

Coronavirus meets the Great Influenza Pandemic

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What is a plausible worst-case scenario for outcomes under COVID-19? This column draws lessons from the 1918-1920 Great Influenza Pandemic. Data for 43 countries imply flu-related deaths back then of 39 million, 2% of the world population, implying 150 million deaths when applied to current population. Controlling for effects from WWI, GDP and consumption in the typical country declined by 6% and 8%, respectively, while real returns on stocks and short-term government bills fell meaningfully. Large potential losses in lives and economic activity justify current policy actions to limit the damage, but there is a difficult tradeoff between mortality and lost output, and this tradeoff warrants discussion that is absent so far.

Beyond contagion and deaths, the spread of the new coronavirus (COVID-19) has led to stock-market crashes, surging financial volatility, decreases in nominal interest rates, and contractions of real economic activity. At this point, there is substantial uncertainty around the eventual scale of the pandemic and its economic implications, especially in terms of how a worst-case scenario could look like. We think the Great Influenza Pandemic provides a reasonable upper bound in terms of mortality and economic effects, as analyzed from the cross-country experience in Barro, et al. (2020).

The pandemic arose in three main waves, the first in spring 1918, the second and most deadly from September 1918 to January 1919, and the third from February 1919 through the remainder of the year (with some countries having a fourth wave in 1920). The two initial waves coincided with the final year of World War I (1918), which helped to spread the infection across countries. An unusual feature of the pandemic was the high mortality among young adults without pre-existing medical conditions. It also killed a number of famous people, including sociologist Max Weber, artist Gustav Klimt, and Frederick Trump, the grandfather of the current US president. Survivors included economist Friedrich Hayek, entrepreneur Walt Disney, and US President Woodrow Wilson.¹

In this column we discuss lessons of the Great Influenza Pandemic in three areas: (1) mortality and morbidity, (2) macroeconomic effects gauged by declines in GDP and consumption, and (3) impacts on financial returns and inflation.

Mortality and morbidity

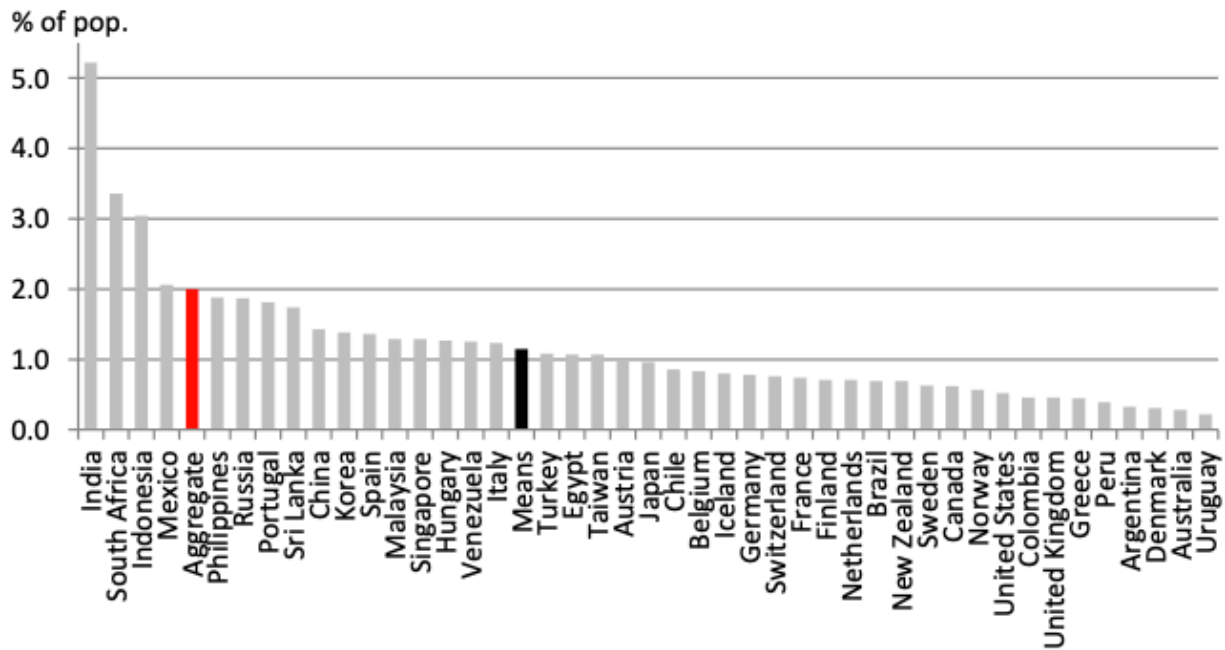
Figure 1 shows our estimates of excess mortality rates from the Great Influenza Pandemic for 43 countries during 1918-1920. The data come from an array of sources, detailed in Ursúa (2009) and Weng (2016). Important references are Johnson and Mueller (2002), Murray, et al. (2006),

Mitchell (2007), and the Human Mortality Database (www.mortality.org). The countries in our sample constitute 89% of estimated world population in 1918, and an even larger fraction of world GDP at the time. Flu mortality varied greatly across countries, with some countries seeing very low rates. The highest rate by far is for India, cumulating to 5.2% during the pandemic. China's death rate was not nearly as high, but because of its large population, it contributed significantly to the number of global deaths. The US had a cumulative death rate of 0.5%, with an associated number of deaths of 550,000.

Adding up the estimates by country and inflating to the world's population (assuming comparable flu death rates in the uncovered places) yields a total number of flu deaths of 26.4 million in 1918, 9.4 million in 1919, and 3.1 million in 1920, for a world total of 39 million over 1918-1920. As shares of the population, the figures are 1.38% for 1918, 0.49% for 1919, and 0.16% for 1920; the sum of these death rates is 2.0%.

Applying that death rate to the current world population (about 7.5 billion) generates staggering mortality numbers: 150 million worldwide deaths and 6.5 million US deaths. However, these numbers likely represent the worst-case scenario today, particularly because health procedures are more advanced than in 1918-20, although other factors like greater international travel work in the opposite direction. In addition, those worst-case scenarios do not account for differences in demographic profiles of the Great Influenza Pandemic and COVID-19.

Figure 1 Flu death rates during the Great Influenza Pandemic (sum 1918-1920)



Source: Table 1 in Barro, et al. (2020) and sources cited therein.

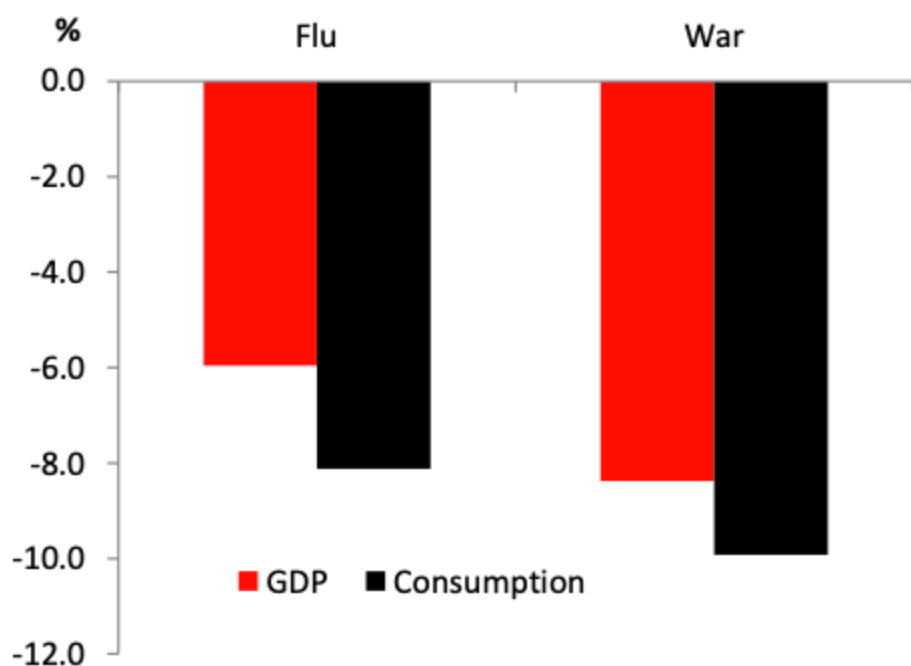
Mortality rates are sometimes expressed as shares of numbers infected, but these are much less reliable because they depend on inaccurately measured counts of infections. For the Great Influenza Pandemic, a commonly quoted figure is that roughly one-third of the world's population was infected by the H1N1 virus. If this number were accurate, a mortality rate of 2.0% for the overall population as we estimated would translate into a mortality rate of 6% of for the infected population. But the latter has to be regarded as highly speculative, because it is based on surveys done in a few places in the US (as described by Frost 1920). This is why in our analysis of macroeconomic effects we use mortality rates out of the total population.

Macroeconomic effects for GDP and consumption

Barro and Ursúa (2008) found that the macroeconomic impact of the Great Influenza Pandemic might have been substantial. That research focused on macroeconomic disasters, defined as cumulative declines by more than 10% in real per capita GDP or consumption (based on data on real personal consumer expenditure). The results suggested that the pandemic may have been the fourth most important negative macroeconomic shock for the world since 1870 – coming after WWII, the Great Depression of the early 1930s, and World War I. Specifically, 12 countries were found to have suffered macro disasters based on GDP and eight countries based on consumption, with trough years between 1919 and 1921. With an expanded dataset, we can now distinguish the effects of the pandemic from the war it partly overlapped with by exploiting variations across countries in flu death rates from 1918 to 1920 and war death rates from 1914 to 1918.

Our analysis reveals statistically significant negative effects of flu and war death rates on economic growth, illustrated in Figure 2. The Great Influenza Pandemic is estimated to have reduced real per capita GDP and consumption of the typical country by 6.0% and 8.1%, respectively. WWI is associated with declines in GDP and consumption by 8.4% and 9.9%, respectively. These numbers accord with the observation we made before that the pandemic could have caused a substantial number of rare macroeconomic disasters. In addition, our econometric exercises show that at least part of the negative effect of the war on GDP was permanent, but the flu effects might have been permanent, temporary, or somewhere in between.²

Figure 2 Baseline estimates of the impact of flu and war death rates on GDP and consumption in typical country



Source: Tables 1-3 in Barro, et al. (2020).

Impact on financial returns and inflation

To assess the impact of flu and war death rates on financial variables, we follow the same econometric strategy as for macroeconomic variables, and we focus on real returns on stocks (based on broad market indices) and short-term government bills. The nominal asset returns were adjusted for consumer price inflation to compute real returns. For the typical country, stock returns were estimated to be negatively impacted by 26 percentage points and 19 percentage points, respectively, by flu and war deaths. For bill returns, the negative effects were 14 percentage points and 13 percentage points, respectively. These outcomes were probably driven in part by strongly positive effects of the Great Influenza Pandemic and WWI on inflation rates.

Implications for the COVID-19 pandemic

The Great Influenza Pandemic of 1918-1920 represents a plausible worst-case scenario for disease outbreaks with global reach like COVID-19. The former's death rate of 2% of the total population translates into 150 million deaths today. Further, that death rate corresponds to estimated declines in GDP and consumption in the typical country by 6% and 8%, respectively. In addition, the pandemic was associated with sizable declines in real rates of return on stocks and short-term bills.

At this point, the probability that COVID-19 reaches anything close to the Great Influenza Pandemic seems remote, given epidemiological differences, advances in public health, and

mitigating policies at play. In any event, the large potential losses in lives and economic activity justify substantial expenditure of resources to attempt to limit the damage. In effect, countries have been pursuing policies of lowering real GDP as ways to curb the spread of the disease. There is clearly a difficult trade-off here concerning lives versus material goods, with little ongoing discussion about how this tradeoff should be assessed and acted upon

References

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Endnotes

1 President Wilson's impairment likely had a negative impact on the negotiations of the Versailles Treaty in 1919. Thus, if the harsh terms imposed on Germany by this treaty led eventually to WWII, then the Great Influenza Pandemic may have indirectly caused WWII.

2 Our analyses focus on the impact of flu death rates on economic outcomes, not on possible reverse effects of economic conditions on the death rate. But it is worth noting that the flu death rate for 1918-1920 has an overall correlation of -0.25 with a country's real per capita GDP in 1910. This negative association likely reflects the impact of better health services and better organisation more broadly.