Quantitative Macroeconomics

Homework 1.

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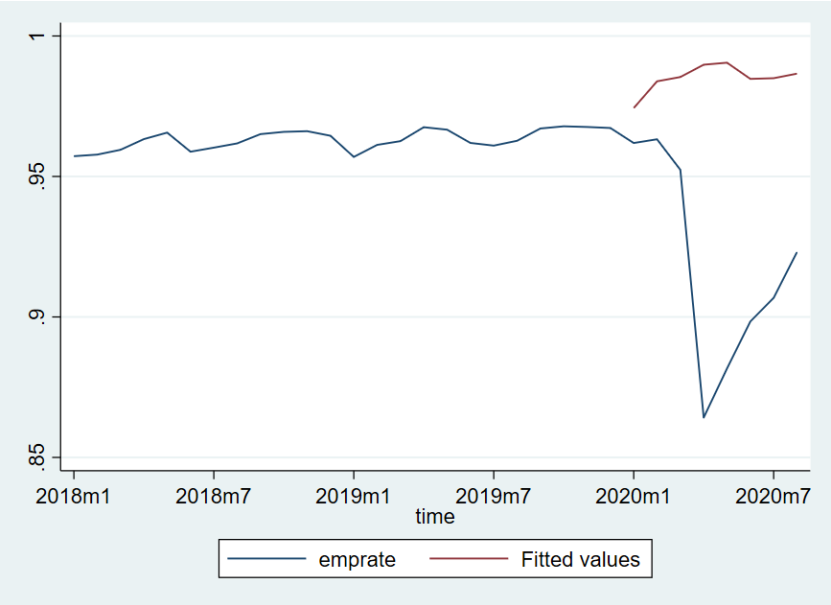
Excercise 1 (i) Figure 1 shows evolution of monthy employment rate. Red line represents prediction of employment trend as if Covid-19 not ocurred. In middle of Covid pandemic employment rate achieved its minimum at level approx 20 percentage points lower than predicted. Accorind to latest data, employment rate recovered half of its reduction.

Figure 1: Employment rate



(ii) Figure 2 shows employment rate of people who graduated from high school (HS emprate) and did not (nonHS emprate). Fitted values represent forecasts of employment rates as if Covid-19 did not ocurred. This shock is much more severe for those who did not graduated from college, as employment rate non high school graduates dropped more than 15 percentage points, while employment rate of high school graduates dropped by less then 10 percentage points, comparing to predicted trend. However employment rate for non high school graduates recovers faster.

Figure 2: Employment rate vs High school education

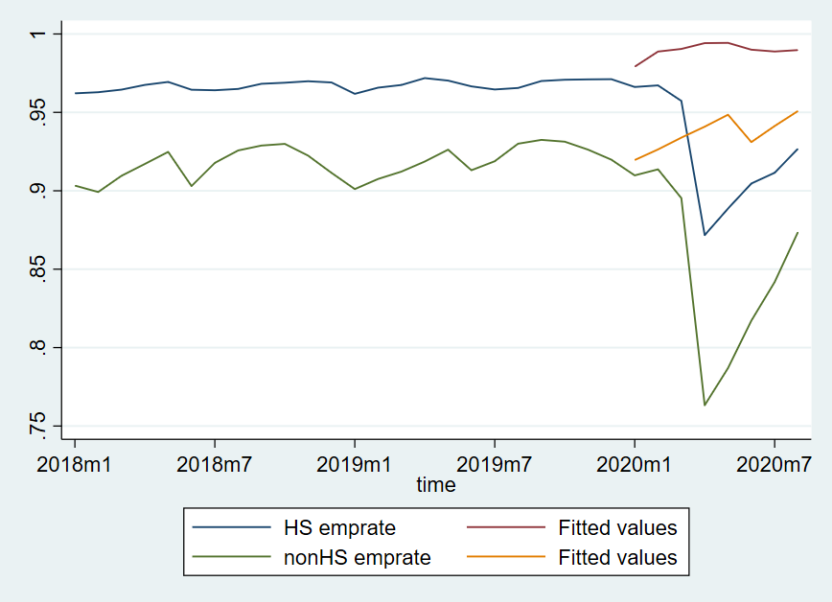
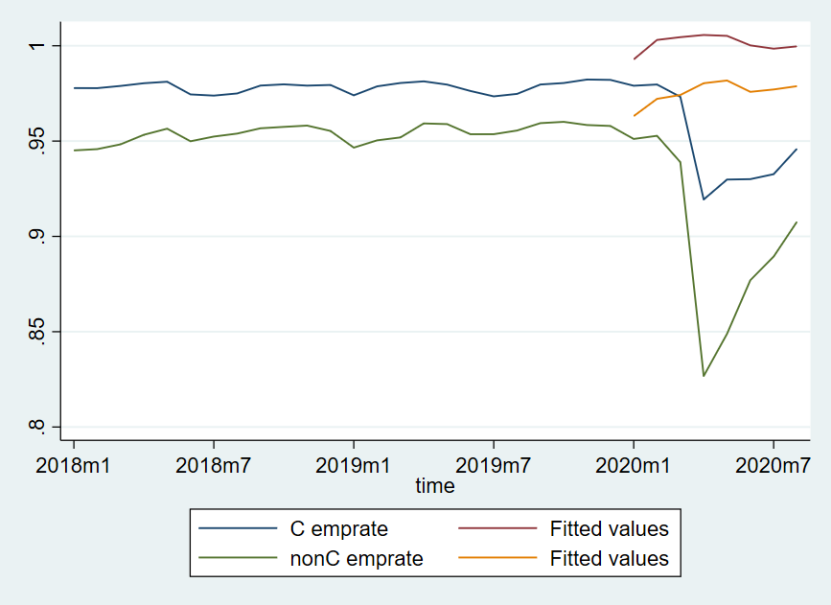


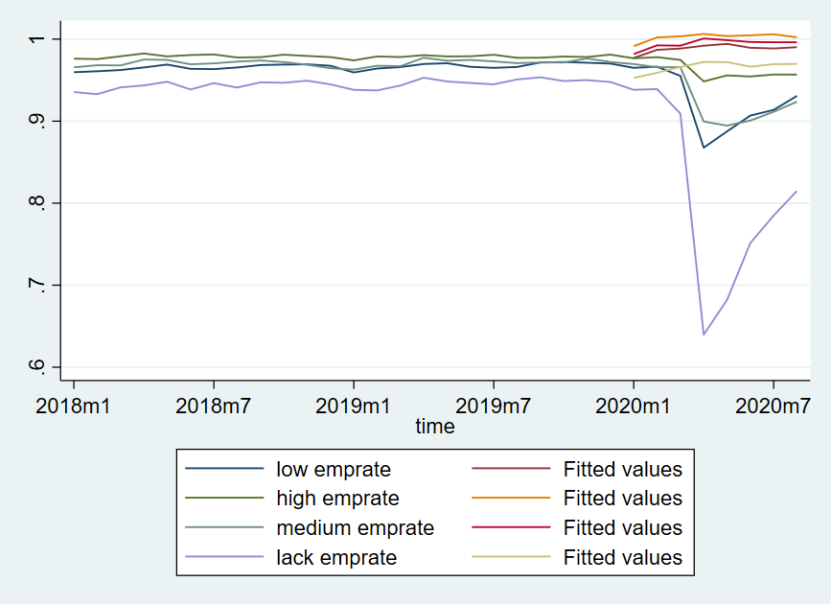
Figure 3 presents analogous employment rates but now for college graduates and rest. I include people in college graduate group if they have at least bachelor title. Trend are similar as in Figure 2 - better educated group of college graduates suffers less Covid-19 shock than those who have not obtained bachelor degree. Employment rate for latter group recovers faster.

Figure 3: Employment rate vs College education



(iii) Figure 4 shows employment rates for four industry groups. Each industry groups was selected using data from IPUMS about time use, praticularly according to question about ability to work from home. I obtained fraction of people that think that they are able to work from home for each major industry group. Then industry groups were determined basing on that fraction. Those who have high ability to work from home almost did not suffer from Covid-19 shock. In the worst situation ale people who has no possibility to work from home as lack emprate dropped dramatically, but now it recovered about 15 percentage points.

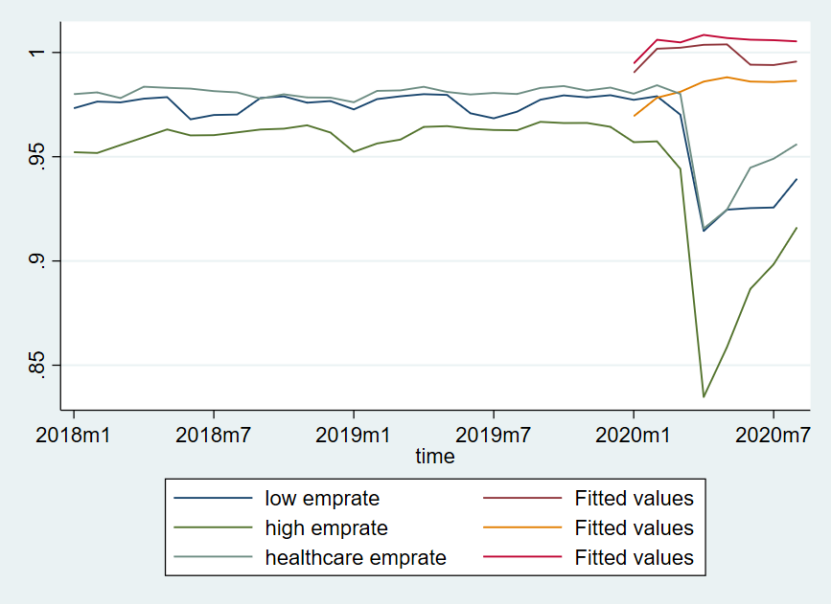
Figure 4: Employment rate vs ability to work from home



(iv) Figure 5 displays employment rates according to occupation groups. Selection of occupation groups

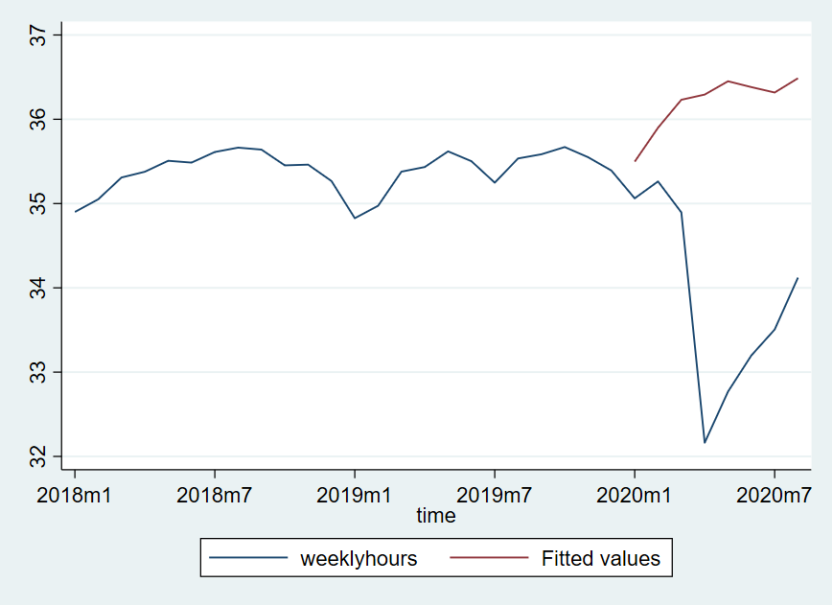
are based on survey from Washington which describes infected people (link: Washington research). One of criterions was occupation. Fraction of infected people was attached to basic CPS data. It is not representative for whole US (information colleted only in Washington), however it gives empirical probability of being infected with coronavirus. There are three groups: people with low and high probability of being infeted and separate group for healthcare occupations. The latter group is created because working in helath care should increase chance of being ill fo Covid, however these people probably should not loose that much jobs since healthcare is essential during corobavirus pandemic.I think that people with higher risk of being infected will not be economically active in such degree as it was before pandemic, at least for time of pandemic. Their behavior may be important for revcovery of whole economy as part of society will submit less supply and will also less work for longer time, because of the risk. People with occupations with high probability of being infected were hit severely. Health care group was hit similarly to people with low risky occupations. It may be because people in healthcare must work besacue of pandemic, as it was previoysly said.

Figure 5: Employment rate vs occupation groups



Excercise 2 (i) Figure 6 shows average weekly hours worked. It diminished significantly during pandemic period, relative to predicted values (as if Covid-19 effect was not present). It dimisihed more than 4 hours in the deepest depression. Now it recovered bout 2 hours.

Figure 6: Average weekly hours.



(ii) Figure 7 prents average weekly hours according to 2 edaucation groups (High school graduates and the rest), analogously as in employment rate case. Both groups were hit with similar magnitude, however both groups almost recovered to level from before pandemic preiod.

Figure 7: Average weekly hours vs High school education.

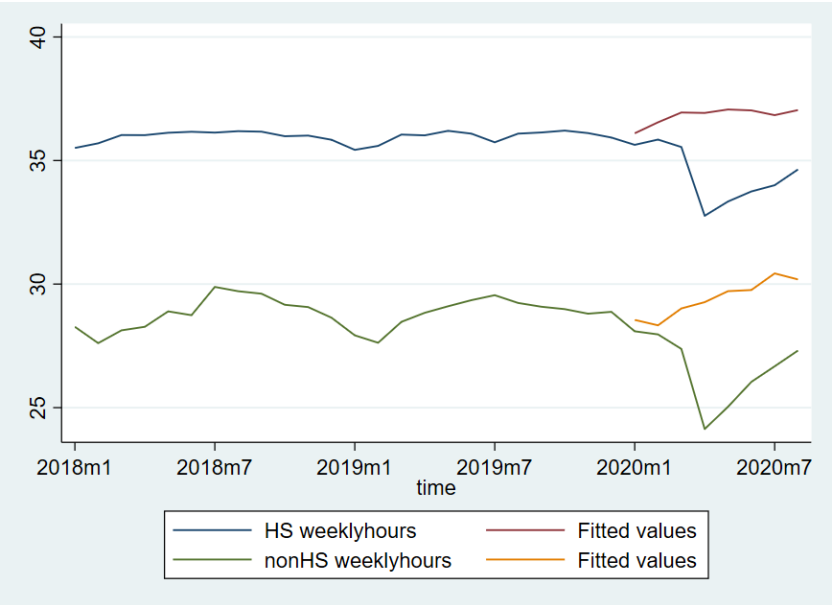
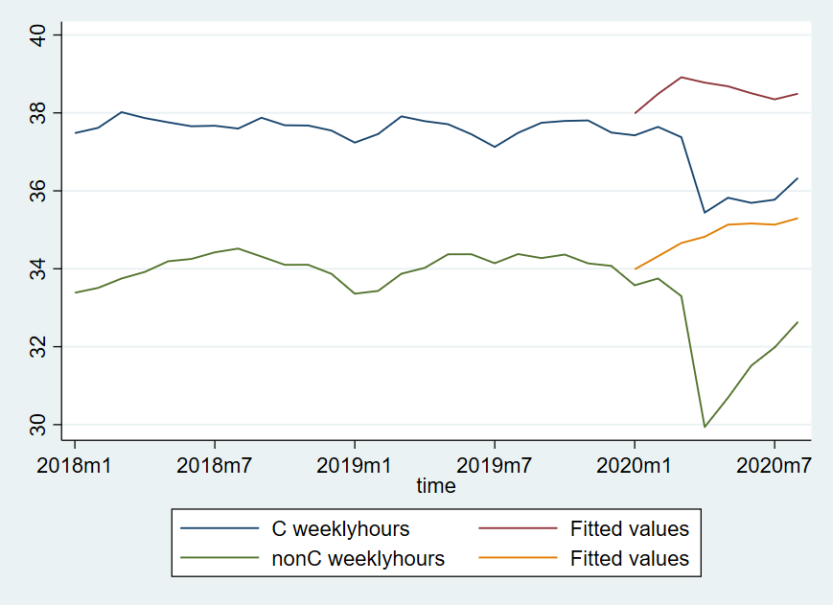


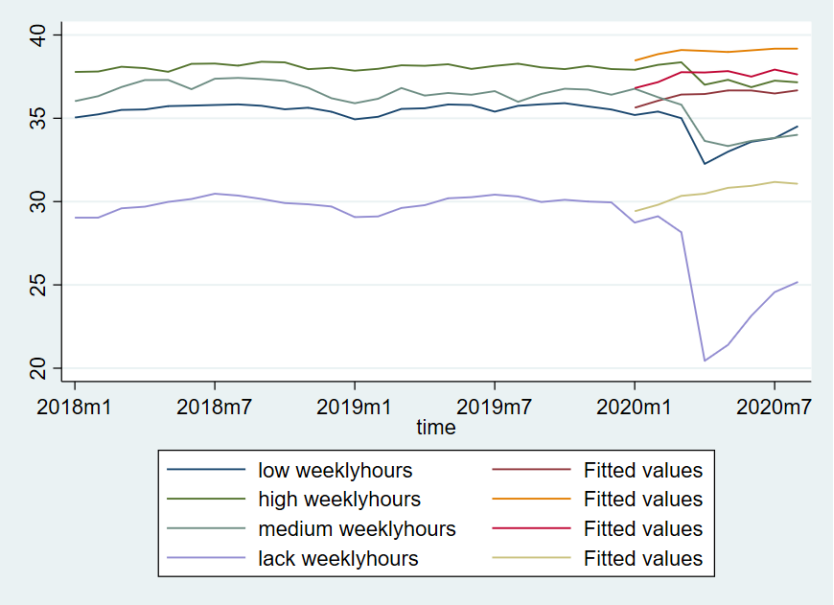
Figure 8 allows to compare College graduates and the restin terms of average weekly hours (group created analogously as in employment rate case). Non-graduates from college suffered more from Covid-19 shock and none of the groups revovered to level from before pandemic. However, non-graduates from college are coming back faster.

Figure 8: Average weekly hours vs College



(iii) Figure 9 shows average weekly hours by industry groups selected with its ablity to work from home (anologous to Figure 4). Those who cannot work from home suffered most, those who can almost did not (high group). Low and Medium groups have almost no differences so criterion of selection should be adjusted.

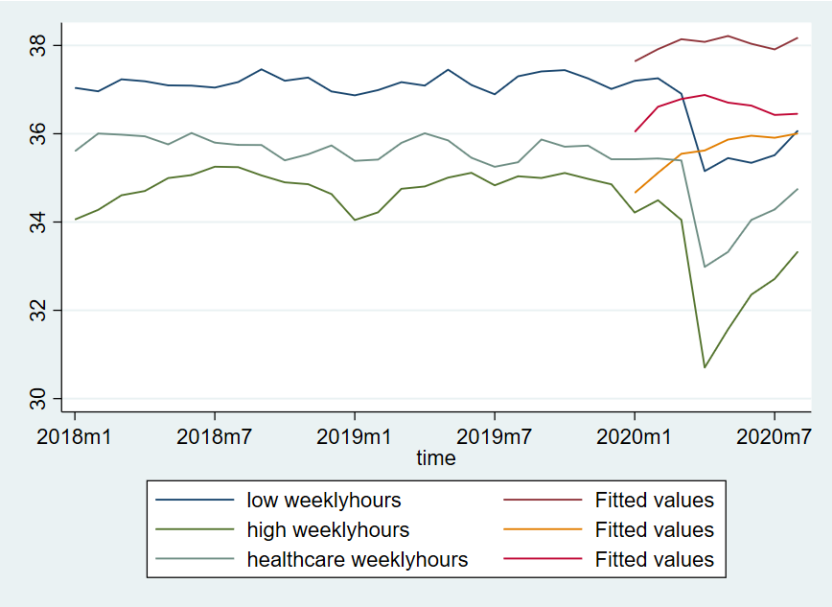
Figure 9: Average weekly hours vs ability to work from home



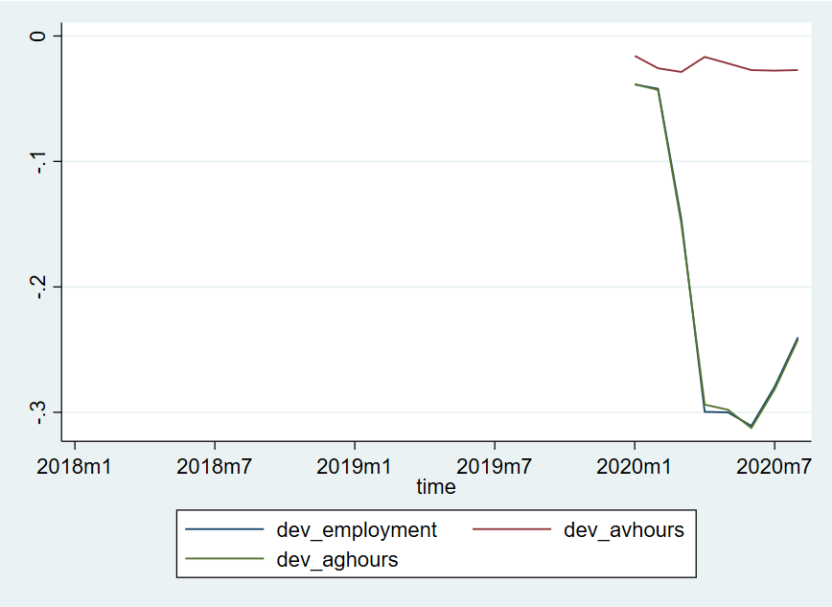
(iv) Figure 10 shows average weekly hours according to occupation groups construted basing on data about risk of being infected with Covid-19. Contrary to analogous figure with employment rate, there are significant diferences between healthcare group and low risk occupation group. It is probably that patients during pandemic did not appeared in health care units as it was before.

Most risky occupation were hitted most severely and low risk occupations reatively weak.

Figure 10: Average weekly hours vs ability to occupation

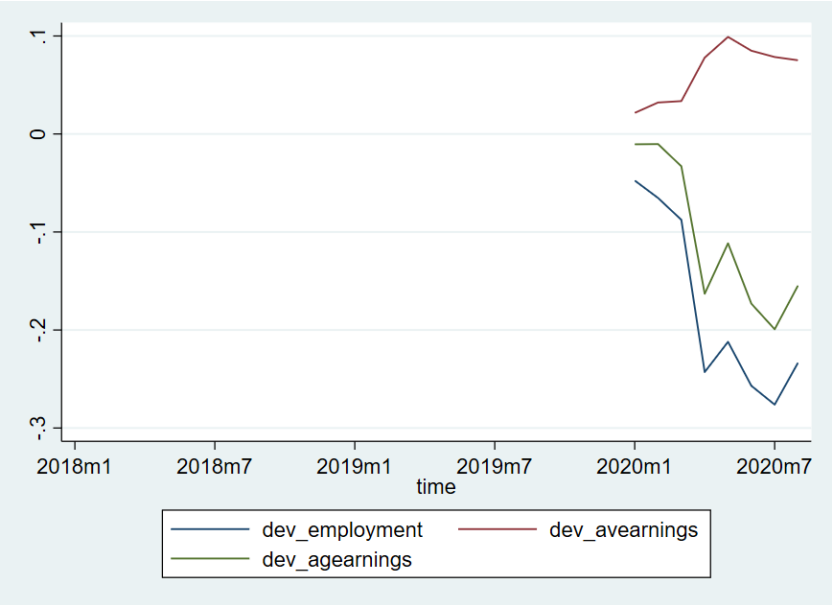


Excercise 3 Figure 10 shows percentage deviations from predicted trend for employment (dev-employment), aggregate weekly hours (dev-aghours) and for average weekly hours (dev-avhours). It may be noticed that behavior of devaition of aggregate hours it driven by behavior of employment, its plots are almost identical. Moreover dev-avhours is near to zero line which means that average weekly hours were relatively weakly affected by Covid-19 shock.



Excercise 4 Figure 11 shows percentage deviations from predited trend for employment (dev-employment), aggregate weekly earnings (dev-agearnings) and for average weekly hours (dev-avearnings). Suprisingly it indicates that average earnings even increased during pandemic as dev-avearnings is positive. Behav-

ior of aggregate earnings in majority is driven by employment decline, however positive dev-avearnings reduces the effect of negative devation of aggreate weekly earnings.



Excercise 5 In Poland there are only quaterly data about unemployment available. Moreover there is lack of public available microdata. Statistical office of Poland offers data about unemployment accoring to different criterions (industry, place of living, occupation ect.) but only at aggregated level; only percentage values for time series are available. Therefore there is no possibility to obtain such figures like in ex. 3 or ex. 4 becasue crosssecion database is impossible to build.