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The Impact of the Covid-19 Pandemic on the Non-financial Corporate Sector in Slovenia*

By

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Abstract

Using annual firm-level data for Slovenia, this paper examines the impact of the Covid-19 pandemic on firm exit, sales, employment and take-up of different types of government financing support. The outcomes in the pandemic year are compared with those in the pre-Covid and post-Covid periods. The firm exit rate did not increase during the pandemic period. The process of cleansing out of less productive firms was still at work during the pandemic but did not intensify. Small and young firms were not impacted disproportionately more from the pandemic shock compared to the pre-Covid period. Government financing support had a strong positive effect on facilitating employment growth. Such support went to firms with greater need. There was little evidence of misallocation of resources towards zombie firms and low productivity firms.

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Short title: Impact of COVID-19 on Slovene firms

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1. Introduction

The Covid-19 pandemic has been characterized as a "crisis like no other" (Georgieva, 2020). The pandemic has had deep health, economic and social impacts on all countries around the world. The adoption of government-mandated measures to contain the spread of Covid-19—namely, lockdowns and quarantines, mobility restrictions, and other public health measures such as social distancing—exposed firms to mutually reinforcing supply-side and demand-side shocks (Muzi et al., 2023; OECD, 2020a). These shocks were manifested in closure of firms or scaling down of their operations, disruption in supply chains and transportation links, and collapsed demand. Covid-19 was also a major reallocation shock, and many firms expanded in response to pandemic-induced demand shifts (Barrero et al., 2020). Nevertheless, overall, economic activity contracted dramatically on a global scale, firms' cash flow deteriorated and their financial vulnerability increased, and labour market slack emerged. To mitigate the negative impact of the Covid-19 shock, governments and central banks across the world provided various forms of financing support to firms and households (OECD, 2020a and 2020b).[1]

The literature on the economic impact of the Covid-19 pandemic is vast. The focus of majority these studies has been mainly on documenting the severity of the impact on operation status, sales, and employment; the heterogeneity in the impact across enterprises; the adjustment mechanisms adopted by firms; and the take-up of government financing assistance (see, for example, Apedo-Amah et al., 2020; Bennedsen et al., 2020; Fernández-Cerezo et al., 2022; Gourinchas et al., 2021; Mateus and Neugebauer, 2022; Muzi et al., 2023; Rawdanowicz and Puy, 2021; and references cited therein). Most of the studies use enterprise survey data, which in some instances are also matched with pre-pandemic corporate accounts. The survey-based studies have limitations. These "pulse" surveys were of continuing firms and were carried out in different stages of the pandemic in different countries. The surveys were not always followed up with additional surveys.[2] Thus, they may not capture the full extent of the impact of the crisis, and any cross-country comparison

[1] Also, see the IMF Policy Tracker (https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19).

[2] The World Bank follow-up enterprise surveys are an exception. See, http://www.enterprisesurveys.org.

needs to correct for the differences in the timing of the surveys.[3] Moreover, as Apedo-Amah et al. (2020) note, many of the survey-based studies rely on narrow samples of firms, and are less likely to provide an accurate assessment of overall impact at the country level. Also important, not all the survey-based studies compare outcomes and patterns during the pandemic period with outcomes and patterns that occurred in the pre-pandemic period, which is essential to capture the additional impact of the pandemic. Notable studies that make this comparison include Bennedsen et al. (2020), Cros et al. (2021) and Muzi, et al. (2023). Notwithstanding these limitations, an indisputable conclusion is that the COVID-19 pandemic inflicted a large negative impact on sales and financial health of enterprises, but that there was considerable heterogeneity across firms and countries.

Some studies constructed simulation models of firms' cash flow and predicted a significant increase in firm failures as a result of the COVID-19 shock, in the absence of government support (e.g., Archanskaia et al., 2022; Gourinchas et al., 2021; Miyakawa et al., 2021). However, actual data for 2020 indicate that in OECD countries and major non-OECD emerging-market economies the expected increase in firm failures did not materialize (Cros et al., 2021; Djankov and Zhang, 2021; Rawdanowicz and Puy, 2021). This outcome is commonly ascribed to the large-scale government support that mitigated the liquidity squeeze faced by firms.[4] Against this backdrop, a debate has emerged regarding whether government support contributed to potential zombification of the economy by reducing the exit of unviable firms (Schepens et al., 2020). The findings on this issue are inconclusive. Archanskaia et al. (2022) and Cros et al. (2021) found that in Europe the dimension of the cleansing mechanism was not magnified during

[3] In their cross-country study of 51 countries based on a data set collected by the World Bank Group and several partner institutions, Apedo-Amah et al. (2020) introduce different controls in the analysis to tackle some of the heterogeneity related to the differences in country samples, implementation strategy, and timing of the surveys.

[4] See Lalinsky and Pál (2022) for analysis of the impact of government support on liquidity and solvency of firms in Slovakia. Schepens et al. (2020) point out that the shock experienced by firms during the Covid-19 pandemic was not caused by excessive risk-taking by firms or banks, as in previous financial crises. Firms in sectors that were otherwise viable were also hit by the pandemic shock. For these sectors the shock was not a solvency shock but a liquidity squeeze, and the sector would rebound after the lockdown conditions were eased.

the pandemic period. They interpreted this finding to imply that the Schumpeterian process of creative destruction was partially frozen but not distorted. However, Muzi et al. (2023) found that in developing economies in Eastern Europe, Central Asia, and North Africa the process of cleansing out of unproductive firms increased during the pandemic period compared to the pre-pandemic period. Lalinsky and Pál (2022) found that in Slovakia zombie firms had a relatively lower chance of obtaining government financial support during the pandemic period. Cirera et al. (2021) note that the reach of government support policies in developing countries was limited, especially for the more vulnerable firms. In addition, because of exclusion concerns over strict targeting in the earlier stages of the pandemic, many firms benefitted from public assistance without having experienced any adverse Covid-19 shock.

In this paper we examine the impact of the Covid-19 pandemic on the non-financial corporate sector in Slovenia, using firm-level data maintained by the Agency for Public Legal Records and Related Services (AJPES). The particular aspects examined are firm exit, sales, employment, and take-up of government financing support. Slovenia experienced three waves of containment measures during March 2020–April 2021. There was a strict lockdown and major parts of the economy were shut down during the first wave covering the period mid-March to end-May 2020. During the second wave, covering the period mid-October 2020 to mid-March 2021, containment measures included closure of restaurants, bars, and close-contact services; travel restrictions across municipalities; limitations on the size of social gathering; and online schooling and work from home. The third wave, characterized by strict lockdown, was brief and covered only the first eleven days of April, 2021. Real GDP declined by 4.3 percent in 2020 owing to the containment measures. The drop in gross value added was steepest in 2020 Q2 (11 percent, year-on-year basis), when containment measures were most restrictive and domestic demand fell significantly. The drop was most pronounced in sectors directly affected by the lockdowns and closure. However, unlike in other countries in the region, gross value added recovered swiftly to above the pre-pandemic level in 2021 as economic growth rebounded to 8.2 percent.

This paper adds to the small number of econometric studies that have examined in a multivariate framework the impact of the Covid-19 crisis on the corporate sector. The paper has several notable features. First, the analysis is based on actual annual data for the entire universe of non-financial firms in Slovenia. Second, the outcomes for firm exit, sales and employment in the

Covid-19 year are compared with outcomes in the pre-Covid year and the post-Covid year. Such a comparison sheds light on whether the association between the variable of interest and covariates had changed during the pandemic period. Notably, in this context, the paper provides evidence on whether smaller enterprises were disproportionately affected by the pandemic and whether the Schumpeterian process of cleansing of less-productive firms was magnified or paused during the pandemic. Related to this aspect, a third notable feature of the paper is that it examines how the take-up of government financing support during the pandemic was associated with productivity, zombie status of firms and other firm characteristics. The paper also compares the pattern across different available types of government support. While there is considerable documentation of government policies on Covid-19 at the country level,[5] multivariate analyses of firm-level access to government support are limited.[6]

To the best of our knowledge, this paper is the first comprehensive assessment of the impact of Covid-19 on the non-financial corporate sector in Slovenia. An earlier study by Masten et al. (2020) carried out immediately after the outbreak of Covid-19 focused on the implications for the Slovenian economic outlook. A World Bank report (World Bank, 2021) provides a descriptive summary of the impact of Covid-19 in Slovenia based on data collected from a very small sample of 499 firms in several rounds of follow-up surveys during 2020. Bighelli et al. (2021 and 2023) examine the relationship between firm characteristics and the probability of receiving government financial support.

The rest of the paper is organized as follows. Section 2 contains a selected review of the recent literature on the economic impact of Covid-19. Section 3 describes the data used in the empirical analysis. Section 4 presents the empirical findings and Section 5 concludes.

[5] See, for example, IMF Policy Tracker (https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19) and OECD (2020a, 2020b).

[6] Notable contributions in this area include Bennedsen et al. (2020), Bighelli et al. (2021 and 2023), Cirera et al. (2021), Fernández-Cerezo et al. (2022), Lalinsky and Pál (2022) and Mateus and Neugebauer (2022).

2. Selected Literature Review

Firm closures and exit

Dimensions of firm closures and exit. Survey-based studies typically document the proportion of firms that were temporarily closed at the time of the survey because of Covid-mandated restrictions. To shed light on the impact of easing of restrictions, many of these studies also relate the temporary closure status of firms to the time that had elapsed since the onset of the pandemic or the peak of the pandemic. Temporary closures and reopenings were an important aspect of the early pandemic period. Evidence indicates that firm closures surged with the onset of Covid-19, but that the proportion of temporarily closed firms fell quickly once the pandemic had peaked and Covid-mandated restrictions were relaxed. For example, a study based on data from the Current Population Survey in the United States (Fairlie, 2020) notes a marked drop in the share of temporarily closed firms from 22 percent in April 2020 to 8 percent in June as many states started to relax Covid-mandated restrictions and closed businesses reopened. Likewise, in their cross-country study based on survey data for 51 low- and middle-income countries, Apedo-Amah et al. (2020) note that firm-closure rates began to fall sharply two weeks after the peak of the crisis: the likelihood of a business being open during the period up to two weeks after the peak of Covid-19 was under 30 percent, but the likelihood increased significantly thereafter to almost 75 percent six weeks after the peak.

Thus, the evidence on firm closures from business pulse surveys should not be seen as indicating permanent exit from the market. The quick reopening of businesses following the relaxation of Covid-mandated restrictions suggests that not all the closures were permanent. The gap between the rate of temporary closure and permanent exit may be enormous. For example, in a survey of small businesses carried out in the United States at the very early stages of the crisis at end-March/early April 2020, about 41 percent of businesses reported that they were temporarily closed because of Covid-19, whereas only 1.8 percent of businesses reported that they were permanently closed because of the pandemic (Bartik et al., 2020). Using data from World Bank follow-up enterprise surveys conducted in six countries in Southern Europe towards the end of 2020 and early 2021, Webster et al. (2021) report that between 28.4 percent and 66.1 percent of firms in these countries had temporarily closed at some stage following the outbreak of Covid-19. However, the percentage of firms confirmed permanently closed since the outbreak of the

pandemic was extremely small, ranging from 0.03 percent in Greece to 5.14 percent in Italy. If it is assumed that firms that could not be contacted during the follow-up survey were also permanently closed, the share of "confirmed or assumed permanently closed" firms increases to a range of 1.6 percent in Greece and 36.1 percent in Italy. Webster et al. (2021) subtly acknowledge that considering non-responding firms as permanently closed was likely incorrect and that it may result in overestimation of actual firm exit from the market.[7] In any event, the survey-based studies do not shed light on changes in the firm exit rate in the pandemic period compared to the pre-pandemic period.

Simulation model-based studies predicted that the Covid-19 shock would result in a significant increase in business failure rates relative to the pre-pandemic period in the absence of government support. Gourinchas et al. (2021) estimated that the SME failure rate in their sample of 17 countries would rise by 9.1 percentage points because of Covid-19.[8] The increases in the failure rate range from 4.8 percentage points in the Czech Republic to 9.9 percentage points in Slovenia and to 13.2 percentage points in Italy. Archanskaia et al. (2022) estimated that for European economies in the aggregate, the Covid-19 crisis would increase the share of financially vulnerable firms by 4 percentage points compared to the counterfactual no Covid-19 scenario.[9] Miyakawa et al. (2021) for Japan predicted an increase in the rate of firm exit by 1.8 percentage points under the Covid-19 scenario, or about 20 percent higher relative to the pre-Covid-19 period.

However, the actual incidence of bankruptcies in OECD countries in 2020 during Covid-19 was not only lower than that predicted in the baseline scenario of the simulated models but also lower than in the pre-Covid periods (Cros et al., 2021; Djankov and Zhang, 2021; Miyakawa et al,

[7] However, Muzi et al. (2023) argue that use of the assumed exit is a preferable option for measuring permanent firm exit, as the confirmed exit measure may underestimate the real magnitude of firm exit.

[8] Gourinchas et al. (2021) defines business failure as a situation where a firm becomes illiquid; i.e., available cash and projected cash flow are insufficient to cover fixed costs, taxes and financial expenses. Their sample of 17 countries comprise 16 OECD member countries and Romania.

[9] Archanskaia et al. (2022) identify a firm as financially vulnerable if it simultaneously satisfies the risk of insolvency criterion and the risk of default criterion. They consider that financially vulnerable firms are more likely to exit the market.

2021; OECD, 2021; Rawdanowicz and Puy, 2021).[10] This unexpected outcome is attributed mainly to the provision of ample liquidity and financial support to firms by governments and central banks during the pandemic, and temporary suspension of bankruptcy procedures in some countries for part of 2020 (Djankov and Zhang, 2021; Miyakawa et al., 2021; OECD, 2021).

Determinants of firm exit. The vulnerability of individual firms during the Covid-19 crisis and the probability of their exit from the market depend on their pre-existing financial vulnerabilities and exposure to Covid-19 shocks (Gourinchas et al., 2021). The empirical literature on this topic has focused on two main aspects: the main drivers of firm exit, with particular emphasis on the role of firm size and productivity; and whether there were significant changes in the impact of the covariates on firm exit during the Covid-19 period compared to the pre-pandemic period.

The prevalent view is that small and medium-sized enterprises (SMEs) were particularly vulnerable to the Covid-19 shock. An OECD (2020a) study argues that because of their less well-established and less diversified customer base, low cash buffers and restricted access to finance, SMEs can survive a liquidity squeeze for a shorter period than larger firms. Surveys of SMEs and scrutiny of social contact-intensive services sectors with high concentration of SMEs typically show elevated rates of firm closures and exit during Covid-19 (e.g., Bartik et al., 2020; Crane et al., 2022; OECD, 2020a).

However, evidence from multivariate analyses of firm vulnerability and exit during Covid-19 is not conclusive. The results depend on the country composition of the sample and measure of firm exit. The findings of three studies based on different subsets of the World Bank Enterprise Surveys database differ (Bosio et al., 2020; Muzi et al., 2023; Webster et al., 2021). For a sample of six countries in southern Europe, Webster et al. (2021) found that the probability of permanent exit, measured as "confirmed or assumed permanently closed", decreased as firm size became larger. However, using data for a sample of 34 countries (mostly in Europe and central Asia),

[10] See also https://www.oecd.org/coronavirus/en/data-insights/bankruptcy-rates-fall-during-covid-19 for charts on individual OECD countries showing the percentage difference in bankruptcies in 2020 and 2021, as compared to the same month or quarter in 2019. However, it is important to note that total number of firm exits can be higher than that indicated by the number of firm bankruptcies.

Muzi et al. (2023) did not find any significant relationship between firm size and permanent exit measured as "confirmed or assumed permanently closed". Though, when exit was measured as "confirmed closed," the relationship between firm size and exit was negative and significant. In a study based on data for a regionally diversified set of 12 high-income and middle-income countries, Bosio et al. (2020) found that "potential exit", proxied by the estimate of survival time in weeks, was not predicated on the size of firms. Cros et al. (2021) examined French firm-level data on bankruptcies and found a significant negative relationship between firm size and probability of bankruptcy. In contrast, in the simulation study of Archanskaia et al. (2022) the probit regression results for the manufacturing sector show that larger firms were less likely to remain financially viable in the Covid-19 scenario. Archanskaia et al. (2022) provide no explanation for this unexpected finding, but it is possible that this result was specific to the manufacturing sector where SMEs were less prevalent compared to the other sectors.

The negative economic impact of the Covid-19 pandemic and the provision of large-scale government support to mitigate the liquidity squeeze faced by firms has sparked particular attention to the relationship between firm productivity and exit during Covid-19. Empirical studies show that in a non-crisis situation less productive firms have higher probability of exit than their more productive counterparts (e.g., Jovanovic, 1982; Damijan 2017). Ordinarily, this negative productivity-exit relationship would also be expected during the crisis induced by the Covid-19 pandemic. However, if there was no efficient screening mechanism in place to ensure that only potentially viable firms received liquidity support, government support could prop up inefficient potentially unviable firms and impede the cleansing process of creative destruction (Schepens et al., 2020). The observed slowdown in bankruptcies and exit during the COVID-19 pandemic is seen by many as evidence that government support was keeping unproductive firms alive (e.g., Altomonte et al., 2021).

The findings of empirical studies that have examined how productivity was related to firm exit and vulnerability during the Covid-19 pandemic are mixed. Cros et al. (2021) and Musi et al. (2023) found a significant negative relationship between productivity and firm exit during the pandemic period, suggesting that the process of cleansing out of less productive firms was at work. In contrast, in the studies by Archanskaia et al. (2022) and Bosio et al. (2020) the relationship between productivity and firm vulnerability (a proxy for likelihood of exit) was not

statistically significant, suggesting that more productive firms were as likely to become financially vulnerable during the Covid-19 pandemic as less productive firms. Bosio et al. (2020) argue that in multiple shock scenarios, firms suffer liquidity shortages regardless of age, size, and productivity levels.

As for the related question on whether productivity-exit association uncovered during the Covid-19 pandemic was similar or different compared to the regular pre-pandemic period, Muzi et al. (2023) observed a magnification of the exit-related cleansing mechanism during the pandemic, despite the availability of government support. However, Cros et al. (2021) found no magnification of the cleansing effect: the coefficient on productivity for the pandemic period was not statistically different from that in the pre-pandemic period. Archanskaia et al. (2022) found that the link between financial vulnerability and productivity had weakened in the pandemic period.

Impact on sales

The Covid-19 pandemic had a large and widespread negative impact on sales of firms, but there was considerable heterogeneity across firms and countries. The World Bank Enterprise Surveys data for a sample of 51 countries over 6 regions show cross-country average reduction in year-on-year sales of about 49 percent in the month before the interview (Apedo-Amah et al., 2020). In some countries, such as South Africa, Bangladesh, Sri Lanka, Tunisia, and Nepal, the average year-on-year drop in sales was greater than 60 percent whereas, at the other end of the spectrum, in Slovenia the average decrease in sales was 15 percent. Studies for the United States report average drop in year-on-year sales in Q2, 2020 ranging from 17 percent to 29 percent (Bloom et al., 2021; Fairlie and Fossen, 2022; Meyer et al., 2022). In all countries, smaller firms experienced a more severe negative impact on sales than large firms. Also, the average reduction in sales was largest in activities that were deemed to be "non-essential" and remained closed beyond the mandatory lockdown period because of government-enforced social distancing restrictions. Firms in accommodation and food services sector were hit particularly hard.[11]

[11] Bennedsen et al. (2020) report that firms in the accommodation and food services sector in Denmark experienced average declines in revenue of 73 percent.

A notable aspect is that not all businesses experienced decrease in sales during the Covid-19 pandemic. The proportion of enterprises that experienced no change or increase in sales was significant. In the World Bank Enterprise Surveys cross-country database used by Apedo-Amah et al. (2020), 16 percent of the firms reported no reduction in year-on-year sales in the last 30 days before the interview.[12] In a survey conducted in Denmark in Q2, 2020, about 34 percent of the firms reported no impact or a positive impact on revenue (Bennedsen et al., 2020). In Spain, 37 percent of the firms surveyed in November 2020, reported no change or increase in sales (Fernández-Cerezo et al., 2022). Surveys in the United States also show that around 40 percent of the firms in the samples experienced a zero or positive impact on sales at the peak of the pandemic in Q2, 2020 (Bloom et al., 2021; Desai and Looze, 2020; Fairlie and Fossen, 2022).

Major reasons for the subdued negative impact or non-negative impact on sales during the pandemic were differential impact of the government-mandated restrictions and adaptation of the business model by firms to the changed environment. Typically, a firm was not forced to close and remained open if its activity was deemed "essential." Also, many firms were prompted by the pandemic to start or increase efforts to sell goods and services online and to introduce delivery services. Webster et al. (2021) found that in their sample of six Southern European countries the proportion of firms that had started or increased online business activity varied from about 13 percent in Croatia and Portugal to around 30 percent in Greece. Also, a substantial proportion of firms in five of the six countries in the sample had introduced or increased delivery services as part of their business. Barrero et al. (2020) report that concerns about face-to-face interactions had stimulated large increases in the demand for online grocery shopping and delivery services in the United States. Bloom et al. (2021) and Fairlie and Fossen (2022) too report that in their samples of United States businesses the negative impact on sales following the onset of the pandemic was less severe for firms that were engaged in online transactions.[13]

[12] Apedo-Amah et al. (2020) do not provide any data on cross-country variation in the proportion of firms that reported no reduction or increase in sales.
[13] EUROSTAT (2020) and OECD (2020c) document the impact of Covid-19 on e-sales of enterprises.

Impact on employment

The onset of the Covid-19 pandemic and the associated introduction of mandatory business restrictions and quarantine triggered large reductions in employment and in hours worked across all countries around the world, despite the resort to remote working by a substantial proportion of firms and efforts by governments to support firms and protect jobs. Employment adjustment operated mostly on the intensive margin (i.e., workers on temporary leave through furlough schemes and reduced work hours), with only a small share of firms laying off workers permanently. Thus, in the cross-country sample analyzed by Apedo-Amah et al. (2020), 63 percent of firms reported adjustment in employment in some fashion, but only 19 percent of the firms had laid off workers permanently. In their sample on United States businesses, Barrero et al. (2020) found that about 15 percent of firms had reduced or expected to reduce gross staffing in 2020, mostly in the form of temporary layoffs and furloughs. The share of permanent layoffs was only 1.5 percent. Webster at al. (2021) found that in southern Europe the proportion of firms that had decreased permanent employment ranged from 12 percent (Croatia) to 42 percent (Greece).

Apedo-Amah et al. (2020) note that permanent reduction in employment was higher among firms that had experienced larger drop in sales. In addition, larger firms were significantly more likely to both lay off and furlough workers. Government mandated closure and social distancing restrictions elicited employment adjustment in some sectors more than in others, and there were cross-country differences in the pattern. Apedo-Amah et al. (2020) observed that firms in the accommodation sector were more likely than firms in other sectors to lay off as well as furlough workers. Fernández-Cerezo et al. (2022) report that in Spain firms in hospitality services were most likely and firms in the real estate sector least likely to adjust employment. In the United Kingdom the pattern was somewhat different: manufacturing and the wholesale and retail sectors experienced the largest increase in redundancies during the pandemic (Powell et al., 2022). Webster et al. (2021) note that support from government or commercial loans to firms was critical to avoid permanent losses in employment.

Notwithstanding the huge negative employment impact, the Covid-19 shock also induced sizeable increase in gross staffing in a significant number of firms. Barrero et al. (2020) provide anecdotal evidence on a drive for new hirings at the peak of the pandemic in the United States by

takeout and delivery-oriented firms, home improvement stores, supermarkets and large retailers that had diversified into e-commerce. Large-scale hiring activity, actual and planned, continued during the pandemic, though at a much-reduced pace (Barrero et al., 2020). Data from the April 2020 Survey of Business Uncertainty indicate that about 4 percent of firms had hired or expected to hire new employees in 2020. Job Openings and Labor Turnover Survey (JOLTS) data on job openings also point to large-scale hiring plans in the immediate wake of the Covid-19 pandemic. Webster et al. (2021) report that in southern Europe the proportion of firms that had increased their permanent workers in 2020 ranged from 4 percent in Croatia to 12 percent in Malta and Italy and 30 percent in Cyprus and Greece.

Take-up of government financing support

Governments across the world implemented a wide range of support measures during the Covid-19 pandemic aimed at addressing liquidity constraints of firms and preserving jobs (OECD, 2020b; and IMF Policy Tracker cited earlier in footnote 1). While there is considerable documentation of government policies on Covid-19, only a limited number of studies have carried out multivariate analyses of the pattern of firm-level take-up of government support. Notable contributions in this area include Bennedsen et al. (2020), Bighelli et al. (2021 and 2023), Cirera et al. (2021), Fernández-Cerezo et al. (2022), Lalinsky and Pál (2022) and Mateus and Neugebauer (2022).

The government support measures can be broadly grouped into employment-based support, tax payment deferral, and debt finance support including credit guarantee and debt service moratorium.[14] Bennedsen et al. (2020) and Cirera et al. (2021) analyze receipt of government support separately for different types of policy support measures. Bighelli et al. (2021 and 2023) and Lalinsky and Pál (2022) focus on the uptake of employment subsidies, and Mateus and Neugebauer (2022) look at the utilization of state-guaranteed loans and public moratorium for existing loans. Fernández-Cerezo et al. (2022) examine the usefulness of several policy support

[14] A cross-country comparison of the measures implemented in OECD and European Union countries (OECD, 2020b) shows that employment subsidies together with income tax deferral and loan guarantee represent the most widely used measures.

measures as reported by firms, and the variable of interest is whether a firm found a specific policy measure "relevant or very relevant" in the alleviation of the Covid-19 shock.

There is some indicative evidence that the likelihood of receiving government support was higher for firms that experienced a larger pandemic-related shock. Firms in sectors most affected by the Covid-19 related lockdown and restrictions, particularly accommodation and food services sector, were more likely to take up government aid (Bennedsen et al., 2020; Bighelli et al., 2021 and 2023; Cirera et al., 2021; Mateus and Neugebauer, 2022). Also, firms that experienced drop in sales were more likely to receive support (Bennedsen et al., 2020; Cirerea et al. 2021). However, this pattern did not hold in the case of fiscal aid in Denmark. Bennedsen et al. (2020) found that financial distress or being in a hard-hit industry was not correlated with higher take up of fiscal aid.

The results of the various econometric studies indicate that, in general, small enterprises were not the main beneficiaries of government aid. Studies by Bennedsen et al. (2020) for Denmark, Cirera et al. (2021) for a sample of 60 mostly developing countries, and Bighelli et al. (2021) for Slovakia and Slovenia found that larger firms were more likely than smaller firms to take up employment-based support. In the case of Croatia and Spain, medium-sized firms were more likely to benefit from employment-based support (Bighelli et al., 2021; and Fernández-Cerezo et al., 2022, respectively). The evidence on the pattern for fiscal-related support is mixed. Cirera et al. (2021) found that the likelihood of receiving payments deferral and tax support increased with firm size. Similarly, Mateus and Neugebauer (2020) found that in Portugal larger firms were more likely to receive a state-guaranteed loan than smaller firms. In contrast, Fernández-Cerezo et al. (2022) report that in Spain small firms were more likely than larger firms to perceive state-guaranteed loans and tax deferrals as very relevant or relevant. Bennedsen et al. (2020) found no significant relationship between firm size and fiscal-related support. Cirera et al. (2021) surmises that the lower likelihood of smaller firms receiving government support may be driven by barriers to access policy support such as lack of awareness.

The provision of large-scale government support to mitigate the negative impact of the Covid-19 shock has sparked concerns about possible misallocation of resources towards firms that did not need support or towards non-viable zombie firms. Cirera et al. (2021) provide some evidence on the former tendency: in their sample of 60 mainly developing countries there was a 20 percent

likelihood of receiving public support for firms that declared not having experienced any pandemic-related shock. Also, there was a 19 percent probability of receiving government support for firms that experienced no change or increase in sales. Cirera et al. (2021) rationalize this outcome on the basis that policy support measures had to be implemented very quickly and that policy makers were more worried about the costs of inaction than about possible misallocation of resources. On the other hand, Lalinsky and Pál (2022) observed that in Slovakia profitable firms had a lower probability of receiving government support.

Empirical studies have found little evidence of misallocation of resources towards zombie firms during the Covid-19 pandemic. In all the four countries studied by Bighelli et al. (2021 and 2023), only a small share of employment subsidies went to zombie firms.[15] For Portugal, Mateus and Neugebauer (2022) report that loans with state guarantee predominantly went to non-zombie firms or firms with low zombie scores.[16] Their estimates of the linear probability model also indicate that zombie firms had a lower probability of receiving state-guaranteed loans. Lalinsky and Pál (2022) too found a negative relationship between zombie status and receipt of employment subsidies.

The evidence on the relationship between productivity and take-up of government support is mixed. In their study on Spain, Fernández-Cerezo et al. (2022) observed a negative relationship between the perceived usefulness of all types of government support measures and total factor productivity. Bighelli et al. (2021 and 2023) obtained a significant negative relationship between productivity and the likelihood of take up of employment-based support in the case of Slovenia and no significant relationship in the case of Finland. However, in Croatia and Slovakia the more productive firms had a higher likelihood of receiving government support. Lalinsky and Pál (2002) obtain a similar result in their study on Slovak firms. A deciles-based measure of productivity indicate that these relationships were not linear.

[15] Bighelli et al. (2021) classified a firm as a zombie firm if it recorded negative profits for three consecutive years and low employment growth prior to the pandemic.
[16] Mateus and Neugebauer (2022) classified a firm as a zombie if its rate of return on assets and net investment ratio were negative and debt service capacity was less than 5 percent for two consecutive years.

3. Data

Following the literature reviewed in the preceding section, this paper examines the following aspects of the impact of the Covid-19 pandemic shock on Slovene firms: (i) How did the Covid-19 shock affect the firm exit rate? (ii) Which categories of firms and sectors were most vulnerable to the Covid-19 shock in terms of exit, sales and employment? In particular, were micro, small and medium-sized firms impacted disproportionately more? (iii) Was the take up of government financing support higher for firms that experienced a larger pandemic-related shock? (iv) Did the take of government support impede the process of cleansing out of less productive firms and zombie firms?

The analysis in this paper is based on annual firm-level data from the Business Register of Slovenia and the Annual Reports of Corporate Entities that are collected by AJPES.[17] The data base pertains to all private business entities, their subsidiaries, and other organization segments, which perform profitable or non-profitable activities. Enterprises (including insurance companies, investment funds, and co-operatives), sole proprietors, legal entities governed by public law, and non-profit organizations are required to present their annual reports to AJPES for the purpose of presenting them publicly and for tax and statistical purposes. The AJPES data base includes information on firms' financial statements, full-time-equivalent (FTE) employment, industrial affiliation, location, and incorporation year of the firm to the business register. Firm-level data on the take-up of government support measures was obtained from Employment Service of Slovenia[18] and data on non-performing loan obligations were taken from the credit register maintained by the Bank of Slovenia, and the data on both variables were merged with the AJPES data base. The analysis in this paper is confined to all non-financial firms that have at least one FTE employee.[19]

[17] The AJPES database is the most comprehensive corporate sector database in Slovenia. There are several studies on the Slovene corporate sector that are based on the AJPES database. These include Banerjee and Ćirjaković (2021), Banerjee and Jesenko (2014 and 2016), Bole et al. (2014), Damijan (2017), Gabrijelčič et al. (2016), and IMAD (2014).
[18] ZRSZ – Povvračilo nadomestila place (gov.si).
[19] Sole proprietors and nonprofit organizations are excluded from the analysis in this paper because, as Damijan (2017) notes, data for sole proprietors tend to be noisy and can be of questionable quality.

Since each firm in the data set has a unique identification code, we can observe entry and exit of firms each year. A firm is considered to have exited in a particular year if it did not report data that year but had done so in the previous year. A firm is deemed to have entered business in a particular year if it started to report data that year but had not done so in the previous year. Thus, the firm exit rate is defined as the number of firms that ceased to report data in the current year divided by the total number of firms that had reported data in the previous year. The firm entry rate is defined as the number of new firms that started to report data in the current year divided by the total number of firms that reported data in the current year.

Firms are classified into four size groups (micro, small, medium, and large) in accordance with Article 5 of the Companies Act (ZGD-1). The classification is based on satisfying any two of the criteria on number of employees, annual turnover, and value of assets. Micro firms have fewer than ten workers and turnover or assets of less than €2 million. The corresponding figures for small firms are 50 workers and turnover of less than €8.8 million or assets of less than €4.40 million. For medium-sized firms the thresholds are 250 workers, turnover of less than €35 million and assets of less than €17.5 million. Above these cut-off points, firms are classified as large.

The data set comprised between 38,850 and 40,690 annual observations on firms during 2019–2021. The size distribution of firms was heavily skewed towards micro firms. Such firms accounted for nearly 90 percent of firms in the sample in 2021, while firms in the largest size category constituted about 1 percent of the total number of firms. Manufacturing and Construction (NACE categories C and F) accounted for 15 percent and 13 percent of the firms, respectively. Almost 40 percent of the firms were in Trade, Transportation and storage, and Accommodation and food service activities (NACE categories G, H, and I).

The methodology of analysis of each of the dependent variable of interest is described below in the relevant sub-sections of Section 4.

4. Empirical results

Firm exit

Broad dynamics of firm exit and entry. Simultaneous firm exit and entry is a routine phenomenon in the corporate sector. It is indicative of firm-level heterogeneity and differential responses to sectoral and aggregate (economy-wide) shocks, and reflects a process of creative destruction. Empirical studies show that firm entry is procyclical while firm exit is countercyclical, and that the procyclicality of firm entry is stronger than the countercyclicality of firm exit (see Tian, 2018). Figure 1 shows the trends in firm exit and firm entry rates in Slovenia over the period 2005–2021, and highlights the contrasting patterns during the Global Financial Crisis (GFC) and Covid-19 pandemic periods. The firm exit rate in Slovenia increased in the aftermath of the GFC to a peak of 17 percent in 2012. The shake out of firms decreased steadily in the subsequent years but remained at a level higher than during the pre-GFC period. In contrast to the outcome following the onset of the GFC shock, there was no increase in the firm exit rate during the Covid-19 pandemic shock. Rather, there was a further slowdown in the firm exit rate in 2020 and this trend continued in 2021. The entry rate of new firms also slowed down during the pandemic in 2020 but remined higher than the exit rate. Surprisingly, there was a pause in the firm entry rate in 2021 when Covid-related restrictions were absent and economic activity rebounded.

The overall trend in exit and entry rates of firms essentially reflect the dynamics of micro firms, given their dominant share in the non-financial corporate sector (Table 1). The unconditional univariate relationship between firm size and exit was negative in the pandemic as well as in the non-pandemic periods. There was a slowdown in the firm exit rate across all size groups in the pandemic year. The slowdown in the exit rate continued in micro firms in the post-pandemic year. The entry rate of new firms was also negatively related to firm size in all periods. The entry rate among micro firms slowed down in 2020 during Covid-19 and paused in the post-Covid period.

The negative impact of the Covid-19 shock is visible in the sectoral pattern of firm exit rates. The exit rate increased sharply in the accommodation and food services sector in 2020, because of lockdown in the first phase of Covid-19 outbreak and subsequent limitations on travel and the size of social gatherings during the second phase. However, the firm exit rate fell in

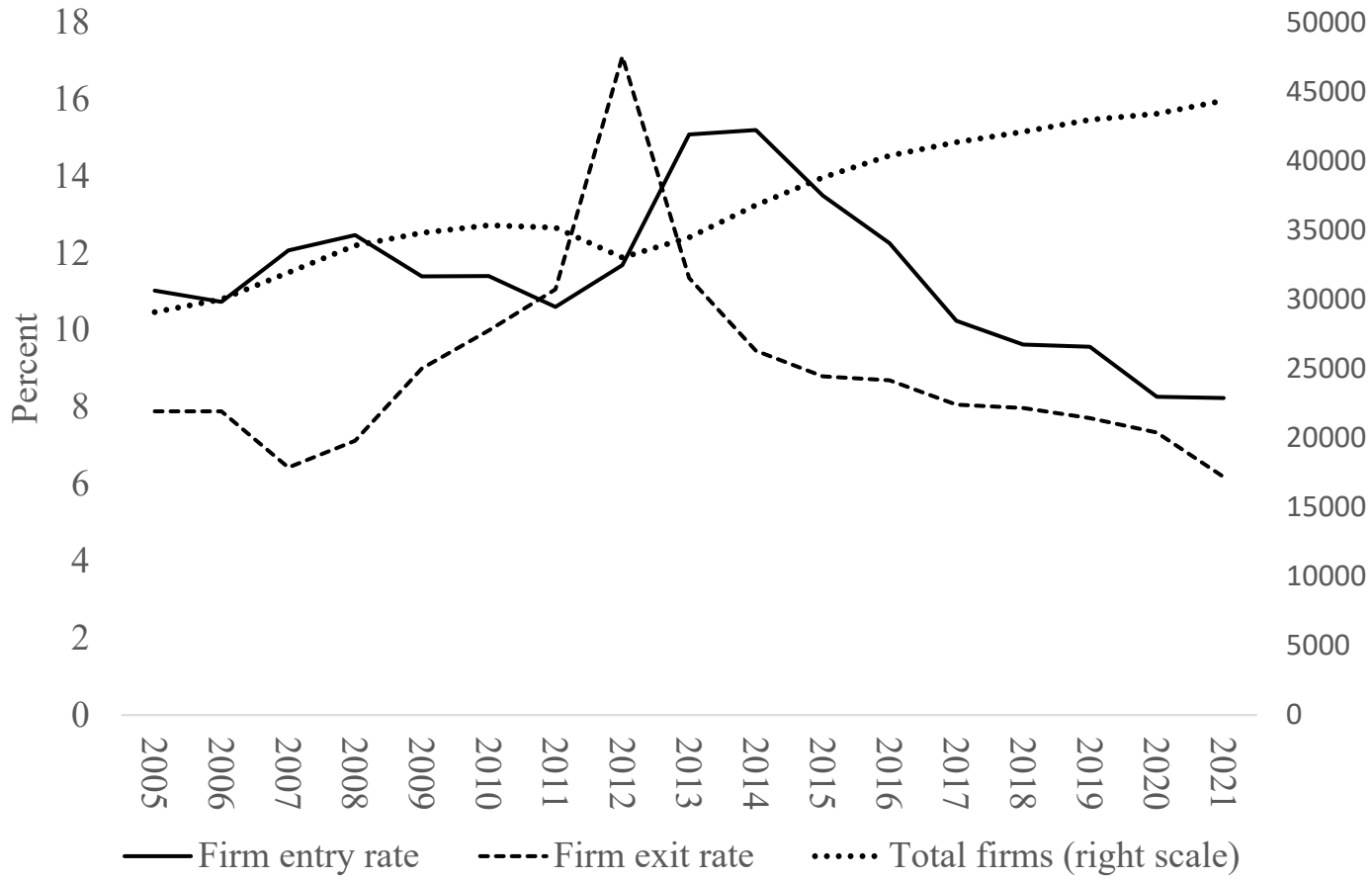

Figure 1. Slovenia: Firm entry and exit rates, 2005–2021.

Table 1: Entry and exit rates by firm size and industry, 2019–2021

	All firms	Micro firms	Small firms	Medium-sized firms	Large firms
Firm exit rate (% of firms in previous year)					
2019	7.9	8.6	1.8	1.4	1.2
2020	7.6	8.3	1.8	1.1	0.6
2021	6.4	7.0	1.5	1.3	0.9
Firm entry rate (% of firms in current year)					
2019	9.5	10.5	1.4	1.0	0.6
2020	8.2	9.1	1.1	1.1	0.8
2021	8.3	9.0	1.9	1.5	0.3

	Manufacturing	Construction	Trade	Transport and storage	Accommodation and food services	Real estate	Others
Firm exit rate (% of firms in previous year)							
2019	5.2	10.0	7.7	8.1	8.5	11.0	8.2
2020	4.8	8.5	6.8	8.1	11.2	11.3	7.8
2021	4.4	6.9	5.8	7.5	7.9	8.6	6.8
Firm entry rate (% of firms in current year)							
2019	6.1	11.3	8.4	12.6	13.1	17.0	9.3
2020	5.4	11.1	7.5	8.8	10.4	11.2	8.1
2021	6.1	11.9	7.0	8.6	10.0	12.5	7.9

manufacturing, construction, and trade indicating that these sectors were subject to less stringent limitations on conducting business once the lockdown phase ended, and perhaps could adjust their business strategies. The exit rate in all sectors of the economy, including the accommodation and food services sector, fell in 2021 to below the pre-covid period as economic activity rebounded. The firm entry rate fell in all sectors of the economy in 2020 with the outbreak of Covid-19, but with the rebound in activity in 2021 there were signs of pick-up in the firm entry rate only in manufacturing, construction, and real estate sectors.

Determinants of firm exit. We examine firm exit in a multivariate context by estimating the probability of exit versus continuation of operations using a binary probit model. The estimated equation is as follows:

$$Y_{it} = \beta_0 + \sum_k \beta_k X_{ki,t-1} + \varepsilon_i$$

where Y_i takes the value of 1 if firm *i* had exited in a particular year *t* and 0 otherwise. β_0 is the constant; β_k is the parameter estimated by the model for variable *k*; X is the vector of explanatory variables; and ε_i is the random error term. Separate regressions are estimated for the pre-Covid year (2019), the year of the COVID-19 pandemic (2020), and the post-Covid year (2021). Further, to check if the influence of the various explanatory variables is significantly different between the three years, a pooled regression for all three years combined is estimated in which the explanatory variables are interacted with dummy variables identifying the COVID-19 pandemic year and the post-Covid year.

The explanatory variables in the regression equations are similar to those that have been highlighted in the literature on corporate finance and COVID-19, and are shown in Table 2. Notably, separately from productivity, we include a variable to indicate if a firm was a zombie, defined as one that had negative equity two years in a row immediately prior to the pandemic period.[20] Productivity is entered in the equation as quintile dummies to allow for a non-linear

[20] This is also the measure used by Bonfim et al. (2023). As Mateus and Neugebauer (2022, section 3.3) have discussed, there is currently still no consensus on how to define a zombie firm. Probably the best-known approach is based on whether a firm exhibits an interest coverage ratio (ICR) below one (Albuquerque and Iyer, 2023; McGowan et al., 2017). According to the ICR criterion, less than 1 percent of the Slovene firms qualified to be classified as zombies in the pre-pandemic period, whereas according to the negative equity criterion about 10 percent of the firms could be

Table 2. Definition of explanatory variables entered in the regression equations [1]

Firm age	Number of years in operation since establishment. Classified into four grou years, 5–9 years, 10–14 years, 15 years or more. Entered in the equation as dummy variables, with the 15 years or more category as the omitted base category.
Firm size	Classified into four groups—micro, small, medium-sized and large—on the of satisfying any two of the three criteria on number of employees, annual turnover, and value of assets (see section on Data in the text). Entered in the equation as three dummy variables, with large firms as the omitted base cat
Exporter status	Classified into four groups—non-exporter, small exporter, medium exporte large exporter—depending on the share of exports to sales to other Europe Union (EU) countries and non-EU countries. Firms are classified as small exporter if share of exports in sales is less than 10 percent; medium exporte share of exports in sales is 10 percent or more but less than 50 percent; and exporter if share of exports in sales is 50 percent or more. Entered in the eq as three dummy variables, with non-exporters as the omitted base category.
Ownership status	Entered in the equation as two dummy variables: state-owned and other for ownership (viz., social, cooperative and mixed ownership). Private ownersh the omitted base category.
Industry affiliation	Entered in the equation as six dummy variables: Manufacturing (NACE classification C), Construction (F), Wholesale and retail trade (G), Transpo storage (H), Accommodation and food service activities (I), and Real estate activities (L). All other activities are grouped together and constitute the om base category.
Return on assets (ROA)	Measured as ratio of net operating profit to total assets, in percent.
Productivity	Total factor productivity (TFP) estimated using the Levinsohn-Petrin metho classified into quintiles. Entered in the equation as four dummies for quintil 4, with quintile 5 (the top quintile) as the omitted base category.
Asset tangibility	Measured as the ratio of tangible fixed assets to total assets, in percent.
Cash-asset ratio	Measured as a ratio of cash or cash equivalents to total assets, in percent.
Debt to total assets	Measured as ratio of total debt to total assets, in percent.
Zombie firm	Entered in the equation as a dummy variable equal to 1 if equity in both 201 2019 was negative; equal to 0 if otherwise.
Non-performing loan obligations (NPL)	Loan obligations are classified as non-performing if they satisfy either or bo the following criteria: (a) loan obligations which are more than 90 days past (b) the debtor is assessed as unlikely to pay its loan obligations in full witho realisation of collateral, regardless of the existence of any past-due amount the number of days past due. Entered in the equation as a dummy variable e 1 if the firm had NPL, and equal to 0 if the firm did not have NPL.

[1] All variables were measured by their values in period *t-1,* except for zombie status.

relationship with firm exit. All the variables except for profitability, tangibility, cash-asset ratio and debt-to-assets ratio are entered as dummy variables. All explanatory variables are lagged by one period in order to mitigate the problem of endogeneity. The descriptive statistics for the explanatory variables are shown in Appendix Table A1.

Since the interpretation of the coefficients in probit regressions is not straightforward, we present the average marginal effects (AME) implied by the estimated probit coefficients in Table 3. For continuous covariates, the AME indicates the amount of change in the probability of exit that results from a one-unit change in the covariate.[21] The AME for a categorical variable shows by how much the predicted probability of a choice option changes as the categorical variable changes from 0 to 1.

The likelihood of firm exit in 2020. Since the impact of COVID-19 is the primary focus of our analysis, we first look at the results of the probit regression for the COVID-19 pandemic year (2020) and then examine whether the associations observed during the pandemic year were different from those in the non-pandemic years.

The probit regression for 2020, shown in column 2 of Table 3, confirms the findings of the unconditional univariate analysis of firm exit by firm size and sector. The probability of exit of micro firms in the pandemic year was 5 percentage points higher than that of firms in the other size groups, after controlling for other firm characteristics. Ceteris paribus, the probability of exit was highest for firms in real estate activities and in the accommodation and food services sector, and lowest for firms in manufacturing and in wholesale and retail trade. The probability of exit was 2.2 percentage points higher for firms in real estate activities, about 1.3 percentage point higher for firms in accommodation and food services, and 1.6 percentage points lower in manufacturing, compared to firms in the base sector category.[22]

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classified as zombies. Significantly, there appears to be no study that has included productivity explicitly in defining a zombie firm, although zombie firms typically have low productivity. In our sample, while firms with negative equity (our measure of zombie firms) were concentrated in the lowest productivity quintile, only 25 percent of the firms in the lowest productivity quintile had negative equity.

[21] The average marginal effects were estimated using the *margins* command in STATA. The marginal effects are calculated for each observation in the data and then averaged.

[22] The base category comprises non-financial firms in NACE categories A, B, D, E, J, M, N, O, P, Q, R and S.

Table 3. Average marginal effects of Probit estimates of firm exit (predicted outcome: exit)

				2019-2021 pooled: slope and intercept dummies		
	Pre-Covid 2019	Covid 2020	Post-Covid 2021		2020 interaction dummies	2021 interaction dummies
	(1)	(2)	(3)	(4)	(5)	(6)
Firm age dummies						
Age 0 to 4	0.0271***	0.0239***	0.0282***	0.0257***	-0.0029	0.0056
Age 5 to 9	0.0218***	0.0213***	0.0156***	0.0207***	-0.0004	-0.0036
Age 10 to 14	0.0045	0.0087**	0.0026	0.0043	0.0040	-0.0014
Firm size dummies						
Micro firms	0.0455**	0.0528**	0.0289	0.0432**	0.0073	-0.0112
Small firms	0.0146	0.0290	0.0101	0.0139	0.0138	-0.0027
Medium-sized firms	0.0059	0.0168	0.0083	0.0056	0.0104	0.0036
Exporter status dummies						
Small exporters	-0.0203***	-0.0242***	-0.0175***	-0.0193***	-0.0038	-0.0001
Medium exporters	-0.0112***	-0.0054	-0.0098***	-0.0106***	0.0055	-0.0003
Large exporters	0.0124***	0.0080**	0.0025	0.0117***	-0.0041	-0.0090*
Ownership dummies						
State-owned	0.0088	-0.0316	0.0103	0.0083	-0.0385	0.0031
Other mixed ownership	-0.0096	-0.0155	0.0042	-0.0091	-0.0057	0.0138
Industry dummies						
Manufacturing	-0.0143***	-0.0160***	-0.0102***	-0.0136***	-0.0017	0.0022
Construction	-0.0078**	-0.0075**	-0.0074**	-0.0074**	0.0003	-0.0007
Wholesale & retail trade	-0.0091***	-0.0120***	-0.0100***	-0.0086***	-0.0029	-0.0024
Transport & storage	-0.0031	0.0003	0.0035	-0.0029	0.0032	0.0068
Accommodation & food services	-0.0083	0.0125***	-0.0105**	-0.0079	0.0198***	-0.0038
Real estate activities	0.0216***	0.0222***	0.0072	0.0205***	0.0007	-0.0126
Total factor productivity dummies						
Quintile 1	0.0595***	0.0630***	0.0573***	0.0564***	0.0038	0.0071
Quintile 2	0.0105**	0.0193***	0.0128***	0.0099**	0.0085	0.0043
Quintile 3	-0.0093**	0.0041	-0.0001	-0.0089**	0.0128**	0.0087
Quintile 4	-0.0089**	-0.0012	-0.0012	-0.0084**	0.0073	0.0071
Profitability (ROA)	-0.0001**	-0.0002***	4.32E-06	-0.0001**	-0.0001	0.0001**
Cash asset ratio	-0.0003***	-0.0004***	-0.0003***	-0.0003***	-0.0001	-0.0001
Tangibility	-0.0004***	-0.0004***	-0.0003***	-0.0003***	-4.5E-05	3.11E-05
Debt-to-assets ratio	0.0001***	-1.63E-06	1.57E-05***	0.0001***	-0.0001***	-0.0001**
Zombie (negative equity) dummy	-0.4481*	-0.4622*	-0.1793***	-0.4250*	-0.0168	0.2264
Nonperforming loan obligations	0.0627***	0.0575***	0.0455***	0.0595***	-0.0045	-0.0090
2020 dummy					-0.0059	
2021 dummy						0.0054
Observations	35,385	36,241	36,723	108,349		

*** p<0.01, ** p<0.05, * p<0.1

In line with the finding of Muzi et al. (2023), the probability of exit was higher for younger firms. As Muzi et al. (2023) notes, younger firms are more vulnerable to a negative shock as they are likely to have less established relations with customers and less access to resources and networks than older firms. Unlike the finding of Muzi et a. (2023), export orientation had a significant influence on firm exit in Slovenia. Small exporters in Slovenia had a smaller probability of exit and large exporters had a higher probability of exit in the pandemic period compared to non-exporters. This likely reflects differential impact of the global supply chain disruptions that occurred in the pandemic period and a greater take-up of government support by small exporters (see Table 10 on government financing support) . Ownership status had no significant relationship with firm exit during the Covid-19 pandemic.

Pre-existing financial conditions of firms had important influence on their survival prospects. The regression results suggest that the cleansing out of less profitable firms and less productive was at work during the pandemic. There was a statistically significant negative relationship between profitability and firm exit. The relationship between productivity and firm exit was non-linear. The probability of exit was highest among firms in the lowest productivity quintile, fell sharply but remained statistically significant in the second quintile, and flattened thereafter. There was no significant relationship between firm exit and productivity in the third and higher productivity quintiles. In line with expectations, firms with larger non-performing loan obligations and those with lower ratio of tangible fixed assets to total assets were more prone to exiting the market while firms with higher proportion of assets held as cash were less prone to exiting. However, the results do not show zombie firms and firms with higher debt leverage—common indicators of firm vulnerability—having a greater probability of exit in the pandemic year.

Comparing firm exit determinants in Covid-19 year and non-Covid years. The results of the pooled regression for the Covid-19 and non-covid years with interaction dummies indicate that the relationship with firm exit observed in the Covid-19 year compared with non-Covid years was significantly different only for profitability, debt leverage, and participation in accommodation and food services sector (columns 4–6, Table 3). For all the other covariates, their association with firm exit was not significantly different between the three periods. Notably, the exit probability of micro firms, younger firms, small and medium-size exporters, less

productive firms, and firms with non-performing loan obligations does not appear to have increased in the Covid-19 year. That the cleansing out of less productive firms did not increase in the Covid-19 year cannot be explained in terms of ae higher likelihood of take-up of government support by less productive firms. As Table 10 shows, there was little difference in the probability of receiving employment subsidies between firms in the first four productivity quintiles. Moreover, firms in the two bottom productivity quintiles had a lower probability of receiving bank loan moratorium. The argument of a higher propensity to take-up government support also cannot be used in the case of the observed unchanged exit-firm size relationship in the Covid-19 year, but this argument explains the unchanged exit-firm age relationship. .

The negative relationship between firm exit and profitability was not significantly different between the Covid-19 year and the pre-Covid year, implying no increase in the likelihood of exit by less profitable firms during the pandemic. However, this pattern reversed in the post-Covid year when profitability was not a significant driver of firm exit. The positive linkage between debt leverage and firm exit was absent in the COVID-19 year compared to the pre-Covid year, perhaps reflecting the mitigating effect of the temporary debt service moratorium measure available to firms. The government-mandated restrictions to contain the spread of Covid-19 had a severe negative effect on businesses in the accommodation and food services sector. The exit probability of firms in this sector shot up in the Covid-19 year compared to the pre-Covid year but fell back toward the pre-Covid level in 2021.

It is not possible to estimate the direct impact of government financing support on firm exit for 2019 and 2020 because of data-related reasons. The government support scheme did not exist in 2019. Data on government support in 2020 are available only for continuing firms but not for firms that exited that year. In a separate specification for 2021 in which government support was included as an explanatory variable lagged by one year, it had a significant negative effect on firm exit, suggesting that government financing support reduced the probability of exit. [23]

[23] The results are not reported in Table 3 but are available from the corresponding author on request.

Impact on sales

We examine two related dimensions of the impact of Covid-19 on sales. We first estimate the proportion of firms that had experienced a year-on-year decrease in sales versus no change or increase in sales, and then calculate for each of these two groups of firms the median value of the annual percentage change in sales. The calculations are done separately for the pre-Covid year (2019), the year of the COVID-19 pandemic (2020), and the post-Covid year (2021). A comparison of the developments in each year sheds light on the additive impact of the COVID-19 pandemic and the extent of recovery in the post-pandemic year. Both dimensions of the impact on sales are first examined by firm size group and industry, and the unconditional univariate analysis is followed by multivariate analysis of firm-level experience encompassing a larger set of explanatory variables.

Share of firms experiencing decrease in sales. Like firm exit, the simultaneous occurrence of decrease and increase in sales is a routine phenomenon in the corporate sector. The observed outcome for firms may differ because of firm-level heterogeneity and differential impact of demand and supply shocks. The negative impact of the Covid-19 shock on sales of Slovene firms was sizeable. For the economy as a whole, the proportion of continuing firms that experienced decline in sales jumped from 41 percent in 2019 to about 62 percent in 2020 (Table 4). A sharp jump occurred across all firm size groups and sectors. However, the magnitude of the negative impact was markedly greater among large firms and firms in accommodation and food services. In the other size groups and sectors, the frequency of firms with decreased sales varied within a narrow range. Thus, about 72 percent of large firms experienced a drop in sales in 2020 compared to 61–64 percent in the other firm-size groups. In the accommodation and food services sector, as many as 86 percent of the firms recorded a drop in sales in the pandemic year compared to 56–62 percent in the other sectors. One reason for the more severe impact of the Covid-19 shock on the accommodation and food services sector was that the government-mandated restrictions were applied to this sector throughout 2020. This sector was affected initially by the strict lockdown implemented in the first wave of the pandemic and later by the containment measures in the second wave that included travel restrictions across municipalities, and closure of restaurants, bars, and close-contact services.

Table 4: Sales status of continuing firms by firm size and sector, 2019–2021

	All firms	Micro firms	Small firms	Medium-sized firms	Large firms
			(in percent)		
Continuing firms that experienced **increase** in sales					
2019	59.4	59.2	60.8	61.7	63.0
2020	38.4	38.6	38.3	36.0	28.2
2021	71.4	70.2	80.1	82.6	85.5
Continuing firms that experienced **decrease** in sales					
2019	40.6	40.8	39.2	38.3	37.0
2020	61.6	61.4	61.7	64.0	71.8
2021	28.6	29.8	19.9	17.4	14.5

	Manufacturing	Construction	Trade	Transport and storage	Accommodation and food services	Real estate	Others
				(in percent)			
Continuing firms that experienced **increase** in sales							
2019	57.6	60.6	57.6	61.0	64.4	58.6	59.9
2020	37.7	44.2	38.7	42.0	14.1	39.7	40.0
2021	77.4	68.0	73.6	73.8	66.4	66.0	69.4
Continuing firms that experienced **decrease** in sales							
2019	42.4	39.4	42.4	39.0	35.6	41.4	40.1
2020	62.3	55.8	61.3	58.0	85.9	60.3	60.0
2021	22.6	32.0	26.4	26.2	33.6	34.0	30.6

There was a strong retreat in the occurrence of decrease in sales in 2021, reflecting the post-pandemic rebound in economic activity and release of pent-up consumer demand. The percentage of firms that experienced decrease in sales in 2021 fell to about 29 percent for the economy, which was well below the level that prevailed in the pre-Covid year. This degree of retreat was visible across all firm-size groups and sectors.

Average change in sales. For all continuing firms in the sample considered together, there was an average drop in sales of about 9 percent during the pandemic in 2020, compared with a small increase in the pre-pandemic year and a strong improvement in the post-pandemic period (Table 5). The average drop in sales was most for micro firms and accommodation and food services activities.[24] Micro firms and firms in the accommodation and food services sector on average saw their sales drop by about 10 percent and 35 percent respectively. The average decrease in sales in other firm-size groups and sectors varied within a narrow range.

The average change in sales of firms in the aggregate masks the differential experience of firms with decreased sales and increased sales. The average change in sales of these two types of firms became magnified in the pandemic year compared to the pre-covid year. However, the degree of magnification was greater for decrease in sales than for increase in sales, signifying that the negative impact was stronger than the opportunities for sales growth. For firms that experienced a contraction in sales in 2020, the average decrease was about 23 percent, which was significantly larger than the average decrease of about 14 percent suffered by firms whose sales contracted in the pre-pandemic year. In contrast, firms that experienced increased sales registered average sales growth of 19 percents in 2020, compared with a 17 percent average gain in sales reaped by such firms in 2019. In the post-pandemic year, the business environment improved markedly, and sales growth became less negative for firms with decreased sales and more positive for firms with increased sales.

Determinants of sales status of firms in 2020, the Covid-19 year. Initially, we considered examining this topic by estimating an ordered probit model with sample selection (Heckoprobit), in which the selection equation identified continuing firms and the dependent variable in the

[24] Thus, although the proportion of firms that experienced decrease in sales was lower for micro firms, among firms that experienced decrease in sales micro firms suffered more than firms in other size groups.

Table 5: Sales dynamics of continuing firms by firm size and sector, 2019–2021

	All firms	Micro firms	Small firms	Medium-sized firms	Large firms
	Median % age change in sales				
All continuing firms					
2019	4.0	4.2	3.0	2.8	2.4
2020	-9.4	-10.1	-5.5	-5.4	-7.0
2021	14.4	14.2	15.7	15.7	15.0
Continuing firms that experienced **increase** in sales					
2019	16.6	18.2	9.8	8.2	5.2
2020	19.1	21.1	10.9	8.2	6.0
2021	27.0	28.4	20.8	20.1	19.5
Continuing firms that experienced **decrease** in sales					
2019	-13.6	-14.5	-9.5	-6.5	-4.9
2020	-23.1	-24.2	-16.2	-13.8	-12.5
2021	-16.0	-16.6	-10.9	-9.2	-7.8

	Manufacturing	Construction	Trade	Transport and storage	Accommodation and food services	Real estate	Others
	Median % age change in sales						
All continuing firms							
2019	3.0	8.1	2.7	4.7	5.2	2.6	4.1
2020	-8.1	-5.6	-9.3	-4.9	-34.7	-7.6	-7.4
2021	18.8	16.5	15.8	16.1	12.4	7.0	11.4
Continuing firms that experienced **increase** in sales							
2019	15.0	29.9	14.2	17.1	13.5	18.2	16.4
2020	15.9	30.7	18.9	19.3	34.5	18.7	17.0
2021	27.3	36.5	26.4	26.3	28.8	26.9	24.6
Continuing firms that experienced **decrease** in sales							
2019	-12.0	-20.4	-12.0	-13.4	-10.3	-17.1	-13.9
2020	-18.8	-23.6	-22.0	-19.1	-38.0	-25.0	-22.9
2021	-14.1	-18.6	-14.9	-15.3	-17.4	-15.1	-16.3

outcome equation distinguished between continuing firms with decreased sales and increased sales. However, on the basis of the Wald test of independent equations, we could not reject the null hypothesis that the errors for the outcome and selection equations were uncorrelated (Chi-square (1) = 0.77; p = 0.3805). Since this test result does not favour the choice of the ordered probit model with sample selection, estimating the outcome equation for continuing firms on their own using a binary probit model would be appropriate.

We first look at the results of the probit regression on sale status for the COVID-19 pandemic year (2020) and then examine whether the associations observed during the pandemic year were significantly different from those in the non-pandemic years. The dependent variable is equal to 1 if the firm experienced decreased sales, and equal to 0 otherwise. The explanatory variables are similar to those included in the probit regression for firm exit discussed in the previous sub-section, except that profitability is excluded from the specification because of its endogeneity with sales. Unfortunately, because of lack of information we are unable to include a variable showing participation of a firm in online transactions and delivery services. For the ease of interpretation, we present the average marginal effects (AME) implied by the estimated probit coefficients in Table 6.

The AME estimates of the relationship of firm size, firm age, and ownership with sales status of continuing firms in 2020 shown in column 2 of Table 6 are in sharp contrast to the multivariate results on firm exit shown earlier in column 2 of Table 3. The contrasting pattern suggests that quite a lot of the vulnerability of micro and young firms to the Covid-19 shock was weeded out by firm exit. Whereas micro firms and younger firms were more prone to exit during the Covid-19 pandemic, among firms that remained in operation micro firms and younger firms had a lower probability of experiencing decreased sales. Among continuing firms, large firms had a significantly higher probability of decrease in sales in the Covid-19 year than the other firm size groups. The likelihood of contraction in sales became less negative (i.e., increased) progressively as firm age rose. While ownership had no significant effect on firm exit, among continuing firms state-owned firms and firms with mixed ownership had lower likelihood of drop in sales than privately owned firms.

As in the case of firm exit, sector-level heterogeneity had a significant impact on firm-level differences in sales status of continuing firms. The probability of decreased sales was

Table 6. Average marginal effects of probit estimates of sales status of continuing firms
(predicted margin outcome: decrease in sales)

				2019-2021 pooled: slope and intercept dummies		
	Pre-covid: 2019	Covid: 2020	Post-covid: 2021		2020 interaction dummies	2021 interaction dummies
	(1)	(2)	(3)	(5)	(6)	(7)
Firm age dummies						
Age 0 to 4	-0.1141***	-0.1443***	-0.0386***	-0.1068***	-0.0350***	0.0647***
Age 5 to 9	-0.0566***	-0.0436***	-0.0028	-0.0529***	0.0101	0.0499***
Age 10 to 14	-0.0332***	-0.0197***	0.0087	-0.0310***	0.0116	0.0405***
Firm size dummies						
Micro firms	0.1191***	-0.1084***	0.1672***	0.1114***	-0.2180***	0.0708*
Small firms	0.0600**	-0.1072***	0.0746**	0.0561**	-0.1615***	0.0252
Medium-sized firms	0.0277	-0.0869***	0.0412	0.0259	-0.1113***	0.0190
Exporter status dummies						
Small exporters	-0.0148**	-0.0003	-0.0383***	-0.0138**	0.0135	-0.0280***
Medium exporters	0.0057	-0.0109	-0.0081	0.0054	-0.0161	-0.0142
Large exporters	0.0350***	-0.0076	0.0479***	0.0328***	-0.0402***	0.0195*
Ownership dummies						
State-owned	-0.0299	-0.2016***	0.0079	-0.0280	-0.1701***	0.0366
Other mixed ownership	0.0248	-0.0571**	0.0127	0.0232	-0.0793**	-0.0093
Industry dummies						
Manufacturing	0.0266***	0.0184**	-0.0594***	0.0249***	-0.0068	-0.0896***
Construction	0.0130	-0.0224***	0.0241***	0.0122	-0.0342***	0.0141
Wholesale & retail trade	0.0100	0.0075	-0.0406***	0.0093	-0.0019	-0.0536***
Transport & storage	0.0007	0.0036	-0.0337***	0.0007	0.0028	-0.0374**
Accommodation & food services	-0.0353***	0.3417***	0.0416***	-0.0331***	0.3689***	0.0785***
Real estate activities	0.0148	0.0194	0.0421***	0.0138	0.0052	0.0321
Total factor productivity dummies						
Quintile 1	-0.0332***	0.0072	-0.0236***	-0.0310***	0.0381***	0.0053
Quintile 2	-0.0183*	0.0485***	-0.0109	-0.0172*	0.0648***	0.0053
Quintile 3	-0.0232**	0.0294***	-0.0130	-0.0217**	0.0506***	0.0075
Quintile 4	-0.0146	0.0071	-0.0314***	-0.0137	0.0206*	-0.0205*
Tangibility	-0.0007***	0.0003***	-0.0009***	-0.0006***	0.0009***	-0.0004**
Cash asset ratio	-0.0004***	0.0003**	8.61E-06	-0.0004***	0.0007***	0.0004**
Debt-to-assets ratio	-4.7E-05*	1.72E-06	1.09E-05	-4.4E-05*	4.59E-05**	5.61E-05**
Zombie (negative equity) dummy	0.0863***	0.0807***	0.0843***	0.0807***	-0.0014	0.0112
Nonperforming loan obligations	0.0650***	0.0399***	0.0889***	0.0608***	-0.0217	0.0361*
2020 dummy					0.3272***	
2021 dummy						-0.2036***
No. of observations	33,544	34,398	35,191	103,133		

*** p<0.01, ** p<0.05, * p<0.1

substantially greater for firms engaged in accommodation and food services activities and lowest for firms in the construction sector. Ceteris paribus, compared to the firms in the base sectoral category, the probability of decreased sales was about 34 percentage points higher for firms in accommodation and food services activities, about 2 percentage point higher for firms in manufacturing, and about 2 percentage points lower for construction firms.

Zombie firms and firms with non-performing loan obligations were more prone to decrease in sales. However, the relationship between productivity and the likelihood of decrease in sales was inverted U-shaped, with firms in the middle range of the productivity quintiles experiencing larger decrease in sales than firms in the bottom and top two productivity quintiles. This pattern was different from that observed in the case of firm exit.

Comparing determinants of sales status in Covid-19 year and non-Covid years. The results of the pooled regression for the pre-Covid year, Covid-19 year and post-Covid year with interaction dummies indicate that the relationship between the covariates and sales status was significantly different between the three periods (columns 5 to 7, Table 6). The level effect on the outcome of sales status also was significantly different from one year to another, as revealed by the coefficients on the intercept dummies. The intercept dummy was significantly positive in 2020, indicating an additive effect of Covid-19 on the likelihood of reduced sales beyond the effects through the covariates. However, the level effect fell back drastically in 2021 to below that in the pre-Covid year.

The association between firm size and the likelihood of decreased sales changed direction in the Covid-19 year compared to the pre-Covid year. There was a negative relationship between firm size and likelihood of decreased sales in 2019, in line with the typical pattern reported in the literature. However, in 2020 smaller firms that remained operational appear to have been more resilient to the Covid-19 shock than larger firms, as a result of which the eventual pattern of the relationship between firm size and likelihood of decreased sales in the Covid-year turned opposite to that observed in the pre-Covid year. The relationship in the post-Covid year reverted toward the pattern in the pre-Covid year but the turnaround was not total, and significant differences remained between the coefficients on the firm size dummies for the pre-Covid and post-Covid years.

At the sectoral level, the additive negative impact of the Covid-19 shock on the likelihood of decreased sales is noticeable only for firms in accommodation and food services. Also noteworthy, firms in the construction sector had a less negative experience on sales status in the Covid-19 year compared with the pre-Covid year. For all the other sectors, no sector-specific additive impact of the Covid-19 shock on the likelihood of decreased sales is discernible: coefficients of these sectoral dummies are not statistically different between the pre-Covid and Covid-19 years. As economic activity rebounded in the post-Covid year, the likelihood of decreased sales fell across all sectors, but there was noticeable sector-level heterogeneity. In the manufacturing, wholesale and retail trade, and transport and storage sectors, the likelihood of decreased sales fell to below the pre-Covid levels. However, in the accommodation and services sector the return to pre-Covid level was partial: the coefficient on the dummy variable for this sector was significantly higher in the post-Covid year than in the pre-Covid year.

The Covid-19 shock and the rebound in economic activity in the post-Covid year had a differential impact on firms of different age groups. Contrary to expectations, the likelihood of decreased sales fell in the Covid-19 year compared to the pre-Covid year among the youngest firms (0–4 years). The coefficients on the other age groups in the Covid-19 year are not significantly different for those in the pre-Covid year, signifying no additional impact of the Covid-19 shock. In the post-Covid year, the variation in the likelihood of decreased sales among firms of different age groups became less pronounced than in the pre-Covid year. The likelihood of decreased sales remained lowest among firms in the youngest age group but there was no significant difference between the other age groups.

The regression results indicate that the likelihood of decrease in sales of firms with non-performing loan obligations, zombie firms, least productive firms did not increase on account of the Covid-19 shock compared to the pre-Covid year. Firms across all productivity quintiles were more prone to experiencing larger decrease in sale in the Covid-19 year compared to the pre-Covid year, but firms in the second and third productivity quintiles suffered more than those in the bottom and fourth quintiles. Sales in the post-Covid year recovered across all productivity quintiles to the pre-Covid year's pattern, with firms in the fourth quintile doing better than those in the other quintiles.

Higher asset tangibility was associated with a lower likelihood of decrease in sales in the pre- and post-pandemic years, consistent with the observation that investment in tangible assets is one of the most important ways by which firms expand their sales capacity (Rabinovich, 2023). However, the relationship switched signs during the pandemic period, and the likelihood of decrease in sales was greater for firms with higher levels of tangible assets, suggesting that capital intensive firms suffered relatively more during the pandemic. The regression results also indicate that the likelihood of decrease in sales rose for more leveraged firms during the pandemic year compared to the pre-Covid year.

The impact of the Covid-19 shock on the sales status–export orientation relationship among continuing firms was strikingly different from that on exit–export orientation relationship examined earlier in Table 3. While the Covid-19 shock did not significantly change the association between firm exit and export orientation, it appears that among continuing firms the Covid-19 shock lowered the likelihood of decreased sales of large exporters compared to the other exporter groups and non-exporters In the post-Covid period, small exporters gained more from the rebound in economic activity and their probability of decreased sales was much smaller than that of the larger exporters and non-exporters.

Ownership had no significant impact on the likelihood of decreased sales among continuing firms in the pre-Covid and post-Covid years. However, during the pandemic in 2020, private firms suffered more from the shock and state-owned firms were impacted the least.

Impact on employment

Studies on job flows in Slovenia and elsewhere show that simultaneous job creation and destruction are a routine feature of labour markets (Banerjee and Jesenko, 2014; Davis, Faberman and Haltiwanger; 2006). The evidence from earlier studies reviewed in the literature survey section that shows large reductions in employment during the pandemic year taking place alongside sizeable gross staffing increase in many firms conforms with this pattern. Thus, to shed light on the additive impact of the Covid-19 shock and its subsequent waning on employment, we document the dynamics of adjustment in full time equivalent (FTE) employment in the Covid-19 year with that in the pre-Covid and post-Covid years. FTE employment is a more accurate measure of the response of employers to the business cycle or shocks than head-count

employment, as it takes into account changes in hours worked as well as number of workers.[25] If employers resort to shorter working hours as well as laying off workers, the FTE measure will show a greater extent of employment contraction than the head-count measure. We first study the dynamics of FTE employment by firm size and industry, and then follow up the univariate analysis with multivariate analysis encompassing a larger set of explanatory variables.

Dynamics of FTE employment. The Covid-19 shock led to an increase in the frequency of contraction of FTE employment and a slowdown in the frequency of expansion of FTE employment among continuing firms. In the event, the incidence of FTE employment contraction and FTE employment expansion turned out to be broadly similar in 2020. As Table 7 shows, the percentage of continuing firms that decreased FTE employment rose to 34.8 percent in 2020 from 28.6 percent in 2019. Correspondingly, the percentage of firms that increased FTE employment declined to 35.5 percent in 2020 from 41.8 percent in 2019.

With the strong rebound in economic activity in 2021 as the Covid-19 shock receded, the conditions in the labour market improved. The frequency of contraction of FTE employment fell from the Covid-19 year's level while the frequency of expansion of FTE employment rose and surpassed the cases of FTE employment contraction. However, the dynamics of FTE employment in the post-Covid year returned only partially to the pre-Covid levels, perhaps suggesting uncertainty among firm owners and managers about the economic outlook.

The tendencies of the frequencies of FTE employment contraction and expansion at the aggregate level during 2019–2021 are also visible across all firm size groups and sectors, but with considerable heterogeneity. Many different sources of firm level heterogeneity can lead to simultaneous large contraction and expansion in FTE employment within narrowly defined sectors of the economy. For example, firms with different factor intensities and production techniques, different entrepreneurial and managerial abilities, and different pre-existing financial vulnerabilities are likely to respond differently to common cost and demand shocks. A rise in the frequency of FTE employment contraction occurred across all firm size groups and sectors in 2020 following the onset of the Covid-19 shock. However, the extent of the increase was least among micro firms (by 5 percentage points from 27.8 percent in 2019 to 32.9 percent in 2020)

[25] However, the AJPES data do not allow us to estimate the importance of shorter working hours versus headcount reductions.

Table 7: Full Time Equivalent (FTE) employment dynamics of continuing firms by firm size and sector, 2019–2021

	All firms	Micro firms	Small firms	Medium-sized firms	Large firms
For continuing firms in 2019					
% of firms that increased FTE in 2019	41.8	39.3	60.2	66.4	58.3
% of firms with no change in FTE in 2019	29.7	32.9	4.3	1.5	0.3
% of firms that decreased FTE in 2019	28.6	27.8	35.5	32.2	41.4
For continuing firms in 2020					
% of firms that increased FTE in 2020	35.5	34.0	47.1	48.2	43.0
% of firms with no change in FTE in 2020	29.7	33.1	3.9	1.5	0.6
% of firms that decreased FTE in 2020	34.8	32.9	48.9	50.3	56.4
For continuing firms in 2021					
% of firms that increased FTE in 2021	37.6	35.5	54.0	58.4	56.2
% of firms with no change in FTE in 2021	30.6	34.0	3.8	1.3	0.0
% of firms that decreased FTE in 2021	31.8	30.5	42.1	40.4	43.8

	Manufacturing	Construction	Trade	Transport and storage	Accommodation and food services	Real estate	Others
For continuing firms in 2019							
% of Firms that increased FTE in 2019	47.8	49.1	38.9	52.3	48.1	30.8	36.0
% of Firms with no change in FTE in 2019	21.0	21.4	35.0	18.0	16.6	45.7	36.4
% of Firms that decreased FTE in 2019	31.2	29.5	26.1	29.7	35.3	23.5	27.6
For continuing firms in 2020							
% of Firms that increased FTE in 2020	37.6	42.4	32.7	43.5	33.7	26.9	33.2
% of Firms with no change in FTE in 2020	20.9	20.8	35.6	18.4	16.1	49.1	36.3
% of Firms that decreased FTE in 2020	41.5	36.8	31.6	38.1	50.2	24.0	30.5
For continuing firms in 2021							
% of Firms that increased FTE in 2021	44.4	44.3	34.9	44.3	37.4	20.9	33.9
% of Firms with no change in FTE in 2021	21.1	20.8	36.8	19.2	17.8	54.0	37.3
% of Firms that decreased FTE in 2021	34.5	35.0	28.3	36.4	44.8	25.1	28.8

and highest among medium-sized firms (by 18 percentage points from 32.2 percent in 2019 to 50.3 percent in 2020). At the sectoral level, hardly any increase in FTE employment contraction was recorded in the real estate sector and the most increase occurred in the accommodation and food services sector (by 15 percentage points from 35.3 percent in 2019 to 50.2 percent in 2020). The pattern of the corresponding fall in the frequency of FTE employment expansion was a mirror image of the pattern of the rise in FTE employment contraction.

There was a drop in the incidence FTE employment contraction and a corresponding rise in the incidence of FTE employment expansion in 2021. The improvement in the employment outcome was more noticeable among medium-sized and large firms, and among firms in manufacturing and accommodation and food services sector. However, the overall state of affairs in the labour market remained less favourable than that in the pre-Covid year.

Determinants of FTE employment dynamics of continuing firms in the pandemic year (2020). We estimate a multinomial probit model for continuing firms in which firms face three options: no change in FTE employment, increase in FTE employment, and decrease in FTE employment. The explanatory variables are similar to those included in the probit regression for firm exit discussed earlier. In addition, we estimate the influence of change in sales and take-up of government financing support. As Apedo-Amah et al. (2020) found, the likelihood of a contraction in FTE employment is expected to be higher, the larger is the drop in sales. Also, since a key objective of government financing support is to provide liquidity and protect employment, it is expected that the likelihood of contraction of FTE employment will be smaller for firms that have received financing support from the government and central bank. We also expect that the standard indicators of financial vulnerability will have positive association with FTE employment contraction; i.e., the higher is the degree of ex-ante financial vulnerability the greater will be the likelihood of employment contraction. In order to avoid the problem of endogeneity, all explanatory variables except for change in sales and government financing support are measured by their pre-covid values. The last two variables are measured by their current values in the pandemic year. For the ease of interpretation, we show the average marginal effects implied by the multinomial probit model.

Most of the findings of the probit regression are consistent the hypotheses noted in the previous paragraph (Table 8). The AME of change in sales shows, in line with *a priori* expectations, a

significant negative relationship between change in sales and downward adjustment in FTE employment. A one percent increase in sales in the Covid-19 year lowered the likelihood of contraction in FTE employment by 0.21 percentage points and increased the likelihood of increase in FTE employment by 0.24 percentage points. Government financing support for enterprises had a strong positive effect on facilitating employment growth. Receiving government financing support increased the probability of FTE employment growth by 7.4 percentage points. However, the finding on the effect of temporary moratorium on servicing of bank debt on employment adjustment is not consistent with a priori expectations. The AME coefficient suggests that firms availing of the debt service moratorium facility had 7.2 percentage points higher probability of FTE employment contraction than those who did not avail of this facility. It is possible that firms which availed of debt service moratorium had a pessimistic longer-term view of their business prospects and determined that an immediate restructuring of their business model was in order. This explanation would be consistent with the finding that firms with larger non-performing loan obligations had a higher probability of FTE employment contraction.

In line with *a priori* expectations, firms that were less financially vulnerable prior to the Covid-19 shock were generally less likely to reduce employment. Thus, the probit regression estimates show that firms that were more profitable and had more cash buffer had a lower probability of reducing their FTE employment. However, the impact of total debt burden on employment adjustment is contrary to expectations and difficult to explain in the multivariate setting. Ceteris paribus, firms with higher debt burden were less likely to reduce employment. A one percent increase in the outstanding debt-to-assets ratio decreased the probability of FTE employment contraction by 0.02 percentage points.

Significantly, zombie firms were more likely to undertake downward adjustment to FTE employment during the pandemic. However, the likelihood of downward adjustment in employment was least among firms in the bottom productivity quintile compared to more productive firms. Firms across the other productivity quintiles were almost equally likely to reduce FTE employment.

The likelihood of downward adjustment in employment in the pandemic year was lowest among young firms and micro firms and highest among firms in the accommodation and food services

Table 8. Average marginal effects implied by estimates of multinomial probit model of full-time equivalent (FTE) employment status of continuing firms in 2020

	FTE unchanged	FTE increased	FTE decreased
Firm age dummies			
Age 0 to 4	-0.1033***	0.1347***	-0.0314***
Age 5 to 9	-0.0505***	0.0567***	-0.0062
Age 10 to 14	-0.0192***	0.0284***	-0.0092
Firm size dummies			
Micro firms	0.5028***	-0.1552***	-0.3476***
Small firms	0.2128***	-0.0467	-0.1661***
Medium-sized firms	0.1077	-0.0064	-0.1013
Exporter status dummies			
Small exporter	-0.0578***	0.0258***	0.0320***
Medium exporter	-0.0312***	0.0044	0.0268***
Large exporter	-0.0111	-0.0103	0.0214***
Ownership dummies			
State-owned	-0.2529***	0.1757***	0.07724
Other mixed ownership	-0.0761**	-0.0061	0.0822***
Industry dummies			
Manufacturing	-0.0541***	0.0016	0.0526***
Construction	-0.1221***	0.0456***	0.0765***
Wholesale & retail trade	0.0349***	-0.0190***	-0.0159**
Transport & storage	-0.0968***	0.0492***	0.0475***
Accommodation & food services	-0.1665***	0.0524***	0.1141***
Real estate activities	0.0835***	-0.0572***	-0.0263
Total factor productivity dummies			
Quintile 1	0.1838***	-0.1923***	0.0092
Quintile 2	0.0759***	-0.1323***	0.0564***
Quintile 3	0.0189**	-0.0949***	0.0760***
Quintile 4	-0.0228***	-0.0459***	0.0687***
Profitability (ROA)	0.0003***	0.0008***	-0.0010***
Cash-asset ratio	0.0017***	-0.0006***	-0.0011***
Tangibility	-0.0005***	0.0004***	6.09E-05
Total debt-to-assets ratio	7.58E-05***	0.0001***	-0.0002***
Zombie (negative equity) dummy	0.0137	-0.0507***	0.0370***
Non-performing loan obligations	-0.0146	-0.0128	0.0273*
Change in sales	-0.0003***	0.0024***	-0.0021***
Government support dummy	-0.0920***	0.0738***	0.0182***
Bank moratorium dummy	-0.0522***	-0.0199**	0.0722***
(N)	34,006		

*** p <0.01; ** p <0.05; * p <0.1

sector. These findings are similar to those obtained by Apedo-Amah et al. (2020) in their cross-country study on 51 countries. Compared to their older counterparts, young firms in the age category of 0 to 4 years were about 3 percentage points less likely to reduce FTE employment and 13 percentage points more likely to increase in FTE employment. The likelihood of increase in FTE employment was a declining function of age. Micro firms had 35 percentage points lower probability of downward adjustment in employment compared to large firms. Furthermore, micro firms were more likely than other firm size groups to make no adjustment to FTE employment: their probability of no change in FTE employment was about 50 percentage points higher compared to the choice outcome of large firms. For firms in the accommodation and food services sector, the probability of FTE employment contraction was 11.4 percentage points higher compared to the choice outcome of firms in the base NACE categories.

Export orientation and ownership also influenced the employment response to the Covid-19 shock. Exporters of all size classes were almost equally likely to decrease FTE employment compared to non-exporters. Small and medium exporters were less likely to keep FTE employment unchanged. This underscores the firm-level heterogeneity and idiosyncratic effects within narrowly defined groups. State-owned firms were more likely than other ownership groups to increase FTE employment during the Covid-19 pandemic year.

Take-up of government financing support

In this sub-section we examine the pattern of firm-level take up of employment-based support, support for coverage of fixed costs, and bank loan moratorium in Slovenia in 2020. Employment-based support comprised of three broad categories: wage subsidy to compensate workers for reduced working hours, wage subsidy to compensate workers temporarily laid-off (furloughed), and wage support to pay employees who were placed in quarantine because of Covid-19.[26] We first consider the unconditional univariate distribution of each type of

[26] In order to benefit from wage subsidy for reduced working hours, firms must have suffered at least a 20 percent drop in revenues in 2020 compared to 2019. In the case of the wage subsidy scheme for temporary layoffs, the initial plan was to limit this benefit only to sectors worst hit by the Covid-19 shock, but later this provision was replaced with a stricter eligibility criterion of at least a 30 percent drop in turnover in 2020 compared with the previous year (see EBRD, Country Assessment for Slovenia, 2020). The EBRD country assessment report and its update for

employment-based support and coverage of fixed costs by firm size and sector for all continuing firms in the sample, and then report the results of multivariate probit regressions. A similar exercise is done for the take-up of bank loan moratorium, but the analysis is confined to continuing firms that had bank loans.

Univariate analysis of take up of government support by continuing firms. Slightly more than one half of continuing firms received employment-based support in one form or another. The most common type of employment-based support was wage subsidy for furloughed workers. In the aggregate, 45 percent of continuing firms received this type of support while the take up of wage subsidy for reduced working time and for employees being in quarantine was limited to only 14–16 percent of continuing firms (Table 9). The utilization of wage subsidies varied across firm size classes and sectors. For all three types of wage subsidies, the proportion of firms receiving support increased with firm size. At the sectoral level, the accommodation and food services sector was the largest recipient of wage subsidies for furloughed workers and reduced working time, while firms in the manufacturing sector had the highest take up of wage subsidy for employees being in quarantine.

The take up of partial coverage of fixed cost was considerably less frequent than employment-based support. The pattern of take up of this type of support by firm size was also different from that for employment-based support. Only 17 percent of the firms received partial coverage for fixed costs, and the take up of this type of was more prevalent among micro and small firms than among larger firm size groups.

Take up of loan moratorium was considerably less frequent than employment-based support. Only about 19 percent of firms with bank debt (or 7 percent of all continuing firms) received moratorium on bank loans. An overwhelming majority (83 percent) of firms that received loan

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Slovenia report that these measures were extended till mid-2021. However, as of December 2021, only half of the support announced at the beginning of the pandemic had been used.

Loan moratoria eligibility conditions were in line with the European Banking Authority (EBA) guidelines and allowed payments deriving from liabilities to be deferred for up to 12 months ((See https://www.eba.europa.eu/eba-publishes-guidelines-treatment-public-and-private-moratoria-light-covid-19-measures)

Table 9. Take up of Government financing support and bank loan moratorium by continuing firms in 2020

	All firms	Micro firms	Small firms	Medium-sized firms	Large firms
	% of continuing firms in each category that received:				
(1) Wage subsidy for reduced working hours	14.0	13.9	14.2	15.6	19.9
(2) Wage subsidy to compensate workers temporarily laid off (furloughed)	45.3	44.7	49.9	50.6	54.4
(3) Wage subsidy to pay employees placed in quarantine	15.6	10.8	44.7	69.2	83.8
(1) or (2)	48.1	47.6	51.5	52.7	55.3
(1) or (2) or (3)	54.6	52.0	70.3	81.8	87.7
(4) Partial coverage of fixed costs	17.1	17.7	13.6	10.9	10.0
(5) Moratorium on bank loans (% of continuing firms with bank debt)	18.9	17.2	26.0	26.8	23.5

	Manufacturing	Construction	Trade	Transport and storage	Accommodation and food services	Real estate	Others
	% of continuing firms in each category that received:						
(1) Wage subsidy for reduced working hours	15.9	6.6	16.3	8.6	28.8	11.3	12.8
(2) Wage subsidy to compensate workers temporarily laid off (furloughed)	45.6	38.6	50.2	40.0	84.2	34.4	39.3
(3) Wage subsidy to pay employees placed in quarantine	27.9	12.0	14.9	10.0	9.3	9.6	14.5
(1) or (2)	49.0	40.2	53.0	42.2	85.6	37.1	42.5
(1) or (2) or (3)	60.1	46.0	57.8	46.5	86.5	42.3	49.8
(4) Partial coverage of fixed costs	10.9	8.9	17.4	11.3	70.4	12.7	14.4
(5) Moratorium on bank loans (% of continuing firms with bank debt)	19.2	9.7	18.1	20.0	49.0	13.5	15.7

moratorium also received employment-based support. Take up of loan moratorium was lowest among micro firms but was equally prevalent among the other firm size groups. Firms in the accommodation and services sector had a higher tendency than firms in other sectors to receive loan moratorium.

Probit regression results for take up of employment-based support by continuing firms. Probit regressions were estimated for the take up of any type of employment-based support and separately for each type of employment-based support, partial coverage of fixed costs and, for firms with bank loans, bank loan moratorium. The empirical results presented in Table 10 are broadly in line with the findings of earlier studies reviewed in the literature survey.

In many respects, the probability of receiving employment-based support in any form was lower (higher) for firms that had less (more) need for support (column 1, Table 10). Thus, firms were less likely to take up support if they experienced higher growth in sales, were more profitable, and had higher cash buffers. The coefficients on all these covariates were negative and statistically significant. In a similar vein, firms in the accommodation and food services sector—the sector that was most negatively affected by the pandemic—were more likely to receive employment-based support in any form.

There also was little evidence of misallocation of resources towards firms with non-performing loan obligations, zombie firms and low productivity firms. The likelihood of receiving any form of employment-based support was lower for firms with non-performing loan obligations and zombie firms. The take up of any form of employment-based support also was weakly related to productivity. The take up of support was almost equally likely across the productivity spectrum except for firms in the top productivity quintiles for whom the likelihood dropped sharply.

Larger firms in Slovenia were more likely than smaller firms to receive employment-based support in any form, which is similar to the findings of Bennedsen et al. (2020), Bighelli et al. (2021) and Cirera et al. (2021), but contrary to the observations in an OECD study (OECD, 2020b). The lower likelihood of smaller firms receiving support is perhaps a reflection of less need: as discussed earlier, micro firms that remained operational during the Covid-19 pandemic had a lower probability of experiencing decreased sales.

Table 10. Average marginal effects of probit estimates of take up of government support by continuing firms in 2020

		Wage subsidy for workers on:				
	Any employment-based support	Reduced working hours	Temporary layoff (furlough)	Quarantine	Partial coverage of fixed costs	For firms with bank debt: Bank loan moratorium
	(1)	(2)	(3)	(4)	(5)	(6)
Firm age dummies						
Age 0 to 4	0.0161**	-0.0222***	0.0323***	-0.0285***	0.0212***	0.0195*
Age 5 to 9	-0.0136**	-0.0203***	0.0039	-0.0211***	0.0119***	0.0221**
Age 10 to 14	-0.0141*	-0.0025	-0.0018	-0.0157***	0.0087*	-0.0007
Firm size dummies						
Micro firms	-0.4576***	-0.1017***	-0.1922***	-0.3977***	-0.0546***	-0.0689**
Small firms	-0.2477***	-0.0715***	-0.0850***	-0.2257***	-0.0125	0.0067
Medium-sized firms	-0.0902***	-0.0422**	-0.0471*	-0.0928***	-0.0107	0.0234
Exporter status dummies						
Small exporters	0.0525***	0.0269***	0.0521***	0.0184***	-0.0050	0.0370***
Medium exporters	0.0301***	0.0239***	0.0283***	0.0088	-0.0200***	0.0482***
Large exporters	-0.0249***	-0.0145**	-0.0060	-0.0303***	-0.0450***	0.0122
Ownership dummies						
State-owned	0.0392	-0.0759*	-0.2235***	0.0877***	-0.0449	-0.2358***
Other mixed ownership	0.0301	0.0285	-0.0166	0.0400**	-0.0141	-0.0385
Industry dummies						
Manufacturing	0.0405***	0.0282***	0.0308***	0.0406***	-0.0194***	-0.0181*
Construction	-0.0403***	-0.0776***	-0.0133	-0.0205***	-0.0585***	-0.0803***
Wholesale & retail trade	0.0558***	0.0348***	0.0952***	-0.0241***	0.0369***	0.0144
Transport & storage	-0.0777***	-0.0499***	-0.0268**	-0.0952***	-0.0324***	-0.0257*
Accommodation & food services	0.3619***	0.1008***	0.4077***	-0.0409***	0.2336***	0.2048***
Real estate activities	-0.0614***	-0.0061	-0.0411**	-0.0442***	-0.0248*	0.0064
Total factor productivity dummies						
Quintile 1	0.1155***	0.0955***	0.1522***	-0.1321***	0.1072***	-0.0111
Quintile 2	0.1262***	0.1033***	0.1543***	-0.0696***	0.1055***	0.0177
Quintile 3	0.1316***	0.0878***	0.1499***	-0.0106*	0.0953***	0.0356***
Quintile 4	0.1102***	0.0622***	0.1091***	0.0250***	0.0682***	0.0423***
Profitability (ROA)	-0.0002*	-1.3E-05	-0.0003***	-0.0003***	0.0001	-0.0006**
Cash-asset ratio	-0.0010***	-0.0004***	-0.0008***	-0.0005***	-0.0005***	-0.0049***
Tangibility	0.0010***	0.0002***	0.0009***	0.0006***	0.0004***	0.0015***
Debt-to-assets ratio	2.99E-05	3.63E-06**	-7.44E-06***	-4.6E-05**	2.87E-05**	0.0002***
Zombie (negative equity) dummy	-0.0304**	-0.0347***	-0.0131	-0.0251**	-0.0390***	-0.1593***
Change in sales in 2020	-0.0021***	-0.0013***	-0.0029***	0.0003***	-0.0037***	-0.0013***
Nonperforming loan obligations	-0.0278*	-0.0052	-0.0128	-0.0106	0.0394***	0.0370**
(N)	34,006	34,006	34,006	34,006	34,006	13,127

*** p<0.01, ** p<0.05, * p<0.1

The probability of take up of employment-based support of any type was higher for firms in the youngest age group (0 to 4 years) and for small and medium exporters, even though firms in these categories were less likely to experience decrease in sales during the pandemic year.

Similar results are observed for the take up of the separate types of employment-based support except for notable differences between them with respect to the impact of debt leverage, zombie status, productivity and profitability (columns 2 to 4, Table 10). The effect of debt leverage on the likelihood of receiving wage subsidies was positive for reduced working time but negative for temporary layoffs and having workers placed on quarantine. The likelihood of receiving wage subsidies for temporary layoffs was not significantly influenced by whether or not a firm was a zombie, whereas zombie firms had a lower likelihood of receiving the other types of employment-based support. In contrast to the pattern for wage subsidies for reduced working time and temporary layoffs, firms in the three lower productivity quintiles were less likely to take up wage subsidies for having workers placed in quarantine. Profitability had no significant effect on the take up of wage subsidies for reduced working time.

The pattern for the take up of bank loan moratorium was similar in most respects to that for employment-based support. Thus, firms were less likely to take up bank loan moratorium if they experienced higher growth in sales, were more profitable, had higher cash buffers, and were micro firms and zombies. Furthermore, the likelihood of bank loan moratorium was higher for firms in the accommodation and food services sector and for small and medium exporters. As in the case of wage subsidy for reduced hours and temporary layoffs, state-owned firms were less likely to take up bank loan moratorium.. However, in contrast to the pattern for the different types of employment-based support, firms in the two lowest productivity quintiles were less likely and firms with non-performing loan obligations and higher debt leverage were more likely to avail of bank loan moratorium. The latter finding is not surprising as such firms typically have higher debt service obligations.

The pattern of uptake of support for fixed costs is similar to that for any type of employment support (compare column 5 with column 1 of Table 10), except in two respects. Highly leveraged firms were more likely to take up support for fixed costs, but profitability had no significant impact.

5. Conclusions

Slovenia experienced three waves of the Covid-19 pandemic during March 2020–April 2021. The authorities acted quickly to contain the spread of the pandemic by introducing containment measures of varying restrictiveness during each wave and initiated various forms of financing support to help mitigate the negative impact of the epidemic on firms and households. As a result of the pandemic-related shocks real GDP declined in 2020, with the drop in activity within the year being deepest in the periods when the containment measures were most restrictive.

Using annual firm-level data for the entire universe of non-financial firms in Slovenia, this paper examined the impact of the pandemic on several aspects of firm outcomes; in particular, exit, sales, employment and take up of government financing support. To obtain a proper assessment of the impact of the pandemic, the outcomes in the pandemic year were compared with the outcomes in the pre-Covid year and the post-Covid year. Thus, the focus of the empirical analyses was on estimating the extent of change in the outcome of interest in the pandemic year, identifying the main drivers of the outcomes in a multivariate framework, and testing whether there were significant changes in the impact of the covariates on a particular outcome during the pandemic year compared to the pre-pandemic and post-pandemic years. The analyses identified the firm-level and sectoral level heterogeneities in the impact of the Covid-19 shock and shed light on the debate on whether the Schumpeterian process of cleansing of less-productive firms was magnified or paused during the pandemic year. The paper also examined the pattern of take up of different types of government financing support to determine if government aid reached firms that needed it most.

In line with the findings of several earlier studies on OECD countries, there was no increase in the firm exit rate in Slovenia following the onset of the Covid-19 shock. In fact, there was a further slowdown in the firm exit rate in 2020 and this trend continued in 2021. While the probability of exit during the pandemic year was higher for micro firms, younger firms, zombie firms and less productive firms there was no evidence that such firms were impacted disproportionately more from the pandemic induced shock compared to the pre-Covid period. Firms in the accommodation and food services sector were most badly hit by the pandemic, reflecting the fact that government-mandated restrictions were applied to this sector throughout

2020. The exit rate of firms in this sector shot up significantly during the pandemic compared to the pre-Covid year, notwithstanding a higher take up of government financing support.

The negative impact of the Covid-19 shock on sales of Slovene firms that remained operational during the pandemic was sizeable. Compared to the pre-pandemic year, there was a sharp increase in both the proportion of continuing firms that experienced drop in sales and average decline in the value of sales. Firms of all size groups and age categories suffered lower sales. However, contrary to common expectations, the magnitude of the negative impact was significantly less for smaller firms and younger firms. At the sectoral level, the additive negative impact of the Covid-19 shock on sales was noticeable only for firms in accommodation and food services. Not all businesses experienced decrease in sales during the Covid-19 pandemic. In the post-pandemic year, the business environment improved markedly and sales growth rebounded.

Because of data constraints, the paper does not include in the analysis of sales whether an activity was deemed as "essential" and whether firms adapted their business model towards online sales and delivery services. In addition, we are unable to incorporate the influence of global value chain participation of firms.

The Covid-19 shock led to an increase in the frequency of contraction of FTE employment across all firm size groups and sectors. However, the extent of the contraction was least among micro firms and young firms and most in the accommodation and food services sector. The likelihood of a contraction in FTE employment was higher the larger was the drop in sales. The take up of government financing support had a strong positive effect on facilitating employment growth.

The findings on the pattern of take up of employment-based support, coverage of fixed costs and loan moratorium suggest that the schemes were well-targeted and successfully implemented. Reassuringly, employment-based support went to firms with greater need for support, such as those experiencing higher declines in revenue and having smaller cash buffers, and the take up of support had a strong positive effect on facilitating employment growth. There also was little evidence of misallocation of resources towards firms with non-performing loan obligations, zombie firms and low productivity firms. Micro firms were less likely than firms in the larger size groups to take up government financing support, but this did not reflect shortcomings in the

implementation of the program as micro firms in Slovenia turned out to be more resilient than firms in other size groups to the pandemic shock.

References

Altomonte, C., Demertzis, M., Fontagné, L. and Müller, S. 2021. COVID-19 financial aid and productivity: has support been well spent? *Policy Contribution* 21/2021, Bruegel https://www.bruegel.org/sites/default/files/wp_attachments/PC-21-031121.pdf

Albuquerque, B. and Iyer, R. 2023. The Rise of the Walking Dead: Zombie Firms Around the World. International Monetary Fund Working Paper WP/23/125, Washington DC. https://www.imf.org/en/Publications/WP/Issues/2023/06/16/The-Rise-of-the-Walking-Dead-Zombie-Firms-Around-the-World-534866

Apedo-Amah, M. C., Avdiu, B., Cirera, C., et al. 2020. Unmasking the impact of COVID-19 on businesses: Firm level evidence from across the world. Policy Research Working Paper 9434, The World Bank, Washington D.C. https://openknowledge.worldbank.org/server/api/core/bitstreams/b26d46b1-969d-59f8-9c03-554e94e7a1a1/content

Archanskaia, L., Nikolov, P. and Simons, W. 2022. Estimates of corporate cleansing during Covid-19 using firm-level data to measure its productivity impact. *Quarterly Report on the Euro Area* 21 (2): 7-18. https://economy-finance.ec.europa.eu/system/files/2022-07/ip184_en-chapter%20I.pdf

Banerjee, B. and Ćirjaković, J. 2021. Firm Indebtedness, Deleveraging, and Exit: The Experience of Slovenia during the Financial Crisis, 2008–2014. *Eastern European Economics* 59 (6): 537-570. DOI: 10.1080/00128775.2021.1966310

Banerjee, B. and Jesenko, M. 2014. Dynamics of firm-level job flows in Slovenia, 1996–2011. *Comparative Economic Studies* 56 (1): 77–109.
DOI:10.1057/ces.2013.30

Banerjee, B. and Jesenko, M. 2016. The role of firm size and firm age in employment growth: Evidence for Slovenia, 1996–2013. *The European Journal of Comparative Economics* 13 (2): 201–221.
https://ejce.liuc.it/18242979201602/182429792016130203.pdf

Barrero, J. M., Bloom, N. and Davis, S. J. 2020. COVID-19 Is Also a Reallocation Shock. *Brookings Papers on Economic Activity*, Summer: 329–371.
https://www.brookings.edu/wp-content/uploads/2020/06/SU20_S5_1_Barrero-et-al_-final-paper.pdf

Bartik, A., Bertrand, M., Cullen, Z.B. et al. 2020. The impact of COVID-19 on small business outcomes and expectations. Working Paper 20-102, Harvard Business School.
https://www.hbs.edu/faculty/Pages/item.aspx?num=58690

Bennedsen, M., Larsen, B., Schmutte, I. and Scur, D. 2020. Preserving job matches during the COVID-19 pandemic: firm-level evidence on the role of government aid.
Department of Economics Working Paper, University of Copenhagen.
https://www.economics.ku.dk/fambuss/publications/covid19_projekt_5_.pdf

Bighelli, T., Lalinsky, T. and CompNet Data Providers. 2021. COVID-19 government support and productivity: Micro-based cross-country evidence. *CompNet Policy Brief* No.14.
https://www.comp-net.org/fileadmin/_compnet/user_upload/Policy_Brief_14th_edition_Bighelli_Lalinsky_Covid_support_and_productivity_Micro_based_evidence.pdf

Bighelli, T., Lalinsky, T. and Vanhala, J. 2023. Cross-country evidence on the allocation of COVID-19 government subsidies and consequences for productivity. *Journal of The Japanese and International Economies* 68: 101246.
https://doi.org/10.1016/j.jjie.2023.101246

Bloom, N., Fletcher, R. S. and Yeh, E. 2021. The impact of Covid-19 on US firms. Discussion Paper No.1788. Centre for Economic Performance, London School of Economics and Political Science, London. https://cep.lse.ac.uk/pubs/download/dp1788.pdf

Bole, V., Prašnikar, J. and Trobec, D. 2014. Policy measures in the deleveraging process: A macroprudential evaluation. *Journal of Policy Modeling* 36 (2): 410–432.
https://doi.org/10.1016/j.jpolmod.2014.01.007

Bonfim, D., Cerqueiro, G., Degryse. H. and Ongena, S. 2023, On-site inspecting zombie lending, *Management Science,* 69 (5): 2547–2567
https://doi.org/10.1287/mnsc.2022.4452

Bosio, E., Djankov, S. Jolevski, F. and Ramalho, R. 2020. Survival of firms during economic crisis. Policy Research Working Paper No. 9293, World Bank, May.
https://openknowledge.worldbank.org/entities/publication/2c9bdc94-07b4-535a-960f-f9652423f5be

Cirera, X., Cruz, M., Davies, E. et al. 2021. Policies to support businesses through the COVID-19 Shock: a firm level perspective. Policy Research Working Paper 9506. The World Bank. Washington, D.C.
http://hdl.handle.net/10986/35012

Crane, L. D., Decker, R. A., Flaaen, A., Hamins-Puertolas, A., and Kurz, C. 2022. Business exit during the COVID-19 pandemic: non-traditional measures in historical context. Journal of Macroeconomics 72, 103419.
https://doi.org/10.1016/j.jmacro.2022.103419

Cros, M., Epaulard, A. and Martin, P. 2021. Will Schumpeter Catch Covid-19? CEPR Discussion Paper No. 15834.
https://cepr.org/publications/dp15834

Damijan, J. P. 2017. Corporate financial soundness and its impact on firm performance: implications for corporate debt restructuring in Slovenia. *Post-Communist Economies* 30 (1): 1–37. DOI: 10.1080/14631377.2017.1398518

Davis, S. J., Faberman, J. and Haltiwanger. J. 2006. The flow approach to labor markets: New data sources and micro-macro Links. *Journal of Economic Perspectives* 20 (3): 3–26. https://doi.org/10.1257/jep.20.3.3

Decker, R. A., and John Haltiwanger, J. 2022. Business entry and exit in the COVID-19 pandemic: A preliminary look at official data. FEDS Notes. Washington: Board of Governors of the Federal Reserve System, May 06, 2022.
https://doi.org/10.17016/2380-7172.3129.

Desai, S. and Looze, J. 2020. Business owner perceptions of COVID-19 effects on the business: Preliminary findings. Trends in Entrepreneurship Series no. 10, Kauffman Foundation.
https://www.kauffman.org/entrepreneurship/reports/business-owner-perceptions-covid-19/

Djankov, S. and Zhang, E. 2021. As COVID rages, bankruptcy cases fall. VoxEU.org. 4 February.
https://cepr.org/voxeu/columns/covid-rages-bankruptcy-cases-fall

EBRD. 2020. Transition Report 2020–21: The State Stikes Back. London.
https://2022.tr-ebrd.com/

EUROSTAT. 2020. Impact of COVID-19 on e-sales of enterprises.
https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Impact_of_COVID-19_on_e-sales_of_enterprises

Fairlie, R. W. 2020. The impact of COVID-19 on small business owners: The F
first three months after social-distancing restrictions. NBER Working Paper No. 27462, August
https://www.nber.org/system/files/working_papers/w27462/w27462.pdf

Fairlie, R. and Fossen, F.M. 2022. The early impacts of the COVID-19 pandemic on business sales. *Small Business Economics* 58 (4):1853–1864 .
https://doi.org/10.1007/s11187-021-00479-4

Fernández-Cerezo, A., Gonzalez, Peinado, M. I. and Moral-Benito, E. 2022. Firm-level heterogeneity in the impact of the COVID-19 pandemic, Applied Economics, DOI: 10.1080/00036846.2022.2133894

Gabrijelčič, M., U. Herman, and A. Lenarčič. 2016. Firm Performance and (Foreign) Debt Financing before and during the Crisis: Evidence from Firm-Level Data." Bank of Slovenia Working Papers 1/ 2016.
https://bankaslovenije.blob.core.windows.net/publication-files/Firm_performance_and_(foreign)_debt_financing.pdf .

Georgieva, K. 2020. Beyond the Crisis. 2020. *Finance & Development* 57 (2) : 10-11.
https://doi.org/10.5089/9781513543666.022

Gourinchas, P., Kalemli-Özcan, S., Penciakova, V. and Sander, N. 2021. COVID-19 and SME failures. NBER Working Paper 27877.
http://www.nber.org/papers/w27877

Institute of Macroeconomic Analysis and Development (IMAD). 2014. Corporate Indebtedness and Deleveraging. Economic Issues, June, Ljubljana. 73–101.

Jovanovic, B. 1982. Selection and the evolution of an industry. *Econometrica* 50 (3): 649–670.
https://doi.org/10.2307/1912606

Lalinsky, T and Pál, R. 2022. Distribution of COVID-19 government support and its consequences for firm liquidity and solvency. *Structural Change and Economic Dynamics* 61: 305–335. https://doi.org/10.1016/j.strueco.2022.03.008

Masten, A. B., Breznikar, M., Caka, P. et al. 2020. Assessing the impact of the COVID-19 outbreak on the Slovenian economic outlook. Bank of Slovenia Staff Analysis. March. https://bankaslovenije.blob.core.windows.net/publication-files/prikazi-in-analize-marec-2020.pdf

Mateus, M. and Neugebauer, K. 2022. Stayin' alive? Government support measures in Portugal during the COVID-19 pandemic. Working Paper 12. Banco de Portugal. Lisboa. https://www.bportugal.pt/sites/default/files/anexos/papers/wp202212.pdf

McGowan, M. A., Andrews, D. and Millot, V. 2018. The walking dead? Zombie firms and productivity performance in OECD countries. *Economic Policy* 33 (96): 685–736 https://doi.org/10.1093/epolic/eiy012

Meyer, B. H., Prescott, B. and Sheng, X. S. 2022. The impact of the COVID-19 pandemic on business expectations. *International Journal of Forecasting* 38 (2): 529–544.. doi:10.1016/j.ijforecast.2021.02.009

Miyakawa, D., Koki Oikawa, K. and Ueda, K. 2021. Firm Exit during the COVID-19 Pandemic: Evidence from Japan. *Journal of the Japanese and International Economies* 59: 101118 https://doi.org/10.1016/j.jjie.2020.101118

Muzi, S., Jolevski, F., Ueda, K., and Viganola, D. 2023. Productivity and firm exit during the COVID-19 crisis: cross-country evidence. *Small Business Economics* 60: 1719–1760. https://doi.org/10.1007/s11187-022-00675-w

OECD. 2020a. Coronavirus (COVID-19): SME policy responses. July. https://read.oecd-ilibrary.org/view/?ref=119_119680-di6h3qgi4x&title=Covid-19_SME_Policy_Responses

OECD. 2020b. COVID-19 Government Financing Support Programmes for Businesses. OECD, Paris.
https://www.oecd.org/finance/COVID-19-Government-Financing-Support-Programmes-for-Businesses.pdf

OECD. 2020c. E-commerce in the times of COVID-19. *OECD Policy Responses to Coronavirus (COVID-19)*. October.
https://www.oecd.org/coronavirus/policy-responses/e-commerce-in-the-time-of-covid-19-3a2b78e8/

OECD. 2021. OECD SME and Entrepreneurship Outlook 2021. OECD Publishing, Paris.
https://doi.org/10.1787/97a5bbfe-en

Powell, A., Francis-Devine, B. and Clark, H. 2022. Coronavirus: Impact on the labour market. House of Commons Library Research Briefing No. CBP8898. August.
https://researchbriefings.files.parliament.uk/documents/CBP-8898/CBP-8898.pdf

Rabinovich, J. 2023. Tangible and intangible investments and sales growth of US firms. *Structural Change and Economic Dynamics* 66: 200–212.
https://doi.org/10.1016/j.strueco.2023.05.001

Rawdanowicz, L. and Puy, D. 2021. Covid-19 and the corporate sector: Where we stand. VoxEU Columns. 22 June.
https://cepr.org/voxeu/columns/covid-19-and-corporate-sector-where-we-stand

Schepens, G., Schnabel, I. and Laeven, L. 2020. Zombification in Europe in times of pandemic. VoxEU Columns. 11 October.
https://cepr.org/voxeu/columns/zombification-europe-times-pandemic

Tian, C. 2018. Firm-level Entry and Exit Dynamics over the Business Cycles. *European Economic Review* 102: 298-326.
https://doi.org/10.1016/j.euroecorev.2017.12.011

Webster, A., Khorana, S. and Pastore, F. 2021. The labour market impact of COVID-19: Early evidence for a sample of enterprises from Southern Europe. IZA Discussion Paper No. 1426. https://docs.iza.org/dp14269.pdf

World Bank. 2021. Enterprise surveys follow-up on COVID-19: Slovenia 2021–Round 3. https://www.enterprisesurveys.org/content/dam/enterprisesurveys/documents/covid-1/country-profile-Slovenia--Round-3_English.pdf

Table A1. Descriptive statistics of firm characteristics for 2020

	All firms in the sample		Continuing firms		Firms that exited	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Firm age dummies						
Age 0 to 4	0.1510	0.0019	0.1469	0.0019	0.2608	0.0124
Age 5 to 9	0.2362	0.0023	0.2343	0.0023	0.2849	0.0128
Age 10 to 14	0.1750	0.0020	0.1764	0.0021	0.1388	0.0098
Firm size dummies						
Micro firms	0.8720	0.0018	0.8689	0.0019	0.9551	0.0059
Small firms	0.0868	0.0015	0.0888	0.0016	0.0329	0.0051
Medium-sized firms	0.0318	0.0009	0.0326	0.0010	0.0096	0.0028
Exporter status dummies						
Small exporters	0.2046	0.0022	0.2077	0.0022	0.1236	0.0093
Medium exporters	0.1274	0.0018	0.1286	0.0018	0.0939	0.0083
Large exporters	0.1662	0.0020	0.1659	0.0020	0.1734	0.0107
Ownership dummies						
State-owned	0.0032	0.0003	0.0032	0.0003	0.0016	0.0011
Other mixed ownership	0.0086	0.0005	0.0087	0.0005	0.0056	0.0021
Industry dummies						
Manufacturing	0.1661	0.0020	0.1678	0.0021	0.1228	0.0093
Construction	0.1187	0.0017	0.1185	0.0018	0.1236	0.0093
Wholesale & retail trade	0.2180	0.0022	0.2192	0.0023	0.1846	0.0110
Transport & storage	0.0708	0.0014	0.0698	0.0014	0.0963	0.0084
Accommodation & food services	0.0625	0.0013	0.0619	0.0013	0.0787	0.0076
Real estate activities	0.0227	0.0008	0.0223	0.0008	0.0337	0.0051
Profitability (ROA)	-1.3703	0.4417	-0.2426	0.3275	-31.4189	8.4995
Cash asset ratio	18.2008	0.1127	18.3255	0.1146	14.8770	0.6207
Tangibility	29.0247	0.1415	29.0967	0.1436	27.1069	0.8079
Debt-to-assets ratio	71.6241	1.6610	68.3346	1.5866	159.2760	17.7470
Zombie (negative equity) dummy	0.0745	0.0014	0.0772	0.0015	0.0016	0.0011
Nonperforming loan obligations dummy	0.0246	0.0008	0.0227	0.0008	0.0746	0.0074