

Macroeconomics II - Problem Set 5

Topics 1 and 2 - Second Block

Topic 1: Growth in the medium run

1. At the end of 2103, the Spanish per capita GDP was 21,948 euro. Compute the Spanish per capita GDP at the end of 2030, assuming that the average growth rate of this variables is:
 - A) 1 percent
 - B) 2 percent
 - C) 4 percent
2. Compute the average gorwth rate of the per capita GDP in the following cases:

	1980	2008
Germany	10,839	20,801
Spain	6,319	19,706
France	11,410	22,223

Dollars of 1990. Source: Angus Maddison, *The World Economy: Historical Statistics*.

3. Assume that $K, L,$ y A growth to the constant rates $\bar{g}_K, \bar{g}_L,$ y \bar{g}_A . Obtain the growth rate for Y in the following cases:
 - A) $Y = K^{1/3}$
 - B) $Y = K^{1/3}L^{2/3}$
 - C) $Y = AK^{1/3}L^{2/3}$

Topic 2: A model of production

1. At the end of 2050, the Spanish Labor Force will be 20 percent lower in comparison to the this same group in 2010. On the other hand, it is expected that the Spanish physical capital will increase 30 percent during that same period. Assume that the participation of capital income in the GDP is 1/3, and that Total Factor Productivity is 1. Use the the Cobb-Douglas production function to quantify the effect of the aforesaid changes on factor prices (w and r) along the 2010-2050 period.

2. The following table shows the capital and the per capita GDP for a sample of countries, at year 2000. Obtain:

- A) Given values for the columns 1 and 2, obtain the corresponding values for columns 3 and 4.
- B) Use the model of production (assuming a capital share of $1/3$) to predict the per capita GDP (column 5), if we also assume that there is no difference in the TFP.
- C) Obtain the level of TFP (column 6) for each country, that is needed for the model to replicate the data.

	Per capita capital	Per capita GDP	Per capita capital	Per capita GDP	Prediction for y	TFP consistent with the data
USA	79,865	33,293	1.000	1.000	1.000	1.000
Canada	76,026	26,904				
South Korea	48,453	15,876				
Mexico	18,740	8,762				
Kenia	1,414	1,244				

Dollars 2000. Source: Angus Maddison, *The World Economy: Historical Statistics*.