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Cross-Country Evidence

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Abstract

This paper examines whether the economic crisis induced by the COVID-19 pandemic exhibits a Schumpeterian "cleansing" of less productive firms. Using firm-level data for 31 economies, the study finds that less productive firms have a higher probability of permanently closing during the crisis, suggesting that the process of cleansing out unproductive arrangements may be at work. The paper also uncovers a strong and negative relationship between firm exit and innovation and digital presence, especially for small firms, confirming the relevance of the ability to adapt to market conditions as a determinant of firm survival. Finally, the study finds evidence of a negative relationship between firm exit and a burdensome business environment, as well as between firm exit and age.

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Productivity and Firm Exit during the COVID-19 Crisis: Cross-Country Evidence[1]

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1 Introduction

Is a major economic shock, such as the one induced by the COVID-19 pandemic, "cleansing" out unproductive firms, in line with the creative destruction process postulated by Schumpeter (1939), or is the crisis displacing productive firms undermining long-run productivity growth? Evidence on the effects of COVID-19 on firm exit is growing as data keep being collected while we keep living in the pandemic. Earlier analyses on firm exit were predominantly concentrated on developed economies and focused mainly on the magnitude of exit. In the United States, using a range of existing data sources, Crane et al. (2020) found elevated exit rates, mostly among small firms and particularly in industries most sensitive to social distancing, with a 50 percent increase in permanent exit rate of restaurants, relative to historical rates. Another study based on surveys conducted immediately at the beginning of the crisis, in March and April 2020, showed a permanent exit rate of about 2 percent (Bartik et al., 2020). Still in the United States, using household-surveys, Fairlie (2020) estimates a drop of 22 percent of active businesses in the first three months of the lockdown.

Another strand of research has aimed to estimate the exit and survival duration through modeling the financial liquidity of firms. In Japan, estimates show a 10 percent increase in exit rates relative to the year prior to the COVID-19 crisis (Miyakawa et al., 2020). A large increase in the failure rate of SMEs under COVID-19, absent government support, was found also for 17 European countries (Gourinchas et al., 2020). Attempts have been made to model the liquidity cushion of firms in order to estimate the survival time of businesses, showing that the median firm has the means to survive between 8 and 14 weeks of total closures, however, the findings fail to support the Schumpeterian process of creative destruction (Bosio et al., 2020). Banerjee and Kharroubi (2020) find that high short-term debt and low earnings relative to interest expenses are the two most significant financial predictors of firm exits during COVID-19.

More recently, as comparable firm-level data in advanced, emerging, and developing economies is becoming available, studies have extended the analysis of the impact of the COVID-19 pandemic on firms moving beyond the single country investigation and the focus on advanced economies. Early evidence shows that the impact of the pandemic is more pronounced for firms in Sub-Saharan Africa despite the greater likelihood to adjust operations or the products and services offered to cope with the shock (Aga and Maemir, 2021). Moreover, the availability of

these rich cross-country data sets has allowed extending the analysis to the determinants of exit. Using this data, Grover and Karplus (2021) find that management practices like target-setting, monitoring, incentives, and operational practices are associated with a higher likelihood of survival for manufacturing firms, but not for the services sector. A more comprehensive analysis, based on the same source of data, examines the organizational structure of firms and finds that survival is closely associated with multi-establishment firms and state ownership, while foreign-owned firms and financially constrained businesses are more likely to cease their operations. The same analysis points to some indications of stringency in COVID-19 and institutional effects on the survival of firms (Liu et al., 2021a). Other evidence points to a higher likelihood of closures (and for longer periods) by female managed firms (Liu et al., 2021b) and to a positive effect of having a website (Wagner, 2021). All these studies define firm exit either as temporary or permanent closure.

This paper builds on the aforementioned research and contributes to the ongoing effort of measuring the effects of the COVID-19 crisis on firm exit by using the same source of data, the World Bank Enterprise Surveys (ES), to look at the effect of firm productivity on the probability of exiting the market during the crisis across countries. Several studies have shown that firm productivity is a significant determinant of firm exit in a non-crisis situation (Hopenhayn, 1992; Baily et al., 1992; Olley and Pakes, 1996; Fariñas and Ruano, 2005; Aga and Francis, 2017). While empirical analyses on firms' responses during previous crises have shown mixed evidence. Baden-Fuller (1989) studied the British recession during the 1980s and found that closing firms were more profitable than the surviving ones. Foster et al. (2016) found that during the 2007–2009 Great Recession the extent of the cleansing effect in the US manufacturing sector was less pronounced than expected. Hallward-Driemeier and Rijkers (2013) found that the East Asian crisis was indiscriminate in terms of the productivity of firms driven out of business. In the context of the COVID-19 crisis, some studies have looked at the effect of the crisis on productivity. Bloom et al. (2020), for example, analyze the effect of COVID-19 on productivity in the United Kingdom showing a reduction in private sector TFP by up to 5 percent in 2020. Hu et al. (2021), using financial data on firms worldwide, assess the impact of COVID-19 on corporate performance showing deterioration in firm performance during the pandemic. None of these studies look at the role of firm productivity as a determinant of firm exit during the COVID-19

crisis. This study attempts to fill this gap in the literature using firm-level data collected before and after the outbreak of the COVID-19 crisis for 31 countries.

Our results show a strong and negative relationship between productivity and firm exit during the time of the COVID-19 crisis, suggesting that the process of cleansing out unproductive arrangements may be at play. These results extend beyond labor productivity to value added per worker. However, data limitations (we lose 45 percent of the sample when using value added, as well as the whole sector referring to hotels and restaurants) restrict the use of value added per worker as a robustness check for our main results based on labor productivity. Moreover, the data do not allow us to assess the extent to which the displacement of less productive firms is actually leading to a more productive allocation of resources. Also, the fact that we found a negative relationship between productivity and exit does not mean that the crisis is not forcing productive firms out of the market.

Among other determinants of firm exit, we find that firms that introduced a product innovation in the years before the crisis are less likely to exit the market. This confirms the results of previous studies that found how innovation and the ability to adapt to market conditions determine the survival of the firms (Ugur and Vivarelli, 2020; Cefis and Marsili, 2005). Evidence from the European financial crisis in the early 2010s also shows that firms that introduced new products prior to the crisis had a higher likelihood of survival (Sidorkin and Srholec, 2014). Similarly, and in line with a recent study (Wagner, 2021), we found a negative relationship between having a digital presence and the likelihood of permanently exiting the market during the pandemic, driven by small firms. This result is not surprising, as the use of technology has become particularly relevant during the COVID-19 crisis as a way to offset the physical remoteness imposed by the social distance requirements put in place to reduce the transmission of the virus. As expected, we also find that firm age is negatively correlated to firm exit, in line with the broader empirical evidence on firm survival in non-crisis situations (Jovanovic, 1982). Finally, on the business environment, we found evidence that cumbersome regulations, as measured by having senior management spent time dealing with regulations, have a strong positive association with firm exit. These findings are in line with previous studies that show how policy-created distortions can create disadvantages for firms with a negative effect on firm performance (Dollar et al., 2005; Fisman and Svensson, 2007; Bigsten and Soderbom 2006; Aterido et al. 2011) and on firm survival (Aga and Francis, 2017).

To summarize, the study contributes to the literature in the following ways. First, it uses nationally representative firm-level data for 31 economies to assess whether firm productivity contributes to differentiated firm exit during the COVID-19 crisis, also controlling for other determinants that may affect firm exit. Second, it uses a measure of firm exit that fully exploits the richness of the available data. Firm exit is measured as permanent exit from the market based on available ES data collected immediately before the declaration of the COVID-19 pandemic, used as baseline, and two rounds of COVID-19 ES data, used as follow-up. Having three data points allowed to keep track of firms over time, taking into considerations not only the effects at the immediate aftermath of the crisis but also the effects after one year since the declaration of the pandemic. Building on the firm-level data on exit, exit rates at country level are also computed. Third, the paper sheds light on the role of innovation and digitalization for firm performance, uncovering suggestive evidence that the adoption of product innovation and the presence in the digital world are important elements for firms to survive through economic downturns.

The rest of the study is structured as follows. Section 2 provides the conceptual framework and literature review; section 3 provides data details and summary statistics; section 4 details the empirical strategy; section 5 provides the results; conclusions are provided in section 6.

2 Conceptual framework and related literature

Productivity is a critical determinant of firm survival as it measures a firm's efficiency and profitability. Moreover, productivity reveals important information about the efficiency of the market in which firms operate. In a well-functioning market with fair competition, more productive firms survive while less productive firms exit the market. Such dynamic allows for continuous reallocation of resources to their highest value of use. With the threat of entry, existing businesses are under the pressure to find ways to increase their efficiency, often through innovative activity.

This relationship between survival and productivity of firms has been theoretically formalized as a standard in the fields of applied microeconomics and industrial organization. In the standard frameworks, firms behave with the objective of profit maximization and are constrained with a budget function. Exits from the market occur when the profits fall below the

threshold of variable costs in the simplest form. Extensions have added complexity to include additional dimensions such as product lifetime, openness to trade, and market concentration (Jovanovic, 1982; Ghemawat and Nalebuff, 1985; Klepper, 1996; Agrawal and Gort, 2002).

Explaining the interlinkages between productivity and firm survival has been under much scrutiny in the field of industry dynamics. Two hypotheses dominate the field: first, one that is much in line with the Schumpeterian growth theory (Aghion et al., 2015) that firm survival occurs primarily on the basis of productivity differentials, i.e. small, less efficient, and younger firms, have a higher likelihood of exit than their more efficient counterparts (Jovanovic, 1982; Hopenhayn, 1992; Melitz, 2003; Melitz and Ottaviano, 2008). The alternative hypothesis postulates that beyond the competitive forces in the market, economic downturns exacerbate the competitive pressures, making productivity differentials more impactful in determining survival (Hall, 1995; Caballero and Hammour, 1994; Gomes et al., 2001).

While the former hypothesis has a vast literature of empirical evidence corroborating it (Hopenhayn, 1992; Baily et al., 1992; Olley and Pakes, 1996; Fariñas and Ruano, 2005), some studies have shown mixed evidence. Even in good economic times, the cleansing of less productive firms is bounded by institutional arrangements. Aga and Francis (2017) provide a comprehensive analysis using a cross-country panel with the same baseline source of data (ES) used by this paper showing that, in normal times, firm productivity and the age of the firm are significant determinants of firm exit. However, the findings highlight the importance of free markets and good institutions as some of the effects on productivity are weakened in low-income economies, economies with limited openness to international trade, and economies with cumbersome bankruptcy procedures.

The latter hypothesis of cleansing during economic downturns has a greater variety of empirical evidence. In prior economic crises, the notion of creative destruction is either weaker than expected or in some cases does not even hold. During the decline of the British steel castings industry in the 1980s when a quarter of productive capacity declined in just four years, many of the businesses that closed were more profitable than the surviving ones (Baden-Fuller, 1989). Ouyang (2009) provides evidence that times of economic distress destroy high-productivity firms during their infancy. Estimates of the survival time of businesses in a crisis that exhibits a

complete halt of economic activity show no evidence of any association with productivity (Bosio et al., 2020a; Bosio et al., 2020b).

Additional evidence of a failure of a cleansing phenomenon during an economic crisis comes from the East Asian financial crisis in the 1990s. The impact on the Indonesian manufacturing sector had driven firms out of business indiscriminately of their productivity in the immediate period of the crisis (Hallward-Driemeier and Rijkers, 2013). The Schumpeterian cleansing was restored shortly thereafter.

While the study of resource reallocation is beyond the scope of this analysis, it is important to note that while some empirical evidence may point to a cleansing of unproductive firms during an economic downturn, the resource reallocation may not necessarily be welfare enhancing. Barlevy (2002) examines the reallocation of labor during business cycles and shows that recessions can exacerbate search friction of jobs resulting in less productive matches for longer periods of time. Findings from the Great Recession in the United States have shown that the reallocation has been less productivity enhancing than in previous recessions (Foster et al., 2016). Evidence from Portugal shows that while the productivity-survivability relationship exists, the reallocative efficiency is not confirmed as the entry rate decreased while firm exit spiked (Carreira and Tiexeira, 2016).

As the COVID-19 crisis has a unique impact on economic activity marked with mass restrictions of movement and human interactions, it leaves us to test two hypotheses: either productive and more innovative firms push less productive firms out and have *potential* long-term economic gains through reallocation of resources; or the global pandemic has had a detrimental effect across businesses regardless of their efficiency and innovativeness, causing permanent scarring to the economy. The next section discusses the data used to test these claims.

3 Data and summary statistics

The main data source used in this paper consists of an establishment-level data set for 31 economies. The sample includes 25 countries in Europe and Central Asia (ECA) and 6 countries in Middle East and North Africa Region, East Asia and Pacific, and Sub-Saharan Africa. The data set combines the World Bank Enterprise Surveys (ES) and the COVID-19-ES Follow up Survey

(COV-ES). The COV-ES is an ongoing survey that is building a panel data set with ES firms as the baseline and with up to three rounds of follow-up data collection. At the time of writing the paper two rounds of COV-ES data collection have been completed. The data collection started in May 2020 for the first round and in November 2020 for the second round; fieldwork lasted about one month for each country. The second round of COV-ES has been collected in 22 economies (see table 1 for a detailed description of the sample composition).[3] While ES and COV-ES data are available for a total of 45 countries,[4] the paper restricts the sample to the countries where the ES were completed either in 2019 or in 2020. This was done to minimize the time between the different moments in which firms were contacted, minimizing, therefore, the possible concerns of using the ES data as baseline both for determining the firm operating status and for building explanatory and control variables.

The ES are nationally representative surveys of formal (registered) firms with at least five employees operating in manufacturing or services sectors of the economies.[5] The data is fully comparable across countries and is collected via face-to-face interviews with business owners or top managers. A common sampling methodology, stratified random sampling, is used in all surveys, together with a standardized survey instrument and a uniform methodology of implementation. For each economy, the sample is stratified by industry, firm size, and location within the country. Sampling weights are provided in the surveys and are used to correct for unequal probability of selection as well as for ineligibility. The 2019-2020 ES data serve as a baseline for comparisons, thus measuring the scenario before exit.

The COV-ES builds on the ES methodology and it is also fully comparable across countries. Questions on the impact of the COVID-19 crisis were administered through phone interviews to all firms in the 2019-2020 ES sample. Besides collecting data on the effect of COVID-19 on firm operations,[6] the COV-ES recontacted all firms interviewed during the ES to determine their operating status. The same process was repeated during the second round of COV-ES. Using this information, the firms interviewed in an initial round of the survey at time t (baseline ES) were

[3] The COV-ES. The paper uses the data collected and published up to March 2021.
[4] As of March 30, 2021.
[5] More information on the ES methodology are available at https://www.enterprisesurveys.org/en/methodology.
[6] The questionnaires used for the ES and COV-ES surveys are available on the Enterprise Surveys website https://www.enterprisesurveys.org/en/covid-19; data are also publicly available for download. The website also presents indicators built from the establishment-level data.

coded according to their operating status as of the time of the subsequent survey rounds, at time $t + n$ (COV-ES round 1 and COV-ES round 2). In each country the latest information available is used; i.e. in countries with two rounds of COV-ES data collection exit is measured by referring to the situation in the second round; while the first round is used for countries with one round of COVID-19 ES data only.

3.1 Firm exit

Combining the information from the baseline and the follow-up surveys, two different measures of permanent exit are computed:

- *Confirmed exit* – which includes establishments in the baseline that declared to be permanently closed during the COV-ES.
- *Assumed exit* – which in addition to confirmed exits, includes firms that could not be contacted during fieldwork and were, therefore, assumed to have permanently closed.

The specific codes based on the standard ES methodology used to define permanent firm exit are presented in table 2.

There are arguments for and against concerning the use of either of the two measures. On one hand, the use of the confirmed exit is more conservative as this measure prudently includes only firms that could be contacted and that explicitly declared to have permanently ceased operations. This argument could be considered particularly suitable for the current study due to the conditions imposed by the pandemic where managers or business owners may not have been able to answer the phone due to temporary closures or changes in contact details, and yet the firm be still in the market. Therefore, restricting the exit to the confirmed cases may avoid the risk of potentially overestimating the actual firm exit. On the other hand, however, establishing a line of communication with firms that ceased operations has proven an extremely challenging task, even more with surveys conducted over the phone. Moreover, it is difficult to imagine a manager of a firm that exited the market answering the phone and participating in a firm-level survey. Under these circumstances, relying on the confirmed exit measure may actually underestimate the real magnitude of firm exit, making the use of the assumed exit a preferable option.

The paper follows this second approach and uses the assumed exit as the main measure of firm permanent exit from the market. The appropriateness behind the use of assumed exit is two-fold. First, the baseline data collection was recently completed hence having up-to-date contact information and therefore the risk of failing to contact to track down the respondents is minimal. Second, in the majority of the countries in the sample, the follow-up data collection was conducted in two rounds. As such, attempts to contact firms were made at two different points in time, therefore further reducing the risks that the lack of an answer was due to a temporary closure. Nonetheless, in order to account for the potential concerns raised when using the assumed exit measure, robustness checks are conducted by using the confirmed exit variable. It is worth notice that, unlike previous papers on firms' survival during COVID-19 (Grover and Karplus, 2021; Liu, et al., 2021a, Liu et al. 2021b, and Wagner, 2021) this paper does not include among "exiters" firms that temporarily interrupted operations due to the COVID-19 outbreak. Focusing on temporary closures might generate confounding effects as in most cases, temporary closures were mandated by local or national governments to curb the transmission of the disease and are not necessarily linked to productivity. Finally, one caveat that should be taken into consideration in both cases is that firm-exit can be computed only for firms in the sample at time *t* and does not consider firms that may have entered the market after time *t* and then exit.

In order to get a sense of the magnitude of the phenomenon under study, before moving to the analysis of the determinants of firm exit, we present exit rates by country using both assumed and confirmed exit (table 3). Exit rates are annualized to account for the different time that has elapsed between the baseline and follow-up surveys, as data collection for the ES and the COV-ES was not conducted exactly during the same months in each country. The exit rates have been estimated according to the following procedure. First, we compute the days that elapsed between time *t* and time *t*+*n* (i.e. between the 2019-2020 ES and the COV-ES) for each establishment. Then, we compute the country-level average days' span between time *t* and time *t*+*n* using the mean of the values calculated as described. Finally, using information from the latter, we compute the annualized estimate of the exit rate for each country. Pooling all the countries together, the average confirmed exit rate is 3.5 percent while the average assumed exit rate is 8.8 percent. As expected, both rates are higher when computed on data from the second round of fieldwork given that, as time goes by, the cumulative share of closed establishments can only increase in a panel data set. Cross-country variability of these rates is significant: confirmed exits range between 0.02

percent (Greece) and 19.70 percent (Mongolia), while assumed exits range between 0.44 percent (Montenegro) and 23.09 percent (Mongolia). Part of the cross-countries variability of both confirmed and assumed exit rates can be explained by the fact that the pandemic peaked in different regions at different times and with different magnitudes.

Moving back to the establishment-level analysis, table 4 provides a detailed description of the explanatory and control variables used in the analysis; table 5 provides the summary statistics for the establishments in the sample; table 6 presents the summary statistics separately for survivors and exiting firms, while figure 1 presents the kernel density functions for labor productivity, showcasing the differences in the distributions between the two sub-groups of the population. Finally, table 7, presents a correlation table of explanatory and control variables.

4 Empirical Strategy

The baseline regression in this paper estimates the following equation:

$$Exit_{ijk} = \beta_0 + \beta_1 Productivity_{ijk} + \boldsymbol{\beta_2}\, Firm\ Control_{ijk} + S_j + C_k + \epsilon_{ijk} \qquad (1)$$

where the subscript *i* denotes each firm; *j* the sector of activity, and *k* the country where the firm is located. The dependent variable $Exit$ is the proxy for firm permanent exit from the market and it is built, as discussed above, by coding each firm in the ES baseline (at time *t*) based on their operating status at the time of the follow-up surveys either COV-ES round 1 or COV-ES round 2 (time $t + n$). $Productivity$, our main explanatory variable, is the variable that captures firm performance; *S* represents the sector fixed effects of 4 categories (manufacturing, retail, hospitality, and other services); *Firm Controls* is a vector of firm-level controls that are discussed below*; C* is to the country-level fixed effects for which firm *i* belongs; and; ε is the usual error term. The regressions are estimated using a logistic regression model, as it is more appropriate when studying extreme event cases such as firm exit which occurs for a rare segment of the population (Hahn and Soyer, 2005). All regressions use Huber-White robust standard error clustered at region and sector level. To account for the pooling data across countries, survey weights are re-scaled to sum to 1, so that each economy is equally considered in the estimations.

In our analysis, the typical concerns of potential endogeneity exist. A possible source of endogeneity that may be impacting our results is simultaneity, i.e., the outcomes we observe may be predictors of firms' productivity. The threat to causal identification is alleviated by the use of lagged explanatory variables: our estimates of firm exit rely on a cross-section of data with the dependent variable taken at the time $t + n$ and the explanatory variables and all firm-level covariates taken from time t. Another important concern that may bias our coefficients is the omitted variable bias; there may be variables that we do not capture that are related to firms' performance, and which affect firms' exit. Our best response to this has been to include a rich set of firm-level controls, as we have done in all regressions. These are described in detail in the sections below.

Another concern in the analysis is distinguishing between the natural rate of firm exit in non-crisis time and the exit that is induced by the spillovers of the COVID-19 pandemic. To address this issue, the sample of analysis is restricted to the surveys that were completed in the year prior to the outbreak of the pandemic. While this does not fully address any events of firm exit in the period after the interview in the baseline ES and prior to the outbreak of COVID-19, the selection of the sample does minimize this time gap, therefore increasing the confidence that we are capturing exit during the COVID-19 crisis. Moreover. for many cases in the sample, the time between the outbreak of COVID-19 and the latest round of the COV-ES exceeds the time gap between the completion of the ES and the outbreak of the coronavirus, further mitigating this bias.

4.1 Main explanatory variable

Our main explanatory variable is a measure of firm performance at the time t. We measure firm performance by using firm labor productivity, defined as (log of) sales over the baseline year t (in USD 2009) divided by the total number of permanent full-time employees.[7] This is in line with a well-established literature that uses the ES data (Hallward-Driemeier, 2013; Clarke et al., 2015; Gui-Diby et al., 2017; Islam et al., 2020).

Given the relevance of capital among the determinants of firm efficiency, focusing on the measure of labor productivity alone would severely limit the analysis. For this reason, capital is

[7] Note that outliers are removed through the following procedure: total annual sales and number of permanent full-time employees are first log-transformed, then trimmed at plus and minus three standard deviations from the mean.

controlled by capturing the firm's investment in fixed assets such as machinery, vehicles, equipment, land, or buildings (new or used) in the year preceding the survey. This variable is used in the baseline regression as it has the advantage of being available for the full sample. We are aware of the limitations of using a variable that capture the purchase of capital and not the stock of capital in the firm. We try to mitigate these limitations by running robustness checks with other proxies for capital, despite the smaller sample for which these variables are available. These include a measure of the cost of capital, calculated as the (log of) the sum of the cost of fuel and electricity incurred by the firm. This is a proxy of how much capital is employed in the provision of services or the manufacturing of goods, as they reflect the utilization of fixed assets employed in the production process. This measure is available for all firms in the sample, subject to the willingness to respond. All amounts are deflated and converted from local currency units into 2009 USD.

An alternative way of including capital in the productivity measure is by computing value added. In our sample, value added is defined differently for manufacturing firms and for those engaged in retail and in selected other services. For manufacturing firms, value added is computed as the difference between the value of sales and the total cost of raw materials and intermediate goods, divided by the number of permanent full-time employees. For retailers and selected other services firms, this is defined as the difference between the value of sales and the total cost of finished goods/materials to resell. Moreover, value added as defined above can't be computed for some service providers such as hotels or restaurants. Given these limitations, this measure has been used as a robustness check, only.[8]

4.2 Control variables

Besides productivity, the age of the firms is also an important variable to consider when analyzing firm survival. Older firms may lay out more substantial investments than younger firms (Ericson and Pakes 1995; Cull and Xu, 2005); they may also benefit from the process of learning by doing, productivity enhancements, and knowledge of customers and markets (Aga and Francis, 2017).

[8] Another measure of firm performance that takes capital into consideration is the total factor productivity (TFP). The use of TFP for this type of analysis, however, is problematic. First TFP is not properly defined for the services sector, which is part of our sample; second, the data requirements to produce accurate TFP estimates are extensive and high response rates would be needed in key variables capturing measurements of capital. Given these limitations we do not use TFP in our analysis.

By contrast, younger firms tend to have higher risks of exit compared to older ones as they may also have less established relations with customers and suppliers and less access to resources and networks than older firms. We measure the age of the firm as the (log of) years of operations.

Like age, the size of the firm exhibits similar patterns and arguments. The measure of firm size used is the log-transformed number of permanent and temporary full-time employees working in the establishment. Several reasons explain why smaller firms may show higher exit rates during crises. Smaller firms may be more severely affected by crises due to limited financial, technological, and human resources and greater dependence on customers, suppliers, and markets (Beck et al., 2005; Butler and Sullivan, 2005; Gertler and Gilchrist, 1994). Conversely, they may be more flexible in adjusting to downturns, being more able to exploit market niches and activities characterized by agglomeration economies, rather than scale economies, and being less reliant on formal credits compared with larger firms and thus less inert and less subjected to sunk costs (Liu et al., 1999; Tan and See, 2004). Varum and Rocha (2012) show that, during downturns, size reduces firms' exit risk by less; the hazard rate increases more rapidly in size. Being part of a multi-establishment firm is also relevant for firm survival. The risk of exit is lower for establishments that belong to multi-unit firms as compared to single-unit establishments suggesting the presence of information and risk sharing mechanisms within a group (Shiferaw, 2009).

Our matrix of establishment-level controls also includes variables measuring outward orientation such as exporter status and foreign ownership. Exporting can be considered as a form of risk diversification through the spread of sales over different markets with potentially different business cycle conditions or in a different phase of the product cycle (Hirsch and Lev, 1971). Therefore, exports might provide a chance to substitute sales at home by sales abroad when a negative demand shock hits the home market and would force a firm to close otherwise (Wagner, 2013). This argument is still valid even in the case of shock that hit globally, such as the one induced by the COVID-19 pandemic, as countries were hit in different ways, different magnitude, and at different points in time. Furthermore, Baldwin and Yan (2011) argue that non-exporters are in general less efficient than exporters (younger, smaller, and less productive); as a result, one expects that non-exporters are more likely to fail than exporters.

Foreign ownership has also appeared to have provided a higher degree of resilience to crisis, possibly due to intra-group lending mechanisms supporting affiliates facing external credit constraints (Kolasa et al., 2010). However, findings on the role of foreign ownership on firm survival are ambiguous. For example, Li and Guisinger (1991) and Gibson and Harris (1996) have found that foreign firms are less likely to exit, whereas Bernard and Sjöholm (2003), Görg and Strobl (2003), Pérez et al. (2004), and Baggs (2005) found opposite results.

Following a well-established strand of literature, we also control for management's characteristics. Manager capabilities are found to be positively related to investment (McMillan and Woodruff, 2002) and innovation (Crowley and Bourke, 2018), and to be determinants of the selection of firms into international markets (Sala and Yalcin, 2015). More experienced managers may be more likely to better navigate the crisis, and thus manager's experience is captured in the empirical specification. Besides the manager's experience, the gender of the manager is also included among the controls in our regression analysis. Female-owned businesses are found to be more short-lived than male-owned businesses in a non-crisis situation (Klanins and Williams, 2014). Similarly, a recent study found that women-led businesses are more likely to close, temporarily or permanently, due to the COVID-19 crisis (Liu et al., 2021). During previous crises, women entrepreneurs were found to downsize their activities (Cesaroni et al., 2015). Finally, a study by Islam et al. (2020) found a productivity gap between firms that do and do not have a female top manager; which possibly may impact firm exit.

The business environment is known to impact firm productivity (Aterido et al., 2011; Commander and Svejnar, 2011), as well as firm entry (Klapper et al. 2004), and firm exit (Aga and Francis, 2017). We capture the business environment by including measures of infrastructure and regulations. Infrastructure is measured by whether the firm experienced electrical outages, and regulations are captured by a measure of whether senior management has spent any time dealing with regulations. Access to finance has also been found to be related to firm productivity (Gatti and Love, 2008; Rajan and Zingales, 1998). Through financing, firms are also likely to have the ability to mitigate the impacts of temporary shocks that would otherwise force them to exit; as such, access to finance may play a role in determining which firms survive and which firm exit the market, incentivizing the process of creative destruction (King and Levine, 1993; Levine, 2005). Firm access to external finance is captured by a measure of whether a firm has a loan or line of credit and by a measure of reliance on loans to finance working capital.

Moreover, we control for innovation and technology. More specifically, we look at the digital presence of the firm, as measured by the firm having its own website. Evidence shows that digital adoption is associated with productivity gains at the firm level (Kharlamov et al., 2020) and with firm resilience in a time of crisis (Wagner, 2021). The productivity gains linked to the use of innovation and technology may be weaker in the presence of skill shortages, which may relate to the complementarities between digital technologies and other forms of capital, including human capital (Gal et al., 2019). Thus, we also control for whether the establishment provides training to the workforce. Moreover, we control for firm's innovation, as measured by having the firm introduced a product innovation in the three years before the survey. The evidence from the existent literature indicates that the effect of innovation on firm survival and productivity is positive (Ugur and Vivarelli, 2020), with positive survival effects reported when the output measure of innovation is product innovation (Audretsch 1991; Audretsch and Mahmood, 1995; Banbury and Mitchell, 1995; Fontana and Nesta, 2009) and organizational innovation (Polder et al., 2009; Raffo et al., 2008; and Siedschlag et al., 2010).

In all our regressions we also control for the sector in which the firms operate. As shown in previous studies, sectors that rely more on customers' mobility and proximity have been impacted harder by the measures taken to contain the spread of the virus. To account for this variation, we added a set of dummies that capture whether the firm operates in the manufacturing sector, in retail, in hospitality (defined as ISIC 3.1 Rev code 55), or in other services.

Finally, we include country fixed effects to control for the country in which the firm is located. The use of country fixed effects as control implies that all time invariant country characteristics that may impact firm exit, such as GDP growth and GDP level, trade openness, and business-related regulations are accounted for in the regressions. Similarly, differences in the intensity of the spread of COVID-19, as well as in the measures put in place by the governments to mitigate the impact of the pandemic, are also accounted for through the country fixed effects.

As a measure of robustness, in place of the country fixed effects, the analysis also employs a vector of country-level controls to account for the magnitude in variation in some of the country characteristics. To control for certain economic and social characteristics, the following variables are employed from the World Bank World Development Indicators: real GDP per capita, the share of the population at age of 65 or above, and the openness to trade measured as the sum of

imports and exports as a percentage of GDP.[9] To control for the extent of the outbreak of COVID-19 and government policies taken to mitigate the outbreak, two measures are taken from Oxford University: the total number of COVID-19 positive cases per one billion inhabitants, and the stringency index which is a composite measure of closures and restrictions. Country-level measures for firm ease of entry and for resolving insolvency are taken from the World Bank Doing Business report as a score from the distance of the frontier of the best performing economy. Finally, to control for the quality of the institutions, the analysis includes a measure of government effectiveness using data extracted from the World Governance Indicators.

5 Estimation Results

In this section, we present marginal effects for a set of logit regressions starting with a parsimonious specification and adding the various controls sequentially.[10] Unless stated otherwise, all relationships discussed in the next paragraphs are significant at the 5 percent level or less.

5.1 Baseline regression results

Our baseline regression results are provided in table 8. For all specifications considered, the relationship between firm permanent exit and labor productivity is large, negative, and statistically significant, suggesting that a process of creative destruction may be at work. The estimated marginal effect of productivity ranges from -0.019 to -0.025. Thus, for a unit increase in the log of labor productivity, the associated decrease in the probability of permanently exiting the market equals 0.019 to 0.025 percentage points. The consistent and negative association between productivity and likelihood of exiting the market is in line with a well-established literature that widely regards firms with higher productivity as facing a lower risk of exiting the market (Hopenhayn, 1992; Baily et al., 1992; Olley and Pakes, 1996; Fariñas and Ruano, 2005). This result points to a silver lining of the pandemic by which less productive firms are the ones

[9] All measures are taken at the year of the baseline survey.

[10] We present results for a sample that varies based on the number of observations in each specification; however, results hold when the regressions are run on a the constant sample determined by the specification with fewer observations. We also conduct sensitivity analysis by removing one country at the time and all the main results hold. In addition, an extreme value test is conducted in which the base specification excludes (1) the top 1 percent of firms, (2) the bottom 1 percent, and (3) both top and bottom 1 percent of firms in terms of labor productivity per country. The results remain robust, indicating that the findings are not driven by tail-end observations.

suffering the consequences, while relatively more productive firms are less like to permanently close and scar the markets.

Several controls show a significant relationship with firm permanent exit and in the anticipated direction. First, we found that innovative firms have a significantly higher likelihood to survive during the COVID-19 crisis. Results show that the estimated marginal effect for having introduced a product innovation in the three years prior to the ES is -0.037 to -0.040; thus, firms that had innovated before the crisis are 3.7 to 4.0 percentage points less likely to exit the market. Similar results were obtained in the context of the early 2010s financial crisis in Europe where an analysis also based on the ES data show that pre-crisis innovation affected their survival odds and performance (Sidorkin and Srholec, 2014). Our results confirm that introducing new products and adapting the business models allows firms to adjust to market developments, allowing them to better cope in times of crisis (Antonelli et al., 2012; Archibugi et al., 2013; Dachs et al., 2017). We also find a negative association between having a digital presence and probability of exit (significant at 10 percent level). Having a digital presence may have helped firms to increase the number of customers in a pre-crisis situation allowing also to reach out to them during lockdowns, potentially mitigating the negative effect of the demand shock.

In line with expectations, the estimated coefficient for the variable measuring the firm years of operations (or firm age) is also large, negative, and statistically significant. This is consistent with the literature for both developed and developing countries (Bernard and Sjöholm, 2003; Frazer, 2005; Aga and Francis, 2017). A cumbersome business environment is also correlated with firm permanent exit from the market. Firms where the senior management spent any time in dealing with regulations are characterized by a higher probability of exiting the market, confirming the critical role of regulations in explaining firm productivity and firm dynamic (Aterido et al., 2011; Commander and Svejnar, 2011; Klapper et al., 2004; Aga and Francis, 2017). Results show that the estimated marginal effect for having senior management spent time in dealing with regulations is -0.019 to -0.026. Finally, the control for the sector shows a higher probability of exiting the market for firms in the hospitality business, confirming that the COVID-19 crisis hit harder in sectors highly dependent on the physical presence of customers like hotels and restaurants. Contrary to expectations, measures of access to finance do not yield results of statistical significance in relation to firm exit.

5.2 Robustness of estimates

A series of alternative specifications are estimated to confirm the results obtained in the baseline analysis. These robustness checks aim at checking the validity of the measure of firm exit, the main explanatory measure of productivity, and the additional set of country-level controls that may affect results. The stability in magnitude and direction of the results and the persistence of statistical significance adds to the validation of the empirical strategy and the attempts to address any biases that were discussed in section 4.

While the baseline analysis rests on the measure of permanent exit, in which firms that are unreachable are assumed to have discontinued business, for purposes of robustness the exercise is repeated using a more conservative measure of exit – one in which only businesses that have confirmed to have ceased operations permanently are considered as exiting firms. The results of the same baseline specification with this alternative measure of exit are shown in table 9. Despite the lower number of events observed by construct of the variable, the results remain robust and significant throughout various specifications and consistent with the baseline findings. The marginal effect of labor productivity on the likelihood of exit ranges from -0.011 to -0.013, indicating that higher levels of labor productivity decrease the likelihood of firms permanently exiting during the COVID-19 pandemic also when the measure of confirmed exit is used. The results for product innovation, and the hospitality sector are also consistent with the baseline findings. The similarity in results indicates that both measures are appropriate for the analysis. Due to the advantages in using the definition of assumed exit discussed in section 3.1, the remainder of the analysis focuses on this independent variable.

The second set of robustness checks focus on the measure of productivity. The baseline analysis includes a measure of labor productivity whilst controlling for any investments in fixed capital. Two alternative sets of model specifications are considered in order to corroborate the baseline estimates on the main explanatory variable – one substitutes the control for fixed capital with the cost of capital usage, while the other uses a measure of value added instead of labor productivity. Both of these are defined in section 4.1. The results which account for the cost of capital are presented in table 10. Even when controlling for the expenses incurred on electrical usage and fuel, the marginal effects of labor productivity on the probability of exit remain negative, consistent, and robust. The coefficients range from -0.018 to -0.022, nearly identical to

the baseline estimates. In addition to confirming the result of less productive firms being more prone to exits, this specification also confirms the effects of the other covariates. Similarly, the Schumpeterian cleansing story is confirmed with the alternative measure of the main explanatory variable by using value added per worker instead of sales per worker as a measure of productivity. The results are presented in table 11. While the magnitude of this measure is slightly lower, results remain robust and significant as most controls are added. After controlling for product innovation and website the significance drops to a 10 percent level and disappears when the firm characteristics on financing are included. However, this measure excludes one of the more strenuously affected sectors – the hospitality industry.

5.3 Model extension: Controls for country-level characteristics

Substituting the country fixed effects with a vector of controls that capture the country's economic and COVID-19 specific characteristics allows the analysis to shed light on how the magnitude of the individual country characteristics affect the likelihood of firm exit. The model specification on which this extension is applied controls for all firm-level characteristics that may impact permanent firm exit and may exhibit collinearities with the measure of productivity. Results are presented in table 12.

In addition to ensuring robustness in the findings of the baseline model and the extensions of examining the impact of country characteristics on exit, this specification includes a measure of the duration between the baseline ES survey and the COV-ES follow-up. This measure attempts to control for any potential identification issues in which firms ceased operations prior to the outbreak of COVID-19. The time duration between the surveys is calculated by taking the difference between the time of baseline ES survey and the COV-ES follow-up at the firm level, then averaged for all firms per country. The marginal effects are presented in the even numbered columns, (2), (4), and (6) of table 12. While unsurprisingly the marginal effect on exit is positive and hence indicating that the longer the period between the surveys, the higher the likelihood of exit, the coefficient on labor productivity remains stable in magnitude and direction with the baseline results, and robust regardless of the model specification. Moreover, this specification includes variables to control for the intensity of the COVID-19 health emergency in the different countries and the related policy responses, including school closures, workplace closures, and

travel bans as provided by the Oxford Stringency Index. Some weak evidence points to an adverse effect of the stringency index on the likelihood of survival of the firm, but further investigation is warranted to make any conclusions on whether this may be due to the severity of the infections or to the policies implemented to control it.

Controlling for country-specific characteristics in the place of country fixed effects yields results similar to those obtained in the baseline specification. The main variable of interest, labor productivity, remains robust with marginal effects ranging from -0.019 to -0.024. In addition, the other variables which were found significant in section 5.1 – age of the firm, the time tax on managers in dealing with government regulations, the use of a website by the firm, and the introduction of new products or services – remain robust in direction, magnitude, and significance. Two country-level controls that relate to the business environment and broader quality of institutions have significant marginal effects. The distance to the frontier score in the ease of entry as measured by the World Bank Doing Business indicators exhibits a negative relation with firm exit indicating that businesses that operate in economies that are more open to new competition have a lower likelihood of terminating operations. Similarly, economies with relatively more efficient government institutions as measured by the World Governance Indicators are less likely to see businesses closing down. Both of these findings point to the importance of the institutional arrangements in which firms operate and their impact on the lifecycle of a business.

5.4 Model extension: Interacting small firms

In this section, we explore how the relationship between firm permanent exit and productivity and between firm permanent exit and the other explanatory variables that show a significant relationship with firm exit varies depending on firm size. These heterogeneities are estimated by including in the baseline regression four terms that capture the interactions of the dummy variable identifying small firm (defined as firms with 5 to 20 employees) and each of the variables of interest; i.e. labor productivity, product innovation, digital presence, and business environment. The interaction terms are included in separate regressions and all simultaneously. Results are shown in table 13. For brevity, results are presented only for the final baseline specification (table 8, column 5).

As highlighted in the literature, small firms may be more severely affected by crises; therefore, understanding if the negative relationship between productivity and firm exit increases or decreases with firm size becomes particularly important when designing policy and targeting government interventions. The same considerations hold for the analysis of the role of the mitigating factors identified in the analysis, such as innovation and digital presence, and the effect of the business environment. The prediction is that the role of mitigating and exacerbating factors may be stronger for smaller firms as they may have fewer channels to smooth the negative effects of the crisis and therefore they may be more exposed to the risk of exiting the market. For these reasons, we expect the interaction terms for digital presence and small size, for innovation and small size, and for labor productivity and small size to be negative and significant; conversely, we expect the interacting term for having the senior management spent time in dealing with regulations to be positive.

Results in table 13 confirm the predictions. That is, the interaction term between digital presence and the dummy for being the firm small is negative, large, and significant. The interaction terms for innovation and small size and for labor productivity and small size are also negative; however, the interaction term with innovation is significant at the 10 percent, only. Concerning the business environment, the interaction terms do not seem to show any differential impact for small firms.

5.5 Model extension: Split sample on productivity

The results presented in earlier sections show a strong association between labor productivity and the likelihood of firms permanently closing their operations. At the same time, other firm characteristics, such as innovation and digital presence appear to influence the survival likelihood. A question that arises, however, is whether the crisis had a disproportionate effect on productive firms in the presence of other vulnerability issues, such as being small or lacking financial access. To answer this question, the sample is analyzed separately for the top and bottom half of firms in terms of labor productivity.[11]

[11] While interacting the measure of sales per worker is one alternative econometric strategy, we rely on splitting the sample in order to allow the slope of the independent variables to vary. Since the sample size for each regression is smaller, any significance in the results is indicative of robustness due to the larger standard errors.

The marginal effects of the baseline regression, along with some interactions on firm size, are presented in table 14. The first four columns (1-4) reflect the results for the bottom half of firms in terms of labor productivity, while the remaining four columns (5-8) show the results for the top half. The results suggest that the crisis is affecting the private sector in line with the cleansing out process rather than scarring the economy by destroying productive firms. Indeed, the positive association between sales per worker and firm exit holds only for the bottom half of firms in terms of labor productivity, consistently with the distribution of productivity presented in figure 1. This means that while productivity differential matters for less productive firms, the survival among businesses with sales per worker in the top half of the distribution is determined by other factors. Firms engaged in retail activities and those in which senior management spends more time dealing with government regulations have a higher likelihood to succumb to the perils of the pandemic, while businesses that are part of a multi-establishment firm are more likely to survive. Interestingly, among the more productive firms, external financing is not significantly associated with exit.

Labor productivity retains its strong and significant association with the likelihood of ceasing operations for firms that fall on the lower half of labor productivity, with the mitigating factors being the purchase of fixed assets and the digital presence. Although external financing decreases the likelihood of exit in general, for smaller and less productive firms it appears to make them even more vulnerable as shown in column 4 of table 14. This may be due to the fact that our measure of access to finance, which captures the access of the firm to bank financing before the crisis, may indicate a higher exposure of less productive firm to bank financing that could have negatively affected their ability to get access to additional financing to face the crisis. Finally, regardless of where a business lies in the spectrum of labor productivity, the two main factors that increase the likelihood of survival are the age of the firm and the introduction of product innovations. Focusing on small businesses, these findings confirm that being adaptable and having a digital presence are crucial characteristics to navigate the effects of the crisis induced by the COVID-19 pandemic.

6 Conclusions

Crises are periods of intensified adjustments. From a theoretical point of view, they may accelerate the Schumpeterian process of creative destruction, by pushing unproductive arrangements out of the market, or exacerbate market imperfections, displacing productive firms. While empirical analyses on the role of productivity on firms' responses during previous crises have shown mixed evidence, in the case of the COVID-19 pandemic evidence on the impact of productivity on firm survival remained uncovered. The present paper attempts to fill this gap in the literature using firm-level data collected before and after the outbreak of the COVID-19 crisis for 31 countries. The paper also extends the analysis to the identification of elements that may increase firm adaptability and, therefore, promote firm survival; these include innovation and digital presence, as well as a conducive business environment.

The results show that there is a strong positive relationship between productivity and firm survival, consistent with the theoretical predictions of the Schumpeterian creative destruction. In addition, the paper confirms the positive role of firm age for firm survival and uncovers suggestive evidence of a positive role of (product) innovation and digital presence, in particular for small firms. Finally, the results point to a negative effect of a cumbersome business environment.

There are several policy implications that can be drawn from our findings. First, our results confirm the importance of supporting innovation and digitalization in the private sector. The ability to quickly adapt to rapidly changing market conditions, nicely captured by the ability of firms to innovate, has been key in the past months; to the same extent, the use of technology has increased its relevance as a way to offset the physical remoteness imposed by the social distance requirements put in place to reduce the transmission of the virus. Supporting firms in keeping the momentum and increasing their efforts in innovation and digitalization may help in promoting sustained productivity growth. Second, the paper claims for specific attention to small firms that may benefit, more than large and more established firms, from improvements in innovation and from digitalization. Third, the results point to the benefit of agile regulations and good governance. The findings point that the burdensome regulations that tax the time of manager decrease the likelihood of survival, while measures of effective governance and a business climate that is welcoming competition increase the probability of survival. Putting these policies into

practice can be a lengthy endeavor, but in the short-term particular emphasis should be placed on avoiding lasting damage to human capital and productivity (Loayza et al., 2020).

While this analysis points to evidence of exit among less productive firms, using data collected up to a year after the declaration of the pandemic, further investigation is required to draw conclusions of the long-term impact of the COVID-19 crisis on the private sector. Some of the big questions that remain to be answered are (1) whether this initial evidence of a higher likelihood of exit by less productive firms remains in the later stages of the pandemic, (2) whether there are economic gains from the reallocation of the resources, both labor and capital, of the businesses that have ceased their operations, and (3) how different are the new entrants on the market and whether the implications of COVID-19 will permanently affect the organization of firms.

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Tables and Figures

Table 1: Sample Composition.

Country	Sample	Fieldwork completion dates		
		ES Baseline	COV-ES Round-1	COV-ES Round-2
Albania	376	05-2019	06-2020	-
Belarus	600	04-2019	08-2020	-
Bosnia and Herzegovina	362	09-2019	03-2020	-
Bulgaria	772	03-2020	09-2020	12-2020
Croatia	404	11-2019	09-2020	01-2021
Cyprus	240	07-2019	06-2020	12-2020
Czech Republic	502	03-2020	10-2020	02-2021
Estonia	360	01-2020	10-2020	02-2021
Georgia	581	01-2020	06-2020	11-2020
Greece	600	07-2019	06-2020	11-2020
Hungary	805	03-2020	09-2020	02-2021
Italy	760	07-2019	06-2020	12-2020
Jordan	601	11-2019	08-2020	01-2021
Latvia	359	01-2020	09-2020	02-2021
Lebanon	532	04-2020	12-2020	-
Lithuania	358	01-2020	10-2020	02-2021
Malta	242	09-2019	09-2020	01-2021
Moldova	360	11-2019	05-2020	11-2020
Mongolia	360	05-2019	08-2020	02-2021
Montenegro	150	07-2019	02-2021	-
Morocco	1,096	01-2020	08-2020	02-2021
Mozambique	601	01-2019	01-2021	-
North Macedonia	360	10-2019	11-2020	-
Poland	1,369	12-2019	08-2020	12-2020
Portugal	1,062	01-2020	10-2020	02-2021
Romania	814	06-2020	09-2020	12-2020
Russian Federation	1,322	07-2019	06-2020	-
Serbia	361	10-2019	02-2021	-
Slovak Republic	429	03-2020	10-2020	02-2021
Slovenia	409	11-2019	08-2020	12-2020
Zambia	601	03-2020	07-2020	02-2021
Total	**17,748**			

Note: The table refers to data available as of March 30, 2021. The data is extracted from the World Bank Enterprise Surveys and the Covid-19-ES Follow up Survey.

Table 2: Definitions of exit.

Firm Status Upon Re-contacting	Confirmed Exit	Assumed Exit
The firm discontinued businesses – (Establishment went bankrupt)	☑	☑
The firm discontinued businesses – (Original est. disappeared and is now a different firm)	☑	☑
The firm discontinued businesses – (Establishment was bought out by another firm)	☑	☑
The firm discontinued businesses – (It was impossible to determine for what reason)	☑	☑
The firm discontinued businesses – (Other)	☑	☑
No reply after having called in different days of the week and in different business hours		☑
Line out of order		☑
No tone		☑
Phone number does not exist		☑
Self-administrated online survey – invitation email bounces back; exhausted all the other ways to contact the establishment		☑
Self-administrated online survey – no reply to the email and exhausted all the other ways to contact the establishment		☑
Self-administrated online survey – survey discontinued (survey initiated but never completed)		☑

Table 3: Assumed and confirmed exit rates between baseline ES and follow-up COV-ES (annualized).

	Confirmed Exit Rate	Assumed Exit Rate	Survey Round
Albania	1.15	1.15	1
Belarus	3.53	4.63	1
Bosnia and Herzegovina	1.17	11.22	1
Bulgaria	5.31	12.53	2
Croatia	1.24	6.62	2
Cyprus	1.57	11.02	2
Czech Republic	1.67	4.67	2
Estonia	2.26	4.83	2
Georgia	3.00	3.00	2
Greece	0.02	3.63	2
Hungary	1.90	4.01	2
Italy	8.10	22.62	2
Jordan	11.39	11.91	2
Latvia	1.20	12.05	2
Lebanon	3.15	14.72	1
Lithuania	0.68	9.25	2
Malta	0.45	0.90	2
Moldova	1.46	8.11	2
Mongolia	19.70	23.09	2
Montenegro	0.44	0.44	1
Morocco	9.03	15.81	2
Mozambique	0.88	13.31	1
North Macedonia	0.18	7.82	1
Poland	2.62	8.26	2
Portugal	7.96	14.35	2
Romania	2.06	14.28	2
Russian Federation	3.11	3.11	1
Serbia	2.02	2.12	1
Slovak Republic	3.67	13.59	2
Slovenia	0.07	3.82	2
Zambia	5.97	6.12	2
Average	**3.45**	**8.81**	

Note: The table refers to data available as of March 30, 2021. The data is extracted from the World Bank Enterprise Surveys and the Covid-19-ES Follow up Survey.

Table 4: Description of explanatory and control variables.

Variables	Description
Sales per worker (log)	Log of annual sales divided by the number of full-time permanent employees (in USD 2009)
Age of firm (log)	Log of the number of years that the establishment has been in operations.
Manufacturing	Equals 1 if establishment is in the manufacturing sector, and zero otherwise
Retail	Equals 1 if establishment is in the retail sector, and zero otherwise
Hospitality	Equals 1 if establishment is in the hotels and restaurants sector, and zero otherwise
Other Services	Equals 1 if establishment is in the selected services sector, excluding retail, hotel, and restaurants, and zero otherwise
Firm buying fixed assets	Equals 1 if establishment purchased fixed assets such as machinery, equipment, land or buildings during the year before the ES, and zero otherwise .
Size (log)	Log of total number of full-time employees
Part of multi-establishment firm	Equals 1 if establishments is part of a firm that is composed of more than one establishments (firm with multiple physical locations), and zero otherwise
Exports directly 10% or more of sales	Equals 1 if establishment directly exporting at least 10 percent of annual sales, and zero otherwise
Foreign ownership (10%)	Equals 1 if establishment has at least 10 percent of foreign ownership, and zero otherwise
Top manager female	Equals 1 if establishment's top manager is a woman, and zero otherwise
Top manager experience in sector (years)	Years of experience of the top manager working in the sector.
Firm experiencing electrical outages during the previous fiscal year	Equals 1 if establishment experienced power outages during the year before the survey, and zero otherwise
Senior management spent time on dealing with regulations	Equals 1 if establishment has senior management spending any time in dealing with regulations during the year before the survey, and zero otherwise
Firm having its own website	Equals 1 if establishment uses website for business related activities, and zero otherwise
Firm that introduced a new product/service	Equals 1 if establishment introduced new or significantly improved products or services over the three year before the survey, and zero otherwise
Establishment offers training	Equals 1 if establishment offers formal training programs for its permanent, full-time employees, and zero otherwise
Firm using banks to finance working capital	Equals 1 if establishment using bank loans to finance working capital, and zero otherwise
Firm with a bank loan/line of credit	Equals 1 if establishment has bank loans or line of credit, and zero otherwise

Table 5: Summary statistics.

Variables	Mean	Min	Max	SD	N
Sales per worker (log)	10.44	3.43	17.52	1.47	15,552
Age of firm (log)	2.79	0.00	5.27	0.74	17,445
Manufacturing	0.51	0.00	1.00	0.50	17,748
Retail	0.18	0.00	1.00	0.38	17,748
Hospitality	0.06	0.00	1.00	0.24	17,748
Other Services	0.25	0.00	1.00	0.43	17,748
Firm purchased fixed assets	0.43	0.00	1.00	0.49	17,599
Size (log)	3.36	0.00	9.91	1.37	17,638
Part of multi-establishment firm	0.13	0.00	1.00	0.33	17,731
Exports directly 10% or more of sales	0.23	0.00	1.00	0.42	17,455
Foreign ownership (10%)	0.11	0.00	1.00	0.31	17,450
Top manager female	0.18	0.00	1.00	0.39	17,712
Top manager experience in sector (years)	20.67	1.00	60.00	11.40	17,201
Firm experienced electrical outages	0.32	0.00	1.00	0.47	17,642
Senior management spent time on dealing with regulations	0.61	0.00	1.00	0.49	15,306
Firms has its own website	0.66	0.00	1.00	0.47	17,709
Firms introduced a new product/service	0.28	0.00	1.00	0.45	17,612
Firm offers training	0.34	0.00	1.00	0.48	17,602
Firm uses banks to finance working capital	0.36	0.00	1.00	0.48	16,591
Firms has a bank loan/line of credit	0.41	0.00	1.00	0.49	17,392

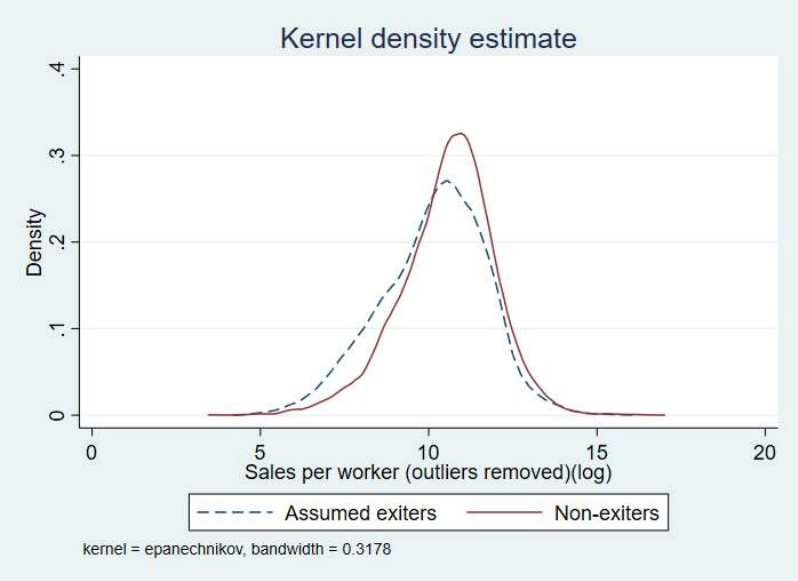
Note: The table refers to data available as of March 30, 2021. The data is extracted from the World Bank Enterprise Surveys and the Covid-19-ES Follow up Survey.

Table 6: Summary statistics by survivors and assumed exiters.

Variables	Surviving (1)	Exiting (2)	Difference (2-1)	P-value (2-1)
Sales per worker (log)	10.58	10.11	-0.48	p < 0.001
Age of firm (log)	2.73	2.62	-0.11	p < 0.001
Manufacturing	0.26	0.22	-0.04	0.002
Retail	0.20	0.21	0.01	0.359
Hospitality	0.10	0.15	0.05	0.001
Other Services	0.44	0.42	-0.02	0.410
Firms purchased fixed assets	0.44	0.33	-0.11	p < 0.001
Size (log)	2.74	2.53	-0.21	p < 0.001
Part of multi-establishment firm Y:1 N:0	0.10	0.09	-0.01	0.543
Exports directly 10% or more of sales Y:1 N:0	0.18	0.14	-0.04	0.003
Foreign ownership (10%) Y:1 N:0	0.08	0.08	0.00	0.823
Top manager female Y:1 N:0	0.19	0.20	0.01	0.412
Top manager experience in sector (years)	20.80	19.36	-1.44	0.002
Firm experienced electrical outages	0.32	0.26	-0.06	0.001
Senior management spent time on dealing with regulations	0.62	0.65	0.03	0.138
Firms having its own website	0.65	0.53	-0.12	p < 0.001
Firm introduced a new product/service	0.31	0.22	-0.09	p < 0.001
Firm offers training Y:1 N:0	0.33	0.29	-0.04	0.031
Firm uses banks to finance working capital	0.33	0.29	-0.04	0.058
Firm has a bank loan/line of credit	0.39	0.35	-0.04	0.030

Note: 'exiting' refers to establishments that exit the economy as measured by the assumed exit. To compute the averages in columns 1 and 2, rescaled weights have been used.

Figure 1: Kernel density functions for labor productivity.



Note: the sample is restricted to the observations included in the baseline regression (colums 5)

Table 7: Correlation table among regressors.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1)	1																			
(2)	0.132	1																		
(3)	-0.023	0.110	1																	
(4)	-0.018	-0.101	-0.265	1																
(5)	-0.086	-0.091	-0.163	-0.127	1															
(6)	0.078	0.028	-0.587	-0.456	-0.281	1														
(7)	0.027	-0.049	-0.007	-0.035	0.015	0.025	1													
(8)	0.100	0.091	0.174	-0.165	0.020	-0.037	0.143	1												
(9)	0.117	0.040	0.006	0.034	0.020	-0.040	0.043	0.226	1											
(10)	0.142	0.094	0.203	-0.126	-0.077	-0.042	0.156	0.217	0.0679	1										
(11)	0.027	-0.025	0.047	-0.035	0.011	-0.020	0.047	0.178	0.124	0.197	1									
(12)	-0.109	-0.100	0.010	0.131	0.053	-0.135	-0.055	-0.087	-0.037	0.009	0.01	1								
(13)	0.234	0.590	0.108	-0.025	-0.043	-0.053	0.023	0.053	0.068	0.080	-0.03	-0.164	1							
(14)	-0.030	-0.043	-0.013	0.027	0.035	-0.027	0.180	0.084	0.037	0.023	0.06	0.019	-0.024	1						
(15)	0.120	0.028	0.028	-0.055	-0.010	0.022	0.139	0.147	0.074	0.093	0.01	-0.051	0.081	0.105	1					
(16)	0.117	0.186	0.070	-0.177	0.024	0.059	0.148	0.211	0.098	0.110	0.05	-0.076	0.113	0.050	0.184	1				
(17)	-0.047	0.006	0.090	-0.056	0.012	-0.042	0.226	0.094	0.091	0.122	0.05	-0.026	0.011	0.124	0.096	0.166	1			
(18)	0.031	0.024	-0.034	-0.058	-0.049	0.099	0.203	0.195	0.127	0.050	0.05	-0.079	0.034	0.124	0.190	0.212	0.161	1		
(19)	-0.046	0.015	-0.003	-0.086	-0.091	0.115	0.198	0.034	0.009	0.049	-0.02	-0.074	-0.021	-0.014	0.088	0.043	0.178	0.068	1	
(20)	-0.037	0.016	0.070	-0.072	-0.048	0.018	0.161	0.133	0.046	0.055	0.00	-0.077	-0.049	0.108	0.113	0.091	0.190	0.099	0.515	1

Note: Survey weights are applied.

Legend:

(1) Sales per worker	(8) Size (log)	(15) Sen. Management spent time on dealing with regulations
(2) Age of firm (log)	(9) Part of multi-establishment firm Y:1 N:0	(16) Firm has its own website
(3) Manufacturing	(10) Exports directly 10% or more of sales Y:1 N:0	(17) Firm introduced a new or significantly improved product/service
(4) Retail	(11) Foreign ownership (10%) Y:1 N:0	(18) Firm offers training
(5) Hospitality	(12) Top manager female Y:1 N:0	(19) Firm uses banks to finance working capital
(6) Other Services	(13) Top manager experience in sector (years)	(20) Firm has a bank loan/line of credit
(7) Firms purchased fixed assets	(14) Firms experienced electrical outages	

Table 8: Baseline logistic regression marginal effects.
Dependent variable: *Permanent Exit (assumed measure)*

	(1)	(2)	(3)	(4)	(5)
Sales per worker (log)	-0.025***	-0.023***	-0.023***	-0.020***	-0.019***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Retail	0.051***	0.046***	0.034**	0.031**	0.026*
	(0.013)	(0.013)	(0.015)	(0.015)	(0.015)
Hospitality	0.058***	0.044**	0.041*	0.043**	0.040*
	(0.020)	(0.019)	(0.021)	(0.022)	(0.021)
Other services	0.027***	0.022**	0.017	0.014	0.013
	(0.010)	(0.009)	(0.011)	(0.011)	(0.011)
Age of firm (log)		-0.038***	-0.035***	-0.034***	-0.035***
		(0.007)	(0.008)	(0.009)	(0.009)
Purchased fixed assets Y:1 N:0			-0.028**	-0.022	-0.024*
			(0.013)	(0.015)	(0.014)
Size (log)			-0.012**	-0.008	-0.008
			(0.006)	(0.006)	(0.006)
Part of multi-establishment firm Y:1 N:0			-0.011	-0.011	-0.010
			(0.016)	(0.017)	(0.017)
Exports directly 10% or more of sales Y:1 N:0			-0.013	-0.008	-0.005
			(0.014)	(0.014)	(0.014)
Foreign ownership (10%) Y:1 N:0			0.022	0.026	0.023
			(0.027)	(0.027)	(0.027)
Top manager female Y:1 N:0			-0.009	-0.006	-0.005
			(0.020)	(0.019)	(0.019)
Top manager experience in sector (years)			-0.000	-0.000	-0.000
			(0.001)	(0.001)	(0.001)
Experienced electrical outages Y:1 N:0			0.004	0.010	0.013
			(0.015)	(0.015)	(0.015)
Senior management spent time on dealing with regulations Y:1 N:0			0.019*	0.025**	0.026**
			(0.010)	(0.011)	(0.011)
Has its own website Y:1 N:0				-0.025*	-0.023*
				(0.013)	(0.014)
Introduced product innovation Y:1 N:0				-0.037***	-0.040***
				(0.011)	(0.012)
Offers training Y:1 N:0				-0.008	-0.006
				(0.017)	(0.016)
Bank financing of working capital Y:1 N:0					-0.001
					(0.013)
Has bank loan or line of credit Y:1 N:0					0.004
					(0.012)
Country FE	YES	YES	YES	YES	YES
Number of observations	15,552	15,322	13,020	12,941	12,593

Note: *** p<0.01, ** p<0.05, * p<0.1. Huber-White robust standard errors in parenthesis and clustered at sampling region, and sector level. Sample size varies due to non-response.

Table 9: Robustness for different measure of exit.
Dependent variable: *Permanent Exit (confirmed measure)*

	(1)	(2)	(3)	(4)	(5)
Sales per worker (log)	-0.013***	-0.012***	-0.012***	-0.011***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Retail	0.020**	0.016*	0.010	0.008	0.008
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)
Hospitality	0.045***	0.037***	0.039***	0.039***	0.034***
	(0.014)	(0.013)	(0.014)	(0.014)	(0.012)
Other services	0.013**	0.011*	0.009	0.009	0.009
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
Age of firm (log)		-0.020***	-0.020***	-0.020***	-0.020***
		(0.005)	(0.006)	(0.005)	(0.005)
Purchased fixed assets Y:1 N:0			-0.017***	-0.014**	-0.014**
			(0.006)	(0.006)	(0.007)
Size (log)			-0.012**	-0.009*	-0.009*
			(0.005)	(0.005)	(0.005)
Part of multi-establishment firm Y:1 N:0			-0.001	0.000	0.000
			(0.014)	(0.015)	(0.015)
Exports directly 10% or more of sales Y:1 N:0			-0.008	-0.007	-0.005
			(0.009)	(0.010)	(0.010)
Foreign ownership (10%) Y:1 N:0			0.037	0.037	0.034
			(0.025)	(0.025)	(0.025)
Top manager female Y:1 N:0			-0.014	-0.012	-0.012
			(0.012)	(0.011)	(0.011)
Top manager experience in sector (years)			0.000	0.000	0.000
			(0.000)	(0.000)	(0.000)
Experienced electrical outages Y:1 N:0			0.007	0.009	0.011
			(0.009)	(0.008)	(0.008)
Senior management spent time on dealing with regulations Y:1 N:0			0.010*	0.013**	0.012*
			(0.006)	(0.006)	(0.006)
Has its own website Y:1 N:0				-0.005	-0.006
				(0.010)	(0.010)
Introduced product innovation Y:1 N:0				-0.017***	-0.016***
				(0.006)	(0.006)
Offers training Y:1 N:0				-0.011	-0.011
				(0.008)	(0.008)
Bank financing of working capital Y:1 N:0					-0.012
					(0.007)
Has bank loan or line of credit Y:1 N:0					0.019**
					(0.009)
Country FE	YES	YES	YES	YES	YES
Number of observations	15,552	15,322	13,020	12,941	12,593

Note: *** p<0.01, ** p<0.05, * p<0.1. Huber-White robust standard errors in parenthesis and clustered at sampling region, and sector level. Sample size varies due to non-response.

Table 10: Robustness for different measure of capital (cost of capital).
Dependent variable: *Permanent Exit (assumed measure)*

	(1)	(2)	(3)	(4)
Sales per worker (log)	-0.022***	-0.019***	-0.018***	-0.018***
	(0.005)	(0.005)	(0.005)	(0.005)
Retail	0.040**	0.035*	0.032*	0.028
	(0.019)	(0.018)	(0.018)	(0.018)
Hospitality	0.041*	0.046*	0.042*	0.046**
	(0.023)	(0.024)	(0.022)	(0.023)
Other services	0.015	0.013	0.012	0.012
	(0.012)	(0.012)	(0.012)	(0.012)
Age of firm (log)	-0.037***	-0.036***	-0.036***	-0.039***
	(0.010)	(0.010)	(0.010)	(0.010)
Cost of capital (log)	0.003	0.002	0.001	0.003
	(0.005)	(0.005)	(0.005)	(0.005)
Size (log)	-0.011	-0.003	-0.003	-0.001
	(0.007)	(0.007)	(0.007)	(0.007)
Part of multi-establishment firm Y:1 N:0	-0.008	-0.007	-0.007	-0.007
	(0.021)	(0.021)	(0.022)	(0.023)
Exports directly 10% or more of sales Y:1 N:0	-0.020	-0.015	-0.012	-0.011
	(0.015)	(0.016)	(0.016)	(0.016)
Foreign ownership (10%) Y:1 N:0	0.035	0.036	0.035	0.035
	(0.032)	(0.032)	(0.032)	(0.034)
Top manager female Y:1 N:0	-0.015	-0.014	-0.013	-0.013
	(0.022)	(0.021)	(0.021)	(0.021)
Top manager experience in sector (years)	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Experienced electrical outages Y:1 N:0	-0.006	-0.001	0.003	0.007
	(0.016)	(0.017)	(0.017)	(0.017)
Senior management spent time on dealing with regulations Y:1 N:0	0.023**	0.029**	0.031***	0.031***
	(0.011)	(0.012)	(0.012)	(0.011)
Has its own website Y:1 N:0		-0.032*	-0.031*	-0.031*
		(0.017)	(0.016)	(0.016)
Introduced product innovation Y:1 N:0		-0.031**	-0.034***	-0.030**
		(0.013)	(0.013)	(0.013)
Offers training Y:1 N:0		-0.016	-0.013	-0.009
		(0.017)	(0.017)	(0.017)
Bank financing of working capital Y:1 N:0			0.000	0.002
			(0.015)	(0.015)
Has bank loan or line of credit Y:1 N:0			-0.004	-0.002
			(0.014)	(0.014)
Purchased fixed assets Y:1 N:0				-0.040***
				(0.014)
Country FE	YES	YES	YES	YES
Number of observations	9,511	9,461	9,324	9,312

Note: *** p<0.01, ** p<0.05, * p<0.1. Huber-White robust standard errors in parenthesis and clustered at sampling region, and sector level. Sample size varies due to non-response.

Table 11: Robustness for different measure of capital (VA).
Dependent variable: *Permanent Exit (assumed measure)*

	(1)	(2)	(3)	(4)	(5)
Value added per worker (log)	-0.014**	-0.015**	-0.014**	-0.011*	-0.010
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Sector FE	YES	YES	YES	YES	YES
Age of firm (log)		YES	YES	YES	YES
Firm characteristics – general			YES	YES	YES
Firm characteristics – website/innovation				YES	YES
Firm characteristics – financials					YES
Country FE	YES	YES	YES	YES	YES
Number of observations	8,545	8,432	7,334	7,292	7,129

Note: *** p<0.01, ** p<0.05, * p<0.1. Huber-White robust standard errors in parenthesis and clustered at sampling region, and sector level. Sample size varies due to non-response and lack of data to estimate productivity for other services.

Table 12: Robustness for country-level controls.
Dependent variable: *Permanent Exit (assumed measure)*

	(1)	(2)	(3)	(4)	(5)	(6)
Sales per worker (log)	-0.019***	-0.019***	-0.024***	-0.022***	-0.021***	-0.021***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Retail	0.018	0.015	0.020	0.016	0.019	0.017
	(0.019)	(0.017)	(0.018)	(0.017)	(0.019)	(0.017)
Hospitality	0.041*	0.030	0.041*	0.031	0.043*	0.033
	(0.025)	(0.023)	(0.024)	(0.023)	(0.025)	(0.023)
Other services	0.004	0.003	0.010	0.007	0.005	0.006
	(0.017)	(0.014)	(0.016)	(0.014)	(0.017)	(0.014)
Age of firm (log)	-0.021**	-0.025***	-0.023**	-0.026***	-0.022**	-0.027***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Purchased fixed assets Y:1 N:0	-0.036**	-0.041***	-0.035**	-0.040***	-0.034**	-0.038**
	(0.016)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Size (log)	-0.012	-0.008	-0.013	-0.009	-0.012	-0.008
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Part of multi-establishment firm Y:1 N:0	-0.012	-0.028	-0.012	-0.025	-0.009	-0.023
	(0.020)	(0.019)	(0.019)	(0.018)	(0.020)	(0.019)
Exports directly 10% or more of sales Y:1 N:0	-0.011	-0.013	-0.011	-0.013	-0.011	-0.013
	(0.019)	(0.016)	(0.017)	(0.016)	(0.019)	(0.016)
Foreign ownership (10%) Y:1 N:0	0.036	0.028	0.041	0.033	0.039	0.034
	(0.033)	(0.030)	(0.035)	(0.031)	(0.033)	(0.030)
Top manager female Y:1 N:0	0.003	-0.005	0.003	-0.004	0.003	-0.005
	(0.019)	(0.019)	(0.019)	(0.020)	(0.019)	(0.020)
Top manager experience in sector (years)	-0.000	-0.000	-0.001	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experienced electrical outages Y:1 N:0	-0.024*	-0.009	-0.023	-0.011	-0.022	-0.008
	(0.014)	(0.015)	(0.014)	(0.015)	(0.014)	(0.015)
Senior management spent time on dealing with regulations Y:1 N:0	0.051***	0.040***	0.054***	0.044***	0.051***	0.041***
	(0.013)	(0.012)	(0.012)	(0.011)	(0.012)	(0.011)
Has its own website Y:1 N:0	-0.047***	-0.038***	-0.051***	-0.041***	-0.049***	-0.041***
	(0.013)	(0.014)	(0.014)	(0.015)	(0.013)	(0.014)
Introduced product innovation Y:1 N:0	-0.033**	-0.040***	-0.029**	-0.037***	-0.030**	-0.038***
	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)
Offers training Y:1 N:0	0.007	0.001	0.012	0.005	0.009	0.003
	(0.015)	(0.016)	(0.015)	(0.016)	(0.015)	(0.016)
Bank financing of working capital Y:1 N:0	-0.005	0.006	-0.005	0.005	-0.007	0.003
	(0.015)	(0.014)	(0.015)	(0.015)	(0.015)	(0.014)
Has bank loan or line of credit Y:1 N:0	0.002	-0.006	0.002	-0.005	0.003	-0.006
	(0.015)	(0.014)	(0.015)	(0.014)	(0.015)	(0.014)
GDP per capita (2010 USD) (log)	0.011	0.059***	0.034*	0.070***	0.025	0.088***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)	(0.022)
% Population at age 65 or above	-0.006*	-0.012***	-0.004	-0.010***	-0.005	-0.011***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Openness (Sum of exports and imports)	-0.000	-0.001***	-0.000	-0.001***	-0.000	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Total COVID-19 cases per billion	0.001	0.001***	0.000	0.001*	0.001*	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Stringency Index	0.001**	0.001	0.001**	0.001*	0.001***	0.001*
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Starting a business (DB)			-0.006***	-0.004***		
			(0.001)	(0.001)		
Resolving insolvency (DB)			-0.000	-0.000		
			(0.001)	(0.001)		
WGI: Government Effectiveness					-0.043*	-0.071***
					(0.023)	(0.021)
Year b/w baseline and COVID surveys		0.197***		0.171***		0.211***
		(0.030)		(0.031)		(0.029)
Number of observations	12,213	12,213	12,213	12,213	12,213	12,213

Note: *** p<0.01, ** p<0.05, * p<0.1. Huber-White robust standard errors in parenthesis and clustered at sampling region, and sector level. Sample size varies due to non-response.

Table 13: Interaction terms for determinants of exit and firm size.
Dependent variable: *Permanent Exit (assumed measure)*

	(1)	(2)	(3)	(4)	(5)
Sales per worker (log)	-0.020***	-0.020***	-0.020***	-0.010	-0.012*
	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)
Age of firm (log)	-0.037***	-0.037***	-0.037***	-0.037***	-0.037***
	(0.009)	(0.008)	(0.009)	(0.009)	(0.009)
Retail	0.028*	0.030**	0.030**	0.029*	0.028*
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Hospitality	0.041*	0.043**	0.042**	0.040*	0.041*
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Other services	0.014	0.015	0.016	0.015	0.014
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Purchased fixed assets Y:1 N:0	-0.026*	-0.027**	-0.027**	-0.027**	-0.026*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Part of multi-establishment firm Y:1 N:0	-0.016	-0.014	-0.015	-0.015	-0.015
	(0.016)	(0.017)	(0.017)	(0.017)	(0.016)
Exports directly 10% or more of sales Y:1 N:0	-0.008	-0.008	-0.008	-0.009	-0.009
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Foreign ownership (10%) Y:1 N:0	0.019	0.018	0.020	0.019	0.018
	(0.026)	(0.025)	(0.026)	(0.026)	(0.025)
Top manager female Y:1 N:0	-0.004	-0.003	-0.004	-0.004	-0.003
	(0.019)	(0.018)	(0.019)	(0.019)	(0.018)
Top manager experience in sector (years)	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experienced electrical outages Y:1 N:0	0.013	0.012	0.013	0.013	0.013
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Senior management spent time on dealing with regulations Y:1 N:0	0.027**	0.026**	0.009	0.025**	0.001
	(0.011)	(0.011)	(0.021)	(0.011)	(0.021)
Has its own website Y:1 N:0	0.029	-0.026**	-0.027**	-0.027**	0.019
	(0.021)	(0.013)	(0.013)	(0.013)	(0.021)
Introduced product innovation Y:1 N:0	-0.041***	-0.010	-0.040***	-0.040***	-0.013
	(0.012)	(0.018)	(0.012)	(0.012)	(0.016)
Offers training Y:1 N:0	-0.010	-0.009	-0.010	-0.009	-0.010
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Bank financing of working capital Y:1 N:0	-0.001	-0.002	-0.001	-0.002	-0.002
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Has bank loan or line of credit Y:1 N:0	0.002	0.002	0.002	0.002	0.001
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Small size (<20)	0.041**	0.007	-0.023	0.122**	0.121**
	(0.017)	(0.013)	(0.019)	(0.054)	(0.056)
Has its own website*Small	-0.070***				-0.059***
	(0.021)				(0.022)
Introduced product innovation*Small		-0.045*			-0.041
		(0.026)			(0.026)
Time tax*Small			0.022		0.036
			(0.025)		(0.024)
Sales per worker (log)*Small				-0.014**	-0.011*
				(0.006)	(0.007)
Country FE	YES	YES	YES	YES	YES
Number of observations	12,593	12,593	12,593	12,593	12,593

Note: *** p<0.01, ** p<0.05, * p<0.1. Huber-White robust standard errors in parenthesis and clustered at sampling region, and sector level. Sample size varies due to non-response.

Table 14: Split sample logistic regression marginal effects.
Dependent variable: *Permanent Exit (assumed measure)*

	Bottom Half of Labor Productivity				*Top Half of Labor Productivity*			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Sales per worker (log)	-0.029***	-0.030***	-0.030***	-0.029***	-0.006	-0.007	-0.007	-0.007
	(0.011)	(0.011)	(0.011)	(0.011)	(0.009)	(0.009)	(0.009)	(0.009)
Retail	0.010	0.012	0.014	0.014	0.042*	0.043**	0.044**	0.045**
	(0.019)	(0.019)	(0.019)	(0.019)	(0.022)	(0.021)	(0.021)	(0.022)
Hospitality	0.040	0.041	0.043	0.042	0.032	0.031	0.033	0.032
	(0.028)	(0.028)	(0.028)	(0.028)	(0.036)	(0.034)	(0.035)	(0.035)
Other services	0.011	0.012	0.013	0.012	0.019	0.021	0.022	0.022
	(0.019)	(0.018)	(0.019)	(0.018)	(0.015)	(0.015)	(0.015)	(0.015)
Age of firm (log)	-0.030**	-0.031***	-0.031***	-0.031***	-0.043***	-0.047***	-0.046***	-0.046***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)	(0.012)	(0.011)	(0.011)
Purchased fixed assets Y:1 N:0	-0.043**	-0.045**	-0.045**	-0.045**	-0.003	-0.007	-0.010	-0.009
	(0.022)	(0.021)	(0.021)	(0.021)	(0.017)	(0.016)	(0.016)	(0.017)
Size (log)	-0.014				-0.005			
	(0.009)				(0.008)			
Part of multi-establishment firm Y:1 N:0	0.046	0.040	0.041	0.039	-0.056***	-0.059***	-0.058***	-0.059***
	(0.030)	(0.029)	(0.029)	(0.029)	(0.018)	(0.018)	(0.018)	(0.018)
Exports directly 10% or more of sales Y:1 N:0	-0.002	-0.006	-0.006	-0.005	-0.013	-0.016	-0.015	-0.016
	(0.022)	(0.022)	(0.022)	(0.022)	(0.018)	(0.018)	(0.018)	(0.018)
Foreign ownership (10%) Y:1 N:0	0.009	0.004	0.003	0.000	0.032	0.027	0.027	0.028
	(0.032)	(0.031)	(0.031)	(0.031)	(0.036)	(0.035)	(0.034)	(0.036)
Top manager female Y:1 N:0	0.014	0.016	0.016	0.014	-0.028	-0.027	-0.026	-0.027
	(0.022)	(0.022)	(0.021)	(0.021)	(0.022)	(0.021)	(0.021)	(0.022)
Top manager experience in sector (years)	-0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experienced electrical outages Y:1 N:0	0.014	0.015	0.015	0.014	0.007	0.007	0.006	0.007
	(0.019)	(0.019)	(0.019)	(0.019)	(0.021)	(0.021)	(0.021)	(0.021)
Senior management spent time on dealing with regulations Y:1 N:0	0.018	0.019	0.018	0.018	0.035**	0.035**	0.034**	0.034**
	(0.018)	(0.018)	(0.019)	(0.019)	(0.015)	(0.015)	(0.015)	(0.015)
Has its own website Y:1 N:0	-0.040**	0.005	-0.043**	-0.044**	-0.005	0.049*	-0.009	-0.009
	(0.018)	(0.028)	(0.018)	(0.017)	(0.017)	(0.026)	(0.017)	(0.017)
Introduced product innovation Y:1 N:0	-0.039**	-0.040**	0.001	-0.038**	-0.042***	-0.041***	-0.022	-0.041***
	(0.017)	(0.017)	(0.023)	(0.017)	(0.015)	(0.015)	(0.020)	(0.015)
Offers training Y:1 N:0	0.004	0.001	0.001	-0.001	-0.015	-0.020	-0.018	-0.019
	(0.018)	(0.019)	(0.019)	(0.019)	(0.020)	(0.019)	(0.019)	(0.019)
Bank financing of working capital Y:1 N:0	-0.014	-0.015	-0.015	-0.069***	0.009	0.010	0.008	0.004
	(0.021)	(0.020)	(0.021)	(0.024)	(0.016)	(0.017)	(0.017)	(0.019)
Has bank loan or line of credit Y:1 N:0	0.011	0.010	0.010	0.011	-0.006	-0.011	-0.010	-0.010
	(0.021)	(0.021)	(0.021)	(0.020)	(0.018)	(0.018)	(0.018)	(0.018)
Small size (<20)		0.046**	0.026	-0.011		0.039	-0.009	-0.022
		(0.020)	(0.018)	(0.021)		(0.028)	(0.018)	(0.021)
Has its own website*Small		-0.060**				-0.079**		
		(0.029)				(0.031)		
Introduced product innovation*Small			-0.056**				-0.031	
			(0.026)				(0.032)	
Small*Bank financing				0.089**				0.007
				(0.042)				(0.024)
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	6,280	6,280	6,280	6,280	6,258	6,258	6,258	6,258

Note: *** p<0.01, ** p<0.05, * p<0.1. Huber-White robust standard errors in parenthesis and clustered at sampling region, and sector level. Sample size varies due to non-response.