

PP440E Case Study

Is COVID-19 a Demand or Supply Shock to the Economy?¹

Updated 01.08.2021

Background reading

- World Economic Outlook – A Crisis Like No Other, An Uncertain Recovery - <https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020>
- World Economic Outlook – Managing Divergent Recoveries <https://www.imf.org/en/Publications/WEO/Issues/2021/03/23/world-economic-outlook-april-2021>
- A visual guide to economic impact of COVID - <https://www.bbc.com/news/business-51706225>
- Financial Times Global Economic Impact Tracker: <https://www.ft.com/content/272354f2-f970-4ae4-a8ae-848c4baf8f4a>
- Zombie firms –
 - <https://www.ft.com/content/85ee735e-b545-11ea-8ecb-0994e384dffe>
 - <https://www.ft.com/content/da175a86-17ad-44bf-9237-db8d4708fb21>
 - <https://www.ft.com/content/ff4dd9c8-7872-4a68-b456-e0a9b2880c4d>

Academic Articles

- Cavallo, Alberto, 2020. "[Inflation with Covid Consumption Baskets](#)," NBER Working Papers 27352, National Bureau of Economic Research, Inc.
- Chetty, Raj John Friedman, Nathaniel Hendren, Michael Stepner, and the Opportunity Insights Team, 2020. "[The Economic Impacts of COVID-19: Evidence from a New Public Database Built Using Private Sector Data](#)," November 2020. See also the full [opportunity insights tracker](#).

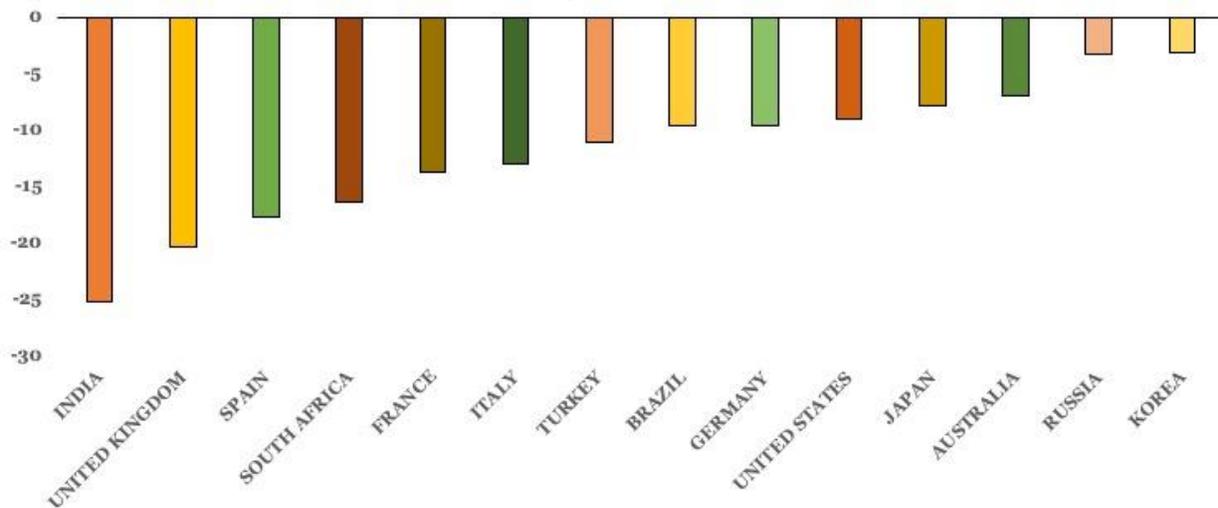
¹ This case study was written by Ethan Ilizetki and Bhargavi Sakthivel

- Guerrieri, Veronica & Lorenzoni, Guido & Straub, Ludwig & Werning, Ivan, 2020. "[Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages?](#)", NBER Working Papers 26918, National Bureau of Economic Research, Inc.
- Hacıoglu, Sinem & Känzig, Diego R & Surico, Paolo, 2020. "[Consumption in the time of Covid-19: Evidence from UK transaction data](#)," CEPR Discussion Papers 14733, C.E.P.R. Discussion Papers.
- Jaravel, Xavier and O'Connell, Martin, 2020. "[Real-time price indices: Inflation spike and falling product variety during the Great Lockdown](#)." *Journal of Public Economics* 191, November.
- Mian, Atif & Sufi, Amir, 2015. "[House of Debt](#)," University of Chicago Press Economics Books, University of Chicago Press, number 9780226271651.

1. Demand or Supply shock?

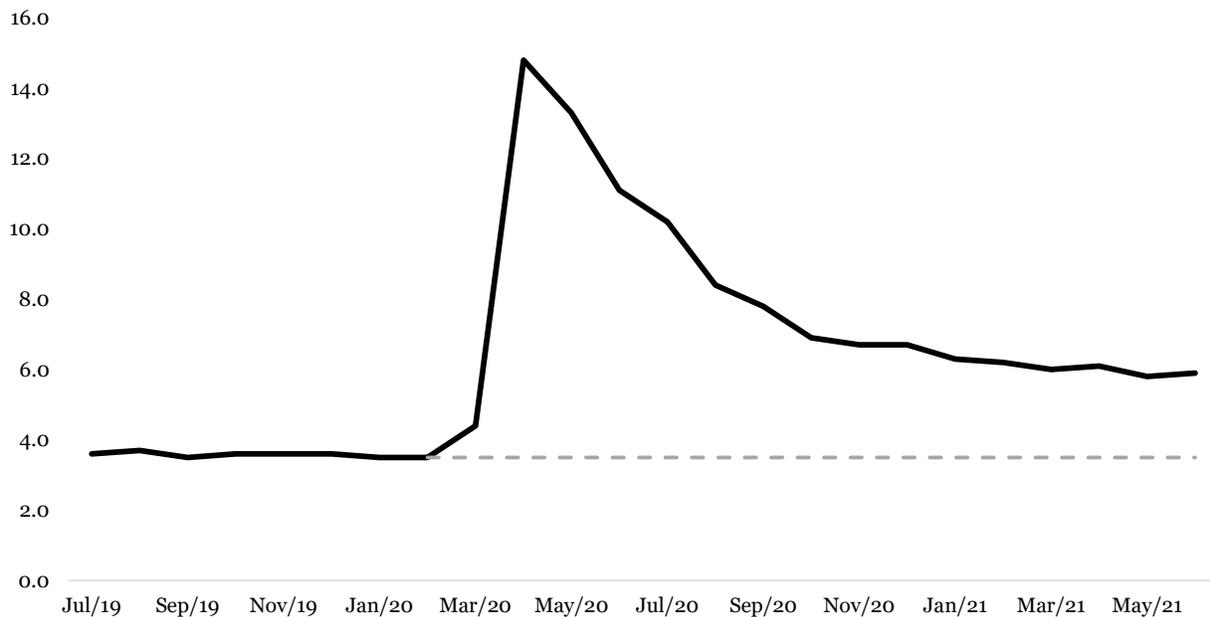
The COVID-19 outbreak threw the entire world into disarray not only because it was an extremely widespread and infectious disease but also by leading to severe lockdown restrictions and causing an unanticipated and monumental economic slowdown (Figure 1). Social distancing, whether enforced by government regulation or by consumers' own choices, meant that many businesses in the hospitality, travel, education and other service industries shut down or saw substantial declines in sales. Even in sectors that were functional, supply chain disruptions caused production slowdowns.

Figure 1: Gross Domestic Product (Quarterly Growth Rate)



This figure plots the quarterly Gross Domestic Product (GDP) growth rate in the second quarter of 2020.
Source: U.S. Bureau of Labor Statistics

Slow growth and high unemployment (Figure 2) are visible symptoms of an ailing economy. At a simple level, it is rather obvious what caused this recession: It is the pandemic itself. If people cannot work and consume less this must necessarily lead to a decline in production, income, and expenditure. At a deeper level, this is a rather difficult recession to analyse. In a macroeconomic sense, any decline in GDP will be caused by a decline in either aggregate supply or in aggregate demand. In this case, both supply and demand were affected by the pandemic.

Figure 2: U.S. Unemployment Rate

This figure plots the unemployment rate. The grey dotted line signals the February 2020 (pre-crisis) unemployment rate. Source: US Bureau of Labor Statistics.

(Negative) supply shocks reflect a reduction in the economy's ability to produce (at a price level). Sectors that have been shut down due to legal restrictions, workers who cannot go to work due to falling sick, self-isolation, or lockdowns can be categorised as part of the supply shock. *(Negative) demand shocks reflect declines in consumers' or firms' willingness to purchase goods (at a given price level).* Workers who have lost their jobs may now be unable to consume as much as before. Fear of contagion and unnecessary exposure to the virus may also cause people to reduce their consumption behaviour such as going on holiday or eating out, all contributing to the demand shock.

Typically, economists will use changes in prices or wages to identify the type of shock an economy is facing. If prices decrease along with quantities, a demand shock is more likely at play: firms are reducing their prices to meet consumers' lower willingness to pay. On the other hand, if prices are moving in the opposite direction, it is more likely to be a supply shock: firms' inability to supply goods induces them to raise prices.

The underlying source of the crisis is clear: the pandemic itself. However, it has been particularly difficult to determine whether the shock is primarily affecting demand or supply. Take the aviation sector, for instance. It may be true that holidays and travelling may not have been on most people's priority lists, supporting a demand-side problem for the sector. On the other hand, social distancing requirements have made it more costly to allow aircrafts to operate at full capacity, restricting the supply of seats on flights. Government mandated flight restrictions led to flight cancellations further limiting supply. There are also differences *across* sectors, with restaurants seeing both low demand (people reluctant to eat out) and low supply (restrictions on dining times and restaurant

capacity) while grocery shopping generally saw *increased* demand as cooking at home substituted for eating out.

It is of crucial importance for policymakers to distinguish supply-side from demand-side shocks, as the policy responses are very different in the two cases. Fiscal and monetary policy are effective in boosting aggregate demand, but these will merely lead to inflation if the shocks are from the supply side. Policy recommendations in face of a supply-driven recession are less clear, but might include subsidies to certain industries that are facing bottlenecks in production.

2. Inflation

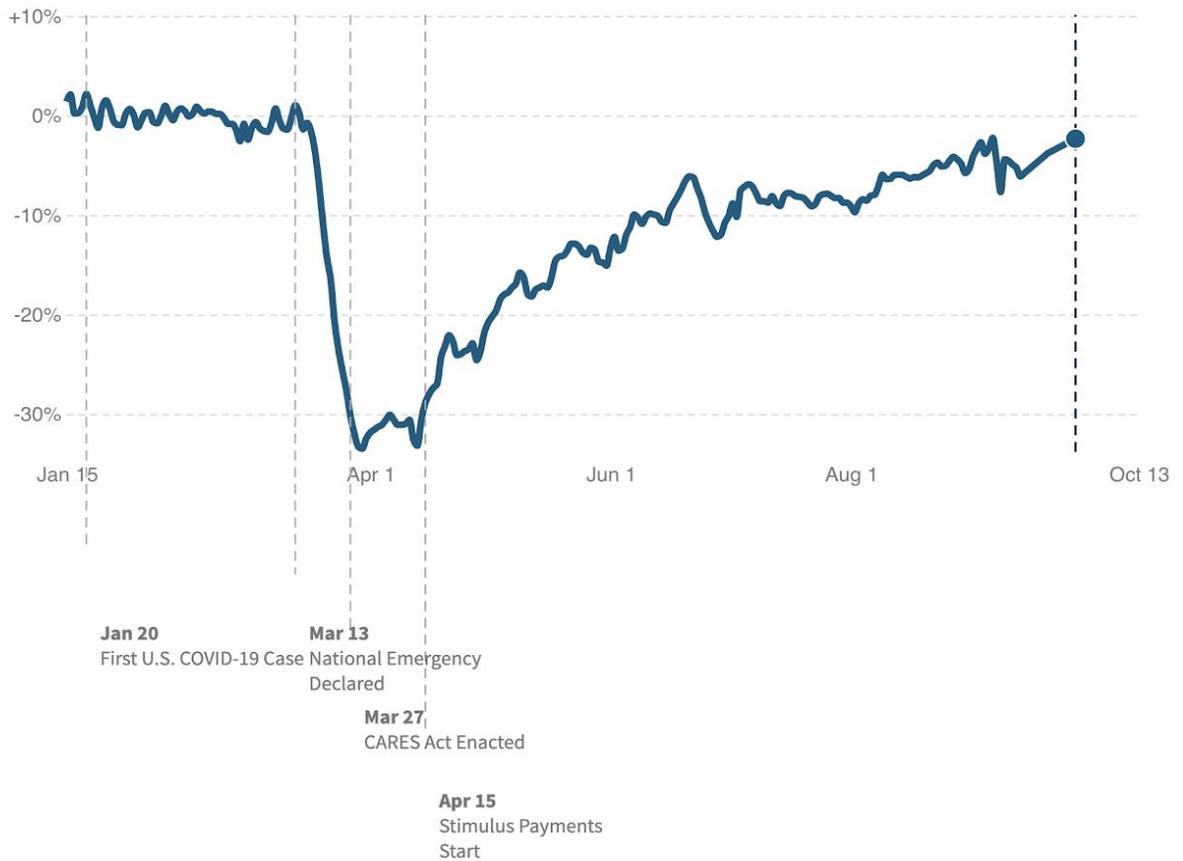
Figure 3 shows consumer spending as measured from credit card and other data and they illustrate that consumer spending decreased by nearly 30% at the beginning of the pandemic. The decline was most significant until April 15, stimulus payments began and this led to a gradual increase in consumption. However, overall consumption is yet to return to pre-crisis levels (Figure 3a). Most countries experienced similar declines in total expenditure (see the case of the UK on Figure 3b).

Isn't this sufficient evidence that the recession is due to a decline in demand? To an economist, the answer is a resounding "no"! Demand must equal supply in equilibrium. Expenditure may have gone down because consumers were reluctant to spend (consumers fearing to eat out), but it may also have gone down because the supply of desirable goods had gone down (the restaurant is closed). It is for this reason that economists also look to price signals to disentangle supply from demand.

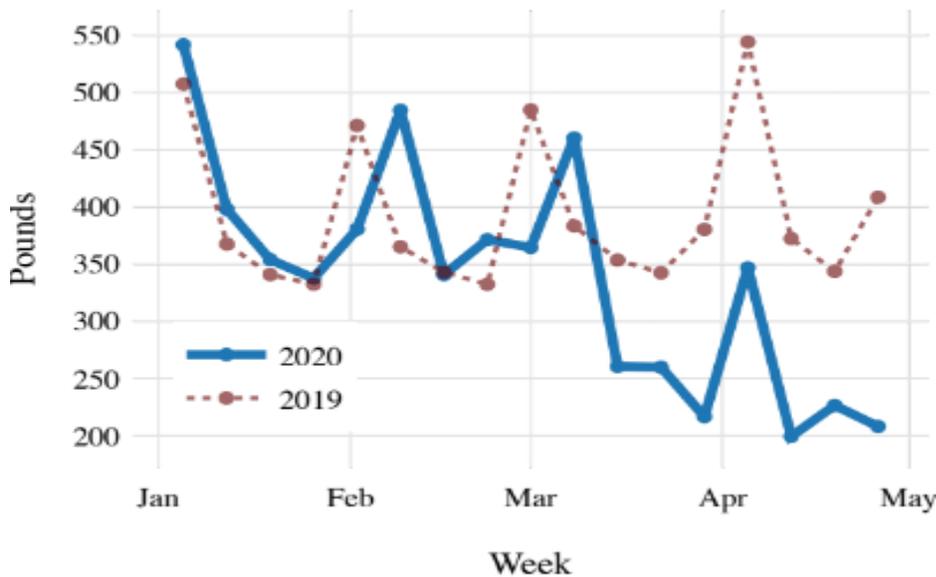
But knowing what happened to prices is hampered by difficulty in measuring inflation in real time. For this reason, economists often look at inflation expectations. Expectations can adjust rapidly and give a real-time indicator of where inflation is heading. Further, inflation expectations can easily be measured at very high frequency. Figure 4 shows the 10-year breakeven inflation rate for the US. This is calculated from the price difference between 10-year government bonds that are inflation protected and 10-year bonds that are not indexed to inflation. The price differential shows investors' willingness to pay for inflation protection and thus their expectation of (average) inflation over the upcoming decade. The figure shows that expected inflation declined by more than one percentage point from 1.63% at the beginning of February to 0.5% in mid-March. Inflationary expectations decreased significantly at the advent of the crisis during February and March of 2020. However, inflation expectations since then have been steadily climbing and have returned to pre-crisis levels by August 2020. This occurred although the economic recovery is far from complete (Figure 2).

Figure 5 shows retrospectively that inflation did indeed decline sharply in March 2020 and experienced an uptick around June 2020. This decline in inflation accompanied by a decline in output would seem to reflect a decline in demand. This is further supported by looking at high-frequency transaction data.

Figure 3: Change in Consumer Spending



(a) This figure shows the percent change in all consumer spending in the U.S. Source: [Opportunity Insights Economic Tracker](#)



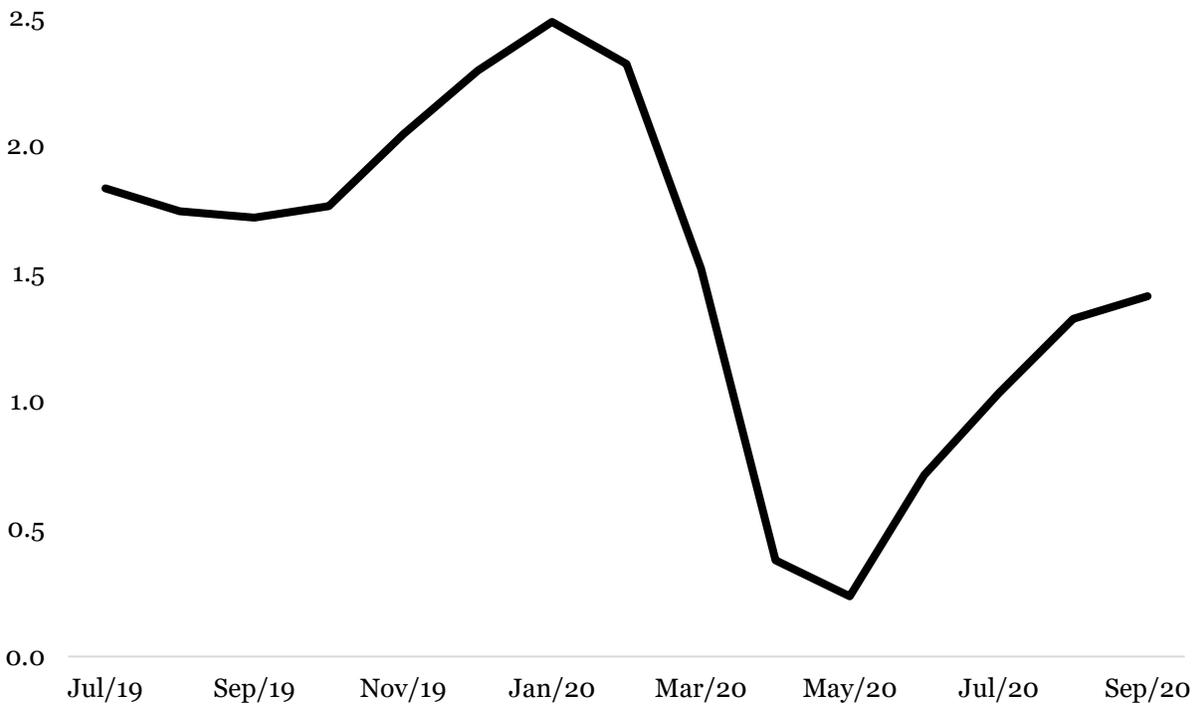
(b) This figure shows the total weekly expenditure in the UK (excluding recurring bills). Source: Hacıoglu, Känzig and Surico (2020)

Figure 4: US 10-Year Breakeven Inflation Rate



This figure represents a measure of expected inflation in the U.S. and is derived from 10-Year Treasury Constant Maturity Securities and 10-Year Treasury Inflation-Indexed Constant Maturity Securities.
Source: Federal Reserve Bank of St. Louis

Figure 5: U.S. Inflation



This figure shows the year on year growth rate of the Consumer Price Index (CPI) or Inflation of the U.S.
Source: US Bureau of Labor Statistics

Analysis of the Covid-19 shock is further complicated by the fact that it wasn't the only shock to hit the world economy. A price war between OPEC and Russia meant that oil supply *increased* dramatically, so part of the lower prices in March reflected a *positive* supply shock (see Figure 6).

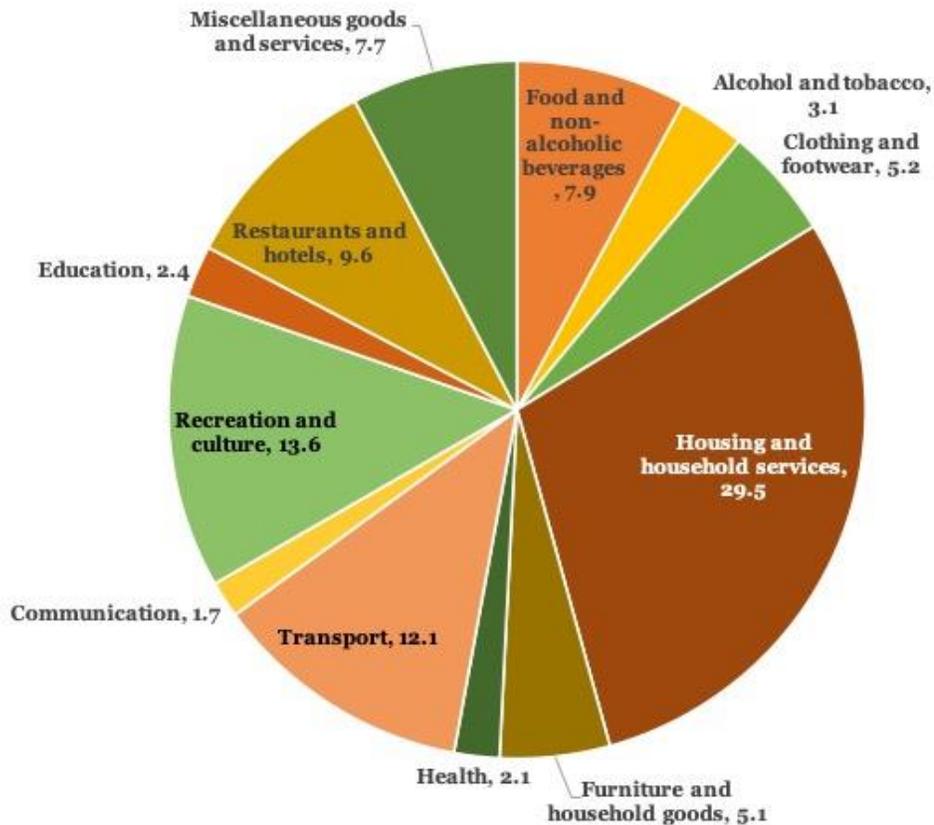
Countries commonly measure inflation based on a consumer basket (see Figure 7). The Consumer Price Index (CPI), is a weighted average of prices in the consumer basket which includes housing, food and beverages, recreation etc. The CPI is the most commonly used index to measure inflation, which is just the percentage change of the CPI. During the pandemic, the consumer basket looked vastly different from its composition in a regular year. This makes it very difficult to assess what actually happened to inflation in this period.

Figure 6: Oil Price (Brent Crude) in US dollars per barrel



This figure shows the Oil Price (Brent Crude) in US dollars per barrel. Source: U.S. Energy Information Administration

Figure 7: Consumer Basket of the UK

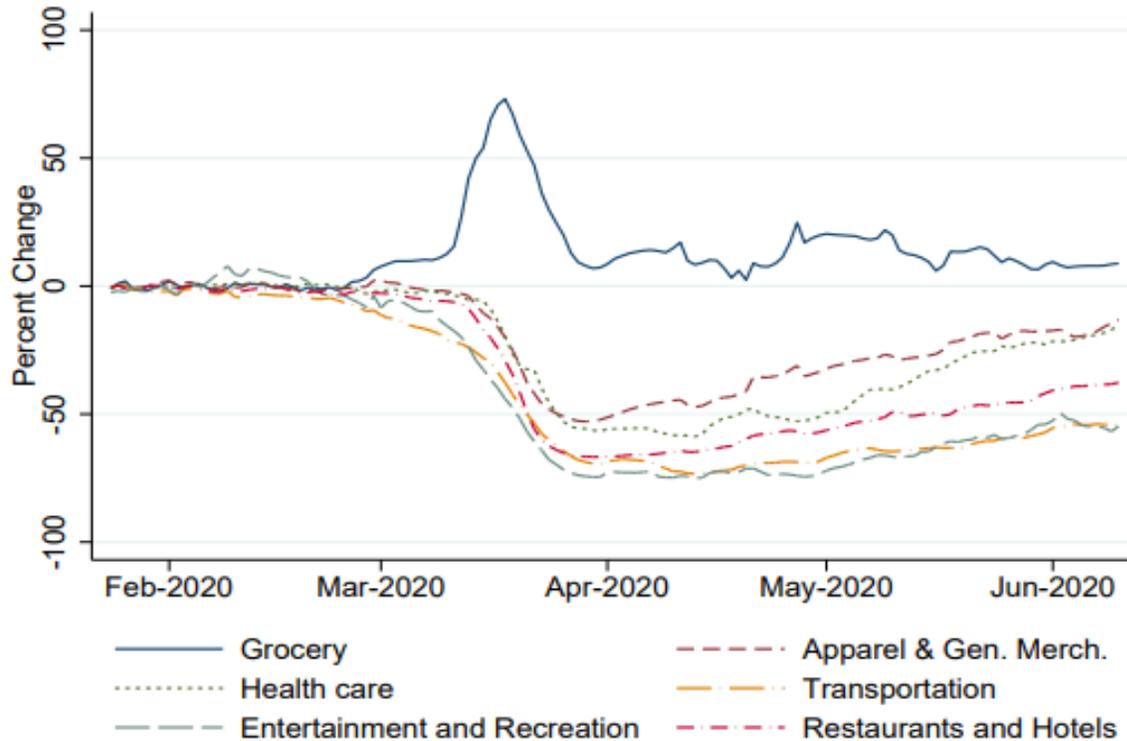


This figure shows the weight of each sector in the consumer basket of the UK. Source: Office of National Statistics

In fact, because the consumer basket has fixed weights, the shift in consumer behaviour due to the pandemic was not appropriately recorded and there is an inherent measurement issue with inflation rates. Consider the UK consumer basket. In February 2020, in the UK, when restaurants and bars were still open, a sizable population frequented these establishments. However, in March 2020 with their closure, there was an increased demand for groceries and supermarket goods as restaurants and pubs closed. So, although consumers are shifting away from contact sectors where prices are declining drastically, they are substituting into other sectors which saw much higher inflation. However, the weighting of each sector to the consumer basket that the CPI is based on is fixed and so with the constant basket, prices appear to be declining overall as seen in the sharp deflation that is evident in the official inflation figures (see Figure 4).

To correct the mismeasurement issue, Cavallo (2020) updated the weights of the different sectors in the consumer baskets in several countries by using credit and debit card data. He found that the inflation rate using the updated consumer baskets was much higher than the official inflation rates using the constant consumer baskets. In other words, the modified consumer baskets suggest that while there may be deflation in the US economy, it may not be as large as the data suggests (see Figure 8).

Figure 8: Changes to U.S. Consumer Spending



This figure plots the changes in the U.S. Consumer Spending during the pandemic by sector. Source: [Cavallo \(2020\)](#)

Jaravel and O'Connell (2020) find that inflation in the UK was 10 times higher than in previous months at the onset of the pandemic. By using supermarket scanner data, they observe that in addition to demand spikes, the cause of the increase in inflation can be attributed to reduced varieties and higher prices for most products which may arise due to supply chain disruptions or changes to market power. This shows that while official figures were showing a deflation, actual prices may have been rising.

Thus, even with modified consumer baskets, studying inflation rates does not have a straightforward interpretation, especially when inflation includes the prices of movie theatres at a time when such entertainment centres are shut down. Wages may be an alternate variable that can be used to identify the type of shock in the economy. However, even disregarding the slow pace of wage adjustments, it is imperative to be cautious of interpreting co-movements between wages and production since fiscal policies have also had a significant role in the post-pandemic world with regards to subsidising businesses, paying salaries of furloughed workers, etc.

3. Interaction between Supply and Demand shocks

It is premature to evaluate whether policymakers should be more concerned about supply and inflation or demand and deflation for yet another reason. Recessions that begin as supply shocks could propagate to have demand side effects and vice versa. Consider a recession that begins because of an adverse demand shock reflected as firms' lower ability to produce. These firms may go out of business, fire workers, and thus harm consumers, who will go on to demand less goods and services (beyond the direct effects of the higher prices due to lower supply). See Guerrieri et al. (2020) for a theory of supply to demand spillovers.

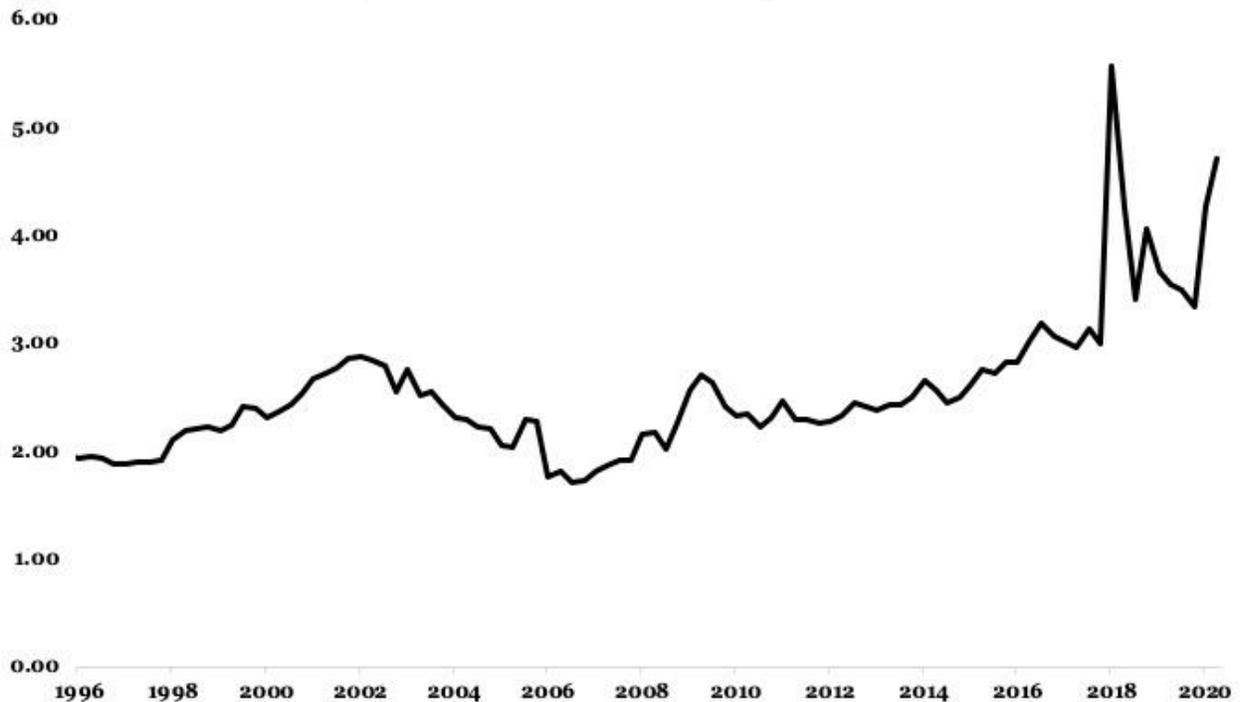
Further, a prominent view of demand-driven recessions puts debt and leverage at front and centre. Mian and Sufi (2015) argue that high leverage of mortgaged homeowners was central to the global financial crisis in the US in 2007-9. The average US household entered this recession with a healthier balance sheets than in the previous recession (but this could change and isn't the case in the UK, for example). During the "great lockdown" of 2020 it is firms' balance sheets may prove an important risk factor.

Many firms have been struggling to operate in these not so normal times. Faced with restrictions, furloughed staff and decreased demand, many firms have racked up enormous debts merely to stay afloat. Even before the pandemic, due to low borrowing costs and unofficial change in approach to leveraged loan guidelines in late 2017, corporate debt to earnings was at historical highs in the US, rapidly expanding in 2018. (see Figure 9).

As firms accumulate debt, their incentives may dramatically change and may harm both aggregate demand and aggregate supply. Similarly to households in the previous crisis, firms with high leverage may channel their earnings to debt repayment at the expense of expenditure on hiring new workers and new investments, thus lowering aggregate demand. Further, high leverage make firms more sensitive to small fluctuations in asset prices. Mian and Sufi (2015) explain how unfavourable changes to asset prices can cause losses to the leveraged players and result in reduced demand, further decreasing asset prices and spiralling further. In the current pandemic, many businesses have benefited from cheap credit from governments and central banks, but this has led to a substantial increase in corporate debt in high income countries.

At the same time, lower expenditures on new investment may also harm supply. With less investment in new products and new price-saving measures, productivity may slow down and have long-term implications on the economy's productive capacity.

Figure 9: Non-financial Corporate Business Debt to Earnings



This figure plots the ratio of Corporate Business Debt to Earnings and can be thought of as a measure of corporate debt overhang. Source: Board of Governors of the Federal Reserve System (US).

4. The Recovery Phase

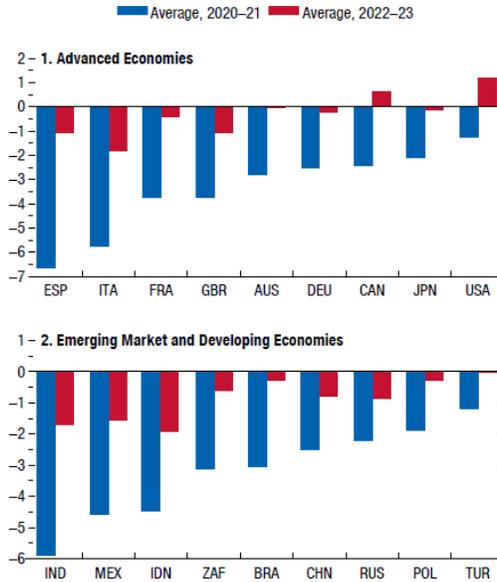
The IMF’s World Economic Outlook report of April 2021 was entitled “Managing Divergent Recoveries”. With large shares of the population in the US, Canada, the UK, and the EU now vaccinated, high income economies are seeing a strong recovery in 2021. In contrast, many developing countries are seeing rapid spread of the virus causing not only major loss of life, but also economic disruption. With the Delta variant spreading in high income countries, the recovery of these economies cannot be taken for granted either, although it is unlikely to see a slowdown of the magnitude of the 2020 “great lockdown”. The IMF report predicts that most countries will be operating well under their long run potential this year (Figure 10).

Unemployment in high income countries also still has a way to go on its way to a full recovery. (See the most recent data for the US in Figure 2). The most recent inflation data has given some support to the more pessimistic voices. Figure 11 updates Figure 5 with data up to mid-2021. On the other hand, inflation expectations have seen an uptick, but still to moderate rates. This is seen in Figure 12, which updates Figure 4 to recent months.

Figure 10: Output Gap for Selected Countries, IMF Estimates and Forecasts

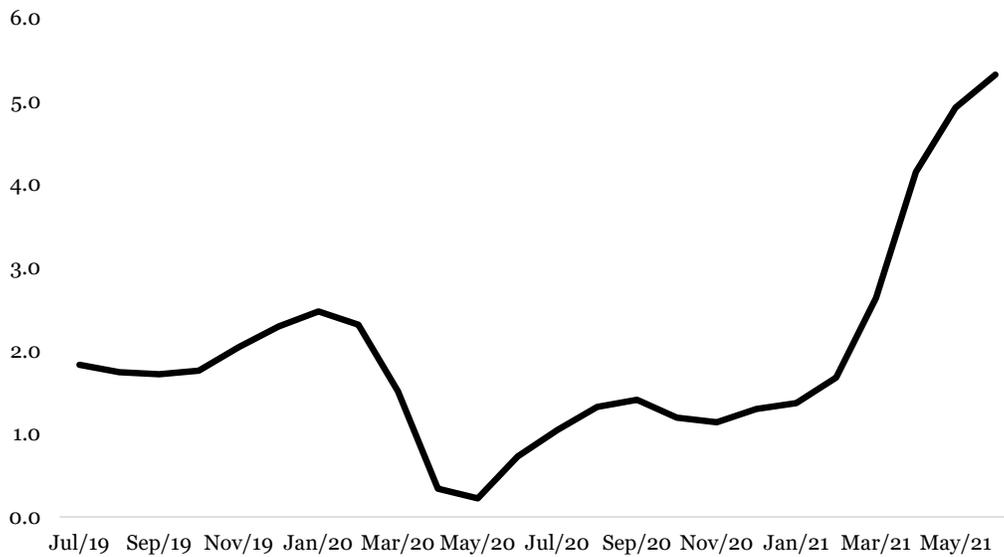
Figure 1.12. Output Gap Projections, 2020–23
(Percent of potential GDP)

Considerable slack is expected in advanced economies and emerging market and developing economies.

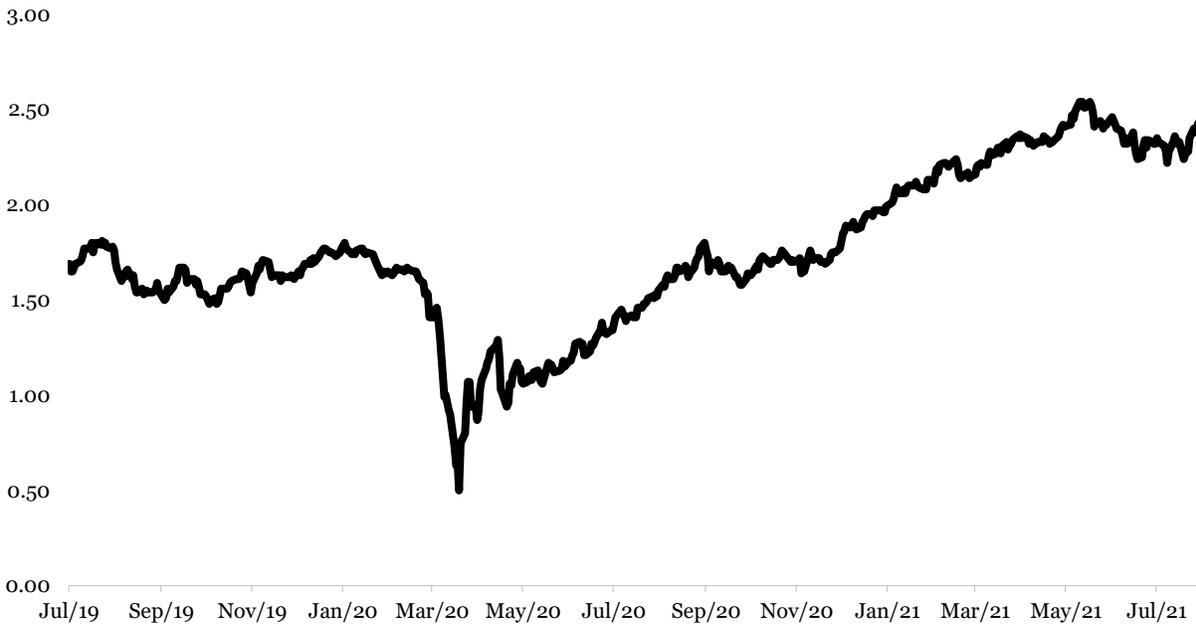


This figure plots the IMF’s forecast of the output gap—the gap between GDP and its long run potential—for selected high-income and emerging market economies for the years 2020-2021 and 2022-2023.

Figure 11: U.S. Inflation



This figure shows the year on year growth rate of the Consumer Price Index (CPI) or Inflation of the U.S.
Source: US Bureau of Labor Statistics

Figure 12: US 10-Year Breakeven Inflation Rate

This figure represents a measure of expected inflation in the U.S. and is derived from 10-Year Treasury Constant Maturity Securities and 10-Year Treasury Inflation-Indexed Constant Maturity Securities.

Source: Federal Reserve Bank of St. Louis

5. Conclusion

Many countries are seeing a resurgence of the pandemic and policymakers' main concern remains containing the pandemic itself. As economist Austan Goolsbee put it: "the number one rule of virus economics is that you have to stop the virus before you can do anything about economics." Although the economy is far from fully recovered, inflation expectations are now higher than their pre-crisis levels. The majority of monetary and fiscal policies put in place around the world during the crisis took the form of social insurance (to both households and firms) to try to avoid a full collapse of the economy and preliminary evidence supports the view that these policies supported consumer spending throughout the first phase of the pandemic. The next round of fiscal policy may take on different forms and the appropriate responses will depend crucially on whether supply or demand factors are front and centre.

Glossary

- Debt overhang: A condition when debt is so large that all income goes towards its repayment
- Deflation: Negative inflation, a situation when prices decrease
- Leverage ratio: The proportion of debts compared to its equity/capital.

Discussion Questions:

- 1. Based on your work or personal experiences during Covid-19, does a demand-side or supply-side explanation seem a better characterization of the Covid-19 recession?**
- 2. Why might your personal experience be unrepresentative of the economy as a whole?**
- 3. Why might your experience, even if it were representative, not be valid evidence of the source of the shock?**
- 4. What do you view as the greatest risks to the economy (supply or demand driven) going forward?**