Economic Analysis and Policy 76 (2022) 129–145

Contents lists available at ScienceDirect

Economic Analysis and Policy

journal homepage: www.elsevier.com/locate/eap

Analyses of topical policy issues

Effects of COVID-19 related government response stringency and support policies: Evidence from European firms ☆

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ARTICLE INFO

Article history:
Received 10 March 2022
Received in revised form 8 July 2022
Accepted 29 July 2022
Available online 6 August 2022

JEL classification:
D22
H12
H32

Keywords:
COVID-19
Firms
Lockdown
Government support policies

ABSTRACT

In this paper we employ survey information on more than 10,000 Southern and Eastern European firms to assess the effects of the COVID-19 related lockdown and government support policies on the business operations of enterprises. Our findings reveal considerable size- and sector-related heterogeneity, with small firms, and firms such as hotels and restaurants operating in the facilities sector reporting the largest losses in terms of sales when governments increase the strictness of confinement measures. Fixed effects regression estimates suggest that a complete lockdown results in an average year-on-year sales growth that is approximately 63 percentage points lower than it would be without any curtailment measures. The magnitude of the coefficient on year-on-year sales change for a complete lockdown is 14 percentage points higher for small compared to large enterprises. Furthermore, our results suggest that state aid in the form of deferral of payments or wage subsidies are associated with firms' labor market and financial outcomes in times of crisis. For instance, deferrals of payments are linked to between 0.7 and 1.5 fewer layoffs per firm in the surveyed enterprises compared to other types of support.

1. Introduction

The year 2020 will be portrayed in history books as the year the COVID-19 pandemic disrupted economies worldwide and individuals suddenly faced a drastic change of their lives. The negative effects of this shock are looming large across countries and sectors of the economy. Governments have undertaken tremendous efforts to contain the spread of the virus, even if that meant lockdown of economic sectors for varying time periods and thus drastic implications for businesses and the employed. At the same time, vast state support funding has been deployed to sustain businesses in coping with the negative economic consequences triggered by the pandemic.

☆ The authors gratefully acknowledge financial support from IMGS and the Bern University Research Foundation. We thank participants at the Economic Analysis and Research Seminar organized by the National Bank of Romania for their valuable comments.

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https://doi.org/10.1016/j.eap.2022.07.013

In this paper, we contribute to the nascent literature that addresses the effects of COVID-19 related lockdown as well as government support policies on firms. Quantifying the magnitude and heterogeneity of the containment measures along different dimensions is paramount to gain an accurate picture of the most hardly hit firms and sectors. This in turn assists policymakers in designing the appropriate response policies and targeting those most in need. The present crisis has revealed how vulnerable societies are to diseases that start in a particular area of the world and then spread like wildfire over the globe and highlighted the risk of similar situations arising in the future. Thus, we also provide insights that can be translated to future epidemics that require stringent government intervention and subsequent support policies to cushion the negative impacts on people's lives.

We employ information from the World Bank Enterprise Survey (WBES) and the first wave of the World Bank Enterprise Follow-up Survey on COVID-19. While in the regular WBES, business owners and top managers of firms of different sizes, active in different economic sectors, are asked about the characteristics, climate, and constraints of their business operations in the respective countries, the follow-up questionnaire aims at collecting timely information on sales, liquidity, operations of the business, labor adjustments or expectations about the future during the COVID-19 crisis. The data sample is a cross-section consisting of around 10,000 firms from a rather homogeneous group of 23 Southern and Eastern European countries, where we have information on both, the business operations of the respondents before and during the pandemic.

Our findings reveal that reported year-on-year sales growth decreases on average by 0.63 percentage points for each one-point increase in lockdown stringency, as measured by the Oxford COVID-19 Government Response Tracker. We document that firm size and sectoral affiliation are related to firm performance in times of pandemic crisis by providing evidence of significant size- and sector-related effect heterogeneity. The magnitude of the coefficient on year-on-year sales change is 0.14 percentage points higher for small compared to large enterprises, resulting in an increasing discrepancy of sales growth between these companies for higher values of the response stringency indicator. A similar picture emerges for firms in the facility sector (e.g., hotels and restaurants) relative to other economic sectors. Firms in the former business sector report a significantly larger reduction in terms of year-on-year sales growth and the gap relative to firms operating in other business sectors intensifies with increasing lockdown strictness.

We also scrutinize the effectiveness of different government support policies such as deferral of payments, fiscal incentives or wage subsidies to alleviate the negative repercussions of the lockdown. Firms that were allowed to defer payments reported between 17.5% and 35.8% fewer redundancies depending on the empirical specification, compared to firms receiving other types of support. Assuming a firm in the dataset laid off on average between 3.8 and 4.2 employees,[1] implies that deferral of payments is linked to between at least 0.67 and 0.74 fewer layoffs per surveyed firm.

The remainder of this paper is structured as follows: Section 2 reviews the relevant literature Section 3 provides an overview of the data and Section 4 addresses the correlation between government response stringency and firm performance. The link between government support policies and financial as well as labor market outcomes is analyzed in Section 5. Finally, Section 6 concludes.

2. Related literature

The nascent literature on the pandemic and its devastating effects deals with several aspects of the crisis. These range from the consequences for individuals and firms, health of the population, spread of the disease, effects on the overall economy or the effects of different forms of state aid. Our research contributes to this quickly evolving literature.

One strand of literature uses high-frequency data to assess the effect of the lockdown in real time. These papers employ for instance transaction data from credit or debit card purchases (Chetty et al., 2020), hourly electricity load (Janzen and Radulescu, 2020), text data from earnings reports (Hassan et al., 2020). These studies find a pronounced negative effect of the lockdown on economic activity.

A second strand of literature employs survey data to assess the impact of the pandemic and the implemented measures on employment and business activities. Adams-Prassl et al. (2020) use real time survey evidence from the UK, US and Germany and show that the immediate labor market impacts of the pandemic differ substantially between countries, with anglophone countries experiencing much more employment ties cut. Furthermore, they find that employees on temporary contracts have been more likely to lose their jobs and women and less educated workers are more affected by the crisis. Bartik et al. (2020) conduct a survey on 5,800 small business in the US during the spring lockdown. Their findings highlight the financial fragility of many small businesses, and how deeply affected they are by the pandemic. They show that 43% of businesses were temporarily closed and that employment had fallen by 40%. These results imply that many of these firms had little cash on hand at the start of the pandemic, which means that they either had to cut expenses, take on additional debt, or declare bankruptcy. This suggests that without financial assistance, the firms are likely to fail. While the above-mentioned papers analyze the effects for developed countries and small businesses, Beck et al. (2020) focus on listed firms in emerging economies, and find that these reacted by reducing investments rather than payrolls.

A third strand of related papers scrutinize the effects of different government policies to cushion the effects of the pandemic. These are mostly single country studies, using information on countries such as the United States (Cororaton

[1] The first number refers to the unrestricted sample including all 3,416 firms that answered the respective survey question and the second to the restricted sample including only those 1,521 firms that received some kind of public support

and Rosen, 2020; Granja et al., 2020) Italy (Core and De Marco, 2020), Portugal (Kozeniauskas et al., 2020) Switzerland (Bruülhart et al., 2020). Financial support to US firms in the form of the Paycheck Protection Program (PPP — a USD 349 bn fund aimed at keeping workers employed by providing forgivable loans to businesses) does not seem to have achieved its scope since the short- and medium-term employment effects of the program were small compared to the program's size. In addition, many firms used the loans to make non-payroll fixed payments and build up savings buffers (Granja et al., 2020). Furthermore, 17.7% of borrowers chose to return their loans after receiving public backlash and some firms who borrowed faced negative stock returns upon PPP loan announcement (Cororaton and Rosen, 2020). The relatively low success of Corona government-backed loans relative to labor-income support measures is also documented by Bruülhart et al. (2020) for Switzerland. They find a better performance of labor-income support measures among small businesses and that recourse to government-backed loans was driven to a large extent by firms' prior history of indebtedness.

Compared to the above mentioned papers, our study includes enterprises of different sizes from a large number of countries and also information of firms' pre-crisis characteristics that may also affect the results and are thus important to account for. In addition, we compare the impact of different support instruments such as wage subsidies, cash transfers, payment deferral or access to credit instead of assessing the effectiveness of one instrument only.

There is a large literature body employing the WBES COVID-19 Follow-Up Survey to assess the short-term impact of the pandemic on businesses, including Apedo-Amah et al. (2020), Bosio et al. (2020), Waldkirch (2021), Nelson (2021), Wagner (2021, 2022), Webster et al. (2021, 2022), and Grover and Karplus (2021). The first two focus on developing countries and report persistent negative impacts on sales and employment adjustments mainly along reduction of hours worked and leave of absence (Apedo-Amah et al., 2020) and identify mismatches between support policies provided and policies most sought (Cirera et al., 2021; Bosio et al., 2020) estimate the survival of 7000 firms in high- and middle-income countries and find that the median survival time ranges between 8 and 19 weeks. Waldkirch (2021) finds that the pandemic's impact has been swift, large, and heterogeneous. His results suggest that effects on exports exceed those on domestic sales and are also greater for foreign-owned firms that rely more on global value chains. The studies by Wagner (2021, 2022) are mainly concerned with firm survival. He shows that female ownership and web presence are highly correlated with continuation of enterprise operations. Singling out the labor market effects of the pandemic is at the heart of Nelson (2021), Webster et al. (2021, 2022). Nelson (2021) looks at firms in 20 emerging countries and finds that whereas containment and closure policies negatively affected permanent jobs and total hours worked at the firm level, temporary employment was less affected. Furthermore, policies directed at closure of public events had significant negative effects across all employment categories. Webster et al. (2022, 2021) focus on labor market consequences in Central American and Southern European countries, respectively. Finally, Grover and Karplus (2021) employ the World Bank Enterprise Survey to analyze the impact of pre-crisis management practices on subsequent post-COVID-19 outcomes, such as firm's ability to adjust their products or shift sales online.

Whereas these studies mostly employ only data from the COVID-19 Follow Up Survey, we enrich our analysis with information from the original World Bank Enterprise Surveys as well. This additional data allows us to explicitly control for pre-crisis firm specific observable characteristics that may affect the results.

3. Data

We draw on two main data sources for this research project. First, data from the World Bank Enterprise Survey (WBES) and the first wave of the World Bank Follow-up Survey on COVID-19 and second, information from the Oxford COVID-19 Government Response Tracker. The regular WBES are representative establishment level surveys where business owners and top managers are asked about the characteristics, climate and constraints of their business operations in the respective countries. They are constructed on a stratified random sample of small (less than 20 employees), medium (20–99 employees) and large establishments (over 100 employees). The COVID-19 follow-up surveys were conducted in countries with recent enterprise surveys and measure the impact of the pandemic on businesses using the same methodology as the WBES.

The questionnaire collects information on sales, liquidity, operations of the business, labor adjustments or expectations about the future.[2] Overall, the follow-up study was implemented in 42 countries, where the original WBES was conducted in 2019 or 2018. For the purpose of our study, we focus on 23 European countries including the Russian Federation. The countries we consider are Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Georgia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Moldova, Poland, Portugal, Romania, Russian Federation, Serbia, Slovak Republic and Slovenia. As the focus of this study is to provide evidence on Europe, we exclude all observations stemming from other regions of the world. The decision to focus only on Southern and Eastern European countries is mainly due to data availability, as the WBES COVID-19 follow-up survey was not conducted in Western and Northern Europe. Overall, our sample covers 10,419 firms that answered both questionnaires, varying between 171 firms (Cyprus) to 1,191 firms (Russian Federation) per country (see Table 1).

2 The complete questionnaire can be accessed under https://www.enterprisesurveys.org/en/covid.

Table 1
Overview of sampled firms.

Country	Year of Baseline survey	Month and year of follow-up survey	No. of Obs.	Business sector					
				D (15–37)	F (45)	G (50–52)	H (55)	I (60–64)	K (72)
Albania	2019	June 2020	347	132	27	123	43	19	3
Belarus	2018	August 2020	551	314	36	163	10	19	9
Bosnia and Herzegovina	2019	February–March 2021	241	86	23	104	11	13	4
Bulgaria	2019	July–September 2020	559	326	41	134	17	37	4
Croatia	2019	September 2020	351	133	35	129	27	21	6
Cyprus	2019	June 2020	171	65	24	63	13	6	0
Czech Republic	2019	September–October 2020	405	252	25	81	18	16	13
Estonia	2019	October 2020	272	100	51	80	19	20	2
Georgia	2019	June 2020	514	182	45	170	92	23	2
Greece	2018	June–July 2020	532	277	35	162	41	12	5
Hungary	2019	September 2020	630	378	37	164	23	21	7
Italy	2019	May–June 2020	453	277	23	108	28	9	8
Latvia	2019	October–November 20202	44	83	29	105	8	16	3
Lithuania	2019	October 2020	214	79	16	85	16	14	4
Malta	2019	September–October 2020	196	67	9	77	11	24	8
Moldova	2019	May 2020	286	110	34	121	3	14	4
Poland	2019	July–August 2020	1,005	738	70	143	18	22	14
Portugal	2019	September–October 2020	820	605	16	144	44	10	1
Romania	2019	August–September 2020	532	327	35	125	11	23	11
Russian Federation	2019	June 2020	1,191	815	42	283	10	23	18
Serbia	2019	February 2021	318	114	33	131	11	20	9
Slovak Republic	2019	September–October 2020	338	154	18	113	22	18	13
Slovenia	2019	July–August 2020	249	93	27	76	18	24	11
Total			10,419	5,707	731	2,884	514	424	159

Notes: Classification of business sections according to ISIC Rev. 3.1. D: Manufacturing; F: Construction; G: Wholesale and retail trade; H: Hotels and restaurants; I: Transport, storage and communications; K: Real estate, renting and business activities (here: only computer and related activities, ISIC Rev. 3.1 72). Corresponding division codes reported in parentheses.

The sample covers small, medium and large formal businesses across the main sectors of the economy (D: manufacturing (ISIC 3.1 Rev. 15–37), F: construction (ISIC 3.1 Rev. 45), G: retail and wholesale trade (ISIC 3.1 Rev. 50–52), H: facility sector (ISIC 3.1 Rev. 55), I: transport, storage and communication (ISIC 3.1 Rev. 60–64), and one business division of sector K: computer related services (ISIC 3.1 Rev. 72)). Table 1 shows that the majority of the surveyed firms (55%) belong to the manufacturing sector, followed by the retail and wholesale trade sector (28% of firms). Hotels and restaurants represent around 5% of enterprises.

Information on the strictness of lockdown measures in reaction to COVID-19 is retrieved from the Oxford COVID-19 Government Response Tracker (Hale et al., 2021) which provides a systematic way to track government responses to the pandemic and renders policy responses comparable across regions and jurisdictions.[3] The project provides a total of 19 different indicators. In our analysis we only consider nine indicators related to containment, closure and health system policies.[4] Fig. A.1 in the Appendix plots the evolution of the monthly stringency index from March 2020 to February 2021. Most of the sampled countries exhibit the same time pattern, with very strict lockdown policies at the beginning of the pandemic that were relaxed during the summer and tightened again towards the end of the year 2020. The highest value during our observation period was reported in Georgia in April 2020, with an average monthly stringency index of 99.51. Only in Belarus policy measures to restrict the outbreak of SARS-CoV-2 were relatively liberal throughout the year. Therefore, it is of no surprise that the lowest average monthly stringency index during our observation period in all sampled countries was reported in Belarus in March 2020, with a value of 4.8. The only curtailment measure that was captured by the nine aforementioned indicators in Belarus during that month was a ban on arrivals from certain regions.

Daily data on the state of the pandemic (i.e., confirmed COVID-19 cases per million people) are obtained from Our World in Data (Ritchie et al., 2020). Table 2 presents summary statistics for the main independent as well as dependent variables. The mean decrease in sales relative to the same month in the previous year amounts to 22.3% but can even reach 100%. Firms laid off on average 3.83 employees, however some recorded even much larger layoffs, with a maximum of 600 employees laid off due to COVID-19. The stringency index varies between a minimum of 4.84 and a maximum of 99.51 with a median of 55.48.

[3] See http://www.bsg.ox.ac.uk/research/research-projects/covid-19-government-response-tracker for information on the calculation of the stringency index.

[4] These are: school closing, workplace closing, cancellation of public events, restrictions on gatherings, closure of public transport, stay-at-home orders, restrictions on internal movements, international travel controls, and public information campaigns.

Table 2
Summary statistics.

	Obs.	Mean	Std. Dev.	Median	Min	Max
$OxCGRT^{SI}$	276	57.09	17.93	55.48	4.84	99.51
WBES Baseline						
Age	10,359	21.05	16.06	19	1	205
$\text{Owner}_{FemaleShare}$	10,419	19.40	33.14	0	0	100
$\text{Sales}_{ExportShare}$	10,324	17.30	30.73	0	0	100
$\text{Supply}_{ImportShare}$	10,020	34.87	36.29	20	0	100
Innovation (No = 1)	10,357	0.70	0.46	1	0	1
COVID-19 Follow-up ES						
%Δ sales	9,676	−22.31	31.40	−20	−100	300
Closure (No = 1)	10,419	0.71	0.45	1	0	1
SaleChange (No = 1)	10,021	0.80	0.4	1	0	1
Employees	9,747	88.72	350.79	23	1	20,000
Layoff	3,416	3.83	18.02	0	0	600
$\text{Overdue}_{Financial}$	9,538	0.10	0.30	0	0	1
Overdue_{Other}	9,937	0.33	0.47	0	0	1
Insolvency	10,032	0.02	0.14	0	0	1

Notes: The variable $OxCGRT^{SI}$ refers to the average monthly value of the stringency index.

4. Response stringency

4.1. Overall impact on firm performance

One major objective of this study is to untangle the effects of COVID-19 related government response strictness on firm performance. For this purpose, we resort to the WBES Follow-up Survey's questions on year-on-year sales growth, which we consider an appropriate measure of firm performance. In the questionnaire, firms are explicitly asked for a relative comparison of sales in the last completed month before the survey was conducted in 2020, with the same month in the previous year, therefore, automatically negating the effect of seasonality. To ensure the validity of our estimates we have to assume that there is no systematic response bias in the reported values. This is however a well-known potential source of bias when working with survey data in general.

Figs. 1 to 3 provide descriptive evidence of reported year-on-year sales growth across months, countries, and economic divisions. Fig. 1 shows that firms that were surveyed in May 2020, therefore providing information on sales in April 2020 relative to April 2019, report the steepest decline, with an average reduction in sales of 53.5%. Reported mean year-on-year sales growth is considerably closer to zero if the COVID-19 follow-up survey was conducted during the later months of 2020 or earlier months of 2021.

Fig. 3 plots the reported year-on-year percentage changes in sales by company size. We follow the classification of the World Bank Enterprise Survey, that distinguishes between small (less than 20 employees), medium (20–99 employees) and large (over 100 employees) establishments. Reported mean reductions range from 17.4% for large establishments to even 25.3% for small sized firms. Panel (a) in Fig. 2 shows year-on-year growth rates of sales by country. While Moldovan enterprises report an average reduction of 54.7%, firms in Latvia are the least affected, with an average year-on-year sales

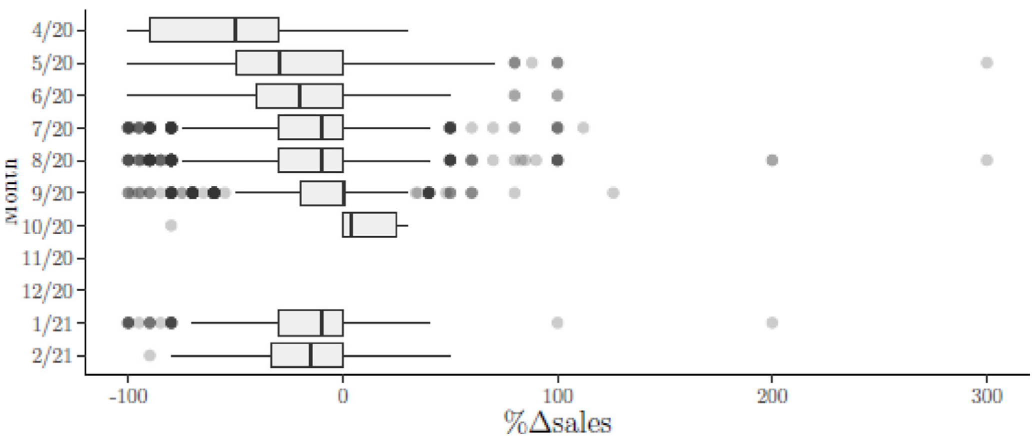

Fig. 1. Changes in sales relative to the same month in the previous year, by month.

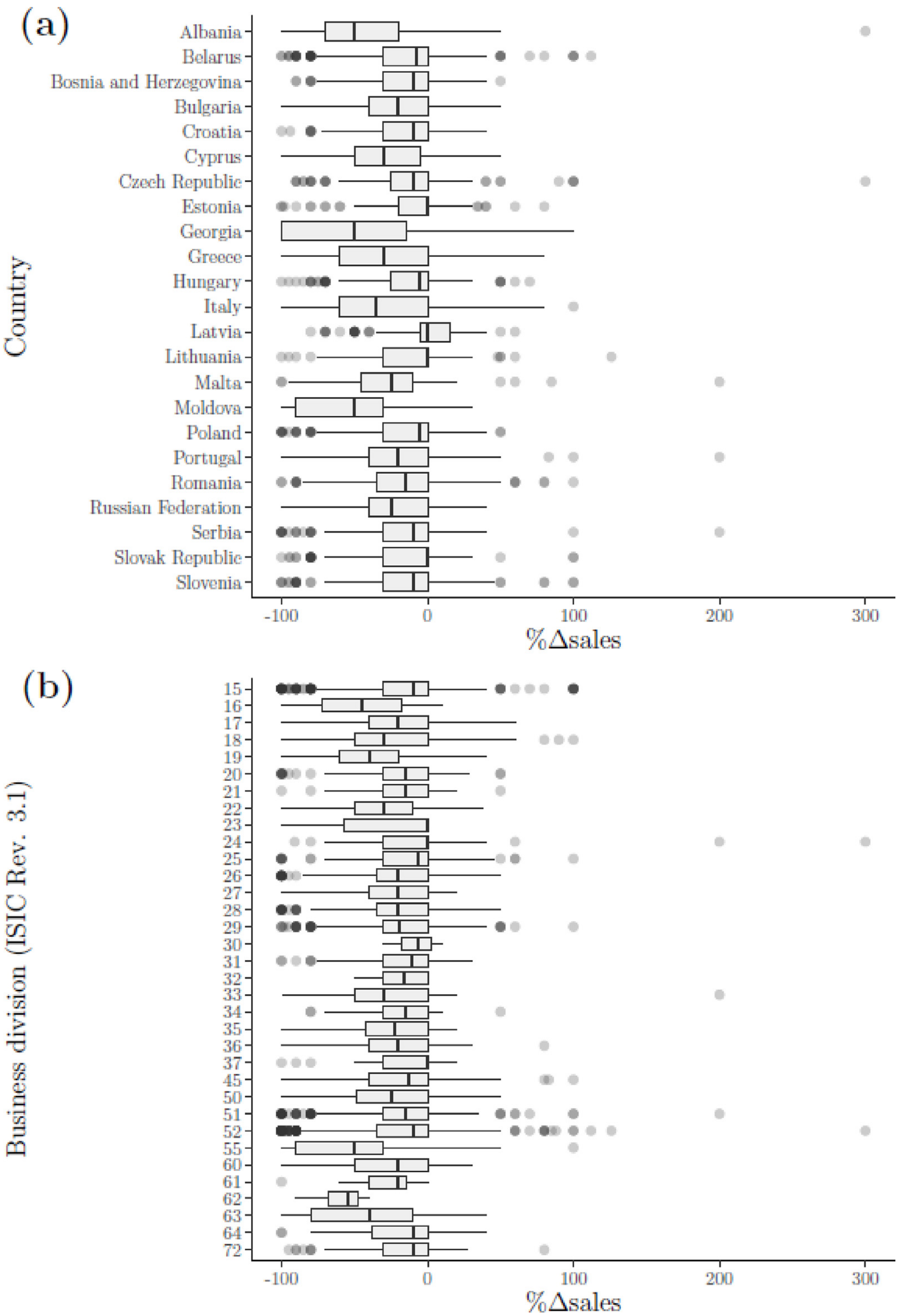

Fig. 2. Changes in sales relative to the same month in the previous year, by (a) country and (b) division. Notes: description of ISIC Codes can be found under https://unstats.un.org/unsd/classifications/Econ/ISIC.

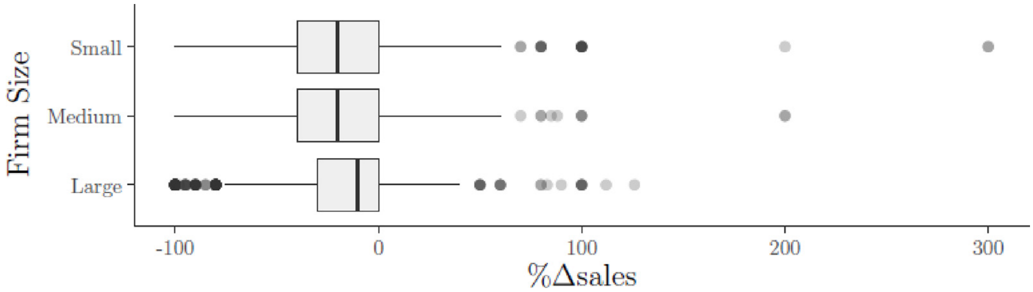

Fig. 3. Changes in sales relative to the same month in the previous year, by firm size. Notes: firm size classifications according to the World Bank Enterprise Survey. Small firms employ less than 20 people, medium sized firms have 20–99 employees, and large firms have more than 100 full-time employees.

change close to zero. However, since the follow-up surveys were conducted at different points in time, and policy measures to cope with the pandemic vary across countries, the comparability of these descriptive unconditional differences in firm performance across jurisdictions is rather limited and calls for an in depth empirical analysis. Panel (b) in Fig. 2 plots growth rates by business division (2-digit ISIC Rev. 3.1). Air transport (62), hotels & restaurants (55), and supporting transport activities (63) report the largest reductions in sales with an average negative year-on-year sales growth of 60%, 55.5% and 44%, respectively. Descriptive statistics suggest that manufacturers of chemical products (24), computing machinery (30), and plastic products (25) are the least affected industry divisions in our sample.

While the temporal variation of the COVID-19 Follow-up Enterprise Survey may limit the explanatory power of descriptive cross-country evidence, it offers the advantage of greater variation in our data. We employ the following regression model to capture the impact of the COVID-19 related lockdown policies on firms' performance in terms of sales changes:

$$\%\Delta sales_{ic} = \propto_0 + \propto_1 OXCGRT^{SI}_{ic} + X_i' A_2 + Y_i' A_3 + COV_{ic} + \theta_s + \zeta_c + \varepsilon_{ic} \quad (1)$$

where the dependent variable, $\%\Delta sales_{ic}$, refers to the reported percentage change in sales for company i in country c relative to the same month in the previous year. The main independent variable of interest $OXCGRT^{SI}_{ic}$ denotes the average stringency index in country c as communicated by the Oxford Covid-19 Government Response Tracker. While the stringency index reports daily changes in lockdown measures, firms in the WBES are asked to provide information on year-on-year sales growth for the last completed month. We construct an average monthly stringency index for every country in our sample and match it to the month that was referred to in the World Bank COVID-19 Follow-up Survey. Therefore, the corresponding coefficient $\propto_1$ measures the average percentage point change in year-on-year sales growth induced by a marginal change in containment measures. As a robustness check, we also employ the monthly maximum value of the stringency index in the respective countries. Y includes additional information retrieved from the COVID-19 Follow-up Enterprise Survey, such as the number of full-time employees in December 2019, information on temporary closure of the establishment during the pandemic, and whether the firm adjusted its products, services, or sales channels in reaction to COVID-19. X includes a set of individual pre-pandemic firm characteristics, such as firm age, share of sales that is exported directly or indirectly,[5] share of input supplies that are of foreign origin, share of female ownership,[6] and general innovative capabilities of the company.[7] To capture demand shocks inherent with the pandemic itself, and therefore to isolate the effect of state confinement measures on firm sales, we introduce the variable COV_{ic}, which indicates the monthly number of confirmed COVID-19 cases per million people in every given country. We also include a full set of sector dummies θ_s and country dummies ζ_c to account for the heterogeneous impact of lockdown policies on industry sectors and unobservables across countries that were not captured by the stringency index respectively.

There are some concerns related to the empirical approach that we discuss in more detail below. First, although we attempt to control for concurrent pandemic-related effects on businesses other than lockdown measures by including the monthly number of confirmed COVID-19 cases per million citizens in our regression it is likely that we do not capture all of these effects, which may bias our estimates. In an ideal setting, inferring causality of the effects of the lockdown would require an adequate counterfactual or control group not affected by the treatment. However, such a counterfactual is difficult to construct in the case of the pandemic since all countries were affected and hence lockdowns have hit all sectors

5 For some service establishments (i.e., hotels), direct sales to foreign customers are defined as direct export. Services sold to foreigners via intermediaries are defined as indirect exports.

6 Firms are asked whether or not there are any females amongst the owners, and if yes, what percentage they own. For larger companies it may be that some stockholders are legal entities rather than physical persons, therefore making it hard for survey respondents to give an informed answer to that question.

7 Innovative capability of the firm is indicated by a dummy variable that is equal to unity if the company introduced new or improved products or services in the three years prior to the baseline survey year.

in all economies worldwide. Second, we only consider firms that survived from the WBES baseline survey until the first wave of the WBES Follow-up Survey on COVID-19 potentially introducing survivor bias. As discussed by Waldkirch (2021), closure rates reported in the WBES Follow-Up Survey are highest in labor-intensive manufacturing such as garments, leather, and furniture, and lower in more skill- or capital-intensive manufacturing such as chemicals and machinery.[8] In our sample more than two-thirds of establishments that were in the last pre-COVID-19 survey responded that they are still in operation. Finally, we acknowledge that there is a wide cross-country heterogeneity in terms of governmental approaches to cope with the pandemic.

However, we feel that the Oxford COVID-19 Government Response Tracker, while certainly not perfect, is among the most suitable cross-country measures of lockdown stringency one can obtain. We do acknowledge the above mentioned limitations of our approach, but we still believe that the derived results are still informative for researchers and policymakers given the stringency of these issues.

4.2. Effect heterogeneity

Looking at the raw data we suspect two main sources of firm-level effect heterogeneity. Fig. 4 suggests a differential impact of the containment policies according to firm size.

To test whether the lockdown policies affected small or medium sized enterprises differently, we first define a multilevel dummy which follows the size definitions of the WBES. We then introduce an interaction term capturing the heterogeneous effect of these lockdown policies by firm size. Since we also suspect effect heterogeneity across sectors, as indicated by Fig. 2 Panel (b), we estimate an alternative specification where we interact the business sector dummies θ_s with the average stringency index in country c as reported by the Oxford COVID-19 Government Response Tracker. By doing so, we can analyze if an increase in the strictness of containment and closure policies impacted some business sectors disproportionately. We use the corresponding business sections (D–K) instead of the 2-digit business divisions that we show in Fig. 2 Panel (b), to avoid a too extensive disaggregation of the results.

4.3. Results

We report the regression results of our main specification in Table 3. Columns (1)–(3) present the results employing the monthly average value of the stringency index, while columns (4)–(6) report the results using the maximum monthly value as a proxy for lock down strictness in any given month. Columns (1) and (4) show the results of the main specification without the interaction terms. We cluster standard errors at the country-level. A one-point increase in lockdown stringency is linked to an average decrease of year-on-year sales growth by around 0.63 and 0.61 percentage points in these specifications. Put differently, if there was a complete lockdown (i.e., $\text{OxCGRT}^{SI} = 100$) sales growth relative to the same period in the previous year would be on average 62.8, or 60.5 percentage points lower than without lockdown measures. Firms that export a higher share of their goods report a steeper decline in year-on-year sales growth, as suggested by the negative and highly significant coefficient of $\text{Sale}_{\text{ExportShare}}$. This correlation may be driven by international trade restrictions as well as travel bans. However, we do not find evidence for a supply shock induced by international restrictions. Having a higher share of imported production inputs, is not significantly linked to firm performance. Establishments that reported product or service innovation during the last three years before the baseline WBES was conducted, report on average a 1.52 percentage point lower reduction in sales growth than companies that did not innovate. Perhaps unsurprisingly, establishments that were not permanently or temporarily closed due to COVID-19 report a 13.8 percentage point lower average decline in year-on-year sales growth than firms that were shut down.

We find strong evidence for heterogeneous effects across firm size and business sectors. Small sized establishments were disproportionately impacted by the containment and closure measures. While a one-point increase in the stringency index is associated with a decrease in year-on-year sales growth by 0.52 percentage points for large enterprises, it decreases reported sales growth of small sized firms by 0.66 ($= (-0.52) + (-0.14)$) percentage points.

Coefficients of differences in year-on-year sales changes between large and medium sized firms are closer to zero but still statistically significant. Models employing the maximum monthly value of the stringency index as a proxy for the strictness of lockdown policies display similar results. Columns (3) and (6) provide evidence of effect heterogeneity across sectors. While, on average, businesses operating in the manufacturing sector (ISIC_D) report a decline in sales relative to the same period in the previous year of 34.7 percentage points,[9] businesses operating in the facility sector (e.g. hotels and restaurants) report a stronger reduction of even 58.2 percentage points.[10] Of course, due to effect heterogeneity, the absolute difference in year-on-year sales decline between both business sectors is even more pronounced assuming a full lockdown (i.e. $\text{OxCGRT}^{SI} = 100$). The results seem plausible, because containment and closure policies are mainly

[8] It is likely that the closure rates reported in the WBES COVID-19 Follow-Up understate the true extent of closure rates as some firms could not be contacted. However, it is unclear if these firms went out of business, relocated, or simply refused to answer the questionnaire.

[9] $57.1{*}0.608 = 34.72$; 57.1 corresponds to the average value of the stringency index.

[10] $57.1{*}(0.608{+}0.412) = 58.24$.

Table 3
Regression results: Response Stringency.

	Dependent variable:					
	%Δ sales					
	(1)	(2)	(3)	(4)	(5)	(6)
OxCGRT^{SI}	−0.628***	−0.524***	−0.608***	−0.605***	−0.513***	−0.564***
	(−6.528)	(−4.769)	(−6.133)	(−3.360)	(−3.020)	(−3.018)
FirmSize$_M$		−0.782			−0.211	
		(−0.336)			(−0.088)	
FirmSize$_S$		−1.330			−0.163	
		(−0.402)			(−0.044)	
Sales$_{ExportShare}$	−0.048***	−0.043***	−0.044***	−0.048***	−0.043***	−0.043***
	(−4.059)	(−3.751)	(−3.975)	(−4.062)	(−3.663)	(−3.849)
Supply$_{ImportShare}$	−0.004	−0.005	−0.005	−0.004	−0.004	−0.004
	(−0.440)	(−0.489)	(−0.496)	(−0.372)	(−0.452)	(−0.403)
log(age)	−0.317	−0.158	−0.385	−0.339	−0.181	−0.410
	(−0.843)	(−0.406)	(−1.016)	(−0.901)	(−0.467)	(−1.084)
log(employees)	2.617***		2.592***	2.638***		2.606***
	(6.133)		(6.198)	(6.072)		(6.167)
Owner$_{FemaleShare}$	−0.023**	−0.025**	−0.023**	−0.023**	−0.026**	−0.023**
	(−1.980)	(−2.116)	(−2.001)	(−2.008)	(−2.135)	(−2.002)
Innovation = No	−1.520*	−1.698**	−1.474*	−1.484*	−1.684**	−1.433*
	(−1.750)	(−1.977)	(−1.699)	(−1.708)	(−1.963)	(−1.661)
Closure = No	13.802***	13.821***	14.230***	13.828***	13.838***	14.279***
	(9.905)	(9.907)	(10.762)	(9.917)	(9.965)	(10.729)
SaleChange = No	−6.644***	−6.771***	−6.477***	−6.648***	−6.793***	−6.485***
	(−4.057)	(−4.196)	(−4.150)	(−4.056)	(−4.199)	(−4.143)
ISIC$_F$	0.380	0.216	2.298	0.335	0.196	4.481
	(0.224)	(0.129)	(0.584)	(0.197)	(0.117)	(1.232)
ISIC$_G$	4.139***	3.910***	6.502***	4.163***	3.936***	6.867***
	(5.227)	(4.779)	(3.578)	(5.280)	(4.851)	(3.935)
ISIC$_H$	−25.958***	−26.094***	−1.750	−25.916***	−26.032***	−0.619
	(−5.657)	(−5.653)	(−0.265)	(−5.643)	(−5.639)	(−0.098)
ISIC$_I$	−9.658***	−9.838***	−10.328**	−9.632***	−9.825***	−9.944**
	(−4.372)	(−4.517)	(−2.039)	(−4.363)	(−4.507)	(−1.964)
ISIC$_K$	0.729	0.454	−7.427*	0.616	0.327	−5.417
	(0.289)	(0.177)	(−1.650)	(0.244)	(0.127)	(−1.172)

(*continued on next page*)

Table 3 (*continued*).

	Dependent variable:					
	%Δ sales					
	(1)	(2)	(3)	(4)	(5)	(6)
log(COV)	−0.437	−0.386	−0.523	−1.481	−1.404	−1.572
	(−0.550)	(−0.513)	(−0.654)	(−0.857)	(−0.856)	(−0.907)
$OxCGRT^{SI}$:FirmSize$_M$		-0.082^{**}			-0.087^{***}	
		(−2.382)			(−2.677)	
$OxCGRT^{SI}$:FirmSize$_S$		-0.135^{**}			-0.146^{***}	
		(−2.437)			(−2.597)	
$OxCGRT^{SI}$:ISICF]			−0.035			−0.071
			(−0.436)			(−1.033)
$OxCGRT^{SI}$:ISIC$_G$			−0.042			-0.044^{*}
			(−1.441)			(−1.746)
$OxCGRT^{SI}$:ISIC$_H$			-0.412^{***}			-0.402^{***}
			(−3.123)			(−3.517)
$OxCGRT^{SI}$:ISIC$_I$			0.015			0.008
			(0.137)			(0.079)
$OxCGRT^{SI}$:ISIC$_K$			0.167			0.119
			(1.790)			(1.296)
Constant	5.844	13.217	6.110	10.247	18.535	8.635
	(0.661)	(1.525)	(0.701)	(0.494)	(0.966)	(0.409)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,888	8,888	8,888	8,888	8,888	8,888
R^2	0.240	0.240	0.244	0.239	0.240	0.243
Adjusted R^2	0.237	0.237	0.240	0.236	0.236	0.240
Residual Std. Error	27.134 (df = 8850)	27.136 (df = 8847)	27.071 (df = 8845)	27.154 (df = 8850)	27.146 (df = 8847)	27.082 (df = 8845)
F Statistic	75.543^{***} (df = 37; 8850)	69.909^{***} (df = 40; 8847)	67.961^{***} (df = 42; 8845)	75.063^{***} (df = 37; 8850)	69.689^{***} (df = 40; 8847)	67.733^{***} (df = 42; 8845)

Notes: $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. All models are estimated using OLS. t-values reported in parentheses. Standard errors are clustered at the country-level.

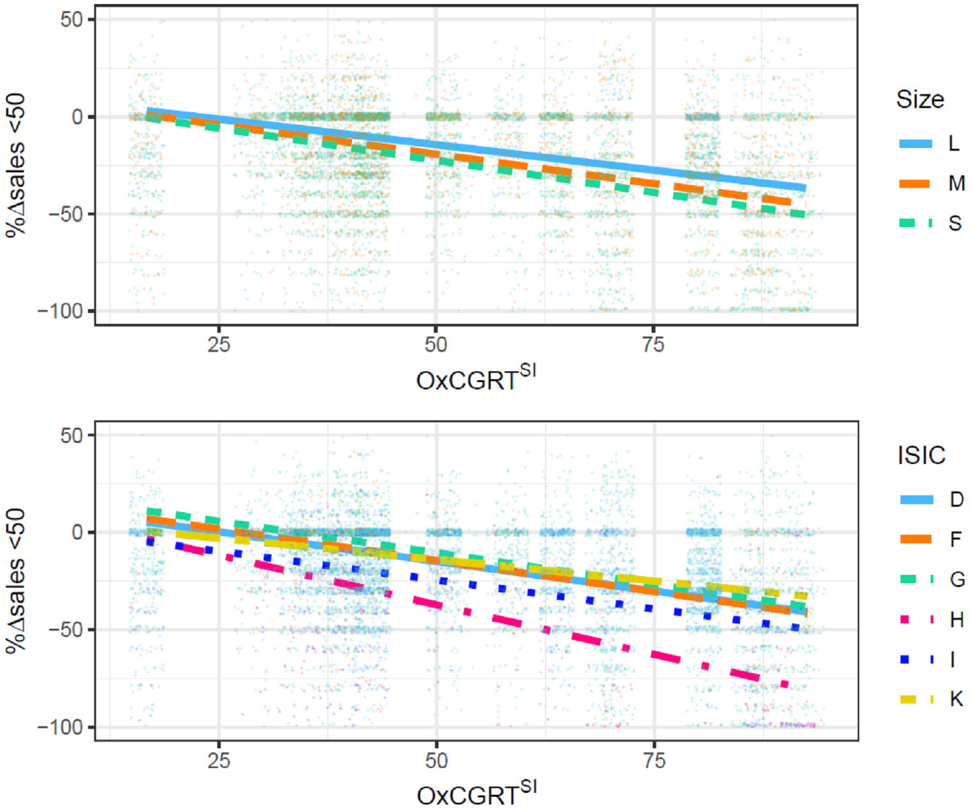

Fig. 4. Interaction Plot: Response Stringency. Notes: Figure plots predicted values of interaction effects using the average value of the stringency index (Table 2, columns (2) and (3)). Firm size classifications according to the World Bank Enterprise Survey. Small firms employ less than 20 people, medium sized firms have 20–99 employees, and large firms have more than 100 full-time employees. Classification of business sections according to ISIC Rev. 3.1. D: Manufacturing; F: Construction; G: Wholesale and retail trade; H: Hotels and restaurants; I: Transport, storage and communications; K: Real estate, renting and business activities, here: only computer and related activities, ISIC Rev. 3.1 72. Each point in the figure corresponds to one actual data point with the color based on their moderator value.

aimed at restricting mobility and social gatherings, both of which the facility sector is highly dependent on. Differences between the decline in the manufacturing sector and other business sectors are not statistically significant. Therefore, our results indicate that these business sectors are impacted proportionally by an increase in lockdown strictness. In the following, we illustrate effect heterogeneity of government response stringency to COVID-19. Fig. 4 plots the previously estimated interaction effects of two of our models (Table 3, columns (2) and (3)). Each dot represents one of the firm-level observations, grouped by firm size and business division, respectively. As shown in Table 3, the slope coefficient between large and small enterprises is significantly different, as well as the difference in slopes between firms in the facility sector and firms in the manufacturing sector. The effect heterogeneity results in an increasing discrepancy in the reaction of sales growth between firms operating in the facility versus firms in other economic sectors with higher levels of the stringency index. We estimate additional model specifications and robustness checks results of which are available upon request.

First, we also check for potential sources of effect heterogeneity other than sector affiliation and firm size, such as exporting status and female ownership, however, we do not find any further significant interaction terms. Second, instead of following the arbitrarily chosen WBES firm size classifications, we interact a continuous measure of firm size (log(employees)) with our independent variable of interest to validate our findings regarding size-related effect heterogeneity. A potential concern regarding our results is that they are driven by countries that followed a different path in containing the spread of the pandemic. Looking at Fig. A.1 in the Appendix we identify Belarus as a potential threat to the validity of our estimates. To address this concern, we re-estimate our main specification outlined in Eq. (1) excluding this country.

The results of using this alternative sample are reported in Table A.1 in Appendix. We also check if our results are biased by countries that were questioned in the earlier months of 2021, therefore reporting sales changes relative to the same month in 2020 (i.e., Bosnia and Herzegovina and Serbia). The main coefficients retain their sign, magnitude, and significance even in these alternative specifications.

5. Government support policies

5.1. Policy targeting

To cushion the negative repercussions documented above, many countries introduced a number of support policies. In the following, we assess the effectiveness of these measures along a number of different dimensions. Overall 3,834 out of 10,419 firms in our sample received public support, 623 firms expected to receive public support within the next three months, 5,542 firms did not get any public support, and 420 firms did not answer the respective survey question. The COVID-19 Follow-up Enterprise Survey distinguishes between five different policy support schemes: direct cash transfers, deferral of payments, credit access, fiscal exemptions and wage subsidies. We provide some descriptive evidence of targeting effectiveness of government support policies, that aimed at relieving economic distress for companies during the COVID-19 pandemic.[11] Fig. 5 Panel (a) plots the correlation between reported average percentage reduction in sales and the share of companies that received public support across sectors. Each dot in the scatterplot represents one business division (2-digit ISIC Rev. 3.1) covered by the WBES. There is a strong and statistically significant ($p<0.01$) Pearson correlation of −0.59 between receiving public support and operating in a specific division that was significantly impacted by the containment and closure policies. 75% of firms operating in the air transport business division (ISIC 3.1 Rev. 62), the most affected industry division in our sample with an average year-on-year sales growth of −60%, received public support.

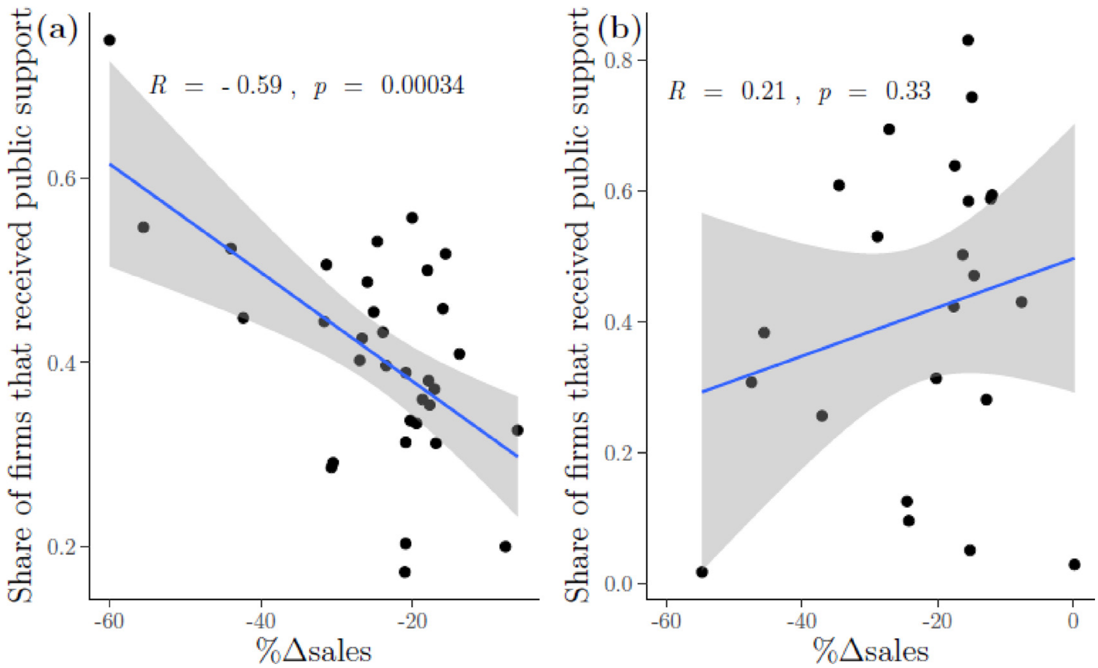

Fig. 5. Target effectiveness of public support by (a) division and (b) countries. Note: business division refers to the 2-digit level ISIC Rev. 3.1 Code. R refers to the Pearson correlation coefficient.

However, the descriptive evidence also suggests that some business divisions, such as manufacturers of motor vehicles, trailers, and semi-trailers (ISIC 3.1 Rev. 34) may have been overcompensated. Companies in these divisions experienced a decline in sales by only 20.1% on average, but 56% received public support to cope with the negative economic consequences of the pandemic. Panel (b) of Figure 6 shows that there is no significant correlation ($p=0.33$) between the share of companies that received public support in any given country and the average mean reduction in sales in the same country. There is a huge discrepancy in public support schemes across countries. In our sample only 1.7% of Moldovan

[11] See Cirera et al. (2021) for a more detailed analysis of targeting effectiveness based on the COVID-19 Follow-up World Bank Enterprise Survey.

firms received public support during the first months of the pandemic, whereas 74% of Slovenian firms and 83% of Serbian firms received any form of public support.[12]

5.2. Policy outcomes

In this section we provide some preliminary evidence on the short-term outcomes of government support schemes during the COVID-19 pandemic. We run the following regression on a restricted sample of firms that received public support in order to assess which particular public support scheme was the most effective in helping firms to cope with the negative economic consequences of the lockdown:

$$O_{ic} = \beta_0 + \sum_{k=1}^{5} \beta_k Support_{ik} + \beta_6 OXCGRT^{SI}_{ic} + \beta_7 Days_i + \beta_6 OXCGRT^{SI}_{ic} * Days_i + X_i'B_9 + Y_i'B_{10} + \theta_s + \zeta_c + \varepsilon_{ic} \quad (2)$$

where O_{ic} denotes the dependent variables of interest, that are either related to *financial* outcomes (i.e., probability of filing bankruptcy, delaying payments due to COVID-19, or defaulting on financial obligations) or *labor* outcomes (i.e., count of workers laid off due to COVID-19). The dummy variable $Support_{ik}$ is equal to unity if firm i reports that it received a specific type of public support (such as possibility to defer payments, cash transfers, fiscal exemptions, wage subsidies or access to credit) and thus captures the effect of each specific government support instrument relative to receiving of any other public support scheme. Therefore, β_1 - β_5 denote our main coefficients of interest. As opposed to the questions on year-on-year sales growth, survey questions on labor, finance, and policies do not refer to a specific time period but rather to the time since the outbreak of the pandemic. Hence, for every individual company i, we estimate the number of days since the outbreak of the pandemic as well as the average daily lockdown stringency, that is defined as the average value of the Oxford COVID-19 Government Response Tracker stringency index between the day the first measures in country c were introduced and the day the follow-up interview was conducted. As an alternative, we also use the maximum value of the stringency index during that exact time period. In our model, we interact the number of days with our stringency measure, since we assume that the negative economic consequences increase with the number of days between the interview took place and the first lockdown measures were introduced. X and Y include the same variables as introduced in the previous sections. We again include full sets of country and sector dummies to control for unobserved differences in policy schemes between countries and sectors.

Of course, one should bear in mind that these results need to be interpreted with caution. It is likely that public support measures were not distributed randomly and that targeting of public support was based on potential outcomes. Also, related to the above, the extent of support policies and their implementation may have been very heterogeneous across countries. In addition, we do not observe intensity of policy support and the exact date the company receives public support. However, the World Bank Enterprise Follow-Up Survey on COVID-19 does not allow for a more detailed characterization of public support schemes.

5.2.1. Labor market outcomes

To compare the effectiveness of the public support schemes on labor market outcomes we refer to the WBES Follow Up‘s question on the number of employees that were laid off due to the COVID-19 outbreak. Only 3,416 companies in our sample provided an answer to the question, out of which 1,521 indicated that they received any kind of public support. We start our analysis with estimating a fixed-effects regression model as laid out in Eq. (2), where the dependent variable is a transformation of the count of employees laid off since the outbreak of the pandemic. We estimate three models assuming different distributions of our dependent variable: Inverse hyperbolic sine (IHS),[13] Poisson, and Negative Binomial. The latter two are especially adequate for count data.[14] We report the results of the model estimating the impact of public support policies on the count of employees laid off due to COVID-19 in Table 4. Columns (1) and (4) display the results of a regression model where the dependent variable is the inverse hyperbolic sine of our labor market outcome.

Columns (2) and (5) present the results of a Poisson regression model and Columns (3) and (6) show the results of a Negative Binomial regression model. Columns (1), (2) and (3) report the results using the average stringency index, the other columns show the estimates if we employ the maximum value of the stringency index. Results indicate that the deferral of payments (i.e., credit, rent, mortgage, interest, and rollover of debt) are strongly correlated to labor market outcomes in terms of the number of employees laid off due to COVID-19. The coefficients of payments deferral are negative

[12] One could argue that these differences are mainly due to the different points in time the survey was undertaken. However, if we compare countries where the survey was conducted during the same months, we still find large discrepancies between countries (e.g., 60.8% of Cypriot establishments received public support, but only 30.7% of Albanian companies in our sample. Both surveys were conducted in June 2020).

[13] The IHS transformation approximates the natural logarithm of that variable and allows retaining zero-valued observations.

[14] The Poisson model assumes that the mean and the variance are equally distributed. However, in case of overdispersed count data (conditional variance is greater than the conditional mean), the Negative Binomial model may represent a suitable alternative. A simple test for overdispersion (Cameron and Trivedi, 1990) provides evidence in favor of using a Negative Binomial model to overcome the restrictions imposed by the Poisson model.

Table 4
Regression results: Number of workers laid off.

	Dependent variable:					
	Layoff					
	(1) (IHS)	(2) (P)	(3) (NB)	(4) (IHS)	(5) (P)	(6) (NB)
Cash transfer = Yes	−0.029	−0.050	−0.127	−0.034	−0.056	−0.092
	(−0.386)	(−0.214)	(−0.959)	(−0.441)	(−1.652)	(−0.689)
Deferral of payments = Yes	−0.192**	−0.444**	−0.237*	−0.194**	−0.463**	−0.251*
	(−2.052)	(−2.461)	(−1.810)	(−2.081)	(−2.407)	(−1.876)
Credit access = Yes	−0.129	−0.216	−0.013	−0.134	−0.229	−0.0003
	(−1.318)	(−1.190)	(−0.093)	(−1.364)	(−1.277)	(−0.002)
Fiscal exemptions = Yes	−0.006	−0.158	−0.195	−0.003	−0.113	−0.173
	(−0.108)	(−0.927)	(−1.211)	(−0.061)	(−0.539)	(−1.034)
Wage subsidies = Yes	−0.013	−0.332*	0.060	−0.017	−0.342*	−0.002
	(−0.173)	(−1.801)	(0.387)	(−0.219)	(−1.850)	(−0.013)
Stringency controls	Yes	Yes	Yes	Yes	Yes	Yes
Baseline firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Follow-up firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,521	1,521	1,521	1,521	1,521	1,521
(Pseudo-)R^2	0.265	0.490	0.087	0.264	0.482	0.085

Notes: $^*p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. Columns (1) and (4) are estimated using IHS. Columns (2) and (5) are estimated using Poisson regression. Columns (3) and (6) are estimated using Negative Binomial regression. Columns (1)-(3) employ the average value of the stringency index. Columns (4)-(6) employ the maximum value. *t*-values reported in parentheses. Standard errors are clustered at the country-level.

and highly significant in all model specifications. Firms that received payments deferral as compared to other forms of public support, laid off between 17.5[15] percent (Table 4, column (1)) 14 and 35.8[16] percent (Table 4, column (2)) 15 fewer workers on average.

A back of the envelope calculation suggests that, in our restricted sample, where the mean number of workers laid off per firm amounts to 4.2, the deferral of payments can save, on average, between 0.74 and 1.5 employees per firm, using the coefficients of the different model specifications. The coefficient on wage subsidies is negative and significant at the ten per cent level only in the Poisson regressions. According to the coefficients reported in columns (2) and (5), firms that received wage subsidies compared to other types of public support laid off around 28 percent fewer employees. This translates into only 3 redundancies compared to 4.2 on average in the restricted sample of firms.

5.2.2. *Financial vulnerability*

In this section we look at a different dimension of firms' vulnerability, namely the probability to delay payments. Hence, Table 5 displays the results of logistic regressions where the dependent variables are binary indicators equal to unity if the firm delayed payments due to the COVID-19 outbreak. The coefficients pertain to average marginal effects. We also estimate an alternative linear model specification, results of which are available upon request.[17] The follow-up questionnaire distinguishes between a delay in payments to financial institutions, suppliers, landlords and tax authorities. We construct two dummy variables, one that captures the delay in payment to financial institutions (Overdue $_{Financial}$) and another one that indicates if the establishment delayed any other payments (Overdue $_{Other}$). The coefficients for deferral of payments, fiscal exemptions and wage subsidies are negative and significant in all model specifications. Receiving national or local government support in the form of payment deferral is associated with firms' ability to repay their financial obligations in time.

It decreases the probability of a firm being overdue on its obligations to any financial institution by 9.5% (Table 5 column (1)) and the probability of delaying payments due to COVID-19 for more than one week to its suppliers, landlords or the tax authorities by 19.8% (Table 5 column (3)). The results also show, that receiving direct cash transfers and wage subsidies are positively correlated to firm‘s financial situation, decreasing the probability of being overdue on obligations to financial institutions by 3% and 4.2%, respectively.

15 $e^{(-0.192)}$ - 1) × 100 = −17.5

16 ($e^{(-0.444)}$ - 1) × 100 = −35.8.

17 The logistic regression model does not converge when using the probability to declare bankruptcy due to complete separation in some of our covariates (i.e. some of our variables perfectly predict the outcome), as well as a low prevalence of insolvency in our sample in general ($n = 189$). Therefore, we can only report the results for this dependent variable employing a linear probability model.

Table 5
Regression results: Finance.

	Dependent variable:			
	$Overdue_{Financial}$		$Overdue_{Other}$	
	(1)	(2)	(3)	(4)
Cash transfer = Yes	−0.030***	−0.032***	−0.048*	−0.047*
	(−2.952)	(−3.288)	(−1.717)	(−1.711)
Deferral of payments = Yes	−0.095***	−0.095***	−0.198***	−0.198***
	(−7.960)	(−7.903)	(−7.146)	(−7.148)
Credit access = Yes	−0.014	−0.014	−0.050*	−0.050*
	(−0.963)	(−1.002)	(−1.781)	(−1.780)
Fiscal exemptions = Yes	−0.040***	−0.040***	−0.076***	−0.076***
	(−3.465)	(−3.457)	(−4.080)	(−4.079)
Wage Subsidies = Yes	−0.042***	−0.042***	−0.050**	−0.049**
	(−5.389)	(−5.329)	(−2.079)	(−2.070)
Stringency controls	Yes	Yes	Yes	Yes
Baseline firm controls	Yes	Yes	Yes	Yes
Follow-up firm controls	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Observations	3,869	3,869	3,927	3,927
R^2	0.106	0.108	0.098	0.098

Notes: *p < 0.1; **p < 0.05; ***p < 0.01. All models are estimated using Logistic Regression. *t*-values reported in parentheses. Standard errors are clustered at the country-level.

6. Conclusion

The COVID-19 pandemic represents an extraordinary challenge for societies worldwide. Even though such a crisis has not been encountered during the more recent decades, the globalized world we live in, characterized by a high mobility of goods and people has shown that it can be easily susceptible to similar situations in the future. A disease that starts in one area of the globe can spread fast to everywhere else paralyzing public life.

Our research contributes to understanding the effect of both government restrictions as well as support policies that may be required during such a crisis. We provide insight into what to expect if governments decide to implement drastic containment policies and what type of enterprises are most likely to be hit.

We employ data on more than 10,000 firms from 23 Southern and Eastern European countries. We find that, on average, small firms (with less than 20 employees) report a reduction in year-on-year sales growth by 0.66 percentage points for each one-point increase in lockdown stringency, as measured by the Oxford COVID-19 Government Response Tracker. This effect is by 0.14 percentage points lower for large firms (with more than 100 employees) where the change in sales was only around 0.52 percentage points for each unit increase in lockdown stringency. Our findings reveal that firms are impacted differently by curtailment measures, depending on their sector affiliation. For example, in the case of a complete lockdown, firms in the facility sector (i.e., hotels and restaurants) would report a year-on-year sales growth that is 100% percentage points lower than without curtailment measures. The gap between losses of firms operating in different sectors widens with increasing stringency. The effect heterogeneity implies that with increasing levels of strictness, firms operating in the facility sector exhibit a more pronounced sales reduction compared to other sectors. Still, in our data, hotels and restaurants represent only around 5% of surveyed enterprises, whereas manufacturing firms which were less severely hit represent around 55% of surveyed enterprises.

We also find that the different forms of government support helped firms in dealing with the negative repercussions. Both financial as well as labor support policies can be linked to a decrease in the number of redundancies as well as the probability of delaying payment obligations in our restricted firm sample. For instance, assuming the mean number of laid off employees ranges between 3.8 and 4.2 in the unrestricted and restricted sample respectively, a 17.5% to 35.8% reduction in layoffs due to deferral of payments implies between 0.74 - 1.5 jobs per firm were saved due to these support mechanisms compared to other types of public support. This highlights the importance of public support measures in helping firms coping with the pandemic. In the absence of such programs, pronounced sales losses threaten liquidity and the ability of firms to survive and hence also the job security of the employed. Even though such government support instruments are costly and may represent sometimes windfall gains for some firms which may be overcompensated (see the descriptive evidence presented in Fig. 5 above), they still represent an essential tool to prevent even worse labor market and further economic outcomes in the long run.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability statement

The data that support the findings of this study are openly available at https://www.enterprisesurveys.org/en/covid-19 and https://www.bsg.ox.ac.uk/research%20/research-projects/covid-19-government-response-tracker.

Appendix

See Fig. A.1.

Table A.1
Regression Results: Response Stringency, robustness checks.

	Dependent variable:			
	%Δ sales			
	(1)	(2)	(3)	(4)
OxCGRT^{SI}	−0.629*** (−6.586)	−0.603*** (−3.347)	−0.628*** (−6.585)	−0.608*** (−3.347)
Baseline firm controls	Yes	Yes	Yes	Yes
Follow-up firm controls	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Pandemic controls	Yes	Yes	Yes	Yes
Observations	8,386	8,386	8,449	8,449
R^2	0.245	0.244	0.241	0.240
Adjusted R^2	0.242	0.241	0.238	0.237
Residual Std. Error	27.085 (df = 8349)	27.108 (df = 8349)	27.236 (df = 8413)	27.257 (df = 8413)
F Statistic	75.436*** (df = 36; 8349)	74.932*** (df = 36; 8349)	76.443*** (df = 35; 8413)	75.943*** (df = 35; 8413)

Notes: $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. All models are estimated using OLS. t-values reported in parentheses. Standard errors are clustered at the country-level. Column (1) and (3) employ the average stringency index. Column (2) and (4) employ the maximum value. In column (1) and (2) we exclude all observations from Belarus. In column (3) and (4) we exclude all observations from Bosnia and Herzegovina and Serbia.

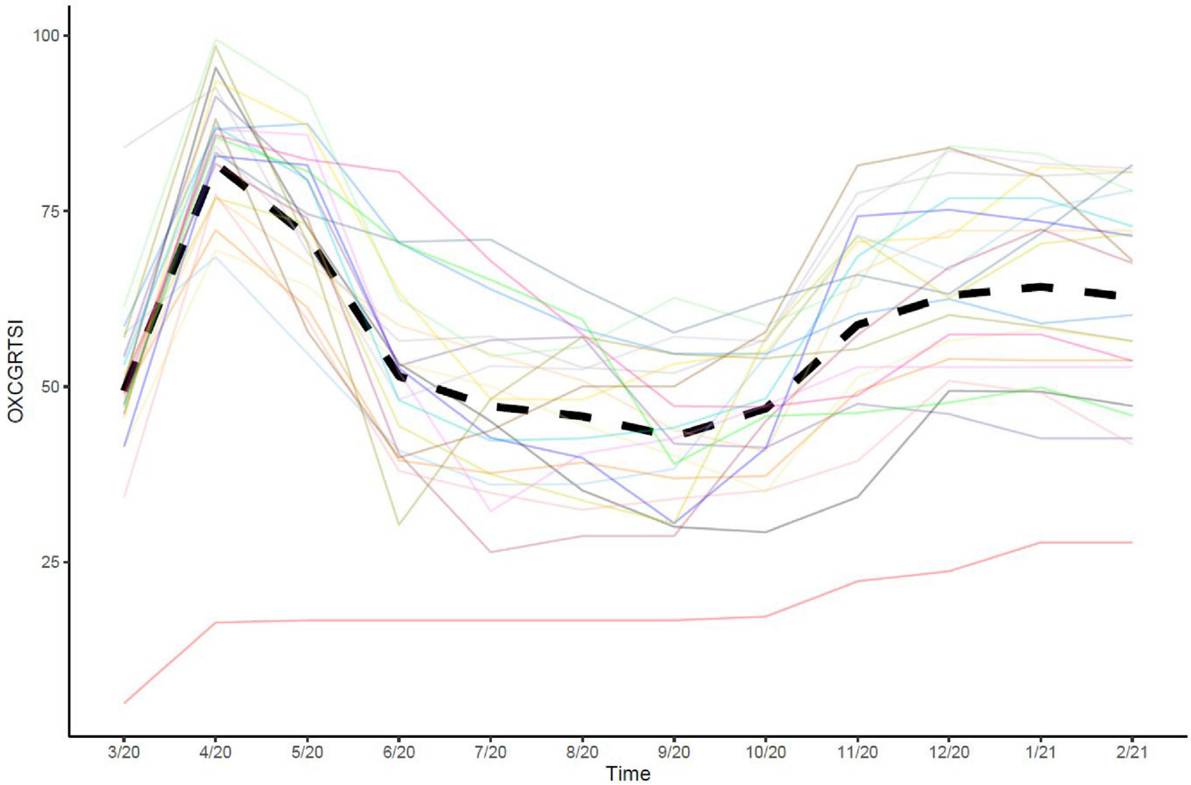

Fig. A.1. Evolution of the Oxford COVID-19 Government Response Tracker Stringency Index, 3/2020 – 2/2021. Notes: Each colored solid line refers to the average monthly stringency index in one of our sampled countries. The black dashed line shows the pooled average monthly stringency index for all sampled countries. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

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