## 1. Portuguese economic data and computation of growth rates

**1.1 (Excel-based) Download the file “MA2 - 2022-2023 - AP1” from Fenix and perform the following exercises:**

1.1.1 Perform the necessary calculations and fill in the columns:

* + - 1. Population (1991-2021)
      2. GDP per capita (1960-1990)
      3. Annual GDP growth rate
      4. Annual population growth rate
      5. Annual GDP per capita growth rate

1.1.2. Plot the evolution over time of GDP per capita in a graph and discuss economically the trend over time, and whether you can identify distinct periods and important fluctuations in the data series. What could the causes of these fluctuations have been?

1.1.3. Plot the evolution over time of the GDP per capita growth rate in a graph and continue the discussion from 1.1.2. Are there any interesting/relevant additional facts/patterns which you can identify?

1.1.4. Compute the discrete and continuous annual average growth rates of Portugal’s GDP per capita between 1960 and 2021. Compare the two figures.

1.1.5. Compute the continuous average growth rates of GDP per capita for the periods 1960-1970; 1970-1980; 1980-1990; 1990-2000; 2000-2010; and 2010-2020. Discuss your findings in a comparative economic perspective.

1.1.6 1.1.6 At the average annual growth rate for 1960-2021, how many years from 2021 will it take for GDP per capita to reach 25,000 Euros? What about if the growth rate is the same as the average for 2000-2021?

1.1.7 At the average annual growth rate (discrete) for 1960-2021, how many years from 2021 will it take for GDP per capita to double? What about if the growth rate is the same as the average for 2000-2021?