Credit Policy as Fiscal Policy:
Evaluating the Effects of International Credit Support Programs During COVID-19

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(Preliminary and incomplete)

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ABSTRACT

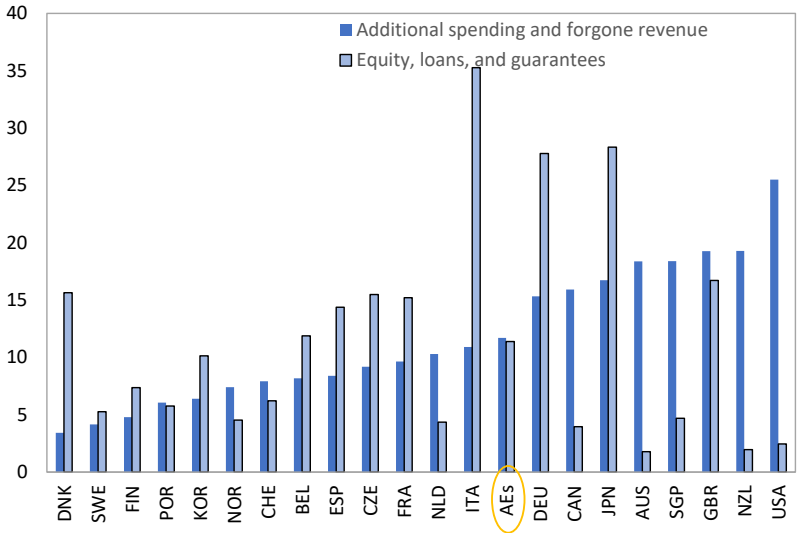
During severe economic downturns, governments have increasingly turned to credit support to supplement more traditional fiscal and monetary stimulus measures. Advanced economies made available more than 5 trillion USD through government-supported credit guarantee and direct loan programs to provide lifelines to firms in the face of the COVID-19 pandemic. Households and businesses also benefited from largescale loan forbearance programs. Notwithstanding the unprecedented scale of these programs, an in-depth study of costs and benefits relative to other fiscal measures is missing. In this paper, we review some of the methodological considerations for measuring fiscal cost and estimating the stimulus effects of credit policies. We use our preferred approach--fair value subsidy estimates and fiscal multipliers applied to loan principal amounts--to estimate the fiscal stimulus provided by the largest credit programs introduced in 2020. We estimate subsidies of 42 percent of loan principal on average, with a wide range across programs, from 24 to 100 percent. The estimates of cost-effectiveness—stimulus per dollar of fiscal subsidy—also vary widely with program characteristics. Although well-structured credit programs appear to provide a relatively low-cost source of support with high fiscal multipliers during economic downturns, there remain longer-run fiscal risks that are not fully captured by the *ex ante* estimates of costs presented here.

1. Introduction

Governments around the world acted to mitigate the economic fallout from the COVID-19 pandemic using a wide variety of policy measures. In addition to traditional fiscal and monetary responses, governments in advanced economies relied heavily on credit guarantee programs, and to a lesser extent on direct lending, equity purchases and large-scale loan forbearance and payment moratoria programs. Assistance to firms of all sizes, and especially to small and medium-sized enterprises (SMEs), was provided through newly created credit programs.

According to the IMF's Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic, for advanced economies the authorized envelopes for the principal amounts of credit support reached about 10 percent of GDP, as represented in Figure 1 (and as much as 30 percent of GDP in Italy and Germany).[3] Those amounts exceeded traditional 'above-the-line' fiscal measures such as cash transfers and tax deferrals, which totaled about 9 percent of GDP (IMF Fiscal Monitor, April 2020).

Figure 1. Discretionary Fiscal Response to the COVID-19 Crisis in Selected Advanced Economies (Percent of GDP)



Sources: Database of Country Fiscal Measures in Response to the COVID-19 Pandemic; and IMF staff estimates.
Note: Estimates as of September 27, 2021. Numbers in U.S. dollar and percent of GDP are based on October 2021 World Economic Outlook unless otherwise stated. Country group averages are weighted by GDP in US dollars adjusted by purchasing power parity. Data labels use International Organization for Standardization country codes. AEs = advanced economies.

Notwithstanding the unprecedented size of the announced credit support measures in response to the pandemic, there has been, to our knowledge, little in-depth analysis of the immediate and longer-run fiscal implications of those programs. That may be because of the complicated nature of making such

[3] Totals also include a small amount of authorized equity purchases.

assessments, and the unavoidable uncertainty surrounding any quantitative conclusions from such an analysis. However, it is precisely the enormous size and uncertainty associated with these policy measures that makes it imperative to quantify the fiscal implications as accurately as possible.

In this paper, we estimate the fiscal implications of credit support programs, focusing on the largest credit guarantee programs introduced during the COVID-19 pandemic in the five largest countries in Europe (France, Germany, Italy, Spain, and the United Kingdom), Japan, and the US. We consider three fiscal aspects of these support programs: First, we estimate the upfront fiscal cost or subsidy element for each program. Second, we discuss how the macroeconomic stimulus effects of credit support can be understood and quantified. We assess the size and cost of stimulus through the lens of fiscal multipliers, which we estimate for selected programs. The results suggest a wide range of outcomes, and we discuss the drivers of those differences. Finally, we include a preliminary and brief discussion of the longer-run fiscal effects of credit support, including its potential impact on future fiscal capacity.

To estimate the realized fiscal cost or subsidy element for each program, we use a fair-value accrual approach. The aim is to produce cost estimates for credit support that are grant-equivalent, meaning that the assessed cost is equivalent to that of providing program beneficiaries an upfront cash grant of the same amount. We discuss the theoretical and practical justifications for using this approach and compare it to the leading alternatives used for assessing the cost of government credit assistance. The reported subsidy cost estimates depend on the specific features of each program: take-up, borrower characteristics, eligibility requirements, guarantee coverage, interest rates, loan maturities, and other loan terms. We gathered information on these variables from a variety of official sources and government and consulting reports, including Anderson et al (2021), and press accounts. For the loan guarantee programs intermediated by private sector lenders, subsidy costs are also sensitive to lender compensation, guarantee fees, whether lenders have "skin-in-the-game," and whether they are responsible for screening borrowers and other services. When program rules provide lenders with compensation in excess of their estimated costs, a portion of the total subsidy accrues to lenders.

Importantly, the cost estimates reported here are based on the realized take-up for each program, which, in many cases, turned out to be much smaller than the available credit envelope. The estimates therefore represent the prospective cost to governments at the date of loan origination rather than at the date of program inception. For the purpose of assessing the fiscal exposure associated with each program at its inception when design choices are being made, it would be useful to also have prospective cost estimates based on the credit envelope. Such estimates would need to take into account the considerable uncertainty about take-up, and the possibility that if conditions had subsequently deteriorated, the losses could have skyrocketed. We chose not to undertake that exercise because there is very little data to discipline such estimates, and hence the range of uncertainty would be very wide.

Our analysis of program costs takes into account the significant uncertainty about the severity and duration of pandemic-related economic and financial distress at the time the programs were authorized, and the envelopes established, and also in the following months when most of the loans were originated. Fortunately, the global economic recovery has been more rapid and robust than many had anticipated. As a consequence, but with some notable exceptions, realized credit losses in most of the programs are now expected to be modest. Increased access to low-cost credit reduced disruptions to business operations and contributed to the recovery. Some businesses used the funds to retain more employees and stay in operation during the height of the pandemic, albeit at reduced levels. Continuity of operations allowed a quicker return to normal as the virus ebbed. However, much worse outcomes were and continue to be a possibility. Had effective vaccines not been developed, had the rates of severe illness and mortality been significantly higher, and had longer and stricter lockdowns been deemed necessary, many more businesses might have taken advantage of the availability of credit support but ultimately been unable to repay their obligations. For the many loans that will not come due for a number of years, performance could deteriorate if there is another economic downturn.

Like other forms of fiscal assistance, credit support has costs and benefits. However, its costs are relatively difficult to quantify, in part because guarantees and risky loans are contingent liabilities that expose the issuing government to significant but low-probability risks, often over an extended time period (IMF, 2017). Most governments fail to recognize the full cost of credit assistance upfront in their budgetary accounts. Rather than using an accrual basis of accounting that incorporates the uncertainties and multiyear time horizons, credit is often recorded "below the line." There is often no immediate budgetary impact, and losses are only recognized on a cash basis many years later.[4] Those practices cause credit assistance to appear cheap or even "free," a perception that contributed to calls for prolonging loan programs directed at helping firms survive when the lockdown measures were tightened or prolonged.[5] With little immediate impact on government budgets, credit programs may seem like a powerful, yet low-cost fiscal measure during a crisis. The analysis here demonstrates that the costs, when properly and consistently measured, can be much higher than those typically reported.

Our main findings can be summarized as follows:

First, the take-up in many credit programs was far smaller than the program envelope.

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[4] Even in countries that are vigilant about fiscal risks related to contingent liabilities, there is some evidence that these standards are ignored or adjusted during severe economic downturns such as the global financial crisis (Hawkesworth, 2010), partly because the heightened uncertainty around the size and duration of economic shocks making it very difficult to estimate costs with accuracy.

[5] https://www.wsj.com/articles/europe-keeps-aiding-companies-to-avoid-surge-of-covid-19-insolvencies-11623576603

Second, cost and take-up varied widely across programs within a single country, reflecting the significant variation in program parameters. As would be expected, programs with relatively generous terms -- such as highly subsidized interest rates, relaxed eligibility criteria, and long maturities -- had high take-up rates and a high subsidy element, whereas programs with stricter eligibility criteria and less favorable terms had much lower take-up and lower subsidy costs.

Third, there were sizable cross-country differences in the subsidy component of credit programs. Presumably, those differences were intentional, as governments sought to balance the attractiveness or accessibility of loans with the fiscal risk from defaults. There is variation even across EU countries that share a common "Temporary Framework" for pandemic credit programs.[6] In fact, we find that in some cases, the measures that seemed superficially the most generous because of their very large envelopes had relatively unattractive terms and conditions and low take-up rates.

Fourth, there were large differences across programs in the stimulus provided and the associated fiscal multipliers. Programs aimed at enterprises that were more likely to spend the funds quickly rather than to save or refinance existing debt provided relatively more stimulus. For some programs that provided significant stimulus with relatively low subsidy rates, the fiscal multiplier was estimated to be higher than for most forms of traditional fiscal support. Highly subsidized programs, however, had much lower multipliers on par with traditional fiscal measures aimed at businesses.

Fifth, the programs initially had the potential to adversely affect long-term fiscal sustainability. An upper bound on the risk exposure is the sum of the credit envelopes. While losses of that magnitude were unlikely to be realized, the sort of deep recession scenarios in which losses would be highest are also those in which governments would be most adversely affected by the reduction in revenues. Based on realized take-up and the likelihood that most of the loans will be repaid, the long-term fiscal impacts are likely to be modest.

Our paper contributes to several strands of literature. Most closely related are Gale (1991) and Lucas (2016), which suggest and apply the methodological approach used here to estimate the aggregate fiscal stimulus provided by US federal credit programs. Auerbach et. al. considers fiscal multipliers during the pandemic, but not ones that are specifically related to credit support. Several recent studies use micro-level bank-firm matched datasets to analyze to what extent and how credit programs affect borrowing. For instance, Mullins and Toro (2018), Ono et al. (2013) and Bacahs et al. (2021) look at the impact of credit programs on business lending in Chile, Japan, and the US, using bank-firm matched samples. There is a recent literature on bank lending behavior during the COVID-19 pandemic and the role of

[6] For more details on the EU State-aid Temporary Framework: https://ec.europa.eu/competition-policy/state-aid/coronavirus/temporary-framework_en

government loan guarantees. Altavilla et al. (2021) and Chodorow-Reich et al. (2020) look at how a bank's lending behavior differs by firm characteristics such as firm size and sector. Core and De Marco (2021), Li and Strahan (2021) and Li et al. (2020) focus on bank characteristics (leverage, asset size) and see how the effects of credit guarantee programs on bank loan supplies differed across banks. Finally, we build on previous work on evaluating the budgetary costs to governments of credit support programs on a fair value basis, including Lucas and Phaup (2010), Lucas (2012 & 2014) and references therein.

The paper is organized as follows. Section 2 describes the credit support programs analyzed in this paper. Section 3 reviews the fair-value approach to measuring credit subsidies, its rationale, and the conceptual case for applying it to government credit programs. Section 4 reports the fair-value cost of each credit support program analyzed and compares those estimates to government-reported information when available. Section 5 discusses how to evaluate the effectiveness of credit programs and fiscal implications of credit programs. Section 6 concludes.

2. Overview of Credit-Support Programs

In this section, we describe some of the common characteristics of major credit support programs for firms introduced by selected advanced economies during the COVID-19 pandemic covered in the analysis. We highlight program features that we later show have significant effects on subsidy costs and stimulus.

We focus on credit guarantee programs for the five largest economies in Europe (France, Germany, Spain, Italy, and the United Kingdom), Japan, and the U.S., which cover more than 90 percent of the total credit guarantee programs introduced in the world during the pandemic. ((In this draft we do not include credit support directed at households, such as the mortgage and student loan forbearance measures that provided significant fiscal stimulus in the U.S.)

We collect detailed information on loan and guarantee conditions, as well as take-up. The main source is from the official reports, which are available 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 its 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."[7] Bilateral discussions with IMF's country teams and with the country's authorities for some cases were conducted as well. We cross-check our information with Anderson et al. (2021), which provides valuable information regarding credit programs in Europe.

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

Government credit programs were introduced swiftly to address corporate liquidity issues, almost coinciding with the announcement of lockdown orders in March 2020. Italy was an exception, as one of the first countries to impose regional quarantines as early as February. The first corporate scheme that Italy introduced in the context of the COVID-19 outbreak was in January, with four separate corporate schemes already introduced in February.[8] At a supranational level, the European Commission first adopted the State Aid Temporary Framework on March 19th to enable member states to use the full flexibility to support the economy in the context of the COVID outbreak, which was updated over time.

Table 1. List of Major Credit Programs by Country

Country	Scheme	Envelope (LCD)	Envelope (USD)	Borrower Types
US	US 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	Special Interest Program (実質無利子・無担保融資等)	99 Trillion Yen	937 Billion USD	SMEs
	Safety Nets for Financing Guarantees No.4 and No. 5			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

The amount of credit support that was made available to firms—the credit envelope—was substantial in some countries. Table 1 presents the major credit programs introduced in countries, a subset of which will be analyzed in depth in this paper. In absolute dollar amounts, the United States introduced programs with the largest total envelope at over 1.4 trillion USD. The Paycheck Protection Program (PPP) and the Main Street Lending Program targeted small and medium-sized firms. Japan introduced an interest-subsidy program of nearly 1 trillion USD for all firms. This is followed by Germany, with close to 900 billion USD of available support.

[8] For more details on the EU State Aid Temporary Framework, https://ec.europa.eu/competition-policy/state-aid/coronavirus/temporary-framework_en.

Eligibility

To increase the likelihood that the support measures reached otherwise solvent firms that faced a pandemic-related liquidity shortage and that needed government support, some programs conditioned the availability of funds on the decline in revenues during the pandemic. Firms had to present evidence of revenue shortfalls during the pandemic compared to previous years to be eligible. Also, firms that were in financial difficulty before the pandemic were not eligible for loans (for instance, EU temporary framework).

Despite such targeting efforts, it was inherently challenging for governments, and for the guaranteed lenders that were enlisted to act as their agents, to ensure that credit reached the intended recipients. Objective measures such as "revenue shortfall" during the initial months of lockdown were not reliable indicators of need, and it was difficult to assess viability. Although efforts were made to make the lending process more streamlined than usual, some smaller firms without existing bank relationships may have been discouraged by the requirements of the application process. The uneven impact of COVID-19 across sectors and across firms within a sector amid general uncertainty about the recovery path further complicated the task of effectively targeting funds.

Firm size was also often an important element of the eligibility criteria. In fact, numerous credit programs introduced a sort of tiering, with differentiated guarantee coverage, pricing, and other terms that depended on firm size. Often, more favorable terms were offered for SMEs and less generous ones for larger companies in terms of guarantee share and maturity, as well as rates and fees. A good example of the case is the French credit guarantee scheme, where the tiering was based on firm size. Under that scheme, loans of micro-enterprises and SMEs received 90 percent guarantees, while loans to mid-caps and large companies received 80 percent and 70 percent guarantees, respectively. Guarantee programs favored SMEs over larger firms for a combination of reasons: (i) SMEs, especially in contact-intensive sectors, were more severely affected by the COVID-19, as highlighted in Gourinchas et al. (2020, 2021); (ii) it is generally harder for SMEs to obtain credit during downturns, as banks become more reluctant to lend to firms when economic uncertainty is too high; and (iii) protecting jobs in the SME sector was a high priority.

Guarantee Terms

Guarantee terms, which varied widely across programs, affected the attractiveness of program participation to both borrowers and lenders. Those terms also affected the size of the associated subsidies. To give an example of the sorts of terms specified, the UK Business Interruption Loan Scheme (CBILS) was a guarantee program directed at small and medium-sized businesses.[9] It provided loans

[9] Source: HM Treasury coronavirus (COVID-19) business loan scheme statistics - GOV.UK (www.gov.uk)

ranging from 50,000 GBP to 5 million GBP, with the available amounts depending on firm characteristics. Loan maturities ranged from 3 months to 6 years, and a variety of loan types were eligible. Collateral was not required on most loans. The program provided an 80% guarantee, and lenders were charged an annual guarantee fee of 75 basis points. The government paid the first 12 months of interest and fees, up to a maximum of 800,000 GBP. 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.

A typical credit guarantee program has the following elements. First, the program specifies *its targets*. In some cases, companies of all sizes are potential users (Germany KfW, France PGE), while in other cases, companies of certain sizes are only eligible (UK CBILS vs. CLBILS). Second, the program specifies *the guarantee coverage,* the degree to which governments will guarantee the loans paid to private financial institutions in case firms are unable to pay them back, for instance, due to firm defaults. In the programs that we studied, the guarantee coverage ranged from 70 percent to 100 percent. Third, the program defines other terms, such as how interest rate(s) are set, loan maturities and eligible structures (e.g., term or asset-backed loans), and guarantee fees (premiums). In some programs, interest rates are fixed by the government (Japan), and in others, lenders are permitted to set the rate but with a cap (Spain), or subject to benefit pass-through (UK and France). For countries in the European Union, guarantee fees are laid out in the EU temporary framework based on maturity and firm size.[10] Finally, loan sizes were typically limited in absolute amounts. For countries subject to the EU temporary framework, the overall amount of loans was subject to a ceiling where the total amount should not exceed: (i) double the annual wage bill of the beneficiary for 2019 or for the last year available; or (ii) 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, interest payments were also paid by the government for one or more years (UK BBLS, UK CBILS).

Among the programs that we studied, five programs (US Paycheck Protection Program, Germany KfW Instant Loan, UK Bounce Back Loan Scheme, Japan Safety Net Guarantee No. 4 and 5, Italy Fondo di Garanzia) offered a full guarantee by the governments. Compared to other loan schemes under the same program umbrella but with partial guarantees, several common features are observed for full guarantee schemes: (i) a quick disbursement and (almost) no credit risk assessment; (ii) a longer maturity than partial guarantee schemes; (iii) a lower maximum loan amount than partial guarantee schemes. As shown below, this resulted in higher subsidies than for more restrictive programs.

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[10] 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.

Involvement of Public and Private Financial Institutions

Public financial institutions played a central role as the administrators of national credit-support programs. A firm starts the process by applying for a loan from an authorized lender (generally a private financial institution). The lender assesses the request and refers the application to a national public financial institution. If the application is approved, the guaranteed loan is disbursed, and it becomes a liability for the public financial institution. The central government, in turn, supports the balance sheet of the public financial institution through credit guarantees, and pays a fee to financial institutions for participating. It is that public liability that makes all of these programs fundamentally fiscal. However, the financing of public financial institutions differs across countries. While it is universal that the state bears a contingent liability, this liability is direct in some cases (Germany's WSF program, where the guarantee is directly issued by the Ministry of Finance) and indirect in others (for the German KfW where KfW must use its own funds first, and for the Japan Financial Corporation). For fully guaranteed loans, additional credit assessment for firms by public financial institutions was discouraged to allow for swift disbursement, raising potential credit risks for governments, including fraud risks.[11]

Envelope vs. Take-up

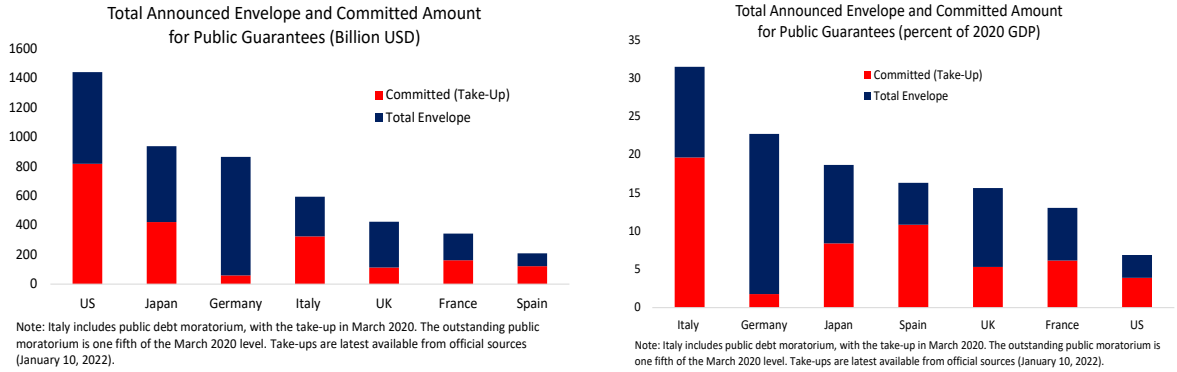
Figure 2 compares the total envelope announced with actual take-up in dollar terms and as a share of 2020 GDP. While the US had the largest envelope in dollar terms, Italy had the largest envelope when normalized by GDP. The actual take-up of loans through these credit guarantee programs turned out to be well below the announced envelope size in most countries (Figure 3). On average, take-up is about 40-50 percent of the announced size (Japan, France, and the United Kingdom), with Spain slightly higher. Despite introducing one of the largest credit envelopes, Germany has the lowest take-up in terms of GDP, with around a 10 percent take-up ratio.

Different factors affect the take-up ratio. As Anderson et al. (2011) point out, the take-up can depend on the size of economic shocks, the attractiveness of program terms, bottlenecks in financial intermediaries in assessing loans, and the availability of non-credit support programs. In Spain, the relatively high take-up rate on guaranteed loans can be partly attributed to the lower availability of alternative fiscal relief measures for corporations (e.g. debt moratoria and direct grants of State aid). In France, the higher-than-average take-up of guaranteed loans reflects their very favorable pricing conditions, especially during the first year of the loan. In Germany, the relatively limited use of such loans mainly reflects: (i) 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, including direct grants and tax deferrals and short-time

[11] https://www.nao.org.uk/press-release/the-bounce-back-loan-scheme-an-update/

working schemes; (ii) less favorable conditions associated with the schemes (e.g. concerning the pricing of loans, a prohibition on distributing dividends and limits on the remuneration of managers); and (iii) some supply-side bottlenecks related to the risk assessment required for large loans. From the loan supply side, the low take-up recorded in Italy mainly reflects operational bottlenecks that initially existed. 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 in the case of Italy. (https://www.ecb.europa.eu/pub/economic-bulletin/focus/2020/html/ecb.ebbox202006_07~5a3b3d1f8f.en.html).

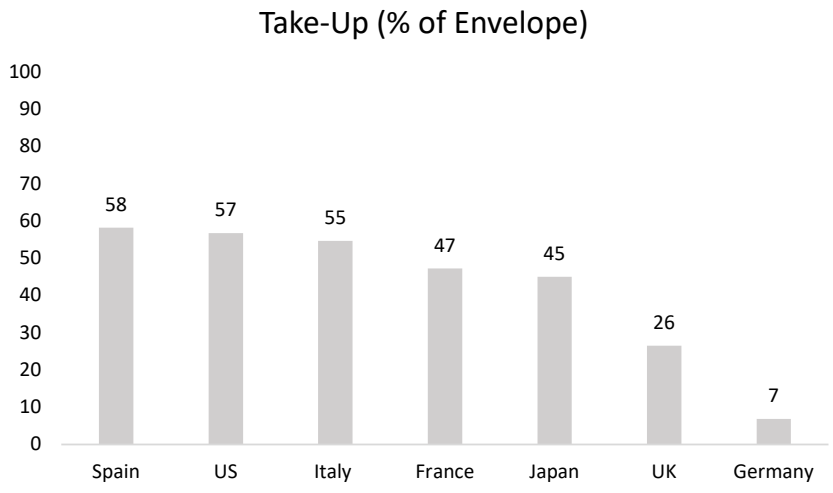
Figure 2. Credit Guarantee Programs during COVID-19: Envelope vs. Committed



Source: Official sources for each country, IMF Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic, and Anderson et al. (2021).

Note: The following programs are included for each country. Italy: "Cura Italia" guarantees and SACE Garantia Italia.; UK: BBLS, CBILS, CLBILS; Spain: ICO loan guarantees, France: Prêt Garanti par l'État; Germany: KfW loans for small and large loans; Japan: Special Interest Supply (both Public Financial Institutions and Private Banks); US: Paycheck Protection Program, Main Street Lending Program, Credit Support for Airlines and Critical Industries.

Figure 3. Take-Up as a percent of envelope (as of January 11, 2022)

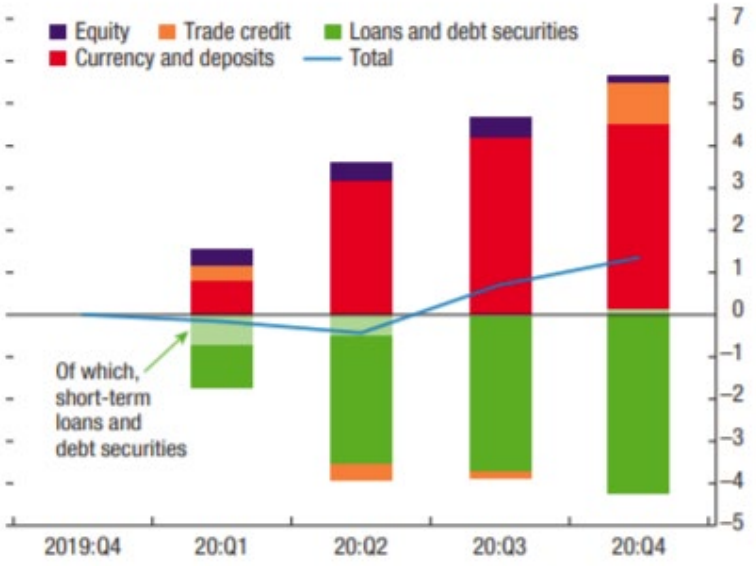


Note: Same programs as in Figure [2]. The take-up values are the latest available as of January 11, 2022.

What did firms do with the loans?

Following a large pick-up in SME-related loans, liquid asset holdings of NFCs also increased in 2020, according to surveys and financial stability reports by central banks. This implies that bank loans taken under guarantee programs were, at least in the initial quarters of the pandemic, largely set aside for saving. Arena et al. (2021) show a pick-up in liquid assets for non-financial corporations in the Euro Area starting from 2020Q2 (Figure 4). According to a British Business Bank survey, 19 percent of firms that applied for the Bounce Back Loans did not spend any bank loans by 2020Q3.[12] However, the use of bank loans increased over time, with more than 22 percent of the Bounce Bank Loan Scheme applicants utilizing all of the finance they sought (Bounce Back Loan Scheme Finance Survey Report 2020).

Figure 4. EU Area Non-Financial Corporations Net financial Transactions by Instrument, Cumulative Change since 2019:Q4 (pertent of 2019 GDP)



Source: ECB; Arena et al. (2021)

Payment Moratoria and other forbearance measures

[12] Source: "Bounce Bank Loan Scheme Finance Survey Report 2020," British Business Bank (Small Business Finance Markets Report 2021 - British Business Bank (british-business-bank.co.uk)).

Although payment moratoriums or debt standstill policies are not the focus of this draft of the paper, moratoria (both for households and non-financial corporations) provided considerable credit support to firms in many countries. According to questionnaires conducted by the European Systemic Risk Board (ESRB), the macroprudential authorities identified moratoria as the most important measures to protect NFCs and households, followed by public guarantees.

In France, Germany, Italy, and Spain, national authorities introduced legislative and non-legislative moratoria on loan repayments for business borrowers in financial difficulty. Moratoria eased short-term liquidity pressures on businesses by allowing borrowers to postpone debt repayment for some time. Loan moratoria therefore act as a complement to the guarantee programs in easing liquidity shortages. They do so for a limited period, however. In a sample of banks that reported to the EBA, virtually all moratoria were due to expire by December 2020, and more than half had expired by September.

In Italy, public guarantees were given to the bank loans covered by the moratorium. Under the Cura Italia decree of March 17, 2020, a debt moratorium was established to allow SMEs suffering from liquidity shocks to not make payments on their loans and credit lines until September 30, 2020. Financial institutions adopting the debt moratorium received public guarantees totaling 33 percent of their relevant payment obligations. In March 2020, under the Cura Italia decree, 1.39 million firms requested and were accepted to begin a debt moratorium, with the total loan size subject to the moratorium reaching 154 billion euros. As of December 3, 2021 (latest available report as of February 10, 2022), 45 billion euros for 402 million companies are reported to remain under moratorium.

Changes to macroprudential regulation were made as well. Extraordinary prudential treatment of loans under moratoria was activated by the European Bank Association (EBA) whereby loans under moratoria are deemed eligible under the EBA guidelines. Classification as forborne or defaulted based on the 90-day-past-due criterion was not automatic.

The subsidy cost of a debt moratorium or forbearance program depends on how it is structured. When the government pays lenders in lieu of the borrower for some period of time, and if it does not expect to fully recover the present value of those amounts, then the programs involve a subsidy. A subsidy was also provided by the provision of loan guarantees on loans under the Italian moratorium. The fair value of such subsidies can be estimated similarly to credit guarantees or direct loans. Sometimes forbearance by creditors is mandated and uncompensated. In such cases, while there is no direct subsidy cost to the government, the mandate is effectively a tax on lenders.

3. Estimating subsidy costs

This section briefly lays out some of the conceptual and practical rationales for evaluating the fiscal or budgetary cost of government credit programs on a fair-value basis, and contrasts that approach with other practices governments follow in measuring and reporting the budgetary cost of credit support. The framework used to implement the fair value estimates, and the principles guiding the market data used for the calibrations, are also explained.

3.1 Rationale for Fair-Value Cost Estimation for Credit Assistance

Loan guarantees, direct loans, and loan participations all involve legally binding commitments on the part of governments and entail uncertain future cash flows that often extend over years or even decades. By contrast, most conventional fiscal policies can be modified over time by legislative or administrative actions and therefore have short commitment periods and involve limited uncertainty about future cash flows.

Those differences raise the question, what basis of accounting puts cost estimates for credit support on a level playing field with those for other types of fiscal policies? In budgetary parlance, the issue is sometimes framed as seeking the "grant-equivalent" cost of credit assistance—the size of a grant that would have the same cost to the government as a specific credit commitment made at a point in time. A grant-equivalent cost can also be described as a subsidy cost. An important benefit of grant equivalent cost estimates is that they allow policymakers to make choices between credit policies and other types of fiscal assistance with full and easily interpretable information about the relative costs of alternative actions. Here, we make the case that a fair value approach is the best way to achieve grant equivalence among the leading alternatives for cost measurement.

Because of the multi-year nature of committed cash flows, a grant-equivalent measure of credit cost must be on an accrual rather than a cash basis. It is standard for accruals to be calculated as the net present value of projected cash inflows and outflows. For a direct loan or participation, when the present value of future cash inflows (from interest payments, fees, and repayments of principal) falls short of the present value of associated costs plus the principal loaned out, the difference represents a cost to the government and a subsidy to the recipient. Similarly, for a credit guarantee, when the present value of future cash outflows under the contract exceeds the present value of fees and recoveries, the cost to the government is positive and a subsidy is conferred. Accruals also facilitate an accurate comparison of costs between direct lending and loan guarantee programs. All else equal, the theoretical cost of a direct loan is identical to that of a 100% guaranteed loan to the same borrower, all else equal. Accrual estimates capture that equivalence. By contrast, cash basis accounting inflates the initial reported cost of direct lending because of the upfront principal outlays, whereas economically equivalent loan guarantees may even appear to make money because of the upfront fees received. Many countries avoid the distortions of cash accounting for credit by removing it entirely from their budgetary accounts. However, that practice has

the effect of making it easier to ignore the costs of credit support, creating an incentive to rely on them excessively.

A critical decision in calculating accruals is the choice of discount rates. In fact, that choice is what distinguishes fair value cost estimates from other accrual methods. Present value calculations are quite sensitive to the choice of discount rates, and estimated costs can only be interpreted as grant equivalent if appropriate discount rates are chosen.[13] With fair value estimates, discount rates are based on observed or estimated discount rates used by private sector investors and financial institutions to value similar obligations. The discount rates used in the private sector reflect time value—that a dollar received today is worth more than a dollar received for certain in the future. Private sector discount rates also include a market risk premium that compensates investors for the risks associated with a particular investment that cannot be easily avoided through diversification. Priced risks include aggregate or business cycle risk, and to varying degrees, interest rate risk, prepayment risk, and liquidity risk.

In a well-functioning financial market, fair values are calculated with reference to market prices and rates. However, during periods of financial distress or elevated uncertainty, when competition between lenders may be unusually limited and normal market function is disrupted, the concept of fair value allows for the use of approximations that avoid the use of highly elevated interest rates. In place of current market rates, an estimate of what the rate would have been in a well-functioning financial market is used for discounting. It is important to make the distinction between fair and market value, as it allows cost estimates to omit distress premiums that many observers would not consider to be legitimate costs to governments.[14]

Well-established principles of financial economics imply that discount rates should be selected on the basis of the priced risks associated with the cash flows on an investment that is being valued (e.g., a direct loan or loan guarantee), but independently of how the investment is financed. That's because the fundamental source of risk is the default risk on the loan, and that risk is unaffected by how the loan is funded. The default risk will be distributed differently between debt and equity holders depending on the share of debt versus equity, but the total risk is conserved between debt and equity. Hence, the "weighted average cost of capital" for funding a loan is (as a first approximation) unaffected by how it is financed. This is the logic of the famous Modigliani and Miller (1958) theorem.

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[13] A more general treatment of these concepts would note that what is important is to identify the appropriate cost of capital. For the applications here, that is accomplished through the choice of discount rates. For more complicated contingent claims, derivative pricing methods may be more reliable for properly incorporating capital costs.

[14] There is a point of view that one should always use market prices, even if they include a distress premium. The idea is that when the government provides support there is an opportunity cost equal to the current market value. Had the government offered the support at its market price rather than at subsidized terms, it could have used those revenues for other purposes.

For governments that report the cost of credit assistance on an accrual basis (e.g., the US and the UK for some programs), the typical practice is to equate discount rates to the interest rate on government debt of a similar maturity. Effectively, the government's cost of capital is equated to its borrowing rate. That choice is at odds with the principle of choosing a discount rate based on the risk of the investment, independent of how it is financed. Importantly, it ignores the physical impossibility of funding a risky investment entirely with safe borrowing and ignores the role of taxpayers and other government stakeholders as equity holders in any risky government investment.

To elaborate, the risks inherent in government credit guarantees and direct loans are similar to those for private sector institutions offering similar products. However, with government credit those risks are ultimately borne by taxpayers and other government stakeholders rather than by firm equity holders. Consider a risky loan made by a government and initially funded by the issuance of government debt. The government debt used to fund the loan will be repaid in full regardless of whether or not the loan defaults. The debt is viewed as risk-free because it is backed by tax revenues and a credible payment commitment; its value is unaffected by the use the funds are put to.

The safety of government debt increases its value to investors, which drives up its price and reduces its required return. Government interest rates, like the prices on government debt, are unaffected by the risk of the credit support that the government extends.[15] Using a rate inferred from the market price of a safe asset to value a risky asset has the effect of treating taxpayer equity as requiring a zero rate of return. That practice creates a downward bias in accrual estimates of the cost of credit assistance relative to full economic cost. The size of the bias will differ across credit programs, and it will be largest for credit activities that involve relatively large exposures to market risk.

Even if one accepts that discounting at risk-free rates understates the cost of credit support, there are many possible objections to using market prices or fair value principles to determine government costs. There are also a variety of practical considerations in the choice of cost accounting measures. In this draft some of these issues are touched on; we will elaborate further in future drafts.

Some hold the view that the market price of risk is not relevant to the government, particularly for the goods and services that the government produces itself. Because credit services are often produced in-house, it is true that the associated risk does not involve a cash charge that the government has to pay out. However, as discussed earlier, risky government investments effectively imposes a non-cash cost on taxpayers and stakeholders. Also, if one accepts that the cost of credit assistance cannot be accurately measured by simply adding up cash flows, then it doesn't make sense to try to simply equate cost with

[15] Of course, the debt of a government that assumes a large amount of risk relative to its ability to tax would also carry a risk premium, but for the developed countries sponsoring the programs discussed here any sovereign risk premium appears to be small.

cash flow.[16] Note that fair value estimates of the cost of credit support represent what a private sector financial institution would charge the government for providing that support to borrowers in a well-functioning financial market. Cost estimates made on a fair value basis are conceptually consistent with those that are reported on a cash basis for the goods and services that the government purchases. When the government buys an office building or a fighter jet or a coffee maker, the price paid includes a charge for the cost of risk associated with the capital used in production. Hence risk charges are routinely included in budgetary costs.

Indeed, the use of market prices is inescapable, the choice is only over which market prices to use as references. Even the government interest rates that are leading alternative to market rates for accrual estimation are derived from market prices. If market prices cannot be trusted to be reflective of social cost, neither can government interest rates. The specialness of government bonds makes it doubtful that the interest rates they bear reflect a pure rate of social time preference. Government bonds are valued highly for their liquidity and use as collateral, and in some countries for the preferential tax treatment they receive. The preferences of relatively wealthy investors determine prices in capital markets, not those of the population at large.

Some people argue that while a traditional market risk premium that compensates for undiversifiable risk is a legitimate government cost, other components of market rates, like the liquidity premium, should not be treated as costs to the government. A rejoinder is that if competitive market prices are generally accepted as the best available indicators of value, and also from a government opportunity cost perspective, there is no reason to make such adjustments. Even if it were desirable to make such adjustments, practical implementation would be extremely difficult (there is no agreement on how to break rates down into these component parts), and it would reduce the discipline imposed by harmonizing government valuation practices with those in the private sector (will add more on benefits of harmonization).

The issue of market incompleteness also frequently comes up as affecting value in a way that might not be captured in fair value estimates. When markets are incomplete, as they surely are, purely private transactions at market prices need not result in an efficient allocation of resources. Nevertheless, as previously noted, governments rely on market prices to measure the cost of their non-credit activities, and it isn't clear how those cost estimates should be adjusted to correct for the effects of incompleteness. The issue of incomplete markets would appear to be much more relevant to estimates of program benefits. Government credit can add value by making markets more complete and reducing the effects of market

[16] Most government activities involve cash transfers for which there is no distinction between in-house production cost and purchase cost. And because most budgeting is done on a cash basis, it becomes a habit to equate cash with cost. That practice make sense for most expenditures, but it creates difficulties for programs where there isn't a simple connection between cash and value.

frictions. However, cost estimates do not attempt to quantify the benefits of government programs, and here we do not attempt to quantify the social benefits of the credit assistance programs during the pandemic.

An important point: While the projected average future losses appear to be very manageable, averages neglect that the risk is more likely to materialize if there is another severe downturn and future fiscal capacity is already challenged. A full accounting of fiscal cost must recognize that future loss rates will be higher than average if a country is in a recession, and vice versa if the economy is strong. That correlation magnifies the fiscal risk of credit programs. Some part of the loans will be prepaid. That adds uncertainty about the timing of future cash flows, but it is likely to have a relatively small effect on future fiscal resources. [17]

Current Practices in Budgetary Reporting of Credit-Support Programs

Countries differ in their approach to reporting on the fiscal cost of credit support. Despite the strong theoretical case for using fair value and its common acceptance and application in private sector accounting, governments have not adopted that practice. A partial exception is the US, whose Congressional Budget Office regularly reports on the fair value of credit support programs as supplementary information for policymakers. As a consequence, credit subsidy costs are not fully reflected in budgetary costs for most countries. In some countries, guarantees are treated as "below-the-line" and outside of the normal budget process. In other countries, guarantees are accounted for on a cash basis, implying that costs are only recognized when losses are realized. Here, we elaborate on these points. Box 2 summarizes the treatment of one-off guarantees in the IMF Government Finance Statistics Manual (GFSM) 2014.

Off-budget (below-the-line). There is variation in off-budget reporting practices. In some countries, only certain types of credit are omitted from the budget, while in other countries, all credit-related programs are treated as off budget items. For loan guarantees, no budgetary expenditures are reported apart from administrative fees for Canada, UK, Slovak Republic, Australia and Turkey (Hawkesworth, 2010). For direct loans, on the other hand, no expenditures apart from administrative fees appear for Canada, UK, Spain, Germany, Austria, Slovak Republic, Portugal and Turkey. Reporting can be even more limited during a crisis. For instance, some countries ignored or made adjustments to their general procedures due to the extreme circumstances during the global financial crisis. [18]

[17] The prepayment option is not very valuable because of the structure of these programs. There have been other government guarantees where the prepayment option has a larger fiscal effect.

[18] The survey conducted by Hawkesworth (2010) shows that the respondents for Denmark and Netherlands said they ignored the rules; those for Hungary, Finland, Mexico, Germany, Turkey and the UK said they adjusted the standards.

Cash-basis accounting. Cash accounting entails reporting the cash flows associated with programs in the years that they are realized. For grants and transfers, cash accounting captures the full value of public resources committed to those uses. However, for a direct loan or credit guarantee, cash accounting has significant and widely recognized weaknesses, some of which were described earlier. For credit guarantees, it delays the recognition of any cost until defaults are realized. That is often many years after the commitments are made, and long after cost information could inform a decision about whether to introduce the program or not. Furthermore, realized losses are a poor indicator of a program's prospective cost because they do not include the full range of outcomes that might have occurred and their likelihood. Despite these significant shortcomings, the practice of cash basis accounting for credit remains common.

Accrual accounting. Budgetary accruals measure the lifetime cost of new credit support in the year a commitment is made. Accruals are calculated by projecting the future cash flows associated with a loan or guarantee and discounting them to the present. Despite its conceptual advantage over cash accounting for credit programs, so far, the U.S. is the only major country that appears to have adopted accrual accounting for all activities classified as credit programs. [19] However, even in this case, the implementation has some shortcomings – primarily the use of Treasury rates for discounting – that cause costs to be underreported.[20]

3.2. Calculating the Subsidy Element

We now turn to how the upfront 'subsidy element' of a government loan or loan guarantee calculated. The subsidy element" is reported per $100 of principal, so as to provide a normalized measure across programs. For borrowers, the subsidy element can be interpreted as the upfront amount that a competitive private sector financial institution would charge the government to offer credit to the borrower on identical terms without any government support. For lenders that participate in guarantee programs, there is a subsidy element when the value of lender receipts exceeds that of lender costs.

An important contribution of the analysis is to demonstrate the practical application of a methodology for estimating subsidies that is parsimonious in its data requirements and relatively straightforward for policy analysts to apply and explain. The sequence of examples below illustrates how the methodology can be

[19] The Federal Credit Reform Act of 1990 (FCRA) requires federal direct loans and loan guarantees – for which cash flows typically extend well beyond the 10-year budget horizon- to be recorded in the budget on an accrual rather than a cash basis. For such programs, the budget records a single payment or receipt that represents the net present value of expected future cash flows.

[20] There are important exceptions including the Troubled Asset Relief Program (TARP) enacted to respond to the global financial crisis, where the law require budgeting to be on a fair value basis, which replaces discounting at Treasury rates with discounting at market rates.

applied for a variety of stylized program structures, including guaranteed and direct government lending, and full and partial guarantees. We also discuss some of the general considerations that guided the choices of discount rates.

3.2.1. General Considerations

Two broad approaches can in principle be used to estimate the subsidy element: discounted present value or derivatives pricing. Here we rely on a discounted present value approach. Its advantages include its greater robustness to the limitations of the available data; its more common usage by financial practitioners; its familiarity to policymakers; and its relative simplicity and transparency.
We calculate discounted net present values by discounting *promised* cash flows with the estimated *interest rate that would be charged* to borrowers by banks for a similar loan without government backing.

A common alternative would be to discount *expected* cash flows at the *expected return* on a similar loan without government backing. A strength of our implementation approach is that it avoids the need to independently estimate expected default rates, recovery rates and risk premiums during this period of unusual upheaval and uncertainty, when projections of those quantities based on historical data may not coincide with investor expectations. As explained below, relying on observations of interest rates charged provides forward-looking proxies for the net effect of those quantities on present value.

In general, cash flows to and from the government arise from principal disbursements and repayments, interest payments, guarantee payouts, guarantee and other fees, and administrative costs. Specifically, cash outflows for direct loans are comprised of disbursements of principal and the costs of origination, servicing, and collection. Cash outflows for loan guarantees include guarantee and other payments to participating lenders. Cash inflows for direct loans include principal and interest payments, and any fees charged. Inflows for loan guarantees arise primarily from fees charged. The size and timing of cash flows differs considerably across loan schemes, and depend on loan maturity, amortization schedule, interest rates and fees charged, borrow characteristics affecting default and recovery rates, collateralization, grace periods, whether the guarantee is full or partial, and other factors.

Most subsidized loans don't have a direct counterpart in the unsubsidized market, or when a comparable product does exist, the terms of the agreements are not publicly disclosed. Hence, the subsidy element has to be approximated based on available information. Public disclosures about credit programs typically include the basic contractual terms like maturity and loan size range, eligibility criteria and characteristics

of borrowers.[21] Publicly available credit market data such as average credit spreads on bonds by credit rating or average bank lending rates by borrower type also informs the estimates.

3.2.2. Calculating the subsidy element for direct loans

This first example demonstrates the subsidy calculation for a direct government loan calculated by discounting promised cash flows at a rate that would be charged by a private sector lender were the loan not guaranteed. It also demonstrates why it is equivalent conceptually to discounting expected cash flows at a risk-adjusted discount rate. Consider a direct lending program that offers credit to qualifying SMEs. Loans are for two years, and the annual interest rate 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. For a 100,000 EUR loan made under the program, the promised cash flow to the government is 100,000 x $(1+.03)^2$ at the end of two years. Because the loans are quite risky, promised payments will exceed the average or expected payments received.

Expected cash flows depend on the full range of possible outcomes, including a rapid economic recovery with low default rates and high recovery rates because most firms are able to quickly return to profitability, and a prolonged downturn with high default rates and much lower recoveries. Because the loan outcomes are correlated with those in the macro economy, risky loans expose lenders to market risk. That market risk lowers the market value of the cash flows, or equivalently, it increases the discount rate that market participants use to discount the expected cash flows.

To impute the subsidy element, the key question we need to answer is how much a private sector financial institution or investor would pay upfront for the promised EUR 100,000 x $(1+.03)^2$ at the end of two years from the same borrower? Assume we infer that value to be EUR 92,663.11. Then the subsidy element is (100,000 – 92,663.11)/1,000 = 7.34; a 7.34% subsidy rate. The subsidy arises because the government has provided EUR 100,000 in principal in return for a claim worth only EUR 92,663 in present value. To put it differently, the government could contract to pay a private lender EUR 7,340 to make the loan to the borrower on those same terms, or the government could have given the borrower EUR 7,3400 to pay to a lender in exchange for making the loan on those terms—it is the grant equivalent cost of credit support. Where did the conclusion that the market would value the promise at EUR 92,663.11 come from? In principal, an analyst could estimate the expected default rate, "d," recovery rate, "ρ,", and risk-adjusted expected rate of return, "R." Then the fair value at time 0, "V_0," of a promised payment, "P_T," in year T would be calculated as

[21] For some programs loan performance data is also now becoming available. That information is useful for various aspects of program evaluation. However, it is largely irrelevant to these calculations, which aim to estimate the upfront or ex ante cost based on the probability distribution of the possible outcomes, before the actual outcomes became known.

$$V_0 = [P_T \times (1 - d) \times \rho]/(1 + R)^T. \quad (1)$$

However, it's not feasible to estimate the default rate, recovery rate or expected return for each pandemic program with any reasonable degree of confidence. Very limited data is available, and the heightened uncertainty in the early stages of the pandemic makes inferences based on historical averages unreliable. Fortunately, an alternative exists that avoids having to estimate these components individually. That alternative is to discount the *promised* payments at the rate a private sector lender would have *charged* for a similar loan. For example, let's assume a lender would have offered a 7% interest rate to these borrowers for the same two-year term. Then the principal amount the lender would provide in exchange for a promised repayment in 2 years of EUR 100,000 x $(1+.03)^2$ is 100,000 x $(1.03)^2/(1.07)^2$ = 92,663.11. The subsidy element is the difference between the 100,000 principal and the 92,663.11 present value of the promised payments, in this case divided by 1,000 to express the result per 100 of loan principal. The resulting subsidy element is 7.34, based on the 7% rate that lenders would have offered to similarly risky borrowers without government support. Notice that the 7% rate can be thought of as aggregating market perceptions about expected defaults and recoveries. It also embeds a market consensus view of the expected return lenders need to earn to compensate for time value and priced risk. Effectively, the rate charged by lenders, "C," is a sufficient statistic for the combined effect of the various cost factors on the value of promised payments.

The observation that "C" is a sufficient statistic for expected losses and the relevant market discount rate allows us to replace equation (1) with:

$$V_0 = P_T/(1 + C)^T. \quad (2)$$

Note that C will be higher than R because it includes compensation for expected losses, and P_T is higher than $E(P_T)$ by the amount of expected losses.

3.2.3. Calculating the subsidy element for loan guarantees

This next example shows that the subsidy element of a 100% loan guarantee is the same as that on a direct loan that is equivalent from a borrower perspective, provided that the guaranteed loan does not involve any subsidies to the lender.

Imagine that this credit program was instead structured as a loan guarantee program. First consider a program rule that make this guarantee program identical to the direct loan program above from the perspective of borrowers. Lenders are required to charge qualified borrowers 3% per annum on 2-year loans, with principal and accrued interest coming due in two years. The government guarantees that

lenders will be repaid in full. Thus, 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 X.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 3.1 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 if it had made the risky loan of EUR 100,000 directly and funded it by issuing a zero-coupon bond with a face value of EUR 100,000 x $(1.03)^2$. We can now calculate the net present value of cash flows at time 0 for each entity. By construction, 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 the market would use to discount cash flows with a 100% government guarantee, then the net present value for the lender is: -100,000 + [100,000 x $(1.03)^2$] = 0. The lender has made a safe loan and earns the fair rate of return on it, and so has zero profit. The net present value for the government is: 100,000 x (1.07)2/(1.03)2 – 100,000(1.03)2/(1.03)2 = -7,340

The subsidy cost is the same as with a direct loan because in either case the government absorbs the default losses and is not fully compensated for the cost of doing so. One can conclude more generally that a 100% guaranteed loan has the same subsidy element as a direct government loan with the same interest rate, when the interest rate equals the government's borrowing rate.

3.2.4. Subsidy element to guaranteed lenders

When the rate charged to borrowers on a guaranteed loan is in excess of the government's borrowing cost, there is an additional subsidy element that benefits the lender at the expense of the government.[22] Consider the same guarantee program as in the above example, but with the government's own borrowing rate at 2% instead of 3%. For the lender, the present value of the guaranteed time 2 cash inflow is 100,000 x $(1.03)^2/(1.02)^2$ = 101,970.4, or EUR 1,970.4 more than the value of the principal

[22] Because lenders would not participate if profits were negative, the mandated rate could not be below the government's borrowing rate.

extended. Correspondingly, the cost to the government of the guarantee commitment is higher by EUR 1,970.4. All else equal, the higher the mandated rate, the higher the lender subsidy element.
Importantly, the analysis thus far has abstracted from the administrative costs a guaranteed lender incurs for origination, servicing and collection on defaulted loans. The government or borrowers must compensate lenders for the cost of these services, else they would not participate. One mechanism to provide compensation for those costs is by mandating a higher borrower rate. When the difference between the borrower rate and the government borrowing rate is set to exactly offset administrative costs, those additional revenues should not be treated as a lender subsidy. To the extent that payments from the government to lenders offset normal administrative costs, the value should be attributed to the borrower subsidy. Not only does the borrower benefit from a below-market interest rate, it also benefits from avoided fees. In the lender subsidy elements reported, an adjustment for the normal levels of administrative costs is incorporated to avoid overstating the subsidies accruing to lenders.

3.2.5. Adjusting subsidy element calculations for partial guarantees

Many pandemic credit guarantee programs offered partial guarantees, with the government absorbing a set fraction of any realized default losses. The procedures described above are easily extended to the situation where losses are shared proportionally between lenders and the government.[23]
Continuing with the previous example, imagine instead of a 100% guarantee, the government absorbs 80% of the losses and lenders bear 20% of losses. As before, the government borrowing rate is 3% and the market interest rate for the risky loans is 7%. Loans come due in two years.

With a partial guarantee, lenders must be allowed to charge a high enough interest rate to compensate for the risk on the unguaranteed portion of the loan. To limit the ability of lenders to capture the subsidy value by charging borrowers a higher rate, in many cases the program rules required that that the value of the guarantee be passed through to borrowers. The resulting borrowing rates have not been made public. We estimate the rates charged by assuming that lenders comply with the directive to pass through the subsidy value by setting a borrower rate that is a weighted average of the market rate, C, and a floor rate, f. The weight on f is the guarantee share. Hence for a program with an 80% guarantee, we would assume the borrowing rate is .2 x C + .8 x f. In this stylized example, we again abstract from administrative costs and set f equal to the government borrowing rate of 3%.[24] The cash flows for borrowers, lenders, and the government are summarized in Table 3.2.

[23] When losses are divided using a senior-subordinate structure, such as when the government takes losses up to some cap, or when it absorbs losses after lender losses have exceeded a specified amount, it becomes necessary to use a derivatives pricing approach to accurately value the various claims. None of the programs we assess were of this type.
[24] The floor rate is equal to the government borrowing rate plus an allowance for administrative costs. When there is a similar program in the same county with a 100% guarantee, we take the floor rate to be the mandated rate in that program. Alternatively, we start with the government borrowing rate and add to it an administrative cost spread. For programs involving fees, those cash flows are also incorporated.

Table 3.2 Cash flows on 80% guaranteed loans

	t = 0	t = 2
Lender	-100,000	$.8 \times 100{,}000 \times (1 + .8 \times .03 + .2 \times .07)^2 + .2 \times pmt_2$
Borrower	100,000	$-pmt_2$
Government	0	$.8 \times [pmt_2 - 100{,}000 \times (1 + .8 \times .03 + .2 \times .07)^2]$

As before there is an equivalence between the loan guarantee and leveraged direct lending that will make it straightforward to calculate the value of the guarantee. The government's time 2 cash flow is identical to if it had made a risky loan of EUR 80,000 directly and funded it by issuing a zero-coupon bond with a face value of EUR 80,000 x $(1 + .8 \times .03 + .2 \times .07)^2$.

We can again calculate the net present value of cash flows at time 0 for each entity. For the government, the present value of the time 2 cash flows is: $80{,}000 \times (1 + .8 \times .03 + .2 \times .07)^2/(1.07)^2 - 80{,}000 \times (1 + .8 \times .03 + .2 \times .07)^2/(1.03)^2 = 75{,}286.51 - 81{,}247.54 =$ -EUR 5,961.04

Hence, the government subsidy is EUR 5,961.04, or a subsidy element of EUR 5.96. The subsidy is lower than in the case of a 100% guarantee, which might be expected since there is less risk exposure. However, a partially offsetting effect on cost is that on the guaranteed portion, the guaranteed rate of return to the lender is higher. The borrower subsidy is the difference between the principal of 100,000 and the present value of the promised payment, which is $100{,}000 \times (1 + .8 \times .03 + .2 \times .07)^2 = 94{,}108.13$. The resulting subsidy of EUR 5,891.87 is smaller than for the 100% guaranteed case because the borrower is paying a higher rate.[25] The net present value of receipts for the lender is similarly calculated by discounting the guaranteed portion of the revenues at 3% and the risky portion of the revenues at 7% and comparing that to the principal extended.

$.8 \times 100{,}000 \times (1 + .8 \times .03 + .2 \times .07)^2/(1.03)^2 + .2 \times 100{,}000 \times (1 + .8 \times .03 + .2 \times .07)^2/(1.07)^2 - 100{,}000 = 100{,}069.2 - 100{,}000 =$EUR 69.2

The very small lender subsidy is by design, as the aim was to set the interest rate on the loans so that the value of the subsidy accrues to the borrowers. In sum, a partial guarantee can be analyzed analogously to a 100% guarantee. The extent to which the subsidy accrues to borrowers rather than lenders will depend on the interest rate and any other fees charged by the borrower.

[25] We assume that the market rate does not change with the increase in the rate charged to the borrower. Whether the market rate would be higher or lower than before is unclear. To the extent that the higher rate causes defaults to increase, the market rate would be higher. However, when lenders retain an interest in the loan they have more incentive to screen borrowers and that may reduce the incidence of defaults.

3.2.6. Further considerations for inferring discount rates

Although using an approach based on discounting promised cash flows at offered rates is relatively tractable, it still involves judgment about what to use as a proxy for the rate a private sector lender would have charged for credit on the same terms. Government supported loan offerings are often quite different than those typically offered by the private sector. For instance, government programs may offer longer maturities and offer credit to riskier borrowers that banks would not lend to. In such cases, it can be difficult to find a completely comparable market rate. Nevertheless, borrowers can be mapped onto observable rates, and the logic for that mapping for each program is briefly explained in the Appendix <need to add those discussions>.

Several objectives broadly guided the choices of comparison interest rates. An important goal was to produce unbiased estimates that reflected as accurately as possible available market information. Another was to use the same or similar assumptions across similar programs, unless there was an objective reason to deviate such as when there were differences in base interest rates across countries. Consistency in assumptions makes comparisons of the features driving cost differentials between programs more apparent.

A further consideration was to avoid using interest rates that reflected distressed market conditions, as doing so would have been inconsistent with fair value principles. Financial markets appeared to function normally during most of the pandemic. However, there was a sharp spike in credit spreads around the time when the pandemic was declared by the WHO in March 2020. In the U.S., the rate spread on high yield bonds, which was hovering around 4% in late February, climbed rapidly to a peak of 11% on March 23. By mid-April, it dropped to 8%. It fell to 6% by the first week of June and stayed in the 5-6% range through the beginning of November. We did not use the highly elevated March rates for any of the calculations on the grounds that the spike may have reflected a temporary period of market disruption. We also took into account that the government response had an effect on credit risk and the market's perception of it. In fact, one reason that rate spreads declined may have been positive effects of government actions on the economy. If government assistance reduces the likelihood of a deeper recession and reduces expected credit losses, then credit support becomes less costly for the government. Hence, for a hypothetical U.S. credit program with a May 2020 inception date that served high yield borrowers, we would have inferred a credit spread in the 7-8% range. That choice is consistent with government actions moderating cost, but also with the market's perception that credit risk remained elevated above recent historical levels.

4. Cost Estimates for Pandemic Credit Programs

Most of the cost estimates reported in this section use the approach described in Section 3, which involves discounting promised cash flows at estimated fair market yields, where the fair market yield depends on the risk associated with particular cash flows being considered. Additional details for individual programs and the assumptions used to make those estimates are provided in the Appendix. For programs that use tiering based on firm size, such as France PGE and Italy SME support by the Central Guarantee Fund (Fondo di Garanzia), we estimate a separate subsidy rate for each tier based on its rules and parameters. We report subsidy rates for 17 separate government credit guarantees.[26]

The estimates are sensitive to the program parameters, and in many cases, the choices were based on limited information. As one example, loan maturity can significantly affect subsidy cost estimates. In some programs, a specific loan maturity was mandated (e.g., 5 years), but in others, maturity was restricted to a range (e.g., 3 months to 7 years), and we were unable to obtain information on the actual maturities of loans that were made. For programs where actual maturities were not known, we assumed that half of the loans had the maximum allowable maturity, and half had a shorter maturity. The choice of the shorter maturity was made based on information about the average maturity of loans made by non-financial corporations for 2020Q2. The Appendix provides a detailed description of other inputs and assumptions for a subset of the programs.

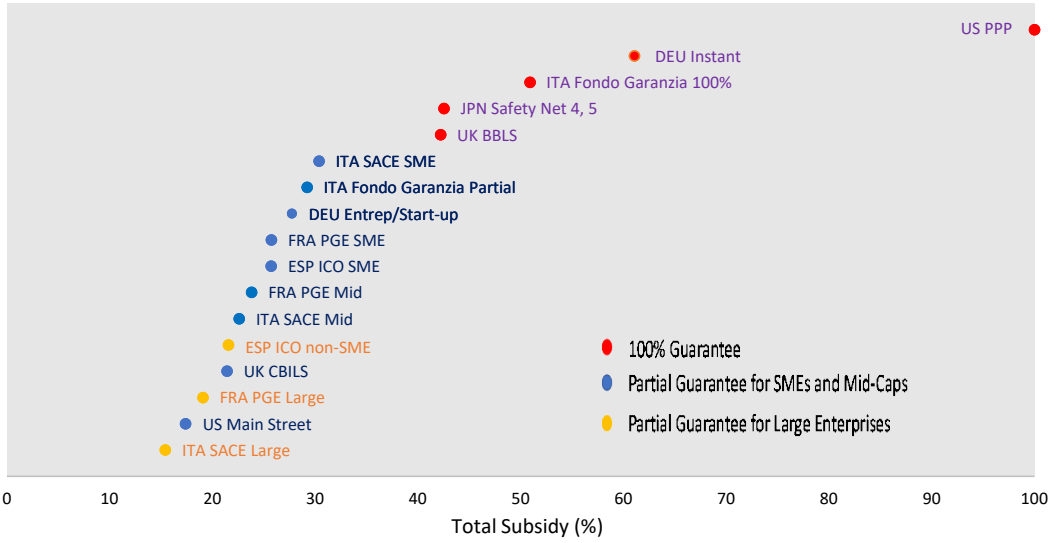
Figure 5 reports total subsidy rates, the sum of the subsidies to borrowers and to lenders. The figure is color-coded to separate fully guaranteed programs in red, partial guarantee programs for SMEs and mid-caps in blue, and partial guarantee programs for large enterprises in yellow. Several patterns emerge. First, as would be expected for subsidized guarantees, the subsidy element is highly correlated with the guarantee share. For fully guaranteed loans, the subsidy rates range from 40 percent to 100 percent of principal, with the US Paycheck Protection Program (PPP) being an outlier on the high end because the loans that didn't default were likely to be forgiven. Subsidy rates for partial guaranteed loans to SMEs and mid-caps ranged from 17 to 30 percent of principal, with the majority of programs falling between 20 and 30 percent. The average subsidy rate for large enterprise guarantees is around 19 percent.

There are many factors at play that affect the differences across programs. The "automatic" and "instant" nature of the fully guaranteed programs was made possible by giving lenders very limited responsibility for screening or verifying borrower eligibility. Those programs offered far below market rates to borrowers and provided relatively generous compensation to lenders. All of those features contributed to

[26] 17 programs include: US (2) Paycheck Protection Program, US Main Street Lending Program; Germany (2) Instant Loan, Entrepreneurial and Start-up Loans; Japan (1) Safety Net 4,5; UK (2) Bounce Back Loan Scheme, CBILS; France (3): PGE for SMEs, PGE for Mid-Cap, PGE for large enterprises; Italy (5): Fondo Garanzia full guarantee (100%), Fondo Garanzia partial guarantee, SACE SME, SACE Mid-sized, SACE large enterprises; Spain (2): ICO non-SME and SME. In the subsidy analysis in the Appendix, we also include the US support for airlines and critical industries under the CARES Act.

their higher subsidy rates. Cross-country differences between programs with the same guarantee share are attributable to variations in maturities, amortization rules, fees, and other concessions. Second, as a corollary of the first observation, guarantee schemes targeting smaller firms have higher subsidy elements, reflecting that governments introduced more generous programs towards SMEs given the nature of the economic shock caused by the pandemic.

Figure 5. Estimated total subsidy element (sum of borrower and lender) by guarantee schemes

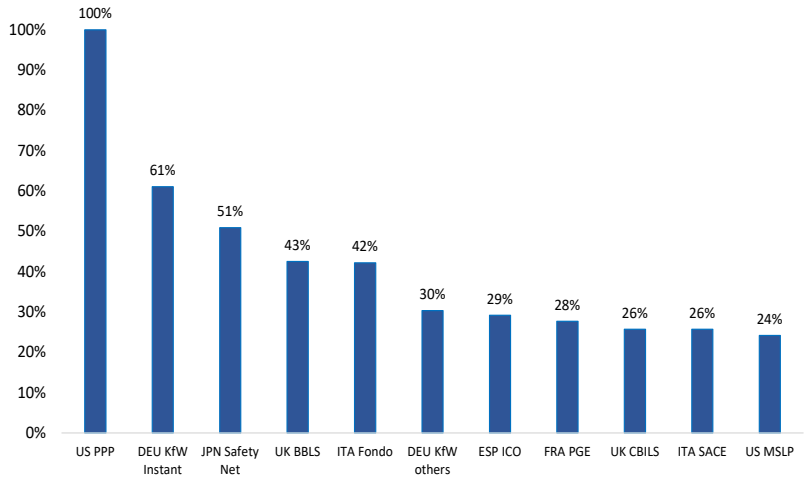


Note: The subsidy element is the average between the upper bound (with the maximum maturity stated in programs) and the lower bound (using the average maturity rate if the information is available or the maturity of new loans to NFCs in 2020Q2). Appendix provides more details on the choice of maturity to estimate the lower bound.

Subsidies accrued to borrowers and to financial institutions that participated in guarantee programs. Subsidies to financial intermediaries arose because the interest payments and net fees they received exceeded their cost of capital, plus an allowance for a normal level of administrative costs and profit (Berg et al. 2016; Gurara et al. 2020). As for borrower subsidies, the estimates of lender subsidies were sensitive to the parameters assumed. To avoid introducing noise into the relative lender subsidy estimates across similar programs, parameter assumptions were standardized unless there was information that suggested using a different value. (An explanation of those standardized assumptions is reported in the Appendix.) Using the take-up values reported by firm size, we calculate the announced-scheme specific total subsidy element as the weighted average of 17 separate guarantee schemes.[27] Figure 6 reports the results. Across countries and programs, the average subsidy rate is around 42 percent.

[27] For Italy's SACE Garanzia Italia, the breakdown by firm size is not available. In this case, we make the assumption that the majority of loans disbursed (4/6) is to large firms, given the average size of loans being greater than 14 million euros. We use 1/6 and 1/6 for SMEs and medium-sized firms, respectively.

Figure 6. Estimated total subsidy element by guarantee schemes



We also look at the relationship between various elements of loan terms and the subsidy element. Scatter plots suggest strong positive correlations between maturity and subsidy element and between the share of government guarantees and subsidy element (Figure 7). Based on 15 observations, excluding the US samples as being an outlier, we find that the average maturity of loans and the share of guarantee fees are positively correlated with subsidy elements (Table 2). An increase in maturity by one year is associated with a 3.7 percentage point increase in the subsidy elements, and an increase in guarantee shares by 10 percentage points is associated with an increase of 7.2 percentage points increase in the subsidy element.

Figure 7. Scatter plots between total subsidy and average maturity/guarantee shares



Note: The same program coverage as in Figure 5.

Table 2. Correlations between total subsidy element and loan conditions

VARIABLES	(1) Totalsubsidy	(2) Totalsubsidy	(3) Totalsubsidy	(4) Totalsubsidy	(5) Totalsubsidy	(6) Totalsubsidy
average maturity	0.0591***					0.0373***
	(0.0102)					(0.00793)
years of pre-amortization allowed		0.0413				0.00664
		(0.0282)				(0.0141)
Share of guarantee coverage			0.979***			0.721***
			(0.161)			(0.151)
Government borrowing rate				-3.308		-2.849
				(6.689)		(2.235)
Fully guaranteed borrwer rate					-7.623**	2.800
					(3.261)	(2.164)
Constant	0.0159	0.236***	-0.535***	0.311***	0.539***	-0.590***
	(0.0537)	(0.0582)	(0.139)	(0.0346)	(0.103)	(0.170)
Observations	15	15	15	15	15	15
R-squared	0.719	0.142	0.740	0.018	0.296	0.929

Note: *** p<0.01, ** p<0.05 and * p<0.1.

Interestingly, we do not find a clear relationship between the take-up of guarantee schemes and the subsidy element. Some programs with a high subsidy element, such as the KfW Instant Loans, have a relatively low take-up rate. Conversely, take-up was high for Spain's ICO SME lending, even though the subsidy element is relatively moderate. There are several possible explanations for the lack of correlation, and further analysis is needed. It could simply be that Germany announced a credit envelope that was much larger than the potential need to boost confidence in the market. Another potential reason for the weak correlation between the take-up and subsidy element could result from the availability of fiscal support for firms other than credit guarantee programs, as suggested by Anderson et al. 2021. For instance, German workers receive 60 percent of his or her pay for the hours not worked, thanks to a social insurance program called *Kurzarbeit*[28], which helped alleviate liquidity issues facing firms. Alternatively, the weak correlation could be due to the lower maximum cap for full guarantee schemes compared to partial ones. For instance, the maximum amount for the UK's Bounce Back Loan Scheme is GBP 50,000, compared to GBP 800,000 for the CBILS.

5. Estimating the Fiscal Stimulus from Credit Support

Government credit support can provide a significant source of fiscal stimulus. Those effects, which are usually omitted from official estimates of stimulus, are estimated here for the COVID-19 pandemic credit programs directed at firms of various sizes. As for other fiscal measures, evaluating the amount of stimulus created involves a measure of the incremental aggregate output attributable to a credit program

[28] https://www.imf.org/en/News/Articles/2020/06/11/na061120-kurzarbeit-germanys-short-time-work-benefit

relative to the program's cost.[29] Such calculations often employ a fiscal multiplier that converts a fiscal expenditure into an estimate of the size of its impact. The analysis here follows the procedure suggested in Lucas (2016) for credit support based on three components: incremental credit demand, a demand multiplier, and subsidy cost.

5.1 Incremental borrowing

In general, credit support can increase borrowing via two distinct channels. The first is a traditional elasticity channel--the intensive margin--whereby the demand for loans increases when the cost of borrowing falls. The second is a credit rationing channel--the extensive margin--whereby businesses or individuals that are unable to obtain credit at any interest rate without government support (for instance, because of asymmetric information about borrower quality) are able to borrow when credit assistance is made available. This channel positively effects both supply and demand.

During severe downturns and periods of elevated uncertainty about borrowers' ability to repay, as during the first year of the COVID-19 pandemic in 2020, the extensive margin can be particularly important. A well-known feature of credit markets is that when risk increases and it is difficult to evaluate the creditworthiness of individual borrowers, lenders cannot necessarily compensate for the increased risk by simply raising rates. Rather, they may pull back from lending. That's because as rates increase, higher quality borrowers tend to withdraw from the market whereas riskier borrowers accept the higher rates knowing that default is an option. That can cause credit markets to break down, with lenders unwilling to lend to borrowers that are willing to accept high rates. An important feature of this channel is that the effects of government credit support can be highly non-linear, with the potential for significant increases in borrowing and spending at a relatively low cost to the government.[30]

What fraction of borrowing under these programs was incremental to the amounts that would have been borrowed in their absence?[31] Answering that question directly is difficult, and in this paper for each program considered we develop a plausible range of answers rather than a point estimate. We first discuss the general idea behind the calculations; the parameter estimates and findings are summarized in section 5.3 below.

On the intensive margin, the calculation of incremental borrowing involves multiplying the observed amounts borrowed by the elasticity of demand with respect to the reduction in in interest rate or the estimated subsidy amount. Although the calculation is simple, there is considerable uncertainty surrounding the choice of elasticities.

On the extensive margin, an assessment of incremental borrowing must rely more heavily on judgement and the nature of individual programs. For example, one would expect that SMEs were more constrained

[29] Some analyses measure the impact of stimulus in terms of job creation or preservation. Auerbach et. al. (2021) find evidence of higher job multipliers in regions with less strict stay-at-home orders during the pandemic.
[30] Stiglitz and Weiss (1981) show that credit supply curves can be backward bending, leading to credit rationing. A simple model in Lucas (2016), which is in the spirit of Michael Rothschild and Joseph Stiglitz (1976) and related analyses, shows that participation on extensive margin can be highly nonlinear, and that it can be the more important of the two margins when both are operative.
[31] We only consider the partial equilibrium version of this question. That is, we do not consider how much incremental borrowing may have occurred because the programs ameliorated economic conditions and hence increased the demand for borrowed funds.

than larger firms and that a large fraction of SMEs participating in these programs would not have borrowed absent the program. However, some firms that would have obtained credit without assistance will choose to borrow via a government program to obtain more favorable loan terms such as lower rates or longer repayment periods. Programs offering larger subsidies would be expected to attract more incremental borrowers of all sizes. Programs with stricter eligibility requirements would likely attract fewer incremental borrowers. The specific ranges of parameters used in the intensive and extensive margin calculations are described in Section Z below.

A more macro approach to estimating incremental borrowing in each country is to compare total commercial or SME borrowing with what would have been expected absent government interventions. We may consider this in a future version.

5.2 Credit multipliers

We use multipliers to provide an estimated range for the amount of fiscal stimulus generated by credit support programs during the pandemic. Specifically, a multiplier is applied to incremental borrowing to produce an estimate of fiscal stimulus. Dividing the estimate of stimulus by the subsidy cost of the programs then produces a fiscal multiplier that is conceptually similar to traditional fiscal multipliers.

A traditional fiscal multiplier translates tax breaks or fiscal expenditures into an estimate of incremental aggregate output. For example, a multiplier of one means that a program produces a EUR 100 of incremental output for each EUR 100 of government spending. As explained earlier, we take the relevant notion of government spending for credit programs to be the present value of the subsidies provided, evaluated on a fair value basis. Because fair value estimates represent the grant-equivalent subsidy cost of credit support, it is therefore conceptually equivalent to the spending measures most often used as the basis for multiplier calculations.

As explained earlier, there is no predictable mapping between the size of credit subsidies and the amount of incremental aggregate output. Hence we apply the multiplier estimates adopted from the macroeconomics literature to the imputed incremental amounts borrowed. The logic is that if businesses use borrowed funds to buy goods and services, or to pay wages and rents, then the effect will be to increase aggregate demand in ways that are similar to traditional stimulus. If, however, the borrowed money is saved, it has no stimulus effect, We apply the multipliers to estimates of incremental rather than to total borrowing to avoid attributing to the programs spending that would have occurred in their absence.

Multipliers always have considerable uncertainty associated with them, and we consider a range of values that take into account the findings of the large body of literature on the subject.[32] Multipliers are estimated to be higher during recessions when there is slack in the economy than during expansions when government spending tends to crowd out private spending. Multipliers are also higher for programs that provide resources to individuals or institutions with a higher marginal propensity to spend. Obtaining credit often involves scrutiny about the use of the funds and other transaction costs, which tends to discourage borrowing simply to stockpile funds. However, some pandemic credit programs offered very favorable terms and reduced scrutiny, suggesting that some businesses that had no immediate spending

[32] See for example Alan Auerbach and Yuriy Gorodnichenko (2012), Charles J. Whalen and Felix Reichling. (2015), and the Congressional Budget Office (CBO 2011c,b 2014), as well as the references therein.

plans may have borrowed and set aside the funds for later use. Such behavior would be consistent with reports of a larger-than-usual fraction of cash stimulus payments being saved because spending opportunities were restricted <add citation>.

5.3 Stimulus calculations

We consider two approaches to estimating stimulus, one on a program-by-program basis, and a second at a more macroeconomic level. The second approach is not included in this draft.

5.3.1 Individual program calculations

The above discussion of the calculation of fiscal stimulus based on individual program estimates is summarized by the following equations. Incremental aggregate borrowing, ΔB, attributable to government credit assistance, is given by:

(5.1) $\Delta B = dA + S(dB/dS) - C$,

where dA is the sum across programs incremental borrowing along the extensive margin, $S(dB/dS)$ is the sum across programs of incremental borrowing along the intensive margin induced by the subsidy, S, and C is the amount by which private lending is crowded out in aggregate. The potential for crowding out is included because it can be important when the economy is operating at close to capacity, during we assume the effect was negligible during this time period.

Incremental borrowing along the intensive margin, $S(dB/dS)$, is approximated using the assumed credit demand elasticities and estimated subsidies for each credit program, and taking the sum over all the programs considered. Note that this elasticity effect applies to all program participants, whether or not they could have borrowed without assistance. Similarly, total borrowing along the extensive margin, dA, is the sum across individual programs.

A credit multiplier is then applied to total incremental borrowing in each program to yield the estimated increase in aggregate output. Let Δb_i denote total incremental loan volume in program i net of any crowding out, so that $\Delta B = \sum_i \Delta b_i$ and μ_i denotes the multiplier for that program. Then the net stimulus effect of federal credit programs, ΔY, is:

(5.2) $$\Delta Y = \left(\sum_i \Delta b_i \mu_i \right)$$

5.4 Macro calculations

The alternative macroeconomic approach to estimating an upper bound for the stimulus provided by credit support programs is based on an estimate of incremental bank borrowing in country j, ΔB_m, is:

(5.3) $$\Delta B_m = \sum_j (\beta_j - \tau_j)$$

where total bank borrowing by either the commercial or SME sector during 2020 in country j is β_j, and expected borrowing by the corresponding sector based on recent historical borrowing-to-GDP data is denote by τ_j.

5.5 Estimates

Here we illustrate the logic behind the stimulus and subsidy calculations with a fairly detailed discussion for the U.K. and U.S. credit programs included in this analysis. Preliminary estimates for the other programs are summarized in the Appendix.

5.5.1 Multipliers

For the stimulus estimates, we use a multiplier approach to translate incremental borrowing into incremental spending. The large literature on fiscal multipliers suggests that their values vary across different types of fiscal policies and across different economic conditions. Table 3 shows the range of multipliers by category of recipient and type of assistance that was considered by the U.S. Congressional Budget Office to evaluate federal fiscal stimulus during the Great Recession of 2009, based on a review of that literature.

Table 3. Ranges for U.S. Fiscal Multipliers

	Estimated Multiplier	
Type of Activity	Low estimate	High estimate
Purchaess of goods and services by the federal government	0.5	2.5
Transfer payments to state and localgovernments for infrastructure	0.4	2.2
Transfer payments to state and local governments for other purposes	0.4	1.8
Transfer payments to individuals	0.4	2.1
One-time payments to retirees	0.2	1
Two-year tax cuts for lower- and middle-income people	0.3	1.5
One-year tax cut for higher-income people	0.1	0.6
Extension of the first-time homebuyer credit	0.2	0.8
Corporate tax provisions primiarly affecting cash flow	0	0.4

Source: CBO (2011b)

These ranges and program types are used as reference points for selecting the multipliers used in the analysis of individual programs. Unlike a typical multiplier analysis that applies multiplier to fiscal spending (which in this case would be the scaled up subsidy element), the multipliers here are applied to the principal borrowed. Like transfer payments, borrowing provides cash relatively quickly. However, to the extent the borrowed funds are saved, the multipliers may be small. Because of the heightened uncertainty caused by the pandemic, the precautionary demand for cash holdings by firms likely increased. We take the relevant range to be .5 to 2, and choose point estimates based on what is known about individual programs.

Multipliers are reduced when funds are saved rather than spent. This phenomenon is supported by evidence on firm cash holdings as shown in Figure X <TBA>.

5.5.2 United Kingdom

The U.K. instituted three major credit guarantee programs, distinguished by the size range of commercial enterprises served and by the terms for borrowers and lenders. All three were under the auspices of the government-owned British Business Bank, with costs covered by HM Treasury. The Bank of England

created a facility to provide liquidity to larger firms through commercial paper purchases, also with backing from HM Treasury to cover losses.

Envelope: GBP 330 billion for all four programs.

Bounce Back Loan Scheme (BBLS)

Government administrative unit(s): BBB and HM Treasury

Program description: The BBLS provided loans from banks and other authorized lenders to businesses that had been negatively impacted by COVID-19. Participants were primarily SMEs and micro-enterprises, but the program was open to most businesses. The rate paid by borrowers was fixed at 2.5%, and no guarantee fees were charged. Loans ranged in size from GBP 2,000 to GBP 50,000, with an average of GBP 30,390. An individual firm's borrowing limit was 25% of turnover. Loans had a maturity of 6 years, with an option to extend repayment. The government covered the first 12 months of interest, and no principal repayment was required in the first year. Borrowers were able to self-attest to their eligibility, and lenders were not obligated to review borrowers' plans or decisions. No collateral was required and there was no recourse to personal assets in most instances. There were few restrictions on the use of the funds. The loans were 100% guaranteed.

Take-up: GBP 46.53 billion

More than 1.5 million loans were approved under the scheme between May 2020 at its inception and May 2021 when the program closed. Overall, lenders approved 74% of loan applications received.

Subsidy calculations for BBLS

This was the most generous of the UK credit support programs. The subsidy calculations follow the procedure described more fully in Section 3 of the paper. The borrower subsidy, reported as a present value per GBP 100 of principal, is found by discounting the scheduled borrower payments at the fair market rate. The lender subsidy is found by discounting the guaranteed payments at the government borrowing rate plus the annual loan administrative cost and subtracting the fixed administrative cost. The lender subsidy, which is the amount by which the fair value of scheduled payments exceeds the loan principal, is reported per GBP 100 of loan principal. The calculations are based on the data in Table 6.1.1.1 and the above program description.

Table 6.1.1.1 Inputs for Subsidy Calculation

base gov't rate	0.006
annual lender admin cost	0.0015
one-time lender fixed cost (% principal)	0.02
Interest rate charged to borrower	0.025
guarantee fee rate	0
fair market interest rate	0.15

term (years)	6
guarantee share	1
Value loans outstanding	£46.53

The fair market rate is based on consideration of (1) the low end of credit card rates, and (2) rates posted online by lenders to small businesses around that time. The possibility for adverse selection into a program that is widely available, that offers credit with very little screening and no collateral or personal guarantees, all at a time of great uncertainty about the future viability of the businesses, suggests a high choice for a fair rate. Many or most participants would probably have been unable to obtain credit at any rate, but the concept of a fair rate is still applicable for the purpose of subsidy calculations, as discussed in Section y.z. The annual loan administrative cost and one-time fixed costs is set to 5 basis points less than the values assumed across all programs primarily serving SMEs because of the more limited lender responsibilities.

The results, summarized in Table 6.1.1.2, show a subsidy to borrowers of 37.26% of principal, and a subsidy to lenders of 4.9% of principal.

Table 6.1.1.2 BBLS Subsidy Calculations

annual pmt per 100 after first year	£21.52
fair value pmts from borrowers per 100	£62.74
fair value of pmts to lenders per 100	£104.94
borrower subsidy per 100	£37.26
lender subsidy per 100	£4.94
total subsidy per 100	42.20
total subsidy	£19,635,151,531

6.1.2 Stimulus calculations

The equation, *S(dB/dS)*, is used to estimate incremental borrowing on the intensive margin, where S is the subsidy and dB/dS is the sensitivity of loan demand to the subsidy. The inputs are a borrower subsidy rate of 37.26%, the take-up of GBP 46.53, and a range of demand elasticities from .75 to .85, bracketing the value of .8 used in Lucas (2016) for businesses. The result is an estimate of incremental borrowing on the intensive margin of GBP 6.1 to GBP 6.9 billion.

The range chosen for incremental borrowing on the extensive margin is based on several observations. Because of the substantial subsidies associated with these loans including a substantially below-market interest rate, long maturities, and minimal screening for credit quality and need, many participants that either could not or would not have borrowed in the absence of the program probably participated. Hence we conclude that the extensive margin effect is high compared to many of the other, less generous,

pandemic credit programs; we take the range to be 70 to 95 percent of take-up that is not attributed to the intensive margin.

The sum of incremental borrowing on the two margins yields a range for total incremental borrowing of GBP 35.9 to 45.8 billion, which translates to a range of incremental borrowing as a fraction of take-up of 77 to 98 percent.

Generally multipliers on assistance to businesses are lower than those for households. The relatively high subsidy rate and unusually easy access to credit provided an incentive for many firms to apply for the funds as a precaution against future needs or to refinance existing loans, rather than to increase immediate spending. Such uses lower the multiplier effect. The chosen range of between .5 and .9 reflects that likely propensity of borrowers to save some or all of the borrowed funds.

The subsidy to financial institutions is also expected to have a modest stimulus effect. Since financial institutions were for the most part adequately capitalized and had ready access to funds, the additional income may have had a small effect on their other lending behavior. We apply a multiplier of .3 to the lender subsidy to recognize its likely modest stimulus effect.

The above calculations are used to compute a range for the stimulus provided by the program, i.e., incremental aggregate output, and also a fiscal multiplier that compares the stimulus to the cost of providing it. Note that the total subsidy and fiscal multiplier estimates are based on the sum of borrower and lender subsidies.

Table 6.1.1.3 Stimulus and fiscal multiplier range calculations

Take-up	GBP 46.53 billion
Subsidy	GBP 19.62 billion total; 17.34 to borrower, to 2.30 lender
Incremental borrowing range:	GBP 34 to 45 billion
Multiplier range borrowers:	.5 to .9
Multiplier lenders:	.3
Stimulus range:	GBP 18.6 to 41.9 billion
Fiscal multiplier range:	0.9 to 2.1

The resulting fiscal multiplier range suggests that the program was comparable in cost effectiveness as stimulus as providing direct payments to individuals.

6.2 Commercial Business Interruption Loan Scheme (CBILS)

Government administrative unit(s): BBB and HM Treasury

Program description: The CBILS subsidizes lending by banks and other authorized lenders to SMEs that had been negatively impacted by COVID-19. Eligibility was restricted to businesses with a maximum annual turnover of GBP 45 million. The program is best understood as offering assistance on much larger

loans than the BBLS, but at less favorable terms and with more lender oversight and control.[33] Loans ranged in size from GBP 50,000 to GBP 5 million, and averaged GBP 237,000. The loans were 80 percent guaranteed. Borrowers had to present a viable plan to the lender, and some regulatory requirements that had been waived for the BBLS program were in force. Lenders determined the rates and fees charged to borrowers, subject to the restriction that the net value of the guarantee had to be entirely passed through to the borrower. Lenders were charged a guarantee rate that was a function of loan maturity; no guarantee fees were directly charged to borrowers. Loans types included overdrafts and invoice finance facilities and asset finance facilities as well as term loans. Allowable maturities ranged from 3 months to 6 years. The government covered the first 12 months of interest and fees. Other features included a limit on refinancing of 20% of the proceeds, and some limited personal guarantees on larger loans.

Take-up: GBP 23.28 billion

Lenders were reported to have approved 42% of loan applications (much lower than the 74% approval rate for the BBLS). Approximately 98,000 loans were approved under the scheme.

6.2.1 Subsidy calculations

The subsidy calculations follow the procedure described more fully in Section x.y of the paper. The borrower subsidy, reported as a present value per GBP 100 of principal, is found by discounting the scheduled borrower payments at the fair market rate. The lender subsidy has several components. It is found by discounting the guaranteed share of scheduled payments at the banks cost of fund on safe lending and discounting the unguaranteed share of scheduled payments at the fair market rate.[34] The sum of those two components, minus a fixed administrative cost and minus the present value of the annual guarantee fees paid, yields the lender subsidy. The lender subsidy is also reported per GBP 100 of loan principal. The calculations are based on the data in Table 6.2.1.1 and the above program description.

Table 6.2.1.1 Inputs for Subsidy Calculation

gov't borrowing rate	0.004
annual lender admin cost	0.0015
one-time lender fixed cost (% principal)	0.025
Interest rate charged to borrower	0.0464
Borrower guarantee fee rate	0
Lender guarantee fee rate	0.01
fair market interest rate	0.1
term (years)	5
guarantee share	.8

[33] A business was not able to take out a BBLS facility if they had been approved for a CBILS facility, and vice versa, but they could pay off a CBILS loan with a BBLS loan. A CBILS loan also precluded participating in the CCFF.
[34] The bank lending cost is taken to be the sum of the government borrowing rate and an annual loan servicing cost,

Principal loan take-up	£23.28

The fair market rate is taken to be substantially lower than for the BBLS because of the loans are screened by lenders, which reduces adverse selection. Nevertheless, the spread over the government rate is higher than the rates offered to business prior to the pandemic because of the possibility of high default rates if the effects of the pandemic were long-lasting[35]. The base government borrowing rate is slightly lower than for the BBLS because the average maturity of loans is shorter. The annual loan administrative cost and one-time fixed administration cost is set to the values assumed across all programs primarily serving SMEs. The guarantee fee is set to be consistent with a maturity distribution around 4 years.[36]

The results, summarized in Table 6.2.1.2, show a subsidy to borrowers of 17.5% of principal, and a subsidy to lenders of 2.9% of principal.

Table 6.2.1.2 BBLS Subsidy Calculations

annual pmt per 100 after first year	£22.87
fair value pmts from borrowers per 100	£82.47
fair value of pmts to lenders per 100	£102.92
borrower subsidy per 100	£17.53
lender subsidy per 100	£2.92
total subsidy per 100	£20.45
total subsidy	£4,760,599,433

In comparison to the BBLS program, the substantially lower borrower subsidy can be attributed to the lower guarantee percentage, the guarantee fees, and greater borrower screening as reflected in a lower fair value rate. The more modest lender subsidy is consistent with the rules prohibiting lenders from directly profiting from the program and oversight by the BBB to ensure that lenders complied.

6.2.2 Stimulus calculations

The same equation as for the BBLS is used to estimate incremental borrowing on the intensive margin. The inputs are a borrower subsidy rate of 17.53%, the take-up of GBP 23.28, and a range of demand

[35] For example, a 5-year bond with a coupon rate of 10%, a default rate of 8%, a recovery rate of 25%, and an expected return of 3.5% (inclusive of administrative costs), would be priced at par, making the 10% coupon a fair market rate.

[36] We have not found data on the distribution of loan types or maturities, but assume loans at the longer end of the allowable range were more desirable. The guarantee fee schedule is 25bps for facilities of 12 months or less, 50bps for facilities lasting from 12 months up to 3 years and 100bps for facilities lasting 3-8 years.

elasticities from .75 to .85, bracketing the value of .8 used in Lucas (2016) for businesses. The result is an estimate of incremental borrowing on the intensive margin of GBP 3.1 to GBP 3.5 billion.

The range chosen for incremental borrowing on the extensive margin is based on several observations. Because of the subsidies associated with these loans including significantly below-market interest rates and long maturities (relative to a typical bank loan), some participants that either could not or would not have borrowed in the absence of the program probably were induced to participate. However, the program was structured so as to encourage participating lenders that might have made loans to its existing borrowers in any case to instead originate the loans under CBILS. Hence, we conclude that the extensive margin effect is modest in comparison to other pandemic credit programs for SMEs; we take the range to be 40 to 80 percent of take-up that is not attributed to the intensive margin.

The sum of incremental borrowing on the two margins yields a range for total incremental borrowing of GBP 11.1 to 19.5 billion, which translates to a range of incremental borrowing as a fraction of take-up of 48 to 84 percent.

Generally multipliers on assistance to businesses are lower than those for households. However, several factors suggest a higher propensity to spend and hence a higher multiplier range than was assumed for the BBLS. Factors suggesting a relatively higher multiplier include: participants were required to document and justify the uses of the funds; refinancing was limited to 20%; and although the loans were subsidized, there were non-negligible costs that would discourage as much precautionary borrowing. The chosen range of between .8 and 1.2 spans the high-middle portion of the historical multiplier estimates in Table zz.

Since financial institutions were for the most part adequately capitalized and had ready access to funds, the additional income provided by the lender subsidy may have had a small effect on their spending or other lending behavior. As for comparable programs, we apply a multiplier of .3 to the lender subsidy to recognize its stimulus effect.

The above calculations are used to compute a range for the stimulus provided by the program, i.e., incremental aggregate output, and also a fiscal multiplier that compares the stimulus to the cost of providing it. Note that the total subsidy and fiscal multiplier estimates are based on the sum of borrower and lender subsidies.

Table 6.2.1.3 Stimulus and fiscal multiplier range calculations

Take-up	GBP 23.28 billion
Subsidy	GBP 4.76 billion total; 4.08 borrower, to 0.68 lender
Incremental borrowing range:	GBP 11.1 to 19.5 billion
Multiplier range borrowers:	.8 to 1.2
Multiplier lenders:	.3
Stimulus range:	GBP 9.1 to 23.6 billion
Fiscal multiplier range:	1.9 to 5.0

The fiscal multiplier range is higher than for the BBLS because of the lower subsidy rate, and because of the higher multipliers applied to the amounts borrowed. The CBILS is a good example of how a disciplined credit program can provide a stimulus at a lower unit cost than for grants or other direct spending. However, as for other broadly targeted credit guarantee programs, it may not reach the recipients most in need of assistance. By design it favored businesses with established banking relationships, some fraction of which might have obtained loans without government support.

6.3 Commercial Large Business Interruption Loan (CLBILS)

Government administrative unit(s): BBB and HM Treasury

The CLBILS offered credit assistance to larger enterprises that had been negatively impacted by COVID-19. In most respects it was similar in structure and intent to CBILS, but it covered much larger loans and placed several additional restriction on borrowers. Loan size was capped at GBP 200 million and for each firm limited by turnover or the annual wage bill. Loan maturity was capped at 3 years, and firms were restricted from making dividend payments while the loans were outstanding. As with CBILS, the loans had an 80% guarantee and lenders paid a guarantee fee. The government paid the first year interest and fees up to a cap of GBP 800,000. Lenders were responsible for due diligence and had flexibility in setting rates and fees, with the restriction that the net value of the guarantee be passed through to borrowers.

Lenders made 716 CLBILS loans in total. Total take-up was GDP 5.3 billion, and average loan size was GBP 7.4 million. The approval rate was higher than for CBILS, at 63%. For comparison, there are 46,000 businesses in the UK classified as medium, and 8,000 businesses in the UK classified as large (by number of employees), with total turnover of GDP 2,789 billion.[37]

The low usage of this facility suggests that most larger enterprises that wanted to borrow were able to obtain more favorable terms outside of the program or preferred to participate in one of the other government-backed credit schemes (a firm could only use one program). Businesses that did use the CLBILS presumably benefited from more favorable loan terms or increased access to funding.

Because of its structural similarity to the CBILS and absent additional information to refine the assumptions, we take the subsidy rate and multipliers to be the same as for the CBILS program in calculating total UK subsidies and stimulus. The calculations are summarized in Table 6.3.1

Table 6.3.1 Stimulus and fiscal multiplier range calculations

Take-up	GBP 5.3 billion
Subsidy	GBP 1.08 billion total; 0.93 borrower, to 0.15 lender
Incremental borrowing range:	GBP 2.5 to 4.4 billion
Multiplier range borrowers:	.8 to 1.2
Multiplier lenders:	.3
Stimulus range:	GBP 2.1 to 5.4 billion

[37] https://researchbriefings.files.parliament.uk/documents/SN06152/SN06152.pdf

Fiscal multiplier range: 1.9 to 5.0

6.4 Covid Corporate Financing Facility (CCFF)

Government administrative unit(s): Bank of England and HM Treasury

Program description: The CCFF was designed to support liquidity among larger investment-grade non-financial firms affected by disruption to their cash flows from Covid through the direct purchase of commercial paper (CP). The facility was open for new purchases from May 2020 to May 2021. The CP issued had a maturity date of March 2022, but could be prepaid.

Unlike most central bank liquidity facilities where credit risk is largely mitigated by collateral or very short maturities, the CCFF exposed the government to potentially significant losses. The rates charged to issuers were linked to their credit quality, and rates ranged from OIS plus 20 to 60 basis points.[38]

CCFF take-up was £37 billion. 107 different companies issued CP to the BoE, with peak issuance of over £20 billion in May 2020. The facility also provided back-up liquidity to other firms. Over £85 billion of borrowing limits to over 230 companies were approved.

The precise subsidy value is difficult to ascertain. Around the time of peak issuance in the program, market commercial paper spreads had risen sharply, by more than 100 basis points for the lower end of investment-grade CP ratings. To the extent that the rate spike was caused by panic or market disruption rather than a rational reassessment of expected loss rates, the market rates would have exceeded fair value rates. While it is impossible to know by how much, we calculate a conservative subsidy range for the program based on underpricing on the CP purchased between 15 and 30 basis points, and on the approved but unused lines of 10 to 20 basis points. Assuming an average maturity of 1.5 years, **the implied subsidy cost is between GBP 0.155 and 0.311 billion.**

No stimulus or fiscal multiplier is estimated for the program in this draft. The facility was designed to avoid disruption to existing funding rather than to provide a source of incremental funding. To the extent it may have avoided some firms cutting back on spending due to lack of funds, it could be considered a source of stimulus. However, as for other policies that improved macroeconomic stability, this analysis does not attempt to estimate the amount or value of those indirect benefits.

7. United States

The U.S. government enacted several new credit support programs as part of its fiscal response to the pandemic. The largest and most popular was the highly subsidized Paycheck Protection Program (PPP) which was directed at small enterprises. The CARES Act, the first major fiscal package that provided pandemic relief, also included a direct loan program for airlines and critical industries operated by Treasury, and several direct loan programs for businesses that were operated by the Federal Reserve.

[38] OIS is an overnight collateralized rate.

In addition to the credit programs that served commercial enterprises and that are covered in this analysis, significant credit assistance was provided to U.S. households in the form of forbearance on an envelope of $1.6 trillion of federally-backed student loans and over $5 trillion of federally-backed residential mortgages.

7.1 Paycheck Protection Program (PPP)

Government administrative unit(s): U.S. Small Business Administration (SBA)

Program description: Small enterprises with less than 500 employees could apply to the program free of charge. The loans, which carried a 1% interest rate and no other fees, were forgivable if certain conditions were met. Those included retaining or rehiring employees for a period of several months. The maximum loan size was based on a multiple of average monthly payroll in 2019 and other conditions and capped at USD 10 million. Loans made in 2020 averaged USD 101,000, and those made in 2021 averaged USD 42,000. Loan maturities were initially set at 2 years, and later increased to 5 years. Principal and interest payments were deferred until at least the first forgiveness eligibility date.

Loans were made by banks and other authorized financial institutions.[39] A lender's primary administrative responsibility was to receive (but not to verify) borrower certifications and representations. The loans had a 100% full faith and credit guarantee. Lenders receives fees for processing PPP loans of: 5 percent for loans of not more than $350,000; 3 percent for loans of more than $350,000 and less than $2,000,000; and 1 percent for loans of at least $2,000,000. The fees were paid upon final disbursement. The Federal Reserve created a secondary market facility to buy the loans from banks, creating a ready source of funding for banks that needed it.

The program envelope was USD 799. It had an initial envelope of USD 349 billion, which was expanded twice by subsequent legislation that also relaxed forgiveness requirements and permitted additional draws by borrowers if certain conditions were met.

Take-up was USD 799. Distributions were on a first-come first-serve basis. The program was heavily oversubscribed, and very close to 100% of available funds were distributed.

7.1.1 Subsidy calculations

We attribute a 100 percent subsidy rate to the loans, and hence a subsidy to borrowers of USD 799 billion. The program was essentially a grant program because most borrowers could be expected to satisfy the modest requirements for forgiveness, and those that couldn't would likely be insolvent and unable to repay the loans. The government might recover some monies, but those amounts were unlikely to cover the administrative costs associated with the program, including the high cost of pursuing delinquent or fraudulent borrowers.

The fees paid to financial institutions that administered the program also had a significant subsidy element. At disbursement, the program paid lenders 5% of the principal for loans under USD 350,000, 3% for loans between USD 350,000 and USD 2 million and 1% for loans over USD 2 million. Based on the minimal screening requirements, the absence of servicing obligations, the 100% credit guarantee, and

[39] Lender information is from https://home.treasury.gov/system/files/136/PPP%20Lender%20Information%20Fact%20Sheet.pdf

federal funding support, we estimate that actual costs to lenders were considerably less than what they were paid. Assuming actual fixed costs of 2% for loans up to USD 350,000, 0.75% for loans between USD 350,000 and USD 2 million, and 0.25% for loans over USD 2 million, and based on the distribution of realized loan sizes, the subsidies to financial institutions totaled USD 19.5 billion.[40]

7.1.2 Stimulus calculations

Because of the widespread understanding that this was essentially free money, and because it involved minimal screening for credit quality and relied on self-attestation of need, arguably it primarily attracted participants that could not have borrowed in the absence of the program, or that would have chosen not to borrow. Hence we conclude that the amount of borrowing that is incremental to what would have been otherwise borrowed is higher than for most of the other programs. Nevertheless, some participants would have borrowed more from other sources had these funds not been available, and hence incremental borrowing is less than the total amount borrowed. Because these are essentially cash grants, we do not distinguish between an extensive and intensive margin effect. We set the incremental borrowing range at 80 to 95 percent of principal, or equivalently USD 639 to 759.

Small business owners in the U.S. are relatively wealthy individuals with a lower marginal propensity to consume than the overall population. It was reported that much of the PPP money went to businesses with an established banking relationship, which favored well-off and non-minority applicants. The high subsidy rate provided a strong incentive for all eligible businesses to apply for the funds, whether or not the recipients intended to save the money or spend it. Because borrowers were relatively affluent and had an incentive to borrow regardless of whether they were short of cash, for the low end of the multiplier range we chose the mid-point of the CBO estimate for "one-year tax cuts for higher income people." However, forgiveness required borrowers to retain employees for several months, and some of those employees would have suffered a reduction in income had they been fired. Employees and (and some sole proprietors) have a high marginal propensity to consume out of income. Assuming that half of the money went to people in that situation, the upper end of the multiplier range is taken to be .8, based on averaging the mid-point of the CBO estimate for "transfer payments to individuals" of 1.25 with the .35 attributed to wealthy proprietors.

The above calculations can then be used to compute a range for the stimulus provided by the program, i.e., incremental aggregate output, and also a fiscal multiplier that compares the stimulus to the cost of providing it. Note that the total subsidy and fiscal multiplier estimates are based on the sum of borrower and lender subsidies.

Table 7.1.1.1 Stimulus and fiscal multiplier range calculations

Take-up	USD 799 billion
Subsidy	USD 818.5 billion (799 borrowers, 19.5 lenders)
Incremental borrowing range:	USD 639 billion to 759 billion

[40] For comparability, lender administrative costs, which vary with loan size, are assumed to be the same across all of the programs considered in this paper. Because of the minimal requirements for lenders in this program, the actual costs may have been somewhat lower and hence the subsidies higher.

Multiplier range borrowers: .35 to .8

Multiplier lenders: .3

Stimulus range: USD 230 to 613 billion

Fiscal multiplier range: 0.28 to 0.75

The fiscal multiplier range is considerably lower than for other credit programs because of the unusually high subsidy rate, and because the target population is relatively wealthy and therefore has a low marginal propensity to spend. Notice that the resulting multipliers are in line with the estimated multiplier ranges in the literature for traditional fiscal measures aimed at businesses, which is what one would expect for this program.

7.2 Main Street Lending Program (MSLP)

Government administrative unit(s): Federal Reserve Bank of Boston (FRBB), and U.S. Treasury

Program description: This program was divided into five facilities, each with a similar structure. On behalf of the FRBB, a special purpose vehicle (SPV) purchased 95% participations in loans to small and medium-sized for profit businesses and nonprofit organizations. Lenders, mostly banks, retained a 5 percent interest in the loans. Eligibility was based revenues of less than $5 billion and fewer than 15,000 employees, non-participation in other credit relief programs, short-term viability, best efforts retention of employees, and other conditions. Loan size was limited by leverage and an absolute cap of USD 50 million. Some uses of funds were prohibited. The loans had a 5-year maturity, deferral of principal payments for two years[41], and deferral of interest payments for one year. Interest was set to 1 or 3-month LIBOR plus 3 percent. Loans were prepayable without penalty. Some facilities allowed an increase the size of existing loans made to borrowers. Lenders were charged an upfront fee of 75 to 200 basis points that could be passed through to borrowers. The FRBB paid lenders 25 to 50 basis points annually for servicing the loans.

Over half of the loans were originated in December 2020. Combined loan volume totaled USD 17.5 billion over 1,830 loans, implying an average loan size of USD 9,562,842. Most of that activity, USD 12.9 billion, was concentrated in priority loans that allowed refinancing of debt owed to another lender and leverage as high as 6. New loans that allowed borrower leverage only as high as 4 accounted for $2.7 billion. The remaining $1.8 billion were in 26 expanded loans. Few loans were made to non-profits.[42]

The program terminated on January 8, 2021.

Envelope: USD 600 billion for all five facilities. U.S. Treasury absorbs losses up to USD 75 billion.

[41] Specifically, principal amortization was 15% at the end of the third year, 15% at the end of the fourth year, and there was a balloon payment of 70% at maturity at the end of the fifth year.

[42] See Bräuning, Falk, and Teodora Paligorova (2021). "Uptake of the Main Street Lending Program," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, April 16, 2021, https://doi.org/10.17016/2380-7172.2897.

Take-up: $17.5 billion[43]

7.2.1 Subsidy calculations

Unlike guarantee programs that shift losses from lenders to the government, lenders in this program received no special protection on their 5% retained stake in the loans. The loans were *pari passu*, which means that any losses were divided proportionally to ownership stake. Superficially, that would suggest that lenders would be unwilling to make these loans at a below market rate. However, because the loans typically provided cash to lenders' existing customers in an amount that was 20 times greater than its participation stake, and because some or all of those funds presumably would help a borrower to meet its existing obligations and possibly avoid default, lenders could reap large benefits even if it entailed some lending at a below-market interest rate.

The subsidy calculations follow the procedure described more fully in Section x.y of the paper. The borrower subsidy, reported as a present value per USD 100 of principal, is found by discounting the scheduled borrower payments at the fair market rate. The total subsidy is adjusted for the net amount paid by lenders to the government. We assume a fair market rate for the loans was 8%, consistent with the assumed rate on other programs geared to mid-sized businesses that required lenders to screen borrowers but fairly loose eligibility requirements. The calculations are based on the data in Table 7.2.1 and the above program description.

Table 7.2.1 Inputs for Subsidy Calculation

gov't borrowing rate	0.004
upfront lender admin charge	0.01
Rate charged to borrower	0.0345
Borrower guarantee fee rate	0
Lender guarantee fee rate	0.01
fair market interest rate	0.08
term (years)	5
Principal loan take-up	USD 17.5 billion

We report the total subsidy, but because it is hard to estimate the indirect benefits that accrued to lenders from helping their existing customers, we do not attempt to impute how it is divided between borrowers and lenders.

Total subsidy: USD 3.04 billion

7.2.2 Stimulus calculations

[43] Need to check if this number from Fed paper is 100% of principal or 95% of principal. Calculation assumes it is 100% of principal.

Because a large fraction of the funds appear to have been used to refinance existing debt, the stimulus contributed by the program is judged to be small. That is, it may have avoided eventual default but it was unlikely to have generated much incremental spending in the short term. We will include an estimate of the stimulus effect range in the next draft.

7.3. Credit Support for Airlines and Critical Industries

Government administrative unit(s): U.S. Treasury

Program description: The CARES Act provides up to $25 billion for loans and loan guarantees to passenger air carriers, repair station operators certified under 14 CFR part 145, and ticket agents; up to $4 billion for loans and loan guarantees to cargo air carriers; and up to $17 billion for loans and loan guarantees to businesses critical to maintaining national security.

Borrowers had to agree to maintain employment levels as of March 24, 2020 to the extent practicable, and in any case not reduce their employment levels by more than 10 percent from the levels on such date, until September 30, 2020. There were also certain restrictions on employee compensation and capital distributions (repurchases and dividends) for a period of time.

In compensation for the credit support, Treasury would receive a warrant or equity instrument in the borrower, or a senior debt instrument. Warrants were mostly used for public companies; private companies provided bonds with PIK interest rate payments.

Summary information is publicly available on borrower identities, loan amounts, and contractual terms.[44] The precise terms were varied to some extent across deals. For example, Treasury agreed to lend American Airlines up to USD 7.5 billion at LIBOR + 3.5% for 5 years. American initially drew USD 550 million and took no subsequent draws. Treasury would receive warrants equal to 10% of the total loan amounts drawn. Agreements we looked at for other commercial airlines had similar terms. The rate spread for the defense industries was higher at LIBOR + 5.5%, and in place of warrants was a PIK bond that appears to have added a 3% payment to Treasury at loan maturity (need to verify PIK structures). We assume the loans amortized over 5 years but did not find information to verify this.

Envelope: USD 46 billion

Take-up: Approvals totaled $21.89 billion; disbursements totaled $2.678 billion.

Most of the program participants borrowed the entire approved loan amount. The large excess of approvals over disbursements is because many of the largest and mid-size commercial airlines borrowed only a small fraction of the amounts approved.

The subsidy calculations follow the procedure described more fully in Section x.y of the paper. The borrower subsidy, reported as a present value per USD 100 of principal, is found by discounting the scheduled borrower payments at the fair market rate. These are direct loans so there are no lender payments or subsidies. (Note: if recalculate include some admin costs for Treasury.) We assume a fair market rate for the loans was 7.5%, 50 bps higher than the assumed rate on other programs geared to

[44] https://home.treasury.gov/policy-issues/coronavirus/assistance-for-industry/loans-to-air-carriers-eligible-businesses-and-national-security-businesses

large corporations because of the high potential for financial distress in the airline industry. The calculations are based on the data in Table 7.3.1 and the above program description.

Table 7.2.1 Inputs for Subsidy Calculation

gov't borrowing rate	0.004
PV warrant value	0.03
PV subsidy undrawn funds	0.005
Rate charged drawn fund	0.0345
fair market interest rate	0.075
term (years)	5
Principal loan take-up	USD 17.5 billion

Total subsidy: USD 0.68 billion (0.10 billion on undrawn; 0.18 billion on drawn)

7.2.2 Stimulus calculations

These funds were intended to allow these firms to continue functioning and to avoid laying off workers. Stimulus estimates will be included in a future draft.

5.5.2 Estimates for U.K. programs

5.5.3 Estimates for U.S. programs

6. Discussion and Conclusions

<TBA>

Appendix

This Appendix explains the assumptions for the program level estimates of subsidy element and stimulus. In this preliminary draft these summaries are only available for selected programs; a complete set of descriptions will be included in a subsequent version of the paper.

1. France

France introduced a EUR300 billion state guarantee scheme (Le prêt garanti par l'État, or PGE) for firms of all sizes. The guarantees were provided by the Ministry of the Economy and Finance, and the program was operated by the French development bank, Bpifrance.

Envelope: €300 billion

1.1 Le prêt garanti par l'État (PGE)[45]

Government administrative unit(s): Treasury, BpiFrance Financement SA

Program description: PGE was made available for businesses of all sizes and sectors whose revenues were negatively affected by COVID-19. As of January 8, 2022, nearly 700,000 enterprises participated in the program. While it was initially envisioned that the program would last until the end of June 2021, the deadline for applications has been extended several times and is now open until June 2022. Guarantee terms differ depending on firm size, with (i) 90 percent coverage for micro-enterprises and employing less than 5,000 employees in France with a turnover under €1.5 billion; (ii) 80 percent coverage for firms with a turnover between €1.5 billion to €5 billion; and (iii) 70 percent coverage for firms with a turnover over €5 billion. Total disbursement (as of January 2022) is about €143 billion, with an average loan size of €204,500. For SMEs, interest rates were capped at 1 to 1.5 percent for 2022 and 2023, 2 to 2.5 percent for 2024 to 2026. Principal payments for the first could be waived, with the maximum loan maturity of 6 years. For SMEs, lenders are responsible for ensuring the borrower's quality and eligibility, but the program requires that the lender's assessment be light and conducted within 5 days. The maximum amount of guaranteed loans follows the Temporary Framework, which is 25% of annual turnover, with some exceptions for young firms and firms with seasonal sectors.

Take-up: €143. 036 billion (as of February 10, 2022)[46]

1.1.1. Subsidy calculations

Given that loan terms differ depending on firm size, we separate the calculations for SMEs, mid-caps and large enterprises. Table 1.1.1.1. presents the inputs for subsidy calculations. To calculate the fully guaranteed borrower rate, we take a simple average of 3 percent, the rate charged for Germany's full-

[45] Official website: https://www.economie.gouv.fr/covid19-soutien-entreprises/pret-garanti-par-letat#
[46] Source: https://www.economie.gouv.fr/covid19-soutien-entreprises/aides-versees-pge

guarantee program, and 2 percent, the rate charged for Italy's full-guarantee program. Guarantee fees follow the EU Temporary Framework, which differs based on firm size and the maturity of loans.

For subsidy element calculations, we assume the maturity of the loan to be 3 years, half of the maximum loan allowed (6 years). This is based on the average duration of new cash loans to non-financial corporations as reported by the Banque de France. The annual loan administration cost is assumed to be 15 basis points, consistent with other programs. Lender's one-time fixed costs are assumed to vary with loan size, with smaller loans having a higher fixed cost (2 percent) and larger loans having a lower value (0.25 percent for loans over €2 million). The results, summarized in Table 1.1.1.2., show a subsidy to borrowers ranging from 12.2 percent (for large enterprises) to 17.8 percent (for SMEs) and a subsidy to lenders at around 3-5 percent.

Table 1.1.1.1. Inputs for Subsidy Calculation

Inputs	**SMEs**	**Mid-Caps**	**Large Enterprises**
Gov't borrowing rate	-0.006	-0.006	-0.006
Interest rate charged to borrower	0.033	0.047	0.053
Annual loan admin cost	0.0015	0.0015	0.0015
One-time fixed cost (% principal)	0.0250	0.0075	0.0025
Fully guaranteed borrower rate	0.025	0.033	0.039
Borrower guarantee fee	0.000	0.000	0.000
Lender guarantee fee (4-6 year loans)	0.005	0.010	0.020
Fair market interest rate	0.103	0.101	0.087
Maturity (years)	3	3	3
Guarantee share	0.9	1	0.7
Principal loans take-up (billions)	105.8	15.7	17.0

Table 1.1.1.2 Subsidy Calculations

Outputs	**SMEs**	**Mid-Caps**	**Large Enterprises**
Annual pmt per 100 after yr 1	52.5	53.5	54.0
Fair value pmts for borrwers per 100	82.2	84.3	87.8
Fair value pmts for lenders per 100	103.5	105.6	104.9
Direct subsidy to borrower per 100	17.8	15.7	12.2
Lender subsidy per 100	3.5	5.6	4.9
Subsidy element (total subsidy per 100)	21.3	21.3	17.0
Total subsidy (euro)	€ 22,495,152,456	€ 3,358,451,768	€ 2,925,803,975

1.1.3 Stimulus calculations

Using the range of borrower multiplier between 0.5 to 0.9 and lender multiplier of 0.3, fiscal multiplier ranges from 1.2 to 3.6 for SMEs and mid-caps, while slightly larger for large enterprises ranging from1.4 to 4.4.

Table 1.1.2.1. Stimulus and fiscal multiplier range calculations

Inputs	**SMEs**	**Mid-Caps**	**Large Enterprises**
Take-up	104.8	15.6	17.0
Subsidy Borrower	17.8	15.7	12.2
Subsidy Lender	3.5	5.6	4.9
Incremental borrowing range	50-87.7	7.3-13.0	7.7-14.0
Borrower multiplier (range)	0.5-0.9	0.5-0.9	0.5-0.9
Lenders multiplier	0.3	0.3	0.3
Stimulus range (billion euro)	49.9-87.7	7.3-13.0	7.7-14.0
Fiscal multiplier range	1.2-3.6	1.2-3.6	1.4-4.4

2. Germany

Germany introduced various federal and regional loan guarantee programs to support businesses affected by the pandemic. In this paper, we focus on programs introduced by the KfW (Kreditanstalt für Wiederaufbau). The 'KfW coronavirus aid' comprises of four different loan guarantee schemes, targeting firms with different needs: (i) KfW Instant loans (100 percent guarantee); (ii) KfW Entrepreneurial loans; (iii) ERP start-up loans; and (iv) direct participation for syndicate financing.[47] As direct participation generates fundamentally different subsidy calculations compared to guarantee providers, we focus on the first three programs. We combine (ii) and (iii) in our analysis, given that these programs have the same loan conditionalities. For the three programs of interest, about €40 billion has been committed, with 98 percent of applications and commitments from SMEs. Median loan amount is below €100,000.

1.1. KfW Instant Loan

Government administrative unit(s): KfW

Initial envelope: unlimited (the treasury guarantee fund to KfW was increased by €150 billion).

[47] Official Source: https://www.kfw.de/inlandsfoerderung/Companies/KfW-Corona-Hilfe/

Program description. The instant loan was available to all active companies in Germany. The initial maximum loan was up to 3 monthly turnovers, with a maximum of €300,000 for firms with less than 10 employees, €500,000 for employees between 10 and 50, and €800,000 for the rest. From April 2021, the maximum loan amount was increased to €1.8 million for companies with more than 50 employees, with a maximum of €1.125 million for firms with 10 to 50 employees and € 675,000 for companies with staffs of up to 10 people. It is a term loan with the government's mandated borrowing rate at 3 percent with a 10-year maturity. KfW provides a 100 percent guarantee for the loans, which is backed up by a guarantee from the German Federal Government.

Take-up: €8.1 billion euro (as of August 2021)

1.1.1. Subsidy calculations

This was the most generous of the German credit programs. With a 100 percent guarantee coverage, the credit approval was relaxed without any additional credit risk assessment by the bank or KfW in order to allow for quick disbursement. Table 2.1.1.1 shows the input assumptions made for the calculations. Fair value market rate is assumed at 15 percent, in line with the assumption made in the UK Bounce Back Loan Scheme. Guarantee fees are subject to the EU temporary framework. Despite the generous loan conditions, the take-up was relatively low at €8.1 billion (as of August 2021). Principal payment was waived for up to 2 years.

Table 2.1.1.2 reports the subsidy estimate calculations using the inputs. Direct subsidies to borrowers are about 47 percent, with a subsidy to lenders at about 14 percent. Compared to other country's credit schemes with a full guarantee, namely, the UK bounce back loan scheme, the instant loan provided longer maturity loans and allowed for a longer period of loan repayment. A large subsidy element to lenders can be due mostly to a low government borrowing rate, providing a large margin for banks with a mandated interest rate of 3 percent.

Table 2.1.1.1 Inputs for Subsidy Calculation

Inputs	Germany Instant Loan
Gov't borrowing rate	-0.005
Interest rate charged to borrower	0.03
Annual loan admin cost	0.0015
One-time fixed cost (% principal)	0.025
Fully guaranteed borrower rate	0.045
Borrower guarantee fee	0
Lender guarantee fee (4-6 year loans)	0.015
Fair market interest rate	0.15
Maturity (years)	10
Guarantee share	1
Principal loans take-up (billions)	8.1

Table 2.1.1.2. Subsidy Calculations for KfW Instant Loan

Outputs	
Annual pmt per 100 after yr 1	14.2
Fair value pmts for borrwers per 100	53.2
Fair value pmts for lenders per 100	114.3
Direct subsidy to borrower per 100	46.8
Lender subsidy per 100	14.3
Subsidy element (total subsidy per 100)	61.1
Total subsidy (euro)	€ 4,946,333,467

Fiscal multiplier ranges from 0.6 to 1.4, using the borrower multiplier between 0.5 to 0.9 and lender multiplier at 0.3.

Table 2.1.2.1. Stimulus and fiscal multiplier range calculations

	Germany Instant Loan
Take-up	8.1
Subsidy Borrower	46.8
Subsidy Lender	14.3
Incremental borrowing range	4.8-7.7
Borrower multiplier (range)	0.5-0.9
Lenders multiplier	0.3
Stimulus range (billion euro)	2.8-6.9
Fiscal multiplier range	0.6-1.4

1.2. KfW Entrepreneurial Loan, ERP Start-up Loan – All Purposes

Government administrative unit(s): KfW

Envelope: unlimited (the treasury guarantee fund to KfW was increased by €150 billion)

Program Description: KfW launched two programs with a partial guarantee of 80 to 90 percent and a potentially higher maximum amount of loans. The 'KfW start-up loans' targeted young companies who had been on the market for less than 5 years, and the 'KfW entrepreneurial loans' were for firms older than 5 years. The guarantee share was tiered based on firm size, with larger firms receiving an 80 percent guarantee and smaller firms receiving a 90 percent guarantee. The maximum loan amount is €100 million, while the loan amount could not exceed 25 percent of the annual turnover in 2019 or double the wage costs in 2019, the current financing requirement for the next 18 months for SMEs and 12 months for large enterprises, or 50 percent of a company's total debt if loans exceed €25 million. Total take-up, combining both programs, is €34.1 billion as of August 2021. Pre-amortization is allowed for up to 2 years.

Take-up: €34.1 billion (as of August 2021)

1.2.1. Subsidy calculations

Table 2.2.1.1. shows the inputs used for subsidy calculations. The fair-value interest rate is assumed to be 10 percent, the same as in the CBILS program in the United Kingdom. Compared to the Instant Loan scheme, lenders are responsible for risk assessments and share risks, lowering the potential credit risk compared to loans made using the Instant Loan scheme. Using these inputs, subsidy elements are calculated and are recorded in Table 2.2.1.2.

A subsidy to borrowers is 19.1 percent of principal, and a subsidy to lenders of 13 percent of principal. The lower subsidy element for lenders compared to the Instant Program can be attributed to the lower guarantee share, a shorter loan maturity, and more intense screening by the lenders.

Table 2.2.1.1. Inputs for Subsidy Calculations

Inputs	Germany Entrepreneurial/Start-up Loans
Gov't borrowing rate	-0.01
Interest rate charged to borrower	9.85
Annual loan admin cost	0.00
One-time fixed cost (% principal)	0.03
Fully guaranteed borrower rate	10.93
Borrower guarantee fee	0.00
Lender guarantee fee (4-6 year loans)	0.01
Fair market interest rate	0.10
Maturity (years)	6
Guarantee share	0.9
Principal loans take-up (billions)	34.1

Table 2.2.1.2. Subsidy Calculations for KfW Entrepreneurial/Start-Up Loans

Outputs	
Annual pmt per 100 after yr 1	27.9
Fair value pmts for borrwers per 100	80.9
Fair value pmts for lenders per 100	112.6
Direct subsidy to borrower per 100	19.1
Lender subsidy per 100	12.6
Subsidy element (total subsidy per 100)	31.7
Total subsidy (euro)	€ 10,813,709,255

2.2.3 Stimulus calculations

The multiplier is slightly higher than the Instant Loan, ranging from 0.8 to 2.5 using the same assumptions for borrower multiplier and lender multiplier.

Table 2.2.2.1. Stimulus and fiscal multiplier range calculations

	Germany Entrepreneurial/Start-up Loans
Take-up	34.1
Subsidy Borrower	19.1
Subsidy Lender	12.6
Incremental borrowing range	16.4-28.7
Borrower multiplier (range)	0.5-0.9
Lenders multiplier	0.3
Stimulus range (billion euro)	9.5-27.1
Fiscal multiplier range	0.8-2.5

2. Italy

The Italian government introduced several measures, operated and managed by various government organizations, to provide liquidity support for firms hit by the pandemic. For SMEs, the decree "Cura Italia" (March 17, 2020) was introduced to provide public guarantees for corporate lending and public guarantees for debt moratorium through the Central Guarantee Fund (Fondo Centrale di Garanzia). On April 8, 2020, the decree "Liquidità" was established to increase the envelope for guarantees for SMEs through the Central Guarantee Fund. The decree also established a new guarantee program for Italian SMEs and large corporations, "Garanzia Italia", administered by SACE, an export credit agency owned by the Italian government. While SACE provided different schemes to support business continuity, i.e. support for working capital and the provision of soft loans, for our analysis, we will cover the SME guarantee program provided by the Fondo Centrale de Garanzia and SACE's Garanzia Italia.

3.1 Finanziamenti garantiti dal Fondo Centrale di Garanzia (FCG)

Government decrees "Cura Italia Decree" (March 17, 2020) and "Liquidità" (April 8, 2020), established credit guarantee programs of over €100 billion and €220 billion for public guarantees for debt moratorium for SMEs through the central guarantee fund (Fondo Centrale di Garanzia). Over time, the endowment to the Guarantee Fund was increased. The program was targeted for SMEs and smaller firms with less than 500 employees, experiencing liquidity constraints as a direct consequence of the pandemic. Guarantee coverage was tiered into three groups: (i) 100 percent guarantee for loans up to €30,000; (ii) 90 percent guarantee for loans up to €5 million; and (iii) 80 percent guarantees on restructured loans up to €5 million. The maximum maturity also differs, with the full guarantee with the longest maximum maturity of 10 years. Since banks are likely to have different credit assessment process for restructured loans compared to new loans, we omit the subsidy calculations for 80 percent guarantees in our analysis.

Government administrative unit(s): Banca del Mezzogiorno – MedioCredito Centrale (fully owned by the Italian government, managing the public fund on behalf of the Ministry for Economic Development), the Italian government

Envelope: Initially guaranteed up €100 billion in loans and was relaxed over time with no legal limit.

Take-up: €151.1 billion (as of December 31, 2021)[48]

2.1.1. Subsidy calculations

[48] Official Source: https://www.bancaditalia.it/focus/covid-19/tabelle-moratorie.pdf

We examine the subsidy element by distinguishing between a full guarantee scheme (100 percent guarantee share) and a partial guarantee (90 percent guarantee share) based on loan conditions. Table 3.1.1.1 documents the inputs. A full guarantee scheme had an upper bound for loans per firm at €30,000. Lending conditions were substantially more generous for the full guarantee scheme than for the partial guarantee scheme, in terms of loan maturity and fully guaranteed borrower rate. Also, the disbursement was 'automatic' when the application was submitted, and no credit assessment of borrowers by lenders was required. For the full guarantee loan, the fair value rate is assumed to be equal to the fair-value rate used for Germany's full guarantee scheme (the Instant Loan) plus the spread between German and Italian bonds at 10-year maturity before the pandemic. As in Germany's case, Italian banks made near-automatic disbursement of loans upon request. For the partial guarantee loan, fair value rate is chosen to be the sum of the fair-value rate used for Germany's partial guarantee scheme (entrepreneurial and start-up loans) plus the spread between German and Italian bonds at 5-year maturity before the pandemic.

Table 3.1.1.1. Inputs for Subsidy calculations

Inputs	100 percent guarantee	90 percent guarantee
Gov't borrowing rate	0.004461	0.003323
Interest rate charged to borrower	0.02	0.04
Annual loan admin cost	0.0015	0.0015
One-time fixed cost (% principal)	0.025	0.025
Fully guaranteed borrower rate	0.0315	0.029
Borrower guarantee fee	0	0
Lender guarantee fee (4-6 year loans)	0.01	0.01
Fair market interest rate	0.17	0.12
Maturity (years)	10	5
Guarantee share	1	0.9
Principal loans take-up (billions)	25.2	100.7

Based on the inputs, subsidy elements are calculated and are presented in Table 3.1.1.2. The direct subsidy to borrowers is about 55 percent of the principal payment for the full guarantee scheme, more than double the subsidy element for the partial guarantee at 24 percent. The lender's subsidy is higher for the partial guarantee, as the lender can charge a higher level of interest rate to borrowers. Despite the generosity of the full guarantee scheme, the take-up is larger for the partial guarantee, about double the take-up of the full guarantee. This is likely to be due to the higher loan limit for the partial guarantee.

Table 3.1.1.2. Subsidy Calculations for SME Guarantees by Fondo Centrale di Garanzia

Outputs	100 percent guarantee	90 percent guarantee
Annual pmt per 100 after yr 1	13.7	35.9
Fair value pmts for borrwers per 100	44.9	75.8
Fair value pmts for lenders per 100	102.3	104.1
Direct subsidy to borrower per 100	55.1	24.2
Lender subsidy per 100	2.3	4.1
Subsidy element (total subsidy per 100)	57.4	28.3
Total subsidy (euro)	€ 14,453,481,611	€ 28,476,493,533

2.1.2. Stimulus calculations

Table 3.1.2.1 Stimulus and fiscal multiplier range calculations

	100 percent guarantee	90 percent guarantee
Take-up	24.8	99.3
Subsidy Borrower	55.1	24.2
Subsidy Lender	2.3	4.1
Incremental borrowing range	15.8-22.7	50.0-84.5
Borrower multiplier (range)	0.5-0.9	0.5-0.9
Lenders multiplier	0.3	0.3
Stimulus range (billion euro)	8.1-20.6	26.3-77.3
Fiscal multiplier range	0.6-1.4	0.9-2.8

3.2 SACE Garanzia Italia[49] [50]

Following the decree on April 8, 2020, SACE agreed to provide € 200 billion of loan guarantees. It was established to provide guarantees for firms that are too large to apply for the central guarantee fund guarantees. Therefore, to be eligible, SMEs must have first exhausted their ability to access the central guarantee fund. The guarantee coverage varied according to firm size, with a 90 percent guarantee for companies with fewer than 5,000 employees and a turnover of less than €1.5 billion, an 80 percent guarantee for larger companies with a turnover between €1.5 billion and €5 billion, and a 70 percent guarantees for very large companies with a turnover higher than €5 billion. Pre-amortization of 36 months is permitted. The application was automatically approved for smaller forms with employees fewer than 5,000 employees. However, for loans for larger enterprises, SACE is responsible for its own credit risk assessment and is subject to approval from the Ministry of Finance.

[49] Official Source: 2020 Financial Statement of SACE (https://www.sace.it/en/about-us/our-numbers)
[50] Other useful reference: https://www.whitecase.com/publications/alert/state-art-italian-liquidity-measures-keeping-italian-companies-alive-2021

According to the SACE financial statement for 2020, through "Garanzia Italia", 1,401 guarantees were issued for a total of € 20.769 billion, with a maximum guarantee amount of €17.793 billion. The average guarantee amount per each loan is about €14 million, suggesting that the main beneficiaries of this particular SACE scheme were large enterprises.[51]

Government administrative unit(s): SACE, Ministry of Finance

Take-up: € 20.769 billion (as of end-2020)

3.2.1 Subsidy calculations

Since we do not have the precise breakdown by firm size, we make an assumption about the distribution of loan disbursements by firm size as follows: 1/6 of loans are for SMEs, 1/6 of loans are for medium-sized firms, and 4/6 are for large enterprises. Table 3.2.1.1. reports the inputs used for the subsidy element calculations. The fair-value rates for small and medium-sized firms were calculated as the sum of the fair value rate used for Germany's partial guarantee programs plus the spread between the German and Italian bond rates at 4-year maturity. For large loans taken by large enterprises, the fair-value rate is set at a lower value as the loan approval and screening process is substantially more rigorous, as the applications were assessed by the SACE and required approval by the Ministry of Finance. With the availability of FCG for SMEs, the take-up of SACE's guarantee program was done by large firms as noted above. Table 3.2.1.2. reports the estimated subsidy elements. The direct subsidy element to borrowers ranges from 10 percent for lager firms to 24 percent for smaller firms.

Table 3.2.1.1. Subsidy calculations

Inputs	SACE SME	SACE Medium	SACE Large
Gov't borrowing rate	0.007891	0.007891	0.007891
Interest rate charged to borrower	0.0378	0.0522	0.0499
Annual loan admin cost	0.0015	0.0015	0.0015
One-time fixed cost (% principal)	0.025	0.025	0.0025
Fully guaranteed borrower rate	0.029	0.036	0.034
Borrower guarantee fee	0	0	0
Lender guarantee fee (4-6 year loans)	0.01	0.02	0.02
Fair market interest rate	0.117	0.117	0.087
Maturity (years)	4	4	4
Guarantee share	0.9	0.8	0.7
Principal loans take-up (billions)	3.47	3.47	13.87

[51] Fiat Chrysler Automobiles received loans from SACE totaling US$7 billion (https://www.reuters.com/article/us-health-coronavirus-fiat-chrysler-loan/italys-credit-agency-sace-approves-state-guarantees-for-fca-7-billion-bank-loan-source-idUSKBN2343HI).

Table 3.2.1.2. Subsidy elements for Garanzia Italia

Outputs	SACE SME	SACE Medium	SACE Large
Annual pmt per 100 after yr 1	103.8	53.9	53.8
Fair value pmts for borrwers per 100	75.8	82.2	89.2
Fair value pmts for lenders per 100	102.3	101.3	102.2
Direct subsidy to borrower per 100	24.2	17.8	10.8
Lender subsidy per 100	2.3	1.3	2.2
Subsidy element (total subsidy per 100)	26.5	19.1	13.0
Total subsidy (euro)	€ 919,648,591	€ 662,438,175	€ 1,800,444,029

3.2.2 Stimulus calculations

Table 3.2.2.1 Stimulus and fiscal multiplier range calculations

	SACE SME	SACE Mid	SACE Large
Take-up	0.6	0.6	9.2
Subsidy Borrower	24.2	17.8	10.8
Subsidy Lender	2.3	1.3	2.2
Incremental borrowing range	6.2-11.4	1.6-2.9	6.2-11.4
Borrower multiplier (range)	0.5-0.9	0.5-0.9	0.5-0.9
Lenders multiplier	0.3	0.3	0.3
Stimulus range (billion euro)	0.9-2.7	0.8-2.6	3.2-10.4
Fiscal multiplier range	0.9-2.9	1.3-4.0	1.8-5.8

3. Japan

The Japanese Government released the Cabinet decision entitled "Emergency Economic Measures to Cope with COVID-19 (issued on April 7, 2020, later amended on April 20, 2020)", which established various government authorities and governmental or quasi-government financial institutions to extend financing support for Japanese firms. Here, we introduce credit guarantee schemes for SMEs introduced by the Ministry of Economy, Trade, and Industry, with the loans guaranteed by the Japan's Ministry of Finance.

Government administrative unit(s): Ministry of Finance, Ministry of Economy, Trade, and Industry (METI), Japan Finance Corporation (JFC)

Take-up: ¥28 trillion (as of end 2020)

3.1. Safety Net Guarantees No. 4 and No. 5

Credit guarantee corporations (CGCs) are public institutions that support SMEs by serving as guarantors to facilitate their borrowing from commercial banks and other private financial institutions. As part of the government's response to the COVID-19 crisis, three programs by CGCs were made available: (i) Safety Net Guarantee No. 5 (all SMEs for specific business types); (ii) Safety Net Guarantee No. 4 (all SMEs in the affected region); and (iii) Crisis-related guarantees (SMEs affected by crisis). Safety net guarantee 4 and

crisis-related guarantees have full guarantees. The maximum amount of loans for all three loan schemes is 280 million yen (about 2.6 million USD) per company.

Table 4.1.1. Subsidy calculation inputs

Inputs	
Gov't borrowing rate	-0.00217
Interest rate charged to borrower	0.002
Annual loan admin cost	0.0015
One-time fixed cost (% principal)	0.001
Fully guaranteed borrower rate	0.0028
Borrower guarantee fee	0
Lender guarantee fee (4-6 year loans)	0.0008
Fair market interest rate	0.07
Maturity (years)	7
Guarantee share	1
Principal loans take-up (trillion Japanese Yen)	28

Table 4.1.2. Subsidy element estimates

Outputs	
Annual pmt per 100 after yr 1	50
Fair value pmts for borrwers per 100	65
Fair value pmts for lenders per 100	101
Direct subsidy to borrower per 100	35
Lender subsidy per 100	1
Subsidy element (total subsidy per 100)	36
Total subsidy (Japanese Yen)	¥10,014,396,335,268

Table 4.2. Stimulus Calculations

Take-up	28
Subsidy Borrower	35
Subsidy Lender	1
Incremental borrowing range	15.4-24.4
Borrower multiplier (range)	0.5-0.9
Lenders multiplier	0.3
Stimulus range (trillion yen)	7.8-22
Fiscal multiplier range	0.8-2.2

5. Spain

According to the Royal Decree Law 8/2020 of March 17 and the Royal Decree Law 25/2020 of July 3, the Spanish government approved the launch of two lines of credit guarantees for an amount of up to €140 billion (€100 billion initially) to guarantee the financing granted to self-employed and businesses affected

by COVID-19.[52] The first package was introduced to support businesses' liquidity (working capital) needs. The second package provided guarantee lines to fund new investment projects by SMEs. As of December 31, 2021, more than 1.1 million firms have benefited, of which 98 percent are self-employed and SMEs.

Government administrative unit(s): Instituto de Crédito Oficial (ICO), Ministry of the Economic Affairs and Digital Transformation

Take-up: €13.5 billion (as of December 31, 2021)

5.1 ICO Líneas Avales "Liquidez" COVID 19 (El Real Decreto-ley 8/2020 de marzo)

Guarantee coverage varies by firm size, with SMEs receiving 80 percent coverage and newly issued loans to large corporations receiving 70 percent coverage. Guarantee maturity was initially set at five years and later extended to eight years. Firms should provide their working capital needs. As of December 31, 2021, 619,118 firms benefited from the scheme, with the total financing provided amounting to €121.9 billion. 90 percent of companies with formalized operations are micro-enterprises and self-employed. The ave
Take-up: €121.9 billion (as of December 31, 2021)

5.2 ICO Líneas Avales "Inversión y actividad" (El Real Decreto-ley 25/2020, de 3 de julio)

Loan conditions for the second package are the same as the first package. The purpose of the second package was to provide financing for current and capital expenses with new investments, the expansion, adaptation or renewal of equipment, facilities and capacities. Firms were required to provide investment needs. As of December 31, 2021, 102,755 firms benefited from the program, amounting to €13.5 billion in financing. 90 percent of companies with formalized operations are micro-enterprises or self-employed individuals. The average guarantee coverage is approximately 75 percent, with a maturity of approximately 4 years.

Take-up: €13.5 billion (as of December 31, 2021)

4.2.1. Subsidy calculations

The inputs used for the subsidy element calculations are reported in Table 5.2.1.1. The fair-value interest rate is calculated as the fair-value rate used for Germany's partial guarantee program plus the spread between German and Spanish bonds for 5-year maturity. Annual loan administration costs varied by firm size, with smaller loans having a fixed rate of 2.5 percent and larger loans (to non-SMEs) having a fixed rate of 0.75 percent. The take-up of guarantee programs was larger for SMEs (85 billion euros) than for

[52] Official Source: https://www.ico.es/web/guest/ico/informes-seguimiento-linea-avales

non-SMEs (37 billion euros). The subsidy elements are calculated in Table 5.2.1.2. The total subsidy element amounts to approximately 21 to 22 percent of principal.

Table 5.2.1.1. Subsidy calculations

Inputs	ICO SME	ICO Non-SME
Gov't borrowing rate	0.000577	0.000577
Interest rate charged to borrower	0.052	0.0583
Annual loan admin cost	0.0015	0.0015
One-time fixed cost (% principal)	0.025	0.0075
Fully guaranteed borrower rate	0.038	0.037
Borrower guarantee fee	0	0
Lender guarantee fee (4-6 year loans)	0.01	0.01
Fair market interest rate	0.108	0.108
Maturity (years)	5	5
Guarantee share	0.8	0.7
Principal loans take-up (billion euros)	85.4	36.5

Table 5.2.1.2. Subsidy Element for Credit Guarantees provided by ICO

Outputs	ICO SME	ICO Non-SME
Annual pmt per 100 after yr 1	28.3	28.7
Fair value pmts for borrwers per 100	84.4	86.1
Fair value pmts for lenders per 100	106.3	107.1
Direct subsidy to borrower per 100	15.6	13.9
Lender subsidy per 100	6.3	7.1
Subsidy element (total subsidy per 100)	21.9	21.0
Total subsidy (euro)	€ 18,733,722,090	€ 7,668,488,330

5.4. Stimulus calculations

Table 5.4.1.1. Stimulus and fiscal multiplier range calculations

	ICO SME	ICO Non-SME
Take-up	85.4	36.5
Subsidy Borrower	15.6	13.9
Subsidy Lender	6.3	7.1
Incremental borrowing range	39.9-71.1	16.8-30.3
Borrower multiplier (range)	0.5-0.9	0.5-0.9
Lenders multiplier	0.3	0.3
Stimulus range (billion euro)	21.6-65.6	9.2-28.0
Fiscal multiplier range	1.2-3.5	1.2-3.7

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