we can explain this based on some observable characteristics of these companies. You are free to make simplifying assumptions, such as:

- Oil companies produce only oil, and only in one future period, next year.
- At the time when a change in share prices is observed, oil companies have already made the necessary investments this period in order to produce next period.
- The two Norwegian companies produce mainly under Norwegian taxation, while the other companies produce mainly elsewhere.

Three possible explanations are suggested below. It is OK to consider one of them at a time. That is, you may analyze borrowing as if there were no taxes and taxes as if there were no borrowing. Then you may introduce operating costs, assuming that there are no taxes and no borrowing.

(Hint: This can be done by using value additivity, with no use of, e.g., the CAPM.)

(1a)

Could the higher relative response to oil prices result from Norwegian companies having borrowed more than other companies? Or perhaps less?

(1b)

Could the higher relative response to oil prices result from high tax rates in Norway? (Hint: Consider first a cash flow tax system, then a more realistic system.)

(1c)

Could the higher relative response to oil prices result from Norwegian companies having higher operating costs next period than other companies? (Operating costs are paid simultaneously with production, in contrast with investment costs, which are paid at an earlier stage.)

(2)

(2a) Illustrate the *Capital Market Line* in a suitable diagram. Explain what kind of objects are located on the line. Explain what kind of objects are located above the line and below the line, if any. Explain what characterizes those objects located far to the right on the line and far to the left on the line.

(2b) Illustrate the *Security Market Line* in a suitable diagram. Explain what kind of objects are located on the line. Explain what kind of objects are located above the line and below the line, if any. Explain what characterizes those objects located far to the right on the line and far to the left on the line.

(2c) Discuss the following statement: "Those, and only those, who live in an economy where the Capital Market Line is steep, are highly rewarded for taking risks."

(2d) Discuss the following statement: "Those, and only those, who live in an economy where the Security Market Line is steep, are highly rewarded for taking risks."

(3)

When the CAPM was derived, it was assumed that short selling was allowed. Can we assume that the market portfolio in the standard model has only positive portfolio weights? What can we say about the effect on the CML of imposing a ban on short selling risky assets, while short selling of the risk free asset (commonly known as borrowing) is still allowed?

(4)

The value of a share can never be negative. This is known as *limited liability:* Those who own the shares in a limited-liability company, cannot be required to pay additional money into the company (for instance, if the company has borrowed heavily and cannot pay back). Try to find some implications of this:

(4a) How far does the SML extend to the left in the diagram (cf. question (2b) above)?

(4b) Can share prices have a normal probability distribution? A lognormal probability distribution?