

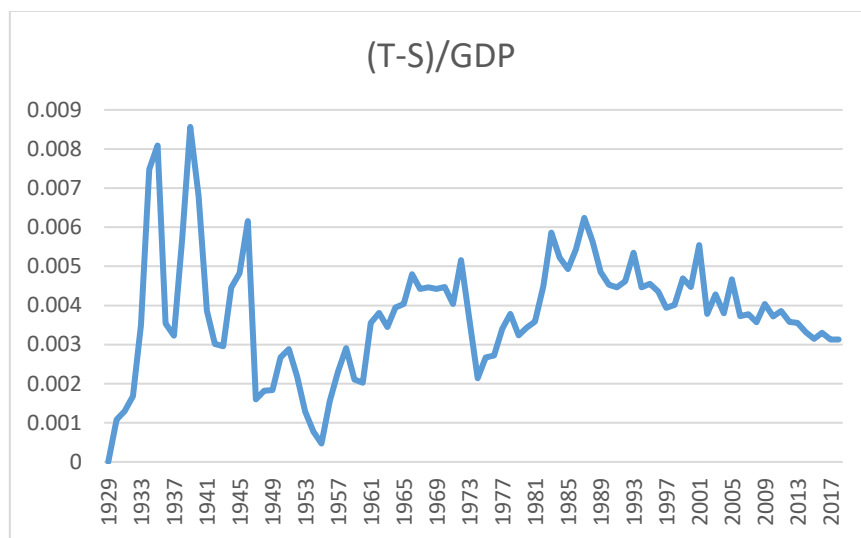
# QUANT MACRO: PROBLEM SET 1

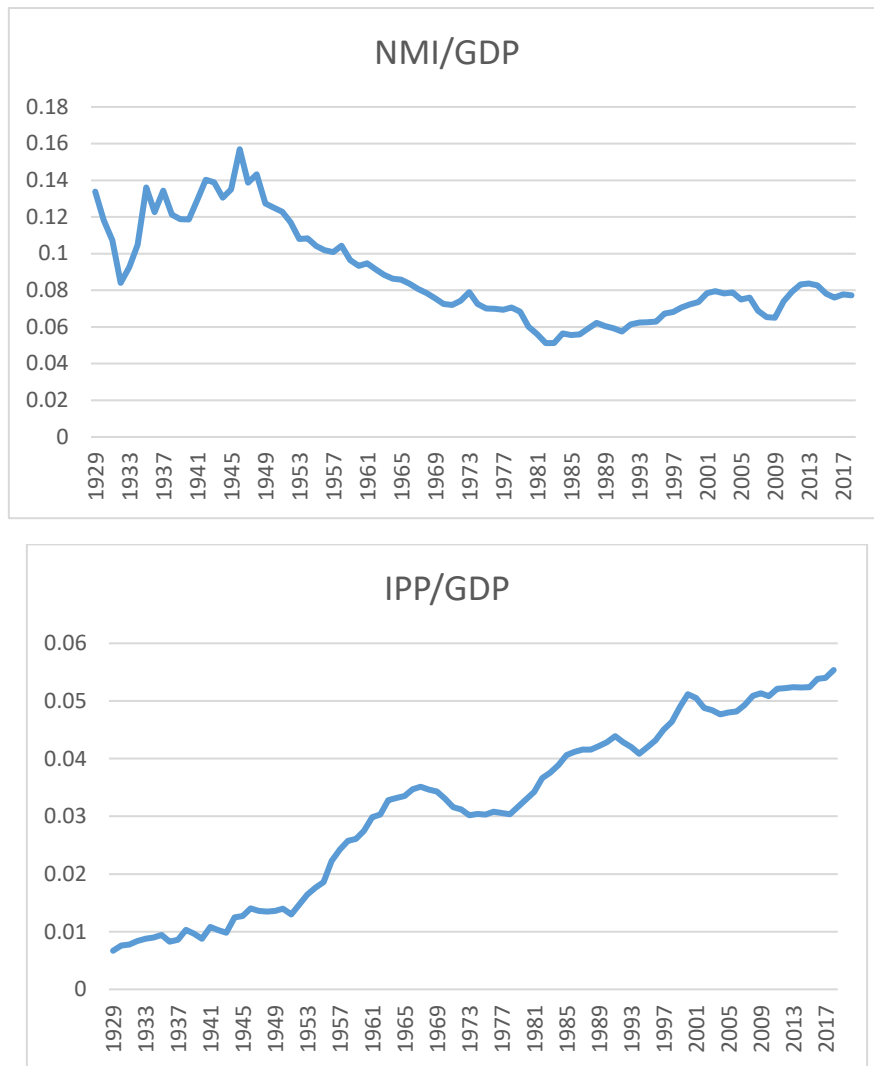
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## Question 1. Secular behavior of the labor share

a) Compute (and plot) the 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. Discuss your results. Notice that these data are available (annually) since 1929 for the U.S. under the 2008 SNA.

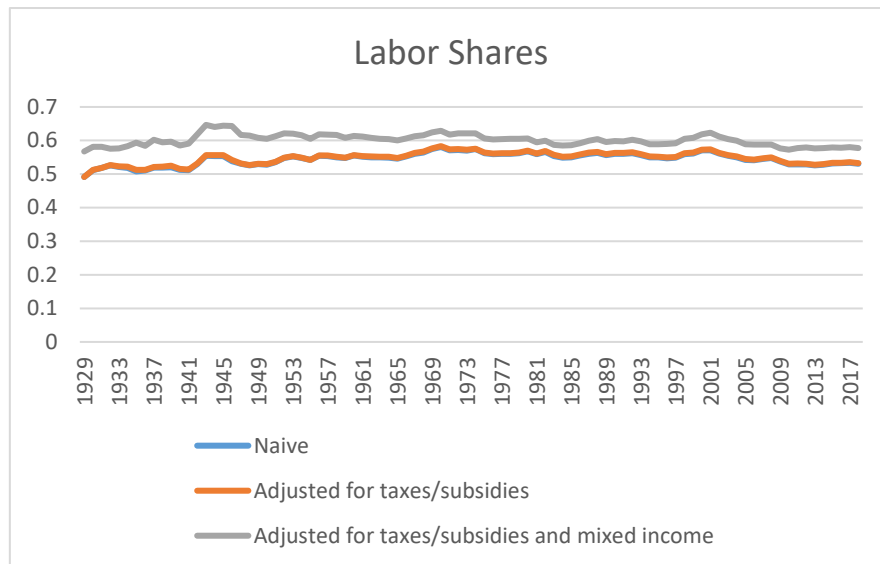
As we can see in the graphs below the ratio of taxes less subsidies on production and imports over gross domestic product,  $(T-S)/GDP$ , presents the highest volatility. The IPP/GDP ratio presents an upward trend since the beginning of the period, whereas  $(T-S)/GDP$  and NMI/GDP seem to move in opposite directions during the second world war. After the war taxes tend to stabilize, in contrast to the net mixed income, which tends down. Analyzing all of them together, we can see that at the beginning of the period they tend to diverge, whereas all of them converge to a similar level at the end of the period.





**b) Compute the economy-wide LS for the U.S. using these four de\_nitions of the LS that we saw in class and discuss your results:**

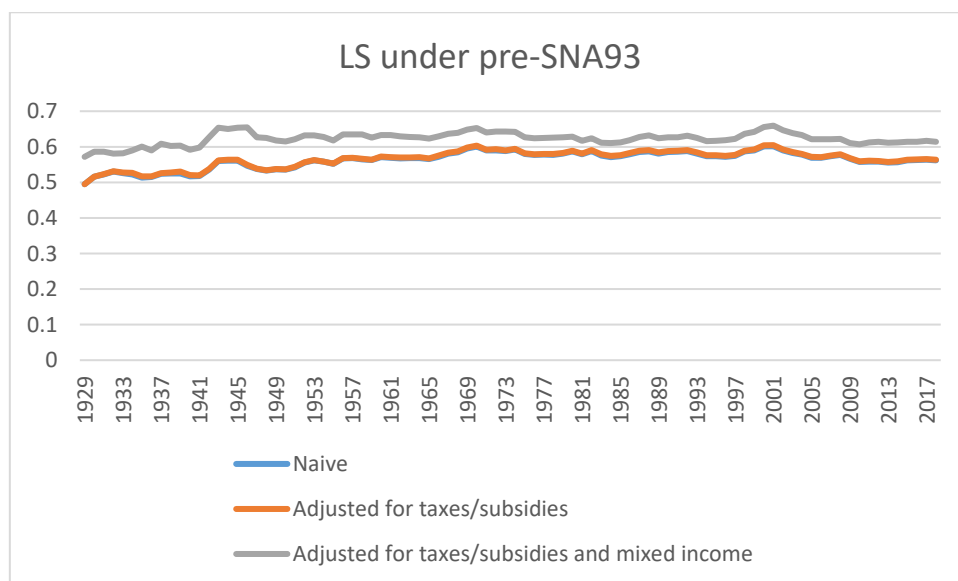
Now we compute three different labor share ratios: the naive, the adjusted for taxes/subsidies and the one adjusted for taxes/subsidies and mixed income. As we can see in the graph the evolution of the three ratios is very similar. In fact, the difference between the naive ratio and the one adjusted for taxes is very low. The ratio or the labor share adjusted for taxes and mixed income is the highest one. In the first part of the period, the labor share tends to increase, after the second world war it decreases, for stabilize until the end of the 90s when it increases also. From 2000 until now the three labor share ratios tend to decrease.



## Question 2. The effects of IPP capitalization

**Use a proxy for the pre-SNA93 construction of the labour share. That is, subtract IPP investment from GDP in all your previous measures. Discuss your results.**

In the following graph we observe the labour share ratios according to the pre-SNA93, that is, we subtract the IPP investment from GDP, and then use the measures used in the exercise above. Comparing with the new normative, the old one yields a little bit higher labour shares, whereas the overall tendency stays the same.



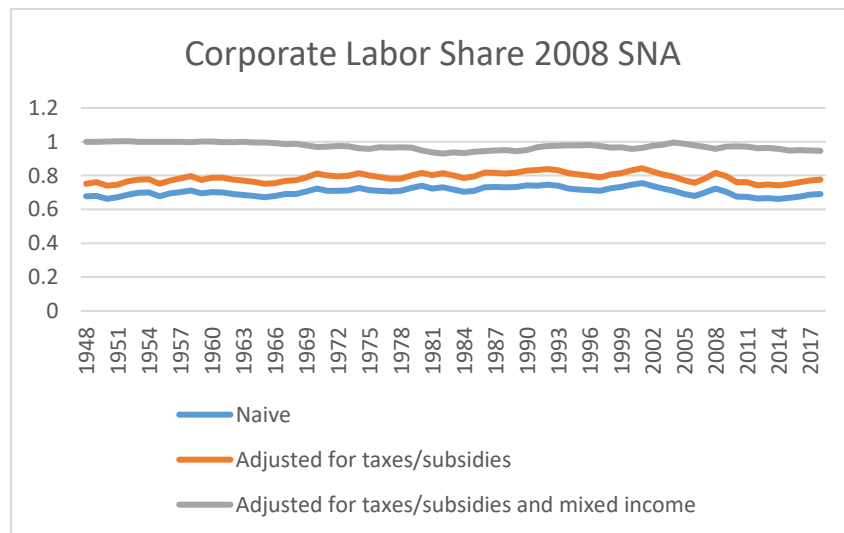
### Question 3. The corporate labour share

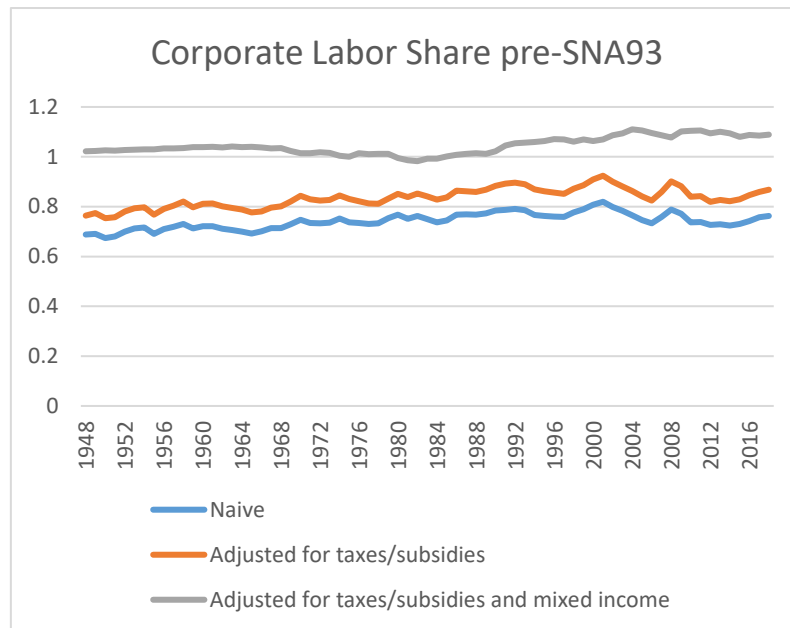
**Redo the previous items using the corporate sector only. Compare and discuss the economywide results with the corporate sector results.**

In this section, we compute the labour shares by three different methods using only data for the corporate sector. The first graph shows the labour share according to the 2008 SNA, whereas the second one shows the labour share under the pre-SNA93. Since in the NIPA tables corporate IPP is missing, I choose private IPP as a proxy for it. Since this proxy also includes households and small firms is too large.

The ratios obtained for the corporate sector show much higher labour shares than the labour shares obtained for the overall economy. This can be because the compensation of employees represents a higher proportion in the total income generated by the sector than the compensation of employees overall the sectors of the economy. In both cases, the labour share goes down in the period of the global crisis which starts in 2007, whereas in last years, labour shares are recovering.

It is also remarkable that the gap between different labour shares is much higher for the corporate sector than for the overall economy. A possible explanation for this could be that the proportion of taxes less subsidies with respect to the income generated by the sector is much larger than this proportion for the case of the whole economy.





#### Question 4. The rate of return to capital

**Compute the time series of the rate of return with the 2008 SNA and your pre-1993 SNA proxy. Discuss your results.**

In order to obtain the rate of return on capital, I use Net Fixed Assets as a proxy variable for capital.

The Gross Domestic Product can be calculated as follows:

$$GDP = r \cdot k + w \cdot h$$

Therefore, we can compute the rate of return as:

$$R = (GDP - LS \cdot GDP) / k$$

As we can see in the graphs the rate of return obtained under 2008 SNA is a bit higher than the rate obtained under de 1993 SNA, due to the fact that the GDP under the new definition is minimally higher than under the old since it not contabilizes the IPP. Therefore the numerator under the new normative is higher, obtaining a higher rate of return.

Under both normative the time path is very similar. After 1929 it decreases significantly, due to the great depression. The same occurs from 2005 until 2009, when it starts to recover again.

