Quantitative Macroeconomics - Homework 1

Zuzanna Brzóska-Klimek

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Question 1. Secular behaviour of the Labour Share.

Computations of the time series were performed in Excel and can be seen in the attached xlsx file.

1 Time series of the ratio of taxes less subsidies on production and imports (T-S) over gross domestic product (GDP), net mixed income (NMI) over GDP and intellectual property products (IPP) investment over GDP in the U.S

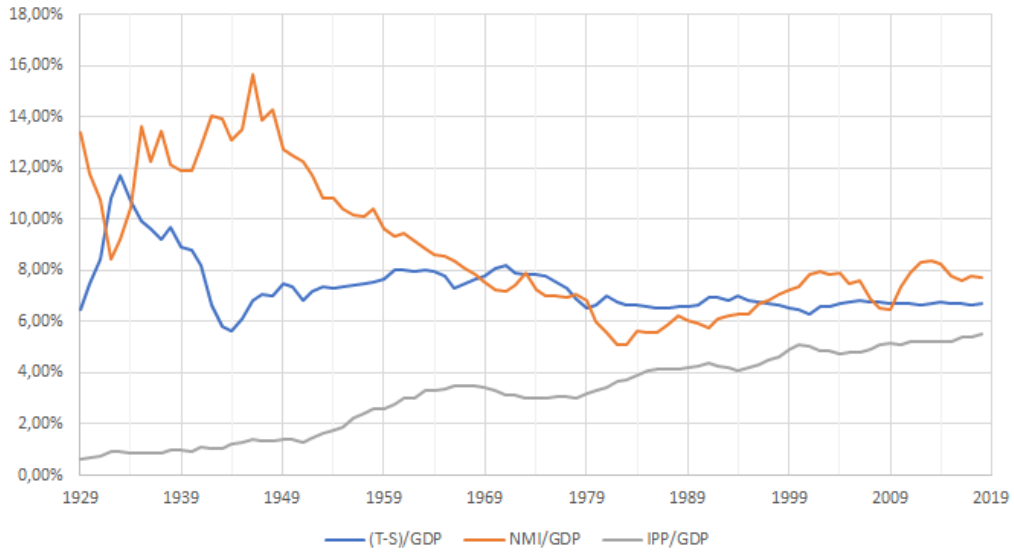

Figure 1: Selected ratios of GDP in US in years 1929-2018

According to graph the ratio (T-S)/GDP has variated barely since 1940' standing at 6-8%. Only during the Great Depression it rocketed up to 12%, reaching its maximum 1933. This fact is consistant with intuitition that imported goods were then highly taxed to limit import stimulate endogenous production. The ratio came back to brackets 6-8% in 1940'.
At the time of Great Depression also the share of net mixed income, which is in fact proprietors' income, plumed to grow back up to 16% right after World War II. Since then the ratio has been mostly decreasing, stagnating at 6-8% with visible drops during further crises of second oil shock in 1979 and subprime mortgage in 2007.
At the same time ratio of PPI was increasing stably with growing importance of intelectual property.

2 Economy-wide LS for the U.S. using four different defnitions of the LS:

(a) a) Naive:

$$LS_0 = \frac{CE}{GDP} \tag{1}$$

(b) b) Adjusted for taxes/subsidies

$$LS_1 = \frac{CE}{GDP - (T - S)} \tag{2}$$

(c) c) Adjusted for taxes/subsidies and mixed income:

$$LS_2 = \frac{CE}{GDP - (T - S) - NMI} \tag{3}$$

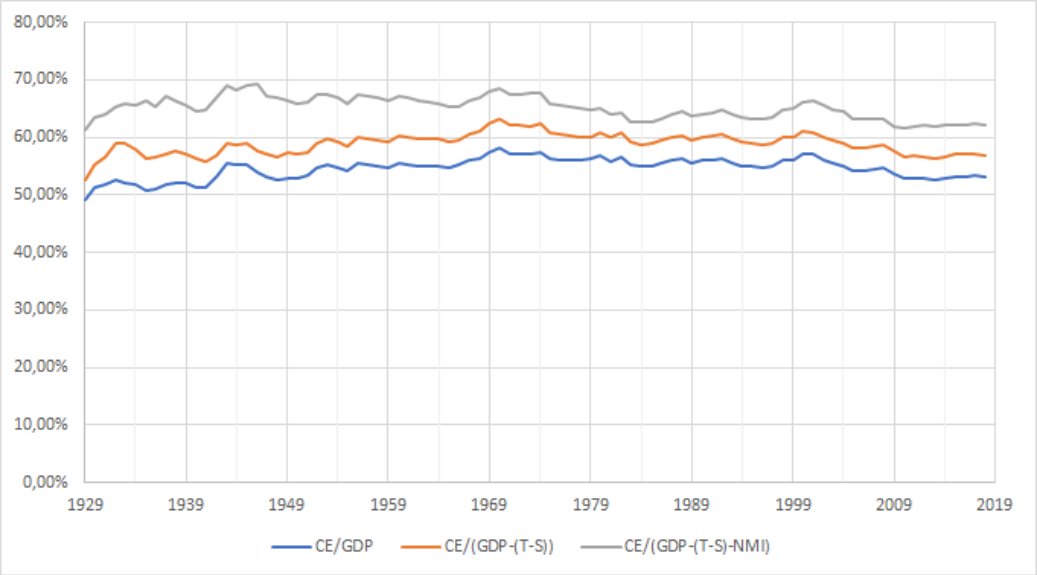

Figure 2: Labor shares calculated with different definitions in US in years 1929-2018

Although all three methods perform different values of calculated labor share, they follow similar trends in time. These values stick in the 50-70% brackets with rather small variation. Of course, the smaller denominator in different approaches, the higher value of labor share.

Question 2. The effects of IPP capitalization.

1 Proxy for the pre-SNA93 construction of the labor share

The proxy for preSNA93 labour share was created by subtracting both private and government IPP investments from GDP.

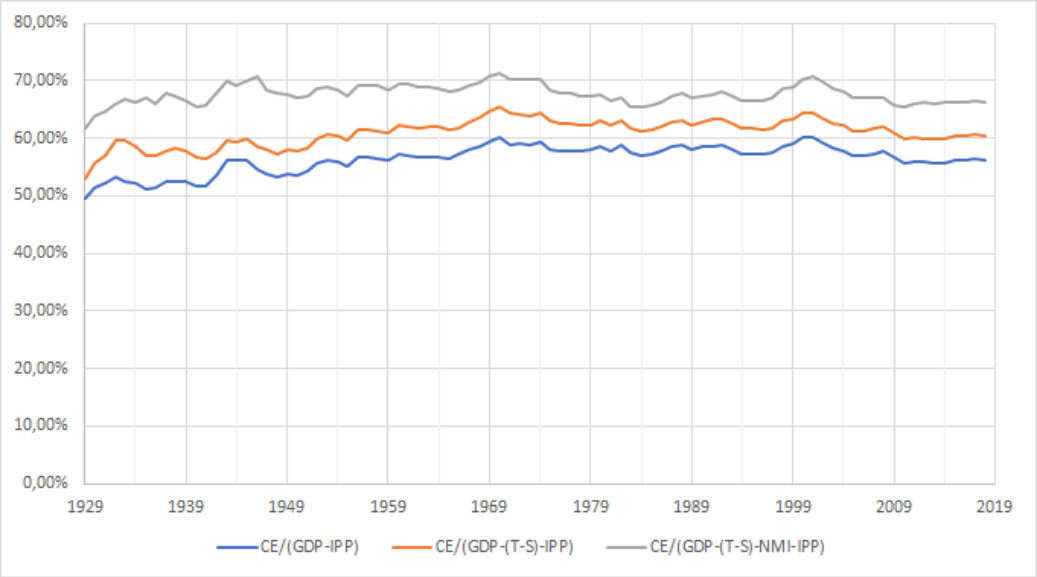

Figure 3: Labor shares calculated with different definitions with pre-SNA93 proxy in US in years 1929-2018

On average the values of different labor shares are similar to each other, however as the share of IPP grows in time, the differences arouse.

Question 3.The corporate labor share.

All the calculations below were performed for corporate sector. In particular private IPP investments were taken into calculation as opposed to economy-wide computation, where both private and government IPP investment were taken into consideration

Ad Question 1. Secular behaviour of the Labour Share.

1 Time series of the corporate ratio of taxes less subsidies on production and imports (T-S) over gross domestic product (GDP), net mixed income (NMI) over GDP and intellectual property products (IPP) investment over GDP in the U.S

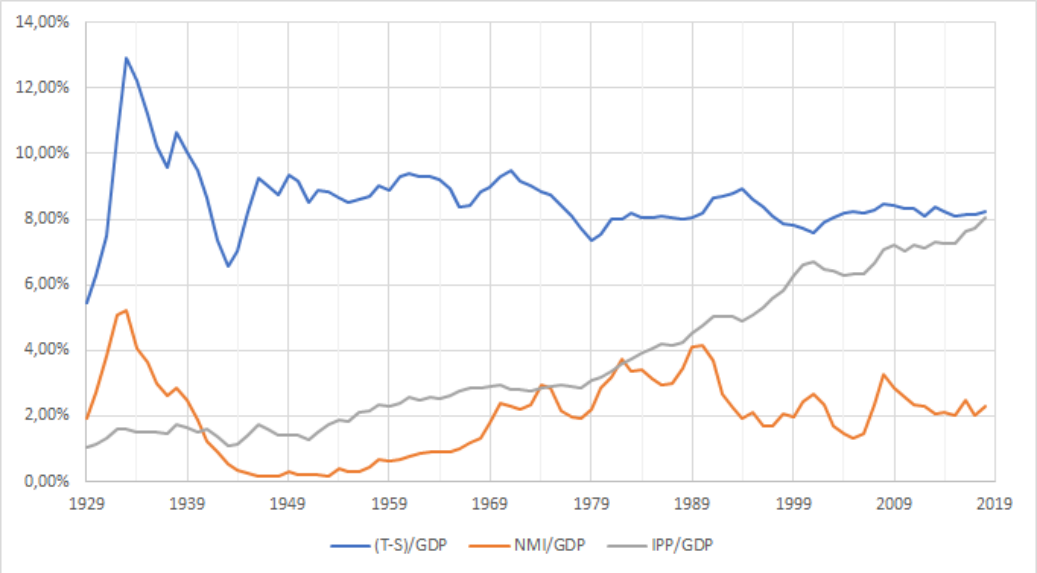

Figure 4: Selected corporate ratios of GDP in US in years 1929-2018

The corporate ratio (T-S)/GDP has variated very similar to the wide-economy one, however it reached higher values up to 13% at its maximum and above 8% at stable stage.
On the other hand share corporate of net mixed income behaved different way than the wide-economy one. In particular it grew during crises and has slighly positive trend since 1950'.
Moreover share of PPI was increasing much more visibly in corporate sector than in wide economy.

2 Economy-wide LS for the U.S. using four different defnitions of the LS

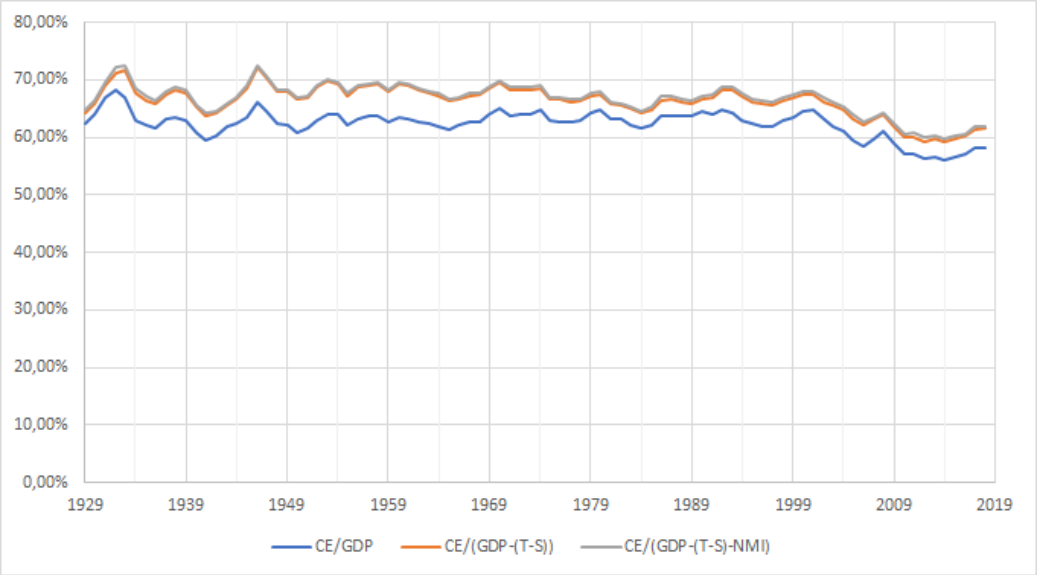

Figure 5: Corporate labor shares calculated with different definitions in US in years 1929-2018

Corporate labor shares meet similar long period trends as the wide-economy ones, however their average value is about 10 percentage point higher. Moreover discrepancies between different methods are smaller.

Ad Question 2. The effects of IPP capitalization.

1 Proxy for the pre-SNA93 construction of the labor share
The proxy for preSNA93 construction of labour share was created by subtracting private IPP investments from corporate GDP.

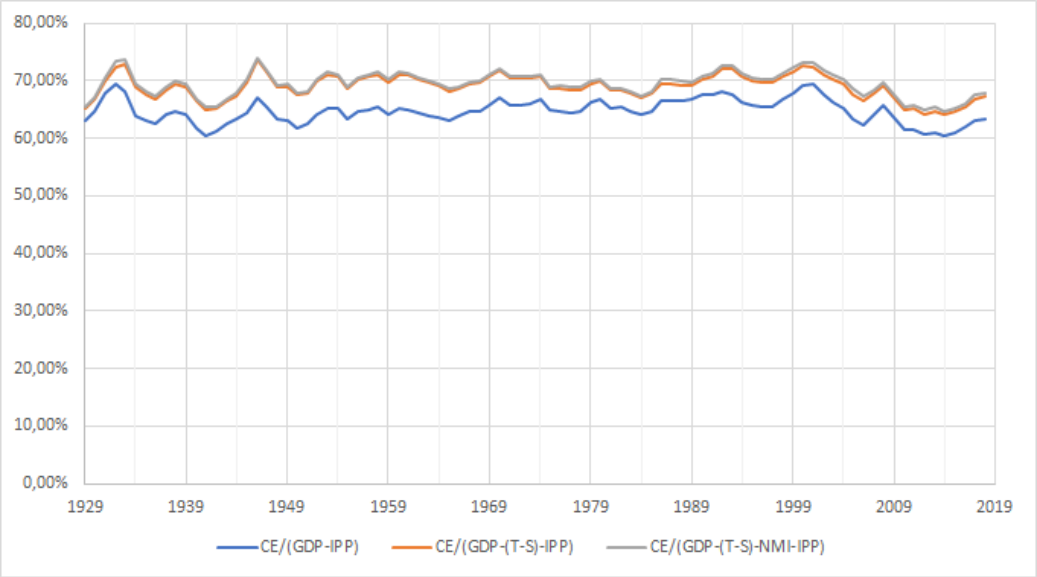

Figure 6: Labor shares calculated with different definitions with pre-SNA93 proxy in US in years 1929-2018

The average value of corporate ratios is a few percentage point higher than in wide economy. Moreover discrepancies between different methods are smaller.

Question 4. The rate of return to capital.

1 Rate of Return on capital for wide economy.
Rate of Return were calculated as below, where FA stands for Fixed assets:

(a) Naive:

$$RoR_0 = \frac{GDP - CE}{FA} \tag{4}$$

(b) Adjusted for taxes/subsidies

$$RoR_1 = \frac{GDP - (T - S - CE}{FA} \tag{5}$$

(c) Adjusted for taxes/subsidies and mixed income:

$$RoR_2 = \frac{GDP - (T - S) - NMI - CE}{FA} \tag{6}$$

For pre-1993 SNA the PPI were also substructed.

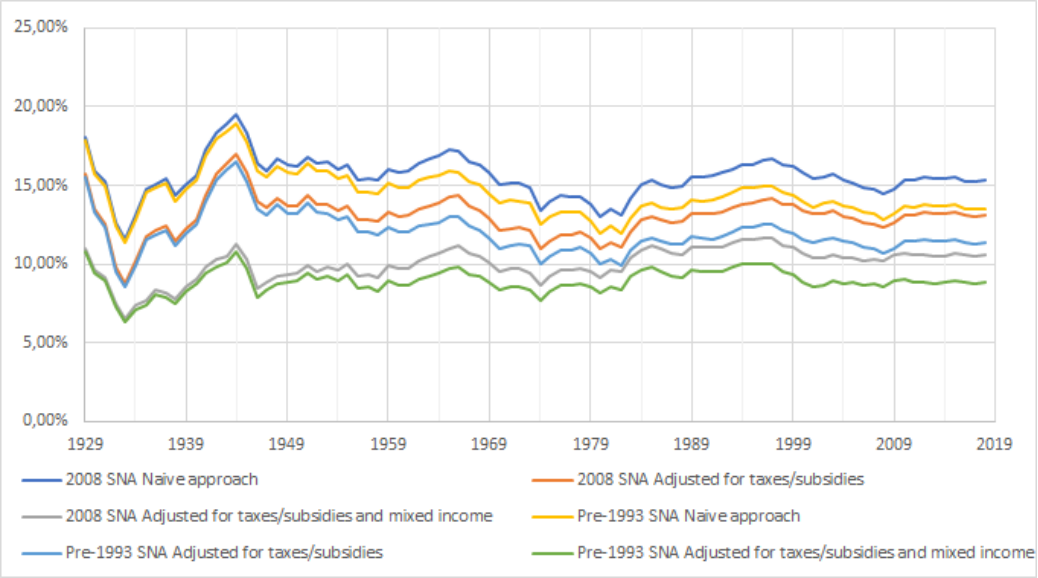

Figure 7: Rate of Return on capital calculated with different methods in US in years 1929-2018

A very interesting fact, that one can see in above graph is that there are increasing in time discrepances between 2008 SNA and Pre-2008 SNA computations, which point the rising importance of IPP in nowadays balance sheets.
The RoR on capital in wide economy is rather stable with values mostly between 7 and 17% with extreme values 6.3 and 19.5%. There also visible drops following crises. Average differnce between extreme values exceeds 5 percentage point.

2 Rate of Return on capital for corporate sector

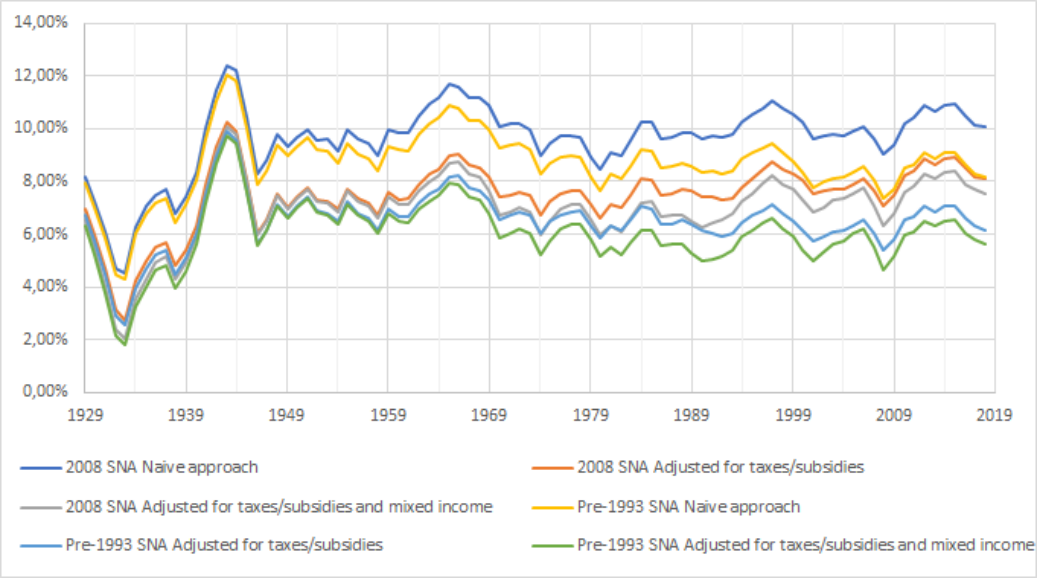

Figure 8: Rate of Return on capital in corporate sector calculated with different methods in US in years 1929-2018

The graph of RoR on capital in corporate sector is rather similar to the wide-economy one, however it amounts smaller values and higher variation.