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## COVID-19, fintech, and the recovery of micro, small, and medium-sized enterprises: Evidence from Bangladesh

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**ADBI Working Paper Series**

**COVID-19, FINTECH, AND THE RECOVERY  
OF MICRO, SMALL, AND MEDIUM-SIZED  
ENTERPRISES: EVIDENCE FROM BANGLADESH**

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**Abstract**

This study assesses the impact of the COVID-19 pandemic on micro, small, and medium-sized enterprises (MSMEs) and the role of Fintech, in particular mobile financial services (MFS), in their recovery from COVID-induced losses. The study uses data from a survey of 216 MSMEs from Bangladesh Small and Cottage Industries Corporation (BSCIC) industrial estates in Bangladesh during January to March 2021. Our results suggest that firms have been recovering gradually after the withdrawal from lockdown in June 2020. So far, 80% of production of the firms compared to pre-COVID levels had recovered by the end of December 2020. We use instrumental variable regression to assess the impact of the use of MFS on firms' production, sales, and profit for three periods: lockdown (March–May 2020), limited lockdown (June–September 2020) and the reopening period (October–December 2020). We find a significant and positive impact from the use of MFS on the production, sales, and profit of firms during this pandemic. The results indicate that the use of digital finance facilitates firms' production through ensuring a stable supply of raw materials and sales that have prompted them to recover faster. However, the concern is that only about 31% of our sample firms use MFS for their businesses and an even lower proportion of firms are accustomed to using an online platform. Therefore, more incentives and supportive policies are needed to motivate MSMEs to use digital finance and online platforms to stay active in operations, particularly during the pandemic.

**Keywords:** fintech, micro, small, and medium-sized enterprises, MSMEs, Bangladesh Small and Cottage Industries Corporation Estates, BSCIC, COVID-19, firm recovery, Bangladesh

**JEL Classifications:** D20, D22, G10, G20

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# 1. INTRODUCTION

A phenomenal surge in the use of Fintech and e-commerce during the COVID-19 pandemic caused a paradigm shift in digitalized purchases by consumers, and the use of online selling platforms and digital payments by firms. The role of Fintech has been substantially realized after the outbreak of COVID-19, when digital payments became an indispensable mechanism for making financial transactions from a safety perspective. Besides facilitating trade, digital payments also helped the government in disbursing stimulus finance to firms and individuals during the COVID-19 pandemic.

Given the positive role of Fintech and digital finance in the pandemic, how and to what extent micro, small, and medium-sized enterprises (MSMEs) have realized the benefits of Fintech are of interest for understanding their recovery from the pandemic. During this difficult time of economic stalemate caused by the pandemic, MSMEs are the hardest hit segment among the industrial units and therefore their recovery has an important bearing on their respective economies (Leach et al. 2020). In this paper, we attempt to examine the losses of manufacturing MSMEs in the pandemic and the extent of the use of Fintech in their recovery.

Note that MSMEs are quite predominant in the industrial structure of economies, comprising over 95% of all economic units (Yoshino and Taghizadeh-Hesary 2018). The contribution of the MSME sector to GDP is over 25% in Bangladesh (ADB 2015), which makes the sector an engine of growth. The contributions of SMEs in different countries thus confirm the importance of SMEs worldwide. In the context of a widespread contraction of different economies during the pandemic, smaller firms could be the vehicles of economic recovery by supporting aggregate demand and employment.

Although SMEs have been affected the most by the pandemic, with necessary but reasonable support, SMEs could play an important role in economic recovery. They can do so by serving as agents of change through their entrepreneurial undertakings, being sources of considerable innovative activities, including Fintech and e-commerce. To this end, for the recovery of the SME sector as well as the economy, various countries in the world have assembled stimulus packages. For example, the government of Bangladesh has declared a subsidized credit package worth \$1 billion to help SMEs to recover their loss and maintain the vibrancy of the economy. Similarly, India announced \$87 billion in cheap finance for the SME sector (Hossain 2020; Bhagwati 2020). The central banks in these countries adopted expansionary monetary and fiscal measures to support SMEs and other sectors of the economy. Considering the opaqueness of SMEs, the empirical question is, what policy leverage do governments have on their cards to deal with the distress of SMEs? The traditional approaches of financing SMEs or providing other business support services to these smaller firms may not be working well in this pandemic (Hossain, Yoshino, and Taghizadeh-Hesary 2020; Hossain 2020). Rather, countries need to find innovative and non-traditional approaches to address the distress of MSMEs during the pandemic.

Therefore, this study attempts to examine the impact of COVID-19 on MSMEs in Bangladesh over the span of three quarters in 2020: during lockdown (27 March 2020–30 May 2020); limited lockdown (June–September 2020) and the reopening period (October–December 2020). Though we planned to survey 500 firms based on our earlier survey of 500 firms conducted in 2017 from 25 BSCIC estates, we have ultimately been able to survey only 216 MSMEs from 17 BSCIC industrial estates, as we had to stop the survey due to the surge of COVID infections in Bangladesh at the end of March 2021. We mainly collected data through physical visits and information on

some firms was collected through telephone conversations. A structured questionnaire has been used for the survey. Both descriptive and regression analysis were performed to derive the results. Our instrumental variable (IV) regression results suggest that the use of MFS significantly contributed to the recovery of the production, sales, and profit of the firms, indicating that the use of MFS facilitates the stable supply of raw materials and sale of products.

The paper is structured as follows. Section 2 provides an overview of SMEs and Fintech use in Bangladesh. Section 3 discusses the firm survey methods and approaches and section 4 discusses the descriptive results. Section 5 discusses the methodology and regression results and section 6 concludes the paper.

## **2. AN OVERVIEW OF SMES AND FINTECH USE IN COVID-19 IN BANGLADESH**

SMEs are quite predominant in the industrial structure of Bangladesh, comprising over 97% (including cottage and micro enterprises) of all economic units (BBS 2013). The number of manufacturing units stands at 868,000 in 2013, registering a 75% increase from the 2001/2003 census (BBS 2001/2003), of which 34,000 are SMEs, employing a total of nearly 7 million workers. While the shares of micro, small, and medium enterprises in manufacturing employment are 7.8%, 16.2%, and 6.5% respectively, their contribution to manufacturing gross value added (GVA) were estimated at 5.9%, 23.7%, and 23.3% respectively (BBS 2013; SMI 2012). The nonfarm sector as a whole has been growing at a rate of 7.9% in the last decade, while the growth of the manufacturing units was about 8.2% (BBS 2013). Only slightly over 10% of all non-farm units are engaged in manufacturing, while the remaining carry out trading and service-related activities.

The BSCIC estates are the only official estates or clusters that accommodate MSMEs, from where our samples are drawn. Since this estate was especially established for MSMEs, it is of interest how COVID-19 has impacted the firms in these estates and how these firms excel in recovery. There are 76 BSCIC estates in Bangladesh, with 5,822 manufacturing units creating employment for 0.56 million people with an average employment of 7,626 persons per estate.<sup>1</sup> About 20% firms in these estates are exporting. Among the established units, about 78% are in operation (Hossain 2021). The growth of employment and exporting firms is about 3%. The production of firms grew by 11% and the value of exports grew by 5%. Access to finance has been identified as the biggest obstacle for SMEs growth and development and financial development is considered as one of the solutions for their financial woes (Hossain et al. 2020).

The adoption of Fintech has enabled MSMEs to sustain their viability during COVID-19 in terms of continuing production activities through assessing market demand and maintaining the sustenance of value chain. The findings from the survey by World Bank and CCAF reveal that the use of FinTech has been increased significantly since the outbreak of the pandemic; particularly digital payments and remittances (60% increases), digital banks (22%), and digital savings or deposits (19%) (CCAF, World Bank, and World Economic Forum 2020). The study found that the priority of Fintech has either increased, or remained high after outbreak of COVID-19. According to a

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<sup>1</sup> The BSCIC industrial estates are the estates established for promoting cottage and MSMEs in rural areas to utilize local potential for industrial development. The total land area occupied by the 74 industrial estates is 1,969.2 acres.

recent MasterCard survey, around 79% of global consumers, and least 91% of consumers in Asia, now transact digitally (Mastercard 2020). The survey also revealed that 6 out of 10 consumers now prefer online transactions in a post-COVID retail market. However, the scenario of SMEs in terms of Fintech use is not encouraging, as Sonobe et al. (2021) find that the percentage of MSMEs using online platforms for sales in 2019 was 8.7% and using a digital payment system was 7.1%, based on their telephone survey of MSMEs in eight countries in April–May 2020.

Bangladesh has also experienced rapid change in the Fintech and e-commerce industry in recent years and the effect of COVID-19 resulted in a paradigm shift in terms of digitalized purchases by consumers, online selling platforms and digital payments. The role of Fintech has been substantially realized after the outbreak of COVID-19, during which digital payments became indispensable mechanism to make financial transactions. Besides facilitating trade, digital payments also helped the government in disbursing financial help to the needy populace during the COVID-19 pandemic (Global FinTech Progression and Bangladesh, Lightcastle,<sup>2</sup> August 2020). The volume of transactions through electronic fund transfer (EFT)<sup>3</sup> substantially increased during the pandemic and banks have witnessed significant growth in online transactions during the pandemic (BEFTN, Bangladesh Bank 2020).<sup>4</sup> Like other countries, the COVID-19 pandemic has triggered a surge in digital finance in Bangladesh. According to Bangladesh Bank, the amount of average daily mobile financial services (MFS) transactions increased by 7% in the third quarter of FY 2019–20 from its previous quarter (Bangladesh Bank 2021).<sup>5</sup>

At present, around 2,500 e-commerce sites are operating in Bangladesh selling products worth over \$2 billion, making it the 46th largest country globally in terms of e-commerce revenue (The Daily Star 2020<sup>6</sup>). Facebook has become an indispensable platform of online business; more than 300,000 Bangladeshi stores are operating through Facebook (IDLC 2019<sup>7</sup>). The social media platform boasts 30 million users and 50,000 business pages in the country. According to the e-Commerce Association of Bangladesh (e-CAB) (Hasan 2020<sup>8</sup>), e-commerce industry in Bangladesh “revolutionized” during the COVID-19 pandemic with an increase in online sales by 70%–80% in July–September 2020 (Sahoo, Hossain and Hassan 2020<sup>9</sup>). The current

<sup>2</sup> <https://www.lightcastlebd.com/insights/2020/07/global-fintech-progression-and-bangladesh>.

<sup>3</sup> Bangladesh Electronic Funds Transfer Network (BEFTN) started its operation on 28th February 2011 that facilitates the transmission of payments between the banks electronically. It allows faster and efficient means of inter-bank clearing over the existing paper-based system i.e., BACPS. BEFTN offers a wide variety of credit transfers, such as payroll, foreign and domestic remittances, social security, company dividends, retirement, expense reimbursement, bill payments, corporate payments, government tax payments, social security payments and person to person payments as well as it can handle debit transfers such as mortgage payments, loan payments, insurance premiums, utility bill payments, government tax payments, government licenses and fees (Bangladesh Bank Website: <https://www.bb.org.bd/fnansys/paymentsys/eft.php>).

<sup>4</sup> However, only the MFS platform of the Fintech industry in Bangladesh gained in popularity. As a result, despite the growing trend of the Fintech ecosystem in Bangladesh, the country has been lagging behind its global counterparts. According to the Global Fintech Index 2021, Bangladesh ranked 78th among 83 countries on the index, indicating a poor performance in terms of using technology to automate and digitalize financial activities. Bangladesh ranked the lowest out of 16 countries in Asia and the Pacific.

<sup>5</sup> <https://www.bb.org.bd/fnansys/paymentsys/mfsdata.php>.

<sup>6</sup> <https://www.thedailystar.net/editorial/news/the-dark-side-e-commerce-1967709>.

<sup>7</sup> <https://idlc.com/mbr/article.php?id=192>.

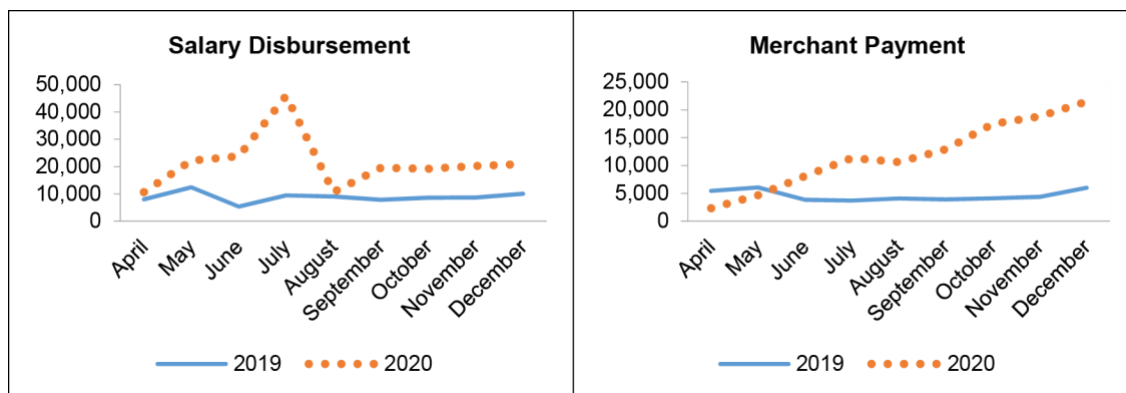
<sup>8</sup> <https://www.newagebd.net/article/114200/the-growth-of-e-commerce-during-the-pandemic-in-bangladesh>.

<sup>9</sup> <https://nextbillion.net/online-commerce-covid19-industry-bangladesh/>.



market size of e-commerce in Bangladesh is around \$1 billion (BDT 8,000 crore) and according to Statista, a business data platform, by 2023 the e-commerce market size will become \$3 billion in Bangladesh (Islam n.d.<sup>10</sup>).

**Figure 1: Month-Wise Salary Disbursement (Million BDT) and Merchant Payment (Million BDT) through Mobile Financial Service in 2019 and 2020**



Source: Authors' compilation from data of Bangladesh Bank.

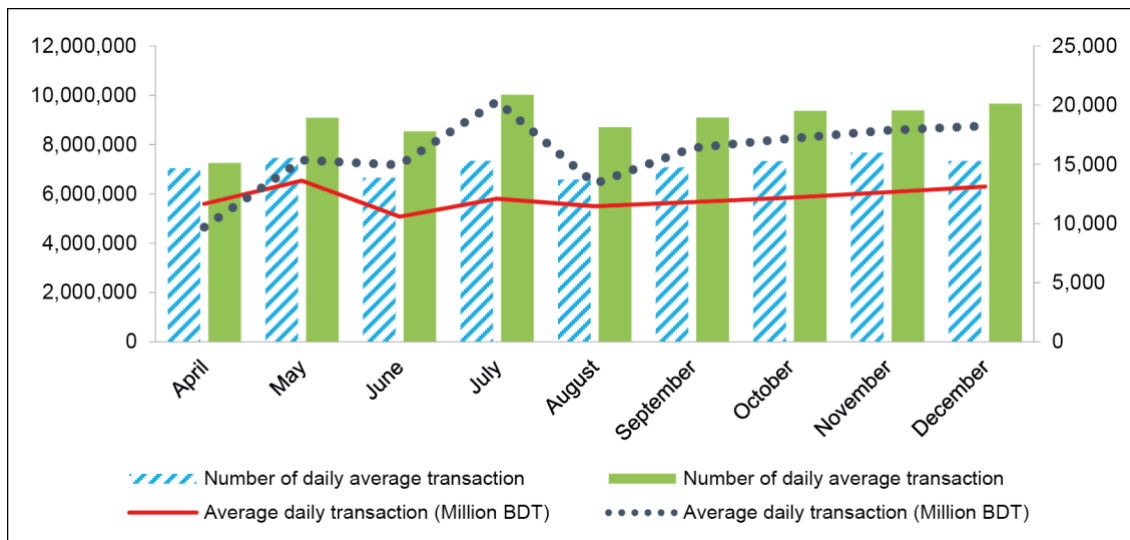
The numbers of monthly merchant payments through mobile financial services followed a steady trend in 2019 which escalated in 2020 (Figure 1). Even though monthly salary disbursement through MFS is higher in each month of 2020 compared to the corresponding month in 2019, the disbursement in 2020 followed a growing trend up to July 2020 and then dropped to a steady trend in the following months. This sudden surge can be explained by the lockdown period up to July when wage payments (especially in the garments industry) were made through mobile transactions.

Figure 2 shows the month-wise average daily transactions (million BDT) and number of daily average transactions made through mobile financial services in 2019 and 2020. The number of average daily transactions was always higher in each month in 2020 compared to 2019. The amount of average daily transactions (million BDT) followed a stable increase from August 2020.

Internet banking showed a burgeoning trend; the total amount of transactions through internet banking was 3.2%, 15.1%, and 32% higher in the three consecutive periods April–June, July–September and October–December compared to the corresponding three periods in 2019 (Figure 3). On the other hand, in the case of mobile banking, the amounts of transactions in the abovementioned three periods were 11%, 42%, and 41% in 2020 in comparison with the transactions in the respective periods in 2019. Given the impressive increase of digital finance in Bangladesh during the COVID-19 pandemic, we are particularly interested in the usage of Fintech by the manufacturing MSMEs and its role in their recovery.

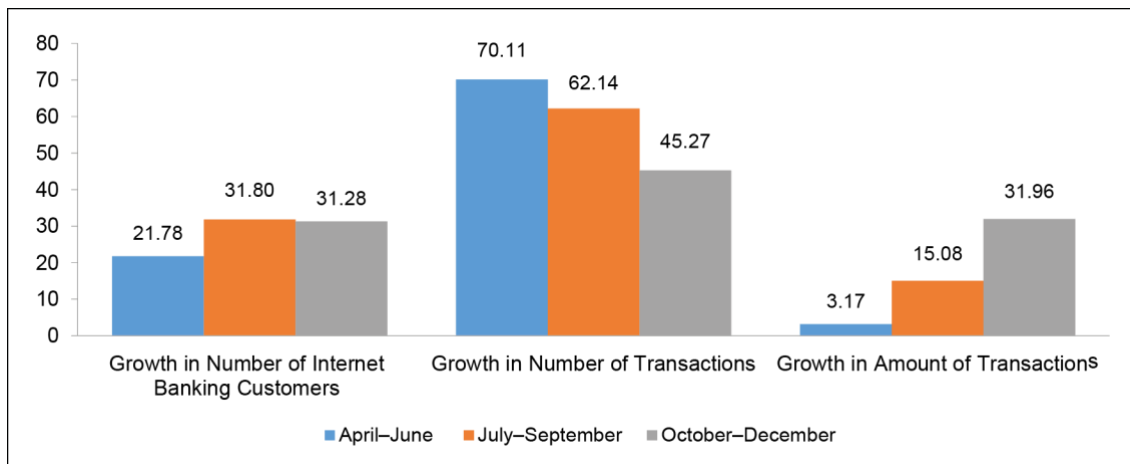
<sup>10</sup> <http://newvision-bd.com/wp-content/uploads/2020/05/Impact-of-COVID-19-on-E-commerce-Industry-of-Bangladesh.pdf>.

**Figure 2: Month-Wise Average Daily Transactions (Million BDT) and Number of Daily Average Transactions through Mobile Financial Service in 2019 and 2020**



Source: Authors' compilation from data of Bangladesh Bank.

**Figure 3: Point to Point Quarterly Growth of Internet Banking in 2019 and 2020**



Source: Authors' compilation from data of Bangladesh Bank.

### 3. FIRM SURVEY METHODS AND APPROACHES

Our current survey of 216 firms is based on a sampling framework of a recent survey of 500 firms from 25 BSCIC estates in 2017 (BIDS survey 2017). We revisit the firms to assess the impact of COVID-19 on their production and recovery during March–May 2020. Although the previous survey was conducted among 25 estates, this time we have been able to collect information from 17 estates across the country out of total 76 estates. Since the BSCIC industrial estate accommodates only the cottage and MSMEs, our sample represents MSMEs in industrial estates.<sup>11</sup> The distribution of the

<sup>11</sup> According to the Industrial Policy 2016 of Bangladesh, those firms with less than 15 workers (or an asset amount of less than Tk10 Lac) are considered a cottage, firms with 16–30 workers (or an asset amount of Tk10–75 Lac) are treated as micro, firms with 31–120 workers (or an asset amount of

surveyed firms across estates is given in Table 1. The survey is being carried out through a structured questionnaire. We collected information on three quarters: March–May 2020 (strict lockdown), June–September 2020 (limited lockdown) and October–December 2020 (no lockdown), depending on the extent of severity of lockdown and the COVID situation. We collect information in particular on the percentage of production, sales, profit and employment for the three periods in terms of whether they decrease, increase or remain the same compared to same pre-COVID-19 period in 2019. We also collect information on the MSMEs' use of Fintech and online platform for their business during the COVID-19 pandemic. The survey started at the end of January 2021 and continued until mid-March 2021 before we were compelled to stop the survey due to a surge of COVID-19 infections in the country.

**Table 1: The Distribution of Samples across Divisions/Districts and Estates**

Division	District	Estate Name	Establishment Year	2021 Survey
Chattogram	Chattogram	Patiya	1990	7
Chattogram	Cumilla	Cumilla	1961	39
Chattogram	Cox's bazaar	Cox's bazaar	1975	1
Dhaka	Dhaka	Dhamrai	1990	15
Rangpur	Dinajpur	Dinajpur	1964	1
Chattogram	Feni	Feni (Charipur)	1962	20
Dhaka	Gazipur	Tongi	1964	39
Sylhet	Habigonj	Habigonj	1995	18
Rajshahi	Joypurhat	Joypurhat	1993	2
Khulna	Khulna	Khulna	1961	18
Dhaka	Narayangan	Jamdhani	1999	18
Dhaka	Narayangonj	Narayangonj	1996	22
Chattogram	Nohakhali	Nohakhali	2007	11
Rangpur	Panchagarh	Panchagarh	1994	1
Barishal	Pirojpur	Swarupkathi	1961	1
Khulna	Satkhira	Satkhira	1988	2
Rangpur	Thakurgaon	Thakurgaon	1998	1
Total		25		216

## 4. DESCRIPTIVE RESULTS

### 4.1 Firm Production, Sales, and Profitability in the COVID-19 Pandemic

In this section we present the status of firms' production, sales, and profitability across three periods: period-1 (P1) is lockdown (27 March 2020–30 May 2020), period-2 (P2) is during limited lockdown (June–September 2020) and period 3 (P3) is the lockdown-free quarter (October–December 2020) and compare them with that of the pre-COVID period. We asked the firms at what percentage their output, sales and profit had decreased/increased compared to the same period before COVID-19 in 2019. The results are reported in Table 2. The results suggest that during the first lockdown in 2020 (March–May), firms were heavily affected as their production had decreased more than 50%, and among the firms, small firms were affected the most. It appears

Tk75 Lac–1.5 crore) are defined as small and firms with 121–300 workers (or an asset amount of Tk15–50 crore) are defined as a medium-sized firm.

that firms started recovering as the government relaxed the lockdown over time. By the end of December 2020, when the lockdown was lifted, firms' production was only 20% lower than the pre-COVID level, indicating that they had recovered substantially. A similar pattern is observed in cases of sales and profit (Table 4).

At the same time, based on their reported loss of outputs (in %: production, sales, and profit) in the P1, P2, and P3 periods, we estimated the recovery rates through a simple method by subtracting the decreased percentage of output (P1, P2, and P3) from 100, which are denoted as R1, R2, and R3, respectively. Thus, R1, R2, and R3 represent the percentage of recovery of outputs at periods 1, 2, and 3 respectively. The results are reported in Table 4. By the end of December 2020, the recovery of production and sales was about 77% and profit was 79%.

**Table 4: Average Decrease (%) in Production, Sales, and Profit across Firm Size Compared to Pre-COVID-19 Level and Estimated Recovery Rates (N = 216)**

	% Decrease in Lockdown (March 2020– May 2020)	% Recovery at Pre- COVID Level	% Decrease in Limited Lockdown (June 2020– September 2020)	% Recovery at Pre- COVID Level	% Decrease in Lockdown-Free Period (October 2020– December 2020)	% Recovery at Pre- COVID Level
	P1	R1 [100-P1]	P2	R2 [100-P2]	P3	R3 [100-P3]
<b>Production (%)</b>						
Micro	53.3	46.7	32.33	67.67	21.28	78.72
Small	62.48	37.52	36.38	63.62	25.83	74.17
Medium	54.62	45.38	28.73	71.27	20.87	79.13
<b>All firms</b>	<b>57.04</b>	42.96	<b>33.26</b>	66.74	<b>22.92</b>	77.08
<b>Sales</b>						
Micro	52.67	47.33	31.47	68.53	20.81	79.19
Small	61.82	38.18	35.85	64.15	25.6	74.4
Medium	55.13	44.87	27.57	72.43	18.48	81.52
<b>All firms</b>	<b>56.61</b>	43.39	<b>32.46</b>	67.54	<b>22.23</b>	77.77
<b>Profit</b>						
Micro	40.1	59.9	28.95	71.05	23.71	76.29
Small	58.2	41.8	34.58	65.42	24.1	75.9
Medium	57.23	42.77	24.31	75.69	21.18	78.82
<b>All firms</b>	<b>49.97</b>	50.03	<b>30.6</b>	69.4	<b>23.48</b>	76.52

Note: P1, P2 and P3 represent periods 1, 2, and 3, respectively.

## 4.2 Fintech Use in the COVID-19 Pandemic

We make an attempt to explore the techniques and mechanisms MSMEs have used for recovery during the pandemic. Since the use of Fintech and online platform have has a big impact worldwide on business recovery during the pandemic, we collect some specific information in regard to these aspects of business and financial transactions. Table 5 provides the status of use of Fintech and online business platform by the surveyed firms and their role in the pandemic-induced business environment. For Fintech, we only collect information on the use of mobile financial services (MFS).

About 31% of the surveyed manufacturing firms are found to use MFS for their business transactions. Among the MFS users, about 74% reported that their transactions through MFS have increased during the pandemic and over 60% agreed that MFS use has facilitated their business in the COVID-19 pandemic. MFS user firms also reported that their sales have increased over 60% during the pandemic indicating a positive role of MFS in facilitating businesses in this pandemic. Similarly, a small number of firms (15%) have an e-commerce website and only 13.6% of the firms sell products online. However, only 15% of their total sales were completed using an online platform and they reported that online sales have increased by about 29% during the pandemic.

**Table 5: Status of Fintech and Online Platform Use among MSMEs**

	Yes	No	Same as Before	N
<b>Mobile Financial Service (MFS)</b>				
Whether use MFS for business (%)	30.56	69.44		216
Has MFS transaction increased during COVID-19 (%)	74.24	25.76	–	66
Has MFS facilitate business during COVID-19 (%)	61.05	30.53	8.42	95
% of sales increased due to MFS? (mean)		30.56		50
<b>E-commerce and online sales</b>				
Have e-commerce website (%)	14.81	85.19		216
Sell product online (%)	13.64	86.36		110
% of total products sold online (mean)		15.47		15
Whether online sales have increased during pandemic (%)	13.11	86.9		61
What % of online sales increased during pandemic? (mean)		28.88		8
<b>Bank Loan (stimulus)</b>				
Stimulus credit received from bank	13.89	86.11		216
<b>BSCIC Loan</b>				
Loan from BSCIC received	0.93	99.07		216

Source: PRISM Survey 2021.

### 4.3 Recovery Rates with the Use of Fintech and Online Platforms

It can be observed from Table 6 that the use of MFS helped firms a faster recovery over time. For example, for those who reported that the use of MFS has increased their production, their recovery rate has jumped from 42% in P1 to 86% in P3, while the increase is only 8% for who thought that the use of MFS had actually contributed to a decrease in their production. For the group of firms that thought the use of MFS had not made any change in their production, their recovery is also relatively lower. On the other hand, the recovery of firms that have been using e-commerce and online business is also substantial compared to P1 though both user and non-user groups' recovery was almost the same in period 3. The descriptive analysis in Table 6 provides an indication that the use of digital finance might have a positive impact on firms' recovery.

**Table 6: Average Recovery Rate (%) of Firms are Using MFS and Online Platforms**

	Recovery in Production in P1 Compared to 2019 (%)	Recovery in Production in P2 Compared to 2019 (%)	Recovery in Production in P3 Compared to 2019 (%)
Reported Business Transaction through MFS:			
Increase	42	72	86
Decrease	88	93	96
Unchanged	67	86	93
Has e-commerce website			
Yes	45	68	86
No	53	79	87
Has online sales increased			
Yes	33	58	76
No	66	82	92

Note: Recovery rate: This is the percentage change of production in any one period of 2020 compared to production in 2019.

## 5. METHODOLOGY AND REGRESSION RESULTS

MSMEs were the segment that was unsparingly affected the most out of all the industrial units worldwide in the COVID-19 pandemic, yet they suffered the most in developing countries. It is also true that MSMEs could recover at a faster rate than larger firms because of their flexibility in adjusting to any sudden changes or crisis because of the dynamics of small firm taxonomy. Various governments worldwide, including Bangladesh, provided various types of stimulus packages that might contribute to their recovery. On the other hand, digital platforms also contributed greatly to the recovery of these firms' production and profitability. Therefore, in this section, we particularly examine the role of FinTech, particularly the use of mobile financial services (MFS) on the recovery of MSMEs. In addition, we attempt to understand which type of firm and industrial sector gained most from these strategies and interventions. In addition, we also assess the role of government stimulus credit on their recovery.

### 5.1 Determinants of the Use of MFS, E-Commerce Websites and Online Sale Platforms

In order to understand the role of MFS on firms' recovery, it is first important to identify the determinants of MFS use by the firms. The study attempted to explore the determinants of usage of MFS by firms using the probit regression model. The dependent variable is a binary choice; taking a value of 1 if firm uses the respective financial service and 0 otherwise. There are two vectors of regressors including firm characteristics and individual characteristics of owners.  $X_i$  is a vector of firm characteristics and  $Z_i$  is a vector of individual characteristics of owners (Eq. 1).

The firm characteristics used in the regression are firm size, type of industry (Food, Textile, Jute, Leather, Paper, Chemical and Pharmaceutical, Engineering, Metal, Agro-Food), distance between firms and some other entities (distance to nearest agent of MFS provider, distance to nearest local market, distance to the sub-district (Upazilla Sadar), distance to district, distance to nearest bank) and firms' source of collecting

raw material (binary variable if firm collects raw material from home district or other district).

The individual characteristics of firms' owners used in the regression are years of education and years of experience of owner at current enterprise.

$$MFS_i = \beta_0 + \beta_1 X_{1i} + \beta_2 Z_{1i} + \epsilon_i \quad (1)$$

### **Results: Determinants of Use of MFS, E-Commerce Website and Online Sale Platform by Firms**

Table 7 depicts the results with the determinants of MFS use (eq. 1) where the dependent variable "use of MFS" is a binary variable which takes a value of 1 if a firm uses MFS and 0 otherwise. Whenever firm characteristics were taken into account, "distance to nearest MFS agent" came up negatively significant, delineating the fact that the firms with a lower distance to the nearest MFS agent are more likely to use MFS. This is expected, as getting access to an MFS agent without difficulties is the key factor that induces firms to use MFS and a shorter distance to an MFS agent actually mitigates such difficulties of accessibility.

On the other hand, the distance to sub-district (Upazilla Sadar) and the use of MFS are positively associated with significance; the firms located far away from sub-districts are more prone to usage of MFS. This is not surprising either as a greater distance to sub-districts means a larger distance to financial institutions located in sub-districts and, therefore, leads to higher costs if financial transactions are executed through physical visits. In such cases, MFS provides a useful mechanism for minimizing the cost of financial transactions.

The results also show that small and micro firms are less likely to use MFS compared to medium firms. It is also evident that the firms that collect raw materials from their own/home district are expected to use MFS more than firms who collect raw material from other districts. This can be explained by the limitations of MFS policy in terms of the small number of transactions as imposed by the central bank of the country<sup>12</sup> and deferred transactions might be an obvious outcome due to this limited scope of transaction. Suppliers of raw materials who are located in the same district as the firm are probably more willing to receive deferred payments compared to the suppliers of other districts considering the issue of "business trust accompanied with distance". Therefore, the firms which collect raw materials from home district enjoy the convenience of deferred payments and are willing to use MFS. The industry dummies came up positively significant across all sectors, showing that the firms of each sector are more likely to use MFS.

On the other hand, when individual characteristics of firms' owners are considered, their years of experience of working at the current enterprise turned out to be positively significant, which depicts that firms with longer period of involvements with their current owners are more likely to use MFS. This finding can be explained in terms of owners' ability and experience acquired through long-term engagements with current business operations that ultimately affect owner's choice of using MFS.

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<sup>12</sup> At present, the ceiling of mobile money transfer is set at BDT 100,000 for cash in and BDT 50,000 for cash out only. <https://www.bb.org.bd/fnansys/paymentsys/mobilefin.php>.

**Table 7: Determinants of Use of MFS by MSMEs**

Variables	(1) Model 1: Use of MFS
Distance to nearest MFS agent	-6.276*** (2.387)
Distance to bank	0.014 (0.130)
Distance to district	0.023 (0.018)
Distance to Upazilla Sadar (sub-district)	0.072*** (0.025)
Distance to local market	0.098 (0.105)
Firm size: micro (base = medium)	-0.796** (0.385)
Firm size: small (base = medium)	-0.726** (0.351)
1 if firms collect raw material from home district	0.492* (0.290)
Years of education of firm's owner	-0.179 (0.111)
Work experience (years) of firm's owner at current enterprise	0.068*** (0.018)
Sector: Food	2.686*** (0.549)
Sector: Textile	2.912*** (0.410)
Sector: Jute	2.242*** (0.729)
Sector: Paper	2.723*** (0.540)
Sector: Leather	3.398*** (0.527)
Sector: Chemical and Pharmaceutical	2.144*** (0.673)
Sector: Engineering	2.997*** (0.535)
Sector: Metal	3.553*** (0.747)
Sector: Agro-Food	2.382*** (0.792)
Constant	-2.075** (0.958)
Observations	197

Robust standard errors in parentheses.

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.



## 5.2 Effect of MFS Use on Production, Sales and Profit

The study attempted to explore the effect of usage of MFS on production, sales, and profit of firms at different time intervals in 2020. The following regression model has been used to estimate the determinants of production, sales, and profit in 2020:

$$Y_{it} = \beta_0 + \beta_1 MFS_{use_{it}} + \beta_2 firm_{size_{dumm}_{it}} + \beta_3 skill_{ratio_{it}} + \beta_4 plot_{type\_dummy}_{it} + \beta_5 raw\_material\_home\_district_{it} + \beta_6 ownership_{it} + \beta_7 stimulus\_credit\_received_{it} + \beta_8 sector\_dummy_{it} + \mu_{it} \quad (2)$$

Where  $Y_{it}$  is the outcome variable (Production or Sales or Profit);  $i$  stands as subscripts for firm ( $i = 1, 2, 3, \dots, 216$ ) and  $t$  stands as subscripts for time intervals ( $t = 1, 2, 3, 4$ ).

$Y_{it}$  refers to the amount of production/sales/profit in period  $t$  in 2020 expressed as percentage of production/sales/profit in period  $t$  in 2019. We asked the firms if production, sales and profit increased, decreased or remained the same in three different periods: strict lockdown period (April–May 2020); limited lockdown period (June–September 2020) and the reopening of the economy (October–December 2020) in 2020 compared to production, sales, and profit in each of these periods in 2019. We also asked if overall production/sales/profit were increased, decreased, or remained the same throughout the year 2020 (January–December 2020) compared to overall production/sales/profit throughout the year 2019 (January–December 2019). Therefore, the production, sales, and profit in 2020 were reported in relative terms in comparison with the production, sales, and profit in 2019. The reported percentage of production, sales, and profit in 2020 in other words represent the percentage of recovery of production, sales, and profit.

Considering the base production/profit/sales in 2019 as 100, the series of production/sales/profit in 2020 used in regressions were computed by subtracting (adding) the reported decreased (increased) percentage of production/sales/profit from 100. For instance, if firms reported that production/sales/profit decreased by  $x\%$  at period  $t$  in 2020; then the corresponding value of production/sales/profit at period  $t$  used in the series was  $(100-x)$ . In case of increased production/sales/profit, if firms reported that production/sales/profit increased by  $y\%$  in at period  $t$  2020; then the corresponding value of production/sales/profit at period  $t$  used in the series was  $(100+y)$ . On the other hand, if firms reported that production/sales/profit remained same at period  $t$  in 2020; the corresponding value of production/sales/profit used in the series was 100.

$MFS_{use_{it}}$  is a binary variable which takes a value of 1 if the firm uses MFS and 0 if the firm does not use MFS and this variable is the variable of our key interest in order to find if firms with MFS usage performed better than their counterparts who did not use MFS. The firm characteristics used as explanatory variables in regressions are firm size; skill ratio (proportion of skilled labor to total labor of a firm); the type of plot where firm is located (according to size: for example, Type A is the largest plot); firm's source of collecting raw material (binary variable taking a value of 1 if firm collects raw material from own/home district and 0 otherwise); type of ownership of firm; receipt of loan by firms as stimulus (binary variable taking a value of 1 if firm received stimulus and 0 otherwise) and type of industry (Food, Textile, Jute, Paper, Leather, Chemical and Pharmaceutical, Engineering, Metal, Agro-Food).

However, considering the possibility of endogeneity embedded into “usage of MFS”, we used a defensible approach of estimating the model through the “Instrumental Variable (IV)” technique instead of OLS method. Distance to nearest MFS agent and work experience of firm’s owner at current enterprise have been used as IVs for MFS use. We found these variables reasonable to be used as these variables are unlikely to affect outcome variable independently (any effect will be indirect and transmitted through the effect of MFS use) as well as to be correlated with the unobservable of the model. Furthermore, in the MFS literature, distance to agent is a widely used instrument (Munyegera and Matsumoto 2016; Murshid et al. 2020).

### Results: MFS Use and Production of Firms in Different Periods

Columns 1, 2, and 3 in Table 8 represent the results with MFS use and production of firms in four different periods;  $t_1$  (April–May 2020),  $t_2$  (June–September 2020),  $t_3$  (October–December 2020), and  $t_4$  (January–December 2020).

**Table 8: MFS Use and Production  
(Production in 2020 as % of Production in 2019)**

Variables	(1) <i>Prod_2020_t<sub>1</sub></i>	(2) <i>Prod_2020_t<sub>2</sub></i>	(3) <i>Prod_2020_t<sub>3</sub></i>	(4) <i>Prod_2020_t<sub>4</sub></i>
1 if firm uses MFS	69.903*** (17.616)	37.033*** (13.522)	33.721** (16.853)	35.144** (14.513)
Firm size: micro (base = medium)	-3.835 (9.352)	-17.102** (8.595)	-18.145** (9.245)	-15.403* (8.397)
Firm size: small (base = medium)	11.064 (8.600)	-5.320 (7.762)	-7.864 (8.329)	-7.502 (7.965)
Skill ratio	22.662** (10.808)	19.437** (8.532)	22.241** (9.932)	22.110** (9.296)
Plot type B (Base: A)	10.963 (7.199)	15.493*** (5.575)	11.788 (7.233)	6.948 (5.873)
Plot type C (Base: A)	16.524* (9.651)	6.413 (7.702)	19.338** (8.581)	9.192 (8.371)
Plot type D (Base: A)	18.683* (11.100)	15.851* (9.308)	17.551 (11.327)	8.836 (8.440)
Plot type S (Base: A)	7.076 (11.323)	3.220 (8.699)	13.348 (11.235)	-1.525 (10.231)
1 if firms collect raw material from home district	4.496 (7.046)	11.232* (6.160)	15.318** (6.841)	8.350 (6.315)
Ownership: joint (base: single)	3.193 (8.668)	10.780 (7.909)	19.813** (7.916)	16.822** (8.218)
Ownership: limited (base: single)	-0.620 (8.460)	0.701 (7.232)	20.000** (7.895)	9.852 (6.918)
1 if firms received stimulus	-16.806* (9.172)	-21.312*** (6.874)	-20.907** (8.977)	-20.522** (7.993)
Sector: Food	-40.959** (17.310)	5.367 (9.275)	7.236 (14.453)	-6.942 (15.358)
Sector: Textile	-21.426 (17.260)	6.360 (9.113)	8.055 (14.423)	-4.198 (15.778)
Sector: Jute	-16.583 (22.880)	1.333 (13.916)	-3.487 (18.294)	-12.591 (19.033)

*continued on next page*

**Table 8** *continued*

Variables	(1) <i>Prod_2020_t<sub>1</sub></i>	(2) <i>Prod_2020_t<sub>2</sub></i>	(3) <i>Prod_2020_t<sub>3</sub></i>	(4) <i>Prod_2020_t<sub>4</sub></i>
Sector: Paper	-28.019 (19.064)	5.215 (11.338)	6.241 (15.573)	-12.824 (16.328)
Sector: Leather	-41.042** (19.092)	-13.781 (9.464)	-9.206 (16.276)	-19.219 (15.929)
Sector: Chemical and Pharmaceutical	-40.656** (17.673)	2.793 (10.645)	10.850 (15.986)	-8.717 (16.175)
Sector: Engineering	-7.423 (18.444)	20.436** (9.195)	25.086* (15.243)	16.768 (16.436)
Sector: Metal	-31.226 (23.307)	5.399 (17.385)	-1.771 (22.269)	-15.634 (22.139)
Sector: Agro-Food	-46.689** (21.845)	15.840 (11.182)	17.739 (16.905)	8.494 (17.150)
Constant	42.262** (19.554)	16.150 (12.944)	9.520 (16.746)	24.199 (17.482)
Observations	214	214	216	216
R-squared	-0.143	0.036	0.116	0.024
<b>Diagnostics test<sup>a</sup></b>				
F-statistics	F(21,192) = 4.51 p > F = 0.00	F(21,192) = 3.56 p > F = 0.00	F(21, 194) = 3.03 p > F = 0.00	F(21,194) = 3.22 p > F = 0.00
Over-identification test	Sargan: 0.116 Chi-sq(1) p-val = 0.7331	Sargan Statistics: 0.256 Chi-sq(1) p-val = 0.6128	Sargan Statistics: 0.213 Chi-sq(1) p-val = 0.6444	Sargan Statistics: 0.910 Chi-sq(1) p-val = 0.3402
Endogeneity test	Chi-sq(1) = 24.346 p-val = 0.0000	Chi-sq(1) = 8.958 p-val = 0.0028	Chi-sq(1) = 3.515 p-val = 0.0608	Chi-sq(1) = 8.748 p-val = 0.0031

<sup>a</sup> Coefficients are jointly significant with a high F-value (p-value is 0.00) implying the fact that the model is strongly identified. The p-value is insignificant in over-identification which means that null hypothesis "the instruments are exogenous" is not rejected. Therefore, the over-identification assumption is satisfied. The p-value of the endogeneity test is significant, implying that the null hypothesis "the treatment variables are exogenous" is rejected. Hence, the endogeneity test is also satisfied.

Robust standard errors in parentheses.

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.

Note: Details of time intervals: *t*<sub>1</sub>: April–May 2020; *t*<sub>2</sub>: June–September 2020; *t*<sub>3</sub>: October–December 2020; and *t*<sub>4</sub>: January–December 2020.

The IV estimates of *MFS\_use* came out positively significant, which shows that the firms which used MFS had higher production compared to the firms who did not use MFS in all the three intervals in 2020 (strict lockdown period, limited lockdown period and reopening of the economy) and this holds the same when total production in 2020 (column 4) is considered. Medium firms performed significantly better compared to micro firms in terms of higher production in period *t*<sub>2</sub>, *t*<sub>3</sub> and *t*<sub>4</sub>. Skill ratio turned out to be positively significant in all the four periods revealing that the firms with higher number of skilled workers experienced higher production. However, the findings suggest that the firms which did not receive a loan as stimulus had higher production which delineates the fact that the stimulus provided by the government did not facilitate the firms' production.

### Results: MFS Use and Sales of firms in Different Periods

Columns 1, 2, and 3 in Table 9 represent the results with MFS use and sales of firms in four different periods;  $t_1$  (April–May 2020),  $t_2$  (June–September 2020),  $t_3$  (October–December 2020), and  $t_4$  (January–December 2020).

**Table 9: MFS use and Sales (Sales in 2020 as % of Sales in 2019)**

Variables	(1) Sales_2020_ $t_1$	(2) Sales_2020_ $t_2$	(3) Sales_2020_ $t_3$	(5) Sales_2020_ $t_4$
1 if firm uses MFS	67.436*** (17.319)	40.326*** (13.770)	26.728 (16.661)	31.912** (14.873)
Firm size: micro (base = medium)	-4.347 (9.191)	-16.600* (8.654)	-21.810** (10.392)	-17.242* (9.368)
Firm size: small (base = medium)	9.330 (8.395)	-5.109 (7.839)	-12.329 (9.460)	-10.463 (8.831)
Skill ratio	25.655** (10.738)	17.095* (8.752)	24.081** (9.712)	25.401*** (9.299)
Plot type B (Base: A)	12.996* (7.388)	16.226*** (5.827)	9.571 (7.571)	9.745 (6.173)
Plot type C (Base: A)	15.890* (9.274)	5.974 (7.917)	12.528 (9.057)	6.607 (8.411)
Plot type D (Base: A)	18.312 (11.638)	12.616 (10.471)	9.578 (11.155)	6.705 (8.748)
Plot type S (Base: A)	7.928 (11.020)	6.238 (9.232)	9.646 (11.111)	-2.505 (10.299)
1 if firms collect raw material from home district	3.181 (7.048)	10.966* (6.327)	15.317** (6.662)	6.868 (6.211)
Ownership: joint (base: single)	3.998 (8.578)	12.195 (8.011)	18.772** (7.928)	15.262* (8.201)
Ownership: limited (base: single)	-0.347 (8.333)	0.576 (7.387)	16.627* (8.599)	6.966 (7.565)
1 if firms received stimulus	-17.968** (8.925)	-23.281*** (7.255)	-21.147** (8.993)	-21.793*** (7.904)
Sector: Food	-42.056** (17.307)	4.883 (9.657)	6.374 (15.015)	-6.235 (15.879)
Sector: Textile	-22.612 (17.088)	6.279 (9.416)	8.406 (15.018)	-4.007 (16.167)
Sector: Jute	-19.817 (22.645)	2.463 (14.053)	-12.206 (18.873)	-16.406 (19.573)
Sector: Paper	-30.147 (18.802)	3.573 (11.596)	4.675 (16.186)	-15.003 (16.593)
Sector: Leather	-43.068** (18.961)	-16.212* (9.765)	-10.784 (16.562)	-21.568 (16.042)
Sector: Chemical and Pharmaceutical	-41.229** (17.424)	2.859 (10.742)	16.701 (17.193)	-9.144 (16.576)
Sector: Engineering	-8.964 (18.254)	20.558** (9.574)	22.634 (15.799)	14.191 (16.741)
Sector: Metal	-32.344 (23.135)	-10.744 (18.093)	-14.470 (22.289)	-18.893 (22.443)
Sector: Agro-Food	-48.481** (21.472)	15.479 (11.725)	14.347 (17.920)	5.490 (17.894)
Constant	43.159** (19.166)	16.332 (12.950)	18.936 (18.064)	28.131 (18.381)

*continued on next page*

**Table 9** *continued*

Variables	(1) <i>Sales_2020_t<sub>1</sub></i>	(2) <i>Sales_2020_t<sub>2</sub></i>	(3) <i>Sales_2020_t<sub>3</sub></i>	(5) <i>Sales_2020_t<sub>4</sub></i>
Observations	213	213	215	215
R-squared	-0.101	-0.018	0.135	0.066
<b>Diagnostics Test<sup>a</sup></b>				
F-statistics	F(21,191) = 4.71 p > F = 0.00	F(21,191) = 3.61 p > F = 0.00	F(21, 193) = 3.22 p > F = 0.00	F(21,194) = 3.39 p > F = 0.00
Over-identification test	Sargan: 0.104 Chi-sq(1) p-val = 0.7472	Sargan Statistics: 0.593 Chi-sq(1) p-val = 0.4413	Sargan Statistics: 0.069 Chi-sq(1) p-val = 0.7929	Sargan Statistics: 0.650 Chi-sq(1) p-val = 0.4200
Endogeneity test	Chi-sq(1) = 22.372 p-val = 0.0000	Chi-sq(1) = 11.219 p-val = 0.0008	Chi-sq(1) = 2.241 p-val = 0.1344	Chi-sq(1) = 6.759 p-val = 0.0093

<sup>a</sup> Coefficients are jointly significant with high F-value (the p-value is 0.00) implying the fact that the model is strongly identified. The p-value is insignificant in the over-identification in the model which means that the null hypothesis “the instruments are exogenous” is not rejected. Therefore, the over-identification assumption is satisfied. The p-value of the endogeneity test is significant in models 1, 2, and 4, implying the fact that the null hypothesis “the treatment variables are exogenous” is rejected. Hence, the endogeneity test is also satisfied.

Robust standard errors in parentheses.

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.

Note: Details of time intervals: *t<sub>1</sub>*: April–May 2020; *t<sub>2</sub>*: June–September 2020; *t<sub>3</sub>*: October–December 2020; and *t<sub>4</sub>*: January–December 2020.

The IV estimates of *MFS\_use* came out positively significant in *t<sub>1</sub>*, *t<sub>2</sub>*, and *t<sub>4</sub>* but not in *t<sub>3</sub>*, which shows that the firms which used MFS had higher sales compared to the firms who did not use MFS during strict lockdown and limited lockdown but not during the period of the reopening of the economy. However, the positive and significant coefficient in *t<sub>4</sub>* reveals that usage of MFS actually facilitated the overall sales of firms in 2020. Medium firms performed significantly better compared to micro firms in terms of higher sales in periods *t<sub>2</sub>*, *t<sub>3</sub>*, and *t<sub>4</sub>*. Skill ratio turned out to be positively significant in all the four periods revealing that the firms with higher number of skilled workers experienced higher sales. However, when the receipt of stimulus is considered, the findings are the same as found in production; the firms which received loan as stimulus had decrease in sales describing the fact that the stimulus provided by the government did not facilitate the firms in terms of higher sales.

**Results: MFS Use and Profit of Firms in Different Periods**

Columns 1, 2, and 3 in Table 10 represent the results with MFS use and profit of firms in four different periods; *t<sub>1</sub>* (April–May 2020), *t<sub>2</sub>* (June–September 2020), *t<sub>3</sub>* (October–December 2020), and *t<sub>4</sub>* (January–December 2020).

The IV estimates of *MFS\_use* came out positively significant in *t<sub>2</sub>* and *t<sub>4</sub>* only, which shows that the firms which used MFS earned a higher profit compared to the firms who did not use MFS during limited lockdown and throughout the year 2020. For specifications in periods *t<sub>1</sub>* and *t<sub>3</sub>*, the endogeneity test is also insignificant. Medium firms performed significantly better compared to micro firms in terms of a higher profit in period *t<sub>1</sub>* only and the skill ratio turned out to be positively significant in periods *t<sub>1</sub>* and *t<sub>4</sub>*.

**Table 10: MFS Use and Profit (Profit in 2020 as % of Profit in 2019)**

Variables	(1) <i>Profit_2020_t1</i>	(2) <i>Profit_2020_t2</i>	(3) <i>Profit_2020_t3</i>	(4) <i>Profit_2020_t4</i>
1 if firm uses MFS	-7.586 (18.052)	-42.045*** (15.653)	-20.808 (16.139)	-72.033*** (17.423)
Firm size: micro (base = medium)	-17.686* (9.767)	-12.764 (9.696)	-3.416 (8.902)	-16.993 (13.034)
Firm size: small (base = medium)	-1.206 (9.078)	-13.335 (9.001)	-6.782 (8.413)	-14.314 (12.268)
Skill ratio	22.796* (11.827)	1.327 (11.532)	-0.870 (12.009)	29.779** (14.119)
Plot type B (Base: A)	7.333 (8.823)	12.204 (7.865)	6.455 (7.615)	9.991 (9.930)
Plot type C (Base: A)	12.977 (10.526)	3.925 (9.002)	9.562 (9.355)	10.258 (10.331)
Plot type D (Base: A)	-3.702 (12.206)	-24.378* (13.285)	-3.967 (13.403)	-24.271* (13.783)
Plot type S (Base: A)	16.128 (11.779)	-10.506 (10.858)	-2.534 (12.005)	-1.368 (11.996)
1 if firms collect raw material from home district	11.552* (6.681)	4.676 (6.561)	3.810 (6.427)	0.109 (8.148)
Ownership: joint (base: single)	-2.615 (8.923)	-0.591 (8.904)	1.955 (8.369)	0.145 (12.051)
Ownership: limited (base: single)	8.985 (9.070)	-8.359 (8.455)	3.131 (7.868)	-1.977 (12.305)
1 if firms received stimulus	-11.341 (8.932)	-13.798 (9.682)	-16.474* (9.951)	-10.904 (12.458)
Sector: Food	-18.145 (14.873)	31.844** (14.144)	48.255*** (15.213)	24.244 (16.771)
Sector: Textile	-18.025 (14.751)	16.170 (14.732)	43.209*** (16.197)	4.073 (16.476)
Sector: Jute	-10.630 (17.516)	16.540 (16.617)	41.632** (18.187)	2.551 (19.687)
Sector: Paper	-33.747* (17.699)	29.274* (17.423)	53.594*** (17.811)	5.828 (22.791)
Sector: Leather	-35.795** (17.693)	11.919 (17.710)	32.179* (18.269)	13.893 (20.483)
Sector: Chemical and Pharmaceutical	-30.677* (17.836)	5.121 (16.833)	28.133 (18.272)	-5.687 (19.422)
Sector: Engineering	9.220 (14.789)	12.875 (15.317)	33.405** (16.549)	2.711 (19.036)
Sector: Metal	-2.003 (24.585)	21.742 (21.229)	30.591 (22.238)	27.533 (20.364)
Sector: Agro-Food	-48.062** (22.254)	9.561 (22.225)	59.199*** (18.656)	12.231 (29.991)
Constant	74.046*** (19.126)	73.723*** (17.552)	41.351** (17.990)	63.374*** (21.389)

*continued on next page*

**Table 10** *continued*

Variables	(1) <i>Profit_2020_t<sub>1</sub></i>	(2) <i>Profit_2020_t<sub>2</sub></i>	(3) <i>Profit_2020_t<sub>3</sub></i>	(4) <i>Profit_2020_t<sub>4</sub></i>
Observations	200	204	205	163
R-squared	0.177	0.060	0.083	0.021
<b>Diagnostic Test<sup>a</sup></b>				
F-statistics	F(21,178) = 2.71 p > F = 0.00	F(21,182) = 2.88 p > F = 0.00	F(21, 183) = 1.73 p > F = 0.00	F(21,141) = 3.65 p > F = 0.00
Over-identification test	Sargan: 0.417 Chi-sq(1) p-val = 0.5187	Sargan Statistics: 2.826 Chi-sq(1) p-val = 0.0927	Sargan Statistics: 1.073 Chi-sq(1) p-val = 0.3002	Sargan Statistics: 0.001 Chi-sq(1) p-val = 0.9712
Endogeneity test	Chi-sq(1) = 0.001 p-val = 0.9812	Chi-sq(1) = 4.813 p-val = 0.0283	Chi-sq(1) = 1.194 p-val = 0.2745	Chi-sq(1) = 9.649 p-val = 0.0019

<sup>a</sup> The coefficients are jointly significant, with a high F-value (p-value is 0.00) implying the fact that the model is strongly identified. The p-value is insignificant in over-identification in models 1, 3 and 4 which means that the null hypothesis “the instruments are exogenous” is not rejected. Therefore, the overidentification assumption is satisfied. The p-value of the endogeneity test is significant in models 2 and 4, implying the fact that the null hypothesis “the treatment variables are exogenous” is rejected. Hence, the endogeneity test is also satisfied.

Robust standard errors in parentheses.

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

Note: Details of time intervals: *t*<sub>1</sub>: April–May 2020; *t*<sub>2</sub>: June–September 2020; *t*<sub>3</sub>: October–December 2020; and *t*<sub>4</sub>: January–December 2020.

## 6. CONCLUSIONS

This paper attempts to assess the impact of the COVID-19 pandemic on MSMEs and the subsequent recovery of the firms during the second half of 2020 after the outbreak of COVID-19 in Bangladesh. The study uses data from a survey of 216 manufacturing MSMEs from BSCIC industrial estates in Bangladesh. Our results based on 216 firms suggests that firms have been recovering gradually after the withdrawal of lockdown from June 2020. So far, firms had recovered 80% of their output at pre-COVID level by the end of December 2020. Small firms appear to be affected more than medium and micro firms. We observe that firms that have used Fintech (we consider only mobile financial service here) and e-commerce platforms perform better than others as their recovery is relatively faster, indicating that MFS might have helped them maintain local product value chains. Moreover, as a mode of payment transfer, MFS might have allowed them to receive money from various sources to continue their business.

Although the percentage of firms using MFS for business is about 31% in our sample, which is relatively low compared to the widespread use of MFS by the individuals. On the other hand, only about 15% of the firms have an e-commerce website and 14% sell online, indicating a low demand for digital finance by these firms as well. Considering the widespread surge of e-commerce and digital finance worldwide by firms including the trading and service sectors, manufacturing MSMEs appear to be lagging behind in this venture. Though our surveyed firms irrespective of MFS users and non-users have recovered substantially in a lockdown free (and low COVID infection rates) environment, still there is scope for them to adopt digital finance and online business strategies to perform better in their business in the coming days.

The findings in this paper highlight the importance of favorable policies and regulations on Fintech and digital access to finance for smaller firms to overcome distresses caused by pandemic-type shocks or natural disasters. Furthermore, access to finance for MSMEs has been a perennial problem particularly in developing countries. Providing access to finance during the pandemic has been instrumental for recovery of the firms. Proper training on Fintech, e-commerce and related skills development are crucial for the growth and development of MSMEs particularly in this pandemic, which is also important for overall economic recovery.



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