Urban Economics and Analysis

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Assignment A

For this assignment, i.e. Assignment A, choose one of the following three exercises. Exercise 1 relates to Chapter 1 (Why Cities Exist) of the Text Book. Exercise 2 to Chapter 2 (Analyzing Urban Spatial Structure) of the Text Book. Exercise 3 deals with Neoclassical Assumptions in relation to the Text Book.

Exercise 1 *Make Exercise 1.1(a, b, c, d) from the text book.*

Concerning Exercise 1.1(a). Please present the costs as follows in a table:

	Market	*River+*	*River-*	*Mine*
Input cost				
Output cost				
Total cost				

Here River+ denotes the market side of the river and River- the mine side of the river. Be sure that it is clear how You did obtain these costs.

Remark: also see footnote 5 on page 15 of the Text Book.

Exercise 2 *Consider the urban model from Chapter 2 in the text book for the residents utility function of Cobb-Douglas type* $u(q, c) = qc$.

a. *Determine the formulas for the optimal floor space* $q^\star(x)$ *and bread consumption* $c^\star(x)$ *in terms of the income* y, *distance to the center* x, *rental price* $p(x)$ *and commuting costs* t.

b. *We know (by the equilibrium principle) that in the equilibrium the utility is independent of* x; *say this utility is* w. *Show that for the equilibrium rental price* $p^\star(x)$ *the equality* $(y - tx)^2 = 4wp^\star(x)$ *holds.*

c. *Show that* $\frac{dp^\star}{dx}(x) = -\frac{t}{q^\star(x)}$.

d. *Show that* $p^\star(x) = \frac{p^\star(0)}{y^2}(y - tx)^2$.

e. *Can we say something about the exact value of* $p^\star(0)$ *in part d?*

f. Show that total equilibrium rent $p^\star(x) \cdot q^\star(x)$ is a decreasing function of x. Is this realistic?

g. Now suppose the utility function is the Cobb-Douglas utility function $u(q, c) = q^{\alpha_1} c^{\alpha_2}$ with $\alpha_1 + \alpha_2 = 1$ and show that the formula in c continues to hold. (In fact this formula holds for a large class of "nice" utility functions.) Is the total equilibrium rent still a decreasing function of x?

Exercise 3 *This exercise is only appropriate for students who followed at least an intermediate microeconomics course.*

Consider the microeconomic model of Chapter 3 in the Text Book (as far we dealt with it) and confront the assumptions made therein with the three types of assumptions made in Slide C. The assumptions in Slide C are explained in detail in the typoscript "Microeconomie voor Bèta's, deel 1. De neoklassieke micro-wereld". You can download it on `https://pvmouche.deds.nl/manus.html` *. As the typoscript is in Dutch, this exercise is in addition appropriate only for students who understand Dutch. If You cannot and nevertheless want to do an exercise like this, then please let me know.*

Please handle in, by email to pierre.vanmouche@wur.nl, before June 13.