The role of government policies for Italian firms during the COVID-19 crisis

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ABSTRACT

This paper aims to respond to this research question: "How effective have government incentives been in preserving firm profitability and growth during the COVID-19 crisis?". We used a large, representative sample of Italian companies, which has produced a deeper study than the macro analyses provided by national statistics. Results shows that government policies alleviated the negative effects of the pandemic on troubled companies, but it was not enough to maintain the same financial health as firms that did not need this support. Small companies were the most adversely affected by the pandemic.

1. Introduction

The COVID-19 crisis has prompted emerging literature on the impact of the pandemic on varied firm aspects such as value (e.g., Shen et al., 2020; Hu and Zhang, 2021), growth (e.g., Bose et al., 2021; Chen et al., 2021) or even the impact from a gender perspective (Liu et al., 2021). Some studies have analyzed not just current growth, but innovation, which affects companies' potential growth, and have found it has decreased caused by COVID-19 (Jin et al., 2022). Companies' worrying perspectives in a context of uncertainty could be worsened by the increase in the cost of equity capital because of the pandemic (Ke, 2022). The severity of this crisis was evidenced by the dramatic fall in the prices of listed firms' stocks during the first months of 2020 (Neukirchen et al., 2022), due to a sharp deterioration of the profitability-risk relationship. In this research environment, some works investigates the influence of monetary authority strategies (e.g. Chen and Yeh, 2021) or government policies during the downturn (e.g. Fendel et al., 2021). The work of Iyer and Simkins (2022) interestingly reviews the economic impact of the Covid-19 emergency, evidencing how governments played a key role in their response to the crisis. Focusing on the Italian context, which suffered from a tight lockdown because of the pandemic (Erdem, 2020), the government issued several decrees to help companies face this extraordinary situation and stay in business, as indicated in the text of the decrees. In light of such governmental strategies, the aim of the present work is to investigate the effectiveness of the policies adopted by the Italian government through these decrees. Specifically, we study the effect of the pandemic and subsequent State aid on firm profitability and growth. Our choice to study this topic stems from the fact that firms are the engine of the economic system, and their growth is essential for job creation and the overall welfare of a country. Considering this relevance, the extant literature has shown particular interest in the determinants of firm growth (Zhou and De Wit, 2009; Gupta et al., 2013), and our work aims to enrich this strand of research. Our findings reveal that, despite a decrease in sales, the support provided by the government has mitigated the negative effects of the COVID-19 crisis. However, we observe that firms that took advantage of the State incentives did not perform as well as firms that did not. Therefore, despite the fact that State assistance supported firms, their survival

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and growth after the downturn could not depend only on government incentives. Our work contributes to the existing literature in several ways. First, we have studied a large sample of firms during the pandemic at the micro (firm-specific) level. Second, we have examined the effect of the COVID-19 crisis on the balance sheets of firms. Third, we have highlighted the effect of State aid during the emergency.

2. Literature review and research question

Many recent papers have investigated the firm-level effects of the COVID-19 pandemic (e.g., Shen et al., 2020; Arnold and Rhodes, 2021; Doruk et al., 2021; Krieger et al., 2021; Huang et al., 2021; Carter et al., 2022; Tchuigoua et al., 2022; Hsu and Yang, 2022; Kumar and Zbib, 2022). These effects could have been influenced by government incentives, which have played a key role in firms (Songling et al., 2018; Minh and Ngoc, 2021), especially during the recent COVID-19 crisis (Tarkom, 2021). Along these lines, Tarkom (2021) and Iyer and Simkins (2022) have recently focused on the impact of government incentives on firms during the coronavirus emergency. Our work joins the direction of such recent studies, and our research question is of relevance because firm growth, which is a core topic in the academic literature as above mentioned, might be influenced in the years ahead because of the recent economic shock. The most commonly used proxies of firm growth are based on the measurements of differences in firm size (Coad and Hölzl, 2021), in terms of employment, sales, and total assets. Jovanovic's (1982) noteworthy contribution and that of other papers suggest that the growth of a company is related to age and size (e.g., Heshmati, 2001; Mateev and Anastasov, 2010). There are a number of important papers that have used the Jovanovic model[3] (e.g., Dunne and Evans, 1987; Hughes, 1994; Heshmati, 2001; Honjo and Harada, 2006; Morone and Testa, 2008; Mateev and Anastasov, 2010; Haltiwanger et al., 2013; Coad et al., 2013; Lawless, 2014; Navaretti et al., 2014; Anton, 2019; Sanchez-Vidal et al., 2020; Yang and Tsou, 2020; Navaretti et al., 2022). Moreover, firm growth is related to profitability (Santos and Brito, 2012). All this evidence prompted us to explore the effect of Italian government policies during the COVID-19 crisis in terms of firm profitability and growth.

3. Research design: data, methodology, and variables

The study employs a large, unbalanced panel sample of 8612659 firm-year observations (collected from the AIDA database of Bureau van Dijk) of non-financial Italian companies over the 2012–2020 period. Our work applies the Jovanovic model (1982), as it is a very commonly used model to measure firm growth and has been used in authoritative doctrine, as mentioned above. The Jovanovic model used is the following:

$$FirmGrowth = \beta_0 + \beta_1 Size + \beta_2 Age + \beta_h X + \varepsilon$$

The logic of the model is that firm growth is associated with an increase in sales, so it is opportune to use this model since a decrease in sales was the first immediate firm-level effect of the pandemic.

Table 1 displays the variables employed in our study and reports the calculation of each single variable.

Table 1
Descriptions of variables.

Variables	Calculation
Employee Growth	variation in the number of employees for each firm compared to the previous year
Sales Growth	variation in sales for each firm compared to the previous year
Grants	balance sheet value of grants obtained by the firm scaled to sales
Total Asset Growth	growth of total assets compared to the previous year
ROA	net income to total assets
Interest	financial expenses emerging from firm income statements to EBIT
Fixed Assets	fixed material assets/total assets
Short-Term Assets	short-term assets/total assets
Stock	total inventory/short-term assets
Cash	cash/short-term assets
Debt	total debt/total assets
Fin_Debt	financial debt/total assets
Size	natural log of total assets over the previous year (t-1)
Age	natural logarithm of 1 + firm age, where firm age is equal to study year minus year of incorporation
Financial Slack	(debt minus cash)/total assets
D_COVID_small	if the year is 2020 and if the firm is small according to the European Commission definition
D_COVID_medium	if the year is 2020 and if the firm is medium-sized according to the European Commission definition
D_COVID_large	if the year is 2020 and if the firm is large according to the European Commission definition

Note: we have eliminated firm-year observations with meaningless economic information, like companies that showed a value for the ratio of fixed assets/total assets higher than 1 or lower than zero.

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[3] Jovanovic's model is a very commonly used model that was formulated after Gibrat's (1931) law.

4. Empirical results

4.1. Descriptive statistics

Table 2 shows the descriptive statistics for the variables used.

Table 3 reports the descriptive statistics for the variables measuring firm growth (Employees, Size, and Sales).

The mean value of Employees is 10.63, and small enterprises make up the vast majority of our sample. It is noticeable that when using both Total Assets and Sales, most companies are classified as small too. To summarize, the dummies according to size do not change much depending on the definition of size.

4.2. The effect of Italian government policies during the COVID-19 crisis

Table 4 shows that the number of employees did not drastically fall despite the pandemic, probably because firms had the opportunity to take advantage of a layoff period using a special integration fund provided by a decree-law the Italian government issued on April 8th, 2020 (the so-called "Decreto Liquidità").

Table 5 shows trends in the variables Sales Growth, Grants, ROA, and Interest. Panel A shows an abrupt decrease for 2020, after many years of a positive trend for Sales Growth. Panel B shows the trend of the variable Grant, which reflects non-taxable revenues that

Table 2

Descriptive statistics.

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
Employee Growth	4,188,222	0.027	0.000	0.413	−1.000	418.000
Sales Growth	6,046,242	0.133	0.001	0.738	−135.750	109.000
Grants	7,151,907	0.062	0.000	4.744	−409.000	6,354.000
Total Asset Growth	7,039,849	0.113	0.009	0.748	−1.000	1,159.965
ROA	8,582,142	0.017	0.007	0.413	−289.000	963.057
Interest	8,139,761	0.100	0.000	10.179	−10,878.300	18,326.730
Fixed Assets	8,564,116	0.215	0.069	0.289	0.000	1.000
Short-Term Assets	8,564,116	0.667	0.785	0.322	0.000	1.000
Stock	8,506,715	0.190	0.007	0.293	0.000	1.000
Cash	8,506,109	0.246	0.122	0.287	0.000	1.000
Debt	8,568,544	0.656	0.740	0.288	0.000	1.000
Fin_Debt	730,601	0.197	0.118	0.227	0.000	1.000
Size	7,146,219	6.073	6.089	1.888	0.000	18.361
Age	13,082,003	2.312	2.485	0.955	0.000	5.476
Financial slack	628,194	0.071	0.047	0.347	−1.000	1.000

As can be seen in Table 2, the panel is unbalanced, as there are not always observations for each company and every year. This is crucial when it comes to the number of observations of the variables created as differences (e.g., the growth variables).[1] The other source of unbalance comes from the fact that there are observations which do not always have a value for all variables in one specific year. The most noteworthy example of this is the variable Fin_Debt, which is an item not always available in the AIDA database.

Table 3

Descriptive statistics for the variables Employees, Total assets, and Sales for different sized firms.

Variable	Obs	Mean	Std. Dev.	Min	Max
Employees	8,408,509	10.63	207.39	0	142,694
Dummy Small	8,408,509	97.19%	0.17	0	1
Dummy Medium	8,408,509	2.38%	0.15	0	1
Dummy Large	8,408,509	0.43%	0.07	0	1
Tot.		100.00%			
Total assets	8,612,659	9,076.01	1,177,204	0	1,541,720,000
Dummy Small	8,612,659	95.16%	0.21	0	1
Dummy Medium	8,612,659	3.64%	0.19	0	1
Dummy Large	8,612,659	1.19%	0.11	0	1
Tot.		100.00%			
Sales	8,611,636	3,050.14	99,195.07	0	68,326,090
Dummy Small	8,611,636	96.75%	0.18	0	1
Dummy Medium	8,611,636	2.58%	0.16	0	1
Dummy Large	8,611,636	0.66%	0.08	0	1
Tot.		100.00%			

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[1] Two examples of the different firms that participate in each analysis are mentioned to give the reader a brief idea: the number of companies for the 8,582,142 firm-year observations of the ROA variable of Table 5 is 1,564,991 different enterprises, and the observations (5,477,196) of the regression of Model I in Table 9 correspond to 1,073,978 different companies.

Table 4

Mean and median for the Employee Growth variable. The variable is winsorized (5%[2]) for the percentiles of each year and sector (at the 3-digit level).

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mean of Employee Growth	3.90%	−1.49%	1.02%	4.67%	3.44%	3.40%	2.92%	4.18%	2.06%
Median of Employee Growth	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 5

Mean and median trends of the variables Sales Growth, Grants, ROA, and Interest. The variable Sales Growth is winsorized (5%) relative to the percentiles for each year and each sector (at the 3-digit level).

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
PANEL A.									
Mean Sales Growth	8.85%	9.91%	12.42%	17.80%	17.25%	17.10%	18.46%	15.77%	−0.07%
Median Sales Growth	−1.59%	−0.28%	0.00%	2.00%	1.51%	2.82%	2.86%	1.37%	−7.13%
PANEL B.									
Mean trend of Grants	4.72%	5.44%	6.18%	5.86%	5.87%	7.30%	5.34%	5.78%	11.21%
Median trend of Grants	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PANEL C.									
Mean of ROA	0.12%	0.26%	0.80%	1.58%	1.79%	2.39%	2.92%	3.17%	2.97%
Median of ROA	0.25%	0.26%	0.40%	0.65%	0.78%	0.98%	1.18%	1.30%	1.34%
PANEL D.									
Mean of Interest	13.22%	12.64%	9.96%	10.49%	9.41%	10.96%	9.66%	7.58%	5.41%
Median of Interest	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 6

Mean and median growth of the variable Total Asset Growth, Fixed Assets, Short-Term Assets, Stock, Cash, Debt, and Fin_Debt. Total Asset Growth is winsorized (5%) relative to the percentiles for each year and sector (at the 3-digit level).

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
PANEL A.									
Mean of Total Asset Growth	7.60%	6.74%	8.39%	10.65%	11.74%	12.56%	13.17%	13.01%	17.61%
Median of Total Asset Growth	0.00%	0.00%	0.29%	0.73%	1.04%	1.49%	1.34%	1.31%	4.05%
PANEL B.									
Mean of Fixed Assets	22.14%	22.01%	21.74%	21.49%	21.27%	21.01%	20.98%	20.90%	21.61%
Median of Fixed Assets	7.04%	6.83%	6.59%	6.53%	6.74%	6.75%	6.96%	6.98%	7.32%
PANEL C.									
Mean of Short-Term Assets	65.63%	65.82%	66.16%	66.63%	67.10%	67.42%	67.52%	67.57%	67.34%
Median of Short-Term Assets	77.45%	77.73%	78.06%	78.64%	79.00%	79.28%	79.16%	79.10%	78.57%
Mean of Stock	20.68%	20.33%	20.00%	19.40%	18.75%	18.20%	17.90%	17.74%	16.70%
Median of Stock	0.95%	0.97%	0.95%	0.81%	0.67%	0.49%	0.34%	0.36%	0.47%
Mean of Cash	21.20%	21.60%	22.35%	23.49%	24.70%	25.59%	26.14%	26.88%	31.75%
Median of Cash	8.19%	8.89%	9.72%	11.11%	12.62%	13.71%	14.26%	15.09%	22.73%
PANEL D.									
Mean of Debt	66.65%	66.60%	66.54%	66.29%	66.00%	65.44%	64.85%	64.17%	61.97%
Median of Debt	75.85%	75.62%	75.45%	75.00%	74.55%	73.70%	72.71%	71.65%	68.43%
Mean of Fin_Debt	20.30%	20.32%	20.41%	19.50%	18.75%	18.34%	18.51%	18.36%	19.42%
Median of Fin_Debt	11.77%	10.17%	10.93%	11.27%	12.18%	11.77%	12.33%	12.40%	14.87%

Note: A detailed look at the table reveals that Fixed Assets, Short Term Assets, Stock, and Fin_Debt tended to be stable throughout the period, including the year 2020. This is probably due to the fact that during the pandemic, firms did not operate regularly. Indeed, as companies were stuck and paralyzed, accounting items did not change much compared to previous years, and remained largely the same.

firms record on their balance sheets when they receive non-refundable cash aid. The mean makes an extraordinary jump upwards in 2020 due to support from government funds, as stipulated in the decree issued by the Italian government on May 19th, 2020 (the so-called "Decreto Rilancio"), which allowed each firm to obtain a sum of money proportionate to their decrease in sales caused by the coronavirus emergency. However, the subsidy was only available for firms that reported a 30% or greater drop in sales in March 2020 compared to March 2019. A comparison between the mean and median indicates that the average company did not receive any subsidy at the end of 2020 because many firms did not suffer the above-mentioned drop in sales.

Panel C shows that the value of ROA was maintained in 2020. It seems that the State grants and the decrease of interest payments were able to compensate for the drop in sales. Additionally, article 60 of the decree issued by the Italian government on August 14th, 2020 (the so-called "Decreto Agosto") gave companies the option to not report depreciation among their costs in their 2020 financial statements, which produced a positive impact on net income.

The trend for the variable Interest may have decreased for two reasons. First, according to Article 56 of the decree issued by the

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[2] We winsorized at the 5% level in line with the work by González-Fernández and González-Velasco (2020). We have also trimmed, instead of winsorizing, as a robustness check for the three growth variables, and the obtained results are similar.

Italian government on March 17th, 2020 (the so-called "Decreto Cura Italia"), firms could suspend the payment of their financing installments. Consequently, the corresponding financial interest included in the installments was not reported as a cost in their financial statements. Second, firms reduced their banking operations because of the pandemic, which meant there was a significant decrease in the bank charges in proportion to the number of banking operations carried out.

Table 6 shows an increase in the values of total assets in 2020, which could be explained by the considerable amount of non-refundable cash that was reported on the asset side of firms' balance sheets. Fixed Assets reflects the "Decreto Agosto" effects of lower depreciation. Moreover, firms increased their cash levels and financial debt from 2019 to 2020. This large boost in cash is the main reason for the increase in total assets. The decree called "Decreto Liquidità" gave firms the opportunity to address the immediate need for liquidity by obtaining a six-year loan from banks, with a grace period of two years, guaranteed by the State Guarantee Fund.[4]

Figures A.1-A.12 in the Appendix A graphically illustrate the trends observed in Tables 4-6.

4.3. Firm growth before and after the COVID-19 crisis: Jovanovic's (1982) model

After an overview to the companies' financial status at the end of each year, including 2020, we investigated the effect of the pandemic and the effectiveness of government incentives first on firm profitability (Tables 7 and 8) using the difference-in-differences (DD) technique, as in Zheng (2022), and then on firm growth (Table 9) using the Jovanovic (1982) model.

The pandemic caused a decrease in sales growth from 2019 to 2020, with potential negative effects on net income. Government incentives tried to safeguard firm profitability in two ways: by providing other revenues (grants) or reducing costs in the profit and losses statement (firms had the opportunity to not report depreciations, postpone interest payments, or obtain a State reimbursement of social costs for employees). Therefore, to appreciate the effectiveness of these government policies, we tested whether firms that used government incentives kept the same profitability levels (in terms of ROA) as firms that did not use them.

DD estimation quantifies how a group of individuals, businesses in this case, would be affected by a rapid change in the economic climate, a policy, or a general treatment, in terms of a specific outcome: profitability, in our study. In our case, companies who take

Table 7

Results for the difference in differences estimation.

Decreto Liquidità	Pre-decree	Post-decree	Diff.	
Companies not treated	0.029	0.032		
N	3,028,815	452,868		
Companies treated	0.029	0.019		
N	1,545,253	236,244		
Differences	0.000	−0.012	−0.013	***
N	4,574,068	689,112		
Decreto Rilancio	Pre-decree	Post-decree	Diff.	
Companies not treated	0.032	0.042		
N	2,049,880	333,123		
Companies treated	0.035	0.037		
N	2,095,597	326,924		
Differences	0.003	−0.005	−0.008	***
N	4,145,477	660,047		
Decreto Agosto	Pre-decree	Post-decree	Diff.	
Companies not treated	0.029	0.032		
N	3,974,058	664,508		
Companies treated	0.027	0.011		
N	659,478	91,408		
Differences	−0.002	−0.021	−0.019	***
N	4,633,536	755,916		
Decreto Cura Italia	Pre-decree	Post-decree	Diff.	
Companies not treated	0.033	0.028		
N	299,535	39,302		
Companies treated	0.025	0.014		
N	83,358	9,887		
Differences	−0.008	−0.014	−0.006	
N	382,893	49,189		

Note: The dependent variable is ROA, defined by Net income/Total Assets. The treatment variables are Decreto Liquidità, which takes the value of 1 when the company was able to borrow significantly in 2020 (its long-term debt was at least 10% higher than the previous year) and zero otherwise; Decreto Rilancio, which takes the value of 1 if the company received grants in 2020 and zero otherwise; Decreto Agosto takes the value of 1 if the company decreased depreciation in 2020 when its fixed assets did not decrease and zero otherwise; Decreto Cura Italia, which takes the value of 1 when the company decreased financial expenses in 2020 when its debt did not decrease and zero otherwise. N stands for number of observations. The asterisks ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

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[4] As Liu (2009) points out, "policy reactions to the 'credit rationing' problem… are needed to redress the perceived flaws in the credit market"

Table 8

Results for the difference in differences estimation comparing 2018 to 2020. In this table, we have controlled for the fact that the pre (years 2012–2019) and post-treatment period (2020) are quite unbalanced, and thus, we compare 2018 to 2020.

Decreto Liquidità	Pre-decree	Post-decree	Diff.	
Companies not treated	0.037	0.032		
N	407,869	452,868		
Companies treated	0.040	0.019		
N	214,918	236,244		
Differences	0.003	−0.012	−0.015	***
N	622,787	689,112		
Decreto Rilancio	Pre-decree	Post-decree	Diff.	
Companies not treated	0.041	0.042		
N	281,077	333,123		
Companies treated	0.045	0.037		
N	284,586	326,924		
Differences	0.004	−0.005	−0.009	***
N	565,663	660,047		
Decreto Agosto	Pre-decree	Post-decree	Diff.	
Companies not treated	0.038	0.032		
N	544,964	664,508		
Companies treated	0.033	0.011		
N	86,708	91,408		
Differences	−0.005	−0.021	−0.017	***
N	631,672	755,916		
Decreto Cura Italia	Pre-decree	Post-decree	Diff.	
Companies not treated	0.038	0.028		
N	36,012	39,302		
Companies treated	0.035	0.014		
N	9,744	9,887		
Differences	−0.003	−0.014	−0.010	***
N	45,756	49,189		

Note: DD estimation attempts to measure the effects of a sudden change in economic environment, policy, or general treatment on a group of individuals/companies. Firms treated are those who took advantage of the government incentives. DD employs the control group's outcome as a proxy for what would have happened in the treatment group if there had been no treatment. The difference between the post-treatment, treated, and control groups' average is then used to calculate the treatment effects. This post-treatment average difference and its statistical significance is given in the column "Diff.". The dependent variable is ROA, defined by Net income/Total Assets. The treatment variables are Decreto Liquidità, which takes the value of 1 when the company was able to borrow significantly in 2020 (its long-term debt was at least 10% higher than the previous year) and zero otherwise; Decreto Rilancio, which takes the value of 1 if the company received grants in 2020 and zero otherwise; Decreto Agosto takes the value of 1 if the company decreased depreciation in 2020 when its fixed assets did not decrease and zero otherwise; Decreto Cura Italia, which takes the value of 1 when the company decreased financial expenses in 2020 when its debt did not decrease and zero otherwise. The asterisks ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

advantage of government incentives are those that are being treated. The outcome of the control group is used by DD as a proxy for what would have occurred in the treatment group if no treatment had been administered. The treatment effects are then determined by comparing the averages of the post-treatment, treated, and control groups. The column "Diff" contains the post-treatment average difference as well as its statistical significance.

Although we observed that ROA remained stable in 2020 for the whole sample in Table 5, the results interestingly show that the differences between treated and not treated firms are statistically significant and negative, indicating that the profitability of firms that used government incentives decreased despite the State aid. Consequently, it is possible that firms that used government incentives experienced such a difficult economic situation that government policies could not fully compensate the negative effects of the crisis. In both cases, the overall profitability is still positive, which seems to indicate that the government's measures have been successful, given the severity of the crisis. The treatment or government measures where the effects of the crisis are more evident is in companies that have not reported depreciation (Decreto Agosto). We can conclude that these companies really needed to show healthier profit and loss accounts. On the other hand, the cases where the companies treated show less difference in profitability is due to the Rilancio decree, for which we can deduce that these grants were really needed, and their impact has been remarkable, although insufficient to completely overcome the effect of this crisis.

As a robustness test, we selected a year randomly, and we compared this year with the pandemic period. The results, which are reported in Table 8, confirm the findings in Table 7.

Additionally, we performed the same analysis in Table 8 by comparing each year of our database with the year 2020. This approach is important to balance the samples that compare pre and post COVID-19 periods, as the post-pandemic period is only 2020, while the pre-pandemic period is 2012–2019. Results for the difference in differences comparison in pairs (which are reported in the appendix A) interestingly confirm the results of Table 8, corroborating our findings.

After examining firm profitability, we analyze firm growth in Table 9, by using Jovanovic's (1982) model, which is usually the proposed model when analyzing firm's growth, making it dependent on age and size. This model is based on the notion of life cycle learning, because firms in a small, perfectly competitive industry vary in size as a result of how they gain efficiency over time. To the main explanatory variables: size and age, many authors, as Heshmati (2001), add other variables to the model that could affect growth

Table 9

Results for the different specifications of the Jovanovic model. Before performing our statistical analysis, we tested whether our 2020 sample was representative and able to explain the effect of the pandemic compared to the previous year. We compared the frequencies of companies by industry NACE (at the 2-digit level) between 2019 and 2020 by running the chi-squared goodness-of-fit test, which showed a non-significant value, meaning that the frequencies are not significantly different, for which there is no bias by sector.

Model: OLS	I Firm Growth		II Firm Growth		III Firm Growth		IV Firm Growth		V Firm Growth		VI Firm Growth		VII Firm Growth	
Size	−0.015 -(64.190)	***	−0.016 -(65.980)	***	−0.008 -(14.030)	***	−0.008 -(14.020)	***	−0.008 -(14.100)	***	−0.016 -(64.150)	***	−0.016 -(65.980)	***
Age	−0.157 −(343.120)	***	−0.156 −(342.610)	***	−0.106 −(73.210)	***	−0.106 −(73.070)	***	−0.105 −(72.870)	***	−0.157 −(340.820)	*****	−0.156 −(340.300)	***
D COVID	-0.090 -(64.260)	***	-0.095 -(66.370)	***	-0.172 -(27.870)	***			-0.178 -(27.050)	***			-0.095 -(65.700)	***
D COVID_medium			0.085 (25.100)	***	0.021 (3.330)	***			0.021 (3.000)	***			0.089 (26.590)	***
D_COVID_large			0.146 (25.230)	***	0.047 (5.980)	***			0.045 (5.130)	***			0.153 (26.070)	***
Financial slack					0.000 -(0.090)		-0.008 -(1.770)	*	-0.012 -(2.570)	***				
Fin. slack *medium							0.019 (3.300)	***	0.014 (2.420)	**				
Fin. slack *large							0.064 (7.000)	***	0.059 (6.190)	***				
Fin. slack* small*cov									0.097 (4.310)	***				
Fin. slack*medium*cov									0.071 (5.050)	***				
Fin. slack*large*cov									0.038 (1.330)					
Grants											-0.002 -(2.540)	**	-0.002 -(2.180)	**
Grants*medium											-0.043 -(2.000)	**	-0.032 -(2.590)	***
Grants*large											-0.537 -(5.440)	***	-0.537 -(5.140)	***
Grants*small*cov													-0.001 -(0.750)	
Grants*medium*cov													-0.244 -(4.600)	***
Grants*large*cov													-0.107 -(0.310)	
Industry dummies	YES		YES		YES		YES		YES		YES		YES	
Year dummies	YES		YES		YES		YES		YES		YES		YES	

Table 9 (*continued*)

Model: OLS	I Firm Growth	II Firm Growth	III Firm Growth	IV Firm Growth	V Firm Growth	VI Firm Growth	VII Firm Growth
Adj R2	0.05	0.05	0.03	0.03	0.03	0.05	0.05
Number of observations	5477196	5477196	526626	526626	526626	5403030	5403030

Note: This table reports the results of the Jovanovic model to which several variables have been added. The dependent variable measuring firm growth is Sales Growth (which is expressed in terms of logarithms. This is the usual transformation carried out by authors using the Jovanovic (1982) model, such as, for example, Heshmati (2001)). We used this proxy of growth in sales since it is appropriate to capture the effect of the pandemic considering the significant drop in sales resulting from the advent of the crisis. D_COVID is the dummy for 2020. To test the combined effect of the size factor and the COVID-19 crisis, we created three categories: small, medium, and large firms and generated two multiplicative dummies for the year 2020: D_COVID_medium, and D_COVID_large (both binary variables). Industry dummies are important, as the crisis that COVID-19 created had a very different impact depending on the sector (Li et al., 2021). The inclusion of year dummies aims to collect the macroeconomic environment that affected companies' growth. These year dummies included or did not include the year 2020 in the different regressions depending on whether we used D_COVID. Model I adds the COVID dummy, which is 1 for year 2020 and zero otherwise. Model II adds the multiplicative dummies of COVID and medium and large company dummies, leaving the multiplicative variable for small firms as the dummy base. Model III adds the variable Financial Slack at the beginning of the period, which could be important because it allows companies to have a stockpile of financial resources that may play a role during an economic crisis, impacting positively on their growth (Sánchez-Vidal et al., 2020). The lower number of observations from Model III is due to the unavailability of the variable Financial Debt for most of the companies, as shown in the descriptive statistics. Model IV provides greater detail, as it adds a multiplicative variable for financial slack for medium and large companies (in this case, continuous variables, as one of the components: financial slack, is), leaving the impact for the smaller firms reflected in the base variable (Financial slack in this model). Model V reports the results for all the aforementioned variables in the previous models with the addition of interactions between the variable Financial Slack, the COVID dummy, and dummies regarding firm size (small, medium, and large companies). As financial slack is continuous, so are these multiplicative variables. Model VI adds a multiplicative variable for Grants for medium and large companies (in this case, continuous variables), leaving the impact for the smaller firms reflected in the base variable (Grants in this model). Finally, Model VII reports the results for all the aforementioned variables in the previous models with the addition of interactions between the variable Grants, the COVID dummy, and dummies regarding firm size (small, medium, and large companies). We also ran the Jovanovic model considering the variable Fixed Assets, which is a proxy for tangibility and a potential driver of availability of finance and growth (Gong et al., 2021) (results are available upon request), observing that having fixed assets was positive for growth in the whole period. Industry and year dummies are included in the model and have a significant impact on the F of the overall model, as shown by the nested-model F test (not reported). The asterisks ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors in parentheses. As a robustness test, we have removed outliers (all observations at the 2.5% level in each tail) of all the variables (except for dummies) from Table 9. Results confirm the findings of the different models.

too. Our results show that Size and Age display a negative and significant coefficient, as predicted by Jovanovic (1982) and others (e.g., Honjo and Harada, 2006). The COVID dummy unsurprisingly shows a negative and significant sign, confirming the findings indicated in Paragraph 4.2. Model II yields interesting results, as there is a negative impact of COVID for small firms (as demonstrated by the variable D_COVID, as it measures the effect on small companies in this model), slightly negative for medium companies, and positive for large companies (in this last case, the result of summing up the coefficients of the base dummy: D_COVID and that of D_COVID_large). Thus, as small enterprises make up more than 95% of our sample, their influence alone drives the coefficient for the COVID dummy in Model I. This result supports the evidence of the national statistics, which showed a decrease in the Italian GDP of −8.9% for 2020 and also followed the same direction as the evidence in Table 5 (median of sales growth for 2020 of −7.13%). This is also in line with the evidence by Sun et al. (2022), who use Chinese data to show that small and medium-sized businesses experienced greater financial hardship than larger businesses during the pandemic, and this has an impact on growth, as we shall see in Models II to V.

In Model III, we added the variable Financial Slack, highlighting that financial issues do not necessarily produce an additional problem if companies want to grow, taking the period as a whole. The results of Model IV showed a positive sign for medium and large companies, which indicates that, for them, enjoying a financial buffer had a positive impact on growth. This evidence is in line with that of Zheng (2022), who finds that firms with cash reserves outperform businesses without sufficient cash reserves, confirming the relevance of cash holdings for firms (Fasano and Deloof, 2021). The negative result of small companies may be due to the fact that they are so financially constrained that they need to sacrifice some growth to keep minimum precautionary financial slack. The results of Model V are very interesting, and, for example, the full impact of having financial slack for medium companies in the first year of COVID-19 is the sum of −0.012 and 0.071, and thus positive. The same is true for medium and large companies (though not significant in this last case). Models III, IV, and V suffer from the imbalanced panel, and the number of observations is clearly smaller than the other regressions. In Models VI and VII, the variable Grants shows a negative sign, indicating that companies receiving grants grow less, which was the requirement to receive a grant. In particular, it seems that medium companies that received grants were those most affected by this crisis.

5. Conclusions and implications

This paper analyzes how Italian firms responded to both the COVID-19 crisis and the consequent State aid provided by the Italian government. We observe that firms experienced a sharp decrease in sales, and this was not accompanied by a corresponding fall in the number of employees, probably due to a special integration fund provided to safeguard employment. We also observed that Italian firms took advantage of the opportunity provided by the government to avoid paying installments on outstanding loans, which meant their financial expenses decreased compared to the years prior to 2020. Moreover, Italian firms used the cash incentives provided by government to a significant degree. These liquid grants, which were non-taxable revenues, allowed companies to increase their total assets and maintain their operating results, as shown in the sample taken as a whole. However, the DD technique later showed that this government aid, or the other incentives, were not enough to stop the decrease in profits for troubled companies and thus, did not fully mitigate the negative effects of the crisis. The Jovanovic (1982) model shows that the impact of COVID on growth was negative for SMEs and particularly for the smaller ones.

Our evidence reflects the impact of the policies of the Italian government (Decreto Liquidità, Decreto Rilancio, Decreto Agosto, and Decreto Cura Italia), suggesting that although State aid has proven to give adequate and timely support to companies, affecting specific items on their balance sheets and income statements, firms could not entirely rely on government incentives to save the day during the troublesome year of 2020. For this reason, we advise companies to accompany State aid with managerial efforts to support their growth in the near future. Our work also has implications for future research, as scholars should investigate how government support can help find ways out of the crisis in years to come. Moreover, future works should investigate firm growth and profitability in the years ahead in light of the 2020 government incentives.

CRediT authorship contribution statement

Declaration of Competing Interest

The authors have no relevant financial or non-financial interests to disclose.

Acknowledgments

Appendix A

Table A.1, Graph A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.10, A.11, A.12
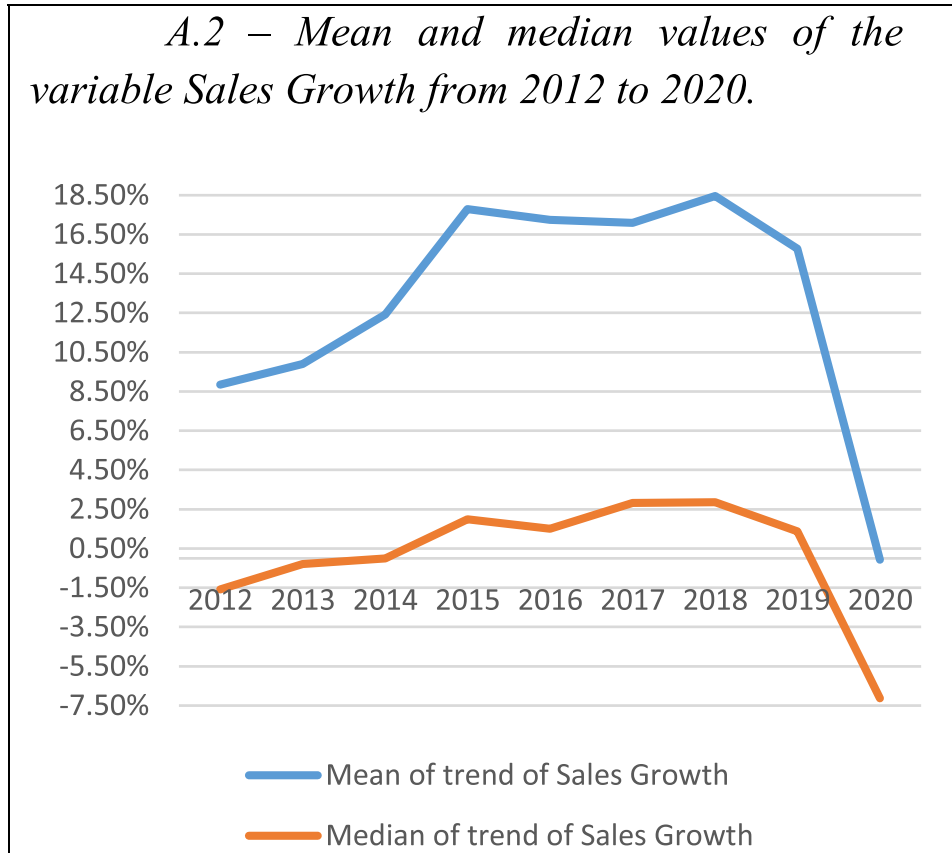
Table A.1

Results for the difference in differences estimation comparing 2020 to each single previous year (except for 2018 which is reported in Table 8).

| Comparison 2012 – 2020	Decreto Liquidità				Decreto Rilancio				Decreto Agosto				Decreto Cura Italia			
	Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.	
Companies not treated	0.019	0.032			0.020	0.042			0.018	0.032			0.022	0.028		
Companies treated	0.017	0.019			0.022	0.037			0.019	0.011			0.017	0.014		
Differences	−0.003	−0.012	−0.010	***	0.002	−0.005	−0.006	***	0.001	−0.021	−0.022	***	−0.005	−0.014	−0.009	***
Comparison 2013 – 2020	Decreto Liquidità				Decreto Rilancio				Decreto Agosto				Decreto Cura Italia			
	Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.	
Companies not treated	0.018	0.032			0.020	0.042			0.017	0.032			0.021	0.028		
Companies treated	0.016	0.019			0.021	0.037			0.018	0.011			0.017	0.014		
Differences	−0.002	−0.012	−0.010	***	0.001	−0.005	−0.005	***	0.001	−0.021	−0.022	***	−0.004	−0.014	−0.010	***
Comparison 2014 – 2020	Decreto Liquidità				Decreto Rilancio				Decreto Agosto				Decreto Cura Italia			
	Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.	
Companies not treated	0.022	0.032			0.024	0.042			0.021	0.032			0.026	0.028		
Companies treated	0.021	0.019			0.026	0.037			0.022	0.011			0.020	0.014		
Differences	−0.001	−0.012	−0.011	***	0.002	−0.005	−0.007	***	0.001	−0.021	−0.023	***	−0.006	−0.014	−0.008	***
Comparison 2015 – 2020	Decreto Liquidità				Decreto Rilancio				Decreto Agosto				Decreto Cura Italia			
	Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.	
Companies not treated	0.028	0.032			0.030	0.042			0.027	0.032			0.031	0.028		
Companies treated	0.028	0.019			0.033	0.037			0.028	0.011			0.026	0.014		
Differences	0.000	−0.012	−0.013	***	0.004	−0.005	−0.008	***	0.001	−0.021	−0.022	***	−0.005	−0.014	−0.009	***
Comparison 2016 – 2020	Decreto Liquidità				Decreto Rilancio				Decreto Agosto				Decreto Cura Italia			
	Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.	
Companies not treated	0.030	0.032			0.032	0.042			0.029	0.032			0.034	0.028		
Companies treated	0.030	0.019			0.036	0.037			0.028	0.011			0.029	0.014		
Differences	0.001	−0.012	−0.013	***	0.004	−0.005	−0.009	***	−0.001	−0.021	−0.020	***	−0.005	−0.014	−0.009	***
Comparison 2017 – 2020	Decreto Liquidità				Decreto Rilancio				Decreto Agosto				Decreto Cura Italia			
	Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.	
Companies not treated	0.034	0.032			0.037	0.042			0.034	0.032			0.038	0.028		
Companies treated	0.036	0.019			0.041	0.037			0.032	0.011			0.032	0.014		
Differences	0.002	−0.012	−0.014	***	0.004	−0.005	−0.009	***	−0.002	−0.021	−0.019	***	−0.006	−0.014	−0.008	***
Comparison 2019 – 2020	Decreto Liquidità				Decreto Rilancio				Decreto Agosto				Decreto Cura Italia			
	Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.		Pre-decree	Post-decree	Diff.	
Companies not treated	0.038	0.032			0.043	0.042			0.039	0.032			0.061	0.028		
Companies treated	0.038	0.019			0.046	0.037			0.031	0.011			0.031	0.014		
Differences	0.000	−0.012	−0.013	***	0.003	−0.005	−0.008	***	−0.008	−0.021	−0.013	***	−0.030	−0.014	0.016	***

Note: DD estimation attempts to measure the effects of a sudden change in economic environment, policy, or general treatment on a group of individuals/companies. Firms treated are those who took advantage of the government incentives. DD employs the control group's outcome as a proxy for what would have happened in the treatment group if there had been no treatment. The difference between the post-treatment, treated, and control groups' average is then used to calculate the treatment effects. This post-treatment average difference and its statistical significance is given in the column "Diff.". The dependent variable is ROA, defined by Net income/Total Assets. The treatment variables are Decreto Liquidità, which takes the value of 1 when the company was able to borrow significantly in 2020 (its long-term debt was at least 10% higher than the previous year) and zero otherwise; Decreto Rilancio, which takes the value of 1 if the company received grants in 2020 and zero otherwise; Decreto Agosto takes the value of 1 if the company decreased depreciation in 2020 when its fixed assets did not decrease and zero otherwise; Decreto Cura Italia, which takes the value of 1 when the company decreased financial expenses in 2020 when its debt did not decrease and zero otherwise. The asterisks ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.
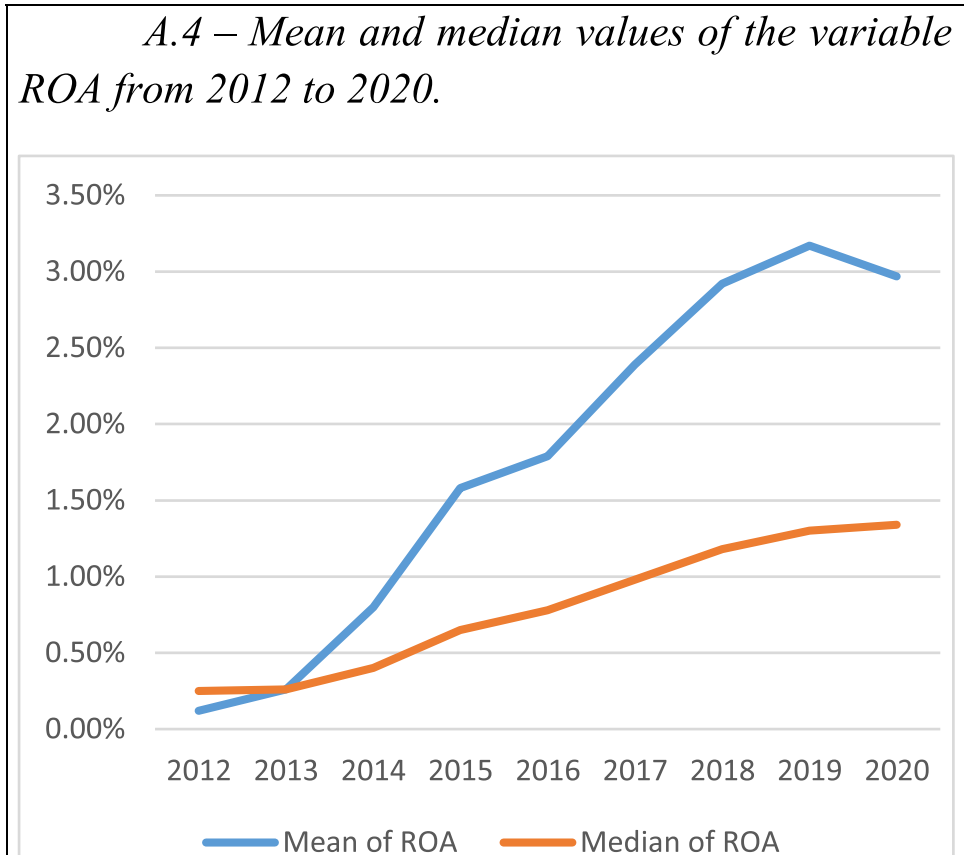
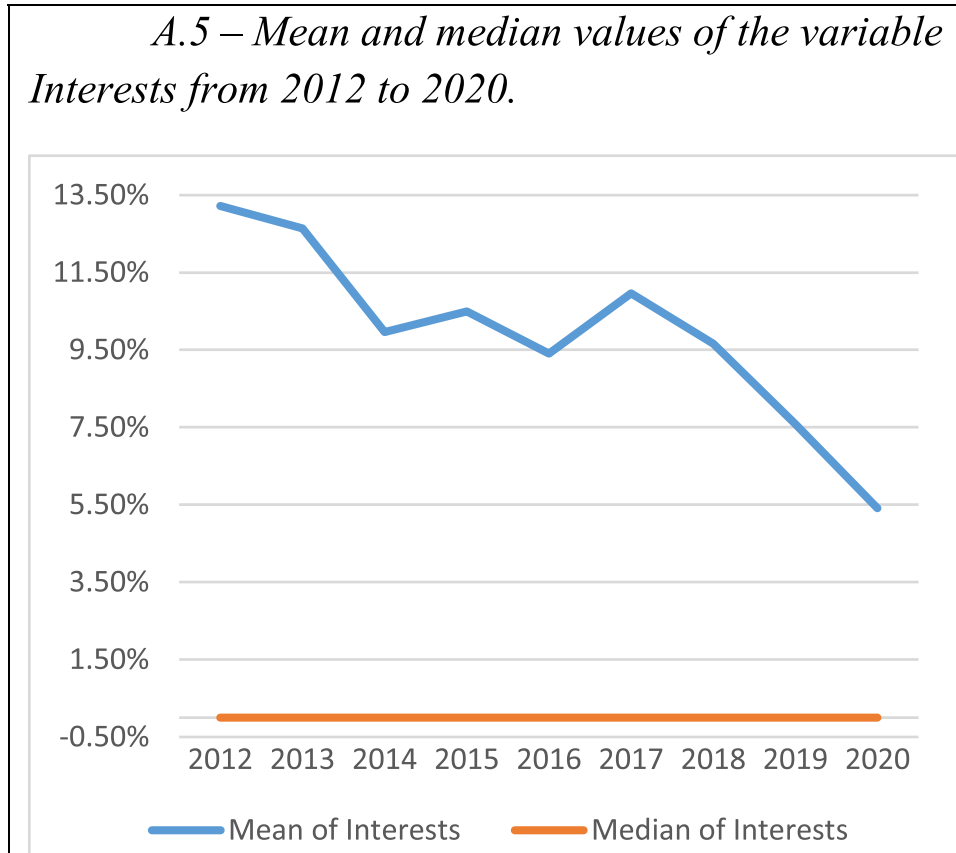*A.1 – Mean and median values of the variable Employees Growth from 2012 to 2020.*

Graph A.1. Mean and median values of the variable Employees Growth from 2012 to 2020.

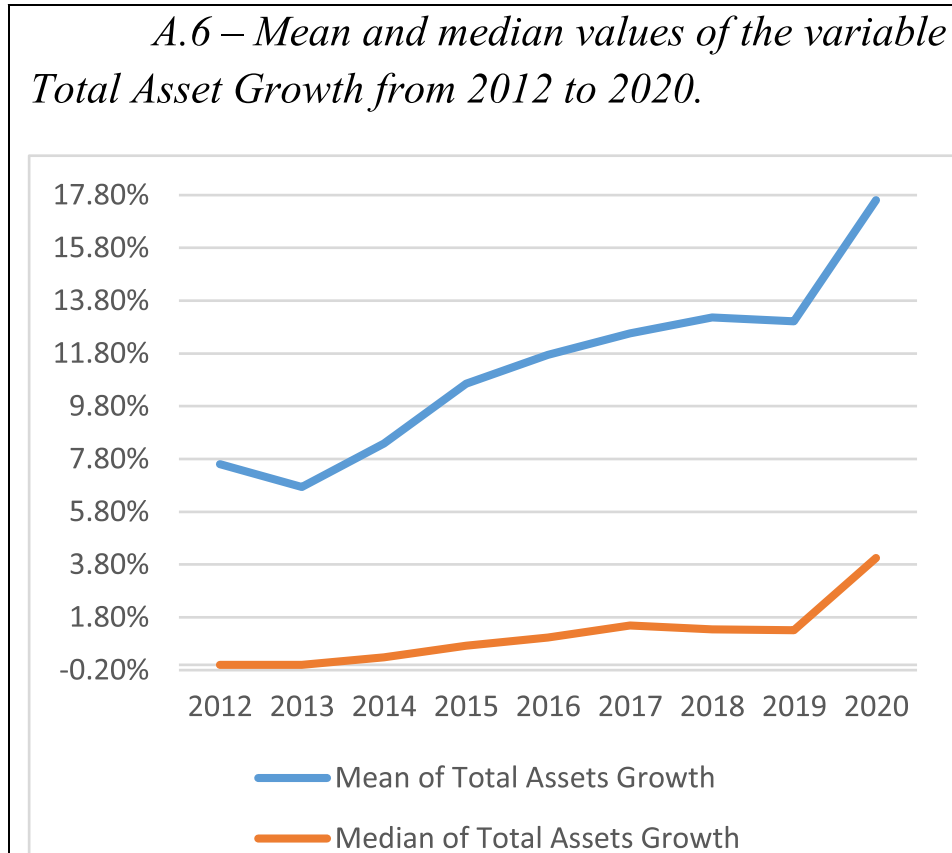## A.2 – Mean and median values of the variable Sales Growth from 2012 to 2020.

Graph A.2. Mean and median values of the variable Sales Growth from 2012 to 2020.

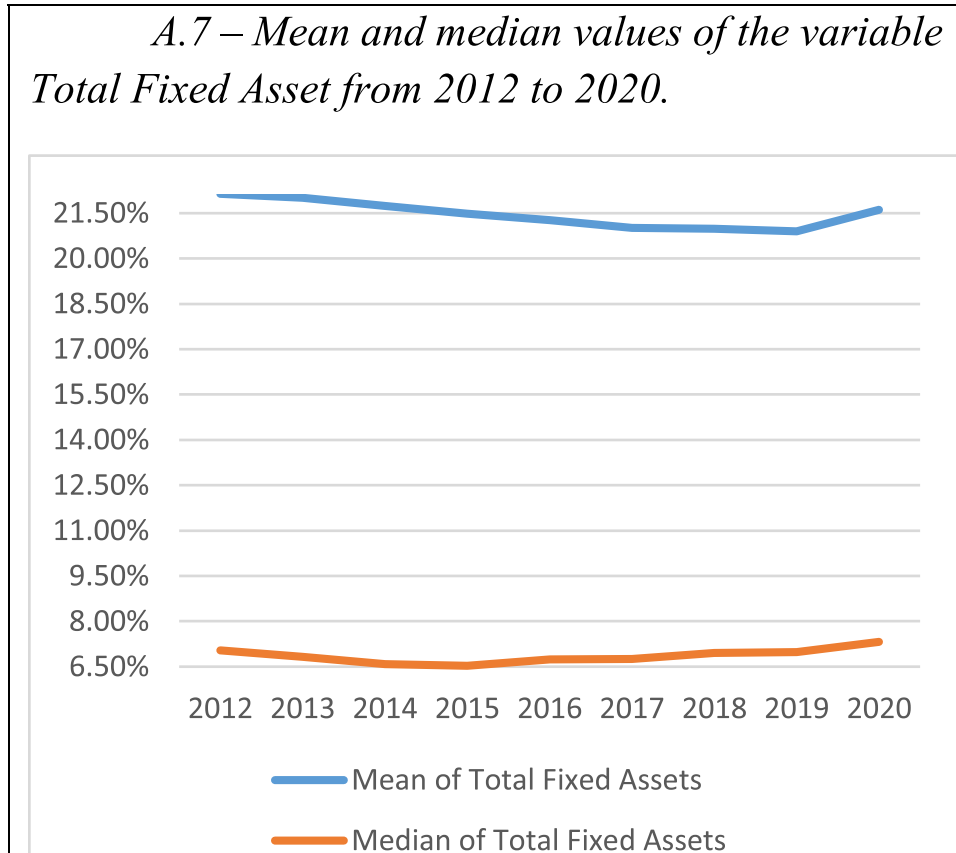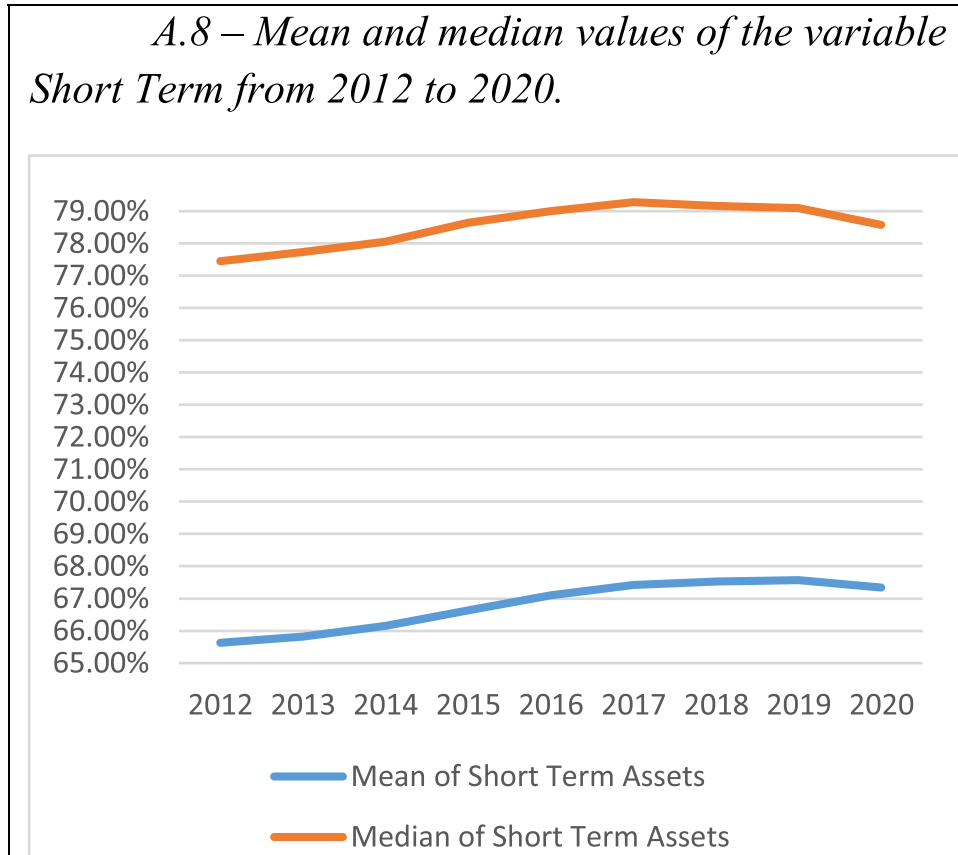*A.3 – Mean and median values of the variable Grants from 2012 to 2020.*
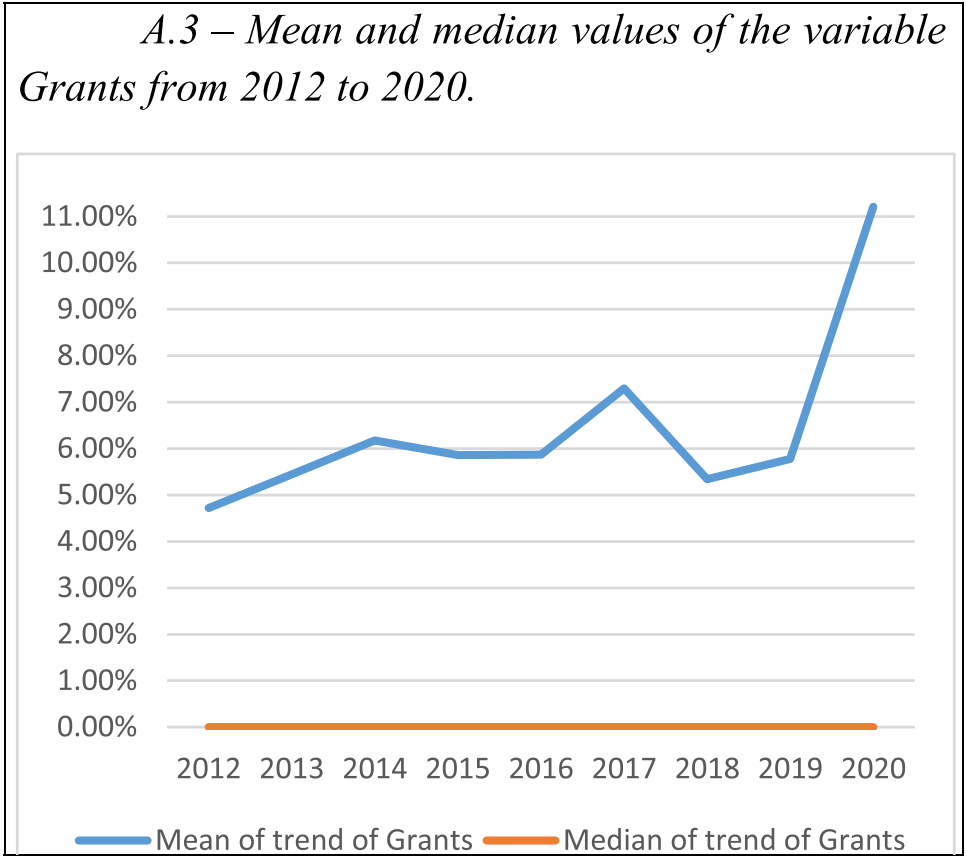
Graph A.3. Mean and median values of the variable Grants from 2012 to 2020.

A.4 – Mean and median values of the variable ROA from 2012 to 2020.

Graph A.4. Mean and median values of the variable ROA from 2012 to 2020.

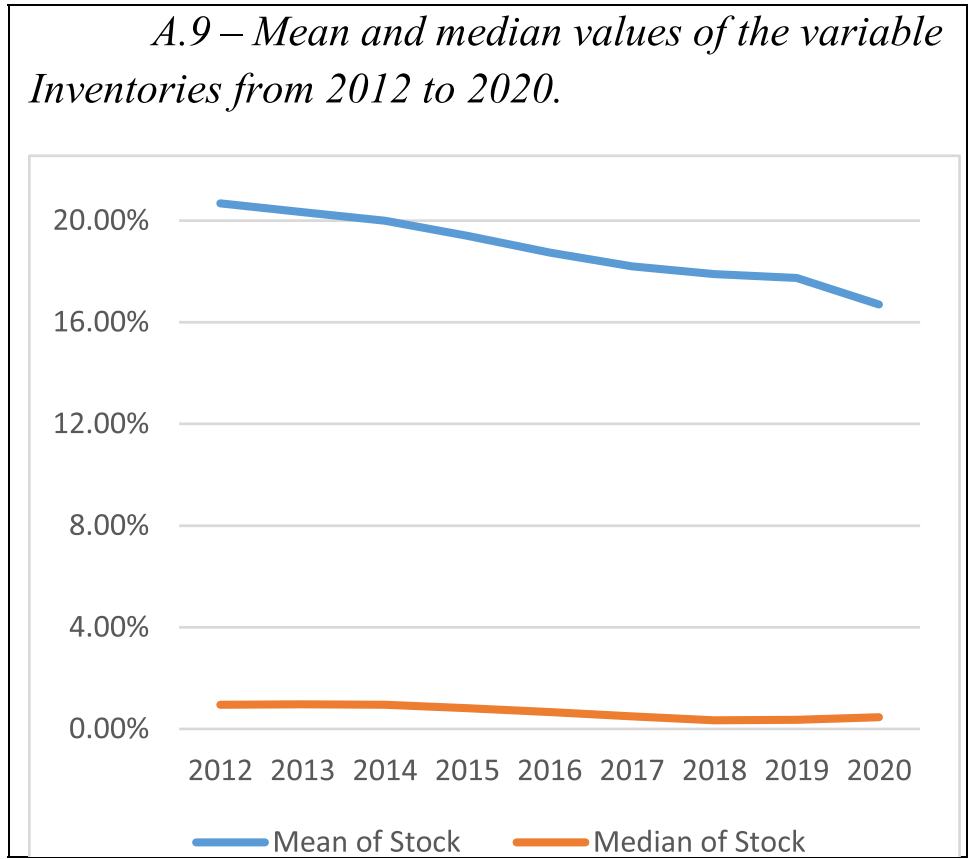*A.5 – Mean and median values of the variable Interests from 2012 to 2020.*

Graph A.5. Mean and median values of the variable Interests from 2012 to 2020.

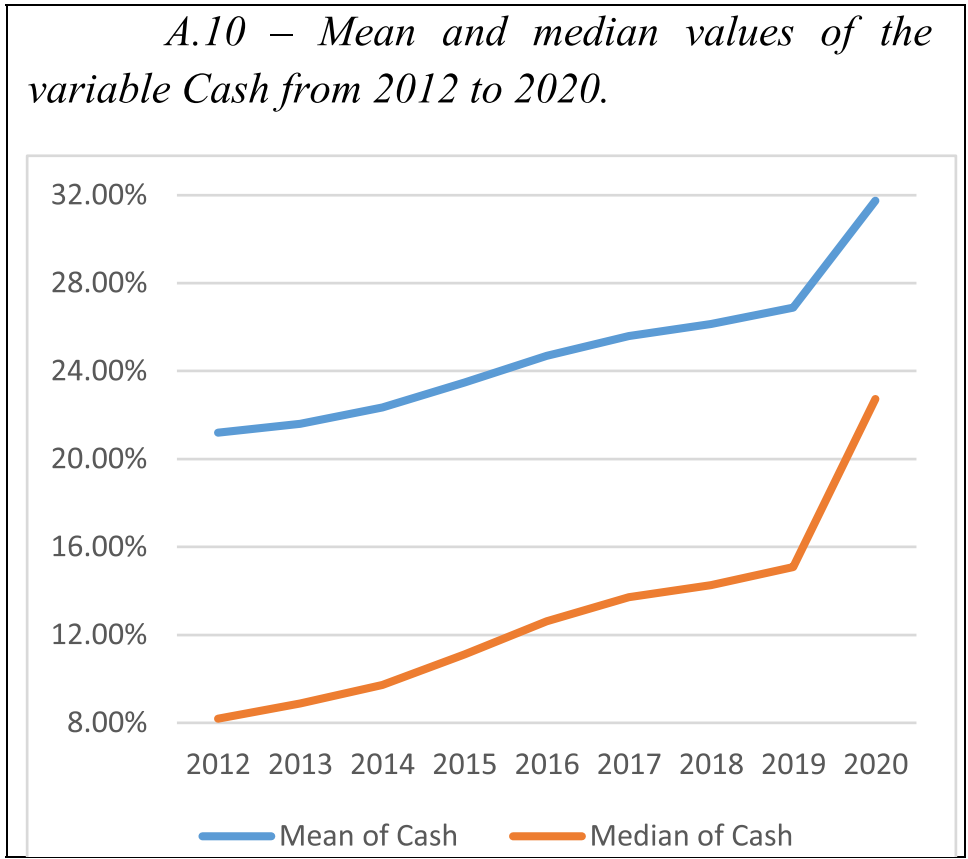**Graph A.6.** Mean and median values of the variable Total Asset Growth from 2012 to 2020.

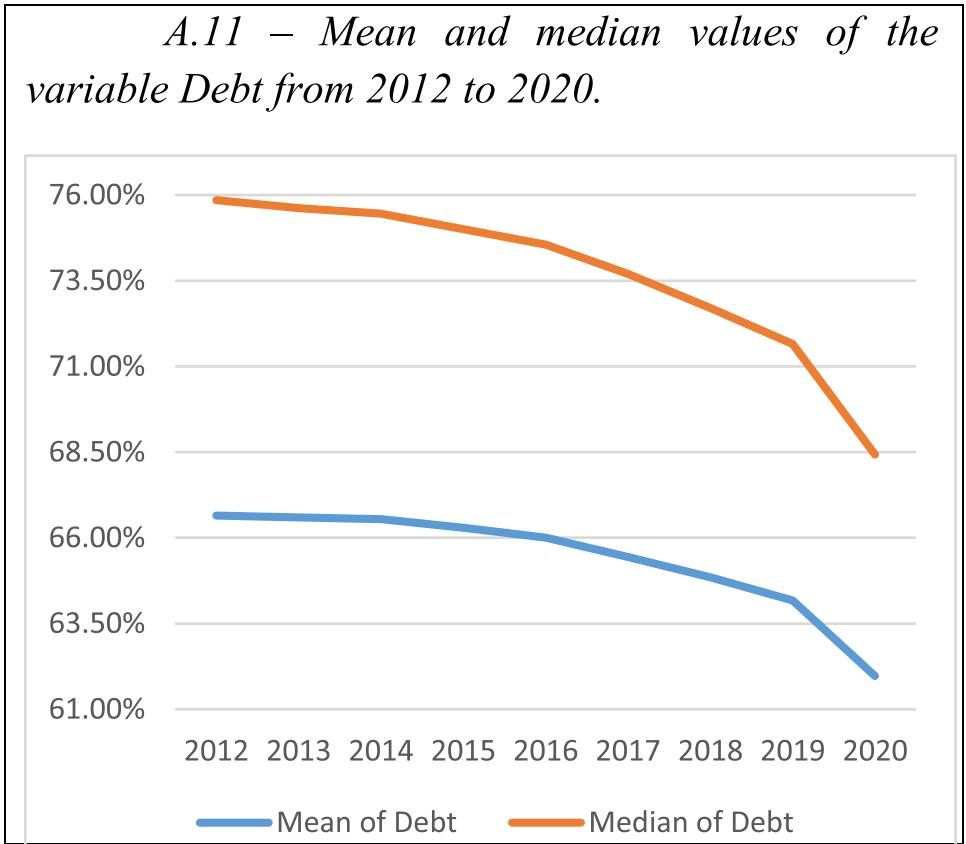## A.7 – Mean and median values of the variable Total Fixed Asset from 2012 to 2020.

Graph A.7. Mean and median values of the variable Total Fixed Asset from 2012 to 2020.

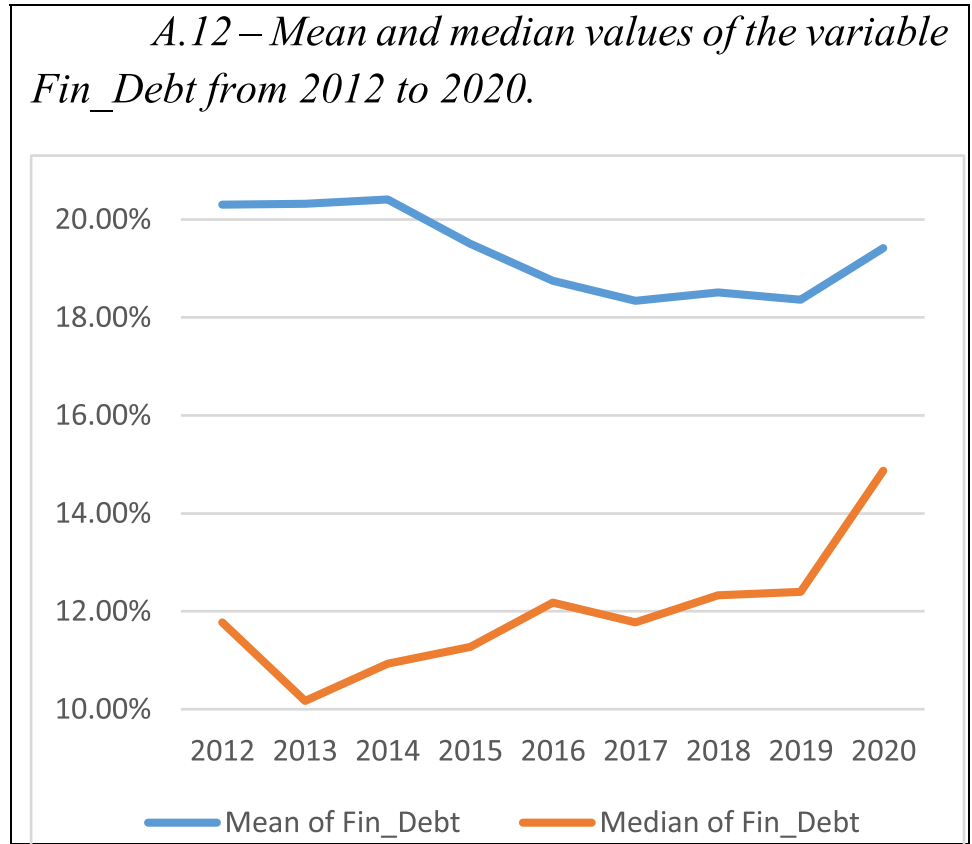**A.8 – Mean and median values of the variable Short Term from 2012 to 2020.**

Graph A.8. Mean and median values of the variable Short Term from 2012 to 2020.

A.9 – Mean and median values of the variable Inventories from 2012 to 2020.

Graph A.9. Mean and median values of the variable Inventories from 2012 to 2020.

A.10 – Mean and median values of the variable Cash from 2012 to 2020.

Graph A.10. Mean and median values of the variable Cash from 2012 to 2020.

A.11 – Mean and median values of the variable Debt from 2012 to 2020.

Graph A.11. Mean and median values of the variable Debt from 2012 to 2020.

A.12 – Mean and median values of the variable Fin_Debt from 2012 to 2020.

Graph A.12. Mean and median values of the variable Fin_Debt from 2012 to 2020.

References

Anton, S.G., 2019. Leverage and firm growth: an empirical investigation of gazelles from emerging Europe. Int. Entrepreneuship Manag. J. 15, 209–232. https://doi.org/10.1007/s11365-018-0524-5.

Arnold, G.E., Rhodes, M.E., 2021. Information sensitivity of corporate bonds: evidence from the COVID-19 crisis. Financ. Res. Lett. 42 https://doi.org/10.1016/j.frl.2020.101911.

Bose, S., Shams, S., Ali, M.J., Mihret, D., 2021. COVID-19 impact, sustainability performance and firm value: international evidence. Account. Finance. https://doi.org/10.1111/acfi.12801.

Carter, D., Mazumder, S., Simkins, B., Sisneros, E., 2022. The stock price reaction of the COVID-19 pandemic on the airline, hotel, and tourism industries. Financ. Res. Lett. 44, 102047 https://doi.org/10.1016/J.FRL.2021.102047.

Chen, X., Liu, C., Liu, F., Fang, M., 2021. Firm sustainable growth during the COVID-19 pandemic: the role of customer concentration. Emerg. Mark. Finance Trade 57 (6), 1566–1577. https://doi.org/10.1080/1540496X.2021.1904884.

Chen, H.C., Yeh, C.W., 2021. Global financial crisis and COVID-19: industrial reactions. Finance Res. Lett. 42, 101940.

Coad, A., Hölzl, W., 2012. Firm growth: empirical analysis. Handbook On the Economics and Theory of the Firm. Edward Elgar Publishing. https://doi.org/10.4337/9781781002407.00035.

Coad, A., Segarra, A., Teruel, M., 2013. Like milk or wine: does firm performance improve with age? Struct. Change Econ. Dyn. 24, 173–189. https://doi.org/10.1016/j.strueco.2012.07.002.

Doruk, Ö.T., Konuk, S., Atici, R., 2021. Short-term working allowance and firm risk in the post-COVID-19 period: novel matching evidence from an emerging market. Finance Res. Lett. 43, 102021.

Dunne, P., Hughes, A., 1994. Age, size, growth and survival: UK companies in the. J. Ind. Econ. 42 (2), 115–140. https://doi.org/10.2307/2950485.

Erdem, O., 2020. Freedom and stock market performance during COVID-19 outbreak. Finance Res. Lett. 36, 101671 https://doi.org/10.1016/J.FRL.2020.101671.

Evans, D.S., 1987. The relationship between firm growth, size and age: estimates for 100 manufacturing industries. J. Ind. Econ. 35 (4), 567–581. https://doi.org/10.2307/2098588.

Fasano, F., Deloof, M., 2021. Local financial development and cash holdings in Italian SMEs. Int. Small Bus. J. 39 (8), 781–799. https://doi.org/10.1177/02662426211011554.

Fendel, R., Neugebauer, F., Zimmermann, L., 2021. Reactions of euro area government yields to COVID-19 related policy measure announcements by the European commission and the European central bank. Finance Res. Lett. 42, 101917 https://doi.org/10.1016/J.FRL.2020.101917.

Gibrat, R., 1931. Les Inegalities Economiques. Sirey, Paris.

Gong, D., Jiang, T., Lu, L., 2021. Pandemic and bank lending: evidence from the 2009 H1N1 pandemic. Finance Res. Lett. 39, 1–5. https://doi.org/10.1016/j.frl.2020.101627.

González-Fernández, M., González-Velasco, C., 2020. An alternative approach to predicting bank credit risk in Europe with Google data. Finance Res. Lett. 35, 1–6. https://doi.org/10.1016/j.frl.2019.08.029.

Gupta, P.D., Guha, S., Krishnaswami, S.S., 2013. Firm growth and its determinants. J. Innov. Entrepreneurship 2 (1), 1–14. https://doi.org/10.1186/2192-5372-2-15.

Haltiwanger, J., Jarmin, R.S., Miranda, J., 2013. Who creates jobs? Small versus large versus young. Rev. Econ. Stat. 95 (2), 347–361. https://doi.org/10.1162/REST_a_00288.

Heshmati, A., 2001. On the growth of micro and small firms: evidence from Sweden. Small Bus. Econ. 17 (3), 213–228. https://doi.org/10.1023/A:1011886128912.

Honjo, Y., Harada, N., 2006. SME Policy, financial structure and firm growth: evidence from Japan. Small Bus. Econ. 27 (4–5), 289–300. https://doi.org/10.1007/s11187-005-6703-0.

Hsu, Y., Yang, Y., 2022. Corporate governance and financial reporting quality during the COVID-19 pandemic. Finance Res. Lett. https://doi.org/10.1016/j.frl.2022.102778.

Huang, Y., Yang, S., Zhu, Q., 2021. Brand equity and the COVID-19 stock market crash: evidence from U.S. listed firms. Financ. Res. Lett. 43, 101941 https://doi.org/10.1016/J.FRL.2021.101941.

Hu, S., Zhang, Y., 2021. COVID-19 pandemic and firm performance: cross-country evidence. Int. Rev. Econ. Finance 74, 365–372. https://doi.org/10.1016/j.iref.2021.03.016.

Iyer, S.R., Simkins, B.J., 2022. COVID-19 and the economy: summary of research and future directions. Finance Res. Lett., 102801 https://doi.org/10.1016/j.frl.2022.102801.

Jin, X., Zhang, M., Sun, G., Cui, L., 2022. The impact of COVID-19 on firm innovation: evidence from Chinese listed companies. Finance Res. Lett. 45, 102133 https://doi.org/10.1016/j.frl.2021.102133.

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

Ke, Y., 2022. The impact of COVID-19 on firms' cost of equity capital: early evidence from U.S. public firms. Finance Res. Lett. 46, 102242 https://doi.org/10.1016/j.frl.2021.102242.

Krieger, K., Mauck, N., Pruitt, S.W., 2021. The impact of the COVID-19 pandemic on dividends. Finance Res. Lett. 42, 101910 https://doi.org/10.1016/j.frl.2020.101910.

Kumar, S., Zbib, L., 2022. Firm performance during the Covid-19 crisis: does managerial ability matter? Finance Res. Lett., 102720 https://doi.org/10.1016/j.frl.2022.102720.

Lawless, M., 2014. Age or size? contributions to job creation. Small Bus. Econ. 42 (4), 815–830. https://doi.org/10.1007/s11187-013-9513-9.

Li, Z., Zhou, Q., Chen, M., Liu, Q., 2021. The impact of COVID-19 on industry-related characteristics and risk contagion. Finance Res. Lett., 101931 https://doi.org/10.1016/j.frl.2021.101931.

Liu, J., 2009. Business failures and macroeconomic factors in the UK. Bull. Econ. Res. 61 (1), 47–72. https://doi.org/10.1111/j.1467-8586.2008.00294.x.

Liu, L., Wei, S., Xu, J., 2021. COVID-19 and women-led businesses around the World. Finance Res. Lett. 43, 102012 https://doi.org/10.1016/j.frl.2021.102012.

Mateev, M., Anastasov, Y., 2010. On the growth of micro, small and medium-sized firms in central and Eastern Europe: a dynamic panel analysis. Bank. Finance Rev. 3 (2).

Minh, T.N., Ngoc, A.M., 2021. Political connections, government support and SME tax payments: a note from fixed-effect quantile regression. Finance Res. Lett. 40, 101771 https://doi.org/10.1016/j.frl.2020.101771.

Morone, P., Testa, G., 2008. Firms growth, size and innovation an investigation into the Italian manufacturing sector. Econ. Innov. New Technol. 17 (4), 311–329. https://doi.org/10.1080/10438590701231160.

Navaretti, G.B., Castellani, D., Pieri, F., 2014. Age and firm growth: evidence from three european countries. Small Bus. Econ. 43 (4), 823–837. https://doi.org/10.1007/s11187-014-9564-6.

Navaretti, G.B., Castellani, D., Pieri, F., 2022. CEO age, shareholder monitoring, and the organic growth of European firms. Small Bus. Econ. 59, 361–382. https://doi.org/10.1007/s11187-021-00521-5.

Neukirchen, D., Engelhardt, N., Krause, M., Posch, P.N., 2022. Firm efficiency and stock returns during the COVID-19 crisis. Finance Res. Lett. 44, 102037 https://doi.org/10.1016/j.frl.2021.102037.

Sánchez-Vidal, F.J., Hernández-Robles, M., Mínguez-Vera, A., 2020. Financial conservatism fosters job creation during economic crises. Appl. Econ. https://doi.org/10.1080/00036846.2020.1751053.

Santos, J.B., Brito, L.A.L., 2012. Toward a subjective measurement model for firm performance. BAR-Braz. Admin. Rev. 9 (SPE), 95–117. https://doi.org/10.1590/S1807-76922012000500007.

Shen, H., Fu, M., Pan, H., Yu, Z., Chen, Y., 2020. The impact of the COVID-19 pandemic on firm performance. Emerg. Mark. Finance Trade 56 (10), 2213–2230. https://doi.org/10.1080/1540496X.2020.1785863.

Songling, Y., Ishtiaq, M., Anwar, M., Ahmed, H., 2018. The role of government support in sustainable competitive position and firm performance. Sustainability 10 (10), 3495. https://doi.org/10.3390/su10103495.

Sun, Y., Zeng, X., Zhao, H., Simkins, B., Cui, X., 2022. The impact of COVID-19 on SMEs in China: textual analysis and empirical evidence. Finance Res. Lett. 45, 102211 https://doi.org/10.1016/j.frl.2021.102211.

Tarkom, A., 2021. Impact of COVID-19 exposure on working capital management: the moderating effect of investment opportunities and government incentives. Finance Res. Lett., 102666 https://doi.org/10.1016/j.frl.2021.102666.

Tchuigoua, H.T., Simo, C., Durrieu, F., 2022. Business cycle and cash holdings: empirical evidence from microfinance institutions. Finance Res. Lett., 103228 https://doi.org/10.1016/j.frl.2022.103228.

Yang, C.H., Tsou, M.W., 2020. Globalization and firm growth: does ownership matter? Small Business Economics 55, 1019–1037. https://doi.org/10.1007/s11187-019-00170-9.

Zheng, M., 2022. Is cash the panacea of the COVID-19 pandemic: evidence from corporate performance. Finance Res. Lett. 45, 102151 https://doi.org/10.1016/j.frl.2021.102151.

Zhou, H., De Wit, G., 2009. Determinants and dimensions of firm growth. *SCALES EIM Res. Rep. (H200903)*. 10.2139/ssrn.1443897.