

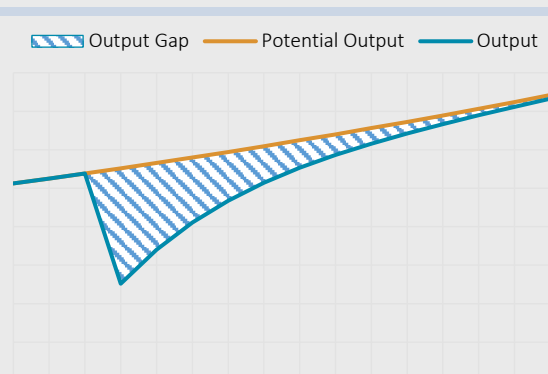
Box 7.1

Pandemic-Driven Supply and Demand Shocks and Their Impact on Potential Output and Output Gap

The coronavirus pandemic poses a great health risk for the entire world, and has strong repercussions for economies. Measures to contain the spread of the coronavirus have changed consumption behavior, affected supply chains and had a significant impact on production and employment. Simultaneous supply and demand shocks, and the interplay between them, imply a great uncertainty in estimating the effect that the deep contraction in the second quarter and the recovery in the following quarter have on the output gap and inflation. This box provides a conceptual perspective on the pandemic-driven supply and demand shocks' impact on potential output and the output gap.

Potential output is defined as the largest amount of output achievable by the factors of production, labor and capital, given the level of technology. The output gap is, therefore, defined as the gap between actual output and potential output (Chart 1). Actual output being lower (larger) than its potential, i.e. the output gap being negative (positive), implies that demand conditions in the economy are disinflationary (inflationary).

Chart 1: Potential Output and Output Gap

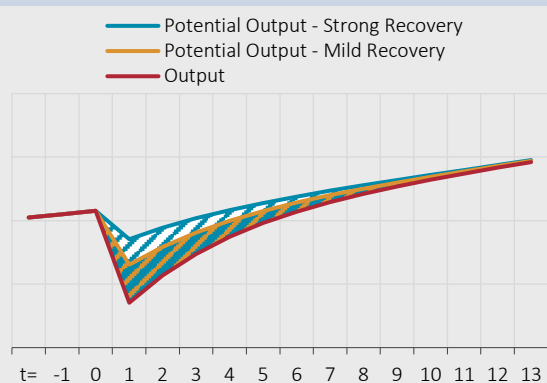


Considering that productivity along with labor and capital do not usually change sharply in the short run, potential output should not be very volatile. However, factors of production might experience severe drops in events such as natural catastrophes and pandemics, and so might potential output. Due to both the direct impact of the coronavirus pandemic and the measures taken against it, part of the population has withdrawn from consumption and production networks. This, acting as a negative supply shock, reduced both labor productivity and labor, leading to a contraction in potential output in the short run. Pandemic-related restrictions disrupted production and supply chains, and at the same time, led to lower mobility and income losses. Moreover, the distortion in international supply chains affected production negatively, and the suspension of export channels reduced aggregate demand. Lower confidence and higher uncertainty tightened domestic demand. Decomposing the decline in output into supply and demand shocks is critical to estimating the output gap reliably and understanding the (dis)inflationary impact of demand conditions.

For the second quarter of 2020, potential output is estimated to be contracting in the short term as a result of supply shocks driven by pandemic-related measures such as social distancing and mobility restrictions, while the magnitude of the contraction is highly uncertain. Given the

sharp fall in GDP, if potential output remained the same, the output gap would rapidly widen, implying strong disinflationary pressures on prices. However, depending on the size of the potential output contraction, output gap estimates differ (Barba Navaretti et al., 2020; World Bank, 2020). To illustrate the supply-side factors, Chart 2 compares the output gap in two scenarios in which potential output contractions differ in magnitude but the fall in GDP is kept fixed. The blue line depicts an economy where there is a mild contraction in potential output, whereas the orange line depicts an economy where there is a stronger contraction in potential output, at time $t = 1$ when the shock hits the economy. A comparison of output gaps denoted by the patterned areas reveals that the economy with stronger potential output contraction experiences a smaller output gap (Chart 3). In other words, depending on the size of supply shocks, the disinflationary impact of demand conditions may remain weaker.

Chart 2: Different Potential Output Contractions and Resulting Output Gaps



Blue patterned area denotes the output gap that corresponds to a mildly contracting potential output, while the orange patterned area denotes the output gap that corresponds to a strongly contracting potential output.

Chart 3: Output Gaps Under Different Potential Output Contractions (Period $t = 1$)

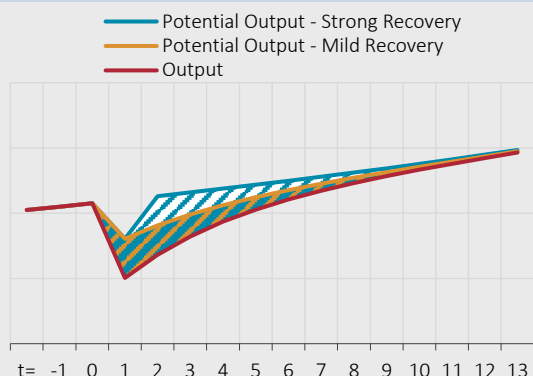


Blue patterned column denotes the output gap that corresponds to a mildly contracting potential output at time $t = 1$ (and to the blue patterned area in the Chart 2), while the orange patterned column denotes the output gap that corresponds to a strongly contracting potential output (and to the orange patterned area in the Chart 4).

In the third quarter of 2020, as part of the normalization policy, restrictions taken against the pandemic began to ease gradually. As firms opened up and factors of production recovered, potential output started converging back to pre-pandemic levels. As in the contraction period, the question of how much of the output recovery will be attributed to supply-side factors (return to activity under capacity constraints, social distancing rules applied at workplaces, etc.) is important to evaluating the demand and inflation relationship. To visualize this, Chart 4 compares the levels of the output gap occurring at period $t = 2$ in two different economies. Both economies roll back the restrictions, but potential output recovers at different speeds.

In period $t = 2$ when normalization begins, the economy indicated by the blue line experiences a sharp recovery in potential output, driven by the complete reversal of supply-side factors. In the economy depicted by the orange line, however, supply-side factors die out gradually, and potential output thus recovers in a slower manner. When there is a sharp recovery in potential output, the output gap is deeper in the negative territory, implying that demand conditions pose stronger deflationary pressures on prices (Chart 5). In this regard, large output growth figures that may materialize in the third quarter do not necessarily imply a large recovery in demand conditions. Implications of the third quarter's output growth for inflation depend on how strong the reversal of supply-side factors is. Medium-term forecasts are conditioned on output gap forecasts, which are produced under the assumption that the contraction and the expansion in the second and third quarters, respectively, are largely attributed to supply-side factors (i.e. potential output).

Chart 4: Different Potential Output Recoveries and Resulting Output Gaps in the Normalization Period



Blue patterned area denotes the output gap that corresponds to a sharply recovering potential output, while the orange patterned area denotes the output gap that corresponds to a mildly recovering potential output.

Chart 5: Output Gaps Under Different Potential Output Recoveries in the Normalization Period (Period $t = 2$)



Blue patterned column denotes the output gap that corresponds to a sharply recovering potential output at time $t = 2$ (and to the blue patterned area in the Chart 4), while the orange patterned column denotes the output gap that corresponds to a mildly recovering potential output (and to the orange patterned area in the Chart 4).

Pandemic-related restrictions work as a supply-side shock on the unit costs channel. If production costs and quantities such as wages, rents and energy were adjusted flexibly, production/sales and inputs would be reduced proportionately to contain unit cost pressures. However, as a result of fixed costs and rigidities, unit costs rise. For instance, pandemic-related social distancing rules brought along capacity constraints in certain services such as restaurants-hotels, retail industry and hairdressing, increasing unit costs significantly in these services. Furthermore, these sectors experienced a shutdown in April, and prices were updated once they opened up during the normalization in June. This justifies taking both supply and demand-side factors into account when evaluating inflationary pressures. As pandemic-related measures are rolled back as part of normalization, supply-side factors that have been dominant in the short term are expected to revert back to pre-pandemic levels. As a result, as potential output recovers, increases in unit costs should be curbed and disinflationary demand-side factors should weigh more on inflation.

References

Barba Navaretti, B., G. Calzolari, A. Dossena, A. Lanza and A. F. Pozzolo (2020), "In and out lockdowns: Identifying the centrality of economic activities", Covid Economics: Vetted and Real-Time Papers 17.

World Bank (2020), "Global Economic Prospects: Chapter 3, June 2020". Washington, DC: World Bank.