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

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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 the take-up of different types of government financial support. The outcomes in the pandemic year are compared with those in the pre- and post-pandemic periods. The firm exit rate did not increase during the pandemic period. The cleansing-out of less productive firms still took place during the pandemic, but did not intensify. Small and young firms did not suffer a disproportionately greater impact from the shock of the pandemic compared to the pre-pandemic period. The take-up of government financial support had a strong positive effect on employment growth. Government support went to firms with greater need. There was little evidence of the misallocation of resources to zombie and low productivity-firms.

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Keywords: Covid-19, firm exit, sales outcome, FTE employment, government financial support

Short title: Impact of Covid-19 on Slovene Firms

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Povzetek

Delovni zvezek proučuje vpliv pandemije covid-19 na izstop iz trga, prodajo in zaposlenost podjetij ter njihovo uporabo različnih vrst državne pomoči. Z uporabo podatkov na ravni podjetja, rezultate iz leta pandemije primerjamo s tistimi v obdobju pred in po pandemiji. Stopnja izstopa iz trga se v času pandemije ni zvišala. Proces izločanja manj produktivnih podjetij iz trga je bil prisoten tudi v času pandemije, vendar se ni okrepil. Majhna in mlada podjetja niso bile nesorazmerno bolj prizadeta zaradi pandemičnega šoka kot v obdobju pred pandemijo covid-19. Uporaba državne finančne pomoči je zelo pozitivno vplivala na spodbujanje rasti zaposlovanja. Državno pomoč so prejela tista podjetja, ki so jo bolj potrebovala in ni videti, da bi pomoč prejela tudi zombie in nizko produktivna podjetja.

1 Introduction

The Covid-19 pandemic has been characterised as a "crisis like no other" (Georgieva, 2020). The pandemic has had deep health-related, economic and social impacts on every country in the world. The government-mandated measures to contain the spread of Covid-19, which included lockdowns and quarantine, 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 the closure of firms or the scaling-down of their operations, disruption to supply chains and transport links, and a collapse in demand. Covid-19 was also a major reallocation shock, with many firms expanding in response to pandemic-induced demand shifts (Barrero et al., 2020). Nevertheless, in overall terms, economic activity contracted dramatically on a global scale, firms' cash flow deteriorated and financial vulnerability increased, and labour market slack emerged. To mitigate the negative impact of the shock of the pandemic, governments and central banks across the world provided various forms of financial support to firms and households (OECD, 2020a; OECD, 2020b).¹

The literature on the economic impact of the Covid-19 pandemic is vast. The majority these studies have mainly focused on documenting the severity of the impact on operation status, sales, and employment; the heterogeneity of the impact across enterprises; the adjustment mechanisms adopted by firms; and the take-up of government financial assistance (see, e.g. 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 the references cited therein). Most of the studies use enterprise survey data, which in some instances is also matched to pre-pandemic corporate accounts. The survey-based studies have limitations. These "pulse" surveys concerned continuing firms and were carried out at different stages of the pandemic in different countries. The surveys were not always followed by with additional surveys.² They therefore might not capture the full extent of the impact of the crisis, and any cross-country comparison 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 country level. It is also important to note that, not all the survey-based studies compared outcomes and patterns during the pandemic period with the outcomes and patterns that occurred in the pre-pandemic period, which would be essential for capturing the additional impact of the pandemic. Notable studies that make this comparison include Bennedsen et al.

¹See also the IMF Policy Tracker ([https://www.imf.org/en/Topics/imf-and-covid19/Policy Responses-to-COVID-19](https://www.imf.org/en/Topics/imf-and-covid19/Policy%20Responses-to-COVID-19)).

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

³In their cross-country study of 51 countries based on a dataset collected by the World Bank Group and several partner institutions, Apedo-Amah et al. (2020) introduced 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.

(2020), Cros et al. (2021) and Muzi et al. (2023). Notwithstanding these limitations, one indisputable conclusion is that while the Covid-19 pandemic had a significant negative impact on the sales and financial health of enterprises, 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 shock of the pandemic, in the absence of government support (e.g. Archanskaia et al., 2020; Gourinchas et al., 2021; Miyakawa et al., 2021). However, actual data for 2020 indicates that in OECD countries and major non-OECD emerging-market economies the expected increase in firm failures did not materialise 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 emerged around 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. (2020) and Cros et al. (2021) found that, in Europe, the dimensions of the cleansing-out mechanism were not magnified during 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 cleansing-out of unproductive firms increased during the pandemic period compared to the pre-pandemic period. Lalinsky and Pál (2022) found that zombie firms in Slovakia had a relatively lower chance of obtaining government financial support during the pandemic period. Cirera et al. (2023) note that the reach of government support policies in developing countries was limited, especially for more vulnerable firms. In addition, because of exclusion concerns over strict targeting in the earlier stages of the pandemic, many firms benefited from public assistance without having experienced any adverse shock from the pandemic.

This paper examines the impact of the pandemic on the non-financial corporate sector in Slovenia, using firm-level data maintained by the Agency for Public Legal Records and Related Services (AJ PES). The particular aspects examined are firm exit, sales, employment, and the take-up of government financial support. Slovenia experienced three waves of containment measures between March 2020 and April 2021. There was a strict lockdown, with major parts of the economy shut down during the first wave (mid-March to end of May 2020). During the second wave (mid-October 2020 to mid-March 2021), containment measures included the closure of restaurants, bars and close-contact services,

⁴See Lalinsky and Pál (2022) for an analysis of the impact of government support on the liquidity and solvency of firms in Slovakia. Schepens et al. (2020) point out that, in contrast to previous financial crises, the shock experienced by firms during the pandemic was not caused by excessive risk-taking by firms or banks. Firms in sectors that were otherwise viable also suffered a 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.

travel restrictions across municipalities, limitations on the size of social gatherings, online schooling and work from home. The third wave, which involved a strict lockdown, was brief and covered only the first 11 days of April 2021. Real GDP declined by 4.3% in 2020 as a result of the containment measures. The drop in gross value added was steepest in 2020 Q2 (11%, 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 closures. 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%.⁵

This paper adds to the small number of econometric studies that have examined the impact of the Covid-19 crisis on the corporate sector within a multivariate framework. 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 year are compared with outcomes in the pre- and post-pandemic years. This comparison sheds light on whether the association between the variable of interest and covariates changed during the pandemic period. In this context, the paper provides evidence on whether smaller enterprises were disproportionately affected by the pandemic and whether the Schumpeterian process of the cleansing-out 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 financial support during the pandemic was associated with productivity, the 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 country level,⁶ multivariate analyses of firm-level access to government support are less common.⁷

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 focused on the implications for the Slovene economic outlook. A World Bank report (World Bank, 2021) provides a descriptive summary of the impact of Covid in Slovenia based on data collected from a very small sample of 499 firms in several rounds of follow-up surveys conducted during 2020. Bighelli et al. (2021) and Bighelli et al. (2023), examine the relationship between the characteristics of a firm and the likelihood of it receiving government financial support. Burger et al. (2023) examine the risk management strategies of international businesses in Slovenia during the pandemic, using survey data collected after the first wave of the

⁵Therefore, on the basis of the pattern of recovery of real GDP, we consider 2021 to be the post-pandemic year.

⁶See, e.g. IMF Policy Tracker (<https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>), OECD (2020a) and OECD (2020b).

⁷Notable contributions in this area include Bennedsen et al. (2020), Bighelli et al. (2021), Bighelli et al. (2023), Cirera et al. (2023), Fernández-Cerezo et al. (2022), Lalinsky and Pál (2022) and Mateus and Neugebauer (2022).

pandemic in 2020.

The rest of the paper is organised 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 contains the conclusions.

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 because of Covid-mandated restrictions at the time of the survey. 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 or 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 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% in April 2020 to 8% 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 less than 30%, but the likelihood increased significantly thereafter to almost 75% six weeks after the peak.

The evidence on firm closures from business pulse surveys should therefore not be seen as indicating permanent exit from the market. The rapid 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 US at the very early stages of the crisis at the end of March and in early April 2020, around 41% of businesses reported that they were temporarily closed because of Covid-19, whereas only 1.8% of businesses reported that they had permanently closed as a results 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) reported that between 28.4% and 66.1% of firms in these countries

had temporarily closed at some stage following the outbreak of Covid-19. However, the percentage of firms confirmed as permanently closed from the outbreak of the pandemic was extremely small, ranging from 0.03% in Greece to 5.14% 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 between 1.6% in Greece and 36.1% in Italy. Webster et al. (2021) acknowledge that considering non-responding firms as permanently closed was likely incorrect, and that this could have resulted in an overestimation of the actual number of firms exiting from the market.⁸ 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 in the absence of government support, the pandemic would result in a significant increase in business failure rates relative to the pre-pandemic period. 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-19.⁹ The increases in the failure rate ranged 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. (2020) estimated that for European economies in the overall, the Covid-19 crisis would increase the share of financially vulnerable firms by 4 percentage points compared to the counterfactual "no Covid-19" scenario.¹⁰ For Japan, Miyakawa et al. (2021) predicted an increase in the rate of firm exit by 1.8 percentage points under the Covid-19 scenario, or about 20% higher relative to the pre-pandemic period.

However, the actual incidence of bankruptcies in OECD countries in 2020 during Covid was not only lower than predicted in the baseline scenario of the simulated models, but also lower than in the pre-pandemic periods (Cros et al., 2021; Djankov and Zhang, 2021; Miyakawa et al., 2021; OECD, 2021; Rawdanowicz and Puy, 2021).¹¹ 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 the 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 exit from the market depended on their pre-existing financial

⁸However, 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.

⁹Gourinchas et al. (2021) define business failure as a situation in which 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 comprised 16 OECD member countries plus Romania.

¹⁰Archanskaia et al. (2020) identify a firm as financially vulnerable if it simultaneously satisfies the criteria of risk of insolvency and risk of default. They consider that financially vulnerable firms are more likely to exit the market.

¹¹See 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 the total number of firm exits can be higher than that indicated by the number of bankruptcies.

vulnerabilities and their exposure to the shocks, caused by the pandemic (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 period compared to the pre-pandemic period.

The prevalent view is that small and medium-sized enterprises (SMEs) were particularly vulnerable to the pandemic 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 less time than larger firms. Surveys of SMEs and the scrutiny of social contact-intensive service sectors, which have a high concentration of SMEs, typically showed elevated rates of firm closures and exit during Covid (e.g. Cirera et al., 2022; OECD, 2020a).

However, evidence from multivariate analyses of firm vulnerability and exit during Covid is not conclusive, with the results depending on the composition of the sample in terms of countries studied and the measure of firm exit. The findings of three studies based on different subsets of the World Bank Enterprise Surveys database differ (Bosio et al., 2023; 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 the size of the firm increased. However, using data for a sample of 34 countries (mostly in Europe and central Asia), Muzi et al. (2023) did not find any significant relationship between firm size and permanent exit measured as "confirmed or assumed permanently closed". However, 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- and middle-income countries, Bosio et al. (2023) 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 conducted by Archanskaia et al. (2020), the probit regression results for the manufacturing sector showed that larger firms were less likely to remain financially viable under the Covid-19 scenario. Archanskaia et al. (2020) 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 other sectors.

The negative economic impact of the pandemic and the provision of large-scale government support to mitigate the liquidity squeeze faced by firms has focused particular attention on the relationship between firm productivity and exit during the pandemic. Empirical studies show that less productive firms have higher probability of exit than their more productive counterparts in a non-crisis situation (e.g. Jovanovic, B., 1982; Damijan, 2017).

Ordinarily, this negative productivity-exit relationship would also be expected during the kind of crisis triggered by the 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 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 pandemic are mixed. Cros et al. (2021) and Muzi et al. (2023) found a significant negative relationship between productivity and firm exit during the pandemic, suggesting that a process of the cleansing-out of less productive firms was at work. In contrast, in the studies by Archanskaia et al. (2020) and Bosio et al. (2023) 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 pandemic as less productive firms.¹² Bosio et al. (2023) argue that in multiple shock scenarios, firms suffer liquidity shortages regardless of age, size, and productivity levels.

As for the related question of whether the productivity-exit association uncovered during the pandemic was similar or different 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 of the pre-pandemic period. Archanskaia et al. (2020) found that the link between financial vulnerability and productivity weakened in the pandemic period.

Impact on sales

While the Covid-19 pandemic had a large and widespread negative impact on sales by firms, there was considerable heterogeneity across firms and countries. The World Bank Enterprise Surveys data for a sample of 51 countries in six regions showed a cross-country average reduction in year on-year sales of around 49% 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 more than 60%; at the other end of the spectrum, in Slovenia for example, the average drop in sales was only 15%. Studies for the US report an average drop in year-on-year sales in Q2 2020 of between 17% and 29% (Bloom et al., 2021; Fairlie and Fossen, 2022; Meyer et al., 2022). In all countries, smaller firms experienced a more severe negative impact on

¹²Archanskaia et al. (2020) considered that the likelihood of exit was greater for more vulnerable firms.

sales than large firms. Moreover, the average reduction in sales was largest in activities that were deemed to be "non-essential" and that remained closed beyond the mandatory lockdown period because of government-enforced social distancing restrictions. Firms in the accommodation and food services sector were hit particularly hard.¹³

A notable aspect is that not all businesses experienced a fall in sales during the pandemic. The proportion of enterprises that experienced no change or an increase in sales was significant. In the World Bank Enterprise Surveys cross-country database used by Apedo-Amah et al. (2020), 16% of the firms reported no reduction in year-on-year sales in the 30 days before the interview.¹⁴ In a survey conducted in Denmark in Q2 2020, about 34% of firms reported no impact or a positive impact on revenue (Bennedsen et al., 2020). In Spain, 37% of the firms surveyed in November 2020 reported no change or an increase in sales (Fernández-Cerezo et al., 2022). US surveys also showed that around 40% 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 Looze, 2020; Fairlie and Fossen, 2022).

Major reasons for the subdued negative impact (or non-negative impact) on sales during the pandemic were the differential impact of the government-mandated restrictions and the adjustment of firms' business models to the changed environment. Typically, a firm was not forced to close and remained open if its activity was deemed "essential". Many firms were also 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 around 13% in Croatia and Portugal to around 30% in Greece. Moreover, 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) reported that concerns about face-to-face interactions had stimulated large increases in the demand for online grocery shopping and delivery services in the US. Bloom et al. (2021) and Fairlie and Fossen (2022) also reported that in their samples of US businesses the negative impact on sales following the onset of the pandemic was less severe for firms that were engaged in online transactions.¹⁵

Impact on employment

The onset of the 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; this was despite the shift to remote working by a substantial proportion of firms and efforts by governments to support firms and protect

¹³Meyer et al. (2022) and Bennedsen et al. (2020) reported that firms in the accommodation and food services sector in Denmark experienced average declines in revenue of 73%.

¹⁴Apedo-Amah et al. (2020) do not provide any data on cross-country variation in the proportion of firms that reported no fall or an increase in sales.

¹⁵Eurostat (2020) and OECD (2020) document the impact of Covid on the e-sales of enterprises.

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. Therefore, in the cross-country sample analysed by Apedo-Amah et al. (2020), 63% of firms reported adjustment in employment of some sort, but only 19% of the firms had laid off workers permanently. In their sample on US businesses, Barrero et al. (2020) found that around 15% 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%. Webster et al. (2021) found that in southern Europe the proportion of firms that had decreased permanent employment ranged from 12% (Croatia) to 42% (Greece).

Apedo-Amah et al. (2020) noted that permanent reduction in employment was higher among firms that had experienced a 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 or furlough workers. Fernández-Cerezo et al. (2022) reported that, in Spain, hospitality firms were most likely and real estate firms least likely to adjust employment. The pattern was somewhat different in the UK: manufacturing and the wholesale and retail sectors experienced the largest increase in redundancies during the pandemic (Powell et al., 2022). Webster et al. (2021) noted that support from government or commercial loans to firms were critical if permanent employment losses were to be avoided.

Notwithstanding the huge negative employment impact, the shock of the pandemic also gave rise to a sizeable increase in gross staffing in a significant number of firms. Barrero et al. (2020) provided anecdotal evidence on a drive for new hirings at the peak of the pandemic in the US by takeaway 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 indicated that around 4% of firms had hired or expected to hire new employees in 2020. Data from the Job Openings and Labor Turnover Survey (JOLTS) also pointed to large-scale hiring plans in the immediate wake of the pandemic. Webster et al. (2021) reported that in southern Europe the proportion of firms that had increased their permanent workers in 2020 ranged from 4% in Croatia to 12% in Malta and Italy and 30% in Cyprus and Greece.

Take-up of government financial support

Governments across the world implemented a wide range of support measures during the pandemic aimed at addressing liquidity constraints of firms and preserving jobs (OECD (2020b); see also the IMF Policy Tracker cited earlier in footnote 1). While considerable documentation exists on government Covid-19 policies, only a limited number of studies have contained 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 Bighelli et al. (2023), Cirera et al. (2023), 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 guarantees and debt-service moratoriums.¹⁶ Bennedsen et al. (2020) and Cirera et al. (2023) analysed the receipt of government support separately for different types of policy support measure. Bighelli et al. (2021), Bighelli et al. (2023) and Lalinsky and Pál (2022) focused on the uptake of employment subsidies, while Mateus and Neugebauer (2022) looked at the utilisation of state-guaranteed loans and the public moratorium for existing loans. Fernández-Cerezo et al. (2022) examined the usefulness of several policy support measures as reported by firms. The variable of interest was whether a firm found a specific policy measure "relevant or very relevant" to alleviating the shock of the pandemic.

There is some indicative evidence that the likelihood of receiving government support was higher for firms that experienced a more considerable pandemic-related shock. Firms in sectors most affected by Covid lockdowns and other restrictions were more likely to take up government aid; this was particularly true of the accommodation and food services sector, were more likely to take up government aid (Bennedsen et al., 2020; Bighelli et al., 2021; Bighelli et al., 2023; Cirera et al., 2023; Mateus and Neugebauer, 2022). In addition, firms that experienced drop in sales were more likely to receive support (Bennedsen et al., 2020; Cirera et al., 2023). However, this pattern did not hold in the case of fiscal aid in Denmark. Bennedsen et al. (2020) found that there was no correlation between financial distress or being in a hard-hit industry 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. (2023) 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). Evidence on the

¹⁶A cross-country comparison of the measures implemented in OECD and EU countries (OECD, 2020b) shows that employment subsidies together with income tax deferral and loan guarantees, represented the most widely used measures.

pattern for fiscal-related support is mixed. Cirera et al. (2023) found that the likelihood of receiving payment deferral and tax support increased with firm size. Similarly, Mateus and Neugebauer (2022) found that, in Portugal, larger firms were more likely to receive a state-guaranteed loan than smaller firms. By contrast, Fernández-Cerezo et al. (2022) reported that small firms in Spain 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 support. Cirera et al. (2023) posited that the lower likelihood of smaller firms receiving government support could have been driven by barriers to accessing policy support, such as a lack of awareness.

The provision of large-scale government support to mitigate the negative impact of the pandemic shock has sparked concerns about the possible misallocation of resources to firms that did not need support, or to non-viable zombie firms. Cirera et al. (2023) provided evidence of the former tendency: in their sample of 60 mainly developing countries there was a 20% likelihood that firms that declared no pandemic-related shock would receive government support; there was also a 19% chance of firms that had experienced no change or an increase in sales receiving government support. Cirera et al. (2023) rationalise this outcome on the basis that policy support measures had to be implemented very quickly and that policymakers were more worried about the costs of inaction than about the possible misallocation of resources. On the other hand, Lalinsky and Pál (2022) observed that profitable firms in Slovakia were less likely to receive government support.

Empirical studies have found little evidence of the misallocation of resources to zombie firms during the pandemic. In all four countries studied by Bighelli et al. (2021) and Bighelli et al. (2023), only a small share of employment subsidies went to zombie firms.¹⁷ For Portugal, Mateus and Neugebauer (2022) reported that state guaranteed loans predominantly went to non-zombie firms or firms with low zombie scores.¹⁸ Their estimates of the linear probability model also indicated that zombie firms had a lower probability of receiving state-guaranteed loans. Lalinsky and Pál (2022) also found a negative relationship between zombie status and the receipt of employment subsidies.

The evidence of 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 Bighelli et al. (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 were more

¹⁷Bighelli et al. (2021) classified a firm as a zombie firm if it had recorded negative profits for three consecutive years and low employment growth prior to the pandemic.

¹⁸Mateus and Neugebauer (2022) classified a firm as zombie if its rate of return on assets and net investment ratio were negative, and debt-service capacity was less than 5% for two consecutive years.

likely to receive government support. Lalinsky and Pál (2022) obtained a similar result in their study on firms in Slovakia. A deciles-based measure of productivity indicated that these relationships were not linear.

3 Data

Following the literature reviewed in the preceding section, this paper examines the following aspects of the impact of the Covid-19 pandemic on Slovene firms: (i) How did the pandemic shock affect the firm exit rate? (ii) Which categories of firms and which sectors were most vulnerable to the pandemic shock in terms of exit, sales and employment? In particular, were micro, small and medium-sized firms subject to a disproportionately greater impact? (iii) Was the take-up of government financial support higher for firms that experienced a larger pandemic shock? (iv) Did the take-up of government support impede the process of cleansing-out of less productive 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 is collected by AJPES.¹⁹ The database pertains to all private business entities, and their subsidiaries, and other organisational segments, that 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 organisations are all required to submit their annual reports to AJPES for the purpose of public presentation and for tax and statistical purposes. The AJPES database includes information on firms' financial statements, full-time-equivalent (FTE) employment, industrial affiliation and location, and the year of the firms' entry in the business register. Firm-level data on the take-up of government support measures was obtained from the Employment Service of Slovenia²⁰ and data on non-performing loan obligations was taken from the credit register maintained by the Bank of Slovenia. The data on both variables was merged with the AJPES database. The analysis in this paper is confined to all non-financial firms that have at least one FTE employee.²¹

Since each firm in the data set has a unique identification code, we can observe the 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

¹⁹The 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 Čirjaković (2021), Banerjee and Jesenko (2014), Banerjee and Jesenko (2016), Bole et al. (2007), Damijan (2017), Gabrijelčič et al. (2016) and IMAD (2014).

²⁰ZRSZ - Povračilo nadomestila place (gov.si).

²¹Sole proprietors and non-profit organisations are excluded from the analysis in this paper because, as Damijan (2017) notes, data for sole proprietors tends to be noisy and can be of questionable quality.

not done so in the previous year. 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. Firm entry 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-sized and large) as per 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 EUR 2 million. The corresponding figures for small firms are 50 workers and turnover of less than EUR 8.8 million or assets of less than EUR 4.4 million. For medium-sized firms the thresholds are 250 workers, turnover of less than EUR 35 million and assets of less than EUR 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 between 2019 and 2021. The size distribution of firms was heavily skewed towards micro firms. Such firms accounted for nearly 90% of firms in the sample in 2021, while firms in the largest size category accounted for approximately one per cent of the total number of firms. Manufacturing and Construction (NACE categories C and F) accounted for 15% and 13% of the firms, respectively. Almost 40% 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 variables of interest is described below in the relevant subsections 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 (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% in 2012. The shakeout of firms decreased steadily in the years following but remained at a higher

level 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 pandemic.²² 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 remained higher than the exit rate. Surprisingly, there was a pause in the firm entry rate in 2021 when Covid restrictions were absent and economic activity rebounded.

The overall trend in the exit and entry rates of firms essentially reflects 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 and non-pandemic periods alike. 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 the pandemic and paused in the post-pandemic period.

The negative impact of the pandemic 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; this was because of the lockdown in the first phase of the Covid outbreak, and the subsequent restrictions on travel and on the size of social gatherings during the second phase. However, the firm exit rate fell in manufacturing, construction and trade, which indicates that these sectors were subject to less stringent limitations on conducting business once the lockdown phase ended. This meant that they were perhaps in a position to 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-pandemic period as economic activity rebounded. The firm entry rate fell in all sectors of the economy in 2020 with the outbreak of Covid-19. However, with the rebound in activity in 2021, there were signs of a pick-up in the firm entry rate only in the 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:

$$Y_{it} = \beta_0 + \sum_k \beta_k X_{ki,t-1} + \epsilon_i \quad (1)$$

²²One reason for this could be that compulsory settlement or bankruptcy proceedings were temporarily suspended in Slovenia between 13 March 2020 and 30 September 2021 (i.e. management was not obliged to start these proceedings while the pandemic was ongoing). The measure aimed at protecting companies from bankruptcies caused by the pandemic. Data from the Statistical Office of the Republic of Slovenia confirms that registrations and declarations of bankruptcies of legal units fell sharply in 2020. See https://static.eurofound.europa.eu/covid19db/cases/SI-2020-11_481.html and <https://www.stat.si/StatWeb/en/News/Index/11644>

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-pandemic year (2019), the pandemic year (2020) and the post-pandemic year (2021). Further, to check whether the influence of the various explanatory variables is significantly different between the three years, a pooled regression for all three years combined is estimated, where the explanatory variables are interacted with dummy variables identifying the pandemic year and the post-pandemic 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. They are shown in Table 2. 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.²³ Productivity is entered in the equation as quintile dummies to allow for a non-linear relationship with firm exit.²⁴ 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 Table A.1 in Appendix.

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.²⁵ The AME for a categorical variable shows the extent to which the predicted probability of a choice option changes as the categorical variable changes from 0 to 1.

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 pandemic year (2020), 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

²³This measure is also used by Bonfim et al. (2023). As Mateus and Neugebauer (2022), Section 3.3, have pointed out, there is currently still no consensus on how to define a zombie firm. The best-known approach is probably the one that looks at whether a firm exhibits an interest coverage ratio (ICR) below one (Albuquerque and Iyer, 2023; McGowan et al., 2018). According to the ICR criterion, less than one per cent of the Slovene firms qualified for zombie classification in the pre-pandemic period. However, under the negative equity criterion, this figure rose to around 10%. Significantly, there appears to be no study that has explicitly included productivity when 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% of firms in the lowest productivity quintile had negative equity.

²⁴Total factor productivity is estimated using the Levinsohn and Petrin (LP) method. This methodology is similar to the Olley and Pakes (OP) methodology, except that the LP method uses material costs instead of investment in the calculations. If in the panel data many firms report zero investment, the use of the OP method can lead to the dropping of a large fraction of the observations from the estimation procedure.

²⁵The 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.

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. All things being equal, the probability of exit was highest for firms in the real estate sector and the accommodation and food services sector, and lowest for firms in manufacturing and in wholesale and retail trade. Compared to firms in the base sector category, the probability of exit was 2.2 percentage points higher for firms in the real estate sector, around 1.3 percentage points higher for firms in accommodation and food services, and 1.6 percentage points lower in manufacturing, compared to firms in the base sector category.²⁶

In line with the finding of Muzi et al. (2023), the probability of exit was higher for younger firms. As Muzi et al. (2023) note, younger firms are more vulnerable to a negative shock; this is because they are likely to have less well-established relations with customers and less access to resources and networks, than older firms. In contrast to the finding of Muzi et al. (2023), export orientation had a significant influence on firm exit in Slovenia. Small exporters in Slovenia had a lower 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 during the pandemic period and a greater take-up of government support by small exporters (see Table 10 on government financial support). Ownership status had no significant relationship to firm exit during the Covid-19 pandemic.

The pre-existing financial conditions of firms had an important influence on their survival prospects. The regression results suggest that the cleansing-out of less profitable and less productive firms 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 out thereafter. There was no significant relationship between firm exit and productivity in the third and productivity quintiles and above. However, the results do not show that zombie firms and firms with higher debt leverage (common indicators of firm vulnerability) were more likely to exit in the pandemic year. In line with expectations, firms with larger non-performing loan obligations and those with a lower ratio of tangible fixed assets to total assets were more likely to exit the market, while firms with higher proportion of assets held as cash were less likely to do so.

Comparing firm exit determinants in pandemic year and non-pandemic years. The results of the pooled regression for the pandemic and non-pandemic years with interaction dummies indicate that the relationship with firm exit observed in the pandemic year

²⁶The base category comprises non-financial firms in NACE categories A, B, D, E, J, M, N, O, P, Q, R and S.

compared with non-pandemic years was significantly different only for profitability, debt leverage, and whether the firm was part of the 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. The exit probability of micro firms, younger firms, small and medium-sized exporters, less productive firms, and firms with non-performing loan obligations does not appear to have increased in the pandemic year. That the cleansing out of less productive firms did not increase in the pandemic year cannot be explained in terms of a 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 were less likely to receive a moratorium on their bank loans. 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 pandemic year, but this argument does explain the unchanged exit-firm age relationship.

The negative relationship between firm exit and profitability was not significantly different between the pandemic year and the pre-pandemic year, implying no increase in the likelihood of exit by less profitable firms during the pandemic. However, this pattern reversed in the post-pandemic year, when profitability was not a significant driver of firm exit. The positive linkage between debt leverage and firm exit was absent in the pandemic year compared to the pre-pandemic 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 pandemic year compared to the pre-pandemic year but fell back toward the pre-pandemic level in 2021.

For data-related reasons, it is not possible to estimate the direct impact of government financial support on firm exit for 2019 and 2020. The government support scheme did not exist in 2019. Data on government support in 2020 is 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 financial support reduced the likelihood of exit.²⁷

Impact on sales

We examine two related dimensions of the impact of the Covid-19 pandemic on sales. We first estimate the proportion of firms that experienced a year-on-year drop in sales

²⁷The results are not reported in Table 3 but are available from the corresponding author on request.

versus no change or an increase in sales, and then calculate for each of these two groups the median value of the annual percentage change in sales. The calculations are done separately for the pre-pandemic year (2019), the year of the pandemic (2020) and the post-pandemic year (2021). A comparison of the developments in each year sheds light on the cumulative impact of the 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 a drop in sales. Like firm exit, the simultaneous occurrence of a 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 the differential impact of demand and supply shocks. The pandemic shock had a sizeable negative impact on Slovene firms' sales. For the economy as a whole, the proportion of continuing firms that experienced a decline in sales jumped from 41% in 2019 to around 62% 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 the accommodation and food services sector. In the other size groups and sectors, the frequency of firms with a drop in sales varied within a narrow range: around 72% of large firms experienced a drop in sales in 2020, compared to between 61% and 64% in the other firm-size groups. In the accommodation and food services sector, as many as 86% of firms recorded a drop in sales in the pandemic year compared to 56% and 62% in the other sectors. One reason for the more severe impact of the pandemic on the accommodation and food services sector was that the government-mandated restrictions were applied to this sector throughout 2020. The 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; these measures included travel restrictions across municipalities, and the closure of restaurants, bars and close-contact services.

The fall in sales saw reversal in 2021, reflecting the post-pandemic rebound in economic activity and the release of pent-up consumer demand. The percentage of firms that experienced a drop in sales in 2021 fell to around 29% for the economy, which was well below the level that prevailed in the pre-pandemic year. This degree of reversal 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 around 9% 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 heaviest for micro firms and for accommodation and food service activities.²⁸ Micro firms and firms in the accommodation

²⁸ Although the proportion of firms that experienced a drop in sales was lower for micro firms, among those firms that

and food services sector saw their sales drop by an average of around 10% and 35% respectively. The average drop in sales in other firm-size groups and sectors varied within a narrow range.

The average change in sales of firms overall masks the differential experience of firms with a drop or increase in sales and increased sales. The average change in sales of these two types of firm became magnified in the pandemic year when compared to the pre-pandemic year. However, the degree of magnification was greater for a drop in sales than for an increase in sales, signifying that negative impact was stronger than the opportunities for sales growth. For firms that experienced a contraction in sales in 2020, the average drop was around 23%, which was significantly higher than the average drop of around 14% suffered by firms whose sales had contracted in the pre-pandemic year. By contrast, firms that experienced an increase in sales registered average sales growth of 19% in 2020, compared with the 17% average gain in sales enjoyed by such firms in 2019. In the post-pandemic year, the business environment improved markedly, and sales growth became less negative for firms that had experienced a drop sales and more positive for firms that had experienced an increase in sales.

Determinants of the sales status of firms in 2020 (the pandemic year). We initially, we considered examining this topic by estimating an ordered probit model with sample selection (heckoprobit), in which the selection equation would identify continuing firms, and the dependent variable in the outcome equation would distinguish between continuing firms with whose sales had dropped and those whose sales had risen. 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 more appropriate.

We first look at the results of the probit regression on sales status for the 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 a drop in 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 subsection, except that profitability is excluded from the specification because of its endogeneity with sales. Unfortunately, a lack of information means that we are unable to include a variable showing participation of a firm in online transactions and delivery services. For ease of interpretation, we present the average marginal effects (AME) implied by the estimated probit coefficients in Table 6.

experienced a decrease in sales, micro firms suffered more than firms in other size groups.

The AME estimates of the relationship of firm size, firm age, and ownership, with the 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 a good deal of the vulnerability of micro and young firms to the shock of the pandemic was weeded out by firm exit. Micro firms and younger firms were more prone to exit during the pandemic; however, of the firms that remained in operation, micro firms and younger firms were less likely to experience a drop in sales. Among continuing firms, large firms were significantly more likely to experience a drop in sales in the pandemic year than the other firm-size groups. The likelihood of contraction in sales became less negative (i.e. increased) progressively as firm age rose. Ownership had no significant effect on firm exit; however, of continuing firms state-owned firms and firms with mixed ownership were less likely to see a 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 the sales status of continuing firms. The probability of a drop in sales was substantially higher for firms engaged in the accommodation and food services sector and lowest for firms in the construction sector. All things being equal, compared to firms in the base sectoral category the probability of a drop in sales was around 34 percentage points higher for firms in the accommodation and food services sector, around 2 percentage points higher for manufacturing firms, and around 2 percentage points lower for construction firms.

Zombie firms and firms with non-performing loan obligations were more prone to experience a drop in sales. However, the relationship between productivity and the likelihood of a drop in sales was inverted U-shaped, with firms in the middle range of the productivity quintiles experiencing a larger drop 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 the pandemic year and non-pandemic years. The results of the pooled regression for the pre-pandemic year, the pandemic year and the post-pandemic year with interaction dummies indicate that the relationship between the covariates and sales status differed significantly different between the three periods (columns 5-7, Table 6). The level effect on the outcome of sales status was also 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 a cumulative effect of the pandemic on the likelihood of reduced sales beyond the effects through the covariates. However, the level effect fell back drastically in 2021 to below that seen in the pre-pandemic year.

The association between firm size and the likelihood of a drop in sales changed direction in the pandemic year compared to the pandemic year. There had been a negative relationship

between firm size and the likelihood of a drop in sales in 2019, in line with the typical pattern reported in the literature. However, smaller firms that remained operational in 2020 appear to have been more resilient to the shock of the pandemic than larger firms, as a result of which the eventual pattern of the relationship between firm size and likelihood of a drop in sales in the pandemic year became opposite to that observed in the pre-pandemic year. While the relationship in the post-pandemic year reverted toward the pattern seen in the pre-pandemic year, the turnaround was not total. Significant differences remained between the coefficients on the firm size dummies for the pre-pandemic and post-pandemic years.

At the sectoral level, the cumulative negative impact of the pandemic on the likelihood of a drop in sales was noticeable only for firms in accommodation and food services. It is also worth noting that, firms in the construction sector had a less negative experience on sales status in the pandemic year compared to the pre-pandemic year. For all the other sectors, there was no discernible sector-specific cumulative impact of the pandemic on the likelihood of a drop in sales: coefficients of these sectoral dummies were not statistically different between the pre-pandemic and pandemic years. As economic activity rebounded in the post-pandemic year, the likelihood of a drop in sales fell across all sectors, although there was noticeable sector-level heterogeneity. In manufacturing, wholesale and retail trade, and transport and storage, the likelihood of a drop in sales fell to below pre-pandemic levels. However, in the accommodation and services sector, the return to pre-pandemic level was partial: the coefficient on the dummy variable for this sector was significantly higher in the post-pandemic year than in the pre-pandemic year.

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

The regression results indicate that the likelihood of a drop in sales at firms with non-performing loan obligations, zombie firms and the least productive firms did not increase on account of the pandemic compared to the pre-pandemic year. Firms across all productivity quintiles were more prone to experiencing larger drops in sales in the pandemic year compared to the pre-pandemic year; however, firms in the second and third productivity quintiles suffered more than those in the bottom and fourth quintiles. Sales in the

post-pandemic year recovered across all productivity quintiles to the pattern seen in the pre-pandemic year, with firms in the fourth quintile doing better than those in the other quintiles.

Higher asset tangibility was associated with a lower likelihood of a drop 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 in which firms expand their sales capacity (Rabinovich, 2023). However, the relationship switched during the pandemic period: the likelihood of a drop 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 a drop in sales rose for more leveraged firms during the pandemic year compared to the pre-pandemic year.

The impact of the pandemic on the sales status-export orientation relationship at continuing firms was strikingly different to the impact on the exit-export orientation relationship examined earlier in Table 3. While the shock of the pandemic did not significantly change the association between firm exit and export orientation, it appears that, among continuing firms, that shock made a drop in sales less likely among large exporters compared to the other exporter groups and non-exporters. In the post-pandemic period, small exporters gained more from the rebound in economic activity, and they were much less likely to experience a drop in sales than larger exporters and non-exporters.

Ownership had no significant impact on the likelihood of a drop in sales among continuing firms in the pre-pandemic and post-pandemic years. However, during the pandemic year of 2020, private firms suffered more from the shock, with state-owned firms suffering the least impact.

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 et al., 2006). The evidence from earlier studies reviewed in the literature survey section, which shows large reductions in employment during the pandemic year taking place alongside sizeable gross staffing increases at in many firms conforms with this pattern. Therefore, to shed light on the cumulative impact of the pandemic shock and its subsequent waning on employment, we document the dynamics of adjustment in full time equivalent (FTE) employment in the pandemic year with that in the pre-pandemic and post-pandemic 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.²⁹ If employers resort to shorter working

²⁹However, the AJPES data does not allow us to estimate the importance of shorter working hours versus headcount reductions.

hours as well as to laying off workers, the FTE measure will show a greater volume of employment contraction than the head-count measure. We first study the dynamics of FTE employment by firm size and industry, then follow up the univariate analysis with a multivariate analysis encompassing a larger set of explanatory variables.

Dynamics of FTE employment. The shock occasioned by the pandemic led to an increase in the frequency of contraction of FTE employment and to 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 reduced FTE employment rose to 34.8% in 2020 from 28.6% in 2019. Correspondingly, the percentage of firms that increased FTE employment declined to 35.5% in 2020 from 41.8 percent in 2019.

With the strong rebound in economic activity in 2021 as the shock of the pandemic receded, the conditions in the labour market improved. The frequency of contraction of FTE employment fell from the level seen in the pandemic year while the frequency of expansion of FTE employment rose and surpassed the number of cases of FTE employment contraction. However, the dynamics of FTE employment in the post-pandemic year only partly returned to the pre-pandemic levels, perhaps suggesting uncertainty among firm owners and managers about the economic outlook. It is also possible that, as in every crisis, firms saw the pandemic as an opportunity to adjust employment in order to enhance productivity and profitability.

While the tendencies of the frequencies of FTE employment contraction and expansion at the aggregate level between 2019 and 2021 were visible across all firm-size groups and sectors, there was considerable heterogeneity. Many different sources of firm-level heterogeneity can lead to a 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 pandemic shock. However, the extent of the increase was least among micro firms (by 5 percentage points from 27.8% in 2019 to 32.9% in 2020) and highest among medium-sized firms (by 18 percentage points from 32.2% in 2019 to 50.3% in 2020). At the sectoral level, hardly any increase in FTE employment contraction was recorded in the real estate sector, while the biggest increases occurred in the accommodation and food services sector (by 15 percentage points, from 35.3% in 2019 to 50.2% in 2020). The pattern of the corresponding fall in the frequency of expansion of FTE employment was a mirror image of the pattern of the rise in FTE employment contraction.

There was a drop in the incidence of 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 in the accommodation and food services sector. However, the overall state of affairs in the labour market remained less favourable than it had been in the pre-pandemic year.

Determinants of the 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, an increase in FTE employment and a reduction 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 a change in sales and the take-up of government financial support. As Apedo-Amah et al. (2020) found, the larger the drop in sales, the higher the expected likelihood of a contraction in FTE employment. Moreover, since a key objective of government financial 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 support from the government and central bank. We also expect that the standard indicators of financial vulnerability will have a positive association with FTE employment contraction, i.e. the higher the degree of ex-ante financial vulnerability, the greater the likelihood of employment contraction. In order to avoid the problem of endogeneity, all explanatory variables, with the exception of the change in sales and government financial support, are measured according to their pre-pandemic values. The last two variables are measured by their current values in the pandemic year. For ease of interpretation, we show the average marginal effects implied by the multinomial probit model.

Most of the probit regression findings are consistent with the hypotheses noted in the previous paragraph (Table 8). In line with *a priori* expectations, the AME of change in sales shows a significant negative relationship between change in sales and downward adjustment in FTE employment. A one per cent increase in sales in the pandemic year lowered the likelihood of contraction in FTE employment by 0.21 percentage points and increased the likelihood of an increase in FTE employment by 0.24 percentage points. Government financial support for enterprises had a strong positive effect on facilitating employment growth. Receiving government financial support increased the probability of FTE employment growth by 7.4 percentage points. However, the finding on the effect of a temporary moratorium on the servicing of bank debt on employment adjustment is not consistent with a priori expectations. The AME coefficient suggests that firms taking advantage of the debt-service moratorium facility had higher probability of FTE employment contraction (higher by 7.2 percentage points) than those who did not use this facility. It is possible that firms that took advantage of a 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 were more likely to experience FTE employment contraction.

In line with *a priori* expectations, firms that were less financially vulnerable prior to the shock of the pandemic were generally less likely to reduce employment. The probit regression estimates therefore show that firms that were more profitable and had a more substantial cash buffer were less likely to reduce their FTE employment. However, the impact of total debt burden on employment adjustment was contrary to expectations and is difficult to explain in the multivariate setting. All things being equal, firms with a higher debt burden were less likely to reduce employment. A one percent increase in the outstanding debt-to-assets ratio reduced the probability of FTE employment contraction by 0.02 percentage points.

Significantly, zombie firms were more likely to undertake downward adjustment of FTE employment during the pandemic. However, the likelihood of downward adjustment in employment was lowest 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 sector. These findings are similar to those obtained by Apedo-Amah et al. (2020) in their cross-country study of 51 countries. Compared to their older counterparts, young firms in the 0-4 years age category were around 3 percentage points less likely to reduce FTE employment and 13 percentage points more likely to increase FTE employment. The likelihood of an increase in FTE employment was a declining function of age. Micro firms had probability of downward adjustment in employment 35 percentage points lower than that of 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 around 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-related response to the shock of the pandemic. Exporters of all size classes were almost equally likely to reduce FTE employment compared to non-exporters. Small and medium-sized 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 pandemic year.

Take-up of government financial support

In this subsection we examine the pattern of firm-level take-up of employment-based support, support for the coverage of fixed costs and bank loan moratoriums in Slovenia in 2020. Employment-based support comprised three broad categories: wage subsidies to compensate workers for reduced working hours; wage subsidies to compensate workers temporarily laid-off (furloughed); and wage support to pay employees who were required to quarantine because of illness.³⁰ We first consider the unconditional univariate distribution of each type of 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 the multivariate probit regressions. A similar exercise is carried out for the take-up of the 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 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. Overall, 45% of continuing firms received this type of support, while the take-up of wage subsidies for reduced working hours and for employees in quarantine was limited to only 14-16% of continuing firms (Table 9). The utilisation of wage subsidy varied across firm-size classes and sectors. For all three types of wage subsidy, 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 hours, while firms in the manufacturing sector had the highest take-up of wage subsidies for employees in quarantine.

The partial coverage of fixed costs was taken up to a considerably lower extent than employment-based support. The pattern of take-up of this type of support by firm size was also different to that for employment-based support. Only 17% 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 firms in larger size groups.

Loan moratoriums were taken up to a considerably lower extent than employment-based support. Only about 19% of firms with bank debt (or 7% of all continuing firms) received

³⁰In order to benefit from wage subsidies for reduced working hours, firms were required to have suffered at least a 20% 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 pandemic. This provision was later replaced by a stricter eligibility criterion of at least a 30% drop in turnover in 2020 compared with the previous year (see EBRD (2020), Country Assessment for Slovenia). The EBRD country assessment report and its update for Slovenia reported that these measures were extended to mid-2021. However, as of December 2021, only half of the support announced at the beginning of the pandemic had been used. Loan moratorium 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>).

a moratorium on their bank loans. An overwhelming majority (83%) of firms that received a loan moratorium also received employment-based support. The take-up of loan moratoriums 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 a loan moratorium.

Probit regression results for the 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, the 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 for firms that had less need for support, and higher for those in need of greater support (column 1, Table 10). Firms were therefore 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 most adversely affected by the pandemic) were more likely to receive employment-based support in any form.

There was also little evidence of the misallocation of resources to 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 for zombie firms. The take-up of any form of employment-based support was also weakly related to productivity. The take-up of support was almost equally likely across the productivity spectrum, with the exception of 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. (2023), 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 were less likely to experience a drop in sales.

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

Similar results can be 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 2-4, Table 10). The effect of debt leverage on the likelihood of receiving wage subsidies was positive for reduced working hours but negative for temporary layoffs and having workers in 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 were less likely to receive the other types of employment-based support. In contrast to the pattern for wage subsidies for reduced working hours and temporary layoffs, firms in the three lower productivity quintiles were less likely to take up wage subsidies for having workers in quarantine. Profitability had no significant effect on the take up of wage subsidies for reduced working hours.

The pattern of take-up of bank loan moratoriums was similar in most respects to that for employment-based support. Firms were therefore less likely to take up a 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 a bank loan moratorium was higher for firms in the accommodation and food services sector and for small and medium-sized exporters. As in the case of wage subsidies for reduced hours and temporary layoffs, state-owned firms were less likely to take advantage of a 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 more likely, to take advantage of a bank loan moratorium. The latter finding is not surprising, given that 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 columns 5 and 1 of Table 10), except in two respects. Highly leveraged firms were more likely to take up support for fixed costs, although profitability had no significant impact.

Univariate analysis of size of government financial support received by continuing firms

For a complete picture of government financial support received by continuing firms, we look at the size of different categories of wage subsidy received by firms in 2020, relative to total wage costs in 2019 and for relative size of partial coverage of fixed costs. As Table 11 shows, for all subsidy categories and all continuing firms considered together, employment-related subsidies equated, on average, to 12.4% of total labour costs. The relative size of subsidies received by a firm for temporary layoffs was considerably higher than the other categories of subsidy. The relative size of employment-related subsidies was substantially higher for micro firms compared to that received by firms in the other

size categories. Moreover, firms in the accommodation and food services sector and in real estate received a noticeably larger amount of employment-related subsidies compared to firms in other industry sectors. The average size of support for the coverage of fixed costs and its distribution pattern by firm size and industry sector were similar to that for employment-related subsidies.

Tobit regression results for size of government financial support received by continuing firms

The multivariate analysis of size of government support carried out using Tobit analysis confirm the pattern discussed in the univariate analysis above. As Table 12 shows, the pattern for the relative size of total wage subsidies was primarily driven by the pattern for relative wage subsidies received for temporary layoffs. For some covariates, their relationship with the relative size of subsidies received for reduced working hours and for having workers in quarantine was different to that for wage subsidies for temporary layoffs. The relationship patterns between the covariates and relative size of different types of wage subsidy were broadly similar to those for the likelihood of take-up of government financial support reported in Table 10.

The Tobit estimates in Table 12 show that for all types of wage subsidy the relative size of the subsidy increased with firm size, and was smaller for firms with a larger cash buffer. With the exception of subsidies for having workers in quarantine, relative wage subsidies were lower for firms with higher growth in sales and for state-owned firms. Subsidies to cover the quarantine of workers were higher for firms higher sales growth and for state-owned firms. The relative size of wage subsidies overall and of subsidies for temporary layoffs was considerably higher for firms in the accommodation and food services sector, which was the sector most severely hit during the pandemic. However, the relative size of subsidies for having workers in quarantine was larger for firms in the manufacturing sector compared to firms in other sectors.

More productive firms received smaller relative wage subsidies, except for subsidies for having workers in quarantine, which were received in higher amounts by more productive firms. A negative relationship between the relative size of subsidies and productivity does not necessarily imply misallocation of resources. Notably, the zombie status of firms and profitability had either a negative impact or no significant impact on the size of relative subsidies. Having non-performing loan obligations also had no significant effect on the relative size of wage subsidies received by firms.

Younger firms received larger relative subsidies overall and for temporary layoffs, while subsidies for having workers in quarantine were smaller for younger firms. For all categories of subsidy, the relative subsidies were higher for small exporters.

The pattern for the relative size of partial coverage of fixed costs was similar in most respects to the pattern for total wage subsidies. The partial coverage of fixed costs was therefore lower for micro firms, large exporters, state-owned firms, firms in trade and in the accommodation and food services sector, firms with higher growth in sales and larger cash buffers, and zombie firms. In addition, the relative size of fixed costs support was higher for younger firms, less productive firms, and firms that had non-performing loan obligations.

5 Conclusions

Slovenia experienced three waves of the Covid-19 pandemic between March 2020 and April 2021. The authorities acted quickly to contain the spread of the pandemic by introducing containment measures of varying degrees of restrictiveness during each wave, and initiated various forms of financial 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 during the year being deepest in those periods in which the containment measures were most restrictive.

Using annual firm-level data for the entire universe of non-financial firms in Slovenia, this paper examines the impact of the pandemic on the following aspects of firm outcomes in particular: exit, sales, employment and the take-up of government financial 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- and the post-pandemic year. The focus of the empirical analyses was therefore 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- and post-pandemic years. The analyses identified the firm-level and sectoral level heterogeneities in the impact of the pandemic and shed light on whether the Schumpeterian process of the cleansing-out of less productive firms was magnified or paused during the pandemic year. The paper also examines the pattern of take-up of different types of government financial support to determine whether 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 pandemic. 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 by the shock occasioned by the pandemic

compared to the pre-pandemic period. Firms in the accommodation and food services sector were severely affected by the pandemic, reflecting the fact that the sector was subject to government-mandated restrictions throughout the whole of 2020. The exit rate of firms in that sector shot up significantly during the pandemic compared to the pre-pandemic year, notwithstanding the higher take-up of government financial support.

At Slovene firms that remained operational during the pandemic, the negative impact on sales was sizeable. Compared to the pre-pandemic year, there was a sharp increase in the proportion of continuing firms that experienced a drop in sales and in the 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 cumulative negative impact of the Covid-19 shock on sales was noticeable only for firms in accommodation and food services. Not all businesses experienced a drop 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 shifted their business model towards online sales and delivery services. We were also unable to incorporate the influence of firms' participation in global value chains.

The Covid-19 pandemic 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 larger the drop in sales, the higher the likelihood of a contraction in FTE employment. The take-up of government financial support had a strong positive effect on employment growth.

The findings on the pattern of take-up of employment-based support, coverage of fixed costs and loan moratoriums 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 was also little evidence of the misallocation of resources to 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 financial support, but this did not reflect shortcomings in the implementation of the programme, as micro firms in Slovenia turned out to be more resilient to the pandemic shock than firms in other size groups. There was also little evidence of the misallocation of resources to firms with non-performing loan obligations, zombie firms and low productivity firms. The likelihood

of take up of government support was lower for these categories of firm. However, the relative size of support was negatively related to productivity.

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

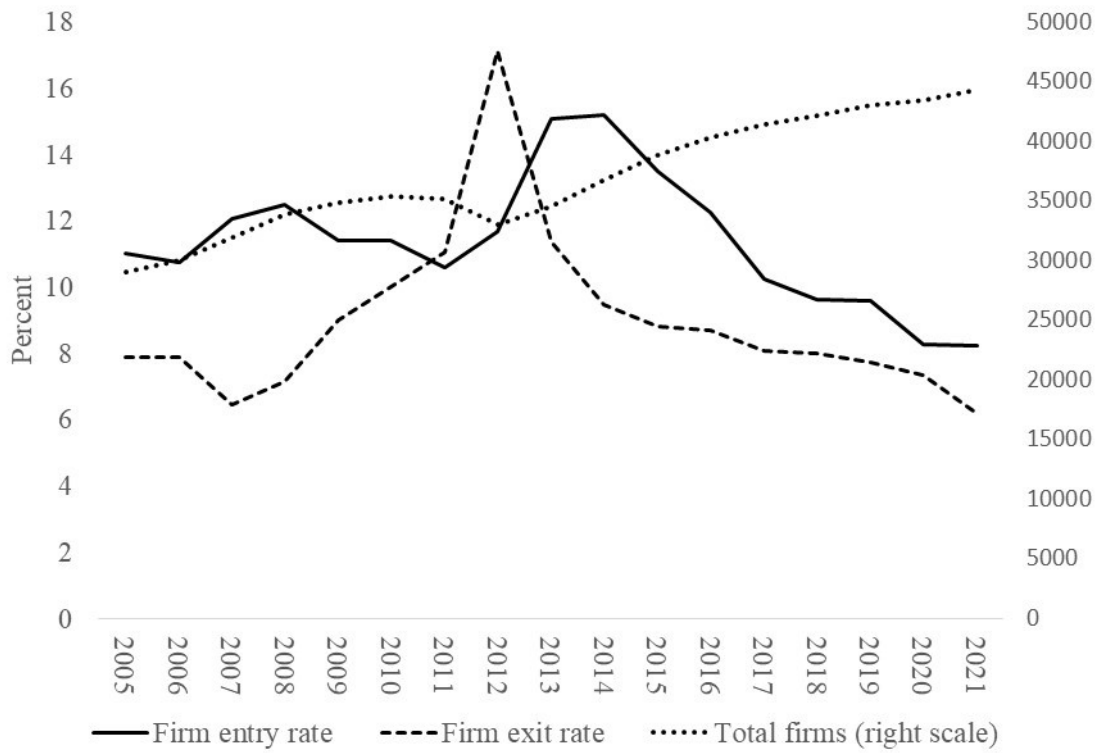


Table 1: Entry and exit rates by firm size and industry, 2019-2021

	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		

	Manu- facturing	Constru- ction	Trade	Transport and storage	Accomm. and food serv.	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

Table 2: Definition of explanatory variables entered in the regression equations

Firm age	Number of years in operation since establishment. Classified into four groups: 0-4 years, 5-9 years, 10-14 years, 15 years or more. Entered in the equation as three 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 basis 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 category.
Exporter status	Classified into four groups: non-exporter, small exporter, medium-sized exporter and large exporter, depending on the share of exports to sales to other EU countries and non-EU countries. A firm is classified as a small exporter if the share of exports in sales is less than 10%; as a medium-sized exporter if the share of exports in sales is 10% or more but less than 50%, and as a large exporter if the share of exports in sales is 50% or more. Entered in the equation 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 forms of ownership (social, cooperative and mixed ownership). Private ownership is 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), Transport and storage (H), Accommodation and food service activities (I), and Real estate activities (L). All other activities are grouped together and constitute the omitted base category.
Return on assets (ROA)	Measured as ratio of net operating profit to total assets, in %.
Productivity	Total factor productivity (TFP) estimated using the Levinsohn-Petrin method, and classified into quintiles. Entered in the equation as four dummies for quintiles 1-4, 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 %.
Cash-asset ratio	Measured as a ratio of cash or cash equivalents to total assets, in %.
Debt to total assets	Measured as ratio of total debt to total assets, in %.
Zombie firm	Entered in the equation as a dummy variable equal to 1 if equity in both 2018 and 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 both of the following criteria: (a) loan obligations that are more than 90 days past-due (b) the debtor is assessed as unlikely to pay its loan obligations in full without realisation of collateral, regardless of the existence of any past-due amount or the number of days past due. Entered in the equation as a dummy variable equal to 1 if the firm had NPL, and equal to 0 if the firm did not have NPL.

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

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

	Pre-Covid 2019	Covid 2020	Post-Covid 2021	2019-2021 pooled: slope and intercept dummies		
					2020 interaction dummies	2021 interaction dummies
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Firm age dummies</i>						
Age 0-4	0.0271***	0.0239***	0.0282***	0.0257***	-0.0029	0.0056
Age 5-9	0.0218***	0.0213***	0.0156***	0.0207***	-0.0004	-0.0036
Age 10-14	0.0045	0.0087**	0.0026	0.0043	0.0040	-0.0014
<i>Firm size dummies</i>						
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
<i>Exporter status dummies</i>						
Small exporters	-0.0203***	-0.0242***	-0.0175***	-0.0193***	-0.0038	-0.0001
Medium-sized 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*
<i>Ownership dummies</i>						
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
<i>Industry dummies</i>						
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
Wholes. & 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
Accomm. & food serv.	-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
<i>Total factor productivity dummies</i>						
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 (neg. eq.) dum.	-0.4481*	-0.4622*	-0.1793***	-0.4250*	-0.0168	0.2264
Nonperf. loan oblig.	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

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 %)							
Continuing firms that experienced an 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 a drop 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		
	Manu- facturing	Constru- ction	Trade	Transport and storage	Accommod. and food services	Real estate	Others
(in %)							
Continuing firms that experienced an 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 a drop 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

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 percentage 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 an 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 a drop 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		
	Manufaturing	Construction	Trade	Transport and storage	Accomm. and food services	Real estate	Others
Median percentage 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 an 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 a drop 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

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

	Pre-Covid 2019	Covid 2020	Post-Covid 2021	2019-2021 pooled: slope and intercept dummies		
				2020 interaction dummies	2021 interaction dummies	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Firm age dummies</i>						
Age 0-4	-0.1141***	-0.1443***	-0.0386***	-0.1068***	-0.0350***	0.0647***
Age 5-9	-0.0566***	-0.0436***	-0.0028	-0.0529***	0.0101	0.0499***
Age 10-14	-0.0332***	-0.0197***	0.0087	-0.0310***	0.0116	0.0405***
<i>Firm size dummies</i>						
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
<i>Exporter status dummies</i>						
Small exporters	-0.0148**	-0.0003	-0.0383***	-0.0138**	0.0135	-0.0280***
Medium-sized 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*
<i>Ownership dummies</i>						
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
<i>Industry dummies</i>						
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
Wholes. & 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**
Accomm. & food serv.	-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
<i>Total factor productivity dummies</i>						
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 (neg. eq.) dum.	0.0863***	0.0807***	0.0843***	0.0807***	-0.0014	0.0112
Nonperf. loan oblig.	0.0650***	0.0399***	0.0889***	0.0608***	-0.0217	0.0361*
2020 dummy					0.3272***	
2021 dummy						-0.2036***
Observations	33,544	34,398	35,191	103,133		

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

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		
with no change in FTE in 2019	29.7	32.9	4.3	1.5	0.3		
that reduced 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		
with no change in FTE in 2020	29.7	33.1	3.9	1.5	0.6		
that reduced 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		
with no change in FTE in 2021	30.6	34.0	3.8	1.3	0.0		
that reduced FTE in 2021	31.8	30.5	42.1	40.4	43.8		
	Manufaturing	Constru ction	Trade	Transport and storage	Accomm. and food serv.	Real estate	Other
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
with no change in FTE in 2019	21.0	21.4	35.0	18.0	16.6	45.7	36.4
that reduced 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
with no change in FTE in 2020	20.9	20.8	35.6	18.4	16.1	49.1	36.3
that reduced 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
with no change in FTE in 2021	21.1	20.8	36.8	19.2	17.8	54.0	37.3
that reduced FTE in 2021	34.5	35.0	28.3	36.4	44.8	25.1	28.8

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 reduced
<i>Firm age dummies</i>			
Age 0-4	-0.1033***	0.1347***	-0.0314***
Age 5-9	-0.0505***	0.0567***	-0.0062
Age 10-14	-0.0192***	0.0284***	-0.0092
<i>Firm size dummies</i>			
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
<i>Exporter status dummies</i>			
Small exporter	-0.0578***	0.0258***	0.0320***
Medium-sized exporter	-0.0312***	0.0044	0.0268***
Large exporter	-0.0111	-0.0103	0.0214***
<i>Ownership dummies</i>			
State-owned	-0.2529***	0.1757***	0.07724
Other mixed ownership	-0.0761**	-0.0061	0.0822***
<i>Industry dummies</i>			
Manufacturing	-0.0541***	0.0016	0.0526***
Construction	-0.1221***	0.0456***	0.0765***
Wholes. & retail trade	0.0349***	-0.0190***	-0.0159**
Transport & storage	-0.0968***	0.0492***	0.0475***
Accomm. & food serv.	-0.1665***	0.0524***	0.1141***
Real estate activities	0.0835***	-0.0572***	-0.0263
<i>Total factor productivity dummies</i>			
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-perf. 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

Table 9: Take-up of government financial support and bank loan moratoriums by continuing firms in 2020

	All	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 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

	Manufa cturing	Constru ction	Trade	Transport and storage	Accomm. 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 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

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 employ- ment-based support	Reduced working hours	Tempora- ry layoff (furlough)	Qua- rantine	Partial coverage of fixed costs	For firms with bank debt: Bank loan morat.
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Firm age dummies</i>						
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
<i>Firm size dummies</i>						
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
<i>Exporter status dummies</i>						
Small exporter	0.0525***	0.0269***	0.0521***	0.0184***	-0.0050	0.0370***
Medium-sized exporter	0.0301***	0.0239***	0.0283***	0.0088	-0.0200***	0.0482***
Large exporter	-0.0249***	-0.0145**	-0.0060	-0.0303***	-0.0450***	0.0122
<i>Ownership dummies</i>						
State-owned	0.0392	-0.0759*	-0.2235***	0.0877***	-0.0449	-0.2358***
Other mixed owner.	0.0301	0.0285	-0.0166	0.0400**	-0.0141	-0.0385
<i>Industry dummies</i>						
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***
Whole. & 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*
Accomm. & food serv.	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
<i>Total factor productivity dummies</i>						
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***
Total debt-to-assets r.	2.99E-05	3.63E-06**	-7.44E-06***	-4.6E-05**	2.87E-05**	0.0002***
Zombie (neg. eq.) d.	-0.0304**	-0.0347***	-0.0131	-0.0251**	-0.0390***	-0.1593***
Change in sales	-0.0021***	-0.0013***	-0.0029***	0.0003***	-0.0037***	-0.0013***
Non-perf. loan oblig.	-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

Table 11: Average (mean value) relative size of government financial support received by continuing firms in 2020

	All	Micro firms	Small firms	Medium-sized firms	Large firms
Only for firms that received government support					
Relative to total labour costs in 2019 (in %)					
(1) Wage subsidy for reduced working hours	1.5	1.7	0.4	0.2	0.1
(2) Wage subsidy to compensate workers temporarily laid off (furloughed)	10.5	11.9	3.6	2.4	2.2
(3) Wage subsidy to pay employees in quarantine	0.4	0.5	0.2	0.2	0.2
(1) or (2)	12.0	13.6	4.0	2.6	2.4
(1) or (2) or (3)	12.4	14.0	4.2	2.8	2.5
Relative to total labour costs in 2019 (in %)					
(4) Partial coverage of fixed costs	11.7	12.9	6.4	3.8	2.8
Only for firms that received government support					
Relative to total labour costs in 2019 (in %)					
(1) Wage subsidy for reduced working hours	1.3	1.0	1.7	0.9	1.4
(2) Wage subsidy to compensate workers temporarily laid off (furloughed)	6.3	8.9	10.3	8.7	15.0
(3) Wage subsidy to pay employees placed in quarantine	0.3	0.3	0.4	0.2	0.7
(1) or (2)	7.6	9.9	12.0	9.6	17.3
(1) or (2) or (3)	7.9	10.1	12.5	9.8	18.0
Relative to fixed costs in 2019 (in %)					
(4) Partial coverage of fixed costs	5.0	6.4	10.6	6.6	33.2
					13.1
					12.0

Table 12: Tobit estimates of determinants of wage subsidies received by continuing firms in 2020

(Dependent variable: amount of wage subsidies received by a firm/total wage costs)

	Wage subsidy for workers on:			
	Total wage subsidy	Reduced working hours	Temporary layoff (furlough)	Quarantine
	(1)	(2)	(3)	(4)
<i>Firm age dummies</i>				
Age 0-4	2.0308***	-0.5708**	2.3574***	-0.2557*
Age 5-9	0.4344*	-0.8162***	0.7683***	-0.2031*
Age 10-14	0.2392	-0.0148	0.2900	0.0142
<i>Firm size dummies</i>				
Micro firms	-5.9051***	-3.5961***	-4.0699***	-4.0680***
Small firms	-3.1851***	-2.8374***	-2.4118***	-1.7892***
Medium-sized firms	-1.0761***	-1.6647**	-1.4854**	-0.5236***
<i>Exporter status dummies</i>				
Small exporters	1.1974***	1.2170***	1.2080***	0.3087**
Medium-sized exporters	0.8588***	1.0414***	0.8276***	0.1506
Large exporters	-0.5541*	-0.7701**	-0.1122	-0.5300***
<i>Ownership dummies</i>				
State-owned	-1.7308**	-3.8565**	-8.3998***	0.5317**
Other mixed ownership	-0.3181	1.0179	-1.0381	0.2836
<i>Industry dummies</i>				
Manufacturing	-0.6824***	1.2140***	-0.8066***	0.3147***
Construction	-3.6952***	-3.8830***	-2.7005***	-0.7266***
Wholes. & retail trade	1.5181***	1.4936***	2.4129***	-0.3622***
Transport & storage	-3.9796***	-2.6516***	-2.5726***	-1.8934***
Accomm. & food serv.	11.6765***	3.5785***	13.0833***	-0.8471***
Real estate activities	-0.6726	0.0762	-0.4694	-0.7044**
<i>Total factor productivity dummies</i>				
Quintile 1	11.6036***	6.5068***	11.6872***	-1.5829***
Quintile 2	7.6514***	5.7727***	7.9964***	-0.9268***
Quintile 3	5.6729***	4.3149***	6.2768***	-0.0549
Quintile 4	3.5563***	2.8099***	3.9760***	0.3879***
Profitability (ROA)	0.0015	0.0033	-0.0013	-0.0036**
Cash asset ratio	-0.0276***	-0.0126**	-0.0303***	-0.0044*
Tangibility	0.0204***	0.0072*	0.0212***	0.0096***
Debt-to-assets ratio	0.0001**	0.0002***	-0.0001	-0.0006
Zombie (neg. equity) dummy	-0.7472	-1.7925***	-0.2247	-0.6208**
Change in sales in 2020	-0.0985***	-0.0503***	-0.1264***	0.0071***
Nonperf. loan oblig. dummy	-0.5809	-0.4614	-0.1864	-0.1837
Constant	-0.8732*	-12.9520***	-7.0896***	-0.5329**
(N)	34,024	34,024	34,024	34,024

Robust standard errors in parentheses

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

Appendix

Table A.1: Descriptive statistics of firm characteristics for 2020

	All firms in the sample		Continuing firms		Firms that exited	
	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.
<i>Firm age dummies</i>						
Age 0-4	0.1510	0.0019	0.1469	0.0019	0.2608	0.0124
Age 5-9	0.2362	0.0023	0.2343	0.0023	0.2849	0.0128
Age 10-14	0.1750	0.0020	0.1764	0.0021	0.1388	0.0098
<i>Firm size dummies</i>						
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
<i>Exporter status dummies</i>						
Small exporters	0.2046	0.0022	0.2077	0.0022	0.1236	0.0093
Medium-sized 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
<i>Ownership dummies</i>						
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
<i>Industry dummies</i>						
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
Wholes. & 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
Accomm. & food serv.	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 (neg. equity) dummy	0.0745	0.0014	0.0772	0.0015	0.0016	0.0011
Nonperf. loan oblig. dummy	0.0246	0.0008	0.0227	0.0008	0.0746	0.0074