COVID-19 Dynamics and Financing of Cash Flow Shortages: Evidence from Firm-Level Survey

Yusuf Adeneye[1*], Fathyah Hashim[2], Yusuf Babatunde Rahman[3] & Normaizatul Akma Saidi[1]
[1]Faculty of Hospitality, Tourism and Wellness, Universiti Malaysia Kelantan, Malaysia.
[2]Graduate School of Business, Universiti Sains Malaysia, Malaysia.
[3]Faculty of Management Sciences, Lagos State University, Nigeria.

Abstract: Research Question: We seek answers to two pertinent questions: (1) Do COVID-19 dynamics establish new determinants of financing structure following cash flow shortages, if yes, (2) To what extent do COVID-19 dynamics affect firms' financing sources? **Motivation:** Firms experiencing cash flow shortages due to the COVID-19 crisis respond either operationally, by making changes to the production process and production lines, or in management and strategy, by making changes to employee job engagement and new technological approaches to delivering goods and services, or financially, through the choice of equity and debt capital and filings of bankruptcy. **Idea:** This study investigates the effects of Covid-19 dynamics (i.e., productivity shocks, credit agreements, closure strategy, employee welfare, online activity adoption, and economic policy response) on the financing structure of establishments. **Data:** A unique cross-country firm-level survey data covering 28 countries was obtained from the World Bank Enterprise Survey (WBES). **Method/Tools:** The study uses the logit regression estimation technique. **Findings:** Logit regression findings reveal that firms that temporarily close business operations due to COVID-19 took fewer bank loans to finance cash flow shortages. The adoption of online sales and delivery services has significant negative effects on account payables whereas it has positive effects on bank loans. Firms adopting remote work arrangements increase their bank loans. Sales on credit and purchases on credit significantly increase the use of accounts payables. Firms actively involved in the production conversion process used more bank loans and less equity finance. Also, firms that engage temporary workers use more equity finance and accounts payables and fewer bank loans. However, we do not find evidence that firms where workers quit voluntarily change their capital structure. Overall, we find evidence of the "spare tire" effect of the capital market as equity finance (i.e., retained earnings) dominates the financing structure across sampled firms in health crisis periods. **Contributions:** Our study is among the first to provide new determinants of capital structure following a health crisis.

Keywords: Productivity shocks, employee welfarism, closure strategy, online activity adoption, economic policy response, financing structure.
JEL Classification: D53, G01, G32, G38, J21

* Corresponding author: Yusuf Adeneye. Tel.: +6010-9101459. Email: adeneye.yb@umk.edu.my

1. Introduction

"COVID-19 in many cases has really threatened stability and also exacerbated the drivers of fragility"

Franck Bousquet (Senior Director, FCV, World Bank Group)

How do firms perform during COVID-19? What indicators have been overlooked by corporate managers in a set of pandemic dynamics in financing cash flow shortages? Do theories of corporate financial policy matter during the pandemic situation? This paper seeks to provide some possible answers to these pertinent questions and how investors and relevant stakeholders may perceive the principal-agency theory differently. The increasing conflict in profitability may pose a new direction into whether corporate managers could manage the risks of COVID-19 that affect firms' investments and the associated return on investments through internal and external finance (e.g., equity finance, bank loans, non-bank loans, and account payable).

Firms experiencing cash flow shortages due to the COVID-19 crisis respond either operationally, by making changes to the production process and production lines, or in management and strategy, by making changes to employee job engagement and new technological approaches to delivering goods and services or financially through the choice of equity and debt capital and filings of bankruptcy. Thus, firms respond to cash flow shortages due to productivity shock, employee welfare, closure strategy, online activity adoption, and economic policy response. Meanwhile, why do firms choose certain equity or debt capital sources to respond to these COVID-19 crisis dynamics over other financing sources? however, is largely unexplored. Therefore, analysing the firm's responses to cash flow shortages through various financing structures may shed light on addressing the dynamics of the COVID-19 crisis by firms and thus validate what financial structure matters significantly.

Corporate finance theory suggests that market imperfections, such as those caused by the financial crisis, create some economic and firm dynamics that result in cash flow shortages, and thus, disrupt production, create unlawful and illegal employee re-contracting agreements, and may induce firms to take an alternative route to production and delivery of business activities. Using a dataset of 276,998 firms across 75 countries, Demirgüç-Kunt *et al.* (2020) show that firm leverage declines during the start and immediate aftermath of the global financial crisis in both advanced economies and developing countries. Although the findings of Demirgüç-Kunt *et al.* (2020) confirmed the impacts of the global financial crisis on firms' capital structure, their study relies on country characteristics, legal systems, and financial development indicators on the type of firms; leveraged SMEs, large non-listed firms, and listed companies.

In this paper, we deviate from the study of Demirgüç-Kunt *et al.* (2020) on the response of country characteristics and financial systems to the impact of the financial crisis on capital structure. We focus on the dynamics created by the COVID-19 crisis and how they affect the financing structure of establishments. The COVID-19 crisis created some dynamics that can induce some agency costs on firms, which may be important for the financing structure of firms. In their agency cost model, Jensen and Meckling (1976) posit that increasing returns variance would induce high risk-taking among shareholders, especially in countries where bankruptcy costs and monitoring costs are high. In this situation, firms engage in de-leveraging and shortening of debt maturities due to uncertainty, risk, and bad news (i.e., cash flow shortages and downgrade of credit ratings) (Diamond, 2004).

The wake of the COVID-19 crisis has uncovered some dynamics that may further explain the variation in the financing structure choice of the firms. In this study, we identified six main COVID-19 dynamics involving productivity shocks; employee welfarism (e.g., Kniffin *et al.*, 2021); closure strategy; online activity adoption; credit agreements, and economic policy response as factors responsible for the cash flow shortages in firms, and how firms thereafter choose between various types of debt and equity capital to address the firm's cash flow shortages. For instance, concerning employee welfarism, the increase in unemployment and declining female gender diversity in corporate firms may be responsible for debt level changes and perhaps corporate firms' takeover bids and liquidation. One reason behind the declining female board and the total number of female workforces is because of additional childcare and household obligations that emerged during the pandemic. This seems to have long-term ramifications on the firm's risk-taking policy and the ultimate capital structure choice.

In this paper, we survey more than 4,500 firms across 28 countries to test (i) whether the COVID-19 crisis dynamics -productivity shocks; employee welfarism; closure strategy; online activity adoption; credit agreements; and economic policy response- affect financing structure, and (ii) whether this effect varies across firms in developed countries (with developed financial systems) and developing countries (with less-developed capital markets). Our investigation into the nexus between the dynamics of the COVID-19 crisis and financing of cash flow shortages is motivated by Ayyagari *et al.* (2011) that during the financial crisis and episodes of credit-less recoveries, cash flows rarely recover without a recovery in external credit, positing that the equity and the bond markets are more instrumental to cash flow recovery. Thus, we investigate how COVID-19 dynamics impact the financing structure of firms during the pandemic situation in the firm's bid to address cash flow shortages.

Our paper provides evidence relevant to strengthening the effective functioning of the financial markets. Although past literature in corporate finance has investigated the link between financial development and capital structure, we, however, do not know how the business operations and activities during COVID-19 shaped the pattern and structure of firms' finances. Also, we do not know whether COVID-19 dynamics drive the use of equity finance over debt finance or "*government as a palliate market*" through government grants. For instance, a positive link between equity finance and productivity shocks may imply that the stock market serves as a "spare tire" in addressing the productivity problems that firms face during the COVID-19 crisis. This paper addresses these issues.

Our study also provides evidence of structural transformation in the form of reallocation shock. Several theoretical models assume that productivity shocks could decline through the reallocation from small retail outlets to more productive larger stores. The rise and start-off of online sales and delivery by many firms during the COVID-19 crisis brought another major firm's structural reallocation, supporting the cleansing dynamics model of Caballero and Hammour (1994) that the COVID crisis has triggered some reallocation effects that would persist long after the COVID-19 crisis recedes. For instance, the results of the forward-looking reallocation model of Barrero *et al.* (2020) show that the expected job reallocation rate and expected sales reallocation rate from January to April 2020 are 5.39 per cent and 3.78 per cent, respectively, which are both 2.4 times and 4.0 times pre-COVID crisis mean. We consider productivity shocks as an anecdote of the coronavirus pandemic and as an indicator of reallocation shock by relating productivity shocks with the financing structure of firms. On the supply side of the reallocation process, our findings may have long-term impacts on credit reallocation and reassessment of capital market efficiency on resource reallocation. Banks would need to raise costly equity buffers ex-ante before liquidating loans to poor prospects firms while reallocating the proceeds to expanding firms, a process that hinges on whether

the agency costs of outside equity financing are low and minimal (Keuschnigg and Kogler, 2020).

The richness of our firm-level survey allows us to examine the dynamics of the COVID-19 crisis and how firms finance their cash flow shortages, thus contributing to the corporate finance literature on corporate financing structure. Our paper also investigates how firms across developed and developing countries address the COVID-19 crisis dynamics and how they deal with cash flow shortages; in essence, we study how COVID-19 crisis dynamics impact the financing structure in firms. Our study differs from past studies on the impact of the financial crisis on capital structure. We not only study the financing structure of firms during the COVID-19 crisis, but we also extend our investigation into new determinants that affect the capital structure, rather than examining the variations of capital structure in pre- and during the COVID-19 crisis. These relatively new dynamics or determinants could reshape our understanding of the agency cost of equity, asset substitution, and the agency cost of debt in the firm's optimal capital structure.

The rest of the paper is organized as follows: Section 2 presents brief literature on the COVID-19 dynamics and capital structure. Section 3 discusses the data and methodology. Section 4 presents the results of the survey, while Section 5 discusses the findings and concludes the paper.

2. Literature Review and COVID-19 Dynamic

This section presents the related studies on COVID-19 dynamics and how may explain the financing structure in firms. These dynamics relate to industry dynamics and macroeconomic conditions: Productivity shocks, employee welfare, closure strategy, online activity adoption, credit arrangements mechanism, and economic policy response. For instance, employment dynamics adjust to the level of productivity shocks, in which case, the firm considers whether to temporarily or permanently close business operations and production, which may also be a function of the available debt capital (Rampini and Viswanathan, 2013; Nucci *et al.*, 2005).

2.1 Employee Welfare Mechanism

Several studies have argued that job loss, firing cost, and employee contracting induce a human cost of bankruptcy that affects the capital structure of firms (Berk *et al.*, 2010; Chemmanur *et al.*, 2013; Funke *et al.*, 1999; Serfling, 2016). Berk *et al.* (2010), arguing in support of the optimal capital structure, submit that firms trade off risk sharing for the benefits of debt. The authors further contend that employees with low-risk aversion would prefer firms with high leverage, while those employees with high-risk aversion prefer to work and stay in low-leverage firms. From the theoretical perspective of Funke *et al.* (1999), if the firm is financially distressed, bankruptcy effects will exceed tax effects, which indicates that labour demand will negatively correlate with the debt ratio. Although past studies seem to have addressed employee contracting and welfarism using employee risk aversion (Berk *et al.*, 2010), wrongful discharge laws (using a good faith, implied contract, and public policy exceptions) (Serfling, 2016), labour demand by using per capita wage and the total number of employees (Funke *et al.*, 1999), our model identifies new determinants of the cross-sectional distribution of firm leverage that have not been investigated in human capital and employee-finance literature. We contend that the shortage in cash flows induced by COVID-19 triggers some bankruptcy costs that influence employee welfarism across firms. Our paper shares an important insight with Ghaly *et al.* (2015), namely, that shortages in cash holdings trigger reduced and bad employee well-being, which may further create a "human cost of bankruptcy" that affects the optimal capital structure of the firm.

Although poor treatment of employees and re-contracting due to COVID-19 may increase the cost of setting court cases and post-recontracting and ex-post-recruitment expenses, it may

reinforce its tax advantages by securing additional debts and sustaining supply-manufacturing chain distribution channels. Our model identifies the effect of "voluntarily quitting of workers", "change in temporary workers", and workers laid off not because of poor financial performance (Wu, 2023) but because of the negative effects of COVID-19 on cash holdings. One significant contribution of our model is in relating these employee welfare factors to COVID-19 and how firms finance their cash flow shortages using various financing sources. That is, whether firms were able to reduce the human cost of bankruptcy induced by the pandemic and how it affects the optimal capital structure is investigated. This contrasts with most recent studies on the impact of COVID on workplace and job loss (Bapuji *et al.*, 2020; Lemieux *et al.*, 2020; Kniffin *et al.*, 2021; McFarland *et al.*, 2020), without assessing their effect on the financing structure of firms. Our results may have practical implications for economic and gender inequality (Alon *et al.*, 2020; Dang and Nguyen, 2020) since COVID-19 exacerbates inequalities in employees' engagement, pay and benefits (Alon *et al.*, 2020; Bapuji *et al.*, 2020). We conjecture that the more the employees are voluntarily quitting their jobs and as more workers are laid off, the increasing agitation by employers to engage in recontracting agreements with staying employees and the ultimate cut in wages in a way to take advantage of tax shields. Thus, we conjecture a negative link between employee welfarism and leverage.

2.2 Productivity Shocks Mechanism

As argued in past literature, capital structure theories point to the relationship between productivity shock and capital structure. Meanwhile, there are mixed arguments on the theoretical views between capital structure and the firm's level of productivity shocks (Berk *et al.*, 2010; Wang *et al.*, 2021). These differential views lend themselves to empirical scrutiny, which may further explain the mixed models on the productivity-financial structure nexus. This study investigates the exogenous variations in financing types induced by factors that affect productivity and business operations. Although we are not concerned about the time effects of the estimation framework due to the data availability structure of the World Bank Enterprise Survey, our model will be able to understand the cross-sectional differences in debt changes in firms following the pandemic dynamics, and why firms must plan for the long-term effects of the pandemic and if possible, take a financial contagion and risk management policies in terms of its business policies and operations for future similar pandemics.

We argue that the production conversion process, firm's level of output, firm's hours worked, firm demand, and firm supply are factors that affect the level of productivity shocks. We conjecture that (i) productivity shocks positively affect debt changes, (ii) in the situation of a negative direction between production shocks and debt changes, it suggests that higher productivity shocks are in line with debt decreases or debt level stagnancy, suggesting that firms or establishments may not have the required collaterals to secure further debt. It may also suggest that firms are not side-line for government economic response stimuli within the criteria of the establishment's contribution to employment generation and government fiscal balances such as taxes. Our model on productivity shocks seems to also have theoretical implications for macroeconomics when Mises stated that:

> *"The period of production ... must be of such a length that exactly the whole available subsistence fund is necessary on the one hand and sufficient on the other for paying the wages of the labourers throughout the productive process."*

> Mises (1912), (1953: 360)

2.3 Online Activity Adoption Mechanism

Many analysts expect that the adoption of online business activities will increase in the wake of COVID-19 since the lockdown policy covering businesses and industries to curb and reduce the spread of the virus generated an initial decline in productivity. Thus, it affected stockouts for most manufacturing firms and less demand for retail services across the globe. At the firm level, the number of shutdowns affected firms to reshape and adopt a new way of doing business via (a) started or increased "business online", (b) started or increased "delivery of goods and services" after online booking orders, or (c) "remote work" arrangement i.e., "work from home (WFH)" employees (Kniffin *et al.*, 2021). Organizationally and financially, the economic shutdown policy appears to (i) reduce sales, (ii) result in changes in some firms' fundamentals, (iii) reduce cash holdings leading to cash flow shortages, and (iv) increase the demands for financing sources to finance new firms' fundamentals in doing businesses online and increasing cash flows. Given the economic uncertainty of COVID-19, financial analysts are trying to understand how the adoption of firms' process of generating revenues through online sales, WFH, and business activities online would affect the financing structure of firms if must decide between the cost and benefits of debts and risk reduction in physical loss of goods, thefts, and delay in meeting customer demands may reduce the risk of bankruptcy and further increases the tax shields benefits.

The study of the firm's online business practices and capital structure is still scanty. The literature on this relationship can be grouped into two parts. First, those who have examined online business activity in firms based on "perceived attitude and behaviour" towards online payment adoption (Daniel *et al.*, 2002; Liébana-Cabanillas and Lara-Rubio, 2017; Ming-Yen Teoh *et al.*, 2013; Shankar and Datta, 2018). Second, studies on corporate finance have been more linked to technology, technology transfer and technological risks (An and Rau, 2021; Audretsch *et al.*, 2016; Vismara, 2022). While the former studies are particular about the perceived factors that influence the adoption of online payment technologies in firms, the latter focuses more on expenses on research and development and patent but link it with capital structure. Through the COVID-19 dynamics, there is a need to bridge the gap between the "value-maximizing effect of online business practices" and capital structure.

Concerning agency problems, firms that adopt online platforms in the sales and delivery of goods and services are more likely to experience a higher return on assets, lower payback periods on investments, and higher profits available for rewarding purposes (e.g., payment of dividends). These factors may be responsible for reducing agency costs of finance. Dividends as rewarding tools are monitoring mechanisms that serve to reduce agency costs (Chen and Steiner, 1999; Hamdan, 2018). In contrast to the two strands of online business activity and capital structure, the wake of COVID-19 is like the global financial crisis that creates an exogenous shock to firms, triggering an increase in agency costs of both equity and debt (Tran *et al.*, 2017). Thus, while we may expect an increase in online business activity and sales to reduce agency cost of debt and equity financing, COVID-19 may induce an exogenous shock in which the expected return on investment reduces despite going online to address COVID-19 challenges. Intuitively, when firms raise external funds easily due to external financial constraints imposed by COVID-19, we will assume the positive impact of online business adoption mitigated agency cost of financing; otherwise, we will assume and conjecture that the investment into online business activity creates a cost that firms incur by not investing in better positive NPV projects rather than starting or increasing online sales.

In our analysis in the present paper, we focus on the factors of online business activities that were further triggered by COVID-19; started or increased business online, started or increased delivery of goods and services, WFH remote work engagement and share of online sales on the financing patterns of firms – and do not differentiate between highly technological firms and lowly technological firms. The broad survey by WBES allows us to identify these

issues and categorize them as "online activity adoption factors or mechanisms". By recording the responses on these factors for estimation purposes, we investigate the link between firms' adoption of online business practices and financing structure. Therefore, we conjecture that online sales and delivery activities will increase retained earnings, which may further help firms in securing debt cheaply. In the same vein, the firm may decide to reduce external equity financing as retained earnings increase (Park and Pincus, 2001). We hypothesized that online activity adoption increases debt and retained earnings while reducing the demand for external equity finance.

2.4 Credit Arrangements Mechanism

Several studies have linked trade credits with the capital structure of firms. Petersen and Rajan (1997) suggest that the firm uses trade credit when access to debt capital is difficult. Since the COVID-19 crisis has created high cash flow shortages and access to the external market is relatively difficult due to depleted liquidity, firms are triggered to go for more credit arrangements, which suggests that higher trade credit will decrease the demand for debt targets to finance cash flow shortages. Following the new demands in credit agreements by banks during and after the post-COVID-19 crisis, firms find it easier to engage in trade credit than seeking debt finance because it is more closely related to the production and distribution process. It may also be harder for firms to avoid it in supplier-customer relationships. For firms that adopt the open business strategy during the COVID-19 crisis, they find it important to engage more in trade credit to continually run business operations as the call for new credit agreements (i.e., demands for material adverse effect-MAE clauses) may further delay business production, lead to temporary closure decision, and a fall in the firm's market competitive advantage.

The substitution theory of debt seems to explain the link between the firm's demand for trade credit over the debt benefits (i.e. tax shields) in their optimal capital structure. Firms could substitute the use of trade credit for additional debt, especially during financial constraints, by trying to reduce the ex-post agency cost of additional debt between the owner-manager and the bondholders. This can induce equity holders to be less risky in their asset substitution decisions since Jensen and Meckling (1976) argue that in firms nearing financial distress, equity holders have the incentive to substitute riskier assets for existing ones in an attempt to "gamble for resurrection," even if the new assets have negative net present value.

The uncertainty regarding the impact of the COVID-19 crisis on cash flows, as firms experience increased cash flow shortages, can make firms face higher variability in their credit terms. COVID-19 has triggered significant changes in credit agreements and terms, which may require banking institutions to evaluate and monitor firms' credit risk levels. This will, in turn, affect the firm's level of access to domestic credits from banks. In their assessment of the new credit arrangement patterns caused by the COVID-19 crisis, Montgomery *et al.* (2020, pp.1) submit that

"as revenues for many businesses sharply declined, borrowers have explored their range of liquidity options, including drawing on revolving credit facilities or delay draw facilities available under credit agreements with their existing lenders. This has caused lenders to take a closer look at the conditions under which they are obligated to fund such borrowings."

This implies that while borrowers seek a delay in payment, they must equally meet minimum daily liquidity to ensure that enough cash on hand is maintained to service credit obligations. Thus, we conjecture a positive link between credit arrangements and the financing choice of firms.

2.5 Economic Policy Response Mechanism

Coronavirus has created uncertainty in business operations, which has called for government support for businesses to finance their cash flow shortages. In Australia, despite over 65% reduction in the revenue of Australian businesses in 2020, 80% of them experience a significant business survival in 2021, arguing that these firms receive support from the Australian federal government experience through the 'JobKeeper' scheme, designed as a 'wage subsidy' paid to employers in a bid to prevent business closures, reduce unemployment and maintain current staff strength (Grimmer, 2022). Although this subsidy might have come with a fiscal cost for the government, it reduces the cost of external borrowing for businesses as businesses may need to explore retained earnings and other non-bank loans to address cash flow shortages. On the contrary, MSMEs in Pakistan did not receive sufficient government support due to a decline in profits and bankruptcy problems (Shafi *et al.*, 2020). Shafi *et al.* (2020) contend that establishments in countries with economic and political instability could not get adequate government support, with most owners of establishments requesting the government to provide low-interest loans, and subsidies on utility charges.

In corporate finance literature, Ebrahim *et al.* (2014) link government support to debt finance. Patronised firms have higher leverage on average due to informal government support since these firms are more likely to service their debt during periods of economic uncertainties (i.e., COVID-19) and financial distress (Shleifer and Vishny, 1992). However, this implicit government support fades if the crisis increases systematic risk levels especially support extracts rents that cause low returns in firms (Ebrahim *et al.*, 2014). Due to COVID-19, we investigate how economic policy response factors (fiscal exemptions, government support, and wage subsidies) affect the financing structure of firms in response to cash flow shortages.

2.6 Business Closure Mechanism

The recent COVID-19 pandemic induced business closures that led to financial losses, insolvency concerns, and liquidity problems among businesses (Guerini *et al.*, 2020), which suggests that establishments that faced liquidity and cash flow challenges during the COVID-19 faced challenges in maintaining daily operations. This is usually understood that businesses characterized by insufficient cash reserves, and lack of access to credit lines would struggle to pay employees, and suppliers, and meet operational expenses, resulting in financial distress, and may ultimately lead to business closures. In Europe, there was economic contraction due to COVID-19, potentially impacting businesses' cash positions, leading to corporate bankruptcies, and temporary and permanent closure of business operations (Ebeke *et al.*, 2021).

The impact of COVID-19 was more serve during the early period of the crisis when there were forced closures and mass layoffs across businesses, suggesting that businesses that experienced more disruptions faced closure, and consequently, cash flow shortages. The risk of closure was negatively associated with lower finances, indicating that such businesses were more likely to reduce their plans to access banks and other credit supply mechanisms due to changes in credit terms that require good financial standings. The bureaucratic hassles and difficulties in establishing eligibility were of more concern to businesses (Bartik *et al.* 2020). These factors such as financial fragility and lower investment responsiveness to cash flow played significant roles in business closure during COVID-19, making it more likely to see a sharp drop in the financing structure of businesses. Thus, we conjecture that permanent and temporary closure of business operations could have a significant impact on the financing structure of establishments.

3. Material and Methods
3.1 Data Source

The dataset for this study consists of responses from firms (i.e., establishments) surveyed from over 4,919 firms in 28 countries[1] from the COVID Enterprise Survey conducted by the World Bank. We use the first-round COVID survey conducted between May and August 2020 as we consider the impacts of COVID-19 more severe in this collection period when government support and other credit arrangements are less or almost absent in some countries. We use the unaudited World Bank Enterprise Survey by establishments. Although there is the possibility of data bias following the audited self-reporting, it is believed that it cannot be a source of bias in this study. Like Beck *et al.* (2005) who also used the WBES to examine financial and legal constraints to growth concerning firm size, we contend that the goal of WBES is on enterprises and business environment and not firm performance. Firm performance is much linked to audited reports.

The essence of the survey is to identify the firm-level problems caused by the global COVID-19 pandemic and how firms finance their cash flow shortages. The firm-level issues range from closure decisions, productivity patterns, online business activity adoption, employee welfare, and credit arrangement to the economic policy response. General information on the establishments is limited to language, gender, sector, and designation as presented in Table 1. The survey has information relating to national sales, and the national language, and the main sources of finance used by firms to deal with cash flow shortages are government grants, account payables, equity finance, retained earnings, and bank and non-bank loans.

The study performs empirical estimation on a sample of 28 countries surveyed in 2020 during the COVID-19 pandemic. These countries are Albania, Armenia, Belarus, Bulgaria, Chad, Croatia, Cyprus, El-Salvador, Georgia, Greece, Guatemala, Guinea, Honduras, Hungary, Italy, Jordan, Moldova, Mongolia, Morocco, Nicaragua, Niger, Poland, Romania, Russia, Slovenia, Togo, Zambia, and Zimbabwe. Data are drawn from the World Bank Enterprise Survey (WBES) compiled by the World Bank. All the variables are collected from various establishments in these countries. We relate the assumptions of our empirical models to past studies. Although the measures of variables in the study are component-based measures rather than accounting or financial measures. For instance, we estimate components of the firm's productivity, including establishment output, establishment total hours worked, establishment product and service demands, establishment inputs supply, and establishment production conversion process instead of the total factor productivity used in Nucci *et al.* (2005). The use of establishment product demands supports the input demand used in the productivity function of Olley and Pakes (1992).

In addition, the survey covers many establishments. It covers three major sectors: manufacturing, retail services, and other sectors. Manufacturing firms constitute about 48.25% of the sampled firms, another 18.23% are from the retail service sector, and the remaining 33.52% are from other sectors. Tables A and B in the Appendix present the total number of firms surveyed in each of the 28 countries and the final number of firms used in this study. Equity finance is the most sourced finance in developed countries to deal with cash flow shortages, next to bank loans, then government grants, non-bank loans, and payables. Meanwhile, in developing countries, firms also used equity finance more than any other financing source but less than their counterpart in developed countries, this may be due to sound financial and institutional settings. Fewer bank loans, as well as retained earnings, are used in firms surveyed in developing countries with no report on account payables. The

---

[1] As at the collection of the data for this study, the World Bank Enterprise Survey (WBES) covers 28 countries involving about 15,605 firms. However, the sample is reduced to 4,919 firms because most firm-level variables and data are missing.

number of firms that used account payables in developed countries is higher than firms that use individual non-bank loans and government grants to finance cash flow shortages. This may be due to the trust factor in supplier-client relations.

3.2 Financing Cash Flow Shortages Models

Firms finance using either equity finance or debt finance or a combination of both. These forms of financing are used to finance cash flow shortages by establishments during the COVID-19. Thus, we conjecture that these finances represent the financing structure of firms. Thus, we consider account payables, equity finance, bank loans and non-bank loans as sources of financing cash flow shortages[2], and are related to the capital structure of firms. The logit regression equations connecting COVID-19 dynamics and cash flow shortages financing are presented in equations (1) to (6). Thus, to explain cash flow shortage financing during COVID-19, logit regressions are utilized. The dependent variables are dummies, which each represent Y =1 or otherwise Y=0 if the firm chooses one of the financing options. So, if a firm uses accounts payable to address cash flow shortages, the firm will be scored "1" and assigned "0" for firms that do not use this finance option.

Employee welfarism model:
$$Y_i^I = \beta_1 \Delta TemporaryWorkers_i + \beta_2 FemaleEmpDiv_i \\ + \beta_3 QuitLeaveWorkers_i + \beta_4 LaidOffWorkers_i + \beta_5 Controls_i + \varepsilon_i \tag{1}$$

Productivity shocks model:
$$Y_i^I = \beta_1 ProductionCProcess_i + \beta_2 Output_i + \beta_3 HoursWorked_i \\ + \beta_4 Demand_i + \beta_5 Supply_i + \beta_6 Controls_i + \varepsilon_i \tag{2}$$

Closure decision model:
$$Y_i^I = \beta_1 WeeksClosed_i + \beta_2 TemporaryClosure_i + \beta_3 Controls_i + \varepsilon_i \tag{3}$$

Credit arrangements model:
$$Y_i^I = \beta_1 CreditSales_i + \beta_2 CreditPurchases_i + \beta_3 Controls_i + \varepsilon_i \tag{4}$$

Online activity adoption model:
$$Y_i^I = \beta_1 StartedOnlinebus_i + \beta_2 StartedDeliverOnline_i + \beta_3 RemoteWork_i \\ + \beta_4 OnlineSales + \beta_5 Controls_i + \varepsilon_i \tag{5}$$

Economic policy response model:
$$Y_i^I = \beta_1 FiscalExemp_i + \beta_2 GovtSupport_i + \beta_3 WageSubsidies_i \\ + \beta_4 Controls_i + \varepsilon_i \tag{6}$$

Where Y_i^I represent the four sources of finance used in addressing cash flow shortages, which are account payables, equity finance, bank loans, and non-bank loans. As a general practice to avoid omitted variable bias, we controlled for GDP growth rate, inflation, private sector credit, and firm size. All variables including the dependent variables are defined in Appendix A2.

---

[2] In our initial data analysis, we consider government grants and retained earnings as part of financing cash flow shortages. However, our initial regression estimates show inconsistent results across the six model specifications. This suggests that the percentage of establishments financed by government grants and retained earnings to cushion the challenges of COVID-19 is less significant in the sampled firms. Also, the economic policy response factors are highly correlated with government grants. Thus, we excluded estimations with government grants and retained earnings models.

3.3 Summary Statistics

Table 1[3] presents the frequencies of the variables in this study. Results in Table 1 reveal that approximately 50% of firms affected by COVID-19 were in the manufacturing sector (representing about 48.25%), which could be due to a lack of access to production resources possible due to governments' lockdown policies. Also, the firms most affected are those whose national languages are English (19.79%), Russian (11.32%), and Arabic (10.80%). Table I reports that most of the sampled respondents, respecting each firm, are members of the board of directors, representing about 47.63% of the total 5,749 firms used for the frequency analysis, followed by general managers with about 14.02%, account managers/officers with about 7.31%, and financial managers with about 6.89%. CEOs and shareholders sampled represent about 5.22% and 0.20% of the sampled firms, respectively.

There is evidence that businesses do not permanently close operations but are temporarily closed. About 45.14% of the firms confirmed that they temporarily closed due to the COVID-19. One aspect of COVID dynamics that was brought to the finance literature during the COVID is the adoption of online business activities and practices to increase the business supply-production chain and delivery of goods and services. About 25.43% of the firms started or increased business online, 23.85% of the firms started or increased online delivery of goods and services, and approximately 30% of employees work remotely from their respective homes. There is also a report that firms also filed for insolvency or bankruptcy during the COVID-19. About 26.77% needed to be tax-responsible, 19.55% had overdue financial obligations that they needed to exercise, and about 5.13% of firms filed for either insolvency or bankruptcy.

Concerning economic policy response, a smaller number of firms received wage subsidies, about 26.07% representing 1499 firms rated "Yes" that they received wage subsidies from the government. About 30% of the surveyed firms received government support, and a low percentage of 13.97 of the firms were able to secure fiscal exemptions and reductions. Among the items of productivity shocks, the percentage of firms that converted their products or services in response to COVID-19 (production conversion process) is 37.88%, less than those firms that were unable to convert their production (i.e., 61.94%). Productivity was obstructed as 66.97% of the firms acknowledged that the total number of firms' hours worked significantly reduced, which supports our reports on the number of firms that temporarily closed due to COVID-19. Less than 32% of firms still work normal business hours.

To assess the importance of credit arrangements during the global pandemic, firms were asked to rate four options, whether credit sales and credit purchases decrease, increase, remain the same, and don't know. Between credit sales and credit purchases, the percentage of firms that experience a decrease in credit sales (i.e. 42.82%) is higher than those firms that experience a decrease in credit purchases (i.e. 39.87%) while there is more increase (i.e. 10.82%) in credit purchases than credit sales (i.e. 9.67%). There seems to be an equal percentage of firms that maintain their credit sales (i.e., 41.83%) and credit purchase levels (43.75%) without further decrease or increase. This suggests that firms ensure a speedy cash conversion cycle during COVID-19 by delaying account payables while reducing the amount of account receivables. Thus, justifying the use of spontaneous financing to address cash flow shortages during the pandemic period.

---

[3] We use a total of 5,749 firms to produce the summary statistics table as presented in Table 1 since some of the information could be relevant for our regression results. This is different from the final 4,919 firms used for performing the logit regression estimations.

Table 1: Firm descriptions and actions displayed during the COVID-19 crisis

Variable	Details	Freq.	Per cent	Variable	Details	Freq.	Per cent
Sector	Manufacturing	2774	48.25	Closure status	Open	5080	88.36
	Other services	1927	33.52		Temporarily closed	669	11.64
	Retail services	1048	18.23		Permanently closed	528	-
National language	Albanian	183	3.18	Temporary closure due to COVID-19	Don't know	673	11.71
	Arabic	621	10.80		No	2481	43.16
	Armenian	32	0.56		Yes	2595	45.14
	Bulgarian	353	6.14	Started or increased business online	Don't know	9	0.16
	Croatian	190	3.30		No	4278	74.41
	English	1138	19.79		Yes	1462	25.43
	French	243	4.23	Started or increased delivery of G&S	Don't know	10	0.17
	Georgian	321	5.58		No	4368	75.98
	Greek	90	1.57		Yes	1371	23.85
	Hungarian	291	5.06	Remote work arrangement (empl.)	Don't know	17	0.30
	Italian	148	2.57		No	4009	69.73
	Mongolian	190	3.30		Yes	1723	29.97
	Polish	348	6.05	Tax authorities	Don't know	30	0.52
	Romanian	324	5.64		No	4180	72.71
	Russian	651	11.32		Yes	1539	26.77
	Slovenian	121	2.10	Overdue financial obligations	Does not apply	201	3.50
	Spanish	505	8.78		No	4261	74.12
Designation	Board Member	2739	47.63		Yes	1124	19.55
	General Manager	806	14.02	Filed for insolvency or bankruptcy	Don't know	14	0.24
	Account Manager	420	7.31		No	5440	94.63
	Financial Manager	396	6.89		Yes	295	5.13
	CEO	300	5.22	Govt. (national or local) support	Don't know	33	0.57
	Admin. Manager	296	5.15		No	3500	60.88
	Marketing Manager	181	3.15		No, but in the next 3 months	455	7.91
	Chief Accountant	162	2.82		Yes	1761	30.63
	Economic Manager	137	2.38	Fiscal exemptions or reductions	Don't know	32	0.56
	Supervisor	131	2.28		No	1381	24.02
	Head of Departments	129	2.24		Yes	803	13.97

Table 1 *(continued)*

Variable	Details	Freq.	Per cent	Variable	Details	Freq.	Per cent
	CFO	117	2.03	Wage subsidies	Don't know	23	0.40
	HR Manager	110	1.91		No	694	12.07
	CEO & Est. Staff	42	0.73		Yes	1499	26.07
	Branch Manager	40	0.70	Establishment hours worked	Decrease	3850	66.97
	Assistant Manager	23	0.40		Don't know	3	0.05
	Shareholder	12	0.20		Don't know (spontaneous)	23	0.40
	Agent	6	0.10		Increase	52	0.90
	Technical manager	5	0.09		Remain the same	1821	31.68
	Auditor	5	0.09	Change in temporary workers	Decrease	1699	29.55
Gender	Female	2061	35.85		Don't know	299	5.20
	Male	3666	63.77		Increase	104	1.81
Financing Structure	Account payable	1224	21.29		Remain the same	3647	63.44
	Equity finance	2446	42.55	Sales on credit	Decrease	2462	42.82
	Government grants	478	8.31		Don't know	326	5.67
	Non-bank loans	153	2.67		Increase	556	9.67
	Bank loans	1196	20.80		Remain the same	2405	41.83
	Retained earnings	252	4.38	Purchases on Credit	Decrease	2292	39.87
Production conversion process	Don't know	10	0.17		Don't know	320	5.57
	No	3561	61.94		Increase	622	10.82
	Yes	2178	37.88		Remain the same	2515	43.75

Figure 1 depicts that firms rely on equity finance more than bank loans to finance cash flow shortages. Intuitively, the wake of the COVID-19 crisis creates a new hierarchy in the capital structure of firms, where firms finance first with equity finance and then with account payables. It may be surprising that firms experiencing cash flow shortages would demand equity finance during the COVID-19 crisis. However, the willingness of equity holders to release capital supports the claim by Jensen and Meckling (1976) that in firms nearing financial distress, equity holders have the incentive to substitute riskier assets for existing ones in an attempt to "gamble for resurrection," even if the new assets have negative net present value. We also offer a closer explanation of why firms seek more equity finance during the COVID-19 crisis. This is because the capital markets play a "spare tire" role in providing an alternative source of external finance when the functioning of the banking sector has been impaired during the crisis (Levine *et al.*, 2016). Figure 1 shows that the hierarchy structure for firms in a crisis period follows a path of equity finance, accounts payable, bank loans, government grants, retained earnings, and non-bank loans.
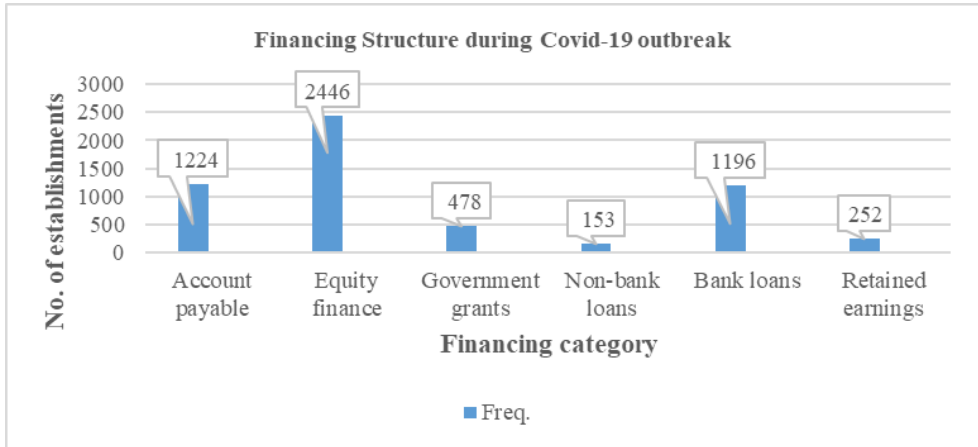
Figure 1: Financing structure during the COVID-19 outbreak
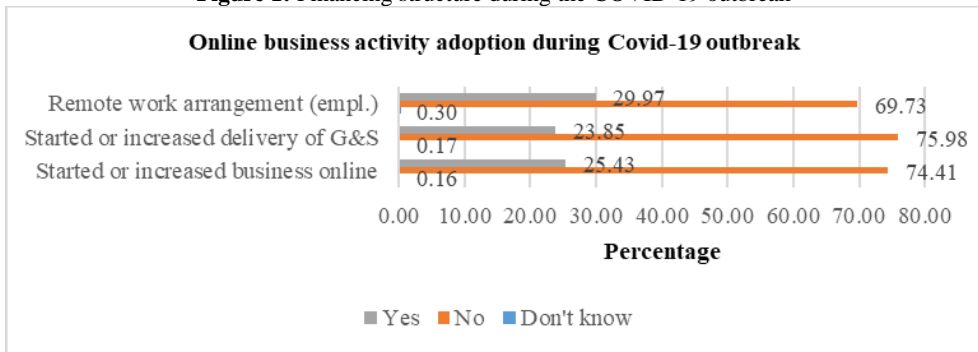
Figure 2: Online business activity during the Covid-19 outbreak

Figure 2 depicts that about 29.97% of the firms engage their employees to work from home, with about 69.73% still engaging their employees on work-in-office (WiO) conditions. Meanwhile, the percentage of firms that start or increase business online is 25.43%, higher than those that start or increase delivery of goods and services, representing about 23.85%. Figure 3 shows whether firms' cash shortages lead to bankruptcy or insolvency. We report evidence that more firms have overdue financial obligations than were filed for insolvency or bankruptcy. Supporting the growth in cash flow shortages, Figure 4 depicts that 45.64% of firms temporarily closed due to the COVID-19 crisis, while about 43.16% of the firms opened despite the pandemic outbreak, probably due to government grants and better fiscal exemptions or reductions in some countries.
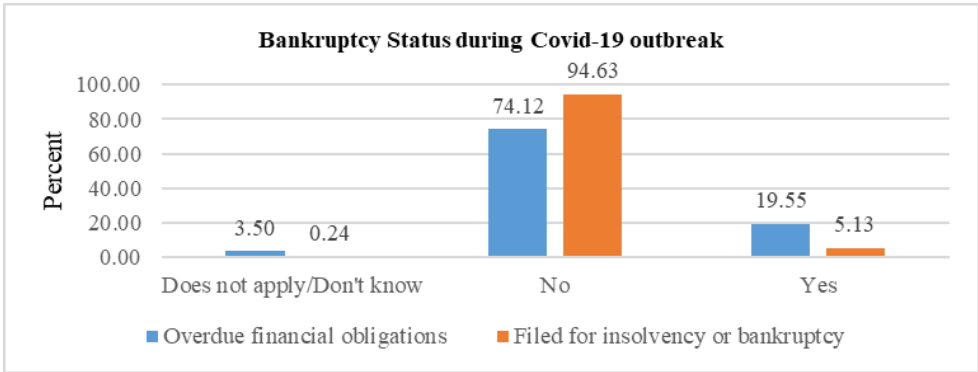
Figure 3: Bankruptcy status during the COVID-19 outbreak
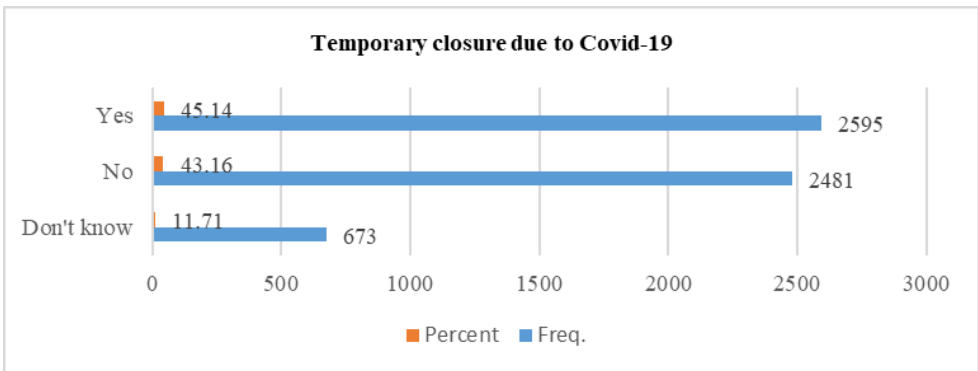
Figure 4: Temporary closure due to the COVID-19 outbreak
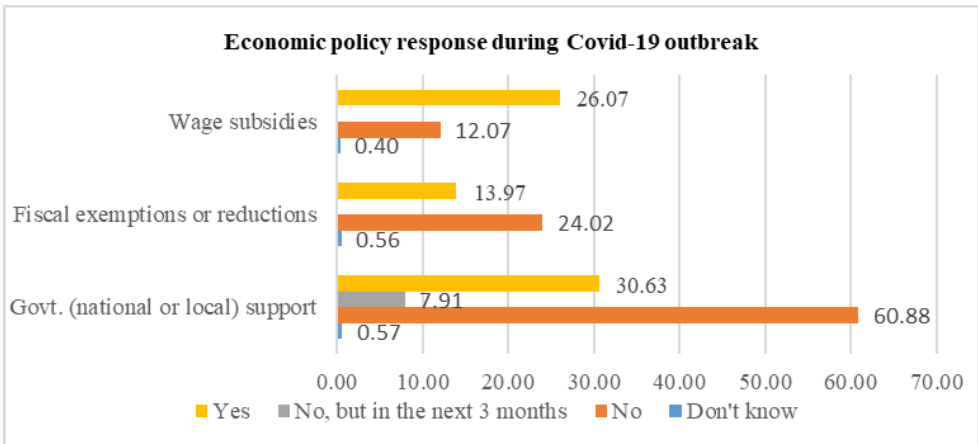
Figure 5: Economic policy response during the COVID-19 outbreak

Figure 5 shows that firms received more government support, representing about 30.63%. About 13.97% of firms received fiscal exemptions or reductions, and more than 25% of the firms received government wage subsidies as an economic policy response for firms during the COVID-19 outbreak. Figure 6 depicts the status of employees during the COVID-19 crisis. About 29.55% of the sampled firms have their temporary workforce reduced while about 63.44% of firms retain the number of their temporary workforce. There was a minimal

increase in temporary workers, probably due to the engagement of technology experts to run firms' online activity operations. Firms that reduce the number of temporary workers also reduced the number of hours worked by 66.97% while about half of the firms that did not change their temporary workers still worked for normal hours as before the pandemic.
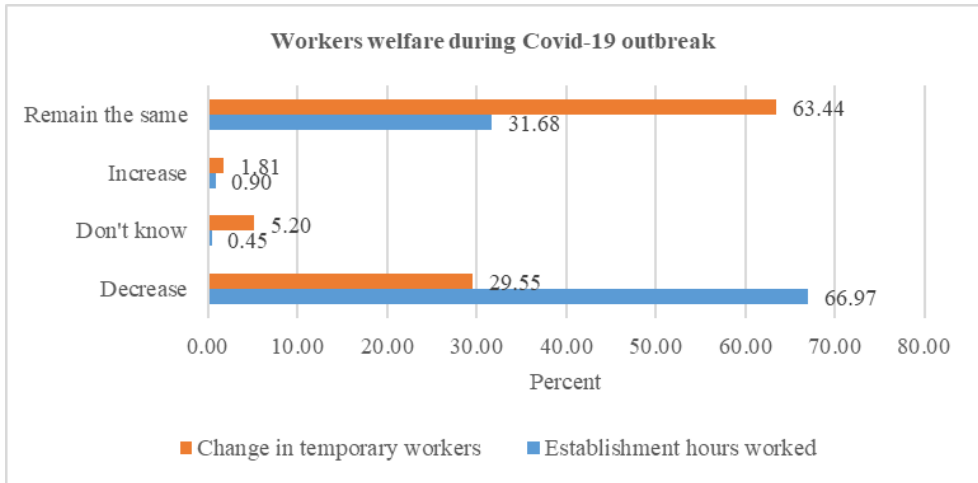
Figure 6: Status of employees during the COVID-19 crisis

Table 2 presents the results for the correlation matrix. We document that the production conversion process, hours worked, firm demand, and firm supply have a positive correlation with accounts payable. Also, we find a negative correlation between firm demand, firm supply, female employee diversity, workers laid off, tax authorities and equity finance. Furthermore, firms that filed for insolvency or bankruptcy experienced lower accounts payable, lower wage subsidies, and lower credit sales, following overdue financial obligations that could not be delayed. Similarly, we find that establishments that finance cash flow shortages using bank loans were able to perform their production conversion process, increase their outputs, and meet their tax obligations. We find a higher positive correlation between sales on credit and purchases on credit. This suggests that both accounts receivable and accounts payable increased simultaneously during COVID-19 due to economic uncertainty, supply chain disruptions, and reduced customer demands. For instance, lockdowns and travel restrictions led to supply chain disruptions, which resulted in delays in payments to suppliers while at the same time, customers are demanding flexible payment agreements. As presented in Table 1, the percentage of firms that experienced a higher decline in sales on credit (i.e., 42.82%) was much higher than firms experiencing a decrease (i.e., 39.87%) and an increase (i.e., 10.82%) in accounts payable, respectively.

Table 2: Correlation matrix

Part A

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Accounts payable	1.000															
2. Equity Finance	-0.376	1.000														
3. Bank Loans	-0.331	-0.494	1.000													
4. Non-bank Loans	-0.081	-0.120	-0.106	1.000												
5. Production conversion process	0.014	-0.146	0.110	-0.007	1.000											
6. Establishment output	-0.062	-0.129	0.165	0.051	0.055	1.000										
7. Hours Worked	0.084	0.114	-0.186	0.055	0.104	0.232	1.000									
8. Firm Demand	0.084	-0.045	-0.072	0.042	0.008	0.127	0.217	1.000								
9. Firm Supply	0.064	-0.065	-0.094	0.163	0.023	0.181	0.227	0.402	1.000							
10. Closure Status	0.040	0.229	-0.249	-0.012	-0.013	-0.248	0.023	-0.033	-0.036	1.000						
11. Temporary closure due to COVID-19	0.186	-0.041	-0.120	-0.042	-0.090	-0.246	-0.084	-0.034	-0.031	0.225	1.000					
12. Temporary workers	0.210	0.020	-0.226	0.144	-0.053	-0.034	-0.013	0.035	0.141	-0.037	-0.032	1.000				
13. Female employee diversity	0.104	-0.035	-0.076	0.054	0.198	0.018	0.083	-0.023	0.062	0.011	-0.059	0.090	1.000			
14. Quit and leave-seeking workers	-0.022	0.057	-0.023	0.008	-0.072	0.051	0.132	-0.024	-0.011	0.007	-0.051	0.016	0.041	1.000		
15. Workers laid off due to COVID-19	0.105	-0.029	-0.060	0.032	0.010	-0.038	-0.060	-0.003	0.026	0.009	-0.043	0.133	0.106	0.023	1.000	
16. Tax Authorities	-0.069	-0.001	0.017	-0.013	0.014	-0.137	-0.055	-0.023	-0.073	0.103	0.155	-0.040	-0.062	0.030	-0.047	1.000

Part B

Variables	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
17. Overdue financial obligations	1.000														
18. Filed for insolvency or bankruptcy	0.222	1.000													
19. Sales on credit	-0.076	-0.089	1.000												
20. Purchases on credit	-0.084	-0.073	0.703	1.000											
21. Fiscal exemptions or reductions	0.018	0.088	-0.072	-0.068	1.000										
22. Govt. (national or local) support	-0.013	-0.069	0.081	0.038	-0.090	1.000									
23. Wage subsidies	0.002	-0.036	0.014	-0.005	-0.018	0.198	1.000								
24. Started or increased business online	0.003	-0.013	-0.038	-0.063	0.075	-0.071	-0.109	1.000							
25. Started or increased delivery of G&S	-0.021	0.023	-0.069	-0.079	0.063	-0.094	-0.093	0.460	1.000						
26. Remote work arrangement (empl.)	-0.045	-0.029	-0.040	-0.055	-0.031	-0.023	-0.033	0.292	0.147	1.000					
27. Share of online sales	0.023	0.015	-0.042	-0.079	0.042	-0.064	-0.071	0.470	0.290	0.267	1.000				
28. GDP growth rate	0.014	0.105	0.066	0.092	-0.107	0.231	0.091	-0.106	-0.065	-0.051	-0.076	1.000			
29. Inflation	-0.034	0.256	0.075	0.100	-0.033	-0.073	-0.209	0.130	0.149	0.066	0.117	0.358	1.000		
30. Private sector credit	0.013	-0.081	-0.166	-0.167	0.196	-0.088	0.018	0.021	-0.013	0.023	0.025	-0.412	-0.569	1.000	
31. Firm size	0.023	0.073	-0.069	-0.064	0.038	-0.089	-0.081	0.041	0.105	-0.069	-0.019	-0.068	0.025	0.114	1.000

Source: Authors' computation

4. Empirical Results

This section presents the results of the various COVID-19 dynamics and mechanisms used in this study. Logit regressions are used to estimate the relation between productivity shocks and the probability that the firm uses a particular form of financing structure. The dependent variables are various sources of financing structure, which are individual binary variables that take the value of 1.0 if the firm uses either accounts payable or equity finance and zero otherwise. Past studies have adopted logistic regression to examine capital structure determinants (Ofek, 1993). Tables 3-8 present the main results.

Table 3 presents the results for the relationship between employee welfarism factors and financing structure. We find that firms that change their temporary workers use accounts payable, equity finance, and non-bank loans to finance their cash flow shortages. Also, we find a negative and significant relationship between female employee diversity, equity finance, and bank loans. However, we found that there are no significant relationships between financing choices and workers who quit and are laid off. This implies that establishments do not have to border about increasing their finances as the number of workers quitting and leaving the business does not have any significant impact on their finances, which contradicts the submission of Berk *et al.* (2010) and Serfling (2016) that firing cost induces a human cost of bankruptcy, although these authors do not establish whether the human cost of bankruptcy is relevant in periods when the firms are faced with variabilities in cash flows.

Table 3: Employee welfarism and financing structure

	[Accounts Payable] (1)	[Equity] (2)	[Bank Loans] (3)	[Non-bank Loans] (4)
Change in temporary workers	0.288***	0.123***	-0.393***	0.771***
	(0.047)	(0.041)	(0.053)	(0.116)
Female employee diversity	0.016***	-0.003*	-0.005**	0.002
	(0.002)	(0.002)	(0.002)	(0.005)
Quit and leave-seeking workers	0.000	-0.001	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Workers laid off due to COVID-19	0.001	-0.001	-0.002	0.002
	(0.003)	(0.003)	(0.004)	(0.007)
GDP growth rate	0.145***	0.278***	-0.248***	-0.241***
	(0.022)	(0.032)	(0.017)	(0.043)
Inflation	-0.720***	0.364***	0.390***	-0.290***
	(0.048)	(0.031)	(0.031)	(0.055)
Private sector credit	-0.053***	0.081***	-0.003	-0.117***
	(0.004)	(0.004)	(0.004)	(0.015)
Firm size	-0.032	0.382*	-0.690***	-0.886**
	(0.211)	(0.224)	(0.235)	(0.347)
Constant	1.407***	-7.183***	0.180	1.858**
	(0.489)	(0.541)	(0.524)	(0.882)
Pseudo R square	0.264	0.269	0.258	0.271
Chi-Square	552.40	745.18	596.46	158.32
Prob. (Chi-square)	0.000	0.000	0.000	0.000
No. of Firms	2,058	2,058	2,058	2,058
No. of countries	28	28	28	28

Notes: Asterisks *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. All variables are defined in Appendix A2.

Table 4: Productivity shocks and financing structure

	[Account Payables]	[Equity]	[Bank Loans]	[Non-bank Loans]
	(1)	(2)	(3)	(4)
Production conversion process	-0.538***	-0.523***	0.899***	0.178
	(0.124)	(0.107)	(0.131)	(0.242)
Establishment output	-0.001	-0.013***	0.013***	0.015***
	(0.003)	(0.002)	(0.003)	(0.006)
Firm's hours worked	0.091***	0.011	-0.154***	0.129*
	(0.033)	(0.030)	(0.040)	(0.067)
Firm demand	0.023	-0.029	-0.051	-0.267**
	(0.049)	(0.046)	(0.065)	(0.105)
Firm supply	-0.089**	0.078**	-0.106**	0.109
	(0.041)	(0.037)	(0.052)	(0.073)
GDP growth rate	0.135***	0.296***	-0.410***	-0.151***
	(0.023)	(0.032)	(0.022)	(0.043)
Inflation	-0.434***	0.167***	0.760***	-0.140***
	(0.039)	(0.033)	(0.045)	(0.042)
Private sector credit	-0.040***	0.067***	0.035***	-0.108***
	(0.004)	(0.004)	(0.006)	(0.011)
Firm size	-0.437***	-0.174	-0.160	-1.062***
	(0.168)	(0.174)	(0.269)	(0.269)
Constant	3.417***	-3.064***	-6.765***	2.106**
	(0.533)	(0.506)	(0.709)	(0.966)
Pseudo R square	0.130	0.222	0.378	0.268
Chi-Square	284.78	645.79	918.49	194.41
Prob. (Chi-square)	0.000	0.000	0.000	0.000
No. of Firms	2,188	2,188	2,188	2,188
No of countries	28	28	28	28

Notes: Asterisks *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. All variables are defined in Appendix A2.

Table 4 provides the results of the logit regressions for the relationship between productivity shocks and financing structure – measured using payables (Model 1), equity finance (Model 2), bank loans (Model 3), and non-bank loans (Model 4). The results reveal that the production conversion process and establishment output are negatively related to account payables and equity finance whereas both productivity shock factors are found to be positively related to bank loans and non-bank loans. The results are significant at the 1 per cent level. The number of hours worked during COVID-19 in establishments is positively related to accounts payable and non-bank loans whereas it is negatively related to bank loans. Suggesting that establishments that open and continue business operations have more financial support from non-bank loans to fund their cash flow shortages, consistent with Grimmer (2022) and Shafi *et al.* (2020), contending that about 75% of establishments received stimulus measures such as loans that do not attract interests and government incentives that were crucial for their survival and adaptability.

Table 5: Closure decision and financing structure

	[Accounts Payable] (1)	[Equity] (2)	[Bank Loans] (3)	[Non-bank Loans] (4)
Closure status	-0.048***	0.069***	-0.121***	-0.010
	(0.017)	(0.014)	(0.016)	(0.042)
Temporary closure due to COVID-19	-0.134	0.400**	-0.145	-4.254***
	(0.201)	(0.156)	(0.188)	(0.919)
GDP growth rate	0.392***	0.430***	-0.364***	-0.178***
	(0.036)	(0.039)	(0.019)	(0.046)
Inflation	-1.117***	0.273***	0.699***	-0.328***
	(0.068)	(0.031)	(0.041)	(0.076)
Private sector credit	-0.081***	0.087***	0.017***	-0.148***
	(0.005)	(0.004)	(0.005)	(0.021)
Firm size	-0.025	0.154	-0.368	-1.274***
	(0.250)	(0.252)	(0.315)	(0.446)
Constant	5.014***	-8.796***	-1.821**	18.831***
	(0.873)	(0.767)	(0.881)	(3.517)
Pseudo R square	0.357	0.352	0.342	0.277
Chi-Square	841.13	1189.08	930.00	137.78
Prob. (Chi-square)	0.000	0.000	0.000	0.000
No. of Firms	2,453	2,453	2,453	2,453
No. of countries	28	28	28	28

Notes: Asterisks *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. All variables are defined in Appendix A2.

The results of the closure decision model are presented in Table 5. Here, we conjecture that there are positive relations between financing structure and the measures of closure decision: closure status and temporary closure due to COVID-19. The results reveal that the establishments that permanently closed businesses have reduced accounts payable, bank loans, and non-bank loans but were able to maintain their internal retained earnings. This result is similar to those that closed business temporarily. Therefore, they avoid loans while also trying to settle their suppliers.

Table 6 provides the results for the relationship between credit arrangements and financing structure. We find a positive and significant relationship between sales on credit, accounts payable, and non-bank loans. Both sales on credit and purchases on credit have a negative relationship with equity finance, suggesting that firms that accumulate a significant amount of their capital in accounts receivable are faced with high financial risk that could reduce their access to equity finance. Similarly, in situations of economic uncertainty (i.e., COVID-19) where equity finance is costly, firms may use accounts payable as a source of spontaneous financing to address current cash flow problems.

Table 7 provides the logit regression results for the factors of online activity adoption (started or increased business online, started or increased delivery of goods and services, remote work arrangement, and share of online sales) and financing structure. The results reveal that establishments that started businesses online reduce their equity finance while increasing their bank loans, suggesting that firms' adoption of online business technologies required huge investments that need banking loans to execute. In addition, establishments that increased their delivery of goods and services, and made more online sales shortened their payments to suppliers since the number of credit sales is very low or almost absent in online sales. More so, results show that establishments require bank loans to finance increased online sales, delivery of goods and services, and remote work arrangements. This indicates that establishments used bank loans to invest in infrastructure needed to support employees' remote work to increase their satisfaction and reduce employee turnover.

Table 6: Credit arrangements and financing structure

	[Accounts Payables]	[Equity]	[Bank Loans]	[Non-bank Loans]
Variables	(1)	(2)	(3)	(4)
Sales on credit	0.230***	-0.059*	0.037	0.234**
	(0.041)	(0.035)	(0.042)	(0.098)
Purchases on credit	0.117***	-0.062*	-0.050	0.106
	(0.041)	(0.035)	(0.043)	(0.099)
GDP growth rate	0.146***	0.307***	-0.341***	-0.117***
	(0.016)	(0.022)	(0.013)	(0.031)
Inflation	-0.535***	0.266***	0.535***	-0.179***
	(0.028)	(0.020)	(0.025)	(0.029)
Private sector credit	-0.040***	0.073***	0.008**	-0.093***
	(0.003)	(0.003)	(0.003)	(0.008)
Firm size	-0.167	0.135	-0.387**	-1.049***
	(0.147)	(0.153)	(0.197)	(0.239)
Constant	1.017***	-5.617***	-2.166***	1.938***
	(0.341)	(0.360)	(0.431)	(0.618)
Pseudo R square	0.173	0.244	0.301	0.209
Chi-Square	815.67	1524.81	1485.06	259.06
Prob. (Chi-square)	0.000	0.000	0.000	0.000
No. of Firms	4,588	4,588	4,588	4,588
No. of countries	28	28	28	28

Notes: Asterisks *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. All variables are defined in Appendix A2.

Table 7: Online activity adoption and financing structure

	[Accounts Payable]	[Equity]	[Bank Loans]	[Non-bank Loans
Variables	(1)	(2)	(3)	(4)
Started or increased business online	0.093	-0.328***	0.646***	-0.143
	(0.120)	(0.101)	(0.112)	(0.284)
Started or increased delivery of G&S	-0.348***	-0.071	0.207*	0.002
	(0.113)	(0.094)	(0.106)	(0.244)
Remote work arrangement (empl.)	-0.157*	0.119	0.207**	0.005
	(0.093)	(0.080)	(0.098)	(0.222)
Share of online sales	-0.010***	-0.003	0.002	-0.008
	(0.003)	(0.002)	(0.003)	(0.008)
GDP growth rate	0.166***	0.286***	-0.335***	-0.085***
	(0.016)	(0.022)	(0.013)	(0.029)
Inflation	-0.502***	0.293***	0.498***	-0.172***
	(0.027)	(0.021)	(0.025)	(0.029)
Private sector credit	-0.040***	0.076***	0.002	-0.088***
	(0.003)	(0.003)	(0.003)	(0.007)
Firm size	-0.249*	0.172	-0.380*	-1.107***
	(0.147)	(0.153)	(0.203)	(0.241)
Constant	3.010***	-5.536***	-4.313***	3.107***
	(0.456)	(0.431)	(0.504)	(0.904)
Pseudo R square	0.157	0.245	0.321	0.195
Chi-Square	737.06	1531.39	1580.40	241.94
Prob. (Chi-square)	0.000	0.000	0.000	0.000
Observations	4,588	4,588	4,588	4,588
No. of countries	28	28	28	28

Notes: Asterisks *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. All variables are defined in Appendix A2.

Table 8: Economic policy response and financing structure

Variables	[Accounts Payable] (1)	[Equity] (2)	[Bank Loans] (3)	[Non-bank Loans] (4)
Fiscal exemptions or reductions	-0.680***	-0.323***	0.376**	0.779*
	(0.132)	(0.114)	(0.178)	(0.406)
Govt. (national or local) support	-0.303*	0.214	-0.230	1.446*
	(0.177)	(0.145)	(0.215)	(0.802)
Wage subsidies	0.335**	0.303**	0.352*	1.382***
	(0.147)	(0.121)	(0.196)	(0.528)
GDP growth rate	0.100*	0.124***	-1.362***	1.402**
	(0.053)	(0.047)	(0.087)	(0.565)
Inflation	-0.857***	0.382***	0.579***	0.468**
	(0.080)	(0.042)	(0.059)	(0.210)
Private sector credit	-0.047***	0.103***	-0.065***	-0.324***
	(0.005)	(0.005)	(0.007)	(0.048)
Firm size	-0.247	-0.175	-0.720***	-0.827*
	(0.210)	(0.236)	(0.270)	(0.452)
Constant	4.860***	-8.041***	4.203***	-9.877***
	(1.016)	(0.890)	(1.262)	(3.806)
Pseudo R square	0.141	0.264	0.426	0.602
Chi-Square	273.23	677.13	684.49	336.18
Prob. (Chi-square)	0.000	0.000	0.000	0.000
No. of Firms	1,870	1,870	1,870	1,870
No. of countries	28	28	28	28

Notes: Asterisks *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. All variables are defined in Appendix A2.

Table 8 presents the logit regression results for the relationship between the measures of economic policy response: fiscal exemptions or reductions, govt. support (national or local), and wage subsidies, and financing structure. The results show that fiscal exemptions have a negative relationship with accounts payable and equity finance but a positive relationship with bank loans and loan bank loans. Government support has a negative and significant relationship with accounts payable, suggesting that firms that do not receive government support extend payments to their suppliers to have liquidity for the firm to finance cash flow shortages. In contrast, wage subsidies have a positive and significant relationship with all the various forms of financing cash flow shortages, with non-bank loans having the largest effect. This suggests that establishments during the COVID-19 employed different forms of financing to retain their employees to prevent lay off or voluntarily quitting.

5. Robustness Test
The present study further examines the COVID-19 dynamics across developed countries and developing countries. Although bankruptcy has been examined in the past corporate finance literature, we re-examine the factors that are induced by COVID-19 on cash flow shortages.

5.1 The Role of Bankruptcy in Financing Cash Flow Shortages
Just like the global financial crisis, firms often risk bankruptcy and insolvency during COVID-19. Several studies in capital structure literature have linked debt maturity, capital structure and insolvency together (e.g., Hussain *et al.*, 2020). Hussain *et al.* (2020) contend that firms that have overdue financial obligations are more likely to experience higher insolvency risk. This is in support of the submission of Cathcart *et al.* (2020) that links financial leverage with default risk in European firms, arguing that firms that rely more on short-term debt are more likely to experience default risk, and they must survive by shifting from short-term debt to long-term finance.

Moreover, loss of business operation and shortfall in cash holdings are dynamic factors that trigger default risk (Della Seta *et al.*, 2020). This leads some firms to have overdue

financial obligations and others to file for insolvency or bankruptcy. Firms with high bankruptcy risk seek more equity issuance than firms with low bankruptcy or insolvency risk that issue debt (Dierker *et al.*, 2019). Firms that often file for bankruptcy have a lower tendency to repay loans, possess more leverage and are common among financially distressed and small-sized firms (Mselmi *et al.*, 2017). In this study, we test some bankruptcy-related factors different from previous bankruptcy measures and that are induced by COVID-19 on financing types of cash flow shortages.

Table 9: Bankruptcy and financing structure

Variables	[Accounts Payable] (1)	[Equity] (2)	[Bank Loans] (3)	[Non-bank Loans] (4)
Tax authorities	-0.677***	0.283***	-0.517***	0.484**
	(0.109)	(0.091)	(0.115)	(0.213)
Overdue financial obligations	0.311***	-0.260***	-0.145	-0.555**
	(0.100)	(0.086)	(0.106)	(0.227)
Filed for insolvency or bankruptcy	-0.351	-0.446**	0.285	-1.197**
	(0.264)	(0.179)	(0.181)	(0.575)
GDP growth rate	0.155***	0.315***	-0.360***	-0.082***
	(0.016)	(0.023)	(0.014)	(0.030)
Inflation	-0.497***	0.280***	0.539***	-0.190***
	(0.027)	(0.022)	(0.026)	(0.029)
Private sector credit	-0.040***	0.075***	0.008**	-0.091***
	(0.003)	(0.003)	(0.003)	(0.008)
Firm size	-0.251*	0.194	-0.398**	-1.071***
	(0.147)	(0.154)	(0.199)	(0.240)
Constant	3.611***	-5.400***	-1.286**	5.370***
	(0.632)	(0.483)	(0.541)	(1.368)
Pseudo R square	0.155	0.246	0.300	0.209
Chi-Square	719.96	1498.31	1417.07	256.77
Prob. (Chi-square)	0.000	0.000	0.000	0.000
No. of Firms	4,469	4,469	4,469	4,469
No. of countries	28	28	28	28

Notes: Asterisks *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. All variables are defined in Appendix A2.

Table 9 reveals that establishments used equity finance (i.e., retained earnings) and non-bank loans to finance their tax obligations. Similarly, firms that have overdue financial obligations delayed payments to suppliers, while using non-bank loans and equity finance to settle these obligations. In particular, the results reveal that establishments that filed for insolvency could not obtain adequate equity finance, non-bank loans and spontaneous finance such as account payables to address cash flow shortages. We find a negative relationship between insolvency, accounts payable, equity finance, and non-bank loans.

5.2 COVID-19 Dynamics and Financing Structure in Developed and Developing Countries

Proponents of the economic theory argue that the degree to which a crisis impacts the capital structure of the firm, creating higher risk and uncertainty, and lower returns, depends on how developed the financial institutions are (Ayyagari *et al.*, 2021). Thus, we test how the COVID-19 dynamics impact the financing structure of firms with developed financial institutions and those with less-developed institutions, which be categorized as developed vs. developing countries. We grouped firms by using the Human Development Index (HDI).

Table 10 provides the results for COVID-19 and financing structure. The economic factors reveal intriguing dynamics among developed nations. There is a positive and significant relationship between the production conversion process and accounts payable, suggesting that firms might be expanding their payment terms with suppliers as they intensify their

production activities. This trend is counterbalanced by a negative impact on equity, potentially attributable to the rise in operational expenses linked to production. Moreover, it is worth noting that government support has demonstrated significant efficacy in mitigating financial burdens and ensuring the preservation of equitable conditions during COVID-19. Also, remote work arrangements led to a rise in bank loans, presumably indicating investments in technologies. However, it has also resulted in a marginal decline in accounts payable.In developing nations, the production conversion process exhibits a substantial link with the increase in accounts payable and bank loans, exerting an adverse impact on equity. Furthermore, implementing online business activities and delivery services leads to a rise in accounts payable, indicating a trend towards expanding commercial operations. Implementing remote work arrangements has been shown to have a dual impact on bank loans, as well as accounts payable and equity, hence highlighting the difficulties encountered during the shift to remote work in developing countries. In general, the findings on COVID-19 dynamics in developing nations underscore the intricacies associated with the adjustment to new corporate financing structures.

Table 10: COVID-19 dynamics across developed and developing countries

VARIABLES	Full Sample		
	Accounts Payable	Equity	Bank Loans
Production conversion process	0.572	-0.341	0.461*
	(0.371)	(0.267)	(0.265)
Establishment output	-0.013*	-0.020***	0.004
	(0.008)	(0.006)	(0.006)
Closure status	-0.027	0.094***	-0.153***
	(0.043)	(0.034)	(0.036)
Temporary closure due to COVID-19	-0.482	-0.550	0.562
	(0.579)	(0.418)	(0.442)
Change in temporary workers	0.508***	-0.027	-0.329***
	(0.133)	(0.105)	(0.123)
Quit and leave-seeking workers	0.003	0.000	-0.001
	(0.002)	(0.002)	(0.001)
Workers laid off due to COVID-19	0.002	-0.001	0.004
	(0.005)	(0.005)	(0.007)
Tax authorities	-0.188	-0.313	0.223
	(0.425)	(0.320)	(0.305)
Overdue financial obligations	0.635	-0.145	-0.495*
	(0.417)	(0.268)	(0.280)
Sales on credit	0.378**	-0.105	0.058
	(0.155)	(0.116)	(0.125)
Purchases on credit	0.326**	-0.119	0.002
	(0.164)	(0.120)	(0.123)
Govt. (national or local) support	-0.993***	-0.162	0.194
	(0.213)	(0.153)	(0.194)
Started or increased business online	0.313	-0.649**	1.250***
	(0.497)	(0.314)	(0.291)
Started or increased delivery of G&S	-0.675	0.041	0.151
	(0.470)	(0.309)	(0.297)
Remote work arrangement (empl.)	-0.320	-0.088	0.654**
	(0.402)	(0.277)	(0.264)
Share of online sales	0.005	0.001	-0.017**
	(0.014)	(0.009)	(0.008)
Controls	YES	YES	YES
Constant	YES	YES	YES
Observations	549	549	549

Notes: Asterisks *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. All variables are defined in Appendix A2.

Table 10 *(continued)*

VARIABLES	Developed Countries			Developing Countries		
	Accounts Payable	Equity	Bank Loans	Accounts Payable	Equity	Bank Loans
Production conversion process	0.283	-1.088**	0.053	1.556	-1.126	1.161*
	(0.526)	(0.514)	(0.564)	(1.350)	(1.243)	(0.625)
Establishment output	-0.001	-0.017*	0.003	-0.099**	0.051*	0.012
	(0.010)	(0.010)	(0.012)	(0.046)	(0.030)	(0.016)
Closure status	-0.030	0.137**	-0.096	-0.160	0.155	-0.135
	(0.070)	(0.068)	(0.084)	(0.172)	(0.123)	(0.089)
Temporary closure due to COVID-19	-0.663	0.153	-0.451	-2.097	-1.232	2.181*
	(0.854)	(0.700)	(0.848)	(1.981)	(1.655)	(1.135)
Change in temporary workers	0.658***	0.023	-0.651***	1.883***	-0.850*	-0.351
	(0.205)	(0.186)	(0.207)	(0.717)	(0.443)	(0.334)
Quit and leave-seeking workers	0.004**	0.001	-0.001	-0.102	0.003	-0.006
	(0.002)	(0.003)	(0.003)	(0.077)	(0.009)	(0.011)
Workers laid off due to COVID-19	0.006	-0.024	0.004	0.010	0.014	0.003
	(0.009)	(0.022)	(0.017)	(0.033)	(0.037)	(0.026)
Tax authorities	-0.393	0.663	0.406	2.364	-5.415**	1.288*
	(0.643)	(0.603)	(0.740)	(1.622)	(2.284)	(0.659)
Overdue financial obligations	1.051*	-0.798	-0.749	-0.560	-0.883	-0.266
	(0.638)	(0.507)	(0.591)	(1.250)	(1.217)	(0.646)
Sales on credit	0.063	0.232	0.012	1.738**	-0.782*	0.120
	(0.268)	(0.248)	(0.282)	(0.740)	(0.461)	(0.310)
Purchases on credit	0.860***	-0.078	-0.294	-0.320	-0.407	-0.129
	(0.298)	(0.253)	(0.292)	(0.519)	(0.466)	(0.245)
Govt. (national or local) support	-1.110***	-0.027	0.684*	-0.936	0.221	0.772
	(0.299)	(0.285)	(0.358)	(0.919)	(0.830)	(0.874)
Started or increased business online	0.460	-1.269**	0.575	-2.185	-1.041	2.740**
	(0.634)	(0.606)	(0.644)	(2.043)	(1.310)	(1.076)
Started or increased delivery of G&S	-0.205	0.110	0.011	-4.682**	2.371*	-0.249
	(0.683)	(0.641)	(0.687)	(1.853)	(1.368)	(0.655)
Remote work arrangement (empl.)	-1.566**	1.079*	0.942	3.293**	-2.003	0.148
	(0.652)	(0.559)	(0.603)	(1.518)	(1.351)	(0.600)
Share of online sales	0.025	-0.061***	0.016	0.040	0.049*	-0.119**
	(0.024)	(0.024)	(0.022)	(0.046)	(0.029)	(0.050)
Controls	YES	YES	YES	YES	YES	YES
Constant	YES	YES	YES	YES	YES	YES
Observations	318	318	318	231	231	231

Notes: Asterisks *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. All variables are defined in Appendix A2.

6. Summary of Findings and Conclusion

This paper investigates how the COVID-19 dynamics affect the firm's choice of financing structure; whether to use equity financing, account payables (delaying payments to suppliers or workers), government grants, commercial bank loans, non-bank loans, or retained earnings (i.e. using establishment's saving), the bankruptcy signals and liquidation of firms. A model was developed, a pandemic-leverage choice model of COVID-19 dynamics, involving six mechanisms: productivity shocks, credit agreements, closure strategy, employee welfare, online activity adoption, and economic policy response. Using a world enterprise survey in

28 countries across 12038 enterprises, this study provides empirical support for the six mechanisms of financing structure. With a calibrated model, the study investigates the effect of productivity shocks, credit agreements, temporary-permanent closure strategy, worker welfare, and online activity adoption on financing structure. The study finds that (i) productivity shocks lower debt capital but influence a higher probability of accessing new credit, (ii) firms that adopt temporary-permanent closure strategy practice more workforce lay-offs and do not require further debt increase, (iii) firms that experience an increase in debt level benefit more from fiscal exemptions and government economic relieve palliatives, and (iv) firm-online activity adoption also matters for access to fiscal exemptions and debt increases, mostly common across manufacturing firms than retailing firms. Evidence shows that prior or overdue financial obligations may induce temporary or permanent business exit, induced by pandemic dynamics rather than firms' management dynamics. Our findings have strong policy implications, suggesting that economic policy response during a pandemic favours debt decreases and may have substantial effects on business continuation, temporary closure strategy, and stoppage in workers lay-off.

Grounded on productivity, welfarism, technology adoption, and bankruptcy mechanisms, in the present paper we have put forward arguments in terms of the likely relationships between COVID-19 dynamics and capital structure.

We have conjectured that ceteris paribus, firms' productivity activities leading to productivity shocks would affect the financing structure of establishment during the global pandemic situation, that is, firms' productivity activities in terms of establishment outputs, hours worked during COVID-19 and production conversion production will reduce retained earnings and equity financing while positively influencing government grants and loans from commercial banks and non-financial institutions. Moreover, accounts payable, equity finance, government grants, retained earnings, bank loans, and non-bank loans dominated the financing structure of establishments during the global COVID-19 outbreak. Government grants provide collateral protection to establishments to cushion the possible agency problem that may arise from the global pandemic and for firms relying on account payables by delaying payments to suppliers, and those using retained earnings possibly use these media of financing to avoid takeover bids, insolvency and any shocks in productivity and revenue. We have also argued that firms that engage in the reduction of temporary workers should go for account payables and those establishments involved in laying off workers during the pandemic can reduce the cost of employees to further finance retained earnings and continue to open without necessarily engaging in temporary business closure or permanent closure of business. If the net increase in retained earnings and accounts payable persist following undue workers quitting or officially laid off, firms can reduce their bankruptcy signals while also using government grants and debt to fund taxes and overdue financial obligations. We have also conjectured that the closure and credit arrangements of establishments impact their financing structure. Firms deciding to open and avoid temporary closure due to COVID-19 may benefit from increased account payables, government grants, and non-bank loans while those establishments that temporarily closed their businesses due to COVID-19 may want to source for additional equity finance, bank loans and maintain high retained earnings to fund business operations and commence online goods and services delivery when reopened. Thus, we have also conjectured that online activity adoption and economic policy response impact the financing structure of establishments during the COVID-19 outbreak.

Our empirical result on establishments across 28 countries indicating developed and developing nations suggests that productivity shocks do impact financing structure. Consistent with our hypothesis, the study finds that the production conversion process and establishment output are positively related to a government grant and debt finance (through loans from commercial banks) but have negative relations with equity finance and accounts

payable. Our result contradicts the findings of Nucci *et al.* (2005) that the firm's total factor productivity reduces leverage due to favourable market policy interventions.

The study also finds that closure status and temporary closure due to COVID-19 significantly affect the financing structure of establishments. That is the nexus between closure and temporary closure due to COVID-19 on financing structure moves in an inverse direction. While closure status has a negative link with equity, retained earnings and bank loans, temporary closure due to COVID-19 has positive effects on equity, retained earnings and bank loans, suggesting that temporary closure due to COVID-19 may influence the further purchase of the firm's stocks and securitization of bank loans.

References

Alon, T. M., Doepke, M., Olmstead-Rumsey, J., & Tertilt, M. (2020). *The impact of COVID-19 on gender equality* (No. w26947). National Bureau of Economic Research.

An, J., & Rau, R. (2021). Finance, technology and disruption. *The European Journal of Finance*, *27*(4-5), 334-345.

Audretsch, D. B., Lehmann, E. E., Paleari, S., & Vismara, S. (2016). Entrepreneurial finance and technology transfer. *The Journal of Technology Transfer*, *41*, 1-9.

Ayyagari, M., Demirguc-Kunt, A., & Maksimovic, V. (2011). *Small vs. young firms across the world: contribution to employment, job creation, and growth*. Policy Research Working Paper Series 5631, The World Bank.

Bapuji, H., Ertug, G., & Shaw, J. D. (2020). Organizations and societal economic inequality: A review and way forward. *Academy of Management Annals*, *14*(1), 60-91.

Barrero, J. M., Bloom, N., & Davis, S. J. (2020). *Covid-19 is also a reallocation shock* (No. w27137). National Bureau of Economic Research.

Bartik, A. W., Bertrand, M., Cullen, Z., Glaeser, E. L., Luca, M., & Stanton, C. (2020). The impact of COVID-19 on small business outcomes and expectations. *Proceedings of the National Academy of Sciences*, *117*(30), 17656-17666.

Beck, T., Demirgüç-Kunt, A. S. L. I., & Maksimovic, V. (2005). Financial and legal constraints to growth: does firm size matter?. *The Journal of Finance*, *60*(1), 137-177.

Berk, J. B., Stanton, R., & Zechner, J. (2010). Human capital, bankruptcy, and capital structure. *The Journal of Finance*, *65*(3), 891-926.

Caballero, R., & Hammour, M. (1994). The cleansing effect of recessions. *American Economic Review*, *84*(5), 1350-1368.

Cathcart, L., Dufour, A., Rossi, L., & Varotto, S. (2020). The differential impact of leverage on the default risk of small and large firms. *Journal of Corporate Finance*, *60*, 101541.

Chemmanur, T. J., Cheng, Y., & Zhang, T. (2013). Human capital, capital structure, and employee pay: An empirical analysis. *Journal of Financial Economics*, *110*(2), 478-502.

Chen, C. R., & Steiner, T. L. (1999). Managerial ownership and agency conflicts: A nonlinear simultaneous equation analysis of managerial ownership, risk taking, debt policy, and dividend policy. *Financial Review*, *34*(1), 119-136.

Dang, H. A. H., & Nguyen, C. V. (2020). Gender inequality during the COVID-19 pandemic: Income, expenditure, savings, and job loss. *World Development*, *140*, 105296.

Daniel, E., Wilson, H., & Myers, A. (2002). Adoption of e-commerce by SMEs in the UK: Towards a stage model. *International Small Business Journal*, *20*(3), 253-270.

Della Seta, M., Morellec, E., & Zucchi, F. (2020). Short-term debt and incentives for risk-taking. *Journal of Financial Economics*, *137*(1), 179-203.

Demirgüç-Kunt, A., Peria, M. S. M., & Tressel, T. (2020). The global financial crisis and the capital structure of firms: Was the impact more severe among SMEs and non-listed firms?. *Journal of Corporate Finance*, *60*, 101514.

Diamond, D. W. (2004). Presidential address, committing to commit: Short-term debt when enforcement is costly. *Journal of Finance*, *59*(4), 1447-1479.

Dierker, M., Lee, I., & Seo, S. W. (2019). Risk changes and external financing activities: Tests of the dynamic trade-off theory of capital structure. *Journal of Empirical Finance*, *52*, 178-200.

Ebeke, M. C. H., Jovanovic, N., Valderrama, M. L., & Zhou, J. (2021). *Corporate liquidity and solvency in Europe during COVID-19: The role of policies*. International Monetary Fund.

Ebrahim, M. S., Girma, S., Shah, M. E., & Williams, J. (2014). Dynamic capital structure and political patronage: The case of Malaysia. *International Review of Financial Analysis*, *31*, 117-128.

Funke, M., Maurer, W., & Strulik, H. (1999). Capital structure and labour demand: investigations using German micro data. *Oxford Bulletin of Economics and Statistics*, *61*(2), 199-215.

Ghaly, M., Dang, V. A., & Stathopoulos, K. (2015). Cash holdings and employee welfare. *Journal of Corporate Finance*, *33*, 53-70.

Grimmer, L. (2022). Lessons from the COVID19 pandemic: The case of retail and consumer service firms. *Journal of Retailing and Consumer Services*, *68*, 103012.

Guerini, M., Nesta, L., Ragot, X., & Schiavo, S. (2020). *Firm liquidity and solvency under the Covid-19 lockdown in France*. OFCE Policy Brief.

Hamdan, A. M. (2018). Dividend policy, agency costs and board independence. *International Journal of Critical Accounting*, *10*(1), 42-58.

Hussain, R. Y., Wen, X., Hussain, H., Saad, M., & Zafar, Z. (2022). Do leverage decisions mediate the relationship between board structure and insolvency risk? A comparative mediating role of capital structure and debt maturity. *South Asian Journal of Business Studies*, *11*(1), 104-125.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305-360.

Keuschnigg, C., & Kogler, M. (2020). The Schumpeterian role of banks: Credit reallocation and capital structure. *European Economic Review*, *121*, 103349.

Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., ... & Vugt, M. V. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American psychologist*, *76*(1), 63.

Lemieux, T., Milligan, K., Schirle, T., & Skuterud, M. (2020). Initial impacts of the COVID-19 pandemic on the Canadian labour market. *Canadian Public Policy*, *46*(S1), S55-S65.

Levine, R., Lin, C., & Xie, W. (2016). Spare tire? Stock markets, banking crises, and economic recoveries. *Journal of Financial Economics*, *120*(1), 81-101.

Liébana-Cabanillas, F., & Lara-Rubio, J. (2017). Predictive and explanatory modeling regarding adoption of mobile payment systems. *Technological Forecasting and Social Change*, *120,* 32-40.

McFarland, L. A., Reeves, S., Porr, W. B., & Ployhart, R. E. (2020). Impact of the COVID-19 pandemic on job search behavior: An event transition perspective. *Journal of Applied Psychology*, *105*(11), 1207–1217.

Ming-Yen Teoh, W., Choy Chong, S., Lin, B., & Wei Chua, J. (2013). Factors affecting consumers' perception of electronic payment: An empirical analysis. *Internet Research*, *23*(4), 465-485.

Montgomery, S., Moudgil, B., & Lam, S. (2020). *Exceptions in credit agreements addressing COVID-19 crisis.* Los Angeles & San Francisco: Daily Journal

Mselmi, N., Lahiani, A., & Hamza, T. (2017). Financial distress prediction: The case of French small and medium-sized firms. *International Review of Financial Analysis*, *50*, 67-80.

Nucci, F., Pozzolo, A., & Schivardi, F. (2005). Is firm's productivity related to its financial structure? Evidence from microeconomic data. *Rivista di politica economica*, *95*(1), 269-290.

Ofek, E. (1993). Capital structure and firm response to poor performance: An empirical analysis. *Journal of Financial Economics*, *34*(1), 3-30.

Olley, G. S., & Pakes, A. (1992). The dynamics of productivity in the telecommunications *equipment industry* (No. w3977). National Bureau of Economic Research.

Park, C. W., & Pincus, M. (2001). Internal versus external equity funding sources and earnings response coefficients. *Review of Quantitative Finance and Accounting*, *16*, 33-52.

Petersen, M. A., & Rajan, R. G. (1997). Trade credit: theories and evidence. *The Review of Financial Studies*, *10*(3), 661-691.

Rampini, A. A., & Viswanathan, S. (2013). Collateral and capital structure. *Journal of Financial Economics*, *109*(2), 466-492.

Serfling, M. (2016). Firing costs and capital structure decisions. *Journal of Finance*, *71*(5), 2239-2286.

Shafi, M., Liu, J., & Ren, W. (2020). Impact of COVID-19 pandemic on micro, small, and medium-sized Enterprises operating in Pakistan. *Research in Globalization*, *2*, 100018.

Shankar, A., & Datta, B. (2018). Factors affecting mobile payment adoption intention: An Indian perspective. *Global Business Review*, *19*(3_suppl), S72-S89.

Shleifer, A., & Vishny, R. W. (1992). Liquidation values and debt capacity: A market equilibrium approach. *The Journal of Finance*, *47*(4), 1343-1366.

Tran, Q. T., Alphonse, P., & Nguyen, X. M. (2017). Dividend policy: Shareholder rights and creditor rights under the impact of the global financial crisis. *Economic Modelling*, *64*, 502-512.

Vismara, S. (2022). Expanding corporate finance perspectives to equity crowdfunding. *The Journal of Technology Transfer*, *47*(6), 1629-1639.

Wang, M., Xu, M., & Ma, S. (2021). The effect of the spatial heterogeneity of human capital structure on regional green total factor productivity. *Structural Change and Economic Dynamics*, *59*, 427-441.

Wu, R. (2023). COVID-19's impacts on business activities and female workers: Empirical evidence from global developing economies. *Journal of International Development*, *35*(1), 163-197.

Appendix

Appendix A: Number of firms in each country

Country	Establishment Surveyed	No. of Firms Sampled
Albania	377	172
Armenia	120	3
Belarus	600	98
Bulgaria	772	306
Chad	153	60
Croatia	404	184
Cyprus	240	81
El-Salvador	719	187
Georgia	701	210
Greece	600	276
Guatemala	345	84
Guinea	150	61
Honduras	332	65
Hungary	805	271
Italy	760	130
Jordan	601	95
Moldova	360	134
Mongolia	360	167
Morocco	1096	475
Nicaragua	333	68
Niger	151	23
Poland	1369	307
Romania	814	216
Russia	1323	464
Slovenia	409	109
Togo	150	28
Zambia	601	304
Zimbabwe	960	341
Total	15605	4,919

Appendix B: Variables and sources

Variable	Definition	Original Source
Bank loans	The dummy variable that takes the value of 1 if the firm sources bank loans (loans from commercial banks) to deal with cash flow shortages, 0 otherwise **(IF COVe2=1)**	WBES
Non-bank loans	The dummy variable that takes the value of 1 if the firm sources non-bank loans (loans from non-financial banks) to deal with cash flow shortages, 0 otherwise **(IF COVe2=2)**	WBES
Equity finance	The dummy variable that takes the value of 1 if the firm sources equity finance to deal with cash flow shortages, 0 otherwise **(IF COVe2=3)**	WBES
Accounts payable	The dummy variable that takes the value of 1 if the firm sources payables to deal with cash flow shortages, 0 otherwise **(IF COVe2=4)**	WBES
Production conversion process	Has the establishment adjusted or converted, partially or fully, its production or the services it offers in response to the COVID-19 outbreak: don't know (1), no (2), or yes (3)? **(COVc3)**	WBES
Establishment output	The percentage of the establishment's output produced **(COVc1)**	WBES
Sales on credit	How sizable are sales on credit due to the COVID-19 outbreak: decrease (1), don't know (2), increase (3), or remain the same (4)? **(COVe1b)**	WBES
Purchases on credit	How sizable are purchases on credit due to the COVID-19 outbreak: decrease (1), don't know (2), increase (3), or remain the same (4)? **(COVe1c)**	WBES
Tax authorities	Has the establishment delayed payments due to the COVID-19 outbreak for more than one week (excluding payments postponed following current regulation) to tax authorities? don't know (1), no (2), or yes (3) **(COVe3c)**	WBES
Overdue financial obligations	Are obligations to any financial institution due: does not apply (1), no (2), or yes (3)? **(COVe4)**	WBES
Filed for insolvency or bankruptcy	Is the firm filed for insolvency or bankruptcy: don't know (1), no (2), or yes (3)? **(COVe5)**	WBES
Closure status	Has the number of temporary workers remained the same? Permanently closed = 1, Temporarily closed = 2, Open = 3, and don't know is -9. **(COVd3b)**	WBES
Temporary closure due to Covid-19	Did this establishment close temporarily due to the COVID-19 outbreak? Yes is 1, No is 0, and don't know is -9. **(COVb1a)**	WBES
Change in temporary workers	Has the number of temporary workers remained the same? Increased = 1, Remained the same = 2, Decreased = 3, and don't know is -9. **(COVd3b)**	WBES
Quit and leave-seeking workers	The number of workers that quit or took leave **(COVd4)**	WBES
Workers laid off due to Covid-19	The number of workers who have been laid off due to the COVID-19 outbreak **(COVd6).**	WBES
Started or increased business online	Did this establishment start or increase business activity online in response to the COVID-19 outbreak? Yes is 1, No is 0, and don't know is -9. **(COVc4a)**	WBES
Started or increased delivery of G&S	Did this establishment start or increase the delivery or carry-out of goods or services in response to the COVID-19 outbreak? Yes is 1, No is 0, and don't know is -9. **(COVc4b)**	WBES
Remote work arrangement (empl.)	Did this establishment start or increase remote work arrangements for its workforce in response to the COVID-19 outbreak? Yes is 1, No is 0, and don't know is -9. **(COVc4c)**	WBES
Share of online sales	The percentage of online sales as the ratio of total establishment's sales **(COVc5)**	WBES
Fiscal exemptions or reductions	Fiscal exemptions or reductions: Yes is 1, No is 0, and don't know is -9. (**COVf2d)**	WBES
Govt. (national or local) support	Fiscal exemptions or reductions: Yes is 1, No is 0, and don't know is -9. **(COVh2f)**	WBES
Wage subsidies	Did your establishment involve wage subsidies as a policy measure in response to the COVID-19 crisis? don't know (1), no (2), or yes (3) **(COVf2e)**	WBES
Firm size dummies	A firm is defined as small if it has between 5 and 50 employees, medium-sized if it has between 51 and 500 employees, and large if it has more than 500 employees.	Beck *et al.* (2005)

Appendix B *(continued)*

Variable	Definition	Original Source
National sales	The percentage of establishment's sales of the number of goods sold (**COVb3a**)	WBES
National language	Nominal scale of country's language. Nominal scale for 17 different languages, ranked from the most spoken language to the least spoken language in the firm's country destination (**a1a**)	WBES