

The COVID economic crisis. (additional chapter for ``Macroeconomics, 8th edition).¹

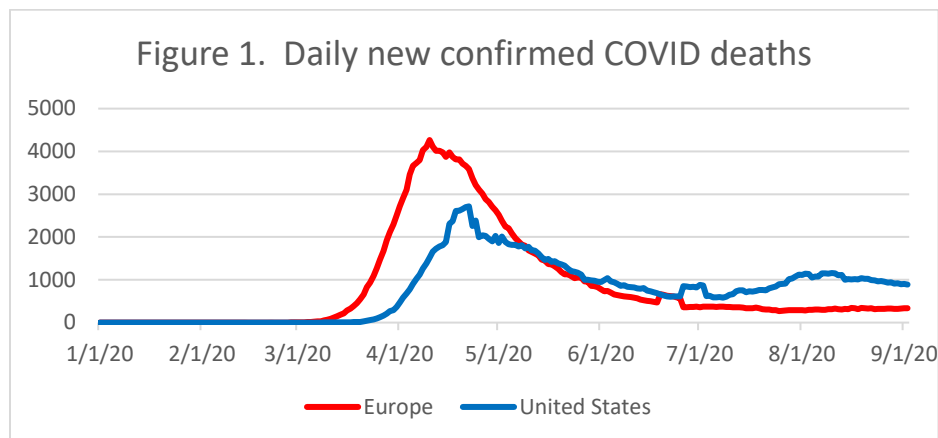
Olivier Blanchard, September 2020

In December 2019, newspapers started reporting cases of infection from a new virus in Wuhan, a large city in China. On January 23, 2020, the Chinese authorities put Wuhan on lockdown: All movement in and out of Wuhan was stopped, all public transport within Wuhan was suspended, and people were required to stay home.

The rest of the world watched, wondering what this disruption would do to China, and by implication, to China's economic partners. Would some of the global supply chains, many of them relying on some of the production being made in China, be disrupted?

What took some time to absorb was the notion that the virus would not stay in China but would cross over to the rest of the world. By January, virus cases appeared in Italy, then in the rest of Europe. By February, it had crossed to the United States.² Figure 1 plots the number of COVID deaths from January on, for both Europe and the United States. Deaths increased sharply in Europe from early March on. The United States followed just a few weeks later.

Faced with this sharp increase, country after country took drastic measures, and by the end of March, nearly all countries were on lockdown. In Europe, deaths peaked in early April at 4,000 deaths a day. In the United States, they peaked in mid-April at more than 2,500 deaths a day. From then on, deaths started to decrease. By the end of May, most strict lockdowns were ended. Deaths reached a low in July but have increased slightly in the United States since then.



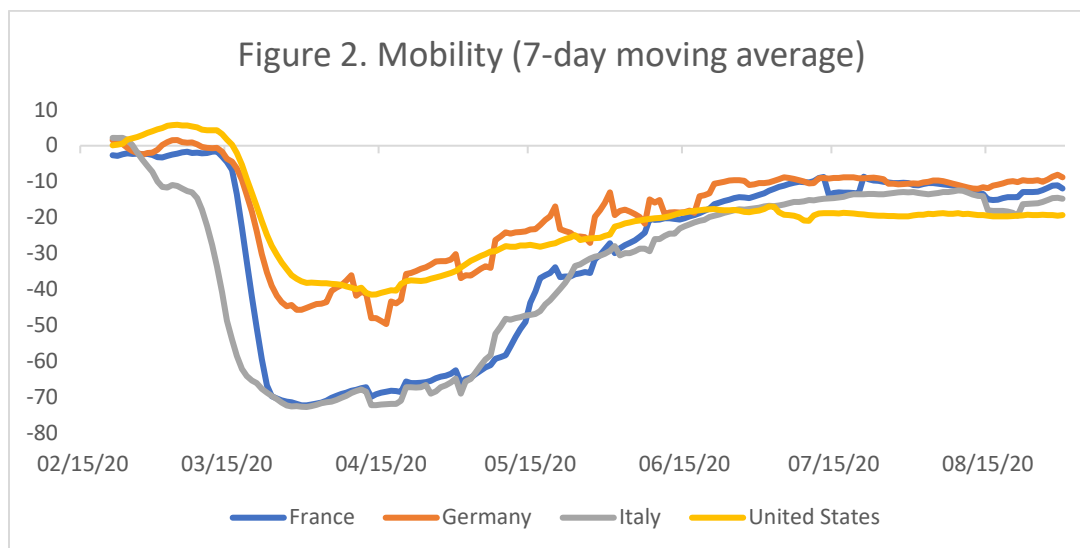
¹ While the chapter is an addition to the 8th edition of "Macroeconomics", it is largely self-contained. It just requires basic knowledge of the IS-LM, and of the notion of the natural level of output.

² For the progression of the pandemic across time and countries, a nice visual representation is given in <https://eiuperspectives.economist.com/healthcare/covid-19-tracking-pandemic>

Source: <https://ourworldindata.org/covid-deaths>

What triggered the economic crisis itself was not the number of deaths; while sad and scary, deaths remained very small relative to the size of population. It was the policy decision to lock down the economy, to avoid further potentially catastrophic increases in infections and deaths.³

This decision had immediate and dramatic economic effects. These are shown in Figure 2, for the United States and three European countries, Italy, France, and Germany. As there are no official activity statistics at a daily frequency, the measure of activity plotted in the Figure is a Google mobility index, constructed by Google based on smartphone data, which measures how much people move to buy goods or to go to work⁴. The data plotted in the Figure gives mobility levels relative to their average January 2020 value. The initial drop in mobility was sudden and large, with mobility dropping by 70% in France and Italy, by 50% in Germany, and by 40% in the United States. Mobility remained very low until the end of the strict lockdowns in May, and then slowly recovered. At the time of writing, it remains however at 10-20% below its January level.



Source: Google mobility index. <https://www.google.com/covid19/mobility/>

Mobility measures are precious as daily indicators, but they are only proxies for economic activity. We now have the numbers for GDP for the first two quarters of 2020, and these are given in Table 1 below for the same four countries. The table gives the level of real GDP for each quarter, relative to GDP in the

³ Side note: There was, and still is, a controversy about how much of a lockdown was needed. An alternative view was that governments should let the infection rate increase and go for “herd immunity”, with a sufficient portion of the population having been infected so further infection naturally declined. Governments felt however that the human cost would be much too large.

⁴ Side note: One of the effects of the COVID crisis is the increased use of “big data” to get real time information about health and economic developments. See for example the site built by Raj Chetty and others, <https://opportunityinsights.org/paper/tracker/>

last quarter of 2019. It shows how large the decrease in activity has been since the start of the crisis, with second quarter GDP standing, depending on the country, between 81% and 90% of its precrisis level.⁵ For comparison's sake, GDP at the end of the Great Financial Crisis stood at 96% of its precrisis level.

Table 1. GDP indices (2019q4= 1.00)

	2019 q4	2020 q1	2020 q2
United States	1.00	0.99	0.90
France	1.00	0.94	0.81
Germany	1.00	0.98	0.88
Italy	1.00	0.94	0.82

Source: Macrobond.

The focus of this chapter is on why output decreased so much, what policies were adopted, and what might lay ahead. Here is a preview:

What happened first was a major policy-induced supply shock. The lockdown forced firms in several directly affected sectors, from restaurants to hotels to airlines, to halt (or at least to drastically decrease) supply. In contrast to other supply shocks we have analyzed earlier in the book---such as an increase in the price of oil, where firms could pass on oil price increases and continue to operate--- many firms had no choice other than to stop or decrease production.

As a result of sharply lower output, and thus lower income, and of increased uncertainty, this shock had a major effect on demand, not just in the sectors directly affected by the lockdown, but also in the non-affected sectors. Thus, the outcome was a combination of a supply shock and a sharp demand response.

In that context, the role of macroeconomic policy was twofold. First: While it could not do much to increase output in the affected sectors, it needed to protect the firms in those sectors from going bankrupt and the workers who lost work from going hungry. Second: It needed to limit the effect of lower demand in the non-affected sectors. It did both, through a combination of fiscal and monetary measures. The decline in output has been very large, but, absent the strong macro policy response, it would have been much worse.

At the time of writing, the infection rates are roughly stabilized, but at different levels---higher in the United States than in Europe. General lockdowns are gone, but many restrictions are still in effect, and new clusters of infection lead to further localized measures to restrict contagion. A reliable and widely available vaccine is at least six months to a year away. The urgent question facing governments is what set of measures they need to take now until the economies are in post-vaccine mode. The less urgent question is what policy measures they need to take to prepare for the post-COVID economy.

⁵ The difference between the decrease in mobility, up to 70%, and the decrease in GDP, 10-20% at most, is striking. The economy can largely function with much less mobility...

The rest of the chapter develops and formalizes this story. Section 1 develops a simple model with two sectors, one directly affected by COVID, the other not, and looks at the overall effects of the lockdown. Section 2 then looks at the role of macroeconomic policy during lockdown, and the measures that were taken. Section 3 looks at the economy post-lockdown and pre-vaccine, namely at the economy as it is at the time of writing, and what the legacies of the crisis might be post-vaccine.

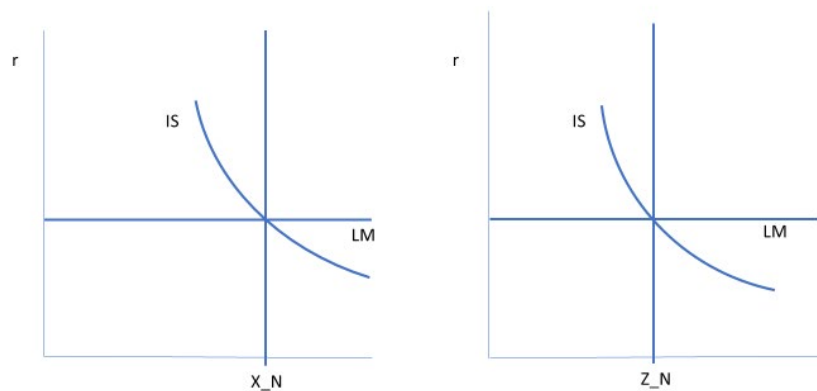
Section 1. The economic effects of the lockdown.

In previous chapters, we thought of the economy as one big sector, and did not differentiate between different sectors. To understand the effects of the COVID shock, we need to relax this assumption and think of two sectors. The first is directly affected by COVID; think of it as composed of restaurants, hotels, airlines, as well as their suppliers. Call it the “affected sector,” and refer to its output as X . The second is not directly affected by COVID, but is potentially affected by a decrease in demand. Call it the “non-affected sector,” and refer to its output as Z .

Starting from a situation in which both sectors are operating at their natural level, we suppose that demand for either sector’s output is equal to its natural level of output. The equilibrium is represented in the two panels of Figure 3. The left panel shows the equilibrium in the affected sector, the right panel shows the equilibrium in the non-affected sector.

The vertical axis in both panels measures the interest rate. The horizontal axis in the left panel measures output in the affected sector, X ; the horizontal axis in the right panel measures output in the non-affected sector, Z .

Figure 3. Initial equilibrium in both sectors



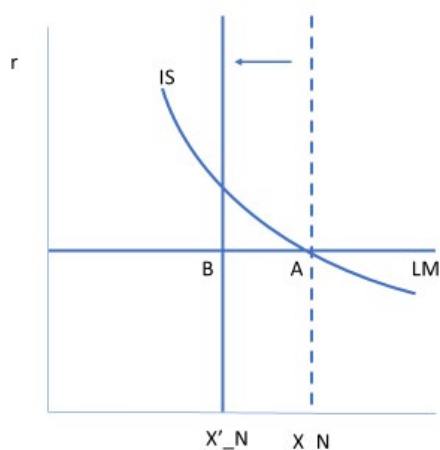
The demand for the goods produced by each sector is represented by the two IS curves, which are specific to each sector. A lower interest rate increases demand for each type of good, and so both IS curves are downward sloping. The interest rate, which is set by the central bank for the economy as a

whole is the same for both sectors and represented by the two flat LM curves.⁶ The natural levels of output in each sector are given by X_n (n for natural) and Z_n respectively.⁷

The way I have drawn the three relations is such that the IS and the LM curves intersect at the natural level of output in each sector. Thus, both sectors, and by implication the economy as a whole, are operating at their natural rate. This is actually not a bad description of where advanced economies were pre-COVID: Output was roughly at its natural level when the COVID crisis hit.

Now assume that the government imposes a lockdown and look first at what happens in the affected sector. On the supply side, output is constrained to decrease, say from X_n to X'_n in Figure 4. Think of restaurants being ordered to close or to remain open under strict conditions, limiting the number of customers they can accommodate. The remaining question is what happens to demand. The simplest assumption is that, knowing that restaurants are closed, customers just do not show up. In effect, demand decreases with supply, and the equilibrium goes from point A to point B. This is a simplification: Demand may go down by more than supply: Even if restaurants can accommodate some customers, customers may be worried enough to stay away anyway; even if airlines still have flights, people may not want to fly. I shall ignore this complication here.

Figure 4. Decrease in output in the affected sector



In short, output goes down in the affected sector because of the lockdown.

The more interesting part of the story is what happens in the non-affected sector. Given our definition of the sector as non-affected, there is no change in the natural level of output, Z_n : Firms are not affected by COVID and can produce in the same way as before. The focus is thus on what happens to demand. One can think of a number of effects:

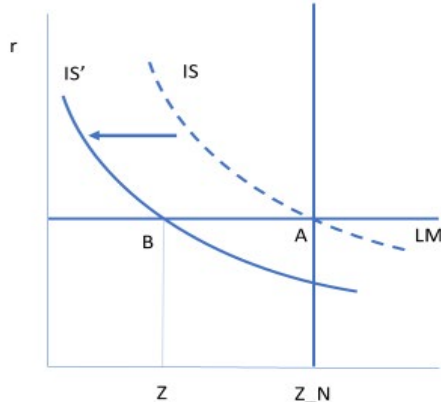
⁶ Side note: Recall, from Chapter 4, that we assume the central bank to choose the interest rate and adjust the money supply so as to achieve that rate. Thus, the LM is drawn as an horizontal line.

⁷ Side note: See chapter 8 for a characterization of the natural level of output.

- To the extent that goods produced by the two sectors are substitutable, there is an increase in the demand for the goods produced by the non-affected sector. If people cannot go to cinemas, they watch more Netflix. If they cannot go to restaurants, they order more take-out. This effect increases demand, shifting the IS curve to the right.
- To the extent that people lose their jobs in sector X, then, unless fiscal policy compensates (more on this below), the large decrease in their income leads to a large decrease in demand for goods Z. For example, a laid-off worker from the airline industry may delay buying a car. This effect decreases demand, leading to a shift in the IS curve to the left.
- Given the uncertainty about how long the COVID will last (e.g. whether the government has the infection under control; whether and when there will be a widely available vaccine; and whether jobs in the affected sector will come back), consumers are likely to worry about the future, and thus do precautionary saving and limit their consumption. This again will shift the IS curve to the left.

The likely outcome, absent a macroeconomic policy response, is shown in Figure 5. The second and third effects are likely to dominate the first, leading to a shift in the IS curve to the left. At a given interest rate, the equilibrium shifts from A to B, and output decreases down to Z.

Figure 5. The decrease in output in the non-affected sector, absent a macroeconomic policy response



Putting things together, the effect of the lockdown, absent a policy response, is to lead to a large decrease in output, not only in the sector directly affected by the lockdown, but in the rest of the economy as well. Let us now turn to the macro policy response

Section 3. The macro policy response

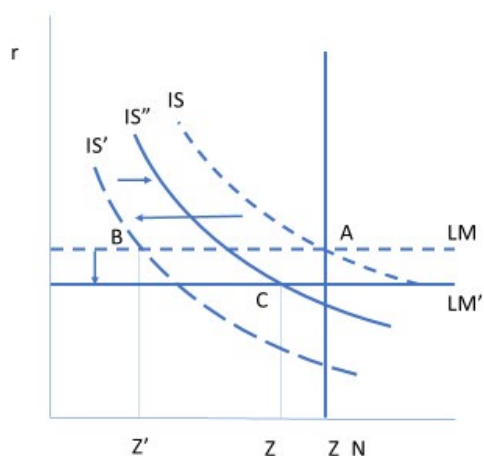
Take fiscal policy first. Fiscal policy cannot do much to increase output in the affected sector, but it can still do two things. The first is to protect the firms and the workers in that sector. Absent help, many

firms are likely to go bankrupt, and many workers, having lost their job, may go hungry. Fiscal policy can help them. The second is to reduce demand spillovers in the non-affected sector. Avoiding bankruptcies and giving unemployed workers more income already goes some way towards achieving this, but more may be needed to limit the decrease in demand and the decrease in output. The potential effect of fiscal policy is shown in Figure 6. Absent fiscal policy, the IS curve would shift to IS'. Policy can offset some of the shift, so that the IS curve shifts only to IS'' rather than to IS'.

Monetary policy can help as well, by decreasing the policy rate and increasing demand. In terms of Figure 6, it can shift the LM curve from LM down to LM'.

As a result of both fiscal and monetary policy, equilibrium output in the non-affected sector, which, absent policy, would have been given by Z' is instead given by Z. Ideally, policy could lead output to remain at the natural level Z_N. The way I have drawn it, the policy response falls short, and output falls even in the non-affected sector. The combination of supply constrained lower output in the affected sector, and demand constrained lower output in the non-affected sector still leads to a major recession, but less dramatic than it would have been absent the policy response.

Figure 6. The decrease in output in the non-affected sector, given the macroeconomic policy response



How does this story fit the facts? Fairly well.

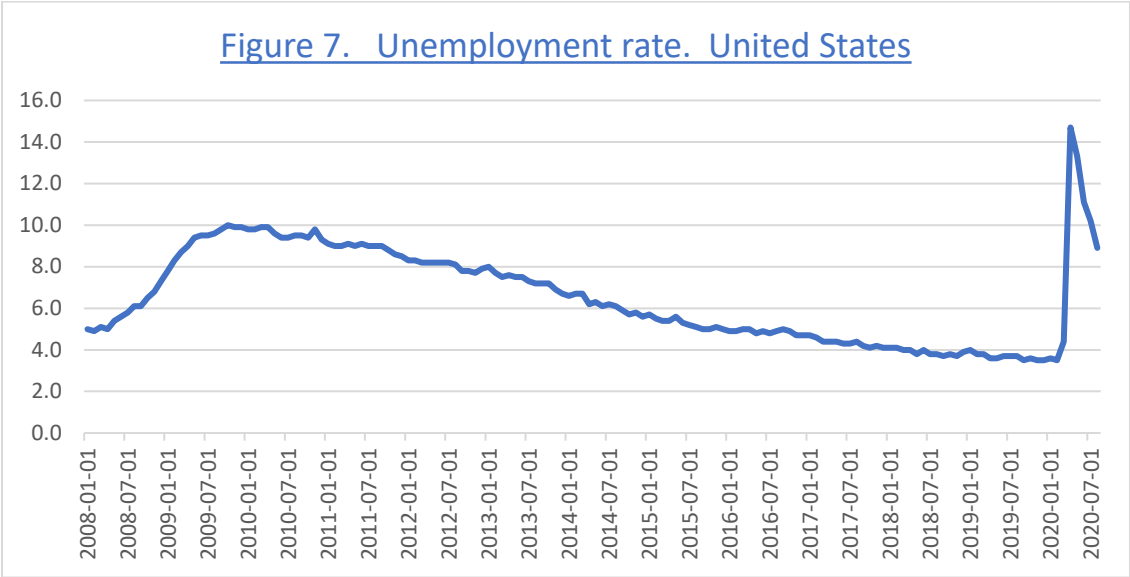
As countries were put on lockdown, both the fiscal and monetary policy responses were rapid and strong.

Start with fiscal policy. Subsidies to workers and firms, together with tax deferrals, amounted to 7.8% of GDP in the United States, 5.9% in France, 11.3% in Germany, all of which were extremely large amounts by historical standards. Furthermore, in order to lower risks to banks, governments committed to partly guarantee loans made by banks to firms in trouble. Guaranteed loans made by banks amounted up to

5.2% of GDP in the United States, 13.4% in France, 30.3% in Germany.⁸ These guarantees are not straight spending, but as some firms will indeed default, the government will have to make good on some of these guarantees, eventually adding to total fiscal outlays. (More detail on the specific measures and on differences between the United States and France is given in the Focus Box “Who spent better? The United States or France?”)

Turn to monetary policy. As we have seen in earlier chapters, interest rates were already very low before the COVID crisis. Yet, central banks took further measures. As a result of the Fed’s actions, the 3-month Treasury bill rate decreased from 1.5% in February down to 0.3% in March, and 0.1% in April. In the euro area, the interest rate was already very low when the COVID crisis hit, so there was little room to decrease it further. Both central banks did more however, going beyond using the policy rate, intervening in a number of financial markets and providing funds to some specific borrowers, in order to decrease the cost of credit.

Jointly, these measures avoided what would have been a catastrophic decline in output, not just in the affected sector, but also in the non-affected sector. Nevertheless, the decrease in activity remained dramatic. As we saw in Table 1, output in 2020 q2 dropped by 10 to 20% relative to its 2019 q4 level. And, as is shown in Figure 7 for the United States, unemployment exploded, with the unemployment rate increasing from 4.4% in March to 14.7% in April. Put in terms of numbers rather than percentages, the number of unemployed workers increased from 7 million in March to 23 million in April.



Source: FRED

⁸ Source: OECD (2020), OECD Economic Outlook, Interim Report September 2020

As you might expect from the analysis above, behind these aggregate numbers, there were major differences across sectors, and this is shown in Table 2. The table shows employment in different U.S. sectors in both April and August, normalized by employment in each sector in February. (Focus for the moment on the April numbers, i.e. those towards the end of the lockdown, and leave the August numbers aside for the time being. We shall come back to those later.)

The table gives numbers for three groups of sectors. First, those directly affected by the lockdown, such as restaurants and airlines, for whom (excepting for airlines) employment typically decreased by half. Second, those not directly affected by the lockdown, but affected by the decrease in demand, such as furniture, electronics, or automobiles. For those, employment decreased substantially as well. Third, sectors that were affected positively by the lockdown, such as food, garden supply equipment, and couriers. Employment barely decreased in those sectors (and has further increased since).

Table 2. Evolution of employment in different sectors

	February	April	August
Total nonfarm payrolls	100	85	92
Motion picture and sound recording industries	100	48	50
Performing arts and spectator sports	100	53	54
Scenic and sightseeing transportation	100	34	57
Amusements, gambling, and recreation	100	42	67
Leisure and hospitality	100	51	75
Air transportation	100	85	79
...			
Furniture and home furnishings stores	100	54	87
Electronics and appliances stores	100	90	91
Motor vehicles and parts	100	82	93
...			
Food and beverage stores	100	99	101
Building material and garden supply stores	100	97	106
Couriers and messengers	100	102	109

Focus Box. Who spent better? The United States or France?

When the lockdowns were declared, fiscal priorities were clear and similar in both countries: Protect workers and firms in the affected sector, and limit the fall in demand in the non-affected sector. But the two countries went at it differently.

Take help to workers.

In the United States, the government used two main tools (for more detail, see the Bruegel study listed at the end of the box.) The first was to let firms lay off workers, rely on unemployment benefit offices to

*distribute unemployment checks, and to top it off by adding 600 dollars a week (for four months) to regular benefits*⁹. This did not go smoothly. Given April's gigantic increase in the number of newly unemployed, unemployment offices were overwhelmed, and many laid-off workers waited weeks to get their first check. The second was the issue of checks for 1,200 dollars to all tax-paying individuals (up to a high level of income---e.g. \$155,000 for joint filers). This was generous, but since no distinction was made based on employment status, many of the checks went to people who were not unemployed and did not need the funds. By increasing income, it boosted aggregate demand (but see the Focus box on what people did with the money), but it did not particularly help those workers most in need.

In France (and in most European countries), the approach was different. Instead of letting firms lay off workers, the state allowed workers to stay with the firm while not working, but paid unemployment benefits to those workers. More specifically, it asked firms to pay their non-working employees 84% of their normal wage up to 4.5 times the minimum wage, and reimbursed the firms for the amount.

This turned out to be a better approach, in two ways. First, as firms knew who their employees were, they could quickly send checks to all those not working. They sometimes had to wait for the reimbursement from the state, but the state had the relevant information on firms, and could do it quickly. Second, it kept the link between workers and the firms, a useful link if many businesses are to go back to normal once a vaccine is available. From the point of view of the workers, it helped psychologically to feel that they were not unemployed but just on furlough, with the expectation of returning to the firm sooner or later. From the point of the firms, they did not have to pay severance payments (which can be high in France), and could keep their workers around for when activity increased again.

Could both schemes have been better designed? Yes. Given the urgency, governments had to act quickly and take rough measures. With the benefit of hindsight, the same objectives might have been achieved at a lower expense. In the United States, it is estimated that the median household actually received more income during the lockdown than before. In France, the generosity of the non-work payments led some workers to be reluctant to go back to work when asked by their firm to do so. However, in real time, decisions had to be taken, and as a result, most workers have been largely financially protected.

Take help to firms.

There again, the two countries took different approaches. In the United States, the government used three main tools in roughly equal proportions. First, tax deferrals; second, help to specific industries, in particular to airlines; third, loans to small and medium size firms, provided either by the Fed directly, with the financial backing of the state if loans go bad, or by banks themselves with the financial backing of the central bank (the banks could use the loans as collateral to borrow from the Fed).

The loans were provided at a very low interest, and, importantly, are to be forgiven if the firm keeps the same number of workers as it had before COVID. Thus, it is likely that most firms taking these loans will satisfy that condition, making the loans closer to grants than to regular loans. This gives an incentive for firms to keep their workers. It is, however, not an efficient way to create such incentives. Many firms,

⁹ Side note: Regular unemployment benefits vary by state and can be very low in some states. Maximum weekly benefits run from 275 dollars in Alabama to 823 dollars in Massachusetts.

that would not have laid off workers anyway and are in no need of help, have benefitted from the program.

France has used the same three tools: tax deferrals, grants to specific industries (e.g. automobiles, tourism, aeronautics, and cultural activities), and loans. The approach to loans has been different from that in the United States. In France, loans have been provided by the banks, with a 90% guarantee by the state, and at a low interest. The high rate of guarantee implies that, were the loans to default, most of the loss will be absorbed by the state. By avoiding offering a 100% guarantee, the state still made sure the banks had “skin in the game” and would not make loans indiscriminately. There is, at this stage, no plan to turn the loans into grants. The incentives to take such a loan by a firm that is not in trouble are thus much lower than in the United States.

Good source for numbers and details: The fiscal response to the economic fallout from the coronavirus, 05 05 August 2020, by Julia Anderson, Enrico Bergamini, Sybrand Brekelmans, Aliénor Cameron, Zsolt Darvas, Marta Domínguez Jiménez, Catarina Midões.

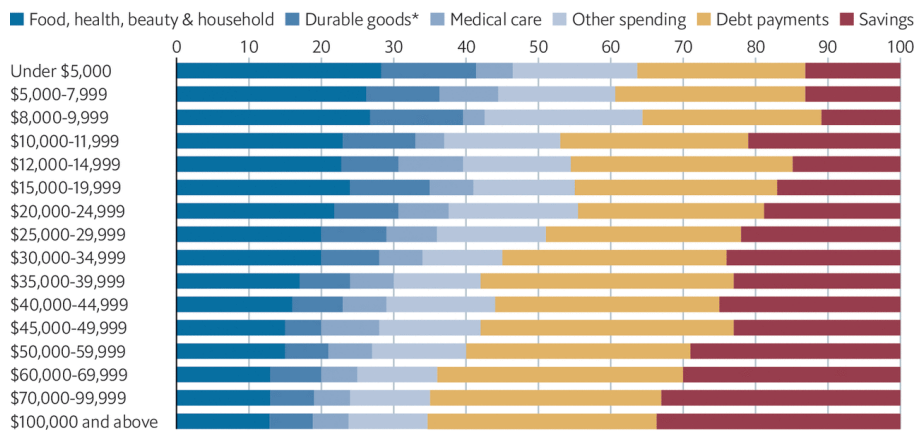
Focus Box: What did people do with the stimulus payments?

One of the components of the US fiscal package was the sending of checks to households. The amount of the check was \$1,200 per person, plus \$500 for any dependent child. There was an income limit over which households did not qualify, but it was high, for example \$150,000 for joint filers.

The purpose was twofold. First, to help those households who were directly affected by the crisis, for example because one or more of the members of the households were out of work or working fewer hours. Second, to sustain aggregate demand to avoid too large a decrease in output in the non-affected sector.

Hey big saver

United States, stimulus payment use by household income, %
July 2020



Source: “How Did U.S. Consumers Use Their Stimulus Payments?” by Olivier Coibion, Yuriy Gorodnichenko and Michael Weber, NBER working paper 2020

*Cars, appliances and other big-ticket items that last longer than a few years

The table above tells what happened. It is based on research by Coibion, Gorodnichenko, and Weber, itself based on a survey of households. The three authors used the Nielsen-Homescan panel, a panel of 80,000 to 90,000 individuals. For their survey, the authors sent the questionnaire to 46,000 individuals, and received 12,000 answers (a high response rate for this type of survey). The main results are summarized in the table, which shows what people did with the additional income, ordered by income level.

There are at least two lessons to be drawn from the table.

First, households spent some of the funds on food and first necessities, 30% for those in the lowest income bracket, 12% for those in the highest one. This is surprisingly large number: one might have thought or hoped that all households would have enough to buy food even in the absence of the check and would not use the funds to buy more. The evidence (confirmed by evidence from other sources) is that a substantial portion of households in the United States live paycheck to paycheck and would indeed have been constrained in their purchase of food, absent the check.

Second, households used a substantial fraction of the funds to save, either in the form of debt payments or actual saving, with saving accounting for 35% of the funds for those in the lowest income bracket, up to 65% for those in the highest income bracket.

Thus, from the view of macro policy, the marginal propensity to consume was fairly low, roughly 0.4 on average. The effect on the aggregate demand was therefore relatively limited.

Why did people save so much? One can think of at least two reasons, with very different policy implications.

People who could not buy cars or go on a cruise, decided to save with the intention to spend it later. This would suggest that there is what economists call "pent up demand" due to the lockdown, and that we shall see a potentially large increase in spending when the COVID constraints are relaxed.

Or people were genuinely worried about the future and decided to save in anticipation. If this is the case, what they do in the future depends on how worried they remain. If, for example, the infection rate increases again, or it takes longer than expected to develop and distribute a vaccine, they may continue to save more, in which case consumer spending may remain depressed for a long time.

Understanding why so much of the stimulus went towards saving is crucial to policy-design in the post-lockdown phase.

Source: The table is from The Economist, based on the working paper by Coibion et al., cited under the figure.

Section 3. The economy post-lockdown

In most countries, strict lockdowns were lifted by the end of May. Since then, constraints have been relaxed, but not eliminated. Many businesses that were closed have reopened, at least partially. The effect has been a major increase in activity. We do not have aggregate numbers yet for 2020 Q3, but

Table 2 and Figure 7 give a good sense of what has happened. From April to August, the employment index increased from 85 to 92 (compared to 100 in February), or roughly halfway back up (although with substantial differences across subsectors, both in the affected and the unaffected sectors. For example, employment in “leisure and hospitality” has increased back from 51 to 75, but employment in airlines has decreased further). The unemployment rate has decreased from 14.7% down to 8.9%.

There are good reasons however to think that the recovery will not continue at this rate.¹⁰

- Much of the recovery so far has been the mechanical result of firms reopening. Even if demand was lower than pre-COVID, firms rehired some of their workers and started producing again. This mechanical effect is coming to an end.
- There is still a lot of uncertainty about the course of the infection: about the introduction of new drugs, about when vaccines will be available on a large scale, and how good they will be. The hope was that, when the lockdown ended, countries could contain the infection to a low level. In some countries however, in particular in the United States, the level of infection and the dynamics of infection are worrisome. In a Gallup poll taken in the United States in March, 97% of the people polled expected the level of disruptions to improve by the end of 2020; in August, this proportion was down to 50%.¹¹ This uncertainty is likely to weigh on consumer spending and on investment.
- Many firms that survived the lockdown by taking out loans have accumulated debt to the point where they may go bankrupt, leading to more unemployment. Many firms are realizing that they may not survive. Even if they do not go bankrupt, they are likely to be short of funds and sharply cut on investment. Many workers are realizing that they may not get their old job back: In April, out of 23 million unemployed, 90% declared themselves to be on temporary layoff. By August, many of them had indeed been called back and the number of unemployed had decreased to 10 million, but among those still unemployed, only 60% declared themselves to be on temporary layoff.¹² As more and more unemployed workers realize they will have to find another job and face what may be a long period of unemployment, they are likely to sharply cut their consumption.

What should macroeconomic policy do in this context?

First, it should distinguish between two phases of the crisis, the current “post-lockdown but pre-vaccine” phase, and the “post-vaccine” phase.¹³ And it should distinguish between two types of firms

¹⁰ Side note: The talk among economic journalists has been whether the recovery would look more like a V, i.e. a sharp drop and a sharp recovery; or more like a U, i.e. a sharp drop and a slower recovery; or a W, a first drop, a recovery and then another drop and recovery; or a Nike Swoosh, i.e. a very slow recovery. At this stage, it looks more like an backwards square root, \surd , i.e. a sharp drop, an initially sharp recovery, and then flat...)

¹¹ <https://news.gallup.com/opinion/gallup/308126/roundup-gallup-covid-coverage.aspx>

¹² <https://www.bls.gov/webapps/legacy/cpsatab11.htm>

¹³ Side note: “Post vaccine” is meant to indicate an economy where COVID constraints are fully relaxed. It may be that the improvement actually comes more from the development of drugs to deal with the infection than from the availability of vaccines to prevent it.

within the affected sector. Those that should go back roughly to normal post-vaccine, say restaurants and hotels; and those that are likely to be affected permanently such as airlines, which may see for example a permanent decrease in business class travel and thus a major source of revenues.

Many of the firms that could go back to normal post-vaccine may however not be able to survive until then. And allowing, for example, restaurants and hotels to fail on a large scale only to be needed again post-vaccine makes little economic and human sense. Thus, fiscal policy must continue to provide help to those firms. The policy challenge is which firms to target, and how best to do it, through further tax deferrals, tax forgiveness, partially guaranteed loans.

Even with help from the state, the crisis seems likely to lead to an unusually high number of bankruptcies among small and medium size firms. Some of them may not be viable after the COVID crisis has passed and should indeed close. Many however might be viable after COVID but be heavily indebted and insolvent because of the COVID crisis. From an economic viewpoint, these firms should not be closed, but their debt should be restructured so that they can survive. The policy challenge is how to make sure that the bankruptcy process will be able to handle the much larger flow and still avoid inefficient bankruptcies.

The issues are different for firms that face permanent changes, not only now, but also post-vaccine. Those firms that have benefitted from the crisis, such as Amazon, Netflix, Zoom, and so on, do not need help. But those firms that face adverse permanent shocks such as airlines or the aeronautic industry, may have too much debt and be unable to adjust. The policy challenge is to offer these firms the right combination of protection and incentives to adjust.

Finally, the unemployment rate is still likely to remain high for some time. For many workers, it may be difficult to find a job. The policy challenge there is again to combine protection with incentives to move for those who are unlikely to get their previous job back.

The post-vaccine economy

Post-vaccine, governments will face at least three legacies of the COVID crisis.

The first is the economic reallocation process. It is not yet clear how much the COVID crisis will lead to a different economy. One may be skeptical that it will lead to major changes, but one change at least seems very likely: Telework is here to stay. In June, 42% of US workers worked from home, and many have found it attractive, and firms will have to adjust.¹⁴ It has potentially major implications for the organization of firms, for productivity, for the organization of cities and suburbs, for transportation, and for inequality. Anecdotal evidence is that rents in New York City have already decreased, because of the desire of those who can telework to live further away from the city.

¹⁴ For more, see Nick Bloom, Jose Barrero, and Steve Davis, "The Future of working from home", July 2020, <https://nbloom.people.stanford.edu/research>



"Doing my work from home over the internet? You *bet* I'm interested!"

Source: <https://www.cartoonstock.com/cartoonview.asp?catref=dden6&type=download>

The second is the large increase in public debt, resulting from the large increase in spending and the large COVID deficits. The US Congressional Budget Office forecasts an increase in public debt held by the public from 79.2% of GDP at the end of 2019 to 98% at the end of 2020, and 104% at the end of 2021.¹⁵ Is this reason to worry? The answer is not necessarily, as the interest payments on debt are extremely low, and likely to remain low for some time. We shall discuss the issue at more length in Chapter 22.

The third is the large increase in the balance sheets of central banks. During the initial phase of the COVID crisis, central banks not only decreased the policy rate, but they also intervened and bought assets in many financial markets to stabilize the rates in those markets. In exchange, they issued monetary liabilities, mostly held by banks as bank reserves at the central bank. The liabilities of the US Fed increased from 4.1 trillion dollars in February to 7.0 trillion dollars in September; the liabilities of the European Central Bank increased from 4.6 trillion euros in February to 6.5 trillion in September.¹⁶ Some observers have worried that this very large increase in the money supply may lead to high inflation in the future. This is unlikely however, and we shall discuss the issue at more length in Chapter 23.

References, data sources

<https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>

¹⁵ <https://www.cbo.gov/data/budget-economic-data#3> September 2020 projections.

¹⁶ Side note: These are large amounts. Recall that, in 2019, US GDP was 21,4 trillion dollars, euro area GDP was 13.3 trillion dollars.

<https://www.oecd.org/coronavirus/en/#data>

For an example of real time data on activity:

https://www.tomtom.com/en_gb/traffic-index/ranking/

For a more advanced treatment based on a two-sector model, see “Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages?” *University of Chicago, Becker Friedman Institute for Economics Working Paper No. 2020-35*