Covid-19 Pandemic and SMEs' Performance in Latin America

Maikol Cerda
David Cervantes
Paul Gertler
Sean Higgins
Ana María Montoya
Eric Parrado
Carlos Serrano
Raimundo Undurraga
Patricia Yañez-Pagans

Covid-19 Pandemic and SMEs' Performance in Latin America

Maikol Cerda*
David Cervantes**
Paul Gertler***
Sean Higgins****
Ana María Montoya*****
Eric Parrado******
Carlos Serrano**
Raimundo Undurraga*****
Patricia Yañez-Pagans*

* IDB Invest
** BBVA Research
*** University of California Berkeley, Haas School of Business
**** Northwestern University, Kellogg School of Management
***** Universidad de Chile
****** Inter-American Development Bank

January 2023

http://www.iadb.org

Abstract

The COVID-19 pandemic generated a large negative external shock to the global economy. Businesses worldwide were affected by economic, health, and mobility restrictions that impacted consumers' ability to access goods and services and firms' profitability and survival rates. In this paper, we study the economic performance of Latin American MSMEs during the pandemic using disaggregated and high-frequency administrative banking deposits and income data from Brazil, Chile, Colombia, Mexico, Paraguay, and Peru. We observe a sharp short-term decline in firm earnings due to the implementation of lockdowns during the second half of March 2020. We show this decline had a heterogeneous impact by economic sector, firm size, and transaction type (in-person vs. online). Focusing on financial technology adoption by studying the migration from in-person to online banking transactions, we find that MSMEs managed to recover revenues to pre-pandemic levels in early 2021 thanks to an increased share of online transactions and that industries facing higher physical exposure to the public (e.g., retailers) experienced a more considerable decline and a slower recovery.

1. Introduction

The COVID-19 pandemic had a significant negative impact on the global economy, with businesses and consumers facing economic, health, and mobility restrictions that affected firms' profitability and probability of survival. In this paper, we examine the economic performance of Latin American Micro, Small, and Medium Enterprises (MSMEs) during the pandemic using high-frequency administrative banking data from Brazil, Chile, Colombia, Mexico, Paraguay, and Peru.

Our analysis shows that the implementation of lockdowns in March 2020 resulted in a sharp decline in business earnings, which had a heterogeneous impact depending on industry, firm size, and transaction type. By studying the shift from in-person to online banking transactions, we find that MSMEs were able to recover their revenues to pre-pandemic levels in early 2021 thanks to an increased share of online transactions. However, we also observe that industries with higher physical exposure to the public, such as retailers, experienced a more significant decline and a slower recovery.

We have access to administrative data that can approximate the revenues earned by MSMEs, covering more than six months and more than a year after the pandemic's beginning. These data come from private financial institutions in Brazil, Chile, Colombia, Mexico, Paraguay, and Peru. The data extend from June 2019 to at least June 2021 and contain information on the total amount and number of deposits that each MSME performed either in-person, online, or through the businesses' point-of-sale (POS). Our results show a salient decline in the total amount of revenues, across all three types of deposits, immediately after the implementation of the first wave of the Latin American COVID-19 lockdowns. These policies took place between the second and fourth week of March 2020 in all six countries in our study.

Besides studying the aggregate impact of the mobility restrictions, we further explore the pandemic's heterogeneous impact on small and medium-sized firms by disaggregating the total amount of deposits using relevant MSMEs' features. In addition to having access to banking transactions, we also access firm characteristics: economic sector, firm size, geographical

location,[1] and businesses' degree of exposure.[2] These characteristics allow us to identify the kind of businesses that mobility restrictions have more severely impacted and whether there exists a significant gap in the speed and the size of the recovery among the different groups during the second half of 2020, after the implementation of the first waves of economic relief programs.

We then turn the analysis to our main topic: the impact of COVID-19 on the digitalization of MSMEs in Latin America. We study the adoption of financial technology by small businesses in Latin America by exploring the economic performance of MSMEs and how their revenue sources evolve. Specifically, we are interested in the migration from in-person to digital channels to perform deposits. We calculate the proportion of the total revenues from digital channels over time. The results show that digital revenues declined less than in-person revenues due to the implementation of the first wave of lockdowns and that there is a persistent substitution between in-person and online transactions.

This research contributes to a growing recent literature on the economic consequences of the COVID-19 pandemic (see Belitski et al., 2022, and Brodeur, Gray, Islam, and Bhuiyan, 2020 for a review). Specifically, we focus on the impact on micro, small and medium enterprises (MSMEs) in developing countries, quantifying the losses, estimating the effect on business survival, and examining how various firm characteristics lead to heterogeneous economic consequences.

Our paper's first contribution to the literature is quantifying the adverse economic effects on MSMEs in Latin America. MSMEs in the United States were financially fragile at the beginning of the pandemic: Bartik et al. (2020) describe median firms having less than two weeks of cash on hand, and Fairlie (2020) notes that most major industries were facing large drops in the number of active business numbers in April 2020. This fragility is also present in Latin America and the Caribbean MSMEs: smaller firms were more negatively affected than large firms, exhibiting the steepest declines in sales and employment and facing more significant liquidity constraints than large firms (Acevedo et al., 2021; Aterido et al., 2021; Guerrero-Amezaga et al., 2022). The

---

[1] We have data on firm location at the municipality or state levels, including whether firms are located in the capital or outside the capital. Since not all countries have data disaggregated at the municipality level, the only geographic split we can generate is whether firms are located in or outside the country's capital. We cannot distinguish between rural and urban municipalities.

[2] The degree of business exposure depends on the predicted extent of physical contact that consumers face when purchasing goods or services and the anticipated distribution of in-person and digital sales of the business. For example, we classify restaurants as high-contact, electronic stores as low-contact, and contractors as no-contact businesses.

negative effects also extend to business survival rates. Bottan, Hoffmann, and Vera-Cossio (2020) conduct a survey and find that a large percentage of respondents from Latin America and the Caribbean report closing their small business during the beginning of the pandemic, and Aterido et al. (2021) discover that one in four formal businesses in four Central American countries closed.

The rapid negative economic impact of the pandemic points to an opportunity for government intervention to help business survival and reduce unemployment. Our paper also contributes to understanding the effects of government lockdowns and economic relief policies on MSME revenues. Bartik et al. (2020) show how mass layoffs and closures occurred only a few weeks into the crisis, indicating how crucial fast government action is when a similar economic downturn occurs. At the same time, successful job retention schemes during the first six months of the pandemic played an essential role in limiting job losses by providing liquidity to firms (OECD, 2021). Government action can also have lasting consequences on the composition of the economy and competitiveness of markets: Fairlie et al. (2022) show how, even though the number of operating businesses recovered quickly, this came at the expense of increased market concentration among larger firms. Economic relief programs should be easy to access for smaller firms with limited financial and human capital since bureaucratic complications can hinder access to emergency resources (Bartik et al., 2020). Lastly, these programs should be targeted specifically at small businesses since they experienced reductions in credit supply despite the increased demand at the beginning of the pandemic (Ben-David, Johnson, and Stulz, 2021).

We also contribute novel evidence of the transition from in-person to online transactions and the higher economic impact on firms unable to conduct online sales. The spread of COVID-19 occurs through exposure to infectious respiratory fluids, so the main recommendations by health authorities have been physical distancing and avoiding crowded indoor spaces (CDC, 2021). Both individual responses to the increased transmission risk and government mobility restrictions led to a sharp drop in physical mobility around the world (Figure 1).

The increase in social distancing reduced the demand for goods and services from physical store locations, impacting more employees and firms that relied on in-person contact with consumers, such as restaurants and entertainment venues (Beland, Brodeur, and Wright, 2020; Cirelli and Gertler, 2022). Bloom, Fletcher, and Yeh (2021) show how the smallest offline firms experienced losses of up to 40 percent compared to less than 10 percent for the largest online firms. Likewise, industries in which a higher fraction of the workforce could not work remotely

experienced a greater decline in employment and expected revenue growth (Papanikolaou and Schmidt, 2022). This led firms to prioritize increasing access to digital payments, as the change in consumer habits harmed firms that could not deliver or sell their products online (Acevedo et al., 2021).

Even as initial lockdowns were lifted, mobility remained low as a significant fraction of the workforce across all countries continued to work from home (Brynjolfsson et al., 2020). This effect has persisted, with an increase in the days per workweek that employees work and desire to work from home (Aksoy et al., 2022). At the same time, desired social distancing is still high and expected to continue in the years ahead (Barrero, Bloom, and Davis, 2022). Both of these trends indicate that the shift from in-store to online transactions will be long-lasting, making it necessary for firms to adopt financial technologies and switch to online sales. Our results provide empirical evidence of this shift across all Latin American countries in our sample, showing the importance of increasing access to online transactions for SMEs in developing countries.

Finally, this paper provides unique evidence of the impact of the pandemic on MSMEs in developing countries using administrative banking data. The effects of the pandemic are more considerable in developing countries than in rich countries, with lower health system capacity, less ability of workers to work online and less ability of individuals to weather temporary income shocks (Miguel and Mobarak, 2022). In addition, MSMEs employ a substantial fraction of the workforce in developing countries (Ayyagari, Demirgüç-Kunt, and Maksimovic, 2014). However, high vaccine acceptance rates could imply that future pandemic lockdowns can be shorter with adequate vaccine distribution (Solís Arce et al., 2021).

The rest of the paper is organized as follows. Section 2 describes the data used in this study, including the data processing for heterogeneity analysis. Section 3 studies the effect of COVID-19 lockdowns and economic relief programs on MSMEs' income. Section 4 presents evidence of the switch to a higher share of online transactions. Section 5 concludes.

2. Data and Methodology

This section outlines the methods and data pre-processing steps we use to create comparable metrics across the six countries part of our study. We also describe company characteristics used in the analysis to help us better understand the heterogeneous impact of the pandemic on businesses. By carefully considering these factors, we aim to shed light on the specific challenges faced by different types of firms during the pandemic.

The banking data consist of administrative, financial firm-specific transactions. The time dimension of the transactions is either at the daily (Mexico, Peru, and Paraguay), weekly (Brazil and Colombia), or transaction (Chile) level. These administrative datasets include all the transactions that micro, small, and medium enterprises performed during the last two and a half years using the business accounts they have contracted with financial institutions. The data we use in this research encompass those transactions classified as deposits or *cash-in* and the sales that each firm performed using point of sales (POS) transactions. We generically denominate these transactions *deposits* and argue that the total amount is a good proxy for capturing MSMEs' revenues. We believe that the total amount of deposits is a good approximation since small businesses in Latin America only have access to a few different bank accounts and periodically deposit most of their sales in these accounts.

The financial information, the specific categorization of the transactions, and the time period each country-specific dataset comprise slightly differ. The information varies across countries since the financial institutions in our study work with different digital technologies and digital servers to process and store every financial transaction that their clients make. We harmonize the data as well as possible and work with aggregate and comparable categories across countries to answer the research questions and perform meaningful cross-country comparisons. We could classify revenues into in-person, online, and POS deposits for most countries (see Table 1). Additionally, we decided to work only with deposits from June 2019 onwards to make the analysis comparable. We then discard earlier information from the data due to data quality concerns and because the sources that the banks used to extract the information earlier than the first semester of 2019 either are less accurate or contain only aggregate or partial information.

In addition to the high-frequency administrative data encompassing banking transactions over more than two years (June 2019–June 2021), we also have access to cross-sectional information that characterizes MSMEs. The information is available for a subset of the total

6

number of MSMEs: contingent upon the country and the specific variable, the total number of categorized MSMEs varies.[3] The cross-sectional datasets are the baseline information that each financial institution had at the beginning of our study, and it does not change during the period of analysis in this research. This paper focuses on three relevant business characteristics: i) firm size, ii) geographical location, and iii) the economic sectors where the MSME provides goods and services. To make the analysis comparable across countries, we classify businesses into micro, small and medium-sized firms. We used the information the bank had available since it was the best strategy to include the largest number of firms in the analysis. While some banks use the official categorization of either the federal government or the national IRS, other banks prefer to use the metrics they have used to classify clients regarding marketing campaigns and risk levels. Appendix A.2 details the definition and thresholds we finally use to classify MSMEs into the three firm sizes for each of the six countries in this study. We additionally group geographic locations (which were available at the regional or district levels) into two categories: MSMEs located in the capital and MSMEs situated in the rest of the country (regional MSMEs). Also, given the miscellaneous descriptions of the economic activities that a MSME can have, we categorize economic sectors using either the International Standard Industrial Classification of All Economic Activities Codes (ISIC) or the Merchant Category Codes (MCC). We work with no more than 12 different economic sectors that follow a similar structure to ISIC and MCC codes. Using the same ISIC and MCC codes, we then work with a more disaggregated categorization of economic activities (more than 55 categories) to classify sectors into a three-category scale that defines the business's exposure degree: non-contact, low-contact, and high-contact industries. We classify economic activities into these three categories considering the degree of social contact that a customer may face when making a purchase and the expected distribution of in-person and digital sales within each category (for more details, see Appendix Tables A.1 and A.2). Our final categorization follows a similar structure to that of Cirelli and Gertler (2022).

Regarding our methodology, we pre-process and clean the data before performing cross-country comparisons. First, instead of using the daily or weekly total amount of deposits, we calculate its simple-mean two-week moving average to reduce noise and seasonal impacts. We also control for any possible effects driven by outliers by replacing outliers with the one-week

---

[3] Due to technical constraints, the financial institutions in this project could not obtain the complete characterization for every firm.

rolling mean (for example, when due to data quality issues, there is a day when all firms sell twice as much as usual). Third, instead of working directly with the total amount of deposits in levels, we create an index by scaling the total amount of deposits by the simple average of the total amount of deposits performed during February 2020. We use February 2020 as the base month since it was the last complete month previous to the first pandemic lockdown, and we do not observe any seasonal effects resulting from the end of the Winter holidays in the data. In this regard, it is also relevant to mention that the World Health Organization formally declared the COVID-19 outbreak a global pandemic on March 11, 2020. Lastly, we intend to include only cash-in transactions that may approximate MSMEs' revenues. We then exclude transactions categorized as interest gains, promotional fees, remittances, and other cash-in transactions that we cannot classify as potential revenues.[4] Table 1 summarizes by country the available data we can access and describes the heterogeneous analyses we performed.

Table 1. Distribution of SMEs by Country and Firm Features

Disaggregation	Brazil	Chile	Colombia	Mexico	Paraguay	Peru
Financial institution	Payment processor	Private bank	Private bank	Private bank	Private bank	Private bank
Unit of analysis	Aggregate	Firm	Firm	Firm	Firm	Firm
Cash-in data:						
POS	Yes	No	No	Yes	Yes	Yes
Deposits	No	Yes	Yes	No	Yes	Yes
Firms size	Yes	Yes	Yes	No	Yes	Yes
Geographic location	No	Yes	Yes	Yes	Yes	Yes
Economic sector	Yes	Yes	Yes	Yes	Yes	Yes
Contact degree	No	Yes	Yes	Yes	Yes	Yes

Note: Data from Brazil include only transactions performed in the Sao Paulo region. POS data from Chile were not available due to technical constraints. For Chile, Colombia, Mexico, and Peru, economic sectors are classified by ISIC and MCC. Given the small number of firms in our Paraguayan sample, we instead use the economic sectors defined by the bank. For Brazil, we use the classification given by the network. Contact degree is categorized as non-contact, low contact, and high contact, matching economic sectors with a contact degree.

---

[4] Other categorized cash-in transactions we do not consider a proxy for revenues are remittances, financial commissions, and mutual funds. Excluded transactions represent less than 3 percent of the total amount of deposits observed during the entire period in each of the five countries where data are available at the transaction level.

Table 2 shows the total number of MSMEs and the distribution of firms by category of interest. We do not have access to the complete characterization for every MSME that banks include in their datasets, and the distribution and total number of MSMEs vary by country and category. Nevertheless, we were able to work with a large number of firms relative to the total number of each bank's clients. This allows us to draw robust conclusions extending to the rest of the firms. The exception is Paraguay: even though we have access to detailed information for almost all MSMEs, the small number of bank business clients (less than 1,000 firms) does not allow us to generalize the conclusions for the Paraguayan economy. The distribution by country within the category of economic sectors is shown in Appendix A.3.

Table 2. Number of SMEs by Country and Firms' Characteristics

	Brazil		Chile		Colombia		Mexico		Paraguay		Peru	
	Jan19 - Dec21		Jan19 - Feb22		Jan19 - Mar22		Jan19-Oct21		Jan19 - Jul21		Jan19 - Jun21	
	N	%	N	%	N	%	N	%	N	%	N	%
Econ. Sector	455.6	100	54,844	50	135,178	69	135,627	100	805	98	73,188	99
Firm Size	455.6	100	40,526	37	193,858	98			818	100	22,336	30
- Micro			11,685	29	45,034	23			390	47	14,586	65
- Small	245.4	54	22,217	55	140,329	72			268	33	6,722	30
- Medium-sized	210.2	46	6,624	16	8,495	4			160	20	1,028	5
Location			108,301	99	196,680	99	133,388	99	818	100	73,349	100
- Capital			58,164	54	84,101	43	16,136	12	416	51	46,289	63
- No Capital			50,137	46	112,579	57	117,252	87	402	49	27,060	37
Exp. Degree			49,179	45	130,845	66	135, 627	100	547	67	69,815	95
- No exposure			31,856	65	58,847	45	6,073	5	207	38	18,340	26
- Low exposure			2,787	6	16,026	12	64,283	47	223	41	10,088	14
- High exposure			16,536	29	56,922	43	65,271	48	117	15	41,487	59
Total Firms	455,6	-	109,463	-	196,952	-	135,627	-	818	-	73,699	-

Note: Statistics for Brazil are based on the average of the weekly total number of card transactions (in millions). We did not have access to the total number of MSMEs included in the analysis.

Table 2 further shows that we can identify the location for most of the businesses included in the research for four out of five countries (more than 99 percent of the total number of firms except for Mexico). For Colombia, Paraguay, and Peru, we can also identify a high proportion of firms' economic sector and their degree of exposure (more than 70 percent of the clients for each

country). However, the same is not true for Chile and Mexico: we can only identify 50 percent and 40 percent, respectively, of the total number of businesses in our study. In addition, even though we can identify the sizes of the firms for almost all clients in Colombia and Paraguay, we can only identify firm size for less than 40 percent of the firms in Chile and Peru. Lastly, note that we do not have access to the size of firms for Mexican firms.

Appendix A.4 describes the different administrative datasets each financial institution provided us throughout this research. In the appendix, we also clarify the different types of transactions and the specific categorizations each bank could obtain from their digital technologies and current servers. Additionally, all figures highlight two events that took place simultaneously in each country in our sample and significantly impacted firms' revenues: the start of the first lockdowns in March 2020 and the introduction of economic relief programs to assist micro, small and medium-sized enterprises in April 2020. These two events are highlighted in all figures using two vertical dashed lines. As every figure will make clear, these two events strongly correlate with the sharp drop in revenues and the rapid economic recovery in 2020. Table 3 details the specific dates of the initial lockdowns and when the different Latin American governments announced their economic relief programs.

Table 3. First Lockdown and Economic Relief Program by Country

Country	1st. Lockdown	MSMEs Economic Relief Programs	Date
Brazil	March 23	PROGER/FAT, CEF	April 13
Chile	March 18	FOGAPE	April 28
Colombia	March 24	Unidos por Colombia	April 5
Mexico	March 23	Apoyo a Empresarios Solidarios	April 21
Paraguay	March 20	FOGAPY	April 13
Peru	March 16	Reactiva Peru	April 13

Note: This table contains the dates when each country in our dataset initiated their first lockdown and economic relief program. All dates are in 2020.

3. Effect of the Pandemic on Firm Revenues

Most Latin American economies enforced the first wave of strict lockdowns during the second half of March 2020. These lockdowns suddenly imposed mobility restrictions that triggered a considerable negative shock across economic sectors and geographical regions, shutting down entire industries. This section studies the effect of pandemic lockdowns and economic relief programs on MSMEs' income, disaggregating by firm characteristics.

3.1 Revenues: Aggregated Analysis

Figure 1 shows the sharp decline in both the total amount and the total number of deposits right after the implementation of the first wave of lockdowns in Latin America (the two indexes use the average amount and number of deposits performed in February 2020). The negative impact on MSMEs' revenues was significant and similar across all Latin American countries part of our research. As the figure shows, countries like Brazil, Colombia, and Peru suffered a decline in deposits of approximately 50 percent. Additionally, the figure shows that the total amount and the total number of deposits experienced a similar rate of recovery in all six countries during the second semester of 2020, reaching pre-pandemic levels towards the end of that year.

Figure 1 also highlights how the immediate decline and the subsequent recovery strongly correlate with changes in mobility. In the bottom panel, we plot changes in mobility using data from Facebook Data for Good.[5] Although we can only observe data starting in March 2020, we can see that countries where MSME revenues were most affected also experienced large drops in mobility compared to the baseline period.

---

[5] The mobility variable is defined as the number of Bing tiles users visited in a given day over the average number of Bing tiles visited during the baseline period in February 2020. Bing tiles are defined as 600 by 600 m2 tiles.

Figure 1. Correlation Main Banking Metrics and Mobility Index

Note: This figure shows the trend of the total amount of deposits, total number of transactions, and Facebook mobility index for all countries in our sample. All panels show two-week rolling means of variables, shown as a percentage change from the February 2020 mean. The top panel shows the percent change in the total amount of MSME deposits; the middle panel the percentage change in the total number of MSME deposits; and the bottom panel the percentage change in Facebook user mobility. The mobility variable is defined as the number of Bing tiles users visited in a given day over the average number of Bing tiles visited during the baseline period in February 2020. Bing tiles are defined as 600 by 600 m2 tiles. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

12

3.2 Firm Size

The first breakdown we present is the distinction between the performance of smaller MSMEs (micro and small firms) and medium enterprises. The intuition behind this is that smaller businesses faced additional short-term limitations in obtaining liquidity during the pandemic's beginning. We categorize MSMEs into micro, small, and medium-sized businesses using official government definitions when available and banks' own definitions as an alternative. Table 4 describes the definition used to classify MSMEs into firm sizes, and Appendix Tables A.3-A.5 detail the specific thresholds and categorization that either governments or private banks use to define the size of businesses.

Table 4. Classification of MSMEs into Firm Sizes

Country	Defined by	Notes
Brazil	Company	The company classifies firm into small and large businesses
Chile	Chilean IRS	The Chilean IRS classifies firms based on annual sales
Colombia	Private bank	The bank classifies MSMEs based on annual sales
Paraguay	Government	The government classifies firms based on annual sales
Peru	Private bank	The bank classifies MSMEs based on the total amount of liquidity

Figure 2 shows the evolution of the total amount of deposits by MSME size and country. Although the differences seem negligible, the series' evolution shows a more significant decline after the first lockdown for micro and small firms, especially in Brazil, Peru, and Paraguay. Two additional factors are worth mentioning. First, smaller firms recovered faster than medium-sized SMEs in Brazil and Peru. Second, SMEs—regardless of their size—reached pre-pandemic levels by the end of 2020. The faster recovery experienced by micro SMEs can be in part explained due to the implementation of significant economic COVID-19 relief programs that primarily helped smaller businesses during the second semester of 2020 (see Appendix A.5).

Figure 2. **Total Amount of Deposits by Country and Firm Size**
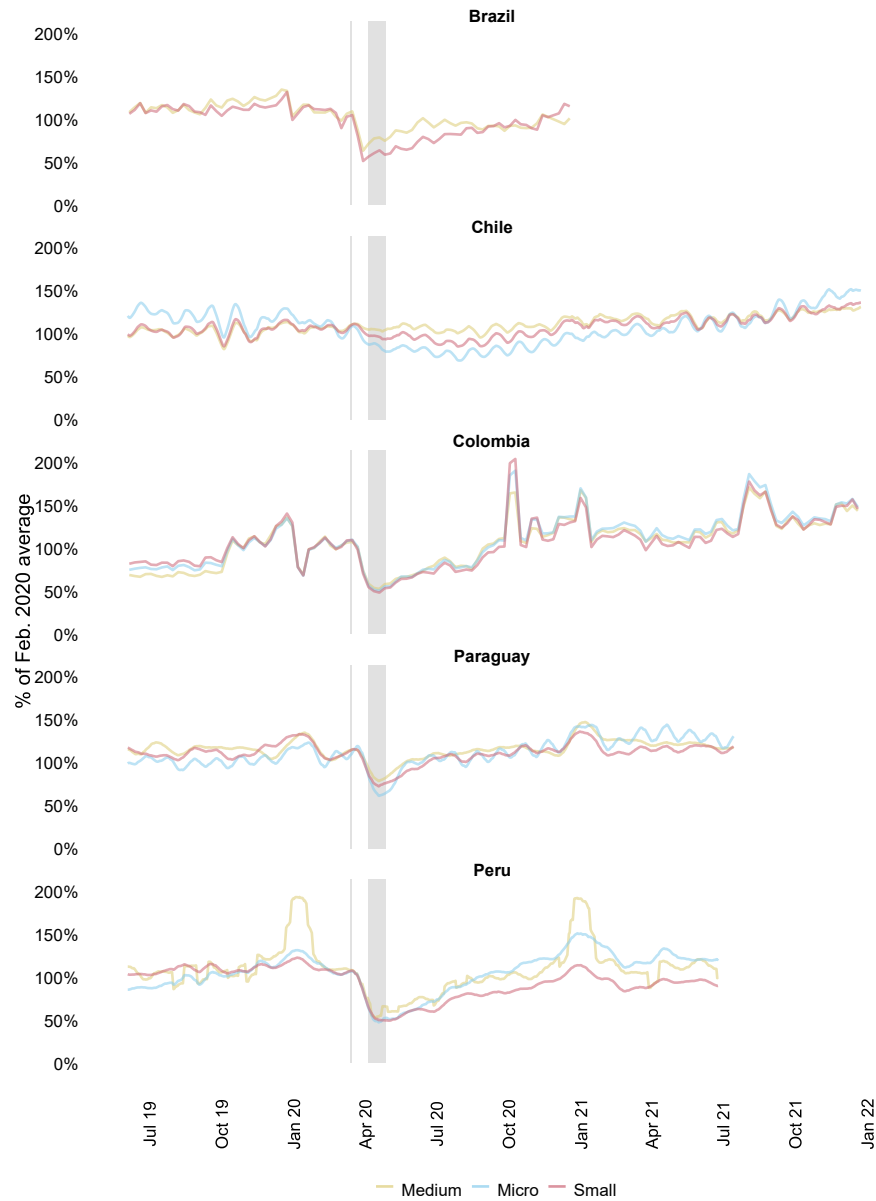
Note: This figure shows two-week rolling means of the total amount of MSME deposits by country and firm size, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

3.3 Geographical Location

The second dimension we explore is the geographical scope of the COVID-19 pandemic. Specifically, we are interested in studying whether MSMEs located in the capital were more or less severely impacted by the mobility restrictions compared to those located outside the capital

(regional MSMEs). As shown in Table 1 above, we had access to the geographical location of the majority of MSMEs in all countries in our sample except Brazil. Since we had different disaggregations across countries, we could only compare the performance of firms in the capital with those outside the capital and could not split between urban and rural locations.

Figure 3. Total Amount of Deposits by Country and Geographical Location
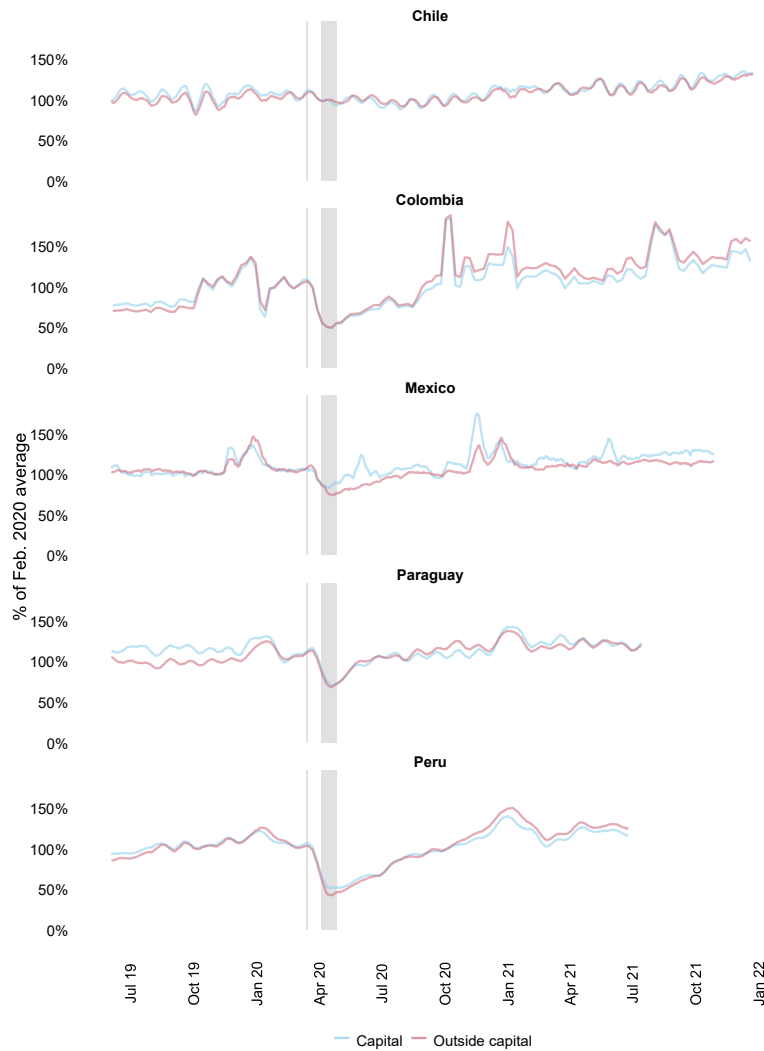

Note: This figure shows two-week rolling means of the total amount of MSME deposits by country and geographical location, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

Figure 3 shows that there are no significant differences in economic performance between MSMEs located in and those outside each country's capital. The evolution of revenues is similar not only after the first wave of lockdowns but also during the subsequent 2020 recovery. Two

15

opposite effects can explain this. First, we expected a better performance from the MSMEs in the capital since they may have easier access to liquidity due to the density of the market. At the same time, mobility and gathering restrictions appeared more strictly enforced in capitals due to better state capacity.

3.4 Economic Sectors

We next study the heterogeneous impact of the COVID-19 pandemic on economic sectors. Previous empirical evidence suggested that industries exposed to close contact between consumers, such as airlines, entertainment venues, and tourism, would suffer more from mobility restrictions. Figures 4-9 show the evolution of the total amount of deposits for all six Latin American economies in this study. The figures support previous findings by displaying substantial differences across economic sectors within each country—especially in the sharp decline experienced immediately after the March 2020 lockdowns. The figures also show that the economic sectors where businesses rely less on direct contact with consumers (such as agriculture, construction, and manufacturing) suffered less from mobility restrictions. Lastly, it is relevant to note that retail sales associated with food did not face a similar decline compared to the rest of retail sales and other businesses such as services. We think that a significant proportion of MSMEs that operate in this industry were able to incorporate online channels and payment methods to sell their products in the short term.

Figure 4. Total Amount of Deposits, Main Economic Sectors, Brazil

Note: This figure shows two-week rolling means of the total amount of MSME deposits by industry for Brazil, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.
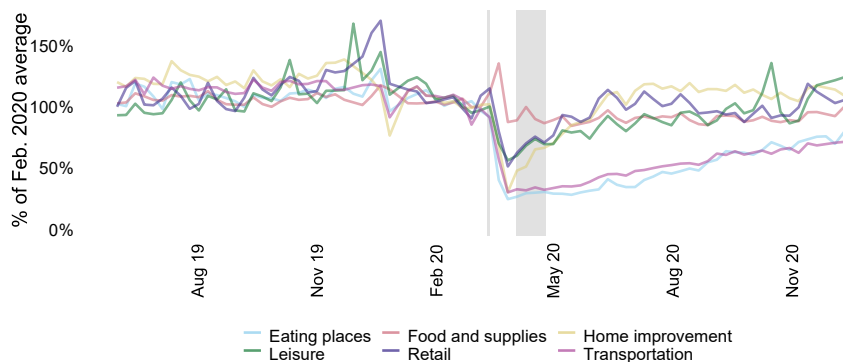
16

Figure 5. Total Amount of Deposits, Main Economic Sectors, Chile
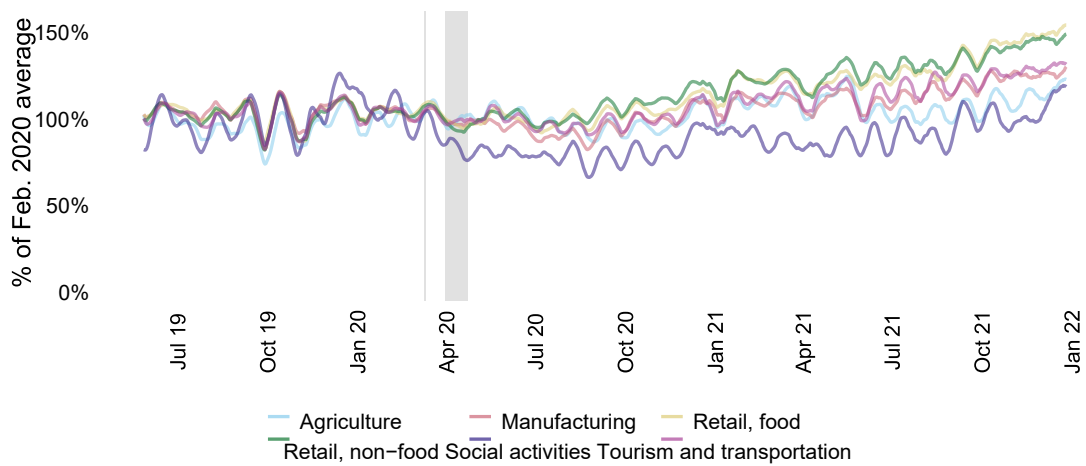
Agriculture — Manufacturing — Retail, food
Retail, non−food Social activities Tourism and transportation

Note: This figure shows two-week rolling means of the total amount of MSME deposits by industry for Chile, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

Figure 6. Total Amount of Deposits, Main Economic Sectors, Colombia

Agriculture — Education — Manufacturing — Retail, food
Retail, non−food Social activities Tourism and transportation

Note: This figure shows two-week rolling means of the total amount of MSME deposits by industry for Colombia, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

17

Figure 7. Total Amount of Deposits, Main Economic Sectors, Mexico

Legend: Education, Entertainment, Healthcare, Retail, food, Retail, non−food, Tourism and transportation

Note: This figure shows two-week rolling means of the total amount of MSME deposits by industry for Colombia, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

Figure 8. **Total Amount of Deposits, Main Economic Sectors, Peru**

Legend: Agriculture, Education, Manufacturing, Retail, food, Retail, non−food, Social activities, Tourism and transportation
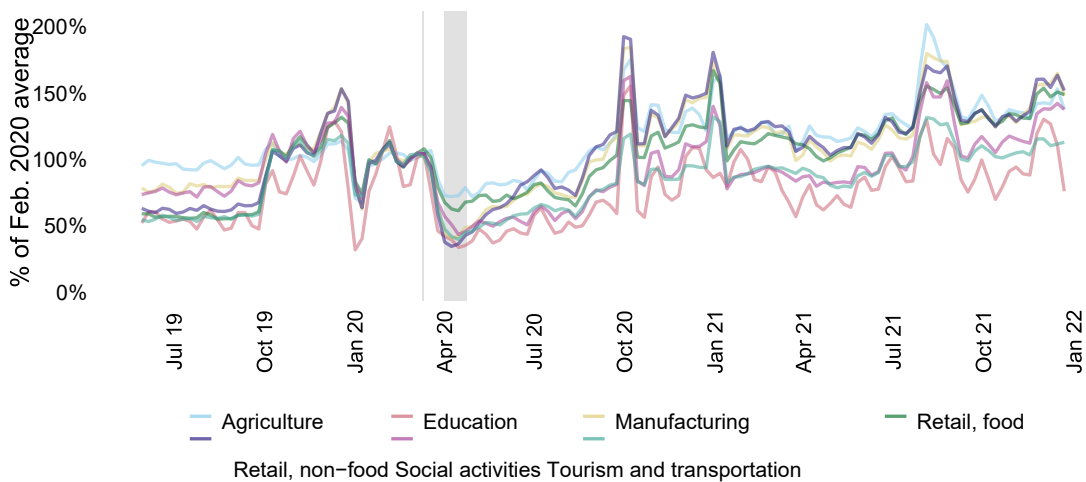
Note: This figure shows two-week rolling means of the total amount of MSME deposits by industry for Peru, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

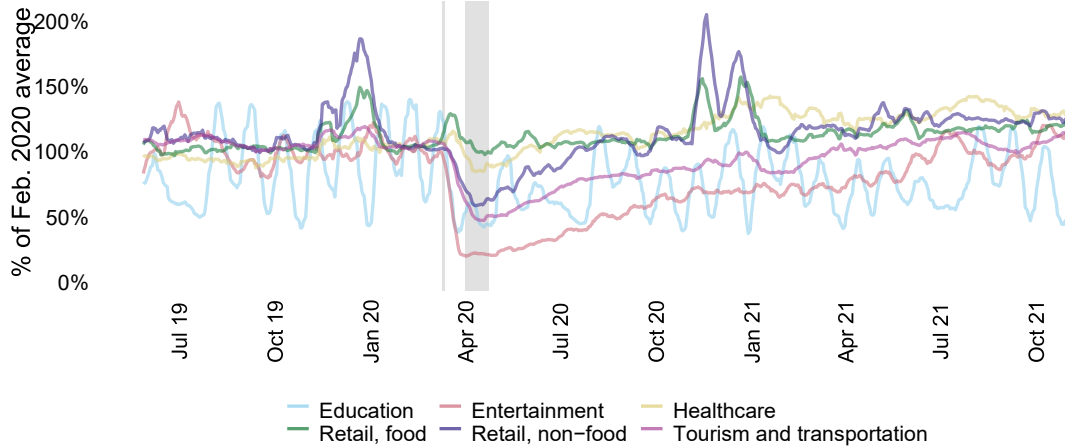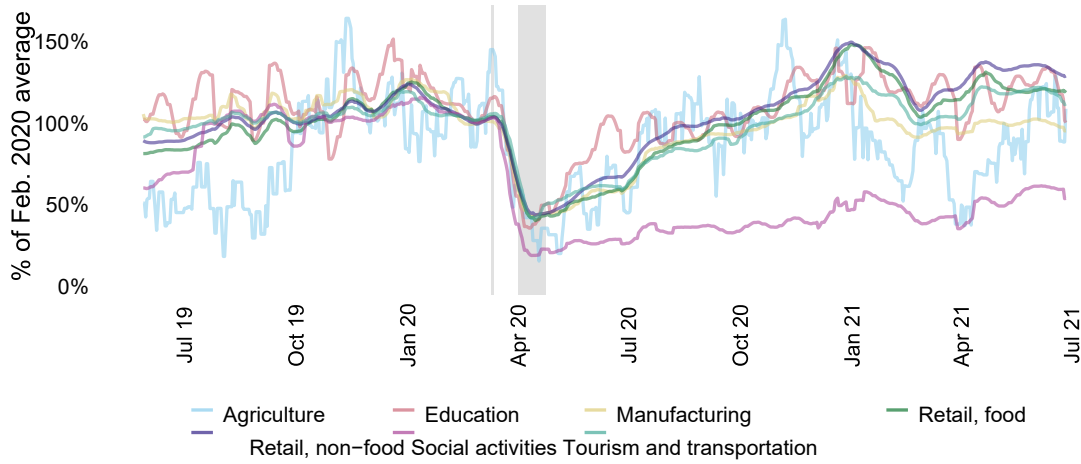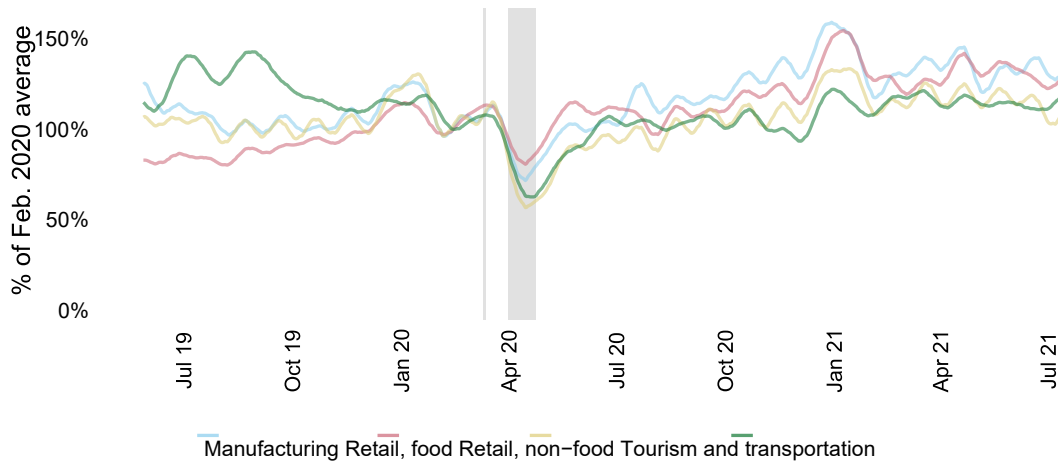**Figure 9. Total Amount of Deposits, Main Economic Sectors, Paraguay**

Manufacturing   Retail, food   Retail, non−food   Tourism and transportation

Note: This figure shows two-week rolling means of the total amount of MSME deposits by industry for Paraguay, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

3.5 Degree of Exposure to Contact

Lastly, we incorporate Cirelli and Gertler's strategy and classify economic activities into non-exposed (non-contact sector) and exposed (high-contact and low-contact sectors) industries. We follow the following two-step approach. First, we use the ISIC and MCC codes to categorize MSMEs into a more granular classification than the economic sectors defined in the previous subsection. Appendix Tables A.1 and A.2 display the final classification of the more aggregate economic sectors into this more granular description. Second, we categorize MSMEs into non-contact and contact sectors using the previous categories. The categorization considers the degree of exposure or direct contact with customers that each economic activity must face when selling its products or services and the relevance of online sales. Using this two-step approach, we generated a classification similar to the categorization used in Cirelli and Gertler. Figure 10 shows the evolution of the total amount of deposits for each Latin American country in our study. The figure indicates that the non-contact sector in Mexico and Paraguay faced a smaller immediate decline and a faster post-recovery than the contact sectors.

Figure 10: Total Amount of Deposits by Country and MSMEs' Degree of Exposure
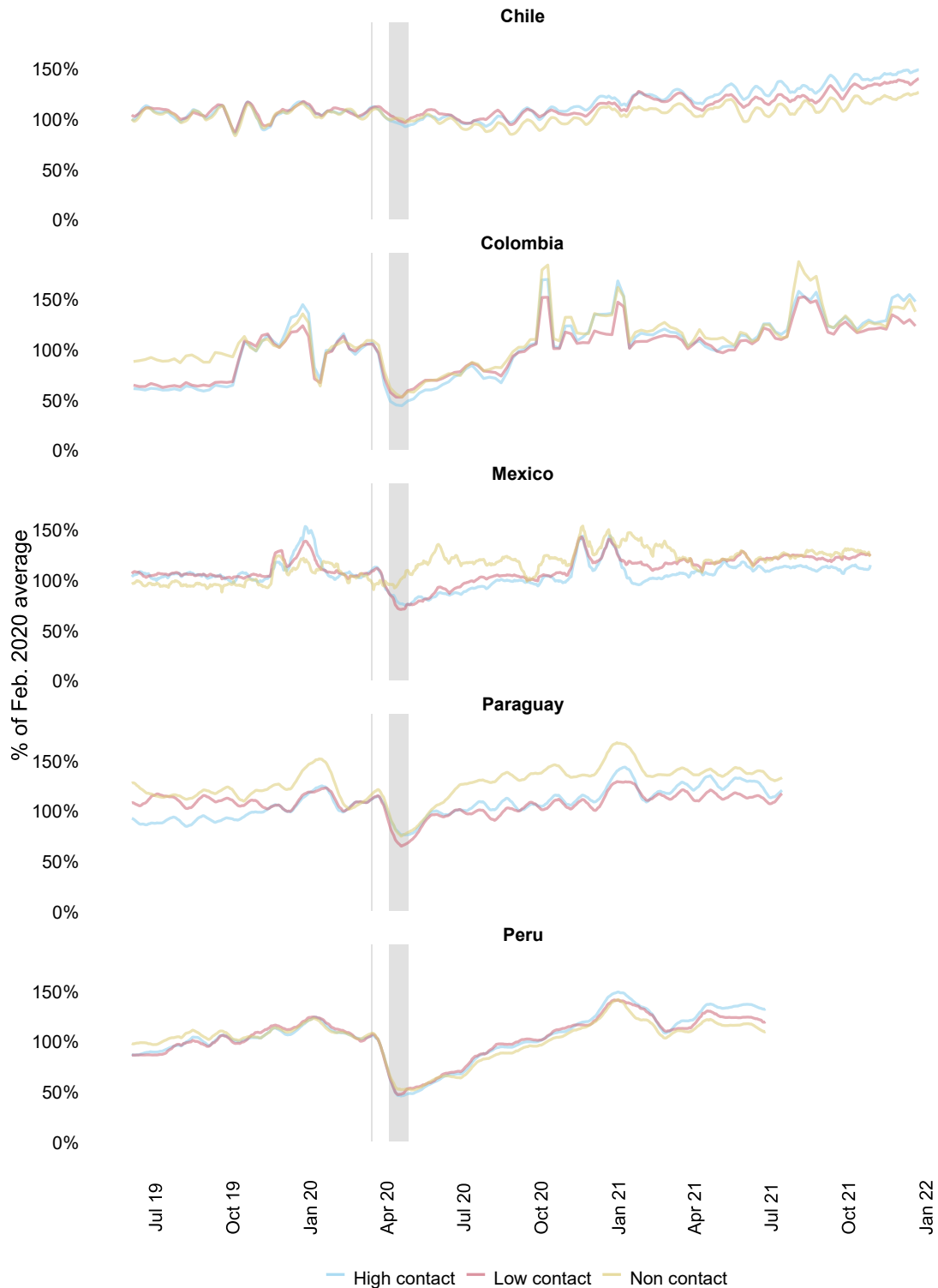
Note: This figure shows two-week rolling means of the total amount of MSME deposits by country and COVID-19 exposure degree, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

4. COVID-19 and the Digital Transformation of MSMEs

The COVID-19 pandemic has led to a rapid shift in sales from in-store to online across most industries in Latin America. This transition was expected due to the restrictions on mobility and gatherings implemented to mitigate the virus's spread, making it difficult for customers to purchase goods and services in-person. The move to remote work and the need for social distancing measures such as lockdowns, physical distancing, and border closures also contributed to online sales, as businesses had to adapt to these changes to continue serving customers safely (OECD, 2021). At the same time, there was a significant migration from working in the office to working from home during the pandemic (Beland, Brodeur, and Wright, 2020, and Brynjolfsson et al., 2020).

In our paper, we focus on how MSMEs adapted to the pandemic by shifting their sales to a higher share of online transactions. The administrative banking data allow us to categorize deposits into in-person and online transactions. We first compare the relevance of these two types of deposits pre and post-implementation of the first wave of lockdowns by looking at the evolution of the total amount of deposits from June 2019 to October 2021. We conclude that the COVID-19 pandemic expanded the use of digital technologies by increasing the proportion of online deposits.

Table 5 shows the total number of MSMEs that performed in-person and online transactions during the last two and a half years by country. The table shows that a higher proportion of MSMEs have been performing in-person transactions compared to online transactions pre-pandemic in all four countries for which we have this disaggregation. Table 5 also shows that during the pandemic (from March 2020 to the last moment with available information), the proportion of MSMEs performing online deposits increased compared to the pre-pandemic period. In Colombia and Peru, the difference between the proportion of firms performing in-person deposits and the proportion of firms with online deposits is now similar.

Table 5. Distribution of SMEs by Type of Transaction

| Country | Pre-pandemic | | | | | Pandemic | | | | |
| | In-person | | Online | | Total | In-person | | Online | | Total |
	N	%	N	%	N	N	%	N	%	N
Brazil[1]	65.7M	61	57.1M	53	108M					
Colombia	129,788	87	105,573	71	148,763	155,374	87	143,261	81	177,644
Paraguay	680	97	544	77	703	772	95	669	83	810
Peru	50,358	92	40,967	75	54,550	54,424	90	50,821	82	60,094

Subsections 4.1-4.5 study the substitution between in-person and online deposits disaggregating by firm characteristics, including size, geographical location, and degree of exposure to contact.

4.1 Revenues by Type of Deposits

Figure 11 compares the time evolution of in-person and online deposits between different countries. The figure highlights how the decline in deposits was more pronounced for in-person than online deposits, and online deposits experienced a faster recovery. This trend holds for all the countries in our sample.

Figure 11 also shows that the switch from in-person to online deposits persisted in the medium term. The gap between both series remained large during the 2020 economic recovery and the first 10 months of 2021. This shows that MSMEs have increasingly used digital sales platforms since the start of the COVID-19 pandemic.

Figure 11. Total Amount of Deposits by Country and Type of Transaction
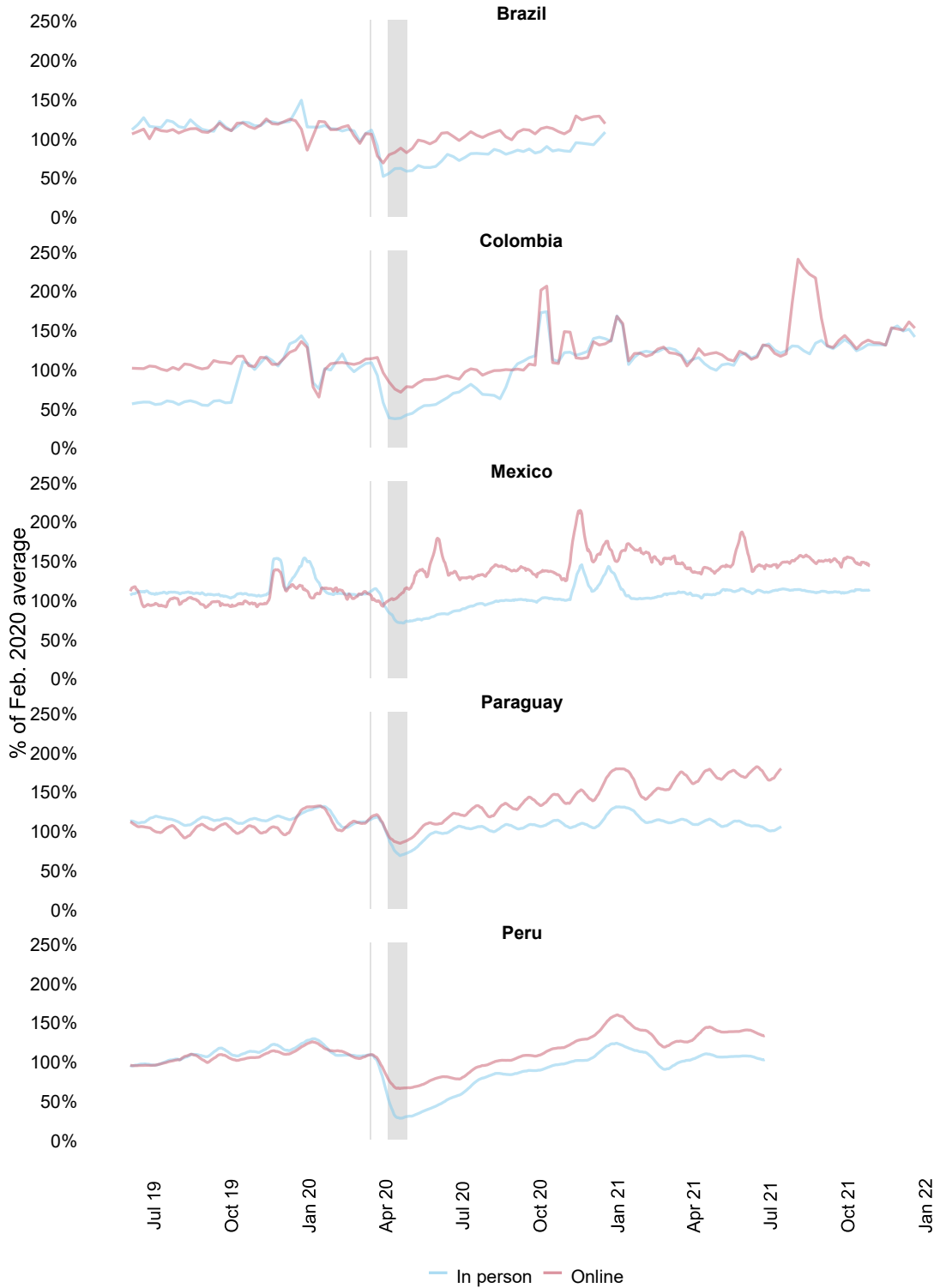
Note: This figure shows two-week rolling means of the total amount of MSME deposits by country and transaction type, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

To further study the relevance and scope of the digitalization process of businesses during the pandemic, we perform a similar analysis disaggregating by all of the available firm characteristics: firm size, geographic location, and exposure to contact. In the following subsections, we compare the proportion of total online deposits across countries and business characteristics.

4.2 Proportion of Revenues Performed Online by MSME Sizes

Figure 12 shows the evolution of the proportion of online deposits by country and business size. As with previous figures, it is evident that the first wave of pandemic lockdowns caused a considerable negative impact on MSME deposits. Micro-enterprises increased the proportion of online deposits after the beginning of the pandemic in all countries in our sample. Small firms, outside of the Colombian case, have not increased the use of online deposits since.[6]

Figure 12. Proportion of Online Total Amount of Deposits by Firm Size
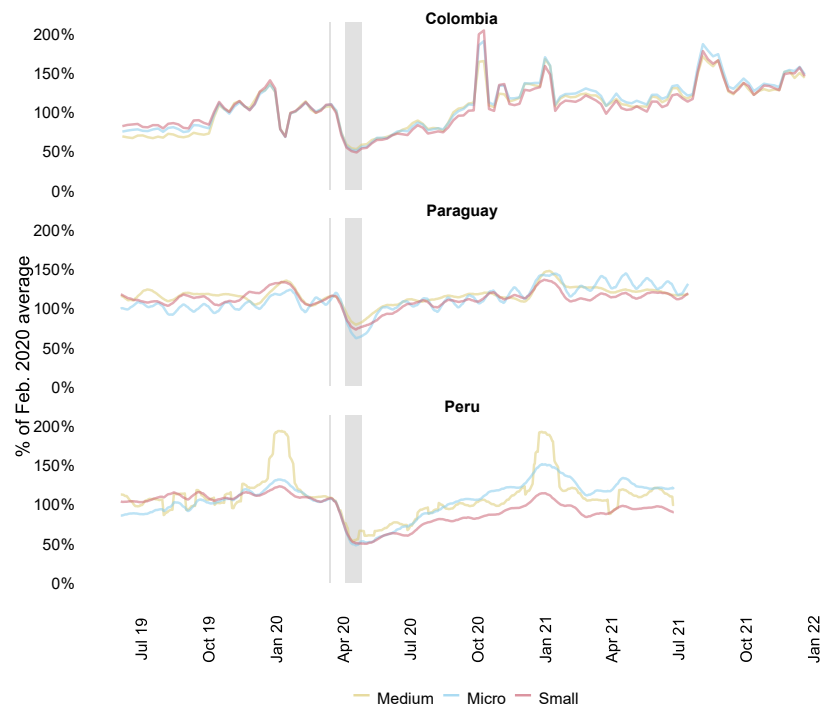
Note: This figure shows two-week rolling means of the percentage of online MSME deposits by country and firm size, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

---

[6] We could not access any information related to the size of firms in the Mexican case. For Brazil, we only have access to the scaled total amount of deposits, so we are not able to estimate the proportion of online sales.

4.3 Proportion of Revenues Performed Online by Geographical Location

Figure 13 shows a similar analysis, now focusing on the geographic location of the MSMEs. Once again, we perform this analysis using two aggregate categories: MSMEs located in the capital and regional MSMEs. This figure shows that MSMEs have been obtaining a percentage of their deposits through online channels equal to or larger than that of regional MSMEs.

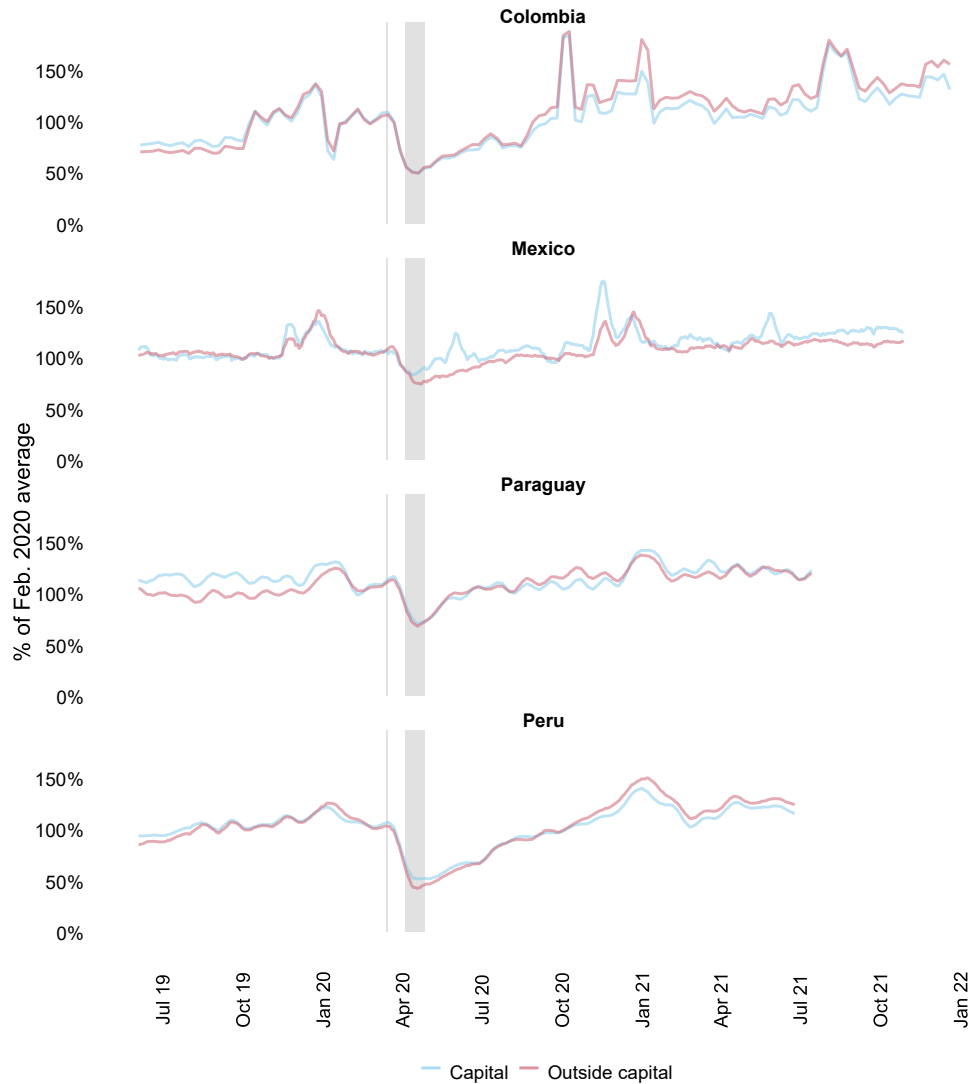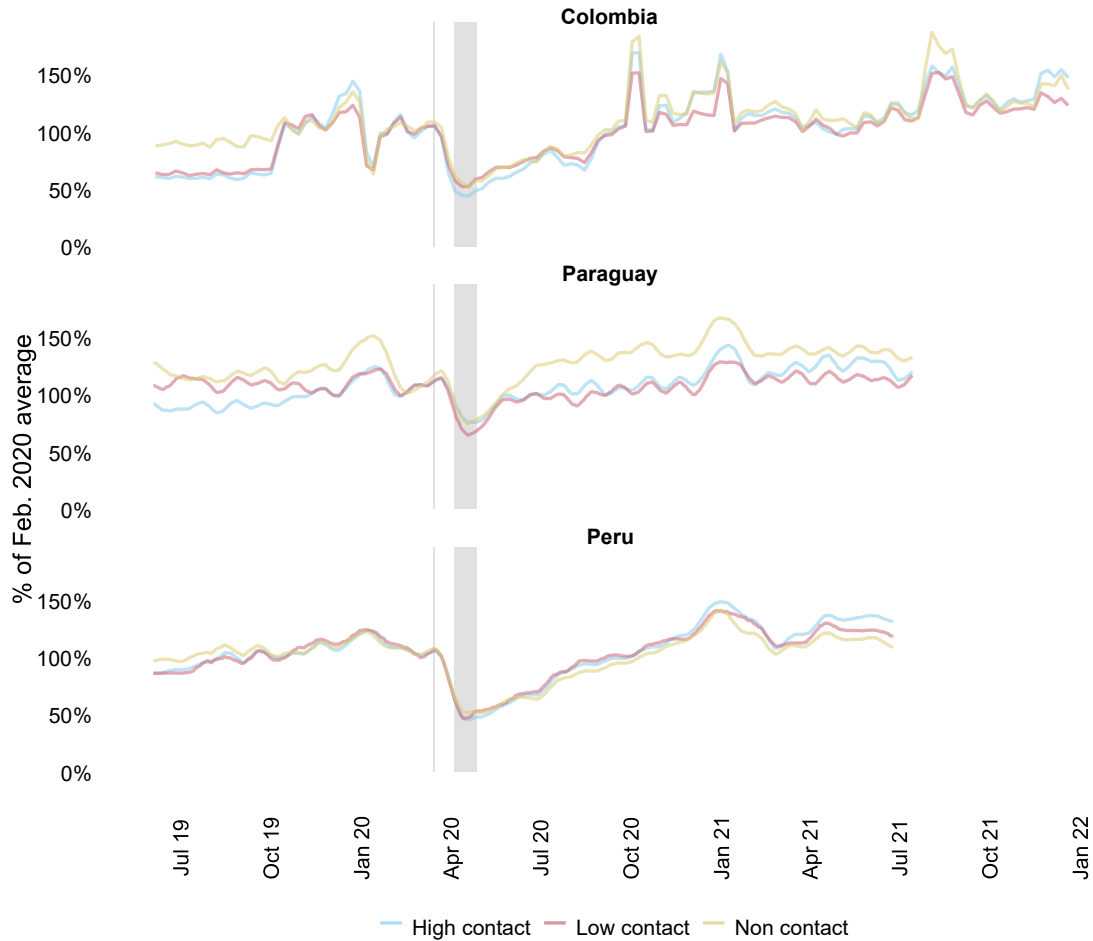**Figure 13. Proportion of Online Total Amount of Deposits by Geographical Location**

Note: This figure shows two-week rolling means of the percentage of online MSME deposits by country and geographical location, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

Similarly to the previous two subsections, Figure 13 highlights the abrupt increase in the use of digital technologies after the enactment of the first wave of lockdowns. Also, the proportion of deposits performed online post-2020 economic recovery remained higher and stable regardless of the location of the MSMEs. Although regional MSMEs still rely relatively more on in-person deposits, Figure 13 reinforces our conclusion that COVID-19 and the mobility restrictions broadly increased and accelerated the digitalization process across small businesses. Figure 13 additionally shows that MSMEs in Mexico and Peru reached a new equilibrium higher than pre-pandemic levels: firms perform deposits online in a higher proportion even after a year later than when the first lockdowns took place.

4.4 Proportion of Revenues Performed Online by MSMEs Exposure Degree

Next, we use our classification based on the contact exposure of industries as the relevant dimension to determine in which economic sectors the COVID-19 pandemic created a more significant impact on the diffusion of digital technologies. The more noticeable findings from Figure 14 are similar to the conclusions obtained in the previous analyses: the implementation of the first wave of lockdowns accelerated the digitalization of MSMEs in all types of firms. Figure 14 shows the relevant surge in the total amount of online deposits in all three contact-based economic sectors. Moreover, the instantaneous surge generated a long-term impact. As expected, the figure shows that industries that rely less on direct contact with customers have mainly been using digital technologies to perform banking transactions compared to economic sectors where clients can purchase in-store products. Finally, it is relevant to notice that MSMEs providing services in the most exposed industry increased the use of online banking immediately after the implementation of the lockdowns in comparison to the other two sectors. This sharp rise gives us an idea of the fast transition of MSMEs from selling exclusively in-store to selling online.

**Figure 14. Proportion of Online Total Amount of Deposits
by MSME COVID-19 Exposure Degree**

Note: This figure shows two-week rolling means of the percentage of online MSME deposits by country and COVID-19 exposure degree, as a percentage change from the February 2020 mean. The gray line indicates the date of the first lockdowns in the sample, and the gray rectangle indicates range of dates of economic relief packages for MSMEs in sample.

The main conclusion we extract from the analyses we performed in Subsections 4.2-4.5 is that the COVID-19 pandemic accelerated the digitalization process of MSMEs in Latin America. Here, we show the significant immediate and permanent substitution from in-person deposits to online deposits that we interpret as greater use of digital banking by small businesses. Online transactions became more important not only during the March 2020 lockdowns but also after the economic recovery. This substitution pattern and the financial technology adoption are present across all industries, firm sizes, and geographical locations.

5. Conclusion

In this paper, we study the impact of mobility restrictions on MSMEs' performance in Latin America by analyzing the rapid fall and subsequent recovery of business earnings. We exploit a series of transaction-level financial datasets from six banks covering June 2019 to October 2021. First, we report that the most significant drop in earnings was due to the lockdowns implemented during the second half of March 2020. The considerable reduction in deposits and transactions was widespread across different industries, firm sizes, and geographical locations.

Second, we combine our panel data of transactions by MSMEs at the firm-daily or fir-weekly level with administrative datasets with firm characteristics. This allows us to estimate the heterogeneous impact of pandemic economic restrictions, which vary across industries, firm sizes, and locations. Our main finding is the significant and persistent shift from in-person to online banking transactions. This shift began right after the implementation of the first wave of lockdowns in March 2020. The transition to digital transactions appears to be permanent since the proportion of online to in-person transactions has remained stable one and a half years after the first lockdown was implemented. The movement to a higher share of online transactions is uncorrelated with the severity of mobility and gathering restrictions imposed during the beginning of the pandemic.

Besides this relevant finding, we also present evidence of heterogeneous effects of the Coronavirus pandemic on different economic sectors. As expected, the pandemic has negatively affected economic sectors that rely more on social gatherings and closer social contact, such as airlines, restaurants and bars, and entertainment venues. Conversely, economic sectors that do not need to rely on close social contact to continue operating, such as agriculture and manufacturing, experienced a smaller decline in earnings and faster recovery after the implementation of economic relief programs.

We believe our findings will help policymakers understand the heterogeneous impact of the economic relief programs so that future programs can improve through more efficient targeting. Economic relief programs should focus on specific economic sectors and firm locations depending on the nature and scope of adverse shocks. Mobility restrictions have different effects across industries and locations, so their impact should be considered in order to effectively support small and medium enterprises during times of economic crisis. Second, we think the evidence presented in this paper shows that increased financial technology adoption and adequate digital infrastructure are crucial to help small businesses in developing economies adapt to temporary economic crises.

Most of these firms are still fragile businesses and face frequent short-term financial constraints. Facilitating access to digital financial resources will allow them to adjust faster during the next negative economic shock.

References

Acevedo, M.C. et al. 2021. "The Impacts of the COVID-19 Pandemic on Firms in the Caribbean." Development through the Private Sector Series, TN-29. Washington, DC, United States: IDB Invest.

Aksoy, C.G. et al. 2022. "Working from Home around the World." NBER Working Paper 30446. Cambridge, United States: National Bureau of Economic Research.

Aterido, R. et al. 2021. "*The Effect of COVID-19 on Firms and Employment in Central America*." Technical Note IDB-TN-2262. Washington, DC, United States: Inter-American Development Bank.

Ayyagari, M., A. Demirgüç-Kunt, and V. Maksimovic. 2014. "Who Creates Jobs in Developing Countries?" In: *Small Business Economics* 43(1): 75–99.

Barrero, J.M., N. Bloom, and S. Davis. 2022. "Long Social Distancing." NBER Working Paper 30568. Cambridge, United States: National Bureau of Economic Research.

Bartik, A. et al. 2020. "The Impact of COVID-19 on Small Business Outcomes and Expectations." In: *Proceedings of the National Academy of Sciences* 117(30): 17656–17666.

Beland, L-P., A. Brodeur, and T. Wright. 2020. "The Short-Term Economic Consequences of Covid-19: Exposure to Disease, Remote Work and Government Response." IZA Discussion Paper 13159. Bonn, Germany: IZA-Institute of Labor Economics.

Belitski, M. et al. 2022. "Economic Effects of the COVID-19 Pandemic on Entrepreneurship and Small Businesses." In: *Small Business Economics* 58(2): 593–609.

Ben-David, I., M. Johnson, and R. Stulz. 2021. "Why Did Small Business FinTech Lending Dry Up During the COVID-19 Crisis?" NBER Working Paper 29205. Cambridge, United States: National Bureau of Economic Research.

Bloom, N., R. Fletcher, and E. Yeh. 2021. "The Impact of COVID-19 on US Firms." NBER Working Paper 28314. Cambridge, United States: National Bureau of Economic Research.

Bottan, N., B. Hoffmann, and D. Vera-Cossio. 2020. "The Unequal Impact of the Coronavirus Pandemic: Evidence from Seventeen Developing Countries." *PLOS ONE* 15(10): e0239797.

Brodeur, A. et al. 2020. "A Literature Review of the Economics of COVID-19." IZA Discussion Paper 13411. Bonn, Germany: IZA-Institute of Labor Economics.

Brynjolfsson, E. et al. 2020. "COVID-19 and Remote Work: An Early Look at US Data." NBER Working Paper 27344. Cambridge, United States: National Bureau of Economic Research.

Centers for Disease Control and Prevention (CDC). 2021. "Scientific Brief: SARS-CoV-2 Transmission." Atlanta, United States: CDC.

Cirelli, F., and M. Gertler. 2022. "Economic Winners Versus Losers and the Unequal Pandemic Recession." NBER Working Paper 29713. Cambridge, United States: National Bureau of Economic Research.

Fairlie, R. 2020. "The Impact of COVID-19 on Small Business Owners: Evidence from the First Three Months after Widespread Social-distancing Restrictions." *Journal of Economics & Management Strategy* 29(4): 727–740.

Fairlie, R. et al. 2022. "Were Small Businesses More Likely to Permanently Close in the Pandemic?" *Small Business Economics* 2022: https://doi.org/10.1007/s11187-022-00662-1

Guerrero-Amezaga, M.E. et al. 2022. "Small Firms and the Pandemic: Evidence from Latin America." *Journal of Development Economics* 155: 102775.

Miguel, E., and A.M. Mobarak. 2022. "The Economics of the COVID19 Pandemic in Poor Countries." In: OECD. *OECD Employment Outlook 2021: Navigating the COVID-19 Crisis and Recovery*. Paris, France: Organisation for Economic Co-operation and Development.

Papanikolaou, D., and L.D.W. Schmidt. 2022. "Working Remotely and the Supply-Side Impact of COVID-19." *Review of Asset Pricing Studies* 12(1): 53–111.

Solís Arce, J.S. et al. 2021. "COVID-19 Vaccine Acceptance and Hesitancy in Low- and Middle-Income Countries." *Nature Medicine* 27(8): 1385–1394.

A Appendix

A.1 Non-exposed and Exposed Economic Sectors

Appendix Tables A.1 and A.2 detail how the economic activities of MSMEs are classified into contact (exposed) and non-contact (non-exposed) sectors. We use a slightly different classification for Mexico, taking into consideration that these datasets use MCC codes (instead of ISIC codes), and Mexican MSMEs part of the study are mainly firms that provide their services in the commerce, retail, and services industries.

Appendix Table A.1. Contact and Non-Contact Sectors Based on ISIC Codes (Chile, Colombia, Paraguay, Peru)

A. Non-Contact Sector		B. Non-Contact Sector	
Econ. Sector	Sub-category	Econ. Sector	Sub-category
Agriculture	Agriculture		B.1 Low-Contact
	Forestry and logging	Education	others
	Fishing and aquaculture	Retail Food	Wholesale clubs and discount stores
Construction	New buildings		
	Building repairs	Retail Non-Food	Equipment and machinery rentals
Financial intermediation	Financial intermediation		Machinery equipment and materials
	Insurance	Social Activities	Business
Government defense	Government defense	Tourism	Travel Agencies
Services	Legal and business services	Transport	Gas stations
Manufacturing	Edible products		B.2 High-Contact
	Textile wood paper plastic glass	Education	Primary and secondary educ
	Retail products		Tertiary educ
	Chemical and electricity products	Healthcare	Doctors and physicians
	Construction materials, machinery		Hospitals
	Motorized vehicles		Social Services
	Medical equipment	Retail Food	Corner stores
	Equipment, machinery reparations		Restaurants and bars
Mining	Mining	Retail Non Food	Clothing Stores
	Support activities		Drug Stores
Tech consulting	Tech consulting		Durable goods
Telecommunication	Telecommunication		Non durable goods
	Services	Social Activities	Artistic and Entertainment
Transport	Land freight transport		Religious and politics
	Logistic transport	Tourism	Hotels
		Transport	Airlines and Rail Transport Bus Passenger
Utilities	Generation and infrastructure		

32

Appendix Table A.2. Contact and Non-Contact Sectors Based on MCC Codes (Mexico)

A. Non Contact Sector		B. Contact Sector	
Econ. Sector	Sub-category	Econ. Sector	Sub-category
Financial, gov. and prof. services	Contractors	B.2. High contact	
	Utilities	Education	Schools
Healthcare	Insurance	Entertainment	Entertainment venues and services
	Medical and hospital equipment	Healthcare	Doctors and physicians
			Hospitals
Retail, non-food	Direct marketing	Retail, food	Bakeries
B. Contact Sector			Bars and nightclubs
B.1. Low contact			Corner stores
Financial, gov. and prof. services	Civil society and political organizations		Grocery stores and supermarkets
	Financial and government services		Restaurants
Healthcare	Drug stores		Department stores
Retail, food	Confectionery stores	Tourism and transportation	Airlines
Retail, non-food	Liquor stores		Hotels
	Meat provisioners		Public transportation
	Wholesale clubs and discount stores		
	Construction materials and home improvement		
	Electronic stores		
	Miscellaneous stores		
	Other retail, durable goods		
	Other retail, nondurable goods		
Tourism and transportation	Autoparts and repair shops		
	Car rentals		
	Service stations and fuel		
	Travel agencies		
	Vehicle dealers		

A.2 Categorization of Firm Sizes

Brazil

Our banking partner classifies firms into small and large businesses based on their annual sales and whether they are part of a chain store or not. Businesses are categorized as chain stores if their payment network code category corresponds to chain stores. According to the banking partner, the most important chain stores in the country are classified correctly. We do not have access to the annual sales threshold for large companies due to privacy concerns.

Chile

The bank follows the classification used by the Chilean IRS. The Chilean IRS classifies businesses into four main categories: micro, small, medium-sized, and large. However, each of these four categories is divided into different subcategories. Table A.3 shows the specific categorization used by the Chilean IRS.[7]

Appendix Table A.3. Classification Firms Sizes: Chilean Revenue Service

Category	Annual Sales (UFs)
No sales	-
Micro 1	0.01 - 200
Micro 2	200.01 - 600
Micro 3	600.01 - 2,400
Small 1	2,400.01 - 5,000
Small 2	5,000.01 - 10,000
Small 3	10,001.01 - 25,000
Medium-sized 1	25,000.01 - 50,000
Medium-sized 2	50,000.01 - 100,000
Large 1	100,000.01 - 200,000
Large 2	200,000.01 - 600,000
Large 3	600,000.01 - 1,000,000
Large 4	> 1,000,000

---

[7] Source: https://www.sii.cl/estadisticas/empresas tamano ventas.htm#4. The UF is a unit of account that is daily adjusted daily for inflation (but is a non-circulating currency). The UF was $CLP 33,100 on July 1st, 2022.

It is important to mention that the universe of clients we study in the Chilean case are only micro, small, or medium-sized firms. We finally group MSMEs using the four main categories.

Colombia

The bank classifies clients into four different categories based on annual sales. The MSMEs being part of this study belong to the *PYME* (SME) segment that includes micro, small, and large *PYMEs*. Table A.4 shows the classification and thresholds used by the bank.

Appendix Table A.4. Classification Firms Sizes: Colombian Bank

Category	Bank Category	Annual Sales (MM $COP)
Micro	MiPYME	0 - 1,500
Small	Small SME	1,500 - 7,000
Medium-sized	Large SME	7,000 - 20,000
Large	Corporations	> 20,000

Peru

The bank classifies MSMEs into three different categories based on the average debt (liquidity) that firms have contracted with the financial system. Table A.5 shows the classification and thresholds used by the bank.

Appendix Table A.5. Classification Firms Sizes: Peruvian Bank

Category	Bank Category	Average Debt (K $Sol)
Micro	Small debtor	< 50
Small	Medium debtor	50 - 150
Medium-sized	Large debtor	> 150

Paraguay

The bank uses the categories and thresholds that the Paraguayan government used when launching the economic relief program, FOGAPY. The government decided to categorize firms into four different categories based on the annual sales (Table A.6).

Appendix Table A.6. Classification Firms Sizes: Paraguayan Government

Category	Government Category	Annual Sales (MM $PYG)
Micro	Micro firm	< 646
Small	Small firm	646 - 3,230
Medium-sized	Medium-sized firm	3,230 - 7,752
Medium-sized	Intermediate Medium-sized	7,752 - 15,000

A.3 Distribution of MSMEs by Country and Economic Sectors

Appendix Table A.7. Number of SMEs by Country and Economic Sectors I

Economic Sector	Chile		Colombia		Paraguay		Peru	
	N	%	N	%	N	%	N	%
Agriculture	4,596	8.4	3,673	2.7	18	3.3	10	0
Construction	6,357	11.6	10,424	7.7	19	3.5	1,713	2.3
Education	835	1.5	2,654	2.0	4	0.7	741	1.0
Financial Intermediation	2,086	3.8	3,147	2.3	3	0.5	1,110	1.5
Government, Defense	1	0	25	0.0	0	0	0	0
Healthcare	1,213	2.2	6,401	4.7	26	4.7	1,503	2.1
Legal and Business Services	5,798	10.6	17,833	13.2	53	9.6	4,966	6.8
Manufacturing	5,155	9.4	12,302	9.1	43	7.8	3,584	4.9
Mining	906	1.6	622	0.4	1	0.2	290	0.4
Others	577	1.0	490	0.2	9	1.5	1,324	1.8
Real State	1,768	3.2	4,365	3.2	10	1.8	682	0.9
Retail, Food	4,768	8.7	15,313	11.3	69	12.5	12,186	16.6
Retail, Non-food	14,174	25.8	40,359	29.9	177	32.1	35,311	48.4
Social Activities	721	1.3	4,507	3.3	1	0.2	906	1.3
Tech Consulting	80	0.1	243	0.2	6	1.1	986	1.4
Telecommunication	1,648	3.0	1,169	0.8	3	0.5	1,137	1.6
Tourism and Transport	3,371	6.2	10,169	7.5	108	19.6	5,339	7.3
Utilities: Generation, Infrastructure	224	0.4	908	0.7			400	0.5
Total	54,844	50	135,178	69	551	67	73,188	99

Note: This table includes the number of SMEs by country and economic sector in our sample.

Appendix Table A.8. Number of SMEs by Country and Economic Sectors II

Economic Sector	Brazil		Mexico		Paraguay	
	N	%	N	%	N	%
Accommodations	1.3	0.3				
Agriculture					19	2.4
Commerce					285	32.0
Domestic Services	36.6	8.0				
Eating Places	31.8	7.0				
Entertainment			1,306	0.9		
Education	3.0	0.6	1,514	1.1		
Financial, Gov, and Prof. Services			10,351	7.5		
Food and Suppliers	78.3	17.2				
Healthcare			16,840	12.2		
Home Improvement	6.9	1.5				
Industry					85	10.6
Leisure	19.8	4.3				
Others	46.8	10.3				
Retail	110.9	24.3				
Retail, Food			55,059	40.0		
Retail, Non-food			34,852	25.3		
Services					194	24.1
Transportation	110.4	24.2				
Tourism and Transport			17,687	13.0		
Wage Earners					249	30.9
Utilities	10.0	2.2				
Total	455.6		137,609	69	805	99

Note: This table includes the number of SMEs by country and economic sector in our sample. Data from Brazil are based on the average weekly total number of card transactions (in millions).

A.4 Datasets

Brazil

Brazil was the only country where we did not get the data from a private bank. We instead work with a payment cards international company. The data are weekly, only contain information for the Sao Paulo region, and extend from January 2019 to December 2021. The data, instead of containing information at the MSME or merchant level, are instead aggregated using all relevant economic features. The total number of transactions and the total amount of deposits correspond to the merchants' sales using POS and either credit or debit cards.

It is relevant to mention that, since we do not have access to MSMEs' information directly, we have to use the categories provided by the company. We work with 10 aggregate economic sectors[8] that are different from the classification we create using the ISIC and MCC codes for the rest of the countries. Lastly, the company only categorizes businesses into small and large firms accordingly to the amount of sales, and whether the merchant is a chain store or not.

Chile

The Chilean private bank provided us with data at the transaction level that extends from January 1, 2019 to February 28, 2022. To make the analysis comparable with the other countries, we sum up all deposits by type of transaction at the firm-day level. The bank classified deposits (or cash-in transactions) into seven different categories (transfers, electronic transfers, checks, payrolls, other payrolls, checks, cashier's checks, and others). The most relevant types of deposits are transfers, electronic transfers and checks. The bank was not able to identify whether deposits were performed in person or online. Additionally, the bank could not access POS transactions due to technical constraints.

Colombia

The Colombian private bank provided us with data at the weekly level that extend from January 7, 2019 to March 28, 2022. The bank delivers three different datasets containing transactions that we classify as deposits: in-person, online, and POS. The in-person dataset (which also includes withdrawals) includes other transactions that we cannot directly identify. These transactions

---

[8] The economic sectors are: Accommodations, Domestic Services, Eating Places, Education, Food and Supplies, Home Improvement, Leisure, Retail, and Transportation.

represent less than 2 percent of the total amount of deposits, and they were excluded from the analysis. The other two datasets contain only one category, so we finally include all these transactions in the analysis. The bank could not have access to POS from January to September 2019 due to technical constraints.

Mexico

The Mexican private bank provided us with daily information on all POS transactions between January 1, 2019 and October 15, 2020. The bank could identify whether merchants' sales were performed online or in-person; however, the data does not include other deposits like cash or checks transactions. The bank classifies MSMEs using MCC codes instead of ISIC codes. The clients then are mostly in the services, retail, and commerce industries (there are not clients in industries like agriculture, mining, and manufacturing).

Paraguay

The Paraguayan private bank provided us with daily information for all type of financial transactions between January 1, 2019 and July 20, 2020. The total number of active firms is only 878. The transactional datasets contain deposits in-person (deposits classified as cash) and online (deposits classified as transfers), and POS transactions. The bank mentioned us that POS transactions are in-person only. Even though we have access to ISIC codes for almost all 818 clients, we decided to work with the aggregate economic sectors that the bank uses to classify clients (commerce, services, industry, and wage earners) due to the lower number of MSMEs included in the Paraguayan case. The bank mentioned us that the data from January to May 2019 were obtained from an old data source (old transactional server) that is not comparable to the data post June 2019. Therefore, we only include in the analysis data from June 2019.

Peru

The Peruvian private bank provided us with daily information between January 1, 2019 and June 30, 2021. Similarly to the Paraguayan case, the bank obtained the financial transactions between January and June 2019 from an old data source that is not comparable to the new source. The data include information on deposits performed online, in-person transactions, and POS transactions. The bank included transactions classified as remittances, interest gains, and others that we do not

include in the analysis. The total amount of these transactions represents less than 3 percent of the total amount of deposits during the whole period.

A.5 Implementation of Lockdown and Mobility Restrictions: The Cases of Brazil, Paraguay, and Peru

Brazil

Once the first COVID-19 case was detected at the end of February 2020, pre-lockdown measures were announced in most of the big cities in Brazil. On March 16, the city of Sao Paulo determined that schools, universities, theaters, and cinemas should remain closed, working at home should be implemented, and social events should be avoided. Subsequently, on March 23, non-essential sectors were closed and public transportation was limited. These restrictions did not apply to critical sectors such as hospitals, clinics, pharmacies, hotels, supermarkets, and companies working in the supply chain. The partial lockdown reduced mobility: the circulation of people in Sao Paulo was reduced by 75–80 percent (accordingly to government estimations).

Taking into consideration the evolution of the pandemic and considering the negative impacts of the restrictions in the economy, the government announced a gradual opening plan known as *Retomada Consciente* at the end of May 2020. The plan determined the opening degree and the functioning of the economic sectors and followed the following five phases:

- Phase 1 – Maximum alert: only essential services are permitted.
- Phase 2 – Control: commercial activities, services, restaurants, cultural and religious events are permitted, although with reduced hours (8 hours maximum), limited seating capacity (40 percent), and the adoption of all health protocols.
- Phase 3 – Flexibilization: the same activities as in phase two are allowed, although with greater flexibility in terms of schedules (maximum of 10 hours).
- Phase 4 – Partial opening: most activities are allowed to operate for a maximum of 10 hours and with a capacity equivalent to 60 percent of the activity.
- Phase 5 – Control: all activities are permitted following the sanitary protocols.

The plan followed the sanitary context and rules determined by each Health Region. It is worth mentioning that despite the progress in controlling the pandemic experimented the second half of 2020, all Health Regions returned to Phase 1 of the Plan, and a new phase called *Emergency*

Phase was implemented in March 2021. The emergency phase implied a new total closure of activities in Sao Paulo that extended until April 2021, when a new transition towards the reopening of the economic sectors began.

Paraguay

After the detection of the first COVID-19 case, pre-lockdown measures were announced on March 10th, 2020. The first restrictions were focused on school closures, prohibition of entertainment events and group activities, and the implementation of a curfew effective from 8 pm to 4 am. Despite this, and due to health considerations and spreading levels, a total lockdown was enforced from March 20th to May 3rd. The total lockdown consisted of mobility restrictions, the prohibition of all economic activities except for those considered as essential, the suspension of international flights, and the closure of borders.

As in Brazil and Peru, a new system called Smart Lockdown was introduced at the end of March to gradually reopen the economy through a four-phase plan that maintained some restrictions on mobility and non-essential economic sectors. The phases are described as follows:

- **Phase 1: May 4–May 24 2020**. The initial phase of the Smart Lockdown plan had the objective of reopening of nearly 60 percent of economic activity. This included re-opening the operation of all types of industry, construction activities, delivery, and collection services. This phase allowed for individual mobility for work and essential activities as long as a circulation form had been completed.
- **Phase 2: May 25–June 14 2020**. The second face had the objective of reopening of 80 percent of the economic activity of the country. This implied reopening commercial stores (up to 800 m2), corporate offices, and sports and cultural centers. Regarding mobility, this phase authorized long-distance travel and non-essential trips from 10 am to 7 pm.
- **Phase 3: June 15–July 19 2020**. This phase restarted the operation of all commercial stores plus the activity of gyms, schools, religious ceremonies (up to 20 individuals), bars, and restaurants (with reservations). A curfew was included from 11 pm–5 am from Sunday to Thursday, and from 12 am–5 am on Fridays and Saturdays.

- **Phase 4: July 20–October 4 2020**. This phase allowed the opening of hotels and religious ceremonies, cinemas, and cultural events up to 50 people. Family gatherings were allowed up to 20 people.

With the implementation of the Smart Lockdown, all the Paraguayan Departments systematically adopted the new rules according to the schedule, but in some circumstances, some departments or districts remained at earlier stages due to their epidemiological status. On October 5th, the whole country entered a state of *new normality* which allowed all economic sectors to get back to work, progressively ending borders closure with international flight starting on October 21. During the last three months of 2020, few restrictions were implemented. However, the government reinstalled restrictions measures at the beginning of 2021 due to the second wave of new COVID-19 cases. Between March and May, the government implemented stricter mobility restrictions (such as traffic restrictions, school closures, prohibition of social events, and operation of essential activities) in those districts considered *red zones*.[9]

Peru

The Peruvian experience follows a similar path to the Brazilian and Paraguayan experiences. The implementation of the first lockdown occurred on March 16, 2020. The initial extension of the lockdown (state of emergency) was 15 days, but these restrictions were extended five times and remained in place until the end of June 2020. Curfews, the closure of borders, and restrictions on transportation among regions were some of the main restrictions implemented during this period. The state of emergency remained until September; however, the lockdown was replaced by focused measures.

To avoid greater negative impacts on the economy, the government implemented the *Reactivacion Economica* plan at the end of April. The plan initially consisted of four phases (one phase in each month from May to August). The plan allowed a gradual opening of the economy with a focus on economic sectors and geographical areas where new COVID-19 cases were controlled. The first phase of the plan allowed the functioning of 27 activities that belonged to the

---

[9] Red zones are districts having a "very high" level of community COVID-19 transmission. In particular, the districts that exceed 150 new confirmed cases per 100,000 inhabitants per-week, and/or have more than 5 deaths per 100,000 inhabitants, within a two-week average.

economic sectors of mining, industry, construction, services, and commerce. The remaining phases were not clearly defined, but the initial goal was to have 90 percent of jobs active in September.

The lockdown was fully lifted at the end of October, taking into consideration the decrease in the number of new cases. Together with this measure, the opening of borders and international travel started to operate once again. However, the restrictions were in place again shortly due to the arrival of the Delta variant at the beginning of 2021. In fact, the implementation of a new lockdown took place at the end of January.

A.6 Economic Measures and Financial Support to MSMEs

In an effort to combat the negative impacts of the COVID-19 pandemic on the economy, several Latin American countries implemented economic policies to assist the most affected industries and small and medium enterprises. These policies were designed to ensure the solvency of firms by providing liquidity. The strategies implemented included facilitating access to credit through government guarantees or new lines of credit and providing tax relief measures and extensions on the payment of utilities and critical services to ensure short-term liquidity. The following are examples of these strategies considering the cases of Brazil, Chile, Mexico, Paraguay, and Peru.

Access to Credit through Special Guarantees

The first programs to be adopted for the relief of companies, especially MSMEs, include an increase in resources and more flexible requirements for special guarantee funds for micro, small and medium-sized companies to facilitate access to credit. The FOGAPE (Chile), Reactive Peru, and FOGAPY (Paraguay) funds received US$3 billion, US$7.268 billion, and US$100 million, respectively, to enable companies to cover their working capital needs, including the payment of salaries and social security obligations, leases, supplies, invoices, and other expenses.

Thus, since its implementation, approximately 346,000, 25,000, and 501,000 guarantees have been granted in Chile, Paraguay, and Peru, respectively. Most of the guarantees have been oriented to micro and small enterprises: 81.4 percent, 80.3 percent, and 98.3 percent of the guarantees granted in Chile, Paraguay, and Peru, respectively, went to micro and small enterprises.

Table A.9 shows that the programs in Chile, Paraguay, and Peru have financed loans totaling US$17.867 billion in Chile, US$630 million in Paraguay, and US$13.887 billion in Peru, representing 7.1 percent, 1.8 percent, and 6.9 percent of GDP, respectively.

Appendix Table A.9. Pandemic Guaranteed Loans by Country (2020-2021)

	Chile		Paraguay		Peru	
Firm Size	N Loans	Amount (MM US$)	N Loans	Amount (MM US$)	N Loans	Amount (MM US$)
Micro	281,637	6,253.3	11,048	105.0	445,534	1,973.0
	81.4%	35.0%	44.1%	16.7%	88.9%	14.2%
Small			9,089	234.6	47,234	4,434.6
			36.2%	37.2%	9.4%	31.9%
Large	20,628	8,489.3	1,403	117.4	6,519	6,798.5
	6.0%	47.5%	5.6%	18.6%	1.3%	49.0%
Total	346,036	17,867.6	25,078	630.6	501,298	13,887.3
% 2020 GDP		0.9%		0.2%		2.1%

Note: This table contains the number and amount of government-guaranteed loans for businesses part of emergency relief programs implemented during the COVID-19 pandemic in Latin American countries from our sample.

Loans with Improved Terms and Conditions

Other strategies used in the context of the pandemic and its effects on enterprises were the creation or improvement of lines of credit for MSMEs to provide resources for companies to finance their working capital, but also for investment and debt refinancing.

Appendix Table A.10. Pandemic Emergency Credit Programs

Country	Credit line	Target firms	Policy
Brazil	PESE	Firms with more than US$70,000 but less than US$2 billion in annual sales	Loans up to 100% of the employer's total payroll, 36-month term, 6-month grace period, annual rate of 3.75%
Chile	Corfo MYPYME	Firms with less than US$3 billion in annual sales	US$150 million in loans through non-bank financial intermediaries
Mexico	Credito a la palabra´	MSMEs and self-employed	Loans up to US$1,270, 36-month term, 3-month grace period, annual rate of 3.75%
Paraguay	Credito BNF´	MSMEs	Loans up to 10 times the employer's total payroll with 1-year term and annual rate of 7%
Peru	FAE-MYPE	MSMEs (tourism, agriculture, and commerce)	Loans up to US$180,000 with a 60-month term, 18-month grace period, annual rate of 5%

Note: This table contains a list of the emergency credit programs for businesses implemented during the COVID-19 pandemic in Latin American countries from our sample.

As shown in Appendix Table A.10, different Latin American countries provided lines of credit with below-market interest rates, flexible payment terms, and grace periods and significant amounts. As with the special guarantee funds, the COVID-19 lines of credit included micro and small enterprises as a priority group.

Short-term Liquidity Support, and Tax Relief Measures

Preserving short-term liquidity was another of the objectives pursued by Latin American countries during the crisis. The extension of corporate tax burdens was a policy promoted by several governments. In this area, the tax strategies used ranged from the extension of corporate tax payment deadlines to the temporary implementation of differentiated tax rates for the most negatively impacted firms. In addition to these policies, and to guarantee companies' liquidity, the deferment of payments of utilities such as water, electricity, and rent was also implemented.

Appendix Table A.11. Pandemic Tax Relief Measures

Country	Target firms	Policy
Brazil	SMEs	- Extension to June 30 of the deadline for filing income tax returns
Chile	Firms facing a 30% decrease in revenues	- Suspension of monthly pension payments (PPM) July, August and September
	SMEs facing a 30% decrease in revenues	- Early income tax refund (from May through April)
	All firms	- Extension of VAT payment until September 2020
	All firms	- Deferral of first category tax until July 2021
Mexico	All firms	- Transitory tax reductions (only in some states)
Paraguay	PRO-PYME regime	- Transitory income tax reduction (from 25% to 15%)
	All firms	- Extension of payment of income tax until April
	All firms	- Exceptional regime for VAT, agricultural VAT and income tax payment facilities
Peru	SMEs	- Extension of the declaration and monthly payment of taxes from February to August 2020 - Extension of up to 4 months of the 2019 annual income tax return and payment of the annual income tax
	SMEs	- Extension for the payment of taxes from July through December 2020
	All firms	- Extension of the deadline for payment of employer's contributions

Note: This table contains a list of tax relief measures for businesses implemented during the COVID-19 pandemic in Latin American countries from our sample.