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Back From the Brink: State-Guaranteed Loans and Financial Recovery

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ABSTRACT

This paper studies the financial trajectories of large firms that accessed a €200 billion state-backed loan programme in Italy, part of broader interventions to contain corporate distress during the COVID-19 crisis. Using firm-level data from 2016 to 2023, we find that supported firms were initially more leveraged, less profitable and less liquid. Their financial performance, however, improved significantly after the intervention. The recovery in debt servicing capacity, even among the most fragile firms, is mainly driven by increased profitability rather than by an extension of debt maturity. Our findings highlight the role of public guarantees in fostering financial resilience.

JEL Classification: G01, G32, G38

1 | Introduction

Italy was the first advanced economy to experience the full force of the COVID-19 pandemic, rapidly emerging as the epicentre of the global crisis in early 2020. The country faced one of the highest death tolls and some of the most stringent and prolonged lockdowns in the developed world. While these restrictions were essential to contain the public health emergency, they came at a substantial economic cost. Data from the Italian National Statistical Office (ISTAT) indicate that real GDP saw a 5.3% drop in the first quarter of 2020, primarily due to significant drops in investment and exports. By the end of the year, the overall decline reached 8.9%, exceeding the European Union's average decrease of 6.2%. Without timely public intervention, the country risked widespread corporate distress and systemic economic disruption, likely more severe than in other major European economies.

In response to this emergency, the Italian government enacted measures to support firms' financial health, most notably through the Liquidity Decree (*Decreto Liquidità*).[1] Among its provisions, the decree introduced the *Garanzia Italia* programme, a state-backed loan guarantee scheme designed to support medium and large enterprises. Under this scheme, the public export-credit agency SACE was authorized to issue guarantees on new bank loans up to a ceiling of €200 billion, equivalent to approximately 11% of Italian GDP.[2] This unprecedented policy effort aimed to ensure continued access to credit, prevent liquidity-driven insolvencies, and support the continuity of productive activity during the most acute phases of the crisis.

This paper investigates the financial trajectories of firms that accessed Italy's state guarantee programme during the COVID-19 crisis and addresses three main research questions. First, which firms obtained public guarantees at the onset of the emergency? Second, to what extent did this intervention contribute to financial stabilization and recovery in the years that followed? Third, how did outcomes vary within the group of supported firms—particularly between financially fragile and

more resilient recipients—and to what extent does the evidence mitigate or reinforce concerns about unintended effects, such as zombie lending? Leveraging financial information on the population of large Italian firms with sales revenue exceeding €50 million between 2016 and 2023, we examine how their financial health evolved in the years surrounding the crisis. Our analysis focuses on their operating performance, capital structure, investment behaviour and ability to meet short-term financial obligations, comparing firms that received public support to those that did not. The empirical evidence reveals two main patterns.

First, firms that accessed state guarantees entered the crisis in a structurally weaker financial position, characterized by lower liquidity and profitability, and higher leverage. Second, these firms showed marked improvements in financial performance in the years following the intervention, gradually converging towards the precrisis profile of their more resilient counterparts. This recovery is particularly visible in the debt service coverage ratio (DSCR), which captures a firm's ability to meet short-term debt obligations. Importantly, this improvement was not driven by a simple extension of debt maturities but rather by a recovery in operating profitability. This, in turn, enabled firms to gradually rebalance their capital structure following the initial spike in leverage caused by the newly issued guaranteed loans. The analysis also shows heterogeneity among supported firms. While stronger firms recovered more rapidly, financially fragile firms also showed meaningful signs of stabilization. Taken together, these patterns suggest that the policy intervention addressed a broad spectrum of financial conditions and contributed to preventing the collapse of more vulnerable firms.

This study contributes to a growing body of literature on the role of public credit guarantees during crises, offering new insights into how such interventions affect firm behaviour and financial outcomes over time. First, we examine the medium-term financial consequences of firms that received state-guaranteed loans, assessing how profitability, leverage and investment policy of supported firms evolved over a multi-year horizon and shifting the focus beyond immediate liquidity relief. Most existing studies focus on short-term credit effects or the allocation mechanisms of guarantee schemes (Jiménez et al. 2022; Cascarino et al. 2022; Core and De Marco 2024). We complement this literature by providing a broader temporal perspective on the financial dynamic of supported firms.

Second, in addition to comparing firms that accessed guarantees with those that did not, we also examine the heterogeneity within the group of supported firms, differentiating between firms that were more or less financially fragile at the onset of the pandemic. This approach allows us to assess whether the policy effectively reached firms most in need and whether these firms were able to recover in line with their more resilient peers. The analysis addresses concerns raised in prior work regarding the risk of misallocation and the uneven targeting of public support (Bonaccorsi di Patti et al. 2024; Core and De Marco 2024).

Third, while much of the COVID-19-related literature focuses on programmes aimed at small enterprises—where credit constraints and information frictions are more pronounced (Brown et al. 2021; Bartik et al. 2020)—we investigate the effect of public guarantees on large firms. This distinction is important because, although support for small and medium enterprises (SMEs) is widely expected to be beneficial due to their greater vulnerability and limited access to finance (Beck et al. 2008), the implications for larger firms, typically less credit-constrained, are less obvious and merit empirical investigation. This paper focuses on a population underrepresented in recent empirical work and adds to the debate on the overall effectiveness of public guarantees.

Finally, a novel feature of the paper is using the DSCR as a forward-looking measure of debt repayment capacity, particularly for the most financially vulnerable firms. By unpacking the components of DSCR (operating profitability and short-term debt service obligations) and analysing their dynamics, we shed light on the mechanisms driving financial recovery. This more granular understanding of how and why firms stabilize after accessing public credit support complements broader studies focused on aggregate loan outcomes or bank-level behaviour (Altavilla et al. 2023; Jiménez et al. 2022), and addresses calls for more firm-level evidence on the quality and sustainability of postcrisis recovery (Khan 2022).

The paper proceeds as follows. The next section reviews the relevant literature on government-backed firm support and credit guarantee programmes. Section 3 presents the institutional framework and operational details of the *Garanzia Italia* programme. Section 4 describes the data and presents the empirical evidence. Finally, Section 5 concludes.

2 | Literature Review

Government intervention in the economy has long been justified by the need to address market failures and ensure financial stability. While such intervention is generally beneficial during stable periods, it becomes crucial in times of economic distress—such as financial recessions or global crises—when firms face severe liquidity constraints. In normal times, public support is essential in relaxing credit constraints stemming from asymmetric information. During crises, the role of the government is even more important to prevent widespread corporate insolvencies and systemic financial instability. Liquidity provision through state-backed loan guarantees, subsidies and tax relief plays a key role in supporting firms facing severe revenue drops and credit constraints. Government-backed credit facilities help alleviate liquidity shortages and ensure that short-term shocks do not translate into permanent negative economic effects. Furthermore, during such periods, credit rationing disproportionately affects SMEs, which often lack established financial records or sufficient collateral (Beck et al. 2008).

Several rationales support indirect public intervention through government guarantee programmes. Banks have superior information about borrowers and higher skills in selecting them. Therefore, governments can delegate screening and monitoring to private banks, which is a more efficient way to provide support than direct government lending. One key advantage of these programmes is their ability to address credit

under-provision and liquidity shocks. Public guarantees ensure that credit continues to flow to firms, particularly those facing cash shortfalls during economic downturns following global crises (Honohan 2010). These interventions generally involve refinancing existing credit and extending new loans and can act as a backstop to prevent default waves and the liquidation of viable firms. Public guarantee programmes can also help counteract the negative economic spirals triggered by crises (European Central Bank 2024). Without such support, firm defaults can lead to job losses, economic contraction and renewed liquidity shortages, ultimately resulting in further bankruptcies. Public guarantees support business continuity and employment and sustain aggregate demand (Bonaccorsi di Patti et al. 2024). Finally, while refinancing existing credit prevents liquidity crises and reduces default rates, additional credit, often with better conditions such as lower interest rates and longer durations, can also improve future performance.

While these programmes benefit firms and the broader economy, they also entail limitations and potential inefficiencies. First, guarantee schemes may lead to credit substitution, where banks prioritize replacing their own risky loans with government-backed ones rather than expanding overall lending. The reduced 'skin in the game' for banks might have unintended consequences. Without bearing the full risk, banks might support firms that are ultimately unviable, leading to 'zombie lending' and hindering the efficient reallocation of resources in the economy (Schivardi et al. 2022). Additionally, banks' decisions on which firms receive guarantees—and under what terms—may be driven by factors beyond the programme's intended objectives, such as their IT capabilities (Fuster et al. 2019) or pre-existing relationships with borrowers (Bolton et al. 2016). Moreover, when the government bears most of the risk, banks have less incentive to carefully screen and monitor borrowers. This can attract riskier firms and exacerbate adverse selection and moral hazard. Finally, the effectiveness of guarantees in stimulating new credit may diminish over time. As the acute phase of the crisis subsides, lending patterns may revert, potentially causing a rebound effect that limits the long-term impact of these interventions (Honohan 2010).

Government measures, such as credit-guaranteed schemes, stabilize firms during crises and help prevent business closures (Brown et al. 2021; Khan 2022). Historically, public credit interventions have been crucial in mitigating economic downturns. During the Great Depression, the U.S. government introduced large-scale financial assistance to prevent bank failures and support industrial production (Bernanke 1983). Similarly, the 2008 global financial crisis led to the implementation of extensive government guarantees and stimulus packages designed to restore credit flow and stabilize financial markets (Mian and Sufi 2014). Brown et al. (2021) explore the impact of a Swedish government programme initiated during the 2008-2009 financial crisis that allowed firms to defer labour tax payments and treat the deferred amount as a government loan. They document that younger, more leveraged firms with less access to traditional credit were more likely to participate, and the programme helped mitigate liquidity shortages and prevent widespread bankruptcies.

Central to this paper, the COVID-19 pandemic has underscored the importance of these interventions, as governments worldwide launched unprecedented financial assistance programmes (Cascarino et al. 2022; Banfi et al. 2024). The effectiveness of public loan guarantees varies significantly across different institutional settings. Khan (2022) examine financial fragility and government responses across different regulatory environments and find that countries with more advanced banking systems experienced smoother credit allocation. In contrast, countries with weaker financial institutions faced greater implementation challenges and inefficiencies in distributing loans to targeted beneficiaries (Rai et al. 2024). International experiences also show variation in how public guarantees stimulate economic recovery. Wang and Yu (2023) highlight how state-owned enterprises in China played a critical role in stabilizing credit flows during the pandemic. In contrast, economies with highly privatized financial systems, such as the U.S. and the U.K., relied more heavily on direct government stimulus rather than credit guarantees (Rehman et al. 2024).

The outbreak of COVID-19 was both sudden and unprecedented, posing an immediate and severe threat to business survival. Bartik et al. (2020) surveyed over 5,800 small businesses at the onset of the pandemic, highlighting their financial fragility and the rapid effect of the crisis on their operations and employment. Similarly, a cross-country study by Liu et al. (2021) finds that women-led businesses were disproportionately affected, facing both a higher likelihood and longer duration of closure than those led by men. Moreover, firms that were credit-constrained before the pandemic experienced considerable financial difficulties, including liquidity shortages and restricted access to traditional bank funding (Khan 2022). The nature of the crisis made swift government intervention essential, even if it carried the risk of imprecise targeting or unintended consequences.

Altavilla et al. (2023) show how guaranteed loans were often accompanied by improved lending terms, such as lower interest rates and longer maturities, particularly for more vulnerable firms. However, this benefit came at a cost, as banks substituted existing, non-guaranteed loans with newly guaranteed loans, shifting credit risk to taxpayers. Using detailed loan-level data, Jiménez et al. (2022) examine the effects of public credit guarantees in Spain during the COVID-19 crisis and reach a similar conclusion. Cascarino et al. (2022) estimate the credit additionality of the public guarantee programme in Italy for SMEs and show that it peaked at the programme's inception—at approximately €0.84 of new lending per euro of guarantee—before declining afterwards. Interestingly, credit additionality showed limited variation across firms with different risks, liquidity and size. Pre-existing bank-firm relationships and, in turn, their impact on lending and loan repayment are also important in the distribution of guaranteed loans (Jiménez et al. 2022; Bonaccorsi di Patti et al. 2024).

Core and De Marco (2024) examine public guarantees for small businesses in Italy during the COVID-19 pandemic and focus on fully guaranteed smaller loans issued without a formal bank credit assessment. Their findings suggest that funds were initially directed towards financially vulnerable firms in the hardest-hit regions but were later distributed more broadly. Notably, there were substantial differences in how banks processed these loans, with larger banks and those with more

advanced information technology systems loaning funds more quickly and at lower interest rates. Bonaccorsi di Patti et al. (2024) explore whether government-backed loans primarily benefited financially vulnerable firms or were instead directed towards less risky entities needing liquidity. They conclude that the programme primarily benefited firms that were already financially stable rather than those in distress.

3 | Institutional Context

The pandemic began in Italy at the end of February 2020. On March 9, 2020, a strict national lockdown was imposed, with all commercial and retail businesses (except those providing essential services, such as grocery stores and pharmacies) closed. The lockdown lasted until May 4, 2020. During this time, the government enacted a series of economic support measures to counteract the economic consequences of the pandemic and containment measures. On March 17, 2020, with Decree Law No. 18/2020, the Italian government approved an initial package of measures, including a public debt moratorium for small and medium-sized enterprises (SMEs) to address firms' liquidity shortage and limit the risk of a credit crunch.

On April 8, with Decree Law No. 23/2020 (known as the 'Liquidity Decree'), the government introduced the largest support programme, based on a loan guarantee scheme. Several new financing arrangements were introduced for SMEs and Midcap firms (with up to 500 employees) based on guarantees provided by the Central Guarantee Fund (CGF), a government fund that has been running public guarantee schemes for SMEs since the early 2000s. The first arrangement allowed banks to grant loans of up to €30,000 to SMEs with 100% coverage without any screening or authorization by the CGF. A second arrangement allowed guarantees on loans of up to €5 million with 90% coverage. A third arrangement was designed for debt renegotiation or consolidation with 80% coverage.

Larger firms and SMEs that had already obtained the maximum amount (€5 million) from the CGF could apply for loans guaranteed by SACE, the Italian export credit agency, within the programme known as *Garanzia Italia*. Both guarantees (issued by CGF and SACE) were available to firms not defined as 'undertakings in difficulty' under EU regulations and whose liabilities were classified as 'performing' as of February 29, 2020. These arrangements complied with the European Commission's Temporary Framework on State Aid and were very similar to those adopted by other major European countries (e.g., France, Germany and Spain).

Initially intended to last until December 2020, the programmes were extended until June 2022 with some minor amendments introduced by Conversion Law No. 40/2020, Law No. 178/2020, Decree No. 73/2021 and Law No. 234/2021.[3] By the end of the programmes, the total funds guaranteed by the CGF for SMEs and Midcap firms amounted to €256.8 billion, while the amount of SACE-guaranteed loans totalled about €42 billion.

To obtain SACE guarantees, the following conditions had to be met.

a. The loan had to be newly issued with a maturity of up to 6 years, including a possible grace period of up to 36 months. (In subsequent modifications, the loan maturity was extended to up to 8 years and, subject to EU Commission approval, up to 10 years.)
b. The supported firm could not be classified as 'in difficulty' under relevant EU regulations, nor could it be recorded as a 'non-performing exposure' within the banking system.
c. The firm's debt-to-equity ratio over the past 2 years must not have exceeded 7.5, the threshold defining a 'company in difficulty' under EU Regulation No. 651/2014.

The loan amount eligible for a state guarantee could not exceed the greater of the following two thresholds: 25% of the company's 2019 annual turnover or twice its 2019 labour costs. The guarantee was granted within the following limits: 90% for companies with no more than 5000 employees in Italy and an annual turnover of up to €1.5 billion; 80% for companies with an annual turnover between €1.5 billion and €5 billion or with more than 5,000 employees in Italy; and 70% for companies whose annual turnover exceeded €5 billion.

The annual fees payable by firms for the issuance of the guarantee were 50 basis points for the first year, 100 basis points for the second and third years and 200 basis points for the fourth through sixth years. The fees for loans granted to small and medium-sized enterprises were halved.

The application for the guarantee also entailed the following commitments.

a. The supported firm and any other firm based in Italy and belonging to the same group were required not to distribute dividends or repurchase shares in 2020 or for the twelve months following the request date.
b. The supported firm was required to manage employment levels through agreements with trade unions.
c. The lender was required to show that, upon disbursement of the guarantee-backed financing, its total exposure to the borrower exceeded the exposure as of the date of the decree.
d. The guarantee-backed financing was to be used for personnel costs, lease or branch acquisitions, investments or working capital related to production activities in Italy. Supported companies were also required not to relocate production.
e. Only 20% of the funding could be allocated to paying loan instalments due between March and December 2020.

4 | Data and Empirical Evidence

4.1 | Data

We gather data from AIDA, a Bureau van Dijk (Moody's Analytics) database that provides comprehensive financial information on Italian firms. Our initial sample includes large firms, defined as those with sales revenues exceeding €50 million in

the 2019 fiscal year (6594 firms). We then examine each firm's complete annual report, including the explanatory notes, to identify those that have utilized the *Garanzia Italia* programme in 2020. For 109 firms, the annual report is either unavailable or the firm is no longer active. Among the remaining 6485 firms, 5375 have annual reports in searchable PDF format, allowing keyword searches for terms such as 'Garanzia Italia,' 'SACE' and 'Decreto Legge n. 23 dell'8 aprile 2020,' along with equivalent expressions. The remaining 1,110 reports are non-searchable. Therefore, we apply optical character recognition (OCR) tools to convert 326 of them into searchable documents while the rest are reviewed manually. Overall, we identify 392 firms—about 6% of the sample—that accessed the *Garanzia Italia* programme in 2020, with a total guaranteed amount of slightly less than €30 billion.[4]

We exclude from the sample 225 firms that operate in the 'Financial and Insurance Activities' sector (NACE codes 64–66), given the specific regulatory framework and financial structure of this industry. For the remaining 6,260 firms, we collect financial information from AIDA to generate variables related to profitability, leverage, investment intensity, and liquidity over the period 2016–2023. Complete data are available for 6,194 firms, of which 385 received a state guarantee in 2020. This is our final sample used for the empirical analysis. The definitions of all variables are provided in the Appendix.

4.2 | The Impact of the Pandemic and Guaranteed Loans

Figure 1 illustrates the evolution of firms' profitability over the sample period. The upper panel presents operating performance (EBITDA and ROA), while the lower panel shows bottom-line profitability (net income and ROE).

Figure 1 reveals two main patterns. First, there was a sharp and simultaneous drop in profitability in 2020, at the outbreak of the COVID-19 pandemic. Aggregate EBITDA declined from approximately €136 billion in 2019 to €107 billion in 2020, while ROA fell from 7.0% to 5.1%. The bottom panel shows a comparable contraction in net income and ROE, which decreased from €57 billion to below €41 billion and from 7.8% to 5.1%, respectively. These trends reflect the widespread and immediate impact of the pandemic on firms' performance. Second, the data document a rapid and sustained rebound in profitability starting in 2021. EBITDA and net income rose steadily, reaching and eventually surpassing their pre-pandemic levels. By 2023, aggregate EBITDA exceeded €160 billion, and ROA reached 7.1%, while net income climbed to over €80 billion and ROE approached 8.7%.

Table 1 reports the number of firms in our sample by industry (year 2019), the number of firms that obtained a state guarantee during the pandemic, and the corresponding percentage.[5] The table is sorted in descending order by this percentage, thereby indicating the sectors most affected by the crisis. The highest reliance on state-guaranteed loans is observed in industries structurally exposed to the disruptions induced by the pandemic. Among the most affected are sectors providing services to individuals, such as 'Residential care and social work activities' and 'Accommodation and food service activities,' where about one firm out of three received guaranteed loans. This evidence is consistent with the contact-intensive nature of these industries, which were severely hit by lockdown and travel restrictions. The 'Manufacture of coke and refined petroleum products' sector also ranks high (15.2% of firms received guarantee loans), plausibly due to the collapse in industrial production and transportation, drastically reducing demand for energy inputs. The 'Construction' sector was also significantly affected, likely due to widespread site shutdowns, supply chain disruptions, and investment uncertainty during the initial stages of the pandemic.

While Table 1 indicates the sectors most affected by the pandemic based on the firms' recourse to state-guaranteed loans, Table 2 offers a complementary perspective by examining the evolution of profitability between 2019 and 2020. The upper section reports the ten industries that experienced the sharpest deterioration in operating performance (ROA) during the first year of the pandemic. For example, the 'Accommodation and food service activities' sector experienced a dramatic decline of 12.3 percentage points, moving from an average ROA of 10.3% in 2019 to −1.9% in 2020. Severe demand shock caused by lockdowns and travel restrictions disproportionately affected tourism, hospitality and dining services. Similarly, the 'Arts, entertainment and recreation' sector saw a 9.5 percentage point drop in ROA, reflecting the halt of live events and cultural activities. Other sectors such as 'Manufacture of textiles,

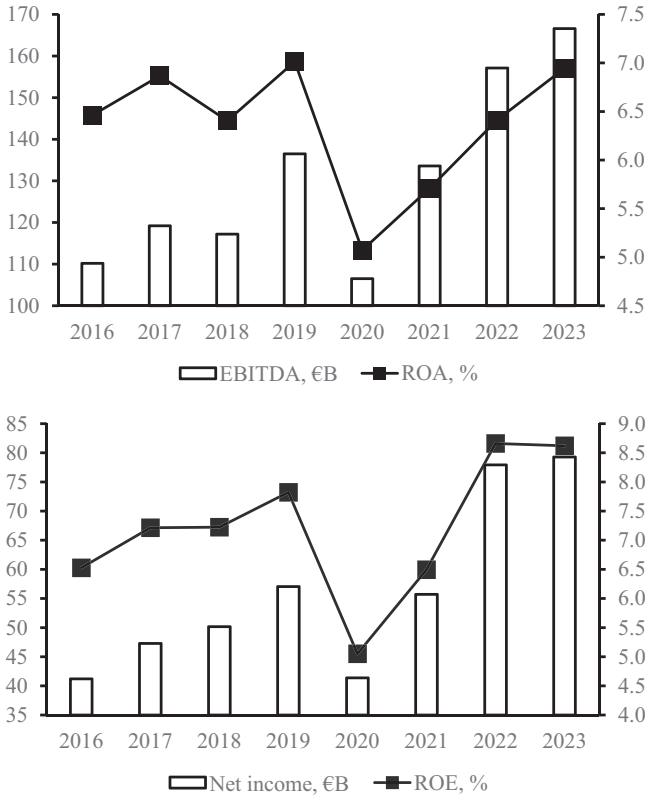

FIGURE 1 | Evolution of firms' profitability. This figure shows the aggregate profitability of firms from 2016 to 2023. The top panel shows EBITDA (€ billion, left axis) and ROA (EBITDA over total assets, right axis), while the bottom panel shows net income (€ billion, left axis) and ROE (net income over total equity, right axis).

TABLE 1 | Number of firms in 2019 and firms with state-guaranteed loans. This table shows the total number of firms in 2019 and the subset that received state-guaranteed loans in 2020. Firms are categorized by industry, following the NACE intermediate SNA/ISIC aggregation A*38.

Industry	Number of firms in 2019	Of which with a state guarantee	%
Residential care and social work activities	28	10	35.7
Accommodation and food service activities	59	18	30.5
Manufacture of coke and refined petroleum products	33	5	15.2
Other services	7	1	14.3
Construction	159	22	13.8
Manufacture of transport equipment	164	21	12.8
Human health services	48	5	10.4
Mining and quarrying	10	1	10.0
Manufacture of textiles, apparel, leather and related products	201	20	10.0
Scientific research and development	10	1	10.0
Administrative and support service activities	206	20	9.7
Other manufacturing, repair and installation of machinery and equipment	136	12	8.8
Arts, entertainment and recreation	49	4	8.2
Manufacture of basic metals and fabricated metal products, except machinery and equipment	397	32	8.1
Transportation and storage	309	25	8.1
Legal, accounting, management, architecture, engineering, technical testing and analysis activities	122	8	6.6
Manufacture of rubber and plastics products and other non-metallic mineral products	251	16	6.4
Real estate activities	47	3	6.4
Manufacture of computer, electronic and optical products	63	4	6.3
Manufacture of machinery and equipment n.e.c.	402	25	6.2
Publishing, audiovisual and broadcasting activities	51	3	5.9
Manufacture of food products, beverages and tobacco products	463	25	5.4
Manufacture of wood and paper products and printing	114	6	5.3
Agriculture, forestry and fishing	69	3	4.3
Other professional, scientific and technical activities	47	2	4.3
Wholesale and retail trade, repair of motor vehicles and motorcycles	1864	73	3.9
IT and other information services	118	4	3.4
Manufacture of electrical equipment	126	4	3.2
Telecommunications	34	1	2.9
Water supply, sewerage, waste management and remediation	112	3	2.7
Electricity, gas, steam and air-conditioning supply	170	4	2.4
Manufacture of chemicals and chemical products	220	4	1.8
Manufacture of pharmaceuticals, medicinal chemical and botanical products	101	0	0.0
Public administration and defence, compulsory social security	1	0	0.0
Education	3	0	0.0
Total	6194	385	6.2

TABLE 2 | Impact of COVID pandemic on ROA. This table shows the average ROA (EBITDA over total assets) by different industries in 2019 and 2020, as well as the change between the two years. Only the first and last 10 industries, sorted by the reduction in ROA, are reported. Industries are classified according to the NACE intermediate SNA/ISIC aggregation A*38.

Industry	ROA 2019, %	ROA 2020, %	Change, %
First ten industries by a negative change in ROA			
Accommodation and food service activities	10.3	−1.9	−12.3
Arts, entertainment and recreation	16.3	6.7	−9.5
Manufacture of textiles, apparel, leather and related products	11.4	5.9	−5.5
Other services	20.6	15.4	−5.2
Mining and quarrying	11.2	6.6	−4.6
Human health services	9.1	4.9	−4.2
Manufacture of coke and refined petroleum products	6.3	2.5	−3.8
Administrative and support service activities	9.9	6.3	−3.6
Residential care and social work activities	6.4	3.2	−3.2
Manufacture of machinery and equipment n.e.c.	9.3	6.6	−2.7
Last ten industries by a negative change in ROA			
Agriculture, forestry and fishing	5.7	5.1	−0.6
Manufacture of wood and paper products and printing	10.7	10.2	−0.5
Manufacture of pharmaceuticals, medicinal chemical and botanical products	14.0	13.5	−0.5
IT and other information services	12.6	12.4	−0.2
Public administration and defence, compulsory social security	0.2	0.1	−0.1
Manufacture of computer, electronic and optical products	7.6	7.6	0.0
Water supply, sewerage, waste management and remediation	8.4	8.7	0.3
Electricity, gas, steam and air-conditioning supply	8.4	8.7	0.4
Scientific research and development	8.1	8.6	0.5
Education	16.5	22.0	5.5

apparel, leather and related products,' 'Mining and quarrying' and 'Human health services' also experienced substantial declines in profitability, the latter likely due to the combined effects of increased operating pressures and disrupted routine services.

In contrast, the lower section of Table 2 highlights sectors that have proven more resilient—or, in some cases, have even benefited—from the economic consequences of the pandemic. The 'Education' sector recorded the largest increase in ROA (+5.5 percentage points), potentially reflecting an acceleration in digital learning and public or private support. 'Scientific research and development' and 'IT and other information services' registered only marginal changes, suggesting a high degree of operational continuity and, in some cases, increased demand for their services. Finally, essential services such as 'Electricity, gas, steam and air-conditioning supply' and 'Water supply, sewerage, waste management and remediation' reported modest improvements in profitability, likely due to the inelastic demand for utilities.

Figure 2 shows the geographical distribution of firms that received state-guaranteed loans and the corresponding amounts, disaggregated at the provincial level. The left panel shows the number of supported firms, which largely mirrors the economic geography of Italy, with a pronounced concentration in the northern provinces, a more moderate presence in the central regions, and a comparatively limited footprint in the south and on the islands. However, the figure also highlights meaningful intra-regional heterogeneity: even within the wealthier northern regions, the distribution of firms requesting support is not uniform. This suggests that differences in local economic structures or sectoral composition affected the likelihood of firms needing access to guaranteed loans.

The right panel presents the total amount of state-guaranteed loans by province. The spatial distribution is similar to that observed in the left panel, but the concentration of resources is even more pronounced. The provinces of Turin and Rome were the primary recipients due to the presence of large firms that secured significant guaranteed loans (e.g., Stellantis Europe, the European branch of the multinational automaker Stellantis, is headquartered in Turin). This discrepancy between the number of recipient firms and the total amounts allocated underscores the importance of considering the scale of financial resources within each province.

Figure 3 adds an important dimension to the analysis by scaling the total allocated state-guaranteed loans to the local economic base. The left panel shows the share of firms receiving

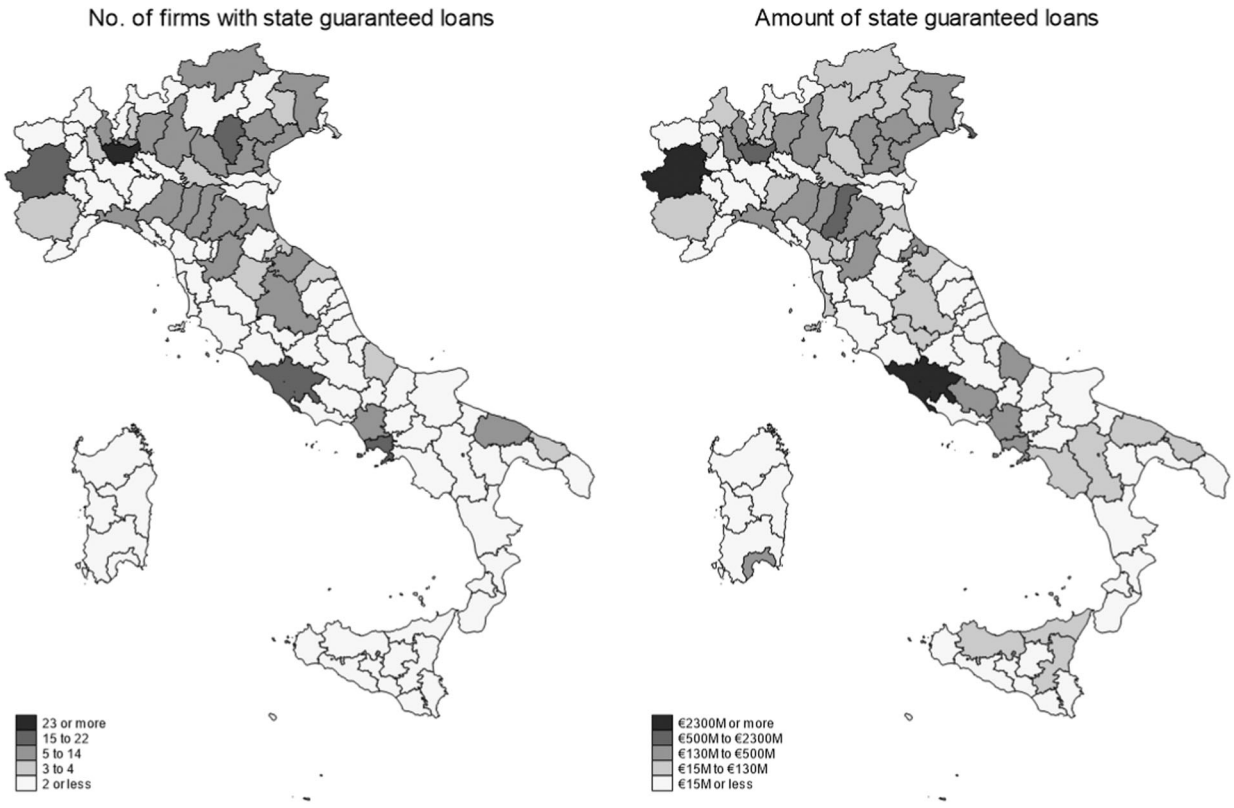

FIGURE 2 | Distribution of firms with state-guaranteed loans and guaranteed amounts by Italian provinces. The left panel of this figure shows the number of firms that obtained a state-guaranteed loan by province, while the right panel shows the total guaranteed amount.

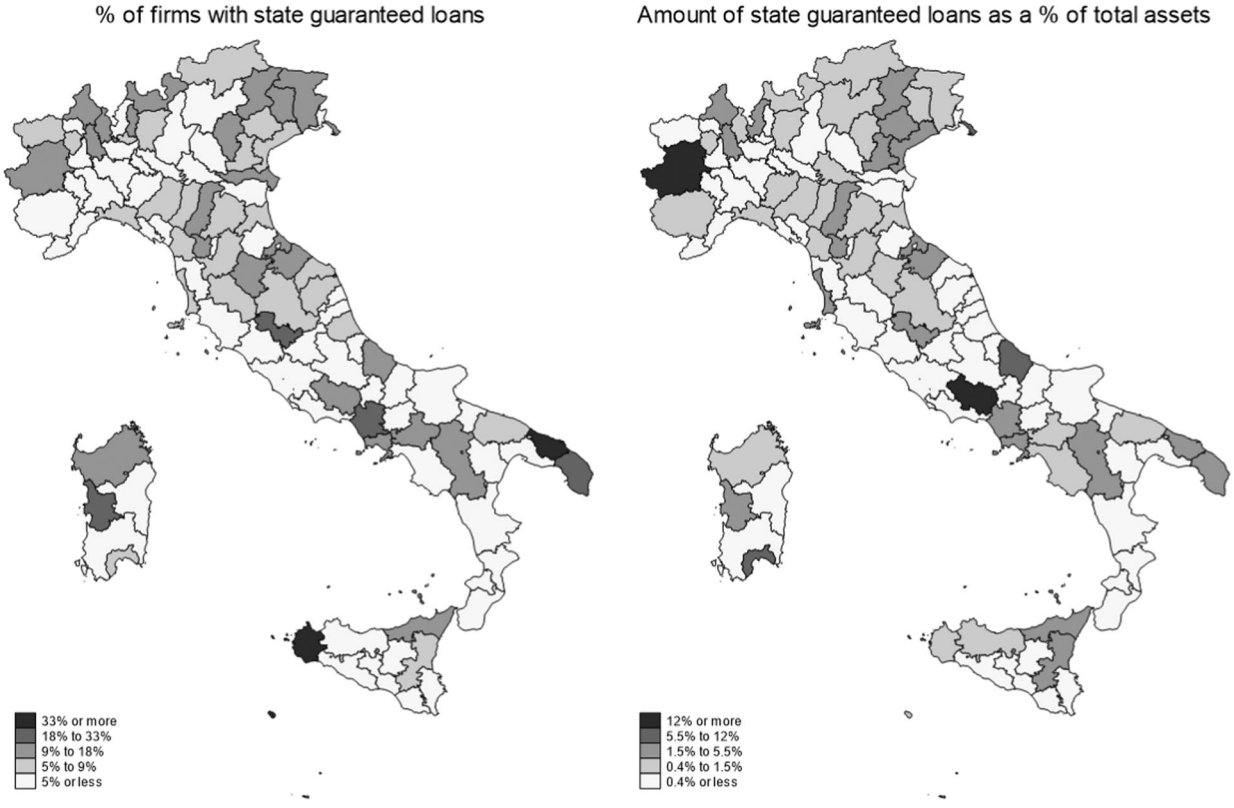

FIGURE 3 | Percentage of firms with state-guaranteed loans and guaranteed amounts as a percentage of total assets by Italian provinces. The left panel of this figure shows the percentage of firms in each province that received a state-guaranteed loan relative to the total number of firms. The right panel shows the total guaranteed amount per province as a percentage of the total assets of firms in that province.

TABLE 3 | Descriptive statistics. This table shows the descriptive statistics of firms over the entire period from 2016 to 2023. Variable definitions are provided in the Appendix.

	N	Mean	SD	p25	p50	p75
Sales, €M	48,480	257.4	1,180.5	64.2	96.0	177.9
EBITDA, €M	48,480	21.6	127.8	2.3	6.2	14.9
Net income, €M	48,480	9.3	114.8	0.4	2.2	7.0
Financial debt, €M	48,480	71.4	1,177.4	0.0	7.5	25.5
Cash, €M	48,480	18.8	127.3	0.8	3.7	11.9
Log sales	48,480	11.7	1.0	11.1	11.5	12.1
CAPEX-to-assets ratio, %	48,480	4.6	8.7	0.6	2.5	6.4
Leverage (NFP/V), %	48,480	7.7	21.2	−3.1	2.5	21.6
Leverage (D/V), %	48,480	16.4	17.5	0.0	11.2	28.5
ROA, %	48,480	8.8	8.6	3.9	7.6	12.6
ROE, %	48,480	9.6	37.9	2.7	9.4	19.2
OCF-to-assets ratio, %	48,480	7.1	7.6	3.0	6.1	10.3
Current ratio	48,480	1.7	1.4	1.1	1.4	1.9
Quick ratio	48,480	1.3	1.2	0.7	1.1	1.5
Cash ratio, %	48,480	8.7	10.8	1.0	4.8	12.4

TABLE 4 | Descriptive statistics of firms with and without state-guaranteed loans in 2019. This table compares firms that received state-guaranteed loans to those that did not, reporting differences in descriptive statistics. *T*-tests for mean differences and Wilcoxon rank-sum tests for median differences are also reported. Statistical significance is denoted as ***, ** and * for the 1%, 5% and 10% levels, respectively. Variable definitions are provided in the Appendix.

	State guarantee = 1			State guarantee = 0			Difference	
	N	Mean	Median	*N*	Mean	Median	Mean	Median
Sales, €M	385	310.0	120.0	5809	240.0	92.0	70.0	28.0***
EBITDA, €M	385	15.0	7.0	5809	23.0	5.9	−8.0	1.1**
Net income, €M	385	−0.3	1.3	5809	9.8	2.2	−10.1**	−0.9***
Financial debt, €M	385	78.0	34.0	5809	66.0	6.9	12.0	27.1***
Cash, €M	385	21.0	5.3	5809	16.0	3.1	5.0	2.2***
Log sales	385	11.9	11.7	5809	11.7	11.4	0.2***	0.3***
CAPEX-to-assets ratio, %	385	6.5	3.9	5809	4.9	2.6	1.7***	1.3***
Leverage (NFP/V), %	385	20.1	20.4	5809	8.0	2.5	12.1***	17.9***
Leverage (D/V), %	385	26.6	27.2	5809	16.3	10.3	10.3***	16.9***
ROA, %	385	6.1	5.5	5809	9.1	7.7	−3.0***	−2.2***
ROE, %	385	2.5	5.0	5809	10.4	9.9	−8.0***	−4.9***
OCF-to-assets ratio, %	385	4.8	4.6	5809	7.3	6.2	−2.6***	−1.6***
Current ratio	385	1.2	1.1	5809	1.7	1.3	−0.5***	−0.2***
Quick ratio	385	0.8	0.8	5809	1.3	1.0	−0.5***	−0.3***
Cash ratio, %	385	6.5	4.2	5809	8.3	4.2	−1.8***	0.0

guarantees relative to the total number of firms in each province, while the right panel presents the loan amount as a percentage of the total assets of firms in the same area. The resulting distribution differs markedly from the pattern observed in Figure 2. Once adjusted for local firm density and asset size, public guarantees appear to be more evenly spread across the country. Several darkest-shaded provinces, indicating the most intensive use of public aid, are now concentrated in the central and southern regions. This suggests that relative to their economic scale, firms in these areas relied more heavily on the guarantee programme, reflecting greater vulnerability to the shock, tighter liquidity constraints or more limited access to

alternative funding. Conversely, some northern provinces that appeared dominant in Figure 2 become less prominent after normalization.

4.3 | Firm Characteristics and Guaranteed Loans

Tables 3 and 4 jointly provide a descriptive overview of the firms in our sample and show systematic differences between firms that accessed state-guaranteed loans and those that did not. Table 3 summarizes the distribution of firm-year observations over the 2016–2023 period. The data shows considerable heterogeneity in size, profitability, capital structure and liquidity. This reflects the coverage of firms of different sizes operating across diverse industries. Building on this, Table 4 contrasts firms that received public support with those that did not, focusing on pre-pandemic characteristics. Firms accessing state guarantees were larger—as reflected by higher sales and total assets, with median sales of €120 million compared to €92 million for other firms—but also significantly more leveraged, less profitable and less liquid. For instance, ROA and ROE were markedly lower for firms accessing state-guaranteed loans, and leverage was substantially higher. Similarly, firms that received state-guaranteed loans exhibited weaker cash flow generation and lower liquidity ratios, including the current and quick ratios. These patterns suggest that public guarantees were more likely to be taken up by firms with greater financial fragility, consistent with the policy objective of targeting support to firms facing significant risk or financing constraints during the pandemic.

Table 5 presents the results of a linear probability model estimating the likelihood that a firm received a state-guaranteed loan in 2020, based on its pre-pandemic financial characteristics (in 2019), including size, profitability, investment intensity and liquidity. The multivariate analysis confirms the evidence already presented in Table 4, after controlling for unobserved heterogeneity across sectors and geographical areas through industry and province fixed effects. The first specification shows that larger and more leveraged firms were significantly more likely to need public support, while more profitable and more liquid firms were less likely to require it. In terms of economic significance, while the unconditional probability of a state-guaranteed loan in the sample is approximately 6.2% (385 out of 6194 firms), a one standard deviation increase in (the log of) sales (1.0 from Table 3) is associated with a 2.2 percentage point increase in the likelihood of requiring support. Similarly, a one standard deviation increase in leverage (21.2%) corresponds to a 2.5 percentage point increase. In contrast, a one standard deviation decrease in ROA (8.6%) and the current ratio (1.4) is associated with a 1.2 and 0.85 percentage point increase, respectively, in the probability of requiring state support. These findings confirm that firms with higher financial risk—i.e., greater leverage, lower profitability and weaker liquidity—were significantly more likely to rely on state-backed credit during the crisis.

TABLE 5 | Likelihood of requiring a state-guaranteed loan. This table presents the results of a linear probability model estimating the likelihood of firms requiring a state-guaranteed loan. Firm variables are measured for the year 2019. Heteroskedasticity-robust standard errors are reported in parentheses. Statistical significance is denoted as ***, ** and * for the 1%, 5% and 10% levels, respectively. Variable definitions are provided in the Appendix.

Dependent variable	State guarantee dummy		
	(1)	(2)	(3)
Log sales	0.0223***	0.0227***	0.0251***
	(0.0039)	(0.0039)	(0.0039)
CAPEX-to-assets ratio	0.0005	0.0003	0.0006
	(0.0004)	(0.0004)	(0.0004)
Leverage (NFP/V)	0.0012***	0.0013***	
	(0.0002)	(0.0002)	
ROA	−0.0014***		
	(0.0003)		
Current ratio	−0.0061***		
	(0.0012)		
ROE		−0.0002***	
		(0.0001)	
Quick ratio		−0.0082***	
		(0.0015)	
Leverage (D/V)			0.0018***
			(0.0002)
OCF-to-assets ratio			−0.0018***
			(0.0004)
Cash ratio			−0.0004
			(0.0002)
Constant	−0.2335***	−0.2478***	−0.2979***
	(0.0505)	(0.0499)	(0.0507)
Observations	6194	6194	6194
R-squared	0.0785	0.0776	0.0801
Industry fixed effects	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes

4.4 | Tracking the Recovery: Financial Adjustment After the Pandemic

Firms receiving state-guaranteed loans differed from those that did not need such aid. Figure 4 provides a dynamic perspective of four key financial indicators—profitability, leverage (using both net financial position and financial debt) and capital investment—over the period 2016–2023, i.e., both before and after the pandemic, comparing firms that received state support with those that did not.

The top left panel presents trends in ROA, measured as EBITDA over total assets. Two notable patterns emerge. First, the 2020

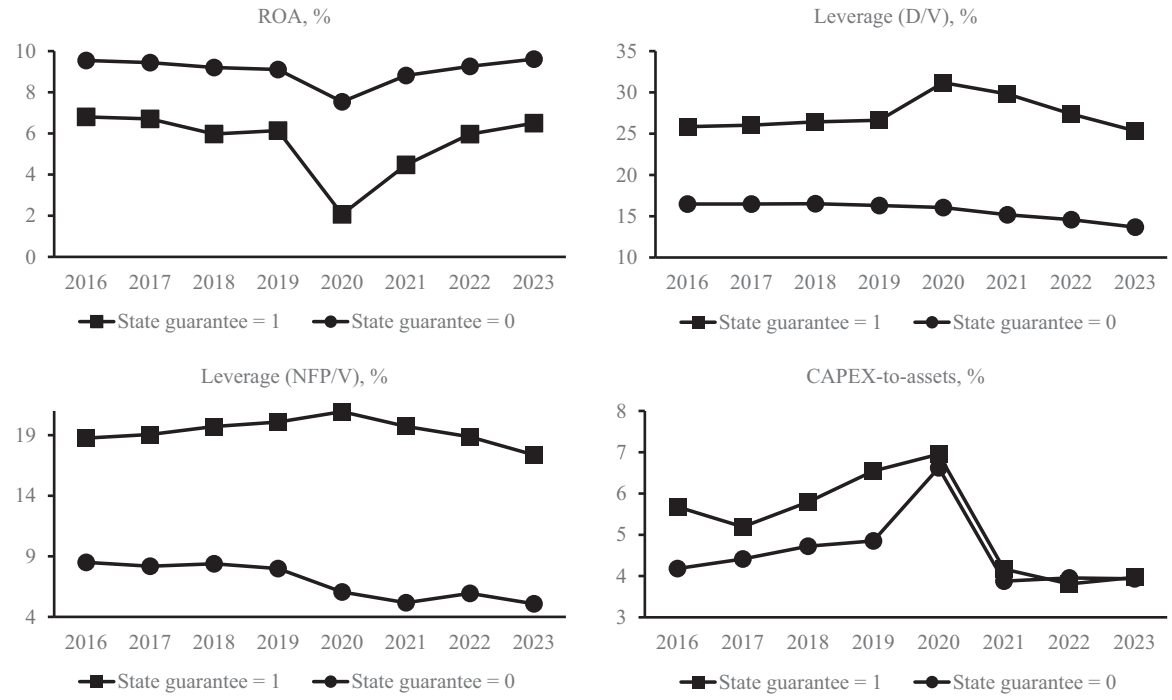

FIGURE 4 | Evolution of firms' profitability, leverage and capital investment: firms with state-guaranteed loans versus others. This figure compares the evolution of profitability, leverage and capital investment for firms that received a state-guaranteed loan versus those that did not from 2016 to 2023. The upper left panel shows ROA (EBITDA over total assets), the upper right panel and lower left panel show leverage, measured as net financial position over total assets and financial debt over total assets, respectively, while the lower right panel shows CAPEX-to-assets ratio.

decline in profitability, corresponding to the onset of the pandemic, is significantly more pronounced for firms that received state guarantees. These firms were financially more vulnerable before the crisis and disproportionately affected by the shock. Second, the profitability of supported firms rapidly recovers, with the gap relative to non-recipient firms narrowing and returning to precrisis level by 2023. While these patterns do not establish causality, they are consistent with the notion that the policy intervention contributed to firm stabilization and recovery.

The top right and bottom left panels of Figure 4 plot two measures of leverage: the ratio of financial debt to total assets and the ratio of net financial position to total assets. Both metrics showed a marked increase for recipient firms in 2020, which is expected given the newly received guaranteed loans. More interestingly, leverage sharply declined in the years that followed, suggesting that supported firms engaged in active deleveraging after the crisis. This trend contrasts with the relatively flat leverage trajectory observed among non-recipient firms and indicates a potential difference in postcrisis financial adjustment.

The bottom right panel presents the evolution of capital expenditures scaled by total assets. Investment activity contracted sharply in 2020 across both groups due to heightened uncertainty and operational and financial constraints. However, in the years following the crisis, capital expenditures remained broadly aligned between treated and untreated firms, with no significant divergence in investment behaviour. This might suggest that state-guaranteed loans effectively supported firms' operational continuity, but had a more limited impact on medium- to long-term investment.

Taken together, Figure 4 confirms the structural differences between firms that received public support and those that did not and shows that the financial trajectory of recipient firms improved markedly following the intervention, particularly in terms of profitability recovery and leverage reduction.

Table 6 presents the results of a linear regression estimating the impact of state guarantees on firms' profitability, leverage and capital expenditures. The models incorporate firm-level controls, and industry and province fixed effects. The variable of interest is the interaction between the state guarantee dummy and various time indicators (*Post* and individual years from 2020 to 2023), allowing for a comparison between treated (beneficiary) and untreated (non-beneficiary) firms before and after the receipt of the guaranteed loans.

In the first two columns, the dependent variable is ROA. Firms that received a state guarantee were significantly less profitable both in levels (as indicated by the negative and significant coefficient of the state guarantee dummy) and in terms of posttreatment performance (as suggested by the negative and significant coefficient of the interaction between state guarantee and *Post*, in Model 1). The interactions between the state guarantee dummy and year indicators (Model 2) indicate that the drop in ROA for supported firms was particularly pronounced in the immediate aftermath of the pandemic. However, this negative effect diminished over time and became statistically insignificant by 2023. This pattern is consistent with the visual evidence in Figure 4, showing a narrowing profitability gap between supported and non-supported firms in the post-pandemic period. While the results do not imply causality, as firms' decision to apply for public support is endogenous,

TABLE 6 | Profitability, leverage and capital expenditures. This table presents the results of a linear regression estimating the impact of state guarantees on firms' profitability (EBITDA over total assets, Models 1 and 2), leverage (net financial position over total assets, Models 3 and 4) and capital expenditures (CAPEX over total assets, Models 5 and 6). Models 1, 3 and 5 include State guarantee (a dummy for firms that received a state-guaranteed loan), Post (a dummy for the post-2019 period) and the interaction between State guarantee and Post. Models 2, 4 and 6 include State guarantee, year fixed effects (2016 is the base year) and the interaction between State guarantee and post-2019 year fixed effects. Heteroskedasticity-robust standard errors clustered at the firm level are in parentheses. Statistical significance is denoted as ***, ** and * for the 1%, 5% and 10% levels, respectively. Variable definitions are provided in the Appendix.

Dependent variable	(1) ROA	(2) ROA	(3) Leverage	(4) Leverage	(5) CAPEX	(6) CAPEX
State guarantee dummy	−1.7728***	−1.7618***	8.1161***	8.1169***	0.7708***	0.7627***
	(0.3201)	(0.3196)	(0.9366)	(0.9366)	(0.2822)	(0.2822)
Post	−1.0065***		−2.2795***		0.3245***	
	(0.0781)		(0.1633)		(0.0770)	
State guarantee dummy × Post	−0.7309**		2.0603***		−1.0759***	
	(0.2927)		(0.6417)		(0.3063)	
Year 2020		−2.3590***		−2.7333***		2.5259***
		(0.0943)		(0.1690)		(0.1426)
Year 2021		−0.8691***		−2.6377***		−0.4271***
		(0.0962)		(0.1820)		(0.1118)
Year 2022		−0.4445***		−1.6803***		−0.4603***
		(0.1038)		(0.1975)		(0.1083)
Year 2023		−0.2520**		−2.0304***		−0.4486***
		(0.1069)		(0.2205)		(0.1123)
State guarantee dummy × Year 2020		−2.0455***		2.6252***		−0.6556
		(0.4193)		(0.6377)		(0.5377)
State guarantee dummy × Year 2021		−0.9397***		2.7826***		−0.8497*
		(0.3432)		(0.7496)		(0.4846)
State guarantee dummy × Year 2022		0.0019		1.7226**		−1.3988***
		(0.3900)		(0.7931)		(0.3981)
State guarantee dummy × Year 2023		0.1100		1.0464		−1.3389***
		(0.3977)		(0.8005)		(0.4343)
Constant	−2.6507	−2.0054	15.1650*	15.4094*	5.3099***	4.4248**
	(2.9138)	(2.8989)	(9.1765)	(9.1782)	(1.9778)	(1.9541)
Observations	48,480	48,480	48,480	48,480	48,480	48,480
R-squared	0.1347	0.1402	0.2056	0.2058	0.0603	0.0714
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

they are consistent with the interpretation that the guaranteed loans have contributed to firm recovery.

The dependent variable in the second set of regressions (Models 3 and 4) is leverage (measured as net financial position over total assets). Supported firms were structurally more leveraged than their counterparts before the pandemic, as confirmed by the positive and significant coefficient of the state guarantee dummy. The negative and significant coefficient of *Post* suggests a generalized deleveraging in the post-pandemic period across all firms. The interaction term between the state guarantee dummy and the year indicators is positive but insignificant in 2023. This suggests that beneficiary firms progressively reduced their leverage, ultimately returning to the pre-pandemic differential in leverage between treated and untreated firms.

Finally, the last two regressions (Models 5 and 6) examine the dynamics of capital expenditures (measured as CAPEX to total assets). Both treated and untreated firms cut capital expenditures after the pandemic (in the years 2021 to 2023). However, as suggested by the negative coefficient of the interactions between the state guarantee dummy and post-

pandemic years (2020 through 2023), supported firms reduced their investment activity more than non-recipient peers. While public support may have eased short-term financial distress, it did not translate into a sustained boost in investment.

4.5 | Unpacking the Recovery: Profitability and Debt Structure

The previous analysis has focused on average effects, but substantial heterogeneity exists among the firms that benefited from state guarantees. In particular, it is important to assess whether initially more fragile firms—characterized by low profitability and high indebtedness—also experienced improvement in their financial conditions. The risk is that extending additional leverage to already weak firms might have only postponed distress, potentially contributing to a 'zombie lending' dynamic. To explore this possibility, Figure 5 shows the evolution of the debt service coverage ratio (DSCR) for supported firms, broken down by DSCR quartiles. We use the DSCR for two reasons.

First, the DSCR effectively captures short-term fragility, as it measures a firm's ability to cover impending debt-related outflows—namely, interest payments and short-term financial obligations—with its operating earnings. This makes it a suitable indicator for identifying financial strain among firms with limited liquidity and significant exposure to near-term refinancing pressure. Second, the DSCR also holds regulatory significance. The DSCR is recognized as a key performance indicator under the Italian Insolvency Code (D. Lgs. No. 14/2019) to assess the sustainability of a firm's debt. Besides, according to the European Banking Authority's guidelines, a

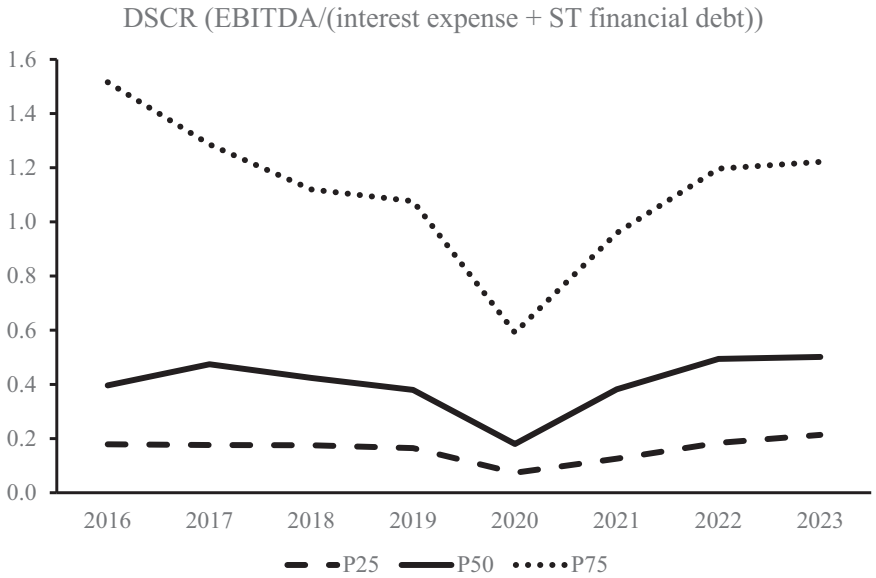

FIGURE 5 | Evolution of debt service coverage ratio for firms with state-guaranteed loans. This figure shows the evolution of firms' debt service coverage ratio (DSCR) (EBITDA over the sum of interest expense and short-term financial debt) for firms that received a state-guaranteed loan in 2020. The figure shows the evolution of the first quartile (dashed line), median (solid line) and third quartile (dotted line) over time.

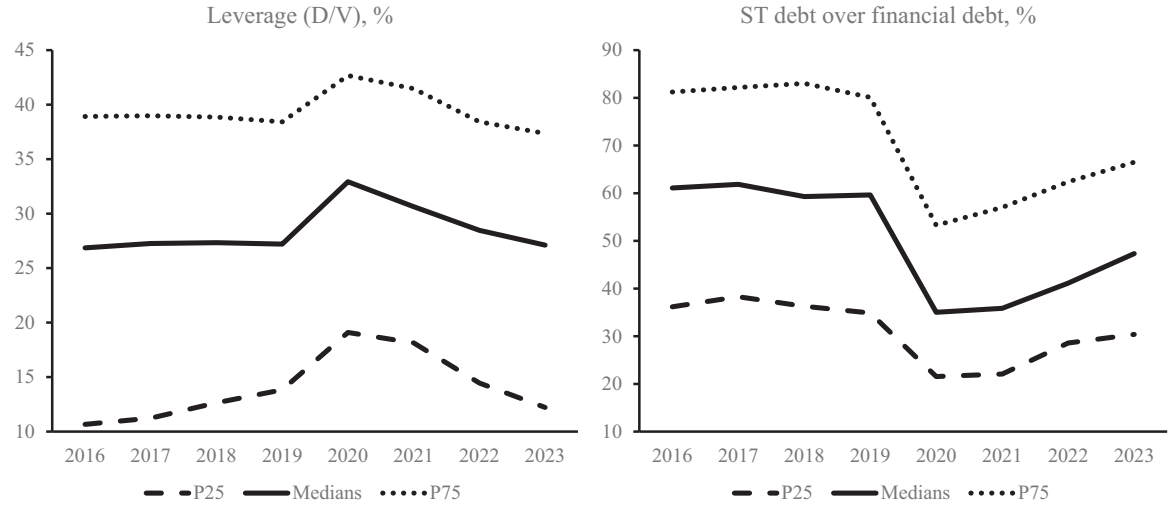

FIGURE 6 | Evolution of leverage and short-term debt ratio for firms with state-guaranteed loans. This figure shows the evolution of leverage (financial debt over total assets, left panel) and the ratio of short-term financial debt to total financial debt (right panel) for firms that received a state-guaranteed loan in 2020. Both panels show the evolution of the first quartile (dashed line), median (solid line) and third quartile (dotted line) over time.

TABLE 7 | Impact of profitability, leverage and cost of debt on firms' debt service coverage ratio (DSCR). This table presents the results of a linear regression estimating how profitability, leverage and the cost of debt affect the ability of firms receiving state-guaranteed loans to repay their debt, measured by the debt service coverage ratio (DSCR, i.e. EBITDA over the sum of interest expense and short-term financial debt) from 2021 to 2023. Heteroskedasticity-robust standard errors clustered at the firm level are reported in parentheses. Statistical significance is denoted as ***, ** and * for the 1%, 5% and 10% levels, respectively. Variable definitions are provided in the Appendix.

Dependent variable	(1) DSCR	(2) DSCR	(3) DSCR
Log sales	0.2999	0.3272	0.2716
	(0.3045)	(0.3154)	(0.3149)
CAPEX-to-assets ratio	0.0056	0.0086	0.0077
	(0.0244)	(0.0247)	(0.0250)
Leverage (NFP/V)	0.0187	0.0259	
	(0.0271)	(0.0285)	
Short-term debt ratio	−0.0214	−0.0195	−0.0211
	(0.0154)	(0.0149)	(0.0165)
Cost of debt	0.2450	0.2404	0.2424
	(0.2529)	(0.2516)	(0.2524)
ROA	0.1985***	0.2004***	0.2058***
	(0.0708)	(0.0715)	(0.0731)
Current ratio	0.4084		
	(0.8026)		
Quick ratio		0.8863	
		(0.9387)	
Leverage (D/V)			0.0426
			(0.0297)
Cash ratio			0.0282
			(0.0331)
Constant	−1.1304	−2.0476	−0.6045
	(5.3007)	(5.5076)	(5.3517)
Observations	1082	1082	1082
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R-squared	0.8686	0.8687	0.8688

DSCR below 1.1 indicates a significant increase in credit risk and implies a downgrade in credit risk classification—from Stage 1 to Stage 2.

Figure 5 confirms the presence of heterogeneous recovery trajectories. The most pronounced improvements in DSCR are observed among firms in a more robust financial position (the third quartile of DSCR), yet there is a clear upward trend across the entire distribution. Notably, the DSCR significantly increased between 2020 and 2023 also among firms in the bottom quartile. This suggests that the recovery in debt servicing capacity was not limited to the most financially robust firms but extended to those that entered the crisis in a more fragile condition.

A potential concern is that the recovery in DSCR may not reflect improved operating performance but rather a mechanical reduction in the denominator, namely, an extension of debt maturity. Beneficiary firms may have used guaranteed funds to replace short-term liabilities with longer-term debt, thereby boosting their DSCR without resolving solvency issues. To investigate this possibility, Figure 6 displays the evolution of two complementary indicators, again broken down by quartiles: the leverage ratio (debt to total assets, left panel) and the ratio between short-term debt and total financial debt (right panel).

The left panel shows that leverage declined steadily across all quartiles after the initial rise in 2020, consistent with a general deleveraging. The right panel indicates a drop in the share of short-term debt in 2020, pointing to a significant extension in debt maturity immediately following the receipt of guaranteed loans. However, this trend partially reversed from 2021 onward. The rebound in short-term debt suggests that the maturity extension was temporary and that the improvement in DSCR reflects a strong recovery in firm profitability rather than changes in the composition or maturity of financial liabilities. Figures 5 and 6 jointly confirm an improvement in operating performance and debt servicing capacity, even among the firms that were initially the most financially vulnerable.

Table 7 complements the visual evidence presented in Figures 5 and 6 by showing the results of a linear regression of firms' DSCR on firm-level variables and firm and year fixed effects over the postcrisis period (2021–2023). To disentangle the effect of the individual components of the ratio, we add ROA, the share of short-term debt, and the cost of debt among the covariates. The results confirm that operating profitability plays a central role in explaining variation in DSCR, as the coefficient of ROA is positive and highly significant across all specifications. The short-term debt ratio has a negative coefficient, as expected, but it is insignificant. While a higher share of short-term debt is associated with lower DSCR, the modest rise in short-term debt observed between 2021 and 2023 (as shown in Figure 6) does not offset firms' improved DSCR. The third component of the DSCR is the cost of debt, which is also insignificant in explaining its variation over time.

Taken together, this evidence shows that the increase in DSCR over the period 2021–2023 is driven by an improvement in the numerator (i.e., operating profitability), which more than compensates for the increase in the denominator (short-term debt and interest expense). This reinforces the view that the financial stabilization of supported firms has likely represented a tangible outcome of the public intervention.

5 | Conclusion

This paper investigates the financial evolution of medium and large Italian firms that accessed a major state-guaranteed loan programme during the COVID-19 crisis. Using firm-level data from 2016 to 2023, we document three key findings. First, firms

that received guaranteed loans entered the crisis in a weaker financial position, as they were less profitable, more leveraged and less liquid. Second, in the years following the intervention, these firms experienced substantial improvements across multiple financial dimensions, gradually converging towards the performance of non-recipient firms. Third, the recovery in debt servicing capacity appears to be primarily driven by operating profitability rather than by changes in debt structure alone.

With the caveat that unobserved confounders might blur the causal link between the state guarantee support and the observed patterns, the results are consistent with the view that the programme has contributed to financial stabilization, particularly for vulnerable firms. These findings contribute to the broader literature on indirect public support of firms in response to external shocks and underscore the importance of evaluating both the cross-sectional and dynamic effects of public interventions on firm behaviour.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data supporting the findings of this study come from the explanatory notes of firms' annual reports (access to the *Garanzia Italia* programme), as well as from AIDA (a commercial database by Bureau van Dijk – a Moody's company, providing firms' financial information).

Endnotes

[1] Decree-Law No. 23/2020, converted into Law No. 40/2020.

[2] SACE is fully controlled by the Italian Ministry of Economy and Finance (MEF) through *Cassa Depositi e Prestiti* (CDP), a financial institution meant to support the country's economic development.

[3] As of June 3, 2020, only 0.46% of total SACE guarantees had been granted. Therefore, we present the programme features as of the Conversion Law No. 40, dated June 5, 2020.

[4] We also conducted Google searches for all 6594 companies to identify any news or announcements related to the use of *Garanzia Italia*. This search did not reveal any additional cases beyond those identified through the review of annual reports.

[5] Industries are classified according to the NACE intermediate SNA/ISIC aggregation A*38.

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Appendix

Variable definitions

Variable name	Definition
Sales	Sales revenues and other operating revenues
EBITDA	Operating income plus total depreciation, amortization and impairment losses
Net income	Net income
Financial debt	Short-term and long-term bank debt, plus short-term and long-term other financial debt, plus short-term and long-term bonds
Cash	Cash and cash equivalents
Log sales	Natural logarithm of Sales
CAPEX-to-assets ratio	Change in net fixed assets plus depreciation, amortization and impairment losses divided by total assets
Leverage (NFP/V)	Financial debt net of cash and cash equivalents divided by total assets
Leverage (D/V)	Financial debt divided by total assets
ROA	EBITDA divided by total assets
ROE	Net income divided by shareholders' equity
OCF-to-assets ratio	Operating cash flow divided by total assets
Current ratio	Current assets divided by short-term liabilities
Quick ratio	Current assets net of inventory divided by short-term liabilities
Cash ratio	Cash and cash equivalents divided by current assets
Short-term debt ratio	Short-term bank debt, plus short-term other financial debt, plus short-term bonds divided by financial debt
Cost of debt	Interest expense divided by lagged financial debt
DSCR	Debt Service Coverage Ratio, i.e., EBITDA divided by the sum of interest expenses and lagged value of short-term financial debt