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## Firm-level trade credit responses to COVID-19-induced monetary and fiscal policies: International evidence<sup>☆</sup>

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### ABSTRACT

This paper provides preliminary evidence of the effects of fiscal and monetary policies designed to mitigate and contain the adverse economic impacts of COVID-19 on supplier-customer relationships during the first two quarters of 2020. We compare the impacts of various intervention policies on corporate trade credit for a sample of 14,623 firm-quarter observations, representing 56 countries, after controlling for quarter-, country-, industry-, and firm-fixed effects. We find that, overall, the monetary interventions are associated with lower levels of trade credit, while fiscal interventions increase the use of trade credit. Our results suggest that trade credit is lower in periods of less-restrictive bank credit. This finding has important policy implications for governments as they attempt to help financially constrained businesses survive the pandemic.

### 1. Introduction

The unprecedented global lockdown due to COVID-19, caused consumer demand to plummet, stalled production, disrupted international supply chains, and pushed the world economy into a deep recession (OECD, 2020). This prolonged collapse of market demand caused cash-constrained firms to become illiquid, leading to corporate insolvencies (Baldwin and Weder di Mauro, 2020). As an important source of working capital financing, trade credit plays a critical role in assisting financially constrained businesses to continue operations and reduces the likelihood of severe financial distress (McGuinness et al., 2018; Li et al., 2018). With COVID-19 continuing to disrupt business operations globally, the role of trade credit should attract more scholarly attention (Goodell, 2020) and, thus, our paper addresses this gap in literature.

Most firms rely on trade credit by borrowing from their suppliers and lending to their customers, both domestically and internationally. For instance, in the United States trade credit is the single most important source of short-term external finance (Petersen and Rajan, 1997). This is also true for most OECD countries, where trade credit represents more than half of businesses' short-term liabilities and a third of all firms' total liabilities (Boissay and Gropp, 2007). As volume of trade payables, trade credit represents:

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one third of non-financial corporations' outstanding bank loans, the size of outstanding corporate bonds, and approximately 20 % of world GDP over the past 25 years (Boissay et al., 2020).

Although trade credit tends to be more expensive than bank credit, the empirical evidence shows that all firms fund their working capital through trade credit (Petersen and Rajan, 1997). Several theoretical and empirical studies attempt to explain why firms use trade credit despite its high cost (see Boissay and Gropp, 2007). From the demand side, trade credit represents the firm's access to capital, especially for the SMEs. Empirically, studies find that firms' demand for trade credit influences their production cycles, optimal ordering quantity, level of inventory, and performance, as well as industry growth (e.g., Fisman and Love, 2003; Chung et al., 2005; Allen et al., 2019). On the supply side, firms can use trade credit to reduce information asymmetry. Trade credit can give the supplier the advantage over specialized financial institutions in evaluating the credit risk of buyers. Additionally, trade credit may allow suppliers to price discriminate by using credit when price discrimination is not legally feasible. Trade credit can reduce transaction costs, guarantee product quality, and help maintain long standing business relationships (Petersen and Rajan, 1997). At the macroeconomic level, empirical evidence suggests a number of factors that determine the demand and supply of trade credit, such as the level of financial market development and the legal and financial structures (Demirgüç-Kunt and Maksimovic, 2001), national culture (Ghoul and Zheng, 2016), the cultural background of finance managers (Bedendo et al., 2020), and level of social trust (Levine et al., 2018). The literature also studies the relationship between trade credit (at the aggregate level) and economic activities. Demirgüç-Kunt and Maksimovic (2001) indicate that trade credit is generally pro-cyclical. However, Ghoul and Zheng (2016) and Boissay and Gropp (2007) find a negative correlation between trade credit and GDP.

Prior research also shows the importance of trade credit to corporate finance in economic crises. In general, trade credit supplements bank credit and capital markets during crises and recessions (Bastos and Pindado, 2013; Petersen and Rajan, 1997). Love et al., 2007 provide evidence that the use of trade credit increased at the peak of the 1997 Asian financial crisis in Indonesia, Malaysia, the Philippines, Mexico, South Korea, and Thailand. During the 2008 global financial crisis, trade credit was the primary source of alternative finance that sustained the global economy (Giannetti et al., 2011).<sup>1</sup> Although trade credit can mitigate the impact of a macroeconomic credit crunch during economic downturns, this effect can be sustained for a short period only. After that, suppliers also become credit constrained and, thus, cease to extend trade credit (Love et al., 2007). Thus, on the contrary, trade credit chains can become a channel through which corporate bankruptcies are propagated in an economy. Bastos and Pindado (2013) and Jacobson and von Schedvin (2015) find evidence of trade credit contagion in supply chains during financial crises. Özlü and Yalçın (2010) find that small firms are more likely to rely on trade credit, especially during recessions, while large firms tend to use more bank loans, thus, reducing the contraction of activity of small firms in difficult times.

To help businesses during crises, all countries around the world have deployed numerous measures to cushion the impacts of the COVID-19 pandemic (IMF, 2020). The interventions include policy interest rate reductions, non-conventional monetary measures (e.g., central bank guarantees, changes in reserve requirements, macro-prudential policies, easing lending requirements, foreign exchange operations, etc.), and fiscal measures (e.g., tax deferrals, government loan guarantees, purchase of corporate bonds and corporate relief funds). The monetary and financial policies are devised to ensure the availability of credit in the banking and financial system, which supports households and businesses in the short-term. Fiscal policies are generally directed at stimulating spending and providing urgently needed cash benefits to businesses. Thus, it is interesting to see how those measures have affected the level of trade credit in the short-term.

The purpose of this paper is to investigate the association between fiscal and monetary intervention measures and the extent of corporate trade credit use in the first two quarters of 2020, coinciding with the first wave of Covid-19. Our sample comprises 14,623 firm-quarter observations representing 56 countries, controlling for quarter-, country-, industry-, and firm-fixed effects. Although this framework does not provide a quantifiable prediction, it allows us to obtain preliminary evidence of the relationship between firms' trade credit use and monetary and fiscal stimuli. We confine our attention to trade payables, as these indicate the change in trade credit activity in a straightforward way, as well as helping us to understand the trends in business activities and the effects of COVID-19 at the firm level.

Prior research analyzes the channels of transmission from monetary policy to trade credit, particularly during periods of monetary tightening (Mateut, 2005; Altunoka et al., 2020). The main channel through which monetary policy affects trade credit, is through bank credit. The relationship between trade credit and bank credit is addressed in the literature through two hypotheses: the substitution hypothesis and the complementary hypothesis. The substitution hypothesis suggests that trade credit is a substitute for bank credit, particularly for firms that are unable to obtain financing from banks (Mateut, 2005; Kestens et al., 2012; Nilsen, 2002), and/or to enhance transaction efficiency (Altunoka et al., 2020). Huang et al. (2011) analyze the trade credit and bank-financing relationship and conclude that the substitution effect between trade credit and bank credit is countercyclical. The complementary hypothesis suggests that a decline/rise in bank credit is accompanied by a decrease/increase in trade credit, thereby, exacerbating the impact on financially constrained firms of any financial contraction or expansion (De Blasio, 2003; Mateut, 2005; Jacobson and von Schedvin, 2015). The transmission of non-conventional monetary policy measures to trade credit can generally be independent of the bank lending channel (Adelino et al., 2020). Using the European Central Bank's (ECB) Corporate Sector Purchase Program (CSPP), they show that firms with access to bond markets (i.e., typically large firms) can act as financial intermediaries, by providing trade credit to their customers who do not have access to bond markets. In this case, firms pass on the additional funding liquidity to their customers through trade credit. This effect benefits other firms (small and financially constrained firms) through supply chains. The impact of

<sup>1</sup> Pattnaik et al. (2020), in their bibliometrics review of trade credit literature over the period 1955–2019, show that most of the research on trade credit followed the global economic crisis of 2008.

fiscal tools on corporate trade credit receives less attention compared with the impact of monetary policy tools. The impact of fiscal policies on trade credit is generally independent of the bank credit channel (Badarau-Semenescu and Semenescu, 2010). Fiscal policy can benefit firms directly through tax holidays, government loan guarantees, and other corporate relief programs. However, fiscal policy measures could also help firms that are not directly targeted by the fiscal policy relief programs, when banks redistribute fiscal relief funds (in part) by increasing the supply of credit to other firms in the economy (Bird et al., 2018).

This paper has number of important contributions. First, it investigates the effects on corporate trade credit of monetary and fiscal policy responses to the COVID-19 pandemic. Recent studies use simulation techniques to estimate the impacts of pandemics on macroeconomic outcomes (Fornaro and Wolf, 2020; McKibbin and Fernando, 2020). The firm level study of De Vito and Gómez (2020) uses simulated distress scenarios for 14,245 firms-year observations from 26 countries, based on 2018 data of firms' fundamentals. They examine how COVID-19 fiscal measures (namely tax deferrals and bridge loans) could affect the short- and long-term liquidity risk of listed firms. To the best of our knowledge, our work is the first to provide a microanalysis, using listed firm-level data, of the effect of monetary, non-conventional monetary, and fiscal policies on corporate trade credit. We use a large sample of 14,623 firm-quarter observations representing 56 countries during the first half of 2020. Using firm level data allows us to control for possible trade credit determinants that differ across firms in the same industry and that lead firms to respond differently to intervention policies. Such information is lost when using macro data. Second, the paper contributes to the literature on the behavior of corporate credit policy during economic crises. COVID-19 is a unique shock: it is exogenous to all countries and unprecedented in speed and severity. Third, we use a unique sample of countries. The intervention policies across countries vary in timing, substance, and magnitude. We carefully select the countries that devised similar policy interventions during each of the first two quarters of 2020. We constructed dummies to capture changes in policy variables, to avoid inconsistency across countries in terms of definition and measurements.

Our results suggest that the monetary interventions are associated with lower levels of trade credit. We find that the policy interest rate (IR), Capital Requirements for Market Risk (CRMR), and Emerging Liquidity Assistant (ELA) programs reduce trade credit. On the contrary, fiscal measures, such as Business Packages for SMEs (BUSPACK), is associated with an increase in trade credit while Business Borrowing (SUPBRO) is negatively associated with trade credit. We also find no effects from Prudential Requirements (PRUDEN) and Market Function (MARFUN) measures on trade credit. These findings support the trade credit-bank credit substitution hypothesis (i.e., trade credit is lower in periods of easy monetary and non-conventional monetary policies). Our finding also suggests that fiscal measures helped to sustain business operations during the first wave of the pandemic, thereby, increasing trade credit. Our results are robust to the use of different measures of trade credit, and to endogeneity testing. While still preliminary, these findings help assess the relative effectiveness of the policy measures implemented during the first two quarters of the COVID-19 pandemic. The monetary interventions seem to benefit firms with better access to capital markets systematically. Thus, fiscal policy measures, particularly those directly targeting small firms in industries that are more affected by the pandemic, are an important complement to central banks' unconventional monetary measures. Given the high integration of supply chains worldwide, coordinated interventions among economies are needed to ensure no disruptions in supply chains, to help financially constrained businesses survive the pandemic, and to minimize long-run unfavorable consequences on industrial structures.

The rest of the paper is organized as follows. Section 2 describes the data and empirical methodology. Section 3 discusses the empirical results. Section 4 concludes.

## 2. Research design

### 2.1. Data and sample

Table 1 Panel A shows the process of selecting our firm level sample from Global Compustat (retrieved in September 2020) for the first and the second quarters of 2020. Table 1, Panel B, shows the distribution of the 14,623 observations across 56 countries. China represents about 30 %, followed by South Korea at about 18 %, with Australia and Thailand at 6.8 % and 6.4 % respectively.<sup>2</sup> We use the International Monetary Fund database of COVID-19 policy interventions (IMF, 2020) to construct our policy variables. Since the intervention policies across countries vary in their timing, substance and magnitude, we selected countries that devised similar policy interventions during each of the first quarters of 2020, carefully. We have also constructed dummies to capture changes in policy variables, to avoid inconsistency across countries in terms of inclusion and measurement (see Appendix A).

### 2.2. Empirical model

Following the econometrics literature (e.g., Cameron and Trivedi, 2010), we test whether the pooled, random-effect, or fixed-effect regression model is most suitable for estimating the associations. Thus, we conduct the Lagrangian Multiplier (LM) test of the random-effect and pooled OLS (Breusch and Pagan, 1980). We show that the null hypothesis is not rejected, that individual effect  $a_i = 0$  for all  $i$ . Then, we test the random- and fixed-effect using Hausman's test. The null hypothesis is that the fixed effect is not correlated with the regressor. We reject the null hypothesis. Therefore, in all of our regressions, we estimate firm-fixed effect regressions, as well as time-fixed effects, and adjust standard errors for heteroskedasticity and within-firm clustering (Petersen, 2009). Fixed effects generate better estimators and alleviate omitted variable bias.

<sup>2</sup> We also re-considered our sample selection by dropping jurisdictions that have less than 15 observations and repeated our analysis, ending with 14526 firm-level observations. Our inference was unchanged, even after considering the new sample selection.

**Table 1**

Panel A: Sample Selection.

Initial Compustat Global sample for First and Second Quarter 2020 on (Sep 2020)			49,482
Less: firms without country	7939		41,543
Less: Firms in country without data on fiscal and monetary policy	8662		32,881
Less: duplicated firms with GVKEY and financial Quarter	15		32,866
Less: Missing data for main dependent variable TC1 (10,171) and control variables	18,199		14,667
Panel B: Sample distribution based on country			
Country	Total	Country	Total
Argentina	54	Malaysia	504
Australia	953	Mauritius	6
Bahrain	1	Mexico	170
Bangladesh	35	Mongolia	1
Botswana	1	Namibia	1
Brazil	377	Nigeria	68
Bulgaria	42	Oman	44
Chile	182	Pakistan	263
China	4457	Panama	2
Colombia	60	PN Guinea	1
Croatia	49	Peru	62
Czech Re	4	Philippines	179
Estonia	23	Poland	406
France	278	Qatar	10
Germany	436	Romania	63
Ghana	7	Saudi Arabia	161
Hungary	13	Serbia	6
India	25	Singapore	216
Indonesia	365	Slovenia	11
Israel	150	South Africa	128
Italy	177	South Korea	2560
Jamaica	14	Spain	74
Japan	2	Sri Lanka	112
Jordan	33	Thailand	942
Kazakhstan	15	Tunisia	7
Kenya	2	Turkey	444
Kuwait	27	Ukraine	10
Latvia	28	UAE	54
Lithuania	13	Vietnam	339
		Total	14,667

$$TC_{i,t} = a_0 + a_{1-7} \text{ Policy } c_{i,t} + a_{7-19} \text{ Control} + \text{Year} + \text{Firms Dummies} + e_{i,t} \quad (1.1)$$

Where  $i$  is firm,  $t$  is quarter,  $c$  is country.

### 2.2.1. Dependent variable: trade credit

In line with previous studies, we use two measures of trade credit that were widely used. In the first measure, we follow [Aktas et al. \(2012\)](#) and [Ferrando and Mulier \(2013\)](#) by calculating the ratio of accounts payable scaled by total sales (TC1). In the second measure (TC2), we follow [Love et al. \(2007\)](#); [Molina and Preve \(2012\)](#); [Afrifa et al. \(2018\)](#); [Li et al. \(2020\)](#) and [Costa and Habib \(2020\)](#) by calculating the ratio of accounts payable (AP) scaled by cost of goods sold (COGS).

### 2.2.2. Independent variables

Our independent variables are divided into policy variables and control variables. The policy variables are as follows:

**2.2.2.1. Monetary policy measures.** We used the central bank policy rate (IR) as a dummy if firms are located in a country where the central bank reduced the interest rate during COVID-19 (in the first two quarters of 2020);

**2.2.2.2. Non-conventional monetary policy measures.** We used five different dummies for each of the following interventions: a) lowering the capital requirements for market risk (CRMR); b) providing Emerging Liquidity Assistance (ELA); c) easing the Collateral Standards Requirement (ECSR), which refers to a government assets purchase program to improve liquidity and funding; d) changing either Prudential requirements (PRUDEN), including countercyclical capital buffers, the liquidity coverage ratio exemption, the level

of Pillar 2 supervisory and inspection-deferred repayment loans, restructuring requirements for retail loans, and/or adjusting the risk-free interest rate and term; e) employing the Market Function (MARFUN) of central bank intervention, such as volumes to lower market volatility (see Appendix A for more details)<sup>3</sup>;

**2.2.2.3. Fiscal policy measures.** We included two dummies to reflect the following interventions: a) a dummy if firms located in countries that introduced packages for small business loans (BUSPECK), including loans to small and medium-sized enterprises (SMEs), purchasing of payroll loan portfolios of SMEs; and allowing SMEs to issue corporate bonds for repaying loans and replenishing operating capital; b) a dummy for fiscal measures to provide loans to firms that were hit hard by COVID-19 (BUSBRO), including Credit Guaranteed loans, extend repayment loans, restructure loans, and Credit lines to affected sectors.<sup>4</sup>

### 2.2.3. Control variables

We follow Li et al. (2020) to control for firm characteristics. We control for SIZE (natural logarithm of total assets), LEV (total liabilities scaled by total assets), CF (total operating cash flow scaled by total assets), ROA (return on assets), CASH (total cash and cash equivalents scaled by total assets), CAP\_INT (total net property, plant and equipment scaled by total assets), INTAN (total intangible assets scaled by total assets), SGA (selling, general and administrative expenses scaled by total assets), and CR (total current assets scaled by total current liability). We also use country level control variables including QGDP (quarterly gross domestic product), QINV (quarterly country investment in infrastructure), COVID19\_SINDEX (COVID-19 Stringency Index), M2 (quarterly broad money supply), and UEMP (quarterly unemployment rate). The variable definitions are provided in Appendix A.

## 3. Results

### 3.1. Descriptive statistics

Table 2 shows the descriptive statistics for both dependent and independent variables. The means for Trade Credit (TC1 and TC2) are 1.192 and 1.943 respectively. The Trade Credit mean in our sample is higher than that in Li, Ng and Saffar (2020), as would be expected during COVID-19, owing to supply-chain disturbances.<sup>5</sup> However, the available firm-quarter US data would be predominant in the sample, biasing the estimates. In addition, policy responses were delayed in the US, and were not synchronous with other countries. We find the mean for firms from countries that reduced the interest rate by the central bank (IR) is about 10 %, and the mean for firms from countries that reduced Capital Requirements for Market Risk (CRMR) is 6.2 %. The mean for firms from countries that announced emerging liquidity assistance, including deposits and emerging lending programs (ELA), is 17.7 %. For countries easing the Collateral Standards Requirement (ECSR) the mean is 0.024 %, and for countries introducing Prudential requirements (PRUDEN) the mean is 27.3. The mean for countries using the Market Function (MARFUN) is 22.6 %. The mean for countries that introduced packages for small and medium-sized enterprises (BUSPACK) is 2.2 % and, finally, the mean for countries that introduced corporate relief programs for business and industries hit strongly by COVID-19 (SUBRO) is about 6%. See Appendix A for variable definitions. We also find the mean of SIZE is 9.17, and LEV, 26.8 %. This figure is very close to that of Zhang (2020). We find the mean for the ROA is 0.03 %, and for CASH 14.6 %, which is close to that in Li et al. (2020). We also present the interaction between all fiscal and monetary policies and firms' mean of trade credit in each country during the pandemic.

### 3.2. Associations between trade credit and monetary, non-conventional monetary, and fiscal measures

Table 3a Panel A shows our regression results concerning the association between trade credit and country responses to COVID-19 through monetary and fiscal policies using a firm-fixed effects model. Models 1–6 represent monetary and non-conventional monetary policy regressions respectively, and Model 7 represents the fiscal policy regression. In Model 1 we find a negative and significant coefficient between the interest rate reductions and trade credit of about 0.4311 at  $p < 1\%$ . For Models 2 and 3 we find negative and significant associations (coefficients 0.1663 and 0.0930) between non-conventional monetary policy as represented by (CRMA and ELA) and trade credit (TC1), at  $p < 1\%$  respectively, while in Model 4, we find a positive coefficient (0.2475), using ECSR as a non-

<sup>3</sup> Constrained by the near zero lower bound of policy interest rates and faced with the risks of financial crisis, central banks around the world rely extensively on unconventional monetary measures by making more active use of their balance sheet to increase liquidity and ease credit conditions, e.g., large-scale asset purchases known as quantitative easing (Todorov, 2020).

<sup>4</sup> We use dummies for policy variables owing to the wide discrepancies among countries in their disclosure of COVID-19 monetary and fiscal policy responses. Countries' announcements of monetary and fiscal policies vary tremendously in terms of disclosure style, details, formats, duration, scope, scale, and conditionality. We use the World Bank COVID-19 response (<https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>) for collecting the fiscal and monetary responses. For instance, in policy rate response, the format style includes: 1) countries disclose the Responses (change from - change to), 2) countries disclose only (change to) and did not show previous rate, while 3) some countries disclose (change by%), 4) others disclose (reduced to - points) finally 5) others disclose null. Thus, we measure our main independent variable as firms located in the response or countries announcing reduction in Interest Rate response, as Dummy equals 1, otherwise 0.

<sup>5</sup> Li et al., 2020 conducted their studies before COVID-19 pandemic, in particular, from 2000 to 2014. Second, although the Li, Ng and Saffar (2020) study used an international sample, US firms represent 45% of the sample. We use the International Monetary Fund database of COVID-19 policy interventions (IMF, 2020) that excludes U.S. interventions in the first two quarters (<https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>) as additional analysis, after truncating our trade credit measures between 0–1, providing consistent results.

**Table 2**  
Descriptive Statistics.

Variable	N	Mean	S.D.	0.25	Median	0.75
TC1	14,667	1.192	3.698	0.294	0.540	1.029
TC2	14,603	1.943	5.061	0.444	0.831	1.653
IR	14,667	0.099	0.298	0.000	0.000	0.000
CRMR	14,667	0.062	0.240	0.000	0.000	0.000
ELA	14,667	0.177	0.382	0.000	0.000	0.000
ECSR	14,667	0.024	0.154	0.000	0.000	0.000
PRUDEN	14,667	0.273	0.445	0.000	0.000	1.000
MARFUN	14,667	0.226	0.418	0.000	0.000	0.000
BUSPAC	14,627	0.022	0.147	0.000	0.000	0.000
SUPBRO	14,627	0.058	0.233	0.000	0.000	0.000
SIZE	14,667	9.102	3.105	7.180	8.823	11.205
LEV	14,667	0.268	0.178	0.124	0.253	0.386
CF	14,667	0.01	0.055	-0.012	0.011	0.035
RAO	14,667	0.003	0.053	-0.007	0.007	0.023
CASH	14,667	0.146	0.129	0.055	0.111	0.195
CAP_INT	14,667	0.318	0.212	0.146	0.290	0.461
INTAN	14,667	0.093	0.135	0.008	0.035	0.116
SGA	14,667	0.03	0.034	0.009	0.019	0.036
CR	14,667	1.892	2.022	0.985	1.373	2.071

conventional monetary policy at  $p < 5\%$ , and a non-significant association for non-conventional policy PRUDEN and MARFUN in Models 5 and 6. Finally, in Model 7, for fiscal policy measures, we find a significant positive coefficient for BUSPACK (0.3660) and a significant negative coefficient using SUBBRO (0.3415) as at  $p < 5\%$  respectively. These findings support the substitution hypothesis, that trade credit is a substitute for bank credit (i.e., trade credit is lower in periods of less-restrictive bank credit (Kestens et al., 2012). The disruption of international supply chains due to COVID-19, could also explain these findings, as large firms resort to domestic bank credit to finance their activities and reduce the likelihood of financial distress. To isolate that effect, we have controlled for time, country, and COVID-19 stringency measures. The positive association between trade credit and fiscal measures suggests that the impact of fiscal policy is direct, and independent of the bank credit channel (Badarau-Semenescu and Semenescu, 2010). De Vito and Gómez (2020) also find that COVID-19 fiscal measures (namely, tax deferrals and bridge loans) reduce the short- and long-term liquidity risk of listed firms.<sup>6</sup>

As a robustness check, we repeat our analysis, including all monetary, non-conventional monetary policy and fiscal policy variables in one regression with results reported in Table 3b, Panel B. In Model 1 we include all independent variables in one fixed-effect regression with period-fixed effects, and find that, for the first three measures (IR, CRMR, and ELA) our results hold, and all three monetary policy measures have negative and significant associations with trade credit (TC1). In addition, we find BUSPACK, as a fiscal policy measure, to have a positive and significant coefficient with trade credit (TC1). In Model 2, we include COVID19\_SINDEX, QGDP, and QINV, as country-level control variables, and find that our results hold, except that CRMR is not significant, while CF becomes positive and significant at  $p < 5\%$ , and both country variables QGDP and QINV negative and significant at  $p < 10\%$ . In Model 3, we add another two country-level economic factors in our regression model (COVID19\_SINDEX and UEMP). In addition to our variables in Model 2, the use of firm-fixed effects reduced our sample by half to about 2588 firm-year observations, as data availability for UEMP was poor. We find only the negative coefficients of IR and ELA are significant at  $p < 0.05\%$ . Interestingly, we find the IR and PRUDEN both negative and significant at ( $p < 10\%$  and better), while MARFUN, and BUSPACK both positive and significant at  $p < 1\%$ . In addition, UEMP and COVID19\_SINDEX become negative and significant at  $p < 5\%$  and better.

In Model 4 we replace UEMP by M2, which increases our sample size to 5016 firm-year observations, and find our first four measures (IR, CRMR, and ECSR) to be all negative and significant for ELA at  $p < 5\%$ . Both coefficients of COVID19\_SINDEX and M2 are negative and significant. Finally, in Model 5, we add all country level measures (COVID19\_SINDEX, UEMP and M2) in the regression, which generates 2495 firm-year observations only. We find the coefficients of IR and ELA to be negative and significant at  $p < 1\%$ . This suggests that even after controlling for country aggregate liquidity, country unemployment rate, and country COVID-19 restrictions, we manage to maintain consistent evidence regarding the impact of fiscal and monetary policy on trade credit. It is often the case that firms make financing decisions partly based on current aggregate macroeconomic conditions. However, given the global nature of the COVID-19 pandemic and its similar impact at the macro level across countries, it is no surprise that, after controlling for country aggregate liquidity and the level of economic activities, the results are generally the same.

### 3.3. Robustness check using an alternative measure for trade credit

Table 4 provides regression results that use another measure for trade credit (TC2). See Appendix A. We repeat our analysis in Table 3a, Panel A, for (Models 1–7), using a firm-fixed effect model. We find our results are consistent for IR in Model 1 at  $p < 0.05\%$ . We also find that the coefficient of PRUDEN in Model 5 is negative and significant at  $p < 0.05\%$  which is consistent with our finding in

<sup>6</sup> Although we use fixed effect estimator to interpret our analysis, we find a consistent evidence after conducting a cross-sectional analysis.

**Table 3A**

Panel A: Regression between trade credit and monetary and fiscal policy.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	TCI						
	Monetary Policy	Non-Conventional Monetary Policy					Fiscal Policy
IR	-0.4311*** (-5.16)						
CRMR		-0.1663* (-1.69)					
ELA			-0.0930*** (-3.02)				
ECSR				0.2474** (2.34)			
PRUDEN					-0.0612 (-1.30)		
MARFUN						-0.0773 (-1.42)	
BUSPACK							0.3660** (2.33)
SUPBRO							-0.3415** (-2.26)
SIZE	-0.6664 (-0.51)	-0.7958 (-0.60)	-0.8009 (-0.60)	-0.7759 (-0.59)	-0.7931 (-0.60)	-0.7835 (-0.59)	-0.6806 (-0.50)
LEV	-4.9144 (-1.40)	-4.9115 (-1.39)	-5.0081 (-1.42)	-4.9272 (-1.40)	-4.9923 (-1.42)	-4.9727 (-1.41)	-1.8811 (-1.42)
CF	-1.3408 (-1.10)	-1.1441 (-0.94)	-1.2514 (-1.02)	-1.2051 (-0.99)	-1.2571 (-1.02)	-1.1829 (-0.97)	-0.4082 (-0.57)
ROA	-2.6944*** (-2.71)	-2.4726** (-2.40)	-2.8200*** (-2.83)	-2.7064*** (-2.71)	-2.7502*** (-2.74)	-2.7142*** (-2.72)	-2.7690*** (-2.68)
CASH	1.2016 (1.22)	1.0113 (1.03)	1.0298 (1.05)	1.0369 (1.05)	1.0540 (1.07)	1.0430 (1.06)	0.4786 (0.70)
CAP_INT	0.7261 (0.29)	0.8717 (0.35)	0.8542 (0.35)	0.8627 (0.35)	0.8370 (0.34)	0.8297 (0.34)	0.3578 (0.14)
INTAN	-4.4405 (-0.80)	-4.2801 (-0.77)	-4.3236 (-0.77)	-4.3399 (-0.78)	-4.3360 (-0.78)	-4.3344 (-0.78)	-4.6381 (-0.79)
SGA	-14.1438*** (-4.72)	-16.4595*** (-5.59)	-16.3428*** (-5.56)	-16.4070*** (-5.60)	-16.5127*** (-5.61)	-16.4307*** (-5.61)	-13.2239*** (-4.31)
CR	-0.0469* (-1.88)	-0.0444* (-1.85)	-0.0464* (-1.92)	-0.0424* (-1.76)	-0.0431* (-1.80)	-0.0452* (-1.88)	-0.0325* (0.65)
Intercept	9.2250 (0.73)	10.3648 (0.81)	10.4483 (0.82)	10.1690 (0.80)	10.3660 (0.81)	10.2823 (0.81)	8.6331 (0.70)
FIRM FE	YES	YES	YES	YES	YES	YES	YES
FQ FE	YES	YES	YES	YES	YES	YES	YES
N	14,667	14,667	14,667	14,667	14,667	14,667	14,213
Adj. R-Sq	0.777	0.776	0.776	0.776	0.776	0.776	0.777
LM: OLS vs RE	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hausman: FE vs RE	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 3b, Panel B, Model 3, while, CRMR, ELA, ECSR, MARFUN, BUSPACK and SUPBRO all maintain their sign, but are not significant. The coefficients of ROA and SGA are found to be negative and significant at  $p < 1\%$ . This supports the argument that easy monetary policy reduces trade credit use at the firm level.

Our previous analysis provides robust results even after controlling for firm characteristics. However, the monetary and fiscal policies of countries constitute non-random occurrences associated with firm-level factors, suggesting that endogeneity could be an issue. We follow Shipman et al. (2017) in constructing a sample of propensity score matched (PSM) treatment and control firms. In un-tabled results, we achieve covariate balance for all of our control variables comprising SIZE, LEV, CF, RAO, CASH, CAP\_INT, INTAN, SGA, WC, and COVI19\_SINDEX.<sup>7</sup> Following Shipman et al. (2017), we include all our control variables that are used to determine trade credit in Eq. 1.1. The regression results of the PSM analysis are shown in Table 5. Un-tabulated results show consistent coefficient signs and magnitudes for the IR, PRUDEN, and SUPBRO associations with credit trade ( $p < 0.01$ ). We also find that all the control variable regression coefficients are significant (at  $p < 0.10$  or better) across all models. This supports our main hypothesis that, even when we control for sample self-selection bias, we find results consistent with our main model.

Finally, Ebeke et al., 2021 assert the importance of the initial position of liquidity and solvency of the firm. Although we have controlled for firms' and countries' liquidity and solvency in our pervious analysis, now we disaggregate our sample, for each country's response, into distressed and non-distressed firms using Altman Z. Firms that are below the means for Altman Z score are the more distressed firms, while those above the sample's mean of Altman Z score are considered less financially distressed firms. Table 5 shows

<sup>7</sup> Table available upon request.



**Table 3B**

Panel B: Regression between trade credit and monetary and fiscal policy using country and COVID-19 control variables.

	(1)	(2)		(3)	(4)	(5)
	TC1	TC1		TC1	TC1	TC1
IR	-0.6566*** (-5.27)	-0.1776** (-2.10)	IR	-0.2147* (-1.79)	-0.3338 (-1.60)	-0.4251** (-1.99)
CRMR	-0.6993*** (-4.62)	0.0182 (0.32)	CRMR	-0.0093 (-0.10)	-0.4678 (-1.20)	0.1676 (0.85)
ELA	-0.3744*** (-4.06)	-0.0779** (-2.32)	ELA	-0.1128 (-1.49)	-0.5309* (-1.83)	-0.2346* (-1.73)
ECSR	-0.0120 (-0.08)	0.0267 (0.30)	ECSR	0.1256 (0.24)	-0.4053 (-1.60)	0.1621 (0.72)
Prudential	-0.0132 (-0.23)	-0.0567 (-1.33)	Prudential	-0.2142** (-2.34)	0.0191 (0.19)	-0.1309 (-0.79)
MARFUN	0.0539 (0.84)	-0.0849 (-1.10)	MARFUN	0.8999*** (5.28)	-0.0555 (-0.38)	1.5012 (1.22)
BUSPACK	0.2357 (1.42)	-0.1685 (-1.13)	BUSPACK	0.5663* (1.89)	0.2375 (1.21)	0.2554 (0.66)
SUPBRO	0.0315 (0.19)	0.0329 (0.43)	SUPBRO	-0.1407 (-0.63)	0.1918 (0.82)	-0.2048 (-1.01)
SIZE	-0.6162 (-0.45)	0.1275 (0.67)	SIZE	-0.6176 (-0.94)	-0.1503 (-0.40)	-0.9712 (-0.43)
LEV	-1.6665 (-1.26)	0.3733 (1.18)	LEV	-4.4346*** (-4.21)	-1.1754 (-0.79)	-4.1237 (-0.84)
CF	-0.3244 (-0.45)	0.6410** (2.05)	CF	0.7479 (0.96)	-0.8346 (-0.70)	0.7679 (1.11)
ROA	-2.0027* (-1.87)	-2.9839*** (-4.84)	ROA	-2.1720*** (-3.36)	-4.3374*** (-4.97)	-2.1110*** (-2.62)
CASH	0.4302 (0.64)	-0.3922 (-1.54)	CASH	2.7937** (2.00)	1.4071 (0.98)	2.8307 (0.68)
CAP_INT	0.5332 (0.21)	0.0752 (0.10)	CAP_INT	-1.2144 (-0.91)	-0.3062 (-0.20)	-0.6445 (-0.13)
INTAN	-4.6549 (-0.79)	0.5475 (0.75)	INTAN	1.0224 (0.32)	0.0363 (0.02)	-0.0333 (-0.00)
SGA	-10.0060*** (-3.31)	-6.2337*** (-3.20)	SGA	-20.9065*** (-4.55)	-10.3745 (-1.41)	-21.1773*** (-2.51)
WC	-0.0367* (-1.91)	-0.0140 (-1.00)	WC	-0.0596 (-0.88)	-0.0235 (-0.91)	-0.0828 (-1.16)
COVID19_SINDEX	-	0.0024 (0.02)	COVID19_SINDEX	-0.5076** (-2.16)	-0.6769 (-1.33)	-0.9000 (-1.40)
QGDP	-	-0.0065* (-1.92)	UEMP	0.0285*** (2.75)	-	0.0175 (1.64)
QINV	-	0.0010* (1.77)	M2	-	-6.9170* (-1.66)	12.0420 (1.31)
Intercept	8.1050 (0.62)	-0.2878 (-0.15)	Intercept	10.1343* (1.89)	117.7994* (1.69)	-179.0406 (-1.18)
Firm FE	YES	YES	Firm FE	YES	YES	YES
FQ FE	YES	YES	FQ FE	YES	YES	YES
N	14,213	6781	N	2588	5016	2495
Adj. R-Sq	0.780	0.980	Adj. R-Sq	0.986	0.897	0.987
LM: OLS vs RE	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Hausman: FE vs RE	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)

our disaggregated sample for each response. We find that IR and SUBBRO both reduce the trade credit for both distressed and non-distressed firms, suggesting that IR and Liquidity responses during the pandemic are very effective policies for reducing the trade credit for both sample types. We also find CRMR, ELA, ECSR and MARFUN significant for the more financially distressed firms, compared with less distressed firms.<sup>8</sup> This suggests that the financially stressed firms, rely on bank financing during financial crises, supporting the hypothesis that trade credit is counter-cyclical at an aggregate level. This is consistent with the findings of [Özli and Yalçın \(2010\)](#) that small firms are more likely to rely on trade credit, especially during recessions, while large firms tend to use more bank loans, thus, reducing the contraction of activity of small firms in difficult times.

#### 4. Conclusion

Using countries' macro-level monetary and fiscal policy responses to COVID-19, we investigate the pandemic's effect on firm-level

<sup>8</sup> We also used median Altman Z-score to disaggregate the distressed and non-distressed financial firms. Our results are consistent with our results in [Table 5](#). We thank an anonymous reviewer for this suggestion.

**Table 4**  
Robustness check using alternative trade credit measures (TC2).

	(1)	(2)	(3)	(4)	(5)	(6)	(8)
	TC2						
	Monetary Policy		Non-Conventional Monetary Policy			Fiscal Policy	
IR	-0.2086*						
	(-1.83)						
CRMR		-0.0139					
		(-0.09)					
ELA			0.0316				
			(0.49)				
ECSR				0.0583			
				(0.29)			
PRUDEN					-0.2310***		
					(-3.23)		
MARFUN						-0.1271	
						(-0.76)	
BUSPACK							-0.3254
							(-1.12)
SUPBRO							-0.0147
							(-0.10)
Intercept	2.4260	3.2719	3.2413	3.2269	3.2874	3.1420	3.6782
	(0.17)	(0.23)	(0.23)	(0.23)	(0.23)	(0.22)	(0.25)
FIRM FE	YES	YES	YES	YES	YES	YES	YES
FQ FE	YES	YES	YES	YES	YES	YES	YES
N	14,603	14,603	14,603	14,603	14,603	14,603	14,183
Adj. R-Sq	0.717	0.717	0.717	0.717	0.717	0.717	0.722
LM: OLS vs RE	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hausman: FE vs RE	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

**Table 5**  
Association between Country fiscal and monetary response and trade credit for distress and non-distress using Altman z score.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	TC1													
	Altman Z>Mean	Altman Z<Mean	Altman Z>Mean	Altman Z<Mean	Altman Z>Mean	Altman Z<Mean	Altman Z>Mean	Altman Z<Mean	Altman Z>Mean	Altman Z<Mean	Altman Z>Mean	Altman Z<Mean	Altman Z>Mean	Altman Z<Mean
IR	-0.1646**	-0.5637***												
	(-2.23)	(-5.19)												
CRMR			0.0019	-0.3303***										
			(0.03)	(-3.49)										
ELA					-0.0018	-0.1435***								
					(-0.11)	(-2.93)								
ECSR							-0.0431	0.4594**						
							(-0.35)	(2.28)						
Prudential									-0.0423	-0.0536				
									(-1.14)	(-1.03)				
MARFUN											0.0558	-0.1434*		
											(0.96)	(-1.82)		
BUSPACK													0.2993	0.3857
													(1.42)	(1.44)
SUPBRO													-0.3496***	-0.3040*
													(-3.30)	(-1.92)
SIZE	0.1207	-1.3688***	0.0562	-1.5172	0.0562	-1.5366	0.0561	-1.4711	0.0581	-1.5088	0.0431	-1.5006	0.1557	-1.4497***
	(0.28)	(-2.83)	(0.19)	(-0.70)	(0.19)	(-0.70)	(0.19)	(-0.68)	(0.19)	(-0.69)	(0.15)	(-0.69)	(0.36)	(-2.98)
LEV	-0.2298	-2.0895**	-0.1450	-2.1612	-0.1457	-2.3235	-0.1536	-2.1691	-0.1456	-2.2741	-0.1479	-2.2692	-0.4283	-2.2109**
	(-0.22)	(-2.04)	(-0.30)	(-1.20)	(-0.29)	(-1.28)	(-0.31)	(-1.20)	(-0.29)	(-1.25)	(-0.29)	(-1.25)	(-0.41)	(-2.15)
CF	0.1756	-0.1301	0.2793	-0.0120	0.2795	-0.0783	0.2825	-0.0038	0.2584	-0.0997	0.2599	-0.0460	0.0522	-0.2086
	(0.18)	(-0.09)	(0.45)	(-0.01)	(0.49)	(-0.07)	(0.49)	(-0.00)	(0.44)	(-0.09)	(0.45)	(-0.04)	(0.05)	(-0.15)
ROA	-1.9765**	-3.4606**	-1.9165***	-3.0818	-1.9145***	-3.8979**	-1.9239***	-3.6296*	-1.9650***	-3.6976*	-1.9257***	-3.6806*	-1.9962**	-3.6474***
	(-2.02)	(-2.52)	(-2.93)	(-1.53)	(-3.36)	(-1.99)	(-3.33)	(-1.86)	(-3.28)	(-1.89)	(-3.33)	(-1.89)	(-2.04)	(-2.65)
CASH	0.2378	0.3766	0.1762	0.0591	0.1760	0.1466	0.1787	0.1544	0.1797	0.1766	0.1769	0.1607	0.3153	0.2677
	(0.30)	(0.30)	(0.53)	(0.05)	(0.53)	(0.11)	(0.53)	(0.12)	(0.54)	(0.14)	(0.53)	(0.13)	(0.40)	(0.21)
CAP_INT	1.9482	-2.6718*	2.0227*	-2.4899	2.0251*	-2.5066	2.0070*	-2.4851	2.0091*	-2.5176	2.0200*	-2.5440	1.8463	-2.5400
	(1.27)	(-1.68)	(1.73)	(-0.97)	(1.70)	(-0.98)	(1.69)	(-0.97)	(1.69)	(-0.98)	(1.70)	(-0.99)	(1.21)	(-1.59)
INTAN	0.7847	-9.7582***	0.8104	-9.4027	0.8120	-9.3605	0.8408	-9.4420	0.8647	-9.4563	0.7794	-9.4370	1.0732	-9.3768***
	(0.24)	(-3.45)	(0.99)	(-10.07)	(1.00)	(-1.06)	(1.03)	(-1.07)	(1.07)	(-1.07)	(0.94)	(-1.07)	(0.33)	(-3.30)
SGA	-0.0974	-19.6722***	-1.0438	-22.5708***	-1.0409	-22.2608***	-1.0676	-22.6819***	-1.1473	-22.7838***	-1.1003	-22.6026***	0.2953	-21.5431***
	(-0.03)	(-3.59)	(-0.21)	(-5.60)	(-0.21)	(-5.57)	(-0.22)	(-5.66)	(-0.24)	(-5.64)	(-0.23)	(-5.63)	(0.08)	(-3.91)
WC	-0.0190	-0.0669	-0.0172	-0.0801	-0.0173	-0.0785	-0.0178	-0.0737	-0.0155	-0.0754	-0.0165	-0.0741	-0.0233	-0.0765
	(-0.66)	(-0.65)	(-1.59)	(-1.00)	(-1.62)	(-0.99)	(-1.60)	(-0.93)	(-1.52)	(-0.95)	(-1.56)	(-0.93)	(-0.81)	(-0.74)
Intercept	-0.8733	17.2210***	-0.3276	18.5860	-0.3275	18.7889	-0.3215	18.1144	-0.3347	18.5194	-0.2212	18.4614	-1.1677	17.9219***
	(-0.21)	(3.65)	(-0.14)	(0.89)	(-0.14)	(0.90)	(-0.13)	(0.87)	(-0.14)	(0.89)	(-0.09)	(0.89)	(-0.28)	(3.78)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FQ FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5647	8566	5647	8566	5647	8566	5647	8566	5647	8566	5647	8566	5647	8566
Adj. R-Sq	0.903	0.707	0.903	0.705	0.903	0.705	0.903	0.705	0.903	0.705	0.903	0.705	0.904	0.705

supplier-customer relationships as reflected in trade credit use. We contribute to the trade credit literature by providing early evidence from COVID-19. We document that several country macro-level fiscal and monetary policy measures show a significant impact on firm-level trade credit. However, we could not test for inter-firm differences, as the short time period does not generate enough degrees of freedom to enable us to carry out such an exercise. Our findings suggest that monetary policy (conventional and non-conventional) responses to COVID-19 entice firms to use bank financing, while fiscal measures sustain the use of trade credit (by supporting the operations of SMEs). We also find that firms, particularly financially stressed firms, rely more on bank financing during this crisis. This

supports the hypothesis that trade credit is counter-cyclical at the aggregate level. The monetary interventions seem to benefit firms with better access to capital markets systematically. Thus, fiscal policy measures, particularly those directly target small firms in industries that are more affected by the pandemic, are an important complement to central banks' unconventional monetary measures. These findings can assist national authorities in identifying the policies that deliver adequate support to the economy. However, given the high integration of supply chains worldwide, multilateral collaboration and coordinated interventions among economies is imperative to ensure no disruptions in supply chains, help financially constrained businesses survive the pandemic, and minimize long-run unfavorable consequences on industrial structures. A coordinated global policy mix may include programs, such as tax deferrals and international guaranteed bank loans to purchase trade receivables (for firms in key industries), and inject cash into supply chains by supporting export credit agencies, working capital financing programs, and new facilities to support exporters and importers. This is especially important as a stress in the corporate sector (or trade credit) could translate into a contagious failure of banks across countries through the supply chain.

Future research should consider the longer time of the impact of fiscal and monetary policy after the pandemic. In addition, as data becomes available, researchers should analyze various factors that might explain variations across countries, industries, and firms in the trade credit response to monetary and fiscal policy measures. As some interventions may systematically benefit firms with better access to capital markets, future research should also focus on long-run consequences of policy interventions during COVID-19 on industrial structures.

### Author statement

We would like to thank the anonymous reviewers and editor for the valuable contribution.

### Appendix A. Variables Definitions

Variable	Definition
TC1	Trade Credit calculated as total accounts payable scaled by total sales
TC2	Trade Credit calculated as total accounts payable scaled by cost of goods sold
IR	A dummy for reductions in central bank policy interest rate (= 1 if IR was reduced during the quarter; = 0 otherwise).
CRMR	A dummy for lowering the capital requirements for market risk (= 1 if the CRMR was reduced during the quarter; = 0 otherwise).
ELA	A dummy for emergency liquidity assistance (= 1 if the ELA was provided during the quarter; = 0 otherwise). This includes Reserve requirement rate for deposits and emergency lending programs.
ECSR	A dummy for easing the collateral standards period to improve liquidity and funding (= 1 if the ECSR was extended during the quarter; = 0 otherwise).
PRUDEN	A dummy that receives one if there were changes in either: prudential requirements including countercyclical capital buffer (CCB); exemption from liquidity coverage ratio (LCR); level of capital defined by the Pillar 2 Guidance; supervisory/inspections; allowing lenders to defer repayment of loans; restructuring requirements for retail loans; and adjustments for risk-free interest rates and terms.
MARFUN	A dummy that receives one in case of central bank interventions in foreign exchanges to lower market volatility (CBFE), expansion of foreign exchange hedging programs (FEH), bans on stock short-selling (BSSS), temporary closures of the stock market (TCSM), amendments to the Market Makers Program, including implementation of swaps of government securities held by market-makers and purchase options of government securities for market-maker.
BUSPECK	Fiscal measures in the form of business packages for small to medium-sized enterprises (SMEs), including loans to SMEs, purchase of payroll loan portfolios; SMEs allowed to issue corporate bonds for repaying loans and replenishing operating capitals.
BUSBRO	Business Borrowing including loans to small firms, loans to firms that were hardly hit by COVID-19, Credit Guaranteed loans, extend repayment loans, restructure loans, and Credit lines to affects sectors.
SIZE	Natural Logarithm of total assets
LEV	Total debt scaled by total assets.
CF	Operating cash flow scaled by total assets.
ROA	Return on Assets
CASH	Total cash and equivalents scaled by total assets
CAP INT	Net Property, Plant, and Equipment scaled by total assets.
INTAN	Total intangible assets scaled by total assets
SGA	Selling, General and Administration expenses scaled by total assets
CR	Working Capital (Total current assets scaled by total liability)
QGDP	Quarterly Gross Domestic Product per capita in nominal US dollars.
QINV	Investment by asset type measured as percentage of total gross fixed capital formation.
COV119_INDEX	A Stringency index that tracks and compares worldwide government responses to the coronavirus, such as school closures, travel bans, etc., recorded as an ordinal scale (Hale et al., 2021).
M2	Quarterly Aggregate Broad Money Supply from IMF, includes currency outside banks, demand deposits, quasi money, and long-term deposits.
Unemployment Rate	Quarterly Unemployment Rate from IMF.
ALTMAN Z	$1.2 (\text{Working Capital} / \text{Total Assets}) + 1.4 (\text{Retain Earnings} / \text{Total Assets}) + 3.3(\text{EBIT} / \text{total Assets}) + 0.6(\text{Market Value of Equity} / \text{Total Liability}) + 1.0(\text{Sales} / \text{Total Assets})$ . We use total common stock equity when market value of equity is missing.

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