Practical Optimization in Finance, Fall 2001

"Aftermath" of Lectures on Wednesday November 21, 2001

The Lectures November 21: First I talked about Project 2. I hadn’t looked closely at your answers (it took considerable time getting them all together; none of your fault, though), but from what I’ve briefly read, they look fine. Then I described a project Søren and I are working on: The formulation of the mortgage-financing problem of an individual homeowner of portfolio choice problem (that in turn can be solved with stochastic programming techniques). You can find (one version of) the paper on the course home-page. The homeowner faces market prices that he can’t do anything about (so there’s a difference from the “no arbitrage”-pricing approach, where we were very concerned about what things “ought to cost”). But he does have many instruments to choose from: Long fixed-rate callable bonds (with several possible coupon rates) and a variety of floating rate loans (“Flex-loan”, if you will). And once his initial portfolio has been comprised, the question arise as to when debt should be called (“converting”) & what to use them. To modeled this we need a model of the stochastic future behaviour of term structures (as well as some other stuff). But with that in place the problem can be formulated in “mathematical programming language”. And solved. We find that risk-neutral investors (unsurprisingly) choose very “aggressive financing”, i.e. using long fixed-rate callable bonds and converting both when rates fall (easy enough to understand why) and they rise. (By buying back old, low-coupon bonds (they are cheap, ’cause rates are high) in the market, and financing this by new higher-coupon bonds you’re reducing the principal on the mortgage; if rates subsequently drop you can call you new higher-coupon debt and go back to old low-coupon debt, the net effect of this “round-trip” being that the outstanding principal has been reduced. Of course this is risky business, because if the rates do not fall again, you end up paying more.) Our result are still preliminary (we’re not ready to put out money where our mouths are), but they do indicate that you have to be very risk-averse not to at least use floating rate loans.

Finally, I talked a little about my suggestions for final projects. These have been posted on the home-page long ago (i.e. last week!) The suggestions are fairly elaborate, but reading them does require some concentration (and that you have the course material handy). The project-suggestions are quite ambitious, so I don’t expect you do do all the things I talk about. Minor miracles will suffice! Further, they are only suggestions. Should you want to do something else, then by all means. One such thing could be “optimal portfolio choice with options”. At the October 31 lecture I talk about portfolio choice (without options); there’s even a spreadsheet you can look at.

In the computer-lab time some of you (but not that many) got started on the final projects.

The rest of the course (as of November 22):

- Lectures will take place in Aud. 12 in Building 308 (i.e. the same place as on November 21) for the last two days.

28/11 Lectures from Søren. Hand-back of Project 2 & more chances to talk projects with me.

5/12 Last day of the course. Maybe lectures from Søren. Last opportunity to get help from me on my projects. I have now decided that: The final projects are NOT to be presented, but rather just handed in no later than the December 6. (If you ‘really, really want’ to do projects on something I can’t provide marginally qualified assistance on, then you’d probably have a strong case in asking for an extension of the deadline. But that’s not something I going to get involved in.)

Kindly,

Rolf