

ECONOMICS 2

2014/2015

Problem Set

3.1.-3.9.

3. ECONOMIC GROWTH, PRODUCTIVITY AND LIVING STANDARDS

Problem 3.1.

Consider the following table for Portugal, expressed in millions of euros. Calculate:

Year	GDPmp, current prices	GDPmp, 2006 prices
2006	160 855.4	160 855.4
2007	169 319.2	164 660.2
2008	171 983.1	164 646.2
2009	168 503.6	159 857.7
2010	172 834.8	162 954.6
2011	171 039.9	160 422.5

SOURCE: [INE \(2012a\)](#).

- The annual rates of growth for real GDPmp.
- The annual inflation rates implicit in the GDPmp deflator.

Problem 3.2.

GDP PER CAPITA IM 2008 AT CURRENT PRICES, EXPRESSED IN US DOLLARS

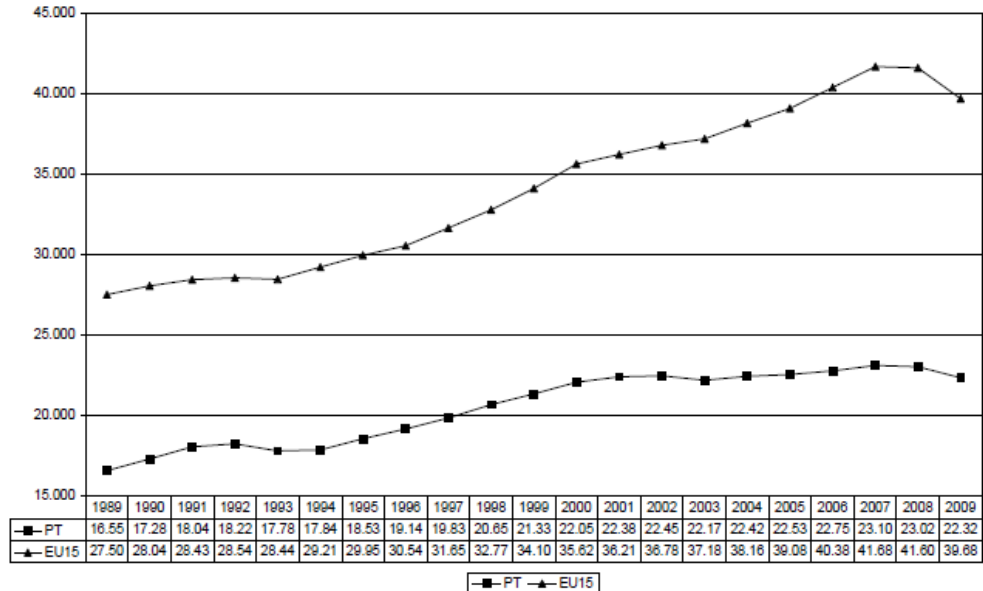
	Based on current market exchange rates	Based on current Purchasing Power Parities (PPP)
Germany	44 488	35 392
Spain	35 558	30 765
UK	46 432	36 316
US	46 541	46 541
Poland	11 861	17 493
Portugal	23 351	22 357

SOURCE: [IMF \(2010\)](#).

- Explain the differences between columns [1] and [2].
- Is the average price level (in dollars) higher in Portugal or in Germany? What about Portugal versus Poland? Base your answer on the information in the table.

Problem 3.3.

The figure below represents the GDP per inhabitant in Portugal and the average for EU15 (expressed in dollars EKS 2009).



SOURCE: [Conference Board \(2010\)](#).

GDP PER CAPITA IN PORTUGAL AND EU15, EKS DOLLARS OF 2009

	1989	2007	2009
Portugal	16 557	23 102	22 329
EU15	27 502	41 682	39 685

SOURCE: [Conference Board \(2010\)](#).

- Was there real convergence between Portugal and the average of the countries within EU15 during the 1989-2009 period? What about in the 1989-2007 period?
- Assuming the annual average rates of growth for Portugal and the other EU15 countries (occurred between 1989 and 2009) remain the same from 2009 onwards, when will the GDP per capita for Portugal and for the EU15 countries be equal?
- Now, assume that, from 2009 onwards, Portugal exhibits an average annual rate of growth one per cent higher than the one calculated for 1989-2009. When will the GDP per capita for Portugal and the EU15 countries be equal?

Problem 3.4.

Consider the following data for the Portuguese economy:

	Average productivity of labour (2000 euros)	Employment as a proportion of total population
1960	5 042	37,3%
2008	25 614	48,5%

SOURCE: [European Commission \(2012\)](#).

- Compute the increase in GDP per capita for Portugal between 1960 and 2008.
- Present the decomposition of that change into the part resulting from the increase of average labour productivity and that resulting from the increase in the proportion of employment in total population.
- Why do we consider that growth in average labour productivity is the key factor in determining long-run living standards?

Problem 3.5.

What is Human Capital? Why is it economically important? How is new human capital created?

Problem 3.6.

Refer some policies that contribute to increase the average labour productivity increase.

Problem 3.7.

Consider the aggregate production function $Y_t = A_t N_t^{2/3} K_t^{1/3}$, where Y_t is aggregate output in year t , N_t is employment, K_t represents physical capital available at the beginning of t , and A_t stands for all the other factors affecting the output level.

- Demonstrate that this production function exhibits constant returns to scale. Provide foundations for your position using the “replication argument.”
- Now suppose that N_t is fixed, for all t , i.e. employment does not vary along time. Prove that the marginal productivity of the capital is decreasing.
- Explain why simply expanding the physical capital stock cannot provide *per se* long-lasting economic growth, considering that the marginal productivity of capital is decreasing.
- What may A_t represent?

Problem 3.8.

Is a higher rate of growth for GDP per capita always better than a lower one?
Explain your position.

Problem 3.9.

Discuss the following statement: "As the environment is fragile and natural resources are finite, ultimately economic growth must come to an end."