

Written Exam for the M.Sc. in Economics Summer 2015

Financial Markets

Final Exam

August 19, 2015 at 10.00 until August 21, 2015 at 10.00

This exam question consists of 6 pages in total (including this page)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by “eksamen på dansk” in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students’ self-service system.

The paper must be uploaded as one PDF document and named with exam number only (e.g. ‘1234.pdf’) and uploaded to Absalon.

Focus on Exam Cheating

In case of presumed exam cheating, which is observed by either the examination registration of the respective study programmes, the invigilation or the course lecturer, the Head of Studies will make a preliminary inquiry into the matter, requesting a statement from the course lecturer and possibly the invigilation, too. Furthermore, the Head of Studies will interview the student. If the Head of Studies finds that there are reasonable grounds to suspect exam cheating, the issue will be reported to the Rector. In the course of the study and during examinations, the student is expected to conform to the rules and regulations governing academic integrity. Academic dishonesty includes falsification, plagiarism, failure to disclose information, and any other kind of misrepresentation of the student’s own performance and results or assisting another student herewith. For example failure to indicate sources in written assignments is regarded as failure to disclose information. Attempts to cheat at examinations are dealt with in the same manner as exam cheating which has been carried through. In case of exam cheating, the following sanctions may be imposed by the Rector:

- 1. A warning
- 2. Expulsion from the examination
- 3. Suspension from the University for at limited period or permanent expulsion.

Please answer all 3 questions and subquestions below.

Problem 1

- (a). In section 8.1.3 we make the assumption that informed trading is more correlated than uninformed trading, whereas in section 9.5 the opposite argument is made. In which circumstances do you think informed trading is more correlated, and in which circumstances do you think noise trading is more correlated? What effect do you think it would have on the analysis of section 8.1.3 if we used the assumption that noise trade is more correlated?
- (b). On page 143 of the textbook, the authors discuss the multi-period version of Kyle (1985). They note that in the multi-period version, “the informed trader trades less aggressively than in the one-period case, in order to avoid dissipating his information advantage too quickly.” Why so? Suppose the insider has information that the value is high – would he not be better off trading on this information quickly before the market maker realizes it?
- (c). Using the insights from Bikhchandani and Sharma, explain why herding due to informational cascades may occur (you may want to use the example we analyzed in class). Why does the price mechanism help to prevent herds.

Problem 2

Let us consider an extension to the Kyle (1985) model of lecture 5. Suppose as before that there is a single asset with value $v \sim N(\mu, \sigma_v^2)$. An *insider* observes the true value and places

a market order x . However, we will now suppose that the insider has an *initial holding* w_0 of the asset, such that conditional on price p , his final wealth is

$$w = (w_0 + x)(v - p).$$

Furthermore, we assume that the insider is *risk averse*, and in particular that he has mean-standard deviation preferences, i.e. he maximizes

$$U = \mathbb{E}[w] - \rho \mathbb{S}(w),$$

where $\mathbb{S}(w) = \sqrt{\mathbb{V}(w)}$ is the standard deviation of w , and $\rho > 0$ is a risk-aversion parameter.

Apart from the informed trader, there is a single *noise trader* with demand $u \sim N(0, \sigma_u^2)$. Total demand is thus $q = x + u$. There is a single *competitive* market maker, who observes total demand and sets prices at expected values, i.e. $p = \mathbb{E}[v|q]$. The variables u and v are jointly normal and independent.

- (a). Suppose the market maker sets prices according to $p = p_0 + \lambda q$, where $\lambda > 0$ and p_0 are parameters. Consider then the insider. To simplify matters, suppose that w_0 is sufficiently big such that in equilibrium, $w_0 + x \geq 0$.¹

Solving his optimization problem, show that he follows the strategy

$$x = \beta(v - x_0),$$

where $\beta = \frac{1}{2\lambda}$ and $x_0 = p_0 + \lambda(w_0 + \rho\sigma_u)$.

- (b). Conditional on the insider strategy that you found in the previous question, use the result on normal distributions from the slides/book² to show that

$$\mathbb{E}[v|q] = \mu + \alpha(q - \beta(\mu - x_0)),$$

where $\alpha = \frac{\beta\sigma_v^2}{\beta^2\sigma_v^2 + \sigma_u^2}$.

- (c). Argue that β and λ is the same as in the model we saw in the lecture. Which of the assumptions we made implies that risk-aversion in this model does not change the insider's aggressiveness?

¹Clearly this will not always hold, but we make this assumption to analyze the case of a 'rich' insider.

²In particular, footnote 4 on page 136. You may also want to refer to Problem Set 1.

- (d). Find x_0 and p_0 . How do they compare to their values in the lecture? What is the intuition for the difference?
- (e). Suppose now that the insider has mean-variance preferences

$$U = \mathbb{E}[w] - \rho \mathbb{V}(w).$$

Suppose again that the insider follows a linear strategy $x = \beta(v - x_0)$ and the market maker uses a linear pricing rule $p = p_0 + \lambda q$. Furthermore, suppose $w_0 = 0$. Find the equilibrium conditions without solving them, i.e. find β as a function of λ , and λ as a function of β . Plot the two functions for some parameter values and guess as to how you think the equilibrium values of β and λ will compare to what we saw in class.

- (f). Find the equilibrium value of β in two cases: (i) $\sigma_u^2 = \sigma_v^2 = \rho = 1$, and (ii) $\sigma_u^2 = \sigma_v^2 = 1$ and $\rho = 2$. What is the intuition for the difference in trader aggressiveness in the two cases?

Problem 3

Below is an article from the Financial Times on May 5, 2015. Please write a short essay discussing to which extent the course readings can relate to the issue of this text. In particular, consider the theories exposed in lecture 9, but feel free to include theories from other parts of the course (for instance theories of market making). Also, you are welcome to elaborate your answer beyond the syllabus.

“You may be surprised by what could end up mattering most on the potential implications for financial markets of the upcoming UK general election.

Yes, markets might react, at least initially, to what they currently perceive as different outcomes for economic policies and EU membership depending on who ends up governing and in what form. But a more lasting differentiator is likely to come from a less appreciated factor – that is, the various approaches towards a financial services industry that has yet to restore its credibility after the debacles of the global financial crisis.

At least superficially, the Conservative and Labour party manifestos propose different futures for economic management. Yet their ability to implement their paths is subject to considerable political and economic constraints.

(...)

Rather than major changes to economic management, what is likely to follow in most post election scenarios is just some tweaking of the current approach. (...) The gap appears larger when it comes to the EU. As the Conservatives have promised to hold a referendum on staying in Europe if returned to Downing Street, a win for them would initially bring greater uncertainty into the marketplace. By undermining UK companies' access to such a large market, an exit would weaken corporate profits. (...) Yet, it is highly unlikely that such a referendum would lead to a UK exit.

Indeed, the biggest potential difference, and the one with the greatest potential financial market impact, is elsewhere.

A Labour government would be likely to take a less lenient approach towards a financial services industry that has yet to overcome a huge trust deficit within society. It would be more open to tighter regulation, limits on pay and the pursuit of a series of high profile legal cases against offending companies. It would engage in a spirited debate with companies threatening to move their headquarters from the UK. It would also be less inclined than the Tories to fight off creeping European regulatory infringement on the operations and risk taking of financial institutions.

With all this leading to a further shrinkage of the financial sector, markets would price in higher risk premiums for both bonds and equities on account of lower future liquidity – that is, tighter constraints on broker-dealers assuming significant counter-cyclical risk as end investors wish to reposition themselves amid changes to fundamentals elsewhere. Such an adjustment could be quite pronounced given the extent to which markets, captivated by the illusion of liquidity, have grossly underpriced a risk factor that is subject to both secular and structural deterioration. It would then be more incumbent on the government to deliver on the measures needed meaningfully to boost growth and validate high financial asset prices, including productive infrastructure investment and tax reform. The alternative is asset prices that converge to the lower fundamentals, overshoot them and risk contaminating the general economy.

In regard to the upcoming election, financial markets have less to worry about than commonly thought on traditional economic and EU issues. What they should be doing instead is better guarding against the gross underpricing of liquidity risk, an already pronounced phe-

nomenon that could prove an important differentiator when assessing the implications of the polls.”