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Bankruptcies during Covid-19 in Italy: An interrupted time-series analysis^{*}

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Abstract

The COVID-19 pandemic triggered widespread economic disruptions, raising concerns about surging bankruptcy rates globally. Italy, one of the hardest-hit countries, faced significant risks of business insolvency. This paper empirically investigates the short-term impact of government interventions on bankruptcy rates in Italy during the initial phase of the pandemic. Using a national dataset of Italian firms and employing interrupted-time-series analysis, we find that bankruptcy rates declined significantly following the introduction of extensive economic support measures, including loan moratoria, guaranteed credit schemes, and direct grants. Our results suggest that these interventions mitigated liquidity constraints and prevented the immediate insolvency of firms, averting a sharp rise in bankruptcies despite severe economic contractions. However, we also highlight potential concerns regarding the postponement of insolvencies, contributing to the "zombification" of non-viable firms. The findings provide critical insights for policymakers regarding the balance between short-term economic stabilization and long-term market efficiency in crisis management.

Keywords: Bankruptcy; COVID-19; Government interventions; Interrupted-time-series. JEL codes: E65, G33, H12.

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1. Introduction

One of the biggest concerns of the Covid-19 economic crisis has been the expected increase in bankruptcies (OECD, 2020a). The Q2 Barometer from credit insurer and riskmanagement company Coface expected insolvencies to rise by one third world wide until 2021, ranging from 12% in Germany, 21% in France, 24% in Japan, 37% in the United Kingdom to 43% in the United States, and 50% in Turkey (OECD, 2020b). The number of active business owners declined by 3.3 million (22%) between February and April 2020 in the United States (Fairlie, 2020). In the first quarter of 2020 a huge drop in incorporations and an increase in dissolutions was observed in the UK with respect to the same period in 2019 (Prashar et al., 2020).

To fight recessive consequences, the COVID-19 crisis has led to an extraordinary level of financial support for companies by governments and central banks. This support has come in the form of the form of public credit guarantee schemes, debt moratoria, direct support to firms through financial assistance programs, central bank lending and purchase programs, and an easing of micro- and macro-prudential regulations. While this support was crucial to keep a cash-strapped economy afloat, it has fuelled debate about whether such policies have encouraged *zombie* lending and *zombie* firms (Laeven et al., 2020).

During the COVID-19 crisis, even with generally favorable financing conditions and state aid measures, companies experienced a decline in turnover and profits. This downturn negatively affected employment and business investment. The financial vulnerability of businesses peaked during the COVID-19 crisis (Ferrando and Rarriga, 2024). Nevertheless, many companies managed to survive due to public support.

Zombie lending is generally defined as lending to non-viable (i.e. zombie) firms, while zombification" refers to a situation in which public stimulus programs and bank lending keep unviable firms alive. A "zombie company" "[...] is largely abandoned by investors and able to stay in business only by tapping banks or bond investors for more credit. The Federal Reserve's efforts to fight the impact of the coronavirus upon the economy may be inadvertently making it possible for a growing number of companies to remain in this twilight state. And as the walking dead of the corporate world multiply, some analysts worry

they are draining the life from the healthy parts of the economy^{"1}. The literature has suggested different ways to measure zombies (Acharya, et al, 2019, 2020, McGowan, et al, 2018, Schivardi et al., 2020, Storz, et al., 2017). The magnitude of the shock clearly has required large-scale government intervention to prevent unnecessary bankruptcies. The challenge is that there are no efficient sorting mechanisms that can be put in place to ensure that government support reaches only those firms that are firms that are illiquid but not insolvent. In such a crisis, it is extremely difficult to distinguish illiquid from insolvent firms. Government interventions therefore realized a trade-off between keeping the economy afloat at the risk of financing some insolvent firms (Gourinchas et al. 2020).

A study by Calcagini et al. (2024) identifies the effects of the lockdown on bank ratings. The performance of companies evidently decreases according to the bank data used by the authors, as a decline in four out of six rating parameters is observed. This study also highlights significant heterogeneity among the sectors of the bank's client companies. Additionally, very high turnover seems to mitigate the effect of the lockdown on essential sectors.

Financial interventions in the Swiss economy have allowed many companies to survive (Eckert et al. 2020). In fact, in none of the main regions or economic sectors of Switzerland had the number of business bankruptcies in the months of COVID-19 been diversified above the average. Analysts conclude that the overall low level of bankruptcies would have been allowed thanks to the Swiss federal government's COVID-19 credit program. The intervention had given smaller companies easy and cheap access to (bridging) loans. Compared to other countries, it seems to have been a rather generous and easily accessible program. The study ends up arguing that at least some bankruptcies would probably have only been postponed by the (COVID-19 credit) program, even considering the previous economic crises, which in Switzerland had not caused a sudden but gradual increase in the frequency of bankruptcies.

There are at least three reasons why this time may be different from previous crises. First, it would be a liquidity shock and not a solvency shock. The shock would have involved sustainable sectors that could have recovered; moreover, they certainly did not enter a crisis

¹ See, "Here's one more economic problem the government's response to the virus has unleashed: Zombie firms", Washington Post, 23 June 2020; <u>https://www.washingtonpost.com/business/2020/06/23/economy-debt-coronavirus-zombie-firms/</u>

due to excessive risk-taking by companies, as has happened in other crises. Furthermore, many sectors that have (temporarily) stalled, such as tourism, are expected to recover after the pandemic. Second, banks should be able to absorb loan losses to a greater extent, as they played a different role in the crisis as they entered this environment with relatively large capital positions. Third, the health and economic fallout of the pandemic resulted in exceptionally large government support, which mitigated liquidity squeeze and the risk of illiquidity turning into insolvency. Based on the elements listed above, many firms that would normally be classified as "zombie" firms in other types of crises are actually viable firms. These are simply times when firms themselves are experiencing temporary liquidity constraints because distancing measures have led to a collapse in aggregate demand. Banks will therefore do their part to preserve good lending opportunities for companies that are experiencing temporary weaknesses (Laeven et al., 2020).

In this article we focus on Italy as an interesting case study because it was one of the countries most affected by the novel coronavirus and the first Western country to implement a lockdown of economic activities, on 11 March 2020 (Bonacini et al. 2021, 2024, Kosteas et al. 2022, Esposito et al. 2024). The Covid-19 pandemic has had a large impact on the Italian economy, with GDP falling by 8.9 percent in 2020. At the height of the crisis, there were widespread fears that, as in the past, the shock would lead to a large number of business failures, with a consequent rapid increase in the number of firms becoming insolvent and, more generally, exiting the market. At the beginning of the crises, it was estimated that under a mild scenario 50,000 companies would need liquidity support in Italy, while under a more pessimistic scenario, these estimates would raise to 100,000 (Schivardi and Romano, 2020). Other studies have looked at the equity shortfall of Italian firms due to COVID-19: it was estimated an eventual aggregate annual drop in profits of EUR 170 billion, with an implied equity erosion of EUR 117 billion (Carletti et al., 2020). These concerns, which are also widely shared at the European level, have led to the introduction of exceptional support measures that have enabled many companies to at least partially cover their liquidity needs and potential capital shortfalls. The emergency legislation approved since February 2020 has had to respond to the explosion of the health emergency by intervening to protect employment in the sectors under lockdown and Italy has suspended the provisions for declaring insolvency (OECD 2020b).

Relying on a national representative dataset of Italian firms which provides information by NUTS-2 region, 2–digit NACE, and month, we explored the immediate changes in bankruptcy rates during the (first wave of the) COVID-19 using an interrupted-time-series analysis. We find a significant decline in bankruptcies in the early pandemic period: this situation can largely be attributed to the economic support measures introduced by the government since the beginning of the pandemic, including a moratorium on loan repayments, government-backed guaranteed loans and direct grants. In particular, the number of bankruptcies in March 2020 was 81% lower than the predicted value for February 2020. After the pandemic, however, bankruptcies increased at a monthly rate of 3.8%, reversing this trend.

The remainder of the paper is organised as follows. Section 2 describes the case of study. Section 3 presents both the dataset and the methodology adopted. Section 4 shows the results of the econometric analysis. The last section concludes and discusses policy implications stemming from the analysis.

2. The case of study

In the context of the crisis, many countries have made adjustments to their bankruptcy regimes (e.g. Australia, Belgium, Colombia, Germany, Italy, New Zealand, Portugal, Russia, Turkey, Ukraine and the United Kingdom). These changes are aimed at giving companies that are struggling due to COVID 19 more time and flexibility before filing insolvency. Australia expanded the debt thresholds for creditors to file for bankruptcy, the debtor's response period from 21 days to 3 months and the temporary protection period for debtors from 21 days to 3 months. For companies severely affected by the crisis but in good health until 18 March, Belgium instituted a bankruptcy moratorium. It protects them from seizure and from the declaration of bankruptcy at the request of the debtor, which can still be presented at the request of the Attorney-General or the debtor himself. The UK has announced temporary changes to insolvency law to give companies some breathing space. The changes include the suspension of the application of the Unfair Trading Act and a new restructuring regime, known as the 'Business Rescue Moratorium', which is designed to (i) prevent creditors from taking enforcement action while the company seeks a rescue/restructuring and (ii) allow the company to continue to access the supply of goods and services necessary to continue trading. The "German Covid-19 Insolvency Law Amendment" postpones the obligation of the management of a legal entity to file for bankruptcy until 30 September 2020 if certain conditions are met. The new rules are intended to give management more time and flexibility to decide whether the company can continue and to help avoid insolvencies caused by the circumstances triggered by the Covid-19 pandemic. The new rules do not relieve management from carefully and continuously monitoring the situation of the company and updating its assessment as the situation develops. The use of the additional rules may also expose directors to personal liability risks (OECD, 2020b).

Faced with the outbreak and spread of COVID-19, Italy was the first European country to announce severe restrictions on travel and individual mobility to slow down the spread of the disease. In a few days, the simple recommendation to "stay at home" was transformed into localised restrictive measures, with civil and criminal penalties for non-compliance. The first two cases of coronavirus in Italy were detected on 30 January, while the first official cases of secondary transmission were detected on 21 February. Following these cases, the authorities imposed extreme restrictions in eleven small municipalities, which were quarantined on 1 March. A few days later, on 8 March, the Italian Prime Minister, Giuseppe Conte, announced that, as of the following day, all 12 provinces of Lombardy and 14 provinces of Piedmont, Veneto, Emilia-Romagna and Marche would be subject to a ban on various economic and social activities and severe restrictions on individual mobility.7 In these so-called "protected areas", which cover 16 million people in central and northern Italy, individuals were not allowed to move between municipalities, except for reasons related to work, health and exceptional circumstances (subject to authorisation and control). Subsequently, on 25 March, the government imposed the temporary suspension of all economic activities, with the exception of those considered "essential" (i.e. necessary either for the survival of the population or for the full functioning of the health sector). Following these decrees, around 8 million workers (34% of the total) were forced to stay at home either working remotely or not (Aina et al. 2023, 2024, Barbieri et al. 2022, Biagetti et al. 2024, Croce and Scicchitano, 2022). After the last operation, 30 March was the first working day on which both the restrictions on personal movement and the closure of sectors had been implemented at the same time across the country, and the day on which the average reduction in personal movement was greatest. These measures remained in force until 4 May, when the so-called Phase 2 began. In short, a number of economic activities (such as restaurants and cafes) were allowed to resume, and travel between municipalities within the same region 6

was permitted for work or health reasons, as well as for small gatherings with close relatives. Phase 3 began immediately afterwards, on 15 June, when the ban on most economic activities and social gatherings was lifted, although face masks and social distancing were still required in enclosed public spaces (Caselli et al. 2022, Bonacini et al. 2021, 2024).

The literature immediately questioned how companies reacted to the pandemic shock. Regarding the sectors most affected by significant changes, Cutrini and Ninivaggi (2024) found that companies in traditional sectors—such as fashion and furniture—had a higher likelihood of default compared to companies in other manufacturing sectors. Additionally, the duration of region-specific lockdown policies was not significantly associated with business survival.

In this context, the emergency legislation approved starting from February 2020 had to react to the explosion of the health emergency, intervening to protect employment in the sectors under lockdown. Italy has suspended provisions for the declaration of insolvency or bankruptcy (OECD 2020b). The law of 24 April 2020, n. 27 (the so-called "Cura Italia Decree") had the purpose of preventing massive layoffs, with a package of measures for a total amount of 25 billion in terms of net balance. In particular, a temporary ban was ordered - starting from 17 March 2020 - of collective and individual dismissals for economic reasons, i.e. linked to company performance (those for just cause were still possible). Beyond support of liquidity, other measures included in the above Decree include a) Measures to ensure business continuity: the Decree includes a series of measures aimed at ensuring the continuity of companies, with particular regard to those that were healthy before the emergency. The drop or loss of share capital will not any lead to company dissolution. Insolvency proceedings have been loosened. b) Deferral of tax obligations by workers and companies (e.g. VAT, withholding tax and social contributions) (OECD, 2020b).

3. Data and methods

Our study relies on bankruptcy proceedings data collected by *InfoCamere*, thus an IT society of the Italian Chamber of Commerce. Specifically, we refer to publicly available statistics from January 2012 to December 2021 provided in the open data warehouse of the Chamber of Commerce of the Marche region.² In this data warehouse the information on the

² Link: http://opendata.marche.camcom.it/. Last visited on June 2023.

bankruptcies occurred over time in Italy are provided by NUTS-2 regions, industry sector (2–digit NACE classification), and month. According to the standard adopted by InfoCamere, we define here the bankruptcy as the event of deletion from the Italian Business Register. Consequently, in the proposed analysis, the moment of bankruptcy coincides with the moment the company is removed from the Italian Business Register and not when the financial default actually occurred.³

Tables A1 and A2 in the Appendix provide some descriptive statistics on our sample of analysis. In particular, they show the average number of bankruptcies by economic sector of activity and Italian NUTS-2 region respectively distinguishing before and after the pandemic advent.

3.1. Methods

The aim of this paper consists of understanding whether the emergency policies introduced by the Italian government in February 2020 to deal with the pandemic situation affected the dynamics of bankruptcies of Italian companies over time. To do that, following Linden (2015), Huitema and McKean (2000a), Linden and Adams (2011), Simonton (1977a), and Simonton (1977b) we estimate the equation which follows:

$$Y_t = \beta_0 + \beta_1 T_t + \beta_2 X_t + \beta_3 X_t T_t + \gamma \cdot months + \varepsilon_t$$

where Y_t is the logarithm transformation of the number of bankruptcies measured at each point in time, T_t is the time since the start of the reference period (January 2012) in terms of months, X_t is a dummy variable which takes value 1 during the pandemic period (since March 2020 onwards) and 0 for the pre-pandemic period,⁴ and X_tT_t indicates the interaction

³ Article 119 of the Bankruptcy Law provides that the closure decree is subject to the same publicity requirements as the declaration of bankruptcy. Consequently, pursuant to Article 17 of the Bankruptcy Law, this decree must be recorded in the business register following its transmission by the Court. It is important to note that on July 15, 2022, the new Business Crisis and Insolvency Code (Legislative Decree No. 14 of January 12, 2019) came into force. Among the innovations introduced by the new code is a redefinition of the business crisis as a natural phenomenon for enterprises. This new perspective aims to move away from the concept of bankruptcy, replacing it with the term 'judicial liquidation.'

⁴ While the first COVID-19 contagions and government reactions to the imminent pandemic started in 23rd of February 2020 already, we believe that first effects on the bankruptcies dynamic are expected from March

term. In this methodological framework, β_0 is the intercept and indicates the starting level of the bankruptcies at T = 0, β_1 is the trajectory of the outcome variable until the COVID-19 outbreak, β_2 is the change in the bankruptcies level following the pandemic advent, and β_3 reports the difference between pre-pandemic and post-pandemic slopes of the outcome. Thus we look for significant p-values in β_2 to indicate an immediate treatment effect and in β_3 to highlight a treatment effect over time. Finally, the model specification include a set of month fixed effects – *months* in the equation above – to control for possible seasonal patterns of bankruptcies.⁵

The econometric method relies on the application of the Interrupted Time-Series Analysis (ITSA) design. The latter methodology is preferred when, like in our case: the outcome variable is ordered as a time series; a number of observations are available in both pre-intervention and post-intervention periods; the intervention is expected to interrupt the level or trend subsequent to its introduction (Campbell and Stanley, 2015; Glass et al., 1975; Shadish et al., 2002). As the emergency policies have been implemented in the same way throughout the country, we specifically adopt a single-group ITSA.

An important assumption of the adopted regression model is that the observations are independent. However, especially when referring to time series, this assumption could be violated because of autocorrelation. To deal with this critical aspect, we estimate the model specification framed above with zero lags and perform the Cumby-Huizinga test for autocorrelation (Breusch-Godfrey). Results of this test, illustrated in Table 1, highlight the presence of serial correlation up to the third lag. As a consequence, to correct for the

²⁰²⁰ only because: i) a small area of the country was affected by the COVID-19 outbreak during the first days of pandemic; ii) the bankruptcy requires a number of administrative steps which, in turn, need some time to be executed. Our methodological choice is also supported by the fact that the number of bankruptcies recorded in February 2020 is very similar to the January 2020 one (see Figure 1 for more details).

⁵ As a robustness check, we replicated the main analysis excluding month fixed effects from the estimated model specification. Results of this check highlight that removing month fixed effects from the model does not substantially change the evidence illustrated in Section 4. Nonetheless, considering the presence of seasonality in the bankruptcies trend (most of month fixed effects are statistically significant in estimation results presented in Table 2), we decide to keep month fixed effects in the model specification adopted for our main analysis. More details are available upon request to the authors.

autocorrelation issue, we estimate a single-group ITSA model where the maximum lag considered in the autocorrelation structure is 3.

H0: $q = 0$ (serially uncorrelated)				H0: q = specified lag-1			
HA: serial	al corr. present at range specified			HA: serial corr. present at lag specified			
lags	chi2	df	p-value	lag	chi2	df	p-value
1 - 1	43.216	1	0.000	1	43.216	1	0.000
1 - 2	43.840	2	0.000	2	12.180	1	0.001
1 - 3	43.843	3	0.000	3	4.167	1	0.041
1 - 4	43.914	4	0.000	4	1.251	1	0.263
1 - 5	43.914	5	0.000	5	0.284	1	0.594
1 - 6	43.976	6	0.000	6	0.088	1	0.766

Table 1. Cumby-Huizinga test for autocorrelation

Source: Elaborations of the authors on InfoCamere data.

4. Results

Table 2 shows the results of the ITSA estimation whereas Figure 1 illustrates a line plot of the predicted dependent variable combined with a scatterplot of the actual values of the dependent variable over time. Estimation results highlight that the bankruptcies trend is overall slightly decreasing during the reference period as they monthly decrease by 0.23% on average. The pandemic advent and the consequent introduction of emergency policies by the Italian government engenders a massive and significant break in the bankruptcies dynamic. In fact, the bankruptcies decrease by 81% in March 2020 – the difference between the predicted value for February 2020 and the March 2020 one (see Figure 1) is significant at 10% level – and their trend becomes positive afterwards (+4.0%). As a result, the post-pandemic trend of bankruptcies increases monthly at a rate of 3.8% (p-value 0.08).

Figure 1. Comparison between the ITSA predicted and actual values of bankruptcies



Source: Elaborations of the authors on InfoCamere data.

Variables	Coefficient
Time	-0.0023***
	(0.0008)
Covid-19	-0.8131***
	(0.3131)
Time * Covid-19	0.0403*
	(0.0215)
February	0.1460***
	(0.0563)
March	0.2981***
	(0.0669)
April	0.0378
	(0.1212)
May	0.1575
	(0.0969)
June	0.1684**
	(0.0689)
July	0.4153***
	(0.0685)
August	-0.7842***
	(0.0740)
September	-0.2525***
	(0.0976)
October	0.2976***
	(0.0716)
November	0.1958***
	(0.0660)
December	0.2667***
	(0.0668)
Constant	6.9109***
	(0.0802)
Observations	120

Table 2. ITSA estimation results

Source: Elaborations of the authors on InfoCamere data.

4.1. Sectorial analysis

For the sake of brevity, while the sectorial analysis has been developed for all sectors listed in Table A1 in the Appendix, we provide in this section estimated results only for those 12 sectors which drive the main evidence displayed above. Specifically, we focus here on the following five sectors: Construction (sector F), Trade (sector G), Hotel and restaurants (sector I), Other business services (sector N), and Sports and recreational activities (sector R). Estimated results for all the other sectors are available upon request to the authors.

Looking at the results about construction sector (panel A of Figure 2), the starting level of bankruptcies in Italy was 5.67(ln). For every month prior to the intervention, the bankruptcies seems to decrease of -0.43%. As far as the first month after the intervention, the number of Italian bankruptcies in this sector decreases of -83%. About the post-intervention, we observe a significant increase of monthly trend of bankruptcies (+4.28%). The estimates produced by specifying post-trend bankruptcies increase monthly at a rate of 3.85%.

As for the Trade sector (panel B of Figure 2). The starting level of bankruptcies in Italy was 5.72(ln) the highest level between the sectors with the most significant impact post-intervention. Specifically, for each month prior to the intervention, bankruptcies decreased by -0.20%. Already in the first month after the intervention, the Italian bankruptcies in this sector decreased by -88%. As regards the post-intervention period, a significant increase in the monthly trend of bankruptcies is observed (+4.25%). The estimates produced by specifying post-trend bankruptcies increase monthly at a rate of 4.04%.



Figure 2. ITSA predicted and actual Values by economic sector



Panel D – Other business services



Panel E – Sport, recreational activities



Source: Elaborations of the authors on InfoCamere data.

As regards the Hotel and restaurants sector (panel C of Figure 2), the initial level of bankruptcies in Italy is equal to $4.0(\ln)$. For every month preceding the intervention, bankruptcies appear to decrease by -0.38%. In the first month after the intervention, the number of Italian bankruptcies in this sector decreased by -80%. As regards the post-intervention, a significant increase in the monthly trend of bankruptcies is observed (+3.76%). Estimates produced by specifying post-trend bankruptcies increase monthly at a rate of 4.15%.

Bankruptcies in the "Other business services" sector start with a lower level than the others: 3.44(ln) (panel D of Figure 2). For every month prior to the month of the intervention, the bankruptcies seems to decrease of -0.31%. As far as the first month after the intervention, the slope in bankruptcies in this sector is: -88%. About the post-intervention period, can be observed a significant increase of monthly trend of bankruptcies (+4.44%). The estimates produced by specifying post-trend bankruptcies increase monthly at a rate of 4.75%.

Finally, the "Sport, recreational activities" sector shows the most significant effects (panel E of Figure 2). The starting level of bankruptcies in Italy was 2.46(ln). For every month prior to the month of the intervention, the bankruptcies seems to decrease of -0.34%. Figure x shows the immediate decline of Italian bankruptcies in this sector that decreases of -118%. About the post-intervention, the estimates show a significant increase of monthly trend of bankruptcies (+6.26%). The estimates produced by specifying post-trend bankruptcies increase monthly at a rate of 6.60%.

4.2. Regional analysis

Overall, while the initial impact of the intervention shows substantial decreases in bankruptcies across all regions, the patterns are slightly different. It can be observed that bankruptcies decrease in the first month; however, they subsequently resume growth.

Below, we examine some results related to the macro-areas. In the Northwest (panel A of Figure 3), bankruptcies decrease by 0.32% each month. In the first month of the intervention, there is a -87.6% decrease, followed by a positive monthly trend (+4.25%) which is not significant.

As for the Northeast (panel B of Figure 3), failures decrease by 0.36% each month significantly, with a -62.5% decrease in the first month of the intervention.

In the Middle of Italy (panel C of Figure 3), there is a significant monthly decrease of 0.08%. In the first month of the intervention, there is a -99% decrease, followed by a monthly trend of +4.7%, but the coefficient is not significant.

In the South and Islands (panel D of Figure 3), the bankruptcies decrease by 0.17% each month significantly, with a -78% decrease in the first month of the intervention, followed by a monthly trend of +4.5%, but the coefficient is not significant.

If we observe the regional data, the interrupted time series show us a repeated pattern in which, the first period the number of bankruptcies decreases and then increase. The most important element that could be emphasized is the first month, where the number of bankruptcies decrease consistently and significantly for almost all regions. The coefficients are not uniform for the average number of bankruptcies for every month. The previous period is in all cases characterized by a positive coefficient as in the national results.



Figure 3. ITSA predicted and actual Values by economic sector

Source: Elaborations of the authors on InfoCamere data.

Although we cannot include all regional analyses due to space constraints, we have chosen to illustrate the case of Lombardia region in our analysis (Figure A1 in the Appendix). Lombardia indeed represents the Italian region most affected by COVID in the early period and was the first to be locked down. In this region, bankruptcies decrease by 0.26% each month, and the coefficient is significant. In the first month of the intervention, there is an -84.8% decrease, followed by a monthly trend of +3.98%, but the coefficient is not significant.

5. Conclusions

Since the beginning of the economic crisis caused by the pandemic, fears have spread that it would lead to a wave of bankruptcies and closures. This fear has led to the adoption of a wide range of direct and indirect support measures for businesses, such as those aimed at reducing the impact of the crisis on the profit and loss account and on the need for liquidity, non-repayable of liquidity, non-repayable contributions and loan moratoria. The banking sector has also been strengthened through the provision of public guaranteed schemes for loans.

The paper presents the initial findings of the analysis on the potential zombification of firms due to COVID-19 and the Italian government's support measures. The analysis supports the hypothesis that there was a significant drop in bankruptcies due to public support during the first months of the COVID-19 period. The onset of the pandemic and the subsequent emergency policies introduced by the Italian government caused a substantial and significant disruption in bankruptcy dynamics.

Specifically, bankruptcies decreased by 81% in March 2020 compared to the predicted value for February 2020. However, this trend reversed post-pandemic, with bankruptcies increasing at a monthly rate of 3.8%.

The macro-area that appears to drive the collapse in bankruptcies in the early months is the North West. From March 2020, considered the break period, there is an approximately 87% drop in the following month. Moreover, the results highlight that the "arts and entertainment" sector experienced the most significant collapse in bankruptcies, with the "construction" sector and the administrative and support service activities sector also seeing drops of around 88%.

This suggests that while the emergency measures were effective in the short term, they may have also supported businesses that were not viable in the long term, leading to a resurgence in bankruptcies once the support was withdrawn. The initial decrease in bankruptcies was followed by a positive trend, indicating that the underlying issues causing business failures were not fully resolved by the temporary measures.

What we can conclude is that the Covid-19 and the help to the firms have reduced for the first period, the first months the number of bankruptcies, but once the first month decreases, in the other months we observe an increase of bankruptcies. In other words, even if the 18

intention of the public policies was valuable because it solved the liquidity crisis of the companies in the short term, the effects in the post-crisis period were very different because the public interventions seem to have favoured the zombification of the Italian companies.

References

Acharya, V. V., Crosignani, M., Eisert, T., & Eufinger, C. (2024). Zombie Credit and (Dis) Inflation: Evidence from Europe. *The Journal of Finance*, *79*(3), 1883-1929.

Acharya, V V, T Eisert, C Eufinger, and C Hirsch (2019), "Whatever it takes: The real effects of unconventional monetary policy", Review of Financial Studies 32(9): 3366–3411.

Aina C. & Brunetti. I & Mussida, C. & Scicchitano, S (2023). "Distributional effects of COVID-19," Eurasian Business Review, Springer, vol. 13(1), pages 221-256, March.

Aina C. & Brunetti. I & Mussida, C. & Scicchitano, S (2024). Even more discouraged? The NEET generation at the age of COVID-19, Applied Economics DOI: 10.1080/00036846.2024.2337790,

Barbieri, T., Basso, G., & Scicchitano, S. (2022). Italian workers at risk during the Covid-19 epidemic. *Italian Economic Journal*, 8(1), 175-195.

Biagetti, M, Croce, G., Mariotti, I. Rossi, F. and Scicchitano, S. (2024). The call of nature. Three post-pandemic scenarios about remote working in Milan, in Futures, Volume 157, https://doi.org/10.1016/j.futures.2024.103337,

Bonacini, L., Gallo, G., & Scicchitano, S. (2021). Working from home and income inequality: risks of a 'new normal' with COVID-19. *Journal of population economics*, *34*(1), 303-360. <u>https://doi.org/10.1007/s00148-020-00800-7</u>

Bonacini, L., Gallo, G., & Scicchitano, S. (2024). Does Working from Home Increase the Gender Wage Gap? Insights from an Italian Survey of Occupations. Feminist Economics, 1–36. https://doi.org/10.1080/13545701.2024.2326509,

Carletti, E. et al. (2020), The equity shortfall of Italian firms in the COVID crisis | VOX, CEPR Policy Portal, VOX CEPR Policy Portal.

Campbell, D. T., & Stanley, J. C. (2015). *Experimental and quasi-experimental designs for research*. Ravenio books.

Calcagnini, G., Favaretto, F., & Giombini, G. (2024). The effect of 2020 lockdown on bank internal ratings. *Journal of Industrial and Business Economics*, 1-42.

Caselli, M., Fracasso, A., & Scicchitano, S. (2022). From the lockdown to the new normal: individual mobility and local labor market characteristics following the COVID-19 pandemic in Italy. *Journal of Population Economics*, *35*(4), 1517-1550.

Croce, G. and Scicchitano, s. (2022), Cities and Working from Home in Italy in the Post COVID-19 Age, in Italian Journal of Public Policies, n. 2/2022

Cutrini, E., & Ninivaggi, F. (2024). Pandemic crisis and firm survival: evidence from the Italian manufacturing industry. *Journal of Industrial and Business Economics*, 1-33.

Eckert, F, H Mikosch and M Stotz (2020), "Corona Crisis and Excess Mortality of Firms: Monitoring Firm Bankruptcies and Formations in Switzerland", Bisnode D&B and KOF Swiss Economic Institute, ETH Zurich.

Esposito, Piero & Mendolia, Silvia & Scicchitano, Sergio & Tealdi, Cristina, 2024. "Working from Home and Job Satisfaction: The Role of Gender and Personality Traits," IZA Discussion Papers 16751, Institute of Labor Economics (IZA).

Fairlie, R. (2020). The impact of COVID-19 on small business owners: Evidence from the first three months after widespread social-distancing restrictions. *Journal of economics & management strategy*, 29(4), 727-740.

Ferrando, A., & Rariga, J. (2024). Firms' financing conditions before and after the COVID-19 pandemic: a survey-based analysis. Journal of Industrial and Business Economics, 1-26.

Glass, G. V., V. L. Willson, and J. M. Gottman. 1975. Design and Analysis of Time-Series Experiments. Boulder, CO: Colorado Associated University Press.

Gourinchas, P-O, Ş Kalemli-Özcan, V Penciakova, and N Sander (2021), COVID-19 and Small- and Medium-Sized Enterprises: A "Time Bomb"?, AEA Papers and Proceedings, 111, 282–286.

Kosteas, V.D., Renna, F., Scicchitano, S. (2022). Covid-19 and Working from Home. In: Zimmermann, K.F. (eds) Handbook of Labor, Human Resources and Population Economics. Springer, Cham. <u>https://doi.org/10.1007/978-3-319-57365-6_325-1</u>

Laeven, L., Schepens, G., & Schnabel, I. (2020). *Zombification in Europe in times of pandemic* (No. 011). No 011, ECONtribute Policy Brief Series, University of Bonn and University of Cologne, Germany.

McGowan, M A, D Andrews, and V Millot (2018), "The walking dead? Zombie firms and productivity performance in OECD countries", Economic Policy 33(96): 685–736.

OECD (2020), OECD Economic Outlook, Volume 2020 Issue 1, OECD Publishing, Paris, <u>https://doi.org/10.1787/0d1d1e2e-en</u>.

OECD (2020), "Coronavirus (COVID-19): SME policy responses", OECD Policy Responses to Coronavirus (COVID-19), OECD Publishing, Paris, https://doi.org/10.1787/04440101-en.

Prashar N, Ri A, Hart M, et al. (2020) Business Dynamism and COVID-19 – An Early Assessment. Coventry: Enterprise Research Centre.

Schivardi, F, E Sette and G Tabellini (2020), "Identifying the Real Effects of Zombie Lending", Review of Corporate Finance Studies 9(3): 569–592.

Schivardi, F and G Romano (2020), "A simple method to estimate firms liquidity needs during the COVID-19 crisis with an application to Italy", CEPR Covid Economics: Vetted and Real-Time Papers.

Shadish, S. R., T. D. Cook, and D. T. Campbell. 2002. Experimental and Quasi-Experimental Designs for Generalized Causal Inference. Boston: Houghton Mifflin.

Storz, Manuela & Koetter, Michael & Setzer, Ralph & Westphal, Andreas, 2017. "Do we want these two to tango? On zombie firms and stressed banks in Europe," Working Paper Series 2104, European Central Bank.

Appendix

Sector of activity	Pre-pande	mic period	Pandemic period		
Name	Label	Number of bankruptcies	Log(Number of bankruptcies)	Number of bankruptcies	Log(Number of bankruptcies)
Agriculture	А	7.1	1.830	5.3	1.530
Extraction, Manufacturing	B-C	198.0	5.232	106.1	4.568
Energy, gas, water, and waste	D-E	6.5	1.685	5.0	1.393
Construction	F	205.1	5.261	112.9	4.613
Trade	G	242.3	5.439	147.5	4.871
Transportation	Н	49.4	3.837	39.4	3.501
Hotel, restaurants	Ι	61.8	4.065	55.1	3.888
Information, communications	J	22.0	3.024	12.5	2.343
Finance, insurance	Κ	6.0	1.664	3.6	1.150
Real estate	L	52.3	3.901	34.0	3.406
Professional services	Μ	32.8	3.425	22.7	2.982
Other business services	Ν	33.4	3.423	27.5	3.192
Public administration, Education, Health	O-Q	8.6	1.994	7.0	1.820
Sport, recreational activities	R	12.4	2.397	9.8	2.077
Other services	S	9.1	2.096	7.6	1.859
Household activities and others	T-X	72.2	4.208	39.9	3.556
Total	1019.1	6.876	636.0	6.345	

Table A1. Average number of bankruptcies by economic sector of activity

Notes: The 'pre-pandemic' period goes from January 2012 to February 2020, while the 'pandemic' period goes from March 2020 to December 2021. Source: Elaborations of the authors on InfoCamere data.

Territory		Pre-pande	mic period	Pandemic period	
NUTS-2 region	NUTS-1 group	Number of bankruptcies	Log(Number of bankruptcies)	Number of bankruptcies	Log(Number of bankruptcies)
Piemonte, Valle d'Aosta	North-West	70.6	4.200	36.4	3.458
Lombardia	North-West	224.3	5.365	137.7	4.784
Liguria	North-West	20.9	2.963	11.1	2.201
Trentino-Alto Adige	North-East	13.1	2.417	6.5	1.724
Veneto	North-East	88.6	4.425	56.2	3.853
Friuli-Venezia Giulia	North-East	16.9	2.681	8.0	1.875
Emilia-Romagna	North-East	74.9	4.271	47.6	3.778
Toscana	Middle	79.7	4.319	50.3	3.843
Umbria	Middle	17.3	2.753	10.6	2.145
Marche	Middle	32.9	3.375	14.5	2.521
Lazio	Middle	118.7	4.633	75.7	4.055
Abruzzo	South	22.0	2.929	13.5	2.337
Molise	South	3.9	1.183	3.3	0.862
Campania	South	79.3	4.294	51.1	3.747
Puglia	South	44.4	3.646	29.5	3.218
Basilicata	South	4.5	1.268	5.4	1.402
Calabria	South	23.1	3.015	15.3	2.581
Sicilia	Islands	62.1	4.056	47.7	3.784
Sardegna	Islands	22.1	2.953	15.4	2.602
Total		1019.1	6.876	636.0	6.345

Table A2. Average number of bankruptcies by Italian NUTS-2 region

Notes: The 'pre-pandemic' period goes from January 2012 to February 2020, while the 'pandemic' period goes from March 2020 to December 2021. Source: Elaborations of the authors on InfoCamere data.





Source: Elaborations of the authors on InfoCamere data.