EARLY WARNING INDICATORS: AN EMPIRICAL INVESTIGATION IN ITALIAN CONTEXT AND FIRST IMPLICATIONS FOR CORPORATE GOVERNANCE

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Abstract

The aim of this paper is to map the exposure to the risk of financial distress and insolvency of Italian companies during 2019 by monitoring the five early warning indicators defined by the National Council of Chartered Accountants and Accounting Experts (CNDCEC) and approved by the Italian Ministry of Economic Development, in accordance with the provisions of the "Crisis and Insolvency Code" (IC-Code). The methodology used to conduct these investigations consists of comparing the average value of each early warning indicator for companies belonging to a specific commodity-related sector to the threshold value established for each sector, in order to capture signs of potential financial distress. The results of the analysis show that Italian limited liability companies (LLC) and joint-stock companies (JSC) (listed and unlisted) in 2019 did not show particularly worrying signs of financial distress and insolvency. The results of the survey are relevant to national regulators, managers, investors, lenders and, more generally, market participants as they shed light on the type of commodity-related sectors in which economic and financial difficulties are more likely to occur. Moreover, the continuous monitoring process of the early warning indicators' average values can provide valuable support to the CNDCEC to verify whether and how to modify/refine their thresholds, thus improving their ability to report foreseeable states of financial distress.

Keywords: Early Warning Indicators, Financial Distress, Insolvency, Corporate Governance

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1. INTRODUCTION

The implementation of models for early identification of financial crisis has not been a widespread phenomenon in Europe in recent years. While France is the first nation in Europe to introduce an innovative and systematized framework for an early warning procedure of financial distress (i.e., "*procedures d'alerte*"), in the rest of Europe there are few legislative experiences aimed at creating a warning system capable of intercepting early signs of financial distress. The Italian

legislator, with the issuance of the "Crisis and Insolvency Code" (IC-Code) (Legislative Decree No. 14 of 12 January 2019), introduced for the first time a corporate crisis and insolvency early warning system, based mainly on the construction of accounting indicators. The IC-Code represents, among other things, the first major institutional and legal intervention to provide concrete support to early detection of financial distress. Its purpose is to intercept and, consequently, a signal in advance symptomatic situations of a potential prospective crisis. Although, recently, many scholars have investigated the causes, characteristics, and main consequences of such an early warning system (EWS) introduction in Italy, thus asking whether five accounting indicators may effectively and promptly intercept the first signs of a potential corporate crisis (Danovi & Riva, 2018; Ceccherini, 2019; Ferrandi, 2019; Riva & Comoli, 2019; Zanardo, 2020; Marcello & Cafaro, 2020; Ianni, Marullo, Migliori, & De Luca, 2021), no one has so far examined the exposure to the risk of financial distress and insolvency of Italian companies in the year of the IC-Code issuance.

The aim of this paper is to map the exposure to the risk of financial distress and insolvency of Italian companies during 2019 by monitoring the five early warning indicators defined by the National Council of Chartered Accountants and Accounting Experts (CNDCEC) and approved by the Italian Ministry of Economic Development, in accordance with the IC-Code. Moreover, this paper investigates "insolvent" companies during 2019, such as companies facing the condition of bankruptcy, composition with creditors, debt restructuring, compulsory liquidation, or extraordinary administration. This study represents the first observation of the exposure of Italian companies to the risk of financial distress and insolvency soon after the introduction of the early warning indicators in 2019 in Italy. Hence, this study may be the reference point for future benchmarking analyses on the performance of Italian companies in the years following the introduction of the IC-Code.

The empirical analysis is conducted on the population of Italian limited liability companies (LLC) and joint-stock companies (JSC) (listed and unlisted) active in 2019, as these companies have corporate models susceptible to the rules introduced by the IC-Code. In order to develop the analysis, the companies were first divided according to their commodity-related sectors and then to their size. Finally, listed companies were isolated. The methodology used for such investigations consists of comparing the average value of each early warning indicator developed by the CNDCEC for all companies belonging to a specific commodity-related sector to the threshold value established for each sector. Through a joint study of all early warning indicators, the study reconstructs the state of the art of the exposure to financial distress and insolvency risk of Italian companies.

The results demonstrate that, apart from specific individual cases, Italian LLCs and JSCs in 2019 did not show particularly worrying signs of financial distress or insolvency. At the same time, the results of the study provide national regulators with relevant information on the type of sectors in which economic and financial difficulties are most likely to occur. In addition, the results are useful to

investors, financers, and, more generally, market participants because they suggest what kind of economic and financial indicators to be particularly monitored to ensure that their strategic investment choices are appropriate to expected returns. Finally, the continuous monitoring process of the average values of the early warning indicators of Italian LLC and JSC companies, both listed and unlisted, can provide valuable support to the CNDCEC to verify whether and how to modify/refine the thresholds, thus improving their ability to report foreseeable states of economic-financial difficulty.

The paper is organized as follows. Section 2 presents the literature review. Section 3 shows the research methodology. Section 4 contains the results of the analysis and discussions, while Section 5 presents the conclusion.

2. LITERATURE REVIEW

The issues of financial distress[1] and insolvency have always been crucial topics to be investigated in both legal and accounting studies, not only for the intrinsic complexity of identifying the factors threatening the corporate going concern but also for the urgent need of its timely detection and rapid response. Previous studies investigated the importance of early identification of corporate financial distress (Marcello & Cafaro, 2020), and several are the predictive models developed so far, especially in the Anglo-Saxon doctrine (i.e., Altman, 1968; Altman, 1983; Altman, Marco, & Varetto, 1994; Yang, Platt, & Platt, 1999; Altman & Hotchkiss, 2006; Gissel, Giacomino, & Akers, 2007; Jiang & Jones, 2018)[2]. However, there are still few EWS in Europe for an early detection of a corporate financial distress. France, for example, has been a pioneer in the field of early warning systems, as it introduced in Europe in 1984 the *"procedures d'alerte"*. The *"procédures d'alerte"* is a set of rules establishing the circumstances where it is necessary to adopt timely measures to overcome the crisis in companies that are potentially in difficulty, thus attributing to certain actors the responsibility to activate an early warning procedure[3], according to a detailed regulatory process[4]. The set of rules of *"procedures d'alerte"* has been an archetype for the Italian early warning institute, i.e., the "Crisis and Insolvency Code" (Innocenti, 2018). The IC-Code, introduced into the Italian legal system by Legislative Decree No. 14 of 12 January 2019 and resulting from the implementation of Law No. 155 of 19 October 2017, is part of a regulatory reform project aimed at speeding up and making efficient the process of identifying the signs of financial distress, thus favoring timely preventive restructuring interventions and countering the deleterious effects of a sudden bankruptcy. With the term "crisis"

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[1] The term "financial distress" in this paper is used to indicate critical business conditions where going concern is threatened. Hence, the terms "financial distress", "business crisis", and "crisis" are used alternatively.
[2] See Ianni et al. (2021) for a detailed mapping of all predictive models of business crisis.
[3] The Code de Commerce transfers the responsibility for the early identification of financial distress signals to the following parties: manager, control body and auditor.
[4] Book VI of the Code de Commerce describes in great detail all the stages of the *"procédures d'alerte"* depending on the company name and the type of person reporting the potential state of crisis of the company, i.e., alternatively, the entrepreneur, the shareholders, the statutory auditor, the works council or the President of the Commercial Court.

the legislator identifies a "state of economic and financial difficulty which makes the insolvency of the debtor probable and, for companies, manifests itself as the inadequacy of prospective cash flows to regularly comply with the previous obligations" (Art. 2 of the "Crisis and Insolvency Code"). A company is "insolvent" when it is not able to regularly comply with its obligations. The introduction of the IC-Code in Italy marked the end of an era, not only because it represented a new organic regulation of crisis and insolvency with a foreword-looking early warning institute (Innocenti, 2018), but also because it entrusted the CNDCEC, at least every three years, with the task of developing early warning indicators capable of promptly intercepting reliable signs of financial distress (Art. 13 of the "Crisis and Insolvency Code")[5].

So far, several studies focused on the features, novelties, and criticalities of the new code, both under the legal perspective (see, among others, Danovi and Riva, 2018; Ceccherini, 2019; Ferrandi, 2019; Zanardo, 2020) and the business one (see, among others, Riva and Comoli, 2019; Marcello and Cafaro, 2020; Ianni et al., 2021). According to Riva and Comoli (2019), for example, the new IC-Code contributes to the involvement of independent professionals in governance mechanisms in Italian companies, even in small-sized family ones. Similarly, it is expected that the strengthening of control systems introduced by the IC-Code will lead to an overall improvement in the effectiveness of business administration (Riva & Comoli, 2019). On the other hand, according to other studies, the effectiveness of the early warning indicators is questioned by the assumption that the alert procedure is neither adequate nor innovative since there is no real internal procedure capable of signaling the symptoms of the crisis to administrative bodies, entrepreneur and shareholders in a timely manner (Ferrandi, 2019; Zanardo, 2020). According to the study conducted by Marcello and Cafaro (2020), financial distress and insolvency forecasting models exploiting econometric and multivariate statistical techniques or computerized and artificial intelligence tools suffer from the important limitation of using only accounting ratios to intercept financial distress. The authors argue that for developing accurate and reliable financial crisis forecasting models it is necessary to both building accounting ratios and considering the potential earnings management policies that companies may adopt to hide financial distress conditions emerging from accounting data. Likewise, Zanardo (2020) wonders whether the Italian early warning system is actually capable of intercepting signs of economic and financial difficulties without a culture of strategic planning of financial needs integrated into corporate governance systems.

Although there have been many contributions on the main characteristics and potential corporate consequences of the Italian early warning system, the actual exposure to financial distress and insolvency risk of Italian companies in the year

the IC-Code issuance has not been investigated to date. In order to fill this gap, this paper aims to map the exposure to the risk of financial distress and insolvency of Italian companies during 2019 through the monitoring of the five early warning indicators defined by the CNDCEC and approved by the Italian Ministry of Economic Development, in accordance with the provisions of the IC-Code.

This study provides a comprehensive and clear view of the economic and financial condition of Italian companies in "year zero", in order to provide a benchmark to make future assessments of the improvement/worsening of their economic and financial conditions and for investigating the effectiveness of the five early warning indicators. Although the IC-Code recognizes that all economic and financial imbalances, which can be monitored through accounting measures, are indicators of financial distress, however, it emphasizes the need to always contextualize such phenomena, relating them to the typical characteristics of the company under examination, considering the nature of the entrepreneurial activity and the date of incorporation and start-up. Therefore, only a joint analysis of accounting indicators and internal and external phenomena (non-accounting nature), such as potential losses deriving from significant environmental damage, which can only be intercepted with an efficient risk management system, will give to the entrepreneur and the controller the right tools to intercept with reasonable reliability the existence of signs of financial distress. Leaving aside, for obvious reasons, the non-accounting warning indicators, whose identification is affected by subjective and random evaluations, here we proceed with the reconstruction of the accounting indicators of financial distress.

3. RESEARCH METHODOLOGY

3.1. Sample selection

The empirical analysis was first conducted by extracting from AIDA Bureau van Dijk database the population of Italian LLCs and JSCs (listed and unlisted) in 2019, i.e., all the Italian companies falling into the two types of corporate models susceptible to the rules introduced by the IC-Code and for which it is possible to calculate the early warning indicators. The year under review is the year of the issuance of the IC-Code.

From a population of 433,368 Italian LLCs and JSCs, only those companies that met these requirements were extracted:

1) not recently established, i.e., they have deposited at least 3 financial statements;

2) with an economic activity other than finance and real estate;

3) with a size larger than that one defined by Directive 2013/34/EU as a micro-enterprise[6];

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[5] The crisis indicators have been published in "Crisi di Impresa. Indici di allerta dei Commercialisti" (Il Sole 24 Ore, 2020).

[6] According to the definition provided by Directive 2013/34/EU, these are companies that do not exceed the numerical limits of at least two of the following three criteria at the balance sheet date: a) balance sheet total: EUR 350,000; b) net revenues from sales and services: EUR 700,000; c) average number of employees employed during the financial year: 10. Micro-enterprises were excluded from the training sample because, given their numerical predominance compared to other company sizes, they would have affected the results of the test too much.

4) with all available financial data needed to calculate the five early warning indicators.

This skimming process resulted in a final sample of 23,818 companies (LLC and JSC), of which 72 are listed companies. For the subsequent analyses, the heterogeneity of the sample has been corrected by isolating first the LLCs and then the listed companies from all other companies in the sample.

3.2. Descriptive analysis

Since the minimum thresholds of the early warning indicators are specific for each commodity-related sector, a segmentation of the sample companies into macro-sectors is proposed below (Il Sole 24 Ore, 2020) and, at the same time, by size, coherently with the classification proposed by the CNDCEC (Table 1).

The macro-sectors are:
– Agriculture, forestry and fishing;
– Mining, manufacturing, and energy/gas production;
– Water supply, sewerage, waste, energy/gas transmission;

– Construction of buildings;
– Civil engineering, specialized construction;
– Wholesale and retail trade of motor vehicles, wholesale trade, energy/gas distribution;
– Retail trade, bars, and restaurants;
– Transport and storage, hotels;
– Services to companies;
– Services to people.

The commodity-related sector with the highest number of enterprises is the "Wholesale and retail trade of motor vehicles, wholesale trade, energy/gas distribution" one, which accounts for 66.65% of the total number of enterprises surveyed, followed immediately by the "Construction of buildings" sector with 6.42% and the "Services to people" sector with 5.53%. These three sectors are also characterised by the predominance of small enterprises (44.96%, 4.53%, and 2.96%, respectively). In fact, in relation to the size, most of the firms are classified as small with a percentage of small firms in the total of 65.68%. See Table 1 for more detailed information.

Table 1. Distribution of enterprises by sector and size (% values)

Sector	Small	Medium	Large	Listed	Total
Agriculture, forestry and fishing	3.76%	1.38%	0.36%	0.00%	5.50%
Mining, manufacturing, and energy/gas production	2.22%	1.01%	0.24%	0.02%	3.49%
Water supply, sewerage, waste, energy/gas transmission	0.03%	0.07%	0.05%	0.01%	0.16%
Construction of buildings	4.53%	1.68%	0.21%	0.02%	6.44%
Civil engineering, specialized construction	0.24%	0.04%	0.04%	0.00%	0.32%
Wholesale and retail trade of motor vehicles, wholesale trade, energy/gas distribution	44.41%	18.39%	3.17%	0.19%	66.16%
Retail trade, bars, and restaurants	3.43%	0.97%	0.37%	0.01%	4.78%
Transport and storage, hotels	2.23%	1.59%	0.44%	0.03%	4.28%
Services to companies	1.29%	1.19%	0.44%	0.42%	3.33%
Services to people	2.97%	1.94%	0.60%	0.02%	5.53%
Total	65.12%	28.26%	5.91%	0.71%	100%

Notes: The methods and criteria for grouping companies into product sectors contained in the table are in line with those established by the CNDCEC for the development of early warning indicators (Il Sole 24 Ore, 2020).

3.3. The calculation of the early warning indicators

The mapping of the state of exposure to financial distress and insolvency risk of the companies in the sample has been carried out through the calculation of the early warning indicators developed by the CNDCEC and the contextual comparison with the warning thresholds by commodity-related sector. The five early warning indicators are the result of a plurality of analyses and investigations considering the product specificities of the companies when defining the thresholds.

According to the "tree" diagnostic system of early warning indicators (Il Sole 24 Ore, 2020), in order to intercept the state of financial distress it is necessary to move from one "node" to another, first checking whether one of the following three phenomena has occurred:

1. Repeated and significant delay in payments.
2. Shareholders' equity negative or below the minimum level established by law (Art. 2484, Clause 4 of the "Codice Civile").

3. Unsustainable debts in the following six months through the use of free cash flows to cover them (debts) (through the calculation of the debt service coverage ratio)[7].

If at least one of the above-mentioned cases occurs, a clear signal of a relevant state of financial distress is triggered, thus generating specific reporting obligations for the entrepreneur and the supervisory body. Specifically, when at least one of the three above-mentioned conditions appears in the last approved financial statements or for three consecutive months, it is compulsory to make an application for accessing to crisis regulation procedure.

If, on the other hand, none of the three phenomena occurs, it is essential to move on to another "node" of the diagnostic tree, using the construction of five specific indicators to be interpreted jointly:

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[7] The debt service coverage ratio (DSCR) is an index constructed by using forecast data to develop a prediction of the company's expected performance over the next six months. When the DSCR is below unity, there is a significant unsustainability of the debt such that there is an obligation to report a presumed financial distress.

1. Sustainability index of financial expenses, calculated as the ratio of financial expenses to turnover.

2. Capital adequacy index, calculated as the ratio of shareholders' equity to total liabilities.

3. Cash return on assets index, calculated as the ratio of cash flow for the year to total assets.

4. Liquidity ratio, calculated as the ratio of short-term assets to short-term liabilities.

5. Social security and tax debt ratio, calculated as the ratio of social security and tax debt to total assets.

When the value of the five indicators exceeds a certain threshold considered as "limit", set by the CNDCEC for each commodity-related sector[8], there is a reasonable presumption of a state of financial distress, but there is no obligation to notify it.

The difference between the indicators of the first node and the indicators of the second node is condensed in their ability to intercept the existence of financial distress signals. The indicators of the first node represent "symptoms of a relevant crisis", while those of the second node represent "signs of a reasonable presumption of crisis". According to the former, the financial distress is evident; according to the latter, the financial distress is presumed.

In this paper, we want to map the overall state of exposure to the risk of financial distress and insolvency of Italian companies during 2019, through the monitoring of the five early warning indicators developed by the CNDCEC. The decision to omit the first three early warning indicators of the first diagnostic node derives from the need to intercept only the cases of presumed and reasonably reliable financial distress. These indicators must be developed at least every three years for each economic activity according to ISTAT classifications.

Specifically, to calculate the sustainability index for finance charges, the numerator is the sum of interest and other finance charges and the denominator is net revenues. For the capital adequacy index, the numerator is the total amount of the company's shareholders' equity, net of receivables from shareholders for payments still due, and dividends approved but not yet recorded, and the denominator is total debts. For the calculation of the cash return index of the assets, the numerator is the cash flow of the year, obtained by adding the economic result of the year to the non-monetary costs net of the non-monetary revenues and the denominator is total assets of the balance sheet.

The liquidity ratio is calculated as the ratio between short-term assets, calculated as the sum of all current assets due within the next financial year including accrued income and prepaid expenses, and total short-term liabilities due within the next financial year plus accruals and deferrals. Finally, the social security and tax debt ratio was calculated as the ratio of social security and tax debts due within and beyond the next financial year to the total assets. For the calculation of the ratios, we used the financial statements data of 2019. Since the sample includes both LLCs, and listed and unlisted JSCs, in order to ensure homogeneity and consistency in the evaluations, we created many sub-samples.

4. RESULTS

Table 2a presents the comparison between the average early warning indicators calculated for LLCs belonging to the same commodity-related sector and the respective warning thresholds[9].

Table 2b presents the comparison between the average early warning indicators calculated for the unlisted JSCs belonging to the same commodity-related sector and the respective warning thresholds.

Table 2c presents the comparison between the average early warning indicators calculated for listed JSCs belonging to the same commodity-related sector and the respective warning thresholds.

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[8] The CNDCEC, in light of the significant and obvious differences arising between companies that can be traced back to separate commodity-related sectors due to the nature of their activities, has recognized specific thresholds for the indices for specific sectors. On the other hand, for innovative start-ups, newly established companies, cooperatives, consortia and companies in liquidation, the early warning indicators are completely different.

[9] The classification by sector was proposed by the CNDCEC and presented in "Crisi di Impresa. Indici di allerta dei Commercialisti" (Il Sole 24 Ore, 2020). The warning thresholds have been retrieved from the same document.

Table 2a. Comparison of average early warning indicators calculated for LLCs belonging to the same commodity-related sector in 2019 and the respective warning thresholds (% values)

Sector	Sustainability index of financial expenses	Capital adequacy index	Cash return on assets index	Liquidity ratio	Social security and tax debt ratio
Agriculture, forestry and fishing	> 2.8	< 9.4	< 0.3	< 92.1	> 5.6
	1%	126%	7%	214%	3.5%
Mining, manufacturing, and energy/gas production	> 3	< 7.6	< 0.5	< 93.7	> 4.9
	2%	170%	10%	20%	4.4%
Water supply, sewerage, waste, energy/gas transmission	> 2.6	< 6.7	< 1.9	< 84.2	> 6.5
	1.1%	99%	5.5%	144%	3%
Construction of buildings	> 3.8	< 4.9	< 0.4	< 108	> 3.8
	0.8%	71%	7%	184%	5%
Civil engineering, specialized construction	> 2.8	< 5.3	< 1.4	< 101.1	> 5.3
	0.6%	57%	6.20%	150%	2.6%
Wholesale and retail trade of motor vehicles, wholesale trade, energy/gas distribution	> 2.1	< 6.3	< 0.6	< 101.4	> 2.9
	0.4%	116%	8%	204%	3%
Retail trade, bars, and restaurants	> 1.5	< 4.2	< 1	< 89.8	> 7.8
	0.3%	74%	6%	167%	5%
Transport and storage, hotels	> 1.5	< 4.1	< 1.4	< 86	> 10.2
	0.5%	94%	8%	154%	7%
Services to companies	> 1.8	< 5.2	< 1.7	< 95.4	> 11.9
	0.4%	92%	8.8%	188%	8.5%
Services to people	> 2.7	< 2.3	< 0.5	< 69.8	> 14.6
	0.3%	77%	8%	156%	5%

Notes: Sustainability of financial expenses ratio, calculated as the ratio of financial expenses to turnover. Capital adequacy ratio, calculated as the ratio of shareholders' equity to total liabilities. Cash return on assets ratio, calculated as the ratio of cash flow for the year to total assets Liquidity ratio, calculated as the ratio of short-term assets to short-term liabilities. Social security and tax debt ratio, calculated as the ratio of social security and tax debt to assets.

The average early warning indicators calculated for Italian LLCs in 2019 contained in Table 2a, show that overall for the commodity-related sectors investigated, there are no serious presumptions of financial distress, as for the majority of the commodity-related sectors no warning threshold is overcome. Of course, it should be noted that only for companies in the "Mining, manufacturing, and energy/gas production" sector there is a chronic average liquidity shortage to meet short-term obligations, while for the "Construction of buildings" and "Wholesale and retail trade in cars, wholesale trade and energy/gas distribution" sectors there is a risk from unsustainable social security and tax debt.

Table 2b. Comparison of average early warning indicators calculated for the unlisted JSCs belonging to the same commodity-related sector in 2019 and the respective warning thresholds (% values)

Sector	Sustainability index of financial expenses	Capital adequacy index	Cash return on assets index	Liquidity ratio	Social security and tax debt ratio
Agriculture, forestry and fishing	> 2.8	< 9.4	< 0.3	< 92.1	> 5.6
	0.8%	151%	7%	200%	2%
Mining, manufacturing, and energy/gas production	> 3	< 7.6	< 0.5	< 93.7	> 4.9
	1%	222%	8%	220%	3%
Water supply, sewerage, waste, energy/gas transmission	> 2.6	< 6.7	< 1.9	< 84.2	> 6.5
	2%	103%	8%	134%	2%
Construction of buildings	> 3.8	< 4.9	< 0.4	< 108	> 3.8
	1%	108%	37%	220%	3%
Civil engineering, specialized construction	> 2.8	< 5.3	< 1.4	< 101.1	> 5.3
	3%	221%	7%	246%	1%
Wholesale and retail trade of motor vehicles, wholesale trade, energy/gas distribution	> 2.1	< 6.3	< 0.6	< 101.4	> 2.9
	0.6%	139%	7%	207%	2%
Retail trade, bars, and restaurants	> 1.5	< 4.2	< 1.0	< 89.8	> 7,8
	0.6%	96%	6%	191%	3%
Transport and storage, hotels	> 1.5	< 4.1	< 1.4	< 86	> 10.2
	1%	221%	8%	238%	4%
Services to companies	> 1.8	< 5.2	< 1.7	< 95.4	> 11.9
	1%	101%	7%	187%	5%
Services to people	> 2.7	< 2.3	< 0.5	< 69.8	> 14.6
	0.8%	148%	7%	194%	6%

Notes: Sustainability of financial expenses ratio, calculated as the ratio of financial expenses to turnover. Capital adequacy ratio, calculated as the ratio of shareholders' equity to total liabilities. Cash return on assets ratio, calculated as the ratio of cash flow for the year to total assets. Liquidity ratio, calculated as the ratio of short-term assets to short-term liabilities. Social security and tax debt ratio, calculated as the ratio of social security and tax debt to assets.

The average early warning indicators calculated for the Italian JSCs in 2019 contained in Table 2b show that, as the LLCs investigated in the previous table, there are no worrying presumptions of financial distress in the commodity-related sectors examined, since for almost all the sectors investigated no warning threshold is overcome for any of the five indices. Only in the "civil engineering, specialized construction" sector there is a significant problem of unsustainable finance charges.

Table 2c. Comparison of average early warning indicators calculated for listed companies belonging to the same commodity-related sector in 2019 and the respective warning thresholds (% values)

Sector	Sustainability index of financial expenses	Capital adequacy index	Cash return on assets index	Liquidity ratio	Social security and tax debt ratio
Agriculture, forestry and fishing	> 2.8	< 9.4	< 0.3	< 92.1	> 5.6
	-	-	-	-	-
Mining, manufacturing, and energy/gas production	> 3.0	< 7.6	< 0.5	< 93.7	> 4.9
	8%	64%	7%	83%	0.8%
Water supply, sewerage, waste, energy/gas transmission	> 2.6	< 6.7	< 1.9	< 84.2	> 6.5
	7%	70%	8%	136%	1%
Construction of buildings	> 3.8	< 4.9	< 0.4	< 108	> 3.8
	2%	45%	6%	144%	3%
Civil engineering, specialized construction	> 2.8	< 5.3	< 1.4	< 101.1	> 5.3
	-	-	-	-	-
Wholesale and retail trade of motor vehicles, wholesale trade, energy/gas distribution	> 2.1	< 6.3	< 0.6	< 101.4	> 2.9
	1%	104%	71%	151%	1%
Retail trade, bars, and restaurants	> 1.5	< 4.2	< 1	< 89.8	> 7.8
	4%	112%	11%	109%	2%
Transport and storage, hotels	> 1.5	< 4.1	< 1.4	< 86	> 10.2
	2%	122%	10%	102%	3%
Services to companies	> 1.8	< 5.2	< 1.7	< 95.4	> 11.9
	0.9%	116%	1%	166%	5%
Services to people	> 2.7	< 2.3	< 0.5	< 69.8	> 14.6
	4%	70%	13%	143%	3%

Notes: Sustainability of financial expenses ratio, calculated as the ratio of financial expenses to turnover. Capital adequacy ratio, calculated as the ratio of shareholders' equity to total liabilities. Cash return on assets ratio, calculated as the ratio of cash flow for the year to total assets. Liquidity ratio, calculated as the ratio of short-term assets to short-term liabilities. Social security and tax debt ratio, calculated as the ratio of social security and tax debt to assets.

Finally, the average warning indices calculated for Italian listed companies in 2019 contained in Table 2c show that there is no overall presumption of financial distress in the commodity-related sectors examined since for all sectors the warning thresholds of the five indices are not overcome. Nevertheless, it is possible to note that on average for listed companies in many product sectors, such as "Mining, manufacturing, and energy/gas production", "Water supply, sewerage, waste, energy/gas transmission", and "Retail trade, bars, and restaurants", "Services to companies" and "Services to people", there is significant unsustainability of finance charges compared to the turnover for the year. Overall, comparing the results of the average early warning indicators calculated for LLCs and listed and unlisted JSCs in 2019 (contained in Tables 2a, 2b, 2c), that listed companies seem to be those most affected by the problems related to the unsustainability of finance charges. Probably, the high indebtedness, sometimes necessary to finance the productive process, generates an unbalanced amount of finance charges compared to the volume of annual turnover.

After calculating the average ratios over 2019, we identified the "insolvent" companies, i.e., all those companies that during 2019 faced the condition of bankruptcy, debt restructuring, composition with creditors, compulsory liquidation, or extraordinary administration. By dividing the companies into groups based on their size, disregarding the product sector they belong to and the division between LLC and JSC, it is possible to calculate the average insolvency rate of "small", "medium", "large" and "listed" companies.

$$Insolvency\ rate = \frac{Number\ of\ insolvent\ companies}{Total\ companies} \quad (1)$$

Table 3 shows that 6.01% of all Italian companies surveyed in 2019 faced a condition of insolvency identifiable as bankruptcy, composition with creditors, debt restructuring, compulsory liquidation, or extraordinary administration. This percentage indicates that, despite a relatively small number of Italian companies faced an actual severe state of financial distress in 2019, the size has a great impact on the ability of companies to ensure their survival over time, as most of these insolvent companies are small. Specifically, 3.71% of all insolvent Italian companies are small, 1.88% are medium-sized, 0.39% are large and only 0.05% are listed companies.

Table 4, on the other hand, shows the detail of the percentage distribution of insolvent companies divided according to the product sector they belong to, without considering their size or market listing.

It can be observed that the highest insolvency rate is registered in the sector "Wholesale and retail trade of motor vehicles, wholesale trade, energy/gas distribution", equal to 4.04%. In contrast, within the product sector of "Water supply, sewerage, waste, energy/gas transmission", no insolvency issues were recorded in 2019.

Table 3. Percentage distribution of insolvent companies by size and listing

Size	Insolvency rate
Small	3.71
Medium	1.88
Large	0.39
Listed	0.05
Total	**6.01**

Table 4. Percentage distribution of insolvent companies by sector of activity

Sector	Insolvency rate
Agriculture, forestry and fishing	0.28
Mining, manufacturing, and energy/gas production	0.24
Water supply, sewerage, waste, energy/gas transmission	–
Construction of buildings	0.44
Civil engineering, specialized construction	0.02
Wholesale and retail trade of motor vehicles, wholesale trade, energy/gas distribution	4.04
Retail trade, bars, and restaurants	0.23
Transport and storage, hotels	0.29
Services to companies	0.21
Services to people	0.31

Isolating within the surveyed sample all LLCs, an analysis was conducted that allows to record the percentage of LLCs that in 2019 have a control body, in accordance with the provisions of Legislative Decree No. 14 of 2019, which implemented Law No. 155/2017. A clarification is needed on this point. The Italian legislator extended the supervisory obligations prescribed to the bodies in charge of corporate control also to LLCs that meet certain requirements. Specifically, Art. 379 of Legislative Decree No. 14/2019 provides that a limited liability company:

– is required to prepare consolidated financial statements;
– controls a company that is required to have a statutory audit;
– has exceeded for two consecutive financial years at least one of the following limits: a) Total assets in the balance sheet: EUR 2 million; b) Revenues from sales and services: EUR 2 million; c) The average number of employees during the year: 10, must compulsorily appoint a supervisory body or an auditor.

According to Decree-Law No. 32/2019, the above constraints were transformed into: a) Total assets in the balance sheet: EUR 4 million; b) Revenues from sales and services: EUR 4 million; c) Average number of employees during the financial year: 20.

Table 5 contains the percentage of all Italian LLCs (divided by the product sector they belong to) that had an internal control body in 2019, in accordance with the provisions of Legislative Decree No. 14/2019. As shown in Table 5, the LLCs having a control body are mostly small. These results show that at the end of 2019, when the obligation to subject LLCs with specific requirements to a more formalized control process was officially introduced into Italian legal system, the percentage of small companies that decided to have an internal control body was particularly high.

Table 5. Percentage distribution of LLC by size and sector with respect to the presence of the controlling body

Sector	Small	Medium	Large	Total
Agriculture, forestry and fishing	76.81%	20.13%	3.06%	100%
Mining, manufacturing, and energy/gas production	70.71%	25.13%	4.16%	100%
Water supply, sewerage, waste, energy/gas transmission	55.56%	22.22%	22.22%	100%
Construction of buildings	76.86%	22.31%	0.83%	100%
Civil engineering, specialized construction	93.48%	6.52%	–	100%
Wholesale and retail trade of motor vehicles, wholesale trade, energy/gas distribution	78.74%	19.33%	1.93%	100%
Retail trade, bars, and restaurants	78.12%	17.38%	4.5%	100%
Transport and storage, hotels	65.23%	34.77%	5.47%	100%
Services to companies	63.39%	36.61%	11.72%	100%
Services to people	61.7%	32.08%	6.22%	100%

The results of this analysis may lead to some reflections about the role of corporate governance strategies. The monitoring over time of early warning indicators certainly provides valuable support to the process of assessing the foreseeable development of corporate performance, solvency and going concern. However, we believe that building and monitoring early warning indicators may be not enough to ensure timely detection of financial distress signals. Flexible corporate governance strategies must be adopted to anticipate and cope with sudden and adverse events which can threaten the corporate going concern. The destabilizing and deleterious effect that the COVID-19 pandemic crisis had on Italian companies is a clear example of this. Many Italian companies, regardless of their commodity-related sector they belong to, which did not show any obvious signs of financial distress or insolvency before the pandemic, went bankrupt during 2020 partly due also to the inability of their governance models to be flexible and find immediate solutions to new and sudden issues. In fact, although early warning indicators can be a useful tool to understand the current state of economic performance and its foreseeable evolution in the immediate future, the adoption of flexible governance models may help companies preventing from going bankrupt. Hence, it would be necessary to adopt strategic governance choices that are not only instrumental to the achievement of long-term objectives and functional to the organizational characteristics of the company, but also flexible in order to anticipate changes/unforeseen risky events and intervene promptly, if necessary. Moreover, in light of the extraordinary importance of governance policies on company performance, the observation of early warning indicators alongside key qualitative indicators (KPIs) and key risk indicators (KRIs) would undoubtedly facilitate the process of making a more accurate and plausible judgement on the foreseeable corporate performance (Virgillito, 2020). In fact, recently, accounting scholars are asking whether early warning indicators will be able to assess the corporate performance on their own in the new post-COVID-19 era.

5. CONCLUSION

The purpose of the paper is to carry out a comprehensive mapping of the state of exposure to the risk of financial distress and insolvency of Italian companies during 2019 through the monitoring of the five early warning indicators defined by the CNDCEC and approved by the Italian Ministry for the Economic Development, in accordance with the provisions of the IC-Code. In addition, this study focuses on investigating "insolvent" companies during 2019, i.e., all those companies that were facing the condition of bankruptcy, composition with creditors, debt restructuring, compulsory liquidation or extraordinary administration. Finally, the study investigates the percentage distribution of LLCs by size and sector with respect to the presence of the control body. The results of the analysis demonstrate that overall Italian LLCs and JSCs in 2019 did not show particularly worrying signs in terms of exposure to financial distress and insolvency risk. Nevertheless, there are some sectors that are particularly exposed to specific issues that, if not properly addressed and overcome, can hinder going concern. Specifically, companies belonging to the "Mining, manufacturing, and energy/gas production" sector are particularly exposed to the risk of a lack of liquidity due to an excessive imbalance between the amount of cash flows from operations and the overall value of the assets. Indeed, it is widely accepted that a sudden compression of the volume of annual net cash flows from operations is a clear sign of financial distress (Altman, 1968; Gilson, John, & Lang, 1990; Wruck, 1990; Gilbert, Menon, & Schwartz, 1990; John, 1993; Johnsen & Melicher, 1994; Turetsky & McEwen, 2001). Similarly, the sectors "Construction of buildings" and "Wholesale and retail trade of motor vehicles, wholesale trade, energy/gas distribution" are particularly susceptible to a high risk of social security and tax over-indebtedness. The unlisted JSCs that exceed the minimum thresholds identified are very few. Specifically, companies belonging to the "Civil engineering, specialized construction" sector suffer on average from a higher level of unsustainable financial expenses, due to the imbalance between the amount of financial expenses and sales revenues. Similarly, listed JSCs, especially those belonging to the sectors of "Mining, manufacturing, and energy/gas production" and "Water supply, sewerage, waste, energy/gas transmission", "Retail trade, bars, and restaurants", "Transport and storage, hotels", and "Services to people" also exceeded the minimum threshold of the financial burden sustainability index on average in 2019.

This study provides a composite picture of the economic and financial health of Italian companies in 2019 by using the early warning indicators introduced in the same year. The results of the study are of interest to national regulators as they shed light on the type of commodity-related sectors in which economic and financial difficulties are most likely to be found through the timely construction and interpretation of early warning indicators. Moreover, the results are useful for managers operating within a specific commodity-related sector to understand which types of indicators should be monitored more often to promptly identify the existence of facts that are likely to compromise the going concern of business operations. This kind of information will be useful in suggesting new and more appropriate organizational systems within companies in order to early intervene in cases of economic and financial difficulty. In addition, the process of continuous monitoring the average values of the early warning indicators of Italian LLC and JSC companies can provide valuable support to the CNDCEC to verify whether and how modifying the warning thresholds, thus improving the ability of the early warning indicators to act as "red flags", for the first symptoms of financial distress and favoring a timely intervention prior to the full manifestation of insolvency. Finally, the results of this survey can suggest to investors, lenders and, more generally, market participants the types of indicators to be monitored to ensure that strategic investment choices are appropriate to expected returns. Future studies may be conducted to verify the state of exposure to the risk of financial distress and insolvency of companies in other European national contexts in a comparative manner for developing more integrated reflections on the effectiveness of early warning system.

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