Discussion Paper

The impact of German public support transfers on firm finance – Evidence from the Covid-19 crisis

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Non-technical summary

Research question

We investigate the effect of emergency aid transfers (November-December aid) on firms' financial situation during the COVID-19 pandemic in Germany. Specifically, we estimate the effects on liquidity reserves, employment and investment prospects as well as on credit negotiations and their results.

Contribution

Using the fourth wave of the Bundesbank's Online Panel-Firms (BOP-F) conducted in February 2021, we contribute to the literature on the effects of public support measures, particularly on small and medium-sized enterprises (SMEs). Survey data allow for a close evaluation of the immediate effects of the November-December aid on firms' financial situation. Compared to financial statements, which are only available on a lagged basis, surveys can evaluate policy measures more quickly. Empirically, we compare differences in the outcome variables between firms with pending and approved applications. We make use of matching methods to account for firm differences that may impact application status. We add to the existing literature by estimating the effects of transfers not only on perceived liquidity, but also on decisions made by firms and their access to external financing sources.

Results

Our results imply that firms that obtained an approval of their application for November-December aid transfers face a 5 percentage point lower probability of being confronted with a low liquidity buffer. In contrast, firms' decisions-making on employment and investments seems hardly affected. However, we find strong evidence that firms consider bank loans to be a substitute for the provision of transfers. The likelihood of starting credit negotiations is 8 percentage points higher for firms with a pending decision. Furthermore, the results provide evidence that the transfer scheme improved the creditworthiness of firms. In this context, we can show that receiving aid measures increased the probability of obtaining a loan at the desired conditions by about 14 to 18 percentage points. This finding may indicate that the transfer program also helped to reduce the likelihood of more restrictive credit conditions, which could have led to an even more severe situation for firms under distress.

Nichttechnische Zusammenfassung

Fragestellung

Wir untersuchen die Auswirkungen von Soforthilfetransfers (November-Dezember-Hilfe) auf die finanzielle Situation von Unternehmen während der Corona-Pandemie in Deutschland. Konkret schätzen wir Auswirkungen der Hilfsmaßnahmen auf Liquiditäts-reserven, Beschäftigungserwartungen, Investitionsentscheidungen sowie Kreditverhand-lungen und -ergebnisse.

Beitrag

Mit einer Auswertung der vierten Welle des Bundesbank Online Panels-Firmen (BOP-F) vom Februar 2021 untersuchen wir die Auswirkungen öffentlicher Fördermaßnahmen insbesondere auf kleine und mittlere Unternehmen (KMU). Umfragedaten erlauben eine eingehende Bewertung der unmittelbaren Auswirkungen der November-Dezember-Hilfen auf die finanzielle Lage der Unternehmen. Zum einen liegen keine granularen Informatio-nen zu den Auszahlungen der Hilfsmaßnahme vor. Zum anderen sind Bilanzkennzahlen nur verzögert verfügbar. Somit ermöglicht die Umfrage eine schnellere und passgenauere Analyse.

Empirisch vergleichen wir Unterschiede der finanziellen Lage von Firmen mit ausste-henden und genehmigten Anträgen. Wir verwenden Matching-Methoden, um Unterneh-mensunterschiede zu berücksichtigen, die sich auf den Antragsstatus auswirken können. Wir tragen zur Literatur bei, indem wir nicht nur Auswirkungen auf die wahrgenomme-ne Liquiditätslage abschätzen, sondern auch auf Entscheidungen von Unternehmen sowie deren Zugang zu Finanzierung erörtern.

Ergebnisse

Unsere Ergebnisse deuten darauf hin, dass Unternehmen, deren Antrag auf Hilfstrans-fers im Rahmen der November-Dezemberhilfen bewilligt worden ist, zu einer um 5 Prozent-punkte geringeren Wahrscheinlichkeit sich mit einem geringen Liquiditätspuffer konfron-tiert sehen. Es gibt jedoch kaum Anzeichen, dass die Bereitstellung von Hilfsmaßnahmen sich auf die Beschäftigungserwartungen bzw. Investitionstätigkeit auswirken. Dennoch finden wir Belege dafür, dass Unternehmen sich durch Bankkredite finanzieren, wenn die Transferzahlungen ausbleiben sollten. Die Wahrscheinlichkeit, Kreditverhandlungen auf-zunehmen, ist bei Unternehmen mit einer Bewilligung der Fördermaßnahme um 8 Pro-zentpunkte geringer. Zudem belegen die Ergebnisse, dass Transfers die Kreditwürdigkeit der Unternehmen verbessert haben. So etwa steigt durch den Erhalt von Hilfsmaßnahmen die Wahrscheinlichkeit, einen Kredit zu den gewünschten Konditionen zu erhalten, um etwa 14 bis 18 Prozentpunkte.

Diese Feststellung zeigt, dass die November-Dezember-Hilfen dazu beigetragen haben, die Wahrscheinlichkeit restriktiverer Kreditbedingungen zu verringern. Dies hätte wieder-um zu einer Verstärkung finanzieller Engpässe in von der Pandemie besonders betroffenen Branchen führen können.

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Abstract

The economic policy response to COVID-19 lockdowns included a variety of measures. Their effects on non-financial firms, however, remain unclear. To shed light on the effect of transfers, we investigate the effect of German emergency aid transfers (November-December aid), a program designed for small and medium sized firms. Using novel survey data, we exploit variation in application status to estimate its effects on the financial situation of firms. We distinguish between firms that had already used aid transfers and those firms with a pending application.

Our results show that firms substantially benefited from the November-December aid program. The provision of transfers improved liquidity and access to credit for distressed firms, while decreasing credit demand. The estimates suggest that firms that had received an approval of their application for November-December aid faced a 5-percentage point lower probability of being confronted with a low liquidity buffer. We also find strong evidence, that firms substituted aid with credit, since firms with a pending application status faced an 8-percentage point higher likelihood of starting credit negotiations. Moreover, the provision of November-December aid improved the creditworthiness of firms. We can show that receiving these transfers increased the probability of obtaining a loan at the desired conditions by 14 to 18 percentage points.

Keywords: SMEs, emergency aid, treatment effects, COVID-19, firm finance.

JEL classification: C14, G32, G33, H84, L25, J68.

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1 Introduction

The COVID-19 pandemic that began in early 2020 put unprecedented pressure on governments to balance health care and economic matters. In order to prevent health care systems from collapsing, governments around the globe imposed restrictions to contain the spread of the virus. These measures were accompanied by severe revenue losses for firms in heavily affected sectors, particularly in services. In this context, governments designed several support measures to assist firms subject to pandemic-related restrictions.

In Germany, the Federal Government designed a broad set of measures for non-financial firms to preserve their businesses. These programs accumulated to a total volume of more than EUR 100 billion. Until September 2021, firms received loans guaranteed by the state-owned investment bank, KfW, amounting to a total of EUR 53.5 billion. Furthermore, the government set up several transfer programs for firms affected by restrictions in the wake of the pandemic. Up to September 2021, the total expenditure of pandemic-related transfer programs summed up to EUR 52.6 billion. This figure clearly stresses the importance of solvency-enhancing measures, which do not lead to an increase in liabilities, as is the case for loans granted via the KfW special loan program.

In this paper, we focus on the so-called *November-Dezemberhilfen* (English: November-December aid), a program to compensate firms for revenue losses induced by mandatory closures during the onset of the second wave of the pandemic in Germany in late 2020. In our analysis, we add to the growing literature on the effects of government support on firms' financial situation. More specifically we address questions on whether government transfers improved firms' liquidity, employment expectations, and investment prospects as well as whether transfers reduced the demand for credit. For the analysis, we make use of firm-level survey data stemming from the Bundesbank Online Panel-Firms (BOP-F). To account for endogeneity, we exploit variation in application status for November-December aid, distinguishing the outcome between firms that had already used aid transfers and firms with a pending application.

The November-December aid program was predominantly requested by firms in service sectors, which received a total volume of EUR 13.7 billion. Given the structure in these sectors, the program was predominantly used by small and medium-sized enterprises (SMEs). The focus on SMEs is further motivated by the maximum support of EUR 1.8 million an individual firm could receive through the program. This threshold was chosen in order to comply with European procurement directives.

Several studies have confirmed that SMEs were hit particular hard by the containment measures during the pandemic (see e.g. Fernández-Cerezo, González, Izquierdo, and Moral-Benito, 2021; Fairlie, 2020; Block, Kritikos, Priem, and Stiel, 2021). In addition, SMEs are more vulnerable than larger firms as they usually possess lower reserves through precautionary savings (see e.g. Bartik, Bertrand, Cullen, Glaeser, Luca, and Stanton, 2020; Cowling, Brown, and Rocha, 2020). As shown by Boddin, D'Acunto, and Weber (2020), retained earnings have become relatively important for German firms in comparison to external financing sources such as bank loans. In this context, SMEs are unlikely to be able to obtain the credit to survive a longer period of *hibernation* - meaning that firms could reduce all non-essential costs and rely on credit financing to survive (see Didier, Huneeus, Larrain, and Schmukler, 2021).

Against the background that firms, which experienced severe revenue losses due to

pandemic-related restrictions, were mostly relying on external financing, we investigate the impact of government support measures on their financial situation. Given the characteristics of SME financing outlined above, the focus on the *November-December aid* program provides a compelling set up. A primary goal was to alleviate the burden on those firms suffering the most under the imposed restrictions. Furthermore, the insolvency regime was temporarily suspended. This might have positive effects on the real economy by avoiding closures, insolvencies and an increased unemployment rate. In this context, preventing large-scale insolvencies can help to stabilize financial markets and the banking sector and is thus essential for the economy as a whole (Elenev, Landvoigt, and Van Nieuwerburgh (2020)). However, for governments an optimal policy design is subject to a trade-off. Without government interventions, recessions can lead to an exit of the most inefficient firms. This cleansing effect can improve overall efficiency of the economy (Wang, Yang, Iverson, and Kluender, 2020; Dörr, Licht, and Murmann, 2021) in the spirit of Schumpeter's *creative destruction* (see e.g. Cros, Epaulard, and Martin, 2021). Therefore, governments should find an appropriate balance between supporting firms which are facing difficulties due to pandemic-related restrictions and inefficient spending on firms which do not need it or would have failed anyway.

After a first lockdown in spring 2020, the number of new COVID-19 infections in Germany rose quite quickly in late 2020. Thus, the German government imposed new restrictions in November and December 2020 to contain the spread of the virus. Among other measures, firms from sectors characterized by a high degree of personal interaction, such as restaurants, were not allowed to receive customers anymore. To compensate these firms and to stabilize the economy, the government set up the *November-December aid* program providing direct monetary support to firms covering up to 75% of turnover loss relative to 2019 in case of direct closures or indirect turnover loss. Firms were eligible for support when they were either directly affected by closures or indirectly lost at least 80% of their turnover.

In order to assess the impact of November-December aid on firms, we make use of survey data from the Bundesbank Online Panel-Firms (BOP-F). This choice was made for several reasons. First, granular official data on payoffs of the *November-December aid* program at the firm level is not available. Second, official balance sheet data covering the period of the pandemic is only available with a long time lag.[1] Third, as we argued above, the majority of firms requesting *November-December aid* are relatively small. This segment is underrepresented in official balance sheet data (see e.g. Stöss, 2001). This bias is driven by thresholds in the reporting requirements of firms. Furthermore, surveys can be designed to gather precise information on a topic of interest.

In each round of the survey, the BOP-F survey covers about 10,000 firms located in Germany. Since June 2020 these firms have been surveyed about every 2 months. Questions cover a wide range of topics on the development of firms, their expectations and access to finance. In the fourth wave of the survey, conducted in February 2021, firms were asked about the usage of public support measures. At the time of the survey, the decision on the applications for November-December aid transfers was still pending for a

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[1]Given the regulation, firms in Germany are obliged to report figures within 12 months after the end of the corresponding fiscal year. The majority of firms utilize the entire time window. Apart from some exemptions, the fiscal year corresponds to the calendar year. This implies that balance sheet data on the pandemic year 2020 would become available at the end of 2021 or in early 2022.

distinct share of firms. This was due to a complicated approval procedure and difficulties in the software processing applications. This variation allows a quasi-experimental set up to identify the effects of government support on firm outcomes. In the analysis, we focus on the impact of the transfers on the liquidity situation of firms, their employment expectations, their investment behaviour and on their negotiations for bank loans.

By applying matching and regression techniques, we can show that firms still waiting for approval of *November-December* aid were facing a 5 percentage point higher probability of being confronted with a liquidity buffer lasting up to one month or less. Effects on employment expectations and investment behaviour are not robust, but there is strong evidence that firms responded to missing aid by substituting aid with credit. The likelihood of starting credit negotiations is about 8 percentage points higher as long as the decision on the aid application is still pending. Furthermore, the results provide evidence that the transfer scheme improved the creditworthiness of firms. In this context, we can show that receiving aid measures increased the probability of obtaining a loan at the desired conditions by about 14 to 18 percentage points. This finding may serve as an indication that the transfer program also helped to reduce the likelihood of more restrictive credit conditions that could have led to an even more severe situation of the firms under distress.

2   Institutional setting and related literature

Due to the COVID-19 pandemic, governments around the globe imposed restrictions to contain the spread of the virus. These measures induced severe revenue losses for firms in heavily affected sectors, particularly in services. For the German economy, the pandemic reflects a strong and exogenous shock (Buchheim, Krolage, and Link, 2021) with heterogeneous impacts across sectors and firm sizes (Sauer and Wohlrabe, 2021; Deutsche Bundesbank, 2021). In this context, the German government designed a broad set of demand stimulating measures, such as cash outs to families and a temporary decrease in VAT, and support to firms (Feld, Grimm, Schnitzer, Truger, and Wieland, 2020). To dampen the negative effects on the real economy, the obligation to file for insolvency was temporarily deferred, the government prolonged a short-time working scheme, where part of wage costs are covered, and financing for firms was supported through guarantees for credit and direct monetary transfers, to name just a few measures. In total, these pandemic-induced firm support measures accumulated to more than EUR 100 billion[2]. This enormous raises the question of the optimal institutional response to support the economy.

In a first step, it is essential to understand which market segments were most affected by the pandemic. Evidence shows that smaller firms are more vulnerable to the COVID-19 shock and less able to adapt (Dörr et al., 2021; Bartik et al., 2020; Fairlie, 2020). That is why the focus of the growing literature on the effects on firms has turned to the effects on small and medium enterprises (see Belitski, Guenther, Kritikos, and Thurik, 2021, for a systematic review of the literature). This relates to the fact that containment measures affected services, retail, and hospitality, where the majority is organized in smaller entities, more than in less affected sectors such as construction and manufacturing. Smaller firms are disproportionately exposed to the crisis because they are less liquid on average due to

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[2]https://www.dashboard-deutschland.de/. Last accessed: September, 30, 2021.

the lower ability to save and increase reserves (Cowling et al., 2020). In times of pandemic related business restrictions, these reserves can be exhausted quickly. Therefore, external financing sources might become important, particularly for SMEs.

In this paper, we concentrate on the impact of the provision of the *November-December* aid program on the financial situation of non-financial firms. On October 28th 2020, the Federal Government of Germany announced a new lockdown for some sectors. In this context, the government also introduced an exceptional economic stabilizer, called *November* aid [3]. These transfers were put in place, targeted at firms, the self-employed and other business-like entities, which would be particularly hit by a new wave of forced closures. In order to avoid misuse, it was possible to make applications for November aid starting on November 25, 2020 via a tax consultant, a lawyer or another authorized third party.

All private firms, self-employed, public firms, clubs and facilities (hereinafter 'firms') were generally able to apply for *November* aid. Eligibility, however, was tied to conditions regarding the damage caused by the COVID-19 pandemic and its containment measures. In their criteria the government distinguishes between directly and indirectly affected firms.

Directly affected firms are those that had to close from October 28, 2020 by order of the government and remained closed throughout November. These include bars, restaurants, museums, hotels and many more. Firms could apply for a similar *December* aid, when they had to stay closed during December. Therefore, both programs are defined as *November-December* aid for the remainder of the paper. Indirectly affected firms are those able to prove that they lost 80% of their turnover compared to the same month in 2019 because of the pandemic. Firms which did not comply with these requirements were able to apply for bridging aid III (Überbrückungshilfe III) in the event of pandemic-related revenue losses. This implies that firms were eligible for only one of these measures. For *November-December* aid, further excluding restrictions with other support programs, such as short-time working or the KfW-granted loan program, were not in place.

In order not to disrupt markets much with aid, especially concerning keeping inefficient firms alive, the government put ineligibility criteria in place. Firms were ineligible to November aid if they (1) were not registered in the German tax register, (2) had no production site or headquarters in Germany, (3) were already financially distressed on December 31, 2019, or (4) were founded after September 30, 2020 or (5) closed before October 31 2020. Furthermore, firms needed at least one employee or another shareholder. Separate firm entities could not apply separately. These eligibility criteria do not exclude the possiblity that firms would have been under distress in 2020 even without the outbreak of the COVID-19 pandemic. Hence, the analysis cannot evaluate whether the transfer program has contributed to delayed filings of insolvency, or even to *cliff effects* characterized by a buildup of a large scale insolvencies at the expiry of the transfer program.

When approved, November aid covered 75% of potential turnover measured by the turnover made during the same period in 2019. To avoid violating European procurement directives, the maximum support was EUR 1 million, but was extended to EUR 1.8 million

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[3]https://www.bundesregierung.de/resource/blob/997532/1805024/5353edede6c0125ebe5b5166504dfd79/2020-10-28-mpk-beschluss-corona-data.pdf?download=1.
Last accessed: 21.07.2021.

on the 28th of January 2021[4].

Responsibility for the approving applications was delegated to the federal state governments. Due to software problems, application processing was subject to delay (see Redaktionsnetzwerk Deutschland, 2021). Furthermore, the obligation for firms to submit the application via an authorized third party was quite challenging and time consuming. Consequently, regular payouts of the aid did not start to progress until the end of January, two months after the start of the lockdown. Thus, a distinct share of firms was still waiting for approval at the time the survey was conducted in February 2021. In total, the overall volume of the *November-December* aid program came to EUR 13.7 billion[5].

So far, there is little empirical evidence on the impact of the *November-December* aid program. Gillmann, Nauerth, Ragnitz, and Spüntrup (2021) conducted a firm survey on the utilization of several support schemes in Germany, namely bridging aid II and III as well as *November-December* aid. The survey was focused on firms belonging to the sectors of retail trade, services and hospitality. It shows that almost 90% of the firms in the hospitality sector applied for *November-December* aid. These firms also provided a positive evaluation of the support scheme. By contrast, only 4% of the firms in retail sales applied for *November-December* aid with a relatively negative evaluation of the program. In addition, Kleifgen, Roth, and Stepanok (2021) use firm survey data from the German Institute for Employment Research, namely the IAB Survey on the Impact of COVID-19. The authors find a small amount of evidence that exporting enterprises were more likely to apply for *November-December* aid and short-time work.

Turning to the financial situation of firms in the light of the pandemic, Block et al. (2021) investigated the effect of cash transfers on the liquidity buffers of the self-employed in Germany during the first lockdown in spring 2020. Their approach is quite close to the methodological approach of our paper. The authors use the self-employed intending to apply for aid as the control group, whereas our paper refers to a control group consisting of firms with a pending decision regarding their application. Although they have a reasonably large self-employed group for whom approval is pending, Block et al. (2021) argue that using those waiting for approval is the less favourable approach. Due to the longer waiting time an endogeneity problem might arise. The complexity of applications leading to the delay might reflect underlying differences. Against this background, we provide several exogeneity tests to motivate the comparison between firms that had already used the transfer and firms whose application for *November-December* aid was pending on the date of the survey.

For Norwegian and US data, Alstadsæter, Bjørkheim, Kopczuk, and Økland (2020) show that support measures had reduced firms' economic distress by cutting the negative effect of the crisis on profitability, liquidity, debt, and solvency. These positive effects suggests that government support schemes helped to prevent further financial distress so far. This finding is partly confirmed by Boddin et al. (2020) showing that the support of credit programs was not important for firms during the first lockdown in spring 2020. The authors observe that firms primarily used retained earnings as a financing source rather than relying on credit. However as retained earnings are a finite source for financing costs in lockdown, their analysis might look different in the second lockdown in late 2020.

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[4]https://www.ueberbrueckungshilfe-unternehmen.de/UBH/Redaktion/DE/FAQ/ ausserordentliche-wirtschaftshilfe.html. Last accessed: 21.07.2021.

[5]https://www.dashboard-deutschland.de/. Last accessed: September, 30, 2021.

Our paper provides an investigation of liquidity buffers, credit negotiations and investment prospects. This helps to understand how firms reacted to the pandemic and to the provision of a pandemic-related support program. Furthermore, we investigate the firms' access to credit and the corresponding credit conditions. We thereby contribute to the literature by assessing whether the support program, namely *November-December* aid, helped firms to maintain their access to loans, and to reduce the likelihood of a potential credit crunch.

3 Data and descriptive statistics

The empirical analysis draws on survey data from the *Bundesbank Online Panel-Firms* (BOP-F), conducted by the Deutsche Bundesbank (see Deutsche Bundesbank, 2021). The survey was initiated in June 2020 to gather information on firms' development, expectations and financial situation. As mentioned earlier, the survey has several advantages, particularly in the light of the COVID-19 pandemic. In contrast to official balance sheet information, survey data can be collected at a higher frequency with a short time horizon. As official balance sheet data is biased towards larger firms (Stöss, 2001), the survey offers the possibility of gathering information on SMEs, a segment particularly hit by containment measures. Furthermore, the survey holds the potential to collect precise information on a given topic. We are aware that using survey data has drawbacks such as potential measurement error and limited sample size. We are therefore looking forward to complementing our analysis with official balance sheet data, for example, as soon as they are available to us.

The BOP-F survey is designed as a panel survey. Up to March 2021, the Bundesbank conducted 4 survey waves. Contacted firms were drawn from the whole population of firms in Germany with turnover larger than EUR 17,500. The responsiveness of firms varied across waves, with around 13% responding to the first 2 waves, followed by a small drop to 10%, and then a steep increase to around 16% of firms answering the 4th wave (Deutsche Bundesbank, 2021).

Table 1: Overview of BOP-F Survey and its panel structure

	1	2	3	4	Total
Responses by wave	10,711	9,150	12,462	16,241	48,564
Firms participating in number of waves	21,235	5,376	2,415	2,333	31,359

Source: BOP-F, own calculation. Field phases - Wave 1: Jun-Jul 2020, Wave 2: Aug-Sep 2020, Wave 3: Okt - Nov 2020, Wave 4: Jan - Mar 2021.

The first four waves cover 48,564 responses from 31,359 firms. As shown in table 1, 10,711 firms participated in wave 1, 9,150 in wave 2, 12,462 in wave 3 and 16,241 in wave 4. Of the 31,359 firms that participated in any of the four waves, 2,333 firms participated in all four waves, 2,415 firms participated in three, 5,376 in two waves and 21,235 only responded once. These figures show that BOP-F is designed as a panel survey. For analytical purposes, it is important to be aware that the consideration of the panel structure and its length comes at the cost of lower observations.

The BOP-F survey covers a wide range of questions designed to gather information over a short time horizon. Several questions are asked in each wave. They comprise the development of key figures (employment, sales, liquidity etc.) and the corresponding expectations, financing sources, credit negotiations and inflation expectations. Furthermore, each survey is complemented by questions related to a specified topic such as payment behaviour or to current policy measures such as the temporary VAT cut in July 2020.

The take up of the *November-December* aid was captured in the 4th wave of the Bundesbank Online Panel-Firms (BOP-F), which was conducted between January 29, 2021, and March 1, 2021. Among other support measures, firms were asked whether they applied for *November-December* aid and about the status of their application. Firms that did not specify their state, sector or turnover respectively were dropped from the analysis, which reduces the sample size from 16,241 to 15,350 firms.

Table 2: Firm situation by sector and turnover

	N	Production decline		Liquidity reserves			November aid			
		share %	mean %	< 2 M	2 < 12 M	sufficient	request	approved	pending	rejected
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Sector										
Manufacturing	3,241	47.6	29.4	10.6	40.2	49.2	11.3	24.7	15.6	59.7
Retail	2,004	52.0	35.5	21.2	40.2	38.6	15.0	11.3	23.0	65.7
Hospitality	728	95.7	84.4	40.9	52.1	7.1	79.0	75.3	15.1	9.6
Others	9,377	38.9	41.1	15.5	36.8	47.8	10.9	41.0	18.0	41.1
Annual turnover in EUR mln in 2019										
to 1	4,278	53.2	54.7	26.5	42.2	31.3	20.5	53.1	14.7	32.2
1 to 7	5,743	45.4	41.1	18.1	43.8	38.1	15.6	44.5	17.4	38.1
7 to 34	3,138	41.9	31.9	8.5	34.7	56.8	10.6	25.3	22.6	52.1
> 34	2,258	33.5	23.9	2.9	22.1	75.0	6.9	16.6	23.8	59.6
Total	15,350	45.2	42.0	16.4	38.7	44.8	14.7	43.1	17.5	39.3

The "thereof" header spans the approved (8), pending (9), and rejected (10) columns.

Source: Bundesbank Online Panel-Firms (BOP-F). Unweighted results. Own calculations.

Table 2 presents descriptive statistics on the application status of *November-December* aid, the business activity, and the financial situation of firms captured in the fourth wave of the BOP-F survey. The variables are grouped by sector and size measured by annual turnover. The impact of the pandemic can be approximated by the question on the change in sales/business activities between December 2020 and a *typical* December such as in 2019. As described in the Bundesbank's Monthly Report in April 2021 (see Deutsche Bundesbank, 2021, p. 37), there is great heterogeneity in the consequences of the pandemic for firms. This figure is quite important for the allocation of *November-December* aid as the impact of pandemic-related measures on sales is a criterion determining eligibility for the support measure.

In Table 2, the panel on the production decline covers two measures. Column (2) reports the share of firms confronted with a decline in production, while column (3) covers the magnitude of the production change of those firms reporting a decline. In December 2020, almost all firms in the sector of hotels and restaurants were confronted with lower revenue figures in comparison to the pre-crisis period. The average downturn reached a value of 84.4%. Furthermore, the descriptive statistics show a negative correlation between firm size and the magnitude of the decline in production/sales, confirming that SMEs were hit particularly hard by the pandemic.

The picture that SMEs and firms in the hospitality sector were most affected by the pandemic is confirmed when turning to the questions on disposable liquidity reserves and the application for *November-December* aid. The former is captured by the question of

how long a firm could maintain its business activities given its current situation without any further support measures. Firms could answer that they possess liquidity reserves for a period of up to one month, two months, 6 months, 12 months, or they could answer that they have generally sufficient liquid means. In table 2, columns (4) to (6) capture these response possibilities, which are grouped as follows: up to two months, between three and twelve months and generally sufficient liquidity. 16.4% of the participating firms reported that they expected to face liquidity shortages within the next two months. This share was particularly pronounced for small firms with annual revenue of less than EUR 1 mln (26.5%) as well as for firms from the hospitality sector (40.9%).

According to columns (8) to (10) of table 2, 14.7% of the interviewed firms applied for *November-December* aid. Broken down by approval status at the time of the survey, 43.1% of the firms were already able to use the support, for 17.5% of the applications the decision was still outstanding, and 39.3% of the applications were rejected. Given the design of the *November-December* aid, it is not surprising that 79.0% of surveyed hotels and restaurants had applied for the support scheme, as reported in column (7) of table 2. In contrast, applications did not exceed 15% in the sectors of manufacturing, retail sales or in other sectors. Furthermore, the outcome of these applications is also characterized by a similar sectoral pattern. In the hospitality sector the approval ratio was above 75%, which stands in strong contrast to other sectors. In the retail sector, for example, about two thirds of the applications were rejected. With respect to firm size, the application ratio shows a weaker relationship between requests and firm size than for a sectoral distinction.

The descriptive statistics clearly confirm a sectoral pattern in the distribution of the *November-December* aid program. Firm size also seems to be a relevant factor. Thus, it is essential to take these firm characteristics into consideration when assessing the impact of the support scheme on the financial situation of firms.

4   Empirical design

In the analysis, we focus on the the impact of *November-December* aid transfers on the financial situation of firms. In a first step, we reduce the sample of the analysis from 15,350 to 2,258 firms which had applied for *November-December* aid. As described above, we do not include firms that had not reported information on firm characteristics such as sector, turnover and location. In total, we consider 974 firms that were already able to use transfers from the *November-December* aid program at the time of the survey. For 396 firms, the decision was still pending at the date of the survey. Furthermore, in 888 cases the application had been rejected.

4.1   Regression samples

To identify the effect of *November-December* aid transfers, we compare firms with an approved and a pending aid application. The former is labeled the treatment group, while the latter is defined as the control group. The analysis is based on three different sample compositions. In each sample, the treatment group contains all 988 firms that had already used the transfer at the time of the interview. The composition of the control group varies across the samples.

In the baseline sample, the control group contains all 396 observations with a pending application. In order to account for the fact that a pending application does not automatically result in an approval, we develop a second and third sample. In both samples, the control group is modified with respect to a prediction on whether the application would be approved in the future. This prediction relies on a logit estimation using information on applications that were already processed, namely approvals and rejections. In this regression, which is presented in table 3, the dependent variable is binary, taking the value of one if the application had already been approved. The set of explanatory variables contains information on the firms' location, size measured by annual turnover in 2019, sector, production decline between December 2020 and December 2019 as well as on the week of the survey. This information was collected in the survey.[6]

This ex-post analysis reveals these characteristics that made firms more likely to obtain an approval for their applications. The first column reports the coefficient estimates of the logit regression, while the second column contains the corresponding average marginal effects. The estimates clearly show that sector as well as production decline are the driving forces behind an approval of the application. Firms from the hospitality (retail) sector have a 26 (24) percentage point higher (lower) probability of having their application approved than firms from the reference group, namely other sectors. Compared with firms without decreasing business activity, a production decline of between 61% and 80% (81% and 100%) results in a 28 (46) percentage point higher probability of having *November-December* aid. Furthermore, the applications of large firms with an annual turnover of more than EUR 34 mln in 2019 are more likely to be rejected than those of small firms with a turnover of less than EUR 1 mln. The impact is estimated at a magnitude of 9 percentage points.

Based on estimates in table 3, we calculate predictions on whether a pending application would be approved. These probabilities are used to compose the control group. For the second sample, we choose a threshold, dropping observations with a likelihood lower than 0.5. This leads to reduction of the size of the control group from 396 to 198 firms. We call this sample the *restricted sample* for the remainder of the paper. For the third sample, the control group is assigned continuous weights obtained from the logit regression reported in table 3. This sample is defined as the *weighted sample*.

4.2 Model specification

After defining treatment and control groups, we report the information on the financial situation used as the dependent variable. Afterwards, we provide a discussion of the set of covariates explaining the outcome variables of consideration.

In the analysis, we regard several items of information from the BOP-F survey as the dependent variable, which are all of a categorical nature.[7]

- First, we measure financial distress using the question on liquidity buffers explained above. This indicator contains five categorical answers on the period a firm possesses sufficient liquidity reserves before it would have to abandon its business activities,

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[6]See Table A3 for the descriptive statistics of the control variables with respect to the application status for *November-December* aid.

[7]See Table A4 for the descriptive statistics of the dependent variables with respect to the application status for *November-December* aid.

Table 3: Explanation rejected vs. approval - logit model

		logit coefficients	avg. marginal effects
Region	East	-0.343*	-0.052*
		(0.198)	(0.030)
	South	-0.269	-0.041
		(0.171)	(0.026)
	West	0.026	0.004
		(0.191)	(0.029)
Annual turnover (EUR mln) in 2019	1 to 7	0.099	0.016
		(0.137)	(0.021)
	7 to 34	-0.235	-0.037
		(0.198)	(0.031)
	> 34	-0.594**	-0.091**
		(0.291)	(0.045)
Sector	Manufacturing	-0.108	-0.020
		(0.169)	(0.032)
	Retail	-1.324***	-0.236***
		(0.219)	(0.036)
	Hospitality	1.470***	0.262***
		(0.174)	(0.029)
Production decline	1 - 20%	0.051	0.010
		(0.261)	(0.049)
	21 - 40%	-0.075	-0.014
		(0.235)	(0.043)
	41 - 60%	0.356	0.069
		(0.248)	(0.048)
	61 - 80%	1.353***	0.277***
		(0.237)	(0.046)
	81 - 100%	2.357***	0.458***
		(0.230)	(0.042)
Calendar week	6	0.261	0.040
		(0.235)	(0.036)
	7	0.169	0.026
		(0.149)	(0.023)
	8	0.093	0.014
		(0.179)	(0.027)
	9	-0.098	-0.015
		(0.403)	(0.061)
Observations		1,862	
Log-likelihood		-877.52	
Pseudo-R^2		0.319	

Notes: Logit model with outcome 'November aid approved', 0=rejected 1=approved, standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Production decline refers to the period between December 2020 and December 2019. Base categories: North, < EUR 1 mln , other sectors, no production decline and week 5. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

namely up to one month, up to two months, up to 6 months, up to 12 months, or they could answer that have generally sufficient liquid means. The respondents could choose only one category. However, we combine the answer options covering the period of the answer, e.g. option (3) 'up to six months' contains positive answers for option (1) 'up to one month', (2) 'up to two months, (3) 'up to six months'.

- Second, we use the question on the employment expectations of firms in their entity over the subsequent six months after the interview. In each wave of the survey, firms could choose between five options: 'decrease significantly', 'decrease slightly', 'remain roughly the same', 'increase slightly', and 'increase significantly'. Employment is one of the few channels a firm can directly decide on, in contrast to 'sales', for example.

- The same holds for the third question focusing on the the importance of potential deferrals of investments as a liquidity ensuring measure. In the survey, firms could choose between five answers: 'completely unimportant', 'unimportant', 'neither nor', 'important', and 'very important'.

- Fourth, we assess the effect of providing of the transfer on the credit demand of firms. This information is captured by the question on whether a firm had initiated negotiations for a bank loan over the three preceding months prior to the interview. We may thereby distinguish between credit negotiations due to the COVID-19 pandemic and those regardless of the pandemic.

- The fifth question covers the result of credit applications. The results of credit negotiations are categorized as follows: 'as desired', 'worse credit conditions (such as higher interest rates or higher securities)', 'lower credit volume', 'pending decision', and 'negotiation ended without any result'. In the analysis, we merge the answers 'worse credit conditions' and 'lower credit volume' into the category 'worse conditions'.

- The last question covers, why firms had refused to negotiate for a bank loan. Therefore, the questionnaire contained three options: 'no prospect of success', 'no need', and 'no longer required'.

In order to assess the effect of *November-December* aid on the variables described above, we need to isolate the treatment as quasi-randomly conditional on observed factors. Therefore, we have to identify those factors affecting the application status. Similarly to the logit estimate in table 3, we regress on a binary variable taking the value of one if the application had been approved, and zero if the application decision was still pending. Furthermore, we include the same set of regressors, namely turnover, sector, region and production decline of firms as well as the date of the interview. The estimates based on the baseline sample are given in table 4. As the results hardly differ across the three samples, we report estimates based on the baseline sample in the main text, while the results based on restricted and weighted samples are presented in tables A1 and A2 of the appendix.

The estimates of the logit regressions are reported in columns (1) to (6). The baseline regression containing all variables is reported in column (1). The last column reports

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Table 4: Logit regression on the application status of *November-December aid*
Approved vs. pending - Baseline sample

Dep. Var. Approval	(1) baseline	(2) ex region	(3) ex turnover	(4) ex sector	(5) ex prod	(6) ex week	(7) avg. ME (1)
Region							
East	-0.031		-0.011	0.084	-0.041	-0.026	-0.005
	(0.217)		(0.214)	(0.210)	(0.213)	(0.217)	(0.038)
South	0.021		-0.069	0.240	0.062	0.016	0.004
	(0.188)		(0.184)	(0.181)	(0.185)	(0.187)	(0.032)
West	-0.134		-0.215	0.053	-0.114	-0.128	-0.024
	(0.203)		(0.199)	(0.197)	(0.200)	(0.202)	(0.036)
Turnover in EUR mln							
1 to 7	-0.325**	-0.320**		-0.364**	-0.312**	-0.296**	-0.055**
	(0.149)	(0.148)		(0.145)	(0.146)	(0.147)	(0.025)
7 to 34	-1.085***	-1.087***		-1.178***	-1.001***	-1.044***	-0.209***
	(0.208)	(0.208)		(0.200)	(0.203)	(0.205)	(0.042)
> 34	-1.556***	-1.557***		-1.613***	-1.505***	-1.512***	-0.314***
	(0.308)	(0.306)		(0.302)	(0.295)	(0.304)	(0.067)
Sector							
Manufacturing	0.195	0.181	-0.006		-0.114	0.180	0.037
	(0.214)	(0.213)	(0.205)		(0.201)	(0.213)	(0.039)
Retail	-1.161***	-1.161***	-1.272***		-1.433***	-1.164***	-0.255***
	(0.243)	(0.242)	(0.237)		(0.234)	(0.242)	(0.055)
Hospitality	0.619***	0.621***	0.637***		0.733***	0.619***	0.108***
	(0.157)	(0.155)	(0.154)		(0.151)	(0.156)	(0.026)
Production decling							
1 - 20%	-0.269	-0.262	-0.258	-0.298		-0.253	-0.047
	(0.395)	(0.395)	(0.381)	(0.386)		(0.392)	(0.068)
21 - 40%	-0.963***	-0.966***	-0.687**	-1.017***		-0.931***	-0.189***
	(0.352)	(0.353)	(0.335)	(0.341)		(0.349)	(0.063)
41 - 60%	-1.088***	-1.094***	-0.703**	-1.114***		-1.064***	-0.216***
	(0.359)	(0.359)	(0.339)	(0.346)		(0.356)	(0.065)
61 - 80%	-0.270	-0.275	0.032	-0.242		-0.270	-0.047
	(0.343)	(0.344)	(0.325)	(0.330)		(0.341)	(0.058)
81 - 100%	0.062	0.059	0.380	0.292		0.076	0.010
	(0.328)	(0.328)	(0.310)	(0.313)		(0.324)	(0.054)
Calendar week							
6	-0.363	-0.357	-0.218	-0.361	-0.319		-0.067
	(0.230)	(0.230)	(0.225)	(0.225)	(0.225)		(0.044)
7	0.171	0.169	0.157	0.185	0.140		0.029
	(0.168)	(0.168)	(0.164)	(0.165)	(0.164)		(0.028)
8	-0.016	-0.011	0.156	-0.007	-0.020		-0.003
	(0.191)	(0.190)	(0.187)	(0.185)	(0.186)		(0.033)
9	0.039	0.049	0.245	0.074	0.061		0.007
	(0.470)	(0.471)	(0.458)	(0.460)	(0.463)		(0.081)
Observations	1,370	1,370	1,370	1,370	1,370	1,370	
Log-likelihood	-722.9	-723.3	-744.4	-748.6	-744.5	-725.1	
LR-test p-value		.8248	0	0	0	.3611	
Pseudo R^2	.1225	.1219	.0964	.0913	.0963	.1198	

Notes: Logit models with dependent variable capturing the application status for November-December aid: 0=pending and 1=approved. ll=log-likelihood, LR-test=Likelihood-ratio test, standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Base categories: North, < EUR 1 mln , other sectors, no production decline and week 5. LR-test compares the log-likelihood values between the baseline specification (1) and the corresponding specification ranging from column (2) to (6). Average marginal effects refer to the estimates obtained from specification (1). *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

the average marginal effects of the baseline specification. In order to test whether a firm characteristic has an impact on the approval decision, we use a specification for each indicator excluding the corresponding categorical covariates. We test the impact of the explanatory variables on the application status by means of a likelihood-ratio test (LR-test). We thereby compare the likelihood values between the baseline specification in column (1) and the corresponding *restricted* specification. The degrees of freedom are determined by the number of omitted regressors in the restricted specification.

Given the p-values of the LR-tests, we find that the annual turnover, sector and production decline of the firm have a significant influence on the application status. By contrast, we do not find any impact either of the firm's location or of the date of the survey. In general, the estimates confirm the insight from the descriptive statistics that smaller entities and firms from the hospitality sector are more likely to have their application approved.

To sum up the findings of this analysis, several firm characteristics do play a role in the approval process, and, thus, have to be included as covariates - particularly those which have a significant explanatory influence on application status, namely size, sector and the magnitude of the firm's production decline. This is also important because these covariates may not only affect the decision, but they may also be correlated with the outcome variables. It is therefore crucial to isolate the treatment effect when assessing the impact of *November-December* aid transfer. Otherwise, the treatment effect might be biased through covariates affecting the treatment status and outcomes simultaneously.

4.3   Estimation strategy

After detecting the factors affecting application status, one can now turn to the final effect estimation assessing the impact of *November-December* aid on the financial situation of firms. In the regression we refer to an OLS set up. Given that the outcome variables of interest described above are of a categorical nature, the dependent variable, out_i, for firm i is binary in each estimation. In an OLS estimation, this implies that the estimations are classified as a linear probability model in which the coefficients of the treatment variable, $status_i$, and of the vector of covariates, $\mathbf{x}_i$, can be interpreted as an impact on the probability of achieving the measured outcome. The treatment status, $status_i$, is captured by a dummy variable taking the value of one for an approved application, and zero for pending applications.

$$out_i \;\; = \;\; \beta_1 status_i + \mathbf{x}_i'\gamma + u_i$$

In contrast to binary response models such as logit and probit regressions, the linear probabilistic model comes at the cost of potentially predicting probabilities outside the range between 0% and 100%. However, the model offers the benefit of a straightforward interpretation without having to report average marginal effects in an additional table.[8]

Each analysis is conducted by means of four different regressions. The first contains the OLS estimates with the treatment variable being the only regressor, followed by OLS regressions including the control variables. The set of covariates comprises region, turnover,

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[8]In addition, we have implemented each regression by means of probit regression, which can be made available upon request.
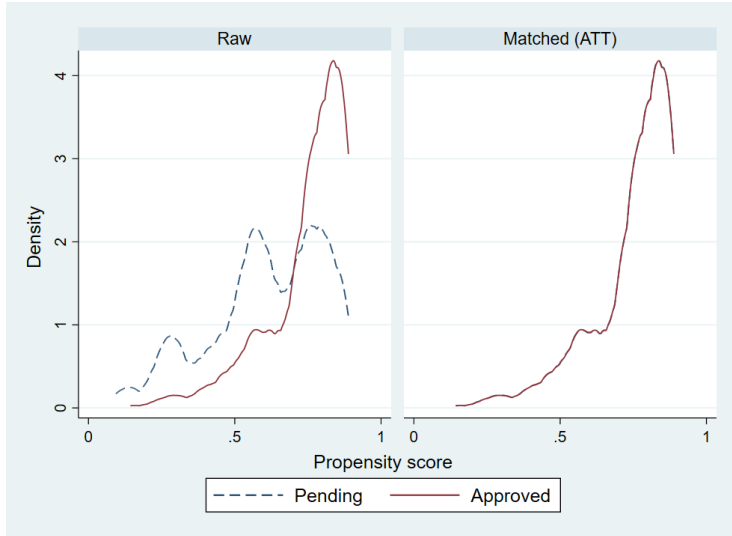
Figure 1: Propensity score kernel distributions
Source: Bundesbank Online Panel-Firms (BOP-F), February-March 2021. Own calculations.

sector and production decline of the firms. The third and fourth regression account for the fact that the treatment variable is subject to the impact of several covariates. In a simple OLS framework, the treatment effect might be biased if a covariate affects both, the treatment and the outcome simultaneously. Thus, we apply two methods in order to isolate the treatment effect on the outcome variables, namely propensity score matching (PSM) and entropy balancing (EBL).

A matching estimation generally has three steps (Heckman, Ichimura, and Todd, 1998). First, we run a logit regression on the application status based on a set of covariates. This set comprises the covariates identified as having an impact on the application status shown in table 4, namely size, sector and production decline. Based on the estimates of the logit regression, we calculate probabilities for each observation to be treated or not. These probabilities are the basis for the second step of propensity score matching. We apply an Epanechnikov kernel weighting function. For each observation in the treatment group, the kernel matching can identify multiple observations for the control group, which receive weights capturing whether these observations are good *matches*. For each treatment observation, the set of control observations is defined by a bandwidth reflecting the distance around the probability estimate of the corresponding treatment observation. Observations of the control group close to the probability estimate of the treatment observation receive a higher weight. By contrast, those control observations outside the bandwidth are weighted by a value of zero. Finally, the weights for the observations of the control group are accumulated, whereas the weights for the treatment group take the value of 1. In the third step, we run regressions on the outcome variables based on the weights obtained from the kernel matching.

Observations are matched on sector, turnover and production decline. Avoiding too many control variables improves matching quality. For the regression samples, we report the distribution of the propensity score with respect to the outcome of the application. Figure 1 displays the matching based on the baseline sample, with the left panel reflecting the *raw* (unmatched) distribution, and the right panel covering the distribution based on

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the weights obtained from the propensity score matching. The distributions based on the *restricted* and *weighted* samples are presented in figures A1 and A2 of the appendix. The distribution of the firms with an approved application is given by the red line, while the blue line represents the distribution of the firms with a pending application. The common support assumption is valid, in the sense that there is sufficient overlap so that no observations are dropped in the estimation of treatment effects. Furthermore, the propensity score distributions of the matched samples show that the method achieves a good balance, for the raw sample and weighted sample. Figure A1 and A2 also illustrate that using a pre-trimming or pre-weighting procedure results in a more similar propensity score distribution.

The good balance between both groups is confirmed by table A5, which presents the summary statistics of the treatment group and the control group before and after the matching procedure. For each covariate, the propensity score matching yields standardized bias with a magnitude lower than 5, which is considered a threshold for efficient matching (see Caliendo and Kopeinig, 2008). As shown in table A7, this also holds for the weighted sample. However, the summary statistics for the restricted sample in table A6 show that the standardized bias exceeds the threshold for several covariates. Thus, the results of the propensity score matching based on the restricted sample should be interpreted with caution.

In *entropy balancing*, weights are assigned to achieve similar values between the covariates in the control group and the treatment group (see Hainmüller, 2012). The idea of minimizing the influence of control variables is very similar to a matching strategy. Conditional on a set of characteristics, the aim is to create similar treatment and control groups with respect to covariates explaining the application status. To achieve this goal, a weighting procedure is used, which assigns non-negative weights to observations of the control group in such a way that distributions of the covariates are similar between the treatment and the control group. In this way, it is possible to achieve similarities for higher moments, such as the variance or the skewness. Since our explanatory variables are exclusively of a binary nature, it is sufficient to focus on the first moment, the mean. Compared to matching, entropy balancing is more direct because weights are assigned directly. The standardized biases presented in tables A5 to A7 show that entropy balancing leads to a better balance of the covariates than the propensity score matching.

5 Results

In this section we report the results of the regressions described in the previous section. In the first part, we focus on the impact of approved applications for *November-December* aid on firms' liquidity reserves and employment expectations. The corresponding output is presented in table 5 for the baseline sample, and in tables A8 and A9 of the appendix for the restricted and weighted samples, respectively. Each table reports the coefficients estimates for the treatment dummy, the approval of the application for *November-December* aid. As described above, each analysis contains four different regressions, namely an OLS regression with the treatment variable being the only regressor, an OLS regression enriched by control variables, propensity score matching, and entropy balancing. The set of covariates comprises region, turnover, sector and production decline of the firms. The results on deferrals of investment as a liquidity source are reported in tables 6, A10 and

A11. The regression output related to credit negotiations is reported in tables 7 and 8 as well as in tables A12, A13, A14 and A15 of the appendix.

Table 5: Effect of *November-December* aid on liquidity and employment - Baseline sample

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Liquidity reserves in months					Employment expectation		
	≤ 1	≤ 2	≤ 6	≤ 12	Sufficient	Decrease	Same	Increase
OLS - no controls								
Approval	-0.0265	-0.00195	0.0304	0.0103	-0.0103	-0.0464	0.0355	0.0109
	(0.0198)	(0.0296)	(0.0260)	(0.0171)	(0.0171)	(0.0285)	(0.0249)	(0.0198)
R-squared	0.001	0.000	0.001	0.000	0.000	0.002	0.001	0.000
OLS								
Approval	-0.0479**	-0.0496*	-0.0263	-0.0270	0.0270	-0.0488	0.0380	0.0108
	(0.0206)	(0.0299)	(0.0262)	(0.0172)	(0.0172)	(0.0302)	(0.0273)	(0.0218)
R-squared	0.042	0.082	0.158	0.209	0.209	0.059	0.035	0.024
PSM								
Approval	-0.0622**	-0.0441	-0.0145	-0.0050	0.0050	-0.0509	0.0402	0.0107
	(0.0296)	(0.0385)	(0.0289)	(0.0185)	(0.0185)	(0.0354)	(0.0305)	(0.0243)
EBL								
Approval	-0.0594**	-0.0416	-0.0112	-0.00826	0.00826	-0.0383	0.0332	0.00510
	(0.0286)	(0.0374)	(0.0286)	(0.0181)	(0.0181)	(0.0349)	(0.0303)	(0.0242)
R-squared	0.008	0.002	0.000	0.000	0.000	0.002	0.002	0.000
Observations	1,327	1,327	1,327	1,327	1,327	1,351	1,351	1,351

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

November-December aid and liquidity reserves

The left part of table 5 shows the estimation results for the impact of *November-December* aid transfer on liquidity reserves for the baseline sample. The dependent variable for column (1) is binary, capturing whether a firm possesses liquidity reserves for a period of up to one month. Column (2) for a period of up to 2 months, column (3) for a period of up to 6 months, column (4) for a period of up to 12 months. Column (5) captures whether a firm possesses sufficient liquidity. This can be regarded as the opposite event to column (4). Thus, the results in columns (4) and (5) contain estimates of the same magnitude but with a different sign.

As shown in the upper part of table 5, the OLS regressions with the treatment variable as the only regressor contain only insignificant estimates for each specification for liquidity reserves. This finding slightly differs when using the restricted sample (see table A8) or the weighted sample (see table A9). In these regressions, the estimates suggest that an approval raises the likelihood of possessing liquidity reserves of up to six (twelve) months by about 7 (4) percentage points.

When focusing on the outcome that a firm possesses liquidity reserves for a period up to one month in column (1), the OLS coefficient is significantly different from zero at the 5% level when including control variables with a magnitude of -0.048. Using propensity score matching and entropy balancing leads to slightly higher coefficients, with a magnitude of -0.062 and -0.058, respectively. This means that an approval of aid leads to a 5 to

6 percentage point lower probability of having very low liquid means vanishing within one month. These figures are confirmed by the regressions based on the restricted and weighted sample, respectively.

Column (2) of table 5 reports the impact of the approved aid on liquidity reserves, which are expected to last for a period of up to two months. In comparison to column (1), these estimates are smaller and predominantly insignificant. The same holds for results on bigger liquidity reserves reported in columns (3) to (5). For each sample and regression model, the estimates are insignificant. These findings suggest that an approval of the application for *November-December* aid improves the financial situation of those firms that were facing liquidity shortages in the short run.

November-December aid and employment expectations

The right part of table 5 contains estimates for the impact of the approval of *November-December* aid on employment expectations. The specification in column (6) provides estimates for the impact of the *November-December* aid on the probability of a firm expecting its employment figures to decline over the subsequent six months. Column (7) shows the estimates for the outcome that a firm expects to have a stable number of employees, whereas column (8) provides the output obtained from regressions on the expectations of rising employment figures.

Based on the results for the baseline sample in columns (6) to (8) of table 5, there is not any evidence that approval of an application for *November-December* aid affects employment expectations over the subsequent six months. For each regression approach and specification, the estimates are insignificant. This finding holds when considering the results based on the restricted sample reported in table A8 or on the weighted sample in table A9, respectively. Thus, we may conclude that employment prospects are not affected by the provision of *November-December* aid.

November-December aid and investment decisions

The results above show that the provision of *November-December* aid leads to an improvement of liquidity reserves, while the impact on the employment prospects of firms is negligible. However, other decisions might also be affected by solvency-enhancing support measures. In this context, we focus on the question whether the provision of *November-December* aid affects firms' potential investment. This topic is captured by the survey question on the importance of a deferral of investments to maintain sufficient liquidity during the pandemic. We make use of this question by using each answering option as a dependent variable in the regressions reported in table 6 as well as in tables A10 and A11 of the appendix.

The results based on the baseline sample in table 6 show that *November-December* aid transfers may have an impact on firms' assessment concerning the importance of investment deferrals as a source of liquidity. Particularly, the estimates of the more robust weighting approaches, propensity score matching and entropy balancing, suggest that approval of an application leads to a higher probability of investment deferrals being completely unimportant as a source for liquidity with a magnitude of 2 to 3 percentage points. This holds for the results based on the weighted sample presented in table A11.

Table 6: Effect of *November-December* aid on the importance of investment deferral as a liquidity sources - Baseline sample

Dependent variable	Deferral of investments				
	Completely unimportant (1)	Unimportant (2)	Neither nor (3)	Important (4)	Very important (5)
OLS - no controls					
Approval	0.0090	-0.0008	0.0037	0.017	-0.028
	(0.013)	(0.015)	(0.020)	(0.029)	(0.031)
R-squared	0.000	0.000	0.000	0.000	0.001
OLS					
Approval	0.0184	0.0048	0.0170	0.0183	-0.0585*
	(0.0132)	(0.0162)	(0.0228)	(0.0315)	(0.0323)
R-squared	0.034	0.060	0.011	0.024	0.046
PSM					
Approval	0.260**	0.0943	0.059	-0.0006	-0.0407
	(0.0121)	(0.0166)	(0.0269)	(0.0385)	(0.0396)
EBL					
Approval	0.0245**	0.0122	0.0061	0.0063	-0.0491
	(0.0118)	(0.0160)	(0.0258)	(0.0373)	(0.0387)
R-squared	0.004	0.001	0.000	0.000	0.002
Observations	1,275	1,275	1,275	1,275	1,275

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table 7: Effect of *November-December* aid on credit negotiations and results - Baseline sample

Dependent	Negotiation		Result			
variable	General	Due to COVID-19	Approved	Worse	Pending	No result
	(1)	(2)	(3)	(4)	(5)	(6)
OLS - no controls						
Approval	-0.107***	-0.0743***	0.144***	0.0185	-0.108**	-0.00132
	(0.0289)	(0.0280)	(0.0490)	(0.0422)	(0.0439)	(0.0460)
R-squared	0.010	0.005	0.020	0.000	0.017	0.000
OLS						
Approval	-0.0795***	-0.0695**	0.141**	0.0430	-0.0814*	-0.0437
	(0.0305)	(0.0296)	(0.0555)	(0.0474)	(0.0466)	(0.0508)
R-squared	0.043	0.040	0.055	0.029	0.044	0.044
PSM						
Approval	-0.0800**	-0.0735**	0.180***	-0.0162	-0.0671	-0.0283
	(0.0365)	(0.0359)	(0.0572)	(0.0587)	(0.0544)	(0.0614)
EBL						
Approval	-0.0796**	-0.0749**	0.163***	0.00175	-0.0570	-0.0452
	(0.0358)	(0.0353)	(0.0564)	(0.0564)	(0.0515)	(0.0611)
R-squared	0.007	0.006	0.029	0.000	0.005	0.003
Observations	1,370	1,370	410	410	410	410

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

The results based on the restricted sample reported in table A10 differ slightly. The estimates based on the propensity score matching are similar. For entropy balancing, the estimate for the impact of the provision of *November-December* on deferrals of investment as a liquidity source is not really clear. The transfer has a positive impact on the consideration of investment deferrals as an important liquidity source, while the effect on their categorization as a very important source is significantly negative. However, our analysis provides some indication that the provision of *November-December* aid has a positive effect on the investment prospects of firms.

November-December aid and credit demand

Firms might substitute outstanding transfers with bank loans in order to maintain their business activities in financial distress. To test this hypothesis, we check whether the treatment has an impact on the likelihood of starting negotiations for a bank loan. Here, table 7 contains a distinction. In column (1), we focus on the question of whether firms generally applied for bank credit, while column (2) captures the credit demand induced by the COVID-19 pandemic.

For the baseline sample reported in table 7, column (1) shows that firms with an approved application have an 8 percentage point lower probability of commencing credit negotiations. This result is robust across the estimation methods and sample compositions. The effect is even more pronounced when referring either to the *restricted* or to the *weighted* sample. In these regressions, reported in tables A12 and A13 of the appendix, approval of an application for *November-December* aid transfers leads to a lower probability of starting negotiations for a bank loan with a magnitude of about 10 percentage points. Turning to credit negotiations due to the pandemic reported in column (2), we find fairly similar effects as for general credit negotiations. The coefficient estimates are slightly smaller, suggesting an impact of 6 to 8 percentage points. This similarity with respect to the motive behind the credit application finding is not surprising as most of the credit negotiations of firms, which had applied for *November-December* aid were triggered by the pandemic.

November-December aid and credit supply

The outcome of credit negotiations is reported in columns (3) to (6) of table 7. In column (3), the dependent variable takes the value of one if the credit was approved at the desired conditions, and zero otherwise. Column (4) assesses whether the outcome of the credit negotiations was characterized by a lower volume or worse credit conditions, e.g. higher interest rates or securities. Column (5) contains the estimates for the question of whether the decision on the credit application was still pending at the date of the interview, while column (6) reports estimates for the probability of the credit negotiations ended in an agreement.

For the baseline sample in table 7, we find that the approval of a *November-December* aid application raises the probability for obtaining a loan at the desired conditions by 14 to 18 percentage points. For the OLS regression including control variables, the coefficient estimate is significant at the 5% level, while we obtain a significance level of 1% for the estimates based on OLS regression without control variables, propensity score matching, and entropy balancing, respectively. This finding is confirmed when using the weighted sample reported in tables A13 of the appendix. For the restricted sample reported in table A12, the impact is significant when using both propensity score matching or entropy balancing, respectively. As already discussed above, the statistics on the matching efficiency of the restricted sample reported in table A6 suggest that the results of the restricted sample should be interpreted with caution. Hence, we may conclude that the provision of *November-December* aid raises the possibility of obtaining a bank loan at desired conditions.

The impact on the likelihood of a pending decision on a credit application is less robust. In the baseline sample, the OLS specifications report that the provision of the support scheme reduces the probability of a pending result of a credit application by 8 to 11 percentage points. However, propensity score matching and entropy balancing report an insignificant impact. The impact of treatment on the probability of obtaining a loan at worse conditions is insignificant. The same holds for the estimates for the likelihood of credit negotiations ending without an agreement. These results are predominantly confirmed when using the *weighted* sample presented in table A13 of the appendix.

In sum, we may conclude that the provision of *November-December* aid clearly reduces

Table 8: Effect of *November-December* aid on reasons for absence of credit negotiations - Baseline sample

Dependent variable	Reasons for no credit negotiations		
	No prospect of success	No need	No longer required
	(1)	(2)	(3)
OLS - no controls			
Approval	-0.0377	0.0358	0.0148
	(0.0318)	(0.0361)	(0.0265)
R-squared	0.002	0.001	0.000
OLS			
Approval	-0.0612*	0.0590	0.0100
	(0.0333)	(0.0382)	(0.0297)
R-squared	0.042	0.053	0.034
PSM			
Approval	-0.0704	0.0821*	-0.0061
	(0.0445)	(0.0482)	(0.0347)
EBL			
Approval	-0.0694	0.0762	-0.0024
	(0.0423)	(0.0463)	(0.0344)
R-squared	0.007	0.006	0.000
Observations	895	895	895

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

the need for bank loans, while improving access to bank loans.

November-December aid and reasons for absence of credit negotiations

Further, firms were asked about their motives if they had not initiated negociations for a bank loan. In the survey, firms could choose between three options: 'no prospect of success', 'no need' and 'no longer required'. The results assessing the impact of the provision of *November-December* aid on the motive for not starting negotiations for a bank loan are reported in table 8 as well as tables A14 and A15 of the appendix.

For the baseline sample in table 8, the estimates show that an approved aid application hardly explains the motive for a firm choosing not to apply for a bank loan. There are only two estimates which are slightly significant at a 10% level. The first is obtained by means of the OLS regression including control variables. The estimate suggests that the transfer reduces the likelihood of limited prospects of success by 6 percentage points. Propensity

score matching shows that the transfer raises the likelihood of firm not needing a loan by 8 percentage points. For entropy balancing, the impact is insignificant.

These results are confirmed by the regressions based on the restricted sample in table A14 and on the weighted sample in table A14. Thus, the analysis hardly provides any evidence on the motive for a firm choosing not to apply for a bank loan.

Furthermore, the estimated and predicted probability of approval for treated and control observation is very similar, which means that pending applications have a similar likelihood of approval compared to processed applications depending on observed characteristics.

If this were not the case, it would mean that there is a selection process biasing estimates.

6   Conclusion

This paper investigates whether the exceptional economic stabilizer did have an effect on firm liquidity, employment expectations, investment prospects and credit negotiations and outcomes. We thereby compare the outcome of those firms that were already able to make use of *November-December* aid transfers with that of firms that were still waiting for a decision on their application for the transfer scheme. In the analysis, we define the treatment and control groups in three different ways. First, we compare approved and pending applications. The other two approaches account for potential rejections of pending applications. The regressions are based on two standard approaches to identifying treatment effects, namely propensity score matching and entropy balancing.

Across all treatment definitions, the results suggest that firms benefited from transfers from the *November-December* aid program. Firms that were able to use the transfer at the time of the interview reported improved liquidity and a lower need for credit financing. Thus, this transfer scheme may be considered a substitute for bank financing of SMEs, which in turn dampens the indebtedness of firms operating in sectors that were heavily affected in the wake of the COVID-19 pandemic. Furthermore, our estimation results show that the outcome of credit negotiations was positively affected by the transfer program. This finding suggests that firms also benefitted from improved creditworthiness and better access to credit financing. Hence, the transfer program also helped to reduce the likelihood of more restrictive credit conditions that could have led to an even more severe situation for the firms under distress, or even a credit crunch.

Although the analysis accounts for differences in observable characteristics between the treatment and control group, we cannot completely rule out the chance of a bias induced by unobservable characteristics. To address this, we checked whether the treatment variable, the provision of the transfer, was affected by the previous development of the firms' disposable liquidity, which could be interpreted as an indication of potential endogeneity problems. The results do not provide any evidence for such endogeneity.[9]

Moreover, we are aware that survey data may be exposed to potential caveats in empirical analyses.

First, the sample size, with around 2,300 firms that had applied for *November-December* aid, should be taken into consideration, when interpreting the results. To increase the

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[9]These results can be made available upon request.

sample size and improve our observational approach, we considered making use of the panel structure of the survey. This, however, would come at the cost of a further reduction of the sample size due to the non-response of firms in previous survey rounds. As discussed earlier, we therefore only used the weak panel structure to test for endogeneity. Furthermore, to account for uncertainty regarding pending applications and potential selection bias, we defined three different samples to derive a robust analysis.

Second, the survey contains self-assessed responses. Thus, we cannot verify the actual outcome of information stemming from the survey. However, the survey includes a question on the firms' consent to match the survey data with administrative information such as balance sheet information. This consent was given by about 80% of participating entities. Since balance sheet data become available with a large time lag, such an investigation has not been possible so far, but is planned for future research. In such a setting, we may investigate whether the provision of the transfers may have an impact on the survival prospects as well as on the financial situation of firms.

Our findings are in line with the outcome of other studies on the effectiveness of public transfer schemes for the corporate sector in times of the COVID-19 pandemic. In line with Block et al. (2021), we find that the transfer scheme improved the financial situation of those entities suffering most from pandemic-related restrictions. Hence, we may conclude that the support scheme helped to avoid closures of firms with a solid foundation which were temporarily suffering from a severe decline in revenue. This is also reflected by the low amount of insolvencies and relatively low unemployment rate recorded in Germany since the onset of the pandemic. However, the distribution of public funds remains a challenging issue for policy makers, particularly regarding the risk of rescuing inefficient firms through government support.

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A   Appendix

We report descriptive statistics for firm characteristics and the outcome variables of interest with respect to the outcome of the *November-December* aid program. As described in the empirical strategy below, we consider firms with an approved application as the treatment group, while firms whose approval was pending may be considered as the control group. Hence, tables A3 and A4 provide summary statistics for firm characteristics and outcome variables for treated and control firms separately. The third category, rejected applications, is reported as well. As all variables are binary, reported values represent the share of firms within the corresponding group.

Table A1: Logit regression on the application status of *November-December aid*
Approved vs. pending - Restricted sample

Dep. var. Approval	(1) baseline	(2) ex region	(3) ex turnover	(4) ex sector	(5) ex prod	(6) ex week	(7) avg. ME
Region							
East	-0.182		-0.123	0.079	-0.052	-0.182	-0.026
	(0.265)		(0.258)	(0.248)	(0.241)	(0.264)	(0.037)
South	0.004		-0.081	0.381*	0.121	0.000	0.001
	(0.231)		(0.223)	(0.215)	(0.209)	(0.230)	(0.032)
West	0.013		-0.116	0.192	0.070	0.023	0.002
	(0.251)		(0.243)	(0.235)	(0.230)	(0.250)	(0.034)
Turnover in EUR mln							
1 to 7	-0.342**	-0.331*		-0.408**	-0.361**	-0.330*	-0.047*
	(0.175)	(0.174)		(0.165)	(0.158)	(0.172)	(0.024)
7 to 34	-1.673***	-1.658***		-1.755***	-1.501***	-1.646***	-0.275***
	(0.259)	(0.259)		(0.242)	(0.239)	(0.257)	(0.045)
> 34	-2.528***	-2.494***		-2.575***	-2.656***	-2.477***	-0.431***
	(0.506)	(0.503)		(0.479)	(0.455)	(0.501)	(0.085)
Sector							
Manufacturing	-0.426	-0.412	-0.647**		-1.100***	-0.466	-0.078
	(0.311)	(0.309)	(0.296)		(0.269)	(0.309)	(0.059)
Retail	-2.404***	-2.384***	-2.419***		-2.898***	-2.382***	-0.437***
	(0.473)	(0.469)	(0.458)		(0.442)	(0.470)	(0.065)
Hospitality	1.130***	1.134***	1.121***		1.049***	1.129***	0.167***
	(0.175)	(0.173)	(0.169)		(0.158)	(0.174)	(0.025)
Production decline							
1 - 20%	-0.804	-0.796	-1.022	-1.364*		-0.867	-0.144
	(0.833)	(0.830)	(0.783)	(0.774)		(0.826)	(0.144)
21 - 40%	-0.651	-0.656	-0.525	-0.994*		-0.668	-0.119
	(0.597)	(0.596)	(0.553)	(0.541)		(0.590)	(0.112)
41 - 60%	-0.274	-0.278	-0.018	-0.561		-0.293	-0.052
	(0.571)	(0.570)	(0.530)	(0.514)		(0.566)	(0.111)
61 - 80%	1.676***	1.667***	1.817***	1.309***		1.621***	0.320***
	(0.539)	(0.537)	(0.493)	(0.480)		(0.531)	(0.103)
81 - 100%	2.103***	2.097***	2.175***	2.006***		2.061***	0.384***
	(0.523)	(0.522)	(0.477)	(0.466)		(0.516)	(0.101)
Calendar week							
6	-0.440	-0.441	-0.250	-0.467*	-0.286		-0.064
	(0.274)	(0.274)	(0.267)	(0.259)	(0.251)		(0.042)
7	0.094	0.094	0.089	0.068	0.121		0.013
	(0.205)	(0.205)	(0.197)	(0.195)	(0.187)		(0.028)
8	-0.054	-0.051	0.131	-0.035	0.054		-0.007
	(0.229)	(0.228)	(0.222)	(0.214)	(0.206)		(0.032)
9	0.248	0.254	0.541	0.314	0.161		0.033
	(0.531)	(0.530)	(0.520)	(0.517)	(0.495)		(0.068)
Observations	1,172	1,172	1,172	1,172	1,172	1,172	1,172
Log-likelihood	-510.3	-510.8	-541.8	-564.2	-594.3	-512.1	.
LR-test p-value		.8407	0	0	0	.4772	

Notes: Logit models with dependent variable capturing the application status for November-December aid: 0=pending and 1=approved. ll=log-likelihood, LR-test=Likelihood ratio test, standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Base categories: North, < EUR 1 mln, other sectors, no production decline and week 5. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A2: Logit regression on the application status of *November-December aid*
Approved vs. pending - Weighted sample

Dep. var. Approval	(1) baseline	(2) ex region	(3) ex turnover	(4) ex sector	(5) ex prod	(6) ex week	(7) avg. ME
Region							
East	-0.144		-0.098	0.032	-0.079	-0.145	-0.024
	(0.230)		(0.224)	(0.223)	(0.225)	(0.230)	(0.037)
South	-0.028		-0.100	0.285	0.058	-0.035	-0.005
	(0.195)		(0.192)	(0.189)	(0.196)	(0.194)	(0.031)
West	-0.053		-0.141	0.150	-0.015	-0.049	-0.009
	(0.214)		(0.210)	(0.209)	(0.215)	(0.213)	(0.034)
Turnover in EUR mln							
1 to 7	-0.308**	-0.301**		-0.344**	-0.329**	-0.290*	-0.051**
	(0.153)	(0.153)		(0.149)	(0.149)	(0.151)	(0.025)
7 to 34	-1.426***	-1.420***		-1.530***	-1.324***	-1.401***	-0.262***
	(0.233)	(0.233)		(0.219)	(0.222)	(0.230)	(0.045)
> 34	-1.979***	-1.964***		-2.046***	-2.137***	-1.932***	-0.369***
	(0.362)	(0.359)		(0.358)	(0.336)	(0.355)	(0.067)
Sector							
Manufacturing	0.010	0.011	-0.200		-0.611***	-0.011	0.002
	(0.224)	(0.223)	(0.214)		(0.218)	(0.222)	(0.044)
Retail	-1.902***	-1.897***	-1.962***		-2.317***	-1.891***	-0.373***
	(0.276)	(0.274)	(0.261)		(0.267)	(0.274)	(0.045)
Hospitality	0.924***	0.924***	0.936***		1.103***	0.926***	0.164***
	(0.159)	(0.158)	(0.156)		(0.153)	(0.158)	(0.028)
Production decline							
1 - 20%	-0.212	-0.220	-0.298	-0.492		-0.219	-0.045
	(0.438)	(0.437)	(0.392)	(0.415)		(0.434)	(0.092)
21 - 40%	-0.961**	-0.969**	-0.732**	-1.085***		-0.946**	-0.200**
	(0.378)	(0.377)	(0.343)	(0.355)		(0.374)	(0.078)
41 - 60%	-0.677*	-0.689*	-0.306	-0.772**		-0.662*	-0.143*
	(0.385)	(0.384)	(0.346)	(0.359)		(0.381)	(0.080)
61 - 80%	0.491	0.478	0.754**	0.512		0.479	0.099
	(0.370)	(0.369)	(0.333)	(0.338)		(0.366)	(0.077)
81 - 100%	1.067***	1.057***	1.311***	1.330***		1.069***	0.200***
	(0.353)	(0.352)	(0.317)	(0.321)		(0.348)	(0.073)
Calendar week							
6	-0.319	-0.318	-0.154	-0.333	-0.233		-0.054
	(0.235)	(0.235)	(0.235)	(0.228)	(0.227)		(0.040)
7	0.156	0.156	0.153	0.153	0.146		0.025
	(0.185)	(0.185)	(0.177)	(0.178)	(0.179)		(0.029)
8	-0.007	-0.004	0.171	0.009	0.061		-0.001
	(0.195)	(0.194)	(0.195)	(0.188)	(0.188)		(0.032)
9	0.085	0.088	0.337	0.124	0.136		0.014
	(0.427)	(0.429)	(0.435)	(0.462)	(0.421)		(0.068)
Observations	1,370	1,370	1,370	1,370	1,370	1,370	1,370
Log-likelihood	-541.0	-541.2	-565.8	-579.9	-586.1	-542.3	.
LR-test p-value		.9435	0	0	0	.6166	

Notes: Logit models with dependent variable capturing the application status for November-December aid:
0=pending and 1=approved. ll=log-likelihood, LR-test=Likelihood ratio test, standard errors in parentheses,
*** p<0.01, ** p<0.05, * p<0.1. Base categories: North, < EUR 1 mln , other sectors, no production decline
and week 5. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A3: Control variables by application status in %

| | | | November aid | | |
		Pending	Approved	Rejected	Total
Region					
	North	19.1	16.3	17.2	17.2
	East	17.6	18.2	19.1	18.5
	South	37.5	43.2	42.1	41.8
	West	25.7	22.3	21.5	22.6
Annual turnover in EUR mln in 2019					
	Up to 1	32.5	47.6	32.2	38.9
	1 to 7	39.6	41.1	38.5	39.8
	7 to 34	18.9	8.8	19.2	14.7
	> 34	9.1	2.5	10.0	6.6
Sector					
	Manufacturing	14.4	9.1	23.3	15.9
	Retail	17.4	3.4	22.2	13.3
	Hospitality	21.9	44.4	6.3	25.4
	Others	46.3	43.0	47.6	45.4
Production decline between December 2019 and December 2020					
	No decline	4.8	4.1	14.1	8.15
	1 to 20 %	7.1	4.5	17.2	10.0
	21 to 40 %	18.7	7.8	30.1	18.5
	41 to 60 %	17.2	7.3	16.6	12.7
	61 to 80 %	17.9	16.9	11.5	15.0
	81 to 100 %	34.3	59.3	10.6	35.8
Calendar week of survey					
	5	52.6	50.2	55.9	52.9
	6	10.1	8.0	6.8	7.9
	7	20.7	22.3	22.2	22.0
	8	14.9	17.1	13.2	15.2
	9	1.8	2.4	2.0	2.1
	N	396	974	888	2,258

Source: Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A4: Outcome variables by treatment status

		Pending	Approved	Rejected	Total	Std. Bias
Liquidity reserves						
	Up to 1 month	12.9	10.4	13.1	11.9	25.9
	Up to 2 month*	38.2	38.5	36.5	37.7	0.8
	Up to 6 month*	74.8	77.8	68.4	73.6	-16.9
	Up to 12 month*	91.0	92.0	85.2	89.1	-13.3
	generally sufficient	9.0	8.0	14.8	10.9	13.3
	N	380	947	879	2,206	
Employment expectation	Decrease	66.6	61.5	59.6	61.6	20.4
	No change	21.3	25.4	22.6	23.6	-21.2
	Increase	12.1	13.1	17.8	14.8	-8.5
	N	394	957	899	2,250	
Deferrals of investment	Completely unimportant	4.3	5.3	4.3	4.7	-19.9
	Unimportant	6.7	6.5	6.7	6.7	1.2
	Neither nor	12.3	12.6	12.5	12.5	-3.4
	Important	32.7	34.3	33.2	33.6	-7.4
	Very important	44.0	41.1	43.3	42.5	11.6
	N	373	913	859	2,145	
Credit negotiations	General	42.1	31.2	39.3	36.3	45.2
	Due to COVID-19	35.5	27.8	32.3	30.9	32.4
	N	396	974	888	2,258	
Outcome of credit negotiations	Approved	35.3	45.8	24.3	34.4	-39.0
	Worse conditions	18.6	21.2	23.7	21.8	-14.8
	Pending	24.5	16.7	23.7	21.3	38.7
	No result	24.5	23.7	34.6	28.6	4.5
	N	140	270	286	698	
Reasons for absence of credit negotiations	No prospect of success	23.1	19.2	27.0	22.8	22.6
	No need	65.9	69.8	61.3	66.0	-16.4
	No longer required	13.4	14.8	17.8	15.7	-12.0
	N	229	676	551	1,456	

Source: Bundesbank Online Panel-Firms (BOP-F). Own calculations. *Std. Bias*: Standardized bias between group of pending and approved applications. Standardized bias captures $Std.Bias = 100 * (\mu_t - \mu_c)/(.5 + (\sigma_t^2 + \sigma_c^2))$, where μ_t and μ_c represent the mean values of the treatment and control group, while σ_t^2 and σ_c^2 are the corresponding variances. * - The respondents may choose only one category. However, we combine the answer options covering the period of the answer, e.g. option (3) 'up to six months' contains positive answers for option (1) 'up to one month', (2) 'up to two months, (3) 'up to six months'.

Table A5: Mean and standardized biases - Treatment and control group - Baseline sample

	Treatment group Mean (1)	Unmatched Mean (2)	Unmatched Std.Bias (3)	Propensity score Mean (4)	Propensity score Std.Bias (5)	E-balancing Mean (6)	E-balancing Std.Bias (7)
Annual turnover in EUR mln							
1 to 7	41.0	38.9	4.1	40.0	2.0	41.0	0.0
7 to 34	8.6	18.4	-29.2	9.0	-1.2	8.6	0.0
> 34	2.5	8.7	-26.9	2.4	0.6	2.5	0.0
Sector							
Manufacturing	9.2	14.2	-15.7	9.1	0.2	9.2	0.0
Retail	3.5	17.4	-46.6	4.1	-2.0	3.5	0.0
Hospitality	45.2	22.4	49.7	44.7	1.1	45.2	0.0
Production decline between Dec 2019 and Dec 2020 in %							
1-20	4.3	6.3	-8.8	4.9	-2.4	4.3	0.0
21-40	7.9	18.4	-31.4	6.9	2.9	7.9	0.0
41-60	7.4	17.1	-29.9	6.9	1.4	7.4	0.0
61-80	16.9	18.7	-4.7	17.8	2.4	16.9	0.0
81-100	59.9	34.5	52.6	60.1	0.4	59.9	0.0

Notes: Summary statistics for approved applications (treatment group) and pending applications (control group). Baseline categories: Turnover below EUR 1 mln , other sectors, and no production decline. Column (1) and (2) represent the unweighted mean values for both groups. Column (4) and (6) report the mean values of the reweighted control group after applying a Propensity score matching or entropy balancing, respectively. The corresponding standardized bias between the treatment and control group is defined as $Std.Bias = 100 * (\mu_t - \mu_c)/(.5 + (\sigma_t^2 + \sigma_c^2))$, where μ_t and μ_c represent the mean values of the treatment and control group, while σ_t^2 and σ_c^2 are the corresponding variances. The descriptive statistics are based on the analysis of the impact on liquidity reserves. Since this questions was not answered by all 1,380 firms with an approved or pending application, the descriptive statistics are based on 1,327 observations. *Source:* Bundesbank Online Panel-Firms (BOP-F monthly). Own calculations.

Table A6: Mean and standardized biases - Treatment and control group - Restricted sample

	Treatment group Mean	Control group					
		Unmatched		Propensity score		E-balancing	
	Mean	Mean	Std.Bias	Mean	Std.Bias	Mean	Std.Bias
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Annual turnover in EUR mln							
1 to 7	41.0	39.4	4.6	44.4	-6.5	41.0	0.1
7 to 34	8.6	17.1	-36.4	6.3	5.9	8.6	0.0
> 34	2.5	5.2	-19.4	1.5	4.3	2.6	0.0
Sector							
Manufacturing	9.2	5.2	15.5	5.2	14.8	9.2	
Retail	3.5	3.1	3.0	3.6	-0.5	3.5	0.0
Hospitality	45.2	43.0	4.4	56.8	-23.0	45.2	0.0
Production decline between Dec 2019 and Dec 2020 in %							
1-20	4.3	0.5	35.3	2.4	12.5	4.3	0.0
21-40	7.9	2.1	38.3	6.8	5.2	7.9	0.0
41-60	7.4	3.6	23.4	7.1	-0.6	7.4	0.0
61-80	16.9	24.9	-27.8	16.8	0.3	16.9	0.0
81-100	59.9	67.9	-23.6	61.7	-3.2	59.9	0.0

Notes: Summary statistics for approved applications (treatment group) and pending applications (control group). Baseline categories: Turnover below EUR 1 mln, other sectors, and no production decline. Column (1) and (2) represent the unweighted mean values for both groups. Column (4) and (6) report the mean values of the reweighted control group after applying propensity score matching or entropy balancing, respectively. The corresponding standardized bias between the treatment and control group is defined as $Std.Bias = 100 * (\mu_t - \mu_c)/(.5 + (\sigma_t^2 + \sigma_c^2))$, where μ_t and μ_c represent the mean values of the treatment and control group, while σ_t^2 and σ_c^2 are the corresponding variances. The descriptive statistics are based on the analysis of the impact on liquidity reserves. Since this questions was not answered by all 1,380 firms with an approved or pending application, the descriptive statistics are based on 1,327 observations. *Source:* Bundesbank Online Panel-Firms (BOP-F monthly). Own calculations.

Table A7: Mean and standardized biases - Treatment and control group - Weighted sample

	Treatment group Mean	Control group					
		Unmatched		Propensity score		E-balancing	
	Mean	Mean	Std.Bias	Mean	Std.Bias	Mean	Std.Bias
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Annual turnover in EUR mln							
1 to 7	41.0	39.0	5.8	41.3	0.9	41.0	0.0
7 to 34	8.6	18.4	-41.2	6.5	-0.3	8.6	0.0
> 34	2.5	8.7	-38.1	1.5	-0.7	2.5	0.0
Sector							
Manufacturing	9.2	14.2		4.6	1.5	9.2	
Retail	3.5	17.4	-65.9	1.4	-0.4	3.5	0.0
Hospitality	45.2	22.4	70.3	55.0	3.4	45.2	0.0
Production decline between Dec 2019 and Dec 2020 in %							
1-20	4.3	6.3	-12.5	1.6	1.8	4.3	0.0
21-40	7.9	18.4	-44.4	2.4	2.8	7.9	0.0
41-60	7.4	17.1	-42.3	5.2	-1.5	7.4	0.0
61-80	16.9	18.7	-6.6	15.1	2.4	16.9	0.0
81-100	59.9	34.5	74.3	74.5	-3.6	59.9	0.0

Notes: Summary statistics for approved applications (treatment group) and pending applications (control group). Baseline categories: Turnover below EUR 1 mln, other sectors, and no production decline. Column (1) and (2) represent the unweighted mean values for both groups. Column (4) and (6) report the mean values of the reweighted control group after applying propensity score matching or entropy balancing, respectively. The corresponding standardized bias between the treatment and control group is defined as $Std.Bias = 100 * (\mu_t - \mu_c)/(.5 + (\sigma_t^2 + \sigma_c^2))$, where μ_t and μ_c represent the mean values of the treatment and control group, while σ_t^2 and σ_c^2 are the corresponding variances. The descriptive statistics are based on the analysis of the impact on liquidity reserves. Since this questions was not answered by all 1,380 firms with an approved or pending application, the descriptive statistics are based on 1,327 observations. *Source:* Bundesbank Online Panel-Firms (BOP-F monthly). Own calculations.

Table A8: Effect of *November-December* aid on liquidity and employment - Restricted sample

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Liquidity reserves in months					Employment expectation		
	≤ 1	≤ 2	≤ 6	≤ 12	Sufficient	Decrease	Same	Increase
OLS - no controls								
Approval	-0.0426	0.0144	0.00316	-0.0222	0.0222	-0.0380	0.0467	-0.0087
	(0.0272)	(0.0382)	(0.0329)	(0.0189)	(0.0189)	(0.0373)	(0.0381)	(0.071)
R-squared	0.001	0.001	0.008	0.006	0.006	0.001	0.001	0.000
OLS								
Approval	-0.0570**	-0.0126	-0.0071	-0.0154	0.0154	-0.0386	0.0484	0.0098
	(0.0277)	(0.0377)	(0.0321)	(0.0190)	(0.0190)	(0.0378)	(0.0331)	(0.0274)
R-squared	0.040	0.074	0.123	0.155	0.155	0.043	0.032	0.020
PSM								
Approval	-0.0706**	-0.0511	-0.0216	-0.0007	0.0007	-0.0271	0.0188	0.00822
	(0.0345)	(0.0439)	(0.0319)	(0.0189)	(0.0189)	(0.0399)	(0.0339)	(0.0276)
EBL								
Approval	-0.0471	-0.0141	-0.0193	-0.0223	0.0223	-0.0202	0.0080	0.0121
	(0.0343)	(0.0477)	(0.0405)	(0.0346)	(0.0346)	(0.0485)	(0.0458)	(0.0300)
R-squared	0.011	0.002	0.000	0.000	0.000	0.003	0.004	0.000
Observations	1,140	1,140	1,140	1,140	1,140	1,155	1,155	1,155

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A9: Effect of *November-December* aid on liquidity and employment - Weighted sample

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Liquidity reserves in months					Employment expectation		
	≤ 1	≤ 2	≤ 6	≤ 12	Sufficient	Decrease	Same	Increase
OLS - no controls								
Approval	-0.0183	0.0224	0.0649**	0.0351**	-0.0351**	-0.0313	0.0294	0.00192
	(0.0204)	(0.0302)	(0.0257)	(0.0163)	(0.0163)	(0.0289)	(0.0253)	(0.0199)
R-squared	0.001	0.000	0.006	0.005	0.005	0.001	0.001	0.000
OLS								
Approval	-0.0531**	-0.0412	-0.0139	-0.0165	0.0165	-0.0471	0.0432	0.00386
	(0.0234)	(0.0326)	(0.0274)	(0.0169)	(0.0169)	(0.0324)	(0.0284)	(0.0236)
R-squared	0.041	0.077	0.135	0.184	0.184	0.047	0.031	0.019
PSM								
Approval	-0.0723**	-0.0380	-0.0013	0.0025	-0.0025	-0.0513	0.054	-0.0030
	(0.0360)	(0.0450)	(0.0321)	(0.0192)	(0.0192)	(0.0407)	(0.0335)	(0.0283)
EBL								
Approval	-0.0594**	-0.0416	-0.0112	-0.0083	0.0083	-0.0383	0.0332	0.0051
	(0.0286)	(0.0374)	(0.0286)	(0.0181)	(0.0181)	(0.0349)	(0.0303)	(0.0242)
R-squared	0.008	0.002	0.000	0.000	0.000	0.002	0.002	0.000
Observations	1,327	1,327	1,327	1,327	1,327	1,351	1,351	1,351

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A10: Effect of *November-December* aid on the importance of investment deferral as a liquidity sources - Restricted sample

Dependent variable	Deferral of investments				
	Completely unimportant (1)	Unimportant (2)	Neither nor (3)	Important (4)	Very important (5)
OLS - no controls					
Pending aid	0.0189	0.0167	0.0058	0.0350	-0.0764*
	(0.0152)	(0.0182)	(0.0267)	(0.0379)	(0.0406)
R-squared	0.000	0.001	0.000	0.000	0.000
OLS					
Pending aid	0.0140	0.0066	0.0013	0.0443	-0.0662
	(0.0148)	(0.0180)	(0.0273)	(0.0391)	(0.0419)
R-squared	0.030	0.049	0.009	0.022	0.043
PSM					
Pending aid	0.0281**	0.0186	-0.0033	0.0114	-0.0549
	(0.0140)	(0.0250)	(0.0345)	(0.0523)	(0.0522)
EBL					
Pending aid	0.0221	0.0120	0.0085	0.0834**	-0.0126**
	(0.0161)	(0.0266)	(0.0326)	(0.0407)	(0.0518)
R-squared	0.005	0.002	0.000	0.000	0.001
Observations	1,084	1,084	1,084	1,084	1,084

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A11: Effect of *November-December* aid on the importance of deferral of investment as liquidity sources - Weighted sample

Dependent variable	Deferral of investments				
	Completely unimportant (1)	Unimportant (2)	Neither nor (3)	Important (4)	Very important (5)
OLS - no controls					
Approval	0.0039	-0.0103	-0.0039	0.0159	-0.0055
	(0.0128)	(0.0152)	(0.0205)	(0.0296)	(0.0312)
R-squared	0.000	0.000	0.000	0.000	0.000
OLS					
Approval	0.0204	0.00595	0.00685	0.0147	-0.0479
	(0.0128)	(0.0155)	(0.0233)	(0.0336)	(0.0351)
R-squared	0.033	0.054	0.009	0.023	0.043
PSM					
Approval	0.0245**	0.0170	0.0033	-0.0087	-0.0369
	(0.0123)	(0.0142)	(0.0293)	(0.0440)	(0.0456)
EBL					
Approval	0.0245**	0.0122	0.0061	0.0063	-0.0491
	(0.0118)	(0.0160)	(0.0258)	(0.0373)	(0.0387)
R-squared	0.004	0.001	0.000	0.000	0.002
Observations	1,275	1,275	1,275	1,275	1,275

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A12: Effect of *November-December* aid on credit negotiations and results - Restricted sample

Dependent variable	Negotiation		Result			
	Negotiation	Due to COVID-19	Approved	Worse	Pnding	No result
	(1)	(2)	(3)	(4)	(5)	(6)
OLS - no controls						
Approval	-0.132***	-0.125***	0.087**	0.031	-0.012	-0.0495
	(0.0383)	(0.0378)	(0.0615)	(0.0505)	(0.0482)	(0.0585)
R-squared	0.011	0.004	0.017	0.000	0.015	0.000
OLS						
Approval	-0.112***	-0.107***	0.112*	0.0262	-0.0105	-0.0513
	(0.0383)	(0.0381)	(0.0553)	(0.0471)	(0.0439)	(0.0533)
R-squared	0.045	0.032	0.069	0.025	0.071	0.059
PSM						
Approval	-0.0981**	-0.110**	0.103	0.0139	0.0091	-0.0523
	(0.0480)	(0.0476)	(0.0747)	(0.0593)	(0.0512)	(0.0674)
EBL						
Approval	-0.115**	-0.116**	0.0380	0.0400	0.0239	-0.0274
	(0.0515)	(0.0516)	(0.0781)	(0.0565)	(0.0488)	(0.0665)
R-squared	0.008	0.008	0.039	0.001	0.002	0.004
Observations	1,172	1,172	363	363	363	363

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A13: Effect of *November-December* aid on credit negotiations and results - Weighted sample

Dependent variable	Negotiation		Result			
	Negotiation	Due to COVID-19	Approved	Worse	Pending	No result
	(1)	(2)	(3)	(4)	(5)	(6)
OLS - no controls						
Pending aid	-0.105***	-0.0649**	0.142***	0.0101	-0.109**	0.00840
	(0.0294)	(0.0286)	(0.0500)	(0.0427)	(0.0444)	(0.0471)
R-squared	0.011	0.005	0.021	0.000	0.017	0.000
OLS						
Pending aid	-0.0854***	-0.0797**	0.120**	0.0354	-0.0535	-0.0505
	(0.0326)	(0.0321)	(0.0574)	(0.0518)	(0.0496)	(0.0542)
R-squared	0.046	0.035	0.072	0.028	0.064	0.059
PSM						
Pending aid	-0.0900**	-0.0864**	0.170***	-0.0198	-0.0439	-0.0359
	(0.0431)	(0.0427)	(0.0639)	(0.0655)	(0.0582)	(0.0697)
EBL						
Pending aid	-0.0796**	-0.0749**	0.163***	0.0017	-0.0570	-0.0452
	(0.0358)	(0.0353)	(0.0564)	(0.0564)	(0.0515)	(0.0611)
R-squared	0.008	0.008	0.037	0.001	0.003	0.003
Observations	1,370	1,370	410	410	410	410

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A14: Effect of *November-December* aid on absence of credit negotiations - Restricted sample

Dependent variable	Reasons for no credit negotiations		
	No prospect of success	No need	No longer required
OLS - no controls			
Approval	-0.0699	0.0497	0.0229
	(0.0448)	(0.0490)	(0.0347)
R-squared	0.004	0.001	0.001
OLS			
Approval	-0.0679	0.0535	0.0183
	(0.0452)	(0.0506)	(0.0365)
R-squared	0.034	0.042	0.032
PSM			
Approval	-0.0442	0.0289	0.0220
	(0.0474)	(0.0550)	(0.0402)
EBL			
Approval	-0.0272	0.0243	0.0112
	(0.0471)	(0.0596)	(0.0462)
R-squared	0.001	0.001	0.000
Observations	776	776	776

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A15: Effect of *November-December* aid on absence of credit negotiations - Weighted sample

Dependent	Reasons for no credit negotiations		
variable	No prospect of success	No need	No longer required
OLS - no controls			
Approval	-0.0254	0.0257	0.0159
	(0.0326)	(0.0368)	(0.0271)
R-squared	0.001	0.001	0.000
OLS			
Approval	-0.0672*	0.0727*	-0.0034
	(0.0368)	(0.0411)	(0.0307)
R-squared	0.045	0.052	0.033
PSM			
Approval	-0.0713	0.0735	0.0028
	(0.0508)	(0.0549)	(0.0397)
EBL			
Approval	-0.0694	0.0762	-0.0024
	(0.0423)	(0.0463)	(0.0344)
R-squared	0.009	0.007	0.000
Observations	895	895	895

Notes: Key explanatory variable: Approval of application for *November-December* aid (0=pending and 1=approved). Observation omitted, if question on dependent variable was not answered. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, OLS: Fixed effects for region, turnover, sector and production decline, PSM: Epanechnikov kernel propensity score matching, EBL: Entropy balancing on first moments of controls. *Source:* Bundesbank Online Panel-Firms (BOP-F). Own calculations.

Table A16: Questions from the BOP-F survey included in the analysis.

Number	Question and answer options
002b	**Question:** How do you think employment (measured in hours worked) will develop in your enterprise over the first six months of this year, i.e. from the beginning of January to the end of June 2021, compared with the last six months of the previous year, i.e. from the beginning of July to the end of December 2020? **Answer options:** 1 = decrease significantly, 2 = decrease slightly, 3 = remain roughly the same, 4 = increase slightly, 5 = increase significantly, -9996 = Does not apply to my enterprise.
401	**Question:** How did your production/business activity in December 2020 develop as a result of the COVID-19 pandemic compared with the typical level of production/business activity in December, e.g. in 2019? **Answer options:** 1 = Decreased, 2 = Stayed roughly the same 3 = Increased, -9996 = Does not apply to my enterprise.
402A	**Question:** You indicated that your production/business activity decreased. How large was the decrease in your production/business activity in December 2020 as a result of the COVID-19 pandemic compared with the typical level of production/business activity in December, e.g. in 2019? **Answer options:** Percent [value range 1-100]
004	**Question:** In October, November or December 2020, did your enterprise negotiate with one or more banks with a view to taking out a loan or establishing a credit line? a- Irrespective of the COVID-19 crisis, b- Due to the COVID-19 crisis **Answer options:** 1 = Yes, 2 = No.
005A	**Question:** What was the outcome of the negotiations? **Answer options:** 1 = Loan/credit line was approved for the desired amount at the desired conditions (interest, collateral), 2 = Loan/credit line was approved for the desired amount but at less favourable conditions, 3 = Loan/credit line was approved for a smaller amount, but at the desired conditions, 4 = Loan/credit line was approved for a smaller amount and at less favourable conditions, 5 = No decision has yet been made regarding the loan application. 6 = Loan negotiations concluded without a deal.
005B	**Question:** What was your reason for not negotiating with banks in October, November and December 2020? **Answer options:** 1 = Not required, 2 = Unlikely to be successful, 3 = No longer required; planned borrowing postponed/cancelled due to current developments.
406f	**Question:** How important is/has been postponing or cancelling planned investments in safeguarding liquidity in your enterprise during the COVID-19 pandemic? **Answer options:** 1 = Not at all important, 2 = Not important, 3 = Neither unimportant nor important, 4 = Important, 5 = Very important, -9996 = Does not apply to my enterprise.
407c	**Question:** Has your enterprise used *extraordinary economic assistance in November/December (= Federal Government grants for parties severely affected by the lockdown as of November)* since the onset of the COVID-19 pandemic? **Answer options:** 1 = Yes, 2 = No, approval still pending, 3 = No, as there is no need, 4 = No, as not approved/not granted, 5 = No, as this government assistance measure was not known about, -9996 = Does not apply to my enterprise.
410	**Question:** Based on the situation today and the most plausible scenario, for how long a period will your enterprise continue to have sufficient liquidity before having to discontinue or abandon its business activities? **Answer options:** 1 = Up to one month, 2 = Up to two months, 3 = Up to six months, 4 = Up to twelve months, 5 = We generally have sufficient liquidity, -9996 = Does not apply to my company.

Table A17: Firm characteristics captured in the BOP-F survey.

| Number	Question and answer options
firmturnover	**Question:** What was the volume of business of your enterprise in 2019? **Answer options:** 1 = EUR 1 to EUR 1 million, 2 = More than EUR 1 million and up to EUR 7 million, 3 = More than EUR 7 million and up to EUR 34 million, 4 = More than EUR 34 million and up to EUR 229 million, 5 = More than EUR 229 million.
firmsector	**Question:** To which economic sector can your enterprise most fittingly be allocated? **Answer options:** 1 = Agriculture, forestry and fishing, 2 = Mining and quarrying, electricity, gas and water supply, 3 = Sewerage and waste management, 4 = Food products, beverages and tobacco, 5 = Consumer products (excluding manufacture of timber products), 6 = Industrial goods (including manufacture of timber products), 7 = Capital and consumer goods, 8 = Construction, 9 = Wholesale, sale and repair of motor vehicles, 10 = Retail, 11 = Transportation and warehousing, 12 = Information and communication, 13 = Hotels and restaurants, 14 = Financial and insurance activities, 15 = Economic, scientific and freelance services, 16 = Education, 17 = Health and social services, 18 = Other services, 19 = Representations of interests, 20 = Public administration, defence, social security.
firmregion	**Question:** In which federal state is your enterprise's head office in Germany based? **Answer options:** 1 = Baden-Württemberg, 2 = Bavaria, 3 = Berlin, 4 = Brandenburg, 5 = Bremen, 6 = Hamburg, 7 = Hesse, 8 = Mecklenburg-West Pomerania, 9 = Lower Saxony, 10 = North Rhine-Westphalia, 11 = Rhineland-Palatinate, 12 = Saarland, 13 = Saxony, 14 = Saxony-Anhalt, 15 = Schleswig-Holstein, 16 = Thuringia
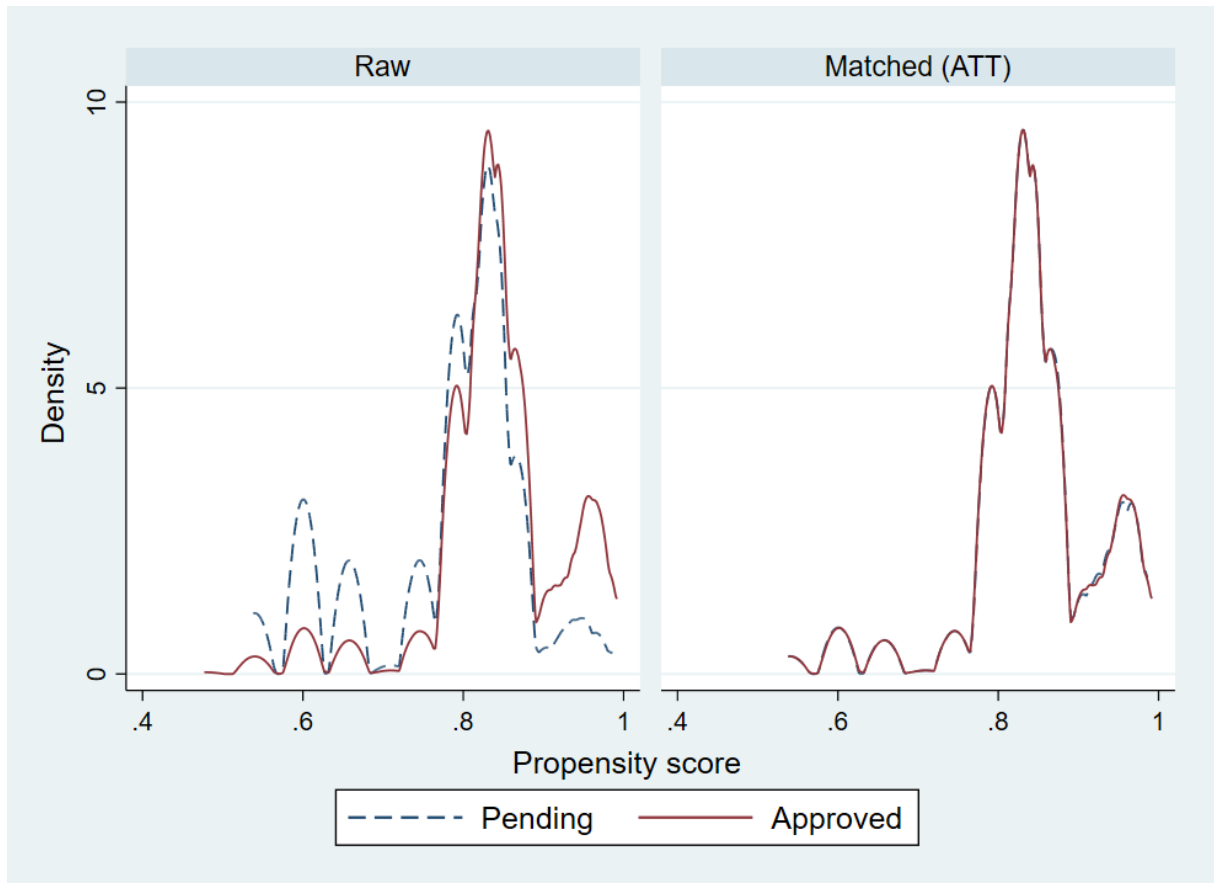
Figure A1: Propensity score kernel distributions - Restricted sample
Source: Bundesbank Online Panel-Firms (BOP-F), February-March 2021. Own calculations.
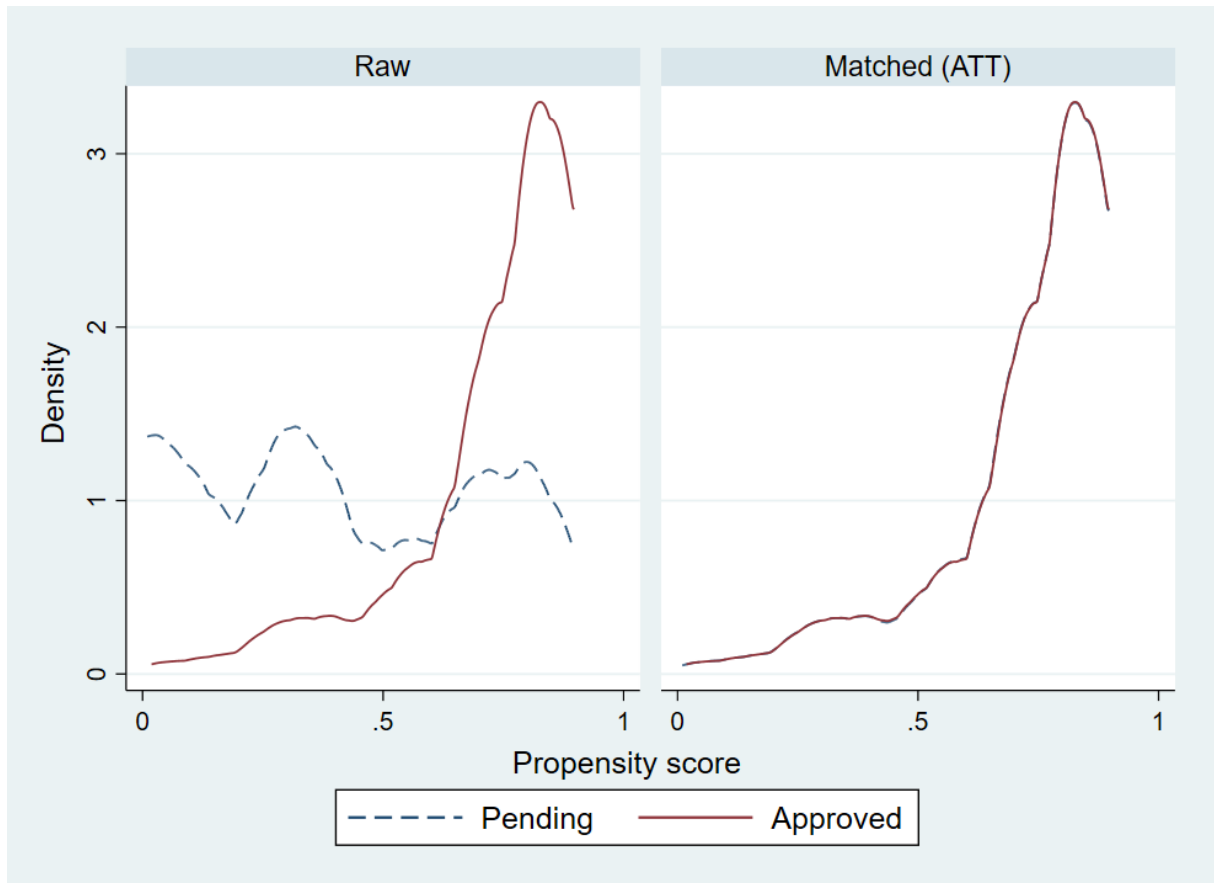
Figure A2: Propensity score kernel distributions - Weighted sample
Source: Bundesbank Online Panel-Firms (BOP-F), February-March 2021. Own calculations.