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A new policy toolkit is needed as countries exit COVID-19 lockdowns

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Executive summary

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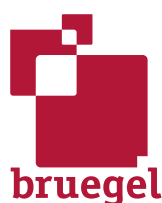
WHEN IT BECAME clear that the COVID-19 pandemic required widespread lockdown of all but essential firms, most governments took measures to protect vulnerable workers and firms from the worst effects of the sudden drop in activity. These measures included unemployment benefits, grants, transfers, loans at low rates and tax deferrals. Their nearly exclusive focus was protection. As lockdowns are lifted, as some of these measures come to an end, and as it becomes clear that some sectors will have to contract and others expand, the focus must progressively shift. As usual in the aftermath of a major shock, protection must be balanced with reallocation, taking into account changing prospects for sectors and firms. Incentives must be given to firms and workers to resume activity, and, when needed, to adjust. Debt inherited from the freeze must be restructured if unsustainable. But policymakers must also consider the consequences of heightened uncertainty about the course of the pandemic and the economy, and the large increase in the number of workers out of work.

IN OTHER WORDS, as governments in advanced economies move from freeze to exit, they must design measures that will limit the pain of adjustment. This Policy Contribution explores how such measures can be designed.

SECTION 1 BRIEFLY describes the measures that were taken to accompany the lockdown, in particular in Europe and the United States. Section 2 presents the protection and reallocation architecture that should underlie the new measures, namely a combination of unemployment benefits to help workers, wage subsidies and partially guaranteed loans to help firms, and a process-light restructuring of legacy debts. Section 3 concludes.

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1 Initial measures

Initial responses to the coronavirus crisis were broadly similar across European countries, while the United States took a somewhat different approach.

Helping workers

In Europe, the main measure to help workers was the introduction or scaling up of job-retention schemes inspired by the *Kurzarbeit* (short-time work) scheme that Germany used extensively to fight off the employment consequences of the Great Recession. See Appendix A, table A1, for details on job retention schemes in selected countries¹. Details and the generosity of the schemes differ across countries, but the essentials are alike: employees on furlough keep their contracts with their employers and take a small pay cut; the government pays the largest part or the entirety of the cost to the employers.

Conceptually, these are systems of non-work benefits for salaried workers, extending the standard unemployment insurance system in three ways:

1. Allowing workers to work part time, with the state paying benefits in proportion to the time not worked;
2. More importantly in the current context, allowing workers to remain formally with the firm even if not working at all, a benefit to both the worker and the firm when activity starts again;
3. Allowing for more generous non-work allowances than the typical unemployment benefits.

Given the exceptionally large increase in claims at the start, the issue of how to actually distribute these non-work allowances turned out to be central and was solved in more or less similar ways in European countries. The firm pays the benefits, usually in proportion to the employee's wage, up to a ceiling. As the benefits are somewhat lower than wages, workers take the loss unless the firm decides to top up the allowance. The state reimburses the firm, hopefully soon after the firm has paid workers. Government refunds to firms are usually subject to minimal requirements, but in Germany they are conditioned on a collective agreement at the firm level.

These schemes have resulted in the state taking charge of the payroll cost of employees made idle by the lockdown. Take-up has been immediate and spectacular. Most of the drop in hours worked has been absorbed by the increase in the number of workers under these schemes rather than by a rise in unemployment. By relying on firms to pay workers, the schemes have proven efficient at reaching workers quickly. In France, 1 million employers applied to potentially enrol 12.9 million employees (nearly two-third of the business payroll). The actual take-up has been lower but still significant, with 8.6 million workers enrolled at some point during April, of which about 4 million were on complete furlough². Small and medium-sized enterprises (SMEs) and hard-hit sectors have massively resorted to the scheme. In the hotel and restaurant industry, about 70 percent of employees were on partial unemployment (*chômage partiel* in French) at the end of April. The French government estimates the cost of the programme to be around 1 percent of yearly GDP; depending on the take-up rate and the length of furlough, it may end up higher.

¹ According to the Organisation for Economic Co-operation and Development, 89 percent of OECD countries have relied on schemes intended to help firms adjust working time and preserve jobs. See the OECD's Employment and Social Policy Response Tracker available via <http://www.oecd.org/employment/>.

² Ministère du Travail, Direction de l'animation de la recherche, des études, et des statistiques (DARES) '[Activité et conditions d'emploi de la main d'œuvre \(ACEMO\)-Covid survey](#)', 20 May 2020. Employers first apply for the scheme, then declare monthly how many workers were put on *chômage partiel*.

In the United States, the government has relied instead on a combination of grants to all households below a certain income level and unemployment benefits for those laid off. Reaching workers this way has proved difficult. Unemployment offices, put in charge of paying benefits, have often been overwhelmed by the increase in claims.

Helping firms

In Europe the measures put in place to help firms have taken the form of a combination of tax deferrals, guaranteed loans and equity injections. Germany launched a €600 billion economic stabilisation fund that combines €400 billion for liquidity guarantees, €100 billion for subsidised loans, and €100 billion for equity injections (Appendix A, table A2). In France the main tool (in terms of size) has been the provision of credit through bank loans, with a state guarantee to banks of 80 percent for loans to large firms (more than 5,000 employees) and 90 percent for loans to smaller firms. The price of the guarantee varies between 0.25 percent and 2 percent over time and banks have committed to lend at cost. By the end of May more than 3 percentage points of annual GDP had been granted in loans to more than 400,000 businesses³.

The United States has again adopted a somewhat different approach. It has mostly relied on a programme of bank loans to SMEs, which can be partially or totally turned into government-financed grants as a function of the proportion of workers kept by the firm (or laid off but rehired before June 30) and so acts as a combination of loans, grants and wage subsidies⁴.

Implementation has been chaotic, however: signoff on loans by the administrative authority and distribution by the banking system have been uneven; firms are served on a first-come, first-served basis without regard for size.

In addition to those measures, both the United States and Europe have introduced dedicated programmes, often in the form of grants, to support self-employed individuals and start-ups.

Unsurprisingly, the European schemes better protect workers and better preserve existing matches between firms and employees. They have also proved to be more flexible, as firms can, on a weekly basis, adapt their payrolls to actual demand and regulatory constraints.

The US scheme is more complex and less protective, especially as laid-off workers may lose access to health insurance, and it does not favour the preservation of the employer-employee match. But it includes stronger incentives to restart.

Whatever their differences, all these support mechanisms raise the same questions: should exceptional job retention and credit schemes be discontinued or made less generous in the post-lockdown phase? Should they be made less attractive to employers, employees and lenders? Should new support instruments be introduced instead?

2 Protection and reallocation

The challenge in the post-lockdown economy will be to combine protection and reallocation in a context in which the nature and duration of the shocks are highly uncertain, unemployment is initially very high and there are few opportunities to find new jobs, firms have a hard time obtaining credit, many firms are likely insolvent or nonviable, and government interventions face the reality of limited public resources.

In this context, we explore the right mix of policies and argue that it should include a gradual phasing out of job-retention schemes and the phasing in of sectoral wage subsidies

³ Ministère de l'Économie et des Finances, 'Tableau de bord des mesures de soutien aux entreprises', 2 June 2020.

⁴ The United States also has an Employee Retention Credit scheme, but eligibility is strict and it covers only 50 percent of the wage cost up to \$10,000. Tax deferrals have also been introduced.

to create incentives to resume production. Credit guarantees for new loans should continue, albeit with decreasing generosity and perhaps some equity participation by the state. Given the likely increase in the number of insolvencies, a process-light loan restructuring programme should be put in place. We propose an automatic restructuring process with public haircuts indexed to private ones but with a continuation premium to provide incentives to not close firms.

Let's start with the special nature of the shocks. So long as physical distancing remains needed, many firms, especially in the service sector, will face both adverse productivity and demand shocks. Productivity shocks and at least part of the demand shocks should, however, largely disappear as firms adapt and when better drugs are discovered or vaccines become widely available. The issue then is whether these firms should be largely kept alive until this is the case. Other shocks, however, are likely to be longer lasting. The increase in teleworking, which was triggered by the crisis, may become partly permanent, with implications for transportation, urbanisation, and the like, which we are just starting to discover.

In normal times, policies should help the reallocation process, letting some firms fail and others expand, and helping the reallocation of workers across sectors. These are not normal times, however. Many firms may fail because they are insolvent even if they are viable. Given the very high uncertainty, banks may be reluctant to advance credit. Unemployment is extremely high, making it difficult for laid-off workers to find other jobs. For these reasons we think that protection (of workers) and preservation (of firms) should be given a higher priority than in normal times. At the very least, policymakers should proceed with caution and shift only gradually the emphasis onto reallocation and liquidation.

Helping workers: adjusting job-retention schemes

Currently, job-retention schemes probably enrol a fourth to a third of private sector employees in several European countries. The schemes are typically more generous than general unemployment insurance and have a somewhat different goal. They aim to provide income to nonworking employees while protecting the employment relationship. Conceptually, they protect mostly the worker, but also the firm.

These schemes worked well during the lockdown. Protection did not come at the cost of job search, as job offers collapsed and there was little point in searching. Where job retention schemes are in place, they should be maintained rather than discontinued. But three types of adjustments are in order.

First, allowances to workers on these schemes should gradually converge to the standard level of unemployment benefits. As vacancies increase and unemployment decreases, job searching will become more relevant, and more incentives must be given to unemployed workers to explore alternative jobs. This suggests maintaining the link between workers and firms to make rehiring easier, but reducing over time the generosity of payments to workers to align them with general unemployment benefits. From an equity standpoint, there is no reason to provide a higher indemnity to workers on protracted furlough than to those laid off by their employers.

Second, incentives for firms should be tilted toward restart. Under the existing regimes, unless firms decide to top off what the state pays (a voluntary option that many firms do not choose), they do not pay for non-work allowances: the state does. Put another way, there is no cost to firms to keep their workers on furlough, and when they put a worker back to work, the cost of doing so is the full wage. To give firms an incentive to take workers back to work, the government could reduce its contribution to non-work benefits, while increasing the contribution made by firms. This, however, would have two effects. It would make it more expensive for firms to keep workers on furlough, and thus, other things equal, induce firms to rehire those workers. But other things would not be equal. The payment for part of the non-work benefits would increase overall labour costs for firms. This increase in labour costs, in the face of adverse productivity and new fixed costs (associated with investments in workplace safety and the lower productivity implied by physical distancing), would go in the wrong direction.

Tightening the screw on job-retention schemes could precipitate layoffs. We believe instead that wage subsidies are a better way to proceed, and we return to this below.

The third adjustment, which is less important conceptually but turns out to be empirically relevant, concerns fraud. *Kurzarbeit* and *chômage partiel* were initially designed for manufacturing companies wanting to adapt to a drop in output by temporarily reducing working time. The problem with its application to a large number of SMEs is that it makes fraud particularly easy. An employer can, for example, claim benefits for half the time of a given employee while asking her or him to work full time. This suggests a gradual tightening of eligibility for job retention when it applies to only a fraction of the working time⁵.

Helping firms: introducing wage subsidies

Even after the lockdown has ended, firms will often suffer from negative demand and productivity shocks. Many firms will need to introduce special arrangements to protect employees and customers, decreasing productivity. In certain sectors, regulations will mandate service at a fraction of normal levels. These constraints will most likely last in some form until vaccines are widely available.

Should these firms be helped until physical distancing constraints are removed? A formal analysis is given in Appendix B, but the conclusions are easy to state: in normal times, the answer would be to let the firms survive or close and let laid-off workers reallocate. In today's environment, there is, however, a strong case for wage subsidies, based both on the high unemployment rate and the temporary nature of the productivity and demand shocks due to physical distancing.

With the exceptionally high level of unemployment from which economies start after lockdown, workers who are laid off are likely to have a hard time finding another job and thus could remain unemployed for a long time. Put more formally, the shadow price of labour is very low. From a social efficiency point of view, firms should make decisions based on a comparison between the marginal product of a worker and this shadow price rather than on the comparison between the marginal product and the wage. If the wage cannot be cut, or at least cut substantially (and for the same reason as there are unemployment benefits, wages should not be cut substantially), wage subsidies are needed to lead firms to take the socially efficient decision.

To the extent that some of the shocks are clearly temporary – even if their duration is uncertain – there is a second argument for introducing wage subsidies. Suppose that in the absence of such subsidies, most of the firms in a particular sector did not survive, but, when the shocks were gone, the sector went back roughly to its pre-crisis state, requiring the creation of many new firms. The costs involved in this process of destruction-creation might be very high. If the expected duration of the shock is not too long, allowing most of the firms to survive is likely to be a better social alternative. Restaurants provide a clear example. By decreasing the number of customers restaurants can accommodate, physical distancing constraints imply a substantial decline in productivity and many restaurants are unlikely to survive a sustained period of lower productivity and lower demand⁶. Decreasing their costs and allowing most of them to survive until the shock is gone probably dominates widespread bankruptcies and later wide-scale reconstruction.

Without a shadow cost to public spending, reflecting the lower shadow price of labour and thus subsidising all firms, whether or not they were subject to shocks, would be desirable. It would, however, be extremely costly fiscally, and thus the focus should primarily be on firms that are suffering temporary shocks and are unlikely to survive without financial help.

5 In France, this also calls for lowering the ceiling for eligibility to *chômage partiel*: For workers paid 4.5 times the minimum wage, the definition of working time tends to be elusive, which facilitates fraudulent behaviour.

6 In Spain, for example, during the first stage, restaurants will be allowed to serve on terraces only and at a maximum of 30 percent of capacity. In the second stage they will be able to serve meals inside but again at a maximum of 30 percent capacity. See the government's [Plan de desescalada](#) published on 28 April 2020.

The list of such sectors is nearly identical in all countries: accommodation and food services; arts, entertainment, and recreation; passenger transportation, especially airlines; retail trade, partially; and, to a lesser extent, construction. Depending on the perimeter, these sectors represent between 4 and 9 percent of GDP⁷. Assuming a wage share, including social insurance contributions, of 70 percent and a subsidy rate of, say, 30 percent, implies a gross fiscal cost of 0.8 to 1.9 percent of GDP.

The net fiscal cost is likely to be much smaller, however, even plausibly negative if the subsidies are well targeted. If each wage subsidy led to the employment of an additional worker, the state would save in both reduced unemployment benefits and increased social contributions. Together, these would most likely exceed the wage subsidy by a large amount. In reality, targeting is likely to be far from perfect, some firms may benefit from the wage subsidies but not increase employment, but the net fiscal cost is nevertheless likely to be small.

The logic of our argument implies that, as unemployment decreases and vacancies increase, these wage subsidies should be reduced over time and that they should obviously end if and when physical distancing constraints are removed. In principle, the adjustment should be state-contingent and stopped if lockdowns must be implemented again, or if unemployment remains very high.

Helping firms: loan guarantees

State guarantees on bank loans to firms were introduced to ensure emergency access to liquidity. But even after the lockdown ends, there is a strong case for maintaining partial guarantees on loans⁸. In the current environment, which firms will survive and which will have to close is difficult to assess, and if banks cannot fully diversify credit risk, they will ask for too high a risk premium or refuse to lend altogether. Also, because of the effects of the lockdown, most banks have seen a decrease in their capital ratios, making them more reluctant to lend even to viable firms that may be short on liquidity. The government can alleviate this problem by providing partial loan guarantees. It is in general in a better position than banks to diversify credit risk and to absorb the macro risk due to uncertainty about the evolution of the pandemic and the availability of a vaccine. It should offer partial guarantees rather than full guarantees or direct government lending: when banks share losses they do not have incentives to lend to bad credit.

Most countries implemented such programmes during the lockdown. As countries exit the lockdown phase, these loan guarantee programmes should be continued, with two modifications.

First, the generosity of the guarantees should decrease over time. As with job-retention schemes and wage subsidies, the decrease should be contingent on the state of the economy. The guarantees are justified by the extreme macroeconomic and microeconomic uncertainty created by the pandemic. As the pandemic risk becomes easier to manage, the guarantees should be phased out.

Second, the use of state guarantees should be linked to restrictions on dividend payments and/or higher future corporate income taxes. Dividend restrictions are already commonly imposed on large firms that require government support.

There might be excessive uptake from firms that do not need the guarantee but, because they have good credit, this would not be costly to the government. The fiscal cost of guarantees decreases steeply as they become less generous because of the direct effect as well as the indirect effect via bank incentives. If the guarantees are reduced over time, maintaining a loan

7 Narrow definition: hotels and restaurants, airlines and ground transportation excluding trains, museums and shows: 4.2 percent for France. Larger definition: same, plus half of the retail sector, rail transportation, home services, leisure sports, and one-third of construction: 8.7 percent for France.

8 For a general discussion of loan guarantees, see Thomas Philippon and Philipp Schnabl (2013) 'Efficient Recapitalization,' *Journal of Finance* 68, no. 1, for the case of debt overhang; and Thomas Philippon and Vasiliki Skreta (2012) 'Optimal Interventions in Markets with Adverse Selection,' *American Economic Review* 102, no. 1, for the case of adverse selection and stigma.

guarantee programme is unlikely to create a problem for public finances. The main danger is the transfer of pre-existing exposures. A bank with an exposure to a firm could ask it to use the guaranteed debt to repay its existing loans. This would be a transfer of risk to the state. A simple remedy (which is already in use) is to require banks to maintain their existing exposure as a condition for making a guaranteed loan.

Firms could be offered the option to convert guaranteed credit into equity or quasi-equity in the form of preferred shares or, for privately held firms, higher profit taxes in the future. The advantage for shareholders or firm owners would be to improve their balance sheets by lowering debt and increasing the equity buffer. The advantage for the state would be to improve the viability of firms and lower the risk of costly defaults. For smaller firms, quasi-equity in the form of an agreement to pay higher taxes in the future might be preferred to proper equity, as the latter requires more monitoring and there is a limit to the extent to which the state can manage a large number of small equity claims.

Note that, like wage subsidies, guaranteed loans are not designed to save all firms. By reflecting the low shadow price of labour, and by pricing credit more correctly, they are designed to induce firms to take socially efficient decisions. Even with the subsidies and the loans, some firms are likely to be insolvent or unviable. Thus, the last leg of our architecture focuses on restructuring.

Restructuring

Dealing with the legacy debts from the crisis will be complex and expensive. There are various ways in which restructuring can be organised, depending on the seniority structure of private and public claims, information problems and administrative burden.

As they exit the lockdown, firms will differ in their health and some will have excessive debt levels. Firms in the post-pandemic environment can be thought of as being in one of three baskets:

- Privately viable (the present value of their profits exceeds recovery value) and solvent (the present value of profits exceeds current debt);
- Not viable and thus not solvent; and
- Viable but have been made insolvent by the shock and thus need debt restructuring.

If the firm is viable and has little or no debt, then the only issue is to make sure that it can access liquidity to finance its operations. The guarantees described above should take care of this. We thus focus here on the case where liabilities are large – the firm is insolvent and may or may not be viable.

Even with wage subsidies and loan guarantees, the social value of a firm as a going concern may substantially exceed its private value. Even for firms that receive them, wage subsidies may be too small to cover the difference between the wage and the shadow value of unemployment. Also, network effects in a fragile and depressed economy are more relevant than usual, as the bankruptcy of a firm may have major effects on its suppliers and their consumers. The implication is that private creditors will, by themselves, close too many firms because they consider only the private value of the firm.

In addition, the number of firms needing debt restructuring is likely to be large and the courts are likely to be overwhelmed, so standard insolvency procedures will not work. The government, as one of the creditors, has neither the information nor the administrative capacity to implement efficient restructuring by itself. It must work with private creditors (typically banks in the case of SMEs) that have more granular information and a better capacity to use it. The process should thus be as quick and simple as possible, ie quasi-automatic. A large number of parties should not be involved in complex bargaining.

Given these constraints, we propose the following scheme:

- If a firm is closed, the government claims the full extent of its rights as a creditor. This should be known in advance so that creditors take this stance into account when making their own decisions.
- If a firm continues but needs restructuring, the government automatically accepts a haircut on its claims (deferred taxes plus guaranteed credits) equal to the haircut agreed by private creditors of the same rank plus a fixed continuation premium.

The government may also turn its debt-like claims into equity-like claims.

The use of a continuation premium, and thus a higher haircut for the government than for the bank, addresses the difference between the social and the private value of the firm and leads the bank to make the right social decision. The bank takes into account that, if it restructures the firm instead of closing it, it will benefit from a more generous haircut from the government (a more detailed discussion and the analytics behind this conclusion are in Appendix C).

In theory, the continuation premium should be equal to the difference between the social and the private value of the firm; if so, letting the bank choose its haircut without further government intervention will lead to the socially optimal decision⁹. This approach induces efficient triage, preserving socially viable firms without subsidising zombie firms. One variation on this scheme is that the government can decide to first turn part of its claim into equity, in the form of higher corporate tax rates in the future, for example. By giving up its senior status, the government can make the restructuring process even simpler, but at some fiscal cost. Doing so in turn allows for a lower haircut by the bank.

The limits of the theoretical argument are clear. Assessing the value of the continuation premium is difficult. But it suggests a general strategy: using a rough number for the continuation premium – say, a haircut higher than the bank haircut by 30 percent – and then letting the bank decide. If it appears to be fiscally too expensive, the government can decide to offer a less-generous continuation premium, say 20 percent instead of 30 percent. That will still induce the private sector to save the most viable firms.

Implementation of such a scheme requires close attention to legal and operational details, which vary from country to country. The government will normally hold senior claims on companies resulting from tax deferrals, as well as more junior claims, including the guarantees. A straightforward approach would be to proceed separately for each seniority class. Alternatively, the state could forgive its senior status in exchange for a larger haircut by the banks.

Whatever the details, the state should resist the temptation of discretionary intervention in the restructuring of SME debt. Although it may have the expertise and the experience required to negotiate the restructuring of claims on mid-cap companies with creditors and stakeholders, this does not apply to SMEs. It would be hard to resist political pressures and to ensure consistency in the treatment of individual cases. Governments should instead define a menu of clearly pre-specified options and let the main creditor bank take charge of the restructuring. If the menu of options is well defined, banks will be led to choose the socially optimal solution.

Finally, the state should implement this policy swiftly. Procrastination would only increase uncertainty.

⁹ This statement is not quite correct. As is well known in corporate finance, if the owner can be replaced, the bank will not consider the value of the firm to its owner. This issue arises in general and can in principle be offset by the use of a higher continuation value. See Appendix C.

3 Conclusion

The measures taken by governments to protect vulnerable firms and employees during the lockdown have largely met their goals – more so in Europe than in the United States.

As the exit phase begins, policy should pivot toward supporting the recovery. On the demand side, this may require further fiscal support. On the supply side, this implies putting gradually more emphasis on backing up productive jobs and viable companies while beginning to phase out existing schemes. The inflexion should be gradual, because there is considerable social value in preserving existing jobs and firms. Flexibility should be retained so that emphasis can be switched back to protection in the event of a second wave of the disease. But the direction should be clearly indicated.

In this spirit, this Policy Contribution has sketched the architecture that should underlie those policies. From the mapping of general principles to specific measures that we are examining in the case of France¹⁰, we realise that the practical implications will differ across countries, reflecting differences in the initial set of measures, different administrative capacities, different bankruptcy legislations, different fiscal constraints and different taxation systems. But we believe that our principles are general.

In particular we make the case for introducing two new instruments. First, we propose temporary wage subsidies to support sectors and firms severely hit by adverse demand and productivity shocks. They would help limit layoffs in these sectors and the corresponding increase in unemployment. We believe that if properly designed, their cost can be limited.

Second, we propose introducing debt-restructuring procedures for SMEs handicapped by excessive legacy debt. Rather than relying on ordinary bankruptcy procedures (which are inefficient and would take considerable time as courts are likely to be overwhelmed), we propose incentives for private creditors to work out restructuring plans of viable but insolvent SMEs where government claims receive automatic haircuts conditional on the banks themselves accepting a (less stringent) restructuring. This would help efficient companies to restart and invest.

We see four main advantages to this strategy. First, reliance on these two instruments makes it possible to tailor public support to a variety of situations. Some firms have no balance sheet problem but suffer from added costs that weigh excessively on their operating account; some are profitable but overburdened by debt inherited from the period in which they had to stop operating. To address these two types of problems with a single instrument would be inefficient and costly. Second, our strategy is flexible as it makes it possible to respond in real time to changes – including possibly reversals – in public health conditions and their implications for production. Third, our approach minimises the use of limited administrative capacity and limits the risk of the state being overwhelmed by a wave of business failures. Fourth, our suggested method addresses the political economy risk of capture, which is inherent to discretionary interventions.

¹⁰ Olivier Blanchard, Thomas Philippon and Jean Pisani-Ferry (2020) 'From freeze to exit: General principles with an application to France' (in progress).

Appendix A

Job retention and credit guarantee schemes, selected countries

	US	UK	Germany	France
Name	Paycheck Protection Program	Coronavirus Job Retention Scheme	Kurzarbeitgeld	Chômage partiel / activité partielle
Principle	Guaranteed bank loans to SMEs convertible into grants if employer retains or rehires workers	Government refunds 80% of gross wage of furloughed workers	Government refunds 60% of net wage of furloughed workers (67% for workers with children)	Government refunds 84% of net wage of furloughed workers
Employee compensation	No requirement	80% of pre-lockdown wage + firm top-up	60/67% of pre-lockdown wage + firm top-up	84% of pre-lockdown wage (100% at minimum wage) + firm top-up
Government refund	100% of actual wage bill (plus supplement for non-payroll costs)	80% of pre-lockdown wage per employee	60/67% of pre-lockdown wage per employee	84% of pre-lockdown wage per employee (100% at minimum wage)
Social insurance contributions	Refunded	Refunded	Exempted	Exempted for wages below 3 times the minimum wage
Eligibility	SMEs (less than 500 employees)	All firms	All firms (minimum 10% of workers have working hours cut by 10%)	All firms
Maximum wage	Payroll cost capped at \$100,000 per employee	£2500 per month	€4687 per month	€5485 per month (4.5 times the minimum wage)
Conditions	Credit distributed by commercial banks Grant conditional on staff headcount at end-lockdown	Agreement with the employee	Collective agreement	Authorization of government agency
Work requirements	No requirement	No work during hours covered, no other work	No work during hours covered, no other work	No work during hours covered, no other work
Number of enrolled employees (date)				

Credit guarantee schemes

	US	UK	Germany	France
Name	Paycheck Protection Program	Coronavirus Business Interruption Loan Scheme	Wirtschaftsstabilisierungsfond + KfW Special Program	Prêt garanti par l'État
Principle	Government-financed bank loans to SMEs convertible into grants if employer retains or rehires workers	Guarantees	Guarantees on bank loans + subsidized KfW credits	Guarantees on bank loans
Coverage of guarantee	100%	100% up to GBP 250K, 80% above	90% for small firms; 70% for large ones	90% for small firms; 80% for larger ones
Rate	1% fixed rates. Lenders compensated by government	Interest holiday for 12 months. Thereafter terms set by lender	Several sub-schemes with different rates	Interest holiday for 6 months Low rates thereafter
Maturity	2 years	Up to 6 years	Up to 5 years	1 year, extendable to 5 years
Eligibility	SMEs (less than 500 employees)	SMEs	All firms	All firms
Termination	30 June 2020			31 December 2020

Appendix B

Wage subsidies

Consider the following much simplified economy.

Decompose time into four periods: pre-lockdown, lockdown, post-lockdown but pre-vaccine, and post-vaccine.

Assume that there are three groups of firms: those not affected by the shock; those affected temporarily during lockdown and post-lockdown, but not post-vaccine; those affected permanently.

Assume firms produce output with labour. Pre-lockdown, productivity per worker is the same for all firms, and so are the wage and shadow wage (the wage equivalent of being unemployed). Productivity is equal to the wage and the firms make zero profit.

Productivity remains the same throughout in the first group. During lockdown and post-lockdown, productivity is lower for the other two groups. Post-vaccine, productivity returns to its pre-lockdown level for the second group but continues to be lower for the third group.

The wage remains equal to 1 throughout. The shadow wage is lower during lockdown and post-lockdown, reflecting high unemployment. It returns to 1 post-vaccine.

Assume that the cost of opening a new firm in the post-vaccine world equals C . We want to find what subsidies in the post-lockdown period achieve the socially optimal outcome.

Optimal policy in post-lockdown period

Suppose that policymakers know exactly each type and outcome. Then, the first group of firms is not affected and there is no need to intervene.

For the second group, the choice is either to have firms produce in the post-lockdown period and the post-vaccine period, which, assuming no discounting, has value $(X' - B') + (1 - 1) = X' - B'$; or to close the firms in the post-lockdown period and open new firms in the post-vaccine period, which has value $0 + (1 - C - 1) = -C$.

The socially optimal decision is therefore to keep firms in the second group open during post-lockdown if $X' - B' > -C$ or, equivalently, $X' - B' + C > 0$.

Turning to private decisions, a firm in the second group will decide to stay open during post-lockdown if $X' - 1 + S > 0$, where S is the wage subsidy. Thus, for private decisions to be

socially optimal, the subsidy must be equal to $S = 1 - B' + C$.

Under the assumptions in the table, as $Y'' < 1$ and wage (W) = 1, firms in the third group will close post-vaccine. The question is whether they should stay open in the post-lockdown period. The same reasoning as above implies that they should stay open if $Y' > B'$, while the private decision implies that they will stay open if $Y' + S > 1$. Thus, for the outcome to be socially optimal, the subsidy to the third group of firms must be equal to $S = 1 - B'$.

Suppose now that we do not know if a firm belongs to the second or the third group. Assume that there is probability p that it belongs to the second group, probability $(1 - p)$ that it belongs to the third group. Then, the optimal subsidy must be equal to $S = 1 - B' + p C$.

In words, the optimal subsidy must reflect the low shadow wage, the probability that the shock is temporary, and the cost of opening a new firm. Note, importantly, that it does not depend on the actual shortfall in productivity. The purpose of wage subsidies is to induce firms to take the socially optimal decision, not to save all firms. Whether firms close or not depends on whether the subsidy is enough to make them viable; even with wage subsidies, firms with a large shortfall will still close. For the firm to remain open, one should have

$(1 - X') < (1 - B') + C$, ie if the productivity decline is inferior to the sum of the drop in the shadow price of labour and the cost of reopening.

Appendix C

Restructuring process

Let V be the privately discounted value of the firm, normalized by the pre-lockdown level of assets. Let R be the recovery value of the assets in case the firm is closed, D the debt from banks (or bonds if a large firm), and L the loans obtained from the government. A firm is (privately) viable if $V > R$. A firm is solvent if $V > D + L$. We normalise all values by the pre-crisis book value of assets, so V, D, L , and R should be interpreted as ratios.

Our framework recognises that there are two separate constraints:

Net present value constraint

Because of risk premia related to pandemic uncertainty and because of other externalities (unemployment, impact on the network of suppliers and customers, congestion externalities in courts), there is a gap between the social value of the firm (V_z) and the private value V . V is the maximum economic value that can be paid out to claimholders.

$V_z = V + Z$. We can think of $Z = V_z - V$ as a measure of the social externalities.

Financial constraint

Because of debt overhang, incentives, and financial distress costs, private firms operate efficiently when $V - E > D + L$, where E is the equity cushion.

In most economic models, E takes the form of a capital requirement or a net worth constraint. In practice it depends on the industry and is likely higher in bad times.

Economic triage: First best

The government has two goals:

Ensure the survival of socially viable firms

This means that, ideally,

If $V + Z > R$, the firm should continue;

If $V + Z < R$, the firm should close.

Protect taxpayer money

This means that, ideally, the government should subsidise only firms that would otherwise not be privately financed. It should pay Z to firms whose value is such that

$V < R < V + Z$

Total cost $G = Z * \text{Prob}(R - Z < V < R) + \text{losses on existing loans}$.

If the government knew V, Z , and R , it would do the triage in two steps. For firms that need

to close, recovery would be R . Assuming *pari passu* risk sharing, banks and private creditors would recover $D/(D + L)*R$ and the government would recover $L/(D + L)*R$.

For firms that should survive, if $V > L + D$ then all is fine. If $V < L + D$ then a haircut (h) is needed. Assuming *pari passu* we would set $(1 - h)*(L + D) = V - E$ to get the haircut and leave the firm with enough equity to operate. Firms where $V > L + D > V - E$ are excessively leveraged and might need pre-emptive restructuring. So an alternative is to treat all firms with $V - E < L + D$ as needing a haircut.

Implementation with limited information

The main issue is that the government does not know V or R . Banks and firms know a lot more about V and R than the government does.

This implies that the government needs the help of banks to implement efficient triage. However, letting the banks make privately optimal decisions would lead to excessive closures. Banks have three options:

1. Continue financing the firm if $V > L + D$; no haircut.
2. Close the firm and recover $D/(D + L)*R$.
3. Continue financing but if $V < L + D$ then accept haircut h such that $(1 - h)*$

$(L + D) = V - E$. Hence the bank gets $(1 - h)*D = D/(D + L)*(V - E)$, which is its *pari passu* share of the pledgeable value.

From the bank's perspective the decision to close under *pari passu* is thus $D/(D + L)*(V - E) < D/(D + L)*R$, which is equivalent to $V - E < R$.

Comparing this to the optimal decision $V + Z < R$ shows that two inefficiencies lead to excessive closure:

1. Equity value E is 'not pledgeable' in the sense of standard corporate finance. This is a private inefficiency that is well known.
2. Z is not internalised by the banks. This is a public externality issue.

Let us now figure out how to implement socially efficient restructuring. Suppose that the government agrees to take a higher haircut ($H > h$) than the banks under continuation. Under liquidation the government maintains its *pari passu* status. The haircut making a bank indifferent between closing and continuation is $1 - h = R/(D + L)$. This then requires

$$(1 - H)*L = V - E - R*D/(D + L)$$

To implement the socially efficient triage, this condition needs to hold when $V + Z = R$. Therefore $(1 - H)*L = R - Z - E - R*D/(D + L)$. The haircut accepted by the government is given by $1 - H = R/(D + L) - (Z + E)/L$. Therefore

$$H = h + (Z + E)/L.$$

Proposition: Implementation under limited information. The following scheme implements the first best allocation:

- If a firm is closed, then government loans (L) and private loans (D) are treated *pari passu*.
- If a firm continues but needs debt forgiveness then the government accepts to take a higher haircut than the banks, given by $H = h + (Z + E)/L$.

The key point here is that H does not depend directly on V or R , thus it is feasible even if the government does not know V or R . The government indexes its haircut (H) to that of the private sector (h) precisely in order to extract information.

This programme costs more money to the government than under full information because it has to give up more of its claims to induce efficient continuation. But it achieves the efficient outcome.

When the government also gives out wage subsidies, then the net present value of these

subsidies should be deducted from Z.

Fiscal equity

Governments have fiscal equity in all firms: the present value of future income taxes. They have an incentive to keep the firm alive. In theory, fiscal equity could be adjusted to increase the efficiency of the programme.

One way to make the programme less expensive is for the government to get relatively more equity in exchange for accepting a higher haircut. For large firms this can be nonvoting preferred stock; for small firms, it could take the form of a higher tax rate on future profits for firms that need restructuring than for those that do not. For instance, suppose the government forgives all corporate taxes due during the lockdown. All firms benefit from this measure. Those that default on their loans would agree to waive some of the corporate tax break. That would be fiscal equity.

An example

Consider a firm before the lockdown with sales of 100 per year, non-labour costs of 50 including maintenance, and labour cost of 40. Its total costs were 90, net profits 10, discount at 10%. Firm value was $V_0 = 100$. Debt was $D = 50$. Entrepreneur had equity $E_0 = 50$.

During the crisis the firm gets an emergency loan from the government equal to $L = 50$. Total debt is now $D + L = 100$.

After the crisis the value of the firm is lower. Future sales are only 75. It manages to lower its non-labour costs to 40 and its labour cost to 30. Its total costs are now 70; profits are 5. The new firm value $V = 50$. Since $50 < 100$ the firm is insolvent.

Suppose that the minimum required equity is $E = 10$. The pledgeable continuation value $V - E$ is only 40. In addition, if workers are fired, their outside value is not 30 because the labour market is depressed. It is only 20. That means $Z = 10$.

Finally, assume that the recovery value of the assets is $R = 44$. Under liquidation, the bank would therefore get $\frac{1}{2}R = 22$. This is the outside value for the bank, and any continuation must provide at least that value for the bank.

Suppose there is no programme and D and L are *pari passu*. To continue the business we would need to reduce the total debt to 40. Each party would get 20 and the entrepreneur 10. This would be lower than the liquidation value, and the bank would decide to close the firm.

But because $V + Z = 60 > 44$ the government would want to keep the firm open. If the government knew V and R , it would hold the bank to its outside option of 22 and would accept 18 to keep the firm open. The minimum cost to convince the bank to continue is an extra haircut of $2 = 4\% \cdot 50$.

However, the government does not know V and R , so that is not feasible. Instead, the government tells the bank: If you agree to continue, I agree to a haircut equal to yours plus $(10 + 10)/50 = 40\%$. The bank accepts. The bank can then estimate the required haircut $(1 - h) \cdot 100 - 0.4 \cdot 50 = 40$ so $h = 0.4$. The bank accepts a 40% haircut from 50 to 30, and the government accepts an 80% haircut from 50 to 10. The total claims are 40: $E = 10$, $V = 50$.

The haircut is large because the programme is designed to save all socially positive projects. Consider a marginal firm, for which $R = 60 = V + Z$. It is barely worth saving. The bank's outside option would be 30, which is exactly the value it gets under continuation.

If government funds are limited it might not be optimal to save a marginal firm. The government could propose a continuation premium of only 20% instead of 40%. In that case the marginal firm ($R = V + Z$) would be closed, but the firm in our example would be saved at a lower cost: $(1 - h) \cdot 100 - 0.2 \cdot 50 = 40$ leads to $h = 50\%$. The bank would get 25, which is more than 22 so it would be happy to continue. The government would accept $H = 70\%$ and get 15, which is more than the 10 it was getting under the more ambitious programme.

Finally, if the government could obtain an equity claim (say of 50%) it could lower the internal buffer from $E = 10$ to $E = 5$. That would increase pledgeable funds and lower the cost of the bailout.