

## Exercises No 4

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Ruprecht-Karls University of Heidelberg  
 Prof. Travis Warziniack, Ph.D.  
 Natural Resources and Economic Development

**Q1.1.:** What does the natural resource curse mean?

*Reference: Barbier 2005*

**Q1.2.:** What is the difference between natural resource abundance and natural resource dependence?

*Reference: Barbier 2005*

**Q1.3.:** How come Botswana has managed to obtain high growth rates although the country is heavily resource-dependent?

*Reference: Barbier 2005*

**Q2.1.:** Reconsider the model of Matsuyama (Barbier 2005 p.113 ff.)

a) What does  $X_t^M = M_t F(n_t), F(0)=0, F' > 0, F'' < 0, \dot{M}_t = \delta X_t^M, \delta > 0$   
 $X_t^A = AG(1-n_t), G(0)=0, G' > 0, G'' < 0$  mean?

b) What does  $\frac{\dot{M}_t}{M_t} = \delta F(v(A))$  mean?

c) Which conclusions can be drawn from Matsuyama's model?

*Reference: modified from Barbier 2005*

**Q2.2.:** Reconsider the Brander and Taylor (1997) model of a small open economy with an open-access renewable resource (Barbier 2005; p.123 ff.).

a) The unit labor requirement  $a_{LH}(S)$  equals  $a_{LH}(S) = \frac{L_H}{H} = \frac{1}{\alpha S}$ . Show that

$a'_{LH}(S) < 0$  and explain the meaning behind the equation.

b) Explain the equilibrium open-access harvesting condition  $p = wa_{LH}(S)$ .

c) What does the ratio of the intrinsic growth rate  $r$  to labor  $L$  indicate here?

d) Interpret the figures belonging to the model (p.125).

e) Which conclusions can be drawn from the model?

*Reference: modified from Barbier 2005*

**Q2.3.:** Reconsider the model of land conversion by Southey (Barbier 2005 p. 131).

a) Name a few problems which arise due to land conversion.

b) What does the following mean?

$$\max_{t_f, t_c} W = V(s) - Ce^{-r(t_c - s)} \quad V(s) = \int_{t_f}^{\infty} v(t) e^{-r(t-s)} dt \quad t_c \leq t_f$$

c) What does  $V(t) = \int_{t=t_f}^{t=\infty} v(t) e^{-r(t-t_c)} dt \geq C(t_c) \geq 0$  mean?

d) Which conclusions can be drawn from Southey's model?

*Reference: modified from Barbier 2005*