Quantitative Macroeconomics - Homework 1

Jakub Bławat

September 2019

1 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.

1.1

Figure 1 shows selected ratios:

- Ratio of taxes less subsidies on production and imports (T - S) over gross domestic product (GDP)
- Ratio of net mixed income (NMI) over GDP
- Ratio of intellectual property products (IPP) investment over GDP.

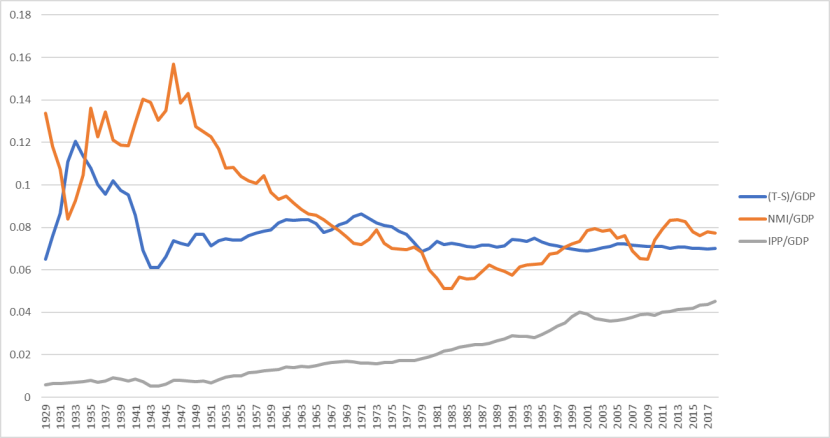

Figure 1: Evolution of selected ratios in US

One can see that during 1930s and 1940s ratios of (T-S)/GDP and NMI/GDP were moving in opposite directions. In late 1940s ratio of net mixed income over GDP starts to decline and drops from almost 16% in 1946 to around 5% at the beginning of the 1980s. Ratio of taxes/subsidies over GDP stabilizes in the post-war period and is almost constant in 21st century. Intellectual property products – that were nearly non-existent at the beginning of analyzed time series – are now getting bigger and bigger part of the share of US GDP.

1.2

- a) Naive:

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

  Current value: 53%

- b) Adjusted for taxes/subsidies

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

  Current value: 57%.

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

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

Current value: 62%.

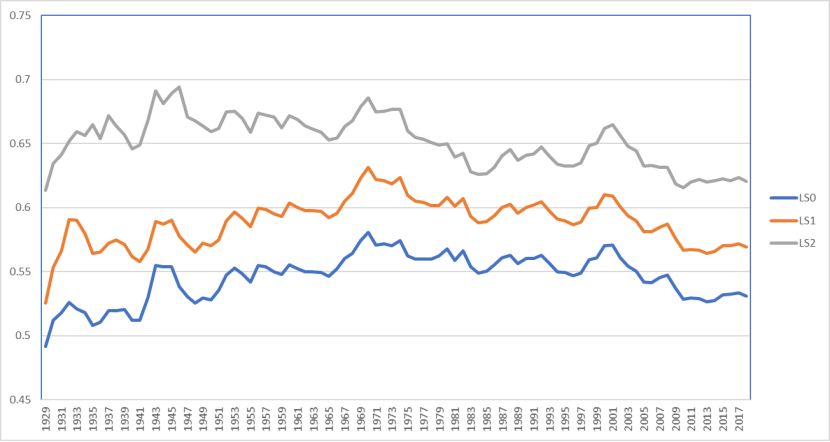

Figure 2: Evolution of labour shares in US

Figure 2 shows that our three methods of calculating labour share follow the same path over time. The maximum was achieved at the end of World War II and minimum at the beginning of our time series. There is a visible downward trend in 21s century.

2 Question 2. The effects of IPP capitalization.

2.1 Proxy of preSNA93 ratios from Question 1

It this section proxy for preSNA93 construction of labour share was created by subtracting IPP investments from GDP.

- Ratio of taxes less subsidies on production and imports (T - S) over gross domestic product (GDP) less IPP
- Net mixed income (NMI) over GDP less IPP
- Intellectual property products (IPP) investment over GDP less IPP

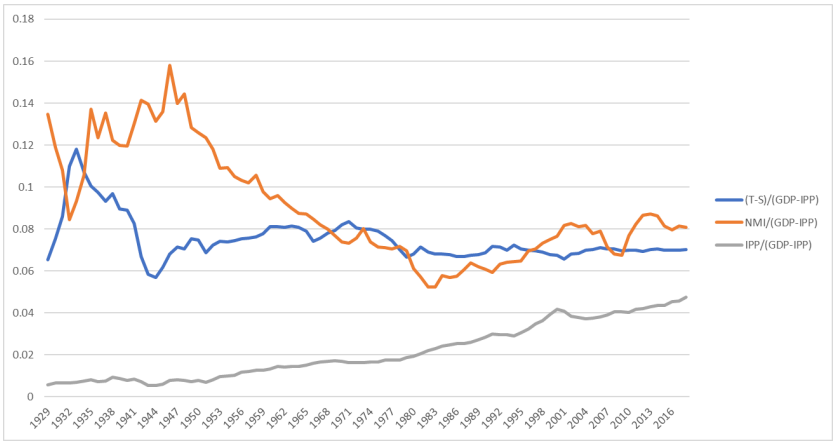

Figure 3: preSNA93 ratios from Question 1

Figure 3 does not differ much from the Figure 1, ratios are just a bit higher, because IPP was deducted from denominator.

2.2 Proxy of preSNA93 Labour Share

- Naive
- Adjusted for taxes/subsidies
- Adjusted for taxes/subsidies and mixed income

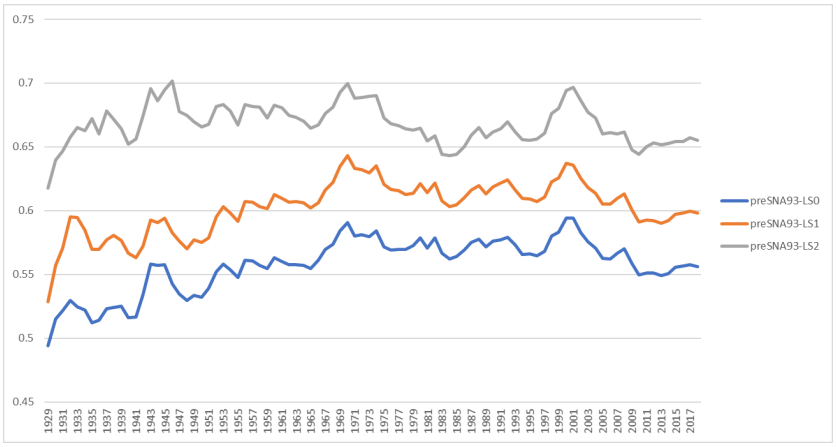

Figure 4: preSNA93 Labour Share

Figure 4 is similar to Figure 2 at also shows that using preSNA93 standards gives a bit higher ratios. However the peak at the turn of the millennium is now much more visible and is almost reaching all time high score. Depending on the method labour share varies between 49.5% and 70% over time.

3 Question 3. The corporate labour share.

For corporate sector the data from NIPA BEA table 1.14 was used.

- Naive corporate labour share (LS0).
- Corporate labour share adjusted for taxes/subsidies (LS1).
- Corporate labour share adjusted for taxes/subsidies and mixed income (LS2).

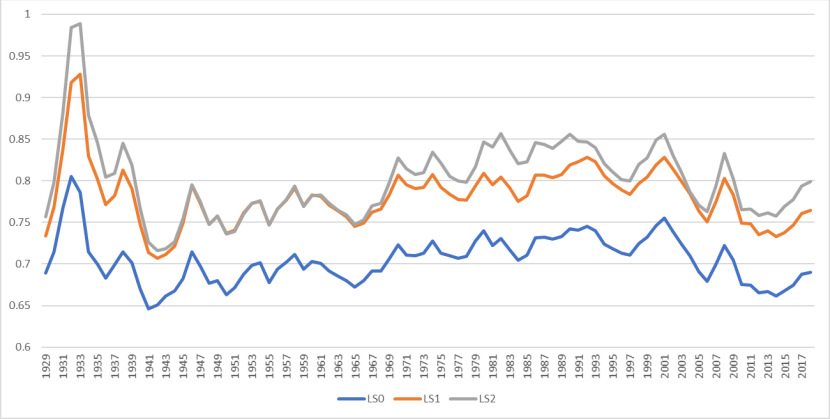

Figure 5: Corporate labour share.

Numbers for corporate labour share are much higher then in previous section. When adjusted for taxes/subsidies and net mixed, labour share is almost reaching a unity.

4 Question 4. The rate of return to capital.

4.1

To approximate capital stock a table 1.1 (Fixed assets) from NIPA BEA was used. Rate of return on capital with naive labour share:

$$RoR_0 = \frac{(1 - LS_0) \cdot GDP}{Fixedassets} \tag{4}$$

Rate of return on capital with labour share adjusted for taxes/subsidies:

$$RoR_1 = \frac{(1 - LS_1) \cdot GDP}{Fixedassets} \tag{5}$$

Rate of return on capital adjusted for taxes/subsidies and mixed income

$$RoR_2 = \frac{(1 - LS_2) \cdot GDP}{Fixedassets} \tag{6}$$

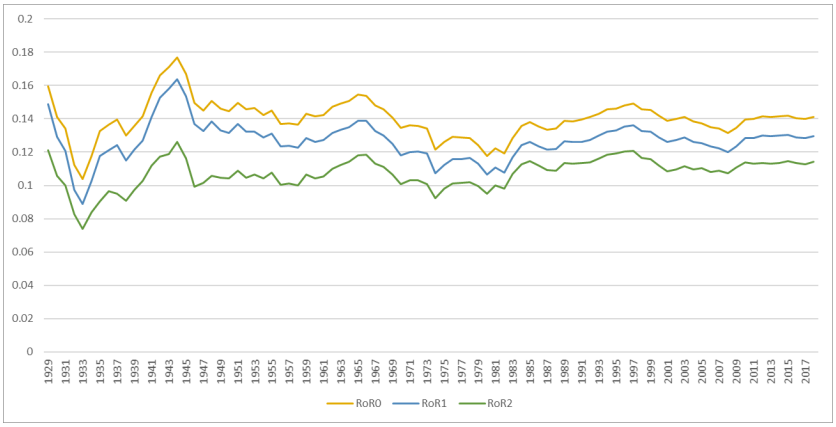

Figure 6: Rate of return on capital over time in US

Calculated rate of return on capital achieves its minimum during The Great Depression and its maximum during the World War II. At first look calculated rate of return on capital which varies from around 8% to almost 17.5% in different methodologies, seems to be counter-intuitive and too high. However similar numbers can be found in literature - e.g. Poterba (MIT 1998)[1]. According to data from this research (page 234) RoR in US varies between 12.9% and 18.7% (with time series from 1966 to 1996).

[1] http://piketty.pse.ens.fr/files/Poterba98.pdf

4.2 Corporate RoR

To compute corporate rate of return on capital, private fixed assets were used together with corporate labour share from previous section.

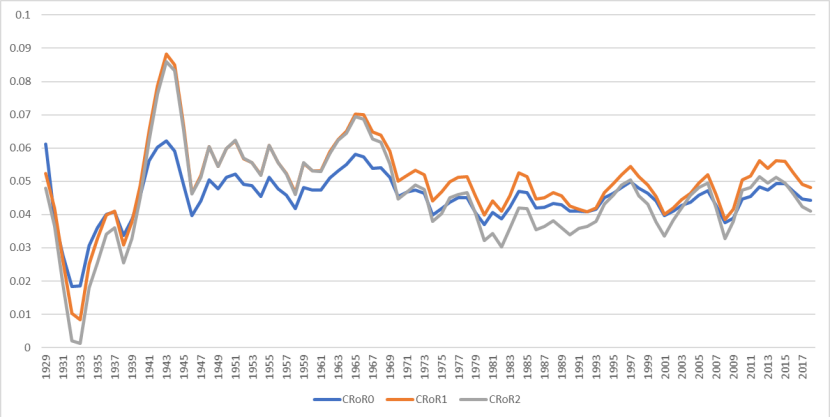

Figure 7: Corporate RoR on capital in US

In this case one can also easily see the impact of The Great Depression and WW2 on the rate of return on capital. The numbers are much smaller than in previous case with rate of return on capital almost hitting zero lower bound in 1933.

5 Data

Necessary data was obtained from NIPA annual tables delivered by Bureau of Economic Analysis with the time range 1929-2018[2].

- Gross Domestic Product and Intellectual Property products from NIPA BEA table 1.1.5.
- Compensation of employees, net mixed income, taxes and subsidies on production and imports from NIPA BEA table 1.12.
- Corporate sector only: net value added, compensation of employees, net interest and taxes on production and imports less subsidies from NIPA BEA table 1.14.

[2]https://apps.bea.gov/iTable/index_nipa.cfm

- Fixed assets and private fixed assets from NIPA BEA table FA 1.1.