

Organizational Resources, Country Institutions, and National Culture behind Firm Survival and Growth during COVID-19

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Abstract

This paper provides one of the first comprehensive and most updated studies on the effects of firms' organizational resources, country institutions, and national culture on the survival and growth of private firms around the world during the COVID-19 pandemic. Analyzing World Bank Enterprise Follow-up Surveys on COVID-19 that cover 18,770 firms in 36 countries, the paper documents four sets of findings. (1) During the pandemic, firms with favorable organizational resources (state ownership and affiliation with parent companies) are more likely to survive and grow, whereas firms with foreign ownership or more financial obstacles are less likely to survive or grow. Firms in countries with a higher per capita income, a lower COVID-19

spread, and a less stringent COVID-19 control policy are more likely to survive and grow. (2) Favorable ownership and parent-company affiliations help cushion the pandemic shock during the pandemic. (3) The relationship between firm characteristics and firm survival/growth is significantly affected by the stringency of a country's COVID-19 policy. (4) Firm survival and growth are positively related to a country's cultural tendency in terms of long-term orientation and are not significantly related to uncertainty avoidance and individualism. The overall quality of country governance is negatively linked to the odds for firm survival as well as revenue and employment growth.

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ORGANIZATIONAL RESOURCES, COUNTRY INSTITUTIONS, AND NATIONAL CULTURE BEHIND FIRM SURVIVAL AND GROWTH DURING COVID-19¹

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Bad companies are destroyed by crisis. Good companies survive them. Great companies are improved by them.

— Andy Grove, Former Intel Corporation CEO

1. Introduction

The COVID-19 outbreak, starting in late 2019, was declared by the World Health Organization as a global pandemic on March 11, 2020. Since then, the virus has quickly spread around the world and claimed more than 2.6 million lives worldwide as of March 31, 2021 (www.who.int). While the pandemic has extracted huge loss of human lives, the loss in economic terms is equally tremendous. Hence, the once-in-a-life-time COVID-19 shock has attracted unprecedented attention from scholars of all disciplines, and deservedly so.

Scholars have acted quickly to point out that the pandemic has adversely affected firm operating performance and stock returns around the world (Alfaro et al. 2020; Al-Awadhi et al. 2020; Ashraf 2020b; Ramelli and Wagner 2020). While this emerging literature on corporate immunity has paid most attention to listed firms in the United States,² some studies have examined the effects of firm/country characteristics on listed firms in a cross-country setting (Ding et al. 2021). In a cross-country study of private firms in 13 countries, Chundakkadan, Raj, and Sasidharan (2020) focus on how financial constraint impacts firm survival rate, and Liu, Wei, and Xu (2021) examine the relative impact of the pandemic on female-headed firms in 24 countries. In single-country studies, Carletti et al. (2020) and Gu et al. (2020) examine Italian and Chinese private firms' behaviors and outcomes during the pandemic, respectively. Despite this emerging literature, on a *worldwide* basis, much remains unknown: How are firm survival and growth affected by firms' access to resources around the world? Do a country's institutions and culture affect firm survival and growth during the pandemic? If so, how? How do firms behave differently during normal times and during the pandemic times?

The pandemic offers a unique context to enhance our understanding on interactions between institutions and organizations. How institutions and organizations interact with each other is a key theme for research in major social sciences disciplines, such as economics (North, 1990), management (Peng, 2003), and sociology (Scott, 2014). A consistent theme is that firms on the one hand leverage their organizational resources, and on the other hand are enabled and constrained by the formal and informal institutional frameworks in which they are embedded. Given the magnitude of this pandemic crisis, firms are likely to endeavor to do their best—

² Albuquerque et al. (2020); Alfaro et al. (2020); Bloom et al. (2020, 2021); Bae et al. (2021); Demers et al. (2020); Fahlenbrach, Rageth and Stulz (2020); Li et al. (2020); Pagano, Wagner and Zechner (2020); Papanikolaou and Schmidt (2020); and Ramelli and Wagner (2020).

survival is at stake. As a result, exploring the impact of organizational resources, national institutions, and culture on the survival and growth of firms is not only of significant scholarly interest, but is also of obvious importance to practitioner and policy interest.

In this study, we add to the burgeoning literature of COVID-19 and firms around the world by conducting one of the first comprehensive cross-country studies concerning the impact of firm/country characteristics on the survival and growth of private firms in mostly developing countries during the pandemic. Our paper builds on and yet differs from the aforementioned studies in at least three aspects. First, we focus on private (unlisted) firms in mostly developing countries, whereas most of the aforementioned COVID studies focus on listed firms. The private sector plays an increasingly important role in developing economies around the world. For the developing world, the private sector provided 90% of employment, 60% of investment, and more than 80% of government revenues.³ From the onset of the COVID-19 crisis, small and medium-sized enterprises (SMEs), which constitute an overwhelming majority of our sample firms, have suffered tremendous operational and financial interruptions—more so than the listed firms. According to World Bank Enterprise Follow-up Surveys on COVID-19 (WBES-COVID19), which has been completed in 36 countries as of February 2021, 45% of surveyed firms are temporarily or permanently closed. The closure rate is 35.4% for listed firms and 45.3% for unlisted/private firms (the rate for SMEs is 45.0%, which is very similar with unlisted firms). Since business obstacles tend to have a more pronounced impact on small firms than do on large firms (Beck, Demirgüç-Kunt, and Maksimovic, 2005; Knack and Xu, 2017), it is reasonable to conjecture that the pandemic shock has a more pronounced impact on private firms than on listed firms.

Second, compared to single-country studies (Carletti et al., 2020; Dai et al., 2021a, 2021b; Gu et al., 2020;), our cross-country setting allows us to examine the effects of cross-country variations in COVID spread severity, COVID policy stringency, country governance, and culture on private firms' survival and growth. We thus cover more comprehensively various key firm/country aspects that could affect the pandemic impact.

Third, our study covers a significant longer time period into the pandemic than the aforementioned studies. The above-cited cross-country firm-level studies use a relatively short time period, the majority of which examines a period from January to March 2020, with a few

³ The source of these statistics is the Australian Department of Foreign Affairs and Trade. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKewiA5bjf54TqAhUIG80KHqPDusQFjACegQIAhAB&url=https%3A%2F%2Fwww.aph.gov.au%2FDocumentStore.ashx%3Fid%3D53a5f52f-5ee9-414b-879b-6bbcd7e8678%26subId%3D252459&usq=AOvVaw0CkVknNIBpgeqhsEa_HFCB

using data up to April 2020. Their studies thus focus on the *immediate* impact of the pandemic. Our study leverages the WBES-COVID 19 data that are mostly collected in June, July and August 2020. Therefore, we are able to capture the *medium-term* impact of the pandemic, and shed light on subsequent government policies such as the policy stringency of COVID-19 control policies. Moreover, the extent of firm survival and growth would clearly depend on the time length of the pandemic, and a medium-term impact study such as ours would be essential for understanding the overall impact on firms.

Empirically, we employ the WBES-COVID data that cover 18,770 firms from 36 countries to examine the effects of firm/country characteristics on firm survival and growth. We document four sets of findings. First, firm and country characteristics play an important role in private firms' survival and growth. Larger firms are much better equipped to weather the pandemic, as they exhibit lower risk of closure and higher revenue and employment growth. We also find that state ownership is linked to higher revenue and employment growth rates during the pandemic. State ownership has been linked to soft-budget constraints (Megginson, Ullah, and Wei, 2014). While the pandemic has brought financial shocks to all firms (Chundakkadan et al. 2020), firms with soft-budget constraints are more likely to survive and even thrive. Interestingly, subsidiaries affiliated with larger parent firms are also significantly more likely to survive and grow during the pandemic, possibly due to supports from their respective parent companies. Exporting firms, in contrast, are more likely to reduce the revenues. A likely explanation is that exporting firms suffer more from interruptions in global supply chains than nonexporters at the onset of the pandemic (Grassia et al. 2020; Peng and Kathuria, 2021). Firms with more financial obstacles are less likely to survive or grow their revenues. Firm survival and growth are, as expected, more likely in countries with a higher per capita income and a less stringent COVID control policy.

The second set of findings is that several firm/country characteristics affect firm growth very differently during normal versus the pandemic times. For example, state ownership and subsidiary status play a significant and positive role in firm growth in pandemic times, whereas they are not important determinants of firm growth in normal/pre-pandemic times—ownership and organizational features that cushion the shocks thus do help greatly during the pandemic.

The third set of finding is that the relationship between firm characteristics and firm survival/growth is significantly impacted by the stringency of a country's COVID control policy. For example, large firms are better equipped than small firms to withstand the increased stringency of government-imposed COVID measures. As governments raise their COVID

policy stringency, firms with state ownership suffer higher probability of closure, possibly due to their higher levels of compliance with government mandates.

The final set of finding is that as an informal institution, two national culture measures—individualism and uncertainty avoidance—play a positive role in firm survival. As a formal institution, the overall country governance quality is negatively linked to firm sales growth, perhaps reflecting the stronger enforcement of the lockdown policies.

Our paper endeavors to make two contributions. First, it adds to the literature on corporate immunity by being one of the first to comprehensively examine the effects of organizational resources, national institutions, and culture on the survival and growth of private firms during the pandemic across a large of number of mostly developing countries. Our paper is perhaps the first on the pandemic's medium-run effects on firms around the world. As mentioned earlier, our study differs from the existing literature from three aspects: our focus on unlisted/private firms, our cross-country setting, and our examination of the medium-run time frame into the pandemic. Our paper enriches this fast increasing literature by starting to fill these gaps. Second, our paper is among the first to find that some firm/country characteristics impact firm survival and growth differently in normal versus in pandemic times. We report that a country's cultural characteristics, such as individualism and uncertainty avoidance, are positively related with private firms' survival, complementing similar findings among listed firms (Ding et al., 2021) and the previous literature on the importance of informal institutions on firm performance and strategic choices in developing countries (Duran et al. 2019). We also find that a country's governance quality is positively associated with firm survival but negatively related to firm growth during pandemic times, a finding that indicates governance plays a different role in facilitating firm prosperity during normal times and pandemic times.

The rest of the paper is organized as follows. Section 2 provides a review of the burgeoning corporate-immunity literature, while Section 3 describes the data and variables used in the study. Section 4 reports our empirical results, and Section 5 concludes our study.

2. Literature Review

The corporate immunity literature studies factors that help immunize firms from the negative shock such as the COVID-19 pandemic (Albuquerque et al. 2020; Ding et al. 2021). Here we review recent studies on firm-level and country-level determinants of corporate immunity.

2.1. Effects of Organizational Resources

Firm survival and growth depend on how firms leverage their bundle of organizational resources and capabilities (Penrose, 1959). During COVID-19, firms that possess such valuable resources are more likely to survive and grow. Specifically, firms whose business models can adjust well to social distancing or remote work are less negatively affected by the pandemic. Pagano et al. (2020) provide firm-level evidence from U.S. listed firms that those firms that adapt well to social distancing outperform their peers that require face-to-face contacts to function. Papanikolaou and Schmidt (2020) offer industry-level evidence that industries less equipped to work remotely suffer bigger declines in sales, employment, and stock returns. Bretscher et al. (2020) show that labor-intensive industries, which are less adaptive to remote work, exhibit more negative stock returns at the onset of the pandemic.

Part of the bundle of organizational resources, firm ownership and affiliations also play an important role in determining firms' effectiveness in coping with the pandemic. Bansal et al. (2020) document that affiliated firms outperform unaffiliated firms in India. Amore, Quarato and Pelucco (2021) report that family-controlled firms fare better than nonfamily-controlled firms in Italy. Ding et al. (2021) show that firms with hedge-fund ownership are better immune to the pandemic than firms without such ownership.

Another aspect of the bundle of organizational resources, a firm's financial flexibility also appears to help weather the storm. Alfaro et al. (2020) and Ramelli and Wagner (2020) find that U.S. listed firms with lower leverage and higher cash holdings are linked to higher firm value. Fahlenbrach et al. (2020) show that financially flexible U.S. listed firms experience a smaller stock price decline at the onset of the pandemic than financially inflexible firms. Ding et al. (2021) examine listed firms around the world, and document that high cash holdings, low debt ratio, and high profitability help minimize firms' exposure from the pandemic-induced stock market shock.

Several studies suggest that corporate social responsibility (CSR) activities may help immunize firms in the crisis. On the one hand, Albuquerque et al. (2020) point out that U.S. listed firms with higher environmental, social, and governance (ESG) ratings outperform their peers with a lower ESG rating in terms of stock returns and operating profit. Ding et al. (2021) examine listed firms from 56 countries and find that firms with more CSR activities suffer less from the pandemic-induced stock return decline. Bae et al. (2021) report that CSR positively affects stock returns during the crisis only if CSR activities are consistent with a firm's institutional environment. On the other hand, Demers et al. (2020) find that ESG scores have

no significant relation with U.S. listed firms' stock returns at the onset of the pandemic. They argue that it is premature to conclude that ESG helps immunize firms in this crisis.

The literature suggests that a cohesive corporate culture—another crucial organizational resource—tends to help weather the pandemic storm better. Shan and Tang (2020) find that Chinese listed firms with more satisfied employees perform better during COVID-19 than those with less satisfied employees. Li et al. (2020) examine U.S. listed firms using the conference call data from January to April 2020 and find that firms with a strong corporate culture are more resilient to the pandemic shock.

All these studies examine *listed* firms in China, Italy, and the United States as well as around the world. A much smaller number of studies have examined private (unlisted) firms' behaviors and outcomes during the pandemic. Bloom et al. (2020, 2021) offer evidence from the United Kingdom and the United States that COVID-19 led to significant total factor productivity (TFP) reduction and sales losses. Dai et al. (2021a, 2021b) find that Chinese SMEs (especially those that export) were severely adversely affected by the pandemic in terms of temporary and permanent closures. Gu et al. (2020) show that state-owned and/or foreign-owned firms in southern China suffer less than their nonstate-owned or nonforeign-owned peers in terms of daily output. Two studies find that firms tend to weather the pandemic storm better when facing less financial pressure: Carletti et al. (2020) study both listed and private firms in Italy and find that private firms and firms with a high pre-pandemic leverage are more likely to exhibit financial distress. Chundakkadan et al. (2020), using survey data of 13 countries from the World Bank, demonstrate that financially constrained firms are more likely to go bankrupt than non-financially constrained firms.

2.2. The Effects of National Institutions and Culture

The COVID-19 pandemic has inflicted pains upon every country in the world, the degree of which varies widely from country to country. Global variations are huge in terms of economic and institutional development (North, 1990), cultural characteristics (Hofstede, 2001), government COVID policy stringency (Fang et al. 2020), and COVID spread severity (Fang et al. 2020). This begs the question: Do country characteristics such as national institutions and culture affect firm behaviors and outcomes during the pandemic? Some scholars have started to examine this question.

As a logical starting point, at the onset of the pandemic, researchers have examined the relation between COVID infection rates and stock returns. They find a significantly negative

link between them: Bretscher et al. (2020) on the relation between COVID infection rates in U.S. counties and stock returns of firms headquartered in respective counties. Similar findings are reported by Bansal et al. (2020) in India, and by Erdem (2020) in a cross-country setting.

As the pandemic progresses, countries around the world begin to adopt various COVID control policies with a wide degree of stringency. Ashraf (2020b) documents that strict social distancing policies negatively affect stock market returns, while government income support and testing policies are positively linked to stock market returns. Kaczmarek et al. (2020) find that countries with high stringency polices outperform countries with weak stringency polices in terms of stock market returns.

A few scholars have examined the role of a country's culture during the pandemic. Culture is defined as "the collective programming of the mind that distinguishes the members of one group or category of people from another" (Hofstede, 2001). Hofstede (2001) categorizes a country's culture into six dimensions—namely, power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, and indulgence. Among the six, uncertainty avoidance, long-term orientation, and individualism are the most examined in the context of the pandemic. High uncertainty avoidance has been linked to larger stock market declines (Ashraf 2020a; Fernandez-Perez et al. 2021). Long-term orientation is commonly linked with smaller stock market declines, as long-term oriented investors can better understand the transient nature of the pandemic, and hence, unlikely to overreact (Hofstede, 2020; Zaremba et al., 2021). Concerning the effect of individualism, some scholars find that more individualistic countries suffer smaller stock market declines (Fernandez-Perez et al., 2021), while others find the opposite (Kaczmarek et al., 2020). These studies mainly focus on the effects of culture on stock markets. Our paper extends this line of research by examining the effects of culture on firm survival and growth during the pandemic.

Prior research has shown that democracy and institutional quality affects stock market returns, firm behavior, and performance (Beck et al., 2005; Hooper, Sim and Uppal, 2009; Xie and Li, 2018). The corporate immunity literature has not shown a consensus regarding the impact of democracy and institutional quality in the pandemic. Fernandez-Perez et al. (2021) and Fang et al. (2020) show that democratic governments and low political corruption are linked to smaller market declines and lower mortality rates during the pandemic. Erdem (2020) find that political and economic freedom, especially the freedom of expression, alleviate the negative relation between the severity of the pandemic and stock returns. However, Zaremba et al. (2021) find that autocratic governments with strong power are able to enforce stringent

COVID policies to limit the negative impact of COVID-19. Ding et al. (2021) find that the power of media, proxied by World Bank's measure of voice and accountability, has no significant impact on stock market reactions to the pandemic.

Overall, an emerging and rapidly accumulating stream of the literature hints at some possible relationship linking organizational resources, country institutions, and national culture to firm survival and growth during COVID. Reported next, our empirical efforts take a deep dive into this direction.

3. Data and Variables

3.1. The Sample

We obtain our sample of firms from two sources. The first firm-level dataset is the World Bank Enterprise Surveys (WBES), which covers over 130 countries around the world. WBES covers firm characteristics, access to finance, employment, sales, costs, and various measures of business-government relations. WBES data have been widely used in economics, finance, international business, and management research.⁴ The second firm-level dataset is the World Bank Enterprise Follow-up Surveys on COVID-19 (WBES-COVID), which represents follow-up surveys on WBES firms. WBES-COVID collects firm information on sales changes, business operations, labor adjustments, access to finance, expectations about the future, and support from the government in response to COVID-19. WBES-COVID now contains survey data for 36 countries as to February 2021. We then merge WBES-COVID with WBES by the unique firm id to combine all firm-level information.

In addition to these two firm-level datasets, we utilize several country-level data sources. Country-level macro and economic variables are gathered from World Development Indicator (WDI). National culture variables and country governance variables are obtained from Hofstede Insights and World Governance Indicator (WGI), respectively. The number of COVID-19 cases are gathered from Center for Systems Science and Engineering at Johns Hopkins University, while the government policy responses to COVID-19 are gathered from Oxford COVID-19 Government Response Tracker. The final sample used in this study includes 18,770 firm-observations from 36 countries.

⁴ Akins et al. (2017); Ayyagari et al. (2011, 2014); Barth et al. (2009); Beck et al. (2005, 2006, 2008); Cheng et al. (2020); Cull and Xu (2005); Jensen et al. (2010); Knack and Xu (2017); Houston et al. (2011); Liu et al. (2021); Xu (2011); and Zhou and Peng (2012).

3.2. Variables

3.2.1. Dependent Variables

The dependent variables in this study are firm closure and growth rates during the pandemic. Firm closure is measured by *Closure*, a dummy variable that equals to one for firms that are temporarily or permanently closed since COVID-19 pandemic declared, and zero otherwise. Firm growth is measured by the percentage changes in sales and in employment between the COVID-19 survey month and the same month a year ago (December 2019), denoted as *Sales growth* and *Employment growth*, respectively.

3.2.2. Firm-Level Characteristics

To evaluate how firm characteristics affect firm closure and growth during the pandemic, we include the following set of firm-level variables drawing on prior studies (Beck et al., 2005; Beck et al., 2008; Cheng et al., 2020; D'Souza et al., 2017; Liu et al., 2020; Ullah and Wei, 2017). We first include firm size, firm age, and three ownership variables. Firm size, $Ln(\text{firm size})$, is calculated as the natural logarithm of the number of employees. Firm age, $Ln(\text{firm age})$, is the natural logarithm of firm age plus one. Ownership is measured in three ways. (1) State ownership, *State*, is a dummy variable that equals to one for firms with government/state ownership, and zero otherwise. (2) Foreign ownership, *Foreign*, is a dummy variable that equals to one for firms with foreign ownership, and zero otherwise. (3) Subsidiary status, *Subsidiary*, is a dummy variable that equals to one if a firm is a subsidiary of another firm, and zero otherwise.

Since publicly listed firms are generally larger and have better access to finance than private firms, we also examine if a firm is a publicly listed firm—*Public*, a dummy variable that equals to one, and zero otherwise. *Exporter* is included to indicate if a firm is an exporter. Lastly, we include a measure of financial constraint, *Finance obstacle*, a categorical variable on a scale 0 – 4, which measures the degree of obstacle in accessing financing, with 0, 1, 2, 3, and 4 indicating no, minor, moderate, major, and very severe obstacles, respectively.

3.2.3. Country Characteristics

We control for country-level economic development, proxied by $Ln(\text{GDP per capita})$, the natural logarithm of GDP per capita in constant 2010 U.S. dollars. We further control for a demographic variable, *Age65*, the percentage of population of age 65 or older, as older population is more vulnerable to COVID-19 (Ding et al., 2021).

We examine the effects of three cultural dimensions on firm survival and growth during the pandemic. Specifically, we focus on three of Hofstede's six dimensions: (1) *Individualism* reflects the degree of interdependence that a society maintains among its members. (2) *Uncertainty avoidance* reflects the extent that members of a society feel uncomfortable with ambiguity and uncertainty. (3) *Long-term orientation* describes how a society encourages thrift/frugality and efforts in modern education to prepare for the future.

A country's governance quality may have a direct impact on the effectiveness of its responses to the COVID pandemic, hence affecting firm survival and growth. We employ the six commonly-used governance measures in Worldwide Governance Indicators (WGI) dataset, constructed by Kaufman, Kraay and Mastruzzi (2011): namely, *Corruption control*, *Government effectiveness*, *Political stability*, *Regulatory quality*, *Rule of law*, and *Voice and accountability*. These measures take the values from -2.5 to 2.5, with a higher value indicating a higher governance quality. We also take the average of the six measures, *Average WGI index*, to proxy a country's overall governance quality (Karolyi, 2015; Pinkowitz et al., 2016).

Our data on COVID-19 cases are obtained from the Center for Systems Science and Engineering at Johns Hopkins University, which collects and maintains COVID-19 data from 192 countries/regions, including the number of confirmed cases, number of deaths, and number of recoveries, starting from January 22, 2020, and ongoing. Our COVID density measure, *COVID spread*, is constructed as the number of cumulative confirmed COVID-19 cases per 1,000 persons, one day before the WBES COVID-19 follow-up surveys begin in each country. We also employ Oxford COVID-19 Government Response Tracker (OxCGRT) database, which provides information on the government policy responses to the COVID-19 pandemic across more than 180 countries. The government COVID policy stringency index, *COVID policy stringency*, is a comprehensive measure that takes into account nine response indicators, including school and workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home orders, public publicity campaigns, restrictions on internal activities and international travel controls. The stringency index ranges from 0 to 100, with 100 indicates the strictest policy.

3.3. Summary Statistics

The descriptive statistics of firm survival and growth are reported in Table 1, Panel A. Among the sample firms, 45% are temporarily or permanently closed since the start of the pandemic. Compared with the same month a year earlier (December 2019), the firms on average

experience 30.03% and 6.16% points decline in revenues and employees, respectively. Firm survival (i.e., 1 - *Closure*) and growth rates vary vastly among firms—see the very large corresponding standard deviations.

The summary statistics of the firm characteristics are in Table 1, Panel B. A median firm has 21 employees and is about 19 years old. About 1%, 12%, and 16% of firms have state ownership, foreign ownership, and a parent company, respectively. About 7% firms in our sample are publicly listed, and 33% are exporters. The median level of financial obstacle, *Finance obstacle*, is 1, indicating that about half of the firms in our sample perceive their financial obstacles as minor.

Table 2 provides the means of firm survival and growth rates by country. Firm survival rates (which are the reverse for the report closure rates) and growth rates during the pandemic vary tremendously across countries. Among the 36 countries, Jordan reports the highest percent of firm closure (96.35%). Firms in El Salvador suffer the biggest sales decline (-56.04%), while those of Guinea report the deepest employment cut (-23.36%). On the more positive side, Latvia report the lowest percent of firm closure (10%), and even reports an increase in sales (0.61%), while Lebanon and Russia report zero employment cut (0%) during the pandemic.

The summary statistics of country-level variables are in Table 1, Panel C. The median per capita GDP in our sample countries is US\$11,968 in 2010 value. The average scores of *Individualism*, *Uncertainty avoidance*, and *Long-term orientation* are 41.5, 81.21, and 49.99, respectively. Both *COVID spread* and government *COVID policy stringency* vary markedly across our sample countries. Lastly, country governance quality measures also vary widely among the sample countries, as shown by the very large standard deviations.

[Tables 1 and 2 here]

Table 3 reports the Pearson correlation matrix for all our key variables. Consistent with our expectation, *COVID policy stringency* positively correlates with firm closure and negatively correlates with firm sales growth and employment growth in crisis. Most of the firm and country characteristics are also significantly correlated with firm closure and growth.

[Table 3 here]

4. Empirical Results

4.1. Effects of Firm and Country Characteristics

To assess the impact of firm and country characteristics on firm survival and growth during the pandemic, we estimate the following baseline cross-sectional regression:

$$Y_{ick} = \alpha + \beta \text{ Firm Characteristics}_{ick} + \gamma \text{ Country Characteristics}_c + v_k + \varepsilon_i \quad (1)$$

The subscripts i , c , k represent firm, country, and industry. Left-hand side of Eq. (1), Y , represents three dependent variables, namely, *Closure*, *Sales growth*, and *Employment growth*. Firm and country characteristics are the same as those described in Section 3.2 above and reported in Table 2 (Panel B and C). We also include the industry fixed effects, v_k , to absorb unobserved industry-level variables that may affect firm survival and growth during the COVID-19 pandemic. We report robust standard errors clustered at the country-industry level. To mitigate the effect of outliers, we winsorize all firm-level continuous variables at the 1st and 99th percentiles.

Before we present the results, we must acknowledge that what we find reflect correlations and descriptive patterns, not causality. Nevertheless, (1) the timeliness of the data, (2) the comprehensiveness of our country coverage, and (3) the urgency to understand the effects of this still ongoing pandemic on firms in countries and firms with different characteristics—all these factors combine to help make this study potentially useful to the research community and policy makers. To the extent we can, we have interpreted our results with insights from the literature so that our interpretations have some foundations.

Table 4 presents our baseline regression results. Several firm characteristics play an important role in firm survival and growth during the pandemic. In particular, larger firms are much less likely to face closure. Large firms are also more likely to grow their revenues and employment during the pandemic. One explanation is that smaller firms suffer bigger negative shock to their revenues. As large firms, with stronger financial cushion and capacity, are better equipped to absorb the pandemic shock, they are able to take over the lost market share by small firms. Relatedly, firms with less financial obstacles are more likely to survive or grow their revenues.

Ownership and parent-company affiliations matter a great deal during the pandemic. First, state ownership is associated with higher sales and employment growth rates during the pandemic. State ownership has been linked to soft-budget constraints (Megginson et al. 2014).

While the pandemic has brought financial shocks to all firms (Chundakkadan et al. 2020), firms with soft-budget constraints are more likely to survive and even thrive, as they can go to the government to ask for financial or other material supports. Besides profit consideration, state-owned firms are also more likely to have political considerations, especially when it comes to absorbing negative shocks to employment during a crisis. The small share of state-owned enterprises in our sample is suggestive that they tend to be those firms on the “commanding heights” that the country wants to hold tight control, and for such strategically important firms, the logic of efficiency often is not the highest priority (Huang et al. 2017). Second, exporting firms would suffer more in terms of revenue growth from pandemic interruptions with global supply chains and from export demand shocks (Grassia et al. 2020; Peng and Kathuria, 2021). Finally, thanks to their parent companies, subsidiaries are significantly more likely to survive and grow during the pandemic.

As expected, firms in countries with a higher per capita GDP, more aged people, and a less stringent COVID control policy are more likely to survive and grow. $\ln(\text{GDP per capita})$ is positively related to sales growth. Consistent with Ding et al. (2021), the results suggest that firms from relatively high-income countries are much more likely to survive the pandemic and even thrive. Moreover, the association of *COVID policy stringency* with firm closure and revenue loss are both statistically and economically significant. One standard deviation increase in policy stringency is associated with an increase in the possibility of firm closure by 14% (i.e., 0.007×20.1) and decreases firm revenue by 6.7% (i.e., -0.334×20.1).

[Table 4 here]

Prior research has shown that (non-listed) private firms tend to be smaller and face more obstacles in the business environment than publicly listed firms (Beck et al., 2005, 2006; Nikolov, Schmid, and Steri, 2020). Hence, private firms may behave differently from publicly listed firms during the pandemic. As a robustness test, we divide the full sample into publicly listed firms and private firms, and rerun the baseline regressions for each subsample. The results are reported in Table 5.

Firm size continues to have the most consistent and significant impact on firm survival and revenue growth across all firms, while firm age exhibits a negative impact on firm survival and sales growth for public firms and negative impact on firm survival for private firms. Subsidiary status plays a highly positive and significant role in the survival of private firms during the pandemic, but is insignificant for the survival of public firms. Being a subsidiary firm is important for growth for both public and private firms, consistent with the baseline

findings. Another notable observation is that financial constraint, *Finance obstacle*, is only significantly detrimental to the survival and revenue growth of private firms, whereas it plays no significant role in publicly listed firms' survival and growth during the pandemic. This is not surprising: listed firms have better access to financing via equity markets.

[Table 5 here]

4.2. The effects of firm/country characteristics during normal versus pandemic times

An advantage of our study over the extant literature on corporate immunity is that we are able to combine the pre-pandemic WBES with the WBES-COVID surveys via a firm's unique identifier. The combined dataset contains firm-level information for both the pre-pandemic period ("normal times") and the pandemic period ("pandemic times"). This allows us to examine if, what, and how firm/country characteristics affect firm growth differently in normal versus pandemic times. Since by definition, the pandemic follow-up survey is conditional on firm existence in the last survey—that is, *Closure* is always zero for WBES—we do not analyze the closure outcome when comparing behavior in normal times and during the pandemic. Instead, we examine firm sales and employment growth in these two periods. The regression results are reported in Table 6, with columns (1) and (3) for pandemic times, and (2) and (4) for normal times.

Most of the firm characteristics affect firm growth *differently* in pandemic versus in normal times. In particular, large firms exhibit a low employment growth during the pandemic (column (3)) but a high employment growth in normal times (column (4)). These results provide additional support for the notion that large firms may have taken advantage of the crisis to shed themselves of excessive workers, which may be politically untenable during normal times. Large firms are able to have significantly higher growth in sales during the pandemic times versus the normal times. Firm age is insignificantly related to sales and employment growth during the pandemic (columns (1) and (3)), but significantly negatively related to sales and employment growth in normal times (columns (1) and (4)). These results may suggest that older firms are better equipped to weather the pandemic shock than younger firms in terms of protecting their workers. An explanation here is that older firms have an employee force that have been together for longer, and have stronger firm culture and thus the owners/managers feel stronger normative pressure, as suggested by the sociology literature (Scott 2014: 64), to maintain employment.

Favorable ownership and parent-company affiliations seem to better cushion firms during pandemic times as opposed to normal times. Ownership structure is also associated with firm growth differently in pandemic versus in normal times. Notably, state ownership plays positive and highly significant role in both sales (column (1)) and employment (column (3)) growth during the pandemic, providing further support for the notion that government ownership and the associated political connections are useful during pandemic times. However, in normal times, state ownership has no significant impact on sales growth (column (2)) or even negative impact on employment growth (column (4)). Furthermore, being a subsidiary is also highly useful to firm growth during the pandemic (columns (1) and (3)), but not so in normal times (columns (2) and (4)).

Not unexpectedly, country-level economic development, proxied by \ln (*GDP per capita*), has a positive and significant association with sales growth in pandemic times (column (1)), but an insignificant association with sales growth in normal times. A possible explanation is that during the pandemic, domestic demand, which rises with GDP per capita, becomes more important for firm growth (Peng and Kathuria, 2021).

[Table 6 here]

4.3. The interactive effect of COVID policy stringency

Our baseline results in Table 4 show that both firm characteristics and COVID policy stringency have significant effects on firm survival and growth during the pandemic. We now examine the interactive effects of firm characteristics and COVID policy stringency on firm survival and growth. Specifically, we estimate the following regression model:

$$Y_{ick} = \alpha + \beta \text{Firm characteristics}_{ick} + \delta \text{Firm characteristics}_{ick} \times \text{Covid policy stringency}_c + \gamma \text{Country characteristics}_c + v_k + \varepsilon_i \quad (2)$$

The dependent variables include the same three as in our baseline model. Our focus is the coefficients of the interaction term, $\text{Firm characteristics}_{ick} \times \text{Covid policy stringency}_c$, as they will provide insights into how a government's COVID policy affects the relation between firm characteristics and firm survival and growth. The results are reported in Table 7.

Government COVID policy stringency has significant interactions with some of the firm characteristics in shaping firm survival/growth relations. When governments increase their COVID control policy stringency: (1) large firms are better positioned than small firms to grow their revenues; (2) firms with state ownership are more likely to close, possibly because

state-owned firms, typically being subject to stronger government influence, are more amendable to government mandates.

When governments increase their COVID control policy stringency, subsidiary firms appear to be better equipped than non-subsidiaries to survive and protect their workers' employment or even add to their labor force. This further suggests possible material help from parent companies in times of crisis. In terms of COVID policy stringency's impact on firm survival, less financial constrained firms are also better positioned to withstand an increased COVID policy stringency, possibly due to financial healthy firms having more resources, financial or otherwise, to cope with the sustained lockdowns and social distancing.

[Table 7 here]

4.4. The effects of country culture and governance

COVID-19 highlights the importance of country-level formal and informal institutions in handling the crisis. During the pandemic, some of the formal institutions would stop to work due to the stay-at-home restrictions, among others. Then informal institutions would loom large to shape organizational choices (North, 1990; Peng, 2003). We thus now turn our attention to how a country's culture (i.e., informal institutions) and governance (i.e., formal institutions) affect firms' survival and growth during the pandemic.

4.4.1. The effects of national culture

We focus on three of Hofstede's (2001) six culture dimensions: individualism, uncertainty avoidance, and long-term orientation. These three dimensions have been found to be more impactful than other culture dimensions on firm behaviors and outcomes during the COVID-19 pandemic (Ashraf, 2020; Fernandez-Perez et al. 2020; Gorodnichenko and Roland, 2020; Kaczmarek et al. 2020; Zaremba et al. 2021). We add the three culture dimension measures to our baseline model (Eq. (1)), rerun the regressions, and report the results in Table 8.

On the one hand, *Long-term orientation* is positively related with revenue growth. This result indicates that firms are more likely to grow in more long-term orientated countries, which is consistent with Zaremba et al. (2021). Duran et al. (2019) also find long-term orientation of a country, which they classify as an informal enabling institution, affect the relative performance of publicly listed family versus non-family firms. It is likely that during the dark times with no light at the end of the tunnel known as COVID-19, firms (and managers) in

countries with a higher level of *Long-term orientation* may have more enduring patience, stronger resilience, and more powerful optimism, whereas firms (and managers) in countries with a low level of *Long-term orientation* may be more easily discouraged to close down and declare bankruptcy.

On the other hand, both *Individualism* and *Uncertainty avoidance* have negative significant association with firm closure, indicating firms in countries with higher individualistic behavior and higher uncertainty avoidance culture have higher probability to survive. Individualism is associated with proactive adaptation, stronger self reliance, all traits that contribute to firm survival. In contrast, uncertainty avoidance cultures orient people toward adherence to social norms and mutual help, which would help contain the pandemic and contribute to firm survival.

[Table 8 here]

4.4.2. *The effects of governance quality*

We employ the WGI to assess the effects of country governance quality on firm survival and growth during the pandemic. We examine all six dimensions of a country's governance quality, namely, corruption control, government effectiveness, political stability, regulatory quality, rule of law, and voice and accountability. Following standard practice, we also use the average value of the above six measures, *Average WGI index*, to proxy a country's overall governance quality (Kaufman, Kraay and Mastruzzi 2011). Table 9 reports the results of the effects of country governance on firm survival and growth during the pandemic.

Robustly (though not consistently significantly), higher quality of country governance is associated with lower sales growth but higher chance of survival during the pandemic. In particular, firms in less corrupt countries (better corruption control) face bigger loss of revenues (Panel A). Firms in countries with more political stable governments have lower probability of closure (Panel C). Firms in countries where enforcement of regulation is more effective suffer bigger losses in revenue and employment (Panel D). Interestingly, as shown in Panel F, firms in countries with better citizen political participation and more accountable government are less likely to face closure but suffer bigger revenue and employment losses. Using the average value of the above six measures, overall we find that high country governance quality is associated with worse firm revenue growth during the pandemic.

These findings may be counter-intuitive in normal times. However, during a pandemic, these findings are plausible and logical. In countries with better governance and less corruption,

citizens are more likely to entrust the governments to carry out COVID-19 control policies. Even some citizens are not happy with the lockdowns or other mitigation measures, highly effective governments are better able to mobilize institutional resources to enforce rules and regulations during the pandemic. The upshot? More complete and more enduring lockdowns. In the short run, firms in these countries suffer in terms of growth as a consequence, but they do benefit in higher chance in survival.

[Table 9 here]

5. Conclusion

This study probes the effects of organizational resources, country institutions, and national culture on firm survival and growth during the still ongoing COVID-19 pandemic. Analyzing the combined WBES and WBES-COVID datasets, we document a number of findings. At the firm level, large firms are much more likely to survive and even thrive in terms of growing their revenues and employment during the pandemic. Our findings about firm size in the pandemic times compliment Beck et al. (2005), who find firm size also plays a significant role in firm growth during normal times. Reflecting favorable access to resources, state ownership and subsidiary status consistently play a useful role in weathering the negative pandemic shock. Firms in high income countries fare significantly better than those in low income countries during the pandemic. We further find that most firm characteristics, such as subsidiary status and financial constraint, impact publicly listed firms to a less extent than they impact private firms during the pandemic.

Most organizational resources, including large firm size, favorable ownership and parent-company affiliations, facilitate firm growth to a greater extent in pandemic versus in normal times. Relatedly, societal resources, proxied by the income level, also allow greater firm revenue growth during the pandemic but not in normal times.

At the country level, we find government COVID policy stringency plays an important role in the relations between firm characteristics and firm survival and growth, and larger firms and firms with parent companies tend to be less harmed by stringent COVID policy. A country's culture characteristics are also important determinants of firm survival and growth in the pandemic. In particular, firms in countries with a individualistic and uncertainty avoidance culture are better equipped to weather the negative shock of the pandemic. Interestingly, we observe consistently that high country governance quality leads to high odds of firm survival but slow revenue and employment growth during the pandemic.

In conclusion, organizational immunity during COVID-19 is likely driven by organizational resources, country institutions, and national culture—with various combinations. Their impact on firm survival and growth differs between normal (pre-pandemic) times and pandemic times. Given the worldwide efforts to tame COVID-19, it is clear that our learning about them is not going to stop any time soon.

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Table 1. Summary Statistics.

This table presents summary statistics for our dependent variables (Panel A), firm-level characteristics (Panel B) and country-level characteristics (Panel C). Please refer to the Appendix for variable definitions and data sources.

| | N | Mean | Std | Min | Median | Max |
|---|----------|-------------|------------|------------|---------------|------------|
| A. Closure and Growth | | | | | | |
| Closure _t | 13948 | 0.45 | 0.50 | 0 | 0 | 1 |
| Sales growth _t | 12904 | -30.03 | 32.68 | -100 | -30 | 40 |
| Employment growth _t | 11384 | -6.16 | 20.42 | -89.26 | 0 | 57.14 |
| B. Firm-level Characteristics | | | | | | |
| Ln (firm size) _{t-1} | 18770 | 3.30 | 1.33 | 1.61 | 3.05 | 6.81 |
| Ln (firm age) _{t-1} | 18560 | 2.88 | 0.70 | 0 | 2.94 | 5.31 |
| State _{t-1} | 18489 | 0.01 | 0.12 | 0 | 0 | 1 |
| Foreign _{t-1} | 18465 | 0.12 | 0.32 | 0 | 0 | 1 |
| Subsidiary _{t-1} | 18756 | 0.16 | 0.36 | 0 | 0 | 1 |
| Public _{t-1} | 18566 | 0.07 | 0.26 | 0 | 0 | 1 |
| Exporter _{t-1} | 18469 | 0.33 | 0.47 | 0 | 0 | 1 |
| Finance obstacle _{t-1} | 18386 | 1.24 | 1.24 | 0 | 1 | 4 |
| C. Country Characteristics | | | | | | |
| COVID policy stringency _t | 18420 | 54.30 | 20.01 | 16.67 | 54.63 | 96.30 |
| COVID spread _t | 18770 | 2.28 | 2.87 | 0.02 | 1.13 | 14.14 |
| Ln (GDP per capita) _{t-1} | 18770 | 9.04 | 1.02 | 6.33 | 9.39 | 10.48 |
| Age65 _{t-1} | 18770 | 14.34 | 6.82 | 2.12 | 15.20 | 23.01 |
| Individualism _{t-1} | 16699 | 41.50 | 18.05 | 6 | 39 | 80 |
| Uncertainty avoidance _{t-1} | 16699 | 81.21 | 15.61 | 50 | 85 | 100 |
| Long-term orientation _{t-1} | 16050 | 49.99 | 22.77 | 14 | 52 | 82 |
| Control of corruption _{t-1} | 18770 | -0.09 | 0.64 | -1.42 | -0.06 | 1.54 |
| Government effectiveness _{t-1} | 18770 | 0.17 | 0.66 | -1.57 | 0.15 | 1.18 |
| Political stability _{t-1} | 18770 | 0.11 | 0.68 | -1.64 | 0.29 | 1.13 |
| Regulatory quality _{t-1} | 18770 | 0.30 | 0.72 | -1.46 | 0.51 | 1.59 |
| Rule of law _{t-1} | 18770 | 0.02 | 0.72 | -1.28 | 0.14 | 1.28 |
| Voice and accountability _{t-1} | 18770 | 0.12 | 0.80 | -1.42 | 0.22 | 1.24 |
| Average WGI index _{t-1} | 18770 | 0.11 | 0.66 | -1.36 | 0.24 | 1.24 |

Table 2. Firm Closure, Growth, and Macro Variables' Distribution by Country in Pandemic Times.

This table reports by country our dependent variables, i.e., Closure, Sales growth, and Employment growth. The table also reports country characteristics, including cultural characteristics, government COVID policy stringency, and COVID spread severity, and overall country governance quality. Please refer to the Appendix for variable definitions and data sources.

| Country | Obs. | Closure _t | Sales growth _t | Employment growth _t | Individualism _{t-1} | Uncertainty avoidance _{t-1} | Long-term orientation _{t-1} | COVID policy stringency _t | COVID spread _t | Ave. WGI index _{t-1} |
|-------------|------|----------------------|---------------------------|--------------------------------|------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------|-------------------------------|
| Albania | 369 | 64.20% | -45.87% | -8.00% | 20 | 71 | 61 | 71.30 | 0.42 | -0.08 |
| Belarus | 589 | 10.57% | -15.75% | -3.51% | 25 | 95 | 81 | 16.67 | 7.28 | -0.45 |
| Bulgaria | 765 | 27.38% | -24.38% | -5.99% | 30 | 85 | 69 | 36.11 | 1.10 | 0.28 |
| Chad | 147 | 84.31% | -41.54% | -4.23% | | | | 74.07 | 0.05 | -1.36 |
| Croatia | 397 | 28.49% | -17.32% | -0.79% | 33 | 80 | 58 | 35.19 | 2.81 | 0.46 |
| Cyprus | 224 | 50.97% | -36.09% | -1.48% | | | | 76.85 | 0.79 | 0.83 |
| Czech | 500 | 23.25% | -13.40% | -3.45% | 58 | 74 | 70 | 38.89 | 2.80 | 0.93 |
| El Salvador | 711 | 67.88% | -56.04% | -12.27% | 19 | 94 | 20 | 96.30 | 0.49 | -0.29 |
| Estonia | 354 | 16.92% | -7.67% | -4.15% | 60 | 60 | 82 | 25.93 | 2.76 | 1.24 |
| Georgia | 600 | 60.82% | -47.93% | -8.37% | 41 | 85 | 38 | 69.44 | 0.21 | 0.45 |
| Greece | 585 | 31.72% | -28.50% | -0.89% | 35 | 100 | 45 | 54.63 | 0.27 | 0.39 |
| Guatemala | 331 | 70.37% | -47.55% | -19.63% | 6 | 98 | | 96.30 | 0.88 | -0.62 |
| Guinea | 149 | 46.15% | -55.10% | -23.36% | | | | 73.15 | 0.36 | -0.87 |
| Honduras | 318 | 85.00% | -54.95% | -21.46% | 20 | 50 | | 96.30 | 1.43 | -0.67 |
| Hungary | 795 | 11.87% | -12.91% | -2.95% | 80 | 82 | 58 | 50.00 | 0.86 | 0.42 |
| Italy | 752 | 58.51% | -37.22% | -3.02% | 76 | 75 | 61 | 63.89 | 3.82 | 0.56 |
| Jordan | 569 | 96.35% | -52.29% | -11.51% | 30 | 65 | 16 | 48.15 | 0.12 | -0.10 |
| Latvia | 334 | 10.00% | 0.61% | -9.83% | 70 | 63 | 69 | 32.41 | 1.24 | 0.86 |
| Lebanon | 506 | 65.90% | 0.00% | 0.00% | 40 | 50 | 14 | 57.41 | 14.14 | -0.90 |

Table 2. Firm Closure, Growth, and Macro Variables' Distribution by Country in Pandemic Times. (Cont'd)

| Country | Obs. | Closure _t | Sales growth _t | Employment growth _t | Individualism _{t-1} | Uncertainty avoidance _{t-1} | Long-term orientation _{t-1} | COVID policy stringency _t | COVID spread _t | Ave. WGI index _{t-1} |
|-----------------|------|----------------------|---------------------------|--------------------------------|------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------|-------------------------------|
| Lithuania | 352 | 43.60% | -12.55% | -5.28% | 60 | 65 | 82 | 37.04 | 1.86 | 0.96 |
| Malta | 241 | 29.90% | -28.25% | -4.89% | 59 | 96 | 47 | 42.59 | 4.68 | 0.87 |
| Moldova | 337 | 52.06% | -53.48% | -8.88% | 27 | 95 | 71 | 80.56 | 2.31 | -0.31 |
| Mongolia | 347 | 47.87% | -35.83% | -15.44% | | | | 60.19 | 0.09 | 0.01 |
| Morocco | 1082 | 72.90% | -44.98% | -5.71% | 46 | 68 | 14 | 64.81 | 0.45 | -0.29 |
| Nicaragua | 326 | 29.89% | -40.58% | -16.95% | | | | 18.52 | 0.28 | -0.98 |
| Niger | 148 | 29.23% | -53.68% | -6.18% | | | | 25.93 | 0.04 | -0.75 |
| North Macedonia | 350 | 32.75% | -27.97% | -5.84% | 22 | 87 | 62 | | 9.02 | -0.03 |
| Poland | 1289 | 20.34% | -15.28% | -3.67% | 60 | 93 | 38 | 39.81 | 1.13 | 0.65 |
| Portugal | 1062 | 28.89% | -20.55% | -1.87% | 27 | 99 | 28 | 56.94 | 5.87 | 1.07 |
| Romania | 795 | 24.80% | -17.90% | -5.87% | 30 | 90 | 52 | 42.59 | 3.37 | 0.24 |
| Russia | 1318 | 64.40% | -24.29% | 0.00% | 39 | 95 | 81 | 74.54 | 2.93 | -0.58 |
| Slovak Republic | 427 | 36.70% | -15.06% | -4.75% | 52 | 51 | 77 | 28.70 | 0.87 | 0.71 |
| Slovenia | 399 | 35.51% | -15.94% | -4.09% | 27 | 88 | 49 | 39.81 | 0.53 | 0.99 |
| Togo | 143 | 27.66% | -47.00% | -6.53% | | | | 53.70 | 0.07 | -0.74 |
| Zambia | 572 | 35.09% | -45.71% | -9.87% | 35 | 50 | 30 | 39.81 | 0.08 | -0.45 |
| Zimbabwe | 587 | 80.27% | -49.33% | -5.93% | | | | 70.37 | 0.02 | -1.20 |

Table 3. Pearson Correlation Matrix.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|----------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------------|-------------------|
| 1. Closure t | | | | | | | | | | | | | | |
| 2. Sales growth t | -0.45 ^a | | | | | | | | | | | | | |
| 3. Employment growth t | -0.13 ^a | 0.23 ^a | | | | | | | | | | | | |
| 4. Ln (firm size) $_{t-1}$ | -0.12 ^a | 0.15 ^a | 0.05 ^a | | | | | | | | | | | |
| 5. Ln (firm age) $_{t-1}$ | -0.10 ^a | 0.07 ^a | 0.04 ^a | 0.24 ^a | | | | | | | | | | |
| 6. State $_{t-1}$ | -0.05 ^a | 0.05 ^a | 0.03 ^a | 0.12 ^a | 0.07 ^a | | | | | | | | | |
| 7. Foreign $_{t-1}$ | -0.02 ^b | 0.01 | 0.01 | 0.28 ^a | 0.00 | 0.06 ^a | | | | | | | | |
| 8. Subsidiary $_{t-1}$ | -0.01 | 0.01 | 0.02 ^b | 0.18 ^a | 0.08 ^a | 0.04 ^a | 0.17 ^a | | | | | | | |
| 9. Public $_{t-1}$ | -0.05 ^a | 0.04 ^a | 0.01 | 0.23 ^a | 0.13 ^a | 0.27 ^a | 0.11 ^a | 0.10 ^a | | | | | | |
| 10. Exporter $_{t-1}$ | -0.10 ^a | 0.10 ^a | 0.05 ^a | 0.35 ^a | 0.13 ^a | 0.04 ^a | 0.22 ^a | 0.04 ^a | 0.09 ^a | | | | | |
| 11. Finance obstacle $_{t-1}$ | 0.13 ^a | -0.14 ^a | -0.06 ^a | -0.07 ^a | -0.04 ^a | -0.01 | -0.05 ^a | 0.00 | 0.00 | -0.06 ^a | | | | |
| 12. COVID policy stringency t | 0.34 ^a | -0.29 ^a | -0.08 ^a | -0.02 ^a | -0.02 ^b | -0.08 ^a | -0.03 ^a | 0.08 ^a | -0.02 ^a | -0.11 ^a | 0.14 ^a | | | |
| 13. COVID spread t | -0.09 ^a | 0.19 ^a | 0.08 ^a | 0.03 ^a | 0.12 ^a | 0.07 ^a | -0.08 ^a | -0.09 ^a | 0.07 ^a | 0.04 ^a | -0.01 | -0.13 ^a | | |
| 14. Ln (GDP per capita) $_{t-1}$ | -0.25 ^a | 0.35 ^a | 0.14 ^a | 0.05 ^a | 0.12 ^a | -0.04 ^a | -0.10 ^a | -0.09 ^a | -0.06 ^a | 0.15 ^a | -0.20 ^a | -0.28 ^a | 0.24 ^a | |
| 15. Age65 $_{t-1}$ | -0.30 ^a | 0.35 ^a | 0.15 ^a | 0.06 ^a | 0.07 ^a | -0.02 ^a | -0.08 ^a | -0.07 ^a | -0.02 ^a | 0.16 ^a | -0.23 ^a | -0.35 ^a | 0.21 ^a | 0.91 ^a |

Superscripts a, b, c represents significance level of 1%, 5%, and 10%, respectively.

Table 4. The effects of firm/country characteristics on firm survival/growth in pandemic times.

This table presents the effects of firm and country characteristics on firm survival or growth in pandemic times. Columns (1), (2), and (3) report results for our three dependent variables, i.e., *Closure_t*, *Sales growth_t*, and *Employment growth_t*, respectively. The explanatory variables are a set of firm characteristics and a set of country characteristics. The sources and detailed variable definitions are shown in the Appendix. Robust t-statistics based on standard errors clustered at the country-industry level are reported in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Closure _t (1) | Sales growth _t (2) | Employment growth _t (3) |
|--------------------------------------|-----------------------------|----------------------------------|---------------------------------------|
| Ln (firm size) _{t-1} | -0.030*** (-5.65) | 3.126*** (5.77) | 0.497** (2.34) |
| Ln (firm age) _{t-1} | -0.033*** (-3.56) | -1.047 (-1.60) | 0.302 (0.71) |
| State _{t-1} | -0.023 (-0.68) | 6.659*** (3.95) | 4.492*** (3.71) |
| Foreign _{t-1} | 0.008 (0.46) | -0.275 (-0.22) | 0.365 (0.52) |
| Subsidiary _{t-1} | -0.034** (-2.13) | 2.589** (2.43) | 1.370** (2.00) |
| Public _{t-1} | -0.016 (-0.76) | 0.218 (0.22) | -0.449 (-0.65) |
| Exporter _{t-1} | 0.012 (0.77) | -1.646* (-1.86) | 0.515 (0.93) |
| Finance obstacle _{t-1} | 0.014** (2.54) | -1.209*** (-4.24) | -0.222 (-1.20) |
| COVID policy stringency _t | 0.007*** (8.10) | -0.334*** (-8.05) | -0.031 (-1.38) |
| COVID spread _t | 0.003 (0.61) | 0.108 (0.30) | -0.018 (-0.11) |
| Ln (GDP per capita) _{t-1} | 0.044 (1.12) | 7.826*** (4.70) | 0.660 (0.72) |
| Age65 _{t-1} | -0.020*** (-2.72) | 0.177 (0.64) | 0.319** (2.44) |
| Industry FE | YES | YES | YES |
| Observations | 12891 | 11929 | 10499 |
| Adj. R-squared | 0.192 | 0.225 | 0.032 |

Table 5. The effects of firm/country characteristics: Public versus private firms.

This table presents the results of subsample analysis on two groups: publicly listed versus private firms. In columns 1 (4), 2 (5), and 3 (6), the dependent variables are *Closure_t*, *Sales growth_t*, and *Employment growth_t*, respectively. The sources and detailed variable definitions are shown in the Appendix. Robust t-statistics based on standard errors clustered at the country-industry level are reported in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. All countries in our sample have both public and private firms.

| | Public Firms | | | Private Firms | | |
|--------------------------------------|-----------------------------|-------------------------------------|--|-----------------------------|-------------------------------------|--|
| | Closure _t (1) | Sales growth _t (2) | Employment growth _t (3) | Closure _t (4) | Sales growth _t (5) | Employment growth _t (6) |
| Ln (firm size) _{t-1} | -0.032* (-1.90) | 3.416*** (3.19) | 0.566 (0.97) | -0.031*** (-5.56) | 3.164*** (5.82) | 0.523** (2.32) |
| Ln (firm age) _{t-1} | -0.039* (-1.76) | -2.990* (-1.77) | -0.314 (-0.34) | -0.033*** (-3.43) | -0.837 (-1.31) | 0.390 (0.87) |
| State _{t-1} | -0.005 (-0.09) | 7.124*** (3.42) | 3.543** (2.37) | 0.013 (0.24) | 6.709** (2.29) | 6.435*** (5.09) |
| Foreign _{t-1} | -0.009 (-0.19) | -1.007 (-0.42) | 0.815 (0.51) | 0.013 (0.70) | -0.395 (-0.27) | 0.228 (0.30) |
| Subsidiary _{t-1} | -0.044 (-1.36) | 6.000*** (2.84) | 3.992*** (3.26) | -0.031* (-1.74) | 2.128* (1.88) | 0.991 (1.42) |
| Exporter _{t-1} | -0.006 (-0.11) | -1.830 (-0.93) | -0.459 (-0.34) | 0.012 (0.77) | -1.576* (-1.67) | 0.614 (1.05) |
| Finance obstacle _{t-1} | 0.010 (0.83) | -0.788 (-1.22) | 0.056 (0.10) | 0.014** (2.43) | -1.235*** (-4.05) | -0.242 (-1.34) |
| COVID policy stringency _t | 0.006*** (5.55) | -0.314*** (-4.94) | -0.030 (-0.81) | 0.007*** (8.00) | -0.337*** (-8.02) | -0.032 (-1.33) |
| COVID spread _t | -0.012* (-1.66) | 0.126 (0.28) | 0.099 (0.34) | 0.003 (0.69) | 0.168 (0.43) | -0.019 (-0.12) |
| Industry FE | YES | YES | YES | YES | YES | YES |
| Macro controls | YES | YES | YES | YES | YES | YES |
| Observations | 890 | 849 | 767 | 12001 | 11080 | 9732 |
| Adj. R-squared | 0.21 | 0.24 | 0.06 | 0.19 | 0.22 | 0.03 |

Table 6. The effects of firm/country characteristics: Pandemic vs. normal times.

This table presents the effects of firm/country characteristics on firm growth, side-by-side, in pre-pandemic (normal) and pandemic times. Columns (1) and (3) show results for the pandemic times, which are the same as columns (2) and (3) in Table 4. We report them here for ease of comparison. Columns (2) and (4) show results for the normal times. The sources and detailed variable definitions are shown in the Appendix. Robust t-statistics based on standard errors clustered at the country-industry level are reported in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Sales growth | | Employment growth | |
|--------------------------------------|----------------------|-----------------------|--------------------|-----------------------|
| | Pandemic (1) | Normal (2) | Pandemic (3) | Normal (4) |
| Ln (firm size) _{t-1} | 3.126*** (5.77) | 1.090*** (4.71) | 0.497** (2.34) | 1.186*** (7.83) |
| Ln (firm age) _{t-1} | -1.047 (-1.60) | -4.569*** (-11.29) | 0.302 (0.71) | -3.502*** (-14.45) |
| State _{t-1} | 6.659*** (3.95) | 2.357 (1.08) | 4.492*** (3.71) | -1.922** (-2.06) |
| Foreign _{t-1} | -0.275 (-0.22) | 0.275 (0.42) | 0.365 (0.52) | -0.819** (-2.35) |
| Subsidiary _{t-1} | 2.589** (2.43) | -0.910 (-1.51) | 1.370** (2.00) | -0.084 (-0.21) |
| Public _{t-1} | 0.218 (0.22) | -1.642** (-2.23) | -0.449 (-0.65) | -0.570 (-1.26) |
| Exporter _{t-1} | -1.646* (-1.86) | 0.747 (1.48) | 0.515 (0.93) | 0.289 (1.01) |
| Finance obstacle _{t-1} | -1.209*** (-4.24) | -0.818*** (-3.91) | -0.222 (-1.20) | -0.512*** (-4.72) |
| COVID policy stringency _t | -0.334*** (-8.05) | | -0.031 (-1.38) | |
| COVID spread _t | 0.108 (0.30) | | -0.018 (-0.11) | |
| Ln (GDP per capita) _{t-1} | 7.826*** (4.70) | 0.910 (0.87) | 0.660 (0.72) | 0.897* (1.71) |
| Age65 _{t-1} | 0.177 (0.64) | -0.106 (-0.59) | 0.319** (2.44) | -0.119* (-1.72) |
| Industry FE | YES | YES | YES | YES |
| Observations | 11929 | 14387 | 10499 | 16476 |
| Adj. R-squared | 0.23 | 0.03 | 0.03 | 0.04 |

Table 7. The joint effects of COVID policy stringency and firm characteristics

This table presents the joint effects of government *COVID policy stringency* and firm characteristics on firm survival and growth in pandemic times. Columns (1), (2), and (3) reports results for dependent variables *Closure_t*, *Sales growth_t*, and *Employment growth_t*, respectively. The key independent variable is *COVID policy stringency_t*, a composite measure taking a value from 0 to 100 (100 = strictest), and its interactions with a set of firm characteristics. The sources and detailed variable definitions are shown in the Appendix. Robust t-statistics based on standard errors clustered at the country-industry level are reported in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Closure _t (1) | Sales growth _t (2) | Employment growth _t (3) |
|--|-----------------------------|----------------------------------|---------------------------------------|
| COVID policy stringency _t | 0.008*** (5.58) | -0.537*** (-6.08) | -0.164*** (-2.89) |
| COVID spread _t | 0.003 (0.64) | 0.115 (0.32) | -0.021 (-0.14) |
| Ln (firm size) _{t-1} × COVID policy stringency _t | -0.000 (-0.47) | 0.049** (2.46) | 0.006 (0.56) |
| Ln (firm age) _{t-1} × COVID policy stringency _t | -0.001 (-1.60) | 0.009 (0.29) | 0.032 (1.45) |
| State _{t-1} × COVID policy stringency _t | 0.002* (1.75) | -0.065 (-0.87) | 0.104*** (2.63) |
| Foreign _{t-1} × COVID policy stringency _t | 0.001 (1.50) | -0.063 (-1.08) | 0.037 (1.06) |
| Subsidiary _{t-1} × COVID policy stringency _t | -0.001* (-1.88) | 0.015 (0.29) | 0.091** (2.38) |
| Public _{t-1} × COVID policy stringency _t | -0.001 (-1.20) | 0.061 (1.15) | -0.040 (-0.92) |
| Exporter _{t-1} × COVID policy stringency _t | -0.000 (-0.30) | 0.006 (0.13) | 0.017 (0.58) |
| Finance obstacle _{t-1} × COVID policy stringency _t | 0.001*** (2.66) | 0.011 (0.67) | -0.008 (-0.80) |
| Ln (firm size) _{t-1} | -0.025** (-2.03) | 0.438 (0.43) | 0.194 (0.34) |
| Ln (firm age) _{t-1} | 0.003 (0.14) | -1.513 (-0.98) | -1.425 (-1.26) |
| State _{t-1} | -0.140*** (-2.64) | 12.019*** (3.42) | 0.670 (0.31) |
| Foreign _{t-1} | -0.061 (-1.24) | 2.951 (1.04) | -1.612 (-0.88) |
| Subsidiary _{t-1} | 0.029 (0.83) | 1.804 (0.56) | -3.695* (-1.74) |
| Public _{t-1} | 0.045 (0.91) | -2.896 (-0.98) | 1.866 (0.83) |
| Exporter _{t-1} | 0.021 (0.58) | -1.916 (-0.71) | -0.324 (-0.22) |
| Finance obstacle _{t-1} | -0.018 (-1.40) | -1.765** (-1.97) | 0.202 (0.39) |
| Industry FE | YES | YES | YES |
| Macro controls | YES | YES | YES |
| Observations | 12891 | 11929 | 10499 |
| Adj. R-squared | 0.19 | 0.23 | 0.03 |

Table 8. The effects of culture on firm survival/growth in pandemic times.

This table presents the effects of three culture dimensions, i.e., *Individualism*_{*t-1*}, *Uncertainty avoidance*_{*t-1*}, *Long-term orientation*_{*t-1*}, on firm survival and growth in pandemic times. Columns (1), (2), and (3) report results for dependent variables *Closure*_{*t*}, *Sales growth*_{*t*}, and *Employment growth*_{*t*}, respectively. For the sake of brevity, only the coefficients of culture variables, *COVID policy stringency*_{*t*}, and *COVID spread*_{*t*} are reported. Firm characteristics, macro-economic variables, and industry fixed effects are included in all regressions. The sources and detailed variable definitions are shown in the Appendix. Robust t-statistics based on standard errors clustered at the country-industry level are reported in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Closure _{<i>t</i>} (1) | Sales growth _{<i>t</i>} (2) | Employment growth _{<i>t</i>} (3) |
|---|------------------------------------|---|--|
| Individualism _{<i>t-1</i>} | -0.003*** (-2.76) | 0.097 (1.57) | 0.010 (0.48) |
| Uncertainty avoidance _{<i>t-1</i>} | -0.003*** (-2.97) | 0.136 (1.32) | -0.001 (-0.04) |
| Long-term orientation _{<i>t-1</i>} | 0.001 (0.77) | 0.104** (2.10) | -0.052** (-2.53) |
| COVID policy stringency _{<i>t</i>} | 0.008*** (7.55) | -0.403*** (-5.68) | -0.044 (-1.59) |
| COVID spread _{<i>t</i>} | -0.004 (-0.78) | -0.220 (-0.32) | 0.138 (0.79) |
| Firm controls | YES | YES | YES |
| Industry FE | YES | YES | YES |
| Macro controls | YES | YES | YES |
| Observations | 11157 | 10273 | 8921 |
| Adj. R-squared | 0.20 | 0.23 | 0.02 |

Table 9. The effects of country governance on firm survival/growth in pandemic times.

This table presents the effects of country governance quality on firm survival and growth in the pandemic times. Columns (1), (2), and (3) report results for dependent variables *Closure_t*, *Sales growth_t*, and *Employment growth_t*, respectively. Panels A-G shows the results for different measures of country governance: A for *Control of corruption*; B for *Government effectiveness*; C for *Political stability*; D for *Regulatory quality*; E for *Rule of law*; F for *Voice and accountability*; and G for the *Average WGI index*. For the sake of brevity, only the coefficients of country governance variables are reported. Firm characteristics, country characteristics, and industry fixed effects are included in all regressions. The sources and detailed variable definitions are shown in the Appendix. Robust t-statistics based on standard errors clustered at the country-industry level are reported in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Closure _t (1) | Sales growth _t (2) | Employment growth _t (3) |
|--|-----------------------------|----------------------------------|---------------------------------------|
| Panel A: Control of corruption | | | |
| Control of corruption _{t-1} | 0.003 (0.07) | -3.359* (-1.89) | 0.177 (0.20) |
| Panel B: Government effectiveness | | | |
| Government effectiveness _{t-1} | 0.039 (0.78) | -1.594 (-0.64) | -0.977 (-0.85) |
| Panel C: Political stability | | | |
| Political stability _{t-1} | -0.125*** (-4.60) | -0.526 (-0.20) | -1.557 (-1.00) |
| Panel D: Regulatory quality | | | |
| Regulatory quality _{t-1} | -0.031 (-0.90) | -4.122** (-2.32) | -3.459*** (-3.50) |
| Panel E: Rule of law | | | |
| Rule of law _{t-1} | -0.012 (-0.31) | -1.616 (-0.87) | 0.542 (0.59) |
| Panel F: Voice and accountability | | | |
| Voice and accountability _{t-1} | -0.070*** (-3.16) | -3.486*** (-2.84) | -1.910** (-2.16) |
| Panel G: Average WGI index | | | |
| Average WGI index _{t-1} | -0.061 (-1.52) | -3.945* (-1.82) | -1.854 (-1.38) |
| Firm controls | YES | YES | YES |
| Industry FE | YES | YES | YES |
| Country controls | YES | YES | YES |

Appendix. Variable Definitions and Data Sources.

| Variable | Definition | Source |
|--------------------------------------|--|---|
| A. Closure and Growth | | |
| Closure _t | Dummy variable that takes on the value 1 if this firm is temporarily closed, or permanently closed since COVID-19 pandemic declared, 0 otherwise. | WBES(op16 & op19) |
| Sales growth _t | The percentage of the sales changes compared to one year ago. | WBES(sa6) |
| Employment growth _t | The percentage of the permanent full-time workers changes since December 2019. | WBES(wf13) |
| B. Firm-level Characteristics | | |
| Ln (firm size) _{t-1} | Ln(Employee _{t-1}) | WBES(l1) |
| Ln (firm age) _{t-1} | Ln(survey year–firm founding year+1) | WBES(b5) |
| State _{t-1} | Dummy variable that takes on the value 1 if the firm is at least partially owned by government or state, 0 otherwise. | WBES(b2c) |
| Foreign _{t-1} | Dummy variable that takes on the value 1 if the firm is at least partially owned by private foreign individuals, companies or organizations, 0 otherwise. | WBES(b2b) |
| Subsidiary _{t-1} | Dummy variable that takes on the value 1 if the firm is part of a large firm, 0 otherwise. | WBES(a7) |
| Public _{t-1} | Legal status of the firm is shareholding company with traded shares. | WBES(b1) |
| Exporter _{t-1} | Dummy variable that takes on the value 1 if the firm exports, 0 otherwise. | WBES(d3a) |
| Finance obstacle _{t-1} | Categorical variable, used to measure “how much of an obstacle: access to finance?” | WBES(k30) |
| C. Country Characteristics | | |
| COVID policy stringency _t | A composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest). | Oxford COVID-19 Government Response Tracker |
| COVID spread _t | Cumulative confirmed COVID-19 cases per thousand persons. | Center for Systems Science and Engineering at Johns Hopkins University |

| Variable | Definition | Source |
|---|---|----------------------------|
| Ln (GDP per capita) _{t-1} | The logarithm GDP of per capita (constant 2010 US\$). | WDI |
| Age65 _{t-1} | Percentage of population aged above 65 among the total population of an economy. | WDI |
| Individualism _{t-1} | National Culture Indicator of the degree to which individuals are supposed to look after themselves or remain integrated into groups, usually around the family. | Hofstede Insights |
| Uncertainty avoidance _{t-1} | National culture indicator that expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. | Hofstede Insights |
| Long-term orientation _{t-1} | National culture indicator that expresses how every society has to maintain some links with its own past while dealing with the challenges of the present and future. | Hofstede Insights |
| Control of corruption _{t-1} | Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. | World Governance Indicator |
| Government effectiveness _{t-1} | Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. | World Governance Indicator |
| Political stability _{t-1} | Political stability measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. | World Governance Indicator |
| Regulatory quality _{t-1} | Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. | World Governance Indicator |
| Rule of law _{t-1} | Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. | World Governance Indicator |
| Voice and accountability _{t-1} | Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. | World Governance Indicator |
| Average WGI index _{t-1} | A proxy of a country's overall governance quality, defined as the average of the six country governance indexes. | Authors' own construct |