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Loans vs Subsidies: Lithuania's State Support Policies During the COVID-19 Pandemic

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Loans vs Subsidies: Lithuania's State Support Policies During the COVID-19 Pandemic*

Mustapha Douch
(University of Edinburgh)

Eglė Jakučionytė
(Bank of Lithuania and Vilnius University)

Swapnil Singh
(Bank of Lithuania and Kaunas University of Technology)

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ABSTRACT

This paper analyzes the firm's choice between subsidy support and loan support during the COVID-19 crisis and explores the implications of this choice on firms' employment growth. We compile a novel micro-level dataset of Lithuanian firms' balance sheet data and government support records during the pandemic period. We use the dataset to provide a set of stylized facts, categorizing the variety of enacted support policies and tracking aid distribution patterns. We show that larger firms were more likely to choose loans over subsidies. This result cannot be fully explained by policy eligibility criteria and the severity of the pandemic shock, suggesting that firm characteristics played a significant role. Finally, we show that the type of support has implications for firms' outcomes – subsidy-recipient firms experienced higher employment growth compared to loan-recipient firms.

1. INTRODUCTION

The global economic landscape faced unprecedented challenges with the advent of the COVID-19 pandemic, necessitating widespread government interventions across sectors. Governments worldwide responded by implementing various support policies, primarily in the form of subsidies and loans for businesses. While existing literature has examined the effectiveness of individual support measures, this study aims to contribute by shedding light on the firm's choice of different types of support, namely subsidies versus loans, and the impact of subsidies compared to loans on firms' employment growth, using novel administrative data from Lithuania.

Our first contribution involves constructing a unique dataset for Lithuania, merging firm-level balance sheet data with quarterly employment and turnover data and records of government support during the pandemic. This exercise required harmonizing firm-balance sheet information over time and merging it with value-added tax declarations as well as information on firms provided by the Social Security Fund in Lithuania. The quarterly frequency of employment and turnover data allows us to track employment trends before, during, and after the pandemic across most firms.

Our second contribution entails a comprehensive analysis of Lithuanian government support policies, categorizing them into distinct types and delineating eligibility criteria. We find that some measures imposed firm size requirements and these requirements varied across measures, resulting in potentially lower access to subsidy support relative to loan support for larger firms. Also, although the majority of measures required applicants to be affected by the pandemic, the definitions of the pandemic effect varied across different measures also potentially creating wedges in access to different types of support.

The third contribution outlines key patterns in the Lithuanian government's aid to firms during the pandemic. Notably, most firms accessed subsidies or a combination of subsidies and loans, with a fraction relying solely on loans. This distribution is noteworthy, given the ample provision of subsidies. This pattern resonates with findings in studies such as [Bighelli et al. \(2021\)](#), highlighting the prevalence of subsidies during the pandemic. It also emphasizes a nuanced understanding of firm behavior, as seen in [Bartik et al. \(2020\)](#), which suggests that firms may choose different types of support based on their specific needs and circumstances. The paper also delves into the distribution of COVID-19 support across industries in Lithuania. A higher share of total support disbursed to accommodation,

trade, and manufacturing sectors, together with a higher rate of supported firms within these sectors, reflect broader global trends observed by [Andrews et al. \(2021\)](#).

Furthermore, our study reveals a systematic difference between firms accessing only loans and those using only subsidies. Both stylized facts and results from the multinomial logit model and the binary choice model indicate that loan-recipient firms tended to be larger in terms of employment relative to subsidy-recipient firms, suggesting that larger firms may have different needs or access to different types of support. The differences between loan-recipient firms and subsidy-recipient firms in terms of total assets, the share of current assets to total assets and labor productivity are not robust to some model specifications. Most of these variables, however, play an important role in accessing government support in general (either loans or subsidies). Our evidence shows that firms with higher employment, higher total assets and higher labor productivity are more likely to be aid-recipients, aligning with the findings of [Guerini et al. \(2024\)](#); [Kozeniauskas et al. \(2022\)](#); [Konings et al. \(2023\)](#); [Meriküll and Paulus \(2024\)](#) among several others that underscore the role of productivity in accessing government support.

After establishing differences in firm characteristics between loan-recipient and subsidy-recipient firms, we provide evidence that the choice between loans and subsidies has implications for firm-level outcomes, namely employment growth. Although most support measures in our sample do not target employment explicitly, employment subsidies being the exception, focusing on growth provides insights as to how the received support affects the firm's behavior beyond increasing cash holdings. Positive changes in employment also proxy for the firm's ability to afford more employees, as well as the firm's performance. In a difference-in-differences framework, we show that subsidy-recipient firms exhibited higher and more persistent employment growth compared to loan-recipient firms. This aligns with the literature, such as [Patrick \(2016\)](#), which emphasizes the role of subsidies in driving economic expansion and fostering employment growth.

After establishing this set of results, we scrutinize the role of firm size in the firm's choice between loans and subsidies. Building on our analysis of state support measures during the pandemic, we explore two other possible explanations. First, we test whether differences in eligibility criteria across measures can explain why larger companies tend to be loan-recipients rather than subsidy-recipients. We restrict the sample to small and medium enterprises (SMEs) and re-estimate the logit models. The results are qualitatively similar to the baseline set of results, suggesting that differences in eligibility

criteria alone cannot explain the difference in firm size between loan-recipients and subsidy-recipients. Second, we explore the role of the severity of the pandemic shock in accessing subsidies vs. loans. We restrict the sample to firms that experienced 30% or higher revenue fall in the beginning of the first or the second quarantine and re-estimate the firm's choice models. Our main results are robust to this restriction as well.

We contribute to the extensive literature on government support during the COVID-19 pandemic that offers insights into the effectiveness of different policy measures and their consequences for businesses. One prominent area of investigation revolves around the effectiveness of job retention schemes. An extensive body of research, e.g. [Autor et al. \(2022\)](#); [Chetty et al. \(2020\)](#) provides evidence that employment support schemes in the US helped preserve jobs in some industries. [Aiyar and Dao \(2021\)](#); [Lalinsky and Pál \(2022\)](#); [Meriküll and Paulus \(2023\)](#) and others provide evidence on European economies, highlighting the positive impact of wage subsidies on maintaining employment levels. Several studies also delineate the effects of employment support schemes on productivity, solvency and liquidity (e.g. [Lalinsky and Pál \(2022\)](#); [Meriküll and Paulus \(2023\)](#)). Another strand of literature provides evidence on the effects of subsidized loans and guarantees, revealing the unintended consequences of such schemes ([Altavilla et al., 2021](#)). Differently from these studies, we do not focus on a particular support measure, but take the population of support disbursed in the form of subsidies or loans, shedding light on a firm's decision to choose a particular type of support and the implications of such choices.

An array of studies also focus on the performance of SMEs during the pandemic and the impact of government support on them, e.g. [Gourinchas et al. \(2020\)](#); [Kalemli-Ozcan et al. \(2020\)](#). We contribute to this discussion as well, because our data includes SMEs in Lithuania, allowing us to analyze their choices and firm-level outcomes.

The paper's structure is as follows: the remaining part of this section provides a summary of related literature, Section 2 describes the data sources, Section 3 provides an overview of the background on state support policies, Section 4 provides stylized facts about government support during the COVID-19 crisis. Section 5 analyzes the firm's choice between loans and subsidies and its implications. Section 6 concludes.

Related literature: The COVID-19 pandemic has had a profound impact on businesses worldwide.

This is because the abrupt and unexpected nature of the COVID-19 crisis prompted a growing corpus of literature delving into state support during the pandemic (Phan and Narayan, 2020; Gourinchas et al., 2020; Ebeke et al., 2021; Bighelli et al., 2021). Thus, understanding the effects of the pandemic and the role of government policies and financial mechanisms is crucial in devising effective support measures. Indeed, governments worldwide have instituted a variety of policies to mitigate the economic fallout resulting from the pandemic, with industries such as tourism and aviation being especially impacted due to measures like quarantine, travel bans, and administrative shutdowns (OECD, 2020a; Fu and Shen, 2020). To mitigate the negative effects of these interventions, governments adopted a number of support policies, which can be classified into four categories: labour, deferral, financial instruments, and structural policies, each bearing unique implications for the economy (Abate et al., 2020; Lalinsky and Pál, 2021; Andrews et al., 2021; Feng et al., 2021; Meriküll and Paulus, 2024; Bighelli et al., 2023; Kozeniauskas et al., 2022; Chetty et al., 2020).¹

These government interventions have proven instrumental in averting an economic meltdown during the pandemic. Several studies have investigated these aspects and shed light on the interplay between subsidies, loans, policy interventions, and how they impact firms. For instance, looking at financial support and constraints, Chen et al. (2022) examine how government policies affect SMEs in China during the pandemic. They highlight the significance of these policies in supporting businesses and helping them navigate the crisis. Whereas, Corredera-Catalán et al. (2021) focuses on SME financing constraints in Spain and proposes a credit guarantee scheme as a solution. By focusing on understanding how financing constraints have affected firms' ability to navigate the challenges posed by the pandemic, Khan (2022) explores various aspects related to financing, such as access to credit, liquidity, and financial support measures implemented by governments. The findings suggest that financing constraints have significantly affected firms' responses to the pandemic. Firms facing higher financing constraints are more likely to reduce costs, postpone investments, and lay off employees. Moreover, these firms are also more reliant on external financing, seeking loans and financial support measures provided by governments.

¹Labour-related aids are aimed at averting layoffs and maintaining employment stability through measures such as short-time work, job retention schemes, wage subsidies, self-employed emergency packages, temporary layoff schemes, pay-check protection programs, unemployment benefits, and sick pay entitlements. Deferrals allow taxpayers to postpone bill payments to a future period, such as VAT payments deferral, income tax payment deferral, moratoria on debt, and delayed payments on certain tariffs for goods or social contributions. Financial instruments involve direct financing, loans or guarantees, including direct cost-of-living compensation, debt/contract relief for households programs, tax cuts, government-backed commercial loans, and credit guarantees. Structural supports encompass more targeted or longer-term measures, like equity injections to strategic firms and support for market expansion and innovation.

Furthermore, [Elenev et al. \(2022\)](#) underscored that government interventions in corporate credit markets halved potential corporate bankruptcies by instilling confidence in investors and the public and providing firms with necessary financial resources. Notwithstanding the swift policy responses, understanding the overall impact of these interventions, particularly their influence on economic actors' behavior – such as firm growth, entry and exit – remains a vital area for future exploration ([Konings et al., 2023](#)).

[Morikawa \(2021\)](#) focuses on the firms utilizing relief policies during the COVID-19 crisis, and the results suggest a positive impact of these policies on firm performance. However, [Criscuolo \(2021\)](#) highlights that there are both risks and opportunities for firms as a result of this unprecedented crisis. In particular, firms that had experienced digital transformations before the crises had enhanced their adoption to overcome financial difficulties brought by the COVID-19 crisis. In turn, this has led to significant reallocation of resources toward highly productive sectors. This is because business dynamics during the pandemic created opportunities for entrepreneurial firms and those able to respond quickly to changing market demands.

Indeed, the reallocation of resources has been suggested to have played an important role during the crisis. For instance, [Barrero et al. \(2020\)](#) discusses the COVID-19 pandemic as a reallocation shock, highlighting the need for firms to adapt and reallocate resources in response to the crisis. This reallocation shock brought by COVID-19 had relatively minor effects on the labour market conditions during the pandemic ([Consolo and Petroulakis, 2022](#)). However, regional solutions for mitigating the risk of SME finance should be adapted to better support businesses ([Taghizadeh-Hesary et al., 2022](#)).

Some researchers also delve into the implications of government support for employment and labour market effects. For instance, [Aiyar and Dao \(2021\)](#) evaluate the effectiveness of job-retention schemes implemented during the pandemic, focusing on the German states. The results highlight that government support had a strong mitigating effect on unemployment as well as helping domestic demand. Similarly, [Wu \(2023\)](#) explores the impact of COVID-19 on business activities and female workers in global developing economies. The results show that firms that experience economic difficulties increase the odds of female workers leaving their jobs. This is because women are more likely to work in sectors severely impacted by the crisis, such as hospitality, retail, and informal employment. Moreover, women-owned businesses have encountered difficulties in accessing government financial support, including credit and government relief programs. This lack of support has hindered their

ability to sustain their businesses and recover from the crisis.

With the availability of firm-level data, including pre- and post-pandemic balance sheets and government aid information, the literature has expanded to include more micro-level analysis. A key area of focus has been the impact of the liquidity crisis on firms and the role of government support in mitigating it (Schivardi et al., 2020; Ebeke et al., 2021; OECD, 2020a). For instance, studies by Alstadsæter et al. (2020) and Blanco et al. (2021) used simulation and firm-level administrative records to demonstrate how to support measures that reduced aggregate liquidity needs and credit risks, thereby fostering favorable financing conditions.

This liquidity crisis has prompted more research on its implication for solvency. Indeed, Belitski et al. (2022) provides a comprehensive analysis of the economic effects of the pandemic on entrepreneurship and small businesses, emphasizing the challenges faced by these entities. One of these challenges is in terms of the pandemic's impact on firm solvency. In this regard, Dörr et al. (2022) examines the insolvency gap among small firms, emphasizing a significant increase in insolvencies during the pandemic. Similarly, Kalemli-Ozcan et al. (2020) estimate SME failures during the crisis, highlighting the severity of business closures. In this regard, Lalinsky and Pál (2022) study the distribution of government support and its effects on firm liquidity and solvency. They emphasize the importance of targeted allocation to ensure desired outcomes. Whereas, Demmou et al. (2021) propose policy responses to address these challenges, particularly concerning liquidity shortfalls during the outbreak. Indeed, by examining different policies, e.g. tax deferral, support to wage payments, and wage subsidy schemes, they show that their relative efficiency depends on their design. Furthermore, considering the effectiveness of loan subsidies, Mikušová and Horváthová (2023) find a positive impact on the real activity of small firms, suggesting that these subsidies stimulate economic activity. However, government support might not be optimal as there are risks associated with supporting "zombie" firms (Hoshi et al., 2023). However, theoretical results from Guerini et al. (2024) suggest that those government policies had a positive effect on healthy but illiquid firms in overcoming the crisis, with no evidence found of a "zombification effect".

Moreover, research by OECD (2020b) and Demmou et al. (2021) underscored the role of wage payment supports as critical policy measures to avert a liquidity crisis, proving particularly effective in reducing liquidity shortages. Likewise, Köhler and Hill (2022) and Yang and Qian (2021) analyzed the impact of wage subsidies and other government subsidies on job retention and firm performance,

noting positive effects on job retention and social welfare. Studies like those by [Maré and Hyslop \(2021\)](#) and [Birskyte and Mingelaite \(2021\)](#) compared the performance of subsidized and non-subsidized firms, indicating that government financial support positively influences the financial performance of small and medium-sized enterprises.

2. DATA

Data Sources. We use three administrative data sources: (1) KOTIS which provides information on the state's support to legal entities in Lithuania, (2) data on employment subsidies as announced by the Employment agency, and (3) Inter-service Data Repository (TDS) which contains detailed information on formal firms operating in Lithuania. We provide more details on all of these datasets next.

KOTIS register is administered by the Competition Council of the Republic of Lithuania and reports all state support and *de-minimis* support provided by the Lithuanian government to firms and individuals. For each case of support, the register includes a unique firm identifier (if the receiver is a firm), the support provider, the reception date, the amount, the type of support, the measure of support (e.g. a subsidized loan, a guarantee, etc.), legal background, and the firm's industry classifiers. The data runs from 2019 to the present. We did a web scrapping of all the available data and classified support into COVID-19 and non-COVID-19 support based on the provided legal background. If the legal background information contains references to COVID-19 or the names of measures that to our knowledge were designed to mitigate COVID-19 effects, we classify such support as COVID-19 support. We checked the main measures of COVID-19 support as reported by the Ministry of Economics and Innovation and in particular by the state-incorporated financial entity "Investment and business guarantees" Ltd (INVEGA²) – the main provider – to make sure these measures were not mis-classified.

KOTIS does not provide employment subsidies that were initiated by changing the Employment law in Lithuania. However, employment subsidies amounted to a substantial share of total COVID-19 support. Using our classification for COVID-19 support, we estimate this share at 40%. Given this lack in KOTIS, we use data on these subsidies as announced by the Employment Agency and collected by the Bank of Lithuania. This data contains unique recipient firms' identifiers and total subsidy amounts for each recipient. The missing values in the amount variable refer to non-disclosed (but received)

²We use the most common abbreviations for agency names, which might not align with their titles in English.

amounts. Thus, the total amount (but not the number of recipients) underestimates actual support as delivered by employment subsidies. In addition to this fault, the dataset misses the exact disbursement date, and thus the exact timing of employment subsidies cannot be exploited in our analysis.

The third data source, TDS, lists formal firms' characteristics and their balance sheet information, which is provided by the State Enterprise Centre of Registers (SECR). From TDS we obtain firms' annual financial reports, including profit/loss statements and cash flow statements over the period 2015–2022. The information provided is not uniform across companies for three main reasons. First, although in Lithuania all firms are required by law to submit their financial reports to SECR, some firms can submit their financial reports in a simplified (shorter) form and not all firms are required to submit profit/loss statements and cash flow statements. Due to this, some variables are missing for some types of firms. For instance, small firms do not have to submit cash flow statements and can submit a shortened version of their balance sheet report, thus reducing the number of available variables.³ Second, financial reports change over time as the law changes the reporting requirements. Third, although reporting to SECR is required by law, non-compliance is present. For instance, out of 194,000 firms that were required to submit financial reports for the year 2020, only 54% submitted the required forms (including firms that submitted with a delay). This statistic is relatively stable over time: it is 57% for the year 2019 and 61% for the year 2018.

TDS also provides firms' quarterly employment and monthly value-added tax (VAT) declarations since 2018. The employment is defined as the average quarterly number of employees for each firm that pays the state social insurance tax. From VAT we obtain the firm's monthly turnover. Specifically, all VAT payers are required to submit form FR0600 which details monthly purchases and sales to the State Tax Inspectorate. TDS provides the information in this form throughout the period and imputes the turnover based on the reported sales⁴.

Sample selection. We exclude budgetary institutions, associations, non-profits, charities and financial firms. In addition dropping observations where employment is less than one restricts the sample to 104,154 firms.

We provide the main summary statistics for our sample in Table 1. The table reports the mean, median, standard deviations, total sums and the number of observations. Variables from firms'

³The Law of Financial Accountability of the Republic of Lithuania No. XII-1696, active since July 1, 2015.

⁴Turnover is imputed by summing up sales that require paying VAT and sales in Lithuania that do not, the supply margin and exports that do not require VAT (the sum of rows 11–13 and 16–20 in version 02 of form FR0600).

balance sheets and profit (loss) statements are observed annually and mostly have more than 400,000 observations. We have significantly fewer observations of financial debts since smaller firms can submit a shortened version of their balance sheet report, which does not include financial debts. We observe that these variables have a right-skewed distribution. Variables observed at the quarterly frequency – employment and turnover – suggest that the median (and average) firm in the sample is small (less than 10 employees) and the median turnover is below 50,000 euros. Although the number of observations exceeds 2 million, a substantial number of firms have only employment data and lack balance sheet information. The number of observations for turnover is lower than for employment because we observe turnover only over the period 2018Q1–2022Q4 instead of 2015Q–2023Q1.

Finally, the last section of Table 1 reports state support data that can be matched with other variables in the dataset. We break support into support types as they are classified in KOTIS. The statistics show that non-COVID-19 support tends to be smaller on average and has smaller median values compared to COVID-19 support, except for subsidies and tax exemptions. For instance, on average a non-COVID subsidy amounts to 43,150 euros and a COVID-19 subsidy is 10,730 euros, whereas a non-COVID-19 loan is on average 47,960 euros and a COVID-19 loan is 102,800 euros.

Both in non-COVID-19 and COVID-19 support, subsidies/ grants and loans stand out as the two most common types of support. Column (4) shows that subsidies and grants amount to 1.52 billion euros (61% of total COVID-19 support) and loans amount to 620 million euros (25% of total COVID-19 support). Guarantees come third with 290 million euros. Other types are substantially more rare and represent small total amounts.

Since subsidies/ grants and loans are the two most common types of support, in the rest of the paper we focus on them. Also, we add tax deferrals to loans, since both require later payment. Tax exemptions imply no later payment but a gift, so we add them to subsidies/ grants. For the rest of the analysis, when we refer to loans, it is loans plus tax deferrals and subsidies are a sum of subsidies, grants and tax exemptions. We entirely drop guarantees and support in the form of increasing state ownership. In the robustness check section, we re-evaluate the baseline results by dropping tax deferrals and tax exemptions from the sample. We find that the main results remain qualitatively the same, although the implications for employment growth are less pronounced. The latter could also be driven by a small-sized loans sample.

The only exception in the paper where we do not follow this support classification strategy is Figure

Table 1: Summary Statistics

<i>Statistics:</i>	mean	median	standard deviation	total	N
	(1)	(2)	(3)	(4)	(5)
<i>annual frequency</i>					
total assets ('000)	1,257.06	84.30	19,435.74	568,650,644.02	452,366
sales ('000)	1,338.85	114.83	19,482.50	566,477,449.71	423,106
current assets ('000)	489.93	49.94	5,688.06	221,324,079.38	451,742
fixed assets ('000)	758.81	12.07	16,833.03	343,755,685.34	453,017
financial debts ('000)	1,981.03	0.51	15,846.50	59,682,582.48	30,127
current assets ratio	0.70	0.81	0.31	315,765.03	450,509
debt ratio	0.61	0.00	71.19	18,252.02	30,103
<i>quarterly frequency</i>					
employment	12.55	3.00	87.12	29,122,276.00	2,320,196
turnover ('000)	519.03	47.27	7,190.24	583,253,219.02	1,123,730
<i>daily frequency (disbursement day)</i>					
<i>non-COVID-19 support: ('000)</i>					
guarantees	11.07	4.53	23.74	33,821.66	3,054
increasing state ownership	55.72	7.94	119.40	1,504.35	27
loans	47.96	1.19	230.70	91,318.98	1,904
subsidies, grants	43.15	2.34	624.45	2,284,259.93	52,942
tax deferrals	0.61	0.08	3.61	3,461.41	5,700
tax exemptions	4.49	0.97	20.22	9,600.69	2,138
<i>COVID-19 support: ('000)</i>					
guarantees	171.08	20.00	465.32	287,586.93	1,681
increasing state ownership	55.00	55.00	21.21	110.00	2
loans	102.80	25.31	676.73	619,567.94	6,027
subsidies, grants	10.73	1.13	60.58	1,520,547.69	169,983
tax deferrals	3.30	0.42	18.32	49,993.46	15,140
tax exemptions	1.18	0.86	1.51	35.33	30

Source: KOTIS (2019–2022), the Employment agency's website and TDS database (2015–2021).

Description: This table provides the summary statistics of our sample. The Employment agency's website announced total sums of employment subsidies per firm but not disbursement dates. Here we create one pseudo date for all employment subsidies.

2. The figure shows the full support and does not add tax deferrals and tax exemptions to subsidies and loans, in order to provide a better picture of support timing. This is discussed in the next section.

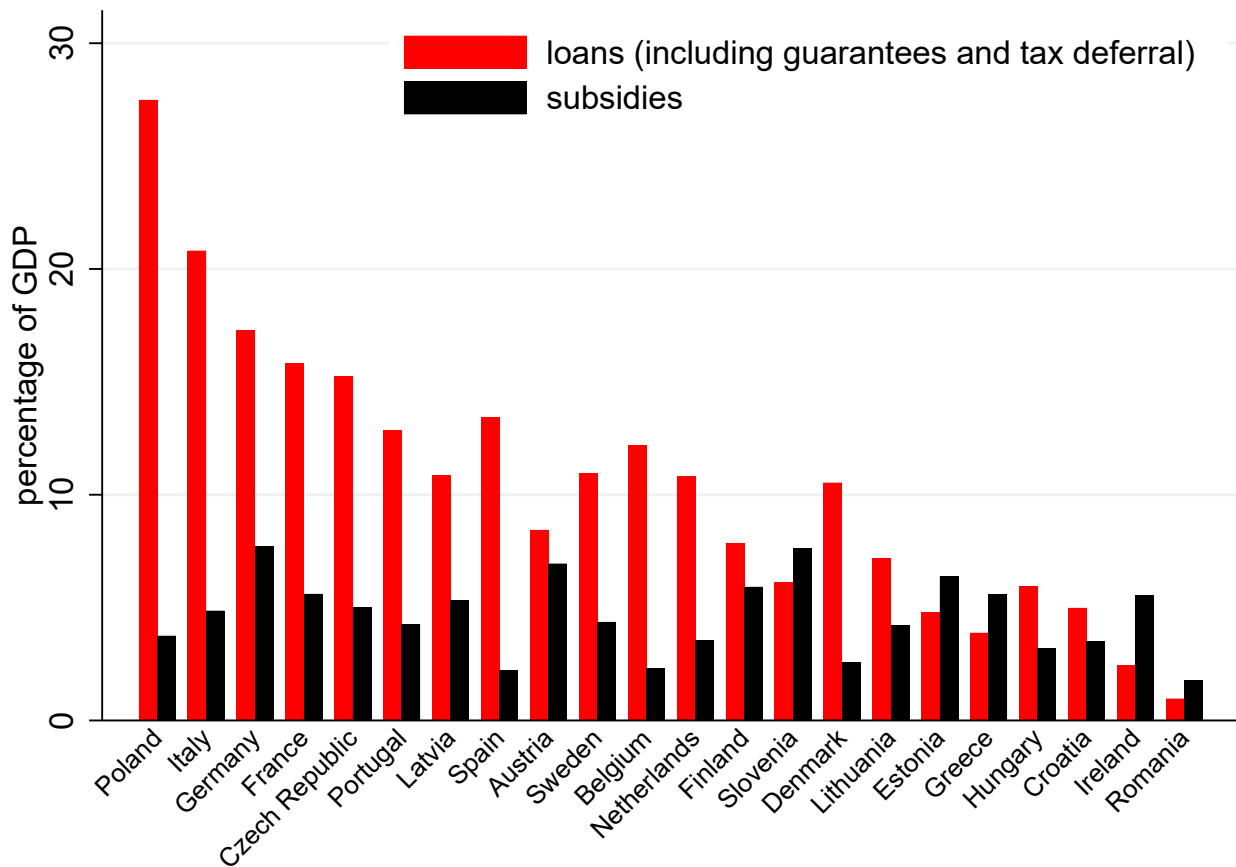
3. BACKGROUND ON STATE SUPPORT POLICIES

3.1 Cross-country Comparison

To grasp the breadth of governmental economic intervention in response to the COVID-19 pandemic, we start with a cross-country evaluation using the data provided by [Kirti et al. \(2022\)](#). Notably, they

indicate that the portion of GDP assigned to subsidies, loans, and assurances for COVID-19 aid varies greatly among countries. Upon examining data from over 200 nations, they reveal that, as of December 2021, roughly 5.5% of GDP, on average, was allocated to COVID-19-related subsidies and loans, with substantial discrepancies noted among countries.

Figure 1: Cross-country Share of GDP Attributed to Subsidies and Loans in the EU



Source: Kirti et al. (2022)

Description: The figure plots the total share of share GDP attributed to subsidies and loans (including guarantees and tax deferral) for COVID-19 support across EU countries.

For illustration, Figure 1 shows the extent of support provided by governments during the pandemic. We discern a substantial fluctuation in governmental support throughout the COVID-19 crisis. For instance, Poland, Italy, France, and Germany provided hefty COVID-19-related aid, with relative sizes fluctuating above 20% of GDP. On the other hand, economies with more limited capacity provided support of about 5% of GDP.

In terms of methodological approaches, various countries adopted divergent strategies in address-

ing the economic impact of the pandemic. These strategies encompassed a spectrum of measures, including direct financial assistance, tax breaks, loan guarantees, subsidies, and other forms of support. The effectiveness of these measures, in turn, was contingent upon factors such as industry dynamics, business size, and organizational structure (Calabrese et al., 2022).

In the case of Lithuania, the government implemented a comprehensive suite of measures aimed at mitigating the adverse effects of the crisis. These measures encompassed the provision of loan guarantees and subsidies to enterprises facing significant disruptions, as well as direct financial aid targeting self-employed individuals and small-scale businesses. We discuss the stylized facts of COVID-19 state support policies in Lithuania in the next subsection.

3.2 State Support Policies in Lithuania

On March 16, 2020, coinciding with the onset of Lithuania’s initial quarantine, the Lithuanian government unveiled a 5 billion euro strategy — equivalent to 10% of the nation’s GDP⁵ — to mitigate the impact of COVID-19. This strategy incorporated a variety of state support mechanisms, with the participation of several government ministries and agencies.

The plan directly addressed the severe lockdown’s initial period and anticipated COVID-19 repercussions by instituting subsidies, tax exemptions and deferrals, as well as subsidized loans and other measures. As the country’s quarantine lightened and then was eventually extended until June 17, 2020, the state support allocation was continuously adapted, and authorities developed additional measures. When the second quarantine ensued from November 4, 2020, until July 1, 2021, the government rolled out new initiatives to tackle emerging challenges, such as liquidity problems faced by large corporations.

In this section, we focus on describing the support variation over time and differences in policy eligibility criteria. Section A, in the appendix, provides a comprehensive overview of state aid provided to businesses based on its provider, timeframe, type, and defining features.

Timeline. COVID-19 support exhibited fluctuations over time. Different types of support also showed different variation; however, both loans and subsidies were received throughout 2020–2021. We demonstrate these temporal variations in Figure 2. Panel (a) depicts the disbursed amount on a monthly basis, conditioned on the type of support: loans, subsidies, and other forms. In the figure,

⁵<https://finmin.lrv.lt/lt/naujienos/visuomenes-sveikatos-apsaugai-ir-salies-ekonomikai-5-mlrd-euru>

we categorize all types of support that do not qualify as loans, subsidies, or grants as "other". The timeline represented in the figure corresponds to the receipt or disbursement of support. Since we do not have exact disbursement dates for employment subsidies and only total sums for each recipient firm, for this exercise we identify the period when employment subsidies were available and divide the total disbursed amount by the number of months when the measures were available, obtaining monthly averages of the respective program of employment subsidies. Then we add these averages to other data for the figure. The shaded region in the figure represents two quarantine periods.

Figure 2 reveals considerable monthly variations in received support, which stem from both fluctuating demand and the uneven roll-out of support measures. Although COVID-19 support was virtually nonexistent in March 2020, it grew significantly in April and peaked in May. Even though several measures were proposed as early as March, the implementing agencies required time to establish precise rules and process applications. The peak in support in May is expected due to the rigorous quarantine measures at the time, triggering a high demand for support. Post-July, the received monthly support dropped by approximately 100 million euros, mostly driven by the drop in loans. This could indicate that the most pressing demand had been met, but supply also declined as certain measures approached their expiry: the deadline for "Loans for Account Payables" was July 17, and "Loans for Businesses Most Affected by COVID-19" had a deadline of July 31. The year 2020 saw the third-highest surge in received COVID-19 support in December, coinciding with the second quarantine. The support remained at approximately 82 million euros per month until August 2021, after which employment subsidies expired and as a result, total support dwindled. However, there were sporadic sharp increases in support, aligning with the roll-out of one of the most substantial loan measures — "Loans for Large and Medium-Sized Businesses" (initiated on October 29, 2021), and the continuation of "Direct COVID-19 Loans (Phase I)" (launched on January 20, 2021).

We can observe that subsidies and grants exhibit less temporal variation compared to loans: the most pronounced decline post-July 2020 is evident in loans.⁶ Loan support experienced a resurgence in August and November, coinciding with the onset of the second quarantine. In contrast, subsidies and grants dropped significantly post-August 2021, dwindling to under 15 million euros per month, with the sole exception occurring in January 2022. Thus, loans and other types of support predominantly characterized the COVID-19 support provided post-August 2021.

⁶Excluding employment subsidies, which are distributed over the period until August 2021 evenly, does not matter for this result.

Though the KOTIS data represents a substantial portion of the state support extended by the government to firms, it does not exclusively pertain to COVID-19 relief. Figure 2, panels (b) and (c), chart the cumulative number of recipients and the total amount disbursed over a more extended period. We display only loans and or subsidies⁷, which form the bulk of government support as shown in panel (a). The dotted vertical line denotes the initiation of the first quarantine in Lithuania. Before the pandemic, loan support was virtually non-existent, while a modest amount of subsidies was granted to firms. Following March 2020, both the number of recipients and the amount for both loans and subsidies saw a significant rise. Looking at cumulative numbers, a considerable number of recipients availed themselves of subsidies compared to loans, as evidenced by the sharp deviation from the linear trend for subsidy recipients. However, when focusing on the disbursed amount, the response is less dramatic. This suggests that, while a large number of firms received subsidies, the average accessed amount was relatively low.

Measures. Table A3 details a broad range of characteristics for COVID-19 subsidies and loans: administering bodies, application deadlines, applicant prerequisites, and other pertinent attributes. Given the vast amount of information this encompasses, we limit our discussion in the primary text. In this sub-section, we identify and analyze the key differences in eligibility criteria that are pertinent to our study.

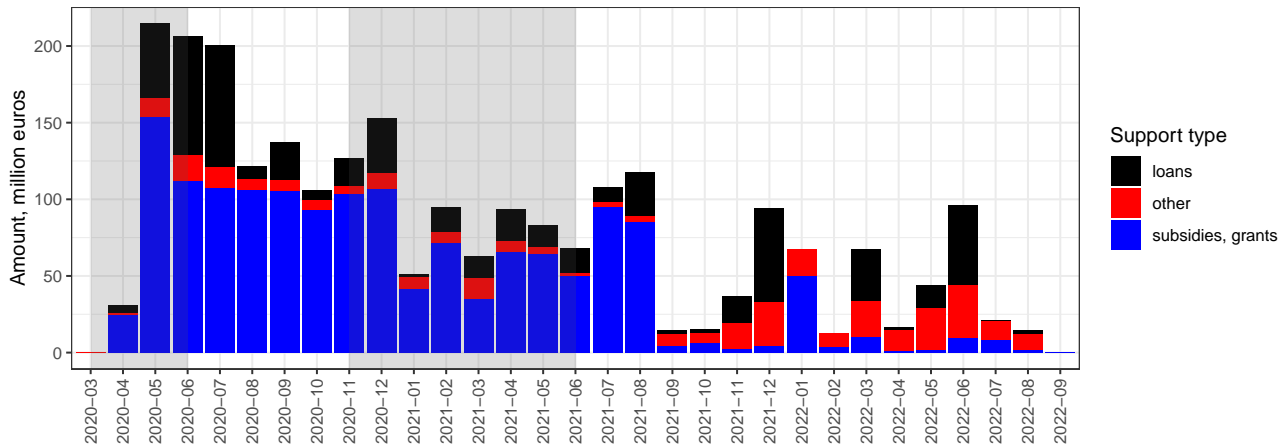
Figure 3 illustrates how recipient size requirements and other eligibility criteria vary across policy measures. For this illustration, we select only those eligibility criteria that appear relevant to our study. In addition to this selection, in the figure we depict only support measures that had a planned budget greater than 20 million euros. In Figure 3, the rows that concern loans are shaded in blue and the rows for subsidies are shaded in orange. Within each type (subsidies and loans) the measures are ranked from the smallest planned budget to the largest, where the planned budget is listed in the last column. If a support measure has a shaded cell with a letter "Y" for a given eligibility criterion, it means that the criterion applies to the program.

The first group of criteria in Figure 3 relate to the size of the recipient. Columns "Micro", "S", "M" and "L" show whether support measures were limited to micro, small, medium or large enterprises.⁸

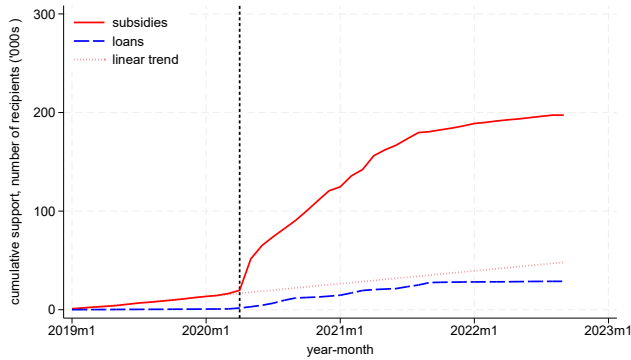
⁷From here on, loans mean loans plus tax deferrals and subsidies means subsidies, and grants plus tax exemptions.

⁸In this analysis, we adopt the firm size definitions used in state support policies in Lithuania, as defined by the Law of Development of Small and Medium Enterprises of the Republic of Lithuania. For example, an entity is considered an SME if it has fewer than 250 employees and at least one of the following holds true: (i) annual income is below 50 million euros; (ii) total assets are below 43 million euros.

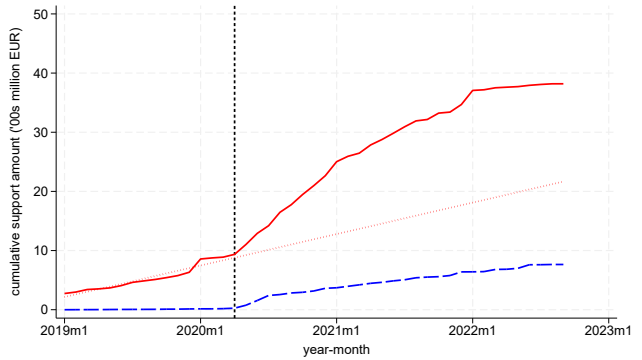
Figure 2: COVID-19 Support by Type over Time



(a) Monthly disbursed amount of COVID-19 support conditional on the type of support



(b) Number of recipients



(c) Disbursed amount

Source: KOTIS database (2019–2022).

Description: The figure plots the disbursement of state support over time. The top panel plots only COVID-19 support. The bottom panels plot the cumulative number of recipients and the amount of total support (both COVID-19 and not) disbursed by the state over time, starting from January 2019.

If for a given support measure the cells for columns "Micro", "S", "M" and "L" are shaded and have a letter "Y", it means that the support measure did not specify the size requirement for recipients.

We observe that size requirements mostly distinguish between SMEs and large companies. Only two loan programs restricted large companies from applying. In addition to this, one loan program restricted small companies from applying – the loan program "Loans for large and medium-sized businesses" targeted medium and large firms. These results would suggest that large companies were eligible for almost all large loan measures or even had a advantage over small companies. Among subsidy measures, a different picture emerges. A larger share of subsidy programs than loan programs had a budget less than 100 million euros and the majority of these smaller subsidy measures were not available for large companies. Subsidy measures with the largest planned budgets were available to large companies, except for two subsidy measures: "Subsidies for micro companies" and "Subsidies for businesses affected by COVID-19". This would suggest that although subsidy measures were more restrictive for large companies than loan measures, the majority of restrictions were placed by subsidy measures with smaller-sized budgets, and therefore these subsidy measures might have been less important for large companies' access to support.

Figure 3 also summarizes eligibility criteria in terms of revenue fall at the beginning or during the COVID-19 pandemic. A few eligibility criteria describe whether a given measure was available to companies affected by COVID-19 or not. Some measures explicitly limit access to companies with a pre-defined fall in revenue. The column "Specified turnover fall" shows that only companies with a pre-defined fall in revenue had access to some of the measures. These measures include three loan measures with planned budgets above 20 million euros and two subsidy measures with planned budgets above 20 million euros. In addition to this requirement, some programs required recipients' main activities to be on a certain list of activities affected by the quarantine (columns "List of quarantine-affected activities" and "VMI list"). These lists were created by different government agencies⁹, but both captured the idea that some activities were more vulnerable to the COVID-19 pandemic than others. Having these three columns ("Specified turnover fall", "List of quarantine-affected activities" and "VMI list") combined, we observe that the requirement of being affected by the pandemic or the quarantine applied to a large number of measures with these exceptions: "Loans to businesses through

⁹The government provided the list of quarantined and indirectly affected activities (NACE2 classification, mostly 2-digit level) at the start of the second quarantine in November 2020 (see the Order by the Minister of the Economy and Innovation and the Minister of Social Security and Labor No. 4-1171/A1-1301, dated December 30, 2020.). The State Tax Inspectorate (VMI) under the Ministry of Finance detailed the list of firms affected by the quarantine and the pandemic at the beginning of the first quarantine.

Figure 3: Eligibility Criteria of COVID-19 Support Policy Measures

	Micro	S	M	L	Specified turnover fall	List of quarantine-affected activities	VMI list	Planned budget (million euros)
Direct COVID-19 loans (phase I)	Y	Y	Y	Y	Y	Y		36
Loans to businesses through alternative financiers "Alternatyva"	Y	Y	Y					50
Loans for large and medium-sized businesses			Y	Y				100
Loans to ensure liquidity of agricultural and fisheries companies	Y	Y	Y	Y	Y			160
Loans for businesses most affected by COVID-19	Y	Y	Y		Y			200
Partial compensation for rent expenses for companies most affected by COVID-19	Y	Y	Y			Y		28
Compensations for employees' COVID-19 testing	Y	Y	Y					30
COVID-19 R&D	Y	Y	Y	Y				30
COVID-19 products LT	Y	Y	Y					31
E. commerce model COVID-19	Y	Y	Y					40
Compensation for interest rate payments	Y	Y	Y					57
Subsidies for micro companies	Y						Y	100
Subsidies for businesses most affected by COVID-19	Y	Y	Y	Y	Y	Y		120
Subsidies for businesses affected by COVID-19	Y	Y	Y		Y			150
Subsidies during downtime	Y	Y	Y	Y				473
Subsidies after downtime	Y	Y	Y	Y			Y	473

Source: Respective laws and measure descriptions provided by measure administrators.

Description: The table provides information on whether given eligibility requirements were applicable. In this table we abstract from COVID-19 support measures other than subsidies, grants and loans. Also, we do not consider support measures with planned budgets below 20 million euros. If a given eligibility criteria applies to a support measure, the respective cell is shaded and has a letter "Y". In cases when eligibility criteria differ for different segments of the same measure, each segment of the same measure is assigned a new row. The planned budget in these cases is divided equally between different rows describing the same measure unless we know exactly how the budget was divided. In cases when the budget information is not available in the laws or measure descriptions, we use the summary statistics by INVEGA or State Audit Office (2021).

Abbreviations: Micro - Micro Enterprises, S - Small Enterprises, M - Medium Enterprises, L - Large Enterprises, List of quarantine-affected activities - the list provided by the government, detailing quarantined and indirectly affected activities, VMI list - the list prepared by the State Tax Inspectorate (VMI) under the Ministry of Finance, detailing Lithuanian firms affected by COVID-19.

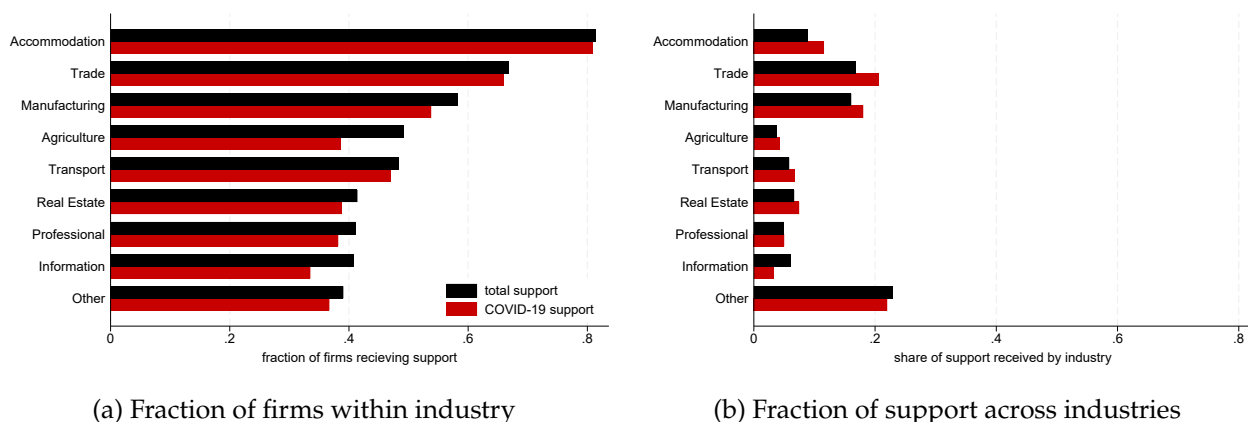
alternative financiers "Alternatyva", "Loans for large and medium-sized businesses", "Compensations for employees' COVID-19 testing", "COVID-19 R&D", "COVID-19 products LT", "E. commerce model COVID-19" and "Compensation for interest rate payments". "Subsidies during downtime" also did not feature such requirements, but they applied only to firms that had employees in downtime during the

quarantine, which would suggest that these firms had to be affected by COVID-19 too. As "Compensations for employees' COVID-19 testing", "COVID-19 R&D", "COVID-19 products LT", "E. commerce model COVID-19" target particular purposes and particular businesses – R&D – they are also less relevant for total access to support. It follows that the majority of programs, both loans and subsidy measures, required firms to be affected by COVID-19. Loan measures were slightly less restrictive as the two loan measures did not directly specify such conditions.

4. STYLIZED FACTS

4.1 Industry breakdown

Figure 4: Government Support Conditional on Industry



Source: KOTIS (2020–2021) and TDS database (2015–2019)

Description: Figure 4 displays the allocation of COVID-19 support measures among various sectors within Lithuania. Panel (a) shows the proportion of firms within each sector that received support in the form of loans or subsidies. Panel (b), in contrast, represents the fraction of total support, based on the amount of aid, received by different industries.

The distribution of support to Lithuanian companies exhibits considerable variation across different sectors, particularly in the number of firms within an industry that received support. Figure 4 panel (a) shows the proportion of firms in each sector that benefited from support in the form of loans or subsidies. The figure emphasizes significant differences in support uptake depending on the sector, with around 36% to approximately 80% of companies gaining from government assistance. Notably, a larger number of firms in the Accommodation, Trade, and Manufacturing sectors received support, while in the Construction, Real Estate, and Other sectors, a relatively smaller number of firms benefited.

Figure 4 panel (a) reflects the significant strain that the pandemic placed on various sectors in

Lithuania. The hospitality industry, which includes hotels and restaurants, was heavily hit due to lockdowns and travel restrictions, prompting governments to extend critical aid to these businesses and their workforce. Similarly, enforced closures or limited operations significantly disrupted the retail industry, leading to the initiation of aid programs to support affected businesses, with a specific emphasis on SMEs. The manufacturing industry also faced challenges such as disrupted supply chains and decreased demand for certain products, prompting the government to implement measures to help manufacturers during these tough times. The trends observed for Lithuania are consistent with those of global governmental support programs, which often prioritize sectors most deeply impacted by the pandemic, with a particular focus on job retention.

Figure 4 panel (b) plots the fraction of total support – based on the amount of support – received by various industries. Comparing the results from panels (a) and (b), it is evident that industries with the highest take-up rate do not necessarily receive the highest share of total support. For example, despite having the highest proportion of firms (in terms of numbers) receiving government support, the Accommodation industry accounts for a smaller share of total support than some other industries such as the Trade industry. This could be driven by both the difference in the average amount of support across industries and the difference in industry sizes.

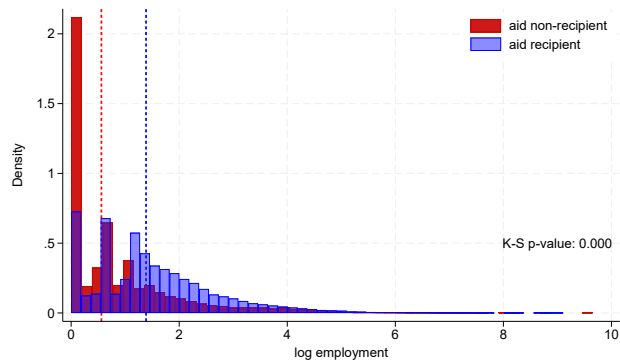
4.2 Firm characteristics of aid recipients

To examine the differences between firms that receive COVID-19 support and those that do not, we analyze key characteristics such as employment, total assets, financial debt, current assets, fixed assets, and productivity. This analysis allows us to assess whether supported firms exhibit distinct features compared to non-recipients.

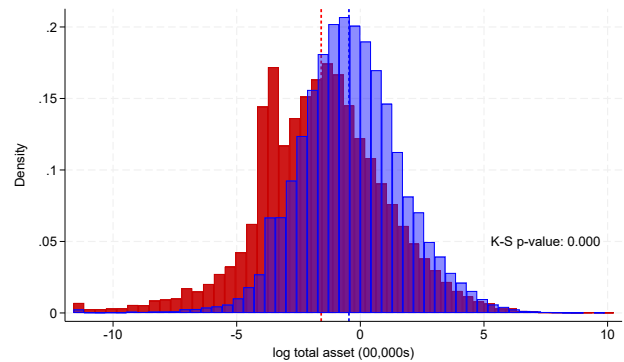
In Figure 5, panels (a) to (f) provide an overview of key characteristics related to firm size, financial performance, and labor productivity among firms receiving government support compared to non-recipients. The panels also report the Kolmogorov-Smirnov test statistic for the exercise where we compare the distribution of the respective characteristics of aid-recipient firms to firms that did not receive aid.

Panel (a) examines the distribution of employment of supported and non-supported firms. Businesses that receive government support tend to have a higher number of employees. This observation suggests two plausible explanations. First, it is possible that support programs intentionally targeted

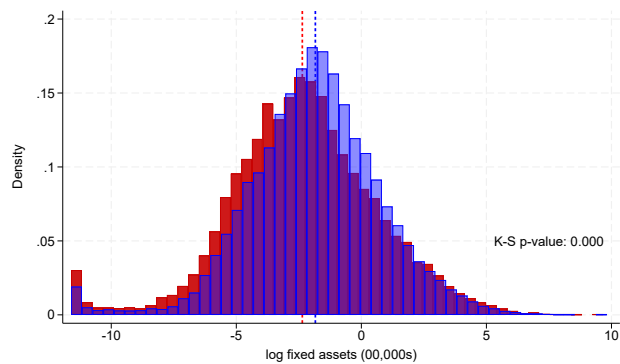
Figure 5: Distribution of Characteristics of Firms Conditional on Aid Status



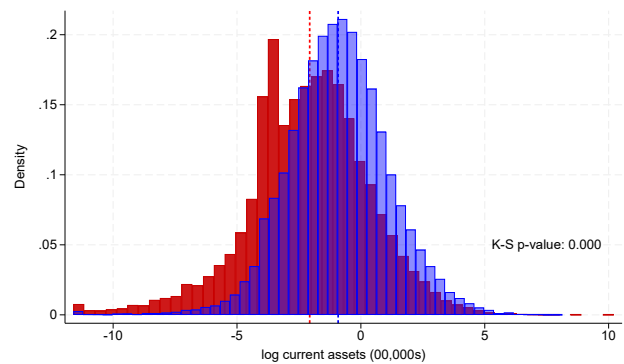
(a) Employment



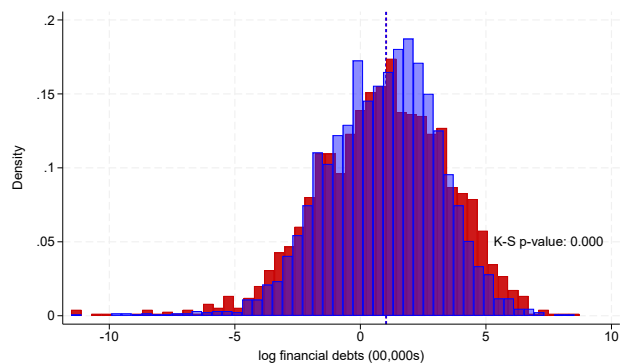
(b) Total assets



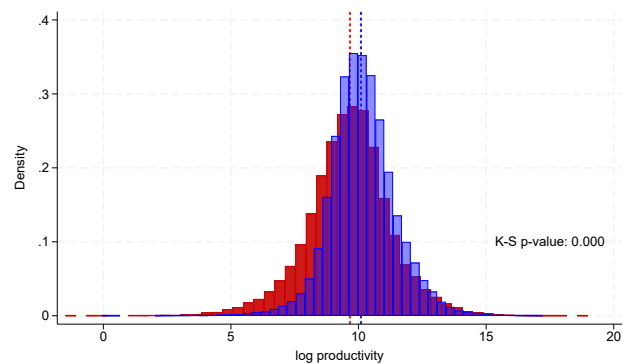
(c) Fixed assets



(d) Current assets



(e) Financial debts



(f) Labor productivity

Source: KOTIS (2020–2021) and TDS database (2015–2019)

Description: The figure plots the distribution of employment, total assets, financial debts, current assets, fixed assets, and labor productivity of firms conditional on receiving government support during the period 2020–2021. Each underlying variable for the firm refers to the median value over the sample period 2015–2019. Firms reporting employment lower than one are dropped. The vertical lines represent the median values. The K-S p-value is the p-value of the test statistic for the Kolmogorov-Smirnov test, comparing the distribution of the respective characteristics of aid-recipient firms to firms that did not receive aid.

larger businesses, aiming to assist them in retaining their workforce during times of reduced revenues or temporary closures. Alternatively, it is also possible that larger firms, due to their size and resources, were more inclined to seek and qualify for government support.

Moving on to panel (b), which explores the distribution of total assets, it becomes evident that firms receiving government support exhibit, on average, a larger asset base compared to non-supported firms. When examining panels (c) and (d), which respectively depict the distribution of fixed and current assets, it becomes apparent that the larger asset base among supported firms is primarily driven by their larger current assets. These businesses may have had higher cash reserves, greater liquidity, or access to credit facilities before the pandemic.

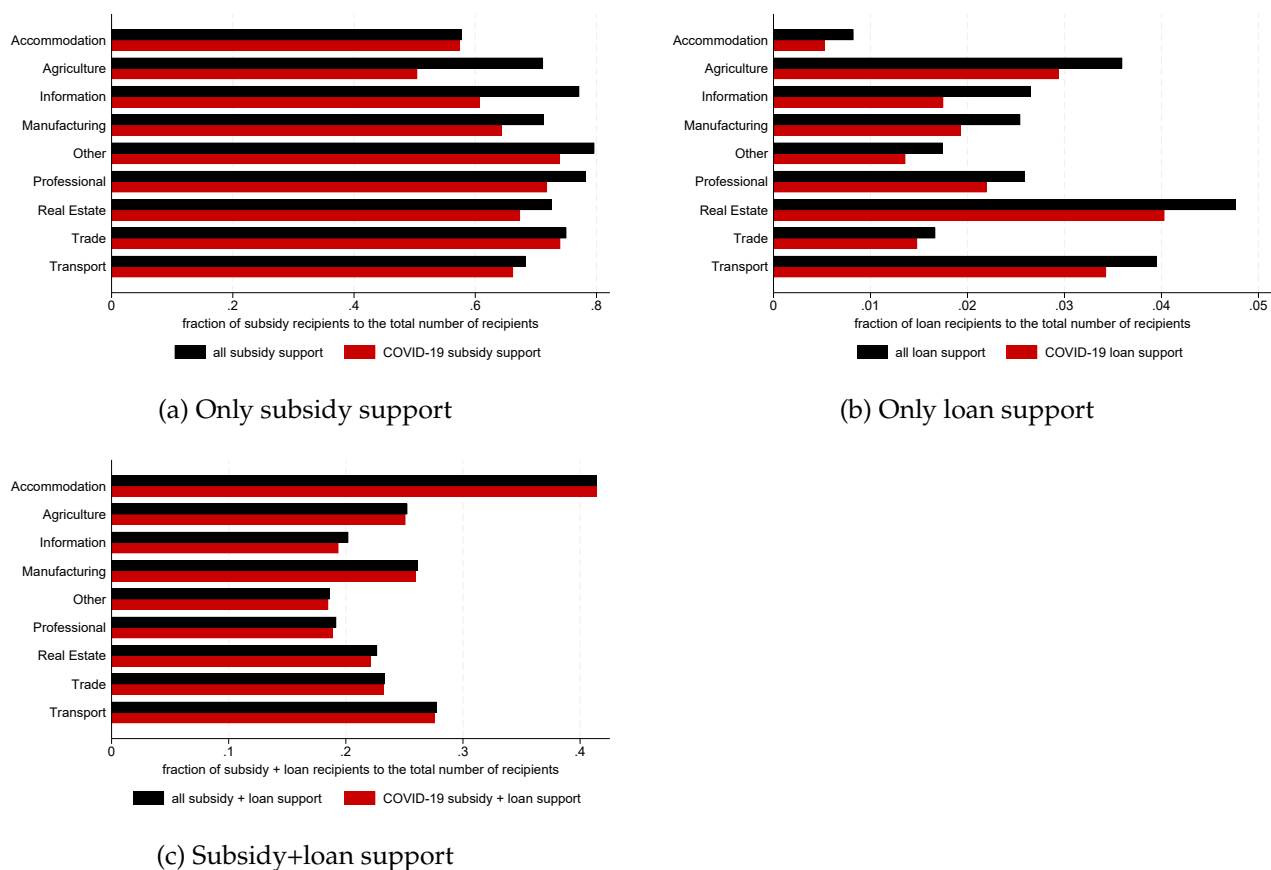
However, when delving into panel (e), which investigates financial debts, differences between firms receiving financial support and those that do not appear to be smaller than for other measures. However, we still reject the equality of the distributions of this characteristic as indicated by the Kolmogorov-Smirnov test statistic. This suggests that firms receiving support tend to be on average more indebted, although the median financial debts overlap for the two groups of firms. Firms receiving support have on average higher labor productivity (panel (f)), suggesting that the allocation of support selects more productive firms and more productive firms also seek support.

In summary, the analysis of Figure 5 showcases distinct patterns among firms receiving government support in terms of key characteristics. Supported firms tend to have a higher number of employees and larger total assets, primarily driven by larger current assets. Also, firms that receive support tend to be on average more productive. Although we rejected the hypothesis that no significant differences are observed for financial debts, this characteristic differs between supported firms and non-supported firms by less than the other characteristics shown.

4.3 Loans, subsidies, and combination

Figure 6 illustrates the distribution of government support in Lithuania across various industries, categorized by the type of support. Panel (a) plots the fraction of recipients that received only subsidies within each industry, whereas panels (b) and (c) repeat this exercise for receiving loans only and receiving a combination of loans and subsidies, respectively. Each of the plots also distinguishes between total support (black bars) and COVID-19 support (red bars). The results reveal that a significant proportion of recipients in all sectors primarily receive subsidies as opposed to loans or a combination

Figure 6: State Support Conditional on Industry and Type of Support



Source: KOTIS (2020–2021) and TDS database (2015–2022)

Description: Figure 4 displays the allocation of COVID-19 support measures among various sectors in Lithuania. Panel (a) shows the proportion of aid-recipient firms within each sector that received support only in the form of subsidies and the proportion of aid-recipient firms that received support only in the form of COVID-19 subsidies. Panel (b) shows the proportion of aid-recipient firms within each sector that received support only in the form of loans and the proportion of aid-recipient firms that received support only in the form of COVID-19 loans. Panel (c) plots the respective shares of aid-recipient firms that received both subsidy and loan support and both COVID-19 subsidy and COVID-19 loan support.

of both. The share of recipients receiving only subsidies ranges from a minimum of 57% in the Accommodation sector to over 75% in the Professional, Information and "Other" sectors. These findings remain largely consistent when considering COVID-19 support only, as Professional and "Other" sectors have the highest fraction of firms receiving only COVID-19 subsidies. However, the list of top three sectors with the highest share of COVID-19 subsidy recipients includes the Trade sector instead of the Information sector.

The results in Figure 6 highlight that the highest share of businesses receiving only loans is in the Real Estate sector, followed by the Transportation sector, followed by the Real Estate and Agriculture sectors, where approximately 3.5% to 4.5% of businesses have availed themselves of this support. The

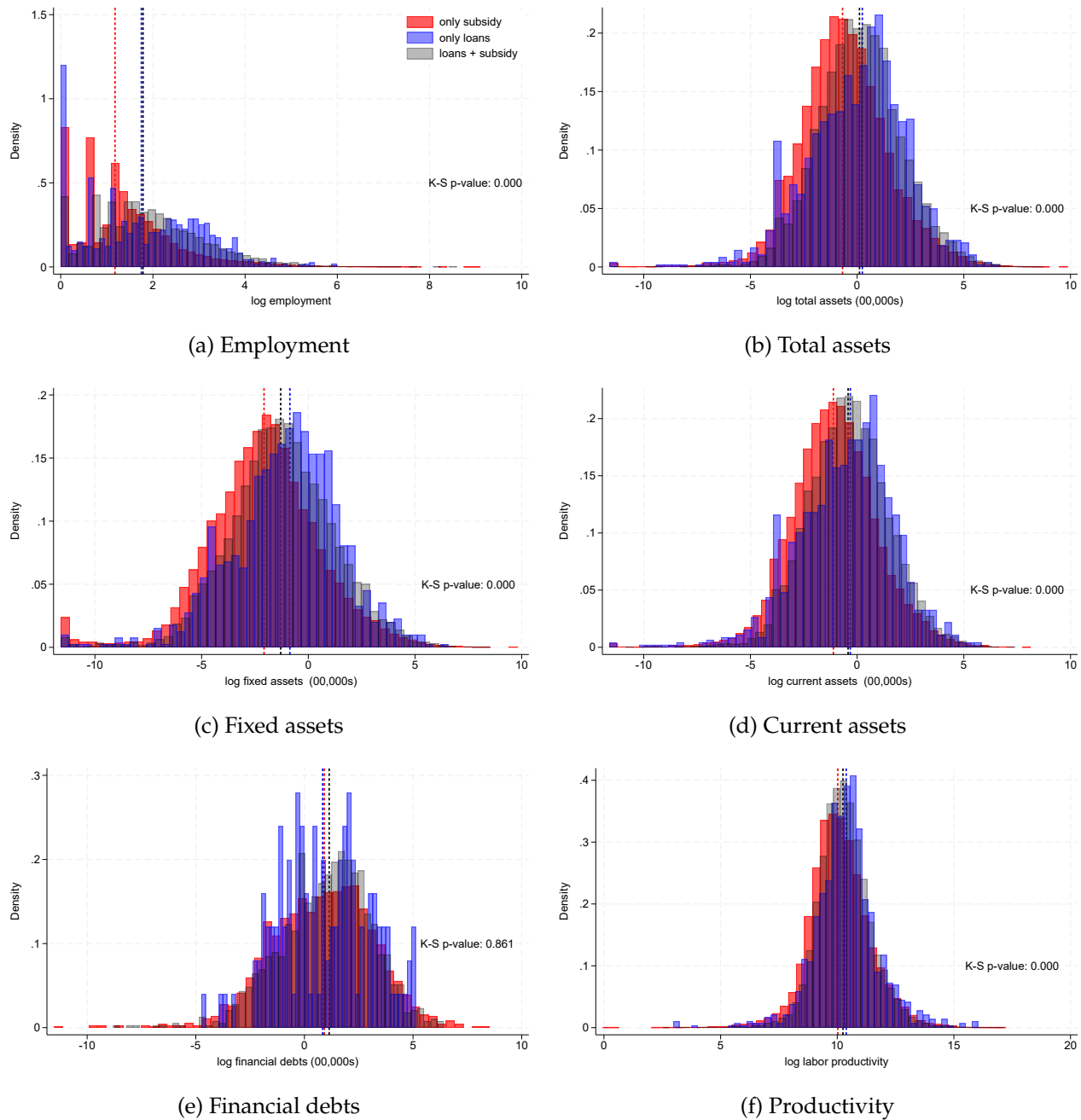
proportion of firms obtaining loans is relatively low in all sectors. One possible explanation is that some businesses may have been reluctant to take on additional debt during a period of economic uncertainty, while others may have been ineligible for loans due to their financial situation or creditworthiness. It is worth noting that certain businesses may have encountered challenges in accessing loans or faced difficulties in repaying them, while others may have utilized loans as a lifeline to sustain their operations during the pandemic.

The fraction of recipients receiving both subsidies and loans exhibits notable variation among sectors, with the Accommodation sector having the largest share, both in terms of total support and COVID-19-related aid. Approximately 40% of recipient firms in this sector received a combination of support in the form of subsidies and loans. However, the Professional and Other sectors have the lowest proportion of firms receiving this type of financial support. Sectors with the highest percentage of businesses benefiting from a combination of subsidies and loan schemes from the government include Accommodation, Agriculture, Manufacturing, and Transportation, where approximately 25% to 40% of recipient businesses received this form of financial support.

These results suggest the existence of a selection process whereby firms opt for different types of government support, whether it be loans, subsidies, or a combination of both. Subsidies appear to be particularly favored among businesses in almost all sectors, with more than 55% of recipient firms in each sector receiving subsidy support, while loans are primarily sought by transportation and real estate firms.

In Figure 7 we plot the distribution of firm characteristics – logarithm of firm employment, total, current, and fixed assets, financial debts, and labor productivity – conditional on a firm receiving only subsidy support or only loan support, or a combination of both. We also report p-values of the test statistic for the Kolmogorov-Smirnov test, comparing the distribution of the respective characteristics of subsidy-only firms to firms that received only loans. Focusing on log employment (panel (a)), only-loan recipients have on average more employees relative to only-subsidy recipients, however, firms which received a combination of loans and subsidy have on average a similar number of employees as firms that received only loans. Similarly, firms which received only loans have a larger asset base (panel (b)), and this is reflected in fixed assets (panel (c)) and current assets (panel (d)). Besides this, loan-only recipients were on average more productive (panel (f)). The differences in these characteristics are also confirmed by the respective p-values of the Kolmogorov-Smirnov test statistic. Hence, firms that solely

Figure 7: Distribution of Characteristics of Firms Conditional on Type of Support



Source: KOTIS (2020–2021) and TDS database (2015–2019)

Description: The figure plots the distribution of employment, total assets, financial debts, current assets, fixed assets, and labor productivity of firms conditional on the type of state support during the period 2020–2021. Each underlying variable for the firm refers to the median value over the sample period 2015–2019. Firms reporting employment lower than one are dropped. The vertical lines represent the median values. The K-S p-value is the p-value of the test statistic for the Kolmogorov-Smirnov test, comparing the distribution of the respective characteristic of subsidy-only firms (the distribution in red) to firms that received only loans (the distribution in blue).

relied on loan-based financial aid tended to be larger and possessed a greater asset base, covering both fixed assets (long-term possessions such as buildings or machinery) and current assets (short-term resources such as cash or inventory). This could indicate that larger, asset-rich firms prefer loans or are more likely to qualify for them, possibly due to their ability to offer collateral or present a lower-risk profile to lenders. However, there are no discernible differences between firms which received only subsidies and firms that received only loans in terms of financial debts (panel (e)) – we cannot reject the equality of the financial debt distribution of loan-receiving firms and subsidy-receiving firms. This might be driven by a relatively small number of financial debt observations.

This section has demonstrated the existence of heterogeneity in the types of support accessed by firms. While a significant proportion of firms have opted for subsidies or a combination of subsidies and loans, a smaller fraction of firms have exclusively chosen loans. Moreover, firms opting for subsidies had a different profile in terms of firm characteristics compared to loan-receiving firms. In the subsequent section, we explore the determinants of the decision between loans and subsidies and its implications for employment growth.

5. CHOICE BETWEEN LOANS AND SUBSIDIES

This section takes a two-pronged approach. First, we scrutinize factors behind the choice of certain firms not to opt for subsidies. Second, we show the employment growth gap between firms that only took loans and those that solely received subsidies. The data shows that subsidy-receiving firms outpaced loans-only firms in terms of employment growth.

5.1 Determinants of the Choice between Loans and Subsidies

In this section, we delve into the factors that determine the choice between loans and subsidies. Specifically, we investigate three factors that may influence the selection process: firm characteristics, policy eligibility criteria, and the severity of the shock experienced by the firm during the pandemic.

Firm characteristics: This section elucidates the determinants of the firm's choice of government support by employing a multinomial logit regression. The dependent variable in this analysis represents the type of government support a firm receives. The variable takes on four values: 0 for no

government support, 1 for subsidies only, 2 for a combination of loans and subsidies, and 3 for loans only. The base outcome is 0 (no government support). For the last column, the dependent variable is dichotomized to two values only: 0 for subsidies only, and 1 for loans only.

The set of independent variables includes firm characteristics such as log employment, log total assets, log current assets ratio and log labor productivity. These variables are included as median values over the period 2015–2019. The choice of independent variables follows closely the observed differences in the distributions of firm characteristics in Figure 7. In an alternative specification, we also include the ratio of financial debts to total assets, however, due to a large number of missing values, the results from this exercise are inconclusive and we abstract from the ratio of financial debts in our baseline model specification. Industry fixed effects are incorporated in all model specifications to account for the specific characteristics of different sectors, and the base industry is Accommodation.

Table 2 presents the results of this multinomial logit regression analysis. Columns (1), (2), and (3) display the estimates for when the dependent variable takes values of 1 (subsidies only), 2 (combination of loans and subsidies), and 3 (loans only), respectively, relative to the base outcome of 0 (no government support).

The coefficients can be interpreted as the change in the log-odds of the outcome relative to the base outcome for a one-unit increase in the predictor, holding other predictors constant. Exponentiating coefficients generate the respective changes in the odds ratio of the outcome relative to the base outcome. For instance, a one-unit increase in log employment is associated with an increase in the odds of a firm receiving only subsidies, a combination of loans and subsidies, or loans only, by 48.3%¹⁰, 107.3%, and 97.2%, respectively, compared to receiving no government support. This aligns with the notion that larger employment figures make firms more eligible for support programs targeting job preservation and creation (Wallsten, 2000). On the other hand, the likelihood of receiving a combination of loans and subsidies increases substantially (107.3%) for firms with higher employment. This suggests that larger firms may require a more diversified support package to navigate economic challenges. The positive coefficient of 0.679, in column (3), indicates that firms with one unit higher log employment are 97.2% times more likely to receive loans only. This may reflect the government's focus on preserving jobs by assisting larger employers facing financial constraints.

A similar interpretation holds for other firm characteristics. The results suggest that higher total

¹⁰We compute the percentage change in the odds as follows: $(\exp(0.394) - 1) \times 100\% = 48.3\%$.

assets decrease the odds of receiving only subsidies or subsidies and loans relative to receiving no support. However, the increase in total assets increases the odds of receiving only loans (although insignificantly). This would suggest that firms with a large asset base opted out of subsidies or could not access them. Similarly, a higher proportion of current assets to total assets reduces the likelihood of receiving only subsidies or subsidies and loans relative to receiving no support. Since a higher share of current assets could mean higher cash holdings and in turn higher liquidity, firms with a higher share of current assets might not require immediate liquidity support in the form of subsidies but still opt for loans. Finally, firms with higher labor productivity are more likely to receive support relative to receiving no support, with the coefficient for receiving subsidies plus loans or only loans being higher than the coefficient for receiving only subsidies.

Industry fixed effects are represented as the difference in the log-odds ratio of receiving government support compared to receiving no support for a given industry relative to the base industry (Accommodation), while holding other factors constant. For example, compared to firms in the Accommodation industry, those in the Agriculture industry have lower odds of receiving subsidy only or subsidy plus loans by 42% and 16.9%, respectively, but 27.2% higher odds of receiving loans relative to receiving no support.

Focusing on columns (1)–(3), and commensurate with the experience of the pandemic, firms in the Accommodation industry are more likely to receive state support. Also, firms with higher employment, current assets ratio and labor productivity are more likely to receive government support. The results also indicate that firm characteristics affect the decision between loans and subsidies: firms with higher employment, higher current assets ratio and higher labor productivity are more likely to choose loans than subsidies. The total asset size appears to be insignificant for choosing loans over subsidies. As the distributions of employment, assets, current assets and labor productivity are different, the major contributing factor is not obvious.

Column (4) presents the estimates when the dependent variable is dichotomous, taking the value of 0 for subsidies only and 1 for loans only. The estimates show that a unit increase in log employment raises the odds of a firm receiving loans only instead of only subsidies by 31%, holding other factors constant. Column (4) also emphasizes that firms that before the pandemic had higher total assets and a higher current assets ratio were more likely to take only loans relative to only subsidies. The role of higher labor productivity in this model appears to be insignificant in the choice between loans and

subsidies.

Including the financial debts ratio results in less precise estimates (Table A7), but we interpret them with caution given the significantly reduced sample size. However, the multinomial logit model still suggests that firms with higher employment and higher labor productivity are more likely to receive support in the form of loans only. The role of the financial debt ratio in obtaining loan support appears to be positive as well. The binary outcome model (column (4)) generates mostly insignificant estimates except for the positive role of the current assets ratio and the financial debts ratio in obtaining loan support.

Policy eligibility criteria: Figure 7 reveals that firms accessing loans tend to be larger in size and also have a larger asset base. Consequently, one possible explanation for the choice between loans and subsidies could be that policy eligibility criteria restricted access to subsidies for larger firms. Although our analysis of Table 3 suggests that subsidy measures were more frequently targeting SMEs compared to loan measures, the measures with the largest budgets typically were open for firms of all sizes. However, the difference in restricting larger companies across different measures could have still influenced larger firms to opt for loans rather than subsidies. To test this, we re-estimate the main model specification, restricting our sample to firms with less than 250 employees on average in 2019.

Table A5 presents the results of a multinomial logit regression when the sample of firms is restricted to firms with less than 250 employees on average in 2019. Columns (1)–(3) display the estimates for when the dependent variable takes values of 1 (subsidies only), 2 (combination of loans and subsidies), and 3 (loans only), respectively, relative to the base outcome of 0 (no government support). The results suggest that the role of higher employment and higher total assets is significant for choosing loans over subsidies even for SMEs. Thus, eligibility restrictions cannot fully explain the role of higher employment and higher total assets for this choice, since all but one subsidy measure was available to SMEs.¹¹

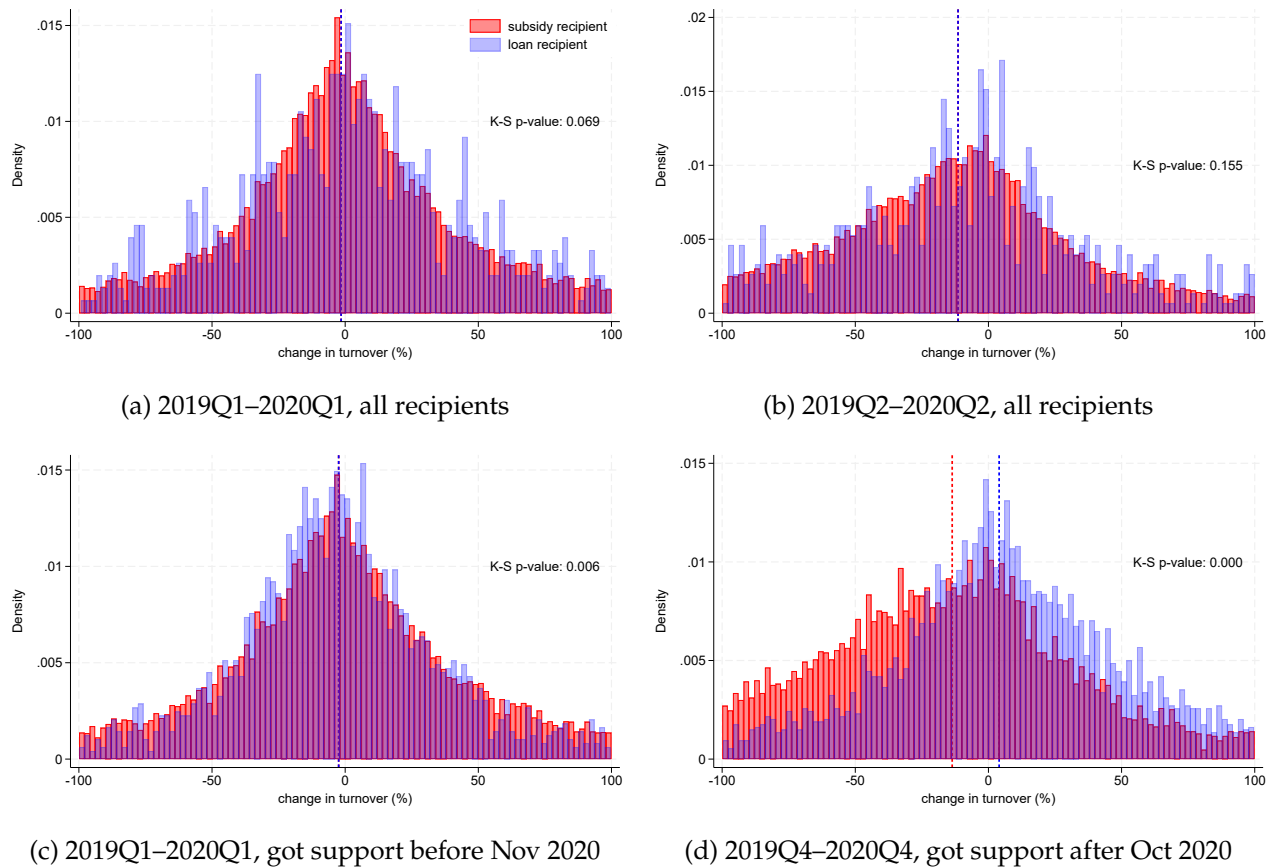
Figure 3 also shows that almost all measures required applicants to be affected by COVID-19, but the exact definition of the effect varied across measures. If subsidy measures had requirements for more adverse COVID-19 effects than loan measures and smaller firms were more affected by the pandemic, this could have led to large firms choosing loans as subsidies were not available for them. In the next paragraph, we explore in more detail whether the severity of the pandemic shock could

¹¹Not all SMEs could access "Subsidies to micro companies", since this measure targeted micro companies.

be the omitted variable in our model. We study if subsidy recipients experienced harsher pandemic effects than loan recipients and if this could have affected their choice between loans and subsidies.

Severity of the pandemic shock: The economic impact of the pandemic varied significantly across industries and within industries (del Rio-Chanona et al., 2020). While some experienced a substantial decline in revenue, others were relatively less affected. It is plausible that firms experiencing a more significant decline in revenue would be more inclined to opt for subsidies. To test this hypothesis, we utilize the reported monthly revenue data of firms and calculate the change in revenue over different periods.

Figure 8: Change in Firm’s Revenue



Source: KOTIS (2020–2021) and TDS database (2018–2022)

Description: The figure plots the change in revenue for firms, conditional on receiving only subsidy or only loans, between the specified quarters and the sample firms. The vertical lines represent the median values. The K-S p-value is the p-value of the test statistic for the Kolmogorov-Smirnov test, comparing the distribution of the revenue change of subsidy-only firms (the distribution in red) to the revenue change of firms that received only loans (the distribution in blue).

Figure 8 presents the histogram of revenue change for two groups: firms that exclusively received

subsidies and firms that exclusively received loans. We consider four scenarios to capture different time frames and two waves of support announcements: at the start of the first quarantine and the start of the second quarantine. There are two main reasons for these scenarios. First, we explore different time frames because support measures initiated at the beginning of the second quarantine focused on the revenue fall during the second quarantine rather than the first quarantine, so focusing on the revenue change in 2020Q1 might not be relevant for all support measures. Also, the revenue fall might have occurred not in March 2020 but a month later, so we expanded our time window to 2020Q2 too. Further, we condition on the period when a given firm received support by restricting the sample to firms receiving support before the second quarantine or after. As a result, we study these scenarios: (1) the change in revenue between 2019Q1 and 2020Q1 (panel (a)); (2) the change in revenue between 2019Q2 and 2020Q2, which corresponds to the first quarter after the imposition of quarantine measures (panel (b)); (3) the change in revenue between 2019Q1 and 2020Q1 for firms that received support in March–October 2020, representing the period before the second quarantine (panel (c)); and (4) the change in revenue between 2019Q4 and 2020Q4, encompassing the period of the second quarantine and the second wave of government support (panel (d)).

Upon examining the first two panels, we observe small differences in the change in revenue between firms that exclusively received loans and firms that exclusively received subsidies. The Kolmogorov-Smirnov test statistic supports this conclusion as we cannot reject the equality of the two distributions in either of the two panels. In panel (c) we can observe that the distribution of firms receiving only subsidies displays thicker tails and in panel (d) the distribution of firms receiving only subsidies is shifted to the left. The Kolmogorov-Smirnov test statistic allows us to reject the equality of distributions as well. These results would suggest that a larger fall in revenue was associated with receiving only subsidy support.

Given the observed difference in the distributions of the revenue change for firms receiving only subsidies compared to firms receiving only loans, taking this into account seems crucial for describing the choice between loans and subsidies. To that end, we re-estimate the logit models on a sub-sample. We restrict our sample to firms that experienced a 30% or larger fall in turnover in 2020Q1 compared to 2019Q1 or 2020Q4 compared to 2019Q4. We chose these two quarters in 2020 as the period that coincides with the beginning of the first quarantine and the second quarantine in order to capture the quarantine effect.

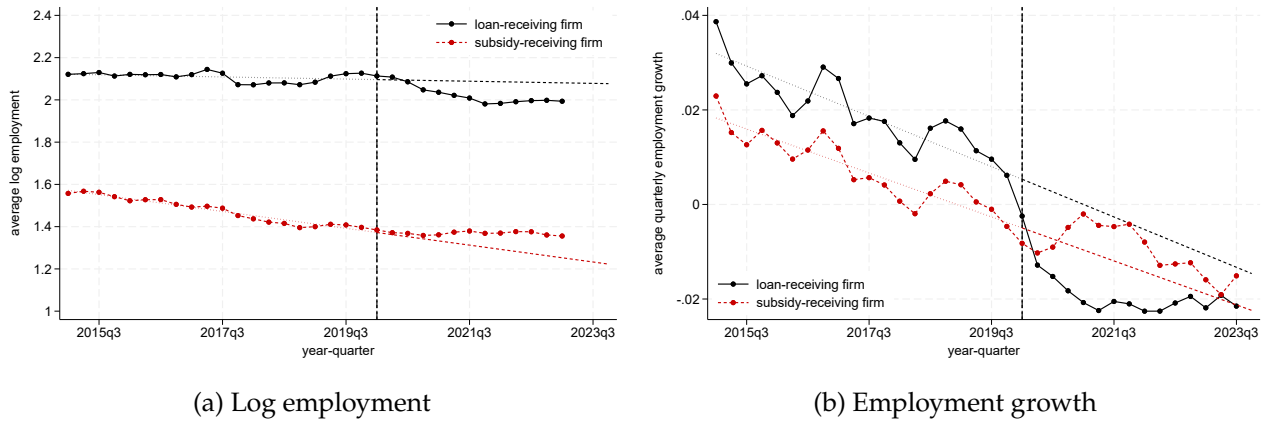
Table A6 reports the results of restricting our analysis to firms more affected by COVID-19. These sample restrictions significantly reduce our sample; for instance, the number of observations for the logit model falls from 34,354 in the baseline specification to 10,470 when estimated only for firms with a 30% or higher fall in revenue. Despite this, we find that some of the baseline results are robust to these restrictions. The role of a larger firm size remains significant for receiving government support regardless of the sample and increases the chances of receiving only loans rather than only subsidies. Higher total assets also increase the odds of receiving only loans, whereas the results for the role of the current assets ratio and labor productivity are inconclusive. For instance, the coefficient for labor productivity is higher for receiving only loans than receiving only subsidies in the multinomial logit models; however, the difference is not high enough as the estimate for labor productivity is insignificant when considering the binary choice between loans only and subsidies only in the logit model.

5.2 Employment Growth

In this part, we focus on the support's effect on firms' employment growth. During the COVID-19 crisis, maintaining employment was one of the main concerns of policymakers and, accordingly, a substantial part of measures targeted employment. Other measures, including the majority of loans, are typically aimed at preserving firms' liquidity. Almost all measures – except employment subsidies – that we consider were classified as measures to sustain firms' liquidity in the government's plan (Meeting minutes of the Government of the Republic of Lithuania, March 16, 2020, No. 14). Despite this, we choose employment growth as the main outcome in this section for two reasons. First, employment growth is one of the key characteristics that describe the firm's success. It encapsulates the firm's ability not only to weather immediate challenges but also to thrive and contribute to economic stability over the long term. Second, identifying the support effect on employment growth, even if the support measures do not target employment explicitly, provides insights as to how the received support affects the firm's behavior beyond increasing cash holdings. This approach is in line with studies that highlight the interconnectedness of financial and operational aspects, where liquidity support may reverberate beyond immediate financial health, influencing firms' behavioral patterns and strategic decisions (Ashton, 2012).

In this part, we narrow our focus to firms that either received subsidies or took loans using COVID-19 support measures, but not both. Figure 9 panel (a) displays the average log employment level for

Figure 9: Average Employment Level and Growth



Source: KOTIS (2020–2021) and TDS database (2015–2023)

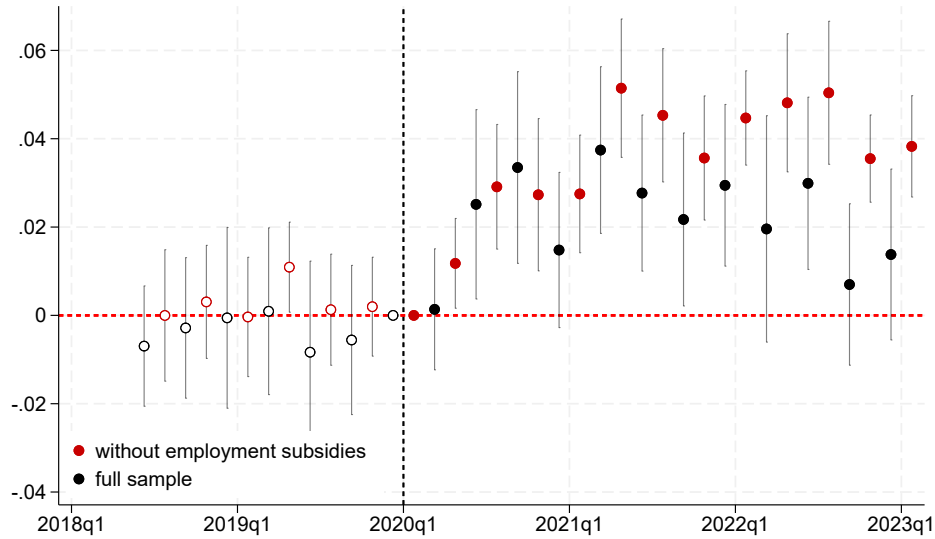
Description: This figure shows the average log employment level and average employment growth for firms that obtained either only subsidies or only loans as COVID-19 support.

firms that got only subsidies or only loans during the sample period from 2015Q1 to 2023Q1. Panel (b) tracks the average quarterly employment change across the same period.

Figure 9 suggests several conclusions. First, there is a difference in the employment levels of subsidy-receiving firms and firms that only took loans. Throughout the entire sample period, the average log employment stands at 2 for loan-receiving firms, while it drops to 1.4 for firms that got subsidy support. Moreover, these two groups follow different employment trends. While the average employment in loan-receiving firms slightly increases, subsidy-receiving firms see a decrease. Then, looking at panel (b), we see a difference in employment growth levels between the two groups, but the trends up to the start of the pandemic are similar. With the onset of the pandemic, however, the employment level and growth of these two groups follow opposite trends. Loan-receiving firms face a sharp decrease in employment growth, while firms that receive subsidies see an increase in employment growth.

We formalize this argument through a difference-in-differences specification. Given the arguments above, we focus on employment growth and not the level of employment. Specifically, to examine the disparity in employment growth between firms that receive subsidies (treated group) and those that receive loans (control group), we estimate the following difference-in-differences equation:

Figure 10: Employment Growth Effects for Firms which Received Only Subsidy Support Relative to Firms which Received Only Loans Support



Source: KOTIS (2020–2021) and TDS database (2015–2023)

Description: The figure plots the result of the difference-in-differences specification, Equation (5.1). Black circles refer to the estimates obtained from the full sample, whereas red circles report the estimates obtained after dropping employment subsidies from the sample. Standard errors are clustered at the industry-year-quarter level. The base quarter is 2020Q1.

$$\Delta L_{idt} = \beta_0 + \beta_1 s_i + \sum_{r=2015,Q2}^{2019,Q4} \beta_r \cdot (s_i \times \gamma_r) + \sum_{r=2020,Q2}^{2023,Q1} \beta_r \cdot (s_i \times \gamma_r) + \alpha_t + \alpha_i + \alpha_{dt} + \varepsilon_{idt} \quad (5.1)$$

where ΔL_{idt} represents the employment growth of firm i in industry d between two consecutive quarters. The variable s_i takes the value of 1 if firm i received only subsidies. Coefficient β_r captures the weighted average difference in the employment growth rate between treatment (subsidy only) firms and control (loan only) firms in the respective quarter relative to the reference quarter of 2020Q1. The term α_t denotes year-quarter fixed effects, α_i represents firm fixed effects, and α_{dt} is the industry-year-quarter fixed effect. The error term is denoted by ε_{idt} . This specification allows us to quantify the differential effect of receiving subsidies versus loans on employment growth, while controlling for time- and firm-specific factors.

The main empirical findings from Equation (5.1) are presented in Figure 10. Figure 10 plots coefficients β_r obtained by using two samples: the full sample and the sample without employment subsidies. Employment subsidies imposed restrictions on decreasing employment: they required

maintaining at least 50% of employees for whom subsidies were received for at least 3 months after receiving subsidies. Although these restrictions were relatively lax, they could nevertheless have affected the employment growth of subsidy-receiving firms. To that end, we check the robustness of our estimates by excluding employment subsidies. The base quarter is 2020Q1. The analysis reveals that before the COVID-19 pandemic, there were no discernible systematic differences in employment growth between the two groups of firms. However, in the post-COVID-19 period starting from 2020Q1, firms that received subsidies experienced a notable increase in employment growth compared to the control group. Specifically, the full-sample estimates show that, by the third quarter of 2020, the employment growth rate for subsidized firms reached approximately 2%, relative to firms which only received loans. This relative gain in employment growth was sustained throughout 2021Q1. There was a further increase in employment growth to approximately 3%, but the difference in the employment growth rate vanishes by the end of the sample. The estimates obtained from the sample without employment subsidies show an even larger difference in employment growth, reaching 4% in 2021 and smaller standard errors. Also, these estimates suggest that towards the end of our sample period, the employment growth rate remained at around 3.5% above the growth rate of the control group.

These findings suggest that the subsidies provided to these firms may have had a positive impact on their ability to retain and generate jobs during and after the pandemic. The observed higher growth rate in employment after 2021Q1 could indicate a stronger economy and increased business activity. By offering financial support, these subsidies likely facilitated the firms in mitigating the adverse effects of the crisis and potentially making investments in their operations, consequently leading to employment growth.

Importantly, these results suggest that subsidies may be more effective in stimulating employment growth compared to loans. Previous studies have highlighted the efficacy of capital subsidies in driving economic expansion ([Bergström, 2000](#)). The findings from this research contribute valuable insights to our discussion on the effectiveness of subsidies in stimulating employment growth, aligning with the broader literature that highlights the positive outcomes associated with targeted financial interventions ([Patrick, 2016](#)).

We show that the results are robust to several model modifications. Table [A4](#) reports the estimates obtained including time-varying firm characteristics (lagged total assets, lagged sales, lagged labor productivity and lagged turnover growth). Also, we restrict the sample by excluding firms missing

more than one observation over the period 2019–2020 to focus on firms with more complete employment history before and after the COVID-19 shock. In the most extensive model (columns (4)) and (7)) some of the estimates β_r lose significance, but we still get a significant difference in the employment growth of approximately 2% at least for four quarters.

5.3 Robustness checks

Our measures for support types aggregate several more narrow support types: namely, subsidies and grants are summed up with tax exemptions and loans are summed with tax deferrals. In this section, we show that excluding tax exemptions and tax deferrals does not affect the conclusions regarding the determinants of the firms' choice between loans and subsidies. However, the implications of this choice for employment growth are less pronounced.

First, we re-estimate the logit models using the sample that excludes tax exemptions and tax deferrals. Tables A8–A9 report the results. The results are qualitatively similar to the baseline results.

Second, we re-evaluate the implications for employment growth. Figure A4 compares the relative employment growth of subsidy-receiving firms with loan-receiving firms. The figure shows the difference in relative growth to be smaller than in the baseline specification. In the full sample, all estimates after 2020Q1 are close to zero and insignificant. In the sample without employment subsidies, we do obtain several positive and significant differences in relative employment growth after 2020Q1; they are mostly around 2%. Given that in the baseline specification, the differences in relative employment growth are more pronounced, these results would suggest that the differences are either driven mostly by firms receiving tax deferrals rather than firms receiving loans or by the small sample size. After excluding tax deferrals, the number of loan support cases decreases from 11,000 to 600. We explore these reasons in more detail.

First, we re-estimate the difference-in-difference model by dropping loans instead of tax deferrals. Figure A5 shows that subsidy-receiving firms perform significantly better in terms of employment growth relative to firms receiving tax deferrals. If we focus on the estimates from the sample without employment subsidies, we can see that the difference in employment growth is close to 5% after the end of 2020. This would support the conclusion that our baseline results are driven by firms receiving tax deferrals. However, taking into account a small sample size for loans, we re-run the model specification once again, comparing employment growth for firms receiving loans and firms

receiving tax deferrals. The number of tax deferrals is closer to the number of loans rather than the number of subsidies (see Table 1), so this puts the sample of loans on a more equal footing with the control group. We report the estimates in Figure A6. The figure shows that the estimates before 2020Q1 are more scattered than in the baseline, but they do not seem to exhibit a clear trend. The estimates for quarters after 2020Q1 suggest that firms receiving tax deferrals had on average 2% lower employment growth compared to firms receiving loans. Combining the insights Figure A5 and A6, we conclude that firms receiving loans perform worse in terms of employment growth outcomes than firms receiving subsidies, however, the difference is less pronounced when we exclude tax deferrals from the loans definition. The reduced difference is also to some extent affected by the small size of the loan sample.

6. CONCLUSION

Our study contributes to the nuanced understanding of the consequences of government support during the COVID-19 crisis, aligning with insights from existing literature on crisis interventions and economic recovery policies. Leveraging a unique dataset that combines balance sheet data for Lithuanian firms with detailed government support records, our research addresses existing gaps in crisis-related research, responding to the call for more granular datasets in this domain (Acemoglu et al., 2020; Chetty et al., 2020). The meticulous categorization of support policies, following established frameworks (Auerbach et al., 2022), not only provides a comprehensive analysis but also allows us to connect our findings with broader discussions on the efficacy of different policy instruments during crises (Zheng et al., 2023).

Thereby, we highlight a discernible pattern in firm preferences for subsidies over loans during the pandemic, aligning with the significance of design and delivery mechanisms in financial support highlighted in previous research (Kyere and Ausloos, 2021). The identification of systematic differences in employment growth between subsidy- and loan-recipient firms adds to the growing literature on the impact of policy interventions on firm outcomes (Bartik et al., 2020; Papanikolaou and Schmidt, 2022) and underscores the need for nuanced policy responses tailored to different firm characteristics.

Our study prompts important questions for future research, such as whether loan support outperforms subsidy support in other outcomes like liquidity and solvency. Additionally, the optimal policy mix to preserve employment and its dependence on the type of aggregate shock are areas warranting

further investigation.

The findings presented contribute valuable insights to the ongoing debate on the effectiveness of support measures during crises, providing policymakers with evidence to refine and tailor interventions for maximum impact.

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Table 2: Determinants of the Firm's Choice of State Support

Dep. var.:	Type of support indicator			
	No support			Subsidies only
Base outcome:				
Other outcome(s):	subsidies only	subsidies + loans	loans only	loans only
	(1)	(2)	(3)	(4)
log employment	0.394*** (0.011)	0.729*** (0.016)	0.679*** (0.042)	0.270*** (0.045)
log total assets	-0.138*** (0.014)	-0.036* (0.021)	0.072 (0.063)	0.257*** (0.070)
log current assets ratio	-0.026*** (0.010)	-0.060*** (0.015)	0.089** (0.045)	0.153*** (0.049)
log labor productivity	0.207*** (0.007)	0.249*** (0.011)	0.245*** (0.033)	0.051 (0.036)
<i>Industry fixed effects, the base industry is Accommodation</i>				
Agriculture	-0.867*** (0.065)	-1.778*** (0.084)	0.241 (0.286)	1.025*** (0.287)
Information	-1.237*** (0.057)	-2.217*** (0.079)	-0.419 (0.294)	0.722** (0.294)
Manufacturing	-0.691*** (0.049)	-1.643*** (0.058)	0.038 (0.248)	0.609** (0.249)
Other	-0.362*** (0.048)	-1.233*** (0.055)	0.353 (0.246)	0.685*** (0.245)
Professional	-0.974*** (0.048)	-1.952*** (0.059)	0.004 (0.250)	0.920*** (0.248)
Real Estate	-1.223*** (0.047)	-2.146*** (0.055)	0.321 (0.238)	1.492*** (0.237)
Trade	-0.263*** (0.045)	-1.094*** (0.051)	0.150 (0.240)	0.308 (0.240)
Transport	-1.165*** (0.049)	-1.880*** (0.057)	0.235 (0.243)	1.336*** (0.242)
Observations		85,942		34,354

Source: KOTIS (2020–2021) and TDS database (2015–2019)

Description: The table reports the estimates of logit models. Columns (1)–(3) report the estimates of the multinomial logit model where the outcome variable takes on four values: 0 for no state support, 1 for subsidies only, 2 for a combination of loans and subsidies, and 3 for loans only. Column (4) reports the estimates of the model where the outcome variable takes on value 1 if a firm receives subsidies only and the base outcome is receiving only loans. Firm-specific characteristics are median values of the respective variable over the period 2015–2019. The current assets ratio is current assets to total assets. Both models also include industry fixed effects.

A. BACKGROUND: LITHUANIA STATE SUPPORT POLICIES

In this section, we present a comprehensive overview of state aid provided to businesses impacted by COVID-19. We categorize this assistance based on its provider, timeframe, type, and defining features. A detailed description of these measures is accessible in Table A3. Table A3 breaks down the support measures across multiple aspects: administering bodies, application deadlines, applicant prerequisites, and other pertinent attributes. Given the vast amount of information this encompasses, we limit our discussion in the primary text to highlight only the fundamental patterns.

A.1 Institutional Framework

A number of ministries coordinated the state aid given to businesses suffering from the COVID-19 pandemic. The Ministry of Economics and Innovation orchestrated several initiatives aimed at enhancing businesses' liquidity. The state-incorporated financial entity, "Investment and business guarantees" Ltd (INVEGA), the Innovation Agency, and the State Tax Inspectorate (VMI) under the Ministry of Finance, executed these measures.

The Ministry of Finance and the VMI facilitated tax exemptions and deferments on a series of taxes, including VAT and income tax. The Ministry of Agriculture, on the other hand, bolstered the liquidity of agricultural enterprises, enhanced their credit market access, and curtailed their borrowing costs. The National Paying Agency (NMA), the Agricultural Credit Guarantee Fund (ACGF), and several other agencies under this ministry implemented these measures. The Ministry of Culture and the Ministry of Energy handled the administration and execution of subsidies and grants.

Two entities — the Customs department under the Ministry of Finance and the State Social Insurance Fund Board under the Ministry of Social Security and Labor (SODRA) — managed the administration and execution of tax deferrals on export/import taxes and social security insurance taxes.

A unique measure witnessed dual involvement. The State Investment Management Agency (VIVA) set up the State Aid Fund for Business towards the end of 2020. While the Ministry of Finance is the only shareholder of VIVA, the state channelled its investments into the fund through an entity established by the Ministry of Economics and Innovation. VIVA manages the State Aid Fund.

Besides the support from domestic institutions, firms received guarantees from the European

Table A1: COVID-19 Support by Provider and Support Type (in Thousand Euros)

<i>Type of support:</i>	guarantee (1)	loan (2)	subsidy, grant (3)	tax deferral (4)	tax exemption (5)	total (6)
Ministry of Social Security and Labor			997,650			997,650
Ministry of Economics and Innovation	74,567	322,265	472,943			869,775
VIVA		224,568				224,568
Ministry of Finance	213,014					213,014
ACGF		72,680	1,548			74,228
VMI				44,392		44,392
Ministry of Culture			13,527			13,527
Ministry of Agriculture		50	12,641		6	12,697
Ministry of Energy			9,893			9,893
other			7,872		12	7,885
SODRA	6	0		5,581		5,587
NMA			4,471			4,471
municipalities		6	3		17	25
Customs department				20		20
total	287,587	619,568	1,520,548	49,993	35	2,477,731
% total support	12	25	61	2	0	100

Source: KOTIS database (2020–2022).

Description: This table compiles the total amounts of COVID-19 support (in thousand euros), classified by support provider (or administrator if the implementing and administrating agencies differ) and type from 2020 to 2022. We define COVID-19 support as outlined in the main text, with the classification of support types given in KOTIS.

Abbreviations: VIVA - State Investment Management Agency, ACGF - Agricultural Credit Guarantee Fund, VMI - State Tax Inspectorate, NMA - National Paying Agency, SODRA - State Social Insurance Fund Board.

Investment Fund. These guarantees were financed from the European Guarantee Fund that was founded to tackle the consequences of the COVID-19 pandemic using contributions of all EU countries.

Finally, certain municipalities offered state aid in the form of loans, tax exemptions, subsidies, and grants. However, compared to other agencies, the total volume of support provided by these municipalities was insignificant.

Table A1 outlines the primary providers of COVID-19 support, categorizing the sums of aid by provider and type from 2020 to 2022. The Ministry of Social Security and Labor as the most significant contributor with almost 1 billion euros disbursed as subsidies. All of this amount was disbursed as employment subsidies either to firms during downtime or after downtime. The Ministry of Economics and Innovation is the second most significant contributor, delivering a wide array of support types, barring tax deferrals and exemptions. This ministry alone facilitated over 300 million euros in loans to businesses and dispersed more than 400 million euros in subsidies and grants. In comparison, the State Investment Management Agency (VIVA), the second-largest provider, offered only a fourth of

the total COVID-19 support the Ministry of Economics and Innovation did, exclusively in the form of loans.

KOTIS also reports more than 210 million euros of guarantees facilitated by the Ministry of Finance, but these guarantees are actually provided by the European Investment Fund and financed from the European Guarantee Fund. Some of this support is also classified as subsidies and grants (about 31 million euros). We changed its classification to guarantees, since this support is also based on the guarantee agreement with the European Guarantee Fund.

Contrary to the assignment of support by the Ministry of Economics and Innovation in the KOTIS system, which assigns support to the administrating ministry rather than the implementing agency (e.g. INVEGA), the support for the agricultural sector, administered by the Ministry of Agriculture, is attributed to the implementing agencies instead of the responsible ministry. As a consequence, the Agricultural Credit Guarantee Fund, specializing in loans and subsidies or grants to agricultural firms, ranks as the third-largest support provider rather than the Ministry of Agriculture itself. The State Tax Inspectorate (VMI) stands fourth in terms of support amount. However, all subsidies provided by this agency are classified under the Ministry of Economic and Innovation, who acts as the administrator of this support. VMI solely administers tax deferrals, which amounted to 44 million euros.

A.2 Comparison to non-COVID-19 support

Composition and providers.

We analyze the composition and provision of non-COVID-19 support over the period 2019–2021. The breakdown of this state support by support type and provider is depicted in Table A2.

Table A2 shows that the provision of non-COVID-19 state support is distributed across more than 18 agencies (some we group into "other") which is a higher number than with COVID-19 support. The largest provider, differently from COVID-19 support, is the Ministry of Culture, providing virtually all support in the form of subsidies. This illustrates that a substantial share of non-COVID-19 state support is funding for cultural institutions. The second largest provider is the Ministry of Economics and Innovation that manages several agencies providing support to businesses on a regular basis. Further from the top of the support providers' list, there are other ministries, ACGF that is also a regular financing provider, and others.

The bottom line shows the support composition by type. We estimate 94% of total non-COVID-19

Table A2: Non-COVID-19 Support by Provider and Support Type (in Thousand Euros)

<i>Type of support:</i>	guarantee (1)	increasing state ownership (2)	loan (3)	subsidy, grant (4)	tax deferral (5)	tax exemption (6)	total (7)
Ministry of Culture		393		863,001		85	863,479
Ministry of Economics and Innovation	33,817	247	60,603	600,880			695,547
Ministry of Energy				205,663			205,663
other		20	6	163,276		1,844	165,147
Ministry of Social Security and Labor		285	522	134,083	2	270	135,162
Ministry of Environment		457	5,667	107,629		1	113,754
NMA		96		109,681		243	110,020
Ministry of Agriculture				47,242			47,242
European social fund agency		2		35,362		295	35,659
ACGF			23,347	2,911		3	26,261
municipalities		5	40	8,129	167	6,687	15,027
Innovation agency				4,385			4,385
SODRA	0		0	48	3,026	33	3,108
Ministry of Transport and Communications			600	40			640
VIPA	4		533				538
VMI					267		267
Competition council				101			101
Ministry of Health				85			85
Ministry of Education, Science and Sport				20			20
total	33,822	1,504	91,319	2,282,541	3,461	9,601	2,422,248
% total support	1	0	4	94	0	0	100

Source: KOTIS database (2020–2022).

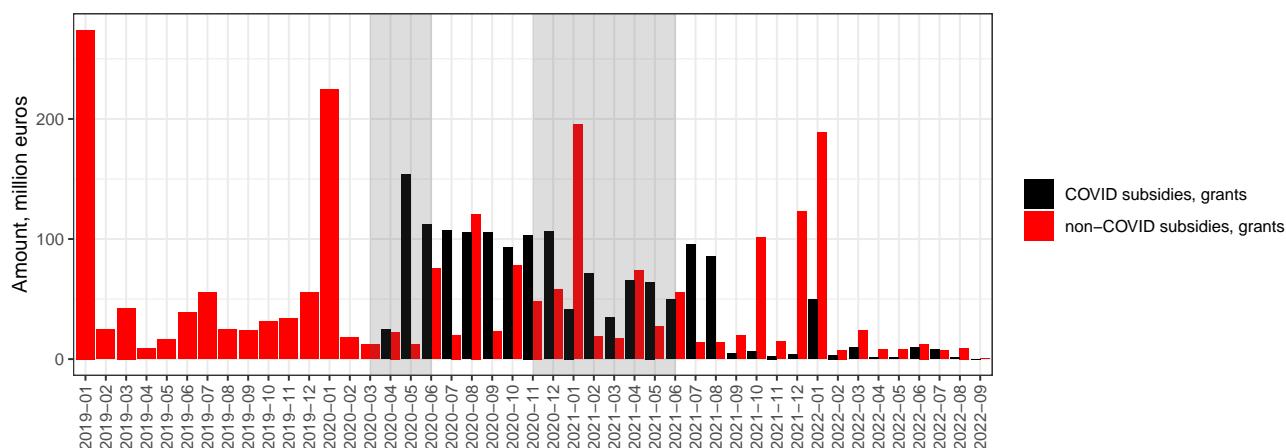
Description: This table compiles the total amounts of COVID-19 support (in thousand euros), classified by support provider (or administrator if the implementing and administrating agencies differ) and type from 2020 to 2022. We define COVID-19 support as outlined in the main text, with the classification of support types given in KOTIS.

Abbreviations: VIPA - Public Investment Development Agency, ACGF - Agricultural Credit Guarantee Fund, VMI - State Tax Inspectorate, NMA - National Paying Agency, SODRA - State Social Insurance Fund Board.

support to be in the form of subsidies and grants and 4% to be in the form of loans. It follows that before the COVID-19 crisis, state support was rarely extended in any other forms than subsidies or grants.

Timing. We exploit the timing of disbursement to validate our classification of COVID-19 support – COVID-19 support as per our classification takes up most of the increase in total state support after March 2020 and follows the expected timeline. Figures A1-A2 contrast disbursed total support to disbursed COVID-19 support as per our classification. Figure A1 plots disbursed non-COVID-19 subsidies and grants and COVID-19 subsidies and grants, whereas Figure A2 does the same exercise for loans. Figure A1 indicates that before the COVID-19 pandemic the bulk of subsidies would be

Figure A1: Subsidy Support over Time

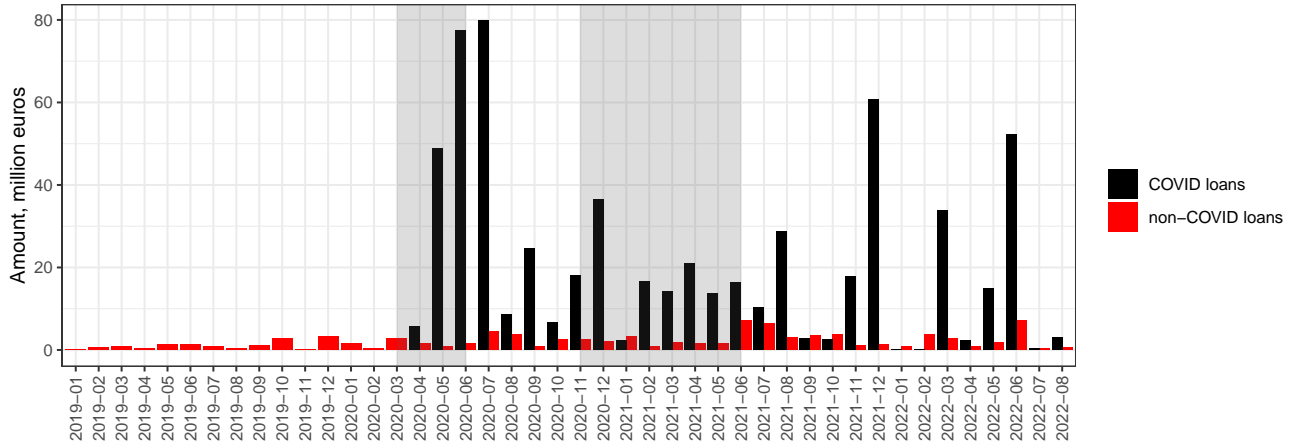


Source: KOTIS database (2019–2022).

Description: The figure plots monthly disbursement of state support provided as subsidies or grants over time. Using our classification, we also distinguish between non-COVID-19 subsidies and grants and COVID-19 subsidies and grants. Grey shaded area corresponds to quarantine periods.

disbursed in the beginning of the year, suggesting that this would be planned annual spending. Our COVID-19 classification does not change this pattern, suggesting that we most likely do not assign regular subsidies to COVID-19 subsidies. Besides this, the figure shows a significant increase in subsidies throughout the period 2020–2021 compared to 2019. This would be in line with Figure 2 panels b and c that show a significant increase in total subsidies after the start of the pandemic. With our classification we capture the majority of this additional subsidy support as COVID-19 support. Our classification also picks up the decrease in COVID-19 subsidy support after 2021. Figure A2 shows that before the pandemic, loan support was minuscule as suggested by Figure 2 panels b and c. Loan support increases dramatically after the breakout of the pandemic and Figure A2 shows that we manage to classify most of it as COVID-19 loans.

Figure A2: Loan Support over Time



Source: KOTIS database (2019–2022).

Description: The figure plots monthly disbursement of state support provided as loans over time. Using our classification, we also distinguish between non-COVID-19 loans and COVID-19 loans. Grey shaded area corresponds to quarantine periods.

Table A3: COVID-19 state support and de minimis support in Lithuania

Measure	Agency	Application timeline	Maximum amount	Eligibility criteria	Can be used for
Loans for accommodation and catering providers	INVEGA	Jul 14, 2020* – Nov 30, 2021	<p style="text-align: center;"><i>Loans</i></p> <p>One of the below: (i) If the entity is registered before Jan 1, 2019, the double of annual before-tax payroll expenses in 2019; If the entity is registered after Jan 1, 2019, the before-tax payroll expenses of 2019 and 2020; (iii) 25 percent of turnover in 2019. In all cases, the loan cannot exceed 3 million euros.</p>	<p>Catering providers: large company. For all: not in difficulty as of Dec 31, 2019; not in restructuring or bankruptcy; filed annual reports for year 2019 with the Registry center.</p>	<p>Necessary expenses: payroll, transport services, purchases of other services, rent, repaying other loans</p>
Loans for travel organizers	INVEGA	Jul 14, 2020* – Nov 30, 2021	<p>One of the below: (i) If the entity is registered before Jan 1, 2019, the double of annual before-tax payroll expenses in 2019; If the entity is registered after Jan 1, 2019, the before-tax payroll expenses of 2019 and 2020; (iii) 25 percent of turnover in 2019; (iv) higher if supported by pre-existing contracts with suppliers, etc. In all cases, the loan cannot exceed 3 million euros.</p>	<p>Registered as a travel organizer; not in difficulty as of Dec 31, 2019; not in restructuring or bankruptcy; filed annual reports for year 2019 with the Registry center.</p>	<p>Repay clients for travels that did not happen because of COVID-19</p>

Direct loans (phase I)	COVID-19	INVEGA	Jan 20, 2021 – Nov 1, 2021	<p>Average monthly turnover but cannot exceed one of the below: (i) If the entity is registered before Jan 1, 2019, the double of annual before-tax payroll expenses in 2019; (ii) If the entity is registered after Jan 1, 2019, the before-tax payroll expenses of 2019 and 2020; (iii) 25 percent of turnover in 2019. In all cases, the loan cannot exceed 100,000 euros.</p> <p>Business expenses loans. Twice of average monthly turnover but cannot exceed one of the below: (i) If the entity is registered before Jan 1, 2019, the double of annual before-tax payroll expenses in 2019; (ii) If the entity is registered after Jan 1, 2019, the before-tax payroll expenses of 2019 and 2020; (iii) 25 percent of turnover in 2019. In all cases, the loan cannot exceed 5 million euros (10 million euros for a company group). Investment loans: Small enterprises: 50% of investment project expenses; Medium enterprises: 40%; In all cases, the loan cannot exceed 3 million euros.</p>	<p>Average monthly turnover between Nov 1, 2020, to Jan 31, 2021, by >=30% compared to from Nov 1, 2019, to Jan 31, 202, or in the government's list of limited business activities due to COVID-19 (for new entities); not in difficulty as of Dec 31, 2019; not in restructuring or bankruptcy; filed annual reports for year 2019 with the Registry center; not in agriculture or finance</p> <p>Business expenses loans: in the government's list of limited business activities due to COVID-19; registered activities not later than Dec 31, 2020; has 3 rejection letters from private finance institutions; not in restructuring or bankruptcy; filed annual reports for years 2019-2020 with the Registry center; not in agriculture or finance. Investment loans also require SME status.</p>	<p>Business expenses from Oct 1, 2020, to Feb 28, 2022 (not loan repayment, dividend payments or investment)</p> <p>Business expenses accrued from Oct 1, 2020. Investment in equipment, machines, means of transport and buildings.</p>
Direct loans (phase II)	COVID-19	INVEGA	Feb 10, 2022 – May 16, 2022			

Loans for businesses most affected by COVID-19	INVEGA through financial intermediaries	Apr 16 – Jul 31, 2020	1 million euros	SME; lost 30% of turnover due to COVID-19; kept 50% of employees relative to March 1, 2020; filed the annual report of year 2019 with the Registry center; not in difficulty as of Dec 1, 2019; not in restructuring or bankruptcy.	Necessary business expenses: payroll, transport services, purchases of other services, rent, loan administration. Cannot be used for loan refinancing, dividend payouts, purchasing residential apartments
Loans for account payables	INVEGA through financial intermediaries	Apr 11 – Jul 17, 2020	All of the below have to be met: (i) not more than 25% of sales income in 2019; (ii) not more than 85% of unpaid account payables; (iii) not more than 500,000 euros	SME; kept 50% of employees relative to March 1, 2020; filed the annual report of years 2018-2019 with the Registry center; not in difficulty as of Dec 1, 2019; not in insolvency as of Dec 31, 2019.	Account payables received between Jan 1, 2020, and March 31, 2020

Joint loans "Avieté"	INVEGA	open the whole period	Loan: up to 40% by the state but not more than 10,000 euros (increased to 30,000 euros in 2022) and the rest by the private sector. Until Dec 31, 2020: the state finances up to 100% but not more than 25,000 euros.	SME; not in insolvency; has a credit rating above CC or Ca	Investment and to cover working capital shortages excluding loan refinancing, purchasing of residential apartments and financial activities
Loans for large and medium-sized businesses	VIVA	Oct 29, 2021 – Jun 3, 2022	25% of annual turnover in 2019 & 25% of double the annual payroll in 2019, exceptions are possible for sectors most affected by COVID-19. The ceiling is 2 million euros.	>= 50 employees; medium and large companies; cannot obtain funding from other sources; not in difficulty as of Dec 31, 2019; filed the financial report of year 2020 to the Registry center; not in tobacco, alcohol, lotteries or financial industries	Business expenses or investment
Loans to businesses through alternative financiers "Alternatyva"	INVEGA through financial intermediaries	Open since Apr 17, 2020 (Nov 23 for the de minimis)	90% of the loan amount but not more than 200,000 euros can be provided from this measure, if de minimis support – 100% of the loan amount but not more than 500,000 euros can be provided from this measure	SME; not in insolvency or bankruptcy; not in weapons, tobacco, alcohol or lotteries, finance	Loans for investment or working capital

Loans to ensure liquidity of agricultural and fisheries companies	ACGF through financial intermediaries	Jul 17, 2020* –	Cannot exceed: (i) double of the payroll of 2019; (ii) 25% of annual turnover in 2019; (iii) 1,000,000 euros. The amount can be higher if supported by pre-existing contracts with supplies, etc.	Business entities in agricultural production working in rural areas, agriculture cooperatives and business entities in fisheries; not in difficulty as of Dec 31, 2019; suffered from COVID-19 in at least one of the ways: (i) monthly turnover fell by at least 10%; (ii) liabilities/total assets > 0.6; (iii) critical liquidity ratio is less than 1;	Working capital
Subsidies during downtime	Employment agency	Apr 5, 2020 – Aug 31, 2021	<p style="text-align: center;"><i>Subsidies, grants</i></p> <p>In 2020, 70 (90) percent of the wage paid to employees in downtime but not more than 1 (1.5) minimum wage; after Jan 1, 2021, 100 percent of the wage paid to employees in downtime but not more than 1.5 minimum wage; after Jul 1, 2021, 100% of the wage in the 1st month of downtime but not more than 90% of the minimum wage and 60% of the minimum wage in the 2nd month of downtime</p>	Not in restructuring or bankruptcy; commits to keep at least 50% of employees for which subsidies were received for at least 3 months after downtime	Payroll expenses for employees in downtime

Subsidies after downtime	Employment agency	May 15 (or after downtime/quarantine) - Dec 31, 2020, Jul 1 – Aug 31, 2021	In 2020, 100% of wage in the 1st-2nd months after downtime, 50% of wage in the 3rd-4th months and 30% of wage in the 5-6th months, green and high-tech companies and firms employing with fixed contracts were offered different percentages; after July 1, 2021, 100% of the wage in the 1st month after downtime but not more than 90% of the minimum wage and 60% of the minimum wage in the 2nd month after downtime	In 2020, one of the three: received subsidies for employees in downtime; employed jobless candidates sent by the Employment agency; suffered from COVID-19 (i.e. is in the specific list made by the Tax agency); after July 1, 2021, if the employee was in downtime for at least 600 hours and received subsidies	Payroll expenses	ex-
Compensation for rent expenses	INVEGA	Sep 6 – Oct 15, Nov 15 – Nov 22, 2021	70 percent of rent but not more than 20,000 euros	Sole entrepreneurs with existing rent leases as of Nov 30, 2020; Included in the list of activities affected by COVID-19; not in fisheries, growing agricultural products	Rent expenses from November 1, 2020, to April 30, 2021	
Partial compensation for rent expenses for companies most affected by COVID-19	INVEGA	May 3* – Dec 1, 2020	Maximum compensation per month is 50% of rent paid in February, 2020	SME**; business activities stopped or limited by the quarantine; received not less than 30% discount for rent; not in difficulty as of Dec 31, 2019; not in restructuring or bankruptcy; registered with the Registry center not later than March 16, 2020; not in e-sales, weapons or lotteries	Rent expenses until Dec 31, 2020	
Compensations for accommodation providers	INVEGA	May 2 – May 16, 2022	One-time compensation 100 eur per room and 50% of utilities, not more than 50,000 euros	Utilities compensation: business entity; registered with the Registry center not later than Oct 31, 2019; not in difficulty as of Dec 31, 2019; not in restructuring or bankruptcy. 100 eur per room: not in difficulty as of Dec 31, 2019; not in restructuring or bankruptcy.		

Compensations for employees' COVID-19 testing	INVEGA	Mar 29, 2021 – Jun 30, 2021	12 euros per test	SME; have not used up 300,000 euros of de minimis support over the last 3 years; not in bankruptcy or restructuring; not in agriculture	Expenses for tests from Feb 23, 2021, to May 31, 2021
Subsidies for incoming tourism travel organizers	INVEGA	Apr 25 – May 9, 2022	30,000 euros	A travel organizer certificate; SME; Lost >=30% of income in 2021 relative to 2019; Registered with the Registry center not later than Oct 31, 2019; not in difficulty as of Dec 31, 2019; Not in restructuring or bankruptcy	Covers services provided to foreign tourists from Jan 1, 2019, to Dec 31, 2021
Subsidies for micro companies	VMI	May 11*, 2020 – Dec 1, 2020	The subsidy depends on the amount of income tax paid in 2019: 500 euros if taxes were below 1000 Eur; 1000 euros if taxes were [1000,2000); 50% of paid taxes if taxes were above 2000 Eur	The number of employees is [1,9]; suffered from COVID-19 (i.e. is in the specific list made by the Tax agency); not in bankruptcy or restructuring; paid all income taxes in 2019; not in agriculture or fisheries	

Subsidies for businesses most affected by COVID-19	VMI	Apr 15*, 2021 – Jul 1, 2021	<p>The applicant chooses one of the three: (i) The percentage of income taxes paid in 2019 that is equal to the percentage of the decline in monthly income over Nov 2020-Jan 2021 (or Dec 1, 2020-Jan 31, 2021); (ii) 70% of fixed expenses (rent, utilities) over Nov 1, 2020 - April 30, 2021 but not more than 40,000 euros; (iii) If its monthly income over Feb-April, 2021 fell by more than 30% compared to the same period in 2019, 70% of uncovered fixed expenses in Nov 1, 2020-April 30, 2021, but not more than 350,000 euros</p> <p>If incomes taxes paid in 2019 are above 2,000 euros, the subsidy amounts to 25% of paid income taxes. If below 2,000 euros, the subsidy is 500 euros</p>	<p>Included in the government's list of activities affected by COVID-19; monthly income declined by more than 50% over Nov 2020-Jan, 2021 (or Dec 1, 2020 to Jan 31, 2021) compared to the same period in 2019-2020; paid at least a share of accrued income taxes in 2019 (if established in 2019); income fell due to COVID-19; not in bankruptcy or restructuring; not in difficulty as of Dec 31, 2019; filed the annual report of year 2019 to the Registry center; not in agriculture, fisheries or finance</p>
Subsidies for businesses affected by COVID-19	VMI	Jan 15*, 2021 – Jun 1, 2021	<p>SME** ; average monthly turnover over the last 6 months from Nov 7, 2020, fell by more than 30% compared to the same period in 2019; monthly income declined by more than 50% over Nov 2020-Jan, 2021, (or Dec 1, 2020, to Jan 31, 2021) compared to the same period in 2019-2020; income fell due to COVID-19; not in bankruptcy or restructuring; not in difficulty as of Dec 31, 2019; filed the annual report of year 2019 to the Registry center; not in agriculture, fisheries or finance</p>	<p>Included in the government's list of activities affected by COVID-19; monthly income declined by more than 50% over Nov 2020-Jan, 2021 (or Dec 1, 2020 to Jan 31, 2021) compared to the same period in 2019-2020; paid at least a share of accrued income taxes in 2019 (if established in 2019); income fell due to COVID-19; not in bankruptcy or restructuring; not in difficulty as of Dec 31, 2019; filed the annual report of year 2019 to the Registry center; not in agriculture, fisheries or finance</p>

COVID-19 R&D	Innovation agency	Oct 28, 2020 – Nov 27, 2020	1 million euros	Business entity; Average annual income from its own production for the last 3 years is at least 145,000 euros, if established later, own shares or average annual income is at least 145,000 euros; not in difficulty as of Dec 31, 2019; Not in bankruptcy or restructuring; Not in agriculture or finance	Development of products or technologies related to COVID-19
COVID-19 products LT	Innovation agency	Oct 28, 2020 – Nov 27, 2020	1 million euros	SME; At least one year old; Average annual income from its own production for the last 3 years (or less if established later) is at least 145,000 euros; not in difficulty as of Dec 31, 2019; Not in bankruptcy or restructuring; Not in agriculture or finance	Development of products needed to fight COVID-19
Creativity vouchers COVID-19	Innovation agency	Jul 16, 2021 – Aug 31, 2021	70,000 euros	SME; At least one year old; Average annual income from its own production for the last 3 years (or less if established later) is at least 50,000 euros; Not in bankruptcy or restructuring	Innovative products (non-technology)
E. commerce model COVID-19	Innovation agency	Aug 19, 2021 – Sep 20, 2021	50,000 euros	SME; At least one year old; Average annual income from its own production for the last 3 years (or less if established later) is at least 50,000 euros; Not in bankruptcy or restructuring	Digitalisation processes
Compensation of interest and guarantee fee	ACGF	Jul 1* – Dec 31, 2020***	100% of guarantee fees and 100% of interest paid from the start of the scheme to Dec 31, 2020, and 80% of interest paid after Jan 1, 2021	Business entities in agricultural production working in rural areas, agriculture cooperatives and business entities in fisheries; not in difficulty as of Dec 31, 2019	Loans and leasing for investment and current assets

Compensation of interest and guarantee fee for the fisheries sector	ACGF	Aug 17* – Dec 31, 2020***	100% of guarantee fees and 100% of interest paid from the start of the scheme to Dec 31, 2020, and 80% of interest paid after Jan 1, 2021	Business entities in fisheries; not in difficulty as of Dec 31, 2019	Loans and leasing for investment and working capital
Compensation of interest for loans without guaranteees	NMA	Jul 1, 2020* – Jan 15, 2021***	100% of interest paid from the start of the scheme to Dec 31, 2020, and 80% of interest paid after Jan 1, 2021	Business entities in agricultural production working in rural areas, agriculture cooperatives and business entities in fisheries; not in difficulty as of Dec 31, 2019	Loans for investment, current assets, biological assets and working capital, leasing of equipment
De minimis aid to businesses in poultry and eggs production affected by COVID-19	NMA	Aug 1, 2020* – Jan 15, 2021***	Not more than income decline in March-June, 2020 compared to the same period in 2019. For entities in the primary production of agricultural products, not more than 20,000 euros, for entities in the processing of agricultural products – 200,000 euros income	Income over March-June, 2020, fell by at least 5% compared to the same period in 2019	

Temporary aid to milk producers	NMA	Jun 11, 2020* –	Specified amount per cow	If registered as milk producers before June 1, 2020, average monthly income over April-May, 2020, of all milk producers is at least 5% lower than the average of April-December in 2017-2019; if registered as milk producers before September 1, 2020, average monthly income over June-August, 2020, of all milk producers is at least 5% lower than the average of June-August in 2017-2019, not in difficulty as of Dec 31, 2019
Temporary aid to cattle keepers	NMA	Jun 11, 2020* – Dec 7, 2020	Specified amounts per sold cattle dependent on age	Registered in the required agriculture registry no later than June 1, 2020; if cattle sold in April 1- June 30, 2020, average monthly income over this period of all cattle keepers needs to be at least 5% lower than in January-March, 2020; if cattle sold in July 1- September 30, 2020, average monthly income over this period of all cattle keepers needs to be at least 5% lower than in January-March, 2020; if cattle sold in October 1- November 30, 2020, average monthly income over this period of all cattle keepers needs to be at least 5% lower than in January-February, 2020; held cattle at least for 6 months, not in difficulty as of Dec 31, 2019
De minimis aid to fur animal keepers	NMA	Sep 7 – 25, 2020	4 euros per fur animal	Registered in the required agriculture registry; held fur animals on Aug 1, 2020

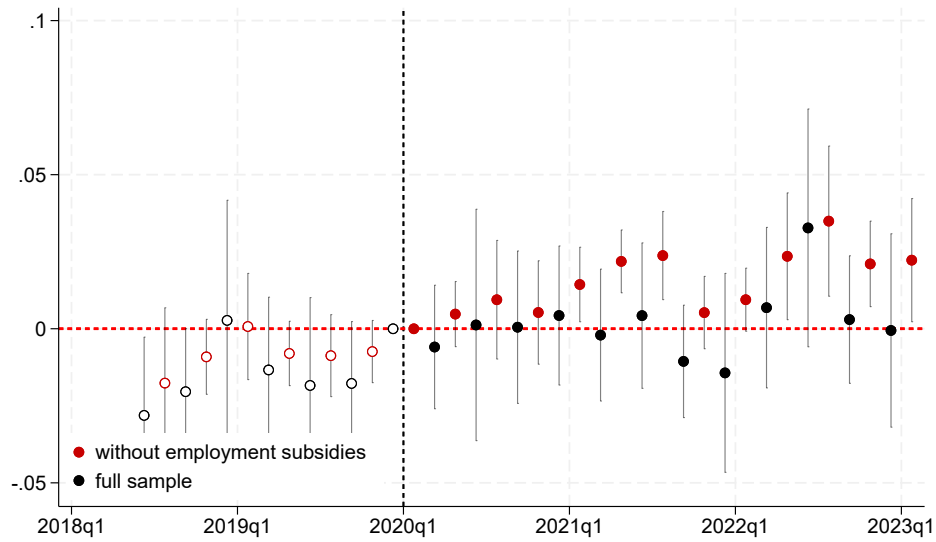
Temporary aid to fur animal keepers	NMA	Nov 23 – 27, 2020	4 euros per fur animal	Registered in the required agriculture registry no later than April 1, 2020; held fur animals on Oct 1, 2020; not in difficulty as of Dec 31, 2019	For production that was destroyed or distributed for free
Temporary aid to vegetable growers	NMA	Jul 21, 2020* – June 30, 2021	225,000 euros	Declared seedlings in 2016-2020; if average monthly income over July 2020-March, 2021, of vegetable growers in Lithuania was at least 5% lower than in the same period 2019-2020, in January-March, 2020; not in difficulty as of Dec 31, 2019	
Temporary aid to pig keepers	NMA	Jul 29, 2020* – Dec 10, 2021	30 euros per sold pig	Registered in the required agriculture registry no later than April 1, 2020; if average monthly income over the specified period of all pig keepers was at least 5% lower than in January-March, 2020; not in difficulty as of Dec 31, 2019	

Source: the respective laws, <https://invega.lt/verslui/visos-priemones/25>, [https://www.vmi.lt/evmi/subsidijos-verslui](https://www.vmi.lt/evmi/subsidijos-labiausiai-nuo-covid-19-nukentejusioms-imonems,https://www.vmi.lt/evmi/subsidijos-verslui)

* - denotes cases when we cannot find the call for the applications and identify the day when the call becomes open, so we use the day when the respective law becomes active.

** - denotes cases when the exact description restricts applicants to firms with annual income in 2019 below 50 million euros and total assets below 43 million euros as of Dec 31, 2019. The exact definition of SME would also restrict the number of employees to less than 250.

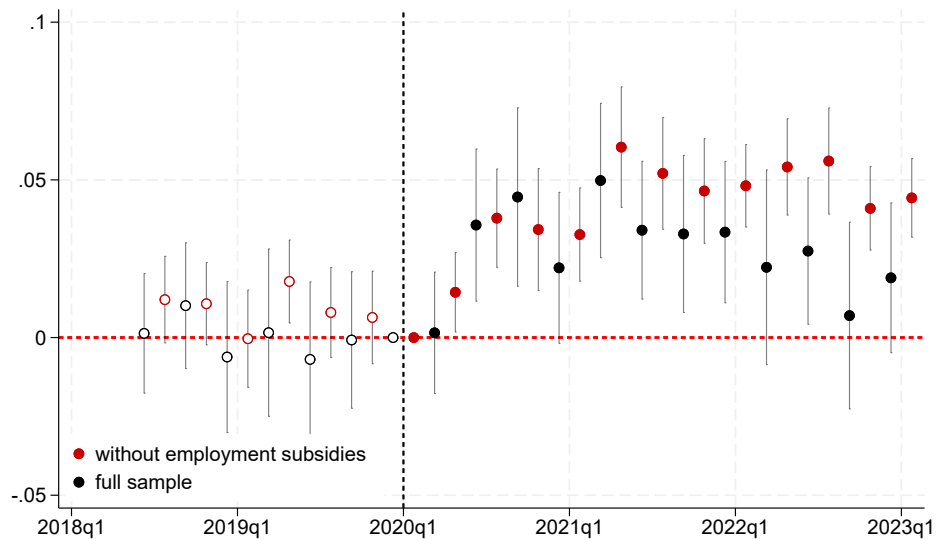
Figure A4: Employment Growth Effects for Firms which Received Only Subsidy Support Relative to Firms which Received Only Loans Support



Source: KOTIS (2020–2021) and TDS database (2015–2023)

Description: The figure plots the result of the difference-in-differences specification, Equation (5.1), after excluding tax exemptions and tax deferrals. Black circles refer to the estimates obtained from the full sample, whereas red circles report the estimates obtained after dropping employment subsidies from the sample. Standard errors are clustered at the industry-year-quarter level. The base quarter is 2020Q1.

Figure A5: Employment Growth Effects for Firms which Received Only Subsidy Support Relative to Firms which Received Only Tax Deferrals



Source: KOTIS (2020–2021) and TDS database (2015–2023)

Description: The figure plots the result of the difference-in-differences specification, Equation (5.1), after excluding loans. Black circles refer to the estimates obtained from the full sample, whereas red circles report the estimates obtained after dropping employment subsidies from the sample. Standard errors are clustered at the industry-year-quarter level. The base quarter is 2020Q1.

Table A4: Employment Growth Effects for Firms which Received Only Subsidy Support Relative to Firms Which Received Only Loans Support from COVID-19 Support

Dep. var.:	Employment growth						
	Receiving loans only						
Base outcome:	> 5 obs			> 5 obs & < 2 obs missing in 2019–2020			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
treat × 2015q2	-0.00870 (-0.87)				-0.00776 (-0.77)		
treat × 2015q3	-0.0129 (-1.75)				-0.00864 (-1.12)		
treat × 2015q4	-0.00882 (-0.74)				-0.00636 (-0.47)		
treat × 2016q1	-0.00363 (-0.32)	0.00731 (0.65)			-0.00169 (-0.15)	0.00929 (0.77)	
treat × 2016q2	-0.000878 (-0.10)	0.00121 (0.15)			0.00105 (0.12)	0.00291 (0.34)	
treat × 2016q3	-0.00198 (-0.22)	0.000482 (0.05)			0.000820 (0.09)	0.00276 (0.28)	
treat × 2016q4	-0.00298 (-0.34)	-0.000946 (-0.11)			-0.00179 (-0.20)	0.000137 (0.02)	
treat × 2017q1	-0.0145 (-1.70)	-0.00509 (-0.64)			-0.0131 (-1.52)	-0.00451 (-0.56)	
treat × 2017q2	-0.0160 (-1.40)	-0.00826 (-1.12)			-0.0146 (-1.24)	-0.00692 (-0.95)	
treat × 2017q3	-0.00281 (-0.26)	0.00476 (0.56)			-0.00139 (-0.13)	0.00563 (0.63)	
treat × 2017q4	0.0111 (1.05)	0.0181 (1.49)			0.0139 (1.26)	0.0196 (1.59)	
treat × 2018q1	-0.00362 (-0.48)	0.00647 (0.78)			-0.00426 (-0.53)	0.00531 (0.65)	
treat × 2018q2	-0.0121 (-1.57)	-0.00438 (-0.48)			-0.0112 (-1.43)	-0.00479 (-0.53)	
treat × 2018q3	-0.00696 (-1.00)	-0.00395 (-0.53)	-0.0116 (-1.63)	-0.00802 (-1.00)	-0.00771 (-1.06)	-0.00423 (-0.57)	-0.00752 (-0.91)
treat × 2018q4	-0.00284 (-0.35)	-0.00563 (-0.74)	-0.00725 (-1.09)	-0.00437 (-0.48)	-0.000722 (-0.09)	-0.00223 (-0.30)	-0.000579 (-0.07)
treat × 2019q1	-0.000563 (-0.05)	0.00366 (0.34)	0.00286 (0.37)	0.00567 (0.67)	0.00212 (0.21)	0.00595 (0.55)	0.00687 (0.80)
treat × 2019q2	0.000938 (0.10)	0.00307 (0.31)	0.000510 (0.06)	0.00266 (0.31)	0.00298 (0.30)	0.00369 (0.37)	0.00293 (0.33)
treat × 2019q3	-0.00834 (-0.80)	-0.00536 (-0.52)	-0.0124 (-1.20)	-0.00734 (-0.69)	-0.00598 (-0.55)	-0.00445 (-0.42)	-0.00706 (-0.65)
treat × 2019q4	-0.00557 (-0.65)	-0.000459 (-0.05)	-0.00700 (-0.82)	-0.00393 (-0.45)	-0.00271 (-0.30)	0.0000641 (0.01)	-0.00416 (-0.47)
treat × 2020q2	0.00137 (0.20)	-0.00499 (-0.63)	-0.00508 (-0.64)	-0.00648 (-0.69)	0.00328 (0.45)	-0.00366 (-0.44)	-0.00559 (-0.58)
treat × 2020q3	0.0251* (2.31)	0.0143 (1.57)	0.0158 (1.87)	0.0109 (1.29)	0.0280* (2.55)	0.0155 (1.64)	0.0118 (1.35)
treat × 2020q4	0.0335** (3.04)	0.0271** (2.76)	0.0233* (2.48)	0.0198* (2.13)	0.0367*** (3.42)	0.0294** (3.05)	0.0204* (2.17)
treat × 2021q1	0.0148 (1.66)	0.00577 (0.61)	0.0119 (1.42)	0.00597 (0.71)	0.0185* (2.06)	0.00676 (0.70)	0.00702 (0.83)
treat × 2021q2	0.0374*** (3.90)	0.0257** (3.04)	0.0301*** (3.65)	0.0229** (2.96)	0.0384*** (3.82)	0.0268** (3.14)	0.0236** (3.02)
treat × 2021q3	0.0277** (3.08)	0.0194* (2.11)	0.0236** (2.94)	0.0215* (2.56)	0.0289** (3.06)	0.0209* (2.24)	0.0223** (2.61)
treat × 2021q4	0.0217* (2.18)	0.00677 (0.80)	0.0214** (2.75)	0.0127 (1.89)	0.0235* (2.30)	0.00789 (0.90)	0.0131 (1.93)
treat × 2022q1	0.0295** (3.17)	0.0202 (1.56)	0.0269** (2.70)	0.0227 (1.76)	0.0299** (3.14)	0.0212 (1.59)	0.0236 (1.79)
treat × 2022q2	0.0196 (1.50)	0.0202 (1.75)	0.0241* (2.25)	0.0236* (2.14)	0.0212 (1.58)	0.0218 (1.83)	0.0245* (2.18)
treat × 2022q3	0.0299** (3.02)	0.0219* (2.42)	0.0231** (2.77)	0.0212* (2.25)	0.0321** (3.09)	0.0225* (2.32)	0.0218* (2.20)
treat × 2022q4	0.00699 (0.75)	-0.00380 (-0.31)	-0.00135 (-0.12)	-0.00861 (-0.67)	0.00849 (0.88)	-0.00241 (-0.19)	-0.00726 (-0.55)
treat × 2023q1	0.0138 (1.40)		0.00936 (0.76)		0.0166 (1.68)		
lag log total assets		0.0107*** (10.95)		0.0141*** (8.37)		0.0106*** (10.91)	0.0139*** (8.22)
lag log sales		-0.130*** (-26.07)		-0.143*** (-19.05)		-0.130*** (-26.00)	-0.143*** (-19.03)
lag log labor productivity		0.136*** (27.17)		0.152*** (19.32)		0.135*** (27.07)	0.153*** (19.36)
lag turnover growth			0.00590*** (9.40)	0.00471*** (7.35)			0.00470*** (7.27)
Observations	1065375	710092	475375	374670	1057762	706698	373642
R ²	0.045	0.103	0.086	0.146	0.045	0.103	0.145

Source: KOTIS (2020–2021) and TDS Database (2015–2023).

Description: This table presents the regression results for model 5.1 with different sample restrictions. The outcome variable is employment growth over the period 2015Q1–2023Q1. The treatment indicator takes value one if the firm received only subsidy support from COVID-19 support over the period 2020–2021. The base outcome is receiving COVID-19 loans only. All models include quarter fixed effects, industry fixed effects and industry-quarter fixed effects. In columns (2)–(4) and (6)–(7) we report the estimates of models that also include lagged log total assets, lagged log sales and lagged log labor productivity. Columns (3)–(4) and (7) include lagged turnover growth. Including lagged turnover growth limits the sample to 2018Q1–2022Q4 due to data availability. We omit the estimates of the constant for the sake of brevity. Standard errors are clustered at the industry-quarter level.

Table A5: Determinants of the Firm's Choice of State Support after Excluding Large Firms

Dep. var.:	Type of support indicator			
	No support			Subsidies only
Base outcome:				
Other outcome(s):	subsidies only	subsidies + loans	loans only	loans only
	(1)	(2)	(3)	(4)
log employment	0.399*** (0.011)	0.770*** (0.016)	0.736*** (0.043)	0.336*** (0.047)
log total assets	-0.137*** (0.014)	-0.028 (0.021)	0.091 (0.063)	0.281*** (0.070)
log current assets ratio	-0.026*** (0.010)	-0.058*** (0.015)	0.091** (0.045)	0.154*** (0.050)
log labor productivity	0.207*** (0.007)	0.248*** (0.011)	0.240*** (0.033)	0.044 (0.036)
<i>Industry fixed effects, the base industry is Accommodation</i>				
Agriculture	-0.867*** (0.065)	-1.787*** (0.084)	0.221 (0.286)	0.993*** (0.287)
Information	-1.233*** (0.058)	-2.187*** (0.079)	-0.388 (0.294)	0.733** (0.295)
Manufacturing	-0.697*** (0.050)	-1.626*** (0.058)	0.051 (0.249)	0.627** (0.249)
Other	-0.362*** (0.048)	-1.219*** (0.055)	0.376 (0.246)	0.713*** (0.245)
Professional	-0.974*** (0.048)	-1.935*** (0.059)	0.024 (0.250)	0.943*** (0.249)
Real Estate	-1.224*** (0.047)	-2.137*** (0.055)	0.326 (0.238)	1.498*** (0.237)
Trade	-0.262*** (0.045)	-1.081*** (0.051)	0.168 (0.240)	0.324 (0.240)
Transport	-1.167*** (0.049)	-1.868*** (0.058)	0.247 (0.243)	1.357*** (0.242)
Observations		85,564		34,169

Source: KOTIS (2020–2021) and TDS database (2015–2019)

Description: The table reports the estimates of logit models obtained from the sample without large companies (companies with 250 or more employees on average in 2019). Columns (1)–(3) report the estimates of the multinomial logit model where the outcome variable takes on four values: 0 for no state support, 1 for subsidies only, 2 for a combination of loans and subsidies, and 3 for loans only. Column (4) reports the estimates of the model where the outcome variable takes on value 1 if a firm receives subsidies only and the base outcome is receiving only loans. Firm-specific characteristics are median values of the respective variable over the period 2015–2019. Current assets ratio is current assets to total assets. Both models also include industry fixed effects.

Table A6: Determinants of the Firm's Choice of State Support in the Sample of Firms with 30% or Higher Fall in Turnover in 2020Q1 or 2020Q4

Dep. var.:	Type of support indicator			
	No support			Subsidies only
Base outcome:				
Other outcome(s):	subsidies only	subsidies + loans	loans only	loans only
	(1)	(2)	(3)	(4)
log employment	0.364*** (0.027)	0.927*** (0.033)	0.756*** (0.080)	0.359*** (0.083)
log total assets	-0.396*** (0.036)	-0.408*** (0.046)	-0.018 (0.123)	0.389*** (0.132)
log current assets ratio	-0.068*** (0.025)	-0.201*** (0.031)	0.022 (0.086)	0.104 (0.088)
log labor productivity	0.115*** (0.019)	0.219*** (0.024)	0.157** (0.066)	0.048 (0.069)
<i>Industry fixed effects, the base industry is Accommodation</i>				
Agriculture	-2.260*** (0.182)	-3.051*** (0.195)	-0.953** (0.477)	1.256*** (0.455)
Information	-2.722*** (0.178)	-3.555*** (0.199)	-1.555*** (0.519)	1.017** (0.498)
Manufacturing	-2.241*** (0.166)	-2.945*** (0.171)	-1.056** (0.422)	1.095*** (0.397)
Other	-1.901*** (0.168)	-2.230*** (0.171)	-0.814* (0.435)	1.041** (0.408)
Professional	-2.538*** (0.166)	-3.267*** (0.173)	-1.038** (0.429)	1.428*** (0.402)
Real Estate	-2.630*** (0.163)	-3.398*** (0.167)	-0.739* (0.404)	1.821*** (0.377)
Trade	-1.204*** (0.163)	-1.805*** (0.166)	-0.644 (0.417)	0.462 (0.390)
Transport	-2.524*** (0.166)	-3.153*** (0.171)	-1.061** (0.422)	1.360*** (0.396)
Observations		21,423		10,470

Source: KOTIS (2020–2021) and TDS database (2015–2019)

Description: The table reports the estimates of logit models for the sample of firms that experienced 30% or higher fall in turnover in 2020Q1 relative to 2019Q1 or in 2020Q4 relative to 2019Q4. Columns (1)–(3) report the estimates of the multinomial logit model where the outcome variable takes on four values: 0 for no state support, 1 for subsidies only, 2 for a combination of loans and subsidies, and 3 for loans only. Column (4) reports the estimates of the model where the outcome variable takes on value 1 if a firm receives subsidies only and the base outcome is receiving only loans. Firm-specific characteristics are median values of the respective variable over the period 2015–2019. The current assets ratio is current assets to total assets. Both models also include industry fixed effects.

Table A7: Determinants of the Firm's Choice of State Support with Financial Debts Ratio

Dep. var.:	Type of support indicator			
	No support			Subsidies only
Base outcome:				
Other outcome(s):	subsidies only	subsidies + loans	loans only	loans only
	(1)	(2)	(3)	(4)
log employment	0.344*** (0.050)	0.618*** (0.057)	0.492*** (0.140)	0.130 (0.156)
log total assets	-0.207** (0.084)	-0.367*** (0.095)	-0.292 (0.241)	-0.045 (0.278)
log current assets ratio	-0.003 (0.045)	0.034 (0.054)	0.247* (0.147)	0.299* (0.164)
log debt ratio	0.002 (0.039)	0.203*** (0.046)	0.198* (0.111)	0.197* (0.111)
log labor productivity	0.101** (0.042)	0.038 (0.049)	0.203* (0.122)	0.097 (0.136)
<i>Industry fixed effects, the base industry is Accommodation</i>				
Agriculture	-0.462 (0.401)	-1.407*** (0.371)	-0.463 (1.153)	-0.099 (1.139)
Information	-1.182** (0.461)	-2.342*** (0.453)	-0.712 (1.282)	0.408 (1.275)
Manufacturing	-0.250 (0.386)	-1.749*** (0.355)	-0.324 (1.084)	-0.162 (1.069)
Other	-0.631 (0.389)	-1.916*** (0.360)	-0.161 (1.093)	0.441 (1.075)
Professional	-0.911** (0.412)	-2.239*** (0.400)	-0.426 (1.175)	0.459 (1.161)
Real Estate	-0.913** (0.385)	-2.047*** (0.353)	-0.171 (1.080)	0.680 (1.062)
Trade	-0.281 (0.386)	-1.143*** (0.354)	-0.148 (1.084)	0.025 (1.071)
Transport	-0.974** (0.393)	-1.735*** (0.357)	-0.174 (1.086)	0.686 (1.073)
Observations		4,124		1,591

Source: KOTIS (2020–2021) and TDS database (2015–2019)

Description: The table reports the estimates of logit models. Columns (1)–(3) report the estimates of the multinomial logit model where the outcome variable takes on four values: 0 for no state support, 1 for subsidies only, 2 for a combination of loans and subsidies, and 3 for loans only. Column (4) reports the estimates of the model where the outcome variable takes on value 1 if a firm receives subsidies only and the base outcome is receiving only loans. Firm-specific characteristics are median values of the respective variable over the period 2015–2019. The current assets ratio is current assets to total assets. The financial debts ratio is financial debts to total assets. Both models also include industry fixed effects.

Table A8: Determinants of the Firm's Choice of State Support with SMEs after Excluding Tax Exemptions and Deferrals

Dep. var.:	Type of support indicator			
	No support			Subsidies only
Base outcome:				
Other outcome(s):	subsidies only	subsidies + loans	loans only	loans only
	(1)	(2)	(3)	(4)
log employment	0.443*** (0.011)	0.800*** (0.023)	0.743*** (0.081)	0.326*** (0.088)
log total assets	-0.137*** (0.013)	0.014 (0.034)	-0.022 (0.121)	0.142 (0.135)
log current assets ratio	-0.024** (0.009)	-0.053** (0.022)	0.193** (0.094)	0.258** (0.102)
log labor productivity	0.200*** (0.007)	0.351*** (0.018)	0.373*** (0.064)	0.215*** (0.071)
<i>Industry fixed effects, the base industry is Accommodation</i>				
Agriculture	-1.145*** (0.062)	-1.161*** (0.103)	2.045*** (0.747)	3.144*** (0.749)
Information	-1.443*** (0.054)	-2.134*** (0.119)	1.118 (0.760)	2.497*** (0.760)
Manufacturing	-0.908*** (0.046)	-1.621*** (0.081)	1.211* (0.730)	2.047*** (0.731)
Other	-0.588*** (0.045)	-1.042*** (0.076)	1.195 (0.736)	1.807** (0.736)
Professional	-1.188*** (0.045)	-1.977*** (0.088)	1.238* (0.731)	2.418*** (0.731)
Real Estate	-1.458*** (0.044)	-2.051*** (0.077)	1.437** (0.720)	2.897*** (0.720)
Trade	-0.460*** (0.042)	-1.137*** (0.071)	0.645 (0.730)	1.027 (0.730)
Transport	-1.352*** (0.046)	-1.777*** (0.080)	1.211* (0.727)	2.554*** (0.727)
Observations		85,564		40,677

Source: KOTIS (2020–2021) and TDS database (2015–2019)

Description: The table reports the estimates of logit models obtained from the sample without large companies (companies with 250 or more employees on average in 2019). Columns (1)–(3) report the estimates of the multinomial logit model where the outcome variable takes on four values: 0 for no state support, 1 for subsidies only, 2 for a combination of loans and subsidies, and 3 for loans only. Column (4) reports the estimates of the model where the outcome variable takes on value 1 if a firm receives subsidies only and the base outcome is receiving only loans. Firm-specific characteristics are median values of the respective variable over the period 2015–2019. Current assets ratio is current assets to total assets. Both models also include industry fixed effects.

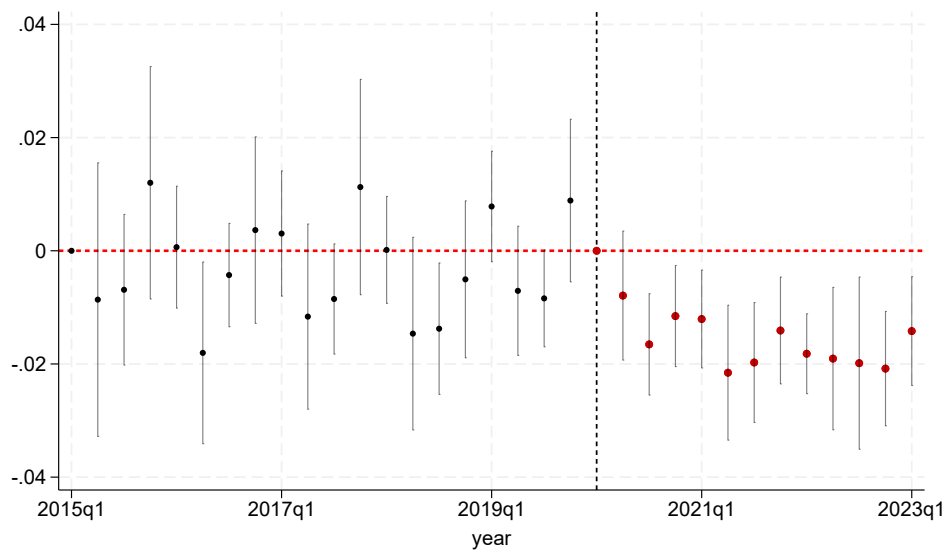
Table A9: Determinants of the Firm's Choice of State Support in the Sample of Firms with 30% or Higher Fall in Turnover in 2020Q1 or 2020Q4 after Excluding Tax Exemptions and Deferrals

Dep. var.:	Type of support indicator			
	No support			Subsidies only
Base outcome:				
Other outcome(s):	subsidies only	subsidies + loans	loans only	loans only
	(1)	(2)	(3)	(4)
log employment	0.444*** (0.025)	0.925*** (0.042)	0.872*** (0.149)	0.451*** (0.150)
log total assets	-0.425*** (0.035)	-0.342*** (0.063)	-0.373 (0.236)	0.019 (0.242)
log current assets ratio	-0.089*** (0.024)	-0.183*** (0.040)	0.104 (0.175)	0.220 (0.178)
log labor productivity	0.112*** (0.018)	0.355*** (0.033)	0.414*** (0.125)	0.332*** (0.128)
<i>Industry fixed effects, the base industry is Accommodation</i>				
Agriculture	-2.450*** (0.168)	-2.368*** (0.201)	12.779 (395.159)	16.191 (635.080)
Information	-2.821*** (0.164)	-3.474*** (0.236)	11.094 (395.159)	14.802 (635.080)
Manufacturing	-2.312*** (0.152)	-2.979*** (0.178)	12.060 (395.159)	15.275 (635.079)
Other	-1.938*** (0.154)	-2.026*** (0.174)	12.079 (395.159)	14.950 (635.080)
Professional	-2.623*** (0.152)	-3.274*** (0.189)	11.997 (395.159)	15.544 (635.080)
Real Estate	-2.755*** (0.149)	-3.273*** (0.171)	12.384 (395.159)	16.093 (635.079)
Trade	-1.288*** (0.150)	-1.832*** (0.168)	11.698 (395.159)	13.886 (635.080)
Transport	-2.603*** (0.152)	-3.011*** (0.177)	11.900 (395.159)	15.418 (635.079)
Observations		21,423		13,174

Source: KOTIS (2020–2021) and TDS database (2015–2019)

Description: The table reports the estimates of logit models for the sample of firms that experienced 30% or higher fall in turnover in 2020Q1 relative to 2019Q1 or in 2020Q4 relative to 2019Q4. Columns (1)–(3) report the estimates of the multinomial logit model where the outcome variable takes on four values: 0 for no state support, 1 for subsidies only, 2 for a combination of loans and subsidies, and 3 for loans only. Column (4) reports the estimates of the model where the outcome variable takes on value 1 if a firm receives subsidies only and the base outcome is receiving only loans. Firm-specific characteristics are median values of the respective variable over the period 2015–2019. The current assets ratio is current assets to total assets. Both models also include industry fixed effects.

Figure A6: Employment Growth Effects for Firms which Received Only Tax Deferrals Relative to Firms which Received Only Loans



Source: KOTIS (2020–2021) and TDS database (2015–2023)

Description: The figure plots the result of the modified difference-in-differences specification, Equation (5.1), where instead of comparing subsidy-receiving firms to loan-receiving firms, we compare firms receiving tax deferrals to loan-receiving firms. The reference group is loan-receiving firms. Standard errors are clustered at the industry-year-quarter level. The base quarter is 2020Q1.