

E X A M**Course code: BE-409****Course name: Real estate economics**

Date: September 28, 2015

Duration: 4 hours

Number of pages incl. front page: 3

Resources allowed: None

Notes: Students may answer in either Norwegian or English

Assignment 1 (15%).

Please provide short and precise answers to the following:

- a) What are the main determinants of housing demand?
- b) What are the main determinants of housing supply?
- c) In Norway, we observe increasing housing prices. What do you consider to be the most important reasons for this?
- d) What defines a housing bubble?

Assignment 2 (30%).

Assume a city with one central business district (CBD). All firms are profit maximizing and they produce a fixed quantity of an identical product, using the same production technology. The firms occupy identical levels of land and other production factors, and there is no substitution between production factors. Output per unit of land is thus fixed. There is perfect competition in the economy.

Let:

 Q = quantity produced P = price of product A = variable unit costs of production C = structure rent (fixed) d = distance to center f = lot size s = transportation costs per unit of product $r_c(d)$ = rent per unit of land



By assumption, P , Q , A and C do not vary across locations within this city.

- a) Derive and illustrate the land-rent function of this profit maximizing firm.
- b) What is the interpretation of this bid-rent function?

Assume now that all roads in this city are highly improved, everything else remains unchanged.

- c) What will be the implications for the land-rent gradient? Illustrate and explain.
- d) Given the assumptions made, who will eventually benefit from these improved roads?

Now, allowing for two types of firms, where one firm (firm 1) has a higher production per unit of land than the other (firm 2).

- e) Where will each of the two types of firms decide to locate? Illustrate and explain.

Assignment 3 (30%)

Density may be given by the ratio F = housing floor area per land area. Assume that the willingness to pay per m² floor area and the cost of construction are given by:

$$P = \alpha - \beta F \text{ and } C = \mu + \omega F, \text{ respectively.}$$

- a) Make the additional assumptions necessary and derive a profit maximizing land-owner's optimal level of F . Illustrate the optimal level of F .
- b) Now if households' willingness to pay (as measured by P) drops, what will be the new optimal level of F , and what are the implications for profits and housing prices? Illustrate and explain.

Assume now that there are external effects across properties. Let f define the level of F of the neighboring land and y the marginal loss in value due to increased neighborhood density.

- c) Why is it reasonable to assume that increasing neighborhood density imposes a negative externality?
- d) In an unregulated market, what will now be the profit maximizing land owner's optimal level of F and his profit?
- e) Will this be the optimal level of F from the society's point of view? Discuss.
- f) Which are the possible ways to ensure the best possible level of development in the case of an externality?

Assignment 4 (25%)

By means of the DiPasquale-Wheaton model (the four-quadrant model):

- a) Describe and illustrate the relationship between the property and asset markets.
- b) Last week, the central bank of Norway decided to reduce the interest rate (i.e. the key policy rate = styringsrenten). Within the framework of the DiPasquale-Wheaton model, what do you think will be the long term effect of this reduced interest rate? Illustrate and discuss.