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COVID-19 Credit Policies around the World: Size, Scope, Costs, and Consequences

ABSTRACT Governments deployed credit policies on a historically unprecedented scale in response to the COVID-19 pandemic. We estimate the effective size of credit policies for seven large advanced economies in terms of the incremental resources provided to firms and households—a measure that allows aggregation across credit support, forbearance, and traditional fiscal policies but that does not appear in traditional government statistics. These estimates are used to reassess the absolute and relative size of different governments' policy interventions and to evaluate whether taking credit policies into account can help explain the cross section of macroeconomic outcomes. Incremental resources increase from an average 14.5 percent of 2020 GDP when only fiscal policies are considered to 22 percent of 2020 GDP when credit policies are also taken into account. Incorporating credit policies also reduces the cross-country variation in the total size of policy interventions. With regard to fiscal cost, fair value estimates for these credit support programs average 37 percent of principal, with wide variation depending on program features. We also discuss several related measurement issues, the financial regulatory changes that accommodated these programs, the pros and cons of the different types of credit policies, and how in principle budgetary costs should be calculated versus how governments account for credit policies in practice.

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Governments around the world deployed credit policies during the COVID-19 pandemic on a historically unprecedented scale. Those policies included loan guarantees, direct government lending, large-scale forbearance programs that allowed millions of households and businesses to temporarily stop making payments on certain debt obligations, and the loosening of regulatory restrictions on banks which encouraged them to participate in those programs. Advanced economies used both credit policies and traditional fiscal policies to a much greater extent than did emerging market and developing economies (EMDEs). Our quantitative analysis focuses on the credit policies of seven large, advanced countries (France, Germany, Italy, Japan, Spain, the United Kingdom, and the United States) that in dollar terms accounts for most credit policies that were implemented globally. The restriction of the analysis to those countries is for reasons of data availability, but the conceptual issues discussed are relevant to governments anywhere that are considering the use of credit policies as a complement to or substitute for traditional fiscal policies.

While a growing body of work studies various aspects of these credit policies, this paper appears to be the first to estimate the effective size of these policies in a way that allows aggregation across credit support, forbearance, and traditional fiscal policies, with the aim of producing statistics that can be used to explore the connections between these policies and various macroeconomic outcomes. Specifically, we introduce the idea of "incremental resources provided" as a unifying concept for sizing credit support, forbearance, and traditional fiscal programs. We operationalize that idea by equating size to principal take-up for government loan and loan guarantee programs, equating size with total avoided payments for forbearance programs, and equating size to reported expenditures for traditional fiscal policies. The size estimates for large-scale credit forbearance programs are an original contribution of this paper, while those for direct lending and guarantee programs are taken from Hong and Lucas (2023), and incremental fiscal spending is taken from the October 2021 release of the International Monetary Fund (IMF) database on fiscal policies in response to COVID-19.[1]

1. International Monetary Fund, "Database of Fiscal Policy Responses to COVID-19," https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19. The database was regularly updated from the onset of the pandemic to track governments' above-the-line and below-the-line activities that are categorized by the IMF as fiscal.

We use these size statistics, separately and in combination, to reassess governments' policy footprints during the pandemic, and also to explore whether taking large-scale credit and forbearance policies into account can better explain the realized cross-country differences in macroeconomic outcomes such as real GDP growth, private savings rates, and inflation. To briefly preview the main findings, we show that these credit policies significantly increased the resources in the pockets of firms and households, bringing the average share of incremental resources provided from 14.5 percent of 2020 GDP when only fiscal policies are considered to 22 percent when credit support and forbearance—as measured by take-up and missed payments—also are added in. Including those policies also paints a quite different picture of the relative aggressiveness of government policies across these countries. Whereas there is considerable variation in the use of traditional fiscal policies, the variation in resources provided as a share of GDP is much lower when credit and forbearance policies are also taken into account.

Furthermore, increases in savings rates between 2019 and 2020 across countries are highly correlated with the combined size of credit and fiscal policies, although forbearance policies have a negative correlation with savings rates. The much higher and more uniform levels of incremental resources provided by European and US governments, and the likelihood that a significant fraction of those resources were initially saved rather than spent, is consistent with pandemic fiscal and credit policies having significantly contributed to the sharp increase in subsequent inflation in all of these countries. In fact, the increase in private savings is highly correlated with inflation cross-sectionally. However, we find no direct correlation in the cross section between inflation rates and the size of these policies. Also suggestive of the importance of credit support and forbearance policies is the finding of a much stronger correlation between the cross section of GDP growth between 2020:Q3 and 2021:Q3 and our broad measure of incremental resources than with traditional fiscal spending alone.

There are a number of foundational conceptual issues related to credit and forbearance policies that are briefly discussed in section I. These include how the policies should be quantified, both for macroeconomic policy evaluation and for budgetary purposes, and why different approaches are required in each case; how to think about the transmission channels of credit policies and their interaction with fiscal and monetary policies; how to choose multipliers to convert raw measures of incremental resources into a more precise estimate of the contribution to aggregate demand from a given policy; the pros and cons of the different types of policies along

multiple dimensions; and how in principle budgetary costs should be calculated versus how governments account for credit policies in practice.

In section II we turn to the task of quantifying the incremental resources provided by each of the major credit support and loan forbearance programs and then aggregate the results in the two broad categories for each country. We also report estimates of the fiscal (i.e., upfront budgetary) cost for the direct lending and guarantee programs on a fair value basis, drawing on our recent estimates in Hong and Lucas (2023). Notably, the fiscal cost is typically much lower than the incremental resources provided, averaging 37 percent of the principal borrowed, because some or most of the funds will be repaid.[2] The estimated costs vary significantly across the programs depending on the generosity of program terms and the riskiness of the borrowers. We also describe the relaxation of regulatory rules that enabled banks to participate in these programs without incurring penalties. The important takeaway from these policies is that by lowering risk-weighted assets and raising consumer credit scores, they may have caused an overly rosy perception of the health of banks and the financial system. Section III reports on the macroeconomic results described earlier, and section IV concludes.

I. Effects of Credit Policies on Fiscal and Macroeconomic Outcomes: Conceptual Issues

A fundamental challenge for our analysis is one of measurement: how to best quantify credit policies so as to make them most comparable to traditional fiscal policies. Our preferred answer will differ depending on the outcome of interest. For example, we suggest that a credit program's effects on aggregate demand (i.e., stimulus effects) are best measured with an estimate of the incremental amount of cash the program puts into the pockets of households and firms, scaled by an appropriate multiplier that reflects factors such as the propensity of the recipients to spend the money rather than to save it. We also use an incremental cash approach to look for macroeconomic effects that are related to aggregate demand, such as GDP growth, saving, and inflation. However, we argue that a credit program's ex ante fiscal cost (or equivalently, its properly measured budgetary cost) should be evaluated in present value terms on a fair value basis in order

2. This excludes the US Paycheck Protection Program, which was effectively a grant program.

to make program cost estimates most comparable to those for traditional fiscal policies.

In addition to addressing measurement issues, as a prelude to the quantitative analysis it is useful to consider (1) the major types of credit policies introduced during the pandemic and their salient similarities to and differences from each other, (2) transmission channels for credit policy and the interaction of credit policies with monetary and fiscal policies, (3) the pros and cons of using alternative types of credit assistance and cash payments in terms of efficacy and cost effectiveness, and (4) how the cost of credit policies should be calculated versus how they are reflected in official government accounts. In this section we lightly touch on each of these issues and the reasons for the measurement choices made and point the interested reader to some of the related literature on these topics for more detailed discussions.

I.A. Types of Credit Policies and Comparisons between Them

A credit policy can be defined as a policy that affects the terms or availability of credit to households, firms, or subnational government entities. Here we classify the pandemic-era credit policies that we consider as falling into three broad categories.

The first category includes government loan guarantees and direct government lending. New loan guarantee programs for firms were the most prevalent form of credit assistance introduced in response to the pandemic. Loan guarantees and direct government loans typically are grouped together (e.g., by the IMF and the US Congressional Budget Office) because their benefits to borrowers and costs to the government are similar, holding the underlying loan and borrower characteristics constant. The similarities arise because through either form of support, the government absorbs some or all of the credit risk without being fully compensated for the cost of doing so. Furthermore, both types of assistance effectively put the government's credit rating in place of the borrower's rating. That allows firms and households that could not qualify for a traditional bank loan to gain access to credit, an often powerful extensive margin effect.

Whereas the economic effects of guaranteed loans and direct government lending are similar, there are several differences worth noting. The participation of private sector lenders in direct lending programs entails additional costs and benefits. It typically involves higher government cost because lenders have to be compensated for the costs and risks of their involvement, and that compensation may be in excess of what is required to induce participation. Part of that higher cost may be offset by efficiency

gains, such as when private lenders are better at screening borrowers or performing other administrative functions. For the government, the two types of credit support have very different effects on its balance sheet and the amount of government debt outstanding. Direct lending typically involves increasing government debt by the principal amount extended, and the loans are recorded on the asset side of the balance sheet. By contrast, credit guarantees do not entail any additional government borrowing, and they are generally treated as off-balance-sheet. Budgetary accounting for credit varies more widely across countries and in many cases is misleading, as discussed below.

A second category of credit policies that several governments introduced on an unprecedented scale during the pandemic were various types of payment holidays. These policies, which we refer to generically as forbearance policies but in some cases were called payment moratoriums, allowed borrowers with existing debt obligations to cease making scheduled payments without penalty for some period of time. As with guaranteed and direct lending, forbearance policies provided additional cash to households that would eventually need to be repaid. Effectively, forbearance is like making a loan to cover the payments coming due on existing debt. However, COVID-19 forbearance policies usually had a shorter maturity than guaranteed and direct loans, with the former typically ranging from a few months to a year and the latter typically lasting for three to ten years. The scale of funds provided relative to the underlying loan size is also different. With forbearance, the additional cash provided is the sum of missed payments over the life of the forbearance policy, whereas with a guaranteed or direct loan it is the entire principal amount. As discussed in section II.B, the size and incidence of the costs of forbearance varied considerably with the way the policies were structured. An important distinction is between forbearance programs that are imposed on private sector creditors and therefore entail hidden taxes and those whose costs are borne by the government.

A third category of credit policies that were important during the pandemic were changes to financial regulations—such as the rules governing when a loan is reported as nonperforming and how it is reported to credit registries. As explained in section II.C, regulatory requirements were relaxed to encourage program participation by both lenders and borrowers. Without these accommodations, the take-up of forbearance and guaranteed loans could have been much lower.

Some actions by central banks fall into the first category of direct lending or loan guarantees, but only some of those policies are included in this analysis. Newly created direct lending and guarantee programs that

were administered by central banks and backstopped by a fiscal authority were included. For example, we include the US Main Street Lending Program, which was administered by the Federal Reserve but whose losses were backstopped by the Treasury under the Coronavirus Aid, Relief, and Economic Security (CARES) Act. In principle we should also include any primary market purchases of private sector securities by central banks, but we did not obtain data to incorporate the effects of those purchases.

Other central bank policies would fall into a fourth category of credit policies that have more indirect effects on aggregate demand and more limited fiscal costs. As such, they would require a different sort of analysis than the one in this paper. These include purchases of private sector securities in the secondary market (which don't provide any new funding to firms) and the massive purchases of government securities that accommodated the fiscal response to the pandemic. In addition to outright securities purchases, central banks expanded their liquidity programs, reopening facilities created in response to the global financial crisis and in some instances adding new ones. For example, the European Central Bank expanded its targeted longer-term refinancing operations (TLTRO III) and introduced the Pandemic Emergency Purchase Programme (PEPP). The Federal Reserve reopened many of the facilities it created during the global financial crisis and added some new ones. While those liquidity facilities had the legal capacity to purchase trillions of dollars of securities, by design they took on very little uncompensated credit risk and didn't directly increase the supply of loanable funds to firms and households.

I.B. Transmission Channels and the Relation of Credit Policy to Fiscal and Monetary Policy

The basic transmission channels from all expansionary demand-side policies to the macroeconomy—credit, fiscal, or monetary—are broadly similar. All increase the resources available to households and firms and thereby encourage additional spending that in turn affects output, prices, asset values, and so forth.

The specifics of the mechanisms differ. Expansionary monetary policies make borrowing cheaper, encouraging investment and consumption (and vice versa for contractionary policies). When expansionary monetary policy is used to accommodate debt-funded government spending, that too can put upward pressure on prices. Expansionary fiscal policies, for example, extended unemployment benefits or tax cuts, lead to increased spending that puts upward pressure on prices and output. Expansionary credit policies lower the cost of credit and increase its availability, encouraging

increased consumption and investment that in turn influences macroeconomic outcomes.

It is important to emphasize that the intent of expansionary policies during COVID-19 was not to spur an increase in consumption during a period when people were encouraged or forced to stay home. Rather, the policies were intended to tide over households and businesses through a period of reduced economic activity, for instance, allowing firms to retain workers and remain going concerns and allowing households experiencing a temporary drop in income to continue covering fixed expenses such as mortgage or rental payments. Some described the policies as providing social insurance rather than as stimulating spending. However, the policies did increase aggregate demand relative to what it would have been in the absence of those policies, and hence it is reasonable to think of them as providing stimulus through aggregate demand effects.

Rather than according credit policy independent status, credit policies are generally treated as a subcategory of monetary, fiscal, and regulatory policies. While it is true that credit policy has aspects related to these other policy types and that it interacts with them, we hope something readers will take away from this analysis is that assessing the effects of credit policies accurately requires considering them separately in their own right.

In fact, credit policies have aspects that are fiscal, monetary, and regulatory. There is a fiscal element ex ante when a policy involves subsidies or ex post when it affects the future finances of the government, for example, when there are future payouts on loan guarantees. There is a monetary element when a credit policy originates from a central bank. There is a regulatory element when the policy affects administrative rules or legal constraints. As with fiscal policy, credit policies can be passive in that the effects arise from standing policies or active as when they are introduced in response to a shock. Also as with other government policies, their effects will vary over the business cycle and with other factors, making the magnitude and timing of their impacts difficult to predict.

In terms of policy interactions, credit policies affect the transmission mechanism of other types of policies, particularly monetary policy, by either blocking or amplifying their effects. The significance of those interactions can be illustrated by considering two historical examples. During the Great Recession, mortgage credit policy partially blocked the normal transmission mechanism for US monetary policy. Typically, one of the main ways that monetary policy easing helps households is via a mortgage refinancing channel. Households are able to reduce their monthly payment obligations by refinancing their mortgages at lower rates. However, because mortgage

credit policy prevented the refinancing of government-backed mortgages on homes whose value had fallen sharply or where minimum income requirements were no longer satisfied because of job loss, the volume of refinancing was much lower than would normally have been expected with such a large drop in interest rates (Remy, Lucas, and Moore 2011).

The interactive effect of credit policies with monetary policies during COVID-19 was the opposite. Both in the United States and internationally, credit policies amplified the effects of monetary policy easing. Loan guarantees, direct lending, forbearance, and relaxation of regulatory policies significantly reduced the barriers for households and firms to take advantage of the low level of real interest rates.

I.C. Credit Policy Multipliers

In order to evaluate the combined macroeconomic effects of credit policies and fiscal policies, a natural question is whether some scaling factors for our estimates of the additional cash made available are necessary to make the different policies more comparable to each other and to traditional fiscal expenditures? An example of such scaling is given by Lucas (2016), who uses a multiplier framework to translate an estimate of the incremental borrowing from US credit support programs during the Great Recession into stimulus estimates that are comparable to those for fiscal policy.

For loan guarantee and direct loan programs, we use take-up (the total principal amount borrowed) as the raw measure of incremental resources obtained by program participants. For forbearance programs, the estimated sum of skipped payments is the corresponding raw measure. The incremental fiscal expenditures are the government-reported cash costs of grants, tax cuts, and other discretionary spending, as reported by the IMF. Using take-up as the proxy for incremental cash made available by guarantee and direct lending programs presumes that the loans would not otherwise have been made, that is, that there was no crowding out of private sector credit. For small and medium-sized enterprise (SME) programs, which account for a large portion of total take-up, it is reasonable to assume that there would have been limited credit availability without government support, or that rates would have been so high as to discourage most borrowing.[3]

3. Lucas (2016) assumed variation across US government credit programs in incremental resources made available during the Great Recession, with borrowing under programs like student loans judged to be largely incremental and borrowing under government mortgage programs less incremental.

For the programs serving larger firms, presumably some would have obtained funding in the absence of government support, and take-up probably overstates incremental resources provided.

Choosing multipliers to convert these raw measures of incremental resources into an estimate of their contribution to aggregate demand is especially challenging for the pandemic period. As noted earlier, the intent of assistance programs during COVID-19 was quite different than that of stimulus programs during past recessions. Rather than to bolster aggregate demand, the assistance was intended to tide over individuals and firms through a period of drastically reduced incomes and heightened uncertainty so as to be able to cover basic needs and minimize displacement. Auerbach and others (2021) address these challenges to multiplier estimation in the context of fiscal policy and emphasize that multipliers were much higher in places with less strict lockdown orders.

Given the difficulty of inferring multipliers for this period, in the analysis that follows we have not applied any scaling factors to our raw estimates of the incremental cash provided by credit assistance programs or fiscal expenditures. However, it is worth considering, at least qualitatively, the extent to which the incremental cash provided via credit programs could be expected to have increased aggregate demand and the reasons the effects may be larger in some programs than in others.

GUARANTEED AND DIRECT LENDING PROGRAMS There are several reasons to expect that a significant share of the funds borrowed were retained for precautionary purposes rather than immediately spent: demand was subdued by lockdowns, caution and economic uncertainty were high, and the subsidies in some of these programs were large enough to make it worthwhile to borrow even if there was no immediate use for the funds. To the extent borrowed funds were spent, for the same reasons the size of subsequent rounds of spending that were triggered may have been much smaller than in a typical recession. These considerations point to smaller multipliers than in prior recessions.

Anecdotal evidence about how the borrowed funds were used supports a higher-than-normal propensity to save the borrowed funds. For instance, according to the British Business Bank, 23 percent of SMEs had spent all their facilities and 19 percent had not spent any by 2020:Q3 (British Business Bank 2021). The gross savings statistics reported in section III also suggest a high propensity to save during this period.

The question remains of whether the multipliers applied to take-up amounts should be lower or higher than those that are on average attached to traditional fiscal expenditures. Lucas (2016) noted that credit multipliers

will tend to be higher than fiscal multipliers, all else equal, because it is costly to borrow and people will refrain from doing so unless they intend to spend the money. However, for the reasons just mentioned, during the pandemic it was relatively low-cost to borrow and the demand for precautionary stockpiles of cash was likely to be elevated. Lacking a basis for adjusting the relative multipliers on credit and traditional fiscal assistance, we concluded that a neutral choice was to set them to be the same and equal to one.

FORBEARANCE Forbearance policies provided additional cash to affected firms and households in the amount of the skipped payments. The additional cash on hand provided funds that would have been otherwise unavailable for spending or for saving. Because most or all of the money had to be repaid eventually, and often with additional accrued interest, the policies should have had minor wealth effects. The primary transmission channel is therefore most likely to be via the effective relaxation of borrowing constraints. These effects are akin to other forms of credit support that operated primarily through increased borrowing on the extensive margin.

The questions of (1) how much of the missed payments were saved rather than spent and (2) whether the propensity to spend out of the additional funds was similar to the propensity to spend out of incremental borrowing from guaranteed or direct lending programs or from fiscal policies can't be answered with the aggregated program data we have available. It seems likely that the propensity to spend varied depending on whether a program was for households or firms and on other borrower and program characteristics. In programs where forbearance was automatic or close to it, more of the funds were likely to have been saved than in programs where some demonstration of hardship was required. There may also have been a lower average propensity to spend than for guaranteed and direct loans, which even at subsidized interest rates entailed higher costs, more effort, and more selectivity.

A further consideration regarding the spending impact of forbearance programs is whether there was a partially offsetting effect from creditors that may have reduced spending or lending to other borrowers, especially for those where forbearance arose from an uncompensated mandate.[4] Given the regulatory forbearance discussed below to accommodate these programs and the generally strong capital ratios of banks, we expect these offsetting effects to have been modest.

4. We thank Alan Auerbach for pointing this out.

I.D. Policy Trade-offs between Credit, Forbearance, and Fiscal Policies

We will see that credit support and forbearance policies appear to have been used as both substitutes and complements to traditional fiscal policies during the pandemic. What criteria should have guided the policy mix? An investigation into these questions is important for informing future policy choices. While an in-depth analysis of the quality of choices made during the pandemic is beyond the scope of this paper, it is useful to evaluate the trade-offs in general terms. Here we briefly discuss some of these considerations, drawing on Lucas (2020).

In choosing between different types of policy responses, important considerations include efficacy, target efficiency, transparency, the costs of financial distress to households and firms, and government cost. In terms of target efficiency and cost transparency, traditional fiscal policies (i.e., cash transfers, tax cuts, and in-kind assistance) will often dominate credit. Such assistance usually reaches the targeted recipients, and it can be distributed relatively quickly and through existing administrative structures. With some notable exceptions, it is transparent who benefits and how much they receive. It doesn't create an overhang of future obligations on recipients. Importantly, cash can help poorer households and proprietors who are less connected to credit markets. For instance, landlords benefit from mortgage forbearance and renters benefit from cash rental assistance. Cash transfers also have the advantage of greater cost transparency.

The main disadvantage of traditional fiscal measures is that they are expensive, costing dollar for dollar the amount of purchasing power provided. That can make it infeasible to provide a meaningful level of assistance on a large scale. When the goal is to offset a big but probably temporary drop in income or to mitigate a sharp contraction in the availability of credit from private financial institutions, credit support can be an attractive alternative.

The cost of credit support to the government can be quite low relative to the amount of funds that are made available, making it a potentially cost-effective way to get money into the hands of people and businesses during times of crisis when liquidity is scarce. That's because most obligations incurred are likely to be eventually repaid. Further, the obligation to repay makes it more credible that those applying for funds truly need the money.

However, the stated advantages of credit presume a program that is well designed so as to reach borrowers who are likely to have the capacity to repay and to screen out those who are not targets for assistance. A striking example of a credit program that had none of these potential advantages was the US Paycheck Protection Program, whose design has been

criticized as a poorly disguised grant program that lacked transparency and target efficiency. A further consideration is that defaults are costly to all parties involved—the defaulting borrowers, lenders, and the government agencies administering the programs. When those costs are taken into account, a loan program with a high expected default rate is likely to be more expensive than providing a similar amount of cash assistance.

Already high government debt levels and restrictions on deficit spending may discourage some countries from increasing traditional fiscal assistance. Credit, for better or worse, may be a legal way to avoid constraints on traditional spending. Large cash transfers also are more likely to raise issues of fairness than debt obligations that have to be repaid.

Among credit policies, a well-crafted forbearance program can have several advantages under certain circumstances. It can get money out the door quickly with little new bureaucracy, and it can be targeted fairly tightly, such as at residential mortgages with some maximum balance. When the government already bears most of the credit risk for loans to borrowers that are targets for assistance, the incremental cost and risk of forbearance is likely to be small. This is particularly true in the United States, where, through its mortgage, student loan, small business, agricultural, emergency, and other lending programs, the federal government is the largest provider of credit to US households. Many of those programs already allowed for forbearance during an emergency without additional legislative action, which made it possible to quickly put the policies into motion. Beyond the direct benefits of reducing cash needs, forbearance policies can avoid longer-term economic damages to employment and access to credit markets by protecting household credit scores.

Forbearance can also have a downside, as discussed at greater length in section II.B. It can only help the limited number of households and firms with existing debt, and this group is likely to be relatively well-off. When it is combined with partial forgiveness of principal or interest, its costs can be much higher and more akin to cash grants, and those policy changes may circumvent the discipline of recognition in the budget process. Forbearance can be target-inefficient when it is made available without consideration of need. The US student loan moratorium is an example that has all of these drawbacks. Forbearance also can be used as a way to avoid recognizing fiscal costs by imposing costs on the private sector. For example, in the case of US mortgage forbearance, servicers were compelled to continue to pay the holders of mortgage-backed securities even on mortgages on which payments had stopped. Bank loans subject to loan moratoria in Europe also presumably involved uncompensated costs to banks.

New credit guarantee or direct lending programs are harder and slower to put in motion than forbearance policies, often requiring new legislative authority, obtaining special expertise from outside government, delays associated with vetting borrowers, and so on. Nevertheless, they can reach firms and households that don't have existing debt, which are often more in need of funds than those that already have a connection to the credit market. The estimates of government cost developed in Hong and Lucas (2023) and reported below suggest that most of the credit support programs introduced during the pandemic had a significantly lower government cost than had the same amount of funds been provided through traditional fiscal spending.

I.E. Estimating and Accounting for the Fiscal Cost of Government Credit Support

What is the most policy-relevant way to assess and budget for the fiscal cost of credit support? And how does the answer compare to how it is budgeted for in practice? We discuss these issues at length and apply them to the COVID-19 guarantee programs in Hong and Lucas (2023). The main takeaways are briefly summarized here; the interested reader is referred to that paper and references therein.

The policy relevance of budget estimates depends on the purposes for which they're used. Arguably, the most important purpose is as an input to help policymakers understand the trade-offs between competing uses of fiscal resources, and to do so upfront, at the point in time authorizing legislation is being drafted and choices between competing actions are being made. Cost estimates also feed into tabulations of aggregate surpluses and deficits, which in turn provide policymakers with a signal about the stance of fiscal policy. The question then is, What basis of upfront cost estimation and accounting for credit support puts it on a level playing field with other types of fiscal policies? This is sometimes referred to as seeking "grant equivalence," whereby the reported cost of credit assistance can be interpreted as the size of a grant that would have the same fiscal cost to the government.

A fair value approach, which equates the estimated cost of credit support with its market value (or an estimate thereof when comparable and reliable market prices are not available), is our choice for achieving grant equivalence. An example that illustrates why a fair value approach achieves that goal is to note that the fair value of a loan guarantee is the price a financial institution would charge for providing an identical guarantee. Therefore, a government could offer grants to program participants to cover the price of loan guarantees purchased from banks or it could buy the guarantees on behalf of the participants. The outlay would be the same in either case.

Notice too that the price charged by a private sector guarantor would reflect the present value of the future uncertain cash flows associated with the guarantee. The discount rates that market participants would implicitly or explicitly assign to those cash flows would compensate for time value and also include a risk premium.

As the previous example foreshadows, operationalizing the idea of fair value cost in a budgetary context requires accounting for credit on an accrual (i.e., present value) rather than a cash basis. What distinguishes fair value accruals from alternative accrual approaches is that the discount rate reflects the risk of the cash flows—the discount rate is "risk adjusted." Risk adjustment recognizes that taxpayers and other government stakeholders ultimately bear the associated credit risk and effectively are shareholders in risky government investments. Online appendix II outlines the specific approach we used for the subsidy cost estimates for the COVID-19-era direct loans and loan guarantees we evaluated. We have not attempted to estimate the fiscal cost of forbearance programs, although we discuss the costs qualitatively below.

In practice, most of the countries covered in this analysis, as well as most countries that are not included, do not record any upfront cost of credit programs in their budgets. Instead, they report credit assistance "below the line," which means there is often no immediate budgetary impact from a new credit assistance program. Losses are only reflected when they eventually are realized. An exception is the United States, which reports credit subsidies on an accrual basis in the federal budget. However, those accruals are required by law to be calculated by discounting expected cash flows at government discount rates. That legal restriction causes the reported costs to be systematically lower than fair value estimates. The Congressional Budget Office has supported fair value cost estimates for credit and often provides supplemental estimates for major credit programs on a fair value basis.

For the purpose of evaluating the macroeconomic effects of credit policy during COVID-19, we follow Lucas (2016) in treating fiscal cost as much less important than the incremental amounts of funds made available. The idea is that the expansionary effects of these policies during episodes of severe economic stress are primarily on the extensive margin of credit provision, rather than on the intensive one where the size of the subsidies is relevant. However, estimates of fiscal costs are important for comparisons of bang for the buck of different policies: the amount of stimulus provided relative to its fiscal cost. We provide some rough comparisons across countries of bang for the buck for the loan guarantee and direct lending programs.

II. Pandemic Credit Policies: Evaluation of Size and Fiscal Costs

In this section we seek to provide a quantitative answer to the deceptively simple question: How much incremental cash did households and businesses obtain via credit support and forbearance programs in different countries in aggregate? As discussed in section I, the answer to this question is a necessary input for analyzing and comparing the broader macroeconomic effects of these policies in a way that is fairly parallel to analyses of the effects of traditional fiscal spending. For the major credit guarantee and direct lending programs, we also report estimates of their fiscal cost (taken from our previous work), which when compared to the incremental cash provided provide bang for the buck estimates for these programs.

In section II.C we also briefly discuss the relaxation of regulatory requirements and other rule changes affecting banks that accommodated the large-scale usage of credit guarantee and forbearance policies. Notably, those policies may have contributed to overly optimistic perceptions about the health of the financial system and of household finances during this period.

We consider credit support in the form of loan guarantee and direct lending programs separately from the assistance provided by forbearance policies. The many differences between these policy types raise somewhat different conceptual issues and necessitate applying different but related measurement approaches. Our estimates draw on, and extrapolate from, data obtained from a variety of sources including official reports and statistical sources, academic and policy papers, and our own recent work on some of these programs.

II.A. Credit Guarantee and Direct Lending Programs for Firms

An intriguing database released by the IMF in 2021 provided an international comparison across countries of pandemic fiscal and credit policies. Specifically, it compared incremental traditional fiscal spending related to COVID-19 with the program "envelope" for below-the-line (off-budget) measures. Traditional fiscal spending includes both health- and non-health-related items.[5] The envelope of below-the-line measures includes the amounts

5. We find that the IMF's measure of incremental spending is, for some countries, similar to, and overall, highly correlated with the excess of fiscal expenditures in 2020 and 2021 over those in 2019.

that were legally authorized for new credit support and equity purchase programs. We equate the envelope with new credit support policies because equity purchases comprise a small share of the totals.[6] Those data suggest the potential importance of credit policies during COVID-19. It reveals the wide variation across countries in the types of policies introduced and the much less aggressive policy responses of emerging markets. The graphs summarizing the IMF findings are reproduced in figure 1.

While the IMF data are suggestive of the potential importance of credit policies during this episode, the credit envelope has only an indirect connection to macroeconomic and fiscal outcomes. In most cases, the envelope is much larger than the amount of credit extended under the programs—the program take-up. Furthermore, the relation between take-up and envelope is a noisy one. The envelopes reported by the IMF also do not include any of the funds made available through the large-scale forbearance programs discussed in section I.

To answer questions about how much money these credit programs made available to borrowers, the fiscal costs, and the stimulus provided, take-up is the more relevant starting point and the one we focus on here. The statistics reported on take-up and cost in this section are largely drawn from our recent paper, Hong and Lucas (2023). In that study, we provided estimates of take-up and fiscal cost on a fair value basis for the major credit support programs for firms that were implemented in seven countries, including the five largest economies in Europe (France, Germany, Spain, Italy, and the United Kingdom), Japan, and the United States.[7] Overall, these programs covered more than 90 percent of the credit support programs for firms that were introduced around the world during the pandemic according to the IMF. Most of these programs were launched following the lockdown orders in March 2020, in anticipation of a wave of firm defaults and a drop in income and liquidity.

Figure 2 compares the total program envelopes with realized take-up, both in dollar terms and as a share of 2020 GDP. In dollar terms, the United States had the largest envelope of about $1.4 trillion. When normalized by GDP, however, several other countries had larger envelopes. The total take-up of credit support by firms in the seven advanced economies we

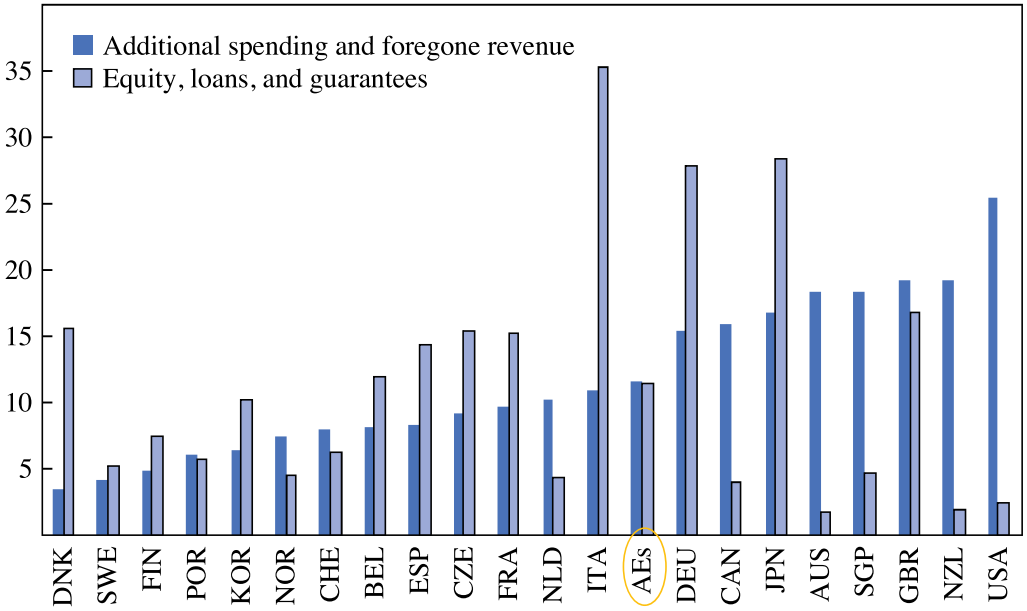
6. The IMF categorizes all of the policies as fiscal and breaks them into these two subcategories: "additional spending and forgone revenue" and "equity, loans, and guarantees."

7. For details of individual programs and countries, see the annex of Hong and Lucas (2023).

Figure 1. Discretionary Fiscal Response to the COVID-19 Crisis in Selected Economies

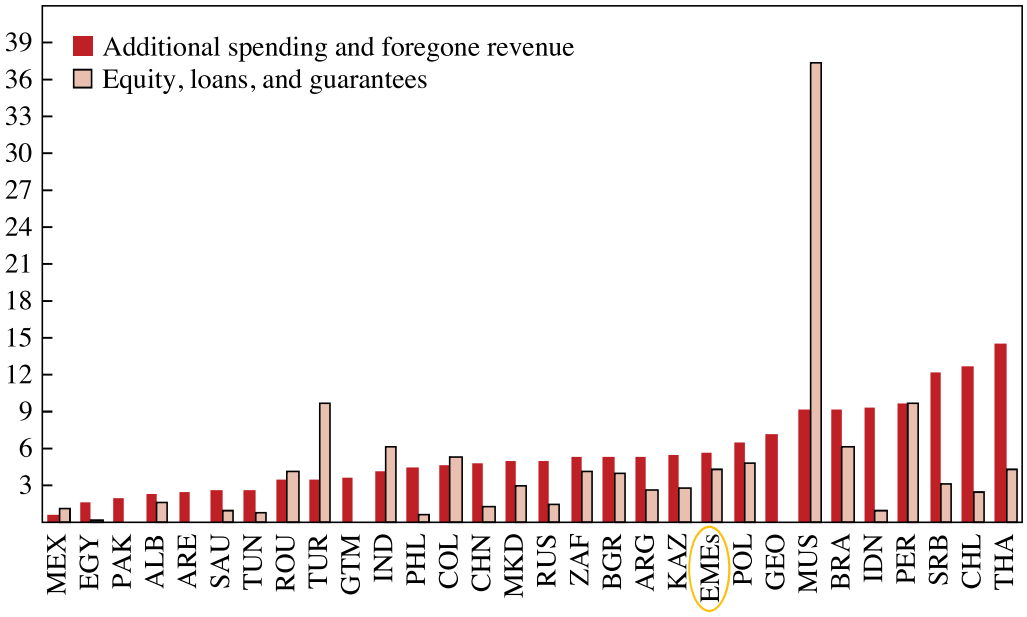
Panel A: Authorized fiscal support for selected advanced economies

Percent of 2020 GDP



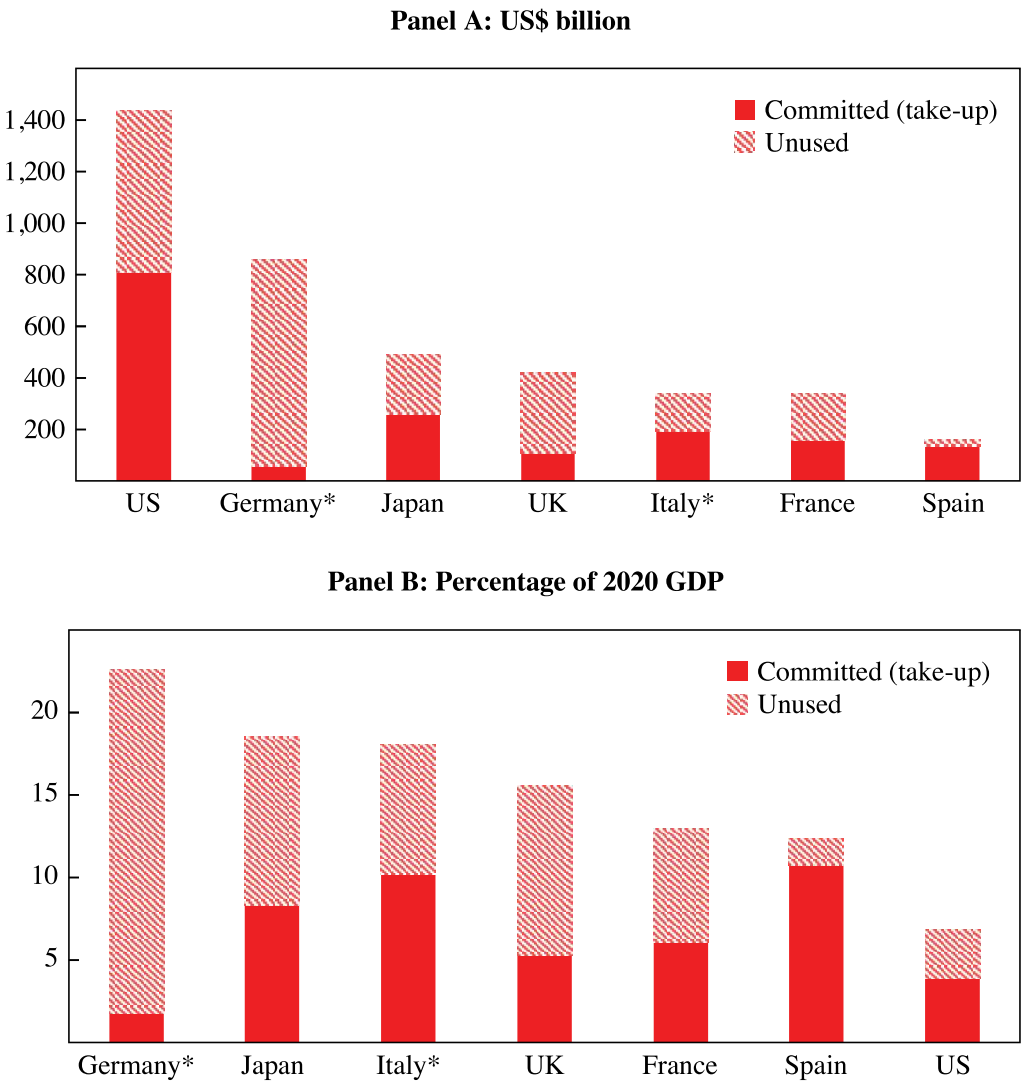
Panel B: Authorized fiscal support for selected emerging market economies

Percent of 2020 GDP



Source: Authors' tabulations using the IMF Database of Country Fiscal Measures in Response to the COVID-19 Pandemic. Panel A was adapted from Hong and Lucas (2023).

Figure 2. Credit Support Programs during COVID-19: Committed versus Unused Envelope



Source: Reproduced from Hong and Lucas (2023); estimates are based on official sources for each country, IMF Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic, and Anderson, Papadia, and Véron (2021).

Note: The following programs are included in each country's total envelope: Italy—"Cura Italia" guarantees and SACE Garantia Italia; United Kingdom—BBLS, CBILS, CLBILS, and the Bank of England's COVID corporate financing facility (CCFF); Spain—ICO loan guarantees; France—Prêt Garanti par l'État; Germany—KfW loans for small and large loans and a part of the increase in the economic stabilization fund (WSF) (400 billion euros) to provide additional state guarantees for firms; Japan—Safety Net No. 4 and No. 5; United States—Paycheck Protection Program, Main Street Lending Program, Credit Support for Airlines and Critical Industries. Last observations were in January 2022, except for Japan (January 2021).

*Some guarantee programs announced by Germany and Italy have uncapped legal limits to provide funds. The bars in the figure show the actual injections to the guarantee funds rather than the cap on total guarantees by the government.

study exceeded $1.7 trillion.[8] Using a simple average across countries, the average take-up is about 6 percent of 2020 GDP.

The wide variation in observed take-up rates has a variety of possible explanations. Countries that experienced larger economic shocks from the pandemic may have had higher take-up rates, other things equal. At the same time, the attractiveness of program terms, bottlenecks in financial intermediaries in assessing loans, and the availability of noncredit support programs are at play (Anderson, Papadia, and Véron 2021). In Spain, for instance, the greater recourse to guaranteed loans can be partly attributed to the lower availability of alternative fiscal relief measures for corporations (e.g., direct grants of state aid). This is consistent with the general pattern we find in section III of what appears to be substitution between credit and noncredit assistance. In France, the higher take-up of guaranteed loans may reflect the favorable pricing offered to borrowers through grace periods and concessional rates, especially during the first year of the loan. In Germany, the relatively limited use of such loans may be due to (1) lower financing needs of firms compared with other countries owing to a less stringent lockdown and firms' greater use of a combination of other policy measures that supported corporate balance sheets, including direct grants and tax deferrals and short-time working allowances; (2) less favorable lending terms (e.g., higher rates, a prohibition on distributing dividends, and limits on the remuneration of managers); and (3) some supply-side bottlenecks related to the risk assessment required for large loans. On the loan supply side, operational bottlenecks and an overwhelming number of loan applications may have impeded the take-up at the initial stage of the programs. Core and De Marco (2021) look at the different levels of information technology used to process online applications by banks in Italy and emphasize the role of information technology in processing high volumes of online applications and disbursements. Over time, the take-up in Italy continued to increase, notwithstanding the existence of a large-scale debt moratorium scheme.

The terms of these credit programs varied along a variety of dimensions. To give a fairly typical example, consider the UK Coronavirus Business Interruption Loan Scheme (CBILS), a guarantee program directed at small and medium-sized businesses.[9] It provided loans ranging from GBP 50,000 to

8. Most credit programs reported take-up through January 2022, except for Japan (January 2021).

9. Gov.UK, "HM Treasury Coronavirus (COVID-19) Business Loan Scheme Statistics," https://www.gov.uk/government/collections/hm-treasury-coronavirus-covid-19-business-loan-scheme-statistics.

GBP 5 million, with the available amounts depending on firm characteristics. Loan maturities ranged from three months to six years, and a variety of loan types were eligible to be guaranteed. Collateral was not required on most loans. The program provided an 80 percent guarantee, with 20 percent of losses absorbed by the private sector lenders. Lenders were charged an annual guarantee fee of 75 basis points. The government paid the first twelve months of interest and fees, up to a maximum of GBP 800,000. Loan pricing was at the discretion of lenders, but lenders had to demonstrate that the net financial advantage of the guarantee was passed through to the borrower.[10] The program wound up authorizing 110,000 loans totaling GBP 26.4 billion.

Structurally, there were common elements across most credit guarantee programs. First, a program specified the characteristics of target beneficiaries. In some programs, companies of all sizes were eligible (e.g., Germany's KfW, the French state-guaranteed loan PGE), while in others, only companies of certain sizes could participate (e.g., CBILS versus the Coronavirus Large Business Interruption Loan Scheme in the United Kingdom). Second, program rules specify guarantee coverage, that is, the share of losses absorbed by the government in the event of a default. In the programs that we assess, the guarantee coverage ranged from 70 percent to 100 percent.[11] Third, program rules restrict other terms, such as how interest rates are set, loan maturities, and eligible loan types (e.g., term or asset-backed loans), and guarantee and other fees or premiums. In some programs, interest rates were fixed by the government (e.g., the United Kingdom's Bounce Back Loan Scheme, BBLS), and in others, lenders were permitted to set the rate but with a cap (Spain) or subject to benefit pass-through (e.g., CBILS and PGE). For countries in the European Union, guarantee fees are prescribed in the EU temporary framework based on maturity and firm size.[12] Finally, loan sizes were typically limited in absolute amounts. For countries subject to the EU temporary framework, loan size was subject to a ceiling where the total amount should not exceed (1) double the annual wage bill of the

10. Although such requirements might not have been strictly adhered to in all cases, the considerable regulatory oversight of the banking system and the adverse consequences of being found to have violated the rules provide incentives for compliance. Anecdotal evidence suggests such rules were taken seriously.

11. The guarantees were typically pari passu, meaning that losses were shared proportionally between lenders and the government.

12. Under the EU temporary framework, guarantee fees (premiums) range from 25 basis points to 200 basis points, increasing progressively in line with the duration of the guaranteed loan and firm size.

beneficiary for 2019 or for the last year available, or (2) 25 percent of the beneficiary's total turnover in 2019. Exceptions could be made if there was appropriate justification and self-certification by the beneficiary of its liquidity needs. Several countries included additional provisions to allow loans to be more generous, such as a one- or two-year waiver of principal payments (pre-amortization). In some countries like the United Kingdom, interest payments were also paid by the government for one or more years.

To make the loans more accessible to certain target borrowers, several countries introduced programs with 100 percent government guarantees and relatively generous terms. There were five programs of this type that are included in the statistics here: the US PPP, Germany KfW's Instant Loan, the UK BBLS, Japan's Safety Nets for Financing Guarantee Nos. 4 and 5, and Italy's Fondo di garanzia. Compared to other programs under the same umbrella but with partial guarantees, these full-guarantee schemes had (1) quicker disbursement and minimal credit risk assessment, (2) longer loan maturities, and (3) lower maximum loan amounts. In some programs, terms were liberalized over time with extensions of loan maturity, extensions of program end dates, or increases in the envelope. The reported take-up and envelope sizes reflect the most recent information on those totals.

FISCAL COSTS OF CREDIT SUPPORT PROGRAMS We equate the fiscal cost of credit support programs to the fair value of the assistance granted, as estimated in Hong and Lucas (2023). The fair value estimates represent the net present value of projected cash flows to and from the government over the life of the underlying loans, approximately as of the point in time when the loans were originated (see online appendix II for a stylized example). Discount rates are inferred from quoted or observed market rates, adjusted using fair value principles for rate determination. Subsidy rates are defined as the ratio of fiscal cost to loan principal at origination. As discussed in section I.E, the aim is to produce cost estimates for credit support that are grant equivalent, meaning that the cost to the government is equivalent to that of providing program beneficiaries with an upfront cash grant that would allow them to obtain credit on the same terms from a private sector financial institution.

We estimated a total fiscal cost of $330 billion ($1.13 trillion including the US PPP). That is relative to an estimated total take-up of $873 billion ($1.76 trillion including PPP). Dividing total fiscal cost by total take-up, the average subsidy rate is 37 percent (67 percent including PPP). The subsidy rate varies widely across programs as a function of program design choices such as the riskiness of target borrowers, the size of rate concessions, loan maturity, fees, and other program features.

In terms of cost efficiency or bang for the buck, a subsidy rate of 37 percent represents significant savings over the 100 percent subsidy associated with traditional fiscal spending. Whether a particular credit program is truly more cost effective than a fiscal action aimed at the same outcome will, of course, depend on additional factors such as whether the targeted recipients are the ones to take advantage of the credit program, whether the funds are put to their intended uses, and whether the multipliers translating take-up to ultimate spending growth are in fact similar to the multipliers on fiscal spending.

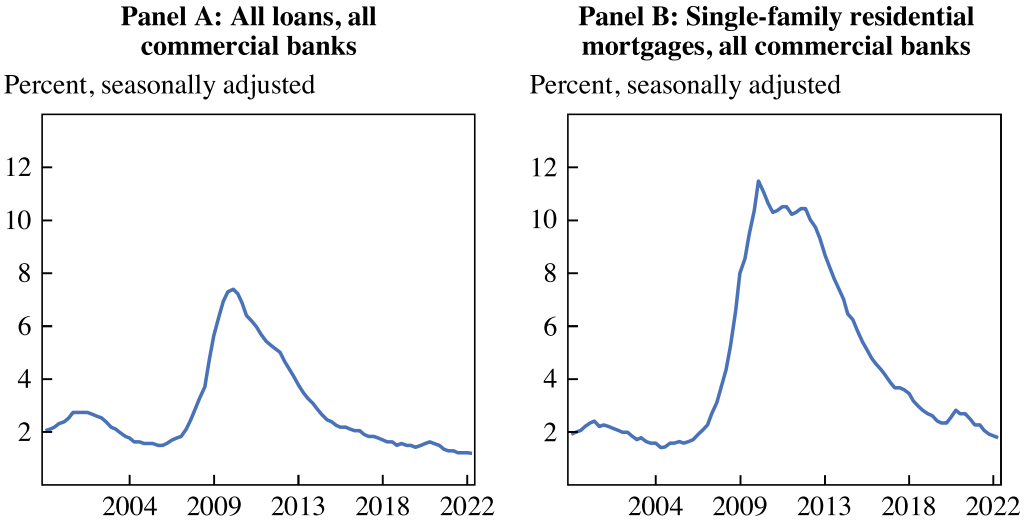
II.B. Forbearance Policies

Many countries adopted debt moratoria and other types of payment holidays on debt (collectively referred to here as forbearance policies) that allowed millions of households and businesses to postpone payments on existing financial obligations for periods ranging from a few months to several years. Most forbearance policies were initiated in spring of 2020 and ended later that year or in 2021. For households internationally, the largest source of payment relief came from mortgage forbearance, with rent, auto loan, and student loan payment stoppages also providing significant assistance in some countries. Forbearance measures for nonfinancial corporations (NFCs) typically were aimed at SMEs with bank loans.

Programs offering rent relief were not included in our tabulations of forbearance. For rent relief that was funded by a national government, the expenditure should be captured in incremental fiscal spending. For moratoria imposed on landlords as a mandate without compensation, funding was effectively via an un-booked tax that wouldn't be captured in any of the data that are available. To the extent that the increased propensity to spend by renters is offset by a reduced propensity by landlords, the omission of those programs should not distort inferences about macroeconomic effects. However, if renters have a higher marginal propensity to consume than landlords, omitting such mandates understates the stimulus effects of government policies.

The goal of forbearance policies was to avoid defaults by the many households and businesses that experienced sharp drops in income that were expected to be temporary. Avoided defaults prevented costly disruptions to lives and businesses. It stopped people from losing their homes, helped firms to remain as going concerns and retain employees, and shored up banks' regulatory capital. As others have noted, the extensive use of forbearance is one explanation for the historically low default rates that have continued through the present day. For example, figure 3 illustrates the

Figure 3. Default Rates on US Loans and Mortgages



Source: FRED Economic Data.

historically low default rates in the United States during the pandemic and in its aftermath. Forbearance policies also carry costs and risks. To highlight a few of them, there is the potential to leave households with unaffordable levels of future debt and to create zombie firms whose eventual insolvency is more costly and potentially more destabilizing than had they been promptly liquidated (see also section I.D). To the extent the loans are treated as performing, the health of the financial system appears better than it is.

Forbearance policies—particularly those that were made widely available such as the moratorium on US student loan payments—also allowed many non-distressed borrowers who could have serviced their loans to stop making payments. The excess funds were then available to save or spend. For example, Albuquerque and Varadi (2022) present evidence for the United Kingdom that the mortgage holiday increased consumption among poorer households and savings among wealthier ones. Importantly, because most missed payments would not come due for several years, the effects of forbearance on savings and aggregate demand could extend well beyond the date that programs officially ended.

In the analysis here, we do not try to identify distressed versus non-distressed recipients of forbearance assistance or its target efficiency. Rather, the more modest goal is to estimate the total amount of incremental funds provided by missed payments under these programs in different countries and regions. The estimates are new to this paper, and we haven't found other studies that try to estimate these quantities in aggregate. Later in this

Table 1. Total Missed Loan Payments due to COVID-19 Forbearance Policies

Country	*Forbearance (US$ billions)*	*Forbearance (% GDP)*
DEU	3.5	0.1
ESP	46.3	3.6
FRA	63.2	2.4
ITA	38.7	2.1
JPN	0	0.0
UK	31.65	1.2
USA	117	0.6

Source: Authors' estimates.

section we add those missed payments to the funds obtained through take-up of credit support programs and from traditional fiscal policies to provide a comprehensive measure of incremental funds going to households and businesses through all major types of government policies during the pandemic.

The results of our investigation into incremental resources provided by large-scale credit forbearance programs, as measured by estimates of total missed loan payments due to forbearance policies, are summarized in table 1. There are several important caveats. The first is that it is possible that there were significant forbearance policies that are left out of these tabulations. Second is that the estimates rely on extrapolations and approximations rather than on direct observations of the volume of missed payments. Third is that there is no offset for any reduction in lender resources when the programs involved uncompensated mandates on the private sector. Nevertheless, they represent our best estimates and are used as inputs into the macroeconomic analysis of section III. Readers primarily interested in those results rather than the details of how these totals were arrived at can safely skip to that section.

ESTIMATING THE SIZE OF INCREMENTAL RESOURCES FROM FORBEARANCE Data on forbearance programs are (even) scarcer than for credit support programs. Ideally, banking regulators or government agencies would monitor government forbearance programs and keep track of the size and timing of missed payments and the characteristics of program beneficiaries. In addition, keeping track of longer-run performance statistics would provide insights into the costs and benefits of such assistance that could inform future policy choices.

We have been able to obtain only limited data on COVID-19 forbearance policies, and only for some of the larger programs. The difficulty of obtaining data is partly due to the variety of channels through which the programs

came about. Some of the programs were authorized through legislation while others came about by administrative decree or were voluntarily instituted by private entities. Some programs that arose from local directives might not be included in national reports. Some programs mandated that lenders participate while others gave lenders more discretion. In many instances the programs were extended beyond their originally announced end date and we are unsure about the ultimate end date or how strictly it was held to. Information about how the missed payments would be treated is also not readily available. For most programs we don't know whether, and at what rate, interest accrued on missed payments or what the scheduled timing was for when missed payments would be recouped.

Despite these many uncertainties, our estimates suggest that forbearance is likely to have provided a significant amount of additional cash to households and firms in some countries. Although there was likely to be some offset caused by the reduced resources of lenders for whom some of the policies were an unfunded mandate, because banks were well capitalized and liquidity was plentiful the offset is expected to be small. Quantifying the additional resources allows us to consider the aggregate effects of those policies.

Our estimates of the total value of missed payments arising from a given policy rely on combining data from various reports and press releases with assumptions to fill in any missing information about borrower types, loan maturities, program duration, and so on. For most major programs in developed countries, we have information on the principal value of loans that received relief and the types of eligible loans. We can estimate the payment reduction per dollar of principal per period (e.g., monthly) based on typical loan maturity and interest rate by loan type. Multiplying by the reported principal value and the assumed duration of the program yields the total value of missed payments that we attribute to the program. For the United States we also partially rely on the estimates in Cherry and others (2021).

European Union. For the EU we primarily rely on information provided by the European Banking Authority (EBA) in their 2020 report to estimate the aggregate reduction in loan payments for households and NFCs in the twenty-five European countries the EBA covers. The headline statistic is that in total about EUR 871 billion of EBA-compliant loans had been granted moratoria as of June 2020, with EUR 860 billion going to households and NFCs.[13] In addition, the EBA reports that other

13. EBA-compliant loans satisfied certain criteria that gave banks regulatory relief (see section III.C).

COVID-19-related relief measures such as noncompliant moratoria and contractual modifications or refinancing applied to an additional EUR 60 billion of loans.

The EBA data further break out the coverage of NFCs and households, with about EUR 495 billion of the loans subject to EBA-compliant moratoria going to NFCs and EUR 365 billion going to households. Overall, 16 percent of SME loans were granted moratoria, followed by 12 percent of commercial real estate loans and 7 percent of residential mortgage loans.

For our estimate of the total payment reductions by households, we assume that all loans are amortizing mortgages, with an original maturity of twenty-four years, an annual interest rate of 2 percent, and monthly payments. Under those assumptions, the monthly mortgage payment is EUR 437 per 100,000 of initial loan principal or 5.3 percent of initial principal annually. Because the loans are amortizing, the mortgage payment per dollar of outstanding principal also depends on the age of the loan. It increases to 6.3 percent of remaining loan principal in five years and 8.2 percent in ten years. Assuming that 25 percent of the loans are fairly new, 25 percent are ten years old, and the rest are five years old implies an average payment as a percentage of principal of 6.5 percent. We further assume that no payments were made for nine months. Taken together, this implies that households had an additional EUR 17.8 billion ($.065 \times 9/12 \times$ EUR 365 billion) of available funds due to these programs.

A similar calculation provides an estimate of the total payment reductions by NFCs. Business loans typically have a much shorter maturity than residential mortgages, ranging from less than a year to ten years or more for some commercial real estate. We assume that all loans are amortizing, with an original average maturity of four years, an annual interest rate of 5 percent, and monthly payments. This implies a monthly payment of EUR 2,303 per 100,000 of initial loan principal or 27.6 percent of principal annually. Because of amortization, the payment amount increases to 52.6 percent of remaining loan principal in two years. We take the 52.6 percent to be the typical payment foregone as a percentage of remaining principal, on an annual basis. We again assume that the payment holiday lasts for nine months. This implies that European NFCs had an additional EUR 195.3 billion ($.526 \times 9/12 \times$ EUR 495 billion) of available funds because of these programs.

Information provided on the largest individual country programs (Italy, France, and Spain) allows those results to be broken out from the European totals. Lacking a breakdown of the share of household versus NFC principal for individual countries, we attribute the share of the total estimated

Table 2. Summary of Imputed Payment Reductions for Four European Countries

France	French banks reported EUR 255 billion of household and NFC loans under moratoria, comprising 7 percent of total loans for households and NFCs. The share of the European total is 255/860 = 29.7 percent, implying a payment reduction of .297 × 213 = EUR 63.2 billion.
Spain	Spanish banks reported EUR 187 billion under moratoria, comprising 10 percent of total loans for households and NFCs. The share of the European total is 187/860 = 21.7 percent, implying a payment reduction of .217 × 213 = EUR 46.3 billion.
Italy	Italian banks reported EUR 156 billion in loans under moratoria, comprising 13 percent of total loans for households and NFCs. The share of the European total is 156/860 = 18.1 percent, implying a payment reduction of .181 × 213 = EUR 38.7 billion.
Germany	While EBA-compliant measures in Germany were less relevant than in other major EU countries, German banks reported the largest amount of loans with other types of COVID-19-related forbearance measures, totaling EUR 14 billion, or 1 percent of total loans. Applying the weighted average payment reduction between household and NFC loans calculated for the EU overall implies missed payments of EUR 3.5 billion (based on .33 × 9/12 × EUR 14 billion).

Source: Authors' calculations.
Note: Estimates based on data and commentary in European Banking Authority (2020).

payment reduction of EUR 213 billion based on a country's share of total loans under moratoria. The calculations and conclusions for Italy, France, Spain, and Germany are summarized in table 2.

Some smaller countries relied the most heavily on moratoria in percentage terms. The EBA notes that the country that had the largest share of bank loans covered by a moratorium was Cyprus at 50 percent, followed by Hungary and Portugal each at greater than 20 percent. The overall average of bank loans to households and NFCs covered under moratoria was 7.5 percent.

Clearly there is considerable uncertainty surrounding these point estimates. The assumed maturity and interest rate on mortgages is loosely consistent with data reported by Statista for recent years for the larger European economies. To the extent that some mortgages had a shorter initial maturity than the assumed twenty-four years or that other types of loans are included with shorter maturities, the estimates are downward biased. The sensitivity to the assumption about rates is reduced by the low and falling mortgage rate environment that has prevailed in Europe for the last decade. The largest source of uncertainty is how long forbearance was in force. According to the EBA, 85 percent of the programs were scheduled to end by year-end 2020 but many were extended into 2021 and some of the arrangements could have continued for even longer. The total payment

reduction is proportional to the length of the forbearance period assumed, making it easy to evaluate the sensitivity to this assumption. The estimates for NFCs have considerable uncertainty associated with the size of the payment relative to loan principal, arising from not having data on the distribution of loan maturities.

United Kingdom. The United Kingdom instituted a payment holiday for residential mortgages in March 2020 that initially allowed a suspension of mortgage payments for up to three months without an effect on borrower credit scores. The policy was soon amended to allow six months of nonpayment. According to Albuquerque and Varadi (2022), at the peak, in May 2020, around 17 percent of all mortgages were on a payment holiday. That proportion declined gradually over time, reaching about 2.5 percent in October 2020. There does not appear to have been large-scale forbearance on business loans.

As for the EU and consistent with information on UK mortgages, the estimated payment reduction is based on an amortizing mortgage with a twenty-four-year maturity bearing an interest rate of 2 percent, with monthly payments. The resulting annual payment per unit of original principal after five years is 6.33 percent of loan principal. The average holiday was assumed to last for four months. Outstanding UK mortgage debt in 2020 totaled about GBP 1.5 trillion. The implied total payment reduction is GBP 31.65 billion.

United States. Under the CARES Act that was enacted on March 27, 2020, US mortgage borrowers could apply for forbearance on loans backed by the government via Fannie Mae, Freddie Mac, or FHA/VA/USDA, and forbearance could last for up to eighteen months inclusive of any extensions. The CARES Act also placed a moratorium on federal student loan payments that is still in effect and that forgives the missed interest payments. Other forbearance measures were instituted as well, but the amounts involved were much smaller.

Cherry and others (2021) report that between March 2020 and May 2021, more than 70 million consumers with loans worth $2.3 trillion entered forbearance, missing $86 billion of their payments.[14] They break the total down into student loans ($45 billion), mortgages ($31 billion), auto debt ($5.7 billion), and revolving debt ($4.7 billion). We take $86 billion as the cumulative total through May 2021.[15]

14. This period is considered to be fourteen rather than fifteen months in our calculations because the CARES Act became law at the end of March.

15. This includes some voluntary forbearance by lenders that shouldn't be included in measures of government support, but we have not adjusted the totals for that effect.

To extrapolate to the end of 2021 for mortgages, we refer to the more recent analysis of Sánchez and Wilkinson (2022) who report that 85 percent of these borrowers had mortgages in forbearance for a year or less. That suggests that less than 15 percent of the mortgages accounted for by Cherry and others (2021) were still in forbearance between June and December 2021. We estimate that an additional $1.6 billion of payments were missed during this time, based on assuming that 10 percent of the mortgages on average were still in the program and prorating it by the relative number of months covered ($31 × .1 × 7/14).

We also need to estimate the additional value of foregone payments for student loans after May 2021, and we do so in two ways. For symmetry with most other pandemic programs, we extrapolate only to December 2021.[16] We employ a back-of-the-envelope calculation similar to what we did for mortgages. Federal student loans outstanding in 2021 stood at approximately $1.5 trillion. About half of loans would have been in grace, deferral, or forbearance even during ordinary times in the past, and the increase in income-based repayment in recent years means that many payments are reduced relative to the originally scheduled amounts. To capture this, we assume that only one-third of the loans would have been in repayment absent the CARES Act. The average interest rate on federal student loans since 2006 has been 6 percent. The standard payment term is ten years but that can be extended to twenty or twenty-five years and extensions happen frequently. Based on these observations, we assume that the typical student loan benefiting from the moratoria has been in repayment for five years and that the principal is originally amortized over twenty years at a 6 percent interest rate. That implies an annual payment equal to 8.6 percent of original principal and 10.1 percent of remaining loan principal after five years. The estimated total missed student loan payments from June 2021 to December 2021 is $29.5 billion ($1.5 trillion/3 × .101 × 7/12). A simple extrapolation from estimates in Cherry and others (2021) serves as a point of comparison and suggests a somewhat smaller total of $22.5 billion ($45 × 7/14) over that period.

Adding the estimated additional $1.5 billion in missed mortgage payments and $29.5 billion in missed student loan payments to the $86 billion in foregone payments reported by Cherry and others (2021) implies total payment reductions of $117 billion.

16. That choice excludes the substantial payment reductions that occurred in 2022 that could be relevant for some questions. We may revisit this in a subsequent draft.

Japan. We have not found mention of any significant loan forbearance policies in Japan. A rental relief program was instituted where participants did not incur any obligation for repayment. There was also tax relief on mortgages. Both of those policies fall into the fiscal category.

ASSESSING COST AND COST INCIDENCE OF FORBEARANCE POLICIES Having previously touched on the potential pros and cons of forbearance policies, here we turn to how to assess their fiscal and private costs conceptually and the incidence of costs. The answer in individual cases will depend critically on how the policy is structured. We consider three major categories of policies: (1) the government forbears on payments owed to itself (e.g., US student loans), (2) the government replaces or provides insurance on payments to private lenders (e.g., the Italian debt moratoria), or (3) the government mandates forbearance by private lenders without compensating them. It is left for future research to apply these principles to quantify the fiscal and private sector costs of the many COVID-19 forbearance policies.

Existing government-backed loans. When a government offers forbearance on its outstanding direct loans or on guaranteed loans that were originated in the past, the incremental fiscal cost of the policy is the difference between the net present value of the associated net government cash flows with and without the forbearance policy (see also sections I.D and II.A). Note that the increase in expected losses following the onset of the pandemic is a sunk cost for the government, and the incremental cost of forbearance does not include those already incurred costs.

A related and more subtle question, both for forbearance policies and for other credit programs, is whether the costs of these policies should be estimated using a static score that abstracts from the macroeconomic effects of the specific policy or whether a dynamic score that takes into account its macroeconomic effects should be used. Importantly, under either approach, cost estimates should take into account the totality of government actions (fiscal, monetary, and regulatory) on the value of the subsidies. Furthermore, a fair value approach to cost estimation incorporates forward-looking expectations about any macroeconomic effects via the market's consensus about the value of risky claims. If government actions are salutary and cause periods of financial stress to be shorter and less severe, incorporating policy effects into projected outcomes will lower the estimated cost, and vice versa for policies that impede recovery. However, given the large uncertainty surrounding the macroeconomic effects of any specific credit program, the two scoring approaches are expected to produce similar cost estimates.

In principle then, the government could institute a forbearance policy with no incremental fiscal cost by adjusting the rates or fees charged so as

to preserve the net present value of future cash flows. A forbearance policy even could have a negative fiscal cost if it caused a net reduction in costly defaults. In practice, however, there are a number of reasons to expect the fiscal cost of such policies to be positive: it extends the period over which the original interest rate subsidies accrue, it increases outstanding loan amounts and thereby the size of potential defaults, it delays recoveries which all else equal reduces their present value, and the policy may be coupled with other costly concessions. A fiscally expensive example is the US moratorium on student loan payments. The program has been extended several times, and the interest component of missed payments is forgiven rather than accrued.

New government backing for private sector loans. The imposition of forbearance policies on private sector lenders and servicers creates costs for those entities that a government can choose to partially or fully absorb. The net present value of the incremental risk absorption by a government is the fiscal cost of the policy. For instance, a government could agree to provide a guarantee to lenders to cover default losses while the moratorium is in effect (e.g., because the borrowing firm goes out of business). The Italian program for bank loans had this feature. It is tricky to estimate the size and incidence of costs with this sort of arrangement. Forbearance tends to reduce near-term defaults but it increases defaults once payments resume. That timing shift makes it relatively inexpensive for the government to guarantee the loans during the forbearance period. That creates additional costs for lenders for the reasons mentioned above (higher balances that default, delayed recoveries, etc.). Those uncompensated costs are equivalent to imposing a tax on lenders, albeit one that is not included in official fiscal accounts.

Mandates on private sector lenders. It appears that under most forbearance policies introduced during the pandemic, lenders received no direct compensation or guarantees for the costs incurred under most mandated forbearance policies. They did receive regulatory relief as described in section II.C. The resulting lender costs can be described as hidden taxes or in budgetary parlance as unfunded mandates. A drawback of uncompensated forbearance mandates is that the costs to lenders are hidden, hard to estimate ex ante, and potentially high. The fact that eventual losses will tend to be larger during longer and deeper downturns is one reason the costs to lenders may be higher than is generally recognized at the onset. Some might argue to the contrary that lender costs are likely to be low or even negative because the policies tend to reduce total losses by providing

time for households and businesses to recover. While that is true for voluntary forbearance, it is reasonable to presume that involuntary policies tend to be costly for lenders.

Finally, while uncompensated forbearance costs are likely to be borne by lenders and their customers most of the time, in the event of a protracted downturn and elevated default rates, some of the costs could again land on governments through their support of distressed financial institutions.

II.C. Regulatory Accommodations

Missed loan payments typically have adverse consequences for both lenders and borrowers even when mutually agreed to. The bank has to report the loan as nonperforming, which affects its capital position, and the borrower's credit score takes a hit. Because of this, it was anticipated that many banks and borrowers would avoid forbearance programs without changes to these rules.

To encourage participation, certain rules and regulations were temporarily relaxed. For example, the EBA (2020) notes that for EU banks, the application of qualifying moratoria did not automatically trigger either a forbearance classification or nonperforming status of the exposure. They did caution banks to continue to monitor credit risk and to classify loans appropriately under the International Financial Reporting Standards.

By design, credit guarantee programs enabled some very risky firms to borrow that otherwise could not have done so. Despite an influx of risky borrowers via these programs, the effect of the large volume of guaranteed loans was to reduce banks' reported risk-weighted assets (RWAs). The EBA (2020) notes that EU banks reported average RWAs to be 18 percent of the exposure value for loans made under public guarantee schemes, whereas the average RWA was 54 percent for banks' loans to NFCs.

The reduction in risk weights was appropriate from a risk measurement perspective because the guaranteed loans were in fact low-risk for the banks. However, a naive reading of the low level of average RWAs could have given some policymakers the false impression that credit risk in the economy was much lower than it actually was.

In the US context, a feature of the student loan moratorium is that missed payments would not be reported to credit agencies and that delinquent loans would be given a fresh start. Haughwout and others (2020) reported this had the effect of increasing average credit scores of student loan borrowers from 647 in March 2020 to 656 in June 2020, primarily initiated by the "curing" of delinquent loans as they entered forbearance.

Table 3. Resources Provided by Credit, Forbearance, and Fiscal Policies as Percentage of 2020 GDP

Country	*Government credit*	*Forbearance*	*COVID-19 fiscal (IMF)*	*Credit + forbearance*	*Credit + forbearance + fiscal*
DEU	1.5	0.1	15.1	1.6	16.7
ESP	10.9	3.6	8.4	14.5	22.9
FRA	6.9	2.4	9.6	9.3	18.9
ITA	10.2	2.0	10.8	12.2	23.1
JPN	5.2	0.0	16.7	5.2	22.0
UK	4.1	1.2	19.3	5.4	24.6
USA	3.9	0.6	21.5	4.5	25.9

Source: Authors' estimates.

Note: For the United States, the Paycheck Protection Program is moved into the credit category and out of the fiscal category where it was recorded in government accounts. Moving it back to fiscal increases that category to 25.3 percent of GDP and reduces the take-up of government credit to 0.08 percent of GDP.

III. Relation of Credit Policies to Macroeconomic Outcomes

In this section we combine the estimates of incremental cash provided by COVID-19 credit policies with incremental fiscal spending for the seven large countries whose credit policies we have studied. We then examine how those policy choices are related to certain macroeconomic outcomes and their differentials across these countries. Specifically, we look at the relation between the incremental resources provided by credit and fiscal policies, both separately and when added together, on GDP growth, savings increases, and inflation.

III.A. Combined Size of Credit, Forbearance, and Fiscal Policies

Estimates of the aggregate incremental resources provided by large, developed countries during the pandemic in the form of government credit support, forbearance, and fiscal policies are summarized in table 3. Credit support is equated to the take-up (drawn principal amounts) of guaranteed and direct loans reported in section II.A. Forbearance is equated to the total payment reductions reported in section II.B. Incremental fiscal support is based on the IMF estimates that are shown in figure 1.

A striking fact revealed by combining estimates of incremental credit and fiscal policies is the relatively small variation across countries in total incremental resources provided, ranging from 16.7 percent of 2020 GDP for Germany to 25.9 percent for the United States, and averaging 22 percent overall. The coefficient of variation across countries for total incremental resources (credit + forbearance + fiscal) is .15, whereas it is .35 for

fiscal spending, .57 for government credit support, and .94 for forbearance. Very similar magnitudes and patterns emerge when quantities are normalized by 2019 GDP, and those results are not reported here.

Also notable is that when credit support and forbearance policies are added to incremental fiscal expenditures, the United States is no longer an outlier from the rest of the pack. When only fiscal policy is considered, and when the PPP is treated as fiscal, the United States has the highest ratio of fiscal expenditures to GDP, exceeding the second-place United Kingdom by 6 percentage points of GDP. This suggests that narratives emphasizing the role of aggressive US policy in fueling domestic and international inflation may exaggerate the disproportionate effect of US fiscal actions.

It appears then that these countries used credit and fiscal policies as substitutes. This observation raises a number of important questions. Why did certain countries, in particular Spain, France, and Italy, rely so much less on traditional fiscal measures? Was credit more attractive due to more binding constraints on government spending and the lack of transparency about the cost of credit policies? Or was credit support perceived as truly more cost-effective or efficacious? Did the countries that relied more heavily on credit policies get the same growth benefits as those that relied more on traditional fiscal measures? These questions are also addressed in the literature on the effects of fiscal space (Romer and Romer 2019; Bergant and Forbes 2023).[17] While we won't speculate further about the various motivations for countries adopting different policy mixes, in the next section we consider how those choices correlated with differential economic growth, savings rates, and inflation.

III.B. Do Credit Policies Help Explain Macroeconomic Outcomes?

To explore whether taking credit support and forbearance into account helps to explain macroeconomic outcomes, we consider the relation between the differentials in macroeconomic country outcomes and alternative measures of the size of government policy interventions. Table 4 reports real GDP growth, the gross increase in private savings, and inflation by country. For the different variables, the time horizon is chosen as follows: real GDP growth is measured from the fourth quarter of 2020 to the fourth quarter

17. Romer and Romer (2019) find that pre-pandemic countries with more fiscal space responded to downturns more aggressively. Bergant and Forbes (2023) find that during the pandemic fiscal space had only a weak correlation with the announced size of fiscal response. These studies include additional macroeconomic policies and cover a wider set of countries, but they do not explicitly incorporate estimates of the incremental resources provided by credit and forbearance policies.

Table 4. Real GDP Growth and Inflation Rates

Country	*Inflation*	*Real GDP growth*	*Increased private saving*
DEU	0.115	0.012	0.195
ESP	0.073	0.067	0.201
FRA	0.071	0.052	0.109
ITA	0.125	0.065	0.352
JPN	0.038	0.006	0.173
UK	0.111	0.088	0.544
USA	0.078	0.057	0.332

Source: IMF World Economic Outlook Database.

Notes: Inflation is the change in CPI between October 2021 and October 2022. Real GDP growth is cumulative growth of quarterly compounded rates through 2021:Q4 divided by cumulative growth of quarterly compounded rates through 2020:Q4. Increased saving is the difference between gross private saving in 2020 and in 2019, divided by 2020 GDP.

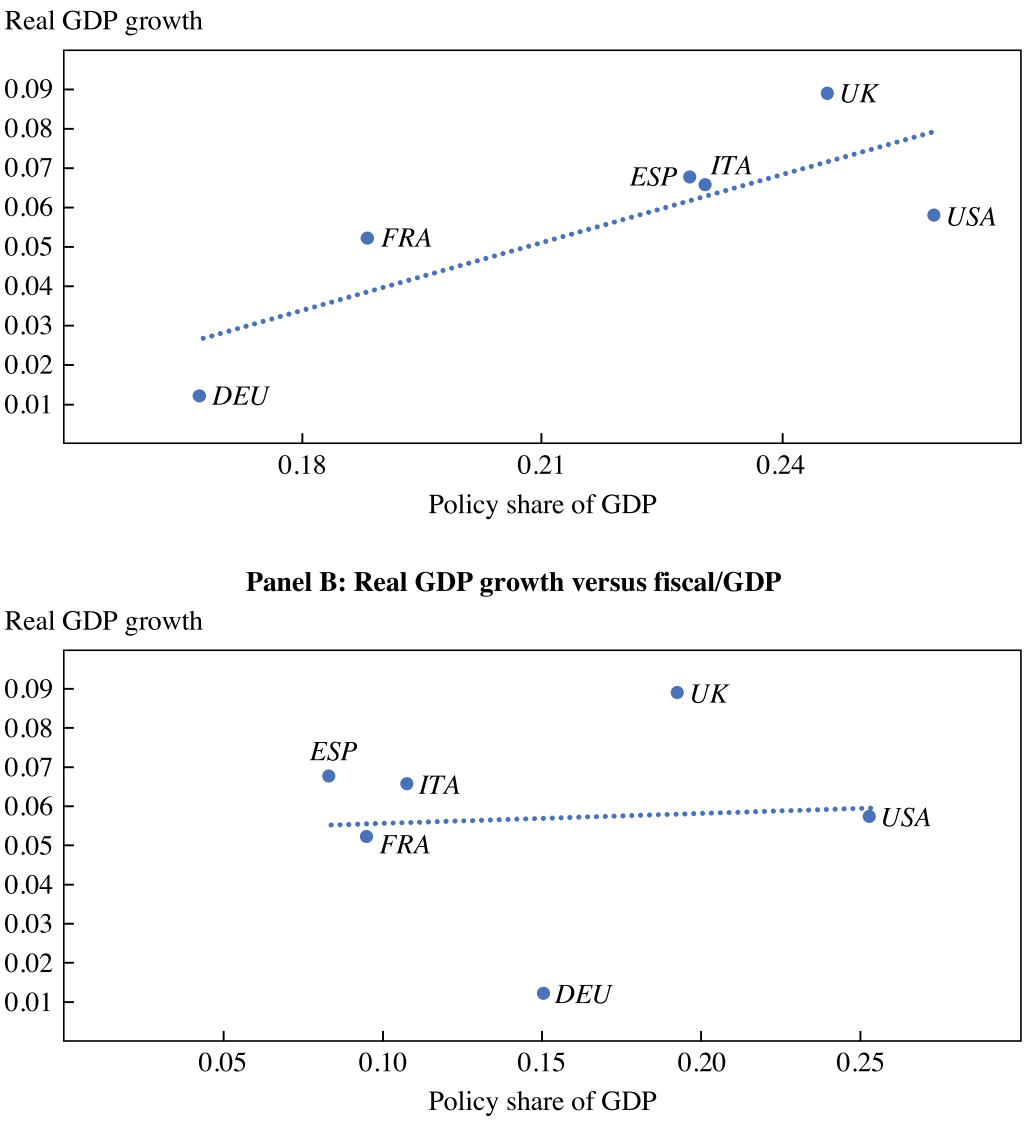
of 2021, a period where pandemic lockdowns were in effect in many countries. Inflation is measured as the ratio of the Consumer Price Index (CPI) in October 2022 to the CPI in October 2021, the period when inflation accelerated. Increased savings is measured as the difference between gross private savings in 2020 and in 2019, divided by 2020 GDP. The reported results are fairly insensitive to modest shifts in the period start date. Because Japan is an outlier in the relation between its policies and macroeconomic outcomes, we exclude it from the figures.

REAL GDP GROWTH The cross-country relation between real GDP growth and the different measures of policy can be summarized by the correlations between them.[18] The correlation between real GDP growth and the sum of the three policy types is .62, whereas it is .35 for the sum of credit and fiscal policy, and −.07 for fiscal policy alone. The unintuitive negative sign for fiscal policy appears to be driven by Japan being an outlier with its very low growth and aggressive fiscal policy.

When the correlations are recalculated excluding Japan, the correlation of real GDP and the sum of the three policy types increases to .79, whereas for credit plus fiscal it is .61, and for fiscal alone it is .07. Figure 4 illustrates the much stronger relation between cross-sectional real growth and a broad measure of resources made available versus the much weaker relation with differences in traditional fiscal spending.

18. We report correlations because with only a few countries and one historical episode, there are insufficient data to undertake a more formal statistical analysis. There are not enough degrees of freedom for even a simple multivariate analysis.

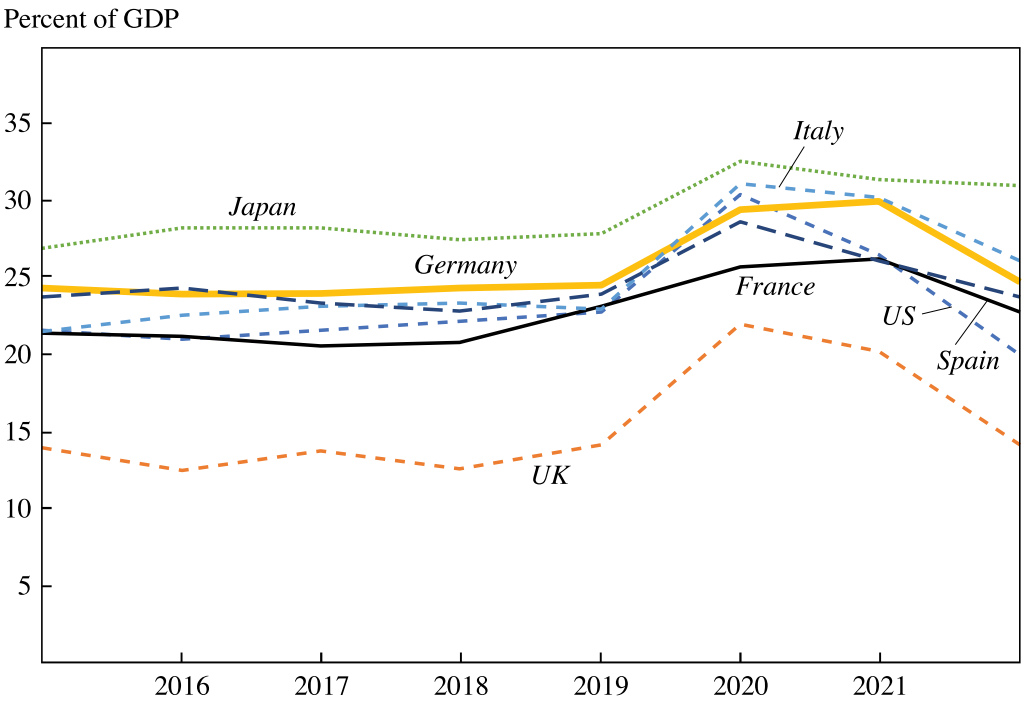
Figure 4. Real GDP Growth versus Alternative Policy Measures



Source: Authors' calculations using the IMF World Economic Outlook Database and IMF Database of Country Fiscal Measures in Response to the COVID-19 Pandemic.

Note: Real GDP growth is cumulative growth of quarterly compounded rates through 2021:Q4 divided by cumulative growth of quarterly compounded rates through 2020:Q4. Fiscal is incremental spending for COVID as reported by the IMF. Credit is take-up in COVID guaranteed and direct lending programs. Forbearance is foregone payments in those programs. All are normalized by 2020 GDP.

Figure 5. Gross Private Savings from 2019 to 2020



Source: IMF World Economic Outlook Database.

GROWTH IN PRIVATE SAVINGS RATES It is well known that savings rates by both firms and households increased sharply during the pandemic. Explanations for elevated savings rates include the reduced activities that money could be spent on, an increased precautionary demand for savings, and the outpouring of funds made available through government spending and credit policies that are the focus here. Figure 5 shows the significant increase in gross private savings that occurred between 2019 and 2020. In most countries savings rates remained elevated in 2021 as well, and only recently have they returned to pre-pandemic rates in most countries. The results reported below on the relation between savings and different policy measures don't qualitatively change when the savings increase is measured as the average of 2020 and 2021 savings relative to 2019.

As for real GDP growth, we consider the correlation between the different measures of policy and increased saving. The correlations are based on the values in tables 3 and 4. The correlation with the sum of the three policy types is .67, whereas it is .69 for the sum of credit and fiscal policy, and .54 for fiscal policy alone. The correlation with forbearance policy alone is −.12. Excluding Japan, the correlation with the sum of the three

policy types increases to .69, whereas for credit plus fiscal it is .79, and for fiscal alone it is .63.

The correlations between savings and policy actions are high (figure 6). Adding take-up of credit support programs increases the correlation, but adding missed payments from forbearance decreases it. A possible explanation for the negative correlation with forbearance is that the more aggressive forbearance policies were a reaction to more-elevated spending needs, and in fact those policies were relatively efficient at getting funds to businesses and households that needed to spend the money. The high correlation with take-up of credit and traditional fiscal policy supports the conjecture that the multipliers on both types of policies were probably lower than in previous recessions.

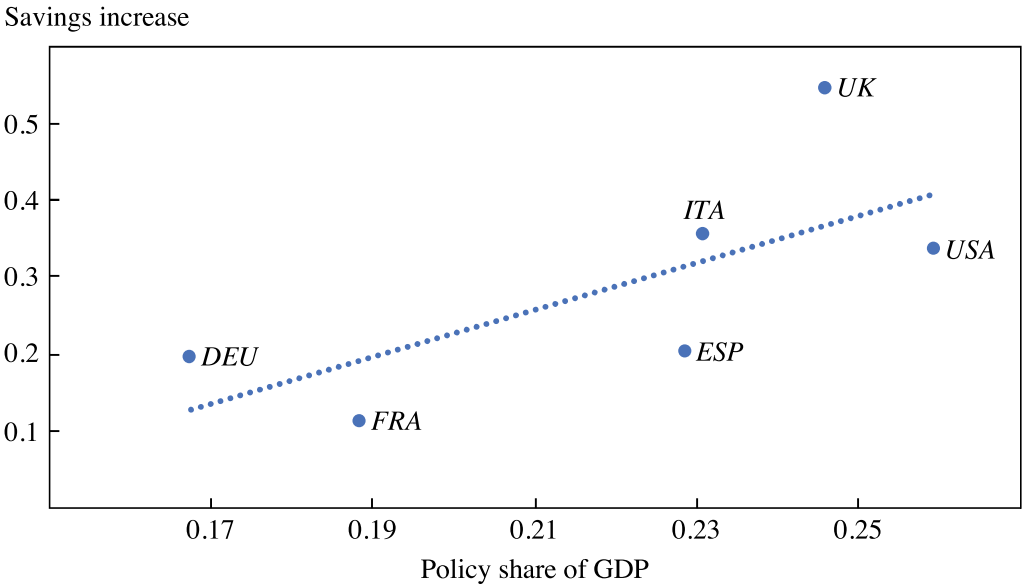
INFLATION The correlation between inflation differentials across countries and any of our policy measures is much weaker than for real GDP growth or for savings rates. It is also lower when credit support and forbearance are included (−.1) than for fiscal policy alone (.17). Japan is excluded in these calculations because Japan's very low inflation juxtaposed with its high fiscal spending causes the correlation between inflation and any of the policy measures to turn sharply negative. A possible reason for inflation differential between these countries to be small is that four of them share a common monetary authority. Figure 7 illustrates the relation between inflation and the different policy measures.

Koch and Doureldin (2023) calculate a measure of unexpected inflation, which is the difference between realized inflation and a projection of inflation imputed from the IMF World Economic Outlook database. Unexpected inflation in 2021 (relative to the October 2019 forecast) is positively correlated with the policy share of GDP, either measured by fiscal policy alone or also including credit support and forbearance.

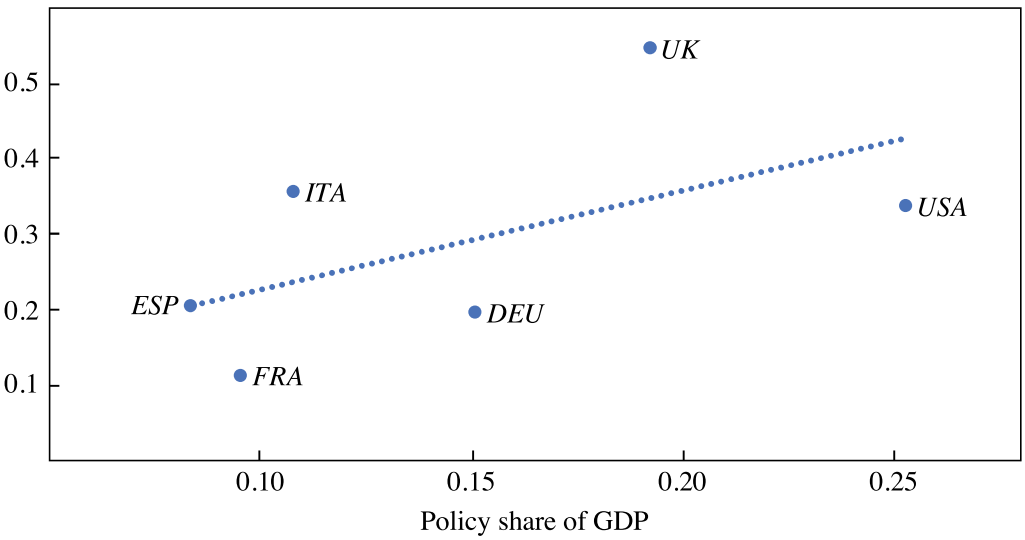
Despite the finding that the take-up rate of credit support and forbearance does not by itself help to explain the cross section of inflation rates across these countries, consideration of the additional resources made available may strengthen the case for government policies having been an important factor in the elevated levels of inflation around the world. The combined measure of incremental government resources averages 22 percent of GDP across the seven countries, versus an average of 14.5 percent for fiscal policy alone. To the extent that credit and forbearance policies contributed to higher savings rates, they could also have caused inflation to continue for longer as those higher levels of savings are gradually run down. The correlation between savings and real GDP growth, and between savings and inflation, are high. The correlations are .65 and .51 respectively when Japan is excluded, and .67 and .56 with Japan. A speculative interpretation

Figure 6. Savings Increase in 2020 versus Alternative Policy Measures

Panel A: 2020 savings increase versus (fiscal + credit + forbearance)/GDP



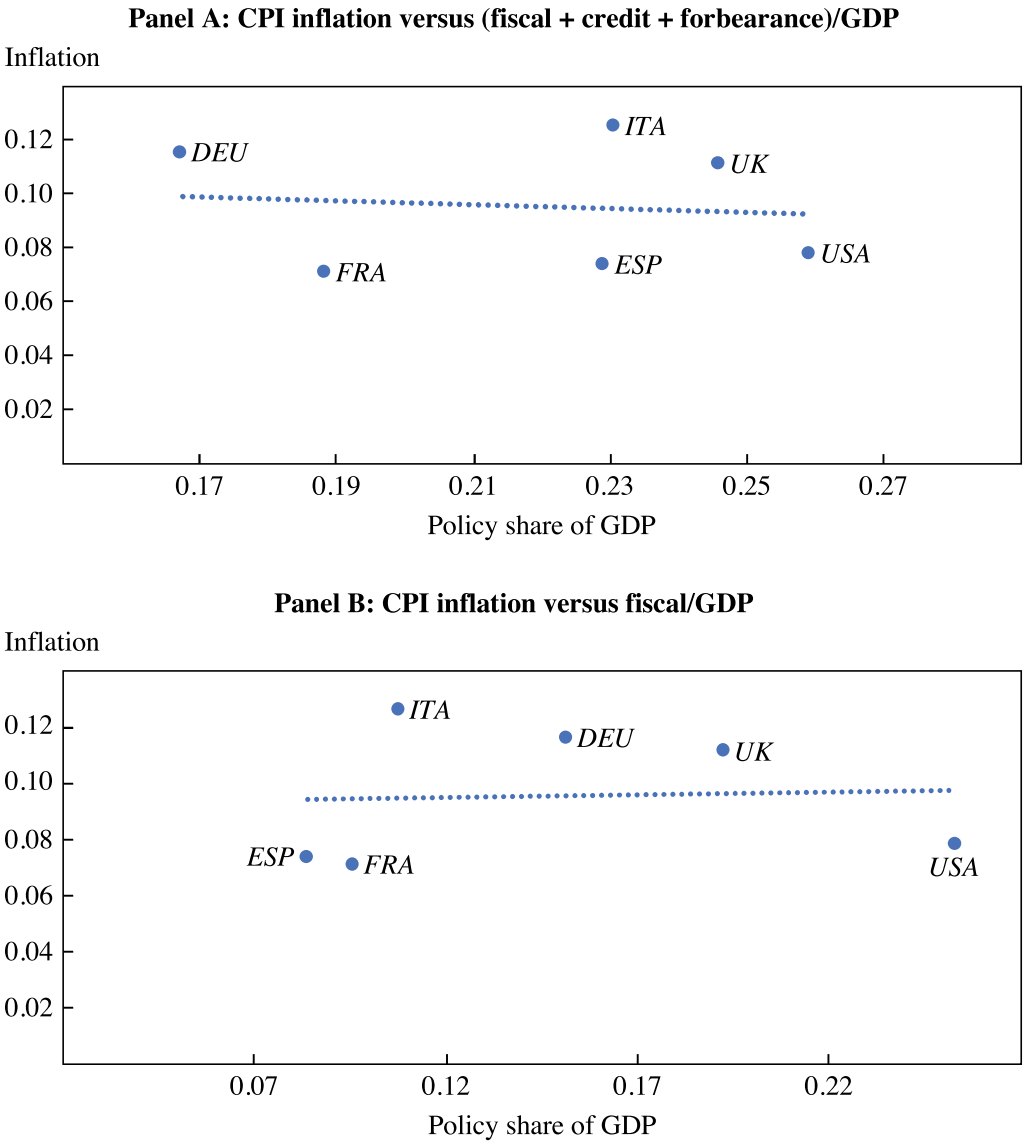
Panel B: 2020 savings increase versus fiscal/GDP



Source: Authors' calculations using the IMF World Economic Outlook Database and IMF Database of Country Fiscal Measures in Response to the COVID-19 Pandemic.

Note: Increased saving is the difference between gross private saving in 2020 and in 2019, divided by 2020 GDP. Fiscal is incremental spending for COVID-19 as reported by the IMF. Credit is take-up in COVID-19 guaranteed and direct lending programs. Forbearance is foregone payments in those programs. All are normalized by 2020 GDP.

Figure 7. Inflation versus Alternative Policy Measures



Source: Authors' calculations using the IMF World Economic Outlook Database and IMF Database of Country Fiscal Measures in Response to the COVID-19 Pandemic.

Note: Inflation is the change in CPI between October 2021 and October 2022. Fiscal is incremental spending for COVID-19 as reported by the IMF. Credit is take-up in COVID-19 guaranteed and direct lending programs. Forbearance is foregone payments in those programs. All are normalized by 2020 GDP.

is that countries that recovered more rapidly wound up saving more of the incremental resources provided by government policies, and that as those higher savings levels are being spent down, they are contributing to higher inflation.

IV. Concluding Remarks

We began by noting the unprecedented number and scale of new credit support and forbearance policies introduced in response to the economic upheaval caused by the COVID-19 pandemic, but also that the effective size of these policies and their macroeconomic effects have not been quantified. The main goal of this project was to begin to fill those gaps in two ways. The first was by developing and implementing procedures to size the different programs in ways that are meaningful for macroeconomic analysis. The second was to use those statistics to look for evidence about whether in fact these policies had quantitatively significant economic effects during the pandemic.

We find that the amount of funds injected into the economy via credit support and forbearance policies was significant: incremental traditional fiscal spending averaged 14.5 percent of GDP across countries, whereas the combined effect of these policies and incremental traditional fiscal spending averaged 22 percent. Furthermore, there was much more uniformity across countries in the combined GDP share of policies than in their individual components. Taking into account the combined size of credit and fiscal policies also appears to better explain cross-country differences in real GDP growth and savings rates than does fiscal policy alone, with the caveat that any inferences are only suggestive because of the small sample size.

The quantitative analysis is restricted to large, advanced economies because of the very limited availability of information on credit support and forbearance programs for most countries. However, the countries included accounted for 45 percent of global GDP in 2020 and an even larger share of global government fiscal and credit market interventions, suggesting that the policies studied here were of quantitative significance globally. We hope that future researchers will undertake similar analyses for additional countries.

The conceptual discussions regarding the measurement of fiscal costs and stimulus effects, the transmission channels through which credit policies operate, and of the pros and cons of fiscal versus different types of credit policies pertain to EMDEs as well as to advanced economies. However, some of the negative aspects of credit policies that we alluded to but did not

emphasize may be particularly salient for EMDEs. That includes their lack of transparency in government accounting for credit and the hidden fiscal risks that are likely to be realized when the economy is weak and fiscal resources are scarce. EMDEs may have more-severe transparency problems, less ability to evaluate the risks, and are likely to have less capacity than advanced economies to manage such shocks when they materialize.

Economists generally do not give credit policy the standalone status accorded to monetary and fiscal policies. An unfortunate side effect of that omission is that the costs and other information about credit policies are poorly and inconsistently measured and reported on in official statistics, and sometimes omitted altogether.[19] There is also less of a common understanding of the ways in which credit policies, as distinct from conventional monetary and fiscal policies, affect macroeconomic and future fiscal outcomes. As we have emphasized in this paper, all of this obscures the effects arising from the totality of credit policies, including the significant fiscal costs and risks they entail. This paper, we hope, is a start at demonstrating the feasibility and the benefits of taking a more holistic approach to credit policies.

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19. These issues are discussed in more detail in Hong and Lucas (2023) and references therein.

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Comment and Discussion

COMMENT BY

ALAN J. AUERBACH The COVID-19 pandemic has left us with myriad terrible outcomes, but for the economist interested in studying government policies, it has also provided a wealth of new data. Going beyond massive fiscal interventions and accommodating monetary policies, governments around the world introduced a wide variety of credit programs aimed at sustaining economic activity and promoting individual well-being. While there have been attempts to collect information about these credit programs, notably by the International Monetary Fund (IMF), as cited in the paper, Hong and Lucas take an important step beyond this in quantifying the effective size of these credit programs as well as their potential impacts on government budgets and economic activity. In doing so, they make the case for paying more attention to credit programs and their effects, even in more normal economic times, and for treating credit programs separately from other types of government policies.

WHAT MAKES CREDIT POLICIES DIFFERENT? Why should we consider credit policies separately? Hong and Lucas offer several justifications. First, credit policies have different effects on the budget than traditional fiscal policies. Whereas the budgetary cost of a tax cut or an increase in government spending equals the upfront change in tax revenues or purchases, the authors argue, the budgetary cost of a credit program is typically much smaller. For example, a government loan program wouldn't incur a cost

Editors' Note: Carmen Reinhart provided a thoughtful discussion on the conference version of the paper by Hong and Lucas in this volume at the Spring 2023 *BPEA* Conference. The recording of her discussion is available at https://www.brookings.edu/events/bpea-spring-2023-conference/.

Brookings Papers on Economic Activity, Spring 2023: 334–345

equal to the amount of initial lending, but just the net present value cost of the loans made once account is taken of future payments of interest and principal. For most of the credit programs evaluated here, this net cost is only a fraction of funds initially made available. This opens the question of how one should measure the net future payments to the government, and Hong and Lucas forcefully argue for using a "fair value" basis for such measurement, relying on risk adjustment rather than simply discounting future payments at the safe government interest rate. While the fair value approach tends to increase credit programs' budgetary costs, there remains a large gap between budgetary cost and initial outlay of funds.

But is this comparison with traditional fiscal policy accurate? That is, should one think of changes in government spending and taxes as happening independently over time, so that each policy innovation occurs only in one year, with no complementary or offsetting components in the future? For many fiscal policies, this is not the case. An example that is perhaps closest to a credit policy in its pattern over time is the change in income tax withholding implemented by President George H. W. Bush in 1992, which was offset when taxpayers filed their returns for that year in 1993—essentially an interest-free loan to taxpayers.[1] While one might dismiss this example as being fairly unusual, in that it was implemented by executive order and offset within roughly a year, it is hardly unique. The use of accelerated depreciation deductions for business investment—going back over two decades in its most recent form, bonus depreciation—involves giving businesses tax deductions earlier than they otherwise would have been permitted, meaning that the time pattern of deductions is accelerated but the sum of nominal deductions over time is unaffected—again, an interest-free loan by the government, although in this case one that takes many years to unwind and has been implemented through the legislative process.

Indeed, we may think of current fiscal policy shocks as having future elements, even in cases where the legislation giving rise to the policy change does not explicitly include such future components. This is the basic approach followed when we estimate the effects of a government policy shock in a structural vector autoregression (SVAR) model, in which we trace out the effect of the shock not only on, say, GDP but also on the future values of the policy variable itself and measure the effects of the policy shock on output considering not only the initial change in the policy variable but also those future induced policy changes. In this context, we

1. Survey evidence in Shapiro and Slemrod (1995) suggests that this temporary policy did lead to an increase in consumption among a substantial fraction of the population.

are defining the dynamic shape of policy using a reduced form approach, rather than relying on what is explicit in legislation—if a current reduction in taxes leads to future increases in taxes, for example, we treat this as a single policy change. Indeed, one could take the same perspective for credit programs. Suppose, for example, that a temporary holiday on student loan repayments makes future reductions in student loan payments more likely through additional loan relief or the restructuring of loans. Should one ignore the future consequences of current policy actions?

In summary, it is not clear to me that one should view credit policies as having a smaller budget footprint because they involve future offsetting payments to the government. This may make them more cost effective than some traditional fiscal policies, but the difference in character is easy to overstate.

A second difference between credit policies and traditional fiscal policies that Hong and Lucas discuss is that credit policies can be effective at relaxing temporary borrowing constraints. The intuition here is straightforward. If the targeted group of businesses or individuals faces borrowing constraints, a policy that makes loans available, either through direct government provision or through government guarantees or subsidies in the private loan market, can expand access to credit. Here, again, one should recognize that certain traditional fiscal policies may share the characteristic with credit policies. Consider once more the case of accelerated depreciation deductions, which in many studies over time have been found to increase investment. The increase in investment could be induced through more than one channel; not only does the effective interest-free loan lower the user cost of capital, the standard way in which investment incentives are thought to encourage investment, but it also makes funds available immediately, especially in the extreme case of full investment expensing, where the entire deduction is received in the year of investment. Indeed, Zwick and Mahon (2017) argue that it is the latter effect that drives the largest responses to investment incentives, which suggests an impact through the relaxation of borrowing constraints.[2]

Not only do some traditional fiscal policies serve to relax borrowing constraints, some credit policies do not seem particularly formulated with that objective in mind. Hong and Lucas are critical of the US student loan

2. An attribute of accelerated depreciation policies that works against its effectiveness at relaxing borrowing constraints is the limit on deductibility for companies without adequate taxable income, which can be particularly acute during periods of economic weakness; see, for example, Altshuler and others (2009). However, this limit is also a policy choice, not a necessary attribute of investment incentive policy.

relief adopted during the pandemic, arguing that the relief plan was poorly targeted to relieve pressure on those in need.

Finally, credit programs are treated differently in government budgets. This difference was the motivation behind the Federal Credit Reform Act of 1990, which required that subsidies embedded in federal credit programs be accounted for on an accrual basis. As a consequence of this legislation, major credit legislation involving anticipated subsidies has immediate budgetary consequences. Thus, even if the costs of such programs are realized after the end of the budget window, these costs are accounted for. Hong and Lucas argue that the current US accounting standard for federal credit programs is too lax, as it fails to adjust for risk. But, even with its current policy, the United States is an outlier. According to the authors, most other countries do not use accrual accounting for their credit programs, recognizing their budgetary costs only when they are realized, that is, on a cash flow basis. Moreover, as these programs are typically treated as below-the-line activities outside the standard scope of government budgeting, there may not be any immediate budgetary account taken, even of those costs that will eventually show up in the future. From a political economy perspective, this is a potentially important difference between credit policies and traditional fiscal policies. Governments that face formal budget restrictions, or that may want to hide the fiscal costs of their policy actions, could move to adopt credit policies not because these policies have better design attributes for the particular challenges to be addressed but because of accounting differences. It would seem that reforms of budgetary accounting, rather than just tinkering with fiscal rules themselves, should be on the agenda, especially outside the United States.

A different type of misleading accounting shows up in one particular type of credit program that Hong and Lucas evaluate—forbearance policies that involve putting off or forgiving periodic payments that otherwise would be due, including temporary relief from paying rent or making payments on mortgages or student loans. A key issue here is who absorbs the costs of the forbearance. According to the authors, many forbearance programs adopted during the pandemic imposed all or most of the costs on the private sector, as creditors and landlords did not receive payments that were due and governments offered little or no compensation for the missed payments. These policies also might have been attractive to governments seeking to understate the true costs of programs, for they involve hidden taxes on one group of private agents to fund transfer payments to another group of private agents. Again, there might be other reasons why such policies might make sense. For example, from an ex ante insurance

perspective, those implicitly being taxed may be in a better position to bear such taxes than other groups when events like the pandemic occur. But in the current setting, it is hard to know the relative importance of such factors and budgetary treatment in decisions to adopt forbearance policies.

WHAT THE PAPER FINDS Starting from a very useful data set compiled by the IMF measuring the magnitudes of above-the-line (fiscal) and below-the-line (credit) policies adopted by a large number of countries from the start of the pandemic approximately through the third quarter of 2021, Hong and Lucas adjust the credit policy measures for seven large countries that accounted for the lion's share of credit policies during the period: the United States, Germany, Japan, the United Kingdom, Italy, France, and Spain, making additions and subtractions based on a very detailed study of the credit programs adopted in these countries. The description of these adjustments takes up a significant part of the paper, and they represent an enormous amount of work on the part of the authors that result in very large adjustments relative to the numbers drawn from the database. For the two main types of credit policies—(1) credit guarantees and direct lending programs, and (2) forbearance policies—they estimate the direct impact (the value of loans taken up in the first case; the value of delayed or foregone payments in the second). For programs in the first category, they also provide measures of fiscal costs, following their preferred fair value approach.[3]

This deep dive into the seven countries' pandemic programs yields a number of interesting findings. First, credit program take-up was substantially smaller than the envelope size, that is, funds potentially available. This is especially true of Germany, for which committed funds for credit programs, at 1.5 percent of GDP, are less than one-tenth of the envelope. Second, the estimated fiscal cost was 37 percent of the total funds actually committed under these credit programs, that is, nearly two-thirds of the funds initially extended by the government were recouped. Third, even with the adjustment of program size by considering funds actually committed, rather than program envelopes, government credit programs were much larger in magnitude than forbearance policies, the latter ranging from zero to 3.6 percent of GDP compared to a range of 1.5 percent to 10.2 percent of GDP for the former. Fourth, credit programs seem to be substitutes for regular fiscal policies, in the mechanical sense that countries that did more of the first did less of the second—there is much less variation among countries in the sum of the two than in either separately. But we don't really

3. They also discuss regulatory accommodations adopted during the pandemic but do not provide monetary estimates of the relief provided by such actions.

know why some countries relied more heavily on traditional fiscal policies and others on credit policies, or why the take-up of credit policies was so low in Germany and so high (relative to the envelope) in others, notably Spain. Did government borrowing restrictions play a role in restricting the use of government credit? Did budget rules push some countries away from traditional fiscal policies? Was the take-up of credit policies higher in countries where subsidies (i.e., fiscal cost as a fraction of committed funds) were higher? There is some speculation in the paper on these issues, but a more systematic analysis would be a useful topic for further research.

In considering these questions, it is interesting to look at the larger group of countries in the original IMF data. While such data do not have the adjustments made by Hong and Lucas for the size of credit programs, they may still be useful for discerning patterns of behavior. Notably, advanced economies, in the aggregate, not only engaged in more of both credit programs and traditional fiscal programs than emerging market economies (between 11 and 12 percent of GDP for each type of program for advanced economies, and less than half that in both categories for emerging market economies), but it also appears that emerging market economies relied relatively less heavily on credit programs.[4] Could the strength of a country's financial infrastructure be playing a role, even among the seven economies on which this paper focuses, in determining reliance on credit market programs?

After discussing the sizes of credit programs across countries, Hong and Lucas move on to what might be the most important questions for evaluating the programs: What were their macroeconomic effects, and how did these effects differ for different types of credit programs? Unfortunately, with only seven countries in the sample, the conclusions one can draw are limited, which leaves the authors in a challenging situation. They opt for the compromise of presenting simple correlations accompanied by caveats to the reader about making causal inferences. Even in this limited context, there are some interesting findings to contemplate. First, there is a strong correlation between GDP growth during 2021 and the combined size of fiscal and credit programs. Second, there is a low correlation between GDP growth and fiscal policy size alone. Third, there is a strong correlation between increases in private saving between 2019 and 2020 and both fiscal

4. For advanced economies as a group, the percentages of GDP are 11.7 for fiscal policies and 11.4 for credit policies. For emerging market economies, the percentages were 5.7 and 4.2, respectively. Data from International Monetary Fund, "Database of Fiscal Policy Responses to COVID-19," https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19.

policy size and combined fiscal and credit policy size. Finally, there is essentially no relationship between policy size and Consumer Price Index inflation between October 2020 and October 2021.

Hong and Lucas are not entirely successful in heeding their own admonitions about drawing causal inferences from these thought-provoking results, and neither likely will be very many readers. Therefore, it is useful to think about what might lead one astray when drawing what might seem to be obvious conclusions from these results. A first problem is endogeneity. Why did the size of policy interventions vary across countries? If traditional fiscal policies were adopted as a countercyclical tool, for example, then countries that suffered larger initial shocks to output at the outset of the pandemic might have adopted more expansive fiscal policies, pushing toward a negative correlation between output growth and fiscal policy size. Delaying the timing of the measurement of output growth, as the authors do (looking only at growth starting in the last quarter of 2020, after a substantial share of the fiscal policies had already been adopted), might help avoid some of this spurious correlation.[5] But there isn't a real solution without some independent source of policy variation—an instrument for policy actions undertaken during the pandemic that is unrelated to the severity of the pandemic-induced economic downturn.[6]

A second problem in interpreting these results is that the small sample, though including many large countries, may be unrepresentative for the larger set of all advanced economies. For example, in the original IMF data set, the correlation between the 2021 year-on-year GDP growth rate among all advanced economies and the magnitude of pandemic fiscal interventions is +0.54, whereas it is −0.08 for the seven countries in the sample used by Hong and Lucas.[7]

Third, even if the correlation coefficient accurately measures a causal relationship, it lacks the scaling that one would want to measure the impact of one variable, in this case the combined size of fiscal and credit policies, on the other—GDP growth; a regression coefficient, rather than a correlation coefficient, serves this purpose. For the seven-country sample,

5. Indeed, based on the authors' data, the correlation between output growth and fiscal policy size is more negative if one measures the growth rate through the fourth quarter of 2021 starting in the second quarter of 2020, rather than the fourth.

6. One such instrument might be a country's bond rating, which Romer (2021) found to be predictive of the size of a country's fiscal interventions during the pandemic.

7. The 2021 year-on-year growth rate is used here because the publicly available IMF data set has GDP data only at an annual frequency. The advanced economy sample excludes Taiwan, for which there is no information in the pandemic policy data set.

the coefficient in a regression of GDP growth on the sum of fiscal and credit policy sizes is 0.57 (with a standard error of 0.33), which is a multiplier of reasonable size, given the literature, particularly in light of the fact that effects on output likely were smaller as a result of restricted movement during the pandemic (Auerbach and others 2022).

In short, there are a lot of intriguing findings about the potential effectiveness of credit policies during the pandemic, but it would require a larger sample of countries and a more careful empirical methodology to draw any serious conclusions. It is hardly the fault of Hong and Lucas that we don't have adjusted data for more countries on credit policies, given the effort they have expended to produce what they have, but one lasting contribution of their work could be to spur others to implement their methodology to produce larger data sets for analysis.

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GENERAL DISCUSSION Robert Hall suggested that the economics of insurance might help quantify the effects of credit programs. Hall noted that the basic principle of insurance is the stabilization of marginal utility. He argued that the United States government's credit programs succeeded in stabilizing marginal utility by stabilizing consumption and that some parts of the credit programs also closely resembled insurance because of their repayment requirements.[1] He ended his remarks by suggesting that

1. Federal Reserve Bank of St. Louis, "Personal Consumption Expenditures: Total for United States," https://fred.stlouisfed.org/series/USPCE.

one could quantify the benefits of pure credit programs by measuring the change in marginal utility, which was pushed nearly to zero by the programs when it otherwise would have been large.

Amy Finkelstein also commented on the potential insurance value of the credit programs, noting that there are two possible explanations for the variable take-up rates of the programs across countries, most of which were well below 100 percent. First, frictions such as transaction costs and lack of information prevented firms from using the credit programs. Second, the available funds may have provided insurance value, even to firms that did not use the funds, in the same way that consumers get value from their insurance even in years when they do not make claims. Finkelstein argued that the second explanation of low take-up rates suggests free benefits from the programs rather than unfortunate frictions.

Deborah Lucas agreed that insurance value was an important consideration when discussing COVID-19-era policies, because unlike government programs, the insurance value of both fiscal policies and credit policies may have been more important than trying to stimulate demand.

Multiple participants raised questions about the political economy of the programs. John Sabelhaus asked whether there was any narrative evidence about what was occurring in legislative bodies while the programs were being enacted. Eric Zwick mentioned that credit programs for firms in particular often benefit policymakers or friends of policymakers, thus creating political risk.[2] Additionally, Zwick asked whether political economy could explain differences between countries' programs, highlighting differences in the financial sectors of the countries studied. Gee Hee Hong highlighted evidence that European countries relied on a common, agreed-upon framework while creating credit programs, which may help explain the similarities between programs across countries. Lucas additionally mentioned that in the United States budget scores that show the government making money are politically advantageous and are passed comparatively easily. She noted that the countries in the European Union had a less political approach to the credit programs than the Paycheck Protection Program in the United States.

Şebnem Kalemli-Özcan suggested bringing emerging market economies into the analysis. She mentioned that in her own work from 2021 with Pierre-Olivier Gourinchas, Veronika Penciakova, and Nick Sander,

2. Associated Press, "Congress Created PPP Loans—Then at Least 12 Members Reaped Their Benefits," *Fortune*, July 8, 2020, https://fortune.com/2020/07/08/ppp-loan-recipients-members-of-congress/.

small and medium-sized enterprise (SME) failures were reduced in both advanced economies and emerging markets.[3] Kalemli-Özcan argued that the prevention of SME failures had substantial macroeconomic effects. She added that while the fiscal and credit programs had small multiplier effects, they had large employment effects due to the prevention of SME failures. Sabelhaus noted similarly that while measures like GDP might capture downstream effects of these policies, other intermediate outputs, such as how many businesses kept their doors open, might help answer whether credit programs had their intended effects.

Lucas noted that the paper includes seven countries because there was insufficient data for other countries. She noted that while the small sample size limits the ability to draw inferences from the data, the relationship between fiscal programs, credit programs, and macroeconomic effects found among the seven countries points to the need for more work on the question. She also noted that the argument could be made that businesses' defaults were not prevented during COVID-19 but instead artificially lowered by the credit programs. She pointed to a recent uptick in defaults in Europe, which suggests that some problems were postponed rather than prevented as a result of the credit programs.[4]

Kristin Forbes asked whether there was any time series data regarding the composition of traditional fiscal versus off-budget loan guarantees and credit programs. She hypothesized that the proportion of off-budget programs may have increased over time and that in an era of high debt levels and fiscal constraints the proportion of off-budget programs may grow. Forbes also highlighted a figure in the paper showing that aggregate fiscal response was similar across countries but the composition of policies was different. She mentioned that her previous work with Katharina Bergant found that countries with higher debt levels were more likely to use a higher share of off-budget policies in their fiscal response, which aligns with the

3. Pierre-Olivier Gourinchas, Şebnem Kalemli-Özcan, Veronika Penciakova, and Nick Sander, "Fiscal Policy in the Age of COVID: Does It 'Get in All of the Cracks'?," working paper 29293 (Cambridge, Mass.: National Bureau of Economic Research, 2021), https://www.nber.org/papers/w29293; also in *Economic Policy Symposium Proceedings: Macroeconomic Policy in an Uneven Economy* (Jackson Hole, Wyo.: Federal Reserve Bank of Kansas City, 2021).

4. Since this discussion took place, defaults in Europe have surged; Sudesh Baniya, "Business Bankruptcy in EU Surges to Highest Levels since 2015," Euronews, August 8, 2023, https://www.euronews.com/2023/08/26/business-bankruptcy-in-eu-surges-to-highest-levels-since-2015#:~:text=Business%20insolvencies%20in%20the%20EU,the%20food%20and%20housing%20sector.

findings of the paper by Lucas and Hong.[5] Lucas noted that she did not have access to time series data across countries while writing the paper.

Jason Furman asked how one would differentiate between the initial effects of credit programs and their downstream effects. Furman gave the example of bailouts that initially cost billions of dollars but also reduce the need for government programs like Medicaid, thus offsetting the cost. He also mentioned that government bailouts can increase GDP, which then increases tax revenue, again offsetting the cost of the initial bailout. He suggested drawing a conceptual line between the dynamic credit scoring in the paper and a complete dynamic model with second- and third-round effects.

Janice Eberly referred to a paper by Susan Cherry and coauthors from the Fall 2021 *BPEA* Conference as a partial explanation for why the incremental resources provided by forbearance appeared so low in the Hong and Lucas paper.[6] Eberly noted that most people who received forbearance on their mortgage payments returned to paying them off very quickly, and thus the size of the forbearance programs may look comparatively small against the fiscal policies and credit policies.[7]

Joe Beaulieu asked whether there were differences in efficiency between the types of policies that economists typically analyze, like taxes, and COVID-19-era fiscal and credit policies.

Lucas also responded to the paper's two discussants. In response to Alan Auerbach, Lucas discussed whether accrual accounting would be preferable in the budget. She said that in the United States budget there was a distinction drawn between firm legal commitments and commitments that could be changed ex post, with accrual only applying to a subset of the former. Lucas suggested that it is difficult to incorporate accrual accounting into a cash budget. She said that credit is currently accounted for on an accrual basis by capitalizing the projected net cash flows on loans made or guaranteed in a given year, in order to make the cost most comparable with

5. Katharina Bergant and Kristin Forbes, "Policy Packages and Policy Space: Lessons from COVID-19," *European Economic Review* 158 (2023):104499. https://www.sciencedirect.com/science/article/abs/pii/S0014292123001289.

6. Susan Cherry, Erica Jiang, Gregor Matvos, Tomasz Piskorski, and Amit Seru, "Government and Private Household Debt Relief during COVID-19," *Brookings Papers on Economic Activity* (Fall 2021): 141–99, https://www.brookings.edu/bpea-articles/government-and-private-household-debt-relief-during-covid-19/.

7. Juan M. Sánchez and Olivia Wilkinson, "Forbearance during COVID-19: How Many Borrowers Used It, and for How Long?," *On the Economy*, Federal Reserve Bank of St. Louis, May 31, 2022, https://www.stlouisfed.org/on-the-economy/2022/may/forbearance-covid19-how-many-borrowers-how-long.

items recorded on a cash basis. She commented further that while accrual accounting has clear advantages, it also risks budget discipline.

In response to Carmen Reinhart, Lucas acknowledged that if emerging markets were included in the analysis, an important further consideration would be international debt relief to those countries. Additionally, she agreed that forbearance was of special concern in emerging markets, where governments may not have paid for forbearance but rather instructed banks to grant forbearance. Finally, she agreed with Reinhart that these policies carry large risks, lack discipline, and therefore require attention. Hong agreed with Lucas and Reinhart that future work should focus on credit policies in emerging markets.

COVID Credit Policies Around the World: Size, Scope, Costs and Consequences (Online Appendix)

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Appendix I. Data Coverage

This appendix provides the list of credit programs and forbearance programs considered in the paper and the data sources.

For credit guarantee programs, we focus on thirteen credit programs introduced in the five largest economies in Europe (France, Germany, Spain, Italy, and the United Kingdom), Japan, and the U.S (See Table 1.1.1 for the full list). Overall, these programs cover more than 90 percent of the direct loan and loan guarantee programs for firms that were introduced in the world during the pandemic.

We compile program data from a variety of sources. The main source of information is from official reports, which are available with varying amounts of detail on the websites of the relevant ministries, central banks, or public financial institutions that oversaw the programs. Some programs released loan term sheets, and some program parameters were found in the text of authorizing legislation. Information collected from official sources is complemented by the IMF's "Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic."[1] In some cases, discussions with IMF's country teams and with country authorities provided additional information. We also rely on analyst and media reports; notably Anderson et al. (2021) provides valuable information regarding the European credit programs.

Table 1.1.1. List of Major Credit Programs by Country

Country	Scheme	Envelope (LCD)	Envelope (USD)	Borrower Types
US	US Paycheck Protection Program (PPP)	799 Billion USD	799 Billion USD	Small Enterprises
	Main Street Lending Program	600 Billion USD	600 Billion USD	SMEs
	Credit Support for Airlines and Critical Industries	46 Billion USD	46 Billion USD	Airlines and Critical Industries
Japan	Safety Nets for Financing Guarantees No.4 and No. 5, Special Interest Program (実質無利子・無担保融資等)	53 Trillion Yen	496 Billion USD	SMEs
Germany	KfW Instant Loans	357 Billion euro	407 Billion USD	SMEs
	KfW Entrepreneur loans			Firms older than 5 years
	KfW Direct Participation Syndicated Loans*			Medium-sized and large firms
	KfW ERP Start-up Loan			Firms younger than 5 years
	WSF*	400 Billion euro	457 Billion USD	Large firms
UK	Coronavirus Business Interruption Loan Scheme (CBILS)	330 Billion pound	424 Billion USD	SMEs
	Coronavirus Large Business Interruption Loan Scheme (CLBILS)*			Large firms
	Bounce-Back Loan Scheme (BBL)			SMEs
	Covid Corporate Financing Facility (CCFF)*			Large investment grade firms
France	PGE	300 Billion euro	342 Billion USD	All firms affected by COVID-19
Italy	Fondo Centrale di Garanzia PMI	>100 Billion euro		Self-Employed, SMEs
	Public Guarantee for Debt Moratorium*	No limit (155 Billion Euro maximum take-up in March 2020)		
	SACE Garanzia Italia	200 Billion Euro	228 Billion USD	Medium and large companies
Spain	ICO loan guarantees	140 Billion Euro	160 Billion USD	SMEs

[1] https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19

Note: We exclude the programs with asterisks that did not provide information on loan terms. We also did not separately estimate the cost of the UK CCFF because of its small take-up and restrictive terms that limited risk.

For the forbearance programs in the EU, the calculations are based primarily on statistics reported in European Banking Association (2020) and information from various press accounts. For the US we used official statistics that were reported by the programs. For the UK we referred to Bank of England publications and Varadi and Albuquerque (2022). For the U.S. we referred to Cherry and others (2022) and official statistics from various agencies.

Appendix II. Description of the Calculating Subsidy Elements of Loan Guarantees and Direct Loans

This Appendix describes a stylized version of the framework we used to calculate the fiscal (or subsidy) cost of government credit programs on a fair-value basis. The example here is for a program that provides a 100% guarantee. The approach used for direct lending and partial guarantees is closely related, and is described in Hong and Lucas (2023).

A notable aspect of the approach we took is that we discounted *promised* cash flows with the estimated *interest rate that would be charged* to borrowers by banks for a similar loan without government backing, a quoted or promised rate.[2] In Hong and Lucas (2023), we show why this is conceptually the same as discounting expected cash-flows at a risk-adjusted discount rate, and emphasize that this approach avoids having to make assumptions about default rates, recoveries, and expected rates of return, all of which would be difficult to ascertain particularly during this period of heightened uncertainty.

The lifetime cost of a new loan or loan guarantee is reported as a subsidy rate: the present value of government costs per 100 (national currency) of loan principal. Multiplying the subsidy rate by the principal take-up in a program gives the total subsidy for that program. Subsidies in these programs accrued primarily to borrowers, but in some instances, there was also a subsidy to guaranteed lenders. For borrowers, the subsidy represents the upfront payment that a competitive private sector financial institution would charge the government to offer credit to the borrower on identical terms but without any government support. For guaranteed lenders, the subsidy is the excess of the present value of lender receipts (fees and loan payments) over the present value of normal lender costs incurred (for administration, funding, and risk).

Example: Subsidy Element of a Full Government Guarantee Loan

In general, cash flows to and from a government arise from principal disbursements and repayments, interest payments, guarantee payouts, guarantee and other fees, and administrative costs. Specifically, cash outflows for loan guarantees include guarantee and other payments to participating lenders, and internal administrative costs. Inflows for loan guarantees arise primarily from fees charged to borrowers or lenders. The size, timing and risk of cash flows differs considerably across programs, and depend on loan maturity, amortization schedule, interest rates and fees charged, borrow characteristics, collateralization, grace periods, whether the guarantee is full or partial, and other factors.

2 The most common alternative would be to discount expected cash flows at the expected return on a similar loan without government backing. Relying on promised cash flows and observed rates has a major practical advantage in that it avoids the need to estimate expected default rates, recovery rates and risk premiums. Estimating those quantities is particularly difficult during periods of unusual upheaval and uncertainty, when projections based on historical data may be poor predictors of future outcomes.

Consider a full or 100% guarantee program that offers credit to qualifying SMEs, assuming no lender subsidies or rate adjustments to cover administrative costs. For the sake of simplicity, assume that loans are for two years, and the annual interest rate charged to borrowers is fixed at 3% under the program rules. No interest or principal repayment is required for the first year, and full repayment of principal and interest comes due at the end of the second year.

On a EUR 100,000 loan, the lender would be guaranteed EUR 100,000 x $(1.03)^2$ at the end of two years. The cash flows for borrowers, lenders, and the government are summarized in Table A2.1. The realized borrower payment at time 2, "pmt_2" is a random variable whose outcome will depend on whether there is a default, and if so, the amount recovered.

Table A2.1. Cash flows on 100% guaranteed loans

	t = 0	t = 2
Lender	-100,000	100,000 x $(1.03)^2$
Borrower	100,000	-pmt_2
Government	0	pmt_2 − 100,000 x $(1.03)^2$

The government's time 2 cash flow is identical to the hypothetical case that it had made the risky loan of EUR 100,000 directly, and at the same time had issued a zero-coupon bond with a face value of EUR 100,000 x $(1.03)^2$. That hypothetical is useful because we know how to value each of those two transactions. Specifically, we can now calculate the net present value of cash flows at time 0 for each entity in Table 3.1. By construction, the borrower cash flows and hence the borrower subsidy is EUR 7,340 as above, which is the difference between the principal received and the present value of the borrower's promised time 2 payment.

The net present value for the lender or for the government will depend on whether or not the 3% is the market interest rate for government obligations. When 3% is the government borrowing rate, and therefore also approximately the rate at which the market would discount cash flows with a 100% government guarantee, then the net present value for the lender is: -100,000 + [100,000 x $(1.03)^2/(1.03)^2$]= 0. The lender has made a safe loan and earns the fair rate of return on it, and so has zero net profit. The net present value for the government is: 100,000 x $(1.03)^2/(1.07)^2$ – 100,000$(1.03)^2/(1.03)^2$ = -7,340, where 100,000 x $(1.03)^2/(1.07)^2$ is the fair value of the promised borrower payment, pmt_2.

As a result, the government absorbs any default losses and is not fully compensated for doing that. Abstracting from any administrative costs, the borrower receives a subsidy and the lender breaks even.