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COVID-19 DEATH RATE IS HIGHER IN EUROPEAN COUNTRIES WITH A LOW FLU INTENSITY SINCE 2018

Chris Hope

UNIVERSITY OF CAMBRIDGE
Judge Business School

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Cambridge Judge Business School author contact details are as follows:

Dr Chris Hope
Emeritus Reader in Policy Modelling
Cambridge Judge Business School
University of Cambridge

Email: c.w.hope.76@cantabgold.net

Please address enquiries about the series to:

Research Manager
Cambridge Judge Business School
University of Cambridge
Trumpington Street
Cambridge CB2 1AG

Email: research-support@jbs.cam.ac.uk

COVID-19 death rate is higher in European countries with a low flu intensity since 2018

Dr Chris Hope

Judge Business School, University of Cambridge

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Abstract

The death rate from COVID-19 is significantly negatively correlated to the intensity of the last two flu seasons in 32 European countries.

Introduction

In the UK, there are about 20,000 excess deaths from influenza in a typical year (PHE, 2019, table 7). However in 2018/19, there were only about 1,700 excess deaths (ibid), and there is anecdotal and statistical evidence that the 2019/20 flu season was very mild in the UK as well (ECDC, 2020a).

This implies that there were over 30,000 people alive in the UK at the start of the COVID-19 pandemic who would have been expected to die in the previous two flu seasons. These people are likely to have been predominantly elderly, and in poor health as

> "most influenza-related deaths occur in the elderly (65 years of age and older) and in those with underlying cardiovascular and respiratory comorbidities" (Clayville, 2011)

These are the people who have been found to be at highest risk of dying if infected with COVID-19. (ONS, 2020).

The number of COVID-19 deaths in the UK, a little over 40,000 by 10 June 2020 (HMG, 2020), is of roughly the same magnitude as this. Is there any link between COVID-19 deaths and the intensity of the previous two flu seasons?

Hypotheses

Comparing across countries,

H0: There is no correlation between COVID-19 deaths and the intensity of the previous two flu seasons.

H1: There is a negative correlation between COVID-19 deaths and the intensity of the previous two flu seasons.

Data

Flu intensity in European countries is measured weekly during flu season by the European Influenza Surveillance Network (EISN). Intensity is expressed as a number between 1 (baseline) and 5 (very high). Values are available for the 2018/19 and 2019/20 flu seasons for most EU member states, the four countries of the UK and Norway and Switzerland (ECDC, 2020a), 32 countries in all.

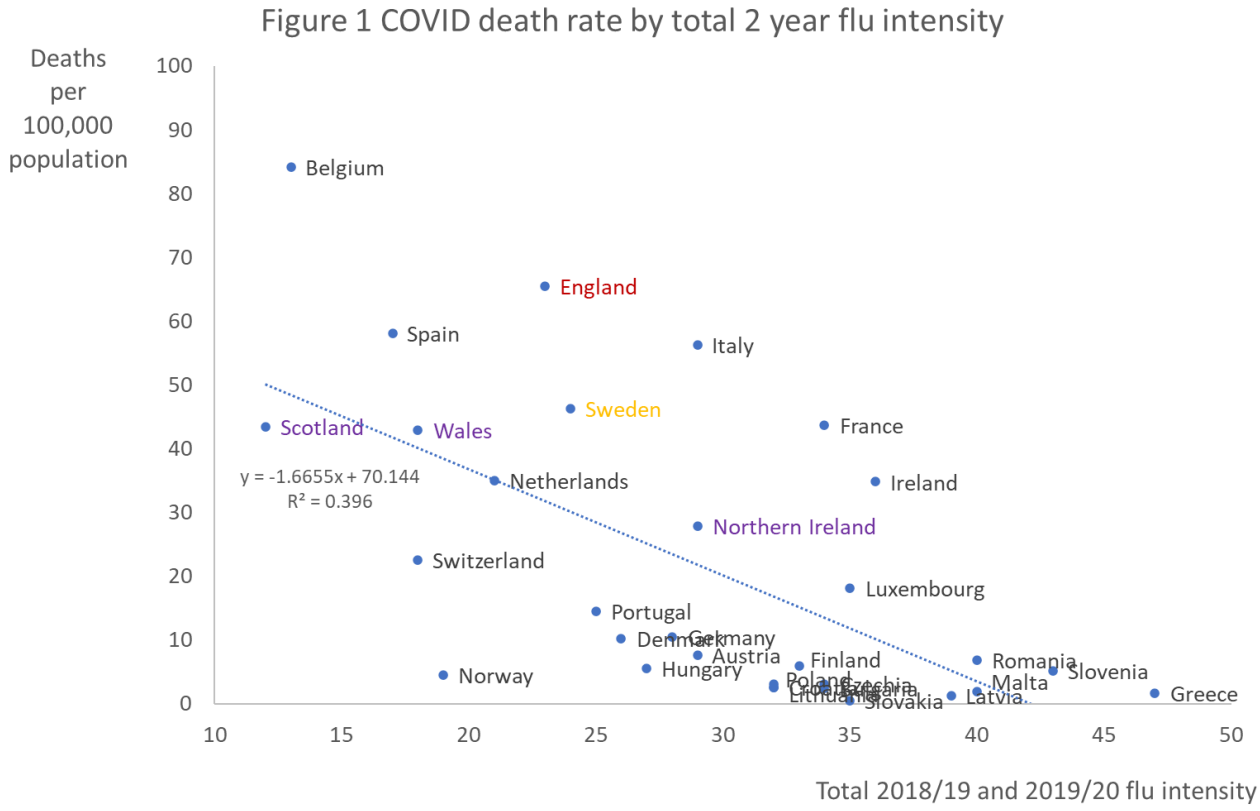
Deaths from COVID-19 up to 10 June 2020 are also available from the ECDC for most of the same countries (ECDC, 2020b). Deaths in Switzerland and the three countries of the UK other than England are obtained from other providers (Worldometers, 2020; Sky News, 2020).

Total flu intensity for 2018/19 and 2019/20 is taken to be the sum of the intensity above baseline for all 35 weeks available for all 32 countries. So very high =4, high=3, medium=2, low=1, baseline=0. Thus a country with baseline intensity in each of the 35 weeks would have a score of 0, and a country with very high intensity in all 35 weeks would have a score of 140. The mean value for the 32 countries is 29.5.

The total death rate from COVID-19 is taken to be the number of deaths per 100,000 population up to 10 June 2020. The mean value for the 32 countries is 20.3.

Results

Figure 1 shows the death rate from COVID-19 by total flu intensity since 2018/19 for the 32 countries. The data are tabulated in the appendix. There is a clear negative correlation between the variables. The OLS regression line is shown. It has an r^2 of 0.396, significant at the 1% level on a 1-tailed test.



Several countries are highlighted in the chart. England did have lower than mean flu intensity, but the death rate for England is 33 deaths per 100,000 above the trend line, while the other three countries of the UK lie close to the regression line.

Sweden, which has attracted some criticism for largely avoiding lockdown measures (BMJ, 2020), also had lower than mean flu intensity, giving it a death rate 16 deaths per 100,000 above the trend line, only about half as far above as England, where lockdown measures have been much more stringent.

There does appear to be a set of countries (Belgium, England, Italy, France and Ireland) with a death rate well above the trend line. Belgium, which has the highest death rate of the 32 countries, had the lowest flu intensity apart from Scotland. Its excess death rate of 36 per 100,000 above the trend line is the highest of the 32 countries.

There is also a set of countries with a death rate well below the trend line. Norway is the most prominent amongst these with 34 deaths per 100,000 below the trend line. Germany is a large country with a death rate that is below the trend line by 13 per 100,000.

Discussion

This is very much a first attempt to investigate any link between the COVID-19 death rate and flu intensity.

The shortcomings include:

- The flu intensity variable collected by the ECDC covers the period of weeks 42 in 2018 to 14 in 2019 and 42 in 2019 to 7 in 2020. It is missing several weeks (weeks 52 and 01 of 2018/19 and weeks 49, 51, 52 of 2019/2020), presumably due to Christmas and New Year breaks.
- The flu intensity variable collected by the ECDC is on an ordinal scale. The assumption made here is that this can be interpreted as an interval scale for the purposes of this analysis.
- COVID-19 deaths are recorded up to 10 June 2020. Although the pandemic appears to be declining in Europe it is not clear whether there will be a second wave of deaths as lockdown measures are relaxed.
- The recording of COVID-19 deaths is not straightforward, and it is not clear that all countries have adopted the same procedures.
- Each country has been allocated equal weight in the OLS regression. This means that Malta, population 0.5 million influences the trend line as much as Germany, population 83 million.
- The trend line implies that Slovenia and Greece should have had a negative death rate from COVID-19, which is not possible.

Despite these shortcomings, the results do suggest that the relationship between COVID-19 deaths rates and previous flu intensity would be worth further and fuller investigation. Further investigation should be able to determine whether the relationship is as significant as this first analysis suggests.

It should also look in more depth at what the five countries well above the trend line (Belgium, England, Italy, France and Ireland) have in common. One possibility is particularly thorough reporting of COVID-19 deaths. Another is a possible lack of attention to care homes early on in the pandemic (Booth, 2020). The architect of Sweden's more relaxed approach acknowledges that this applies to Sweden too (Henley, 2020). Another possibility is population density. Or it could just be random variation around the trend line, as is always present.

References

BMJ 2020;369:m2376 Has Sweden's controversial covid-19 strategy been successful?

Booth R, 2020, Covid-19: risk of death in UK care homes 13 times higher than in Germany, https://www.theguardian.com/world/2020/jun/28/covid-19-risk-of-death-in-uk-care-homes-13-times-higher-than-in-germany accessed 30 June 2020.

Clayville L R, 2011, P T. 2011 Oct; 36(10): 659-662, 665-668, 684.

European Centre for Disease Prevention and Control, 2020a, https://flunewseurope.org/ accessed 15 June 2020.

European Centre for Disease Prevention and Control, 2020b, https://www.ecdc.europa.eu/en/cases-2019-ncov-eueea accessed 10 June 2020.

HM Govt, 2020, https://coronavirus.data.gov.uk/ accessed 15 June 2020

Henley J, 2020, We should have done more, admits architect of Sweden's Covid-19 strategy, https://www.theguardian.com/world/2020/jun/03/architect-of-sweden-coronavirus-strategy-admits-too-many-died-anders-tegnell accessed 30 June 2020.

Office for National Statistics, 2020, https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/articles/coronaviruscovid19roundup/2020-03-26#coviddeaths accessed 15 June 2020

Public Health England, 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/839350/Surveillance_of_influenza_and_other_respiratory_viruses_in_the_UK_2018_to_2019-FINAL.pdf accessed 15 June 2020.

Sky News, 2020, https://news.sky.com/story/coronavirus-extra-445-deaths-added-to-uks-covid-19-total-11998662 accessed 10 June 2020.

Worldometers, 2020, https://www.worldometers.info/coronavirus/country/switzerland/ accessed 10 June 2020.

Appendix

Table A1 gives the data for the 32 countries used in figure 1.

Table A1 Flu intensity and COVID-19 death rate by country

EU/EEA and the UK	total 2 year flu intensity	COVID-19 death rate *per 100,000*
Austria	29	7.6
Belgium	13	84.2
Bulgaria	34	2.4
Croatia	32	2.6
Czechia	34	3.1
Denmark	26	10.2
England	23	65.5
Finland	33	5.9
France	34	43.7
Germany	28	10.5
Greece	47	1.7
Hungary	27	5.6
Ireland	36	34.8
Italy	29	56.3
Latvia	39	1.3
Lithuania	32	2.6
Luxembourg	35	18.1
Malta	40	1.9
Netherlands	21	35.0
Northern Ireland	29	27.9
Norway	19	4.5
Poland	32	3.1
Portugal	25	14.5
Romania	40	6.9
Scotland	12	43.4
Slovakia	35	0.5
Slovenia	43	5.2
Spain	17	58.1
Sweden	24	46.3
Switzerland	18	22.6
Wales	18	42.9