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Evidence from Colombia

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Abstract[*]

The pandemic hit the Colombian economy as hard as other countries. Using a novel Business Pulse Survey, this paper tests the effect of government support and COVID-19 cases on firms' performance. A one-standard-deviation increase in government support (in periods in which the pandemic's intensity was average) increased the percentage of firms reporting normal operations by 4.8 percent. Political demonstrations in spring 2021, however, reduced the percentage by 13 percent each month they lasted. Firms' financial distress also counters the impact of government support, suggesting the need to ease firms' access to financial markets. Last, we show that investing in digital solutions improved firms' performance but remote work degraded it.

JEL classifications: D22, L20, L25, O10
Keywords: COVID-19, Firm performance, Policies, Working from home

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1. Introduction

Colombia reported its first case of COVID-19 on March 6, 2020, by which point over 96 countries had reported at least one case.[1] On March 23, with 235 confirmed cases, Colombian authorities announced a lockdown[2] that remained in effect until September 1, 2020.

The country then entered a phase in which some sectors of the economy opened (at least partially). With the goal of minimizing large crowds, the government required different sectors to have different working hours and allowed some establishments (such as churches, gyms, and movie theaters) to operate at limited capacity. Sporting events, concerts, bars, and discotheques remained fully closed.

COVID-related restrictions hurt economies worldwide. According to the World Bank (2022), world GDP fell in 2020 by 3.4 percent and GDP in Latin America and the Caribbean fell by 6.4 percent. Then, 2021 witnessed the beginning of a recovery across the world. The World Bank (2022) estimates that global GDP increased by 5.5 percent in 2021 and GDP in Latin America by 2.6 percent. In Colombia, GDP fell by 6.8 percent in 2020 and rebounded in 2021 by a record-breaking 10.6 percent.

The unprecedented outbreak led many countries to implement policies to support both firms and households. The World Bank (2022) notes that at least 135 countries, including Colombia, implemented more than 1,600 measures in total to help firms. The main policy efforts in Colombia centered on the creation of a fund—the Emergency Mitigation Fund—with three main goals: to directly address the health emergency; to aid the most vulnerable populations; and to protect employment and promote economic activity. This paper studies the last of these goals.

Understanding the effect of the pandemic requires novel data. Because the situation was unprecedented, new data sets that were designed to cover the relevant dimensions of the pandemic. The United States, for instance, designed the Small Business Pulse Survey to study the "effect of the pandemic on small, single-location employer businesses in the United States," and it adjusted existing surveys to the new circumstances (Buffington et al., 2021: 312). Likewise, the World Bank supported the design and implementation of Business Pulse Surveys in sixty low-, middle-,

[1] https://www.minsalud.gov.co/Paginas/Colombia-confirma-su-primer-caso-de-COVID-19.aspx, visited November 16, 2021.

[2] https://www.minsalud.gov.co/Paginas/Seran-19-dias-muy-importantes-para-frenar-la-incidencia-de-la-COVID-19.aspx, visited November 16, 2021.

and high-income countries, including Guatemala, Brazil, Nicaragua, Honduras, and El Salvador in Latin America.

A growing but limited literature has studied the impact of government support on firms' performance across the world during the pandemic. Using data from 60 countries, Cirera (2021) finds that government support was effective despite some mismatch between firms' needs and government offerings. Lalinsky and Pál (2021), using firm-level data on Slovakia, find that subsidies saved jobs and helped sustain economic activity. This seems to be a generalizable finding. Finally, Gourinchas et al. (2022), using a novel framework, find that government support reduced failures of small and medium-sized enterprises while helping sustain employment.

This paper uses the Business Pulse Survey (BPS) that the Colombian Statistical Agency began in April 2020. The monthly survey, available for 59 sectors (including manufacturing, construction, retail, and services), inquires about firms' performance and several other matters, such as the use of pandemic-aid-oriented government support. We use the BPS to quantify the impact of government support on sectoral performance during the pandemic since April 2020 and until December 2021.

Unlike similar surveys elsewhere, BPS data is currently unavailable at the firm level, thus, we lack information that would allow a deeper study, for example, on firm size. Still, the BPS is rich enough to allow us to quantify the impact of government support and explore other pandemic-related topics, such as the effect of working from home on firm performance. We complement our analysis of the impact of government support by studying how firms' financial struggles, such as complications in accessing financial services or delaying debt payments, affected their performance.

To explain firms' performance during the pandemic, we use information on the percentage of firms operating normally in a given sector as the dependent variable.[3] We are particularly interested in the effects of government support on firm performance, and we use a sectoral measure from the survey to proxy for access to COVID-support policies. We mitigate endogeneity issues by exploiting the monthly frequency of the data set and using three-month moving averages of the government-support variable. We explore whether the impact of policy support on firm performance varied with the intensity of the pandemic.

[3] The survey defines "normal" as operating at pre-pandemic capacity.

An idiosyncracy of the Colombian recovery is the violent political demonstrations that surged during spring 2021. Protesters blocked roads in cities, threatening access to food in some places and hindering firms from accessing raw materials required to produce their products and from delivering those products. Moreover, these demonstrations coincided with the most virulent pandemic wave, which meant that the economy simultaneously suffered from the pandemic, roadblocks, and violence. To the best of our knowledge, no previous studies have estimated the demonstrations' economic impact; according to our calculations, they significantly impaired firms' capacity to operate normally.

Two novel findings stand out. First, government support was crucial for allowing firms to operate normally during the pandemic. A one-standard-deviation increase in government support benefited around 5 percent of firms per month. Second, the spring 2021 demonstrations had a devastating effect on the economy. During the peak of the protests, around 13 percent of firms reduced their operations. These results are robust across specifications.

The pandemic also brought changes in firms' labor policies; of particular interest here are their responses to the need to invest in digital solutions and accommodate employees working from home. We find that a one-standard-deviation increment in investment in digital solutions improved the performance of over 3.4 percent of firms. Unlike in more advanced economies, and possibly because of the relatively low skill level of the Colombian labor force, working from home there is associated with significantly worse firm performance. Our findings suggest that around 2.3 percent of firms performed worse when employees worked from home.

The second section of the paper describes the path of the pandemic in Colombia. The third section describes the policy response to the pandemic, and the fourth presents the data. The following section details the estimation strategy, and the sixth presents the results. In the seventh section, we discuss the implications of the results; we conclude in the final section.

2. COVID-19 in Colombia

Lockdowns in Colombia started on March 23, 2020, and eased slightly in September 2020, with some regional differences. They remained mostly unchanged during the second wave of the disease: the December 2020 holiday season. However, seeking to induce economic recovery, the government promoted domestic tourism, albeit with capacity limitations. As the wave faded, the

country's positivity rate (the number of positive cases divided by total tests) fell for the first time, reaching around 10 percent.[4]

When the holidays ended, the number of cases rose, and the authorities imposed new restrictions. Authorized by the central government, the main cities took steps to limit mobility to contain the virus. Medellín, the second-largest city, ordered total lockdowns from January 8, 2021 until January 12. Other measures followed. For instance, a curfew between midnight and 5:00 a.m. ran from January 27 until February 2. Cali, the third-largest city, ordered a complete lockdown between January 15 and January 18, 2021, and then imposed curfews between 8:00 p.m. and 5:00 a.m. from January 19 until January 22, 2021.[5] Bogotá selectively locked down neighborhoods in which the virus was spreading fast. Overall, during January and February 2021, lockdowns were common, though they were not as strict or prolonged as those imposed during the early months of the pandemic.

By early March 2021, at the end of the second wave, Colombia prepared to face a third wave. The peak of this third wave was expected in late April, and visual analysis suggests that it closely followed the second wave's pattern (Figure 1). The government authorized another round of lockdowns, and each mayor could tailor them to meet the local requirements. Bogotá, for instance, issued a decree whereby only essential personnel were allowed to leave their homes between April 23, 2021, and April 26, 2021.[6] Weeks later, on May 11, when the occupancy of intensive care units reached a record 95.9 percent, a second decree ordered a curfew between 11 p.m. and 4 a.m. while imposing additional restrictions on individual mobility.[7] The situation was not very different in the rest of the country.

On April 28, spurred by a tax-reform proposal, demonstrations began nationwide. The protests escalated and became increasingly violent, especially in cities such as Cali and Bogotá.

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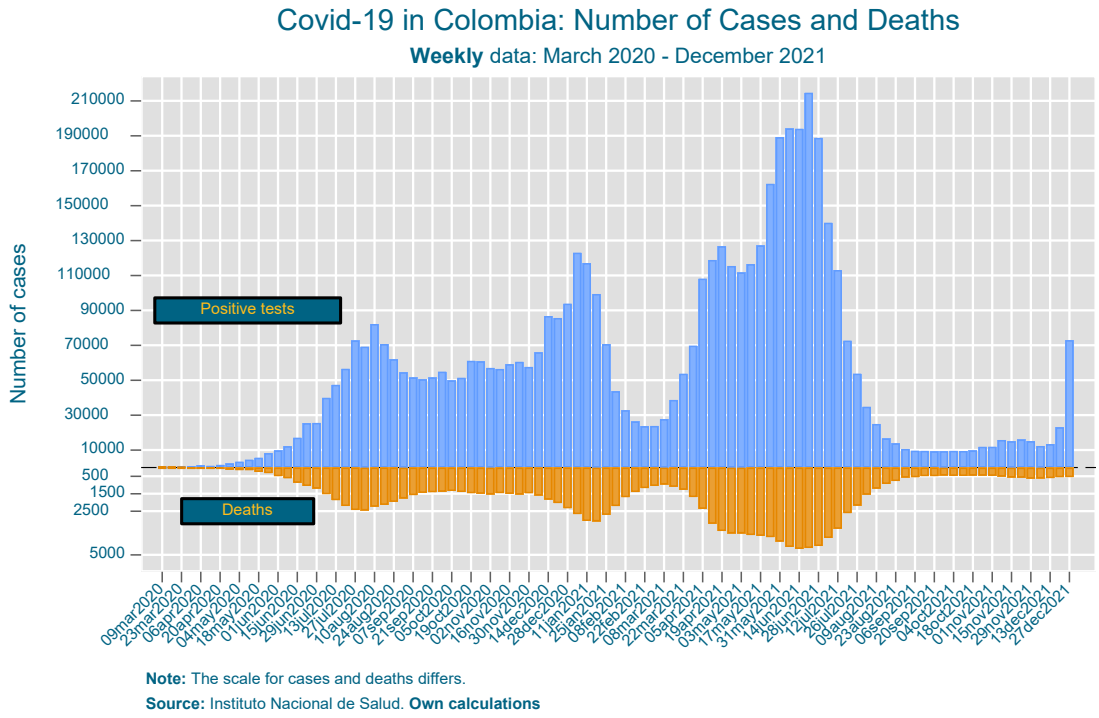
[4] In May 2020, the World Health Organization had advised governments to reopen only when the positivity rate was 5 percent or lower for at least fourteen days. See https://coronavirus.jhu.edu/testing/testing-positivity, visited December 1, 2021.

[5] http://www.andi.com.co/Uploads/Decreto%200010%20de%202021Medidas%20Orden%20Publico%20Ley%20Seca%20y%20Toque%20de%20Queda.pdf, visited December 1, 2021.

[6] https://bogota.gov.co/mi-ciudad/gestion-juridica/decreto-148-pico-y-cedula-toque-de-queda-y-cuarentena-general, visited December 1, 2021.

[7] https://bogota.gov.co/mi-ciudad/salud/decreto-172-del-11-de-mayo-de-2021-medidas-contra-covid-19-bogota#:~:text=172%20DE%20(11DE,legales%2C%20en%20especial%20las%20conferidas, visited December 1, 2021.

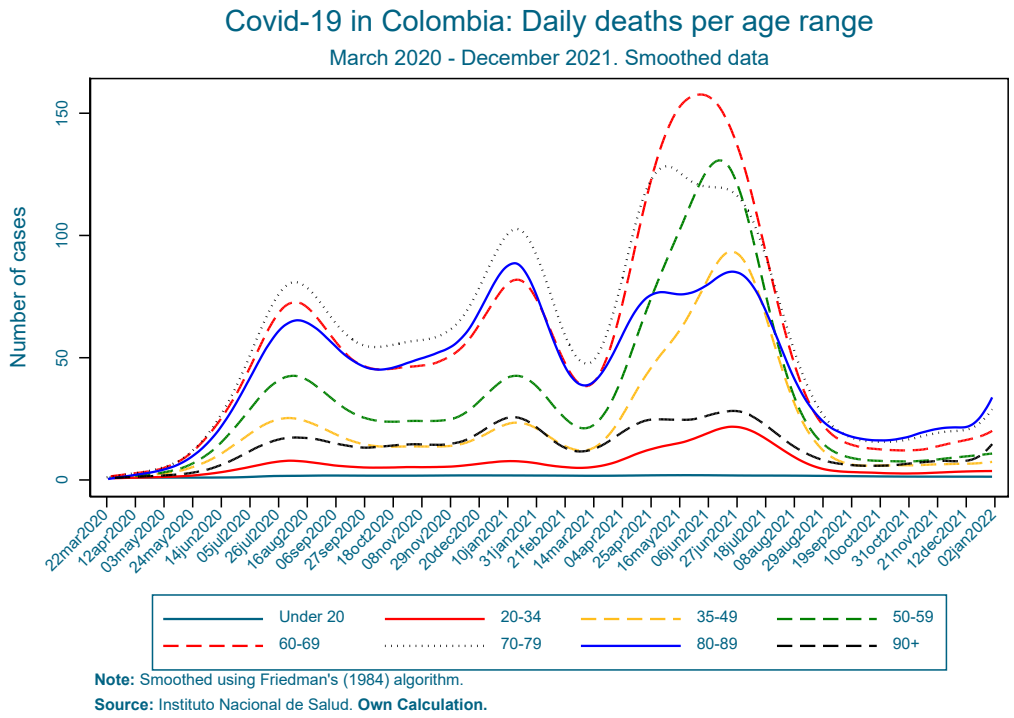
Figure 1.



Initially, authorities tried to keep pandemic-related restrictions in place despite the protests in the streets. But the social and political pressure stemming from the demonstrations kept growing. The May 11 decree in Bogotá came just days after the mayor canceled proposed quarantines for the weekend starting on Friday, May 7. As protests grew and violence increased, it became evident that restrictions on mobility were futile.

Demonstrations, including roadblocks and acts of violence, continued for at least seven weeks until the National Strike Committee called for an end to them. The protests, which occurred during the worst of the third wave (Figure 1), coincided with the end of the almost-perfect correlation between deaths and age (Figure 2). Death figures for individuals aged between 35 and 59 disproportionally rose in the weeks that followed the beginning of the demonstrations. That period was also the worst for COVID-19-related deaths for those between 20 and 34 years old.

Figure 2.



Note: Smoothed using Friedman's (1984) algorithm.
Source: Instituto Nacional de Salud. **Own Calculation.**

3. Policy Response to the Pandemic

As the COVID-19 pandemic progressed, governments worldwide responded with a wide range of measures to support households and firms. To counter the pandemic's effects, developing countries' governments initially allocated between 1 and 3 percent of GDP, a quarter of which was devoted to supporting businesses. Though smaller than in other parts of the world, the fiscal effort in Latin American countries was substantial (Cirera et al., 2021; Cavallo and Powell, 2021).

To face the pandemic challenges, in March 2020, the Colombian government created the Emergency Mitigation Fund (or FOME, its acronym in Spanish), which drew resources from a savings and stabilization fund, regional pension funds, and the national treasury. Fondo de Mitigación de Emergencias (2021) notes that by March 2021, 25 percent of its resources had been used to protect employment and promote economic activity (Fondo de Mitigación de Emergencias, 2021, Table 2). Sixty-nine percent of the resources approved for these purposes during 2020 and 2021 focused on a formal employment-protection program.[8] This was essentially

[8] Table 5 in Fondo de Mitigación de Emergencias (2021).

a payroll subsidy. Firms were eligible if they could demonstrate that they existed prior to January 2020 and witnessed a 20 percent reduction in revenues during the pandemic.[9] The program paid firms 40 percent of the monthly minimum wage per worker employed, 50 percent for female workers, and 50 percent for employees in the tourism, hotel, food-away-from-home, recreation, entertainment, and art industries. The program remained active in 2022.

By March 2021, 23 percent of FOME's funds were used to support credit guarantees provided by the Fondo Nacional de Garantías (FNG). As of December 2021, the FNG's COVID-19 program had guaranteed loans amounting to around COP 25.1 trillion (nearly 5 percent of the financial system's stock of loans), or USD 6.3 billion.[10] The program, named Unidos por Colombia (United for Colombia), opened credit lines to support payroll payments, investments in fixed assets, and working capital. In addition, very small firms could also apply for loans to restructure their debts.[11]

By March 2021, FOME had spent 3.6 percent of its funds through Bancoldex (a development bank focused on growth and foreign trade). The institution authorized two additional credit lines, initially called Colombia Responde (Colombia Answers). It assigned COP 175 billion to small and medium-sized enterprises and COP 75 billion to larger firms, or USD 46.5 million and USD 20 million, respectively, to fund working capital for the tourism, airline, and entertainment industries (Conpes 3999, 2020).[12] In addition, Bancoldex launched a credit line, Colombia Responde para Todos (Colombia Answers to Everyone), targeting all industries that were initially not covered and amounting to COP 350 billion (USD 93 million).

FOME used its remaining funds to support the cultural sector through instituting a direct line of credit to be allocated via government-owned financial institutions and regional governments. These institutions are outside the scope of the BPS.

Soon after the pandemic began, the government realized that certain sectors needed to be excluded from the lockdowns. By April 24, 2020, textiles, apparel, leather, wood manufacturing,

[9] http://www.desarrolloeconomico.gov.co/noticias/abc-programa-apoyo-al-empleo-formal-paef#_ftn1 as visited on March 11 2022.
[10] https://www.fng.gov.co/ES/Paginas/Asi_Vamos_Unidos_por_Colombia.aspx as visited on March 11 2022. The dollar figure is based on the official USD rate for December 31, 2021: 3,981.16.
[11] https://www.fng.gov.co/ES/Paginas/Programa_Unidos_por_Colombia.aspx as visited on March 11 2022.
[12] Prices in dollars based on the official USD rate for June 30, 2020: 3758.91.

paper and cardboard, chemicals, metals, and electrical-equipment manufacturing and other sector, were allowed to open gradually.

The Colombian government also implemented subsidies and selectively eliminated or deferred various taxes to support firms throughout the pandemic. For example, in May 2020, the government announced it would subsidize a percentage of the minimum wage for firms reporting a 20 percent decrease in sales.[13] It also suspended, until December, the 8 percent consumption tax on restaurants and eliminated the 19 percent VAT on commercial leases. Other policies adopted include a two-month partial suspension of pension payments by employers (and workers), an accelerated devolution of the VAT and income tax (Barrera, 2020), and the approval of three VAT-free days. Finally, an existing energy surcharge was suspended for tourist accommodations, theme parks, and recreation facilities.

4. Data

The Colombian Statistical Agency's (DANE's) BPS sends all firms in the agency's directory a link to the survey. Each of the monthly firms surveyed in the BPS is representative of the larger sample of firms (census-like) surveyed by DANE in other survey instruments that it conducts yearly. The survey respondents have varied throughout each wave of the BPS, with just over 2,350 firms responding to the early surveys and over 8,000 firms responding in the third quarter of 2021.

The data, aggregated at the two-digit-sector level, are available for the manufacturing, retail, and service sectors from April 2020 until December 2021. The surveys are carried out between the end of the first week of month t and the end of month $t+1$; they take $t-1$ as the reference month. Thus, the survey carried out between September 7, 2021, and October 6, 2021, takes August 2021 as the reference period.

The survey evaluates firms' performance during the pandemic and inquires about the number of companies operating normally, as opposed to those that operate partially or had to close. The BPS asks: "On the month of reference, what was the state of your operations?" If a firm operates normally, it is producing as if there had been no COVID-related shock.

[13] This and the following events are reported in https://coronaviruscolombia.gov.co/Covid19/acciones/acciones-de-economia.html as visited on March 1, 2022.

Table 1 shows the number of firms that responded to the question on changes in operations. To understand the numbers, recall that the survey was designed to follow the impacts of the pandemic; thus, the sample was smaller during the first months. However, the sample size stabilized by August 2020 and declined in the last quarter of 2021. Overall, the BPS surveyed an average of 6,819 firms each month, with a median of 7,381.

Table 1. Number of Firms That Respond to the Question on Changes in Operation

Month	04-20	05-20	06-20	07-20	08-20	09-20	10-20	11-20	12-20	01-21	02-21	03-21	04-21	05-21	06-21	07-21	08-21	09-21	10-21	11-21	12-21
Number of firms	2,351	3,301	4,002	6,617	7,375	7,791	6,905	7,575	7,381	7,299	7,570	7,910	7,842	8,044	8,090	8,145	8,201	8,082	5,202	6,605	6,921

Source: Business Pulse Survey, DANE; authors' calculations.

The variable of interest concerns firms' use of government support. Thirty-three percent of firms surveyed in the BPS belong to the wholesale-and-retail sector, 32 percent to services, 28 percent to manufacturing, and the rest, 7 percent, to construction.[14] Figure 3 presents the share of firms that received government support per month and sector.[15] The percentage of firms benefiting from public support has fallen during the pandemic, although it slightly increased in the last four months of 2021.

[14] There is no evidence of sectoral bias in the use of government support, as the percentage of firms that know about the government's instruments closely resembles that of firms that actually use such instruments.
[15] Sectors follow DANE's aggregation.

Figure 3.

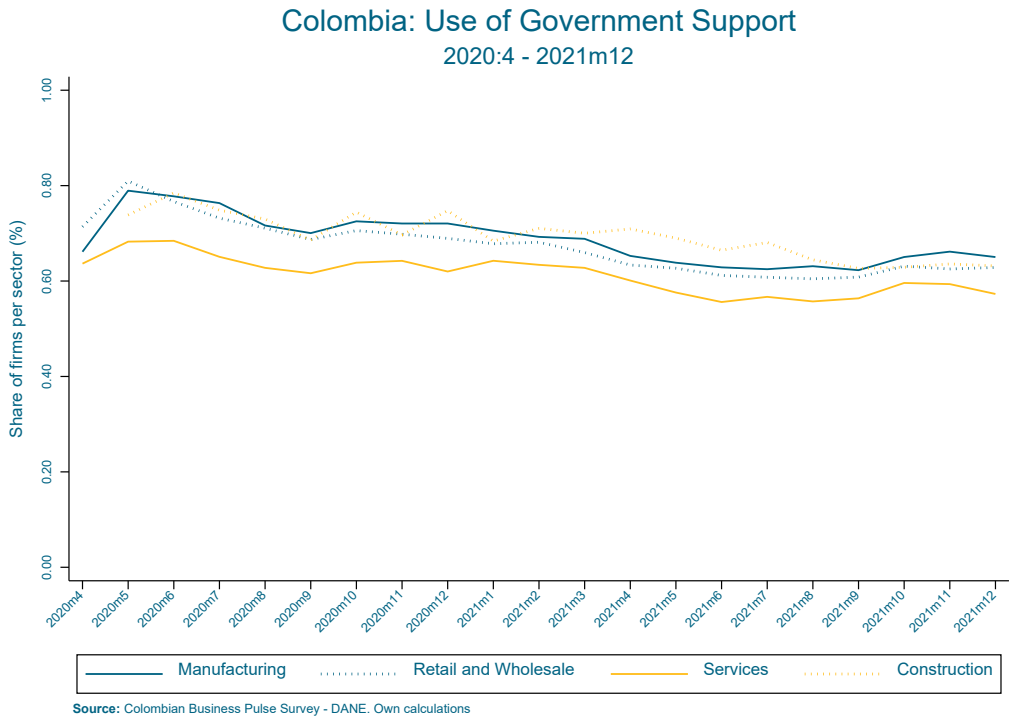


Figure 3 also shows that service-sector firms received less government support. The service sector, as defined by DANE, is relatively broad, making it difficult to correlate with measures of lighter or stricter lockdowns.[16] Our empirical exercise includes disaggregated sectoral fixed effects to control for unobserved systematic differences in firm performance across sectors.

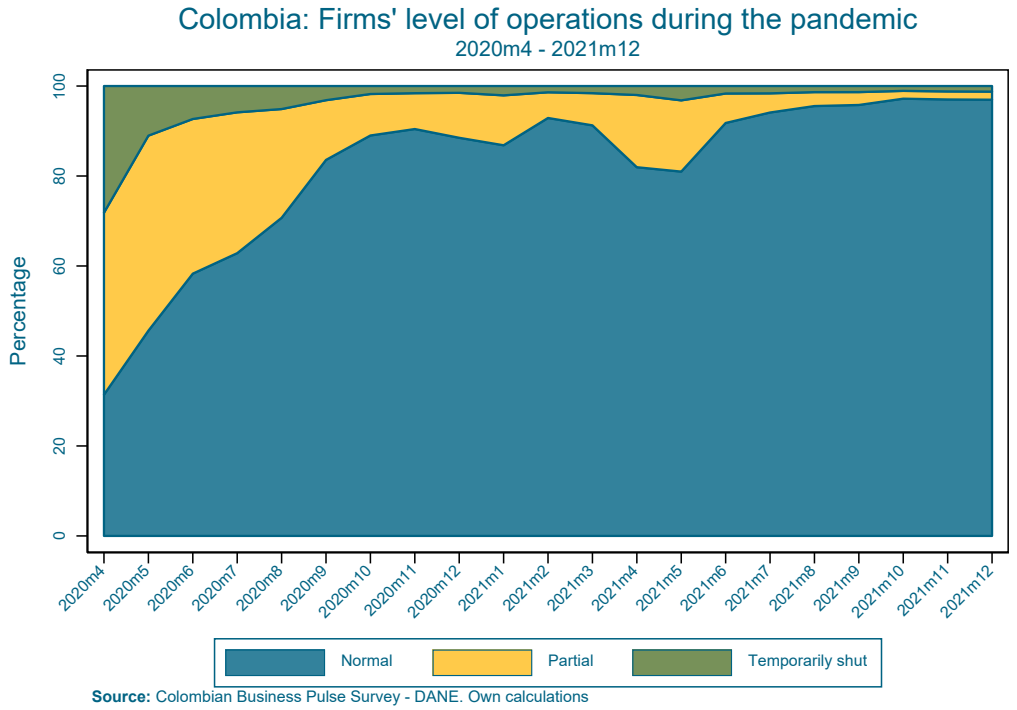
The survey also asks about firms' delays in servicing their liabilities and pending debts as well as whether they have had difficulties in accessing financial services. The BPS also inquires about firms' investment in digital solutions and changes in the number of employees working from home.

The best proxy for how the pandemic impacted firms is whether their operations remained normal, whether they operated partially, or whether they had had to shut down temporarily. Figure 4 shows the early lockdown measures' strong impact on the economy. Only a third of the companies kept their operations normal initially, but by October 2020, when lockdowns were eased, around 90 percent of surveyed firms were operating normally. The figure dropped again during the second wave (December 2020–January 2021) and again during the third wave,

[16] The service sector ranges from hotels to food and beverage services to television to telecommunications.

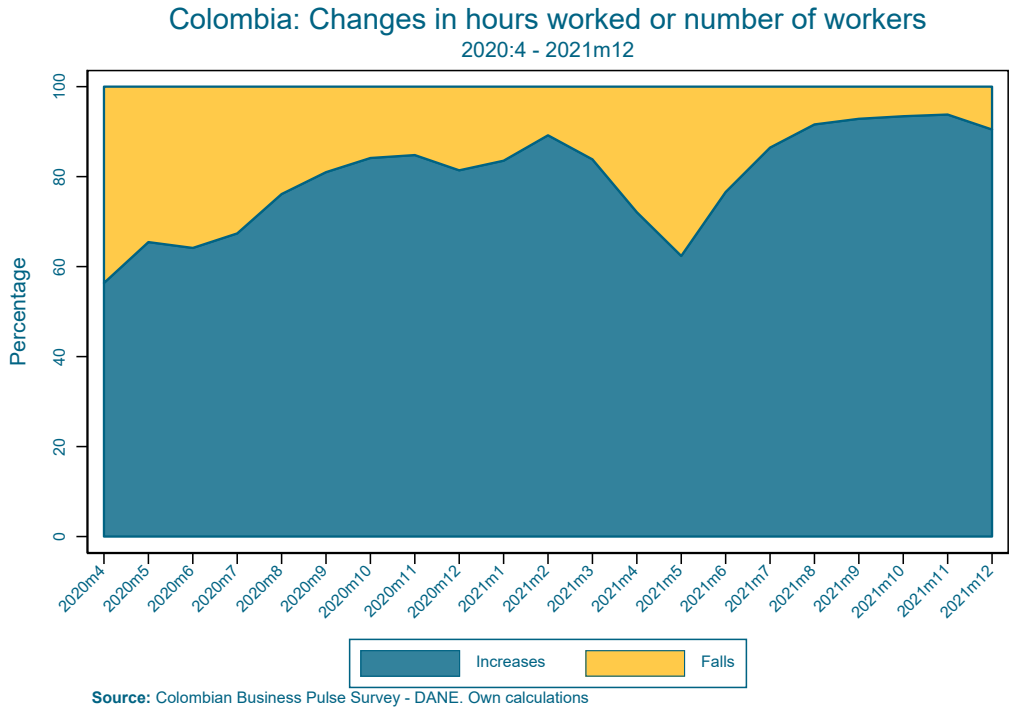
coinciding with the spring 2021 demonstrations. Indeed, during the third wave, the number of firms that operated partially or had had to shut down temporarily increased more than during the second wave.

Figure 4.



Regarding the effects of the pandemic on the labor force, Figure 5 depicts changes in the number of hours worked. The impact of the pandemic was immediate, as labor use fell in 40 percent of firms in April 2020. However, a recovery trend began and continued almost unabated during the second wave but ended with the January and February 2021 lockdowns. As the third wave grew, as restrictions became stricter and more frequent, and as protests swamped the country, firms' situation worsened. Unlike firms' operations, the number of workers or number of hours worked by workers dropped similarly to how they had dropped at the beginning of the pandemic.

Figure 5.



The BPS asks two questions about whether firms took advantage of government policies aimed at supporting the private sector during the pandemic. It first inquires whether a firm has asked for or is currently benefiting from any COVID-19 government-support measure. It notes that a government program should be understood as any official measure from central, regional, or local authorities. It then inquires about the type of measure the firm has asked for or is benefiting from. The alternatives are deferred payments for income tax and other taxes, utility subsidies, credit access and guaranteed loans, social-security-payments exemptions, payroll subsidies, and the government's purchases of goods and services. It also includes the option of "other." Unfortunately, the responses to the second question are not publicly available; thus, we focus on the first question: "Has this firm asked (or is it receiving) any government support, either national or local, issued as a consequence of COVID-19?"

5. Estimation Strategy

The objective of the empirical exercise is to determine how public policies affected firms' performance during the pandemic. The BPS is rich enough to explore the effect that the firms' receipt of government support had on their performance. We estimate the following equation:

$$P_{it} = \beta_1 GS_{it^*} + \beta_2 C_t + \beta_3 GS_{it^*} C_t + \gamma X_{it^*} + s_i + m_q + u_{it} \qquad (1)$$

Here, P_{it} is performance (the number of firms operating normally) in sector *i*, where *i = 1 . . . 59*, and month *t* = April 2020 . . . December 2021. Each month, the BPS reports the number of firms that requested or benefited from government policies that supported the private sector. Given that the number of firms surveyed, although relatively steady, varies in every wave (Table 1), P_{it} refers to the percentage of firms operating normally with respect to the number of firms surveyed in each survey wave.

We aim to understand the impact of government support GS_{it^*} on a firm. The subscript t^* means that *t* is the moving average of a variable during the previous three months (*t−1* to *t−3*). While a non-lagged variable potentially raises identification issues, the moving average of a lagged variable mitigates the problem. The three-month moving average also smooths the impact of the relevant variables on the performance measure, avoiding the need to identify specific temporal dynamics in the relationship between the dependent variable and the regressors.

C_t is the number of COVID-19 cases per month relative to the pandemic mean—that is, the average number of cases between April 2020 and December 2021. It allows us to control for the intensity of the pandemic.[17]

The interaction between GS_{it^*} and C_t captures the possibility that the impact of receiving government support on firm performance is conditional on the intensity of the pandemic.

X_{it^*} represents other controls that can impact firms' normal operations. We include difficulty accessing financial services, delays in servicing outstanding liabilities and debts, investment in digital solutions, and increases in number of employees working from home.

The model also includes sectoral and quarterly fixed effects, q_m and s_i.

[17] Given that adherence to COVID restrictions may have fallen over time because of pandemic fatigue (Reicher and Drury, 2021), we normalize the monthly number of cases relative to the pandemic mean to capture the feeling that the pandemic is intense.

Table 2 reports summary statistics for the main variables used in the empirical exercise. Denoted with an asterisk are the variables included in the estimations as three-month moving averages. To deal with extreme values, we winsorize all relevant variables in the top and bottom two and a half percentiles.

Table 2. Summary Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Normal Operations*	1,059	0.87	0.16	0.10	1.00
Government support (use)*	1,059	0.64	0.14	0.33	0.90
Covid Cases (see text)	1,059	1.14	0.85	0.17	3.47
services*	1,055	0.17	0.11	0.00	0.56
debt*	1,059	0.21	0.12	0.00	0.63
Investment in digital solutions*	1,059	0.14	0.09	0.00	0.45
Increases in home employment*	1,043	0.07	0.05	0.00	0.33

*Percentage of firms per sector/month
Source: Authors' calculations based on DANE data.

Table 2 reveals that, on average, 64 percent of firms in each sector and each month received some type of government support. Around 17 percent of firms per sector per month had difficulties accessing financial services, 21 percent suffered from delays in servicing outstanding liabilities and debt, 14 percent invested in digital solutions, and 7 percent increased the number of employees working remotely.

6. Results

We report our results in three subsections. First, we report the baseline results of estimating equation (1) without any additional controls (X_{it^*}). Next, we explore sources of sector-wide heterogeneity that may alter the impact of policies on firm performance. Finally, we present some extensions on how teleworking and investing in technological solutions affected firms' performance.

6.1 Baseline Results

Table 3 presents our baseline results. In the first column, we report a simple version of equation (1), in which accessing government support and the intensity of the pandemic explain performance. It also controls for sector and quarter fixed effects that capture any other relevant sectoral or

macroeconomic dynamic that could be affecting performance besides the pandemic itself and controls for a dummy that captures the impact of the demonstrations.

Estimates suggest that, while the intensity of the pandemic had a significant adverse effect on firm performance, the policy measures implemented by economic authorities mitigated them. A one-standard-deviation increase in the intensity of the pandemic (0.85), measured as the number of cases reported relative to the mean during the sample period, reduces the normal percentage of operations in an average sector by 2.2 percent per month. In contrast, an increase of one standard deviation in the number of firms in a sector accessing policies to mitigate COVID-19's effects (0.14) improves performance in the average sector by 4.6 percent in a month. It is possible to translate these effects into the number of firms affected by using the median number of firms that DANE surveys each month: 7,381.[18] The same one-standard-deviation increase in government support increases normal operations for around 372 firms.

The demonstration dummy is negative and significant, suggesting a reduction of 12.6 percent of firms reporting normal operations per month during the demonstrations. Abstracting from other ongoing factors, and given that 7,943 firms on average were surveyed during the protests, 1,000 firms per month were unable to operate normally during the riots.

To capture the possibility that the impact of policy measures varied depending on the severity of the pandemic, equation (2) in Table 3 adds the interaction between government support and the COVID-intensity measure.

Although the stand-alone COVID coefficient is positive and statistically significant, the net impact of COVID-19 on normal operations—the COVID-19 regressor and its interaction with government support—is negative and significant. The net effect of COVID-19 on the percentage of firms operating normally is −0.028, statistically significant at the 1 percent level.[19]

[18] We prefer the median over the average because during the initial rollout of the BPS, few firms were surveyed.
[19] This and the following coefficients are estimated at the mean.

Table 3. Baseline Results

Dependent Variable: Performance (Normal Operations - %)		
	Eq 1	*Eq 2*
Government support (3-month avg.)	0.333	0.445
	[0.117]***	[0.122]***
Covid	-0.026	0.030
	[0.005]***	[0.014]**
Government support (3-month avg.) * Covid		-0.089
		[0.022]***
Demonstrations (1 = April, May 2021)	-0.126	-0.124
	[0.013]***	[0.013]***
Observations	1,059	1,059
R-squared	0.729	0.733

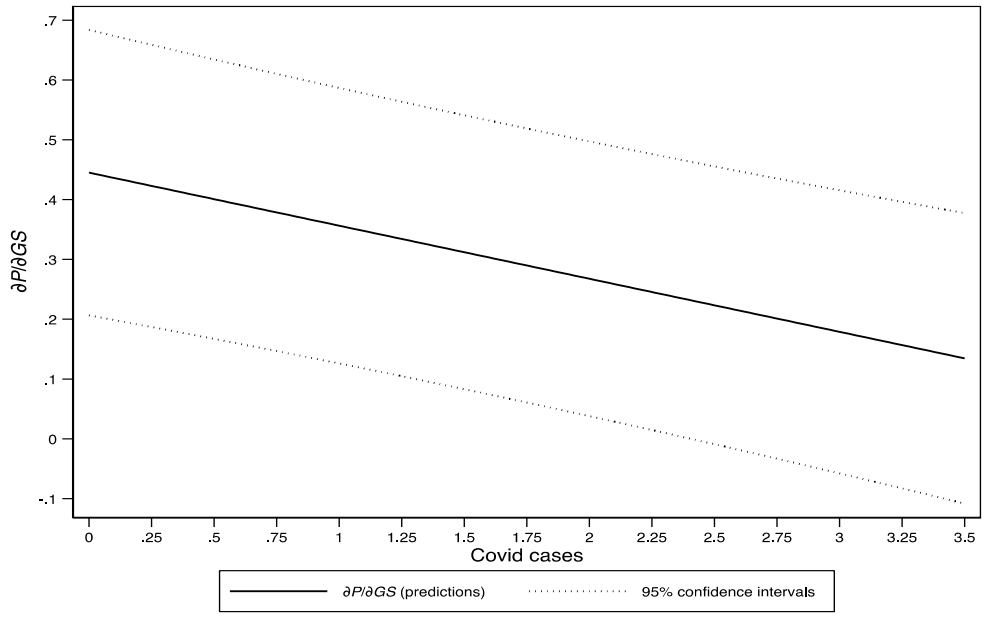
Robust standard errors in brackets * Significant * 10%, ** 5%, *** 1%
Note: Sectoral and quarterly fixed effects included in every specification.
Source: DANE, authors' calculations.

The interaction between government support and COVID-19 helps explore the former's impact on different levels of pandemic intensity. At the average COVID-19 intensity, the net effect of *GS* on normal operations is 0.34 percentage points, statistically significant at the 1 percent level (equation (2)). Considering that the unit of *GS* is the percentage of firms receiving the support within a given sector and month, the result implies that a one-standard-deviation increase in government support at the average intensity of the pandemic increases the percentage of firms reporting normal operations by 4.8 percent, or 355 firms.[20]

The average result discussed above can be further explored by plotting the interactive effect of government support and COVID-19. Figure 6 depicts the effect on firm performance of a change in government support as a function of the intensity of the pandemic. As COVID-19 intensity increases, the impact of government support fades. At the pandemic's peak, the effect of policies on firm performance was statistically insignificant.

[20] As noted above, according to Table 1, the median number of firms that DANE surveys each month is 7,381. We use this figure to compute the number reported in the text.

Figure 6. Marginal Impact of Government Support on Normal Operations



Source: Own calculations based on DANE
Note: The standard errors are calculated as follows:
$\sigma_{\frac{dP}{dGS}} = \sqrt{Var(\beta_1) + C^2 Var(\beta_3) + 2CCov(\beta_1, \beta_3)}$.

6.2 Sector Heterogeneity

A key source of heterogeneity across sectors is related to the financial conditions faced by the average firm in the sector. Accessing COVID-19 policies should allow firms to perform normally if their financial conditions remain favorable. If firms saw their access to finance interrupted or if their financial health deteriorated drastically during the pandemic, the policies likely helped them to remain afloat but not necessarily to perform normally. We test this conjecture by controlling for two variables included in the survey: whether firms faced difficulties accessing financial services and whether they faced problems servicing their debts and liabilities.

To ensure proper identification, we need to ensure that difficulties in accessing finance or deterioration of financial health did not ameliorate the effects of the policies. While some policies to support firms were aimed at increasing access to finance, such as the provision of guarantees through the national guarantee fund, as described above, most of the policies were aimed at providing subsidies to cover wage bills. To test the claim that, on average, policy use did not affect financial access or difficulty servicing debts and liabilities, Table 4 reports regressions using accesing support policies as the independent variable and financial restrictions as the dependent

ones. The results show no significant relationship between the use of the policies and the independent variables.

Table 4. Financial Variables and Government Support

Dependent Variable:	Difficulty Access Fin. Services	Difficulty Serving Liabilities and Debts
	Eq 1	*Eq 2*
Government Support (3-month avg.)	-0.040	-0.032
	[0.048]	[0.072]
Covid	0.006	0.008
	[0.003]**	[0.004]**
Demonstrations (1 = April, May 2021)	0.027	0.045
	[0.007]***	[0.010]***
Observations	1,055	1,059
R-squared	0.799	0.767

Robust standard errors in brackets * Significant * 10%, ** 5%, *** 1%
Note: Sectoral and quarterly fixed effects included in every specification.
Source: DANE, authors' calculations.

Table 5 assesses the impact of the aforementioned financial variables on firm performance. Equation (2) adds additional controls to the baseline specification. Namely, in it, we estimate the following variation of equation (1):

$$P_{it} = \beta_1 GS_{it^*} + \beta_2 C_t + \beta_3 GS_{it^*} C_t + \gamma_1 F_{it^*} + \gamma_2 GS_{it^*} F_{it^*} + s_i + m_q + u_{it} \qquad (2)$$

Here, F is either access to financial services or difficulty in servicing debts or liabilities. Table 5 reports the estimation of equation (2). Equation (1) and equation (4) each report specifications with either of the financial controls, while equation (1) and equation (4) add their interactions with the measure of accessing policy support. The latter regressions allow us to explore whether financial difficulties reduced the positive impacts of the policies.

Table 5's equation (1) and equation (4) reveal that firms facing financial troubles encountered performance problems. A one-standard-deviation increase in the reports of firms facing difficulties accessing finance (0.11) is associated with a 7.3 percent decrease in firm performance. Similarly, a one-standard-deviation increase in firms reporting problems in servicing their debts and liabilities (0.12) is also associated with a 7.3 percent reduction in firms reporting normal performance in a given month and sector.

Table 5. Performance and Financial Variables

Dependent Variable: Performance (Normal Operations - %)						
	Eq 1	*Eq 2*	*Eq3*	*Eq4*	*Eq5*	*Eq6*
Government Support (3-month avg.)	0.432	0.903	0.916	0.430	0.837	0.848
	[0.121]***	[0.110]***	[0.110]***	[0.116]***	[0.112]***	[0.112]***
Covid	0.026	0.025	0.002	0.016	0.015	-0.007
	[0.013]**	[0.012]**	[0.012]	[0.014]	[0.012]	[0.011]
Government Support (3-month avg.) * Covid	-0.082	-0.080	-0.045	-0.056	-0.055	-0.021
	[0.021]***	[0.019]***	[0.019]**	[0.021]***	[0.019]***	[0.018]
Difficulties Accessing Financial Services 3-month avg.	-0.666	0.961	1.041			
	[0.085]***	[0.210]***	[0.210]***			
Government Support (3-month avg.)*Difficulties Accessing Financial Services 3-month avg.		-2.292	-2.417			
		[0.285]***	[0.285]***			
Delayed in Liabilities & Debts (3-month avg)				-0.609	0.644	0.711
				[0.060]***	[0.158]***	[0.157]***
Government Support (3-month avg.) *Delayed in Liabilities & Debts (3-month avg)					-1.758	-1.862
					[0.229]***	[0.229]***
Demonstrations (1 = April, May 2021)	-0.130	-0.129	0.019	-0.125	-0.125	0.020
	[0.013]***	[0.013]***	[0.034]	[0.013]***	[0.013]***	[0.032]
Government support (3 month avg.) * Demonstrations			-0.229			-0.225
			[0.053]***			[0.051]***
Observations	1,051	1,051	1,051	1,059	1,059	1,059
R-squared	0.770	0.791	0.795	0.773	0.792	0.795

Robust standard errors in brackets * Significant * 10%, ** 5%, *** 1%
Note: Sectoral and quarterly fixed effects included in every specification.
Source: DANE, authors' calculations.

Table 5 additionally reports an interaction between government support and the demonstrations dummy to capture the direct impact of the protests on the efficiency of official aid. Unsurprisingly, the results suggest that the demonstrations negatively affected firm performance, leading over 22 percent of firms to be unable to operate normally.

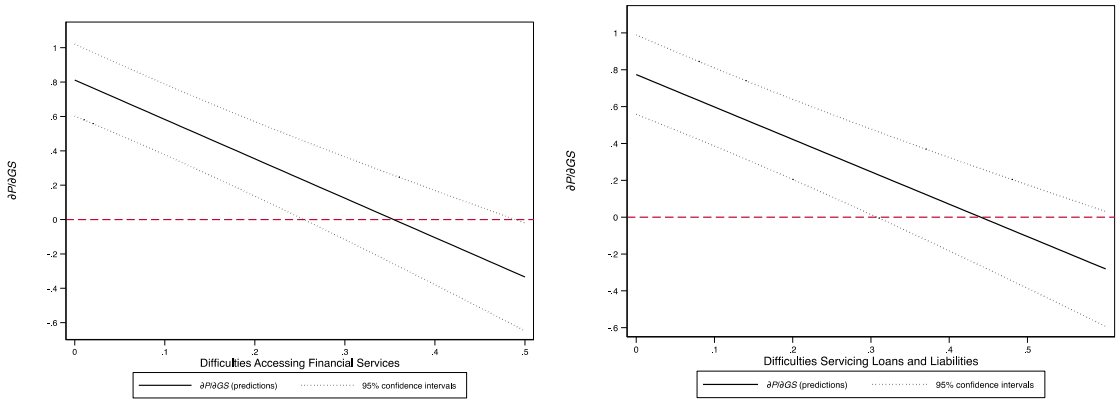
Equation (2) and equation (4) of Table 6 add an interaction between each of the financial difficulties and government support. Using the net coefficients for difficulty accessing financial services (−0.53) and for delays in servicing liabilities and debts (−0.50), both statistically significant at the 1 percent level, implies that a one-standard-deviation increase in the respective variable leads to a 5.9 percent or 6 percent decrease in normal operations, respectively. These figures mean that 433 firms stopped operating normally when facing financial difficulties and 442 when delays arose in servicing liabilities and debts.

Figure 7, panels (a) and (b) plot the marginal impact of accessing government support conditional on different levels of the relevant financial variables analyzed. Based on equation (2) and equation (4) in Table 6, the marginal effect of accessing policies depends on the intensity of

the pandemic and the level of the financial variable analyzed. Namely, $\frac{\partial P_{it}}{\partial GS_{it^*}} = \beta_1 + \beta_3 C_t + \gamma_2 F_{it^*}$. We fix the pandemic intensity (C) at its average value to graph the marginal effect.

Figure 7. Marginal Impact of Government Support and Financial Variables

(a)Access to Financial Services (b) Difficulties Servicing Loans and Liabilities



Source: Authors' calculations based on DANE.
Note: The standard errors are calculated as follows:
$\sigma_{\frac{dP}{dGS}} = \sqrt{Var(\beta_1) + \bar{C}^2 Var(\beta_3) + F^2 Var(\gamma_2) + 2\bar{C}Cov(\beta_1, \beta_3) + 2FCov(\beta_1, \gamma_2) + 2\bar{C}FCov(\beta_3, \gamma_2)}$
with $\bar{C} = 1.14$.

While at the average value of the financial variables, accessing policies had a negative and significant effect on average firm performance, as financial difficulties increased, the marginal impact faded. Indeed, when accessing financial services or delay in servicing debt and liabilities is relatively low, government support is positively associated with firms' performance. However, as difficulties increase, government support's impact on performance fades, becoming insignificant when financial challenges grow large.

The above behavior explains, in part, why despite the policy effort of Colombian authorities, the nation fell into its worst recession in modern history. A lesson from this analysis is that policies aimed at supporting wage bills and tax rebates during troubling times require more active policies regarding financial support to firms. Given the nature of the production function that requires other inputs beyond labor, firms need support on all fronts to operate normally during times of distress.

6.3 Extensions

The pandemic resulted in two significant changes in how firms traditionally operate. First, there was a massive shift toward working from home. Second, firms using the internet or digital platforms to buy inputs, sell products, engage with workers working from home, or expand their collection capabilities made substantial investments. In 2020 around four to five million workers shifted to long-distance work in Colombia.[21] In addition, evidence suggests COVID-19 shifted the direction of innovation toward supporting work from home (Bloom et al., 2021). Thus, we ask how working from home and investing in digital solutions impacted firm performance. Table 6 addresses the effect by adding to Table 5's controls investment in digital solutions and a measure of the increase in workers working from home. Equations (1–3) report the results controlling for accessing financial services, and equations (4–6) control for delays in servicing debts and liabilities.

Table 6. Performance, Digital Investment, and Working from Home

Dependent Variable: Performance (Normal Operations - %)						
	Eq 1	*Eq 2*	*Eq3*	*Eq4*	*Eq5*	*Eq6*
Government Support (3-month avg.)	0.839	0.936	0.804	0.802	0.858	0.748
	[0.114]***	[0.116]***	[0.086]***	[0.111]***	[0.110]***	[0.088]***
Covid	0.023	0.025	0.023	0.013	0.016	0.015
	[0.012]*	[0.012]**	[0.014]*	[0.012]	[0.012]	[0.014]
Government Support (3-month avg.) * Covid	-0.077	-0.073	-0.070	-0.053	-0.049	-0.048
	[0.019]***	[0.020]***	[0.020]***	[0.019]***	[0.020]**	[0.020]**
Difficulties Accessing Financial Services 3-month avg	0.716	1.230	0.844			
	[0.212]***	[0.228]***	[0.185]***			
Government Support (3-month avg.)*Difficulties Accessing Financial Services 3-month avg.	-1.972	-2.604	-2.064			
	[0.286]***	[0.295]***	[0.246]***			
Delayed in Lliabilities & Debts (3-month avg)				0.530	0.778	0.520
				[0.158]***	[0.247]***	[0.183]***
Government Support (3-month avg.) *Delayed in Liabilities & Debts (3-month avg)				-1.596	-1.915	-1.523
				[0.230]***	[0.320]***	[0.234]***
Demonstrations (1 = April, May 2021)	-0.133	-0.137	-0.143	-0.128	-0.135	-0.141
	[0.013]***	[0.013]***	[0.014]***	[0.013]***	[0.013]***	[0.014]***
Investment in Digital Solutions 3-month avg.	0.266		0.396	0.257		0.374
	[0.088]***		[0.067]***	[0.087]***		[0.066]***
Increase Home Employment (3-month avg.)		-0.364	-0.417		-0.392	-0.461
		[0.099]***	[0.066]***		[0.092]***	[0.064]***
Observations	1,051	1,016	1,016	1,059	1,024	1,024
R-squared	0.795	0.802	0.809	0.792	0.801	0.807

Robust standard errors in brackets * Significant * 10%, ** 5%, *** 1%
Note: Sectoral and quarterly fixed effects included in every specification.
Source: DANE, authors' calculations.

[21] https://www.eltiempo.com/colombia/otras-ciudades/trabajo-en-casa-en-colombia-dos-anos-despues-de-la-llegada-del-covid-19–648851, as visited March 15, 2022.

A growing literature studies the impact of working from home on the labor market and on workers themselves. On the latter, Aczel et al. (2021), for instance, studied the performance of 704 academics working from home. Despite findings suggesting that they would be more efficient in the future, half of the researchers decreased their work efficiency during the pandemic.

Early research suggests that working from home tends to benefit highly educated, highly paid employees, contradicting the results of Aczel et al. (2021). Bonacini et al. (2020), using Italian data, argue that an increase in the odds of working from home favors older men with higher education and income levels, thus increasing income inequality.

If working from home benefits high-skilled workers, it might be problematic for a country such as Colombia, with a relatively large amount of low-skilled workers. Indeed, this hypothesis supported is by the finding of Gottlieb et al. (2021) that the ability to work from home is low in developing countries.

Although our data set does not allow us to design a detailed exercise identifying the specific sources that impact firms' performance when working from home, it is rich enough to test the effects working from home has on the capacity of firms to operate normally. Our results consistently suggest that increasing work from home lowered firms' performance. The coefficient reported in equation (6) in Table 6 implies that a one-standard-deviation increase in the number of employees working from home (0.05) reduces performance by 2.3 percent, harming 170 firms per month.

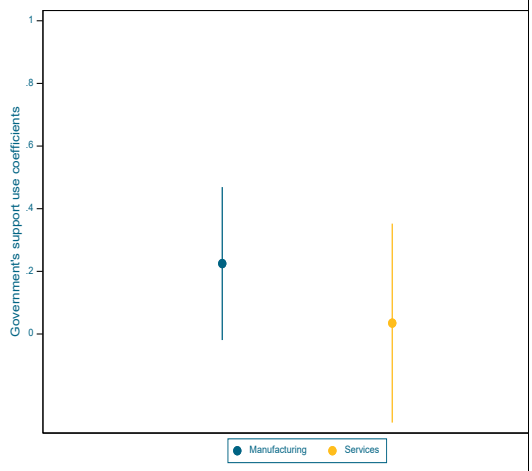
Additionally, recall that during spring 2021, historically large demonstrations swept the country, putting at risk the economic recovery and protesters' health during the severe third COVID-19 wave (Figure 2). The coefficient varies between 12.4 and 14.3, suggesting that the protests impact around 13 percent of surveyed firms' ability to operate normally each month. Using the 7,943 firms surveyed on average during the protests, and considering the coefficient for equation (3) (or equation (6)), over 1,120 firms per month are unable to operate normally during the demonstrations. Although it is a temporary effect, it is the single most substantial effect on firms' performance.

Last, the data potentially allow us to review government support's impact across sectors. Figure 8 reports the estimated coefficients when dividing the sample across sectors—that is, manufacturing and services—using equation (3) in Table 3 as the base specification. Although the coefficient for services is not statistically significant (panel [a]), the results suggest that neither

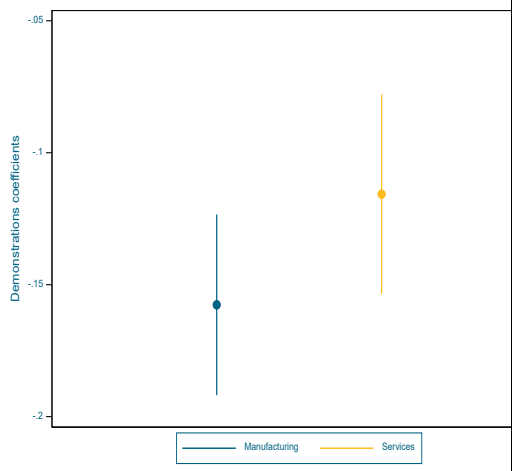
government support (panel [a]) nor demonstrations (panel [b]) nor investment in digital solutions (panel [b]) have significantly different sectoral effects on firms' performance. Panel (e) suggests some sectoral differences in working from home. Not surprisingly, performance is hit harder in the manufacturing sector.

Figure 8. Sectoral Effects
(Based on the specification in equation (3) of Table 6)

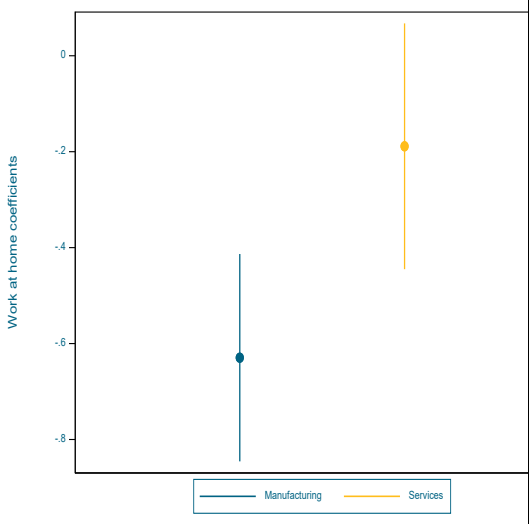
(a) Government's Support Coefficients per Sector



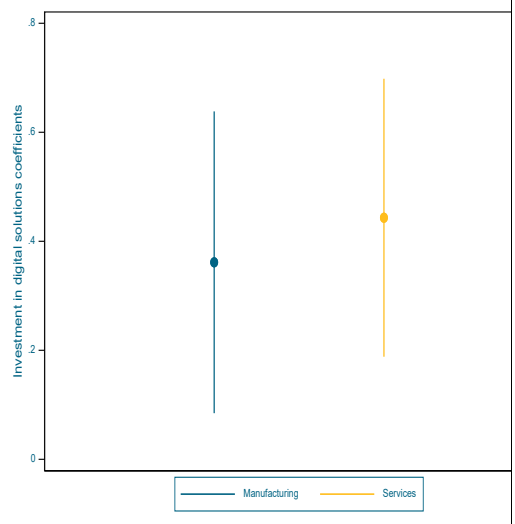
(b) Demonstrations Coefficients per Sector



(c) Work-at-Home Coefficients per Sector



(d) Investment in Digital Solutions



Source: DANE, authors' calculations.

7. Discussion

The impact of the pandemic on the economy is evident across the world. All countries had to deal with the shock, which brought their economies to a halt quickly. Colombia, of course, was no exception. However, on the road to recovery, it faced a challenge that made its case unique: the particularly violent spring 2021 demonstrations that swept the country for just over two months.

The pandemic had a non-negligible impact on the ability of Colombian firms to perform normally. Government pandemic support proved crucial in protecting the operational capacity of firms. A novel finding of our exercise is that as COVID-19 cases increased, the capacity of government support to accomplish its objective faded. Thus, during the worst months of the pandemic—April, May, and June 2021, which coincided with the demonstrations—the impact of government support on firms' performance essentially was nonexistent.

A significant challenge for the economic recovery was the spring 2021 demonstrations. Our estimations imply that a staggering 13 percent of firms were unable to operate normally during each month of the protests. Considering that each month of government support helped, on average, over 350 firms, that 1,000 firms were affected by the demonstrations implies an effect nearly three times larger. Moreover, taking into account that during the protests, the pandemic was at its peak, government support was unable to accomplish its objective. Thus, the net effect of the demonstrations was that around 1,000 firms were unable to perform normally each month.

The spring 2021 demonstrations, nevertheless, had an unexpected effect, having taken place in the midst of the largest wave, in which lockdowns were decreed across the country. The massiveness of the protests made any restrictions unviable because of the political inability to enforce them. Thus, although the number of deaths increased significantly, neither the central nor local governments had any practical option to impose any lockdowns. Consequently, after spring 2021, mobility restrictions were limited to a small number of sectors, such as concerts, which began to be allowed only in early 2022.

In Colombia, as in other countries, many of the early policy measures sought to minimize the loss of jobs. A growing literature explores the potential unwanted impact of such support policies on firms' long-term survival, particularly on small and medium-sized enterprises. Dörr et al. (2022), looking at Germany, conclude that the early policy response led many small firms to a state of insolvency. Gourinchas et al. (2021), in contrast, using data for 13 European countries, argue that the early measures had little, if any, impact on business failures. However, they do find

significant exposure to the risk of credit contraction, which could have disproportionately impacted firms that did not need support to survive the early stages of the pandemic.

Using available financial-distress measures, we explored the impact of pandemic-associated difficulties on firms' performance. The results for difficulties accessing financial services and delays in servicing liabilities and debts imply that they hindered firms' performance by themselves. We found that lack of access to financial services and inability to service debt diminished the efficacy of government support programs. The results align with those of Hu and Zhang (2021), who find, using a cross-section sample of 107 countries, that the pandemic hurt firms less in countries with better financial development, better institutional quality, and more effective government. Indeed, our result that as financial distress increases, the effect of government support on firms' performance declines suggests that Colombia lacked the financial depth needed to keep government aid effective. A policy lesson naturally follows. Firms benefit from public support, but complementary measures are required to guarantee their normal operations when facing shocks as large as the COVID-19 pandemic.

The paper also explored the important role of digital investing and working from home, both characteristics of the pandemic worldwide. With consumers confined to the home and unable to visit any business in person during the worst stages of the pandemic, firms responded by investing in digital solutions to keep revenues flowing. Our results show that such investments helped firms' performance.

The world is still discussing the impact, costs, and benefits of working from home. Evidence suggests that working from home tends to benefit high-skilled workers. In the Colombian case, the results show that working from home hurts firms' performance, potentially reflecting the state of the country's workforce. Further, recent research shows that video conferencing hinders the production of ideas, a result stemming from the narrower cognitive focus of virtual interaction compared to face-to-face interaction (Brucks and Levav, 2022).

8. Conclusion

This paper studied the effect of the pandemic on firms' performance in Colombia. Not surprisingly, we found that the pandemic directly hit firms' ability to operate normally. To counter the effects of the unprecedented pandemic, the Colombian government, like most other countries, designed measures to help firms survive. Using the novel BPS data set, we found that the official support

was effective for most of the crisis, the exception being when the pandemic, as measured by the number of cases, was at its worst. The paper also tested the consequences of the demonstrations that took place during spring 2021. We provided compelling evidence that firms' performance was significantly damaged during the protests, nullifying any effects of government support.

Testing the role of financial distress, as measured by difficulties accessing financial services and delays in servicing debts and liabilities, we found that firm performance was damaged. As these complications increased, the effect of government support on firm performance faded.

There are two main conclusions from our empirical exercise. First, government support was effective in helping firms operate normally during the pandemic. Second, financial distress vitiates firms' performance. Thus, although it is valid to praise the authorities' effort to aid firms, there is room to adjust policy making given that beyond government support, firms require other measures to guarantee them access to financial markets.

Complementary results suggest that the demonstrations were particularly damaging to firms. And while investing in digital solutions proved to be effective at aiding firms, working from home had the opposite effect.

A natural limitation of the paper relates to the level of aggregation of the available survey. In particular, there is value in exploring further the effects of working from home as surveys roll out, including annual manufacturing, commerce, and service surveys.

The BPS also does not allow us to analyze the impact of the pandemic by firm size. Results in other countries (Dörr et al., 2022; Gourinchas et al., 2021) show that smaller firms suffered the most from the pandemic. The exercise will surely be conducted in Colombia when the data become available, but we see no reason to believe that the results will differ from those found elsewhere. A similar point can be made for region-specific effects.

Our results are robust to different specifications, and we defend their validity on the ground that the survey allows for enough cross-sectoral heterogeneity. Nevertheless, once firm-level data become available, we will be able to explore within-sector specifics that can shed further light on the best way to deal with significant shocks.

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