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Evolving impacts of the COVID-19 pandemic on micro, small, and medium-sized enterprises in Asia

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ADBI Working Paper Series

**EVOLVING IMPACTS OF THE COVID-19
PANDEMIC ON MICRO, SMALL, AND
MEDIUM-SIZED ENTERPRISES IN ASIA**

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Abstract

Since the first quarter of 2020, micro, small, and medium-sized enterprises (MSMEs) in developing countries have faced significant hardship due to the economic shocks related to the COVID-19 pandemic. Questions arise, however, regarding the extent to which MSMEs' hardship has varied between sectors and between countries over time, whether it is gender neutral, whether the digitalization of MSMEs could alleviate it, and whether government support has reached MSMEs. This paper aimed to answer these questions using new survey data from eight developing Asian countries around the middle and toward the end of 2020. We found a wide variation in the severity of and responses to the pandemic impacts on MSMEs between sectors and between countries. Turning to common trends, our significant findings were as follows. First, MSMEs' sales and non-permanent employment tended to recover toward late 2020. Second, despite the general trend, the pandemic shocks concentrated on hard-hit industries, such as food processing, textiles, tourism, food and drink services, and education, which even deteriorated in the second half of 2020. Third, women-led enterprises remained vulnerable, exhibiting bleak prospects for sales or more job cuts than men-led but otherwise similar enterprises. Fourth, the digitalization intensity had a nonlinear relationship with MSMEs' sales and employment, suggesting that online sales beyond a certain threshold, around 40% of the total sales, could generate more revenues and jobs for MSMEs. Last, the number of MSMEs receiving support from their governments increased in the second half of 2020. Still, such support did not effectively reach the most affected or vulnerable MSMEs.

Keywords: COVID-19, micro, small, and medium-sized enterprises (MSMEs), layoffs, cash shortage, digitalization

JEL Classification: D22, J63, L25, O53

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1. INTRODUCTION

The COVID-19 pandemic has caused severe disruption of economic activities globally since early 2020. In mid-July 2021, the World Health Organization (WHO) reported that the pandemic had led to 190 million confirmed cases and caused 4.1 million deaths worldwide, of which 21% of confirmed cases and 13% of deaths were concentrated in the South-East Asian region and the Western Pacific region.¹ At the time of writing, COVID-19 vaccine rollouts are still at an early stage in most developing countries, and resurgent outbreaks of new variants of the infection show that the pandemic is far from finished (ADB 2021). In particular, the pandemic has posed significant challenges for the survival and development of micro, small, and medium-sized enterprises (MSMEs), which are the backbone of Asia's economic growth.

Various studies on the economic impacts of the COVID-19 pandemic have reported severe hardship for small business owners, such as substantial losses of revenues, liquidity shocks, and business closures (e.g., Bartik et al. 2020; Fairlie 2020; Lu et al. 2020; Shafi, Liu, and Ren 2020; Apedo-Amah et al. 2020; Shinozaki and Rao 2021), while the scale of employment adjustment, such as layoffs of workers, was limited in scale in the early phase of the pandemic and lockdowns (Abebe, Bundervoet, and Wieser 2020; World Bank 2020). Given the enormous diversity of MSMEs in size, products and services, and technological and managerial sophistication as well as the labor, material, and output markets that they face, it is fair to say that our knowledge about MSMEs' experience during the pandemic is not sufficient to guide policymakers.

This report provides an overview of the major results of the survey of MSMEs in eight Asian countries—Bangladesh, India, Indonesia, the Lao PDR, Malaysia, Mongolia, Pakistan, and Viet Nam—that ADBI conducted in collaboration with the Asian Productivity Organization (APO)² and the respective countries' national productivity organizations (NPOs). It aims to supplement our knowledge about the pandemic-related crisis that MSMEs are facing in Asia. The survey took place in two waves in these countries in the middle and toward the end of 2020 in an online format because of the necessity to keep social distance as well as the lockdown measures that the governments had imposed. We sent out a questionnaire in the respective languages to MSMEs on NPOs' lists of clients, such as training program participants and newsletter subscribers. We collected usable data from slightly more than 2,200 enterprises in the first wave and slightly more than 2,400 in the second wave.

Two weaknesses of the data are noteworthy. First, while we repeated the survey, the data are not panel data. Unfortunately, only slightly over one-third of the enterprises that responded to the survey in the first wave responded to it in the second wave. Thus, the data are essentially two sets of cross-sectional data from different points in time. Because of the unavailability of a large panel, this paper did not intend to establish any causal relationship between variables. Instead, we confined ourselves to a descriptive analysis of the data. Even when we used regressions, their use aimed to summarize the statistical relationship between the left-hand-side variable and multiple right-hand-side variables. The second weakness is that our sample enterprises are likely to be biased toward MSMEs that are conscious of the need to improve their

¹ Source: World Health Organization (WHO). n.d. "WHO Coronavirus (COVID-19) Dashboard." <https://covid19.who.int/>.

² The APO is an intergovernmental organization established in 1961 to increase productivity in the Asia and the Pacific region through mutual cooperation with its member national productivity organizations (NPOs). A list of member NPOs is also available on the official website: <https://www.apo-tokyo.org/about/overview/>.

management practices and learning about fintech and those that use digital platforms. This is because we sent our questionnaire only to MSMEs on the NPOs' lists of clients, even though they were clients in a broad sense. It would not be surprising to learn that the sample MSMEs tended to outperform the average MSMEs in the same industry in the same country in firm survival, sound finances, and employment. It is necessary to bear such possible or likely biases in mind when interpreting the results of the data analysis that we report below.

Despite such potential biases toward relatively high-performing firms, one of the major findings is that the majority of sample MSMEs in each country experienced acute cash shortages and drastic reductions in employment in the early half of the year and remained unable to escape from financial instability and to rehire regular workers in the second half. Another major finding is the considerable dissimilarity or heterogeneity among the eight countries with respect to the size distribution of the sample firms, the prevalence of women-led enterprises, the prevalence of digital commerce, and so on. Surprisingly, a significant difference among countries is apparent in the type of support that the government provided as well as the type of support that MSMEs preferred. The third major finding is that, despite such heterogeneity among countries, relationships still exist between variables; these relationships are apparent in several countries and there are no data from any country that refute them.

The descriptive analysis developed in this report begins by looking at the summary statistics of data on the major variables and reporting heterogeneity among countries. It will then turn to some simple hypotheses predicting how some of these variables associate with the extent of reduction in employment or sales revenue. One of such hypotheses is about gender inequality. A few existing studies have suggested that the impacts of the crisis on MSMEs are not gender neutral. That is, there has been a resurgence of interest in the so-called female underperformance hypothesis, which the economics and management literature has long discussed (e.g., Du Rietz and Henrekson 2000; Pucheta-Martínez and Gallego-Álvarez 2020; Pueyo, Carreras, and Ngoo 2020), in the context of the COVID-19 crisis. For example, Wei and Xu (2020) found that the pandemic has further widened the gender gap in business earnings based on data covering 24 developed and developing countries. Their study also reported that female entrepreneurs are more likely to face business closure mainly due to their disadvantages in access to finance and that women-led firms are more likely to decrease their number of employees, especially female employees. Interestingly, our data reveal that the reduction of the actual sales for women-led MSMEs was smaller than that of men-led but otherwise similar enterprises in late 2020. Nevertheless, they also show that female entrepreneurs have consistently bleaker prospects for future sales revenue and remain relatively less able to retain employment than enterprises with male leaders.

The COVID-19 crisis has expedited the digitalization of the economy across the world, as Fang (2021), among many others, have argued. Guo, Yang, Huang, and Guo (2020), in their study in the People's Republic of China (PRC), concluded that digitalization, especially digital platforms and smartphone apps, provides MSMEs with a new channel to connect with customers and enables them to respond more effectively to the crisis and improve their business performance. Sonobe et al. (2021), among others, hypothesized that digitalization would destroy and create jobs as initially the job destruction effect would dominate with the application of digital technologies but then the job creation effect would dominate. They reported that the hypothesis is consistent with both waves of the survey data: while MSMEs that earned only a small fraction of their revenue from online sales tended to reduce their employment more than those that did not engage in online sales, MSMEs that earned a large fraction of

their sales revenue from online sales tended to maintain their employment size better. The present report provides more evidence for such a nonlinear relationship.

Some studies have analyzed the role of government support for MSMEs. Using firm-level data in 17 developed countries, Gourinchas et al. (2021) argued that the absence of government support would increase the failure rate of SMEs by 9.1 percentage points during the pandemic. Government support can thus play an important role, but the question arises of which type of support is effective and whether its provision is efficient and equitable. It seems natural to hypothesize that government support that targets severely affected enterprises is effective. Our data, however, reveal that those enterprises that experienced cash shortages and more drastic employment reductions were no more likely to receive government support. Abebe, Bundervoet, and Wieser (2020) found that, while the majority of MSME entrepreneurs in Ethiopia identified the waiving of taxes as the most desirable form of support, fewer than 1% of female entrepreneurs received any government support. Consistently, the present study found that, while the second half of 2020 witnessed general increases in government support for MSMEs, the support provision did not necessarily reach the most affected enterprises, including ones with female leaders.

The rest of the paper proceeds as follows. Section 2 describes the survey design and data. Section 3 summarizes the estimation results. Finally, Section 4 provides the conclusion.

2. COVID-19 MSME SURVEY

2.1 Survey Design and Administration

An online survey took place in two waves over 2020 to understand the evolving situation of MSMEs undergoing economic shocks from the global COVID-19 pandemic in a partnership involving ADBI, the APO, and NPOs. In the two waves, eight NPOs in Bangladesh, India, Indonesia, the Lao PDR, Malaysia, Mongolia, Pakistan, and Viet Nam participated in the survey. The survey invited the clients of these NPOs, which are dominantly MSMEs, to respond. While the classification of small and medium businesses varies across countries (Gibson and Vaart 2008; Aga, Francis, and Rodriguez Meza 2015), we defined an MSME by its employed workforce size³ in this study. The client MSMEs are mostly those that have received training, consulting services, or newsletters from these organizations or attended their events. We did not restrict our target to any particular sector, size, or type of business but targeted either owners or managers of firms.

We designed an online questionnaire using SurveyMonkey, the cloud-based software, in early April 2020 and revised it before the second wave in late 2020, mainly to capture the changing situations of MSMEs more closely. The questionnaires consisted of seven sections, beginning with identification questions about the firms and respondents and then enquiring about the immediate impacts of the pandemic, responses of MSMEs, government support, expected performance, profiles of firms, and business competitiveness. With NPOs, we translated it into the respective native languages and directly distributed it to their clients through email and online messaging services. Generally, it took respondents about 15 minutes to complete all the questions. The online form allowed respondents to resume if the internet connection was disrupted or respondents had to stop temporarily for various reasons. In addition,

³ A microenterprise has fewer than 10 permanent employees; a small enterprise has 11 to 30; and a medium enterprise has more than 30.

NPO staff surveyed respondents by telephone or visitation⁴ and then entered their responses into the online system if most MSMEs did not have sufficient internet access.

We launched the first wave of the survey first in Viet Nam and Malaysia in May 2020 and completed it by mid-June 2020. Five countries delayed the start to August 2020, and the Lao PDR launched it in September 2020. The follow-up or second wave of the survey started in November 2020 with Malaysia and Viet Nam. The rest of the countries began the second wave in January 2021. Though the timing of the survey's start varied across participating countries due to government restrictions and levels of preparedness, the first wave aimed to capture the situation under the initial shocks during the first half of 2020, and the second wave sought to understand the changing situation in the second half of 2020.

The implementation of the online survey took around 3 to 5 weeks and closed once each country had received about 300 valid and complete responses. The second survey aimed initially to consult those firms that had participated in the first wave to obtain panel data, which was a significantly challenging approach for online surveys. Some sample firms had closed their business, and others were reluctant to participate in the second wave for various reasons. As a result, the sample firms in the first wave were not necessarily the same as those in the second wave. Around 30% of the sample firms in the first wave participated in the second wave. Thus, the results in the report should be taken with caution and interpreted as conditional associations rather than direct influences.

Enterprises participated in the survey voluntarily. While the online survey was open, each response was checked for completeness daily, and NPO staff followed up to ensure that the respondents answered all the mandatory questions in the form. Upon the closure of the online survey, staff reviewed the collected data carefully to remove duplicated entries or invalid respondents. The final sample included 2,344 valid responses in the first wave and 2,505 responses in the second wave, of which around two-thirds came from owners of enterprises.

There are at least two sources of potential sample bias that readers should keep in mind when interpreting the findings of this paper. The first is that this survey might cover only those firms that were still in operation at the time of the survey, which would cause a sample selection bias in firm longevity and growth. However, this problem might not be particularly serious because our survey also covered firms that had temporarily shut down their business because of the COVID-19 pandemic. Around 35% of firms in the first wave and 30% of firms in the second wave reported temporary closure.

The second source of bias is that the NPOs targeted the firms for which they have contact information. Firms in developing countries, especially microenterprises, are usually poorly managed, and the majority of their owners are not aware that training and coaching activities would improve their productivity and business performance (Higuchi, Nam, and Sonobe 2015; McKenzie and Woodruff 2017; Bruhn, Karlan, and Schoar 2018; Higuchi, Mhede, and Sonobe 2019; McKenzie 2020). Since the firms in our sample have some connection with the NPOs, they do not necessarily represent ordinary firms in their countries. Therefore, they are biased toward the well-informed type or the type of firms that are more eager to improve their productivity or competitiveness. Moreover, the sample is probably biased toward respondents who

⁴ Telephone interviews took place partially in Bangladesh, Indonesia, and Viet Nam. In-person interviews took place in the Lao PDR.

could use technology to answer the survey or avail themselves of some help to complete the survey.

2.2 Data

This study used the pooled cross-sectional data that the two waves collected over 2020 to analyze the evolving situations for MSMEs in developing countries. The survey asked the sample firms about the extent to which their performances had varied compared with their previous status in the same period in 2019, before the world felt any pandemic impact. Specifically, MSMEs' actual sales revenues, growth prospects for future sales, and permanent and non-permanent employees were in focus. Four ordered categories captured the severity of these four impacts: decline by over 40%, decline by up to 40%, the same (no impact), or increase relative to the pre-pandemic level in 2019.

The survey also asked whether firms had faced disruptions in ensuring cash flows or raw materials under the pandemic. These issues are typically chronic problems for many MSMEs, but the pandemic shocks may have exacerbated them. Furthermore, the survey asked whether firms had received or needed any government support (e.g., tax- or loan-related support) to sustain their business operation amidst the pandemic shocks. These outcome variables took binary values.

Table descriptively summarizes the impacts on sales revenues, growth prospects of sales revenues, and permanent and non-permanent employees in early and late 2020. First, the share of firms reporting some losses in sales revenues became smaller over 2020. In early 2020, about 78% of MSMEs experienced declines in their sales, which shrank to 68% in late 2020. On the other hand, their growth prospects for future sales hardly changed over the period. Second, one-third of MSMEs had already cut over 40% of non-permanent employees in early 2020, which declined to 20% of all firms in late 2020. On the other hand, the layoff of permanent employees remained lower but virtually unchanged over time.

The magnitudes of the pandemic shocks varied across the countries over time (Table 1). For instance, the growth prospects of sales revenues that Indonesian firms shared were by far the highest in early 2020 but dropped to the lowest of all countries in late 2020. In contrast, most Vietnamese firms appeared in the high categories in sales growth prospects in late 2020. Furthermore, about 60% of Malaysian MSMEs had cut over 40% of temporary workers in early 2020, but most quickly returned to the pre-COVID level in late 2020.

Table 2 summarizes the other outcome indicators of MSMEs. First, about 80% and 45% of the sample firms faced cash and raw material shortages, respectively; these figures did not show substantive changes over time. Second, nearly half of the sample firms received at least one kind of government support in early 2020, increasing slightly toward the end of 2020. In addition, the share of the firms needing government support remained almost the same over time.

Significant cross-country variations are observable, particularly for government support (Table 2). For instance, only one-third of firms in Pakistan had received some government support by the end of 2020 compared with over 70% of firms in Mongolia. The governments of Malaysia and Mongolia appear to have been the most generous providers of support. In comparison, almost all firms in Bangladesh expressed the need for further government support in late 2020 compared with fewer than 20% of firms in India.

Table 1: Summary of Different Impacts on MSMEs' Sales and Employment in Early and Late 2020 (Percentage of Sample Firms)

	<i>Decline over 40%</i>		<i>Decline up to 40%</i>		<i>Same</i>		<i>Increase</i>					
	Total (%)	Highest Country Mean	Total (%)	Highest Country Mean	Total (%)	Highest Country Mean	Total (%)	Highest Country Mean				
First wave: Early 2020												
Actual sales revenues	30	44	IND	48	64	BGD	13	22	MNG	9	13	IND
Sales growth prospects	22	44	BGD	36	59	PAK	16	30	MNG	27	79	IND
Permanent employees	15	23	IDN	30	47	PAK	50	77	BGD	5	9	MYS
Non-permanent employees	31	60	MYS	25	49	PAK	40	68	BGD	4	6	MNG
Second Wave: Late 2020												
Actual sales revenues	27	42	IDN	41	53	BGD	14	21	IND	18	27	LAO
Sales growth prospects	23	48	IDN	43	76	BGD	13	76	VNM	21	52	VNM
Permanent employees	17	39	IDN	30	40	LAO	49	70	BGD	5	8	LAO
Non-permanent employees	20	30	IDN	29	45	BGD	45	58	MYS	5	8	IND

Note: The data on all the variables in this table are available from the eight countries. The country name abbreviations are as follows: Bangladesh (BGD), India (IND), Indonesia (IDN), Malaysia (MYS), Mongolia (MNG), the Lao PDR (LAO), Pakistan (PAK), and Viet Nam (VNM).

Source: COVID-19 MSME Survey, ADBI.

Table 2: Summary Statistics on MSMEs' Status in Early and Late 2020

	Obs.	Total Mean	Std Dev.	Lowest Country Mean	Highest Country Mean		
First Wave: Early 2020							
Cash shortage	2,265	0.80	0.40	0.69	MNG	0.93	BGD
Raw material shortage	2,265	0.45	0.50	0.33	MYS	0.65	PAK
Government support received	2,237	0.51	0.50	0.19	IDN	0.68	MYS
Tax-related support received	2,237	0.38	0.49	0.09	BGD	0.73	MNG
Loan-related support received	2,237	0.32	0.47	0.16	MNG	0.73	BGD
Government support needed	2,344	0.84	0.36	0.62	BGD	0.93	VNM
Tax support needed	2,237	0.53	0.50	0.08	BGD	0.75	VNM
Loan support needed	2,237	0.48	0.50	0.27	IDN	0.68	MYS
Second Wave: Late 2020							
Cash shortage	2,412	0.79	0.40	0.65	VNM	0.93	IDN
Raw material shortage	2,412	0.49	0.50	0.32	MYS	0.64	MNG
Government support received	2,365	0.56	0.50	0.31	PAK	0.73	MNG
Tax-related support received	2,365	0.24	0.43	0.07	PAK	0.48	LAO
Loan-related support received	2,365	0.21	0.41	0.08	PAK	0.42	BGD
Government support needed	2,505	0.81	0.39	0.46	IDN	0.98	BGD
Tax support needed	2,365	0.49	0.50	0.15	IDN	0.75	VNM
Loan support needed	2,365	0.42	0.49	0.17	IDN	0.66	BGD

Note: All the variables in this table are binary variables with a value equal to zero or one. Std Dev. means standard deviation. The data on all the variables in this table are available from the eight countries. The country name abbreviations are as follows: Bangladesh (BGD), India (IND), Indonesia (IDN), Malaysia (MYS), Mongolia (MNG), the Lao PDR (LAO), Pakistan (PAK), and Viet Nam (VNM).

Source: COVID-19 MSME Survey, ADBI.

Next, we present the sample firms' characteristics (Table 3). Women-led firms account for about 30% of the sample firms across both waves, and the average firm age is about 13 years. In addition, the sample consists of 50% micro, 27% small, and 20% medium and large firms, respectively, in the first-wave data, differing slightly in the second wave with a greater concentration on micro-enterprises. About 20% of firms are export-oriented, earning more than half of their annual sales from foreign trading. Over half of the firms had online sales, the earnings from which accounted for about 20% of the total sales in 2019 on average.

Table 3: Summary Statistics on the Sample Firms' Characteristics

	Obs.	Total Mean	Std Dev.	Lowest Country Mean	Highest Country Mean		
First Wave: Early 2020							
Women-led firms	2,279	0.30	0.46	0.08	IND	0.59	LAO
Firm age (years)	2,126	13.4	12.3	7.98	LAO	19.8	IND
Microenterprise	2,170	0.49	0.50	0.28	BGD	0.81	IDN
Small enterprise	2,170	0.27	0.44	0.14	IDN	0.46	BGD
Medium enterprise	2,170	0.24	0.43	0.05	IDN	0.47	VNM
Export oriented	2,172	0.19	0.40	0.06	IDN	0.52	PAK
Selling online	2,140	0.59	0.49	0.26	MNG	0.84	VNM
Online sales 2019 (%)	2,178	21.0	29.2	8.71	BGD	35.0	VNM
Plan to increase online sales	2,140	0.69	0.46	0.39	MNG	0.85	IDN
Manufacturing—food processing	2,170	0.12	0.32	0.02	BGD	0.38	IDN
Manufacturing—textiles and apparel	2,170	0.06	0.24	0.02	VNM	0.20	PAK
Services—tourism/restaurants/hotels	2,170	0.07	0.25	0.00	BGD	0.18	LAO
Services—wholesale/retail trading	2,170	0.07	0.26	0.02	IND	0.22	LAO
Services—information and education	2,170	0.06	0.24	0.01	BGD	0.10	MYS
Second Wave: Late 2020							
Women-led firms	2,416	0.33	0.47	0.08	PAK	0.67	IDN
Firm age (years)	2,327	12.6	11.7	7.62	IDN	21.7	IND
Microenterprise	2,313	0.60	0.49	0.27	VNM	0.89	IDN
Small enterprise	2,313	0.21	0.41	0.08	IDN	0.31	BGD
Medium enterprise	2,313	0.20	0.40	0.03	IDN	0.50	VNM
Export oriented	2,278	0.17	0.37	0.03	IDN	0.32	MNG
Selling online	2,505	0.53	0.50	0.20	BGD	0.81	VNM
Online sales 2019 (%)	2,282	19.5	28.8	7.16	BGD	35.3	VNM
Plan to increase online sales	2,254	0.71	0.46	0.61	BGD	0.81	IDN
Manufacturing—food processing	2,313	0.15	0.36	0.02	VNM	0.60	IDN
Manufacturing—textile and apparel	2,313	0.08	0.27	0.01	MYS	0.15	BGD
Services—tourism/restaurants/hotels	2,313	0.08	0.27	0.00	BGD	0.23	LAO
Services—wholesale/retail trading	2,313	0.09	0.29	0.01	IND	0.15	LAO
Services—information and education	2,313	0.06	0.24	0.01	IDN	0.12	MYS

Note: All the variables in this table are binary variables with a value equal to zero or one except for firm age (years) and online sales 2019 (%). The categorization of the size of firms is micro, small, and medium based on the number of permanent employees at the end of 2019. A microenterprise has fewer than 10 permanent employees, while a small enterprise has 11 to 30 and a medium enterprise has more than 30. The export-oriented dummy is equal to one if exports account for about a half or more of firms' sales revenues and zero otherwise. Selling online is a dummy indicating whether the firm had online sales in 2019. Online sales 2019 is the proportion of sales revenues from online sales in 2019.

Source: COVID-19 MSME Survey, ADBI.

Firms' characteristics and sector composition vary significantly across the countries (Table 3). Indonesia, the Lao PDR, and Mongolia have larger shares of women-led firms, averaging between 40% and 60% of the total, while women-led firms account for fewer than 10% in India and Pakistan. Similarly, Indonesia, the Lao PDR, and Mongolia account for the majority of microenterprises. The intensity of online sales also shows a contrasting picture across countries. For example, over 80% of Vietnamese firms had some online sales, earning about 35% of their total sales, while only around 20% of firms in Bangladesh engaged in online sales, earning less than 10% of their total sales on average. Furthermore, the proportion of hard-hit MSMEs, those particularly exposed to the pandemic shocks,⁵ varies substantially across countries.

3. FINDINGS

This section presents the findings from the regression analyses. We have organized them around the study's research questions. We present the estimated coefficients of the regression analyses in Appendix Table A1–Appendix Table A7.⁶

3.1 Evolving Situations of MSMEs

We found a general improvement in MSMEs' sales revenues and number of non-permanent workers during the second half of 2020. The regression results show that MSMEs' actual revenues have a positive association with the second survey wave dummy variable, while their growth prospects for future sales do not have a significant association (Appendix Table A1). Similarly, the non-permanent employment of MSMEs has a positive association with the second survey wave dummy variable, while permanent employment does not show a significant association (Appendix Table A2).

These findings suggest that MSMEs, which had experienced similarly acute impacts from the global pandemic economic shocks in the first quarter of 2020, generally showed a slight recovery process by regaining some of the losses in sales revenues and rehiring casual and temporary employees during the second half of 2020. Descriptively, the survey data also seem to support this finding, given the increased proportion of business owners citing a labor shortage that increased from 22% in early 2020 to 61% in late 2020, albeit to varying degrees across countries. It coincided with the time when many countries in Asia had gradually decreased the most stringent government controls. Nevertheless, the findings also show that many MSMEs did not have optimistic prospects for future sales or remained unable to rehire permanent and regular employees to the pre-COVID-19 level, possibly because they anticipated a possible resurgence of the pandemic shocks.

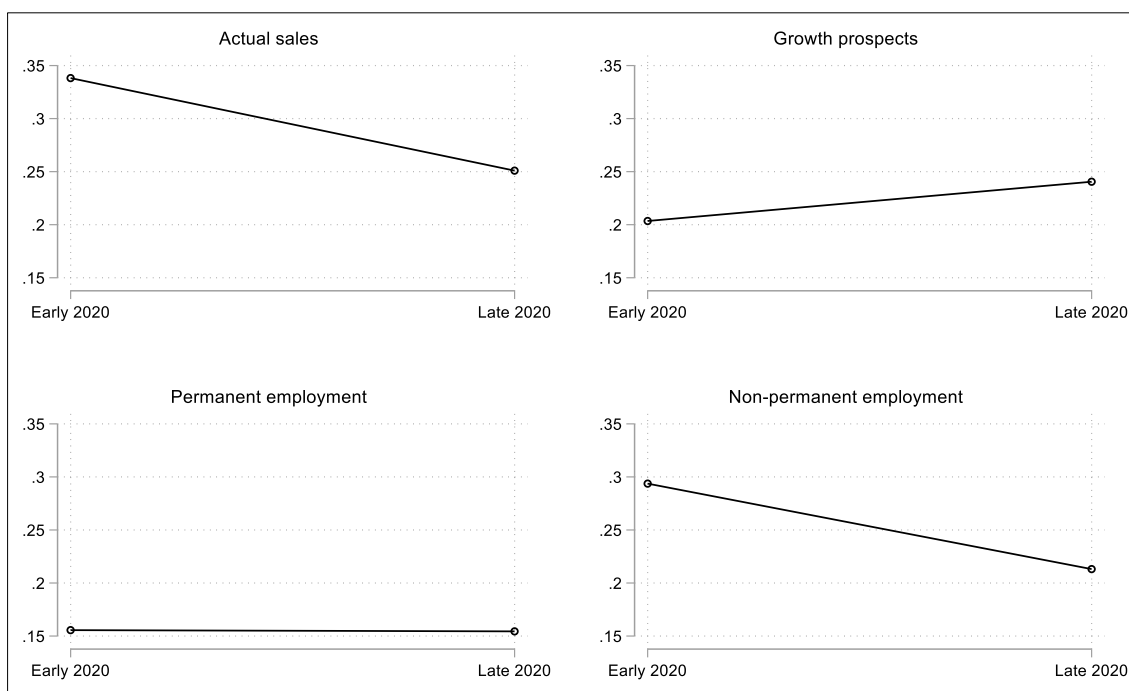
Next, we predicted a firm's likelihood of suffering the most severe impacts on its sales revenues, growth prospects of sales revenues, permanent employment, or non-permanent employment and compared such likelihoods between early and late 2020 (Figure 1). A firm's probability of losing over 40% of its sales shrank from around 35% in early 2020 to about 25% in late 2020. Similarly, the likelihood of laying off

⁵ In this study, food-processing firms; textile-, garment-, and leather-producing firms; wholesale and retail trading firms; and hospitality services (restaurants, bars, etc.), hotels, and tourism operators (referred to as hospitality service providers) are the sectors that the pandemic shocks have severely affected.

⁶ Each of these tables presents the regression outputs based on two corresponding outcome variables (e.g., actual sales revenue vs. sales growth prospects), of which each offers three different models' results, using (a) the first-wave sub-sample, (b) the second-wave sub-sample, and (c) the pooled data (using both first- and second-wave data).

non-permanent workers of over 40% shows a significant downward trend. On the other hand, a firm’s likelihood of having the most severe growth prospects (over 40% decline) was around 20% in early 2020, slowly increasing to 25% in late 2020. Similarly, the probability of laying off over 40% of permanent workers remained constant at around 15% over time.

Figure 1: Probabilities of Losing over 40% of Sales and Employment in Early and Late 2020



Source: COVID-19 MSME Survey, ADBI.

Then, we investigated whether MSMEs’ shortages of cash flows and raw materials intensified over the period. We found that the second-wave survey dummy variable has a negative association with cash shortage issues but a positive association with raw material disruptions (Appendix Table A3). These findings suggest that the cash shortage issues appeared in early 2020 as a short-term shock due to the rapidly shrinking external demand but improved over time. On the other hand, raw material shortage issues hit many MSMEs with significant time lags. The difficulty of acquiring raw materials in developing countries may relate to earlier contractions in the global supply chain, causing price hikes and logistics shocks. Though it is possible to interpret this as a sign of recovery among MSMEs during the second half of 2020, the issue could have been a significant bottleneck for MSMEs as more businesses resumed their production and service operations.

3.2 Hard-Hit MSMEs

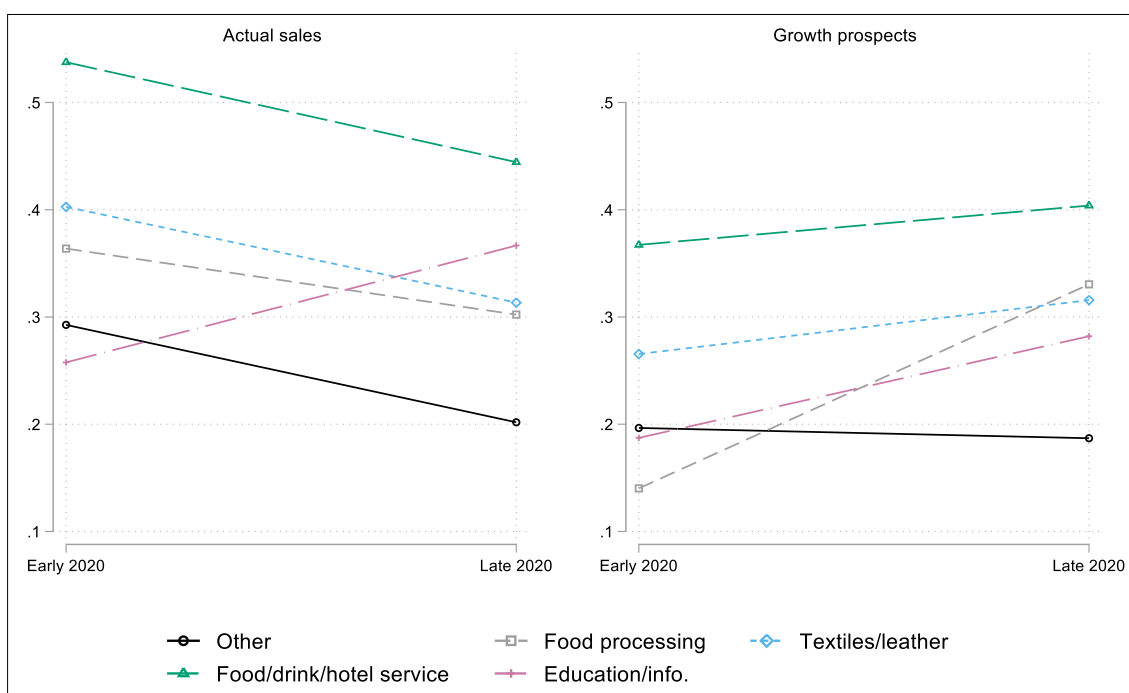
This section focuses on determining whether the pandemic impacts had an even distribution across sectors and whether they varied over time. Overall, the summary statistics show that the pandemic impacts had an uneven distribution across countries and sectors (Table 3). As Sonobe et al. (2021) also reported, producers of textiles, garments, and leather goods, as well as operators of hospitality services (e.g.,

restaurants, bars, hotels, and tourism), stood out as experiencing the most severe impacts from the pandemic shocks in the first half of 2020. Alarmingly, the second-wave survey data show that the range of hard-hit sectors had expanded. In late 2020, food-processing firms, wholesale/retail traders, and education service producers started exhibiting a significant decline in addition to hospitality services and garment MSMEs. We call these five sub-sector groups “hard-hit sectors” in this study.

The regression results obtained from the first-wave sample also confirm the uneven distribution of the pandemic impacts. Controlling for firms’ characteristics and other country variations, we found that hospitality services and textile/leather manufacturing firms had a negative association with the actual sales and sales growth prospects in early 2020. Furthermore, the results from the second-wave sample show that MSMEs in food processing, trading, and education services, besides textile and hospitality MSMEs, had a negative association with actual sales and sales growth prospects (Appendix Table A1). Moreover, we found that job cuts of both permanent and non-permanent employees intensified in late 2020 in these hard-hit MSMEs more than in others, while significant layoffs concentrated only on the hospitality service industries in early 2020 (Appendix Table A2).

Next, we estimated how the probabilities of facing the most severe impact (i.e., losing over 40% compared with the pre-pandemic level) differed between the hard-hit sectors and the other sectors and how they varied over time. Figure 2 presents the predictions for the actual sales revenues and sales growth prospects of MSMEs. The probabilities of having severe losses in actual sales sloped downward from early to late 2020 for most sectors except for the education service industries, which experienced a sharp rise. On the other hand, the probabilities of facing the most severe decline in sales growth prospects sloped upward in all hard-hit sectors, but those for other sectors remained virtually flat.

Figure 2: Probability of Losing over 40% of Actual Sales and Growth Prospects in the Hard-Hit Sectors in Early and Late 2020

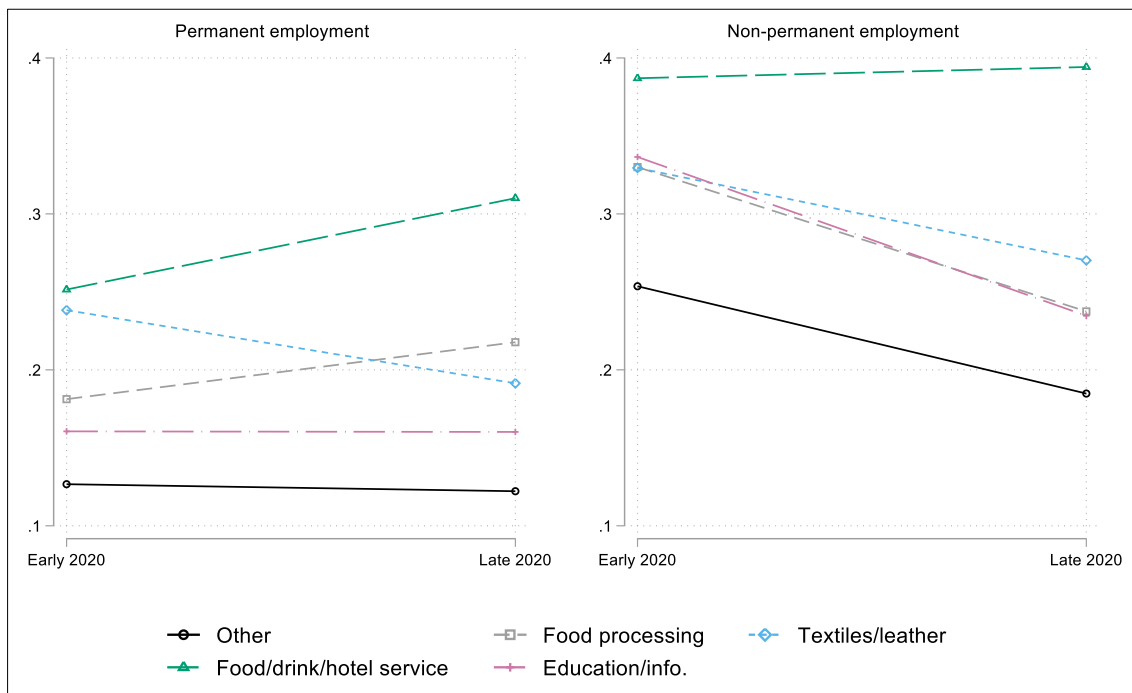


Source: COVID-19 MSME Survey, ADBI.

The finding suggests that hospitality service MSMEs stand out significantly from all other hard-hit MSMEs, facing the most severe likelihood of a significant decline in actual or forecasted sales revenues throughout the period. The findings also show that education service MSMEs quickly emerged in late 2020, perhaps due to prolonged school closures resulting from the pandemic, as well as the global economic slowdown, shrinking household incomes that had been allocated to private education. The probability of the most severe future sales growth prospects stayed lower in education service MSMEs than that for the average of other sectors in early 2020 but sharply increased to over 30% in late 2020, surpassing that for most industries except hospitality services.

Similarly, we predicted the probability of severe layoffs of permanent and non-permanent employment (Figure 3). Again, the predicted probabilities of severe job cuts in hard-hit MSMEs remained consistently higher than those in other sectors throughout 2020. Furthermore, the probability of severe layoffs of permanent employees did not vary over 2020 in most hard-hit sectors except for hospitality services and food-processing MSMEs, which seem to have intensified the laying off of their permanent employees in the second half of 2020. On the other hand, the probabilities of non-permanent job cuts appear to have decreased sharply over time in all sectors except the hospitality service industries.

Figure 3: Probability of Cutting over 40% of Permanent and Non-permanent Employees in the Hard-Hit Sectors in Early and Late 2020



Source: COVID-19 MSME Survey, ADBI.

3.3 Vulnerable MSMEs

This section highlights the vulnerable MSMEs, particularly women-led firms and microenterprises, and investigates how COVID-19 affected them differently. Respectively, women-led firms and microenterprises account for about 30% and 50–60% of the sample firms (Table 3). Women-led firms are relatively more concentrated in the hard-hit industries, facing a greater chance of business disruptions.

Table 4 compares the average characteristics of women- and men-led firms based on the survey sample. There are a few notable differences between the two groups. On average, women-led firms tend to be younger and predominantly micro-sized compared with their male counterparts. More women-led firms sell their goods and services online than men-led firms, and their online sales are more significant than those of men-led firms. Female entrepreneurs seem to be more willing to adopt digital technology. A possible explanation is that adopting digital technology enables female entrepreneurs to balance their domestic workloads, childcare, and business operations better (UN Women 2020) or diversify their marketing means as the traditional markets customarily favor men.

Table 4: Comparison of Firms' Characteristics by Gender of Firms' Leadership

	Women-Led Firms			Men-Led Firms		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Firm age (years)	1,392	9.8	8.5	3,001	14.4	13.1
Microenterprise	1,415	0.70	0.46	3,068	0.48	0.50
Small enterprise	1,415	0.19	0.39	3,068	0.26	0.44
Medium enterprise	1,415	0.11	0.008	3,068	0.27	0.008
Export oriented	1,393	0.17	0.38	3,001	0.18	0.39
Selling online	1,405	0.59	0.49	3,048	0.51	0.50
Online sales 2019 (%)	1,393	24.9	30.0	3,001	18.1	28.3

Note: All the variables in this table are binary variables with a value equal to zero or one except for firm age (years) and online sales 2019 (%).

Source: COVID-19 MSME Survey, ADBI.

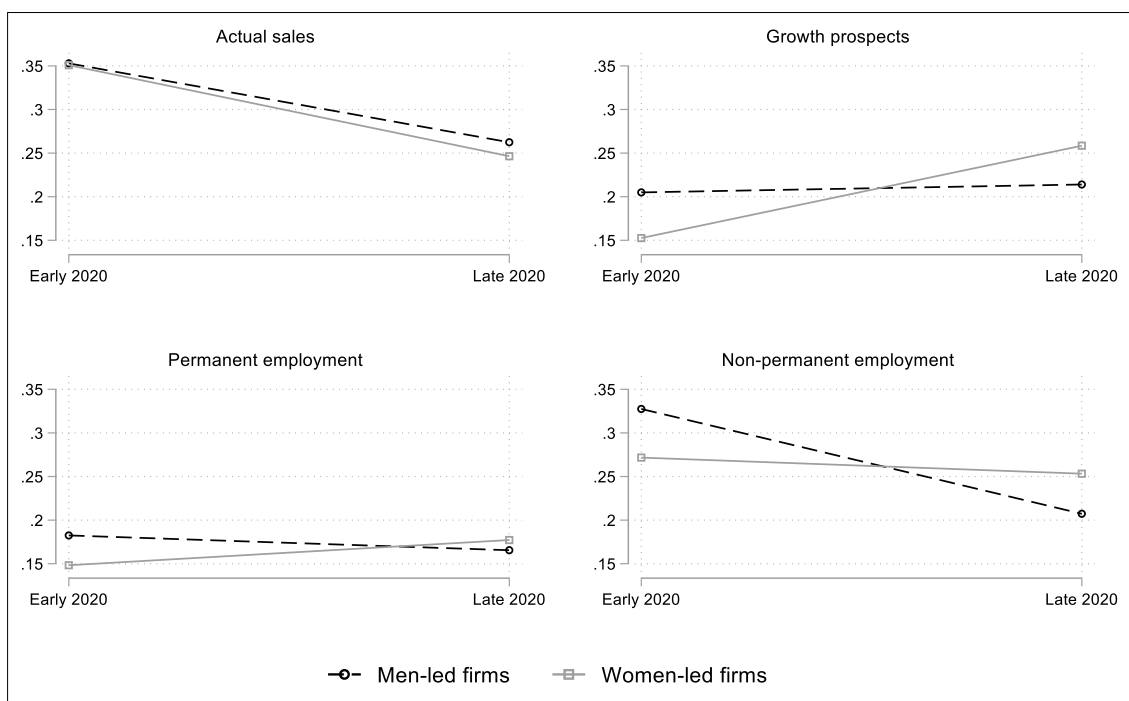
The regression analysis using the second-wave sample shows that women-led firms have a positive association with the actual sales, suggesting that the sales revenue for female entrepreneurs recovered in the second half of 2020, which is inconsistent with the existing studies indicating that female entrepreneurs experienced a drastic decline in sales revenue during the pandemic. However, the result also shows that the coefficient of an interaction term between women-led firms and the second-wave survey dummy has a negative association with sales growth prospects (column (6), Appendix Table A1). This finding suggests that, despite some recovery, female entrepreneurs had gloomy prospects for sales growth in the second half of 2020. On the other hand, microenterprises have a negative association with both actual sales and sales growth prospects (column (2) in Appendix Table A1), suggesting that microenterprises had substantially lost their actual sales and had severe prospects for sales growth, especially in late 2020, compared with larger firms.

With respect to employment, we found that the coefficient of the interaction term of women-led firms with the second-round survey dummy has a negative association with both permanent and non-permanent employment (columns (3) and (6), Appendix Table A2). This finding suggests that female leaders of firms cut more employees,

regardless of their permanent or temporary status, in late 2020 than their male counterparts. Similarly, the coefficient of the microenterprise dummy has a negative association with both permanent and non-permanent employees, indicating that they tended to cut employment more than larger firms.

Figure 4 presents the predicted probabilities of having the most severe loss by gender of firm owners. For the actual sales revenue, there is no clear gender difference. However, for sales growth prospects, the likelihood of expecting more than a 40% decline increased substantially among women-led firms in late 2020. Regarding employment, the likelihood of having more than a 40% reduction of both permanent and non-permanent employees did not improve among female firm leaders compared to their male counterparts in late 2020. In sum, there are clear gender differences in MSMEs' employment status; firms with female leaders cut employment of both permanent and non-permanent employees more than firms with male leaders in the second half of 2020.

Figure 4: Probabilities of Losing over 40% of Sales and Employment by Gender of Firm Owners in Early and Late 2020



Source: COVID-19 MSME Survey, ADBI.

Finally, turning to cash and raw material shortages, Appendix Table A3 presents the estimation results. The estimation result regarding whether women-led firms faced a cash or raw material shortage is not significant, but we found that firms with male leaders were more prone to experience raw material shortages in late 2020. We also found that microenterprises were more likely to suffer from cash flow disruptions than larger firms.

3.4 Digitalization of MSMEs

MSMEs' uptake of digital technology remains significantly behind that of larger firms though the COVID-19 pandemic has accelerated the adoption and usage of digital technologies. As presented earlier (Table 3), our survey data show that only about half of the survey sample firms stated that they have some online sales by the end of 2019. The sample firms have quite a wide distribution of online sales in their total revenues, with a significant concentration of MSMEs without any online sales. It is also important to note that the cross-country variation is substantial. For instance, over 80% of MSMEs in Viet Nam have some online sales; however, this share is around 30% of all MSMEs in Bangladesh and Mongolia.

Next, we investigated whether digitalization could mitigate the adverse impacts of the pandemic. The regression analysis results show that the intensity of online commerce is strongly related to the overall sales revenues and the employment of permanent and non-permanent workers of MSMEs. First, the proportion of online sales has a nonlinear or u-shaped (convex) relationship with MSMEs' sales revenues and growth prospects, especially during the second half of 2020 (Appendix Table A1). This means that sales revenues or sales growth prospects may have decreased as the online sales share increased to about 30% of the total sales, but the actual sales and growth prospects may have improved if the online sales share exceeded that point. This relationship is not significant according to the first-wave data.

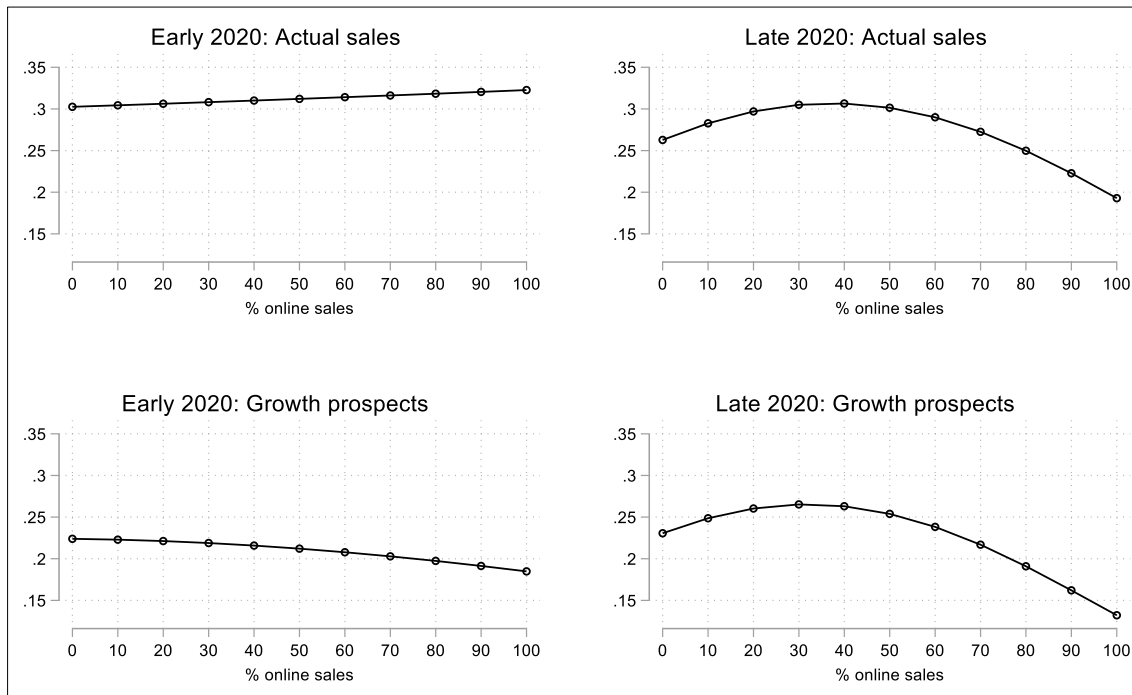
Second, we found that the intensity of online sales also exhibits a significant nonlinear relationship with MSMEs' permanent and non-permanent employment. However, unlike our observation for sales, this relationship is significant throughout 2020 (Appendix Table A2). This finding means that layoffs of employees may have intensified to a point at which the online sales share exceeded 40% of the total revenues, but the job cuts moderated if their online sales share surpassed that point. In sum, these findings point to the growing importance of digitalization for MSMEs to survive the pandemic shocks.

Based on the regression analyses, we predicted that the probability of having over 40% online sales declined at different levels of online commerce shares in actual sales and growth prospects for future sales (Figure 5) as well as temporary and permanent employment (Figure 6). As Figure 5 shows, the degrees of curvature of actual sales and growth prospects are sharper in late 2020, and online sales are not significant according to the first-wave data. In early 2020, the digitalization of MSMEs could rarely predict whether they would lose a substantial amount of sales, but, in late 2020, digitalization became increasingly more critical for MSMEs as their survival seems to have been conditional not just on whether they had online sales but also on the extent to which they could digitalize their marketing.

Similarly, we predicted the probabilities of cutting permanent and non-permanent employment by more than 40% at different intensities of online sales (Figure 6). The figure shows similar concave curves, which peak at around 30–40% in early and late 2020. The probability of cutting non-permanent employees is also located slightly lower in late 2020 than in early 2020.

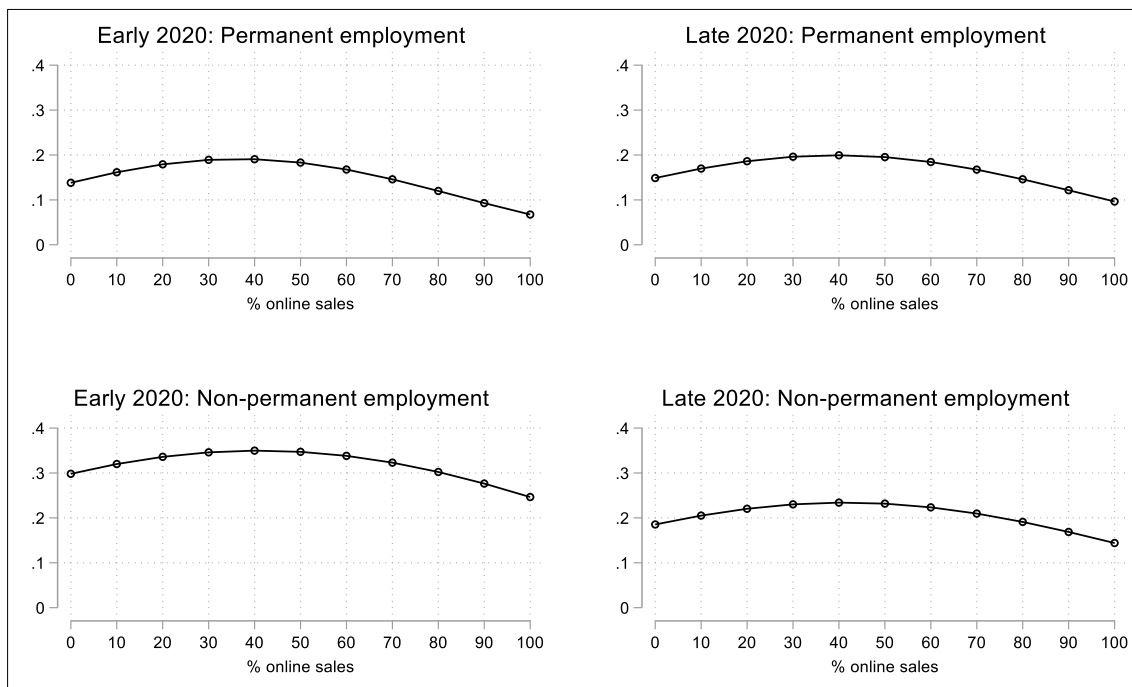
We also found that MSMEs' digitalization could benefit both men- and women-led firms almost equally. The findings imply that increasing online commerce had the potential to transform the trajectory of MSMEs, including vulnerable firms, by boosting their revenues and employment even amid the prolonged pandemic shocks.

Figure 5: Probabilities of Losing over 40% of Actual Sales and Growth Prospects and Digitalization Intensity in Early and Late 2020



Source: COVID-19 MSME Survey, ADBI.

Figure 6: Probabilities of Cutting over 40% of Permanent and Non-permanent Employees and Digitalization Intensity in Early and Late 2020



Source: COVID-19 MSME Survey, ADBI.

We then attempted to characterize the MSMEs that have more online sales and those that intend to expand their online sales. Our findings show that women-led, younger, or export-oriented firms tended to have more online sales than their respective counterparts (columns (1)–(3) in Appendix Table A4). Among various industries, more firms in hospitality industries, such as food and drink services and hotels, and education service providers tended to have more online sales, particularly in the second-wave sample. We also found that younger firms and export-oriented firms had a stronger intention to expand their online sales share (columns (4)–(6) in Appendix Table A4). Furthermore, firms with over half of their total sales coming from online sales were more willing to increase their online sales in the coming months. The gender of MSMEs' heads or firm size was not significant in relation to the intention to expand online sales. Further research, however, is necessary to understand MSMEs that had no online sales and to determine what could motivate them.

3.5 Government Aid for MSMEs

This section examines the government support that MSMEs have received and still feel to be necessary to cope with the COVID-19 shocks. Three types of government support are in focus: (a) any assistance, covering all types of assistance; (b) tax-related support (e.g., tax payment deferrals, tax exemptions, and lowered tax); and (c) loan-related support (e.g., rescheduling of bank loans and emergency loans). More than half of the firms needed tax-related support, with considerable variations among countries. For example, around 70% of Vietnamese sample firms but only 8% in Bangladesh and 15% in Indonesia reported that they needed tax-related support. Nearly 70% of sample firms in Malaysia and Bangladesh but only around 20% of Indonesian firms reported the need for loan-related support.

Appendix Table A5 presents the estimation results regarding whether firms have received or needed any kind of government support. First, we found that the second-wave survey dummy was positive and significant, suggesting an overall increase in MSMEs receiving government support over time (column (3) of Appendix Table A5). Second, women-led MSMEs, hard-hit sectors, and microenterprises showed a negative association with receiving government support in the second half of 2020. This finding suggests that MSMEs in the hard-hit sectors, firms with female leaders, and microenterprises were less likely to receive government support than their counterparts in the second half of 2020. Third, export-oriented firms and long-established firms had a close association with receiving any government support.

We turn now to the regression results concerning MSMEs' need for government support. Again, we found that the second-wave survey dummy was positive and significant, suggesting an overall increase in firms needing government support over time (column (6) of Appendix Table A5). However, only women-led firms had a negative association with such a need according to the second-wave sample (columns (5) and (6)).

Next, we focused specifically on loan- and tax-related support, obtaining similar findings overall. Specifically, women-led firms, microenterprises, and hard-hit sector dummies (only loan related) had a negative association with these specific kinds of government support (Appendix Tables A6 and A7). However, one exception was that the second-wave survey dummy was negative and significant for receiving both loan- and tax-related support, suggesting that fewer firms received loan- and tax-related support in late 2020. In addition, women-led firms and microenterprises had a negative association with the need for tax- or loan-related support. In sum, our findings revealed that MSMEs in vulnerable conditions, such as firms with female

leaders, microenterprises, or firms in the hard-hit sectors, were relatively less likely to have received or demanded government support, despite their disparate situations.

4. CONCLUSION

This study provides a comprehensive analysis of MSME business owners' responses to the severe global pandemic shocks based on new data that we collected over 2020 in eight developing countries across Asia. MSMEs have played an essential role in sustaining Asia's economic growth and absorbing the growing working population in the region for several decades. However, their economic activity has contracted significantly due to sudden shocks, especially the stringent government policy responses, and a rapidly shrinking demand due to the global pandemic. Moreover, relative to large-scale companies, MSMEs have inherited more challenges, which place them in vulnerable situations. Thus, the recurrent pandemic waves may have exacerbated their hardship, and many of them are approaching business failure despite striving to survive.

The study described the overall evolving situation of MSMEs. While the general picture showed that they started regaining the substantial losses in actual sales revenues and suspended the reduction of the number of non-permanent workers toward the end of 2020, they remained unable to recover their confidence in their future prospects and permanent workers by the end of 2020, which may also pose uncertainty for their business survival and sustainable development.

The general trend may mask a significant disparity emerging among small business owners, which may worsen. MSMEs in hard-hit sectors (i.e., food processing, textiles, wholesale/retail trading, hospitality services, and education) and vulnerable conditions, such as women-led firms and microenterprises, have not experienced the general positive trend. As shown, the characteristics of hard-hit sectors and vulnerable groups are quite closely correlated. Without shocks, they were relatively more prone to any risks due to their limited working capital and limited access to finance. The findings also revealed that these vulnerable MSMEs were more likely to reduce their number of employees, which will damage their operation in the long term.

Despite the significant hardship for MSMEs, the vital role of digitalization and government support appeared hopeful. We showed that intensifying online sales benefited men- and women-led MSMEs equally and did not discriminate microenterprises or specific sectors. Moreover, the study found a nonlinear relationship with sales and employment in late 2020, suggesting that the use of online sales decreases sales and displaces labor input up to a certain point but that larger-scale use of online sales increases sales and creates jobs. An urgent question concerns how governments can support MSMEs to boost their digitalization. In addition, despite increases in the number of MSMEs receiving government support, the provision has not reached the most affected or vulnerable firms, such as firms operating in hard-hit sectors, firms with female leaders, or microenterprises. Thus, governments could improve their targeting and design support to meet their needs.

While the vaccine rollout is advancing in many countries, the pandemic shocks are still far from over. As the economy gears up for a speedy recovery, supporting MSMEs remains a critical and urgent challenge. The evidence from this study should be helpful for policymakers in crafting policy responses to support MSMEs in surviving the hardship.

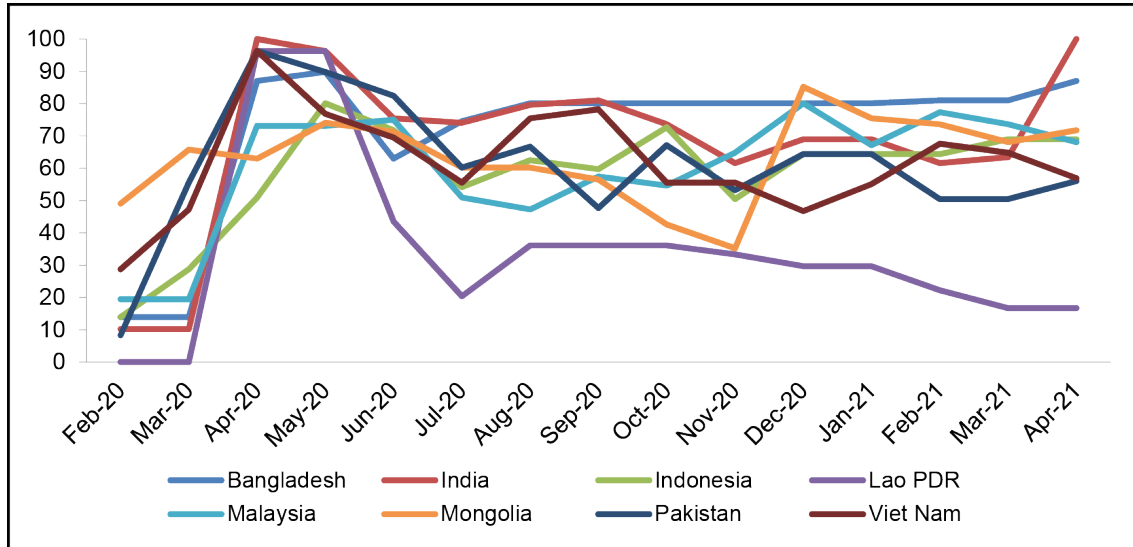
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APPENDIX

Appendix Figure A1: Government Response Stringency Index, February 2020–April 2021



Note: This is a composite measure based on nine response indicators, including school closures, workplace closures, and travel bans, rescaled to a value from zero to 100 (100 = strictest). If policies vary at the subnational level, the figure shows the index as the response level of the strictest sub-region.

Source: Hale et al. (2021).

**Appendix Table A1: Estimated Functions Explaining Actual Sales
and Expected Sales Growth: Ordered Logit Regression
(Estimated Coefficients)**

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Only W1	Only W2	All	Only W1	Only W2	All
	Actual Sales			Sales Growth Prospects		
Second survey wave			0.427*** (0.086)			-0.055 (0.070)
Women-led firms	-0.115 (0.132)	0.173* (0.094)	0.009 (0.117)	0.123 (0.106)	0.083 (0.096)	0.358*** (0.096)
Second wave ## women-led firms			0.075 (0.139)			-0.606*** (0.124)
Firm age (years)	-0.005 (0.005)	0.012*** (0.004)	0.005* (0.003)	-0.002 (0.004)	0.009** (0.004)	0.003 (0.003)
Export oriented	0.241* (0.145)	0.231** (0.113)	0.251*** (0.088)	0.043 (0.117)	0.271** (0.114)	0.193** (0.079)
Microenterprise	-0.075 (0.161)	-0.443*** (0.123)	-0.311*** (0.096)	-0.162 (0.123)	-0.232* (0.124)	-0.143* (0.085)
Small enterprise	0.171 (0.163)	-0.230* (0.129)	-0.094 (0.100)	0.006 (0.121)	-0.081 (0.131)	0.003 (0.087)
Online sales in 2019	-0.091 (0.680)	-1.276*** (0.469)	-1.086*** (0.378)	0.045 (0.531)	-1.325*** (0.481)	-0.793** (0.344)
Online sales in 2019—squared	-0.009 (0.770)	1.711*** (0.552)	1.299*** (0.440)	0.241 (0.605)	2.075*** (0.568)	1.379*** (0.400)
Manufacturing—food processing	-0.271 (0.302)	-0.584*** (0.218)	-0.487*** (0.175)	-0.291 (0.282)	-0.529** (0.220)	-0.589*** (0.166)
Manufacturing—textiles and leather	-0.957* (0.564)	-1.275*** (0.376)	-1.142*** (0.310)	-0.387 (0.513)	-0.866** (0.370)	-0.709** (0.290)
Services—tourism, food and drink services	-1.087*** (0.353)	-1.347*** (0.270)	-1.221*** (0.213)	-1.224*** (0.329)	-1.519*** (0.269)	-1.358*** (0.202)
Services—wholesale/retail trading	0.200 (0.315)	-0.439** (0.224)	-0.214 (0.181)	-0.544* (0.291)	-0.527** (0.225)	-0.492*** (0.172)
Services—information and education	-0.515 (0.417)	-1.174*** (0.296)	-0.908*** (0.240)	-0.919*** (0.345)	-1.204*** (0.297)	-1.001*** (0.217)
Observations	1,359	2,262	3,621	2,071	2,262	4,333
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.0375	0.0544	0.0393	0.156	0.0972	0.0836
Log-likelihood	-1,573	-2,784	-4,427	-2,345	-2,656	-5,257

Notes: The numbers in parentheses are standard errors. ***, **, and * indicate the 1%, 5%, and 10% significance levels, respectively. "W1" refers to the first-wave survey period (early 2020), and "W2" refers to the second-wave survey period (late 2020). The notes to Table 1 and Table 2 define the dependent variables and explanatory variables, respectively. The coefficient of "second survey wave" indicates the difference from the first survey wave. "Second wave ## women-led firms" is the interaction term of the second-wave survey dummy and the women-led firm dummy. All the specifications include country and sector fixed effects.

**Appendix Table A2: Estimated Functions Explaining Employment:
Ordered Logit Regression Results for Permanent and Non-permanent Workers
(Estimated Coefficients)**

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Only W1	Only W2	All	Only W1	Only W2	All
	Permanent Workers			Non-permanent Workers		
Second survey wave			0.118 (0.072)			0.622*** (0.071)
Women-led firms	0.190* (0.106)	0.014 (0.098)	0.248** (0.099)	0.131 (0.106)	-0.118 (0.096)	0.266*** (0.097)
Second wave ## women-led firms			-0.330*** (0.128)			-0.526*** (0.125)
Firm age (years)	0.002 (0.004)	0.013*** (0.004)	0.007*** (0.003)	-0.002 (0.004)	0.008** (0.004)	0.003 (0.003)
Export oriented	-0.266** (0.117)	-0.134 (0.114)	-0.198** (0.081)	-0.126 (0.118)	-0.056 (0.112)	-0.071 (0.079)
Microenterprise	-0.268** (0.124)	-0.250* (0.129)	-0.239*** (0.088)	-0.001 (0.124)	-0.317** (0.126)	-0.180** (0.086)
Small enterprise	0.031 (0.123)	-0.166 (0.135)	-0.047 (0.091)	0.014 (0.123)	-0.145 (0.133)	-0.069 (0.089)
Online sales in 2019	-2.237*** (0.521)	-1.940*** (0.488)	-2.230*** (0.350)	-1.401*** (0.521)	-1.507*** (0.476)	-1.379*** (0.341)
Online sales in 2019—squared	3.062*** (0.591)	2.461*** (0.578)	2.907*** (0.408)	1.714*** (0.581)	1.823*** (0.559)	1.694*** (0.393)
Manufacturing—food processing	-0.337 (0.279)	-1.010*** (0.240)	-0.808*** (0.181)	-0.082 (0.266)	-0.935*** (0.236)	-0.626*** (0.173)
Manufacturing—textiles and leather	-0.018 (0.508)	-1.235*** (0.391)	-0.768** (0.308)	-0.349 (0.485)	-1.306*** (0.374)	-0.865*** (0.292)
Services—tourism, food and drink services	-0.549* (0.330)	-1.400*** (0.286)	-1.028*** (0.215)	-0.109 (0.319)	-1.474*** (0.283)	-0.777*** (0.208)
Services—wholesale/retail trading	0.309 (0.298)	-0.578** (0.249)	-0.224 (0.190)	0.276 (0.282)	-0.480** (0.243)	-0.153 (0.181)
Services—information and education	-0.010 (0.357)	-1.116*** (0.311)	-0.582** (0.233)	0.243 (0.341)	-1.197*** (0.306)	-0.330 (0.224)
Observations	2,071	2,262	4,333	2,071	2,262	4,333
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.0531	0.0572	0.0470	0.103	0.0374	0.0449
Log-likelihood	-2,228	-2,429	-4,698	-2,227	-2,590	-4,975

Notes: The numbers in parentheses are standard errors. ***, **, and * indicate the 1%, 5%, and 10% significance levels, respectively. "W1" refers to the first-wave survey period (early 2020), and "W2" refers to the second-wave survey period (late 2020). The notes to Table 1 and Table 2 define the dependent variables and explanatory variables, respectively. The coefficient of "second survey wave" indicates the difference from the first survey wave. "Second wave ## women-led firms" is the interaction term of the second-wave survey dummy and the women-led firm dummy. All the specifications include country and sector fixed effects.

**Appendix Table A3: Estimated Functions Explaining Cash
and Raw Material Shortages: Logit Regression
(Estimated Coefficients)**

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Only W1	Only W2	All	Only W1	Only W2	All
	Cash Shortage			Raw Material Shortage		
Second survey wave			-0.264*** (0.100)			0.250*** (0.080)
Women-led firms	-0.209 (0.139)	-0.199 (0.132)	-0.335*** (0.130)	0.049 (0.116)	-0.407*** (0.110)	0.032 (0.108)
Second wave ## women-led firms			0.277 (0.169)			-0.423*** (0.140)
Firm age (years)	-0.012** (0.005)	-0.014*** (0.005)	-0.013*** (0.003)	-0.009** (0.004)	-0.004 (0.004)	-0.006** (0.003)
Export oriented	0.013 (0.160)	0.253 (0.155)	0.121 (0.110)	0.506*** (0.131)	0.560*** (0.131)	0.565*** (0.091)
Microenterprise	0.508*** (0.172)	0.795*** (0.161)	0.635*** (0.116)	0.263* (0.139)	0.096 (0.144)	0.178* (0.098)
Small enterprise	0.040 (0.168)	0.494*** (0.169)	0.260** (0.117)	0.065 (0.139)	0.083 (0.153)	0.081 (0.102)
Online sales in 2019	1.194* (0.707)	1.431** (0.658)	1.335*** (0.468)	1.686*** (0.577)	3.191*** (0.556)	2.474*** (0.391)
Online sales in 2019—squared	-1.777** (0.775)	-2.320*** (0.750)	-2.062*** (0.524)	-1.973*** (0.652)	-3.899*** (0.664)	-2.931*** (0.456)
Manufacturing—food processing	-0.464 (0.372)	-0.349 (0.348)	-0.359 (0.252)	-0.328 (0.297)	0.124 (0.248)	-0.078 (0.187)
Manufacturing—textiles and leather	-0.046 (0.733)	0.120 (0.580)	0.117 (0.452)	0.005 (0.579)	-0.611 (0.411)	-0.312 (0.328)
Services—tourism, food and drink services	-0.222 (0.432)	-0.326 (0.391)	-0.295 (0.288)	-0.907*** (0.350)	-0.743** (0.304)	-0.786*** (0.227)
Services—wholesale/retail trading	-0.392 (0.394)	-0.494 (0.348)	-0.451* (0.259)	-1.000*** (0.317)	-0.442* (0.256)	-0.623*** (0.197)
Services—information and education	-0.132 (0.485)	-0.314 (0.435)	-0.270 (0.321)	-1.808*** (0.419)	-0.854** (0.340)	-1.245*** (0.259)
Constant	2.770*** (0.472)	2.006*** (0.380)	2.500*** (0.297)	0.590* (0.339)	0.356 (0.280)	0.202 (0.217)
Observations	2,071	2,262	4,333	2,071	2,262	4,333
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.0806	0.105	0.0785	0.0803	0.105	0.0826
Log-likelihood	-931.8	-1,026	-1,991	-1,310	-1,402	-2,747

Notes: The numbers in parentheses are standard errors. ***, **, and * indicate the 1%, 5%, and 10% significance levels, respectively. "W1" refers to the first-wave survey period (early 2020), and "W2" refers to the second-wave survey period (late 2020). The notes to Table 1 and Table 2 define the dependent variables and the explanatory variables, respectively. The coefficient of "second survey wave" indicates the difference from the first survey wave. "2nd wave ## women-led firms" is the interaction term of the second-wave survey dummy and the women-led firm dummy. All the specifications include country and sector fixed effects.

**Appendix Table A4: Estimated Functions Explaining
the Current and Planned Digitalization
(Estimated Coefficients)**

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Only W1	Only W2	All	Only W1	Only W2	All
	Online Sales in 2019 (OLS)			Intention to Increase Online Sales		
Second survey wave			-1.993*			0.046
			(1.017)			(0.091)
Women-led firms	3.672**	5.734***	4.760***	0.018	0.045	-0.045
	(1.481)	(1.352)	(1.381)	(0.146)	(0.126)	(0.131)
Second wave ## women-led firms			0.166			0.115
			(1.793)			(0.170)
Firm age (years)	-0.221***	-0.177***	-0.199***	-0.012**	-0.010**	-0.010***
	(0.055)	(0.054)	(0.038)	(0.005)	(0.005)	(0.003)
Export oriented	9.682***	9.886***	9.919***	0.328*	0.492***	0.446***
	(1.655)	(1.579)	(1.136)	(0.168)	(0.162)	(0.115)
Microenterprise	-0.154	-1.591	-1.004	-0.173	0.106	-0.043
	(1.756)	(1.769)	(1.241)	(0.162)	(0.161)	(0.112)
Small enterprise	-0.237	0.287	-0.035	0.014	-0.084	-0.042
	(1.758)	(1.883)	(1.285)	(0.164)	(0.172)	(0.117)
Online sales in 2019				9.715***	10.466***	10.180***
				(0.892)	(0.837)	(0.599)
Online sales in 2019—squared				-7.741***	-9.517***	-8.738***
				(1.009)	(0.940)	(0.672)
Manufacturing—food processing	-0.103	1.806	1.332	-0.037	0.548**	0.359
	(3.809)	(3.131)	(2.413)	(0.371)	(0.279)	(0.218)
Manufacturing—textiles and leather	2.213	8.084	6.099	0.176	0.201	0.301
	(7.255)	(5.261)	(4.267)	(0.748)	(0.500)	(0.411)
Services—tourism, food and drink services	-0.263	8.261**	4.423	-0.441	0.144	-0.097
	(4.518)	(3.827)	(2.919)	(0.432)	(0.342)	(0.261)
Services—wholesale/retail trading	-5.387	0.917	-0.944	-0.476	-0.022	-0.129
	(4.056)	(3.236)	(2.534)	(0.381)	(0.278)	(0.220)
Services—information and education	3.976	8.531**	6.915**	-0.723	-0.124	-0.385
	(4.867)	(4.193)	(3.170)	(0.450)	(0.376)	(0.279)
Constant	12.225***	5.308	9.213***	1.004**	0.101	0.413*
	(4.338)	(3.521)	(2.773)	(0.414)	(0.305)	(0.245)
Observations	2,071	2,262	4,333	2,067	2,253	4,320
R-squared	0.163	0.155	0.146			
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared				0.231	0.172	0.187
Log-likelihood				-965.7	-1,130	-2,132

Notes: The numbers in parentheses are standard errors. ***, **, and * indicate the 1%, 5%, and 10% significance levels, respectively. "W1" refers to the first-wave survey period (early 2020), and "W2" refers to the second-wave survey period (late 2020). The notes to Table 1 and Table 2 define the dependent variables and explanatory variables, respectively. The coefficient of "second survey wave" indicates the difference from the first survey wave. "Second wave ## women-led firms" is the interaction term of the second-wave survey dummy and the women-led firm dummy. All the specifications include country and sector fixed effects.

Appendix Table A5: Estimated Functions Explaining Received Support and Need for All Types of Support: Logit Regressions

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Only W1	Only W2	All	Only W1	Only W2	All
	Received Any Aid			Need Any Aid		
Second survey wave			0.408*** (0.081)			0.287** (0.127)
Women-led firms	0.049 (0.117)	-0.236** (0.110)	-0.099 (0.108)	0.127 (0.206)	-0.406** (0.175)	0.341* (0.183)
Second wave ## women-led firms			0.031 (0.140)			-0.855*** (0.220)
Firm age (years)	0.009* (0.004)	0.017*** (0.005)	0.012*** (0.003)	-0.001 (0.007)	-0.006 (0.007)	-0.003 (0.005)
Export oriented	0.321** (0.131)	0.439*** (0.134)	0.376*** (0.092)	0.283 (0.235)	0.306 (0.220)	0.273* (0.157)
Microenterprise	-0.321** (0.136)	-0.617*** (0.148)	-0.444*** (0.099)	-0.475** (0.230)	0.282 (0.231)	0.049 (0.157)
Small enterprise	0.005 (0.137)	-0.270* (0.157)	-0.097 (0.102)	0.031 (0.234)	0.693** (0.272)	0.344** (0.170)
Online sales in 2019	0.383 (0.578)	0.701 (0.543)	0.459 (0.386)	0.797 (0.955)	1.034 (0.804)	0.699 (0.588)
Online sales in 2019—squared	-0.341 (0.647)	-0.830 (0.637)	-0.575 (0.443)	-1.382 (1.042)	-1.514 (0.926)	-1.165* (0.662)
Manufacturing—food processing	0.205 (0.303)	-0.180 (0.257)	0.073 (0.190)	0.186 (0.422)	-0.615 (0.440)	-0.338 (0.290)
Manufacturing—textiles and leather	-0.864 (0.589)	-1.105*** (0.424)	-0.912*** (0.338)	-0.171 (0.781)	-1.166* (0.682)	-0.639 (0.484)
Services—tourism, food and drink services	-0.409 (0.351)	-0.772** (0.310)	-0.573** (0.227)	0.316 (0.664)	-0.104 (0.610)	0.126 (0.433)
Services—wholesale/retail trading	-0.355 (0.318)	-0.541** (0.264)	-0.452** (0.198)	-0.087 (0.482)	-1.334*** (0.465)	-0.617** (0.313)
Services—information and education	-0.085 (0.380)	-0.426 (0.341)	-0.276 (0.249)	0.898 (0.727)	0.427 (0.844)	0.561 (0.537)
Constant	0.398 (0.339)	1.153*** (0.290)	0.498** (0.218)	0.357 (0.475)	5.729*** (0.851)	1.960*** (0.336)
Observations	2,071	2,262	4,333	1,983	2,262	4,333
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.0903	0.0968	0.0811	0.220	0.243	0.166
Log-likelihood	-1,306	-1,402	-2,752	-578.6	-682.6	-1,381

Notes: The numbers in parentheses are standard errors. ***, **, and * indicate the 1%, 5%, and 10% significance levels, respectively. "W1" refers to the first-wave survey period (early 2020), and "W2" refers to the second-wave survey period (late 2020). The notes to Table 1 and Table 2 define the dependent variables and explanatory variables, respectively. The coefficient of "second survey wave" indicates the difference from the first survey wave. "Second wave ## women-led firms" is the interaction term of the second-wave survey dummy and the women-led firm dummy. All the specifications include country and sector fixed effects.

Appendix Table A6: Estimated Functions Explaining Received Tax-Related Support and Need for Tax-Related Support: Logit Regressions

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Only W1	Only W2	All	Only W1	Only W2	All
	Received Tax-related Support			Needed Tax-related Support		
Second survey wave			-0.446*** (0.090)			0.213** (0.083)
Women-led firms	0.198 (0.127)	-0.314** (0.125)	0.219* (0.115)	-0.067 (0.126)	-0.449*** (0.110)	0.103 (0.113)
Second wave ## women-led firms			-0.572*** (0.157)			-0.658*** (0.147)
Firm age (years)	0.010** (0.005)	0.007 (0.005)	0.008** (0.003)	0.005 (0.005)	0.007 (0.004)	0.005* (0.003)
Export oriented	0.304** (0.146)	0.339** (0.141)	0.256*** (0.098)	-0.050 (0.141)	0.281** (0.129)	0.106 (0.093)
Microenterprise	-0.251 (0.154)	-0.636*** (0.163)	-0.363*** (0.108)	-0.336** (0.151)	-0.550*** (0.142)	-0.379*** (0.100)
Small enterprise	0.174 (0.152)	-0.231 (0.169)	0.029 (0.109)	0.081 (0.154)	-0.179 (0.152)	-0.027 (0.105)
Online sales in 2019	1.681*** (0.637)	1.071* (0.630)	0.936** (0.430)	0.289 (0.628)	0.727 (0.554)	0.471 (0.404)
Online sales in 2019—squared	-1.636** (0.716)	-1.345* (0.755)	-1.091** (0.499)	0.032 (0.703)	-0.704 (0.649)	-0.297 (0.464)
Manufacturing—food processing	0.956*** (0.349)	-0.133 (0.296)	0.322 (0.222)	0.452 (0.322)	-0.153 (0.257)	0.083 (0.199)
Manufacturing—textiles and leather	0.081 (0.671)	-0.200 (0.476)	-0.122 (0.390)	0.578 (0.625)	-0.573 (0.424)	-0.195 (0.343)
Services—tourism, food and drink services	0.325 (0.393)	-0.144 (0.344)	-0.004 (0.255)	-0.048 (0.372)	-0.004 (0.306)	-0.077 (0.234)
Services—wholesale/retail trading	0.402 (0.362)	-0.135 (0.299)	0.010 (0.230)	0.398 (0.342)	-0.192 (0.259)	0.067 (0.205)
Services—information and education	0.426 (0.435)	-0.126 (0.416)	0.031 (0.288)	-0.786* (0.403)	-0.477 (0.334)	-0.639** (0.255)
Constant	-3.028*** (0.429)	-0.656** (0.323)	-1.281*** (0.255)	-2.657*** (0.413)	0.161 (0.281)	-0.906*** (0.227)
Observations	2,071	2,262	4,333	2,071	2,262	4,333
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.209	0.133	0.154	0.214	0.121	0.141
Log-likelihood	-1,090	-1,089	-2,269	-1,126	-1,378	-2,580

Notes: The numbers in parentheses are standard errors. ***, **, and * indicate the 1%, 5%, and 10% significance levels, respectively. "W1" refers to the first-wave survey period (early 2020), and "W2" refers to the second-wave survey period (late 2020). The notes to Table 1 and Table 2 define the dependent variables and explanatory variables, respectively. The coefficient of "second survey wave" indicates the difference from the first survey wave. "Second wave ## women-led firms" is the interaction term of the second-wave survey dummy and the women-led firm dummy. All the specifications include country and sector fixed effects.

Appendix Table A7: Estimated Functions Explaining Received Loan-Related Support and Need for Loan-Related Support: Logit Regressions

Variables	2	(2)	(3)	(4)	(5)	(6)
	Only W1	Only W2	All	Only W1	Only W2	All
	Received Loan-related Support			Needed Loan-related Support		
Second survey wave			-0.550*** (0.093)			-0.154* (0.079)
Women-led firms	-0.204 (0.139)	-0.275** (0.133)	-0.314** (0.128)	-0.066 (0.115)	-0.132 (0.110)	-0.068 (0.108)
Second wave ## women-led firms			0.105 (0.173)			-0.071 (0.141)
Firm age (years)	-0.000 (0.005)	0.010** (0.005)	0.004 (0.003)	-0.009** (0.004)	-0.015*** (0.005)	-0.011*** (0.003)
Export oriented	0.276* (0.151)	0.341** (0.151)	0.290*** (0.105)	0.009 (0.129)	0.178 (0.125)	0.093 (0.089)
Microenterprise	-0.723*** (0.157)	-0.397** (0.168)	-0.595*** (0.112)	0.026 (0.135)	-0.209 (0.140)	-0.055 (0.096)
Small enterprise	-0.028 (0.152)	-0.039 (0.174)	-0.027 (0.112)	0.211 (0.136)	-0.134 (0.148)	0.078 (0.099)
Online sales in 2019	0.698 (0.670)	0.956 (0.693)	0.778* (0.470)	0.184 (0.570)	0.903* (0.544)	0.385 (0.385)
Online sales in 2019—squared	-0.728 (0.757)	-1.470* (0.839)	-1.028* (0.546)	-0.411 (0.640)	-1.111* (0.636)	-0.607 (0.443)
Manufacturing—food processing	0.226 (0.344)	-1.078*** (0.277)	-0.548*** (0.211)	-0.192 (0.291)	-0.279 (0.252)	-0.289 (0.188)
Manufacturing—textiles and leather	-0.604 (0.717)	-0.841* (0.460)	-0.669* (0.385)	0.405 (0.559)	-0.381 (0.415)	-0.083 (0.327)
Services—tourism, food and drink services	0.146 (0.412)	-2.005*** (0.423)	-1.011*** (0.275)	-0.499 (0.346)	-1.015*** (0.314)	-0.818*** (0.230)
Services—wholesale/retail trading	0.224 (0.373)	-1.287*** (0.296)	-0.725*** (0.228)	-0.421 (0.310)	-0.426* (0.255)	-0.435** (0.195)
Services—information and education	-0.361 (0.470)	-1.674*** (0.440)	-1.165*** (0.310)	-0.767** (0.375)	-1.192*** (0.341)	-1.052*** (0.250)
Constant	1.292*** (0.393)	0.821*** (0.306)	1.427*** (0.241)	0.579* (0.331)	1.534*** (0.284)	1.211*** (0.216)
Observations	2,071	2,262	4,333	2,071	2,262	4,333
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.220	0.137	0.175	0.0736	0.0929	0.0744
Log-likelihood	-1,020	-1,006	-2,072	-1,329	-1,400	-2,764

Notes: The numbers in parentheses are standard errors. ***, **, and * indicate the 1%, 5%, and 10% significance levels, respectively. "W1" refers to the first-wave survey period (early 2020), and "W2" refers to the second-wave survey period (late 2020). The notes to Table 1 and Table 2 define the dependent variables and explanatory variables, respectively. The coefficient of "second survey wave" indicates the difference from the first survey wave. "Second wave ## women-led firms" is the interaction term of the second-wave survey dummy and the women-led firm dummy. All the specifications include country and sector fixed effects.