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Economic impact of the Corona pandemic: Costs and the recovery after the crisis

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ABSTRACT

Since the outbreak of the Corona virus, policymakers around the globe introduced numerous emergency measures such as the wearing of masks, restrictions to mobility and travel and the shutdown of large parts of the economy, including firms, workplaces and schools. The implementation of restrictions (lockdown) helped to keep the number of infections below the capacity of health care systems in most countries. While many human lives have been saved, the lockdown contributed to a severe recession at the global scale. This paper examines the economic costs of the Corona virus and the prospects for a solid recovery. Increased uncertainty of private households and firms and the building of buffers against future shocks, lower productivity due to a reversal of the globalization process and a non-optimal policy mix generating inefficiencies and potential risks arising from asset markets can prevent a return to the pre-crisis steady state.

1. Introduction

Since the outbreak of the Corona virus, policymakers around the globe introduced numerous emergency measures such as social distancing and the wearing of masks, restrictions to mobility and travel and the shutdown of large parts of the economy, including firms, workplaces and schools. The implementation of harsh restrictions (lockdown) contributed to keep the number of infections below the capacity of health care systems in most countries. After the initial period, the restrictions have been relaxed to some extent, as tests and vaccines against the virus became increasingly available. The vaccines were expected to limit the spread of the virus and to protect against severe courses of the disease. In fact, infection rates in the pre- and post-vaccine period are highly correlated across countries. This might show a rather fast diffusion of vaccines, especially in advanced countries. During winter 2021, infections raised again to record levels in many places. However, current mutations of the virus appear to be less severe, at least for the vaccinated. Nonetheless, the recent closure of economic activities in Shanghai shows that the pandemic has not passed.

The lockdown helped to save many human lives. At the same time, the measures contributed to a vast recession at a global scale. It should be noted, however, that the economic losses might be still lower when compared to a scenario without appropriate policy action. Bodenstein et al. (2020) stressed that the absence of social distancing can amplify the costs of the pandemic over long time intervals in terms of output, consumption and investment. To decrease the costs, social distancing policies should be skewed towards non-essential industries and occupations that can be performed from home. Due to input-output linkages, however, even non-targeted industries are forced to reduce output. For example, producers of intermediates are more affected by the crisis if they sell their output to sectors restricted by social distancing (Laeven, 2020). Getachev (2020) found that voluntary social distancing is important for both flattening the curve of new infections and minimising economic damage. Infection-averse individuals are faced by the trade-off between the costs of social distancing and the risk of getting infected and losing labour income. Although social distancing enforced by the government is more effective in flattening the curve, it implies higher economic costs. Following Barro et al. (2020) the human costs during the Spanish flu exceed those of Corona by far, especially in terms of fatalities. However the economic losses are much larger in Corona

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times, even under moderate assumptions. The key question for policymakers is how to manage the trade-off between the spread of the virus and the economic costs. Dealing with this trade-off is a major challenge under the conditions of the pandemic (Eichenbaum et al., 2020).

The pandemic affected both the supply and demand conditions in the economy. Infections and lockdowns reduced labour supply and productivity. Decreasing profits, increasing costs and overcapacities placed a burden on investment and R&D activities of firms. Consequently, capital accumulation might slow down, implying a slower expansion of potential output. Growth dividends attributed to globalization, such as gains from the ongoing division of labour organized in international production chains might decline. In the pre-crisis period, global manufacturing helped to reduce costs and ensured low prices for consumers. However, the process is vulnerable to lockdowns in particular locations, as they can generate disruptions to the entire chain. Despite economic motives, there is some risk that the activities are re-allocated to the regional neighborhood, probably accompanied by efficiency losses. In addition, more than one half of the participants in a US household survey reported substantial income and wealth losses because of the pandemic (Coibion et al., 2020). Drops in consumption, especially in travel and clothing are involved. To improve the resilience against future shocks, households may become more reluctant to raise consumption expenditures. The uncertainty with respect to the path and duration of the pandemic can dampen business and consumer confidence (Baker et al., 2020). Higher credit default and non-performing loans can contribute to tighter lending standards of banks. Guerrieri et al. (2020) argued that supply shocks associated with the pandemic are amplified by changes in aggregate demand, especially lockdowns, layoffs and the exit of firms. Expansionary fiscal policies are less effective, as the closing of some industrial sectors may reduce the traditional Keynesian multiplier feedback.

This paper investigates the economic impact of the pandemic and the prospects for a smooth recovery at the global scale. If further mutations of the virus can be kept under control and vaccines remain effective, the worst of the pandemic might be already passed, despite the new increase in infections due to the Omicron variant. However, the economic conditions change considerably, at least for some time. Higher uncertainty of private households and firms, lower productivity growth due to a slowdown of the globalization process and a non-optimal policy management can prevent an early return to the pre-crisis steady state path. Section 2 quantifies the strength of the lockdown, based on standard indicators like the Oxford stringency index. Section 3 discusses the macroeconomic impact of Corona in terms of output growth and inflation. The effects are quantified by comparing forecasts of major institutions before and after the outbreak of the pandemic. Section 4 presents the policy reaction to combat the recession. The focus is on discretionary fiscal policies encompassing additional public spending and equity support, loans and guarantees. According to the evidence in Section 5, the expansionary measures had only minor success in stimulating the economy. Section 6 concludes with an outlook for the recovery.

2. Indicators of social distancing

Several indicators are available to assess the scope of corona-related policies. The government response tracker developed by the Blavatnik School of Government at the Oxford University is the standard measure of policies directed to limit the spread of the virus (Hale et al., 2021). It collects daily information on containment and closure practices, which is available from various sources. The Oxford index is rank scaled and built on several components, such as the closing of schools and workplaces, the cancellation of public events, restrictions on gatherings and public transport, stay-at-home regulations and limitations to domestic and international travel. The composite measure is a simple arithmetic average of eight ingredients, rescaled to vary between 0 to 100. Increasing values of the indicator imply stricter regulation. Fig. 1 shows the timing of the lockdown in the four largest economies in the world, i. e. the US, China, Japan and Germany. While there is a common trend, more or less, the strength of the lockdown shows national specificities.

The restrictions appear to be particularly strong in China, including
temporary quarantines even in large cities (Wuhan). The suspension of inner Chinese trade and travel was an important policy element especially during the first phase of the pandemic. While the restrictions were partially lifted in later periods they were quickly reinforced thereafter. Hence, the development shows an erratic pattern, although in a rather tight interval. Fast changing lockdown conditions can lead to additional uncertainty of private households and firms. Despite the fact that the number of infections quickly declined to low levels, the Chinese lockdown is still rather strong at the current edge. Currently, a lockdown has been implemented in Shanghai. Due to geopolitical advantages and social habits with respect to the wearing of facial masks, Japan experienced a low number of infections in the beginning of the pandemic. Higher infections, probably also caused by the Olympic Games led to stricter lockdowns in the later period. Since then, the restrictions have been relaxed to some extent, but are still sizeable.

Many African countries showed a moderate evolution of infections and fatalities. Since the outbreak of the virus in the world economy, most governments took drastic measures to slow down the spread of the virus. However, they were forced to re-open their economies rather early even though the number of cases was higher than when they decided on lockdowns. The lower spread of the virus may be explained in terms of a younger population, higher temperature and less developed travel systems.

One popular alternative to the Oxford indicator is the Google mobility index designed to measure individual mobility behaviour. Different categories are distinguished, such as the visits to parks, retail and recreation, public transport and workplaces. Changes in mobility are expressed relative to a benchmark observed just before the outbreak of the pandemic, i.e. Jan to Feb 2020. Therefore, the information content of the indicator is rather limited, as seasonal patterns are involved. Compared to the benchmark, the Google index shows an increase in mobility in the later period, probably not due to weaker restrictions but also due to warmer temperatures after winter.

3. Macroeconomic impact of the pandemic

The Corona virus led to a deep recession especially in the advanced countries and large emerging markets. However, the impact cannot be easily quantified, as the Corona period is still too short at arrive at robust conclusions. Cross section regressions are hardly suited to estimate the macroeconomic effects, as country heterogeneity is neglected, and parameters are subject to instability. Time series regressions are also not appropriate. Due to the low (quarterly) frequency of national accounts data, about six observations are available up to the current edge. Therefore, some studies inferred the Corona effect from pre-crisis relationships. Based on costs of natural disasters of the past, Ludvigson et al. (2020) estimated the effects for the US economy. The Corona shock is treated as a sequence of large disasters in a VAR model. Even under the conservative scenario, the pandemic led to cumulative losses in industrial production of 20 percent and in employment in the services sector of 40 percent over a one year period. Hence, massive reallocations of labour are involved. Chudik et al. (2021) used a global VAR environment to capture the international dimension of the crisis. The relationship between output growth and excess financial volatility is subject to threshold effects for both advanced and emerging market countries. The Corona shock is identified by the IMF forecast revisions for GDP growth. The results suggest that the pandemic caused a long-lasting decline in global output, although the effects are unequal in different regions if the world economy. While Asian countries are less affected and boosted by the Chinese catching up process, the impacts are larger in the West. Because of the strong interlinkages through trade, the findings call for a coordinated multi-country policy response to mitigate the effects of the pandemic.

Other studies determined the effects by simulation models. As such, the results are heavily shaped by initial assumptions and the calibration of equations. Mandel and Veetil (2020) found global output losses of 23 percent if many countries operate under lockdown conditions at the same time. Depending on the substitutability of inputs, trade in intermediates along global value chains can amplify the effects substantially. The recovery period increases if partial lockdowns remain in place. Based on a CGE model, Walmsley et al. (2021) concluded that GDP in the US will fall between 15 and 23 percent over a two year period, depending on the duration, the strength of the virus and the availability of vaccines. The combination of mandatory closures and partial reopenings of businesses appears to be the most relevant factor affecting the results. Due to oversimplified assumptions, the simulation evidence can be presumably interpreted as showing the upper bound. For example, markets are perfectly competitive and assumed to adjust instantaneously. Reductions in output are accompanied by a corresponding decline in wages and salaries as people become unemployed, with adverse effects on consumption. In addition the simulations do not take into account the huge stimulus packages which have prevented a larger fall in disposable income of many households.

To assess economic activity at a higher frequency, several real time indicators are available, such as tons of freight transported by carrier, electricity demand, claims for unemployment insurance or non-farming wage bills. While they capture different aspects, their relation to the overall economy is unclear. Early indicators and purchasing manager indices may offer a more comprehensive picture and could be taken as a proxy for contemporaneous economic activity. Dreger and Gros (2020) reported evidence that the Oxford indicator is important to explain monthly economic sentiment in the EU. It is also shown that sentiment aggregated per quarter is highly correlated with GDP growth on the year-on-year base.

In the following, the quantitative impact of Corona on GDP growth and inflation is inferred from the forecasts of major institutions before and after the outbreak of the pandemic. With respect to the non-Corona factors, both forecasts broadly rely on a similar information set. In particular, the paths of output and inflation expected by the IMF in Spring 2021 and Autumn 2019 (Update January 2020) are compared. The pre-crisis forecasts are treated as the benchmark. While the virus caused huge forecast revisions, the contribution of other factors can be almost neglected. Thus, the bulk of the differences should be attributed to the outbreak of the pandemic. Spring 2021 forecasts are preferred over those from Spring and Autumn 2020. In the earlier reports, the IMF expected a fast recovery and a relatively short period of the lockdown, implying that Corona related effects are likely underestimated. Forecasts of other institutions like the OECD or surveys of professional forecasters show a very similar picture. Fig. 2 hold the outlook revisions in 2020 and 2021 for advanced countries and emerging markets in terms of GDP growth and inflation.

The macroeconomic impact of Corona is probably long lasting. Global production declined by 7 percent of GDP after the outbreak of the pandemic. Due to the later relief of the lockdown and cyclical effects, a moderate recovery is expected for 2021. However, world output will still be 4 percent below the pre-crisis steady state. While the US, China and South Korea are expected to recover relatively fast, the crisis caused more detrimental effects in the Euro area, the UK and especially in India.
Compared to output growth, the forecast revisions for CPI inflation are only modest, often between 0.5 and 1.0 percentage points.\(^5\)

Differences of GDP growth and CPI inflation compared to pre-crisis benchmark, based upon IMF forecasts in the World Economic Outlook, various issues.

It should be noted that the sectoral composition changed considerably. Services are often more affected by the lockdown than manufacturing. While the latter suffered from the fall in foreign and domestic demand, services with high personal interactions, such as transport, travel, accommodation and entertainment showed the largest contraction, due to the complete closure of businesses. The share of low skilled workers is rather high in some of these sectors. The losses are lower in services with high skilled workers and the potential to do remote work. Examples include ICT, finance and banking, management and ecommerce. In addition, Corona promoted the trend towards the digitalization of social and economic activities. Communication tools are essential to keep collaboration running. The tools play an increasingly role in everyday work in the future. Working from home will be much more accepted than it was before the crisis started. According to a recent survey conducted by McKinsey, firms accelerated the digitization of their customers and supply-chain interactions as well as their internal operations by about three to four years. The share of digital or digitally enabled products in firm portfolios sped up by roughly seven years.

\(^5\) Since inflation forecasts for 2021 have not been published in Autumn 2019, the comparison is limited to the first year of the pandemic.

\(^6\) Higher prices of energy and raw materials led to a tremendous increase in inflation in 2022. There are different factors behind this evolution, such as the faster-than-expected recovery, i.e. less negative output gaps, especially in the Anglo-Saxon countries (footnote 4) after the lockdown and the war against Russia and the Ukraine.

Thus, the crisis had already long lasting effects on the economy. The qualification profile of workers will change accordingly, with potential implications on the alignment on labor market policies.

The Corona pandemic also affected the inequality of income, both between and within countries. Probably in contrast to the popular view, the direction of the global impact is not obvious. On the one hand, richer countries with larger fiscal capacities can mobilize more resources to combat the recession. Given that the fiscal measures are successful income losses might be less severe than in poorer countries. In fact, the relationship between per capita income and fiscal packages appears to be positive for the G20 countries, although it is not overwhelmingly strong (Fig. 3). The coefficient of determination is 0.4, and will slightly decline, if additional countries and less developed economies are included. The broader sample is probably less informative, as cross section heterogeneity is not controlled for. On the other hand, richer countries are often deeper integrated in the world economy. The virus can be transmitted easier, and lockdowns tend to be harder. Richer countries experienced larger losses in life (and income) due to an older demographic structure and higher urbanization rates. On balance, the dispersion of unweighted per capita income has fallen, see Deaton (2021) and Ferreira et al (2021). If the countries are weighted by their population, however, international income inequality increased. But this interpretation is largely driven by outliers, such as the human losses in India in later waves of the virus.

As large household surveys are still not available for the pandemic period, inference on the evolution of inequality within countries does not exist. On the one hand, there is some indication that the dispersion of income has increased. Low skilled (and low income) workers have experienced higher income losses, as they are often employed in contact-intensive services with low ability to work from home. As a consequence, they might be hit by lockdowns to a higher extent. Furthermore, the share of labour income in total income is usually high for poorer households. Therefore, these households cannot benefit from the recent surge in stock and house prices. In contrast, richer households can even overcompensate potential losses in labour income by rising capital income. On the other hand, the income decline may be compensated by increasing public transfers especially targeted to households with low income. While poverty rates in the US declined steadily during the pre-crisis period, this tendency came to a halt. Because of the outbreak of the virus, poverty rates increased again from 10.5 to 11.4 percent, according to the US Census Bureau. Nonetheless, the rise would have been probably more pronounced than without the fiscal support.

4. Fiscal packages to combat the recession

To limit the effects of the recession and the lockdown, the fiscal authorities launched a series of expansionary packages to promote the recovery. They work on top of the automatic fiscal stabilizers. The latter soften the recession without further action, as they lead to declining...
revenues and rising public expenditures. For example, tax revenues from income and consumption fall, and transfers increase due to higher unemployment benefits. Hence, the stabilizers will dampen cyclical fluctuations.

Support measures for firms and households are important to cushion the immediate impacts of the crisis. They also help to safeguard the capacity of the economy to rebound as soon as possible. The main priority is to weaken negative feedback loops and channels of contagion that could otherwise amplify the shock. For instance, liquidity constraints can lead to insolvencies, credit defaults and a banking crisis. Fiscal support can help to restore confidence of economic agents, can maintain the cash flow of firms and improve their access to capital. Ceteris paribus, the size of discretionary measures could be lower for countries with stronger automatic stabilizers and social safety nets.

The instruments are classified along several dimensions, depending on their impact on the public budget. Additional spending, transfers or tax cuts trigger higher deficits, as they are financed by a rise in government debt. Support to firms in financial trouble through loans or equity injections lead to higher debt, but a creation of assets is involved. The budget might improve in the future if the funds are repaid. Guarantees do not affect debt positions in the short run, but the government may be exposed to additional financial risks over the medium- and long-term. The size of fiscal packages and the projected evolution of the government debt to GDP ratio are shown in Fig. 4.

5. Economic impact of fiscal packages

The fiscal measures might have contributed to limit the effects of the economic recession. Due to the short period of the pandemic, time series regressions are not appropriate. To obtain preliminary insights, cross section analysis is more reliable, provided that the degree of heterogeneity of countries is not very strong. To obtain the broad picture, two cross section regressions are run, both for the sample of the G20 countries. In particular, initial output losses (2020) and the cumulative output losses over the pandemic period (2020-21) are explained by the size of fiscal packages. The former specification might be better suited to study the contemporaneous effects of fiscal policies, whether they are implemented or even announced. For instance, the EU commission decided on a recovery plan for Europe in 2020, but first financial funds from the initiative are observed not before 2021. The cumulative design is suited to take some adjustment into account. The results are displayed in Fig. 5.

In contrast to optimistic beliefs, the fiscal packages did not contribute to weaken the recession on top of the automatic stabilizers. In fact, the correlation between output losses and discretionary fiscal impulses is virtually equal to 0 and largely significant. Thus, the main effect of the additional measures is a further rise in public debt, not the desired economic outcome. Although the evidence seems to be fairly robust, it does not necessarily imply that the policies have been inefficient. The findings refer to the overall fiscal packages. They include elements such as guarantees that do not create actual, but potential financial obligations. However, if the analysis is restricted to the additional spending component, the results are similar. Furthermore, it might be argued that the effects of fiscal packages have been anticipated before the forecasts were made. Hence, an additional impact would not be a surprise. To rule out this interpretation, the regressions were re-estimated, using the earliest forecasts available after the outbreak of the virus to construct the endogenous variable. Fiscal measures have been only discussed at that stage. Again, the results remain largely stable.

It should be noted that individual components of the fiscal packages might have contributed to improve the development. To safeguard employment as much as possible, for example, several countries relieved the regulation for short time work, according to the positive experience
with this instrument during the global financial crisis. Firms can keep employment at lower costs, avoid matching frictions and save costs related to the hiring and firing of the workforce. In this sense, better short time work allowances supported the liquidity position of firms. Hence, the drop in investment is probably lower than it would be without the measure. Short time workers can benefit from the instrument, as the public subsidies stabilize their incomes and private consumption.

If longer time series become available, a more differentiated view on automatic stabilizers and fiscal discretionary measures could emerge. However, the preliminary evidence suggests that huge positive outcomes should not be taken as granted. Instead, large dead-weight and habitual effects have to be expected. For instance, the policies promoted not only the competitive and innovative enterprises. Unproductive and non-competitive firms can also receive support. The instruments lack accuracy and need to be evaluated rigorously as soon as possible. In addition, several measures are not strictly limited to a certain period. For instance, notification requirements have been partially suspended for insolvent firms and extended over an initial period. Hence, the share of zombies in the economy has likely increased. Lobbying and political pressure from interest groups can critically influence the decisions. Therefore, the economy might become less efficient and dependent on continued fiscal support, and the structural change towards a climate friendly economy could be impeded.

6. Perspectives for recovery

Since the outbreak of the Corona virus, policymakers around the globe introduced numerous emergency measures such as the wearing of masks, restrictions to mobility and travel and the shutdown of large parts of the economy, including firms, workplaces and schools. The implementation of restrictions (lockdown) helped to keep the number of infections below the capacity of health care systems in most countries. While many human lives have been saved, the lockdown contributed to a deep recession at the global scale. Advanced countries and large emerging markets experienced a sharp decline of their economies.

This paper examines the economic impact of the pandemic and the prospects for a smooth recovery. If further mutations of the virus can be kept under control and vaccines are effective, the worst of the pandemic might be already passed. However, this assumption seems to be fairly optimistic, as infection rates increased again over winter 2021. Moreover, the pandemic is not fully treated as a global phenomenon up to the current edge. The funds of the COVAX initiative of the UN are still rather low to support higher vaccination rates in less developed countries. Stronger outbreaks of the virus in these parts of the world could be imported by advanced countries. In addition, the economic conditions changed considerably, at least for some years. Higher uncertainty of private households and firms, the risk of lower productivity due to some reversal of the globalization process and a non-optimal policy management can prevent an early return to the pre-crisis steady state path.

Uncertainty of private households and firms will probably persist for several years. Risk averse agents will likely increase buffers against future shocks. Consumption and investment decisions will be influenced by the Corona experience. Despite strong economic gains, some de-globalization of production might be expected as a higher regionalization of production chains can reduce geopolitical risks of lockdowns. Fiscal stimulus packages had limited success to promote the recovery. Higher government debt and a less efficient economy due to the emergence of zombie firms place a substantial burden on the future development. This might weaken the structural change towards a climate friendly economy. As the pandemic is still ongoing, the initial assumption of a strong and fast (V) recovery does not seem to be very plausible. From the current point of view, a K-shaped recovery of the economy is more likely. While some sectors, especially technology and e-commerce can expand their activities rather fast, other areas like contact intensive services might lag behind. Dividends of digital, communication, management and creative skills will likely increase.

Although inflation increased in recent months, monetary policy remains ultra-expansive. Interest rates lost their role as policy instruments in the global financial crisis. Since then, central banks switched to unconventional measures to stimulate the economy. Depending on the persistence of higher inflation pressure, however, some reversal of the policy might be required. The exit from the expansionary policy stance bears further risks. Rising interest rates can lead to over-indebted public finances. Therefore, central bank decisions might be affected by fiscal policymakers to a higher degree. Lower credibility of the monetary authorities could contribute to higher inflation expectations, triggering an increase in actual inflation. In addition, inflating bubbles in the real estate and stock markets are largely driven by the boost of liquidity. A burst of these bubbles could have huge adverse effects on the real economy, and further fiscal support might be required.

For a sustainable recovery at the global scale, new engines of growth need to be identified. The change towards climate friendly production might be an important catalyst of the development. Deeper economic integration in East Asia could generate positive spillovers to the rest of the world. This process is heavily shaped by the Chinese economy, as it provides the largest export market for many countries in the region. Due to the rather strong rebound in China, the economic losses attributed to Corona have remained rather moderate for many Asian neighbours. Progress towards integration in the Korean peninsula would constitute an additional driver, especially in the long run. A reunification could provide access to cheap labor and abundant natural resources of the North. Combined with technology and capital in the South, an enormous economic potential can arise. According to a report conducted by Goldman Sachs, a unified Korean economy could surpass that of Japan or Germany in terms of size and influence within a period of three or four decades.

Conflict of interest

This paper was presented at the conference of the Asia Economic Community Foundation in Incheon, South Korea, on Nov. 4, 2021. There is no conflict of interest.

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