



Financial configurations of Italian private hospitals: an evolutionary analysis

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ARTICLE INFO

Article history:

Received 18 October 2021

Received in revised form 28 April 2022

Accepted 14 May 2022

Keywords:

Private hospital

PTA

Health policy

Financial profile

Economic performance

ABSTRACT

Private hospitals are an important pillar in many hybrid systems. In Italy they are bound to grow, but we have little knowledge of how they are coping with financial pressures. We use a configurational approach to determine the relationship between the macroprofiles of Italian private hospitals and their performance. We built a unique dataset with governance and financial statements data of all Italian private hospitals. We use a combination of partial triadic analysis (PTA) and clustering technique to identify both the main explicative financial dimensions and hospital configurations, and trace their evolutionary paths from the beginning of Regional Health Care Turnaround Plans (2008) to 2016. Understanding the evolution of configurations, our study entails also some implications for policy and practice.

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1. Introduction

In Italy, the private hospital sector is very significant and tends to expand [29]. The accredited hospitals, financed by the National Health Service (NHS), are the majority. They cover 30.4% of the beds nationwide, although a profound heterogeneity at the regional level exists. Since 2007, the incidence of accredited private individuals has been increasing. In the overall reduction in hospital supply, public hospitals cut their beds more remarkably. Most accredited hospitals are small family businesses (60% have less than 100 beds; only 11% exceed 200 beds; 9 out of top 10 private hospital groups belong to families, according to Mediobanca Report 2010-2014) that face an industrial concentration process, due to the difficulties of the public sector in financing health system.

Although, in Italy, there is a vast scientific literature about public hospitals [28], academic concern in private hospitals has risen recently [27, 7, 11], especially about financing, size and levels of industry concentration [11]. To date, no study has dealt about economic perfor-

mance, financial profile, and structural growth. Beyond the conceptual relevance, there is also a practical one.

Since 2007, various political and economic macro-events have marked the sustainability of the I-NHS. First, the launch of Regional Healthcare Turnaround Plans [15, 31], following the introduction of fiscal federalism in 2001 and the financial responsibility of the Regions to cover their health deficit. Second, the 2008 macroeconomic crisis and the sovereign debt crisis in the EU (2010-12) which resulted in the introduction of rationing measures. Therefore, understanding the economic, financial, and growth profiles over a 10-year period - during a deep and long financial crisis - can be useful to find management and policy implications. We use a configurational approach combining partial triadic analysis (PTA) and cluster analysis to identify Italian accredited private hospitals' financial typologies and trace their evolution over time. Alternative configurations can lead to different paths, which can change over time. Our research questions are the following:

- RQ 1. What financial aspects best explain the heterogeneity between private hospitals?
- RQ 2. What are the main configurations of private hospitals?
- RQ 3. How have these configurations changed over time? (2008; 2012; 2016)

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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<https://doi.org/10.1016/j.healthpol.2022.05.004>

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Our paper is organized as follows. [Section 2](#) is a review of the existing literature on private hospitals. [Section 3](#) describes the research methods we used to collect and analyse the data. [Section 4](#) outlines the findings of the analysis. [Section 5](#) discusses the main key information deriving from the analysis and the implications for research, policy-makers, and managers. [Section 6](#) reports in a final reflection on our research

2. Background

2.1. Current knowledge about private hospitals

Recently, in Italy too, academic and policy interest in the private hospital sectors has been growing. Scholars' perspective tends to focus on the legal form and location [9, 37, 27], on the size (number of beds or wards) [9, 8], on the business model in terms of mix (service mix; payer mix), and on installed and used capacity [9, 8, 11], setting appropriateness of production [8]. Other sources, classified among gray literature, such as the "Associazione Italiana Ospedali Privati" (National Private Hospitals Association) annual reports, focus on the observation of a constantly changing reality, to offer to operators, decision-makers, and public opinion, analysis, and reflections that affect both the ways in which hospital services are carried out and the behavior and opinions of citizens who request services and evaluate their activities.

However, there is a complete lack of studies on the most essential characteristics and configurations of private hospitals and how these have evolved and evolve over the years as a result of major changes in regulation and funding. No study has ever investigated private hospitals and their evolution. The Italian setting is appropriate because since 1992 it has been in continuous institutional evolution as a result of macroeconomic reforms and shocks. These changes modified the regulatory and financing scenario of private hospitals, implying significant strategic and operational choices, in terms of industry concentration, too.

2.2. Towards a practical framework

The identification of hospital-specific features and configurations is a necessary step towards designing policy and management interventions to improve their performance. Obviously, there is no single stand-alone action that is effective in improving hospital performance, but a multidimensional bundle of actions tuned to the context is rather required. Some reviews have appeared over the years to assess the effects on economic, administrative, and healthcare outcomes of different types of property of hospitals [48, 20]. Anyway, hospital performance is influenced by factors that may be wholly or partially out of the control of the hospital management. So, we have two broad categories of impactful variables. First, system-wide factors, which hospitals do not govern. Second, hospital-wide factors, which can be managed by the hospital. We consider hospitals as open systems that must interact with the healthcare system and other ones for survival, adaptation, and growth [32].

2.2.1. System-wide factors in Italy

In the early 1990s, a prospective financing system and a broad administrative decentralization were introduced in the Italian NHS, so today there are mainly 21 local systems on regional basis. Each Region has sufficient autonomy to organize its own system. Each of them decides (i) how many health authorities and hospital trusts to establish (ii) how many private hospitals can operate under public funding, (iii) what are the governance bodies of the system, (iv) the reimbursement mechanisms, and (v) budget constraints [23]. Thus, each Region establishes the degree of competition in its quasi-market [16]. For private hospitals, each Region regulates, for example, the number of beds (size) by medical and surgical specialties (scope), organizational, workforce,

and technological standards (degree of cost structure rigidity), fees for services (profitability), and budget constraints (asset utilization). As the potential role for competition in healthcare was often mixed [17], starting from the end of the 1990s and for almost the entire first decade of the 2000s, many Regions have reformed their system by mitigating the quasi-market and encouraging collaboration between public providers. A new season began with the introduction of fiscal federalism in Italy (2001) that resulted, from 2007 to 2010, in the Regional Healthcare Turnaround Plans in 10 different Regions [15]. These regions had to reduce growth in healthcare spending and provided a major contribution to reduce financial deficits. Any strategic policy occurred under the supervision of Ministries of Health and Economic Affairs. Among the various measures adopted by the Regions, there are also the regulation of reimbursement fees and new strict predetermined budget constraints. The plans were supposed to last 3 years, but they still exist today. Following the 2008 macroeconomic crisis, even the Regions without Turnaround Plans played a more effective role in the governance of their system: they limited the autonomy of all providers, they enforced policies similar to recovery plans'.

In summary, in all Regions, regulation has become more stringent with profound repercussions on private hospitals. So, their location strongly influences their strategic, economic, and financial profile. Furthermore, Regions pay providers with different timescales that induce private hospitals to systematically resort to financing operations that modify their financial profile [1, 4, 3, 2, 13, 26, 30].

2.2.2. Hospital-level factors

Evidence about the effect of hospital private nature on performance is mixed. As profit-making, private hospitals should achieve profitability under any conditions [40]. When they face greater financial pressure, they tend to improve their efficiency [19] and adjust their financing schemes [10, 35].

Hospital reimbursement mechanisms are important to understand financial implications [25]. In Italy, private hospitals were found to be less efficient than public ones. One reason is that regional specific regulations set a limit to the number of funded admissions and budget constraints are quite volatile [12, 5].

Moreover, most Italian private hospitals are small family businesses. Generally, size (beds) is frequently and positively associated to operating and total margins, but negatively correlated to cash flow [36]. Family ownership has implications on financial configurations of private hospitals [14]. A 2015 Mediobanca survey reports that 9 out of 10 largest Italian hospital groups, in terms of number of employees and turnover, are family businesses and often use control-enhancing mechanisms to reinforce the control, especially cross-shareholdings [41]. Most Italian private hospitals are stand-alone organizations with family control and capital fragmented among numerous second or third generation family members. Sometimes, ownership is enlarged to physicians under debt-to-equity transactions. Generally, in Italian family businesses, equity prevails on debt as financial source, because families do not want to lose control. Indeed, family businesses tend to put socio-emotional values before business values [42]. Many family members are engaged in business and therefore personnel costs are often higher. Moreover, family business is more risk-adverse and traditional banking finance is the most common source of debt. All these features affect firm ability to sustain the highly rigid hospital cost structure and growth through mergers and acquisitions.

3. Materials and methods

The objective of this study is to analyse the distinct configurations of companies operating in the private hospital sector. By using the PTA, combined with a clustering technique, we map: (i) the different corporate governance characteristics of the Private hospital; (ii) the most relevant economic-financial indicators.

3.1. Data collection

We queried Aida database by Bureau van Dijk to find the governance and financial data of all the Italian accredited private hospitals that duly filed the financial statements in the years 2008-2012-2016. The query was based on the private hospitals and nursing homes. We extracted the following information.

- The Region where the operational headquarters are located;
- The ownership structure, such as (i) legal form, (ii) number of shareholders, (iii) BVD independence indicator;
- The hospital size based on (i) employees and (ii) total assets;
- The operational growth (revenues) and structural growth (employees and total assets);
- The economic performance, through (i) ROA, (ii) Ebitda margin, (iii) net income/sales;
- The financial profile is understood as (i) debt/equity ratio, (ii) financial leverage, and (iii) primary liquidity ratio.

The query counted 1,165 firms. We proceeded excluding (Fig. 1):

- firms that presented the following legal forms: Consortium (42), Social Cooperative (27), Sole Proprietorship (14), Foundation (3), Limited Partnership (2), Simple Company (2);
- firms that carry out rehabilitation activities and nursing homes, that is to say, those realities that do not provide ordinary or day hospitalization services, as they have financing mechanisms (non-accredited private hospitals);
- firms for which complete information was not available for the three financial years considered.

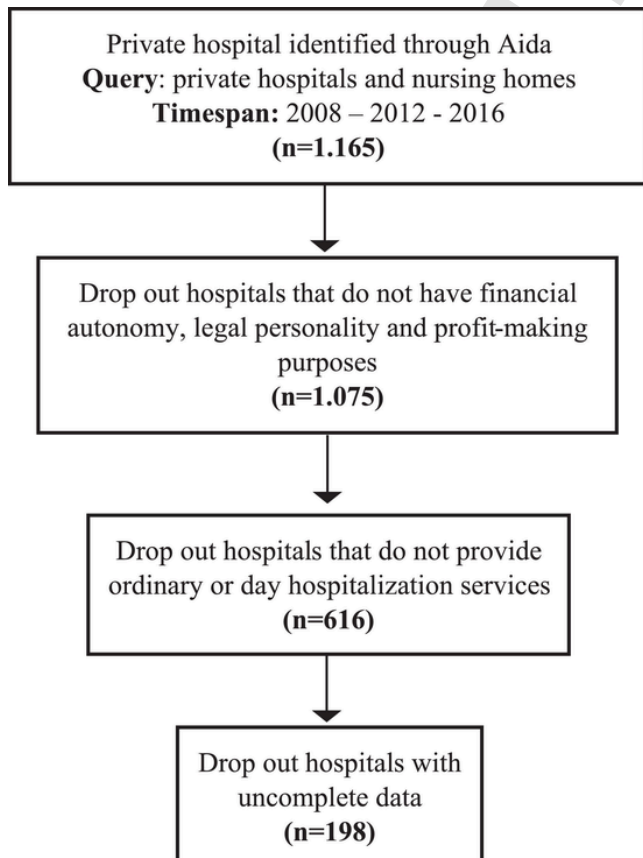


Fig. 1. Data collection workflow.

Our final dataset is composed of 198 companies observed in 3 different periods (2008 - 2012 - 2016).

3.2. Data analysis

3.2.1. Partial triadic analysis (PTA)

To answer the first research question and therefore bring out the most differentiating features of the Italian accredited private hospital, we used Partial triadic analysis [21]. PTA, also called X-STATIS, is an extension of principal components analysis (PCA) [22], that is useful for managing multiple data tables that measure sets of variables collected on the same observations but at different times or places [45, 43, 44, 38, 6, 33, 47]. It is a technique based on a simplified approach of three modalities of factor analysis [49, 24] which allows to (i) compare relationships between different data sets, (ii) integrate these datasets into an optimal weighted average called compromise, (iii) project each original dataset on a compromise to analyse commonalities and discrepancies.

Ade4, a multivariate data analysis package for the R statistical environment [46] was used for the analysis. We performed the PTA on our panel data, covering 198 accredited private hospitals, in three different periods. The three tables, which form our historical series, are standardized for each year, and then transformed into a single data frame.

3.2.2. Hierarchical clustering

To answer our second research question, that is to identify the configuration of Italian accredited private hospitals, we used the agglomerative hierarchical clustering technique [7]. Since configurational research is based on the assumption that there are distinct and meaningful groupings of companies within a larger entity, grouping methods are central to this part of investigation. Cluster analysis has been used several times both in the hospital sector and other industries. Clustering or group analysis is a set of multivariate data analysis techniques aimed at selecting and grouping homogeneous elements in a data set. Clustering techniques are based on measures related to the similarity between elements [39]. In the hierarchical analysis of clusters, the segmentation technique is based on the logic of minimizing the distances between the statistical units within the groups and maximizing the distances between the groups. The results are internally homogeneous and externally heterogeneous groups. The hclust function of the R stats package was used for the hierarchical analysis of the clusters.

3.2.3. Combined analysis

Finally, to answer the third research question, that is, how the configuration of Italian accredited private hospitals changes over time, we combined the results of PTA with the results of the hierarchical analysis of the clusters. We identified the centroids of each cluster and analysed their trajectory over time (2008-2012-2016). We choose to use the centroids because studying the trajectory of all 198 private hospitals would lead to misunderstood results. The centers of gravity represent the "average position" of all the companies that are in a particular cluster, or the arithmetic mean of the coordinates of each company on the axes identified through the PTA. Therefore, they are the best representation of our clusters.

4. Findings

4.1. Ownership structure of private hospitals

In terms of ownership structure, 85 out of 198 Italian accredited private hospitals are organized as companies; 6 of them have a single shareholder. 113 out 198 hospitals are organized as limited companies; 6 of them with a single shareholder. Up to 50% of private hospitals have between 1 and 3 shareholders. The other 50% have 11 shareholders on average. Moreover, they have concentrated ownership. Indeed, accord-

ing to the BvD Independence Indicator that categorizes the degree of independence of a company, more than 50% of our sample has 1 shareholder with direct ownership of over 50%.

4.2. Discovering main financial dimensions

The first two components summarize 58% of the variance of the original variables. Since we are in a compromise situation, we believe that these two axes (Factor 1 and Factor 2) represent the information contained in the original variables sufficiently. Error! Reference source not found. reports the coordinates of the Intrastructure step of the PTA and shows the factorial (Fig. 2).

The three-period graphs have the same scale and can be overlaid and compared. The advantage of using the PTA lies in the fact that all points are in the same space, so the two axes have the same meaning in all three graphs. We can interpret the first axis as the financial profile axis and the second axis as the profitability (economic performance). Through PTA, these two aspects have been identified as the best aspects to explain the variability among private hospitals.

4.3. Main financial configurations

Starting from the axes' common structure over the years, it is possible to identify the main configurations of private hospitals, through hierarchical cluster analysis. Fig. 3 shows the results of the hierarchical analysis cluster, in the three periods. The 198 private hospitals form 4 different clusters. Looking at the average values of the variables in each cluster, we can understand what are the configurations of the private hospitals that compose them.

1 Cluster 1 is the one located in the upper left quadrant. This cluster reports Italian accredited private hospitals in a situation of severe financial stress. This cluster is defined by a liquidity index and an interest coverage rate of less than 1. The liquidity index is an instrument that expresses the company's ability to meet the financial commitments undertaken. It is given by the ratio between available assets and short-term debt. The numerator represents the amount of cash in hand and the bank, the readiness for realization, and short-term credits. The denominator is given by the debts to be paid immediately on sight or in the short term. Having a liquidity index lower than 1 means that the companies that are part of this cluster have a shortage of liquidity with respect to short-term debts. The interest coverage rate, on the other hand, indicates the degree of coverage that the operating result can provide at the cost of financial charges. It is given by the ratio between EBITDA and financial charges. The numerator represents the operational management of the company. On the other hand, the denominator is given by financial charges. Similarly, having an interest coverage rate of less than one means that the income generated by the operations is not sufficient to pay off the capital invested to produce it. In this case, the final solvency is negative.

2 Cluster 2 is the one located in the upper right quadrant. This cluster displays Italian accredited private hospitals in an excellent financial and economic situation. In this cluster, we find positive values both of the debt ratios (e.g. liquidity index = 2) and of the profitability ratios (e.g. EBITDA/Sales = 16.5%). In this case, the solvency ability and profitability are positive.

3 Cluster 3 is the one located in the lower right quadrant. This cluster shows Italian accredited private hospitals in a situation of severe economic tension. This cluster is defined by an EBITDA/Sales ratio of less than 10%. The EBITDA/Sales indicator

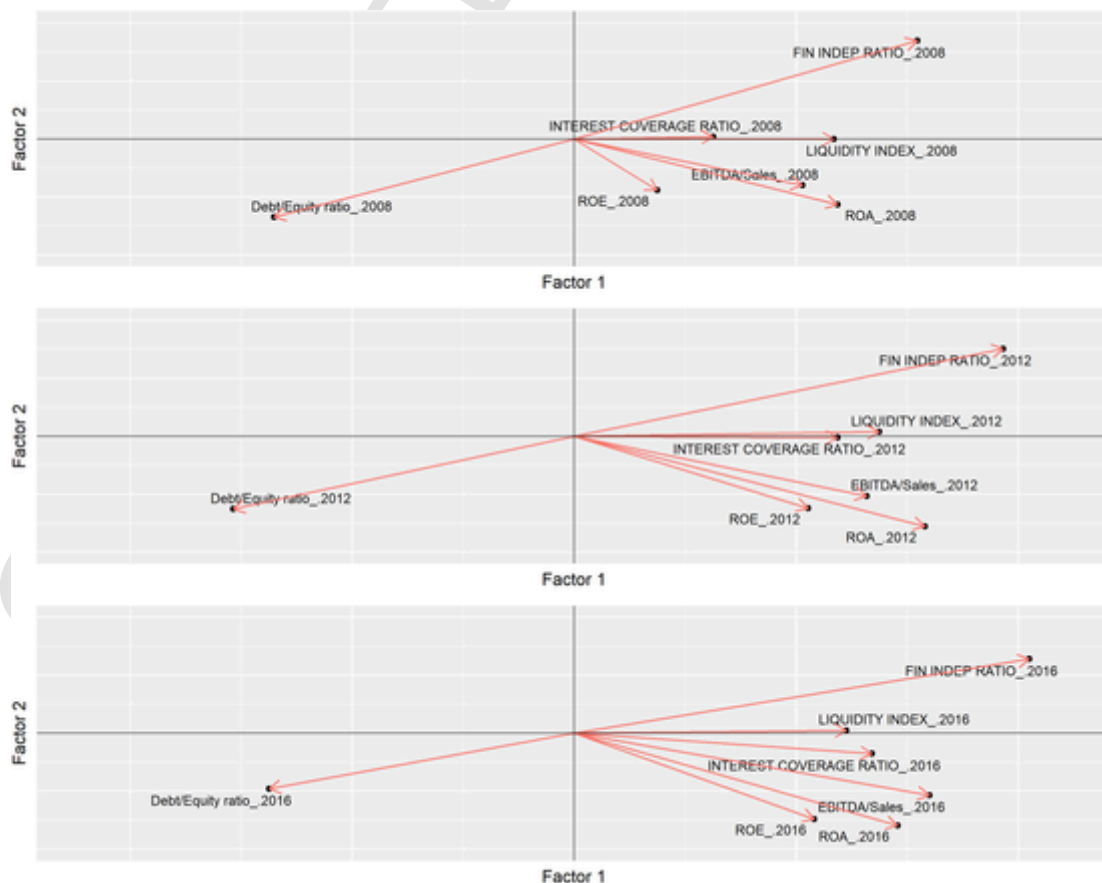


Fig. 2. Factorial map of the economic-financial variables.

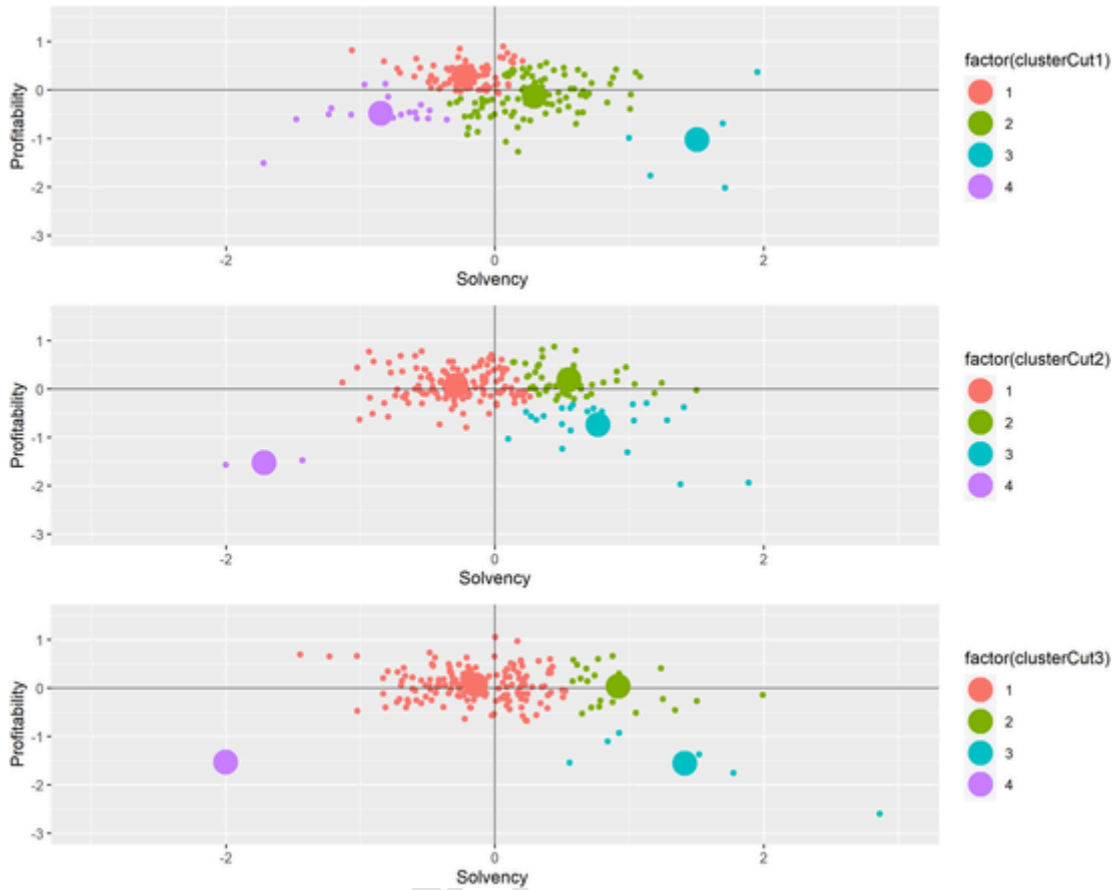


Fig. 3. Factorial map of private hospital in 2008, 2012, 2016.

expresses the company's true ability to stay on the market as it measures how much operating income it can generate per unit of turnover. EBITDA is the most important measure of income because it is not influenced by investment policies (through depreciation), financing policies (through interest expense), extraordinary and fiscal policies. Having a low EBITDA/Sales ratio means that businesses are not very profitable. Looking also at the ROE values of private hospitals in cluster 3, we see that the percentage of profitability of invested capital is low. A value tending to zero means that wealth is neither being created nor destroyed. In this case, the final profitability is negative.

4 Finally, cluster 4 is located in the lower-left quadrant. This cluster reports Italian accredited private hospitals in their worst

situation. Indeed, in this cluster we find lower average values, both for debt ratios (eg liquidity index = 0.69) and profitability ratios (ROE = -3.95%). In this case, the solvency and the final profitability are negative.

4.4. Tracing configurations' paths

In Fig. 4 the coordinates of the centroids for each cluster and period are represented on the PTA plot and the patterns of the clusters over time are highlighted. The size of the spheres reports whether that cluster has grown in number or not, while the arrow shows how it has moved over time.

First, we can observe the change in size of clusters.

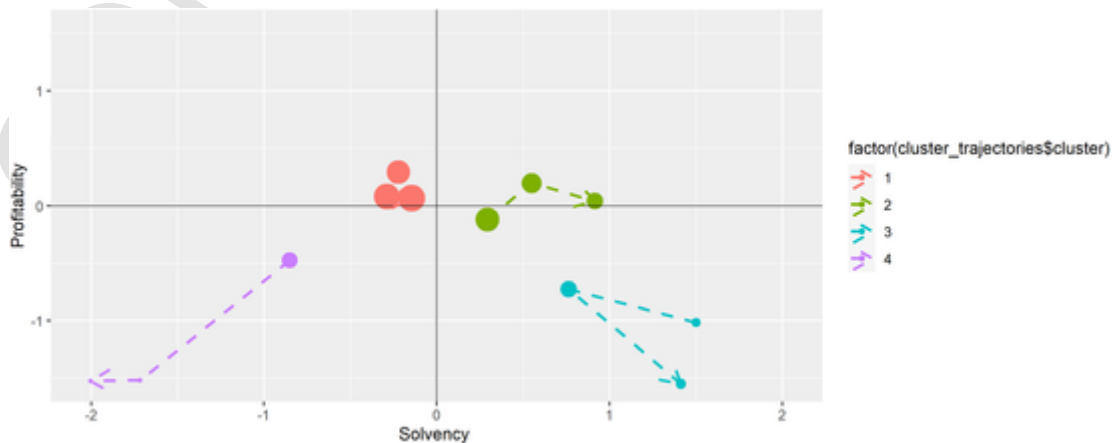


Fig. 4. Graphic representation and trajectory of the centroids.

- 1 Cluster 1, composed of Italian accredited private hospitals with negative solvency, has grown ($n = 84$ in 2008, $n = 130$ in 2012, and $n = 168$ in 2016). Therefore, from 2008 to 2016, the number of private hospitals that became indebted and unable to meet their debts increased.
- 2 Cluster 2, shrinks from 91 to 44 and then to 22 companies. This cluster represents the best hospitals from both financial and economic points of view. This downsizing highlights the difficulty for these hospitals over the years deriving from the inability of the public sector in financing the healthcare services provided.
- 3 Cluster 3, made up of those hospitals in serious economic tension, has grown in 2012 but then recovers the initial size in 2016 ($n = 5$ in 2008, $n = 22$ in 2012 and $n = 6$ in 2016). This situation shows that the inability of these hospitals to create wealth is only a temporary default as they, as already mentioned, are an important pillar in the Italian healthcare sector.
- 4 Finally, cluster 4, which represents the worst hospitals from both a financial and economic point of view, downsizes ($n = 18$ in 2008 and $n = 2$ in 2012–2016).

Instead, as regards the patterns, it is possible to observe that the four clusters move towards different directions over the years.

- 1 Cluster 1 shifts down from factor 2 in 2012 and then shifts slightly to the right in 2016. This change is due to changes in the values that make up Factor 2, i.e. due to changes in the levels of profitability of firms. Therefore, hospitals in cluster 1, already characterized by financial stress, are then starting to suffer economic stress.
- 2 Cluster 2 towards Factor 2, in 2012 and then moves straight to the right, towards Factor 1, in 2016. This shift, on both axes, is due to a change in both profitability and solvency values. Therefore, hospitals in cluster 2 continue to improve both financial and economic profiles.
- 3 Cluster 3 moves upwards in 2012 falling lower than before in 2016. The final result of the displacements of this cluster is a worsening of economic performance. Therefore, hospitals in cluster 3 that already had reduced profitability, see their economic stress increasing.
- 4 Finally, cluster 4 drops remarkably, over time. This collapse is due to the worsening of both economic and financial profile of the companies that made up this cluster. Therefore, hospitals in cluster 4 continue to deteriorate.

5. Discussion

This study provides an overview about the financial configurations of Italian accredited private hospitals and their evolution over time. It provides three relevant contributions. First, the PTA allows to identify solvency and profitability as key financial aspects to explain the heterogeneity among Italian accredited private hospitals. Second, clustering analysis identifies four main financial configurations among these hospitals. Third, we trace clusters evolution paths over time. Our findings show that hospitals in an excellent economic and financial situation have decreased (cluster 2); highly indebted hospitals and weak for profitability have increased (cluster 1); hospitals in worse economic and financial situation (cluster 4) and those less profitable (cluster 3) have worsened their situations. In synthesis, the period coinciding with the macroeconomic crises (2008–16) saw a significant worsening of the financial conditions of Italian private hospitals.

A first research idea for the future is to broaden the timespan of analysis. Probably, Covid-19 will have changed these configurations. A second thread of research is to investigate other characteristics of these hospitals such as structural, operational and governance features. Configurational approach is increasingly applied in strategy, governance,

and organization research, but it requires appropriate research methodologies to realize their potential [34]. Although clustering we use in this paper is currently considered the best option to identify configurations, future research could combine it with qualitative comparative analysis to find more interesting and complex configurations [18].

Understanding the evolution of configurations, our study has some implications for policy and practice. Due to the difficulties of the public sector in financing healthcare industry, private hospitals are facing a slow industry concentration. Profitability and debt indicate that Italian private hospitals have non-sustainable business models and are heavily exposed to banks. They need to upgrade to benefit from operational and financial synergies. The industry restructuring process should be encouraged and favored by policy makers with subsidies and incentives. Family businesses increase professionalism in the managerial structure and open equity to non-family members shareholders.

6. Conclusion

Italian private hospitals have worsened their financial condition in recent years as macroeconomic crises threatened the sustainability of public healthcare funding. These hospitals need to upgrade and be more complementary to public hospitals.

Declarations of Competing Interest

None.

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