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Macroeconomic effects of Covid-19: an early review

Key takeaways

- *Past epidemics had long-lasting effects on economies through illness and the loss of lives, while Covid-19 is marked by widespread containment measures and relatively lower fatalities among young people.*
- *The short-term costs of Covid-19 will probably dwarf those of past epidemics, due to the unprecedented and synchronised global sudden stop in economic activity induced by containment measures.*
- *The current estimated impact on global GDP growth for 2020 is around –4%, with substantial downside risks if containment policies are prolonged. Output losses are larger for major economies.*

Introduction

The Covid-19 pandemic is not only the most serious global health crisis since the 1918 Great Influenza (Spanish flu), but is set to become one of the most economically costly pandemics in recent history. Experience with past epidemics provides some insights into the various channels through which economic costs could arise, in the short as well as longer term. At the same time, Covid-19 differs from previous episodes in several important ways. Notably, the globally synchronised lockdowns and trauma of financial markets reinforce one another into an unprecedented economic sudden stop. For these reasons, the Covid-19 global recession is unique. However, past epidemics can shed light on transmission channels to the economy, especially when stringent containment policies are not in place.

This Bulletin provides an early review of empirical studies on the economic costs of epidemics. We first review studies on past epidemics, and then turn to the latest quantitative estimates of Covid-19's impact on global growth.

Lessons from past epidemics

Studies on past epidemics identify a number of channels through which economic costs can arise. The loss of productive workforce through mortality and illness is a key channel, particularly prominent in severe pandemics such as the 1918 influenza.[1] But the study of past epidemics provides useful insights on several of their economic consequences, including costs due to weak consumer sentiment, high exposure of the services sector, the impact of social distancing policies and potential financial amplification. All these factors remain relevant today, albeit to different degrees. Table 1 summarises the methodologies and findings of selected studies on the macroeconomic costs of past epidemics. A number of insights emerge.

[1] Barro et al (2020) observe how the deaths and illnesses of famous people as a result of the 1918 flu pandemic may have disproportionately affected the economy by influencing the course of history. For example, the illness of US President Woodrow Wilson may have contributed to the harsh terms of the Versailles Treaty in 1919.

Economic losses from past epidemics Table 1

Epidemic(s)	Fatalities	Studies and methods	Economic losses
Influenza pandemic, 1918–19	Up to 50 million	Barro et al (2020) Cross-country panel regressions	6 ppt lower GDP growth and 8 ppt lower consumption growth overall
		Brainerd and Siegler (2003) US states data	Mortality significantly lowers growth over following decade
		Correia et al (2020) US states data	18% decline in manufacturing activity per year; prompter and more aggressive containment helped cushion the impact
SARS, 2003	774	Lee and McKibbin (2004) CGE model	0.1% loss in global GDP in 2003
		Hai et al (2004) Chinese surveys	1–2 ppt lower GDP growth in China
H5N1 avian influenza, 2003–19	455	Burns et al (2006) World Bank estimate	0.1% loss in annual global GDP 0.4% for Asia
Ebola, 2014–16	11,323	World Bank (2014) CGE model	2.1 ppt lower GDP growth in Guinea, 3.4 ppt in Liberia, and 3.3 ppt for Sierra Leone in the first year of the epidemic
Hypothetical influenza pandemics		Global Preparedness Monitoring Board (2019) A 1918-type pandemic	4.8% loss in annual global GDP
		Fan et al (2016) A 1918-type pandemic; Includes the intrinsic cost of mortality to GDP loss	0.4–1% of GDP loss per year due to ex ante prospects of a pandemic, 86% of which is due to mortality and 14% to income loss. For moderate pandemics, the share of income loss is larger at 40%
		Keogh-Brown et al (2010) An H1N1 pandemic UK,FR,BE,NL/Multisector CGE	1.4–6% loss in annual GDP; 0.5–2 ppt of which due to mortality; 0.9–4 ppt from school closures and absenteeism
		Burns et al (2006) A 1918-type pandemic	3.1% loss in annual global GDP; 0.4 ppt of which due to mortality; 0.9 ppt from illness and absenteeism; 1.9 ppt from efforts to avoid infection)
		Arnold et al (2006) A 1918-type pandemic	4.25% loss in annual GDP 2.25 ppt from the supply side; 2 ppt from the demand side

First, the estimated costs of epidemics vary significantly, depending on their severity and how they were dealt with. The 1918 influenza is generally considered as the costliest epidemic in modern history.[2] Correia et al (2020) estimate that this pandemic curtailed manufacturing activity by around 20%, while Barro et al (2020) estimate the negative impact on GDP to be around 6–8% overall. Social distancing measures were introduced to contain the 1918 pandemic, but these varied across jurisdictions and there was no synchronised stop in economic activity. Correia et al (2020) find that the US states that introduced containment measures earlier had relatively higher medium-term growth. This suggests that, at the time, the economic costs were due primarily to loss of lives, spread out over three years (see also Fan et al (2016)). A number of studies estimate the cost of a hypothetical 1918-type influenza pandemic in the modern era. The Global Preparedness Monitoring Board (2019), for example, estimates that the cost of such a pandemic could be close to 5% of global GDP. Costs associated with other milder epidemics are

[2] Many past epidemics resulted in extremely high fatality, due to poorer sanitary standards as well as a different social context. The bubonic plague of the 14th century claimed up to 200 million lives, while the spread of European viruses in Mexico reduced the population from an estimated 15–20 million in 1520 to less than a million in 1600.

typically an order of magnitude lower. The estimate for the SARS epidemic in 2003, for instance, is only 0.1% of global GDP according to Lee and McKibbin (2004). Those of the H1N1 "bird flu" and Ebola epidemics are similarly small, at least relative to global output.

Second, macroeconomic costs can materialise through both supply and demand effects. In response to an epidemic risk, workers may limit social interactions by reducing both labour supply and consumption. Arnold et al (2006) examine the supply side channel in a 1918-like pandemic scenario, by combining an estimated loss of employee work days with an estimated productivity per worker.[3] They conclude that, in the first year, the pandemic reduces GDP by about 2.3%. To assess the demand side, the same study draws on the SARS episode of 2003 and assumes that a pandemic's effects would be especially severe among industries whose products required customers to congregate. The overall demand side effects would reduce GDP by 2%.

Third, pandemics can have long-lasting adverse effects on the economy. On the supply side, Fan et al (2016) find that, in the case of the 1918 influenza pandemic, the most important cost was mortality and the reduction of the labour force.[4] A one-time reduction in the labour force would raise the ratio of capital to labour and lower the rate of return to capital, slowing the pace of capital accumulation and GDP growth for many years.

Pandemics may also persistently depress aggregate demand. Jordà et al (2020) study the long-run effects of a sample of 12 major epidemics in Europe stretching back to the 14th century. They find that pandemics were followed by multiple decades of low natural interest rates, due to higher precautionary saving and depressed investment opportunities. Indeed, unlike wars, pandemics do not destroy physical capital, and typically give rise to a long period of excess capital per surviving worker.

Some general lessons from these studies may be relevant for the current episode. First, when an epidemic reaches a global scale with a substantial loss of lives, the economic loss can also be very high and persistent. This means that confinement measures, while costly, also have economic benefits in preserving the workforce. These are relevant for the cost-benefit assessments of alternative confinement policies, in addition to the primary objective of saving lives. The literature also makes clear that the interactions between supply and demand transmission channels are not specific to Covid-19, but a feature of epidemic shocks in general.

Gauging short-term economic impact of Covid-19[5]

While no two epidemics are exactly alike, the current pandemic differs fundamentally from past episodes. The rapid global spread of Covid-19, aided by closer international integration and the possibility of transmission through carriers without symptoms, has led to much faster transmission than past episodes such as SARS. This has prompted a large-scale containment policy, put in place globally in an almost synchronised way, in turn leading to a global sudden stop in economic activity. Recent studies on the economic impact of Covid-19 face the inevitable challenge of dealing with rapidly changing circumstances.

Earlier estimates have been overtaken by events, as large-scale stringent social distancing policies were introduced and the pandemic spread. McKibbin and Fernando (2020) is one of the earliest systematic

[3] They assume that 30% of workers become ill, with 2.5% fatality. Those who survived would miss three weeks of work, because of either sickness, voluntary social distancing or the need to care for family members. They then compute the impact on GDP of the employment lost to the pandemic, using the average sectoral productivity per worker in 2004.

[4] The concurrent World War I presented a challenge in quantifying the effect of the pandemic on mortality – see Barro et al (2020). Long-term effects on labour supply are also documented in Jordà et al (2020), who find that real wages remained elevated over more than three decades after pandemics.

[5] It is too early to evaluate the long-term economic impact of Covid-19 – how the pandemic will end remains highly uncertain and agents' behaviour could change in ways that are hard to predict. That said, today's more advanced public healthcare, the more stringent screening/quarantine procedures and the lower fatality rate of Covid-19 for the younger population should help mitigate loss of workforce and effects on potential output.

studies of potential economic cost of Covid-19. Released at a time when a pandemic did not yet appear to be an imminent threat, roughly half of the scenarios assume the epidemic would be contained within China, leading to 0.3–2.2% loss in terms of global GDP. In pandemic scenarios, where fatality reaches 3% and risk premia spike globally, the expected loss goes up to 11%. UNCTAD (2020) highlights the supply chain disruptions as a result of containment measures in China, noting that 20% of global trade in manufacturing intermediate goods originates there. They expect the European Union, the US, Japan, Korea and Taiwan to be most affected by supply disruptions. Meanwhile, an OECD early estimate – released shortly before the pandemic started to spread in the US – suggests a 1.5% loss in terms of global GDP in a pandemic scenario.

How is this time different? Table 2

Factors	1918 pandemic	SARS	Covid-19 1 March	Covid-19 8 April
Death toll	50 million Higher among younger people, significant fall in workforce	774	2,996	82,220 Higher among older people, likely limited fall in workforce
Containment measures	Social distancing; vary across jurisdictions	Social distancing in China and Hong Kong SAR	Wuhan and Lombardy lockdowns	Global lockdown
Financial amplification	Little	Little	Some market sell-off	Sharp tightening in financial conditions
Real amplification	Little	Little	Supply chain disruptions	Supply chain disruptions; sudden stop in demand
Context	WWI; high share of manufacturing sector in GDP in advanced economies	Chinese growth accelerating	Highly globalised economies and integrated cross-border supply chains; high share of services sector in GDP in advanced economies; high leverage in parts of real sector	

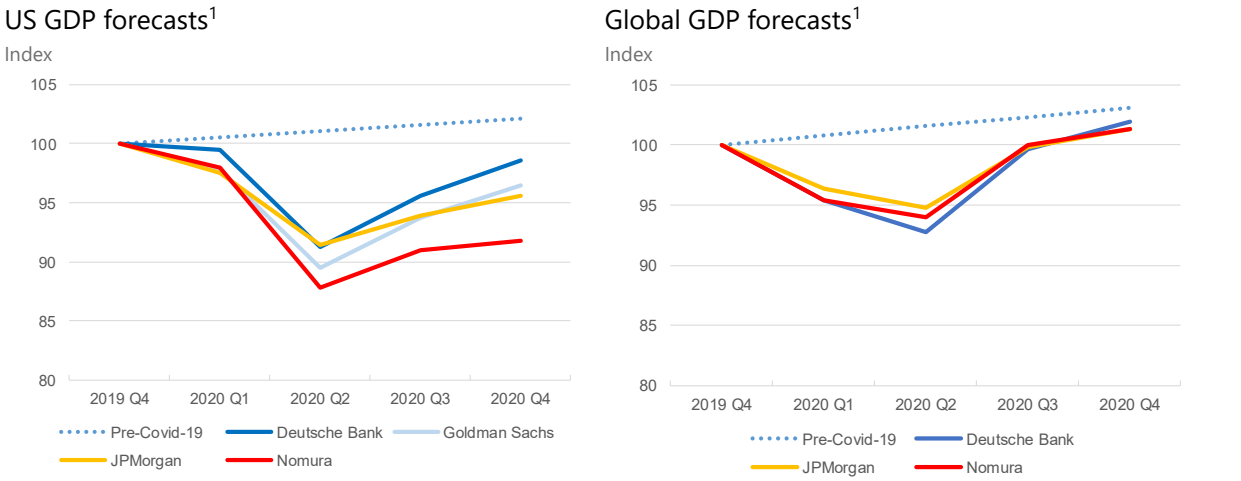
The scale and stringency of quarantines introduced during March, unforeseen by earlier estimates, effectively brought a large fraction of global economic activity to a synchronised standstill. Heightened financial market turbulence then amplified this initial shock, as financial markets came to grips with a historic global sudden stop. The context of high globalisation[6] and high leverage in parts of the corporate and household sectors make these short-term amplification mechanisms more potent than in past epidemics. As summarised in Table 2, these features make the Covid-19 pandemic unique, and led to sharp and rapid revisions in economic forecasts. Prominent economists raised the possibility of GDP falling by as much as a half in the short run, as a consequence of the global sudden stop (eg Gourinchas (2020), Saez and Zucman (2020)). These assumptions led to new estimates that are an order of magnitude larger than previous ones. At the end of March, the OECD estimated that large-scale shutdowns would result in a GDP loss of about 20–25% for each month that they remain in place, implying that a three-month shutdown would induce a 5–7% drop in annual GDP, all other things equal.

Recent private sector GDP forecasts point to a substantially larger GDP short-term impact of the Covid-19 pandemic than in previous outbreak episodes, or indeed severe recessions in the past. Graph 1 shows selected private sector forecasts made in the last week of March. All point to a very deep contraction in the first half of 2020. For the US, the quarterly contraction is expected to be largest in the second quarter. It is also notable that, by the end of 2020, the level of US GDP under these projections would still fall short

[6] Kohlscheen et al (2020) point to cross-country spillovers as an important amplification channel of the Covid-19 shock.

of trend by 4–10%. For the global economy, the quarterly contraction during the first two quarters ranges from 10 to 20%, as China's GDP is expected to contract by over 40% in the first quarter. But in the event the Chinese economy recovers rapidly, global GDP may recover close to trend by year-end. At the same time, there are also worse case scenarios, under which the second-quarter contraction is larger and the recovery more protracted across all major economies. It remains uncertain how fast the losses could be made up, if at all, once the global economy recovers.

GDP forecasts by private sector, as of end of March 2020 Graph 1



1 As of 31 March for Deutsche Bank and Goldman Sachs; as of 27 March for JPMorgan and Nomura. Pre-Covid-19 paths assume US quarterly growth of 2.1% and global growth of 3.1%.

Sources: Deutsche Bank; Goldman Sachs; JPMorgan; Nomura

The economic cost of the Covid-19 pandemic can be proxied by GDP forgone, namely the difference between current forecasts and pre-Covid-19 outlook (dashed lines in Graph 1). Under the baseline scenario, annual output loss ranges between 5 and 9% of pre-Covid-19 estimates for the US, and between 4 and 4.5% for the global economy. In worse scenarios, these costs could reach 11% for the US and 8% for the global economy. The latest IMF (2020) forecasts released on 14 April already inch towards these scenarios, with US and global output losses in 2020 projected at 8% and 6% respectively. These costs are an order of magnitude higher than the estimated costs of previous epidemics, and exceed those during the Great Financial Crisis in 2008–09 – when OECD countries on average lost 3% of GDP per year.

There are also possible long-term damages from a prolonged economic shutdown, harder to quantify but potentially significant. Bankrupt firms will make no output contribution after containment is lifted, and could disrupt supply chains of surviving firms. Unemployed workers could lose skills and long-term relationships with firms which are costly and take time to re-establish. Hardship and demoralisation could in turn have an impact on labour productivity. Experiences from past recessions suggest that these scars on the economic fabric can be deep and persistent (Eichengreen (2020)).

Conclusion

The cost-benefit analysis in health policies certainly goes beyond accounting for economic gains and losses. But even from a narrow economic perspective, the adequate course of action is far from settled. On the one hand, the high output losses from global efforts to contain the Covid-19 pandemic are unprecedented. On the other hand, it is unclear if the counterfactual scenario would be less costly – an uncontrolled pandemic such as the 1918 Great Influenza resulted in substantial and persistent damages. A better understanding of the transmission channels of the Covid-19 shock to the economy, the interaction between economic decisions and the epidemic, and the policy trade-offs is therefore needed.

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