Homework No.1 - Quantitative Macroeconomics

Szymon Wieczorek - QEM

The homework consists of 4 questions. This file has all the necessary solutions to the problem.

The data used in the homework came from Bureau of Economic Analysis and represents the statistics for US economy in the 1929-2018 period.

Question 1 was divided into two parts: first about calculation of rates of GDP, NMI and IPP over GDP i and the second one, about calculating labor share for US economy in three different approaches: naive, adjusted for taxes/subsidies and adjusted for taxes/subsidies and mixed income.

The first part of Question 1 was to calculate the relation of taxes minus subsidies, proprietors' income and intelectual property products to GDP. The table below shows the relation along the data timespan.

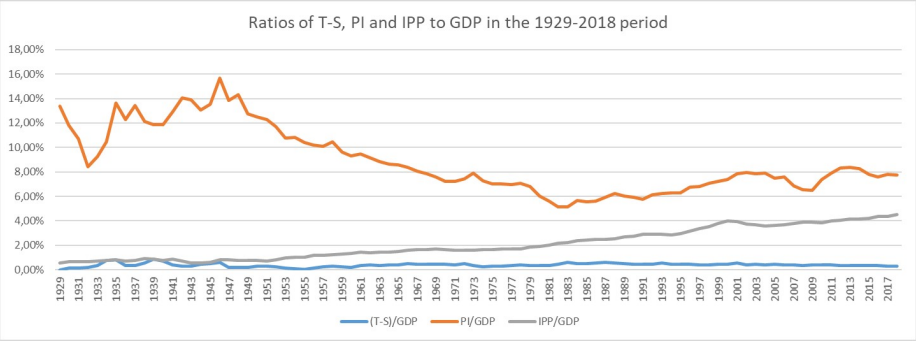

Figure 1: Question 1 part 1

As it can be seen on the table, the relation on taxes minus subsidies to GDP is very low and never exceeds 1 percent. For proprietors' income, the relation varies between 5 percent in 1980's and 16 percent in the 1940's. The relation between IPP and GDP increased over time from 0.5 percent in 1929 to surpass the 4 percent level in the most recent data.

The second part of Question 1 consisted of request to calculate the labor share for US economy in three different approaches: naive, adjusted for taxes/subsidies and adjusted for taxes/subsidies and mixed income. The table below shows the labor share along the data timespan in three configurations.

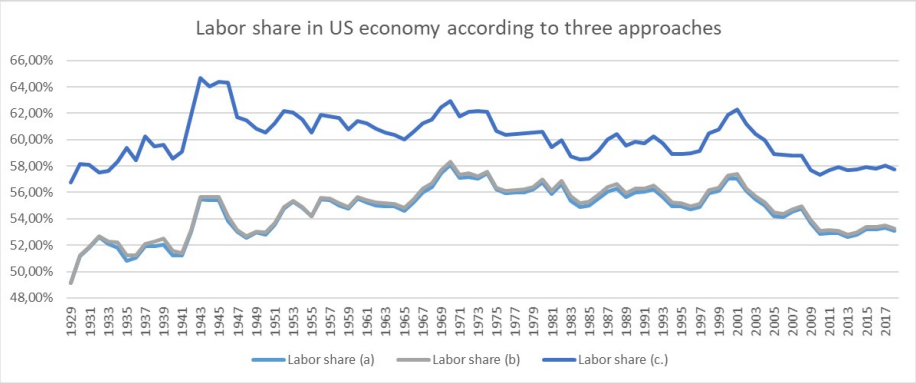

Figure 2: Question 1 part 2

Although labor share varied between the three approaches, all cases exhibit exactly the same time trends. For naive approach, LS varies between 49 percent and 58 percent. For approach adjusted by taxes minus subsidies, the corresponding interval is the same as for naive approach and for (c) the interval ranges between 57 percent on both ending of the timespan and above 64 percent in 1940's.

Question 2 was about calculating the same things as for 1.2, but this time using a pre-1993 SNA proxy for labor share. We do this by deleting intelectual property products (IPP) from the GDP measure. Then we redo what we already did in Question 1 part 2. The results are shown in the table below.

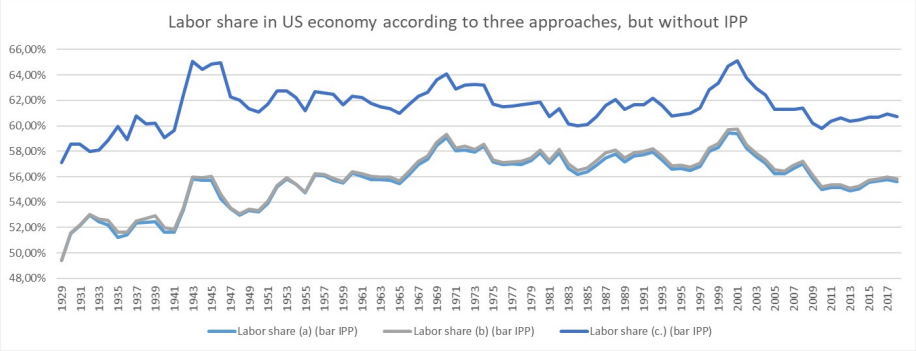

Figure 3: Question 2

This time the intervals are different along the timespan. For approaches (a) and (b), the corresponding levels of labor share are between 49 percent in

the beginning and 60 percent around year 2000, and for (c) between 57 in the beginning and 65 percent in 1940's and around year 2000.

Question 3 was about calculating labor share, but only for corporate sector. This time the difference consisted of taking only the non-government wages and supplements and redoing what has been already done in Question 1 part 2 and Question 2. The results are shown in the table below.

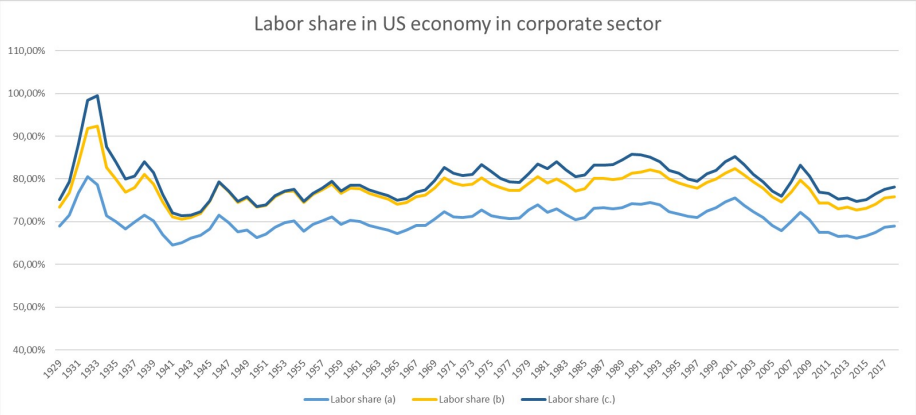

Figure 4: Question 3

The plot has 3 lines, each of which represents one of three approaches to the calculation of labor share. These values are generally very high, having minimum values about 65 percent in 1940's and most recent times and maximum values reaching 100 percent during the economic crisis in early 30's.

In final question there was a necessity to calculate rate of return on capital in American economy. We used the labor share levels already calculated in the previous part of the homework. The results are shown on the graph below.

There are 6 lines on this graph representing three approaches to the labor share calculation and two SNA systems concerning calculating assets. They differ from each other along the timespan. The values they represent, i.e. rate of return in American economy, varies between 9 percent and 18 percent. Approaches adjusted for both taxes minus subsidies and net mixed income yielded much lower rate of return than those that were not adjusted by NMI. The difference in system of national accounts becomes significant in 50's and 60's to result in a gap reaching 2 percent in 60's and 70's that shrinked below 1 percent in the most recent period.

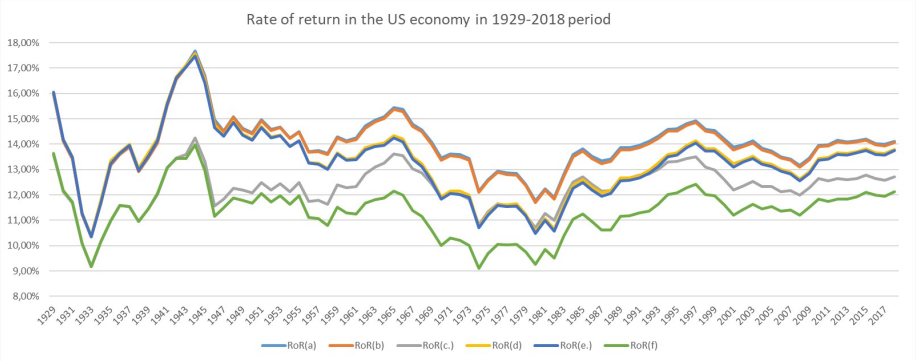

Figure 5: Question 4