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Abstract

This paper assesses whether corporate liquidity needs in the G7 economies were met during the containment phase of the COVID-19 pandemic (February-June 2020) using various approaches to identify credit supply shocks. The pandemic crisis adversely affected nonfinancial corporate sector cash flows, generating liquidity and solvency pressures. However, corporate borrowing surged in March and into the second quarter, thanks to credit line drawdowns and unprecedented policy support. In the United States, the bond market was buoyant from the end of March onward, but credit supply conditions for bank loans and the syndicated loan market tightened. In other G7 economies, credit supply conditions generally eased somewhat across markets during the second quarter. Among listed firms, entities with weaker liquidity or solvency positions before the onset of COVID-19, as well as smaller firms, suffered relatively more financial stress in some economies in the early stages of the crisis. Residual signs of strain remained as of the end of June. Policy interventions, especially those directly targeting the corporate sector, had a beneficial effect on credit supply overall.

JEL Classification Numbers: E51, E52, E58, G32, H81

Keywords: Corporate funding, Corporate cash, Credit supply, Financial constraints, Loan guarantees, Central bank policies, Group of Seven economies, COVID-19, Economic crisis

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I. INTRODUCTION

The COVID-19 pandemic has triggered a deep global economic crisis. Closures and restrictions imposed by governments to contain the spread of the virus, as well as social distancing, have severely disrupted business activity and clouded the economic outlook amid heightened uncertainty. Corporate cash flows have been heavily impaired in many industries, with adverse implications for corporate liquidity and solvency.

In major advanced economies, severe disruptions to corporate funding markets became apparent amid a sharp tightening of financial conditions early in 2020 following the onset of the COVID-19 crisis, as corporate bond funds, loan funds, and prime money market funds faced large outflows (FSB 2020). This led to a collapse in the issuance of nonfinancial corporate bonds, syndicated loans, and commercial paper, and to a jump in corporate spreads. Many firms turned to their existing credit lines to secure funds in a "dash for cash."

In response, policymakers in these economies quickly announced a wide range of fiscal, monetary, and financial sector policy measures—many of them unprecedented—to support markets and address corporate funding needs. The combination of these measures helped normalize financial conditions during the second quarter of 2020, as discussed in IMF (2020a).

Several papers on the global financial crisis have documented that a decline in credit supply has adverse consequences on employment, investment, and total factor productivity growth (Duchin, Ozbas, and Sensoy 2010; Chodorow-Reich 2014; Duval, Hong, and Timmer 2020). The degree of eventual economic scarring from the COVID-19 crisis will therefore depend to a significant extent on how well the financial system—supported to an exceptionally large extent by policies—is able to meet the corporate sector's demand for liquidity during the crisis. This means preventing still-solvent firms facing liquidity strains from turning into insolvent entities or being forced to significantly curtail their activities.

Against this backdrop, this paper assesses whether corporate sector liquidity needs were met in the G7 economies—Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States—during the initial containment phase of the crisis (from the beginning of February to the end of June 2020), with a special focus on firms with market access.[2]

We tackle this question in three steps. First, we analyze the impact of the COVID-19 crisis on aggregate credit volumes in several segments of the corporate debt market and on the debt financing choice of firms with market access. Second, we discuss the evolution of aggregate conditions in credit markets and quantify the credit supply shocks in several of these markets. Because changes in credit conditions are also likely to be visible through their differential

[2] While the COVID-19 crisis has severely hurt a very large number of unlisted small and medium-sized enterprises, which traditionally face difficulties accessing external financing, lack of recent publicly available data for these firms prevents a thorough analysis of their funding situation during the pandemic. Gourinchas et al. (2020) provide a model-based analysis of the impact of the COVID-19 crisis on small and medium-sized enterprises.

impact on firms with different characteristics—as some firms are likely to be more vulnerable to aggregate funding liquidity shocks than others—we complement this aggregate analysis with a firm-level analysis. We ask whether the ease of access to external finance and pre-crisis liquidity position had an impact on firm-level relative financial performance in the early stages of the crisis, potentially signaling the presence of tighter credit conditions.[3] Third, we also examine the effect of key policy announcements on the supply of corporate credit during the containment phase of the pandemic, acknowledging that such an analysis is a very challenging task because of the flurry of measures taken in a short period of time.

We employ a variety of methodological approaches, combining descriptive analysis based on readily available macrofinancial data at daily, monthly, or quarterly frequency with econometric-based measurement. Our analysis of credit volumes blends a description of credit data from a variety of sources and results from an empirical model of corporate financing choice based on Adrian et al. (2013). Our examination into aggregate credit supply conditions relies on the description of bank loan officers lending survey results, the econometric estimation of a credit supply and credit demand system of equations for the primary syndicated loan market for which we implement an identification through heteroskedasticity strategy (following Rigobon 2003), as well as the construction of Gilchrist and Zakrajsek (2012)'s excess bond premium (EBP), to gauge the evolution of investor risk appetite in the secondary corporate bond market.[4] To further gauge the presence of shifts in credit supply, we analyze how listed firms' cumulative abnormal returns during various time windows depended on their pre-crisis vulnerability to a liquidity shock. We capture this vulnerability by one of three possible measures: small firm size—a common indicator of financial constraints (Hadlock and Pierce 2010), low cash relative to industry peers (Josephs et al. 2020), and a high net short-term debt to asset ratio—a measure capturing rollover needs.[5] Our policy analysis is based on vulnerable firms' relative stock market performance on policy announcement days. Depending on data availability, each analysis covers all seven economies or only a subset.

We document that drawdowns of existing credit lines and unprecedented policy support helped maintain the flow of credit to firms, and that corporate borrowing surged in March and the second quarter of 2020. As a result, the nonfinancial corporate sector (in the aggregate) managed to build cash buffers to cope with a period of reduced cash flow and high uncertainty. We find that the bond market was particularly buoyant in the United States from the end of March onward, but that credit supply conditions for bank loans and

[3] The paper does not project liquidity gaps at the firm level (see Banerjee and others 2020); rather, it provides a quantification of the challenges that firms faced in accessing debt financing during the containment phase of the COVID-19 crisis. Similarly, the paper does not provide an account of differences in performance across industries but controls for the heterogeneous effect of the crisis across industries in the empirical analysis.

[4] See De Santis (2016) for an analysis of the excess bond premium in the euro area.

[5] Josephs et al. (2020) find that U.K. firms with high pre-global-financial-crisis cash holdings invested significantly more than their cash-poor rivals during the ensuing crisis and recovery phase. Almeida et al. (2011) document that firms whose long-term debt was largely maturing right after the third quarter of 2007 cut their investment-to-capital ratio more than otherwise similar firms whose debt was scheduled to mature after 2008.

syndicated loans tightened. In Japan, bank lending standards eased, but bond market supply conditions tightened somewhat despite a solid year-on-year increase in issuance. In other G7 economies, credit supply conditions generally evolved in a more homogeneous manner across markets, with somewhat easier conditions prevailing, on average, during the second quarter. We find that, among listed firms, entities with weaker liquidity positions before COVID-19, as well as smaller firms, suffered relatively more financial stress in some economies during the early stages of the crisis, and residual signs of strain remained as of the end of June. Finally, we provide evidence that policy announcements, especially announcements of policies directly targeting the corporate sector, boosted the relative performance of those firms, suggesting that they improved credit supply conditions.

Our paper contributes to the literatures on credit developments, credit supply conditions, and the impact of policy actions on credit supply during the COVID-19 crisis. We provide a cross-G7 and cross-credit-market perspective, by contrast with most papers in the literature to date which focus on one country (typically, the United States) and/or one market. The sharp increase in U.S. banks' credit provision in March 2020 because of credit line drawdowns has been discussed in Acharya and Steffen (2020), Greenwald et al. (2020), Kapan and Minoiu (2020), and Li et al. (2020), while the increase in U.S. bond market issuance following the announcement of the Federal Reserve's new credit facilities has been analyzed in Acharya and Steffen (2020) and Halling et al. (2020). Hasan et al. (2020) discuss the pricing of global syndicated loans during the early phase of the pandemic. While Acharya and Steffen (2020) and Darmouni and Siani (2020) analyze the choice of bond issuance versus credit line drawdown, our focus is on bond issuance versus new syndicated loan issuance. Our finding that firms with greater pre-pandemic relative cash positions fared better echoes Acharya and Steffen (2020), who show that the U.S. stock market rewarded firms with access to liquidity through either cash or committed lines of credit from banks. Our other finding that the pandemic hurt smaller firms relatively more is in line with Chodorow Reich et al. (2020) who show that smaller firms' credit lines are subject to greater lender discretion, and with Greenwald et al. (2020), who document that unconstrained firms' credit line drawdowns after adverse shocks crowds out credit to smaller firms. Finally, our finding that policy announcements have helped offset the increase in liquidity constraints is consistent with Boyarchenko et al. (2020) who find a strong positive effect of the Federal Reserve corporate credit facilities on bond prices and liquidity, and with Chodorow Reich et al (2020) who show that the U.S. government's Paycheck Protection Program helped alleviate smaller firms' funding shortfall.

Beyond the COVID-19-related literature, we also contribute to the literature on credit supply shock measurement. We are unaware of other papers using Rigobon (2003)'s identification through heteroskedasticity methodology to identify credit supply shocks in any G7 economy.[6]

[6] However, see Coelho et al. (2017) for an application in the context of Brazil.

Our dataset contains country-level, nonfinancial firm-level, bank-level, and securities-level information for G7 economies.[7] For each of the empirical exercises performed, we provide information in the relevant section below on the sample, our transformations of the raw data, as well as on the methodology we implemented. The three euro area economies (France, Germany, Italy) are often analyzed as a group to improve sample size.

The rest of the paper is organized as follows. Section II describes quantitative developments in credit markets. Section III discusses corporate debt financing choices. Section IV focuses on the dynamic of credit supply across credit markets. Section V turns to the firm-level analysis of relative stock market performance. Section VI discusses the effect of policy announcements. Section VII concludes. Appendices provide detailed information on data sources and policy announcements.

II. CORPORATE BORROWING DEVELOPMENTS

We start our analysis by discussing firms' borrowing from key segments of the corporate credit market—namely the bank loan market, the syndicated loan market, the bond market, and the commercial paper market— during the containment phase of the crisis. Loans represent the major source of corporate debt funding in the G7 economies, ranging from 58 percent in the United States to 90 percent in Germany, according to the latest available financial accounts data provided by the OECD. The remainder is composed of debt securities. In terms of issuance by firms with market access, the ratio of syndicated loans (which are mostly held by banks post syndication if they are investment grade and by nonbanks if they are non-investment grade) to bonds ranges from two to three.[8]

Developments in bank lending

Despite a period of acute financial stress early in the year, outstanding amounts of bank credit to firms grew significantly in March and in the second quarter in all seven economies analyzed (Figure 1, panel 1). On a year-over-year basis, the rate of bank credit growth during the first half of the year was clearly above trend.[9] Part of this dynamic is clearly attributable to sizable credit line drawdowns, especially in the United States (Figure 1, panel 2). Listed firms' drawdowns increased more than 40 percent, on average, compared with the first half of 2019. The increase was particularly spectacular in the United States, where net drawdowns at the end of March doubled, representing an increase of $250 billion, which is of the same order of magnitude as the increase in commercial and industrial loans by domestic banks over the same period.[10] Panel 3 of Figure 1 shows that these drawdowns were concentrated in

[7] The detailed data sources are provided in Appendix 1.

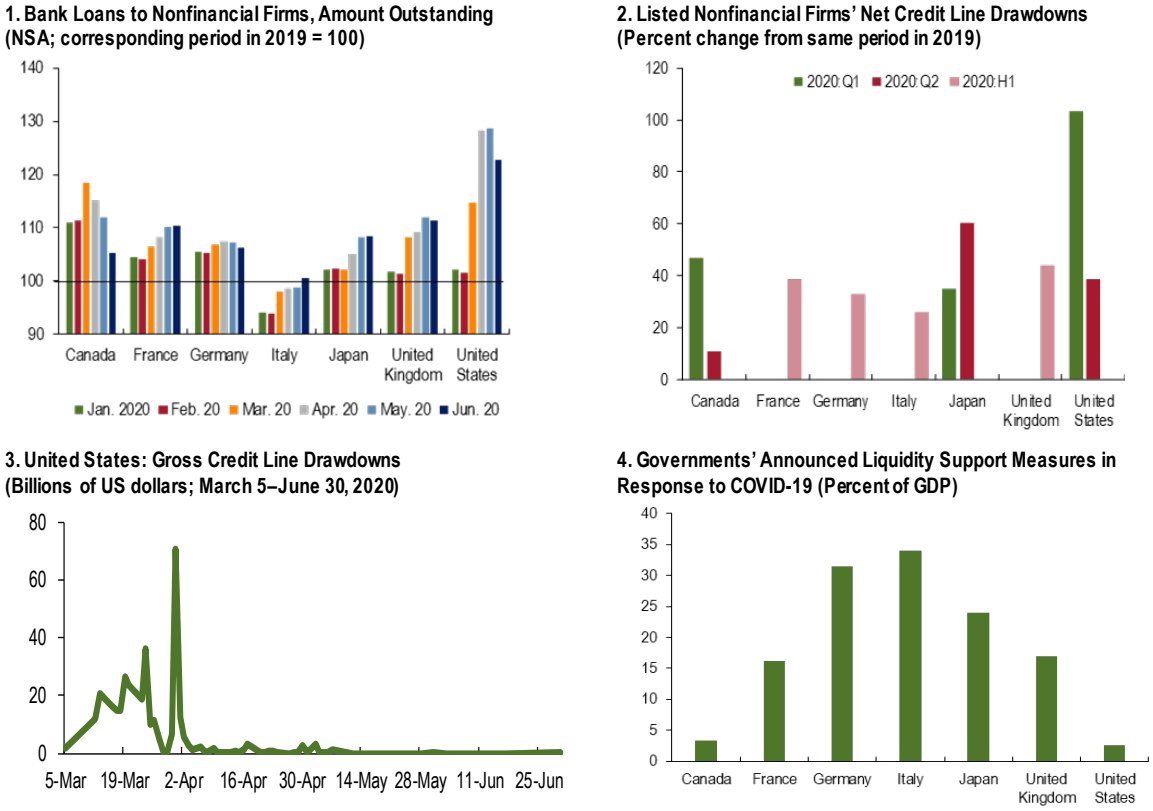
[8] Syndicated loans include both term loans and credit lines.

[9] Before the pandemic, the volume of nonfinancial corporate bank loans was on a declining trend in Italy.

[10] Acharya and Steffen (2020) and Kapan and Minoiu (2020) discuss credit line drawdowns in the United States in early 2020. In contrast to the experience of the global financial crisis described in Ivashina and Scharfstein (2010), the increase in credit line drawdowns was related to immediate liquidity demand rather than concerns about the health of the US banking sector.

March, with a peak on the last day of the month. Presumably, this reflects firms' desire to secure funds while they were still in compliance with their maintenance covenants and because they expected a sharp deterioration in cash flow during the second quarter. Gross drawdowns in the United States subsided at the beginning of April, resulting in a decline in utilization rates—that is, the share of credit line commitments used. The same reduction can be observed in Canada; drawdown activity in Japan, however, continued during the second quarter, resulting in a utilization rate of 60 percent. Nevertheless, utilization rates across the seven economies remained well below 50 percent, on average, at the end of June, suggesting that liquidity insurance remained significant, at least in the aggregate.[11]

Figure 1. Bank Lending to Nonfinancial Firms and Government Liquidity Support



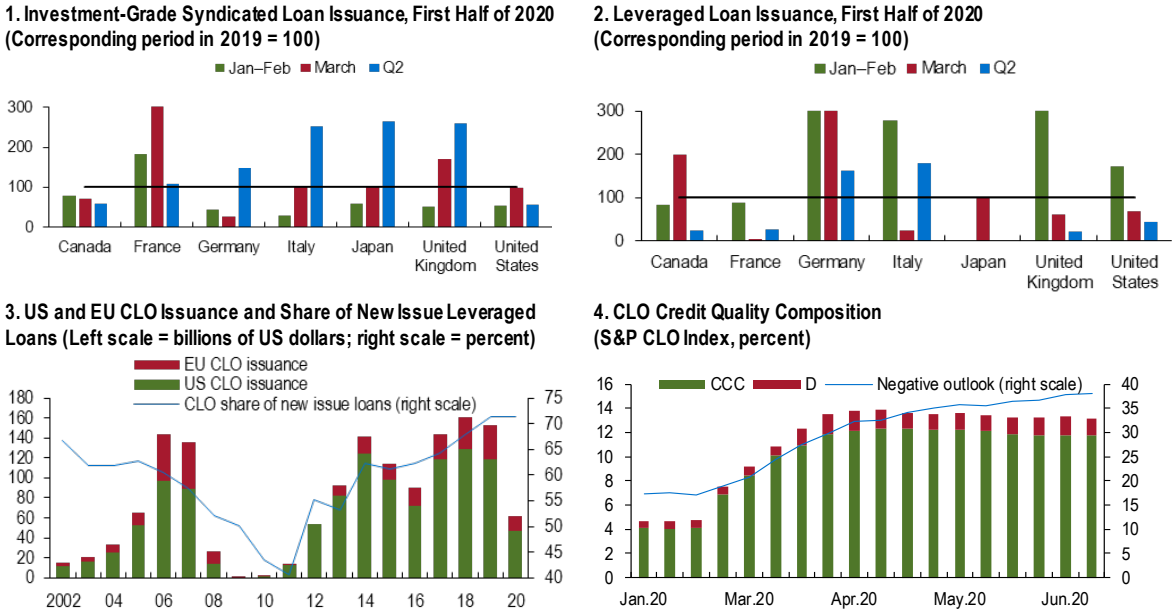
Sources: Federal Reserve; Haver Analytics; IMF, Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic (June 2020); S&P Capital IQ; S&P Leveraged Commentary & Data; and IMF staff calculations.
Note: Panel 2 is based on data available as of August 25, 2020. Half-yearly data are used instead of quarterly data for European economies because of scant quarterly reporting (when first half data are not available, but first quarter data are, the latter are used). Panel 4 shows liquidity support (including equity injections, loans, asset purchases or debt assumption, guarantees, and quasi-fiscal operations) per country as a percent of GDP. Amounts do not include above-the-line fiscal measures, such as the US Paycheck Protection Program, which amounts to about 3 percent of US GDP. NSA = not seasonally adjusted.

Bank credit developments during the second quarter also reflected the implementation of government programs (notably, off-budget credit guarantees) that transferred part—sometimes all—of the credit risk to the sovereign, as well as government-sponsored loans with a significant grant component. These direct support programs to corporate funding

[11] Of course, there was substantial heterogeneity across firms and sectors. In the United States, the utilization rate was significantly above average in wholesale and retail trade —a sector particularly affected by the pandemic— at the end of June.

represented between 2.6 and 34 percent of GDP as of June 12 (Figure 1, panel 4). They complemented other on-budget fiscal measures that directly supported corporate cash flows and solvency; for example, through grants, employment support programs, and reductions in tax liabilities.[12] As of early July, committed amounts were significantly smaller than announced amounts in European economies (Anderson, Papadia, and Véron 2020). Falagiarda et al. (2020) report take-up rates of about 5 percent, 20 percent, and 40 percent for Germany, Italy and France respectively as of end-August.

Figure 2. Developments in Syndicated Loan Markets



Sources: Dealogic; S&P Capital IQ; S&P Global Ratings; S&P Leveraged Commentary & Data; and IMF staff calculations.
Note: Bars in panels 1 and 2 are truncated at 300. For panel 3, 2020 data is annualized through end-June 2020. Date for individual European countries is not available, so the European Union aggregate is shown. EU = European Union. CLO = collateralized loan obligation.

Developments in syndicated loans issuance

Syndicated loan issuance during the first half of the year was somewhat more heterogeneous across economies. It was generally stronger than in 2019 in Europe and Japan, but weaker in the United States and Canada, especially during the second quarter. This appears to have been driven by a surge in investment-grade loan issuance in Europe and Japan (Figure 2, panel 1) and a drop in leveraged loan issuance outside of Germany and Italy (Figure 2, panel 2).[13] The weak recovery in the leveraged loan markets was to a large extent due to subdued demand from the traditional investor base. Collateralized loan obligation (CLO) new issuance has been slow to restart.[14] While activity picked up modestly from March levels,

[12] See the IMF's Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic, https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19.

[13] It should be noted that the euro area leveraged loan market is significantly smaller than its US counterpart.

[14] A collateralized loan obligation is a structured finance product collateralized predominantly by broadly syndicated leveraged loans. See Paper 2 of the April 2020 GFSR for a discussion of risky corporate credit markets.

new CLO supply ran at half of the pace in 2019, while still accounting for more than 70 percent of new leveraged loan demand (Figure 2, panel 3). CLO investors were concerned about the wave of downgrades and defaults (Figure 2, panel 4), which may have affected lower-rated tranches.

Developments in corporate bond issuance

Corporate bond markets in the first quarter were generally more resilient despite coming under intense pressure in mid-March. Policy responses by central banks announced in the second half of March, especially facilities aimed at directly supporting corporate bond markets, appear to have boosted activity in these markets and contributed to a reversal in corporate bond fund flows (including exchange-traded funds). During the second quarter, investment-grade issuance surged to levels twice as large as those in 2019 in France, Germany, the United Kingdom, and the United States (Figure 3, panel 1). The response of the high-yield segment was somewhat more muted outside the United States, probably reflecting its relative underdevelopment and the focus of central banks' purchases on the investment-grade segment. For its part, the United States saw high-yield investment-grade issuance during the second quarter more than double compared with that in 2019 (Figure 3, panel 2).

The characteristics of new debt in the high-yield bond market reveal a shift toward higher quality. In G7 economies, nearly 60 percent of high-yield new issues during the first half of the year were BB-rated, and more than 30 percent of the bonds were secured, the highest levels for the past 15 years at least (Figure 3, panel 3). By use of proceeds, more than 80 percent of year-to-date supply was for refinancing existing debt as lower yields and strong investor demand encouraged a range of issuers to tap into the market to repay credit lines, or for short-term expenses such as working capital (Figure 3, panel 4). Issuance motivated by acquisition and dividends or share repurchases, however, were at their lowest in a decade.

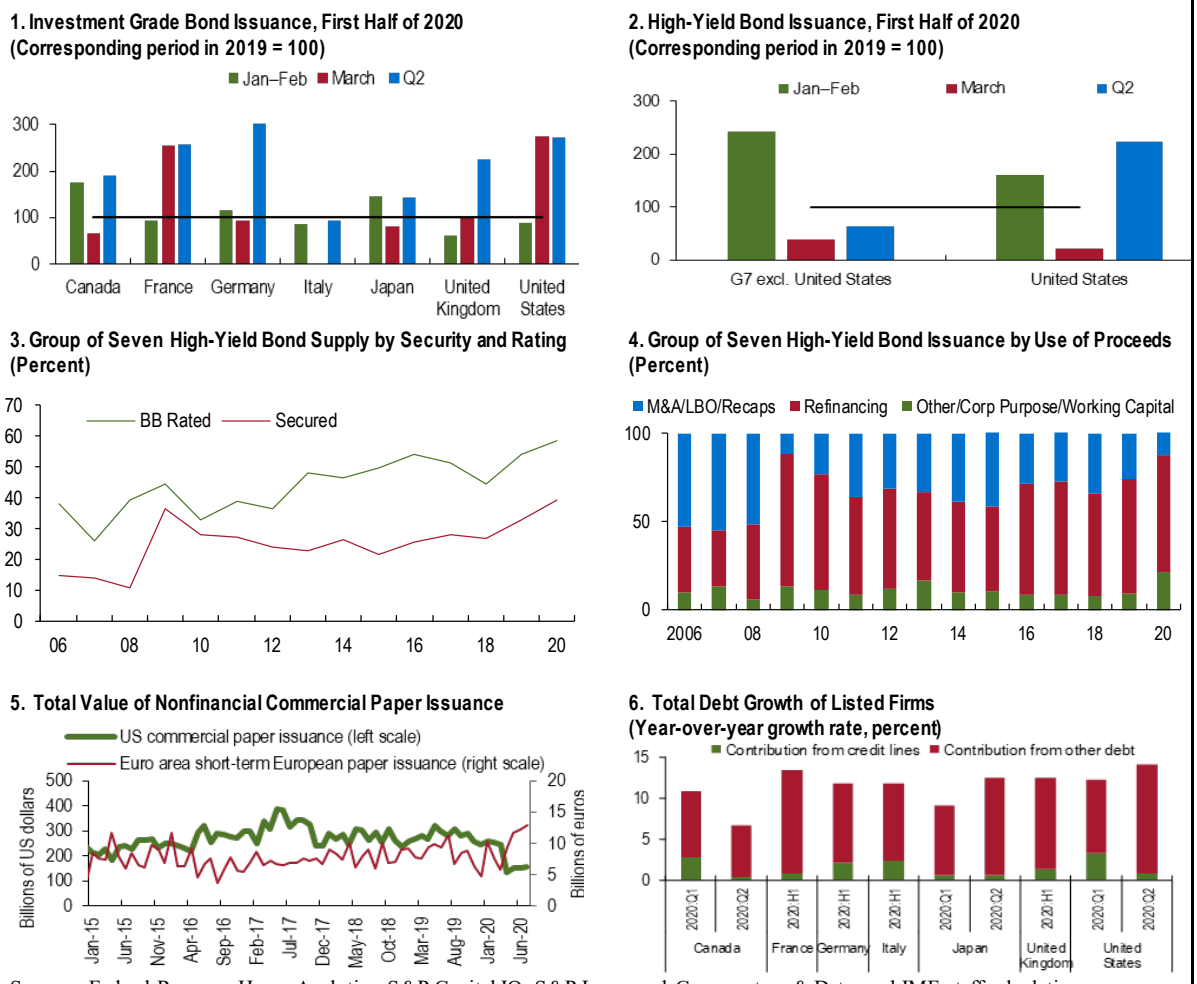
Commercial paper market

In contrast to the bond market, volumes in the commercial paper market in the United States did not rebound following their sharp drop in March, when investors shifted funds from prime to government money market funds (Figure 3, panel 5), despite the reintroduction of the Federal Reserve's Commercial Paper Funding Facility on March 17 and inflows resuming into prime funds, especially from institutional investors. It appears that the fall in bond market yields tempted firms to reduce their refinancing risk and substitute commercial paper with longer-term debt.[15] By contrast, commercial paper issuance in the euro area, supported by the European Central Bank's expansion of its commercial paper purchases through the Asset Purchase Programme and the Pandemic Emergency Purchase Programme, rebounded quickly from the March through and hit a record high in June. Incentives to

[15] Li and others (2020) suggest that liquidity rules introduced at the time of the 2016 money market fund reform may not have achieved the goal of making the system immune to runs. See also the discussion in Eren, Schrimpf, and Sushko (2020).

substitute commercial paper with longer-term bonds were weaker in the euro area, because the yield differential remained more stable than in the United States (where it tightened).[16]

Figure 3. Corporate Bond and Commercial Paper Issuance



Sources: Federal Reserve; Haver Analytics; S&P Capital IQ; S&P Leveraged Commentary & Data; and IMF staff calculations.
Note: Bars in panel 1 are truncated at 300. For panels 3 and 4, 2020 data are through end-June. Euro area refers to three euro area economies (France, Germany, Italy). Panel 6 is based on data available as of August 25, 2020. Data as of the first half of the year are used for European Group of Seven economies to account for semiannual reporting of most firms (when first half data are not available, but first quarter data are, the latter are used). LBO = leveraged buyout; M&A = mergers and acquisitions

[16] The Bank of Canada and the Bank of England also introduced commercial paper purchase programs, whereas the Bank of Japan stepped up its existing program. These countries are not shown on the chart for lack of data.

Changes in listed firms' aggregate corporate debt

All in all, the year-over-year growth rate of total debt of listed firms was strong, generally exceeding 10 percent, with notable contributions from credit line drawdowns in Canada and the United States during the first quarter (Figure 3, panel 6).

Changes in corporate cash holdings and corporate deposits

While some of the new funds borrowed were spent to compensate for immediate pressures on cash flow, evidence indicates that this additional borrowing also contributed to a build-up of cash reserves to cope with the uncertainty and the expected reduction in future cash flow triggered by the pandemic shock. In the aggregate, listed firms' cash flow statements for the first half of 2020 reveal an accumulation of cash and short-term investments ranging from about zero percent of assets in Italy to about 2.8 percent of assets in Japan. This behavior contrasts sharply with that observed a year earlier, when cash ratios decreased (Figure 4, panel 1). Comparing the two periods, the differential change in cash levels can be attributed mostly to an increase in financing and a reduction in investment in all seven countries. The accumulation of cash is also visible from nonfinancial corporate deposit data, which reveal a large expansion during both the first and the second quarter, especially in the United States and France (Figure 4, panel 2).

III. CHOICE BETWEEN BOND AND SYNDICATED LOAN ISSUANCE

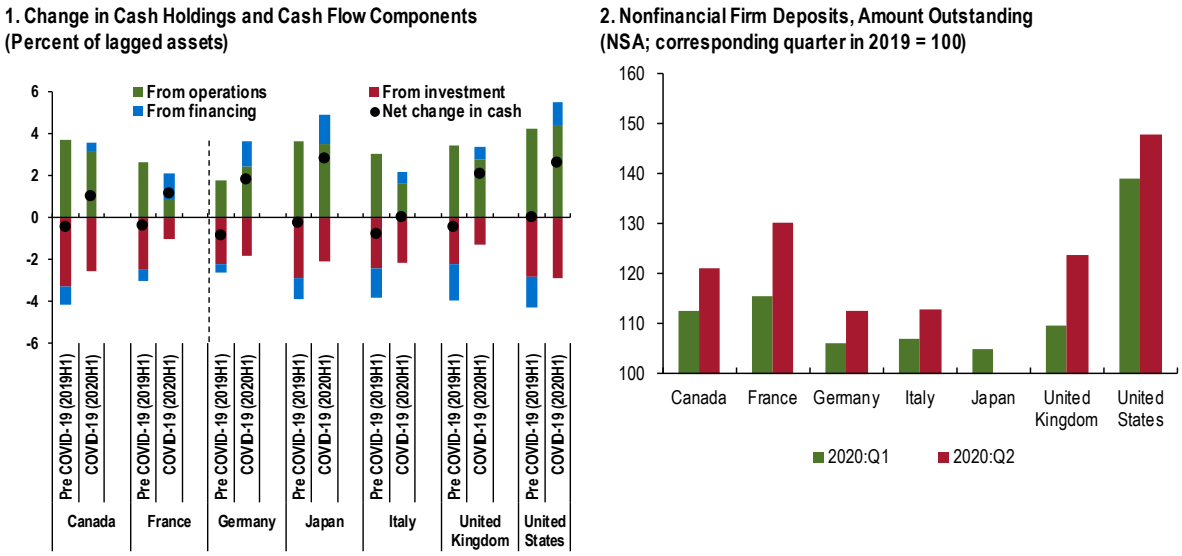
Aggregate developments in bond and syndicated loan issuance discussed in Section II above suggest that, for firms with access to these markets, the bond market clearly was the preferred source of debt financing in the United States, but perhaps not in the other G7 economies. We test more formally this hypothesis through a more granular analysis of the debt financing choice of these firms using a logit model as described below.

Building on Adrian et al. (2013), we ask whether, conditional on the issuance of at least a bond or a syndicated loan, a firm was more likely to issue a bond than a syndicated loan during the first two quarters of 2020, controlling for firm characteristics and credit supply indicators. We exploit data on the quarterly issuance of syndicated loans and corporate bonds in Canada, the euro area, and the United States. Japan and the United Kingdom are excluded because of low sample size. The sample period covers 2000:Q1 to 2020:Q2. Issuer information is matched with data from corresponding corporate financial statements for the end of the quarter preceding issuance. Only issuances for which all explanatory variables are available are considered. A firm-quarter is included in the sample if the firm issued at least one syndicated loan or one corporate bond during that quarter.[17] The number of firms included in the analysis is 163 for Canada, 285 for the euro area, and 1,516 for the United

[17] Syndicated loans consist of loans labeled "Revolving/Term Credit Facility", "Revolving Credit", "Credit Facility", "L/C Facility", "Bridge Facility", "Swingline Facility", "Reducing Revolving Credit", "Overdraft Facility", "Commitment Line", and term loans consist of loans labeled as "Term loan", and "Term loan A-H" in the Dealogic database.

States. Data are winsorized at the 99 percent level to reduce the influence of outliers, and Tobin's Q values greater than 10 are trimmed to 10.

Figure 4. Change in Corporate Cash-to-Assets Ratio and Corporate Bank Deposits



Sources: Bank of Japan; Federal Reserve Board; Haver Analytics; S&P Capital IQ; and IMF staff calculations.
Note: Panel 1 shows the listed nonfinancial firms' quarterly net change in cash as well as the contributions from the three cash flow components. Panel 2 shows the amount of nonfinancial firms' deposits outstanding in the first and second quarters of 2020 compared with the corresponding quarter of 2019. Data for the second quarter are not available for Japan. NSA = not seasonally adjusted.

We estimate the following equation separately for each jurisdiction using pooled maximum likelihood:

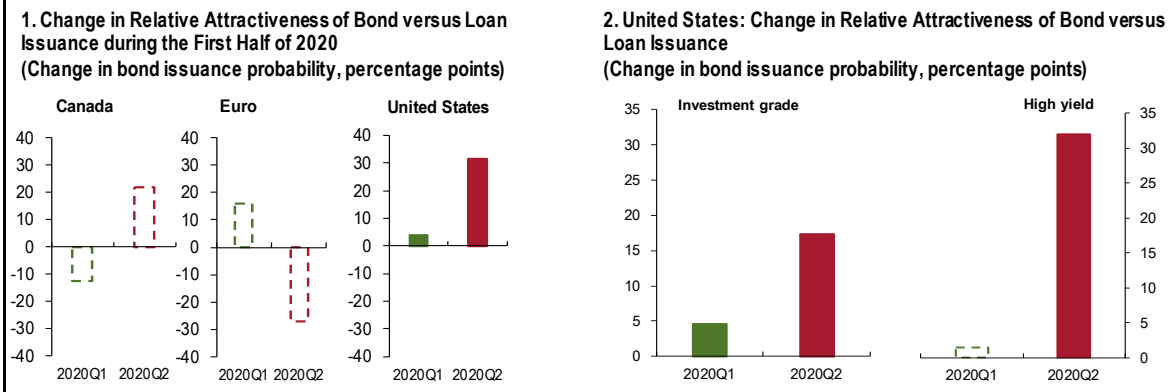
$$log\frac{Prob[Bond\_issuance_{i,t}=1|Char_{i,t},Credit\_supply_t,Crisis_t]}{Prob[Bond\_issuance_{i,t}=0|Char_{i,t},Credit\_supply_t,Crisis_t]} = \alpha+\beta\cdot Char_{i,t}+\gamma\cdot Credit_{supply_t}+\delta\cdot Crisis_t+\varepsilon_{i,t}\,,$$

where $Bond\_issuance_{i,t}$ is a dummy variable equal to one (resp. zero) if firm *i* issues a bond (resp. syndicated loan) in quarter *t*. If firm *i* issues both a bond and a syndicated loan in the same quarter *t*, $Bond\_issuance_{i,t}$ is equal to one if the outstanding amount of bonds issued in the quarter is larger than the amount of syndicated loans. $Char_{i,t}$ is a vector of firm characteristics that includes size, Tobin's Q, asset tangibility, rating, profitability, leverage, and liquidity gap (defined as the ratio of short-term debt minus cash to total assets). $Credit\_Supply_t$ is a vector of variables that captures credit supply conditions and includes the LIBOR-OIS spread and the excess bond premium (EBP—see section II-C below). $Crisis_t$ is a set of time dummy variables including a global financial crisis (GFC) dummy (equal to 1 during 2007:Q3-2009:Q2) and two COVID-19 crisis dummies (one for each of the first two quarters of 2020). [18]

[18] The number of quarter-firms during the first half of 2020 is 40, 70, and 552 for Canada, the euro area, and United States, respectively, and is sufficiently large to carry out the estimation.

Results indicate a shift toward bond financing in the United States but not in other jurisdictions (Figure 5, panel 1). One interpretation of this shift is that the Federal Reserve's March 23, 2020 announcement of new corporate credit facilities had a particularly strong stimulative impact on domestic bond markets.[19,20] Conversely, the fact that the choice between bond and loan financing was not affected in the euro area likely reflects—at least partially— the presence of central bank corporate bond purchase programs predating the pandemic.[21]

Figure 5. Corporate Financing Choice



Sources: Dealogic; Haver Analytics; S&P Capital IQ; and IMF staff calculations.
Note: Panels 1 and 2 show the change in the probability of issuing a bond (versus a loan) for a nonfinancial firm with characteristics equal to the sample mean during the first and second quarters of 2020 compared with before the COVID-19 crisis. Colored bars indicate significance at the 1 percent level. Empty bars indicate lack of statistical significance.

Available data for the United States allow a deeper analysis by market segment. We thus repeat the analysis for investment grade bond issuance versus investment grade loan issuance (IG), and for high yield bond issuance versus syndicated loan issuance (HY).[22] A firm-quarter is included in the sample for the IG exercise, if the firm issued at least one investment grade loan or one investment grade bond during the quarter. Likewise, the sample for the HY exercise consists of the set of firm-quarters for which a firm issued at least one leveraged loan or one high-yield corporate bond during the quarter. We find that the shift toward the bond market happened in both the investment-grade and high-yield segments, with the shift

[19] Thus, a key driver of the shift toward bond financing in the United States is likely to be related to policy rather than to the weakness of banks' balance sheets, as was the case at the time of the global financial crisis (Adrian et al. 2013; Becker and Ivashina 2014). The Federal Reserve corporate credit facilities cover the primary bond and loan markets as well as the secondary bond market. As of November 30, 2020, no purchases had been made on the primary markets (Federal Reserve 2020).

[20] The evidence for the U.S. market is consistent with the findings of Acharya and Steffen (2020).

[21] Like the U.S. Federal Reserve, the Bank of Canada announced its first corporate bond purchase program during the pandemic (on April 15, 2020) but the size of this program was much smaller than the size of the Federal Reserve facilities.

[22] Investment grade loans are the deals labeled "Investment Grade", investment grade bonds are the deals labeled "Investment Grade Corporate Bond", leveraged loans are the deals labeled "Leveraged" or "Highly Leveraged", and high-yield bonds are deals labeled "High Yield" in the Dealogic database.

in the former already visible in the first quarter of 2020, in line with record investment-grade issuance levels in March discussed above (Figure 5, panel 2).[23]

IV. Shifts in Aggregate Credit Supply Conditions

The large increase in borrowing (net of withdrawals from existing credit lines) in March and the second quarter of 2020 was associated with credit spreads that widened sharply in March and subsequently slowly declined (see IMF 2020a). A key reason for the wider spreads is obviously the sharp deterioration in corporate fundamentals and concerns about default risk in all seven economies (Figure 6, panel 1), but a tightening in credit supply may also have played a role.

To assess how much of the widening in spreads can be attributed to adverse credit supply conditions, this section looks at evidence available in different segments of credit markets. For the commercial bank loan market, useful information is obtained from central banks' quarterly surveys of bank lending officers, which measure officers' perception of the strength of credit demand and of the evolution of their banks' lending standards.[24] For the European and US primary syndicated loan markets, an empirical analysis to disentangle credit supply from demand factors is conducted by making use of publicly available transaction-level issuance data. The value of the credit supply shock in each quarter is obtained by computing the time-varying residual term of the credit supply equation. For the secondary corporate bond market, we construct Gilchrist and Zakrajšek (2012)'s excess bond premium to gauge shifts in supply.

Methodology to analyze credit supply in the syndicated loan market

To identify aggregate credit supply shocks in the syndicated loans primary market, we estimate a credit supply and demand system of simultaneous equations and use an identification through heteroscedasticity strategy (Rigobon 2003). The dataset is composed of syndicated loan issuances in the euro area, the United Kingdom, and the United States. Canada and Japan are excluded from the analysis because of their small sample size. A regression-based method following Kapan and Minoiu (2018) is used to impute missing tranche values for each lender in each transaction. The sample period covers 2010:Q1 to 2020:Q2 for the euro area and the United Kingdom, and 2005:Q1 to 2020:Q2 for the United States. Issuer information is matched with data from corresponding quarterly corporate financial statements and lender information is matched with data from corresponding quarterly bank financial statements. Only issuances for which all explanatory variables are

[23] One factor likely contributing to the large volume of high-yield bond issuance in the United States in the second quarter was the announcement on April 9, 2020, by the Federal Reserve that the scope of its new corporate credit facilities would be extended to high-yield exchange-traded funds and bonds and loans from firms that lost their investment-grade status after March 22, 2020.

[24] An important caveat in interpreting results of bank lending officers' surveys is that they do not always clearly distinguish between changes in default risk and changes in credit supply in the definition of lending standards.

available are included. The sample contains 5,086 loans provided by 220 banks, and the estimation is carried out separately for each jurisdiction.

To identify the effect of credit supply shocks on the spread, accounting for the endogenous effect of the spread on issuance volume, we use the following supply-demand system of equations is used:

$$\begin{pmatrix} 1 & -\phi_s \\ 1 & -\phi_d \end{pmatrix} \begin{pmatrix} \log(spread_{it}) \\ \log(volume_{it}) \end{pmatrix} = \begin{pmatrix} \alpha_i \\ \beta_i \end{pmatrix} + A \begin{pmatrix} \log(spread_{it-1}) \\ \log(volume_{it-1}) \end{pmatrix} + \gamma [Controls]_{it} + \begin{pmatrix} e_{it} \\ u_{it} \end{pmatrix},$$

where i refers to a bank and t to a quarter, α_i and β_i are bank fixed effects, $spread_{it}$ is a weighted average of all the contractual spreads of loans, $volume_{it}$ is the weighted average of the volume of loans, $[Controls]_{it}$ is a set of predetermined variables which could affect either credit demand or supply and includes the weighted average of the logarithm of the maturity and of the tranche rating, and some bank-specific characteristics (capital ratio, nonperforming loan ratio, loan-to-asset ratio, and return on average equity).[25]

Since the right-hand-side variables include the first lag of spread and volume, and the left-hand-side variables are contemporaneous, this system of equations can be characterized as a bank-level bivariate structural panel vector autoregression (VAR). The contemporaneous relationship between spread and volume is captured by the two price elasticities ϕ_s and ϕ_d. With a positive supply price elasticity ϕ_s and a negative demand price elasticity ϕ_d, the terms e_{it} and u_{it} are interpreted as supply and demand shocks, respectively.

The identification through heteroscedasticity strategy proceeds in four steps. First, using a bank-level unbalanced panel dataset on loan volumes and associated spreads, we estimate the reduced form bivariate panel VAR model with ordinary least squares. Second, assuming the shock process is heteroscedastic because of multiple regimes, we compute the variance-covariance matrix of volumes and spreads. For the euro area and the United Kingdom, the sample period is divided into two regimes: (i) 2010:Q1-2019:Q4 (before the onset of COVID-19 crisis) and (ii) 2020:Q1-Q2 (COVID-19 crisis). For the United States, the sample period is divided into five regimes: (i) 2005:Q1-2007:Q2 (before the GFC), (ii) 2007:Q3-2009:Q1 (during the GFC), (iii) 2009:Q2-Q4 (recovery after the GFC); (iv) 2010:Q1-2019:Q4 (before the onset of the COVID-19 crisis) and (v) 2020:Q1-Q2 (COVID-19 crisis).[26]

Third, to ensure that the sign conditions regarding price elasticities and volatilities are satisfied, we perform exponential transformation as follows:

$\phi_d = -\exp(\psi_d)$, and $\phi_s = \exp(\psi_s)$
and
$\sigma_{d,n} = \exp(\omega_{d,n})$ and $\sigma_{s,n} = \exp(\omega_{s,n})$,

[25] The tranche rating is captured by the Dealogic composite rating, which is based on the tranche ratings by Fitch Ratings, Moody's, and Standard & Poor's.

[26] Regimes around the GFC follow time periods in Adrian et al. (2013).

where $\sigma_{d,n}$ and $\sigma_{s,n}$ and the standard deviations of the demand and supply shocks in regime n respectively, where $n \in \{1,2\}$ for the euro area and the United Kingdom, and $n \in \{1,2,3,4,5\}$ for the United States.

Fourth, with the estimate of the price elasticities of credit supply $\widehat{\phi_s}$ in hand, we compute the aggregate credit supply shock as the residual $\widehat{e_t}$ of the aggregate supply equation.

$$\overline{\log(spread_t)} = \alpha + \widehat{\phi_s}\,\overline{\log(volume_t)} + \hat{A}_{ds}\overline{\log(spread_{t-1})} + \hat{A}_{ss}\overline{\log(volume_{t-1})} + \hat{\gamma} \cdot \left[\overline{Controls_t}\right] + \widehat{e_t},$$

where $\bar{\cdot}$ is the operator that takes a simple average over all banks and α is the average bank fixed effect in the supply equation.

Methodology to analyze credit supply in the secondary bond market

To assess credit supply conditions in the secondary bond market, we follow Gilchrist and Zakrajšek (2012)[27] to construct the excess bond premium (EBP). The dataset comprises monthly secondary market corporate bond yields in the euro area Japan, and the United Kingdom. Canada is excluded because of the small sample size. We do not compute the EBP for the United States because it is readily available from the U.S. Federal Reserve Board. The sample period is 2005:M1 to 2020:M6. Corporate bonds included in the sample are limited to unsecured straight bonds with fixed coupon issued with a maturity shorter than 30 years. Only bonds for which information on all explanatory variables is available are included. Their number is 70 for the euro area, 1,286 for Japan, and 53 for the United Kingdom. Estimations are carried out for each jurisdiction separately.

We proceed as follows. First, for each individual bond i issued by firm j, we construct the so-called GZ spread, defined as the spread against a hypothetical safe bond that would deliver the same cash flows. We use an OIS-based zero coupon rate curve to construct the safe yield. The cash flows are replicated based on the bond characteristics including coupon rate, coupon schedule, and maturity. Second, we obtain the monthly excess bond premium of each individual bond as the residual $\hat{e}_{ijt}$ of the following panel regression:

$$\begin{aligned}\log(GZspread_{ijt}) = {} & \alpha_j + \beta \cdot PD_{jt} + \gamma_1 \cdot \log(Outstanding_{ij}) + \gamma_2 \cdot \log(Coupon_{ijt}) + \gamma_3 \\ & \cdot \log(Maturity_{ijt}) + \gamma_4 \cdot \log(Age_{ijt}) + \gamma_5 \cdot I(Callable_{ijt}) + \gamma_6 \cdot Level_t + \gamma_7 \cdot Slope_t \\ & + \gamma_8 \cdot Curvature_t + [Interactions\ with\ Level_t] + [Interactions\ with\ Slope_t] \\ & + [Interactions\ with\ Curvature_t] + e_{ijt},\end{aligned}$$

where α_j is a firm fixed effect, PD_{jt} is Moody's KMV 1-year expected default frequency, Age_{ijt} is the number of days past since the issuance, and $I(Callable_{ijt})$ is a dummy variable equal to 1 when the bond is callable. $Level_t$, $Slope_t$, and $Curvature_t$ are factors extracted from the OIS-based zero-coupon rate curve by a dynamic factor model à la Diebold and Li (2006). $[Interactions\ with\ Level_t]$, $[Interactions\ with\ Slope_t]$, and $[Interactions\ with\ Curvature_t]$ are

[27] Similar exercises have been conducted in the literature (e.g., Anderson and Cesa-Bianchi 2020; De Santis 2016; Favara and others 2016; Suganuma and Ueno 2018; and Leboef and Hyun 2018).

interactions between all time-varying firm/bond-specific variables included in the equation and the respective interest rate factors. The only difference between this specification and that used in Gilchrist and Zakrajšek (2012) is the inclusion of firm fixed effects. Third, the economy-level EBP is defined as the median over firm j of the average of individual EBPs $\hat{e}_{ijt}$ over bond i during each quarter. Namely,

$$EBP_t \simeq median_t\left(\frac{1}{N_{j,t}}\sum_{i=1}^{N_{j,t}}\hat{e}_{ijt}\right),$$

where $N_{j,t}$ is firm j's number of outstanding bonds during quarter t.[28]

Discussion of the evidence on aggregate shifts in credit supply

Survey-based evidence indicates that the commercial bank loan market in the United States was an outlier across countries in the second quarter. Credit demand fell and lending standards tightened sharply, while the evolution was generally muted or the opposite in the other G7 economies.[29] In particular, a large loosening of credit conditions was observed in Japan and the United Kingdom (Figure 6, panel 2).[30] This stands in sharp contrast to the experience during the global financial crisis, when surveys indicate that banks tightened lending standards consistently across the board. The situation in the current crisis is likely related to the fact that banks' indicators of funding stress spiked only briefly in late March before normalizing thanks to the speed of policy support to financial markets and the economy, as well as to the effect of government programs to support lending to businesses (Bank of England 2020; European Central Bank 2020).[31]

Turning to supply conditions in the syndicated loan and bond markets, the divergence across the two markets during the second quarter in the United States is striking. The top part of Figure 6, panel 3, shows the time series of the credit supply shock in the syndicated loan market. Credit conditions were neutral in the first quarter, on average, and tightened during the second quarter, bringing the market into a tight position, though not as tight as in the aftermath of the global financial crisis. By contrast, the bottom part of the same panel, which shows supply conditions in the secondary bond market, reveals that a large part of the March

[28] Gilchrist and Zakrajšek (2012) define the economy wide EBP as the mean of the e_{ijt} rather than the median. We prefer using the median because our sample size is smaller, and the median is less affected by the presence of outliers than the mean.

[29] The evolution of the index for the United States indicates only that the tightening of lending standards was widespread, not that it was intense. However, the text describing the survey results makes it clear that lending standards were tight and explains that "banks, on balance, reported that their lending standards across all loan categories are currently at the tighter end of the range of standards between 2005 and the present" (Board of Governors of the Federal Reserve System 2020).

[30] In the United Kingdom, the survey question refers to the "availability of credit" rather than to lending standards per se. The two notions are different in the presence of government loan guarantees, which may explain part of the difference between the United Kingdom and the euro area economies.

[31] The total amount of credit line drawdowns could also be a factor explaining the tightening of lending standards in the United States because it reduced the amount of bank capital available for new lending and it made the risk that a large share of off-balance sheet credit line exposures might come on balance sheet more salient (Kapan and Minoiu 2020).

tightening was undone during the second quarter. Aside from the stimulative effect of the introduction of the Federal Reserve corporate credit facilities mentioned previously, two supply-side considerations may explain the buoyancy of the US bond market. First, with short-term rates near zero and Treasury purchases by the Federal Reserve bringing down term premiums, investors' search for yield pushed them toward yield-providing assets, especially those within the perimeter of central bank support. Second, expectations of no rise in the policy rate for several years reduced investors' incentives to get exposure to floating rates. As syndicated loan rates are mostly floating and bond rates are mostly fixed, some investors may have found bonds relatively more attractive in this current environment. A separate analysis for investment-grade syndicated loans and leveraged loans indicates that conditions moved from easy to tight during the second quarter in both segments.[32]

The dynamics of credit conditions in the United Kingdom's bond market mirrored those in the United States, but no tightening was observed in the syndicated loan market, on average (Figure 6, panel 4). A yield curve that shifted toward zero, as in the United States, may also have contributed to making the corporate bond market attractive to investors. In the euro area, where key policy rates remained unchanged around zero, bond market conditions continued to be broadly neutral, on average, during the first half of the year, but a clear loosening of conditions took place in the loan market during the second quarter (Figure 6, panel 5). In Japan, the March bond market tightening persisted through the end of June, but overall risk aversion was within the normal range observed over the past decade (Figure 6, panel 6).

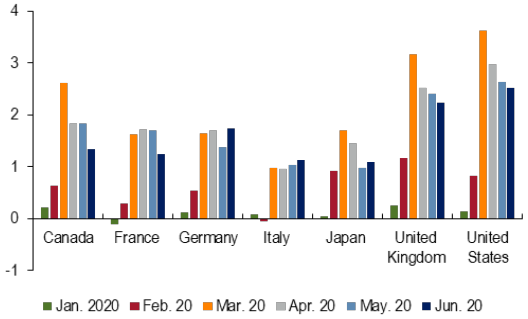
All in all, the evolution of the excess bond premium suggests that conditions in bond markets were generally favorable during the second quarter, especially in the United Kingdom and the United States. In the United States, however, bank lending standards were tight, and this country was a clear outlier in the bank loan market compared with the other G7 economies, where the change in lending standards ranged from a small tightening to a large easing. These differences across economies and markets likely reflect the relative strengths of the different policy responses targeting the two markets, in particular the scope of government-sponsored loan guarantee programs as well as investors' search for yield in an environment of ultra-low interest rates and shifting expectations about future policy rates.[33]

[32] Loan covenant quality in North America continued to weaken during the first quarter, reaching its all-time worst level (according to Moody's)—to the benefit of borrowers who would need that flexibility during the crisis (Moody's Investors Service 2020).

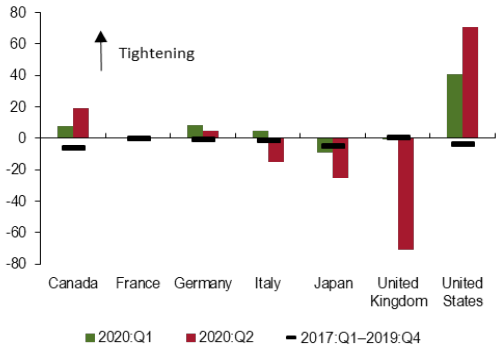
[33] It is plausible that, in each country, the structure of the financial sector (for example, market-based versus bank-based) played a role in the choice of policy instruments and calibration of the policy response across different markets, which in turn may explain the relative dynamics of supply conditions in the various markets.

Figure 6. Evolution of Credit Supply Conditions

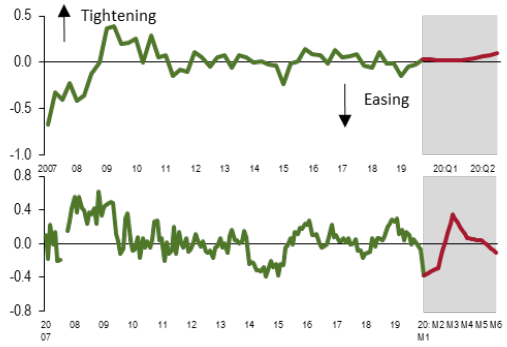
1. One-Year Expected Default Frequency of Nonfinancial Firms Rated between Baa1 and B3 at the End of 2019, End of Period, 75th Percentile
(Difference from end-2019, percent)



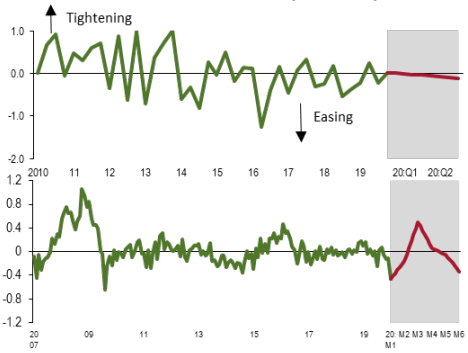
2. Change in Bank Lending Standards
(Index; see note for details)



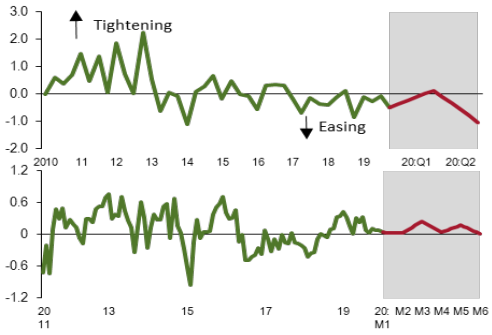
3. Credit Supply Conditions in the United States
(Top: syndicated loan market, spread residual, percent—quarterly; bottom: bond market, excess bond premium, percent—monthly)



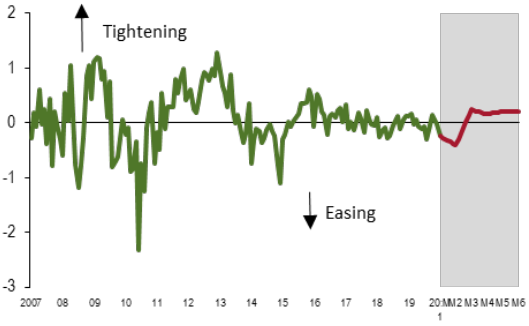
4. Credit Supply Conditions in the United Kingdom
(Top: syndicated loan market, spread residual, percent—quarterly; bottom: bond market, excess bond premium, percent—monthly)



5. Credit Supply Conditions in the Euro Area
(Top: syndicated loan market, spread residual, percent—quarterly; bottom: bond market, excess bond premium, percent—monthly)



6. Credit Supply Conditions in Japan
(Bond market, excess bond premium, percent—monthly)



Sources: Bank of Japan; Bloomberg Finance L.P.; Dealogic; Federal Reserve Board; Haver Analytics; Moody's Analytics; Refinitiv Datastream, Eikon; S&P Market Intelligence; and IMF staff calculations.
Note: Panel 1 shows the change in the 75th percentile of the one-year end-of-period expected default frequency of nonfinancial firms rated between Baa1 and B3 (lower medium grade to highly speculative grade) at the end of 2019 in each Group of Seven country between the end of 2019 and each of the first six months of 2020. Panel 2 shows the quarter-on-quarter change in bank lending standards from the bank lending survey conducted by respective central bank; change is shown in the form of an index ranging from -100 to 100. Canada, euro area economies, and the United Kingdom report a balance of opinions weighted by asset size with a base value of 0; Japan reports a balance of opinion weighted by the level of easing or tightening; the United States reports an unweighted balance of opinion in two categories by firm size (large versus small); and the figure shows the simple average of the two. Credit conditions in Canada and in the Japanese syndicated loan market could not be computed because of insufficient data. M = month.

V. PRE-COVID-19 FIRM LIQUIDITY VULNERABILITIES AND RELATIVE STOCK MARKET PERFORMANCE

To complement the aggregate analysis presented in the previous section, we perform a comparison between the stock market performance of firms most vulnerable to funding shocks and that of other, less vulnerable firms. In what follows, the analysis focuses on vulnerabilities to funding liquidity shocks measured at the end of 2019 along three dimensions: (1) small size (low total assets), (2) low cash relative to industry peers (as a share of total assets), and (3) high short-term debt net of cash and short-term financial investments (as a share of total assets).[34] We examine the effect of these three vulnerabilities over and above the effect of leverage-related vulnerabilities, which clearly amplified the effect of the negative cash flow shock related to COVID-19 in five of the seven economies (Figure 7, panels 1 and 2).

We analyze how firms' degree of financial vulnerability at end-2019 mattered for their relative stock market performance during various phases of the pandemic. All G7 listed nonfinancial firms with matching end-2019 financial statements data are included in the sample.[35] The sample contains 388 firms for Canada, 376 firms for France, 316 firms for Germany, 220 firms for Italy, 2750 firms for Japan, 548 firms for the United Kingdom, and 1631 firms for the United States. The sample period covers January 1, 2019 to June 30, 2020.

We use a standard event study methodology, which can be described as follows. After choosing an event start date T_1 and end date T_2 , we compute firm i's cumulative abnormal return (CAR) between days $T_1 \, and \, T_2$:

$$CAR_i(T_1,T_2) = \sum_{t=T_1}^{T_2} Abnormal\ Return_{i,t} \, ,$$

where daily abnormal returns on day t are calculated based on a standard capital asset pricing model (CAPM) model whose parameters are estimated from a regression of daily firm-level stock returns on daily domestic market returns during 2019.[36] CARs are computed for the time period from February 3, 2020 to March 31, 2020, and from Feb 3, 2020 to June 30, 2020.

As explained above, we are mainly interested in the effect of three indicators of vulnerability (size, relative cash, liquidity gap) at end-2019 on stock market performance. Given the rise in nonfinancial corporate sector leverage in several G7 economies during the period preceding COVID-19, as documented in IMF (2019b), we also examine the impact of high corporate

[34] A high level of short-term debt net of cash exposes a firm to rollover risk. A low level of cash reduces a firm's room to maneuver in case credit conditions tighten (see, for example, Joseph and others 2020).

[35] We apply a series of filters to the raw data. First, observations are dropped on an economic basis when values are incompatible with the economic content of the data. Specifically, we keep observations only if their market capitalization, total assets, and total revenues are positive, if their leverage ratio is below 1, and if their cash-flow-to-total-assets ratio is greater than -2. Second, we filter observations on a statistical basis, by eliminating those for which a variable takes a value below the first percentile or above the 99th percentile of each country-specific variable distribution. Finally, to avoid bias from market illiquidity, we drop firms that traded less than 60 days in 2019.

[36] We checked that the results are robust to using abnormal returns based on a three-factor Fama-French model instead of the CAPM model.

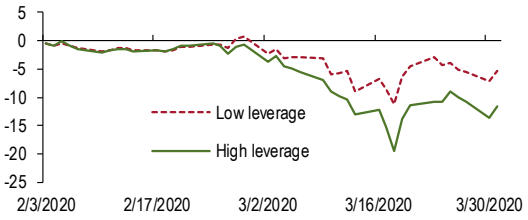
indebtedness on firms' financial stress during this period. We therefore run the following cross-sectional regressions:

$$CAR_i(T_1,T_2) = \beta_{T_1,T_2}\, High\ Vulnerability_i + \gamma_{T_1,T_2} Controls_i + \epsilon_{i,T_1,T_2},$$

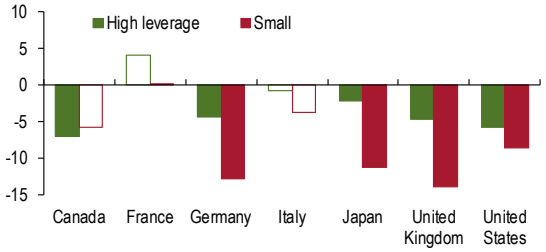
Where $High\ Vulnerability_i$ is an indicator variable equal to one when a firm is identified as vulnerable. High vulnerability corresponds to size in the lowest tercile, relative cash in the lowest tercile, liquidity gap in the highest tercile, or leverage in the top half of the distribution at the end of 2019. Firm-level controls include the book-to-market ratio, Tobin's Q, and the EBITDA-to-total assets ratio (all as of end-2019), a sectoral dummy based on SIC2 classification, and change in 12-months ahead consensus sales forecast between 2019:Q2 and 2020:Q2 to capture the firm-specific impact of the COVID-19 shock on the demand for a firm's products.[37] High-leverage (resp. small size) is also controlled for with an indicator variable equal to one when the total debt-to-asset ratio (resp. total assets) is above the median (resp. below the first tercile) of the end-2019 distribution in the relevant country. The specification is estimated separately for each G7 economy. The coefficient of interest is β_{T_1,T_2}, and represents the differential impact of macrofinancial developments between T_1 *and* T_2 on the most vulnerable firms relative to other firms.

Figure 7. Firm-Level Stock Market Performance

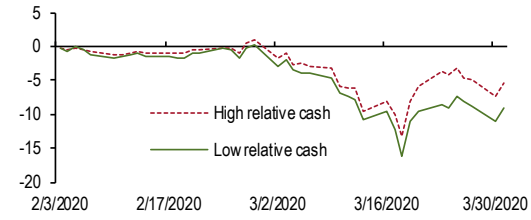
1. Cumulative Abnormal Return of US Firms with Low and High Leverage during February–March 2020
(Percent)



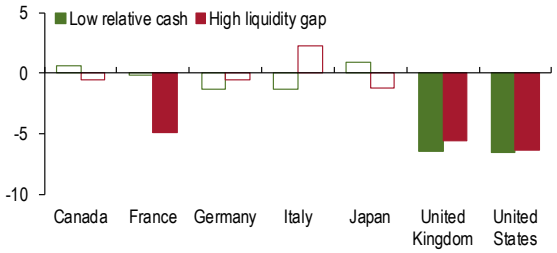
2. High-Leverage Firms' and Small Firms' Relative Equity Performance during February–March 2020
(Percentage points)



3. Cumulative Abnormal Returns of US Firms with Low and High Relative Cash during February–March 2020
(Percent)



4. Liquidity-Poor and Cash-Poor Firms' Relative Equity Performance during February–March 2020
(Percentage points)



Sources: Refinitiv Datastream; S&P Capital IQ; and IMF staff calculations.
Note: Firm characteristics are as of the end of the fourth quarter of 2019. Leverage in panels 1 and 2 is defined as the debt-to-asset ratio. A high-leverage (low-leverage) firm is one in the top (bottom) half of the leverage distribution. In panels 2 and 4, equity performance is based on cumulative abnormal returns during February 3–March 31, 2020, and firm-level characteristics are controlled for. "Relative cash" is defined as in Joseph and others (2020), and a low-relative-cash (high-relative-cash) firm is one in the lowest (highest) tercile of the relative cash distribution. "Small" is defined as being in the lowest tercile of the distribution of total assets. "Liquidity gap" is defined as total short-term financing minus cash and short-term investments as a ratio of total assets. A high-liquidity-gap firm is one in the highest tercile of the distribution. Solid colored bars indicate statistical significance at the 5 percent level. Empty bars indicate lack of statistical significance at conventional levels.

[37] When no such forecast is available, we use the 2-digit industry sales forecast (except for the U.S. where we use the 3-digit sales forecast).

Evidence of relatively greater financial stress measured by cumulative abnormal returns is pervasive for relatively smaller firms. Their underperformance during February–March in Germany, Japan, the United Kingdom, and the United States was close to, or greater than, 10 percentage points (Figure 7, panel 2). Furthermore, firms that entered the COVID-19 crisis with relatively high liquidity vulnerabilities also experienced relatively greater financial stress than those with higher liquidity buffers in some economies during late February and March. Panel 3 of Figure 7 shows the cumulative abnormal returns of two groups of US firms: those with low and high relative cash. While the stock market performance of the two groups is indistinguishable until late February, a wedge in favor of the latter group appears at that time and becomes wider during the second half of March. Our more formal econometric investigation, which controls for a number of firm characteristics (including the industrial sector) at the end of 2019 as well as the expected size of the pandemic-related revenue shock, confirms that visual impression: firms with relatively less cash suffered more financial stress in the United Kingdom and the United States, and those with a relatively higher level of short-term debt (net of cash) suffered more in France, the United Kingdom, and the United States (Figure 7, panel 4).[38] In these five cases, the underperformance of firms with liquidity vulnerabilities between early February and end-March was about 5 percentage points.

VI. The Impact of Policy Announcements on Relative Stock Market Performance

In our final section, we attempt to gauge the effect of policy announcements on corporate funding constraints. Precise measurement of the effects of policy announcements and actions in the context of the COVID-19 crisis is an extremely challenging task. A variety of policy measures—monetary, fiscal, and financial sector—were announced over a short period of time, sometimes on the same day, making it difficult to isolate their effects. Important details of announced policy packages were sometimes released with a lag, and policy measures announced on different days could have had strong complementarities. Furthermore, because many of the economic policy measures announced early on in the crisis were concurrent with negative news about the progression of the pandemic and its effect on the real economy and financial markets—as well as with the announcement of containment policy measures imposing restrictions on economic activity—assessment of their impact is extremely difficult.[39]

In the face of these challenges, and with full acknowledgment of the associated limitations, we follow two simple approaches to try to gauge the impact of key policy announcements on corporate funding liquidity stress. First, we examine the effect of policy announcements on the relative stock market performance of the most vulnerable firms over a horizon of two trading days, taking into account the negative impact of global financial market volatility

[38] The finding for the United Kingdom echoes that of Joseph and others (2020).

[39] For example, the March 12 announcement by the Federal Reserve Bank of New York of new large repo operations coincided with one of the worst declines in US stock market history. The announcement, however, was a surprise and took place in the middle of the trading day, at a time when the intraday decline was already very large.

during days when it was extreme.[40,41] Second, we assess the overall impact of the policy response by extending (to the end of June) the analysis of the relative stock market performance of groups of vulnerable firms that were found in the previous section to have underperformed during February–March. In both cases, several firm characteristics are controlled for. As in the previous section, the relative performance of firms most vulnerable to adverse funding liquidity shocks (controlling for solvency and other firm characteristics) is interpreted as a symptom of changing credit supply conditions. The focus on those firms is not meant to suggest that policies explicitly targeted them but that policies to support the economy (and credit provision in particular) may have benefited them relatively more.

To assess the impact of policy announcements on firms' relative stock market performance, we first gather data on monetary, fiscal, and financial sector policy announcements between February 1st and June 30th, 2020 from the Yale Program on Financial Stability database, and complement it with information from the IMF COVID Policy Tracker, official sector press releases, and press reports. The latter two sources are also used to obtain information on the time of the policy announcements during the day. A policy announced before (resp. after) market close on day *d* is associated with trading day *d* (resp. *d+1*). The paper focuses on key policy measures that supported corporate funding directly or indirectly. Their selection is based on judgment and their list is provided in Appendix 2. The sample comprises 128 policy announcements and 63 announcement days. Panel 1 of Figure 8 shows the monthly number of key announcements and announcement days in the sample. The size and speed of policy action were unprecedented, with the number of key measures skyrocketing to 87 in March 2020. Policymakers often announced multiple measures on a single day, such that the total number of measures greatly exceeds the number of days with policy announcements. Panel 2 of Figure 8 plots the number of announcements, by category and country.[42]

Early central bank measures focused on market liquidity and policy rate cuts. Central banks also significantly expanded asset purchase programs. In the United States, the Federal Reserve reactivated several programs implemented during the GFC, such as the Term Asset-Backed Securities Loan Facility and the Commercial Paper Funding Facility. Yet, central bank responses to the COVID-19 crisis differed from those in response to the GFC. At that time, when the financial system was impaired, central banks supported selected markets and intermediaries to keep credit flowing to the economy. In response to the COVID-19 crisis, central banks intervened more directly to ensure firms' ability to obtain funding and to promote financial and macroeconomic stability in the sectors most exposed to the pandemic. New facilities focused on the purchase of corporate bonds and loans in the primary market, the purchase of corporate bonds in the secondary market, as well as on direct incentives to provide lending to nonfinancial firms. Government actions included the provision of loans and guarantees to businesses as well as measures to directly support corporate cash flows. To

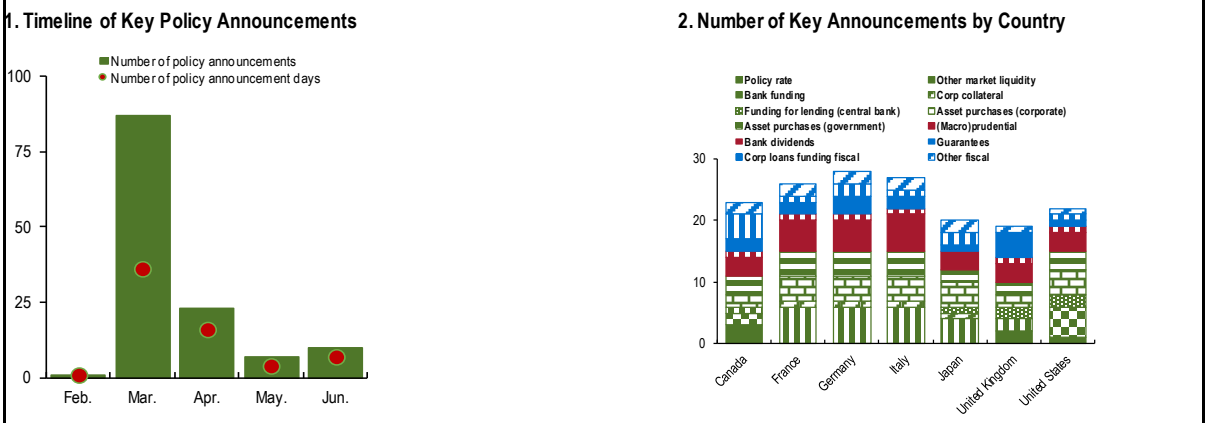
[40] The analysis does not try to assess whether program eligibility mattered for firms' financial performance.

[41] Global financial market volatility is defined as extreme when the Chicago Board Options Exchange Volatility Index (VIX) is above the 80th percentile of its distribution during February–June 2020.

[42] Measures taken by the European Central Bank or the European Union are included for each of the three euro area economies.

support bank lending, supervisors released countercyclical capital buffers wherever they had been activated, introduced restrictions on payouts to shareholders, and encouraged making use of the flexibility of loan classification and provisioning rules.

Figure 8. Key Policy Announcements in Group of Seven Economies, February–June 2020



Sources: Yale School of Management Program on Financial Stability; and IMF COVID-19 Policy Tracker. Corp = corporate.

With the policy data in hand, we pool intervention days across countries in the period from February 3, 2020 to June 30, 2020, and estimate the following model:

$$Abnormal\ Return_{i,j,k,t} = \sum_{v=1}^{3} \beta_v High\ Vulnerability_{i,j,k,v} + \sum_{v=1}^{3} \sigma_v High\ Vulnerability_{i,j,k,v} \times High\ VIX_t + \rho Controls_{i.j.k} + \lambda Controls_{i.j.k} \times High\ VIX_t + \theta_{k,t} + \lambda_j + \epsilon_{i,j,k,t},$$

Where i is firm, j is sector, k is country, t is trading day, and v is a type of vulnerability. As previously, three vulnerabilities enter the regression simultaneously: either (low relative cash, small size, high leverage) or (high liquidity gap, small size, high leverage). The dependent variable is calculated by averaging firms' abnormal returns in the two-day period including the date of the policy announcement and the following day. Controls include the book-to-market ratio, Tobin's Q, cash-flow-to-total assets ratio and the pandemic-related revenue shock proxy as above. $High\ VIX_t$ is a dummy variable equal to one whenever the daily level of the VIX is above the 80th percentile of the VIX distribution in the period from February 3, 2020 to June 30, 2020. This variable captures the time-varying effect of extreme volatility on firms with different characteristics. $\theta_{k,t}$ are country-date fixed effects and λ_j are 2-digit industry fixed effects. Standard errors are clustered at the industry and country-date levels. The coefficients of interest are the β_v coefficients.

Policy announcements appear to have had a positive effect on the relative stock market performance of smaller firms (relative to larger firms) as well as on those with high leverage (relative to those with low leverage). Pooling all 63 announcement days in the sample, this

effect amounts to about 0.3 percentage point of overperformance a day over two days for smaller firms and about 0.1 percentage point a day over two days for high-leverage firms. By contrast, no significant effect can be found for firms with liquidity vulnerabilities (Figure 9, panel 1). Given the small number of announcement days, identifying significant effects at the country level is challenging. Yet the data suggest a positive effect for small firms in Canada and for small firms and high-leverage firms in Japan.

Direct versus indirect measures

It is plausible that some types of vulnerable firms were more affected by certain types of policy announcements than others. Some policies, such as government guarantees or purchases of corporate securities by central banks, have a *direct* impact on corporate funding and solvency, whereas others, such as macroprudential measures or changes in financial sector regulation, have only an *indirect* impact. We therefore extend the analysis by studying the differential impact of different types of interventions on the abnormal returns of vulnerable firms.

To study the differential impact of different types of interventions on the abnormal returns of vulnerable firms, we enrich the above model as follows:

$$
\begin{aligned}
Abnormal\ Return_{i,j,k,t} = & \sum_{v=1}^{3} \beta_v High\ Vulnerability_{i,j,k,v} + \\
& \sum_{v=1}^{3} \sigma_v High\ Vulnerability_{i,j,k,v} \times High\ VIX_t + \\
& \sum_{v=1}^{3} \eta_v High\ Vulnerability_{i,j,k,v} \times Direct\ Policy_{k,t} + \\
& \sum_{v=1}^{3} \omega_v High\ Vulnerability_{i,j,k,v} \times High\ VIX_t \times Direct\ Policy_{k,t} + \\
& \rho Controls_{i.j.k} + \lambda Controls_{i.j.k} \times High\ VIX_t + \theta_{k,t} + \lambda_j + \epsilon_{i,j,k,t},
\end{aligned}
$$

Where $Direct\ Policy_{k,t}$ is a dummy variable equal to one for policy announcement days when the set of policy interventions included at least one that targeted the corporate sector directly. The coefficients of interest are the η_v, which measure the differential effect of policy announcements that included direct measures on firms with high vulnerability relative to policy announcements that included only indirect measures.

Comparing announcement days when at least one policy with a *direct* impact was announced with those when policies with only an *indirect* impact were announced, it appears that policies with a *direct* impact benefited firms with liquidity vulnerabilities relatively more.[43]

[43] When estimated separately, the effect of measures with an indirect impact is not statistically significant. It is plausible that such measures, including changes in financial sector regulation or macroprudential policy, take longer to have an effect on financing conditions for nonfinancial firms than measures with a direct impact. Among measures with a direct impact, the announcements of on-budget fiscal measures supporting firm solvency appear to have been the most powerful: excluding announcement days when such measures were

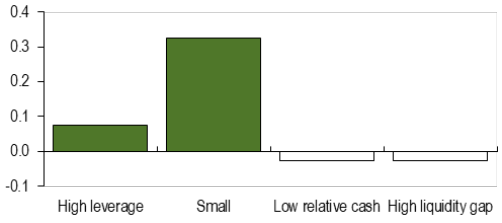
Continued

The effect amounts to 0.2 percentage point of overperformance a day over two days for liquidity-poor firms and to 0.13 percentage point a day over two days for cash-poor firms (Figure 9, panel 2). No difference across types of policies is observed for high-leverage firms and small firms.[44]

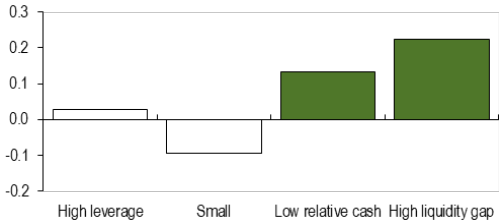
The analysis of the stock market performance of vulnerable firms through the end of June confirms that stress at smaller firms had generally disappeared by then—except in the United Kingdom, where it remained significant—while strains in high-leverage firms remained in Germany and Japan (Figure 9, panel 3). Stress at firms with liquidity vulnerabilities, however, persisted in France, the United Kingdom, and the United States (Figure 9 panel 4), echoing findings from the aggregate analysis of the loan markets in the US economy.

Figure 9. The Effect of Policies on Vulnerable Firms

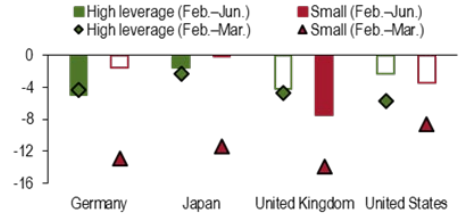
1. Effect of Policy Announcements on the Relative Equity Performance of Vulnerable Firms
(Percentage points, average effect over two days)



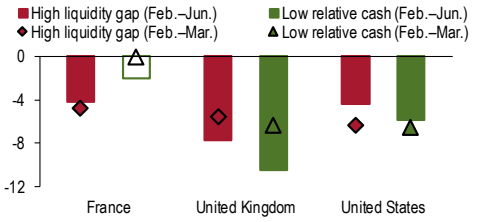
2. Relative Effect of Announcements of Policies Targeting the Corporate Sector Directly on the Relative Equity Performance of Vulnerable Firms
(Percentage points, average effect over two days)



3. High-Leverage and Small Firms' Relative Equity Performance during February–June 2020
(Percentage points)



4. Cash-Poor and Liquidity-Poor Firms' Relative Equity Performance during February–June 2020
(Percentage points)



Sources: IMF, COVID Policy Tracker; press releases and press reports; Refinitiv Datastream; S&P Capital IQ; Yale Program on Financial Stability; and IMF staff calculations.
Note: In panels 1 and 2, the effect of policy announcements is calculated net of the effect of extreme volatility, and equity performance is based on cumulative abnormal returns on the day of the policy announcement and the following day. Leverage is defined as the debt-to-asset ratio. A high-leverage (low-leverage) firm is one in the top (bottom) half of the leverage distribution "Relative cash" is defined as in Joseph and others (2020), and a low-relative-cash (high-relative-cash) firm is one in the lowest (highest) tercile of the relative cash distribution. "Small" is defined as being in the lowest tercile of the distribution of total assets. "Liquidity gap" is defined as total short-term financing minus cash and short-term investments as a ratio of total assets. A high-liquidity-gap firm is one in the highest tercile of the distribution. In panels 3 and 4, equity performance is based on cumulative abnormal returns during February 3–June 30, 2020. Solid colored bars indicate statistical significance at the 5 percent level. Empty bars indicate lack of statistical significance at conventional levels.

announced, the difference between the effect of measures with a direct impact and those with an indirect impact loses significance. Among the other four types of measures with a direct impact, corporate asset purchase programs appear to have been relatively more powerful.

[44] While it is very plausible that major policy announcements in the United States had positive spillover effects on other G7 countries, spillover analysis is impeded by the occasional concurrence of major announcements in the United States with those in the other countries. Focusing on days when an announcement was made in the United States only, no evidence can be found that the announcement had a positive effect on the relative performance of vulnerable firms in other G7 countries. Spillovers to emerging markets are discussed in Paper 2 of this report.

VII. CONCLUSION

In this paper, we provide evidence that the tightening of credit conditions that took place across G7 economies in March 2020 as the COVID-19 pandemic gathered momentum was quelled to a very large extent thanks to an unprecedented set of powerful policy interventions. Despite the deterioration in its solvency, the nonfinancial corporate sector, as a whole, was generally able to obtain the funding it needed to continue operating during the second quarter.[45] Yet signs of tighter credit conditions also surfaced during the second quarter in some segments of the credit market or did not fully dissipate for some types of firms with a viable business model but vulnerable to adverse liquidity shocks. While US bond markets have been buoyant, bank-dependent firms, as well as those with pre–COVID-19 liquidity vulnerabilities, continued to face a more difficult environment. Firms with pre–COVID-19 liquidity vulnerabilities in the United Kingdom also appeared to have been left behind, despite overall favorable credit conditions. We believe that our findings can help inform ongoing discussions about the calibration of continued policy support in G7 economies as the COVID-19 pandemic is still raging and mass vaccination to bring it under control is not expected to be completed until well into 2021.

An interesting topic for future research would be an exploration of the reasons for the cross-country differences in the evolution of credit supply conditions documented in the paper. In particular, while recent research discussed in the introduction has shed light on some of the reasons why U.S. banks tightened their lending standards during the initial phase of the pandemic, the contrast between this sharp tightening and the absence of a significant tightening in Europe during the same period remains somewhat puzzling, given metrics indicating that the U.S. banking system was in a stronger position at end-2019 (IMF, 2019), and the U.S.'s relatively stronger economic outlook during the pandemic. There is no doubt that further economy-level analysis of highly granular datasets will yield very useful insights on this question and, more generally, on the interactions between financial system structure, financial vulnerabilities, financial constraints, and policies.

[45] Because of lack of firm-level data for unlisted small and medium-sized enterprises in 2020, we could not establish the degree to which this conclusion carries over to those firms.

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APPENDIX 1. DATA SOURCES

Appendix Table 1.1. Data Sources

Variable	Description	Source
Aggregate Macrofinancial Indicators		
Consumer Price Index	Consumer price index	IMF, International Financial Statistics
Libor-OIS spread	Spread between Libor and the overnight index swap rates, bps	Thomson Reuters EIKON
VIX Index	Chicago Board Options Exchange Volatility Index, average and end-of-period	Haver Analytics
Overnight Index Swap Rate	Overnight index swap rate (1-month, 2-month, 3-month, 4-month, 5-month, 1-year, and 2-year maturities)	Thomson Reuters EIKON
Zero coupon yield	Zero coupon bond yield (3-year, 4-year, 5-year, 6-year, 7-year, 10-year, 12-year, 15-year, 20-year, 25-year, and 30-year maturities)	Thomson Reuters EIKON
Bank Lending Survey and Aggregate Bank Loan and Deposit Indicators		
Business lending standards	Business lending standards change, bank lending survey opinion balance, weighted and unweighted	Haver Analytics
Business loan demand	Business loan demand change, bank lending survey opinion balance, weighted and unweighted	Haver Analytics
Total nonfinancial corporate loans	Nonfinancial corporate loans by MFIs, amount outstanding, local currency unit, not seasonally adjusted	Haver Analytics
Total nonfinancial corporate deposits	Nonfinancial corporate deposits, amount outstanding, local currency unit, not seasonally adjusted	Haver Analytics
Corporate Loan and Bond Indicators		
Syndicated loan amount issued	Syndicated loan amount issued, gross, local currency unit	Dealogic
Syndicated loan grade	Indicates whether a syndicated loan is of investment grade or leveraged	Dealogic
Syndicated loan instrument type	Indicates the type (term loan or credit line) of a syndicated loan	Dealogic
Collateralized loan obligation issuance	Collateralized loan obligation (CLO) issuance, billion USD or euro	S&P LCD
Collateralized loan obligation credit rating	Collateralized loan obligation (CLO) credit rating	S&P Global Ratings
Commercial paper issuance	Nonfinancial commercial paper issuance in the US and the euro area, billion USD or Euro	Federal Reserve; European Central Bank; and Haver analytics.
Corporate bond amount issued	Nonfinancial corporate bond amount issued, gross, local currency unit	Dealogic
Corporate bond grade	Indicates whether a corporate bond is investment grade or high yield	Dealogic
Corporate bond outstanding	Outstanding amount of existing bond	Bloomberg, Thomson Reuters EIKON, DataStream
Corporate bond coupon rate	Bond coupon rate	Bloomberg, Thomson Reuters EIKON, DataStream
Corporate bond maturity	Years to maturity	Bloomberg, Thomson Reuters EIKON, DataStream
Corporate bond yield to maturity	Total yield anticipated if the bond is held to maturity, annual rate	Bloomberg, Thomson Reuters EIKON, DataStream
Excess bond premium (United States)	Corporate bond market credit spread not attributable to expected default risk, percent	Federal Reserve Board

Appendix Table 1. Data Sources(concluded)

Nonfinancial Firms Characteristics and Indicators		
Total assets (nominal terms)	Book value of total assets, local currency unit	S&P Capital IQ
Size	Log of total assets deflated by CPI	S&P Capital IQ; Haver; IMF staff calculation
Tobin's Q	Market capitalization of equity plus total debt, divided by book value of total assets	S&P Capital IQ; IMF staff calculation
Asset tangibility	Gross PP&E/total assets	S&P Capital IQ
Rating	Scaled indicator ranging from 1 (default) to 22 (AAA) of the S&P issuer rating.	S&P Capital IQ, IMF staff calculation
EBITDA	Earnings before interest, taxes, depreciation and amortization, local currency unit	S&P Capital IQ
Profitability	EBITDA divided by total assets	S&P Capital IQ, IMF staff calculation
Leverage	Short-term and long-term financial liabilities divided by total assets	S&P Capital IQ, IMF staff calculation
Liquidity gap	Short-term financing net of cash as a share of assets	S&P Capital IQ, IMF staff calculation
Cash flow from operations	Firm's cash flow from operations, local currency unit	S&P Capital IQ
Cash flow from investment	Firm's cash flow from investment, local currency unit	S&P Capital IQ
Cash flow from financing	Firm's cash flow from financing, local currency unit	S&P Capital IQ
Cash	Cash and short-term investments, local currency unit	S&P Capital IQ
Excess cash	Cash holdings relative to industry peers average, normalized by industry standard deviation	S&P Capital IQ; IMF staff calculation
Expected default frequency (EDF)	One-year expected default frequency of nonfinancial firms, percent	Moody's Analytics
Stock price	Daily stock price, local currency unit	Datastream
Credit lines drawdown (net)	Credit lines drawdown, local currency unit	S&P Capital IQ
Credit lines utilization rate	Listed nonfinancial corporates' credit lines drawdowns as a share of undrawn credit lines plus drawdowns, percent	S&P Capital IQ
Credit lines drawdowns for US firms (gross)	US nonfinancial corporates' gross credit line drawdowns, US dollars	S&P LCD
Total debt	Total debt, local currency unit	S&P Capital IQ
Bank Characteristics		
ROAE	Return on average shareholders' equity outstanding, percent	SNL
Capital ratio	Ratio of capital to risk-weighted assets, percent	SNL
Loan to asset ratio	Ratio of total loans outstanding to total assets, percent	SNL
NPL ratio	Ratio of non-performing loans to total assets, percent	SNL
Policy Indicators		
Policy announcements	Monetary, fiscal, and financial policy measures taken in response to COVID-19, and their announcement dates and times.	Yale Program on Financial Stability, IMF COVID Policy Tracker, press releases and press reports.

APPENDIX 2. POLICY ANNOUNCEMENTS

This appendix provides the types and list of policy announcements considered in the paper. Policies can be grouped into twelve fine categories, and two coarse categories as follows:

Appendix Table 2.1. Types of Policy Announcements

Policy Categories	Policy Code	Examples
Policies providing *indirect* support to firms		
Monetary policy rate cut	MPR	A cut in the monetary policy rate
Asset purchases – government securities	APG	Central bank government securities purchase program
Other market liquidity	OML	Central bank program aimed at restoring liquidity in a specific market (excluding corporate funding markets)
Bank funding	BKF	Targeted long-term refinancing operation
Funding for lending (Central Bank)	FCB	Central bank liquidity provision to banks to encourage bank lending
Macroprudential policy easing	MAP	Easing of the macroprudential policy stance, easing of bank capital/liquidity requirements or policy guidance encouraging use of flexibility in regulation
Bank dividend constraints	BKD	Policies limiting bank dividend distribution
Policies providing *direct* support to firms		
Government loan guarantees	GUA	Government loan guarantees to nonfinancial businesses
Corporate collateral easing	CCL	Easing of central bank collateral requirements to include a wider scope of nonfinancial firm debt securities
Asset purchases – corporate securities	APC	Central bank corporate bond purchase program
Corporate loans funding by the government	CLF	Government programs providing loans to the nonfinancial corporate sector
Fiscal relief	FIS	Government support through grants, tax holidays, payroll and employment support

Note: The classification of policy measures is based on the Yale Program on Financial Stability (YPFS)'s COVID-19 Financial Response Tracker.

Appendix Table 2.2. List of Announcement Dates and Policy Announcements [46]

Jurisdiction	Announcement Date	Main Policy Announcements	Policy Code
Canada	3/4/2020	Monetary policy rate cut	MPR
	3/12/2020	New term repo operations	OML
	3/13/2020	Business Credit Availability Program (BCAP); Restriction on bank dividends; Bankers' Acceptance Purchase Facility (BAPF); Lowering domestic stability buffers	APG;BKD;CLF;MAP
	3/16/2020	Swap Line with Fed; Monetary policy rate cut	MPR;BKF
	3/18/2020	Announcement of fiscal package	FIS
	3/20/2020	Contingent Term Repo Facility (CTRF)	OML
	3/25/2020	Co-lending program for SME; Loan guarantee program for SME	CLF;GUA
	3/27/2020	Monetary policy rate cut; New Business Credit Availability Program Measures (CEBA); Government of Canada Bond Purchase Program (GBPP); Commercial Paper Purchase Program (CPPP); Encouragement to use bank regulatory buffers; Regulatory easing; Basel III delays; Additional fiscal stimulus	MPR;CLF;APG;APC;MAP;GUA;FIS
	4/9/2020	Relaxation of leverage ratio, of risk-weight floor factor; Other regulatory easing	MAP
	4/15/2020	Corporate bond purchase program; Provincial Bond Purchase Program (PBPP)	APG;APC
	5/11/2020	Large Employer Emergency Financing Facility (LEEFF)	CLF
Japan	2/28/2020	Japan Federation of Credit Guarantee Corporation (JGF) loan guarantees	GUA
	3/16/2020	Commercial paper and corporate bond purchases expansion; Introduction of the Special Funds-Supplying Operations to Facilitate Corporate Financing regarding the Novel Coronavirus (COVID-19); Swap Line with Fed; Increase in ETF/REIT Purchases	BKF;FCB;APG;APC
	3/17/2020	JFSA encourages use of bank regulatory buffers	MAP
	3/30/2020	Elements of Basel III delayed	MAP
	4/7/2020	New lending facilities and fiscal support announced	CLF;FIS
	4/8/2020	Easing leverage ratio exposure	MAP
	4/27/2020	Increase of corporate bonds, commercial papers purchases; increase of T-Bills purchases; Additional monetary policy measures incl. the expansion of Japanese government securities (JGS) offered under the Securities Lending Facility (SLF); Strengthening of the Special Funds-Supplying Operations (incl. expanding the range of eligible collateral to private debt)	APC;APG;BKF;CCL
	5/22/2020	Extended the purchases of CP and corporate bond; Extended the Special Funds-Supplying Operations; Established a new fund-provisioning measure aim to provide funds to Small and Medium Sized Enterprise (SMEs)	APC;BKF;CLF
	5/27/2020	More fiscal and central bank support to SMEs	BKF;FIS
	6/16/2020	Expansion of the Special Program to Support Financing in Response to the Novel Coronavirus	APC

[46] Announcement dates are associated with the following trading day if news releases occurred after the stock market close. In the paper, only the main policy announcements are considered.

Appendix Table 2.2. List of Announcement Dates and Policy Announcements (continued)

Jurisdiction	Announcement Date	Main Policy Announcements	Policy Code
United Kingdom	3/11/2020	New Term Funding scheme; Announcement of coronavirus Business Interruption Loan Scheme (CBILS) incl. government guarantees; Release of Countercyclical Capital Buffer (CCyB); Monetary policy rate cut	BKF;FCB;GUA;MAP;MPR
	3/16/2020	Swap Line with Fed	BKF
	3/17/2020	COVID Corporate Financing Facility (CCFF); New fiscal package announced; GBP 330 billions of guaranteed loans	APC;FIS;GUA
	3/19/2020	Increase in treasuries purchases; Increase in corporate bonds purchases; Monetary policy rate cut	APC;APG;MPR
	3/31/2020	Restrictions on bank dividend policies	BKD
	4/3/2020	Coronavirus Large Business Interruption Loan Scheme (CLBILS)	GUA
	4/16/2020	Expansion of Coronavirus Large Business Interruption Loan Scheme (CLBILS)	GUA
	6/18/2020	Easing of requirements for Asset Purchase Facility (APF)	APG
United States	3/12/2020	1.5 tn USD repo operations are announced	OML
	3/16/2020	Increase holdings of agency mortgage-backed securities (MBS); Committed to purchase up to $500 billion in Treasuries; Monetary policy rate cut; Overnight and term repo facility expanded	APC;APG;MPR;OML
	3/17/2020	Commercial Paper Funding Facility (CPFF); Primary Dealer Credit Facility (PDCF); Adjustment to the definition of eligible income	APC;OML;MAP
	3/23/2020	Primary Market Corporate Credit Facility (PMCCF); Secondary Market Corporate Credit Facility (SMCCF); Main Street Lending Program; Revised definition of eligible retained income; Term Asset-Backed Securities Loan Facility (TALF)	APC;APG;FCB;MAP;OML
	3/27/2020	Coronavirus Aid, Relief, and Economic Security (CARES) Act; Broad fiscal measures; early adoption of the "standardized approach for measuring counterparty credit risk	CLF;GUA;FIS;MAP
	4/9/2020	Expansion of Primary Market Corporate Credit Facility (PMCCF); Secondary Market Corporate Credit Facility (SMCCF); Term Asset-Backed Securities Loan Facility (TALF); Modified capital rule to favor Paycheck Protection Program (PPP)	OML;APG;APC
	4/30/2020	Expansion of Main Street Lending Program	FCB
	6/25/2020	Restrictions on bank dividend policies	BKD

Appendix Table 2.2. List of Announcement Dates and Policy Announcements (concluded)

Jurisdiction	Announcement Date	Main Policy Announcements	Policy Code
Euro area / European Union	3/12/2020	Targeted Long-Term Refinancing Operations expanded; Increased envelope of additional net asset purchases for current programs; Postponement of the EU-wide stress test	BKF;APG;APC;MAP
	3/16/2020	Swap Line with Fed; Increased reporting requirements for holders of net short positions	BKF;MAP
	3/19/2020	Pandemic Emergency Purchase Programme (PEPP) and corporate sector purchase programme (CSPP) expansion; Collateral requirements include non-financial corporations	APG;APC
	3/20/2020	Capital requirements relaxation. Increase in swap lines operations frequency	BKF;MAP
	3/26/2020	Removed purchase limits and lowered maturity minimums from Pandemic Eemergency Purchase Programme (PEPP)	APG;APC
	3/27/2020	Recommendation on bank dividend distribution	BKD
	4/7/2020	Collateral easing measures for Pandemic Emergency Purchase Programme (PEPP) and Targeted Longer-Term Refinancing Operations (TLTROs)	BKF
	4/16/2020	Temporary reduction of capital requirements for market risk	MAP
	4/22/2020	Grandfathering of the eligibility of marketable assets used as collateral in eurosystem credit operations (including fallen angels)	BKF
	4/30/2020	Pandemic emergency longer-term refining operations (PELTROs)	BKF
	6/4/2020	Pandemic emergency purchase programme (PEPP) expanded	APG;APC
	6/24/2020	Temporarily adapted banking rules for banks	MAP
France	3/12/2020	Bpifrance guarantees	GUA
	3/16/2020	Credit and treasury lines guarantee by Bpifrance	BKF;GUA
	3/17/2020	Announcement of $384 Billion fiscal bill	FIS
	3/18/2020	Release of the counter-cyclical bank capital buffer	MAP
	4/15/2020	Announcement of second fiscal package	FIS
Germany	3/13/2020	Protective Shield for Businesses	CLF;GUA
	3/18/2020	Release of Countercyclical Capital Buffer (CCyB)	MAP
	3/23/2020	Economic stabilization fund; fiscal stimulus package	GUA;FIS
	4/6/2020	Quick Loan Program	GUA
	6/3/2020	Fiscal stimulus package	FIS
Italy	3/16/2020	Heal Italy Decree. The decree includes: i) loans government guarantees ii) broad fiscal support measures	GUA;FIS
	4/6/2020	Liquidity Decree	GUA
	5/14/2020	Relaunch Decree	FIS
	6/4/2020	Changes in minimum requirements for own funds and eligible liabilities (MREL)	MAP