Quantitative Macroeconomics
**Homework 1**

Labor market and COVID
Santiago Albarracin

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causing coronavirus disease 2019 (COVID-19), was declared a global pandemic on March 11, 2020. In response to this pandemic, different country worldwide implemented social distancing measures and strict quarantines between the population. The effect of the disease and the different measures of response from the countries affected the global and national economy, this paper tries to study some of the variables that suffered a direct shock from this particular situation. For the present analysis we use the information provided by the IPUMS CPS harmonizes microdata from the monthly U.S. labor force survey and the Current Population Survey (CPS), we concentrate our analysis in the years 2019 and 2020 for checking the importance of the economic shock.

1.1 Monthly employment rate in the U.S.

The labor market where one of the principal economic variables that suffered an important shock. Like we have explained before the main impulses of economic disorder (disease and quarantine) affected directly the employment rate. In the present analysis we study the employment rate of the U.S.

Like we can see in the next graph, the employment stability of the U.S. before Covid-19 was fluctuating between 95% and 97%. This mean the country presented an unemployment rate of only 3-5, data that is really noticeable, taking into consideration the size of the country. But all this changed since the declaration of global pandemic, from that moment forward we can see the shock, in the month of March (3rd month of the year) we can observe how the employment rate drastically drop until achieve a lower mark of less than 87%. With this drop of the employment we can see the huge gap that represents a change of 10% from previous information. After the lowest mark, we can see how the economy starts to improve but until the last data obtained the situation remains with a gap of 5% from the pick before the pandemic.

Source: IPSUM, CPS. Own made
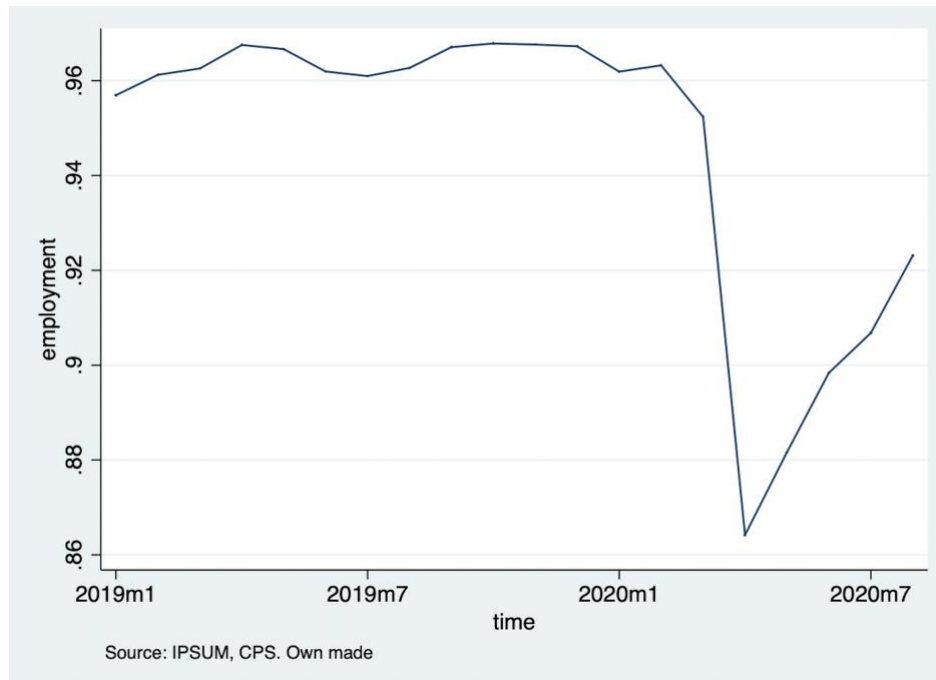
1.2 Monthly employment rate by level of education in the U.S.

For generating a more robust analysis we tried different division of the population for the analysis of employment in the U.S. In the present analysis we generate the vision by different levels of education. In the present examination we use these different thresholds:

- Less than High School. In this group we select the individuals that has a level of education lower than High School, this mean less than 12 years of study without taking into consideration the pre-escolar and special education.
- High School. In this group we select the individuals that has achieved a high school formal level of education. In this subgroup are also included the people that leave the college or undergraduate studied incomplete.
- College. In this group we select the individuals that has achieved a minimum level of graduation from college. Normally in the case of U.S. this means 15 years of formal education (taking into consideration that college is completed in 3 year of study)
- More than College. In this group we select the individuals that has a level of formal education greater than a college degree. This subgroup collects all the people that has a level of postgraduate education.

In the present plot we can observe how the employment rate was affected in a different magnitude taking into consideration the different education that the groups have achieved. Firstly, it's easy to observe that before the pandemic the level of employment was directly affected by the level of education, because with higher education the probability of being employed was higher. This situation is replicated when we take into consideration the time lapse in which the pandemic was in their higher pick, in this situation we

can see how the less educated group suffered a drop in 15 percentual point in contrast with the drop of only 1.5 percentual points that the people with higher education experienced.


Source: IPSUM, CPS. Own made
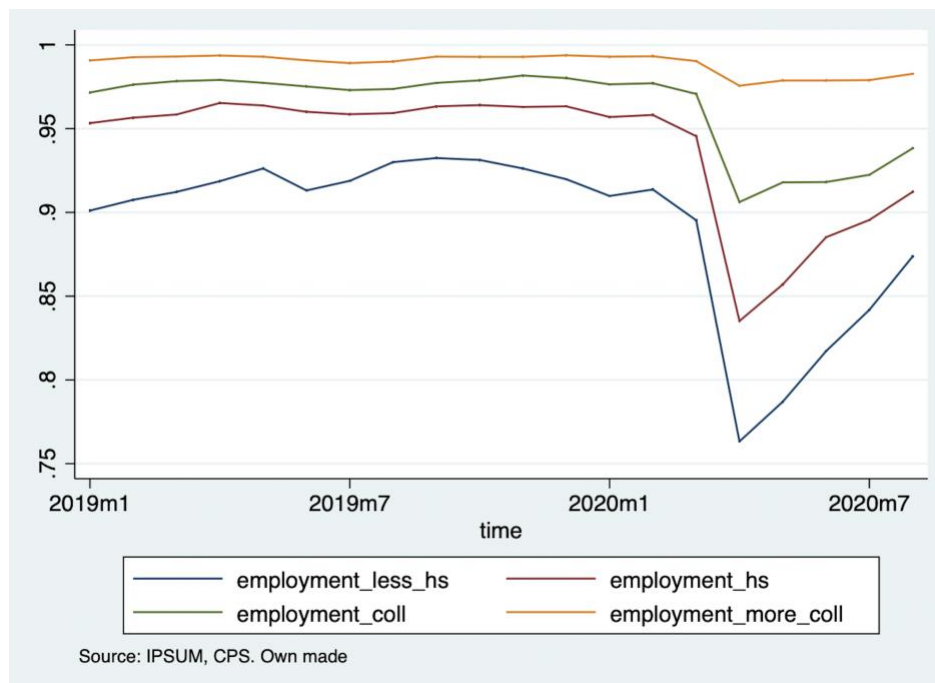
1.3 Monthly employment rate by industry type of work required in the U.S.

For better understanding of the labor market in the U.S. and how the Covid-19 pandemic affected the employment rate we divide between the type of employee that the different industries in that the country has. In the attachment we make the next division:

- Physical employment. In this subgroup we concentrate the different personnel that make their work with a more physical tiredness. This type of work in merely presential by the workers due to the physical labor that they implement in the industry.
- Intellectual employment. In this subgroup we concentrate the different employees that exercise a more intellectual work for the enterprises or organizations. In this group we agglomerate a more professional type of work, work that is characterized by the intellectual use of tools. This work some time does not require physical presence in exchange this means that the worked don't need to be in a certain location on the contrary their work can be transferred thank to different technological connections.

Before the pandemic evaluation we can see how the physical work was more stable than the intellectual work, this can be explained because most of the physical work were more focus on necessary workers than the intellectual work. But this stability is completely contrasted in the pandemic period. Like we can observe in the next graph, the physical workers presented a significantly higher reduction of employment in the crisis stage, this would be explained thanks to the evolution in telework. In the present year the expansion of teleworkers thanks to the Covid-19 crisis exploited un a significantly manner, this was

because of the lack of need from the intellectual worker of a presential in office work, in contrast these types of employees never stopped working from home without regarding the quarantine situation.


Source: IPSUM, CPS. Own made
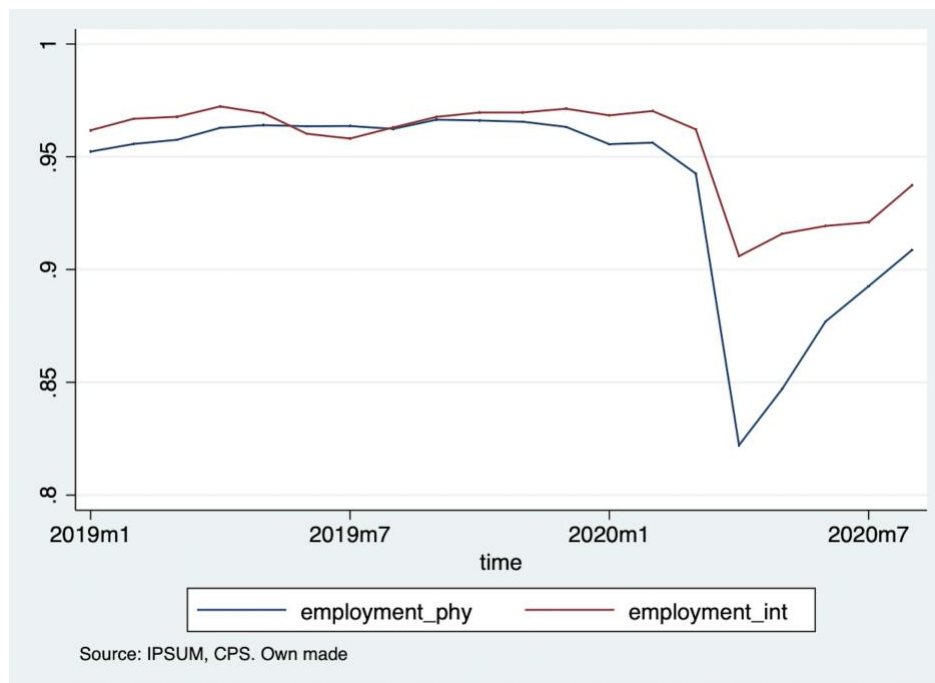
1.4 Monthly employment rate by occupation type in the U.S.

Continuing our exploration, we made another division regarding the type of occupation that the personal has. In this subtitle we try to generate different types of subgroups dividing them in:

- Private office employees. In this subgroup we selected the personnel that has works in the private sector but maintain a more in office approach.
- Public office employees. In this subgroup we selected the personnel that works in the public sector but maintain a more in office approach.
- Field workers employees. In this subgroup we selected both types of employees (private and public) but that exercise a in field work for the institutions in which they work.

In the present graph we can check the different sensibility that each of the previous subgroups had with the pandemic shock. We can prove that the private in office employee are the ones that have a lower effect from the pandemic, this can be explained by the big transition to the teleworking that the private enterprises had. In second place we can check the In-field workers, these types of workers where propense a suffer a constraint thanks to the pandemic but because most of them realize necessary work they level of unemployment where the second grater. Finally, we can observe the shock level that had the public in office workers, in contrast of other countries the dismissal of staff was not prohibited, in response to this the level of unnecessary workers in the public sphere where reduced.

Source: IPSUM, CPS. Own made
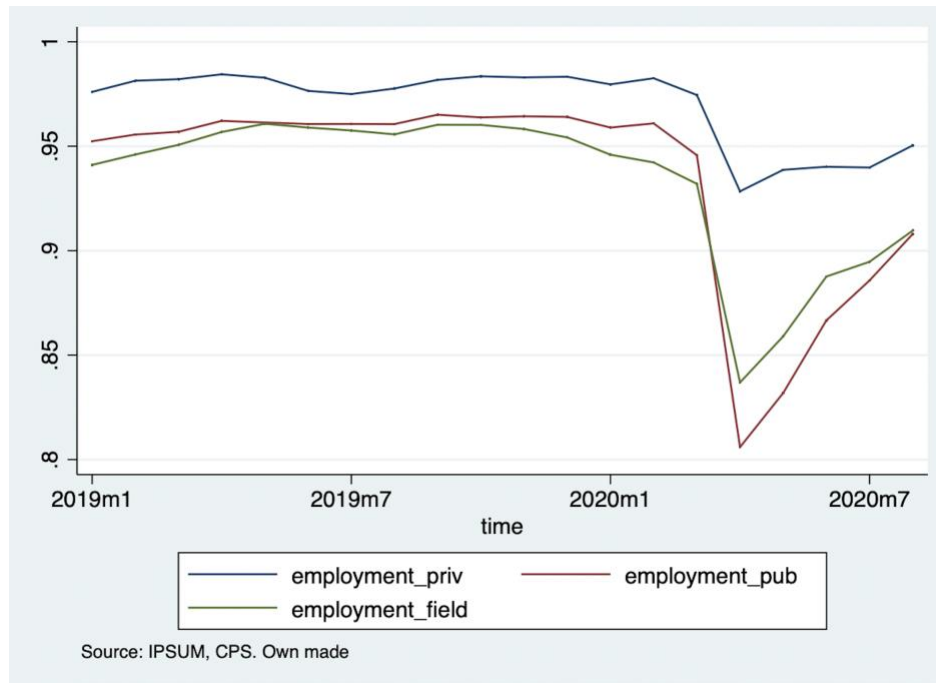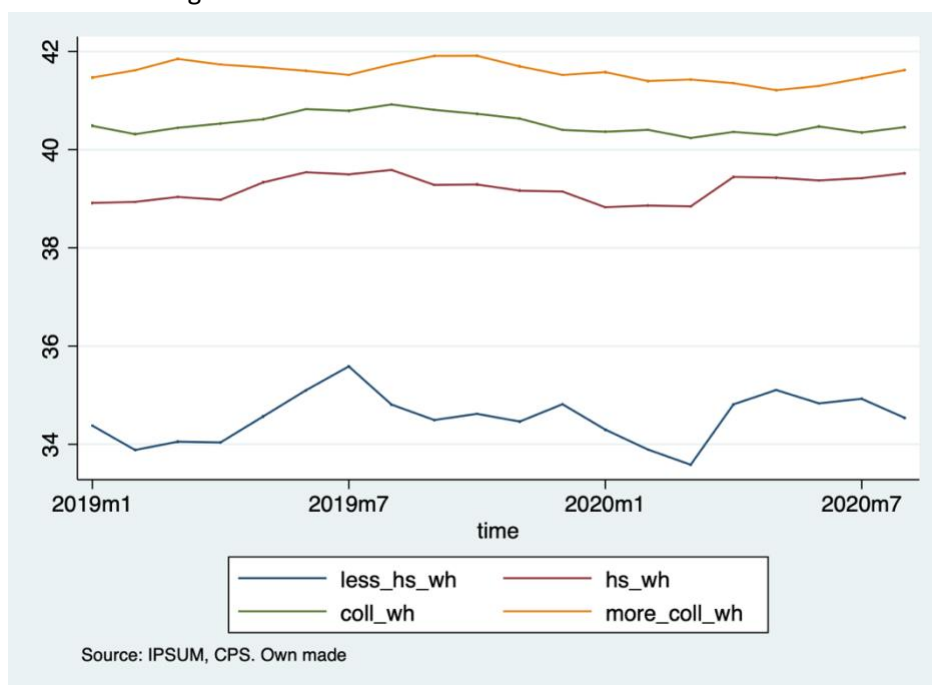
2.1 Average weekly hours in the U.S.

Other important variable to study is the average weekly hours worked by the people in labor age. Like we have explained before we want to check the impact of the main impulses of the economic disorder (disease and quarantine).

In the next graph we can observe the total average weekly hours analysis. Like we can see the sensibility of this variable with respect of the pandemic crisis was completely different to the one given by the employment. In this case the average weekly hours apparently go up, but this effect is in less than 1 percentual point. Additionally, we can observe how this type of comportment was similar to the one in 2019.

Source: IPSUM, CPS. Own made
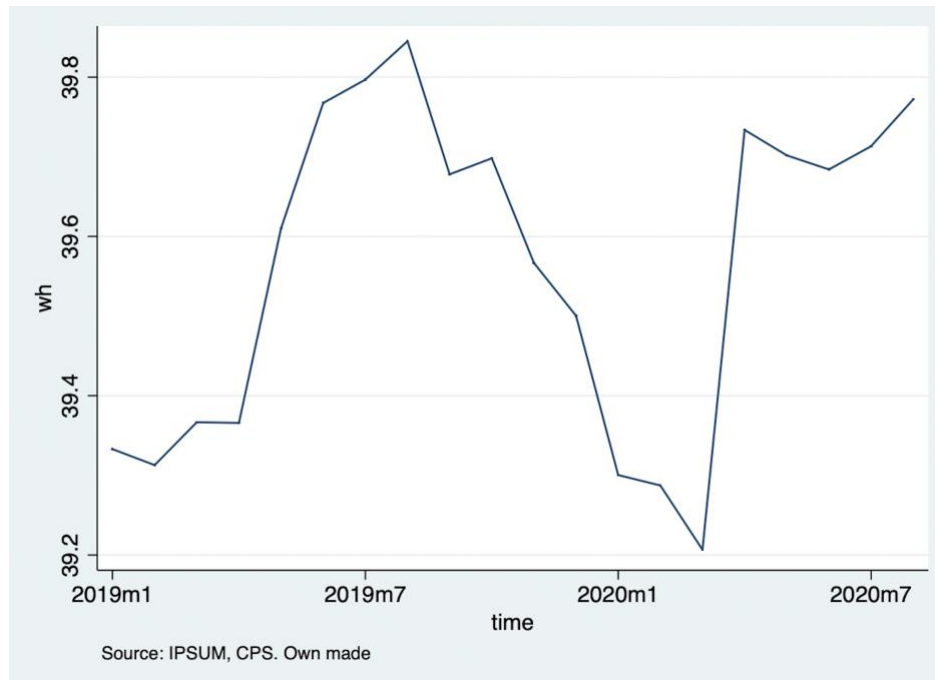
2.2 Average weekly hours by level of education in the U.S.

In the evaluation of the average weekly hours concentrated by the same levels of education generated before we can conclude that the effect of the Covid-19 crisis was not significant, less than 1pp in each case. We can observe how the time of hours worked is correlated with the level of education that the worker has. Higher education, higher hours worked. Besides this, we can observe that with lower education the volatility of this variable is higher.


Source: IPSUM, CPS. Own made

2.3 Average weekly hours by industry type of work required in the U.S.

In the present estimation we can conclude that with the division corresponding to type of workers required the effect of the current situation remains insignificant with the variable. Besides that, something interesting that we can observe is that in the case of more intellectual workers, the volatility that the average weekly hours have is not that important like in the case of physical workers. Maybe this can be explained with help of the previous graph and that the education and type of worker are correlated in most of the cases.

Source: IPSUM, CPS. Own made
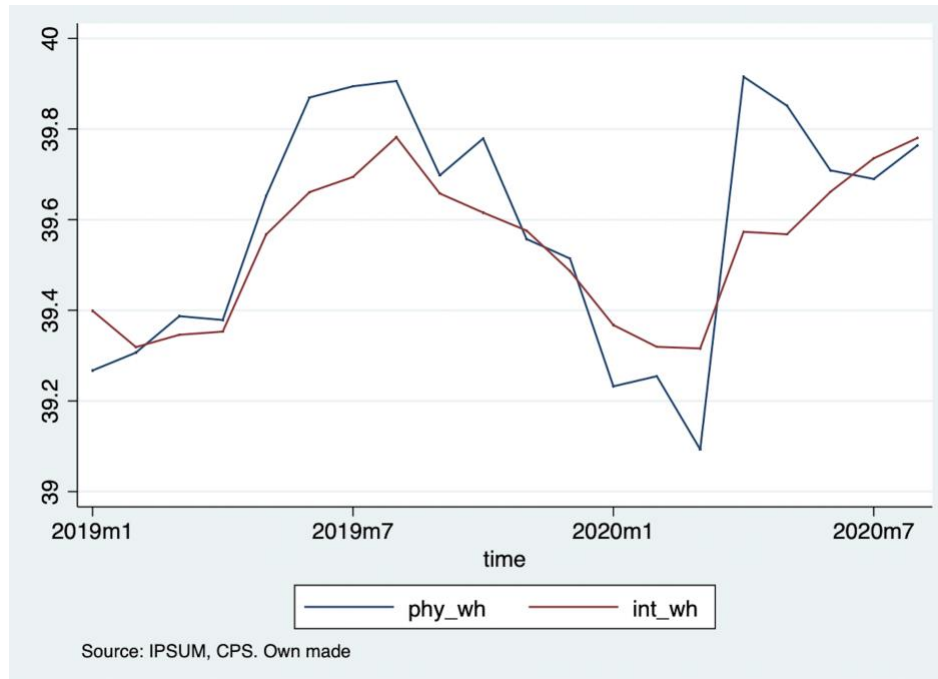
**2.4 Average weekly hours by occupation type in the U.S.**

When we make the division corresponding of the occupation type of worker, we can observe how the public in office worker has the lower working hours. This observation maybe possible due that in the case of public institution the policy of control of weekly hours is stricter than in the case of private organization. There is lower overworking schedules. Strangely in the case of public in office workers we can se and upward change, maybe this is due to the necessity of public services during the pandemic, essentially in the case of health care.

Source: IPSUM, CPS. Own made
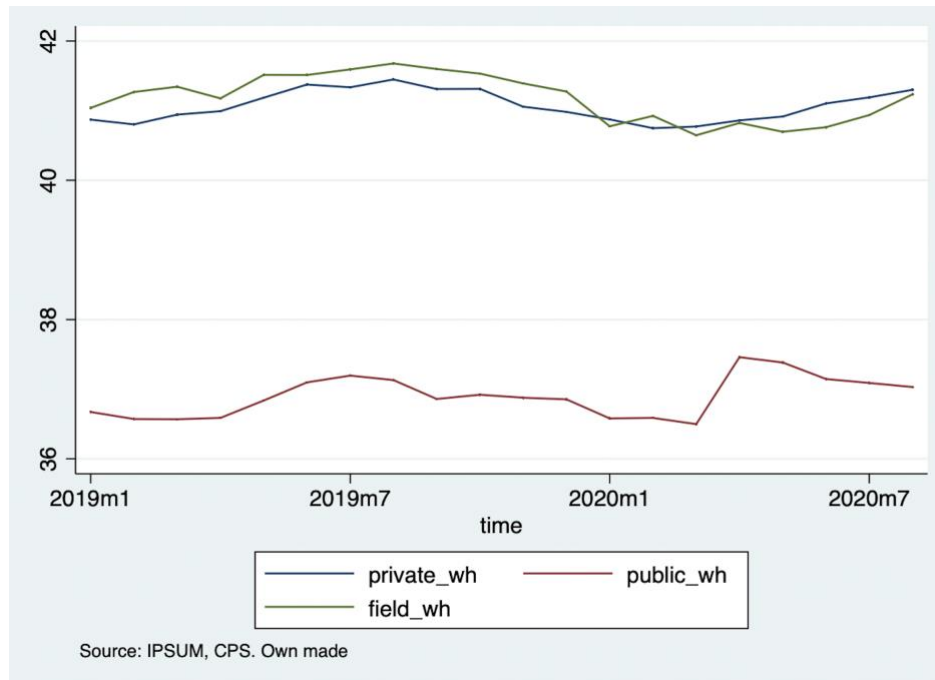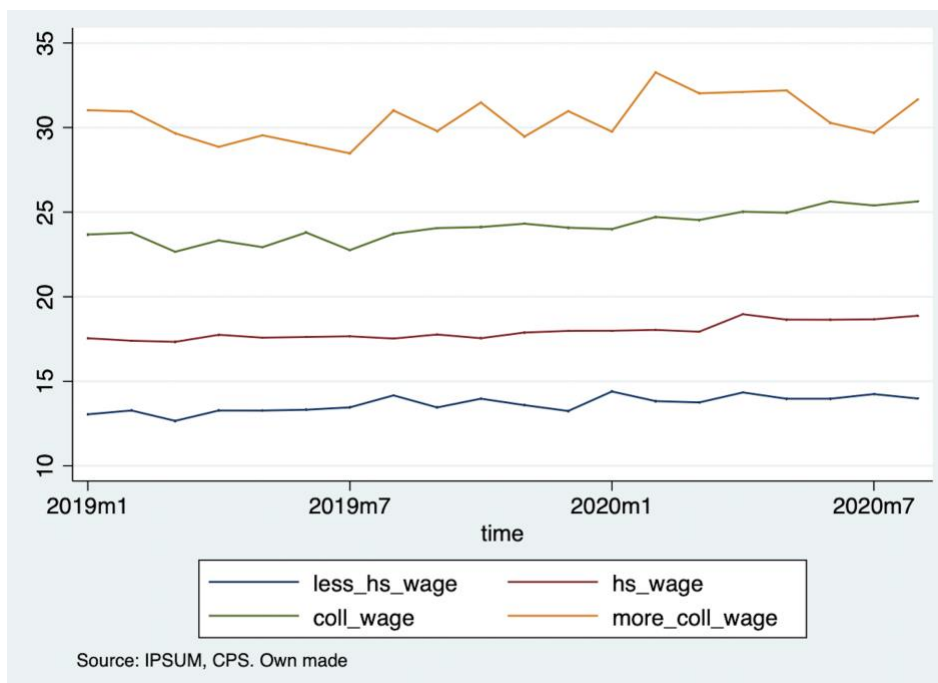
4.1 Average hourly wage in the U.S.

The last economic variable that we are going to study is the average hourly wage. In the next subtitles we want to explain if there is any change in this variable in the period studied (2019 to 2020) to check if the Covid-19 pandemic affected the wage of the laboral force.

In the general context we can observe how the average hourly wage maintain an upward behavior in the last year. With respect of the studied shock, we can see that it affected presenting some lower point in the month of March and May, but this constrained values where improved in both cases.

Source: IPSUM, CPS. Own made
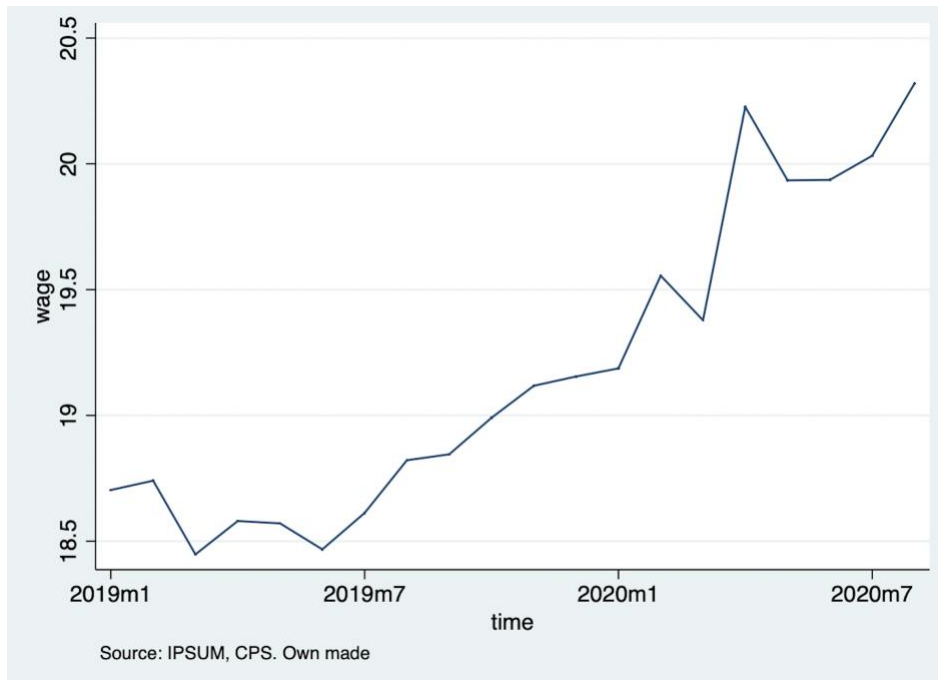
4.2 Average hourly wage by level of education in the U.S.

Exanimating the variable making some division according to the level of education, we can observe how the level of formal education and the hourly wage are correlated. This behavior is highly explained in the economic literature. On the other hand, we cannot see a significant effect of the pandemic over this variable by an education division.


Source: IPSUM, CPS. Own made

4.3 Average hourly wage by industry type of work required in the U.S.

In this estimation we can conclude that with the division corresponding to type of workers required remains insignificant with the variable. We can observe that the volatility of wage is similar in both cases. But there is the gap between physical and intellectual worker like in the previous analysis.

Source: IPSUM, CPS. Own made
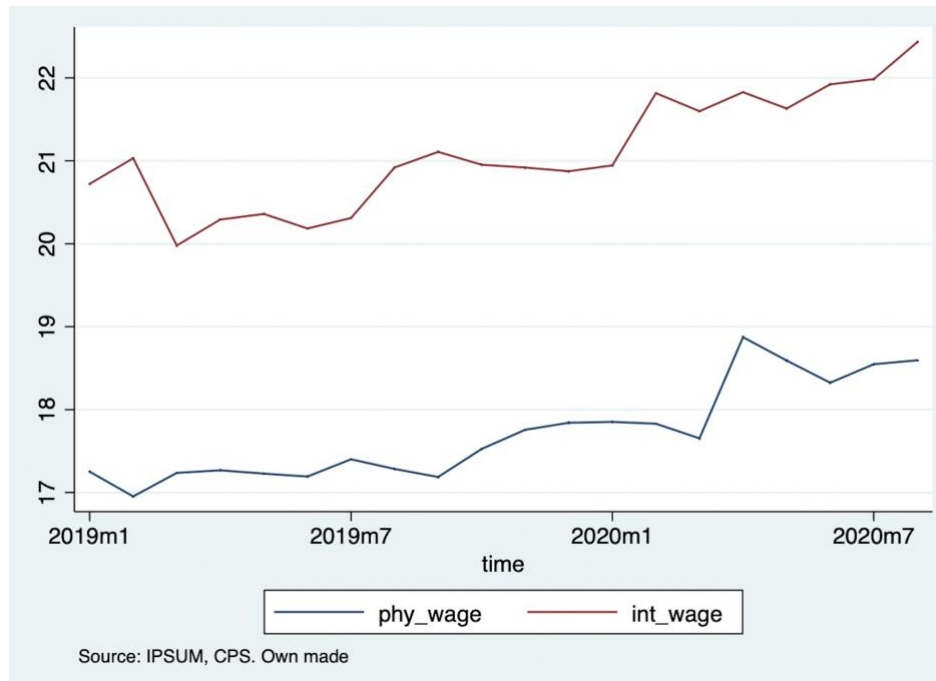
4.4 Average hourly wage by occupation type in the U.S.

With the aggregation by the occupation type of worker, we can observe how the public in office worker has the lower salary of all the studied groups. This observation maybe possible because in the private sector an field work the salary is considerate with concordance of the productivity of the individual, situation that produces a higher stimulus for better work that repercuss in higher wages.

Source: IPSUM, CPS. Own made
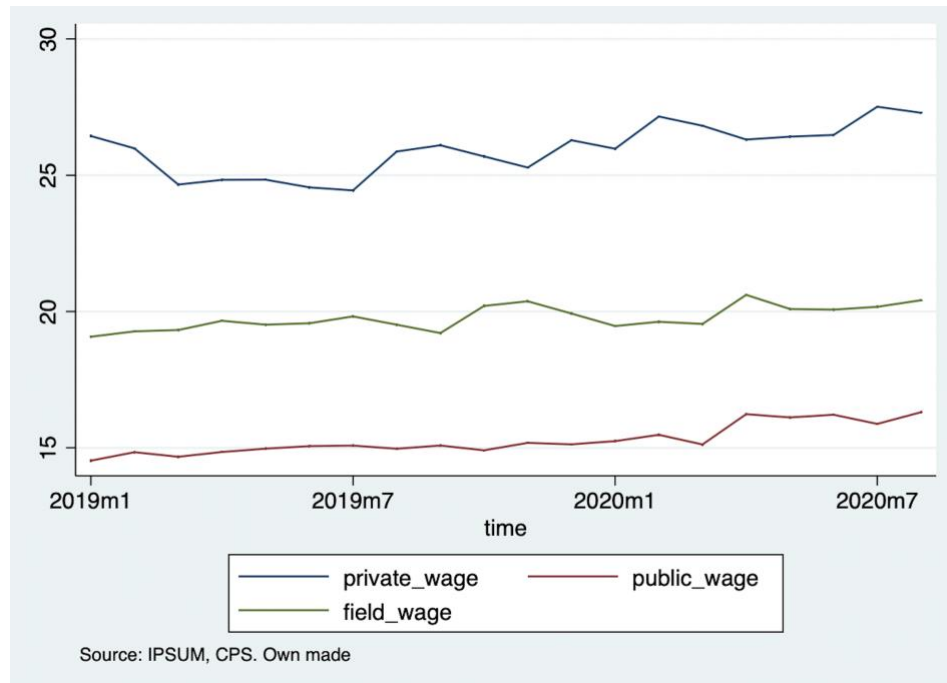
5.1 For my country, Bolivia.

In the case of Bolivia, the National Institute of Statistics (INE, for their name in Spanish), does not obtain information with that much frequency like in the U.S. In the case of Bolivia, the household surveys are collected only one time a year, problem that makes impossible to compare the situation by monthly evolution. Additionally, the Household survey is conducted from June to October that mean that the information of the survey is not available. Usually it's available in the first month of the next year of the survey.