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Government Support During COVID-19 and Corruption

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Abstract: We analyze the allocation and effectiveness of government support in response to the COVID-19 outbreak across a nationally representative sample of firms in 32 countries representing different levels of institutional transparency. The probability of receiving government support is higher for larger firms, firms belonging to business support groups and innovative firms in low corruption countries. In high corruption, countries firms competing against unregistered establishments, with lack of internationally recognized quality certification and no formalized business strategy are more likely to receive government support. Using the panel structure of the data to address reverse causality, selection bias and unobserved heterogeneity, we then find that government support improves firm-level outcomes more strongly in low corruption countries. Among different types of government support, we find wage subsidies to be more effective in high corruption countries while technical assistance for adoption of digital technologies in low corruption countries. In addition, social distancing and lockdown policies do not seem to be as effective in improving firm-level outcomes in high-corruption countries most likely because of weaker capacities to enforce such policies. These results show the importance of enhancing systems of accountability and enforcement procedures that will ensure that fiscal stimulus aid is deployed to benefit those who need it the most.

Keywords: COVID-19 crisis; policy interventions; corruption; technical assistance; subsidies.

JEL classification: G01; G18; G30; H12; H25; H32.

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1. INTRODUCTION

The role of government in the market economy has been the focus of many industrial policy and public policy debates. The basic justification for government assistance to the private sector is the existence of market failures (Greenwald & Stiglitz, 1986). Subsidies are seen as an appropriate response to activities that generate externalities. Furthermore, public subsidies may convey positive information to other potential investors thereby reducing information asymmetries associated with raising external capital (Stiglitz & Weiss, 1981; Myers & Majluf, 1984). In contrast, rent-seeking viewpoints argue that subsidies will be captured by groups that aim to maximize their own benefits (Stigler, 1971; Peltzman, 1976). In addition, the evolutionary view of market, argues that governments have no role to play in correcting information asymmetries as information costs are an integral part of the market and a necessary mechanism for selecting the best firms (Georghiou & Metcalfe, 1998).

The COVID-19 pandemic, and the resulting government response it triggered, have renewed interest in this debate. On the one hand, as argued by Stiglitz (2021), governments should take a more active role in order to correct different aspects of market failures such as: externalities created by the nature of the contagious disease, absence of the market for risk and compensation for firms in preparation for disaster. On the other hand, the large sums of funds required to deal with emergencies, the urgency of disbursing aid and economic stimulus packages create the perfect storm for corruption to occur which in turn makes government intervention ineffective, or even damaging (Vrushi & Kukutschka, 2021).

In this paper, we assess the impact of government support in response to the COVID-19 outbreak on various firm-level outcomes using the World Bank COVID-19 ES Follow-up Surveys. We initially investigate the allocation of government support to different types of firms to determine if there is significant association between certain firm characteristics and the probability of receiving government support. Exploiting the panel structure of the data to address reverse causality, selection bias and unobserved heterogeneity, we then examine the impact of government support on various financial and real firm-level outcomes such as: the probability of the establishment temporarily closing, of reporting a decrease in sales, a decrease in the number of temporary and full-time employees, a decrease in salaries, wages or benefits, a cash flow decrease, delayed payments to landlords, suppliers, tax authorities and financial institutions as well as the probability of the establishment filing for insolvency or bankruptcy. To gain more insights into the effectiveness of different forms of government support we differentiate between different types of government support received, namely, cash transfers, deferral of financial obligations, access to new credit, tax reductions or deferrals, wage subsidies, technical assistance, and other forms of government support. We estimate these relations separately for a subsample of low corruption and high corruption countries to investigate the role of corruption in the allocation and effectiveness of government support in response to the COVID-19 outbreak.

We find that there are substantial differences in the type of firms receiving government support in low corruption compared to high corruption countries. In low corruption countries factors such as firm size, being a member of a business support group and being an innovative firm have a significant positive impact on the probability of receiving government support. In contrast, firms that compete against unregistered establishments, firms with lack of internationally recognized quality certification and no formal business strategy with clear key performance indicators are found to be more likely to receive government support in high-

corruption countries. Furthermore, in these countries pandemic severity is negatively associated with the probability of receiving government support, unlike in the sample of low corruption countries where it has a positive effect. In terms of the effectiveness of government support, we find that government support as a response to the COVID-19 pandemic has a generally positive effect on firm-level outcomes, but that this effect is stronger in low corruption countries. Wage subsidies have the highest impact on firm-level outcomes in high-corruption countries, whereas technical assistance or subsidies for adoption of digital technologies have the highest impact in low corruption countries.

The results of this paper make several contributions. First, we contribute to the industrial policy literature and the general debate on governments' involvement in the private sector (Stigler, 1971; Stiglitz & Weiss, 1981) by showing that government interventions can be beneficial for firm-level outcomes in crisis times, such as the COVID-19 pandemic, but that this positive effect weakens in high corruption environments. Second, we contribute to the growing literature on the economic impact of the COVID-19 pandemic. Studies have found that the pandemic has affected different aspects of economic activity such as the labor market (Adams-Prassl *et al.*, 2020; Alfaro *et al.*, 2020a), the stock market (Albuquerque *et al.*, 2020; Alfaro *et al.*, 2020b; Baker *et al.*, 2020a; Fahlenbrach *et al.*, 2021), credit markets (Acharya & Steffen, 2020; Li *et al.*, 2020; Norden *et al.*, 2021; Beck & Keil, 2022; Berger *et al.*, 2022), household consumption (Baker *et al.*, 2020b; Coibion *et al.*, 2020) and the overall macroeconomy (Ludvigson *et al.*, 2020; Eichenbaum *et al.*, 2021; Guerrieri *et al.*, 2022). We contribute to this literature by revealing a channel through which the pandemic has impacted the private sector, namely the allocation of government support. Finally, we contribute to the literature on governments' disaster response in environments with weak institutions and high corruption. Corrupt governments are associated with high earthquake fatalities due to substandard construction practices (Anbarci *et al.*, 2005; Escaleras *et al.*, 2007). In such environments, politically connected firms can gain preferential treatment by governments through informal government-business relations (Fisman, 2001; Faccio *et al.*, 2006) which in turn impacts governments' ability to respond to disasters. We contribute to this literature by analyzing the impact of different types of government support policies on firm-level financial and real outcomes (as opposed to stock market reactions) and by showing that the allocation of government support and its effectiveness in a time of economic distress varies in different institutional environments.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature. Section 3 presents the data, variables and discusses descriptive statistics. Section 4 presents the methodology. Section 5 presents and discusses the results. Section 6 provides the implications of the results while Section 7 discusses the limitations of the study and provides directions for future research.

2. LITERATURE REVIEW

Theoretically, there are opposing views on whether government involvement in the private sector is beneficial for firm-level outcomes. Market failures traditionally associated with asymmetric information being available to firms and imperfect markets leading to higher financial costs and more generally the problem of incomplete markets (Greenwald & Stiglitz, 1986) have been the main rationale for government interventions. On the one hand, government subsidies provide firms with additional sources of funding helping them survive

and grow. When investing in activities that generate externalities firms making the investment are unlikely to bear the entire cost or benefit of such investments, therefore they will tend to invest below or above the socially optimal level. Another rationale for public subsidies lies in the fact that they may convey information to other potential investors. Information asymmetries may make raising capital (equity and debt) expensive or even impossible for entrepreneurs (Stiglitz & Weiss, 1981; Greenwald *et al.*, 1984; Myers & Majluf, 1984). Government subsidies help reduce these information asymmetries by sending a positive signal to market-based financiers thereby serving as a catalyst for external investments. In contrast, an extensive political economy and public finance literature has emphasized the distortions that may result from a biased distribution of government subsidies based on the private benefits of interest groups or politicians. As pointed out by Stigler (1971) and formally modeled by Peltzman (1976), the theory of regulatory capture suggests that subsidies will be captured by groups that aim to maximize their own benefits and whose collective political activity is not too difficult to arrange. According to rent-seeking viewpoints government subsidies are distributed based on social networks or political connections rather than firms' prospects or social contribution and as such they do not contribute to firm performance. Furthermore, the evolutionary view of market (Metcalfe, 1994; Georghiou & Metcalfe, 1998) argues that information costs are an integral part of the market and are necessary as a selection mechanism – for promoting the best firms.

Empirically, studies have examined the effect of different public subsidization programs on firm-level outcomes. Lerner (1999), examining the US Small Business Innovation Research program shows that program awardees grew significantly faster than matched firms and were more likely to attract venture financing. This implies that public subsidization of small firms plays an important role in certifying firm quality. In contrast, Bergstrom (2000) examined the effect of public capital subsidies on total factor productivity for a sample of firms in Sweden. The author finds little evidence of subsidies affecting productivity. Similarly, Lee (1996) and Beason and Weinstein (1996) both suggest that government intervention have negative effects on productivity growth. The aim of this study is to test which of these two opposing views holds in times of crisis, such as the COVID-19 pandemic, and if the effect is homogeneous across countries with different levels of institutional transparency.

Our paper is also related to the growing literature analyzing the impact of COVID-19 on different aspects of economic activity such as the labor market, the stock markets, the credit markets, household consumption and the overall macroeconomy. Regarding the impact of COVID-19 on firm-level outcomes, Fairlie and Fossen (2021) using administrative data from the California Department of Tax and Fee Administration document average losses in sales of 17% in the second quarter of 2020 relative to the second quarter of 2019, with the largest losses occurring in businesses affected by mandatory lockdowns such as accommodations. Furthermore, there is evidence that the effect of the pandemic has not been equal across firms. Ding *et al.* (2021) find that firms with better pre-pandemic finances – more cash, less debt and larger profits, less exposed to global supply chains, with more corporate social responsibility activities and less entrenched executives experience a milder drop in stock returns due to the pandemic. Liu et al. (2021) find that during the COVID-19 pandemic, women-led businesses are more likely to close and for a longer time compared to men-led businesses. These differences widen in developing countries and in countries with high gender inequalities. Hu and Zhang (2021) find that the COVID-19 pandemic has had a negative effect

on firm performance and that this negative effect weakens in countries with better institutions, better healthcare systems and more developed financial systems.

Furthermore, there is evidence suggesting that in high corruption environments public procurement contracts are more likely to have cost overruns, be awarded to campaign donors and exhibit inefficiencies (Gallego *et al.*, 2021). Kubinec *et al.* (2021) show that in countries with weak rule of law where politically connected firms are able to circumvent restrictions, policies designed to mitigate COVID-19 are ineffective. The effectiveness of government policies aimed at mitigating the negative consequences of COVID-19 has been mainly analyzed from the perspective of stock market reactions to different policy announcements. Shanaev *et al.* (2020) examining 51 national stock markets show that the direct effect of the pandemic on the financial markets is relatively low, while the most significant drivers of negative stock returns are policy interventions. Ashraf (2020) using daily data on stock market returns for 77 countries find that announcements of government social distancing measures have a direct negative effect on stock market returns whereas government announcements regarding public awareness programs, testing policies and income support packages result in positive market returns. Kong and Prinz (2020) using Google search data combined with data on the announcement dates of non-pharmaceutical interventions (NPIs) in US states between march 14 and march 28, 2020, find that restaurant and bar limitations and non-essential business closures can explain only 6% and 6.4% of unemployment claims implying that other factors are responsible for the increase in unemployment claims during the pandemic such as declines in consumer demand or local policies. To the best of our knowledge our paper is the first to test the allocation and effectiveness of different types of government support policies (wage subsidies, deferrals, subsidized credit, technical assistance, etc.) for a large cross-section of countries.

3. DATA

In order to test the two opposing views on governments' involvement in the private sector during times of economic distress such as the COVID-19 pandemic, we combine several data sources. The first data source is the most recent EBRD-EIB-WB Enterprise Survey which is a joint initiative of the European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB) and the World Bank Group (the World Bank). This survey was conducted in 2018-2020 and makes the sixth round of the Business Environment and Enterprise Performance Surveys (BEEPS)[1] covering almost 28,000 enterprises in 41 economies. The purpose of the survey is, through interviews with firms in the manufacturing and services sectors, to obtain feedback from enterprises in EBRD countries of operation (and beyond) on their perceptions of the environment in which they operate as well as the biggest obstacles to enterprise growth[2].

The second data source are the COVID-19 ES Follow-up Surveys. As part of the efforts of the World Bank Group to understand the impact of COVID-19 on the private sector, the Enterprise Analysis unit has conducted follow-up surveys on recently completed Enterprise Surveys (ES) in several countries. The follow-up surveys re-contact all establishments sampled in the standard ES and are designed to provide quick information on the adjustments brought about by COVID-19 in the private sector. The process of survey implementation is ongoing at the time of writing this paper. Table no. A1 lists the countries used in the sample, the number of follow-up surveys completed (out of three planned) and the date of their

completion. Out of the 41 countries in the baseline survey, 32 have at least one COVID-19 follow-up survey wave completed.

We supplement this data with the Oxford COVID-19 Government Response Tracker (OxCGRT) data introduced in Hale *et al.* (2021). This data collection effort provides a systematic way to track government responses to COVID-19 across countries over time. The data is combined in a number of indices that aggregate various measures of government responses. To account for the severity of the pandemic in different countries and over time we use the Johns Hopkins University Center for Systems Science and Engineering (JHU CSSE) database. Finally, the Transparency International Corruption Perception Index is used to categorize countries into the subsample of low and high corruption countries[3].

3.1 Pre-covid firm-level characteristics

To construct pre-COVID firm-level variables we use BEEPS VI. As we want to assess which type of firms are more likely to receive government support, we construct several firm variables such as: Firm size, Firm age, Foreign firm, Capital city, Political, Membership, Certified, KPI, Website, Manager experience, Informal competition and Innovative. The definition of all the variables is given in Table no. A2. Table no. 1 shows descriptive statistics for the whole sample (columns 1-5), as well as for the sample of low corruption countries (columns 6-7) and the sample of high corruption countries (columns 8-9), separately. The last column (10) reports mean differences of variables for the two subsamples of countries and their significance. Around 16% of firm observations in our sample are located in the capital city, have a mean age of 21 years and around 7% are foreign owned. Only 4.7% of firms have someone appointed to a political position in the country whereas 44% are members of a business support group.

3.2 Post-covid firm-level variables

As our goal is to assess the extent to which government support in response to the COVID-19 pandemic has impacted firm-level outcomes we construct several dependent variables using the ES COVID-19 Follow-up Surveys. As can be seen from Table no. 1, about 23.6% of firm observations in our sample have temporarily closed due to the COVID-19 outbreak. Table no. 2 shows mean values by countries. On average, Russia, Albania and Azerbaijan have the highest percentage of firms that closed temporarily due to the COVID-19 outbreak, 62.4%, 59.3% and 57.6%, respectively, whereas countries with the lowest percentage of temporarily closed firms are Hungary (6.6%), Latvia (7.1%) and Belarus (8.4%). Table no. 3 shows mean values by industries. Hotels and Restaurants and Air Transport industries have the highest percentage of firms that have closed temporarily, 50.4% and 45.5%, respectively. Industries which have the lowest number of temporarily closed firms are Recycling (13.5%), Radio, Television and Communication Equipment (14.1%) and Food Products and Beverages (14.4%). On average, 55% of firm observations report a decrease in their sales, about 16% report a decrease in the number of temporary workers and about 10% of firm observations report a reduction in sales, wages or benefits due to the COVID-19 outbreak. When looking at mean differences we find that the pandemic has had a stronger effect on firms in high corruption countries as indicated by significantly worse firm financial indicators in the sample of high corruption countries compared with the sample of low corruption countries.

Table no. 1 – Descriptive statistics[4]

	All countries					Low-corruption		High-corruption		Low-High Corruption
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Obs	Mean	Mean Diff
Government support	30,691	0.324	0.468	0	1	13,844	0.387	16,847	0.271	0.116***
Government support: Cash	30,691	0.117	0.321	0	1	13,844	0.168	16,847	0.075	0.093***
Government support: Deferral	30,691	0.091	0.288	0	1	13,844	0.099	16,847	0.085	0.014***
Government support: Credit	30,691	0.055	0.227	0	1	13,844	0.062	16,847	0.049	0.013***
Government support: Tax	30,691	0.109	0.312	0	1	13,844	0.096	16,847	0.119	-0.023***
Government support: Wage	30,691	0.254	0.435	0	1	13,844	0.290	16,847	0.225	0.066***
Government support: Digital	30,691	0.012	0.111	0	1	13,844	0.018	16,847	0.008	0.009***
Government support: Other	30,691	0.012	0.109	0	1	13,844	0.020	16,847	0.006	0.014***
Close temporarily	30,259	0.236	0.425	0	1	13,359	0.176	16,900	0.284	-0.108***
Sales decrease	30,672	0.555	0.497	0	1	13,836	0.485	16,836	0.612	-0.127***
Temporary workers decreased	29,896	0.159	0.366	0	1	13,592	0.124	16,304	0.188	-0.064***
Laid off (ln)	22,770	0.261	0.755	0	7.601	10,169	0.219	12,601	0.294	-0.075***
Salary reduced	19,132	0.104	0.305	0	1	9,019	0.088	10,113	0.118	-0.031***
Cash flow decreased	28,649	0.517	0.500	0	1	12,504	0.434	16,145	0.581	-0.147***
Delay landlords	28,497	0.134	0.341	0	1	12,861	0.113	15,636	0.152	-0.039***
Delay suppliers	30,995	0.249	0.432	0	1	13,848	0.214	17,147	0.277	-0.063***
Delay tax	30,982	0.130	0.337	0	1	13,838	0.094	17,144	0.160	-0.066***
Overdue	29,879	0.090	0.286	0	1	13,612	0.067	16,267	0.110	-0.043***
Insolvency	31,021	0.015	0.122	0	1	13,863	0.014	17,158	0.016	-0.002
Firm age (ln)	43,485	2.817	0.738	0	5.323	19,594	2.901	23,891	2.749	0.153***
Capital city	44,042	0.160	0.367	0	1	19,792	0.145	24,250	0.172	-0.027***
Firm size	43,713	1.740	0.778	1	3	19,580	1.713	24,133	1.762	-0.049***
Foreign firm	43,167	0.069	0.253	0	1	19,478	0.076	23,689	0.062	0.014***
Political	40,484	0.047	0.211	0	1	19,634	0.043	20,850	0.050	-0.007***
Membership	40,448	0.441	0.497	0	1	19,626	0.355	20,822	0.523	-0.168***
Manager experience (ln)	42,635	2.856	0.731	0	4.248	19,199	2.950	23,436	2.779	0.171***
Website	43,927	0.673	0.469	0	1	19,771	0.721	24,156	0.633	0.088***
KPI	40,397	0.457	0.498	0	1	19,606	0.446	20,791	0.467	-0.021***
Certified	42,918	0.304	0.460	0	1	19,456	0.316	23,462	0.294	0.022***
Competition informal	41,046	0.309	0.462	0	1	18,817	0.272	22,229	0.341	-0.068***
Innovative	43,704	0.270	0.444	0	1	19,696	0.312	24,008	0.235	0.077***
Exporter	31,056	0.133	0.340	0	1	13,492	0.152	17,564	0.119	0.033***
Online sales	29,764	6.075	16.370	0	100	13,100	6.484	16,664	5.753	0.731***
Remote work	30,956	4.777	14.639	0	100	13,605	5.848	17,351	3.936	1.911***
Female employees	30,229	38.204	28.643	0	100	13,131	38.597	17,098	37.903	0.694**
Pandemic severity	32	195.078	165.517	5.603	883.498	12	252.493	20	160.628	91.864***
Stringency index	29	58.894	11.327	31.48	77.439	12	57.207	17	60.086	-2.879***

Note: * indicates significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table no. 2 – Descriptive statistics by countries[5]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Baseline ES	Follow-up Wave 1	Follow-up Wave 2	Follow-up Wave 3
Countries	Corruption index	Government support	Close temporarily	Nr of firms	Nr of firms	Nr of firms	Nr of firms
Albania	35	0.391	0.593	377	344	/	/
Armenia	42	0.594	0.572	546	462	/	/
Azerbaijan	30	0.628	0.576	225	101	/	/
Belarus	45	0.053	0.084	600	563	/	/
Bosnia and Herzegovina	36	0.517	0.236	362	290	/	/
Bulgaria	43	0.184	0.143	772	673	630	596
Croatia	47	0.370	0.111	404	348	360	372
Cyprus	58	0.432	0.360	360	303	298	327
Czech Republic	56	0.470	0.147	502	439	472	475
Estonia	74	0.233	0.118	360	287	291	276
Georgia	56	0.358	0.282	581	501	482	/
Greece	48	0.533	0.144	600	575	565	584
Hungary	44	0.242	0.066	805	660	753	702
Italy	53	0.400	0.263	760	655	538	609
Jordan	48	0.157	0.536	601	498	448	368
Kazakhstan	34	0.125	0.463	1,446	961	/	/
Latvia	56	0.156	0.071	359	256	290	184
Lebanon	28	.	0.489	532	446	401	/
Lithuania	60	0.462	0.245	358	213	228	233
Malta	54	0.634	0.128	242	231	237	222
Moldova	32	0.037	0.275	360	284	291	246
Mongolia	35	0.184	0.494	360	284	235	/
Montenegro	45	0.526	0.296	150	136	/	/
Morocco	41	0.245	0.353	1096	810	762	774
North Macedonia	35	0.364	0.219	360	292	246	/
Poland	58	0.395	0.112	1,369	975	1018	983
Portugal	62	0.280	0.125	1,062	823	889	915
Romania	44	0.260	0.113	814	599	611	600
Russian Federation	28	0.100	0.624	1,323	1161	/	/
Serbia	39	0.843	0.176	361	345	/	/
Slovak Republic	50	0.468	0.232	429	372	352	355
Slovenia	60	0.561	0.250	409	269	287	234

Our main independent variable is Government Support which takes the value 1 if establishments answered yes to the question "Has this establishment received any national or local government support in response to the crisis?" On average, 32% of firm observations in our sample have received government support. There is a large cross-country variation, with firms in Serbia, Malta and Azerbaijan having the highest percentage of firms receiving government support, 84.3%, 63.4% and 62.8%, respectively, whereas firms in Moldova and Belarus having the lowest percentages, 3.7% and 5.3%, respectively. In terms of the prevalence of government support by industries, Table no. 3 shows that the highest percentage of firms receiving government support is in the Air Transport industry (which is also the industry that was hit the hardest by the COVID-19 pandemic as shown by the percentage of firms temporarily closed) where about 73% of firms received government support, followed by the Hotels and Restaurants industry with 56%.

In order to better understand the type of government support received, we decompose the Government Support variable into the type of support received, namely: Cash if the support involved cash transfers for businesses, Deferral if the support involved deferral of credit payments, utility bills, rent or mortgage, suspension of interest payments or rollover of debt, Credit for access to new credit, Tax for tax reductions or tax deferrals, Wage if government support was in the form of wage subsidies, Digital if the support involved technical assistance or subsidies for adoption of digital technologies and Other for all remaining forms of government support measures such as childcare support, compensation for rent, vouchers, sick leave, downtime allowance for employees, and other similar forms of assistance. As can be seen from Table no. 1, the most prevalent form of government assistance is in the form of wage subsidies (25% of firm observations report receiving this type of government support), followed by cash transfers (with 12%) and tax reductions or deferrals (with 11%). When looking at the differences between high and low corruption countries we find that in low corruption countries a higher percentage a firms receive government support.

Table no. 3 – Descriptive statistics by industries[6]

Industry	(1) Government support	(2) Close temporarily	(3) Laidoff
Air transport	0.727	0.455	38.250
Basic metals	0.390	0.202	6.930
Chemicals and chemical products	0.275	0.218	1.570
Coke, refined petroleum products and nuclear fuel	0.217	0.227	1.435
Computer and related activities	0.312	0.171	1.598
Construction	0.247	0.240	3.173
Electrical machinery and apparatus	0.329	0.192	2.076
Fabricated metal products	0.320	0.160	1.605
Food products and beverages	0.282	0.144	2.405
Furniture, n.e.c.	0.369	0.276	3.837
Hotels and restaurants	0.560	0.504	4.680
Land transport	0.323	0.182	3.379
Machinery and equipment	0.309	0.165	2.444
Medical, precision and optical instruments	0.343	0.188	1.895
Motor vehicles, trailers and semi-trailers	0.425	0.199	4.671
Office, accounting and computing machinery	0.294	0.316	4.294
Other non-metallic mineral products	0.234	0.341	2.184

Industry	(1) Government support	(2) Close temporarily	(3) Laidoff
Other transport equipment	0.324	0.191	2.297
Paper and paper products	0.373	0.188	1.765
Post and telecommunications	0.203	0.213	1.284
Publishing, printing and reproduction of recorded media	0.437	0.307	2.054
Radio, television and communication equipment	0.380	0.141	4.058
Recycling	0.329	0.135	1.551
Retail trade	0.315	0.269	2.493
Rubber and plastics products	0.317	0.194	2.630
Sale, maintenance and repair of motor vehicles	0.323	0.212	1.145
Supporting and auxiliary transport activities	0.464	0.221	3.654
Tanning and dressing of leather	0.405	0.423	13.224
Textiles	0.372	0.248	8.175
Tobacco products	0.231	0.385	0.000
Water transport	0.381	0.250	2.450
Wearing apparel	0.326	0.363	11.339
Wholesale trade and commission trade	0.301	0.249	3.124
Wood	0.305	0.198	1.728
Total	**0.324**	**0.236**	**3.231**

The ES COVID-19 Follow-up Surveys also asked firms a number of questions regarding their sales, production, labor force and finances. We construct a number of control variables that are expected to influence our dependent firm-level outcomes, such as Exporter, Online sales, Remote work and Female employees. About 13% of firm observations in our sample are categorized as exporters. On average, only 6% of firms' total sales are online sales, 4.7% of firms' workforce work remotely and about 38% of full-time employees of a firm are female. These variables vary by survey waves and can therefore be included in the fixed effects regressions described in the following section.

3.3 Country-level variables

We use the Stringency Index from the Oxford COVID-19 Government Response Tracker (OxCGRT). This index is comprised of nine component indicators including: school closing, workplace closing, cancelling public events, restrictions on gatherings, closing of public transport, stay at home requirements, restrictions on internal movement, restrictions on international travel and the presence of public info campaigns. The index is calculated as simple average of the individual component indicators. Because the individual indicators have different maximum values they are rescaled to create a score between 0 and 100. These scores are then averaged to get the composite index. The indices should not be interpreted as a measure of the effectiveness or appropriateness of a government's response rather a way for simple and efficient cross-national comparisons of government interventions. We lag the Stringency Index by one period (wave) to allow for government responses to affect firm behavior.

The variable Pandemic severity is from the JHU CSSE database and represents the number of new confirmed COVID-19 cases per day per million people. It is important to note that due to delays in reporting the reported case figures on a given date do not necessarily show the number of new cases on that day. As this data is reported daily, we match by date

with the ES COVID-19 Follow-up Surveys which also record the day the interview was conducted. As with the Stringency Index variable we lag this variable by one period (wave) in the regression analyses.

As our goal is to evaluate the relation between government support and firm-level outcomes in countries with different levels of corruption we use the 2019 Transparency International Corruption Perception Index to categorize countries into the sub-sample of low-corruption and high-corruption countries. The index ranges from 0 to 100 with higher values indicating less corrupt countries. Among the countries included in our sample, countries like Estonia, Portugal, Lithuania, have the lowest level of perceived corruption, with scores of 74, 62 and 60 respectively. Whereas countries with the highest level of perceived corruption are Russia (28), Lebanon (28) and Azerbaijan (30).

4. METHODOLOGY

We start the empirical analysis by examining if some types of firms are more likely to receive government support compared to others, by estimating the following equation:

$$Government\ support_{ijkt} = \alpha_1 + \beta_1 Firm\ type_{ijk} + \beta_2 L.Pandemic\ severity_{kt} + \varepsilon_{ijkt} \quad (1)$$

where, *ijkt* denote firm, country, industry and time (month-year), respectively. *Government support* is the dummy variable indicating whether the firm received government support at time *t*. *Firm type* are firm characteristics such as *Firm size, Firm age, Foreign firm, Capital city, Political, Membership, Certified, KPI, Website, Manager experience, Informal competition* and *Innovative*. The definition of all the variables is given in Table no. A2. These variables are constructed from the baseline ES (BEEPS VI) and capture firm characteristics before the start of the pandemic. As such, they do not vary across the three follow-up waves therefore do not carry the time (month-year) subscript. *Pandemic severity* as measured by the number of new confirmed COVID-19 cases per day per million people accounts for the severity of the pandemic across countries and over time. We lag this variable by one period (survey wave). By including country and industry fixed effects in equation (1) we compare firms from the same country and industry to determine which firm characteristics are significantly correlated with the probability of receiving government support. In addition, time fixed effects control for trends or factors common to all firms that evolve over time. We estimate the equation using OLS and cluster the standard errors by industry[7].

Next, we evaluate the impact of government support on various firm-level outcomes. We exploit the panel structure of the data to isolate more precisely the effect of government support on various firm-level outcomes by estimating a fixed effect model. In addition, we allow for a one period (wave) time-lag in determining the effect of receiving government support. The specification we test is the following:

$$Firm-level\ outcome_{ijkt} = \alpha_1 + \beta_1 L.Government\ Support_{ijkt} + \beta_2 Firm\ controls_{ijkt} + \beta_3 L.Pandemic\ severity_{kt} + \beta_4 L.Stringency\ index_{kt} + \varepsilon_{ijkt} \quad (2)$$

where, *Firm-level outcome* of firm *i*, in country *j*, industry *k* and time (month-year) *t*, is one of the outcome variables described above: *Close temporarily, Sales decrease, Temporary workers decreased, Laidoff, Salary reduced, Cash flow decrease, Delay suppliers, Delay landlords, Delay tax, Overdue* and *Insolvency*. *Government support* is the dummy variable indicating a firm that received government support in response to the COVID-19 crisis. Using the lag of this variable addresses the potential reverse causality problem. However, there may still be an endogeneity concern coming from selection bias. Government support may not be randomly allocated across firms, which may bias the results we find. Indeed, from estimating equation (1) we find that certain firm characteristics are significantly associated with the probability of receiving government support. The panel structure of the data allows us to use firm fixed effects, thereby absorbing all time-invariant firm heterogeneity. As the time period we are analyzing is relatively short, the within-firm heterogeneity is likely to be time-invariant. By comparing the same firm over time, we help to alleviate endogeneity concerns coming from selection bias. To absorb any remaining time varying heterogeneity within firms we include *Firm controls* which are time-varying firm characteristics. Specifically, we include the variables *Exporter, Online sales, Remote share* and *Female employees*. There is evidence that exporting firms have been disproportionately hit by the pandemic through disruptions in global supply chains and export demand shocks (Bosio *et al.*, 2020; Dai *et al.*, 2021; Liu *et al.*, 2021a). Furthermore, firms in industries more suitable for remote work report less productivity loss (Bartik *et al.*, 2020) and are less likely to cut jobs (Alfaro *et al.*, 2020a). Research also shows that women are more affected by the COVID-19 pandemic (Adams-Prassl *et al.*, 2020; Fairlie, 2020; Liu *et al.*, 2021b). *Pandemic severity* represents the number of new confirmed cases per million people. The coefficient of this variable is intended to capture the direct impact of the pandemic on firm-level outcomes. *Stringency index* measures government policies with regards to social distancing measures and lockdown policies. These variables are also lagged by one period (survey wave).

To understand the effect of corruption on the relation between government support and firm-level outcomes we estimate the equations above separately for the subsample of low-corruption and high-corruption countries[8]. Furthermore, in equation (2) we decompose the *Government Support* variable into types of government support received, namely, cash transfers (*Cash*), deferral of financial obligations (*Deferral*), access to new credit (*Credit*), tax reductions or deferrals (*Tax*), wage subsidies (*Wage*), technical assistance (*Digital*) and other forms of government support (*Other*). We estimate the equation using OLS with standard errors clustered by industry.

5. RESULTS AND DISCUSSION

5.1 Which firms are more likely to receive government support?

Table no. 4 presents the results from estimating equation (1). Columns 1-3 restrict the sample to low corruption countries, whereas columns 4-6 show the results for the sample of high corruption countries. In low corruption countries, larger firms, firms that are member of a business support group and innovative firms are 3.2, 3.9 and 1.8 percentage points (p.p.) more likely to receive government support, respectively. These factors do not seem to be as important for the sample of high corruption countries. Instead, in these countries firms that

compete against unregistered establishments, those with lack of internationally recognized quality certification and no formal business strategy with written key performance indicators are more likely to receive government support. Finally, pandemic severity as measured by the number of new confirmed COVID-19 cases per million people positively affects the probability of receiving government support in the sample of low corruption countries but has a negative and significant effect on the sample of high corruption countries.

Table no. 4 – Determinants of government support[9]

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.: Government support	**Low-corruption countries**			**High-corruption countries**		
Firm age	0.008	0.008		-0.007	-0.011	
	(0.009)	(0.012)		(0.006)	(0.011)	
Capital city	0.021	0.033		0.005	0.016	
	(0.024)	(0.026)		(0.015)	(0.020)	
Firm size	0.039***	0.032***		0.019*	0.004	
	(0.008)	(0.009)		(0.011)	(0.014)	
Foreign firm	0.011	-0.004		-0.017	0.020	
	(0.023)	(0.026)		(0.040)	(0.050)	
Political	0.002	-0.012		0.017	0.039	
	(0.014)	(0.019)		(0.020)	(0.025)	
Membership	0.038***	0.039***		0.014	0.030**	
	(0.012)	(0.013)		(0.009)	(0.013)	
Manager experience	-0.002	0.005		0.000	-0.009	
	(0.011)	(0.013)		(0.007)	(0.008)	
Website	0.023*	0.019		0.018*	0.019	
	(0.013)	(0.013)		(0.009)	(0.012)	
Key Performance Indicators	-0.008	-0.005		-0.013**	-0.012	
	(0.015)	(0.017)		(0.006)	(0.013)	
Certified	-0.027*	-0.032		-0.034***	-0.035**	
	(0.014)	(0.019)		(0.009)	(0.016)	
Competition informal	0.013	0.015		0.028***	0.034**	
	(0.014)	(0.013)		(0.009)	(0.013)	
Innovative	0.017*	0.018**		0.012	0.003	
	(0.010)	(0.008)		(0.009)	(0.014)	
L.Pandemic severity		0.000**	0.000		-0.000	-0.000***
		(0.000)	(0.000)		(0.000)	(0.000)
Constant	0.115*	0.069	0.380***	0.234***	0.241***	0.249***
	(0.066)	(0.089)	(0.033)	(0.056)	(0.033)	(0.021)
Country FE	yes	yes	no	yes	yes	no
Industry FE	yes	yes	no	yes	yes	no
Time FE	yes	yes	yes	yes	yes	yes
Firm FE	no	no	yes	no	no	yes
Observations	12100	6806	7779	12626	5204	7260
R-sq	0.111	0.099	0.014	0.213	0.188	0.028

Note: * indicates significance at the 10% level, ** at the 5% level and *** at the 1% level.

5.2 The impact of government support on firm-level outcomes

In this section we discuss the results from estimating equation (2). In general, Table no. 5, shows that the effect of receiving government support is more positive in low-corruption countries (Panel A), compared to the effects found in high-corruption countries (Panel B). In terms of types of government support received we find that technical assistance or subsidies for adoption of digital technologies have a greater impact on firm-level outcomes in low corruption countries, whereas wage subsidies have a greater impact in high-corruption countries. Firms receiving government support for the adoption of digital technologies in the current period are 36.6 percentage points (p.p.) less likely to temporarily close their business in the subsequent period in low-corruption countries compared to a 18.6 p.p. probability reduction in high-corruption countries. In addition, these firms are 19.4 p.p., 21.3 p.p. and 15.3 p.p. less likely to reduce the number of temporary workers, to lay off workers and reduce the salary, wage or benefit of existing permanent full-time employees, respectively. These coefficients are insignificant for the sample of high-corruption countries. Furthermore, firms receiving technical assistance are 38.9 p.p., 52.2 p.p. and 37.1 p.p. less likely to delay payments to their landlords, suppliers and tax authorities, respectively, and 19.5 p.p. less likely to file for insolvency or bankruptcy. Again, these coefficients are insignificant (or are positive) for the sample of high corruption countries. In contrast, wage subsidies are the most effective type of government support in high corruption countries. In these countries firms receiving wage subsidies are 3 p.p. less likely to temporarily close, and 5.7 p.p. and 4.4 p.p. less likely to report a decrease in sales and in the number of temporary workers, respectively. In addition, these firms are 5.7 p.p., 2.9 p.p. and 2.3 p.p. less likely to report a decrease in liquidity or cash flow, to delay payments to tax authorities and to become overdue on financial obligations, respectively. The least effective forms of government assistance are tax reductions or deferrals and access to credit. With regards to cash transfers and deferrals of obligations we find that in high corruption countries firms that received cash transfers had a higher probability of closing temporarily, of delaying payments to landlords and of being overdue on its obligations to financial institutions but less likely to report a decrease in the number of temporary workers. In addition, firms that received government support in the form of deferral of financial obligations are less likely to temporarily close but more likely to report a decrease in sales and delays in payments towards tax authorities. In low corruption countries the effects of cash subsidies and subsidies in the form of deferral are generally positive and never worsen firm-level outcomes as is the case in high corruption countries.

Table no. 5 – The impact of government support on firm-level outcomes [10]

Panel A: Low-corruption countries											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Dependent variable:	**Close temporarily**	**Sales decrease**	**Temporary workers decreased**	**Laidoff**	**Salary reduced**	**Cash flow decrease**	**Delay landlords**	**Delay suppliers**	**Delay tax**	**Overdue**	**Insolvency**
L.Governmemt support: Cash	0.005	-0.036*	-0.011	-0.023	-0.015	-0.018	-0.017	-0.051**	0.001	-0.017*	0.004
	(0.015)	(0.018)	(0.015)	(0.014)	(0.014)	(0.015)	(0.016)	(0.020)	(0.012)	(0.008)	(0.003)
L.Governmemt support: Defferal	0.004	-0.003	-0.007	-0.036	0.005	0.013	-0.049**	-0.019	-0.053***	-0.026*	-0.025***
	(0.019)	(0.021)	(0.018)	(0.040)	(0.013)	(0.025)	(0.020)	(0.022)	(0.009)	(0.014)	(0.009)
L.Governmemt support: Credit	-0.023	-0.042	-0.029	0.024	-0.012	-0.025	0.003	0.015	-0.005	-0.001	-0.012
	(0.016)	(0.031)	(0.022)	(0.039)	(0.030)	(0.046)	(0.030)	(0.032)	(0.013)	(0.014)	(0.009)
L.Governmemt support: Tax	-0.002	-0.026	0.002	0.013	0.004	0.007	-0.001	0.014	-0.013	0.011	0.017*
	(0.027)	(0.038)	(0.023)	(0.030)	(0.022)	(0.027)	(0.020)	(0.033)	(0.017)	(0.019)	(0.009)
L.Governmemt support: Wage	-0.082***	-0.032	0.003	0.022	0.009	-0.057**	-0.024**	-0.019	-0.007	-0.006	0.005
	(0.023)	(0.026)	(0.019)	(0.018)	(0.007)	(0.022)	(0.011)	(0.016)	(0.013)	(0.006)	(0.004)
L.Governmemt support: Digital	-0.366***	0.030	-0.194***	-0.213*	-0.153***	-0.142	-0.389***	-0.522***	-0.371***	-0.102	-0.195***
	(0.055)	(0.111)	(0.062)	(0.122)	(0.053)	(0.101)	(0.073)	(0.057)	(0.075)	(0.070)	(0.058)
L.Governmemt support: Other	-0.011	0.014	-0.008	0.053	0.077**	-0.023	-0.074*	-0.097	-0.066**	-0.033	-0.011***
	(0.039)	(0.069)	(0.044)	(0.071)	(0.033)	(0.054)	(0.041)	(0.064)	(0.029)	(0.024)	(0.004)
Exporter	0.011	-0.072*	0.008	-0.014	0.007	-0.030	-0.036	-0.012	-0.000	-0.014	0.008
	(0.027)	(0.040)	(0.024)	(0.046)	(0.027)	(0.040)	(0.052)	(0.047)	(0.010)	(0.014)	(0.006)
Online sales	-0.001***	-0.000	0.000	0.002***	0.001***	0.000	0.000	-0.000	-0.000	0.000	0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Remote work	0.000	0.000	-0.000	0.001	-0.000	-0.000	-0.000	-0.001	0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Female employees	0.001**	0.000	0.000	0.002**	0.001**	-0.000	0.000	-0.001	0.000	0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
L.Pandemic severity	-0.000	0.000	0.000	0.000	0.000	0.000	0.000***	0.000	0.000**	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L.Stringency index	-0.002***	0.002*	0.001	-0.000	-0.001**	0.001	0.001**	0.002***	-0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Constant	0.273***	0.141	0.099**	0.020	0.074	0.200	-0.039	0.026	0.022	-0.010	0.007
	(0.046)	(0.141)	(0.039)	(0.121)	(0.054)	(0.135)	(0.043)	(0.080)	(0.032)	(0.034)	(0.008)
Firm FE	yes	yes	yes	yes	Yes	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	6722	6899	6852	6669	6880	6914	6193	6915	6908	6817	6905
R-sq	0.101	0.180	0.028	0.022	0.065	0.148	0.090	0.062	0.092	0.016	0.114

Note: * indicates significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table no. 5 – The impact of government support on firm-level outcomes (*continued*)

Panel B: High-corruption countries											
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Dependent variable:	**Close temporarily**	**Sales decrease**	**Temporary workers decreased**	**Laidoff**	**Salary reduced**	**Cash flow decrease**	**Delay landlords**	**Delay suppliers**	**Delay tax**	**Overdue**	**Insolvency**
L.Governmemt support: Cash	0.052*	0.014	-0.081***	-0.061	-0.022	0.014	0.043**	-0.048	-0.014	0.060***	0.001
	(0.028)	(0.035)	(0.018)	(0.037)	(0.022)	(0.035)	(0.018)	(0.029)	(0.022)	(0.020)	(0.004)
L.Governmemt support: Defferal	-0.039**	0.084**	0.018	-0.075	-0.023	0.042	-0.034	0.032	0.046*	0.011	-0.000
	(0.018)	(0.033)	(0.029)	(0.069)	(0.026)	(0.027)	(0.033)	(0.027)	(0.024)	(0.016)	(0.001)
L.Governmemt support: Credit	0.029	-0.017	0.021	-0.045	-0.015	-0.013	-0.001	0.052**	-0.010	0.021	0.001
	(0.030)	(0.042)	(0.020)	(0.051)	(0.032)	(0.050)	(0.022)	(0.025)	(0.029)	(0.020)	(0.001)
L.Governmemt support: Tax	-0.018	0.019	0.023	0.067	0.019	0.031	0.004	0.012	-0.053**	-0.015	0.000
	(0.025)	(0.039)	(0.027)	(0.053)	(0.018)	(0.037)	(0.021)	(0.041)	(0.021)	(0.021)	(0.001)
L.Governmemt support: Wage	-0.030**	-0.057**	-0.044***	-0.017	0.013	-0.057*	-0.011	-0.019	-0.029**	-0.023**	-0.000
	(0.011)	(0.024)	(0.014)	(0.031)	(0.012)	(0.029)	(0.011)	(0.025)	(0.012)	(0.010)	(0.002)
L.Governmemt support: Digital	-0.186**	0.137	-0.083	0.006	-0.117	0.049	0.128*	0.109	0.148	-0.275**	0.000
	(0.086)	(0.166)	(0.082)	(0.108)	(0.081)	(0.167)	(0.069)	(0.086)	(0.089)	(0.127)	(0.001)
L.Governmemt support: Other	-0.052	0.041	0.058	-0.003	-0.012	-0.044	-0.009	0.042	-0.000	0.004	0.001
	(0.036)	(0.058)	(0.078)	(0.075)	(0.060)	(0.054)	(0.024)	(0.051)	(0.046)	(0.017)	(0.001)
Exporter	0.004	-0.008	0.029	0.041	0.017	0.025	0.010	0.004	0.040	0.022	-0.008
	(0.021)	(0.028)	(0.021)	(0.060)	(0.022)	(0.030)	(0.025)	(0.025)	(0.027)	(0.025)	(0.006)
Online sales	0.000	-0.001	-0.003***	-0.005***	-0.001**	0.001*	-0.000	-0.002***	-0.002**	-0.001***	-0.000
	(0.001)	(0.001)	(0.000)	(0.002)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
Remote share	0.000	0.001	0.000	0.000	0.002*	-0.001	0.001	0.002**	0.002***	0.000	-0.000
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Female employees	0.000	0.000	-0.001**	-0.003*	-0.000	0.000	-0.000	-0.001	0.000	-0.000	-0.000
	(0.000)	(0.001)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
L.New cases	-0.000*	-0.000	-0.000	-0.000	-0.000	0.000	0.000*	0.000**	0.000***	0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L.Stringency index	0.001*	0.002	0.001**	-0.003*	-0.001	0.003***	0.002***	0.001	0.003***	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Constant	0.206*	0.619***	-0.051	0.843***	0.288***	0.406***	-0.074	0.141	-0.236**	-0.033	0.005
	(0.102)	(0.156)	(0.098)	(0.167)	(0.068)	(0.145)	(0.079)	(0.093)	(0.106)	(0.069)	(0.010)
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	6475	6672	6560	6657	6668	6668	6284	6693	6693	6509	6650
R-sq	0.033	0.129	0.049	0.031	0.018	0.099	0.041	0.024	0.053	0.042	0.006

Note: * indicates significance at the 10% level, ** at the 5% level and *** at the 1% level.

There are also important differences with regards to lockdown and social distancing policies and the direct effect of the pandemic on firm-level outcomes in the two subsamples of countries. In low corruption countries stricter social distancing policies decrease the probability of the establishment temporarily closing, whereas in high corruption countries this probability increases. Furthermore, in high-corruption countries stricter social distancing policies increase the probability of firms reporting a decrease in temporary workers. Whereas, in both sample of countries, a negative effect is found on financial outcomes such as delaying payments towards landlords, suppliers, or tax authorities. It seems like social distancing policies have a relatively more positive effect on firm-level outcomes in low corruption countries most likely because the enforcement of these measures is stricter in these countries. With regards to the coefficients on the pandemic severity they are generally positive and significant indicating an adverse direct impact of the pandemic on firm-level outcomes, more so for high-corruption countries. In these countries, which generally have less effective systems in place to manage crisis and a weaker health system, unable to deal with the increasing number of emergencies, firms are more affected in the form of hours lost due to workforce exposure to the pandemic or a general decline in the propensity to consume by customers (and an increase in precautionary savings) which is reflected in firm financial outcomes such as delay in payments to landlords, suppliers, tax authorities or financial institutions. What is interesting to note here is that the probability of firms temporarily closing and filing for insolvency or bankruptcy decreases with the pandemic severity in high corruption countries which is not the case in the sample of low corruption countries. This, coupled with the results of worsened financial outcomes as a direct impact of the pandemic points to undue forbearance and evergreening in high-corruption countries by allowing unviable firms extend their life beyond what is economically feasible.

With regards to control variables, we find that the *Exporter* variable does not enter significantly in any of the regressions. The *Online sales* variable generally improves firm-level outcomes in high corruption countries while for low corruption countries the effect is less conclusive. *Remote share* worsens firm outcomes in high corruption countries whereas it is insignificant in the sample of low corruption countries. The variable *Female* enters negatively and significantly in the regressions of high corruption countries for the outcome variables *Temporary workers decreased* and *Laidoff* indicating that in these countries firms with a higher percentage of permanent full-time employees are less likely to reduce the number of temporary and full-time workers. In contrast, for the sample of low corruption countries the coefficient of *Female* on the outcome variable *Laidoff* is positive and significant.

Overall, these results point to a differential effect of government support on firm-level outcomes in different institutional environments. The positive effect of government support policies is more pronounced in low-corruption countries. Furthermore, the type of government support received is important for determining the effectiveness of policies. Measures aimed at improving the liquidity of firms produce better results in high corruption countries, whereas those intended to provide technical and digital assistance are more effective for firms in low corruption countries. With regards to lockdown and social distancing policies, results show that they produce relatively better results in low corruption countries with stronger systems in place to ensure enforcement of such policies. Finally, the direct impact of the pandemic is stronger and more negative in high-corruption countries whose health systems are generally less able to respond in a timely and effective manner to emergencies arising from the rapid spread of the contagious disease.

6. IMPLICATIONS

The COVID-19 pandemic, which started as a health crisis but quickly turned into an economic crisis, triggered widespread reactions from governments around the world. The results of this paper support theories predicting a positive effect of governments' involvement in the private sector in times of economic distress such as the COVID-19 pandemic. Our findings echo the argument put forward by Stiglitz (2021) that pure market forces cannot address problems created by the nature of the contagious disease such as externalities and the absence of markets for risk. Our findings are in line with previous empirical studies which find a positive effect of various subsidy programs on firm-level outcomes in normal times (Lerner, 1999; Moffat, 2014; Criscuolo *et al.*, 2019). In times of crisis, when the need for social protection and regulation grows, this involvement becomes even more valuable. However, our results also support studies which find that in environments with weak institutions and high corruption governments' ability to respond to disasters is diminished due to inefficient practices (Anbarci *et al.*, 2005; Escaleras *et al.*, 2007; Gallego *et al.*, 2021) and giving preferential treatment to politically connected firms (Fisman, 2001; Faccio *et al.*, 2006; Kubinec *et al.*, 2021).

Our findings have important policy implications. During a global pandemic when there is an urgent need for investing public funds in sectors that have suffered the most from the COVID-19 outbreak and for undertaking other closure and containment measures, special attention should be paid to the institutional context of disbursing aid and implementing these policies. Not all types of government support measures and stringency levels of social distancing policies are effective in every institutional environment. Wage subsidies, for instance, were found to be more effective for improving firm-level outcomes in the sample of high-corruption countries whereas technical assistance or subsidies for adoption of digital technologies were found to be more effective in the sample of low corruption countries. To the best of our knowledge, the results of this paper provide the first evidence on the impact of different types of government subsidies on firm-level financial and real outcomes for a large cross-section of countries during a global pandemic. We believe these results will help policymakers respond more effectively to mitigate the economic consequences of the pandemic by tailoring specific policies depending on the institutional context of implementing them. The results of the paper also call for a coordinated effort to maintain and enhance control and accountability systems in times of crisis if subsidies are to be allocated to its most productive uses.

7. LIMITATIONS AND FUTURE RESEARCH

The results of this paper should be interpreted having some caveats in mind. First, as with every cross-country study, establishing causality is difficult as countries differ on a number of different dimensions, some of which difficult to quantify. While the empirical analysis ensures accounting for problems such as reverse causality, selection bias and unobserved heterogeneity at the firm level, we are careful not to make any causal statements regarding corruption driving the differences we find between the subsample of low and high corruption countries. Our results provide suggestive evidence that the effect of government subsidies on firm-level outcomes is not homogeneous across groups of countries which share similar institutional characteristics such as the level of transparency, as measured by the Corruption Perceptions Index. Second, using survey data raises the question of the bias caused by self-reporting. Concerns regarding the quality of data can never be completely eliminated in empirical work. Accounting data for instance, also suffer from quality issues due to the quality of the auditing process which can vary across countries. We

do not believe self-reporting to be a major problem with our analysis as the questions we use are not of a sensitive nature. Third, attrition rate can be another source of bias in empirical work using panel data. To this end we have presented the number of firms participating in the baseline survey and the follow-up surveys to give a picture of the extent of this bias. As can be seen from Table no. 2 (columns 4-7) the response rate varies by countries, however on average about 75% of firms from the baseline survey were followed up in the first round of the COVID-19 Follow-up surveys.

The results of this paper could be extended in several directions. First, as more data become available it would be informative to go beyond examining the incidence of receiving government subsidies. Namely, examining how the quantity of subsidies received impacts firm-level outcomes would allow gaining insights on the optimal amount of government subsidies and any non-linear relations that may exist between government subsidies and firm performance measures. Second, the richness of the survey data could be further explored by analyzing if the effect of government subsidies on firm performance varies by different types of firms such as family businesses, foreign firms, certified, innovative or other firm types. This would allow fine-tuning government support policies depending on the structure of the firm population and facilitate the post-pandemic economic recovery. We leave these questions for future research.

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ANNEXES

Table no. A1 – Date of completion of ES COVID-19 Follow-up Surveys

Countries	ES Follow-up Survey COVID-19 Impact		
	Round 1	Round 2	Round 3
Albania	June 2020	/	/
Armenia	June 2020	/	/
Azerbaijan	April-May 2021	/	/
Belarus	August 2020	/	/
Bosnia and Herzegovina	February-March 2021	/	/
Bulgaria	July-September 2020	November-December 2020	April-May 2021
Croatia	September 2020	December-January 2020-2021	May-June 2021
Cyprus	June 2020	November-December 2020	April 2021
Czech Republic	September-October 2020	January-February 2021	May-June 2021
Estonia	October 2020	February 2021	July-August 2021
Georgia	June 2020	October-November 2020	
Greece	June-July 2020	November 2020	April-May 2021
Hungary	September 2020	January-February 2021	May-June 2021
Italy	May-June 2020	November-December 2020	April-May 2021
Jordan	July-August 2020	November-January 2020-2021	June-July 2021
Kazakhstan	January-March 2021	/	/
Latvia	October-November 2020	February 2021	July-August 2021
Lebanon	November-December 2020	May-June 2021	/
Lithuania	October 2020	February 2021	July-August 2021
Malta	September-October 2020	January 2021	May-June 2021
Moldova	May 2020	October-November 2020	May-June 2021
Mongolia	August 2020	February 2021	/
Montenegro	February 2021	/	/
Morocco	July-August 2020	February 2021	May-June 2021
North Macedonia	October-November 2020	May-June 2021	/
Poland	July-August 2020	November-December 2020	May-June 2021
Portugal	September-October 2020	January-February 2021	May-June 2021
Romania	August-September 2020	November-December 2020	April-June 2021
Russian Federation	June 2020	/	/
Serbia	February 2021	/	/
Slovak Republic	September-October 2020	January-February 2021	May-June 2021
Slovenia	July-August 2020	November-December 2020	May-June 2021

Table no. A2 – Variable definitions

Variable name	Definition
BEEPS VI	
Firm size	Permanent, full-time workers at the end of last fiscal year, 1=small (<20), 2=medium (>=20 & <100), 3=large (>=100).
Firm age	Year of survey minus year establishment began operations.
Foreign firm	=1 if the percentage of the firm owned by private foreign individuals, companies or organizations is greater than 50
Capital city	=1 if the firm is located in the capital city
Political	=1 if the owner, CEO, top manager or any of the board members of this firm has ever been elected or appointed to a political position in the country

Variable name	Definition
BEEPS VI	
Membership	=1 if the firm is part of business membership organization, trade association, guild, chamber of commerce or other business support group
Certified	=1 if establishment has an internationally recognized quality certification
KPI	=1 if the firm has formalized, written business strategy with clear key performance indicators
Website	=1 if establishment has its own website
Manager experience	Years of experience of the top manager working in the sector
Informal competition	=1 if establishment competes against unregistered establishments
Innovative	=1 if during the last three years, the establishment has introduced new or improved products or services
ES COVID-19 Follow up surveys	
Close temporarily	=1 if establishment closed temporarily (suspended services or production) due to the COVID-19 outbreak
Sales decrease	=1 if establishment's sales for last completed month decreased compared with the same month in 2019/2020
Temporary workers decreased	=1 if the total number of this establishment's temporary workers decreased since previous round month
Laidoff	How many workers have been laid off due to the COVID-19 outbreak?
Salary reduced	=1 if establishment reduced the salary, wages or benefits of permanent full-time employees due to the COVID-19 outbreak
Cash flow decrease	=1 if establishment's liquidity or cash flow has decreased since previous round month due to the COVID-19 outbreak.
Delay landlords	=1 if establishment delayed payments due to the COVID-19 outbreak for more than one week (excluding payments postponed following current regulation) to its landlords
Delay suppliers	=1 if establishment delayed payments due to the COVID-19 outbreak for more than one week (excluding payments postponed following current regulation) to its suppliers
Delay tax	=1 if establishment delayed payments due to the COVID-19 outbreak for more than one week (excluding payments postponed following current regulation) to the tax authorities
Overdue	=1 if establishment has been overdue on its obligations to any financial institution
Insolvency	=1 if establishment has filed for insolvency or bankruptcy
Government support	=1 if establishment has received national or local government support in response to the crisis
Government support: Cash	=1 if the government support involved cash transfers for businesses
Government support: Deferral	=1 if government support involved deferral of credit payments, utility bills, rent or mortgage, suspension of interest payments or rollover of debt
Government support: Credit	=1 if government support involved access to new credit
Government support: Tax	=1 if government support involved tax reductions or tax deferrals
Government support: Wage	=1 if government support involved wage subsidies

Variable name	Definition
BEEPS VI	
Government support: Digital	=1 if government support involved technical assistance or subsidies for adoption of digital technologies
Government support: Other	=1 if government support involved all remaining forms of assistance such as childcare support, compensation for rent, vouchers, sick leave, downtime allowance for employees, and other similar forms of assistance
Online sales	Percentage of firm's online sales out of total sales
Remote share	Percentage of firm's workforce working remotely
Exporter	=1 if firm's sales are more than 50% exports (direct and indirect)
Female employees	Percentage of permanent, full-time employees that are female
JHU CSSE database	
Pandemic severity	Number of new COVID-19 cases per day per million people.
Transparensy International	
Corruption	Corruption Perceptions Index 2019.
OxCGRT	
Stringency index	Index measuring government policies on social distancing measures.

Notes

[1] The survey was first undertaken in 1999-2000, and subsequently in 2002, 2005, 2008-2009, 2011-2016, and the most recent sixth round in 2018-2020.

[2] The survey universe consists of commercial, service or industrial business establishments with at least five full-time employees in the non-agricultural economy. This definition excludes: financial intermediation, real estate and renting activities and all public or utilities sectors. Government departments (including military, police, education, health and similar activities) as well as primary industries such as agriculture, mining etc. were also excluded. For most countries two sampling frames were used: an official frame of establishments supplied by the national statistical office of the country and the sampling frame consisting of establishments that participated in BEEPS V. The sample was selected using stratified random sampling. Three levels of stratification were used in all countries: industry, establishment size and region.

[3] For robustness we also use the Control of Corruption index from the World Governance Indicators database to classify countries into low and high corruption countries and results do not materially change.

[4] Table no. 1 reports descriptive statistics for the variables used in the analyses. Obs. denotes the number of observations, Std. Dev. the standard deviation, Min. and Max. the minimum and maximum values, respectively. Summary statistics are shown for the whole sample (columns 1-5), for the sample of low corruption countries as defined by those countries who score above 50 in the 2019 Transparency International Corruption Perceptions Index (columns 6-7) and high corruption countries as defined by countries that score below 50 in the same index (columns 8-9). The last column (10) shows mean differences between low and high corruption countries. Mean difference tests are based on the t-test with equal variances. The definition of all the variables is given in the Annexes, Table no. A2.

[5] Table no. 2 shows mean values by countries of the 2019 Transparency International Corruption Perceptions Index (column 1), Government support - a dummy variable indicating firms that received national or local government support in response to the crisis (column 2) and Close temporarily - a dummy variable indicating firms that closed temporarily (suspended services or production) due to the COVID-19 outbreak (column 3). Column 4 shows the number of firms participating in the baseline BEEPS VI survey by countries. Columns 5,6 and 7, show the number of firms participating in the COVID-19 Follow-up surveys. These are firms with eligibility codes: 1- Eligible establishment (correct name and address), 2- Eligible establishment (different name but same address- the new establishment bought the original establishment), 3- Eligible establishment (different name but same address- the establishment changed its name) and 4- Eligible establishment (moved and traced). Cells with / indicate that the follow-up round has not been conducted yet, at the time of writing the paper.

[6] Table no. 3 shows mean values by industries of Government support - a dummy variable indicating a firm which received national or local government support in response to the COVID-19 crisis (column 1), Close temporarily - a dummy variable indicating firms that closed temporarily (suspended services or production) due to the COVID-19 outbreak (column 2), Laid off - the average number of workers a typical firm in the industry has laid off due to the COVID-19 outbreak (column 3). Industries are classified according to the two-digit International Standard Industry Classification Rev. 3.1 of all economic activities.

[7] For robustness we have also estimated the equation with a non-linear probit model and confirm the same results. Due to the large number of fixed effects we prefer the OLS regression model and report those results throughout the paper.

[8] In addition, to mitigate concerns that the results are influenced by the variation in the number of firms present in each country (as presented in Table no. 2), we re-estimate our model excluding the countries with the largest number of firms i.e. those with over 1,000 firms in the baseline survey (Russian Federation, Kazakhstan, Morocco, Poland and Portugal) and find that the main results do not materially change.

[9] Table no. 4 presents OLS regression results. The dependent variable is Government support, a dummy variable indicating a firm which received national or local government support in response to the COVID-19 crisis. In columns (1)-(3) the sample is restricted to low-corruption countries as defined by those countries who score above 50 in the 2019 Transparency International Corruption Perceptions Index, whereas in columns (4)-(6) the sample is restricted to high-corruption countries i.e. countries that score below 50 in the same index. The definition of all variables is given in Table no. A2. Country, industry, time (month-year) and firm fixed effects are used as indicated in the table. Standard errors are clustered by industry and appear in brackets.

Overall, results in this section show that the probability of receiving government support in response to the pandemic situation is driven by different considerations in low- compared to high-corruption countries. In high-corruption countries factors such as firm size, being a member of a business support group or being an innovative firm have less bearing on the probability of receiving government support. Instead, factors such as informal competition, management and firm quality have a greater impact. As informal competition is more prevalent in the sample of high corruption countries it puts formal businesses at a disadvantage by having to pay taxes or abide regulations which informal businesses are able to evade. In times of crisis, however, formal businesses can benefit from government support to mitigate the adverse effects of the crisis. In addition, membership to a business organization provides firms with a network of support and information facilitating access to government aid. In fact, research shows that information frictions can act as a barrier to accessing government support (Custodio *et al.*, 2022). In the sample of high corruption countries this mechanism of support that membership to a business organization provides does not seem to be as effective in facilitating access to government aid as in the subsample of low corruption countries. Finally, it may seem counterintuitive that in high corruption countries pandemic severity has a negative association with the probability of receiving government support. This could be explained by the fact that limited resources in times of crisis are prioritized for more urgent investments in health care systems, diverging funds away from economic support measures..

[10] Table no. 5 shows OLS regression results. The dependent variables are indicated in each of the columns (1)-(11). Government support is decomposed into types of government support received in response to the COVID-19 crisis. The definition of all the variables is given in Table no. A2. In Panel A the sample is restricted to low-corruption countries as defined by those countries who score above 50 in the 2019 Transparency International Corruption Perceptions Index, whereas in Panel B the sample is restricted to high-corruption countries i.e. countries that score below 50 in the same index. Time (month-year) and firm fixed effects are used as indicated in the table. Standard errors are clustered by industry and appear in brackets.