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The recession-mortality nexus and Covid-19

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Key takeaways

- *Countries with a stronger predicted GDP decline in 2020 have also seen a larger number of deaths in excess of official Covid-19 fatalities.*
- *Historical data show that recessions are systematically associated with higher mortality, especially in developing economies. Following a recession, death rates remain elevated for several years.*
- *The eventual death toll of Covid-19 may be understated if the impact of the pandemic-induced recession is neglected. Limiting the economic fallout of the pandemic could also reduce excess mortality.*

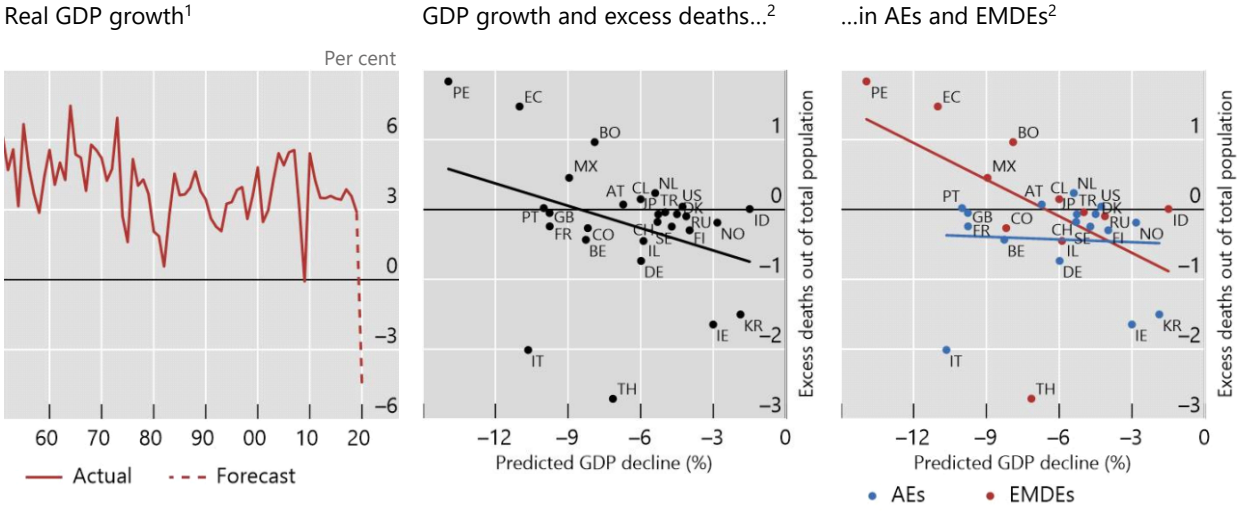
The coronavirus recession will go down on record as the most severe global economic downturn since World War II (Graph 1, left-hand panel). Although recent news about vaccines is a hopeful sign the pandemic can soon be brought under control, a striking pattern is that countries with a stronger predicted GDP decline have so far seen a higher number of excess deaths after taking into account official Covid-19 fatalities. The centre panel in Graph 1 relates the predicted decline in GDP in 2020 on the horizontal axis to deaths in excess of official Covid fatalities relative to deaths in previous years and standardised by total population on the vertical axis. There is a clear negative relationship across countries: the deeper the expected recession, the higher excess deaths. The right-hand panel splits the sample into middle- and lower-income emerging market and developing economies (EMDEs) and high-income advanced economies (AEs). There is a strong negative correlation between the depth of the coronavirus recession so far and excess deaths in EMDEs, while the relationship is rather weak among AEs.

The negative correlation between excess deaths and recession depth could reflect that a more severe course of the pandemic leads to a deeper recession and an undermeasurement of Covid-19 fatalities. More infections could lead to deeper recessions because of stricter containment measures and greater voluntary social distancing. They could also be associated with higher excess death rates if the undermeasurement or misclassification of Covid fatalities in official health statistics is worse in countries more affected by the pandemic. Similarly, a higher number of Covid infections may lead to congestion of health care systems, increasing deaths from other causes.[1]

In this Bulletin we investigate an alternative possibility: could the economic contraction induced by the pandemic itself lead to higher death tolls today and in the years to come? Drawing on historical data covering 180 countries over six decades, we first analyse the recession-mortality nexus empirically, with a focus on differences across AEs and EMDEs. We then discuss the channels through which recessions could affect public health and mortality. The Bulletin ends with implications for public policy.

[1] However, the patterns observed in the centre and right-hand panels of Graph 1 remain intact when accounting for the number of total Covid-19 infections per capita and the number of available hospital beds per capita.

The coronavirus recession and excess deaths Graph 1



[1] From 1950 to 1980, GDP growth is based on the Maddison Historical Statistics and calculated by averaging real GDP across all 137 countries for which data are available. From 1981 onward, data on real GDP growth is from the IMF WEO; the forecast for 2020 is from the October edition. [2] For each country, excess deaths in 2020 are computed as total deaths minus official Covid-19 deaths and the average of yearly total deaths between 2016 and 2019. The predicted GDP decline is the forecast of real GDP growth in 2020 from the October edition of the IMF WEO. Straight lines denote the linear fits.

Sources: IMF, *World Economic Outlook* (October 2020); Maddison Historical Statistics (Inklaar et al (2018)); authors' calculations.

Exploring the relationship between recessions and mortality

To explore the possibility of a systematic relationship between economic downturns and mortality, we use data covering 180 countries over the period from 1961 to 2018. We investigate the link from various angles, contrasting AEs with EMDEs and the effects of recessions on overall as well as child mortality rates.[2]

Cyclical fluctuations in output and mortality rates are negatively correlated over time, consistent with the notion that mortality increases during economic downturns. This pattern is illustrated in the first and second panels of Graph 2, which show the evolution of detrended per capita GDP (blue lines) and detrended mortality and child mortality rates (red lines, inverted scales) over time. Detrended per capita GDP and death rates move in tandem, with the relation more pronounced for child mortality. Child mortality rates visibly increase in the wake of contractions in global income, for example following the Asian crisis in the mid-1990s or in the aftermath of the Great Financial Crisis.

The link between outright recessions, defined as years of negative growth in real GDP, and mortality differs drastically between richer and poorer countries, as the third and fourth panels in Graph 2 show. The panels contrast average mortality and child mortality rates during recessions (red bars) with those in non-recession years (blue bars), separately for EMDEs and AEs.[3] While average mortality rates are only slightly higher during recession years in AEs, they increase markedly during recessions in EMDEs (Graph 2, third panel). In EMDEs, there are on average nine deaths per 1,000 people in years of positive GDP growth. During recessions the average mortality rate exceeds 12 – an increase by one third. These differences are even starker for mortality rates among children below the age of five. In AEs, child mortality rates exhibit almost no difference in recession and non-recession years (fourth panel). By contrast, in EMDEs they are

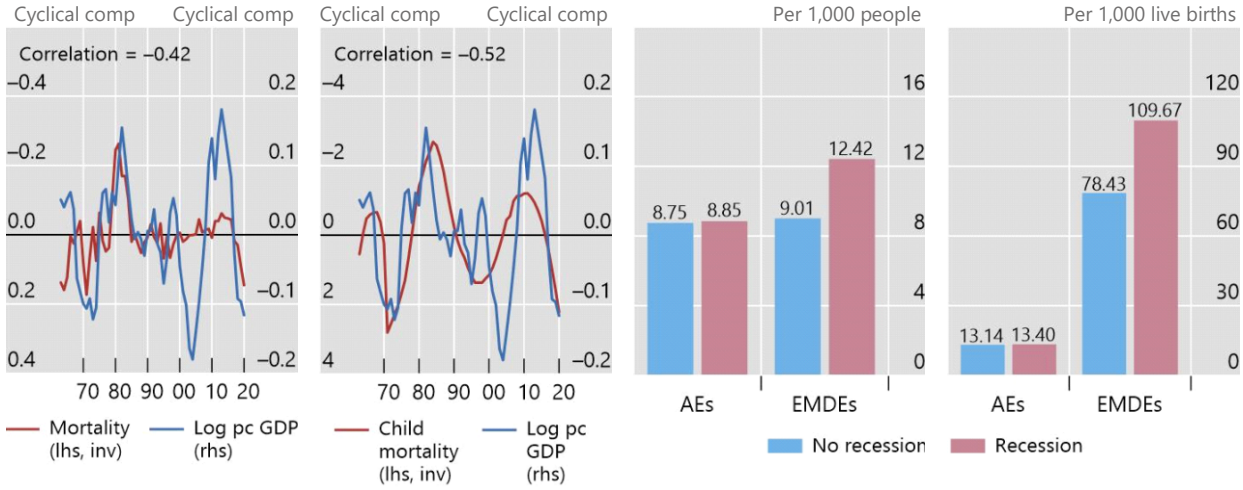
[2] For a more detailed analysis of the relationship between recessions and mortality, see Doerr and Hofmann (2020), who conduct similar analytical exercises, but control for country effects and specific confounding factors such as trend per capita income, total population, time trends and coinciding conflicts, famines or epidemics.

[3] The classification of the country groups follows the World Bank categorisation. The empirical findings do not hinge on the specific definition of recessions or AEs and EMDEs (Doerr and Hofmann (2020)).

significantly higher when the economy contracts: child mortality rates average 110 per 1,000 live births in recessions, compared with around 78 during non-recession years. This implies a relative increase of over 40%, which is notably larger than that for total mortality.[4]

Mortality rates are higher during recessions

Graph 2



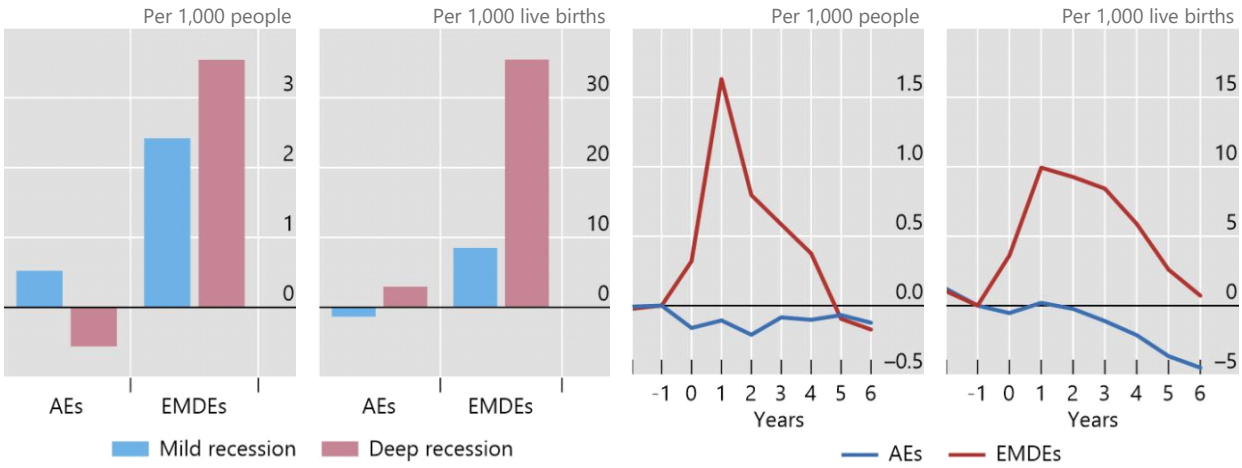
[1] The mortality rate is measured as "Death rate, crude (per 1,000 people)" and indicates the number of deaths occurring during the year, per 1,000 population estimated at mid-year. [2] GDP per capita in current US dollars. The cyclical components of the mortality rates and of per capita real GDP are calculated as deviations from a Hodrick-Prescott filter trend with smoothing parameter 1,000. The cyclical components shown are population-weighted averages across 180 countries. [3] The child mortality rate is measured as the "Mortality rate, under-5 (per 1,000 live births)", defined as the probability per 1,000 live births that a newborn baby will die before reaching age five, if subject to age-specific mortality rates of the specified year. [4] Recessions are defined as years of negative annual GDP growth. Averages are population-weighted.

Sources: World Bank; authors' calculations.

The negative correlation between the predicted GDP decline and excess deaths in 2020 among EMDEs in Graph 1 suggests that deeper recessions are associated with higher mortality. This notion is supported by the historical data when we split recessions into mild (blue bars) and deep (red bars) recessions. Mild recessions are years with a decline in annual GDP of at most 2.5%; deep recessions denote years with GDP contractions of at least 2.5%. To illustrate the difference in the mortality impact of mild and deep recessions, we report the change in death rates during the two types of recessions relative to non-recession years. The first and second panels of Graph 3 show that in EMDEs mortality increases more strongly during deep recessions than during milder recessions. Specifically, their average increase in mortality rates equals 3.5 deaths per 1,000 people in years of deep recessions. It averages less than 2.5 deaths during mild recessions (first panel). The pattern is again more pronounced for child mortality, which increases by 35 per 1,000 live births during deep recessions in EMDEs, compared with an average of around eight during milder recessions (second panel). Among AEs, there is no systematic difference: in both types of recessions, death rates do not change by much relative to non-recession years.

[4] The link between recessions and mortality in EMDEs and AEs suggested by Graph 2 is consistent with the academic literature. Baird et al (2011) and Mahrutappu et al (2017) show that economic recessions increase child mortality rates in developing countries, while Doerr and Hofmann (2020) show that the same does not hold true in AEs. For AEs, Graph 2 does not indicate the existence of a healthy recession paradox found by previous studies that focus on the richest AEs (eg Ruhm (2016)). The broader coverage of 57 AEs in Graph 2 explains the discrepancy (Doerr and Hofmann (2020)).

The nexus is stronger during deeper recessions and persists for several years Graph 3



[1] The mortality rate is measured as "Death rate, crude (per 1,000 people)" and indicates the number of deaths occurring during the year, per 1,000 population estimated at mid-year. [2] Mild recessions are years of annual GDP declines of at most 2.5%, deep recessions years of annual GDP declines of at least 2.5%. The vertical axis denotes the average change in mortality and child mortality rates during years of mild and deep recessions, relative to the average in all non-recession years. [3] The child mortality rate is measured as the "Mortality rate, under-5 (per 1,000 live births)", defined as the probability per 1,000 live births that a newborn baby will die before reaching age five, if subject to age-specific mortality rates of the specified year. [4] The vertical axis denotes the average change in mortality and child mortality rates relative to their level in the year before the start of a recession. The horizontal axis shows the years before and after the start of a recession. For recessions that last more than one year, only the first year is assigned the value zero. Averages are population-weighted.

Sources: World Bank; authors' calculations.

Looking beyond the immediate impact of recessions reveals that they cast a long shadow. Following the start of a recession, EMDEs register elevated death rates for several years. This is shown in the third and fourth panels of Graph 3, which report the evolution of average mortality rates and child mortality rates over time. The vertical axis measures the change in death rates relative to their levels in the year directly before the start of a recession. The horizontal axis shows the years before and after the start of a recession, where a value of zero indicates the first year of the recession. In EMDEs (red lines), mortality and child mortality rates rise steeply in the year of a recession. They increase even further in the subsequent year. Mortality rates increase for four years on average after the beginning of a recession, while child mortality rates remain elevated for up to six years. The strong rise in mortality rates during the early years of recessions reflects that recessions often last more than one year. The years following the start of a recession are hence occasionally recession years themselves. In AEs (blue lines), mortality and child mortality rates do not increase in the years following recessions. Mortality rates even slightly decrease initially.[5]

The nature of the recession-mortality nexus

Which mechanisms could explain the link between recessions and mortality? A large body of existing literature shows that lower incomes can directly affect health and mortality (see Cutler et al (2006) for a survey). Recessions that reduce income can give rise to malnutrition with potentially lethal consequences (O'Connell and Smith (2016)). Job losses in an economic downturn can trigger existential angst and increase stress-related health problems or suicide rates (Case and Deaton (2020)). Similarly, economic growth often sustains public spending, in particular on social security and health care. Recessions can

[5] The decline could potentially reflect the presence of the healthy recession paradox (Ruhm (2016)) All results are confirmed in formal regression analyses, which show that the increase in death rates in EMDEs remains statistically significant for several years, while the dynamic effects in AEs are statistically insignificant (Doerr and Hofmann (2020)).

therefore be associated with an inadequate provision of these services, with potentially harmful effects on public health (Liang and Tussing (2019)).

These adverse direct effects of recessions on health are particularly relevant in poorer countries, where incomes are often close to subsistence levels and health care systems underdeveloped (Grigoli and Kapsoli (2018)). Economic downturns could further disproportionately hurt children, the weakest segment of society. During recessions, parents may need to cut back on aspects of child care like nutrition and health care. And governments may be forced to reduce medical care provision, which may affect children in particular (Maruthappu et al (2017)).

In contrast, private or state-provided financial buffers largely protect individuals' living standards during economic downturns in richer economies. Health care systems are generally better funded, further mitigating the direct effects of recessions on health. As a consequence, indirect effects of recessions on living conditions and lifestyle habits could dominate and give rise to a "healthy recession paradox" (Ruhm (2016)). Such beneficial effects of recessions may arise because a slowdown in economic activity could be associated with fewer job-related and traffic accidents, less air pollution, a healthier diet or more exercise (Burgard et al (2013)).

Overall, these considerations suggest that recessions adversely affect mortality, and especially child mortality, in EMDEs. Their effect on public health in AEs is ambiguous. These observations are in line with the historical patterns uncovered in this Bulletin, as well as those observed during the Covid-19 pandemic.

Conclusions

The analysis in this Bulletin suggests that the death toll from Covid-19 could be higher than the fatalities directly due to the disease, as the deaths arising from the pandemic-induced recession also have to be taken into account. The historical data show that the recession-mortality nexus is stronger in EMDEs than in AEs, and more pronounced for child mortality than for total mortality. The mortality effects of recessions, and hence presumably also of the coronavirus recession, thus stand in sharp contrast with the direct mortality impact of Covid-19: the pandemic mainly affects seniors, which represent a larger share of the population in AEs (Natale et al (2020)). The fact that recessions raise death rates in EMDEs for several years could also mean that the pandemic-induced downturn will lead to further deaths in the years to come. A preliminary analysis for 2020 already reveals a significant correlation between the expected decline in GDP and excess deaths in EMDEs, which could in part reflect the effect of recessions on mortality.

These findings have implications for pandemic response policies, amid positive news about the availability of vaccines in some countries. Studies of the design of optimal containment measures (eg Alvarez et al (2020), Eichenbaum et al (2020)) rest on a trade-off between lives saved and the depth of the recession due to policy interventions. A common assumption is that a stricter lockdown reduces pandemic-related deaths, but comes at the cost of a steeper decline in economic activity. This trade-off could be more complex as the economic consequences of virus containment policies may also have repercussions on mortality. Policies suppressing infections at an early stage could thus prove particularly effective in containing both mortality and economic damage (Correia et al (2020)), if they avoid a hard lockdown later. More generally, our analysis suggests that containing the coronavirus recession may also reduce excess mortality. These considerations apply to rich and poor countries alike: even if the recession-mortality nexus is mostly present in EMDEs, in a globalised world recessions in AEs spill over to EMDEs (Kohlscheen et al (2020)), possibly raising mortality rates there.

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