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Abstract

This study examines how firms have made strategic choices and performed during the COVID-19 pandemic. Drawing on the organizational resources and strategic change literature, it uses World Bank Enterprise Surveys and the COVID-19 Follow-up Enterprise Surveys to examine how different endowments in organizational resources affected firm performance as measured by their survival status and sales growth, and how these resources interact with and affect strategic responses in the supply of inputs, response to changing demand, liquidity management, and innovation. The results indicate that larger firms, firms with foreign or state ownership, and subsidiary companies performed better during the pandemic by more effectively stabilizing supply, managing liquidity, and fostering new product development. Chief executive officers with longer tenure improved survival rates. Firms in richer countries have coped with the pandemic better and stringent government COVID-19 control policies have tended to hurt firms' performance.

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1. Introduction

The COVID-19 pandemic has evolved into a defining event that shaped every aspect of our lives, including whether firms stay alive and how they perform. The pandemic has led to large global variations in terms of government COVID-19 policy stringency and COVID-19 spread severity (Fang et al. 2021). The existential threat of the pandemic has resulted in unprecedented uncertainties for firms: what would be the demand for their products in the near future? Would their input supply be steady? Would banks continue to provide loans? Such uncertainties inevitably force every firm to employ whatever resources it has to meet the challenge.

The literature on the impact of the pandemic on firms has focused on the adverse effects of the pandemic on firm performance. Whether based on single-country studies on the United States and other countries,[1] or the emerging literature examining the impact on developing countries, studies invariably and unsurprisingly find adverse and significant effects of the pandemic on firm survival and growth (Chundakkadan, Raj, and Sasidharan 2020, Liu, Wei, and Xu, 2021; Liu et al. 2021). Furthermore, favorable organizational resources as captured by state ownership and parent-company affiliation tend to help firms in developing countries survive better and grow more strongly during the pandemic, and firm performance during the pandemic is further affected by pandemic containment policies and a country's culture and governance (Liu et al. 2021).

Yet despite this emerging literature, on a *worldwide* basis, much remains unknown. We remain ignorant about the mechanisms through which the pandemic has affected firms. There are many ways firms could be conceivably affected. The pandemic caused a large drop in demand: it resulted in a decline in income and rise in unemployment, all of which drastically reduced demand. The pandemic also drastically disrupts the supply of inputs: various policies that restrict domestic and international mobility, as well as financial difficulties facing firms, would surely disrupt both imports and domestic supplies. The pandemic also severely hampers the working of critical market-supporting institutions such as banks and other financial intermediaries, which play critical roles in maintaining economic prosperity (Levine 1997). The role of financial intermediations would play an even more critical role at the time of crisis, when otherwise healthy firms face risks

[1] For studies on U.S. firms, see 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). For other single-country studies of the impact of the pandemic on firms, see Carletti et al. (2020) and Gu et al. (2020) on Italian and Chinese private firms.

of bankruptcy without access to finance.

In this paper, we examine how access to organizational resources and the pandemic control policy affects the underlying mechanisms behind firm performance, and the explanatory power of the mechanisms for firm performance during the pandemic. We ask, what resources, such as size, ownership, or CEO's tenure, help firms survive and grow? What strategies did a firm choose that affect its survival and growth around the world? Is it the choice of stabilizing demand? Is it securing input supply? Or is it the effort to reduce uncertainties in finance? We also examine how the impact of the pandemic differs as the pandemic moves along, as captured by two different post-pandemic surveys for the same set of firms. We also pay attention to how economic development level and COVID-19-related policies affect firm performance.

The rest of the paper is organized as follows. We develop our hypotheses in Section 2. Section 3 introduces the data and variables in the study. Section 4 presents our empirical results. We discuss our findings and conclude in Section 5.

2. Hypotheses

2.1. Strategic Choices and Performance during COVID-19

The existential threat of the pandemic has resulted in unprecedented uncertainties for firms. The strategies that firms would adopt to confront such challenges become matters of life and death. The drop in income and the rise in unemployment during the pandemic drastically reduce demand. Firms then have to utilize whatever resources are at their disposal to stabilize the demand for their products. The pandemic also drastically disrupts the supply of inputs. Various policies have been adopted to restrict domestic and international mobility, and financial access has also become more difficult. The factors would surely disrupt both imports and domestic supplies, and firms have to use their resources to restore and stabilize their input supplies. The pandemic also severely hampers the working of critical market-supporting institutions such as banks and other financial intermediaries, which play critical roles in maintaining economic prosperity (Levine 1997), especially at the time of crises when otherwise healthy firms face risks of bankruptcy without adequate access to finance. Firms could then utilize their resources such as firm networks or

relationships to banks to reduce liquidity issues. The strategic choices by firms to stabilize demand, input supply, and liquidity access should facilitate firm performance. We thus expect:

Hypothesis 1. Firm performance during the COVID-19 pandemic would be boosted by firm strategies to stabilize demand, input supply, and liquidity.

2.2. How Organizational Resources Affect Strategic Change during COVID-19

Facing unprecedented uncertainty during the pandemic, firms' organizational resources have strong implications on how they are affected by the pandemic. According to the resource-based view, firms fundamentally differ by their unique, un-imitable resources and capacities (Barney, Wright, and Ketchen 2001: 643).[2] Such resources (or capacity) differences could stem from imperfections in markets for production factors, and path-dependent, firm-specific history in learning and asset accumulation (Barney 1991; Ghemawat 1991, Dierickx & Cool 1989).

To consider the impact of firm resources on firm performance during turbulent times, we follow the framework of Kraatz and Zajac (2001), which summarizes various theoretical perspectives on how organizational resources would affect how organizations deal with demand changes and subsequently organizational performance. Here we rely on their framework to frame our hypotheses on how organizational resources might, under different theories, affect firm performance and strategic choices during the pandemic.

The first perspective on firm resources could be termed "resources as barriers to learning" (Kraatz and Zajac 2001). According to this theory, firm-specific competencies and capacities could become competency traps, framing the firms to focus on what they are good at, at the expense of explorations and innovations (Levitt & March 1988; Levinthal & March 1993; Leonard-Barton 1992). Furthermore, at times of drastic changes, firms could suffer dynamic inefficiency due to reliance on the pre-change ways of doing things (Ghemawat and Costa 1993). Under this perspective, organizational resources—at least some particular ones--could lead to fewer strategic changes, which would ultimately hurt performance. Furthermore, since the lack of learning would result in dynamic inefficiency, this view implies that the differences in firm performance for those with organizational resources would become more disadvantaged over time. Since there is no strong reason why the effects of strategic changes would hinge on the extent of organizational

[2] See Scott (2014: 37-38) for a summary of the resource-based view.

resources, this view does not imply that organizational resources will moderate the effect of strategic changes on firm performance during the pandemic.

Hypothesis 2a of resources hindering learning. Firms rich in organizational resources would adopt fewer strategic changes and have worse performance during the pandemic; this performance disadvantage would become more pronounced over the course of the pandemic; and such resources do not moderate the effect of strategic changes on firm performance during the pandemic.

The second perspective is what Kraatz and Zajac (2001) termed "resources as environmental buffers." By this view, facing drastic environmental changes, organizations endowed with strong resources may be extra protected, leading to passive adaptation and strategic adjustments (Cyert & March 1963). Similar to economists' notion of soft budget constraint (Kornai 1980), strong resources allowed the organizations better chance of survival, which may induce shirking. By this view, resource-rich organizations are less likely to adopt strategic changes at times of environmental changes, and would have worse performance. Different from the view of organization as a barrier to learning, this environmental-buffer view does not imply changes in performance over the course of the pandemic—presumably shirking would roughly stay constant. Similar to the previous view, this view does not have implications on how organizational resources would matter for the effects of strategic changes on performance. We thus expect no moderating effects of resources on the effects of strategic changes on organizational performance.

Hypothesis 2b of resources as environmental buffers. Similar to H2a, firms with more organizational resources would adopt fewer strategic changes and have poorer performance during the pandemic; different from H2a, their performance differences associated with organizational resources do not change over the course of the pandemic; and similar to H2a, such resources do not moderate the effect of strategic changes on firm performance during the pandemic.

The third perspective is what Kraatz and Zajac (2001) coined as "resources as commitments." According to this view, organizational resources can be best thought as organizational commitments. In the process of building firm capacity and shaped by history, firms may have strong commitments to specific goals, organizational routines, structures, and ethical guidelines. A pioneer in this view is Selznick (1957), which put the concept of distinctive

competence and thus the idea of commitment at the center of his theory. He argues that great organizations would make commitments to ensure the persistence of the distinctive competency and would bind its range of strategic options. Such organizations then have stable and often inflexible structures.[3] Resource-rich firms thus would have fewer strategic changes, which tend to hurt short-term performance. Because of the underlying competencies and commitment, the non-adoption of strategic changes should have less negative effect on organizational performance, especially for the long run because the organizations could avoid "opportunistic adaptations" (Selznick 1957) and safeguard its organizational competence and identity (Hannan & Freeman 1984). From this perspective, resource-rich organizations are less likely to have strategic changes, and resources would negatively moderate the effects of strategic changes on subsequent performance. This is the key difference of this view with the other two views: the negative moderating effects of resources on the effects of strategic changes on subsequent performance.

Hypothesis 2c of resources as commitments. Like H2a-b, organizational resources would be negatively associated with strategic changes and hurt performance during the pandemic; and such resources *negatively* moderate the effect of strategic changes on firm performance during the pandemic.

The fourth perspective is “resources as facilitators” (Kraatz & Zajac 2001). Representing this line of thinking, Schumpter (1942), Penrose (1959), and Nelson and Winter (1982) view historical competence not as an impediment to strategic changes. Instead, they view it as actively promoting strategic changes and enhancing the effects of such changes on organizational performance. Schumpeter (1942), for instance, views competent organizations as better able to innovate during "creative destructions." Penrose (1959) views firms as always having untapped distinctive resources such as under-used knowledge, management talents and physical assets, and their usages as the sources of firm expansion and growth. Nelson and Winter (1982) view resource-rich firms as having accumulated more useful routines that allow them to better adapt to changes.[4] By this view, organizational resources lead to more strategic changes and would *positively* moderate the effect of strategic change on subsequent performance. This positive moderating effect is a distinctive prediction of this view.

[3] See also Ghemawat (1991, p. 14).
[4] Other authors with a similar view include Bowman and Hurry (1993) and Cohen and Levinthal (1990).

Hypothesis 2d of resources as facilitators. Different from H2a-c, organizational resources would be positively associated with strategic changes and firm performance during the pandemic; and such resources *positively* moderate the effect of strategic changes on firm performance during the pandemic.

Different from Kraatz and Zajac (2001), we propose the final perspective, resources as a commitment-constrained facilitator, which views resources as heterogeneous and represent a mixture of commitments and facilitators. Economists have emphasized that firms (and countries) often face a bottleneck in their value-adding process, with some critical ingredients explaining the success or failure of the whole enterprise. Think of the O-ring failure in explaining the failure of the Challenger launch: the failure of a single part among tens of thousands of parts in extremely cold weather resulted in the failure of the whole Challenger launch. It is thus conceivable that some resources could be especially important during the turbulent pandemic.

Resource-richer firms do have stronger commitment to firm-specific routines, values, and other assets. For those resources not focusing on learning and adaptations, the predictions of "resource as commitment" still applies, that is, with adherence and respect for pre-existing routines and capacities, resource-rich firms should have less strategic changes. Furthermore, commitments to past values and practices—when such commitments are not adaptations and learning per se--does imply constraints and partial adjustments, as implied by "resource as commitment" perspective, which suggests that strategic changes have less effects on firm performance during the pandemic—that is, resources negatively moderate the effects of strategic changes on firm performance.

However, *some* routines, values, and culture could be a commitment to adaptation and learning, as in "resources as facilitators." From this perspective, firms rich in *some* resources could adopt *more* strategic changes, in contrast to the perspective of “resources as commitment” in Kraatz and Zajac (2001), which implies less strategic changes in such firms. Again, when commitment for some resources is about encouraging adaptations and learning, then firms rich in *these* resources could positively moderate the effects of strategic changes on firm performance.

Hypothesis 2e of heterogeneous resources. The importance of various firm-specific resources could differ dramatically during the pandemic; firms rich in resources *not* focusing on

adaptation and learning would adopt fewer strategic changes, and such resources *negatively* moderate the effect of strategic changes on firm performance during the pandemic; firms rich in adaptation and learning resources would adopt more strategic changes, and such resources *positively* moderate the effects of strategic changes on firm performance during the pandemic.

Firm leadership also matters for pandemic performance and strategies. The sociological literature on leadership as pioneered by Selznick has emphasized the importance of institutionalization shaped by organizational leaders (Selznick 1957: 16-17; Knudsen 1995). Firm leaders have their specific visions of how firms should behave, and they would put into the organizations their unique culture and organizational routines (Nelson and Winter 1982; Scott 2014: 36-37) and commit to such "institutionalizations." Such organizational structure and commitment, on the one hand, makes the firm unique and move to tap into its potential of excellence, and on the other hand, also makes the firm less adaptable to drastic changes. Since such unique firm-specific commitments tend to be stronger for firms with CEOs of longer within-firm experience, we expect such firms to be less adaptable to the pandemic in the short run. We thus expect:

Hypothesis 3 on CEO experience. Firms led by CEOs with longer tenure are less adaptive to the pandemic.

2.3. Country-Level Effects

Besides firm-specific organizational resources, the country-level business environment also matters greatly. Firms in countries with a larger market (as proxied by GDP per capita) face fewer input and demand problems due to the lack of reliance on international trade, which has been more drastically disrupted by the pandemic (Peng et al. 2021). Firms in countries with stringent COVID-19 policy face stronger disruptions in production, transportation, input supply, and access to finance, and they thus should face more demand, input supply, and liquidity issues.

Hypothesis 4 on country characteristics. Firms in countries with higher GDP per capita and less stringent COVID-19 policies should face less difficulties in demand, supply, and liquidity.

3. Data

3.1 The Sample

The sources of firm-level data we employed are the World Bank Enterprise Surveys (WBES) and the COVID-19 Follow-up Enterprise Surveys, both conducted by the World Bank. WBES offers an expansive array of economic data on 171,000 firms in 148 countries, and the data has been widely used in economics, finance, international business, and management research. Since the outbreak of COVID-19 pandemic, to measure the pandemic's impact on the firms, the Follow-up Enterprise Surveys re-interviews those firms that had been interviewed in WBES in selected countries. The follow-up surveys contain 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. We combine the WBES data with COVID-19 Follow-up Enterprise Surveys data. The former provides us with the pre-determined firm characteristics which are employed as independent or control variables; the latter provides seven indicators measuring firm responses during the pandemic.

By April 2021, the Follow-up Enterprise Survey has been implemented in 41 countries, and firms in 26 countries out of them have been re-contacted in the second round. The relevant WBES of these 41 countries have been posted in different years during 2016-2019. We choose to use the data of the latest survey, which means that for firms having been interviewed in two rounds, we only keep the second-round survey data and for firms that have only one round survey, we just use the data. The reason is that the COVID-19 pandemic is still ongoing, and the surveys add a few new interview questions over time, thus using the latest survey could help to examine the impact of COVID-19 more accurately. We also use the first-round survey to check the robustness and compare the results with the results of the second-round survey to explore the dynamic of firm responses during COVID-19.

We further collect country-level data from various sources. GDP per capita is from the World Development Indicators database (WDI). The stringency of government policy to contain COVID-19 is from 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. For each round of the survey in the country, we gather government policy stringency data a day before the day that the survey was started. The final sample used in this study includes 16,038 firm-observations from 41 countries.

3.2. Variables

3.2.1. Firm Performance and Channel Variables

Firm performance during the COVID-19 pandemic is captured by two variables: firm closure and growth rate. Firm closure, *Survival,* is a dummy variable that equals one for firms that had not temporarily or permanently closed and zero otherwise. Firm growth is measured by the changes in monthly sales between the latest month (survey month) and the same month a year ago, denoted as *Sales growth*.

We rely on four variables to gauge strategic responses for explaining firm performance during COVID-19. They are four channels through which firms implement their strategies: stable demand, stable input supply, stable liquidity, and innovation. We use them as dependent variables to see how firm organizational resources and national characteristics affect strategic adjustments by firms, and how such adjustments explain firm performance. Specifically, *Stable demand* is a dummy variable that equals one for firms that had not experienced decreased demand for production or service compared to a year ago and zero otherwise. *Stable input* is a dummy variable that equals one for firms that had not experienced decreased supply of inputs compared to a year ago and zero otherwise. *Stable liquidity* is a dummy variable that equals one for firms that had not experienced decreased liquidity or cash flow availability since the COVID-19 began and zero otherwise. *New products* is a dummy variable that equals one for firms that have introduced new production or service in response to the COVID-19 and zero otherwise. The original question corresponding to *New Products* has been added into the questionnaire since November 19, 2020, thus it is available mostly in second-round surveys. Since the pandemic tends to reduce product demand, disrupt input supply, and reduce liquidity access, firms' stability in demand, input supply, and liquidity represents positive and vigorous strategic changes to keep them prosperous at turbulent times. Introducing new products during the pandemic also clearly represents proactive

strategic changes.

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 include firm size, firm age, three ownership variables, manager's experiences and labor productivity. All these firm-level variables are obtained from the standard WBES implemented before the outbreak of the COVID-19 pandemic.

The indicator for small firms, *Sizable*, is a dummy variable indicating a firm's number of permanent employees being more than 20. Firm age, *Log Age*, is the natural logarithm of firm age plus one. Ownership and group affiliation are measured in three ways. (1) State ownership, *SOEs*, is a dummy variable that equals one for firms with government/state ownership, and zero otherwise. (2) Foreign ownership, *Foreign*, is a dummy variable that equals one for firms with foreign ownership, and zero otherwise. (3) Subsidiary status, *Subsidiary,* is a dummy variable that equals one if a firm is a subsidiary of another firm, and zero otherwise. Manager's experience, *Log Experience*, is the natural logarithm of a manager's years of experience by 2020. Labor productivity, *Log LP*, is the Log natural logarithm of LP which equals to sales over the number of employees. Employees include both permanent workers (with a weight of one) and temporary workers (with a weight of 0.5).

3.2.3. Country Characteristics

We use two country-level variables. The first is a country's economic development proxied by *Log GDPPC*, which is the natural logarithm of GDP per capita in constant 2010 US dollars. The second is the index of government COVID policy stringency (*Policy stringency*), which 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 original stringency index ranges from 0 to 100, with 100 indicating the strictest policy. To make the coefficients more readable, we divide it by 100. Definitions and sources of all variables are in Table 1.

3.3. Summary Statistics

The descriptive statistics of firm survival and growth are reported in Table 2. Among the sample firms, 55.2% had stayed open and had never been temporarily or permanently closed since the start of the pandemic. Compared with the same month (survey month) a year earlier, the firms, on average, experienced 24.1 percentage points decline in revenues. Firm survival and growth rates vary vastly among firms, as demonstrated by their standard deviations that are quite large. Compared to a year ago, there are 40.9% of firms that had been maintained stable demand for production or service, and 47% firms had maintained stable supply of inputs. Since COVID-19 began, 29% of firms had been able to maintain stable liquidity or cash flow availability, and 20.4% of firms introduced new production or service.

In the sample, slightly more than half (i.e., 52.3%) are sizable firms, 10.1% are foreign-owned firms, 1.5% are state-owned firms, and 14.4% of the firms are affiliated to a parent company. The average *Policy Stringency* is 0.627, and the minimum and maximum values are 0.08 and 0.84, respectively, suggesting that it varies markedly across our sample countries.

Table 3 reports the Pearson correlation matrix for all our key variables. Consistent with our expectation, *Stable demand* and *Stable input* are positively correlated, while both are positively correlated with *Survival* and firm *Sales growth*. Similarly, *Stable liquidity* correlates positively with firm survival and firm growth. *New Product* is not significantly correlated with *Survival*, but is significantly correlated with *Sales growth*. We also find that firms with stable input supply and liquidity are more likely to introduce new products and services.

4. Results

4.1. Empirical Specifications

To explain firm performance during the pandemic, we consider several strategic changes: *Stable demand, Stable input, Stable liquidity,* and *New product*. As discussed earlier, during the turbulent pandemic, the normal is deterioration in demand, input, and liquidity, and the capacity to make these aspects stable represents firms' vigorous strategic efforts. Similarly, during the times of crises, innovations are perhaps the most proactive moves that firms could make.

We thus estimate the following three equations to investigate the determinants of firm performance, of firms' changing circumstances and innovation strategy, and to what extent the changing circumstances and strategy affect firm performance.

$$Y_{cki} = \alpha_1 X_{ci} + \beta_1 Z_c + v_{1k} + \epsilon_{1ci} \quad (1),$$

$$S_{ci} = \alpha_2 X_{ci} + \beta_2 Z_c + v_{2k} + \epsilon_{2ci} \quad (2),$$

$$Y_{ci} = \alpha_3 X_{ci} + \beta_3 Z_c + \delta S_{ci} + v_{3k} + \epsilon_{3ci} \quad (3),$$

Whereas *c*, *k,* and *i* represent country, industry, and firm. *Y* is firm performance, including *Survival*, and revenue growth, respectively. *S* represents firms' strategic choices. In particular, *S* includes *Stable demand, Stable input, Stable liquidity,* and *New product*. *X* is firm-level variables, including indicators of firm organizational resources, which include *Sizable, Foreign, SOE, Subsidiary*; an indicator of firm leadership, *Log experience*; and other controls, such as log firm age. Since the COVID-19 firm surveys were conducted in two waves, we also control for a 2nd-wave dummy to control for the general trend. *Z* represents country-level characteristics, which include the level of GDP per capita (in the log) and *Policy stringency*. Equation (3) aims to show, after conditioning on firm situations and strategy, how basic firm and country characteristics contribute to firm performance. It also shows whether and how firm strategies contribute to its fortunes.

4.2 Baseline Results

Table 4 reports the baseline results, with the first two columns on firm performance, the next four columns on firms' strategic responses, and the last two columns the combined version for firm performance.

During the pandemic, sizable firms (i.e., those with 20+ employees) have a higher probability of survival by 8.9 percentage points and lower sales growth by 6.8 percentage points. Their pandemic fortune is clearly partly explained by their strategic responses relative to those of small firms: they are 7.5 percentage points more likely to report stable output demand, 4.6 percentage points more to report stable input supply, and 7.3 percentage points more to report stable liquidity. For expositional convenience, we call the above differentials total differentials. They are also more likely to innovate during the pandemic by 6.1 percentage points. Even after conditioning on firms' strategic responses, sizable firms still have a significantly higher probability of survival by 6.8 percentage points (or 76% of the total differential) and higher revenue growth by 3.4 percentage points (or half of the total differential). These mechanisms combined thus explain about ¼ to ½ of the total small-firm differentials (relative to those of non-small firms) in firm survival and growth.

During the pandemic, foreign-owned firms fare better. Relative to domestic firms, they have a higher probability of survival by 3.3 percentage points and higher revenue growth by 2.3 percentage points. From the strategic response equations, they are significantly more likely to achieve stability in demand, input supply, and liquidity. After controlling the four indicators of strategic responses, foreign-owned firms no longer have a performance advantage during the pandemic. Thus, the total advantage of foreign-owned firms during the pandemic can be *fully* explained by their strategic responses.

The state-owned enterprises (SOEs) did better during the pandemic, as manifested by an advantage in revenue growth of 6.8 percentage points (relative to non-SOEs). They are also significantly more likely to maintain stability in output demand, input supply, and liquidity. After controlling the strategic responses, the SOE advantage in revenue growth becomes statistically insignificant. Here, the strategic choices completely explain the total performance advantage of SOEs during the pandemic.

During the pandemic, firms with parent companies do better. They had higher probability of survival by 3.5 percentage points and higher sales growth by 1.4 percentage points (insignificant). Interestingly, their strategic responses are quite different from those of SOEs and foreign-owned firms. They do not have better prospects for stability in demand or input supply. Instead, they have better liquidity, perhaps due to help from parent companies. They are also more

likely to adopt innovation strategy, perhaps due to beneficial technology spillover from other affiliates and the parent company. After controlling the strategic responses, parent-owned firms no longer have a significant performance advantage.

In contrast, the total differentials by firms with experienced CEOs could not be explained by the strategic responses. Firms with more experienced CEOS have a higher probability of survival and no significant difference in growth. Neither do they have significant differences in stability in demand, input supply, or liquidity, and they are less likely to adopt the innovation strategy. After conditioning on the strategic choices, the differentials barely change. Thus, whatever differences caused by experienced CEOs are not due to the differences in demand and/or supply or liquidity, but due to their innovation strategies and other things that we do not measure.

Firms in countries with higher GDP per capita are associated with higher firm survival and faster firm growth. Part of the advantages are due to the stabilizing aspects that allow firms to strategize predictably in richer economies: they face stronger stability in output demand, input supply, and liquidity, indicating the advantages in the market system and the financial system. Judging from the ratio of the coefficients, we see that the channels explain around 20% and half of the total survival and revenue growth differentials.

Firms in countries with more stringent COVID-19 containment policies have a lower probability of survival and lower sales growth. They also face lower stability in output demand, input supply, and liquidity access. Once conditioning on the strategic choices, the direct effects (i.e., the remaining effects conditioning on the strategic response effects) still account for 87% and 41% of the total survival and revenue growth differentials. The strategic choices thus account for 13% and 59% of the total survival and the revenue growth differentials.

In the last two columns, the four strategic response variables are all important and significant in explaining either survival or revenue growth, or both. This supports hypothesis 1. The portion of variations in *Survival* being explained, by adding the strategy variables, increases from 0.153 to 0.206; and that for revenue growth, from 0.146 to 0.497. Strategic responses thus are critically important in explaining firm performance during the pandemic.

4.3. The Role of Firm Heterogeneity

A concern is that our interpretation of the effects of organizational resources may simply reflect the failure to control for omitted firm heterogeneity. For instance, omitted firm capacity could be correlated with both firm organizational resources and contemporaneous firm performance. To allow this possibility, we use the same specifications as Table 4 and add further control of lagged labor productivity, a reasonable proxy of firm past capacity, and see if our conclusions on the link between organizational resources and firm performance, as well as the role of the channels, remain valid. The results are reported in Table A1 in the appendix.

Based on columns (1) to (3), the link between organizational resources and firm performance remains qualitatively identical, and the magnitudes change only slightly. Not surprisingly, more productive firms (in the past) have better survival chance and higher firm growth. The little changes in magnitudes are shown by the coefficient of SOEs for revenue growth, from 0.068 in Table 4 to 0.076 here. The extent of change is similarly small for parent-company affiliation, the indicator for sizable firms, or country-level GDP per capita and COVID-19 policy stringency. Omitted variables on capacity thus cannot be the reason for the link between firm performance and organizational resource and/or country-level income and policy stringency. Essentially the same can be said about the link between the strategic responses and our key explanatory variables and about the link between the strategic responses and firm performance. To summarize, our key conclusions in Table 4 are not due to omitting firm heterogeneity (as proxied by lagged productivity).

4.4. Explanatory Power of Channels on Firm Performance

To further shed light on how the strategic responses contribute to firm performance differentials, we consider how much their variations can be further explained by adding the strategic responses one at a time. Table 5 reports the adjusted R-squared for several specifications: first, only basic controls without the strategic response variables; then add one of the four strategy variables one at a time.

In terms of the increases in the portion of variations being explained for firm survival and firm growth, the order of importance of explanatory power seems to be stable output demand, followed roughly by stable input supply and stable liquidity, with the importance of innovation trailing behind. Stabilizing product demand thus appears to be especially important, followed by stabilizing critical inputs, with innovations playing some role.

4.5. The Changing Impacts of the First and the Second Waves

Do the impacts of organizational and national resources and national policies change as the pandemic deepens? To see this, we estimate our specification using the full sample, but interact the second-wave dummy with our key variables. The timing of the two waves varies from country to country.[5] Since the data in the first wave did not have information on firm innovation, we drop the innovation strategy as a potential channel in this sub-section. The results are contained in Table 6.

As the pandemic proceeds from the 1st to the 2nd wave, the sizable-firms' advantage in performance does not change, but their advantage in stabilizing product demand almost double, indicating their stronger capacity to find new sources of demand, the most important element behind firms' pandemic performance. Foreign firms and SOEs do not exhibit differences in either performance or strategies during the two waves. Subsidiaries' advantage in survival dropped from being positive to roughly zero, indicating declining help that parent companies are able to offer as the pandemic deepens. Interestingly, firms headed by CEOs with more within-firm CEO tenure have an advantage in survival, but the advantage declined by roughly half, but these firms have their advantage in input access increased, indicating that a key advantage for being affiliated with parent companies could be sourcing inputs. Firms headed by more seasoned CEOs thus proved to be declining in advantage in survival, but maintains a strong advantage in sourcing inputs.

At the country level, COVID-19 policy stringency exerts *less* negative effect on firm growth as time goes by, as shown by the positive and significant coefficients of this variable on

[5] The first wave was between May 2020 and November 2020, and the second wave was from October 2020 to June 2021. The time gap between the two rounds for sample firms ranges from 2 to 8 months, with an average of 5.7 months.

firm revenue growth. We find little difference in the effect of policy stringency on firm strategic responses. The overall gist is that firms become increasingly adaptable to COVID-19 policy stringency. The income level of a country becomes increasingly positively associated with firm survival, indicating stronger resilience of richer countries in helping their firms to survive.

4.6. How Resources Moderate the Effects of Strategic Choices on Firm Performance

We now allow resources indicators to moderate the effects of firms' strategic choices on performance. The results are in Table 7.

Size negatively moderates the effects of strategic choices on firm performance, as indicated by the negative interaction coefficients between *Sizable* and *Stable liquidity* for firm survival and between *Sizable* and *Stable demand* for firm revenue growth. Similarly, foreign ownership negatively moderates the effects of strategic choices on firm performance, as indicated by its negative interaction term with *Stable input*.

Affiliation with the state (i.e., state ownership) negatively moderates the effect of *Stable liquidity* on firm growth. This is similar to the patterns for firm size and for foreign ownership. There is an interesting difference: state ownership positively moderates the effect of *Stable demand* on firm growth. A similar pattern is found for being a subsidiary, which negatively moderates the effect of *Stable input* on firm survival and firm growth, but positively moderates the effect of *Stable demand* on firm survival and firm growth. Also similarly, CEO tenure negatively moderates *Stable input* for firm growth, but positively moderates the effect of *Stable demand* for firm growth. Furthermore, it positively moderates the effect of *New Product* on firm survival. There thus seems to be binding constraints for increasing demand for SOEs, subsidiaries, and firms with a long history of the incumbent CEO, and strategies that stabilize demand for them have a higher payoff for firm performance during the pandemic. Combining our earlier finding that firms with a long history for the incumbent CEO have lower *New Product*, but such history positively moderates the effects of *New Product* on firm survival, our interpretation is that such firms tend to be less innovative, but once they do innovate, the payoff is higher.

5. Discussion and Conclusion

5.1. Discussion

We now discuss how our findings match our hypotheses and the various theories of resources. We have found that most resource-rich firms (i.e., sizable firms, SOEs, foreign firms) have more stable demand, input supply, and liquidity access during the pandemic. Relative to non-affiliated firms, group-affiliated firms do not have more stable demand or input supply, but they do have better liquidity access. Interestingly, while other types of resource-rich firms do not differ in their innovations during the pandemic by ownership, sizable firms and group-affiliated firms innovate more. These findings are partly consistent with resources as in the facilitator hypothesis (H2d) and the heterogeneous resource hypothesis (H2e) since most resource-rich firms have more strategic changes. But the match with the heterogeneous resources hypothesis is best since the patterns of strategic responses differ by resources. For instance, innovation responses are only observed for sizable firms and for group-affiliated firms, but not for SOEs and foreign firms.

We have also found that the importance of strategic responses differs greatly among various types of resources**.** Strategic responses explain ¼ to ½ of the total performance differentials for sizable firms, but the full performance differentials for foreign firms, SOEs, and subsidiaries, and yet almost nothing for firms with seasoned incumbent CEOs. Again, the gist of the findings is largely consistent with the heterogeneous resource hypothesis, but not with other hypotheses. Furthermore, in explaining the variations in firm performance during the pandemic, the order of importance of explanatory power seems to be stabilizing output demand, followed roughly by stable input supply and stable liquidity, with the importance of innovation trailing behind.

We have found that firms with seasoned incumbent CEOs have better survival but not a difference in growth and do not differ in strategic choices in general except having fewer innovations. This is consistent with hypothesis 3 that such firms could be too wedded to their history and less adaptable to turbulence.

We also find that country resources and policies matter greatly. Firms in countries with a larger market (as proxied by GDP per capita) and less stringent COVID-19 policy have more stable

demand, input supply, and liquidity. This is consistent with hypothesis 4 on the importance of effective size of domestic market for firms in the pandemic world.

We find substantial variations in various resources' dynamic property over the course of the pandemic. As the pandemic proceeds over time, the sizable-firms' advantage in performance does not change, but their advantage in stabilizing product demand doubles, indicating their stronger capacity to source new demand, the key constraint facing firms during the pandemic. While foreign firms and SOEs do not exhibit differences in either performance or strategies during the two waves, subsidiaries' advantage in survival dropped from being initially positive to completely disappear. Again, these findings are consistent with the heterogeneous resource hypothesis, but not with other hypotheses on resources.

Interestingly, firms headed by more seasoned incumbent CEOs have an initial but declining advantage in survival, but gain an advantage in input access, indicating advantage in network for the provision of key inputs.

In terms of country-level effect, our analysis indicates that, as time goes by, the pandemic and pandemic policies affect firms less and less, especially for firms in richer countries.

The evidence on moderating effects of resources suggests that resources moderate the effects of strategies on performance differently. Firm size negatively moderates the effects of strategic choices such as demand stabilization and obtaining liquidity on firm performance. Similarly, foreign ownership negatively moderates the effects of strategic choices on firm performance. So far, the evidence is inconsistent with the hypothesis of resources hindering learning (H2a) and the hypothesis of resources as an environmental buffer (H2b) and is consistent with the hypothesis of resources as commitment (H2c). State ownership, group affiliation, and incumbent CEO experience negatively moderate the effect of *strategic choice* on firm performance, but they *positively* moderate the effect of *stable demand* on firm performance. This piece of evidence, as well as earlier evidence in this paragraph, is consistent with the heterogeneous resource hypothesis but not with the other hypotheses. There thus seem to be binding constraints for increasing demand for SOEs and subsidiaries, and strategies that stabilize demand for them have a higher payoff for firm performance during the pandemic.

5.2. Concluding Remarks

Our exercise makes several contributions to the literature. We contribute to the literature on organizational resources and firm performance during the COVID-19 pandemic. The literature has found that firms affiliated with parent companies outperform those without such affiliations in India (Bansal et al. 2020), in Italy (Amore, Quarato and Pelucco 2021), and around the world (Liu et al. 2021). Firms with ownership connections to owners with favorable resources also tend to do better during the pandemic, as documented for hedge-fund ownership (Ding et al. 2021), state ownership and foreign ownership in China (Gu et al. 2020), and state and foreign ownership around the world (Liu et al. 2021). Furthermore, firms of smaller sizes and, therefore, less access to resources are also more likely to shut down during the pandemic in China (Dai et al. 2021a, 2021b) or around the world (Liu et al. 2021). We contribute to this literature in examining the impact of organization resources around the world, allowing the pandemic effects to depend on the stage of the pandemic, and examining how the pandemic affects work through firm strategies. The advantages of different resources are shown to vary over time. We also examine the explanatory power of these strategies in explaining firm performance and find the channels to be overwhelmingly important. Relatedly, we also offer evidence that a more extended leadership history seems to hinder the adaptation of firms to the pandemic.

We also contribute to the literature on organizational resources, strategies, and performance. Kraatz and Zajac (2001) suggest four different theories of organizational resources: hindrance of learning, environmental buffer, commitment, and facilitators. We add to this literature by examining the validity of these theories of resources for firms at the time of the pandemic. We modify the theory in showing that a firm has heterogeneous resources, and no single theory can explain what we find on resources. Instead, some resources act as commitments, while others act as facilitators, and some resources are binding constraints and would play a larger role at the time of the pandemic.

We also contribute to the understanding of how COVID-19 containment policies affect firms around the world. The literature has found strong adverse effects of COVID-19 infection rates on stock returns (Bretscher et al. 2020; Bansal et al. 2020; Erdem, 2020) and a negative

relationship between strict social distancing policies and stock market returns (Ashraf 2020b).[6] Further work has documented lower firm survival and growth in countries with more stringent lockdown policies (Liu et al. 2021). We add by showing that firms in countries with stringent COVID-19 policy face more trouble in stabilizing demand, input supply and liquidity, and that countries become more resilient with respect to COVID-19 policy stringency over time.

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[6] This finding is contrary to Kaczmarek et al. (2020), who find that countries with high stringency policies outperform countries with weak stringency policies in terms of stock market returns.

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Table 1 Variables definition and sources

Variable	Definition	Sources
Survival $_{i, t}$	A dummy variable indicating the firm is currently open and have never temporarily closed since COVID-19 declared, value is missing if firm permanently closed during COVID-19.	COVID-19 Follow-up ES
Survival P $_{i, t}$	A dummy variable indicating the firm is currently open and have never temporarily closed since COVID-19 declared, value is 0 if firm permanently closed during COVID-19.	COVID-19 Follow-up ES
Sales growth $_{i, t}$	Growth of sales in monthly compared to one year ago, percentage/100. Winsorized at 1% level.	COVID-19 Follow-up ES
Output demand stable $_{i, t}$	A dummy variable indicating the firm have not experienced decreased demand for production or service compared to 1 year ago.	COVID-19 Follow-up ES
Input supply stable $_{i, t}$	A dummy variable indicating the firm have not experienced decreased supply of inputs compared to 1 year ago.	COVID-19 Follow-up ES
Liquidity stable $_{i, t}$	A dummy variable indicating the firm have not experienced decreased liquidity or cash flow availability since COVID-19 began.	COVID-19 Follow-up ES
New products $_{i, t}$	A dummy variable indicating the firm introduced new production or service in responses to COVID-19, mostly interviewed in second-round surveys.	COVID-19 Follow-up ES
2nd Round $_{i, t}$	A dummy variable equaling to 0 for the first-round survey observations and 1 for the second-round.	COVID-19 Follow-up ES
Non-small $_{i, t-1}$	A dummy variable indicating medium and large firm which permanent employees is above or equals to 20.	Standard WBES
Log Age $_{i, t-1}$	Log form of firm age by 2020.	Standard WBES
Foreign $_{i, t-1}$	A dummy variable indicating firm's share of ownership by private foreign is above 0	Standard WBES
SOEs $_{i, t-1}$	A dummy variable indicating firm's share of ownership by government or state is above 0.	Standard WBES
Subsidiary $_{i, t-1}$	A dummy variable indicating the firm is part of a large firm.	Standard WBES
Resource score $_{i, t-1}$	The sum of Non-small, Foreign, SOE and Subsidiary	Standard WBES
Log Experience $_{i, t-1}$	Log form of manager's years of experience by 2020.	Standard WBES
Log LP $_{i, t-1}$	Log form of LP, LP equals to sales/ (Lperm+ 0.5* Ltemp). Lperm (Ltemp) is the number of permanent (temporary) employees.	Standard WBES
Log GDP per $_{c, t-1}$	Log form of GDP per capita in 2019.	WDI
Policy stringency $_{c, t}$	A composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 1 (1= strictest). At one day before the first day when the survey had been implemented in the country.	Oxford COVID-19 Government Response Tracker

Table 2 Summary statistics

Variable	Observation	Mean	SD	Min	Max
Survival $_{i, t}$	14,433	0.552	0.497	0	1
Survival P $_{i, t}$	14,808	0.538	0.499	0	1
Sales growth $_{i, t}$	13,483	-0.241	0.296	-1.000	0.400
Output demand stable $_{i, t}$	13,831	0.409	0.492	0	1
Input supply stable $_{i, t}$	13,905	0.470	0.499	0	1
Liquidity stable $_{i, t}$	14,119	0.286	0.452	0	1
New products $_{i, t}$	10,995	0.204	0.403	0	1
2nd Round $_{i, t}$	14,977	0.690	0.463	0	1
Non-small $_{i, t-1}$	14,977	0.523	0.500	0	1
Log Age $_{i, t-1}$	14,977	2.951	0.636	0.693	5.333
Foreign $_{i, t-1}$	14,977	0.101	0.301	0	1
SOEs $_{i, t-1}$	14,977	0.015	0.122	0	1
Subsidiary $_{i, t-1}$	14,977	0.144	0.351	0	1
Resource score $_{i, t-1}$	14,977	0.782	0.793	0	4
Log Experience $_{i, t-1}$	14,977	2.923	0.635	0.693	4.304
Log LP $_{i, t-1}$	13,331	12.648	2.493	4.173	23.105
Log GDP per $_{c, t-1}$	14,977	9.024	1.009	6.325	10.480
Policy stringency $_{c, t}$	14,977	0.627	0.152	0.083	0.843

Table 3 Pearson correlation matrix for key COVID-19 variables

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	Survival $_{i, t}$	1													
(2)	Sales growth $_{i, t}$	0.389*	1												
(3)	Output demand stable $_{i, t}$	0.275*	0.630*	1											
(4)	Input supply stable $_{i, t}$	0.284*	0.555*	0.668*	1										
(5)	Liquidity stable $_{i, t}$	0.309*	0.481*	0.524*	0.441*	1									
(6)	New products $_{i, t}$	-0.018	0.071*	0.057*	0.019	0.027*	1								
(7)	Non-small $_{i, t-1}$	0.127*	0.151*	0.100*	0.074*	0.112*	0.073*	1							
(8)	Log Age $_{i, t-1}$	0.079*	0.089*	0.039*	0.039*	0.042*	-0.009	0.182*	1						
(9)	Foreign $_{i, t-1}$	0.024*	0.021	0.020	0.014	0.027*	0.041*	0.180*	-0.0001	1					
(10)	SOEs $_{i, t-1}$	0.052*	0.049*	0.048*	0.032*	0.047*	0.009	0.087*	0.094*	0.024*	1				
(11)	Subsidiary $_{i, t-1}$	0.019	0.017	0.013	-0.005	0.018	0.057*	0.132*	0.101*	0.158*	0.045*	1			
(12)	Resource score $_{i, t-1}$	0.106*	0.118*	0.083*	0.054*	0.096*	0.088*	0.770*	0.174*	0.568*	0.238*	0.593*	1		
(13)	Log Experience $_{i, t-1}$	0.082*	0.070*	0.033*	0.056*	0.033*	-0.028*	0.089*	0.497*	-0.043*	-0.047*	0.048*	0.054*	1	
(14)	Log GDP per $_{c, t-1}$	0.225*	0.299*	0.174*	0.225*	0.202*	-0.079*	0.054*	0.066*	-0.098*	-0.043*	-0.087*	-0.048*	0.129*	1
(15)	Policy stringency $_{c, t}$	-0.185*	-0.058*	-0.053*	-0.074*	-0.021	-0.038*	-0.039*	-0.069*	-0.053*	-0.167*	-0.012	-0.076*	-0.051*	0.216*

Note: * represents statistical significance at the 1 percent levels. The observations of each variable vary.

Table 4 Baseline regressions

Dependent Variables	SurvivalP$_{i, t}$	Sales growth $_{i, t}$	Output demand stable $_{i, t}$	Input supply stable $_{i, t}$	Liquidity stable $_{i, t}$	New Products $_{i, t}$	Survival $_{i, t}$	Sales growth $_{i, t}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Non-small $_{i, t-1}$	0.089***	0.068***	0.075***	0.046***	0.073***	0.061***	0.068***	0.034***
	(0.012)	(0.007)	(0.011)	(0.011)	(0.010)	(0.010)	(0.013)	(0.005)
Age $_{i, t-1}$	0.014	0.009	-0.003	-0.006	0.015*	-0.016*	0.012	0.010**
	(0.010)	(0.006)	(0.010)	(0.009)	(0.009)	(0.008)	(0.011)	(0.005)
Foreign $_{i, t-1}$	0.033**	0.023**	0.025*	0.036**	0.056***	0.022	0.010	0.004
	(0.017)	(0.010)	(0.015)	(0.016)	(0.017)	(0.017)	(0.019)	(0.008)
SOEs $_{i, t-1}$	0.038	0.068***	0.151***	0.067*	0.086**	0.031	-0.020	0.022
	(0.034)	(0.020)	(0.045)	(0.040)	(0.036)	(0.058)	(0.047)	(0.024)
Subsidiary $_{i, t-1}$	0.035***	0.014	0.021	0.011	0.023*	0.029*	-0.004	0.010
	(0.013)	(0.009)	(0.013)	(0.015)	(0.013)	(0.017)	(0.014)	(0.006)
Log Experience $_{i, t-1}$	0.020**	-0.005	-0.005	0.012	0.005	-0.021**	0.026***	0.000
	(0.009)	(0.005)	(0.009)	(0.008)	(0.007)	(0.008)	(0.009)	(0.003)
2nd Round $_{i, t}$	0.010	0.019	-0.001	-0.009	-0.158***	-0.040*	0.014	0.016
	(0.031)	(0.016)	(0.023)	(0.030)	(0.022)	(0.024)	(0.041)	(0.012)
Log GDPper $_{c, t-1}$	0.118***	0.090***	0.093***	0.111***	0.112***	-0.003	0.097***	0.043***
	(0.018)	(0.007)	(0.012)	(0.012)	(0.009)	(0.013)	(0.022)	(0.007)
Policy stringency $_{c, t-1}$	-0.782***	-0.231***	-0.272***	-0.389***	-0.183***	0.056	-0.678***	-0.096***
	(0.078)	(0.037)	(0.057)	(0.059)	(0.054)	(0.073)	(0.100)	(0.035)
Output demand stable $_{i, t}$							0.057***	0.233***
							(0.017)	(0.010)
Input supply stable $_{i, t}$							0.089***	0.111***
							(0.019)	(0.010)
Liquidity stable $_{i, t}$							0.208***	0.093***
							(0.014)	(0.007)
New products $_{i, t}$							-0.007	0.032***
							(0.015)	(0.006)
Industry, Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,808	13,483	13,831	13,905	14,119	10,995	10,695	10,359
Adjusted R^2	0.153	0.146	0.056	0.079	0.082	0.039	0.206	0.497

Note: *, **, *** represent statistical significance at the 10, 5, and 1 percent levels. Heteroskedasticity-corrected standard errors clustered at the country-industry level in columns. The subscript i represents firm, j represents industry, c represents country, and t represents during the COVID-19 epidemic and t-1 represents a time before the COVID-19 outbreak. Year FEs labeled as Yes means that fixed effects of the year when implemented the lagged ES surveys (cover 2016-2019) are controlled for. The following tables are the same.

Table 5 Adjusted R^2 of different specifications having channel variables one by one

		Survival $_{i,t}$	Sales growth $_{i,\ t}$
		(1)	(2)
Basic controls	Observations	10695	10359
	Adjusted R^2	0.133	0.114
Basic controls + Output demand stable $_{i,\ t}$	Output demand stable $_{i,\ t}$	0.205***	0.346***
		(0.013)	(0.008)
	Observations	10695	10359
	Adjusted R^2	0.173	0.456
Basic controls + Input supply stable $_{i,t}$	Input supply stable $_{i,t}$	0.198***	0.293***
		(0.016)	(0.012)
	Observations	10695	10359
	Adjusted R^2	0.170	0.358
Basic controls + Liquidity stable $_{i,\ t}$	Liquidity stable $_{i,\ t}$	0.277***	0.266***
		(0.014)	(0.008)
	Observations	10695	10359
	Adjusted R^2	0.193	0.278
Basic controls + New products $_{i,\ t}$	New products $_{i,\ t}$	0.007	0.054***
		(0.017)	(0.010)
	Observations	10695	10359
	Adjusted R^2	0.133	0.119

Notes: *, **, *** represent statistical significance at the 10, 5, and 1 percent levels. Heteroskedasticity-corrected standard errors clustered at the country-industry level in columns.

To make the adjusted R^2 comparable in each panel, for each dependent variable, the observations are the same as the sample is limited to that all channel variables have observations.

Table 6. Examining dynamic effect by using panel data from the 26 two-round countries

Dependent Variables	Survival $P_{i, t}$	Sales growth $_{i, t}$	Output demand stable $_{i, t}$	Input supply stable $_{i, t}$	Liquidity stable $_{i, t}$	Survival $_{i, t}$	Sales growth $_{i, t}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-small $_{i, t-1}$	0.090***	0.065***	0.045***	0.033***	0.059***	0.068***	0.042***
	(0.014)	(0.009)	(0.011)	(0.012)	(0.012)	(0.013)	(0.006)
Non-small $_{i, t-1}$ × 2nd Round $_{i, t}$	0.008	0.005	0.041***	0.020	0.015	-0.002	-0.006
	(0.009)	(0.008)	(0.013)	(0.016)	(0.009)	(0.010)	(0.006)
Age $_{i, t-1}$	0.023**	0.002	-0.017	-0.019	0.008	0.022**	0.006
	(0.010)	(0.008)	(0.011)	(0.011)	(0.011)	(0.009)	(0.005)
Age $_{i, t-1}$× 2nd Round $_{i, t}$	-0.024***	0.004	0.013	0.012	0.008	-0.028***	0.000
	(0.008)	(0.008)	(0.012)	(0.013)	(0.009)	(0.008)	(0.006)
Foreign $_{i, t-1}$	0.020	0.015	0.032*	0.042***	0.048***	0.015	-0.003
	(0.021)	(0.014)	(0.016)	(0.015)	(0.018)	(0.021)	(0.010)
Foreign $_{i, t-1}$× 2nd Round $_{i, t}$	0.020	0.012	0.004	0.005	0.024	0.006	0.008
	(0.016)	(0.014)	(0.020)	(0.024)	(0.015)	(0.016)	(0.012)
SOEs $_{i, t-1}$	-0.005	0.080***	0.118**	0.109*	0.179***	-0.045	0.011
	(0.059)	(0.029)	(0.051)	(0.063)	(0.054)	(0.055)	(0.030)
SOEs $_{i, t-1}$× 2nd Round $_{i, t}$	0.015	-0.005	0.031	-0.067	-0.079	0.021	0.015
	(0.039)	(0.034)	(0.116)	(0.070)	(0.067)	(0.042)	(0.030)
Subsidiary $_{i, t-1}$	0.022	0.032***	0.029*	0.009	0.040**	0.012	0.018**
	(0.016)	(0.011)	(0.017)	(0.016)	(0.015)	(0.015)	(0.008)
Subsidiary $_{i, t-1}$× 2nd Round $_{i, t}$	-0.023*	-0.009	-0.013	-0.014	-0.012	-0.025*	-0.004
	(0.013)	(0.012)	(0.018)	(0.019)	(0.011)	(0.013)	(0.010)
Log Experience $_{i, t-1}$	0.041***	-0.005	-0.001	-0.006	-0.000	0.041***	-0.003
	(0.010)	(0.007)	(0.011)	(0.010)	(0.010)	(0.009)	(0.005)
Log Experience $_{i, t-1}$× 2nd Round $_{i, t}$	-0.019**	0.004	-0.001	0.021*	-0.001	-0.023***	0.003
	(0.008)	(0.006)	(0.012)	(0.012)	(0.009)	(0.008)	(0.005)
Log GDPper $_{c, t-1}$	0.082***	0.108***	0.114***	0.135***	0.124***	0.036	0.050***
	(0.028)	(0.011)	(0.011)	(0.014)	(0.011)	(0.026)	(0.007)
Log GDPper $_{c, t-1}$× 2nd Round $_{i, t}$	0.075***	-0.014	-0.010	-0.009	0.004	0.070***	-0.005
	(0.013)	(0.009)	(0.010)	(0.012)	(0.008)	(0.012)	(0.008)
Policy stringency $_{c, t-1}$	-0.552***	-0.424***	-0.246***	-0.292***	-0.229***	-0.479***	-0.297***
	(0.078)	(0.043)	(0.047)	(0.058)	(0.040)	(0.076)	(0.031)
Policy stringency $_{c, t-1}$× 2nd Round $_{i, t}$	-0.138	0.228***	-0.005	-0.136	0.080	-0.110	0.216***
	(0.118)	(0.064)	(0.074)	(0.090)	(0.078)	(0.113)	(0.049)
Output demand stable $_{i, t}$						0.071***	0.220***
						(0.015)	(0.011)
Output demand stable $_{i, t}$× 2nd Round $_{i, t}$						-0.010	0.020**
						(0.024)	(0.009)
Input supply stable $_{i, t}$						0.095***	0.090***
						(0.015)	(0.010)
Input supply stable $_{i, t}$× 2nd Round $_{i, t}$						-0.010	0.017
						(0.026)	(0.011)
Liquidity stable $_{i, t}$						0.133***	0.159***
						(0.016)	(0.009)
Liquidity stable $_{i, t}$× 2nd Round $_{i, t}$						0.081***	-0.070***
						(0.015)	(0.008)
2nd Round $_{i, t}$	-0.449***	0.076	0.123	0.140	-0.181*	-0.395***	0.003
	(0.149)	(0.098)	(0.093)	(0.121)	(0.092)	(0.134)	(0.076)
Industry, Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,383	19,124	19,707	19,521	19,853	19,308	18,768
Adjusted R^2	0.151	0.190	0.065	0.087	0.093	0.207	0.528

Notes: *, **, *** represent statistical significance at the 10, 5, and 1 percent levels. Heteroskedasticity-corrected

standard errors clustered at the country-industry level in columns.

For the sample used in this table, we choose those 26 countries that having been interviewed in two rounds, then construct a panel dataset by appending the two rounds' data. $2^{nd}\ Round_{i,t}$ here indicates period for same firm in the panel data, which is different from the one used in the cross-sectional dataset in which *it* indicates the period of survey wave for different firms. The question related to $New\ products_{i,t}$ is asked mostly in second-round surveys, and there are too few observations in the first-round survey data, thus we do not consider it here.

Table 7. The moderating effects of resources

Dependent Variables	Survival $_{i, t}$ (1)	Sales growth $_{i, t}$ (2)
Non-small $_{i, t-1}$	0.083***	0.066***
	(0.018)	(0.008)
Age $_{i, t-1}$	0.012	0.011**
	(0.011)	(0.005)
Foreign $_{i, t-1}$	0.034	0.003
	(0.028)	(0.014)
SOEs $_{i, t-1}$	-0.053	0.001
	(0.116)	(0.058)
Subsidiary $_{i, t-1}$	-0.015	0.013
	(0.022)	(0.013)
Log Experience $_{i, t-1}$	0.023*	0.003
	(0.013)	(0.006)
2nd Round	0.014	0.016
	(0.040)	(0.012)
Log GDPper $_{c, t-1}$	0.098***	0.042***
	(0.022)	(0.007)
Policy stringency $_{c, t-1}$	-0.678***	-0.092***
	(0.099)	(0.035)
Output demand decr $_{i, t}$	-0.004	0.183***
	(0.063)	(0.031)
Input supply decr $_{i, t}$	0.159***	0.199***
	(0.059)	(0.033)
Liquidity decr. $_{i, t}$	0.271***	0.112***
	(0.055)	(0.030)
New products $_{i, t}$	-0.131**	0.006
	(0.064)	(0.028)
Output demand stable $_{i, t}$*Non-Small $_{i, t-1}$	0.020	-0.044***
	(0.025)	(0.013)
Input supply stable $_{i, t}$* Non-Small $_{i, t-1}$	-0.013	-0.014
	(0.022)	(0.013)
Liquidity stable. $_{i, t}$* Non-Small $_{i, t-1}$	-0.073***	-0.014
	(0.024)	(0.009)
New products $_{i, t}$* Non-Small $_{i, t-1}$	0.013	-0.011
	(0.020)	(0.011)
Output demand stable $_{i, t}$* Foreign $_{i, t-1}$	0.050	0.018
	(0.047)	(0.020)
Input supply stable $_{i, t}$* Foreign $_{i, t-1}$	-0.087**	-0.006
	(0.040)	(0.018)
Liquidity stable. $_{i, t}$* Foreign $_{i, t-1}$	0.012	0.003
	(0.039)	(0.013)
New products $_{i, t}$* Foreign $_{i, t-1}$	-0.011	-0.018
	(0.033)	(0.018)
Output demand stable $_{i, t}$* SOEs $_{i, t-1}$	0.004	0.242**
	(0.271)	(0.107)
Input supply stable $_{i, t}$* SOEs $_{i, t-1}$	-0.003	-0.102
	(0.274)	(0.099)
Liquidity stable. $_{i, t}$* SOEs $_{i, t-1}$	0.095	-0.141***
	(0.112)	(0.048)
New products $_{i, t}$* SOEs $_{i, t-1}$	-0.019	-0.004
	(0.108)	(0.086)
Output demand stable $_{i, t}$*Subsidiary $_{i, t-1}$	0.081**	0.039**
	(0.038)	(0.019)
Input supply stable $_{i, t}$* Subsidiary $_{i, t-1}$	-0.062*	-0.039**
	(0.037)	(0.020)
Liquidity stable. $_{i, t}$* Subsidiary $_{i, t-1}$	0.015	0.008
	(0.035)	(0.013)
New products $_{i, t}$* Subsidiary $_{i, t-1}$	0.003	-0.009
	(0.034)	(0.013)

Table 7. The moderating effects of resources (Cont'd)

Dependent Variables	Survival $_{i, t}$ (1)	Sales growth $_{i, t}$ (2)
Output demand stable $_{i, t}$* Log Experience $_{i, t-1}$	0.010	0.021**
	(0.022)	(0.010)
Input supply stable $_{i, t}$* Log Experience $_{i, t-1}$	-0.014	-0.024**
	(0.019)	(0.011)
Liquidity stable. $_{i, t}$* Log Experience $_{i, t-1}$	-0.009	-0.004
	(0.018)	(0.009)
New products $_{i, t}$* Log Experience $_{i, t-1}$	0.040**	0.012
	(0.020)	(0.008)
Industry, Year FEs	Yes	Yes
Observations	10,695	10,359
Adjusted R^2	0.208	0.500

Note: *, **, *** represent statistical significance at the 10, 5, and 1 percent levels. Heteroskedasticity-corrected standard errors clustered at the country-industry level in columns.

Appendix

Table A1. Controlling for firm heterogeneity (i.e., labor productivity)

Dependent Variables	SurvivalP$_{i, t}$	Sales growth $_{i, t}$	Output demand stable $_{i, t}$	Input supply stable $_{i, t}$	Liquidity stable $_{i, t}$	New products $_{i, t}$	Survival $_{i, t}$	Sales growth $_{i, t}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Non-small $_{i, t-1}$	0.085***	0.062***	0.068***	0.036***	0.074***	0.062***	0.061***	0.033***
	(0.013)	(0.007)	(0.012)	(0.012)	(0.010)	(0.011)	(0.013)	(0.006)
Age $_{i, t-1}$	0.013	0.010	-0.007	-0.004	0.014	-0.019**	0.011	0.012**
	(0.010)	(0.006)	(0.010)	(0.010)	(0.009)	(0.009)	(0.011)	(0.005)
Foreign $_{i, t-1}$	0.026	0.017	0.014	0.023	0.046**	0.024	0.003	0.003
	(0.018)	(0.010)	(0.016)	(0.016)	(0.018)	(0.018)	(0.021)	(0.009)
SOEs $_{i, t-1}$	0.045	0.076***	0.161***	0.084**	0.102***	0.012	-0.037	0.020
	(0.039)	(0.021)	(0.046)	(0.039)	(0.037)	(0.063)	(0.048)	(0.026)
Subsidiary $_{i, t-1}$	0.027*	0.009	0.020	0.011	0.021	0.030	-0.015	0.006
	(0.014)	(0.009)	(0.014)	(0.015)	(0.013)	(0.018)	(0.015)	(0.006)
Log Experience $_{i, t-1}$	0.017*	-0.008	-0.006	0.007	0.003	-0.013*	0.026***	-0.002
	(0.010)	(0.006)	(0.009)	(0.008)	(0.008)	(0.008)	(0.010)	(0.004)
Log LP $_{i, t-1}$	0.021***	0.016***	0.024***	0.022***	0.017***	0.003	0.024***	0.005**
	(0.007)	(0.003)	(0.004)	(0.004)	(0.004)	(0.005)	(0.007)	(0.002)
2nd Round $_{i, t}$	0.064*	0.049***	0.048**	0.041	-0.128***	-0.028	0.076	0.022
	(0.037)	(0.017)	(0.023)	(0.029)	(0.024)	(0.027)	(0.048)	(0.015)
Log GDPper $_{c, t-1}$	0.112***	0.086***	0.087***	0.108***	0.109***	-0.014	0.093***	0.041***
	(0.018)	(0.007)	(0.011)	(0.012)	(0.009)	(0.012)	(0.022)	(0.006)
Policy stringency $_{c, t-1}$	-0.824***	-0.265***	-0.337***	-0.439***	-0.231***	0.086	-0.764***	-0.094***
	(0.082)	(0.037)	(0.064)	(0.064)	(0.049)	(0.075)	(0.093)	(0.034)
Output demand stable $_{i, t}$							0.062***	0.234***
							(0.018)	(0.010)
Input supply stable $_{i, t}$							0.076***	0.110***
							(0.020)	(0.010)
Liquidity stable $_{i, t}$							0.199***	0.093***
							(0.015)	(0.007)
New products $_{i, t}$							-0.003	0.030***
							(0.015)	(0.007)
Industry, Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,173	12,030	12,284	12,381	12,565	9,691	9,452	9,187
Adjusted R^2	0.156	0.152	0.062	0.084	0.084	0.042	0.206	0.501