



Investigating financial statements in hospitality: a quantitative approach

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Abstract

The aim of this paper is to investigate, through financial-statement analyzes, the economic-financial performance of Italian hotels, after the international economic crisis, also considering the possible macro-regional differences. The study focuses the financial statements of 5473 hotels from 2009 to 2018. National data are also disaggregated in the three macro-areas that characterize Italy for different social and economic aspects. Anova test and Tukey–Kramer test are used. Results show that the crisis affected profitability. Italian hotels have a low capitalization, unable to cope with the large structural investments that require significant debts. The profitability indicators record similar trends in the three macro-areas, while the financial independence index and the coverage index show significant different values in the three observed areas. Therefore, in the digital era, Italian hotel industry has all the potential to restructure itself. Here five ratios are considered to observe medium sized hotels. Future research with other variables will be useful, even on smaller hotels, and the analysis of their trends by cohorts of companies is necessary, as well as the integration of quantitative data with qualitative evidence. This paper encourages the culture of temporal sector comparison, re-evaluating the potential of accounting information systems, in order to promote data-based growth and development strategies. Furthermore, it contains indications for government officials, as well as for countries in the process of developing the hospitality sector following the example of the Italian experience.

Keywords Italian hotels · Tourism in Italy · Economic-financial performance · Crisis · Ratios

This paper is the result of collaborative work. However, it is possible to attribute to Pietro Pavone: Method and Empirical Findings whit all its paragraphs; to Biagio Simonetti: Some Methodological Problems. The other sections are of Guido Migliaccio.

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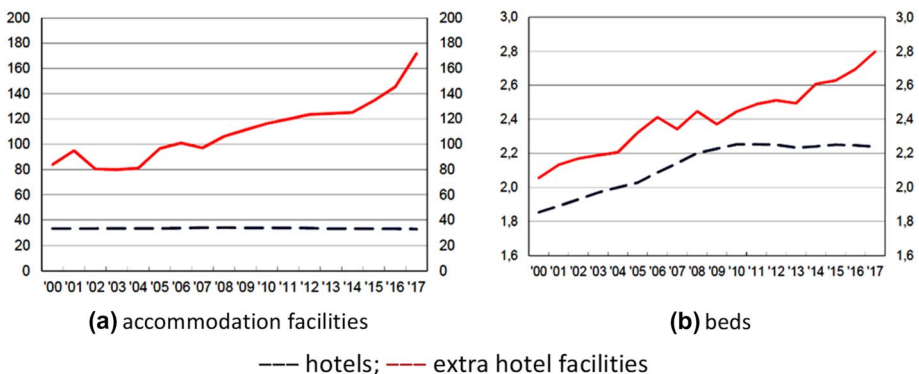
1 Introduction

Despite growing international competition, Italy still attracts tourist flows, continuing the positive trend (ONT 2018) and promoting employment and local development. Nevertheless, the degree of aging of accommodation facilities remains, including the hotels that are protagonists, and a particular civil and fiscal regulation that influences the management (Desinano 2010; Molinari 2017; Cipolla and Biasion 2010; Bonfiglietti 2018; Ricci et al. 2007; Liberatore 2001; Benevolo and Grasso 2010). In 2017, 33,000 hotels and over 170,000 non-hotel facilities operated, offering around 5 million beds (Fig. 1), to which private beds should be added that are not registered (Petrella and Torrini 2018, and related bibliography).

In recent years, hotels have suffered from the competition of alternative structures, which have almost doubled and have also led to a different quality of the offer, to the advantage of better-quality facilities. However, the prominent role of the hotels remains, which has led us to evaluate their economic, income, capital and financial performances through a national and macro-regional quantitative survey developed on the financial statements of numerous companies with turnover exceeding € 800,000. The financial-statement have been taken from the “Aida” database—Computerized Business Analysis (update 268, software version 103.00) (<https://aida.bvdinfo.com>) of the company Bureau Van Dijk.

The ten-year trends (2009–2018) of two profitability ratios (Roe and Roi) and three patrimonial/financial ratios (Financial Independence Index, Current Index and Fixed Assets Coverage Index) are observed in the national context and in the three macro-areas that classically distinguish Italy for social and economic aspects. Numerous statistical elaborations, among which the ANOVA method (Gu 2013; Solari et al. 2009; Strang 1980; Ross and Willson 2017; HackerJoel and Angiolillo-Bent 1981; Quirk 2012; Liao and Li 2018), allow useful propositional conclusions.

The study is about a single nation, but it has an international interest both because Italy is a privileged tourist destination, and because the demand for accommodation facilities is like in many other destinations. Even if there are differences between regions, the problems of hospitality have common characteristics, obviously considering the different environmental and economic specificities.



Source: Petrella & Torrini (2018) citing Eurostat data.

Fig. 1 Accommodation capacity in Italy

Furthermore, it presents a methodology that can be easily exported wherever financial statement data are available. In this way, accounting can be useful for carrying out benchmarking analyzes (Fondazione Cariplo 2008; Ferragina 2007; Kharlamova et al. 2020; Bhattacharya et al. 2020) which can support public authorities, as well as companies. In this way, the accounting creates the conditions for adequate improvement programs, as part of the strategic planning of each hotel.

The paper begins by outlining the hypotheses to be verified and the related research questions. An analysis of the literature follows which shows the lack of a study with this methodology.

Then the methodology is described. Therefore, the results of the elaboration of the main financial statement ratios are presented using explanatory tables and graphs. Each result is discussed. Finally, the paper outlines limitations, implications and conclusions.

2 Purpose

Therefore, the purpose of this paper is to investigate, through financial-statement analyzes, the economic-financial performance of Italian hotels, after the international economic crisis (2009–2018), also considering the possible macro-regional differences induced by a different economic and structural development of the territories.

The hypotheses to verify:

- H1: global financial crisis has reduced corporate profitability;
- H2: the necessary restructuring has changed the financial-statement position;
- H3: national territorial imbalances affect the hotel financial statement.

From these conditions to be verified, three articulated research questions derive:

- RQ1: What was the evolution of the main income ratios? So, have the companies survived the crisis reduced their profitability?
- RQ2: Has the possible change in company profitability had any effect on the assets and financial structure of the hotels?
- RQ3: How did the territorial location affect the patrimonial and income results?

Hypotheses and research questions consider the stringent connections between the income aspects of management and capital and financial balances, and above all they try to evaluate the opportunities for corporate self-financing. Obviously, the company results are related to the trend in tourism demand, which is conditioned by the general economic situation.

The economic crises, such as the financial crisis of 2008, or the pandemic of 2020, have a decisive impact on tourist flows, even if the need to travel as well as the desire to meet different cultures do not change. The financial statements record the fluctuations in demand primarily in their income results, which are notoriously reduced when the economic resources of tourists are lower.

So, the detailed analysis of the economic and financial performance of a tourism industry among the best in the world can provide useful information to all countries interested in tourism development.

3 Literature review

The international bibliography on the subject is articulated, even if the methodology proposed here is not widespread. It is appropriate to distinguish the bibliography on profitability and that concerning the capital and financial position.

3.1 Economic-income performance

The international doctrine has investigated above all the genesis of profitability, focusing some factors or trying a multifactorial approach. Among the first authors, Taylor et al. (2018) that analyzed the relationship between hotel profitability and culinary innovation. The importance of culinary innovation is also confirmed by Sharma (2017). However, innovation cannot be limited only to catering, but to all management; in this sense Sandvik et al. (2014).

Numerous studies link profitability and localization. Among these are the studies of Lado-Sestayo et al. (2016, 2018), etc.

Some marketing scholars, on the other hand, correlate profitability and distribution channels, especially telematics (Makki et al. 2016; Kang et al. 2007).

Profitability also depends on the quality of the service provided (Aznar et al. 2016), as well as the socio-economic extraction of customers (Iyengar and Suri 2012 and Krakhmal 2012). In the context of the globalized economy, this also requires a careful analysis of the market structure, as proposed by Pan (2005). Even the presence of other accommodation facilities, although competing, increases the profitability of the hotels (Aznar et al. 2017; Georgantzas 2003).

In any case, the price variable continues to affect customer choices (Chen and Chang 2012a, b).

Internal behaviors and dominant values in the organizational structure of the company, are further elements that affect profitability (Simons et al. 2018; Singh et al. 2017).

According to a multifactorial approach, instead, Lado-Sestayo and Vivel-Búa (2018), using a model of least squares modeling, showed that the characteristics of the hotel, their position, the competitive environments and the factors of tourist destination affect the hotel performance and its results.

Finally, international literature presents numerous quantitative studies that seek to measure the effectiveness, efficiency and cost-effectiveness of the production combination. Ben Aissa and Goaid 2016 using data envelopment analysis and the Return On Assets (ROA) analysis. Singh (2017) also explores the role of revenue management as a strategic choice for Indian hotels. The close correlation between operational efficiency and hotel profitability is also the conclusion of the recent contribution by Xu (2017), which can be linked to the research of Sami and Mohamed (2014) which highlighted the relationships financial and economic performances and technical efficiency. Much also depends on the accommodation capacity and the risk of underutilization of the rooms (Tsai and Gu 2012; Chiu and Huang 2011, etc.).

The studies that adopt a methodology similar to the one proposed below are those of Diakomihalis (2011) concerning financial structure and profitability analysis of Greek

hotels, and of O'Neill and Mattila (2006) which proposes an analysis of the effects of revenue drivers on profitability. However, the numerous criticisms regarding the use of traditional financial performance measures should also be considered (Chow et al. 2003).

The extensive Italian bibliography includes numerous considerations on the genesis of hotel income in the context of more extensive monographs dedicated to company management (Desinano 2010; Molinari 2017; Cipolla and Biasion 2010; Bonfiglietti 2018; Ricci et al. 2007; Liberatore 2001; Benevolo and Grasso 2010). In it the studies that are more similar to this paper are, however, the researches of Iovino and Migliaccio (2018a) and especially Migliaccio (2018) who have used a methodology similar to the one used here, although referring to a different audience with different purposes.

3.2 Capital and financial performance

Most scholars have correlated financial performance with some variables to verify their effect. Thus, for example, the marketing experts who have analyzed the relationship between financial results and e-commerce, especially online reviews, which are constantly spreading in the hotel industry (Raguseo and Vitari 2017; Morosan et al. 2017; DeFranco et al. 2017; Xie and So 2018; Xie et al. 2017), obviously in the context of the more general commercial, technological and marketing trends (Van Niekerk 2016; Hua et al. 2008; Jae Lee and Jang 2007; Jang et al. 2006). This also considering the diffusion of the brand via the Web (Raguseo and Vitari 2017) and the effects of its modification (Hanson et al. 2009).

Property (Chen et al. 2013) and corporate governance (Al-Homaidi et al. 2019) also influence financial performance that seem to be directly related to intellectual capital (human, structural and relational) (Sardo et al. 2018). Governance is characterized by particular leadership styles that generate different outcomes (Tran 2017), also related to the different learning ability of the workers (Nair 2019).

Management is more complex, but it also leads to better financial results, in the context of concentration processes (Yang 2019; Hsu and Jang 2007) and collaboration between hotels, especially in the rapidly spreading networks (Rotondo and Fadda 2018).

Furthermore, numerous studies link financial performance to the more traditional tools that characterize hotel hospitality.

First of all, the effect of particular terrorist events or serious international economic crises (Min et al. 2009; Kosová and Enz 2012). And then the domestic visitors, the employment rate, the year of activity, the adhesion to a chain system (Shieh et al. 2018), or even dimensions and star category (Alarcón et al. 2016), or employee training, investments and government policies (Sharma and Upneja 2005; Hoskova-Mayerova 2016, Dinçer et al. 2020). Then the relationships between finance and room revenue, rather than occupancy (Rushmore and O'Neill 2015), or by correlating performance with innovative restaurant services (Chen and Chang 2012a, b).

There are many correlation analyzes that use accounting results. For example, the reference to Roa—Return on assets is frequent (Al-Homaidi et al. 2019; Chen et al. 2013; Hsu and Jang 2007) or Roe—Return on equity (Chen et al. 2013; Hsu and Jang 2007) and Ros—Return on sales (Raguseo and Vitari 2017). References also to the net interest margin (NIM) and earnings per share (EPS) (Al-Homaidi et al. 2019); leverage, liquidity, operational efficiency (Chen et al. 2013); net operating income, pre-tax profit and return on assets before tax (Shieh 2012; Hua et al. 2008), up to hypothesize a system of indexes inserted on fuzzy comprehensive evaluation model (Su and Huang 2017).

The numerous references to accounting outcomes are also a clear symptom of the greater need for an integrated information system that can monitor every service (Steed et al. 2003) and provide a dashboard for constant monitoring of management (Santos Lavrador and Laureano 2019).

With the exception of an Italian study (Iovino and Migliaccio 2018b) more generically referred to tour operators, there is no systematic study in the international bibliography on the trend of balance-sheet ratios, as an expression of the economic and financial performance of Italian hotels. This article would like to fill this gap.

4 Method and empirical findings

The subject of this paper is a sample of 5473 hotels with turnover exceeding 800,000 euros, from 2009 to 2018. However, the information is not always available: the elaborations are related to a lower number of data for each year. In addition to the national temporal evolution of the ratios (Roe, Roi, Financial independence index, Current ratio and Fixed asset coverage index), a disaggregated analysis is provided by geographical macro-areas: North (Valle d'Aosta, Piemonte, Liguria, Emilia-Romagna, Lombardia, Trentino-Alto Adige, Veneto and Friuli-Venezia Giulia), Centre (Toscana, Umbria, Marche, Abruzzo and Lazio) and Southern Italy (Campania, Molise, Puglia, Basilica, Sicilia and Sardegna). The research also makes use of the Anova test of variance analysis and the Tukey–Kramer test. With the use of the “columnwise” technique we consider all the observations available for each ratio: on average 2910 observations for the Roe, 2151 for the Roi, 3216 for the financial independence index and 2929 for the fixed assets coverage index.

There are 2578 hotel companies located in Northern Italy, 1578 in Central Italy and 1317 in the South (Fig. 2 and Table 1), with high concentration of hotels in Lazio (838, over half of the companies in Central Italy) and in Lombardia (711, almost a third of the hotels in the North); the southern region with the greatest presence of hotels is Campania (460 out of a total of 1317).

Size profile (Table 2) could be expressed by the average number of employees which is growing (from 21 in 2009 to 29 in 2018): these are mainly small hotel companies.

The prevailing legal form (Fig. 3) is the S.r.l. (over 90% of the total), while 5.2% is constituted by S.p.a. Other legal forms (consortiums, cooperatives, S.a.s., S.n.c.) have only a residual value in the sample.

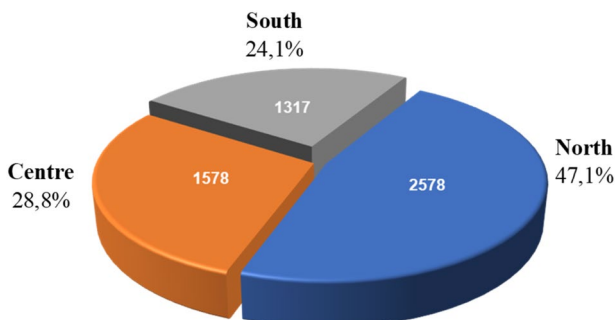


Fig. 2 Data distribution by geographical area

Table 1 Data distribution by region

| Regions | Obs. | % |
|-----------------------|------|-------|
| Lombardia | 711 | 13.0 |
| Veneto | 557 | 10.2 |
| Emilia-Romagna | 464 | 8.5 |
| Trentino-Alto Adige | 415 | 7.6 |
| Piemonte | 185 | 3.4 |
| Liguria | 129 | 2.3 |
| Friuli-Venezia Giulia | 82 | 1.5 |
| Valle d'Aosta | 35 | 0.6 |
| NORTH | 2578 | 47.1 |
| Lazio | 838 | 15.3 |
| Toscana | 473 | 8.6 |
| Abruzzo | 116 | 2.1 |
| Marche | 93 | 1.7 |
| Umbria | 58 | 1.1 |
| CENTRE | 1578 | 28.8 |
| Campania | 460 | 8.4 |
| Sicilia | 268 | 4.9 |
| Sardegna | 213 | 3.9 |
| Puglia | 209 | 3.8 |
| Calabria | 105 | 1.9 |
| Basilicata | 43 | 0.8 |
| Molise | 19 | 0.4 |
| SOUTH | 1317 | 24.1 |
| Total Italy | 5473 | 100.0 |

Table 2 Data distribution by number of employees

| Size category | <i>n.</i> employees | % |
|---------------|---------------------|------|
| Medium | > 50 | 8.5 |
| Small | < 50 | 61.5 |
| Very small | < 10 | 30.0 |

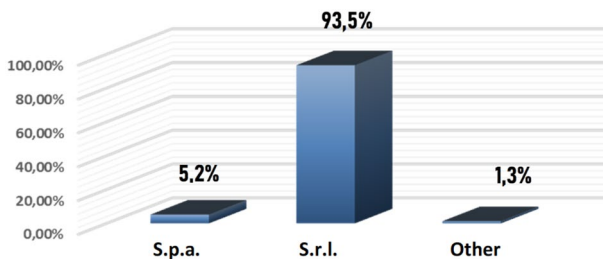
**Fig. 3** Data distribution by legal form

Table 3 Roe: statistics

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Italy | | | | | | | | | | |
| Obs. | 2422 | 2579 | 2687 | 2765 | 2870 | 3084 | 3290 | 3427 | 3505 | 2473 |
| Mean | -3.81 | -0.67 | -0.07 | -0.31 | 0.20 | 4.15 | 8.87 | 11.22 | 12.31 | 11.89 |
| Median | -0.11 | 0.24 | 0.51 | 0.40 | 0.83 | 1.69 | 4.21 | 5.52 | 7.43 | 7.32 |
| S.d. | 31.05 | 30.68 | 31.00 | 31.52 | 32.13 | 31.55 | 32.84 | 32.16 | 31.40 | 29.09 |
| Var. | 964.38 | 941.34 | 960.78 | 993.40 | 1032.3 | 995.20 | 1078.5 | 1034.4 | 986.00 | 846.10 |
| Min. | -148.6 | -149.9 | -148.8 | -148.5 | -149.7 | -147.6 | -149.9 | -149.7 | -149.6 | -145 |
| Max. | 147.67 | 145.85 | 98.74 | 147.40 | 123.82 | 140.94 | 147.51 | 138.98 | 146.94 | 146.87 |
| North | | | | | | | | | | |
| Obs. | 1170 | 1246 | 1314 | 1348 | 1407 | 1515 | 1632 | 1716 | 1782 | 1416 |
| Mean | -5.01 | -0.70 | 1.13 | -1.19 | -0.13 | 3.32 | 10.79 | 12.11 | 13.62 | 12.70 |
| Median | -0.63 | 0.35 | 0.91 | 0.57 | 1.07 | 1.99 | 6.05 | 6.85 | 9.29 | 8.62 |
| S.d. | 33.25 | 32.43 | 31.14 | 31.48 | 33.08 | 32.69 | 34.21 | 33.03 | 31.97 | 28.97 |
| Var. | 1105.7 | 1051.8 | 969.59 | 990.76 | 1093.9 | 1068.3 | 1170.3 | 1091.2 | 1021.8 | 839.28 |
| Min. | -143.4 | -148.2 | -146.9 | -148.5 | -148.5 | -147.6 | -149.9 | -149.2 | -149.3 | -145 |
| Max. | 147.67 | 145.85 | 98.74 | 101.66 | 123.82 | 138.74 | 132.38 | 138.98 | 146.94 | 146.87 |
| Centre | | | | | | | | | | |
| Obs. | 651 | 693 | 710 | 737 | 763 | 807 | 852 | 880 | 893 | 597 |
| Mean | -3.04 | 0.09 | -0.22 | 1.34 | -0.20 | 4.96 | 6.47 | 8.61 | 10.09 | 9.34 |
| Median | 0.13 | 0.43 | 0.62 | 0.67 | 0.92 | 1.71 | 3.34 | 4.07 | 5.12 | 4.69 |
| S.d. | 31.76 | 31.12 | 32.04 | 34.38 | 33.10 | 30.97 | 31.58 | 32.75 | 31.37 | 31.17 |
| Var. | 1008.6 | 968.33 | 1026.7 | 1182.3 | 1095.8 | 959.34 | 997.56 | 1072.7 | 984.1 | 971.82 |
| Min. | -147 | -149.9 | -148.8 | -147.9 | -149.6 | -141.6 | -129.1 | -149.6 | -149.6 | -139.2 |
| Max. | 124.36 | 94.44 | 97.70 | 131.89 | 96.32 | 100.00 | 147.51 | 122.29 | 144.13 | 114.89 |
| South | | | | | | | | | | |
| Obs. | 601 | 640 | 663 | 680 | 700 | 762 | 806 | 831 | 830 | 460 |
| Mean | -2.32 | -1.42 | -2.30 | -0.36 | 1.33 | 4.95 | 7.51 | 12.15 | 11.89 | 12.69 |
| Median | 0.01 | 0.03 | 0.10 | 0.07 | 0.54 | 1.28 | 1.96 | 4.48 | 5.38 | 6.38 |
| S.d. | 25.27 | 26.43 | 29.46 | 28.15 | 28.99 | 29.79 | 31.07 | 29.48 | 30.07 | 26.39 |
| Var. | 638.58 | 698.59 | 867.62 | 792.27 | 840.22 | 887.55 | 965.48 | 869.18 | 904.16 | 696.43 |
| Min. | -148.6 | -148.3 | -148.8 | -136 | -134 | -139.8 | -147.3 | -139.1 | -147.6 | -140.3 |
| Max. | 96.72 | 112.95 | 94.59 | 147.40 | 115.51 | 140.94 | 106.55 | 121.91 | 128.17 | 99.3 |

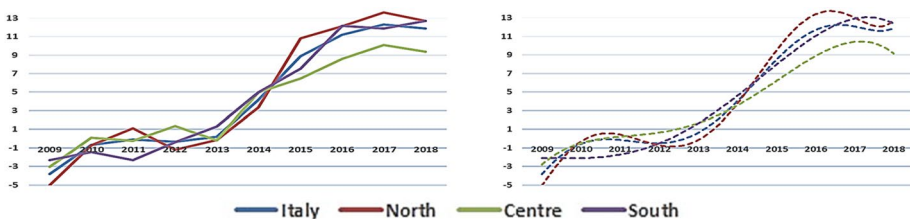
**Fig. 4** Roe trend by geographical macro-areas

Table 4 Roe: interpolation equations

| Areas | Equations | R^2 |
|--------|--|-------|
| Italy | $y = 0.0017x^6 - 0.0494x^5 + 0.5135x^4 - 2.174x^3 + 2.7307x^2 + 4x - 8.854$ | 0.99 |
| North | $y = 0.0032x^6 - 0.0952x^5 + 1.0495x^4 - 5.0571x^3 + 9.7206x^2 - 1.9898x - 8.7143$ | 0.99 |
| Centre | $y = -0.021x^4 + 0.4326x^3 - 2.8709x^2 + 8.2054x - 8.555$ | 0.96 |
| South | $y = -0.0112x^4 + 0.1778x^3 - 0.5775x^2 + 0.6247x - 2.2983$ | 0.99 |

Table 5 Roe: analysis of variance

| Source of var. | SQ | gdl | MQ | F | Sig. | F crit |
|----------------|----------|-----|----------|-------------|-------------|----------|
| Between groups | 4.520427 | 2 | 2.260213 | 0.062073319 | 0.939947696 | 3.354131 |
| Within groups | 983.1238 | 27 | 36.41199 | | | |
| Tot. | 987.6443 | 29 | | | | |

Significant level 0.05

4.1 ROE: return on equity (%)

It is the relationship between net profit and equity and measures the overall profitability of the company. Table 3 summarizes the statistics by geographical macro-areas.

From the evolution of the index (Fig. 4) it is possible to consider two periods: before 2013 values, almost always negative, show the scarce convenience of equity risked in hotel-type entrepreneurial initiatives, while the strong growth in average values (especially since 2015), it seems to have rewarded the ability to hold capital in previous years, especially considering very low interest rates in the same period. The worst year is the first after the great global economic crisis (in 2009 – 5 in the North, – 3 in the Center, – 2.3 in the South and – 3.8 on a national basis). In the last three years of the observed period, the highest values are recorded (almost always above 10), preferring hotel companies in the North and the South compared to those in the Center which, on the other hand, record good profitability but below the national average.

Table 4 shows the equations of the interpolation functions, calculated for each group. The statistical significance of polynomial approximations is reliable: R^2 coefficient assumes very high values, always above 0.96.

Table 5 shows the results of the analysis, assuming the geographical area as independent variable. The results lead to accept the null hypothesis (H_0), with a level of reliability of 95%, indicating the absence of statistically significant differences between the groups: it results that $F < F$ crit.

4.2 ROI: return on investment (%)

It compares operating income with invested capital (sum of net working capital and fixed assets).

The profitability of core operations seems to follow the trend observed for Roe, without ever assuming negative values. The trend is growing, at a more sustained speed once again

Table 6 Roi: statistics

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Italy | | | | | | | | | | |
| Obs. | 1874 | 1955 | 2318 | 2361 | 2396 | 2325 | 2339 | 2152 | 2183 | 1603 |
| Mean | 1.32 | 2.10 | 2.88 | 1.92 | 2.69 | 3.83 | 4.70 | 5.70 | 6.24 | 6.31 |
| Median | 1.32 | 1.64 | 2.19 | 1.50 | 1.96 | 2.61 | 3.45 | 3.91 | 4.46 | 4.73 |
| S.d. | 8.71 | 8.49 | 8.66 | 8.96 | 8.89 | 8.94 | 9.15 | 8.96 | 9.09 | 8.54 |
| Var. | 75.86 | 72.06 | 75.07 | 80.26 | 79.09 | 79.93 | 83.67 | 80.33 | 82.64 | 72.88 |
| Min. | -29.77 | -29.98 | -30.00 | -29.87 | -29.95 | -28.57 | -29.50 | -29.66 | -29.77 | -28.63 |
| Max. | 29.88 | 29.95 | 29.93 | 29.79 | 29.92 | 29.92 | 29.84 | 29.97 | 29.95 | 29.97 |
| North | | | | | | | | | | |
| Obs. | 939 | 967 | 1143 | 1194 | 1199 | 1155 | 1138 | 1041 | 1039 | 875 |
| Mean | 1.21 | 1.99 | 2.91 | 2.02 | 2.47 | 3.37 | 5.11 | 5.55 | 6.40 | 6.19 |
| Median | 1.16 | 1.63 | 2.28 | 1.52 | 1.98 | 2.32 | 3.81 | 4.01 | 4.87 | 4.90 |
| S.d. | 8.72 | 8.46 | 8.68 | 8.90 | 8.54 | 8.80 | 8.87 | 9.08 | 9.24 | 8.65 |
| Var. | 76.01 | 71.58 | 75.34 | 79.21 | 72.90 | 77.44 | 78.75 | 82.43 | 85.29 | 74.78 |
| Min. | -29.77 | -29.98 | -30.00 | -29.54 | -29.95 | -28.49 | -29.17 | -29.66 | -29.77 | -28.63 |
| Max. | 29.88 | 29.85 | 29.86 | 29.79 | 29.92 | 29.68 | 29.84 | 29.97 | 29.80 | 29.97 |
| Centre | | | | | | | | | | |
| Obs. | 465 | 498 | 598 | 603 | 616 | 608 | 615 | 564 | 583 | 403 |
| Mean | 1.70 | 2.85 | 3.73 | 2.02 | 3.36 | 4.77 | 4.41 | 5.29 | 5.76 | 6.01 |
| Median | 1.56 | 2.14 | 2.48 | 1.54 | 2.02 | 3.26 | 3.56 | 3.56 | 4.00 | 4.48 |
| S.d. | 9.48 | 9.50 | 9.49 | 9.74 | 9.93 | 9.59 | 9.58 | 9.52 | 9.42 | 8.28 |
| Var. | 89.91 | 90.26 | 90.10 | 94.88 | 98.58 | 92.04 | 91.87 | 90.68 | 88.77 | 68.53 |
| Min. | -29.63 | -26.54 | -26.74 | -29.87 | -29.22 | -28.57 | -29.50 | -27.32 | -29.18 | -27.81 |
| Max. | 29.21 | 29.95 | 29.93 | 29.59 | 29.84 | 29.92 | 29.68 | 29.73 | 29.95 | 29.97 |
| South | | | | | | | | | | |
| Obs. | 470 | 490 | 577 | 564 | 581 | 562 | 586 | 547 | 561 | 325 |
| Mean | 1.16 | 1.55 | 1.94 | 1.58 | 2.43 | 3.75 | 4.20 | 6.41 | 6.43 | 7.03 |
| Median | 1.47 | 1.42 | 1.72 | 1.47 | 1.88 | 2.50 | 2.84 | 4.05 | 4.29 | 4.73 |
| S.d. | 7.86 | 7.34 | 7.59 | 8.18 | 8.42 | 8.41 | 9.18 | 8.08 | 8.44 | 8.54 |
| Var. | 61.80 | 53.91 | 57.58 | 66.99 | 70.85 | 70.81 | 84.24 | 65.25 | 71.31 | 72.91 |
| Min. | -28.85 | -22.20 | -29.90 | -28.56 | -27.79 | -27.76 | -28.48 | -24.57 | -29.07 | -24.22 |
| Max. | 29.29 | 28.58 | 29.14 | 29.59 | 29.80 | 29.64 | 29.42 | 29.76 | 29.76 | 29.45 |

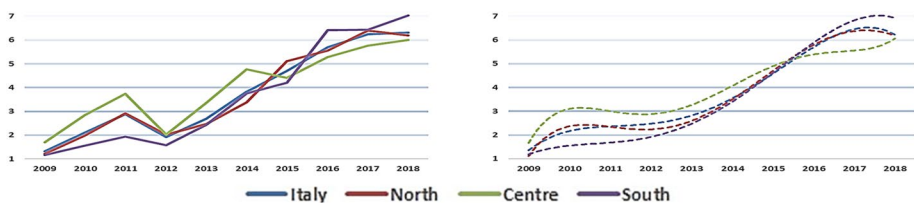
**Fig. 5** Roi trend by geographical macro-areas

Table 7 Roi: interpolation equations

| Areas | Equations | R^2 |
|--------|--|-------|
| Italy | $y = -0.008x^4 + 0.1665x^3 - 1.1044x^2 + 3.0775x - 0.775$ | 0.97 |
| North | $y = 0.0013x^5 - 0.0459x^4 + 0.5709x^3 - 3.0292x^2 + 6.9828x - 3.3553$ | 0.97 |
| Centre | $y = 0.0027x^5 - 0.0811x^4 + 0.882x^3 - 4.2724x^2 + 9.2036x - 4.0647$ | 0.89 |
| South | $y = -0.006x^4 + 0.1184x^3 - 0.6767x^2 + 1.6541x + 0.1008$ | 0.98 |

Table 8 Roi: analysis of variance

| Source of var. | SQ | gdl | MQ | F | Sig. | F crit |
|----------------|----------|-----|----------|-------------|-------------|----------|
| Between groups | 0.647547 | 2 | 0.323773 | 0.087369943 | 0.916596034 | 3.354131 |
| Within groups | 100.0559 | 27 | 3.705775 | | | |
| Tot. | 100.7035 | 29 | | | | |

Significant level 0.05

after 2013. The widest range of variation is found in the South: from 1.16 to 7.03 (Table 6 and Fig. 5).

Table 7 shows the interpolation equations for each group. Also for the Roi the interpolating function is polynomial, with a very high R^2 coefficient (from 0.89 to 0.98).

The analysis of variance (Table 8) does not show statistically significant differences between the three macro-areas considered: $F(2, 27) < F$ crit (p value: 0.916596034).

4.3 Financial independence index (%)

The ratio between net equity and total assets is particularly useful for judgments on the measurement of the balance between the different types of financing. Table 9 presents the statistics related to this index, separately by geographical area.

The values (Fig. 6) range from a minimum of 26.35 of the companies in the Center (2015) to a maximum value of 35.28 in the South (2009). From the highest values at the beginning of the period, a capacity for financing with own resources is progressively decreasing with the continuation of the entrepreneurial initiative and the increase, therefore, of the debt exposure to third parties. A timid sign of a trend reversal can be seen starting from 2015 to 2016 when the index values return to growth, in many cases reaching levels above 2009 levels. Graphically distanced from the other groups is the South, with a financial independence index on average higher and with a trend, first decreasing and then increasing, more pronounced in the trend variations.

Table 10 shows the equations of the interpolation functions. Also in this case the statistical meaning of polynomial approximations is reliable: R^2 close to 1.

Table 11 shows differences between groups considered relevant, because statistically significant, relative to the financial independence index. Indeed: $F(2, 27) = 15.74$, p value = $2.93135E-05$, $F > F$ crit (p value < 0.05). Therefore, having rejected the null

Table 9 Financial independence index: statistics

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Italy | | | | | | | | | | |
| Obs. | 2739 | 2882 | 3018 | 3155 | 3263 | 3439 | 3593 | 3715 | 3764 | 2595 |
| Mean | 30.78 | 29.64 | 29.10 | 28.17 | 27.79 | 27.75 | 28.01 | 28.57 | 29.90 | 32.43 |
| Median | 25.22 | 23.56 | 22.74 | 21.23 | 20.43 | 20.36 | 21.12 | 22.45 | 24.09 | 27.41 |
| S.d. | 28.09 | 27.76 | 27.52 | 27.71 | 27.70 | 27.58 | 26.76 | 26.37 | 26.42 | 26.42 |
| Var. | 789.15 | 770.59 | 757.22 | 767.68 | 767.54 | 760.55 | 716.18 | 695.55 | 697.76 | 697.81 |
| Min. | -48.71 | -48.66 | -46.31 | -50.00 | -47.42 | -48.14 | -49.41 | -47.85 | -45.78 | -48.65 |
| Max. | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.53 | 100.00 | 99.94 |
| North | | | | | | | | | | |
| Obs. | 1338 | 1415 | 1486 | 1565 | 1606 | 1699 | 1771 | 1861 | 1902 | 1482 |
| Mean | 29.11 | 27.76 | 27.66 | 26.97 | 26.93 | 26.81 | 27.79 | 28.88 | 30.43 | 32.42 |
| Median | 22.81 | 21.27 | 21.59 | 20.04 | 19.63 | 19.69 | 21.62 | 23.64 | 25.16 | 27.19 |
| S.d. | 27.60 | 27.14 | 26.84 | 27.16 | 26.82 | 26.60 | 25.81 | 25.88 | 25.75 | 25.93 |
| Var. | 761.99 | 736.69 | 720.21 | 737.48 | 719.38 | 707.60 | 666.39 | 669.76 | 663.31 | 672.51 |
| Min. | -48.54 | -48.28 | -46.31 | -50.00 | -47.42 | -48.14 | -49.41 | -47.85 | -45.69 | -48.45 |
| Max. | 99.61 | 100.00 | 99.68 | 100.00 | 99.73 | 100.00 | 100.00 | 98.65 | 99.96 | 99.94 |
| Centre | | | | | | | | | | |
| Obs. | 749 | 784 | 816 | 847 | 888 | 924 | 962 | 969 | 985 | 634 |
| Mean | 29.86 | 28.47 | 27.93 | 27.08 | 27.00 | 26.73 | 26.35 | 27.07 | 28.06 | 31.30 |
| Median | 25.04 | 21.97 | 20.73 | 19.23 | 18.48 | 18.08 | 18.00 | 18.44 | 20.50 | 25.07 |
| S.d. | 28.72 | 27.89 | 28.01 | 28.47 | 28.55 | 28.34 | 27.68 | 27.08 | 27.69 | 27.85 |
| Var. | 824.89 | 777.97 | 784.63 | 810.68 | 815.20 | 803.08 | 765.97 | 733.34 | 767.00 | 775.80 |
| Min. | -48.71 | -46.27 | -38.54 | -49.40 | -44.24 | -43.11 | -46.52 | -37.23 | -45.78 | -48.65 |
| Max. | 100.00 | 100.00 | 100.00 | 100.00 | 99.66 | 100.00 | 98.97 | 98.50 | 100.00 | 99.38 |
| South | | | | | | | | | | |
| Obs. | 652 | 683 | 716 | 743 | 769 | 816 | 860 | 885 | 877 | 479 |
| Mean | 35.28 | 34.88 | 33.43 | 31.94 | 30.48 | 30.86 | 30.34 | 29.56 | 30.82 | 33.97 |
| Median | 30.81 | 29.52 | 27.59 | 25.57 | 23.62 | 24.15 | 23.34 | 24.59 | 25.44 | 30.71 |
| S.d. | 27.92 | 28.25 | 27.93 | 27.67 | 28.38 | 28.49 | 27.50 | 26.58 | 26.29 | 25.92 |
| Var. | 779.29 | 798.30 | 780.34 | 765.78 | 805.62 | 811.87 | 756.12 | 706.35 | 691.08 | 671.74 |
| Min. | -48.11 | -48.66 | -44.23 | -33.68 | -43.87 | -43.34 | -41.32 | -44.12 | -43.11 | -41.33 |
| Max. | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.56 | 99.53 | 99.98 | 98.75 |

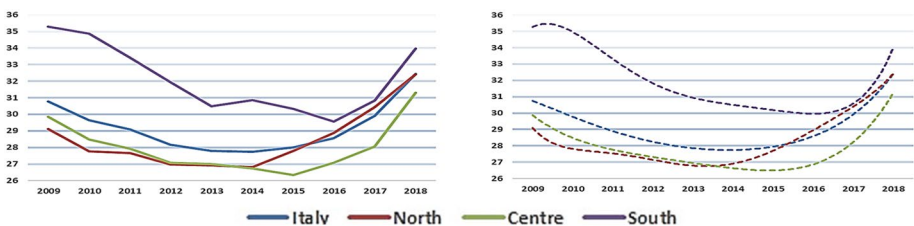


Fig. 6 Financial independence index trend by geographical macro-areas

Table 10 Financial independence index: interpolation equations

| Areas | Equations | R^2 |
|--------|---|-------|
| Italy | $y = 0.0005x^5 - 0.0109x^4 + 0.0992x^3 - 0.3199x^2 - 0.5586x + 31.539$ | 0.99 |
| North | $y = 0.0006x^6 - 0.0206x^5 + 0.2789x^4 - 1.8444x^3 + 6.2761x^2 - 10.79x + 35.201$ | 0.99 |
| Centre | $y = 0.0072x^4 - 0.1354x^3 + 0.9616x^2 - 3.4317x + 32,471$ | 0.99 |
| South | $y = 0.0038x^5 - 0.1019x^4 + 1.024x^3 - 4.6168x^2 + 7.7949x + 31.159$ | 0.98 |

Table 11 Financial independence index: analysis of variance

| Source of var. | SQ | gdl | MQ | F | Sig. | F crit |
|----------------|----------|-----|----------|-------------|-------------|----------|
| Between groups | 103.9357 | 2 | 51.96787 | 15.74870018 | 2.93135E-05 | 3.354131 |
| Within groups | 89.09513 | 27 | 3.29982 | | | |
| Tot. | 193.0309 | 29 | | | | |

Tukey–Kramer test

| Comparison | Absolute difference | Critical range | Result |
|--------------|---------------------|----------------|---------------|
| North–Centre | 0.491 | 10.10838167 | Not different |
| North–South | 3.68 | 10.10838167 | Not different |
| Centre–South | 4.171 | 10.10838167 | Not different |

Significant level 0.05

hypothesis, a further statistical test is required to identify where the differences found with Anova are located.

Therefore, in relation to this index, the rejection of the null hypothesis is not due to a particular group.

4.4 Current ratio

The current index, the ratio between current assets and short-term debts, provides a measure of hotel liquidity. Table 12 presents statistical data by geographical area.

The range varies from 0.94 (North, 2013) to 1.3 (South, 2018). A prudent business management should tend to a current ratio always higher than 1, instead Fig. 7 shows values slightly lower than 1 before 2013 and only marginally higher in the second part of the observed period. Therefore, the general level of liquidity does not seem to indicate an optimal balance between current assets and short-term liabilities, also considering the exposure to third-party lenders previously analyzed. The Southern area differs for higher values, always greater than the national data and the average values of the other groups, even graphically more distant from the set of Northern enterprises.

Table 13 shows the equations of the interpolation functions. The statistical significance of polynomial approximations is reliable: R^2 between 0.93 and 0.99.

Table 12 Current ratio: statistics

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|--------|------|------|------|------|------|------|------|------|------|------|
| Italy | | | | | | | | | | |
| Obs. | 2686 | 2822 | 2978 | 3114 | 3219 | 3408 | 3559 | 3688 | 3732 | 2558 |
| Mean | 1.02 | 1.04 | 0.98 | 1.01 | 0.99 | 1.02 | 1.07 | 1.11 | 1.17 | 1.22 |
| Median | 0.62 | 0.64 | 0.62 | 0.62 | 0.65 | 0.67 | 0.73 | 0.79 | 0.82 | 0.84 |
| S.d. | 1.27 | 1.32 | 1.20 | 1.29 | 1.18 | 1.22 | 1.24 | 1.23 | 1.30 | 1.36 |
| Var. | 1.60 | 1.73 | 1.45 | 1.67 | 1.40 | 1.48 | 1.55 | 1.52 | 1.69 | 1.84 |
| Min. | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 |
| Max. | 9.73 | 9.95 | 9.92 | 9.92 | 9.86 | 9.78 | 9.89 | 9.91 | 9.96 | 9.94 |
| North | | | | | | | | | | |
| Obs. | 1319 | 1395 | 1475 | 1552 | 1595 | 1691 | 1760 | 1852 | 1895 | 1468 |
| Mean | 0.95 | 0.96 | 0.95 | 0.96 | 0.94 | 0.97 | 1.04 | 1.08 | 1.14 | 1.17 |
| Median | 0.54 | 0.57 | 0.58 | 0.59 | 0.61 | 0.63 | 0.71 | 0.76 | 0.78 | 0.79 |
| S.d. | 1.27 | 1.19 | 1.18 | 1.22 | 1.17 | 1.18 | 1.20 | 1.21 | 1.28 | 1.30 |
| Var. | 1.62 | 1.42 | 1.39 | 1.49 | 1.36 | 1.40 | 1.44 | 1.47 | 1.63 | 1.70 |
| Min. | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 |
| Max. | 9.73 | 9.95 | 9.92 | 9.51 | 9.84 | 9.52 | 9.79 | 9.86 | 9.38 | 9.80 |
| Centre | | | | | | | | | | |
| Obs. | 734 | 766 | 801 | 830 | 871 | 913 | 953 | 958 | 973 | 622 |
| Mean | 1.07 | 1.04 | 0.96 | 1.03 | 1.02 | 1.07 | 1.08 | 1.12 | 1.20 | 1.29 |
| Median | 0.71 | 0.68 | 0.68 | 0.67 | 0.71 | 0.73 | 0.75 | 0.84 | 0.85 | 0.92 |
| S.d. | 1.20 | 1.24 | 1.07 | 1.26 | 1.13 | 1.21 | 1.20 | 1.17 | 1.29 | 1.37 |
| Var. | 1.44 | 1.55 | 1.14 | 1.60 | 1.27 | 1.47 | 1.44 | 1.37 | 1.66 | 1.87 |
| Min. | 0.01 | 0.02 | 0.01 | 0.02 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 |
| Max. | 9.04 | 9.91 | 9.40 | 8.77 | 9.11 | 9.78 | 9.85 | 9.91 | 9.96 | 9.94 |
| South | | | | | | | | | | |
| Obs. | 633 | 661 | 702 | 732 | 753 | 804 | 846 | 878 | 864 | 468 |
| Mean | 1.12 | 1.23 | 1.08 | 1.10 | 1.06 | 1.10 | 1.13 | 1.16 | 1.20 | 1.30 |
| Median | 0.72 | 0.73 | 0.62 | 0.63 | 0.69 | 0.71 | 0.73 | 0.82 | 0.84 | 0.87 |
| S.d. | 1.31 | 1.60 | 1.38 | 1.45 | 1.28 | 1.29 | 1.37 | 1.34 | 1.37 | 1.49 |
| Var. | 1.72 | 2.56 | 1.90 | 2.11 | 1.64 | 1.65 | 1.88 | 1.80 | 1.88 | 2.21 |
| Min. | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.00 |
| Max. | 9.20 | 9.89 | 9.61 | 9.92 | 9.86 | 9.71 | 9.89 | 9.87 | 9.95 | 9.67 |

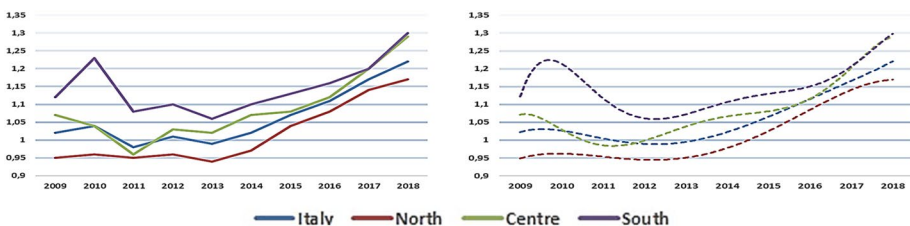
**Fig. 7** Current ratio trend by geographical macro-areas

Table 13 Current ratio: interpolation equations

| Areas | Equations | R^2 |
|--------|--|-------|
| Italy | $y = 4E-05x^5 - 0.0014x^4 + 0.0169x^3 - 0.0823x^2 + 0.1529x + 0.9367$ | 0.97 |
| North | $y = -0.0003x^4 + 0.0068x^3 - 0.044x^2 + 0.1023x + 0.8842$ | 0.99 |
| Centre | $y = -6E-05x^6 + 0.0019x^5 - 0.0242x^4 + 0.1485x^3 - 0.4412x^2 + 0.5494x + 0.8373$ | 0.97 |
| South | $y = -7E-05x^6 + 0.0025x^5 - 0.0364x^4 + 0.2636x^3 - 0.9688x^2 + 1.6257x + 0.2363$ | 0.93 |

Table 14 Current ratio: analysis of variance

| Source of var. | SQ | gdl | MQ | F | Sig. | F crit |
|----------------|---------|-----|----------|------------|-------------|----------|
| Between groups | 0.08736 | 2 | 0.04368 | 5.92167101 | 0.007372875 | 3.354131 |
| Within groups | 0.19916 | 27 | 0.007367 | | | |
| Tot. | 0.28652 | 29 | | | | |

| Tukey–Kramer test | | | |
|-------------------|---------------------|----------------|---------------|
| Comparison | Absolute difference | Critical range | Result |
| North-Centre | 0.072 | 0.095870537 | Not different |
| North-South | 0.132 | 0.095870537 | Different |
| Centre-South | 0.06 | 0.095870537 | Not different |

Significant level 0.05

Table 14 shows statistically significant differences between geographical areas with respect to the values of the current ratio: $F(2, 27) = 5.92$, p value = 0.007372875, $F > F$ crit (p value < 0.05). However, since ANOVA does not allow to identify the exact source of the statistically significant difference, a second test is performed to fill this information gap.

The genesis of the variability of the current ratio is mainly attributable to the differences between companies in the North and South of Italy.

4.5 Fixed assets coverage index (%)

With the analysis of patrimonial solidity we study “the possibility of maintaining a stable financial balance with reference to not a short time” (Caramiello et al. 2003). Fixed assets coverage index relates tangible assets to equity. The statistical data, by geographical area, are in Table 15.

The range of variation is between 2.06 in 2018 in Central Italy and a maximum of 2.64 in the North in 2010. As shown in Fig. 8, the values are on average higher in the North (2.53 on average), while the lower values are recorded in the Center (2.1). Southern hotel companies record values that do not differ much from the national average.

Table 16 shows the equations of the interpolation functions: polynomial approximations report an R^2 coefficient variable between 0.79 and 0.86.

Also with regard to the fixed asset coverage ratio, the Anova test (Table 17) leads to reject the null hypothesis and to accept the alternative one, highlighting

Table 15 Fixed assets coverage index: statistics

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Italy | | | | | | | | | | |
| Obs. | 2476 | 2574 | 2696 | 2839 | 2940 | 3120 | 3295 | 3414 | 3499 | 2441 |
| Mean | 2.46 | 2.42 | 2.39 | 2.42 | 2.42 | 2.41 | 2.40 | 2.29 | 2.37 | 2.29 |
| Median | 1.64 | 1.65 | 1.61 | 1.62 | 1.56 | 1.53 | 1.50 | 1.44 | 1.42 | 1.40 |
| S.d. | 3.06 | 2.97 | 2.98 | 3.07 | 3.11 | 3.12 | 3.11 | 2.95 | 2.99 | 2.79 |
| Var. | 9.33 | 8.80 | 8.89 | 9.45 | 9.69 | 9.72 | 9.67 | 8.69 | 8.95 | 7.79 |
| Min. | -9.34 | -9.64 | -9.75 | -9.82 | -9.25 | -9.78 | -9.79 | -9.91 | -8.99 | -9.00 |
| Max. | 14.95 | 14.98 | 14.93 | 14.85 | 14.78 | 14.96 | 14.98 | 14.95 | 14.96 | 14.97 |
| North | | | | | | | | | | |
| Obs. | 1180 | 1237 | 1309 | 1390 | 1424 | 1513 | 1604 | 1687 | 1761 | 1384 |
| Mean | 2.61 | 2.64 | 2.53 | 2.62 | 2.53 | 2.59 | 2.52 | 2.37 | 2.45 | 2.41 |
| Median | 1.69 | 1.73 | 1.69 | 1.70 | 1.66 | 1.64 | 1.57 | 1.51 | 1.48 | 1.46 |
| S.d. | 3.23 | 3.21 | 3.14 | 3.26 | 3.23 | 3.20 | 3.19 | 2.95 | 2.98 | 2.91 |
| Var. | 10.44 | 10.31 | 9.87 | 10.66 | 10.44 | 10.27 | 10.16 | 8.73 | 8.89 | 8.47 |
| Min. | -8.54 | -9.64 | -9.75 | -8.27 | -8.38 | -9.78 | -9.59 | -9.53 | -8.30 | -9.00 |
| Max. | 14.95 | 14.93 | 14.93 | 14.85 | 14.78 | 14.91 | 14.98 | 14.95 | 14.67 | 14.97 |
| Centre | | | | | | | | | | |
| Obs. | 692 | 713 | 738 | 764 | 810 | 853 | 896 | 896 | 915 | 600 |
| Mean | 2.32 | 2.08 | 2.09 | 2.10 | 2.14 | 2.12 | 2.19 | 2.07 | 2.16 | 2.06 |
| Median | 1.48 | 1.42 | 1.41 | 1.38 | 1.35 | 1.33 | 1.30 | 1.25 | 1.24 | 1.23 |
| S.d. | 3.05 | 2.78 | 2.93 | 2.89 | 2.99 | 3.02 | 3.12 | 2.89 | 3.04 | 2.72 |
| Var. | 9.29 | 7.72 | 8.57 | 8.37 | 8.96 | 9.10 | 9.73 | 8.38 | 9.23 | 7.38 |
| Min. | -9.34 | -8.41 | -8.04 | -9.82 | -9.13 | -8.67 | -9.50 | -7.79 | -8.99 | -7.29 |
| Max. | 14.83 | 14.52 | 14.76 | 14.48 | 14.59 | 14.96 | 14.82 | 14.95 | 14.96 | 14.28 |
| South | | | | | | | | | | |
| Obs. | 604 | 624 | 649 | 685 | 706 | 754 | 795 | 831 | 823 | 457 |
| Mean | 2.34 | 2.36 | 2.42 | 2.40 | 2.53 | 2.37 | 2.40 | 2.37 | 2.41 | 2.22 |
| Median | 1.66 | 1.69 | 1.66 | 1.67 | 1.70 | 1.52 | 1.52 | 1.47 | 1.45 | 1.46 |
| S.d. | 2.68 | 2.61 | 2.68 | 2.83 | 2.99 | 3.03 | 2.93 | 2.98 | 2.96 | 2.48 |
| Var. | 7.18 | 6.81 | 7.18 | 8.04 | 8.91 | 9.19 | 8.58 | 8.91 | 8.74 | 6.17 |
| Min. | -8.58 | -9.10 | -8.37 | -7.67 | -9.25 | -8.06 | -9.79 | -9.91 | -8.30 | -7.36 |
| Max. | 14.80 | 14.98 | 14.81 | 14.28 | 14.17 | 14.17 | 14.25 | 14.95 | 14.82 | 13.93 |

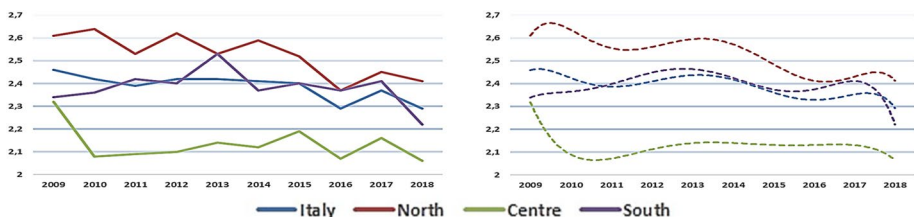
**Fig. 8** Fixed assets coverage index trend for geographical macro-areas

Table 16 Fixed assets coverage index: interpolation equations

| Areas | Equations | R^2 |
|--------|--|-------|
| Italy | $y = -9E-05x^6 + 0.003x^5 - 0.0372x^4 + 0.2192x^3 - 0.6308x^2 + 0.7941x + 2.1107$ | 0.86 |
| North | $y = -0.0001x^6 + 0.0048x^5 - 0.0618x^4 + 0.3897x^3 - 1.2315x^2 + 1.7802x + 1.729$ | 0.84 |
| Centre | $y = -0.0002x^5 + 0.0071x^4 - 0.0817x^3 + 0.4404x^2 - 1.0784x + 3.0313$ | 0.83 |
| South | $y = -9E-05x^6 + 0.0026x^5 - 0.0296x^4 + 0.1567x^3 - 0.4072x^2 + 0.5181x + 2.099$ | 0.79 |

Table 17 Fixed assets coverage index: analysis of variance

| Source of var. | SQ | gdl | MQ | F | Sig. | F crit |
|----------------|----------|-----|----------|-------------|-------------|----------|
| Between groups | 0.794207 | 2 | 0.397103 | 58.15050439 | 1.63699E-10 | 3.354131 |
| Within groups | 0.18438 | 27 | 0.006829 | | | |
| Tot. | 0.978587 | 29 | | | | |

Tukey–Kramer test

| Comparison | Absolute difference | Critical range | Result |
|--------------|---------------------|----------------|-----------|
| North–Centre | 0.394 | 0.092247215 | Different |
| North–South | 0.145 | 0.092247215 | Different |
| Centre–South | 0.249 | 0.092247215 | Different |

Significant level 0.05

Table 18 % of observations on the total number of companies

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Roe (%) | 44.25 | 47.12 | 49.10 | 50.52 | 52.44 | 56.35 | 60.11 | 62.62 | 64.04 | 45.19 |
| Roi (%) | 34.24 | 35.72 | 42.35 | 43.14 | 43.78 | 42.48 | 42.74 | 39.32 | 39.89 | 29.29 |
| Financial independence (%) | 50.05 | 52.66 | 55.14 | 57.65 | 59.62 | 62.84 | 65.65 | 67.88 | 68.77 | 47.41 |
| Current ratio (%) | 49.08 | 51.56 | 54.41 | 56.90 | 58.82 | 62.27 | 65.03 | 67.39 | 68.19 | 46.74 |
| Fixed assets coverage (%) | 45.24 | 47.03 | 49.26 | 51.87 | 53.72 | 57.01 | 60.20 | 62.38 | 63.93 | 44.60 |

statistically significant differences: $F(2, 27) = 58.15$, p value = $1.63699E-10$, $F > F$ crit (p value < 0.05).

Significant differences between all the groups are shown.

5 Some methodological problems

The complexity of the phenomenon to be investigated has made it necessary to analyze a consistent volume of data. The data processing was carried out not with the sole purpose of achieving a high statistical significance, but to highlight a trend of information

that is sufficiently useful for the purpose of analyzing the sector and the management of individual companies.

However, for necessary precision, it is important to underline some limits of the methodological approach.

First of all, it should be noted that the high number of companies corresponds to a high percentage of missing data. Table 18 quantifies the percentage of data that can be used on those available, comparing the total number of hotels in the sample with useful observations.

It is clear that the data processed vary from a minimum of 34.24% (Roi in 2009) to a maximum of 68.77% (Financial Independence Index of 2017). In absolute terms, the data is significant and therefore leads to the information sought, but its availability varies greatly over the years and for the various indices.

We must also consider that it is possible that, in the same year, data from a company are available for an index, while they are missing for another index, an element that makes heterogeneous the universe of data. In a subsequent elaboration it is possible to replace the “columnwise” technique used in this paper with an alternative methodology, skimming the available data and therefore observing only the companies that present all the data for the decade. However, it is believed that the trend information would not change substantially.

Another critical element is the absence of companies that have ceased their activity in the decade, given that the company Aida eliminates these companies from the database. Instead, the data relating to companies that have deposited their first financial-statement in any of the years of the considered period are present. In this way, information relating to more recently established companies coexist alongside companies that have been operating for several years. It is clear, for example, that some financial statement information reflects the different degree of aging of the structures. It would therefore be appropriate to further select the mass of data by comparing those deriving from companies that have the same year of activity, thus obtaining a “cohort homogeneity”.

Additional critical factors derive from the use of Anova, in particular with regard to the basic hypothesis of independence of the samples. It is not necessarily true, in fact, that the hotels located in the three macro areas of the country are substantially independent, considering that they sometimes respond to a single governance. Particular attention must be paid to the selection of the sample of companies to be considered.

6 Conclusion and implication

Italy is an emblem of tourism-oriented countries (ONT 2018). The hotel sector is affected by recent trends that favor alternative hospitality structures. However, the hotels remain numerous and provide better quality services (Petrella and Torrini 2018). This quantitative research highlighted their economic and financial performance from the years of the global financial crisis to the present, making use of the critical analysis of the trends of five financial-statement ratios that characterize the large sample. Alongside the national data, a disaggregated analysis has also been provided for geographical macro-areas (North, Central and South Italy), also using some statistical tools to better interpret the phenomenon.

The first hypothesis is confirmed (H1): the global economic crisis has reduced corporate profitability, which has grown in subsequent years, although not constantly, as shown by the evolution of Roe and Roi (RQ1) profitability ratios. In the different geographical areas, the trend is similar, albeit with slightly different values.

Italian hotels have a low capitalization that requires significant debts, probably also induced by the low cost of money in recent years: there is still a tendential improvement probably due also to self-financing. The values of the current ratio are satisfactory, despite the fact that the stock has a modest importance compared to fixed assets. The fixed assets coverage ratio has different values in the various geographical areas, confirming the low capitalization of hotels forced to borrow to cover fixed investments.

As a first approximation it is not possible to identify close connections between profitability and the performance of the capital and financial ratios (H2 and RQ2), a more detailed analysis being necessary. The trends of two indices (Roe and Roi) are similar in the different geographical areas (H3 and RQ3). The geographical location of hotel businesses, on the other hand, affects financial and capital balances, especially with regard to financial independence.

In conclusion: in the digital age the Italian hotel industry has the potential to restructure. However, high and growing profitability must favor adequate self-financing processes to improve the capital structure, strengthening internal financing and thus reducing debt.

As derived from the analysis of the literature, there is no other research with which to compare the results of this elaboration. The publications most similar to this paper are the papers of Iovino and Migliaccio (2018a) and Migliaccio (2018) who used a similar methodology, but related to a different research object and for a different period. The first (Iovino and Migliaccio 2018a) analyzed the trend of Roi and Ros of hotels comparing it with that of travel agencies and tour operators, in the years 2007–2015. It therefore only assessed the profitability dynamics. It concludes that the crisis has affected hotels and tourism intermediaries, as is evident from the progressive reduction of income indices in the first 3 years.

However, it underlines that on average the profitability is positive, even in the years in which other sectors have recorded disastrous results. Fluctuating situations followed which, however, since 2012 have taken on the clear symptoms of a recovery.

The authors highlight the parallelism in the trends of the main income indices between the operators present in the three macro-regions of the nation: both the Roi and the Ros, in fact, follow similar trends throughout the long period of time considered, with differences in absolute value not high. This study, which concerns a different period (2009–2018), reaches similar conclusions both with respect to the profitability trend and by comparing it in the three Italian macro-regions. The profitability analysis already proposed by Migliaccio (2018) is more complete because it analyzes the trend of all the main hotel income indices: Roe (Return on Equity) Roa (Return on Assets) Roi (Return On Investment) Ros (Return on Sales) and Incidence rate for extra charges and income, for the period (2008–2017), without however breaking it down by geographical macro-areas. Despite differences in absolute values, the trends are similar to those found in these pages. Furthermore, this study considers equity and financial dynamics, not investigated by other studies.

This study may have further developments, also analyzing other profitability, productivity and financial indicators to confirm or refute the outlined interpretative hypotheses. The relevant theme of tourist networks and destinations should also be explored (Migliaccio et al. 2018). Its main limitation however is its almost exclusively quantitative nature, based on financial-statement data for hotels with at least € 800,000 in turnover. A more comprehensive picture could be made by extending the sample even to smaller hotels, especially those with family size. The analysis would also improve the trend analysis of indexes for cohorts of companies, tracing trends for activities started in the same year, paying attention

to the younger ones, considering the characteristics and risks typical of the newly established companies (Nicolò 2017; Nicolò and Nania 2017; Nicolò and Ricca 2019).

Financial-statement considerations should then also be integrated with qualitative analyzes, also intercepting variables that are notoriously neglected in the context of economic-financial reporting. Everything, then, should be related to an interdisciplinary evaluation, considering that tourist dynamics must however conform to higher ethical values as correctly affirmed (Nicolaidis 2018a, b, c, 2019; Ramphal and Nicolaidis 2018; Nicolaidis and Grobler 2017; Urban and Hoskova-Mayerova 2017).

This study may have different implications.

It can certainly be useful for the development of empirical research related to public or private companies, with financial-statement data available for at least a decade. It favors data-based analyzes and therefore develops a culture of comparison, favoring the identification of possible disadvantages of the single company with respect to the sector average. Thus the importance of the financial-statement for management purposes is reevaluated. Moreover, it can also be useful to those who govern the sector that can base their choices of intervention on certainly significant information. It also contributes to the knowledge of the Italian situation which, however, can be considered a useful reference for all the countries that want to develop tourism.

This study is part of a larger project to analyze the performance of Italian companies before, during and after the 2008 economic crisis. In addition to the aforementioned writings by Iovino and Migliaccio (2018a, b) and Migliaccio (2018) related to tourism, the project investigated Italian cooperative companies (Fusco and Migliaccio 2015, 2016a, b, 2018, 2019), with particular attention to the social cooperatives that manage socio-welfare residences for the elderly (Migliaccio and Losco 2018). More recently, a similar methodology, *mutatis mutandis*, has also been extended to corporations belonging to different sectors relevant to the national economy: plastic (Migliaccio and De Blasio 2017), tanning (Migliaccio and Arena 2018a, b), energy (Iovino and Migliaccio 2019a, b; Migliaccio and Ciotta 2019); social enterprises (Migliaccio and Molinaro 2019) and the football sports industry (Migliaccio and Corea 2019).

The ambitious goal of the project is to develop an intersectoral comparison to evaluate differences and similarities that could lead to focus the most successful strategies useful in the unfortunate hypothesis of new crises.

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