Residential & Workplaces

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Introduction & data

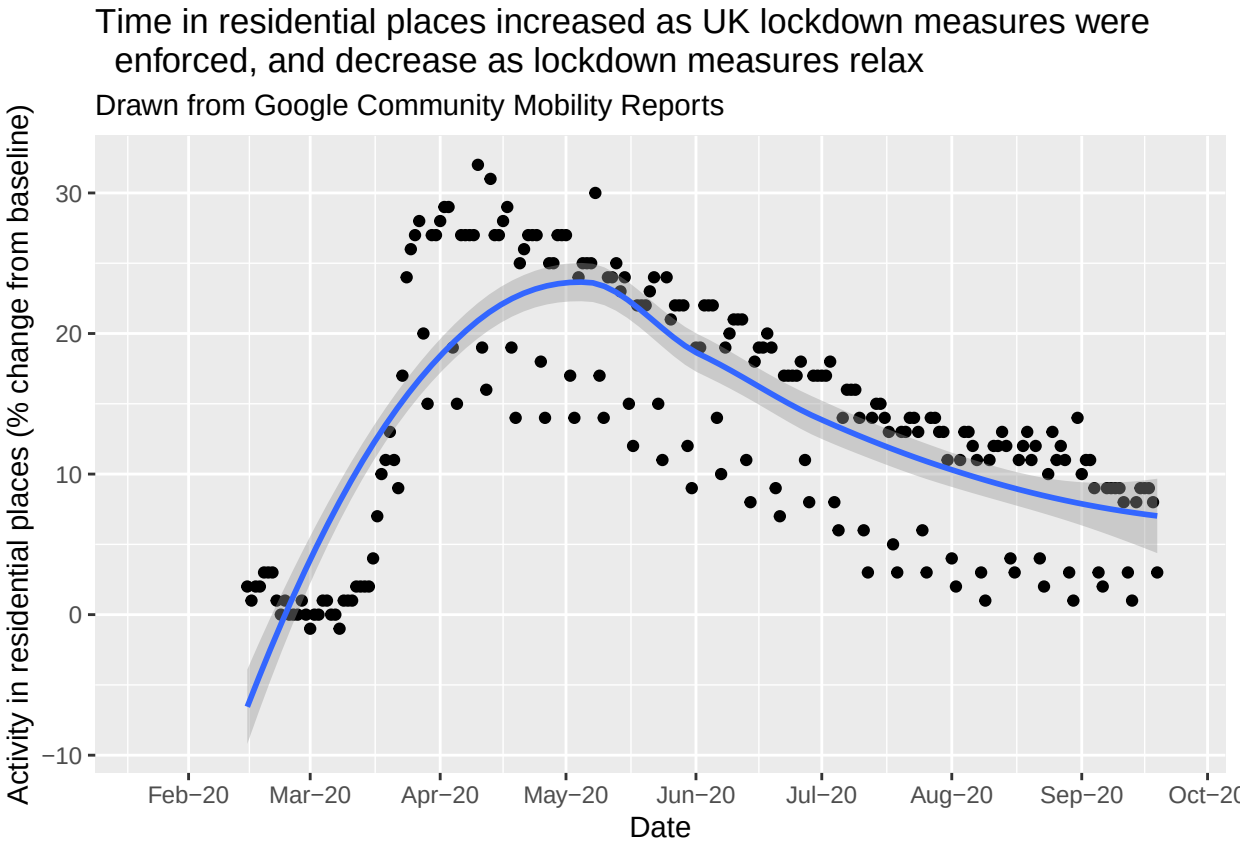
Since the large impacts of the pandemic on OmniCorp, particularly in the retail and hospitality sectors, we are interested in the effects of lockdown and other government interventions and how/why these might be different in different countries.

In the following, we will use the dataset "tidycovid19.csv", downloaded from the tidycovid19 R package on 24th September 2020. Descriptions of the different variables found in the data relating to the current epidemic and further details of the package can be found at this website (Gassen 2020).

We look at how the frequency of people visiting residential places and workplaces has changed during the pandemic for countries in Europe and America. In particular we study the `gcmr_residential` `gcmr_workplaces` variables from a community mobility report (Google, 2020). The variables are expressed as a percentage*100 change relative to the baseline period Jan 3 - Feb 6, 2020.

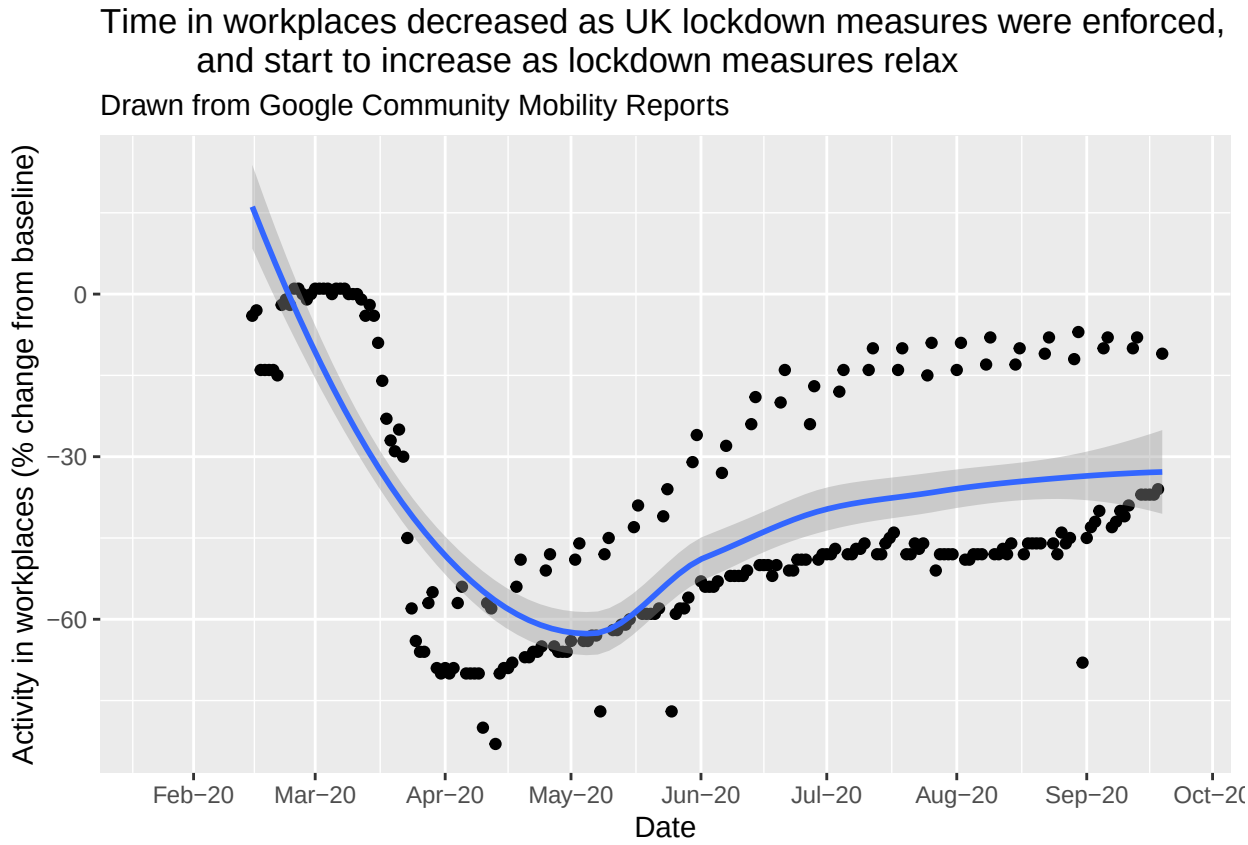
UK Data

We start by looking at how the frequency of visits to residential places has changed for UK. (need to delete one of graphs - wasn't sure if point or line graph better).



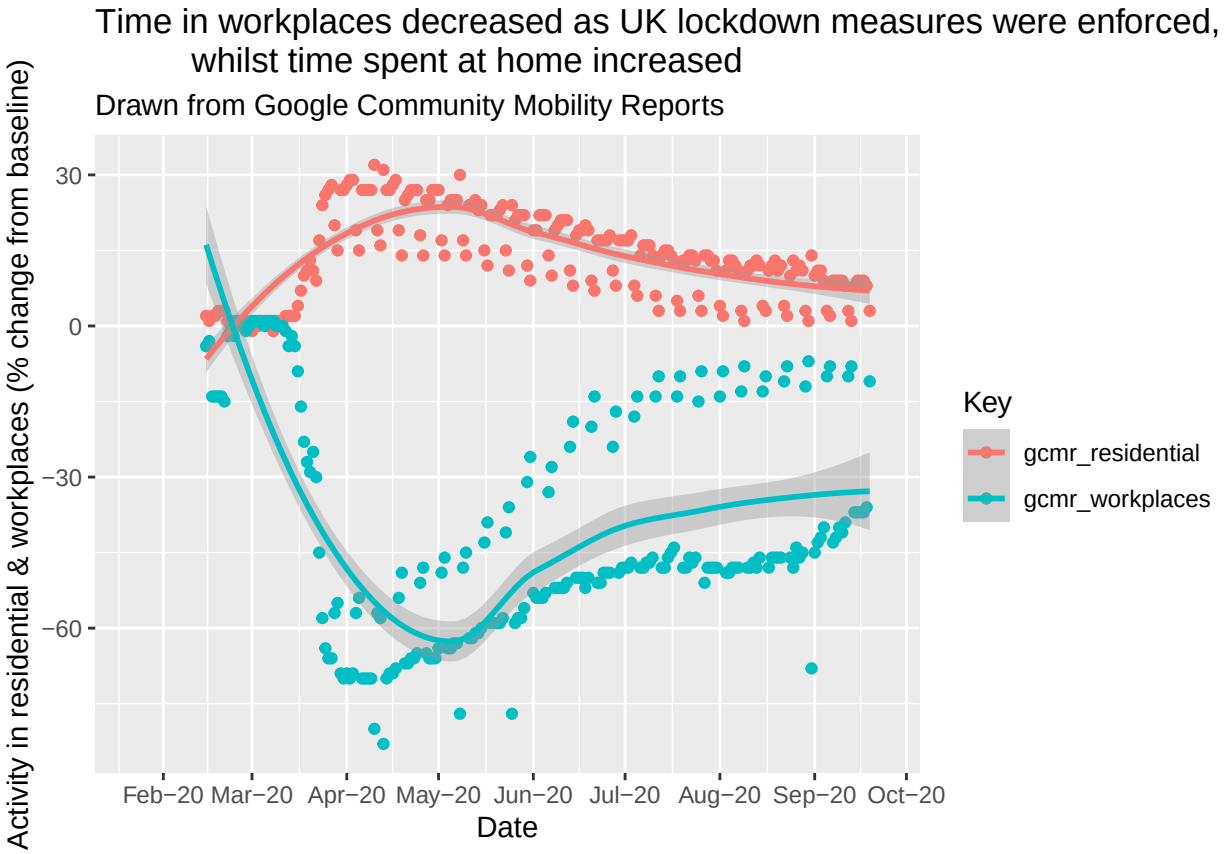
We note that there is an obvious increase in the time spent at home as lockdown is enforced on 24th March. In particular, the baseline measurement for activity in residential places is exceeded from this time onwards. However, we also see that the activity in residential places since is very volatile.

We now look at how the frequency of visits to workplaces has changed for UK. (need to delete one of graphs - wasn't sure if point or line graph better).



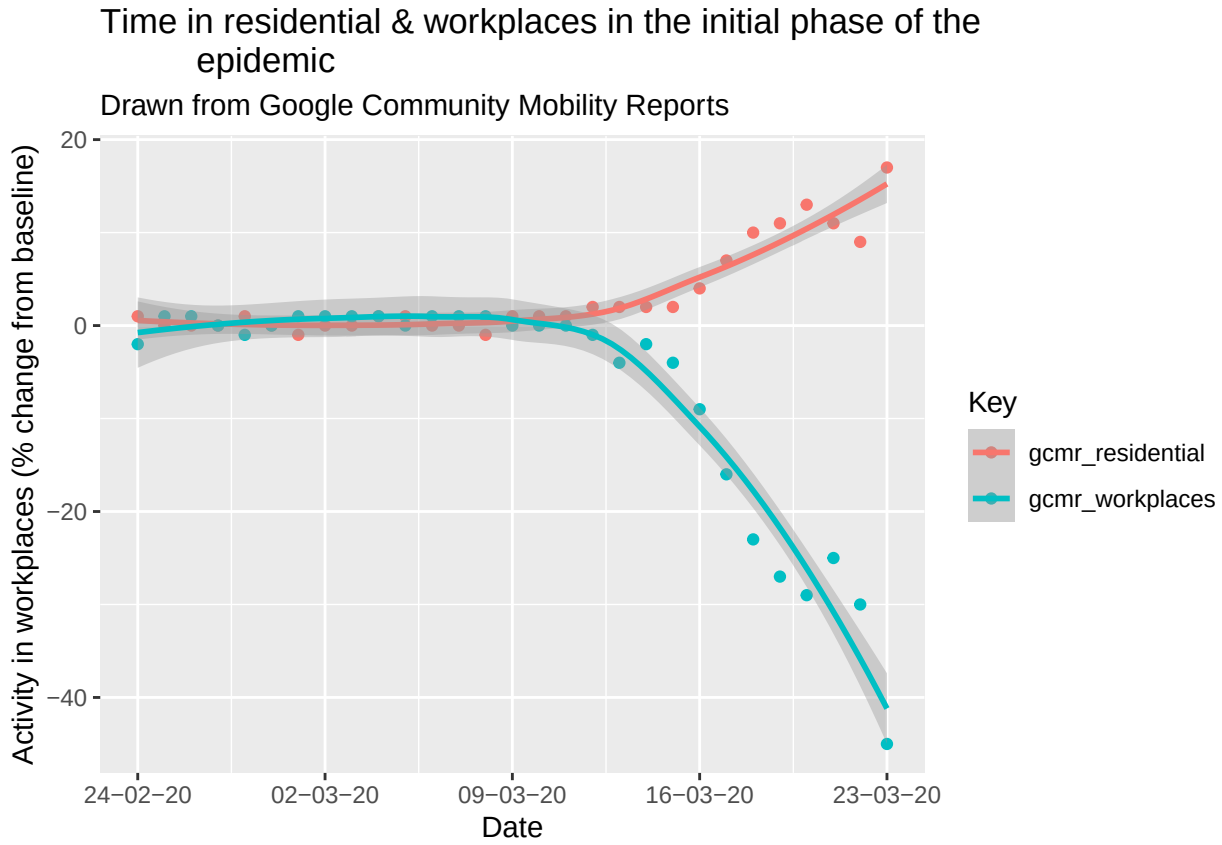
There is a dramtic decrease in the frequency of visits to workplaces since the UK lockdown is implemented on 24th March. The frequency of visits to workplaces does not recover to the baseline amount, even at the end of the time period it is far from it.

We see from these graphs that the `gcmr_residential` and `gcmr_workplaces` variables have an inverse relationship. We take a look at these variables for the UK on a single graph.



A plausible reason for this relationship is since lockdown measures were enforced by the government, everyone was asked to stay at home, and this included working from home. Therefore, a huge number of the working population were no longer travelling to work and instead remaining at home, and working remotely.

We look closer at the activity in residential & workplaces for UK in the initial phase of the pandemic. Since it is difficult to define precisely the 'first stage' of the pandemic in the UK, we look at the data from before the UK entered lockdown, 24th February - 23rd March.

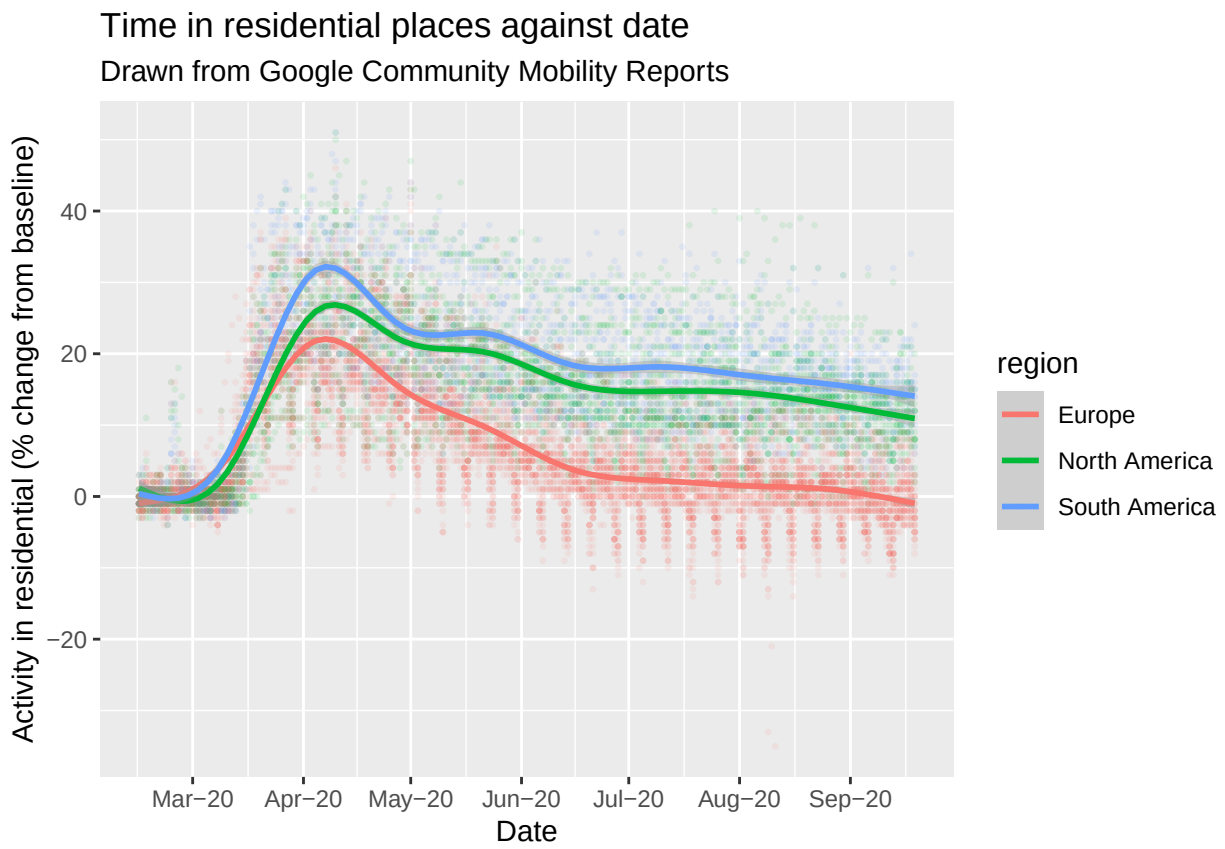


This plot confirms our thoughts of an inverse relationship between these variables.

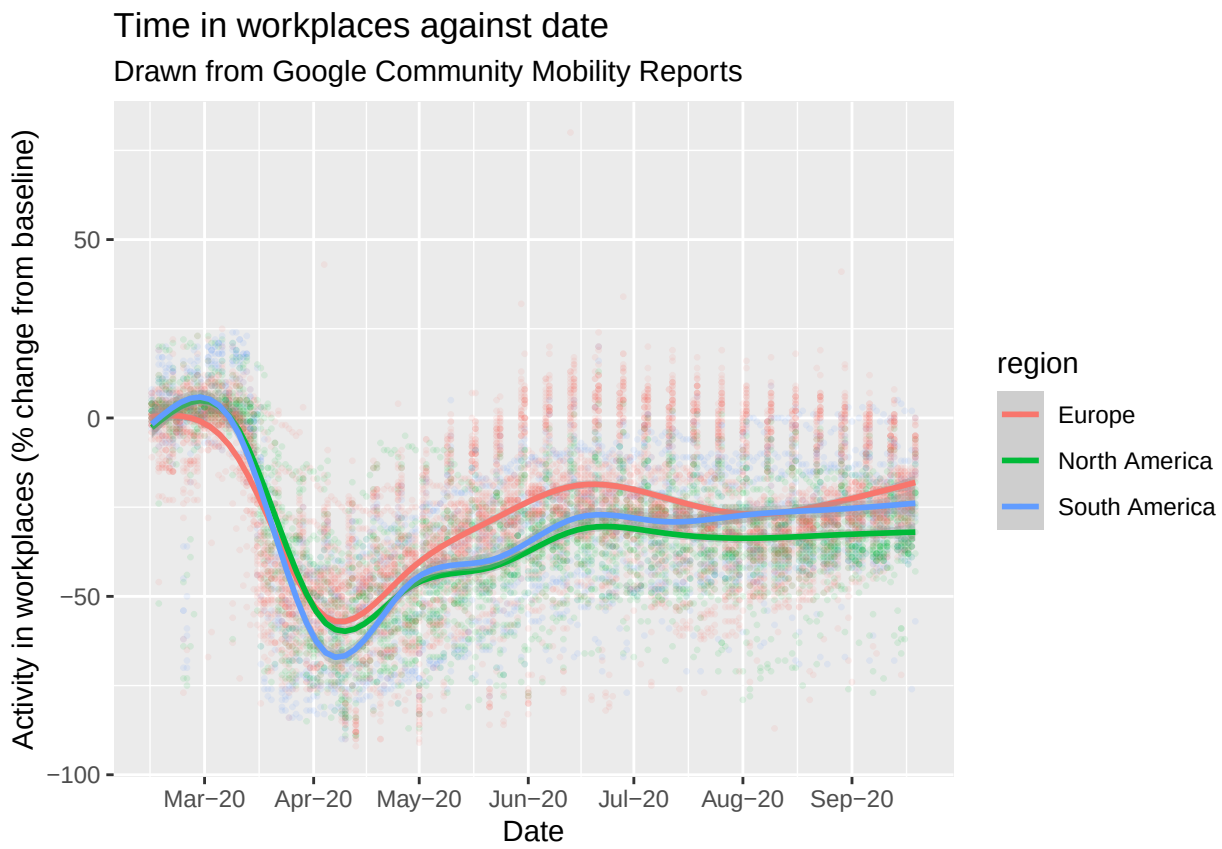
(We could try to do some modelling here??)

Europe & America Data

We now look at the frequency of visits to residential places and workplaces for countries in Europe and America. We look particularly at the trends for Europe, North America and South America against date. We remove the data points and show the overall trend of the regions

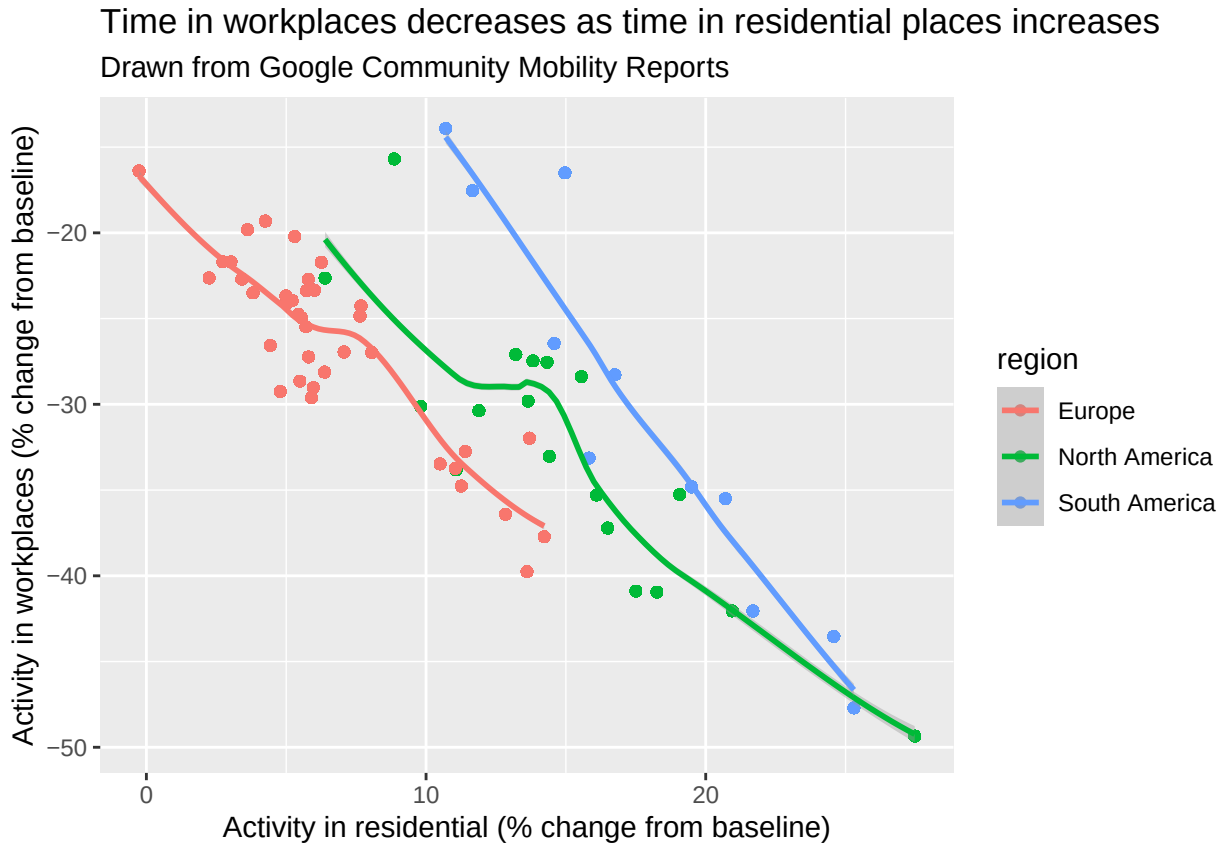


There is a huge increase in the time spent at home in all regions, with all peaks in April. The biggest spike is in South America, however this is potentially misleading since in this time period South America is in Autumn, in which people potentially stay at home more than in Spring.



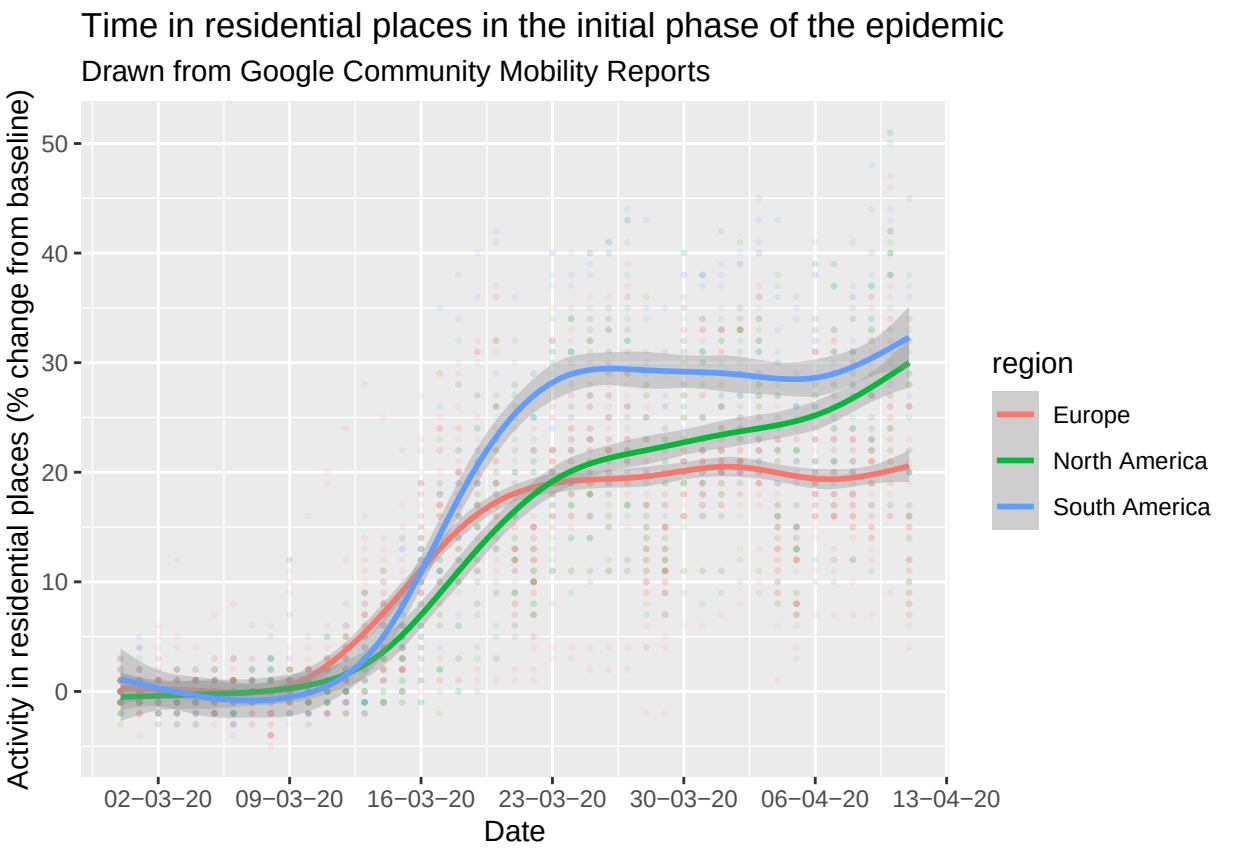
From these two plots we have the same inverse relationship between time in residential places and time in workplaces that we saw in the UK data.

We now look at the average percentage change in the frequency of visits to residential places against workplaces for countries in Europe and America from this year. We look particularly at the trends for Europe, North America and South America.

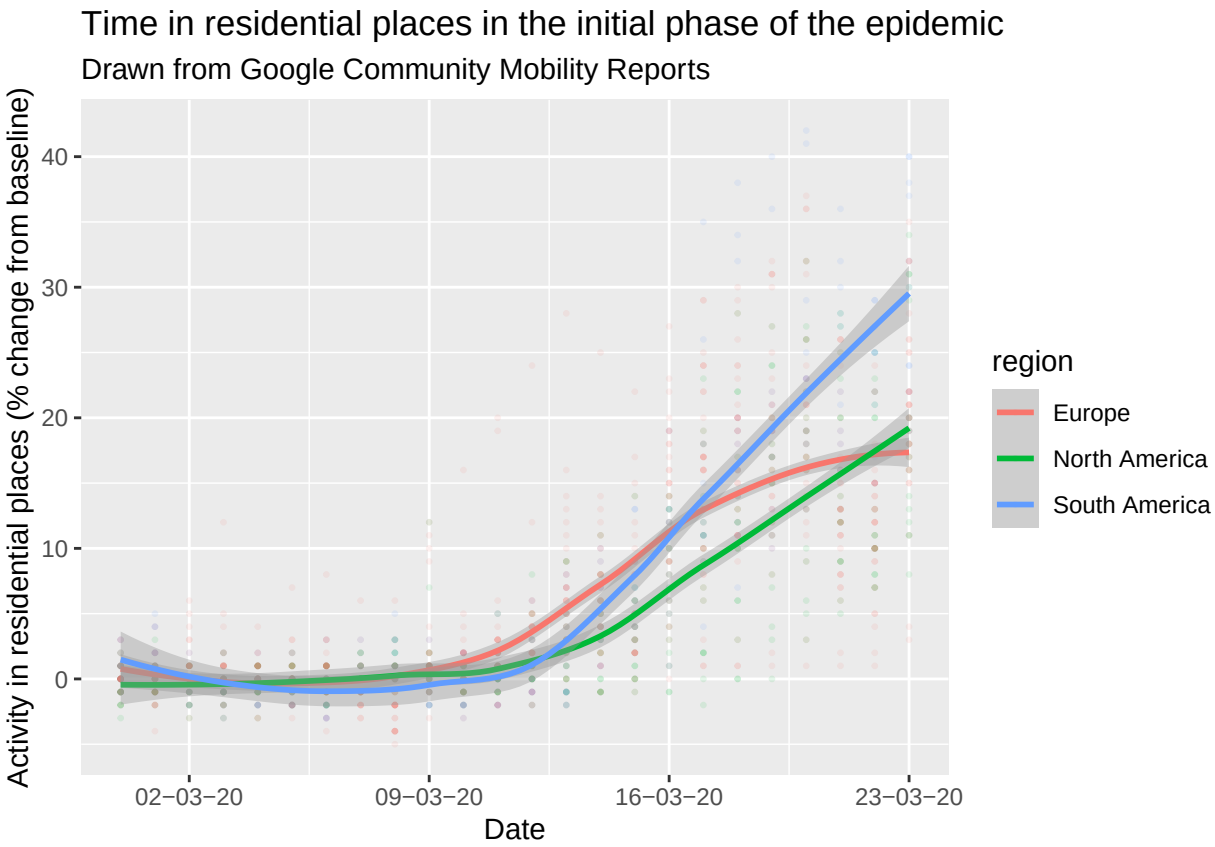


We see from this plot that as the time spent in workplaces decreases, the time spent in residential places increases, and this is true across the regions.

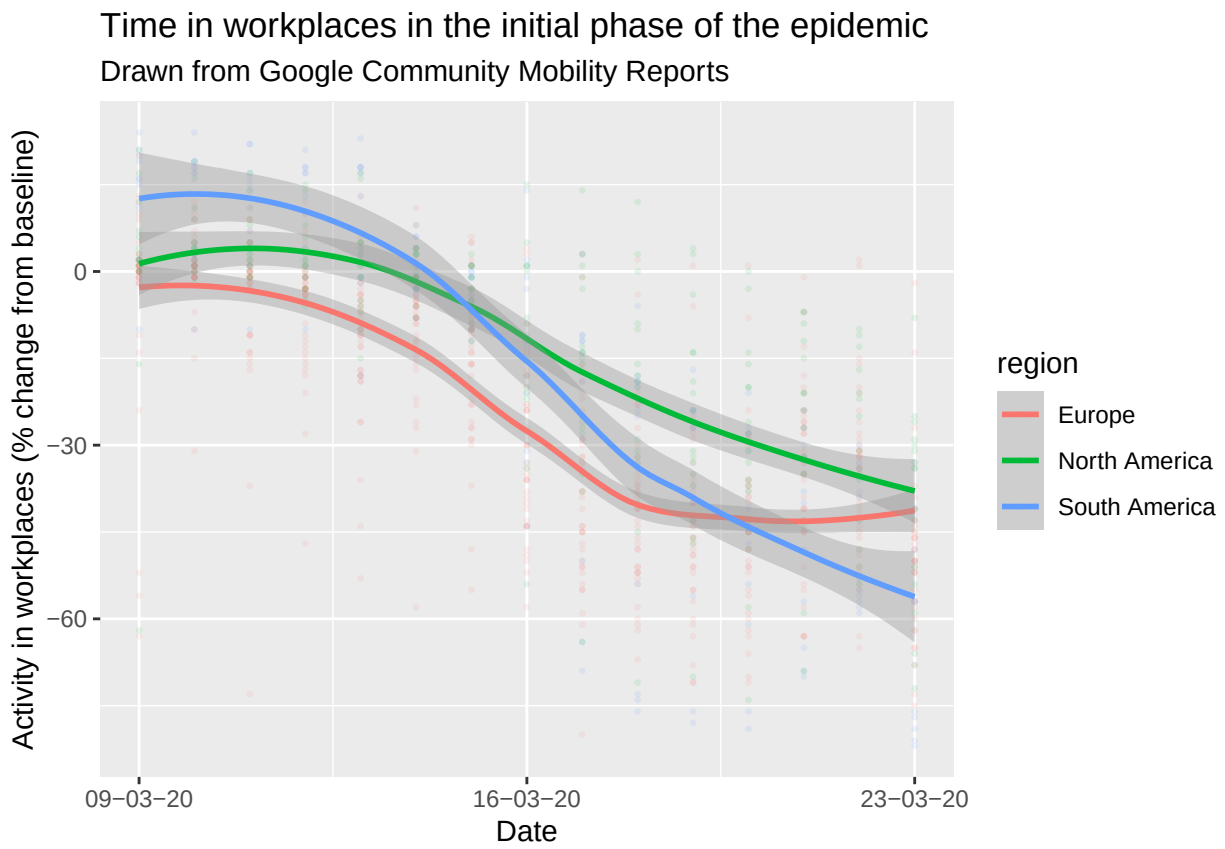
We look closer at the activity in homes and workplaces for these regions from 1st March - 11th Apr (note: these dates are subject to change from the data we gain from lockdowns). This is because we see a significant increase in activity in residential homes in this time period, as well as a significant decrease in activity in workplaces.



We look even closer at the data for time in residential places from before the UK entered lockdown, 1st - 23rd March. (Here I will link to lockdowns of diff countries, may change the time frame according, potential for modelling here)


Time in residential places in the initial phase of the epidemic
Drawn from Google Community Mobility Reports
Activity in residential places (% change from baseline)
40
30
20
10
0
02−03−20
09−03−20
16−03−20
23−03−20
Date
region
Europe
North America
South America

We see that from 9th - 23rd March approx. the time in workplaces falls in every region. We look closer at the data for this time period.



From this plot we see that both North & South America begin to increase and remain above the baseline reference, until about the 14th March, whilst Europe decreases throughout the time period, indicating that there were lockdown enforcements (such as working from home) earlier in Europe than in North & South America.

Conclusion

With more time spent at home and less time going into work there is less exposure to physical shops, i.e workers are no longer travelling past shops on their way into or home from work, or during their coffee/lunch breaks, so this results in an overall decrease in time spent in shops.

(More to add..)

References

Gassen, 2020, *Download, Tidy and Visualize Covid-19 Related Data.* [online] Available at: https://joachim-gassen.github.io/tidycovid19/

Google, 2020. *COVID-19 Community Mobility Report.* [online] Available at: https://www.google.com/covid19/mobility/