

Gender representation and financial performance: an empirical analysis of public hospitals

An analysis of
public
hospitals

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Abstract

Purpose – Recently, the relationship between gender representation and organizational performance has been the focus of various studies. However, some research gaps still exist. First, in the healthcare sector, this relationship has been poorly explored. Moreover, in public management studies, researchers focusing on performance tend to focus exclusively on gender differences at the top and/or middle management level. This research aims at exploring the relationship between women's representation and performance in public hospitals at all organizational levels.

Design/methodology/approach – To achieve the research objective, 63 healthcare organisations were analysed through ordinary least squares regressions on panel data from 2012 to 2018.

Findings – Results show that, in the hospital setting, gender diversity and financial performance are related at every organizational level.

Originality/value – To the authors' knowledge, this is one of the first studies focusing on the link between gender and performance at every level of professional and employment category; avoiding focusing exclusively on top management, which was the case in previous studies on the topic. Moreover, it contributes to a poorly explored literature which is gender studies in public healthcare management.

Keywords Gender, Women, Healthcare, Hospital, Performance

Paper type Research paper

1. Introduction

In the last decade, the management literature has focused increasingly on women's representation and its impact on organisational performance (Campbell and Mínguez-Vera, 2008; Ali *et al.*, 2011; Opstrup and Villadsen, 2015; Naciti, 2019; Naciti *et al.*, 2021a; Park, 2021; Galletta *et al.*, 2022). Most of the studies have confirmed a positive relationship between women's representation and organisational performance (Sabharwal, 2014; Park, 2021). This has been explained by adopting multiple perspectives. Some authors agree that a greater presence of women in top management positions allows organisations to put in place better decision-making processes due to the different skills and characteristics of the management (Bart and McQueen, 2013; AbouAssi and An, 2017). Others maintain that better performance is the result of a lack of discrimination, which allows organisations to select managers based on their competencies and not on their gender, race, religion, and so on (Kim and Starks, 2016).

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Though most research on gender focuses on private sector organizations, attention to the relationship between gender representation and organizational performance has also been devoted by public administration and management scholars (Ricucci, 2002; Linstead, 2005; Pitts, 2005; Meier *et al.*, 2006; Mastracci and Bowman, 2015; Opstrup and Villadsen, 2015; Kim and Park, 2017; Park, 2013, Park, 2021; Cuadrado-Ballesteros *et al.*, 2021). However, to the best of the authors' knowledge, little attention has been paid to the healthcare sector (Lanz, 2008; Miller, 2009; Ellwood and Garcia-Lacalle, 2015; Arena *et al.*, 2021).

According to the World Health Organisation (WHO), healthcare organisations are characterised by occupational gender segregation and inequality between men and women in health roles and professions (Blackburn *et al.*, 2002). It is a stratification that reflects gender stereotypes and leads to an underestimation of the personal skills necessary to perform particular functions with respect to the characteristics associated more generally with gender (WHO, 2019). Horizontal segregation is particularly evident in nursing and obstetrics – where most of the employees are women – or in surgery – where most of the employees are men. This creates within organizations strongly unbalanced categories in which one gender could be significantly underrepresented. Moreover, the 2020 Global Health 50/50 report (Global Health 50/50, 2020) states that 69% of healthcare organisations are headed by men and 80% of leadership positions are filled by men. An invisible barrier prevents women from reaching the highest levels of the hierarchy: the so-called glass ceiling (El Arnaout *et al.*, 2019). The most prestigious and best-paid managerial roles are not accessible to females, so occupational segregation by gender might also be described as vertical. Due to the above-mentioned characteristics and the resulting complexity, healthcare organizations offer interesting opportunities to analyse and better comprehend the relationships between women's representation – at each organizational level – and the organizational performance in the public sector. As such, this study aims at contributing to the ongoing debate over gender differences in public management focusing on the healthcare sector.

To achieve this objective, the authors collected data on the percentage of females in every professional category for all Italian public autonomous hospitals. In addition, two financial indicators have been computed – one aimed at measuring organisational solvency and one aimed at measuring economic efficiency. Overall, 63 healthcare organisations were analysed through Ordinary Least Squares (OLS) regressions on panel data from 2012 to 2018.

The study is organised as follows. The following section comprises a brief review of the literature relating to the study's research question. The third section describes the sample that was analysed and the research methodology. The fourth section presents the findings. The final section sets out conclusive assessments and discusses the implications of the study.

2. Theoretical background

2.1 Gender studies in public sector management

Gender studies are emerging in the public management debate (McDougall, 1998; Pitts and Wise, 2010; Mastracci and Bowman, 2015; Kim and Park, 2017; Park, 2021; Cuadrado-Ballesteros *et al.*, 2021; Polzer *et al.*, 2021). Most of these researches adopt the representative bureaucracy theory according to which public organizations employing a bureaucracy that matches the general population on salient indicators of diversity - such as race, ethnicity, or gender - manage to develop policies better suited to the interests of diverse groups (Meier, 1993; Pitts, 2005; Park, 2013; Ricucci *et al.*, 2014).

A recent stream of research has examined the relationship between gender and performance at the organisational level by linking gender representation and diversity measures to specific outcomes (Park, 2021). This relationship has been investigated in different public settings ranging from national to local government.

Meier *et al.* (2006) carried out an empirical analysis of public schools in Texas and concluded that organisations with more women in the classroom were characterised by

higher student attendance, lower teacher turnover, and higher overall performance. [Choi \(2009, 2013\)](#) analysed the moderating effects that diversity management plays on the relationship between diversity and the organisational performance of public workforces. She pointed out that the different relations between the two observed dimensions depended greatly on the form of diversity (i.e. gender, race, age, and so on).

[Park \(2013\)](#) explored the relationship between women's representation at different government levels and performance through the analysis of media coverage and social welfare budget. She found that representative bureaucracy influences substantive consequences on governmental performance.

To investigate the relationship between gender diversity in top management and the financial performance of public sector organisations, [Opstrup and Villadsen \(2015\)](#) gathered data from 91 Danish municipalities. The results of their quantitative study indicated that municipalities with gender-diverse management groups achieve better financial performance. Furthermore, they noted that organisations accrued positive outcomes from gender diversity in management only when the management structure facilitated the effective use of individual differences. This confirmed the results of previous studies (e.g. [Rubin, 2009](#)) demonstrating that organisational fairness has a positive relationship with high levels of organisational performance and trust in management. [Kim and Park \(2017\)](#) tried to identify the link between diversity management and organisational fairness in the public sector. Using a data set from the 2013 US Federal Employee Viewpoint Survey (FEVS), they adopted an OLS regression model to test their hypotheses. Although their findings showed that diversity management had a positive impact on organisational fairness, different perceptions of this impact arose depending on specific characteristics of the employees surveyed (namely, position, payment grades, and the type of federal agency).

[Cuadrado-Ballesteros *et al.* \(2021\)](#) recently investigated the extent to which gender influences budget deviations in Spanish municipalities. Their findings suggest that women's presence in local government may improve the financial situation because they assume a more prudent approach when budgeting, which leads local government officials to underestimate budgeted revenues and overestimate budgeted expenditure.

Overall, the results of studies focusing on the relationship between gender and performance in both public and private organisations confirm a positive relationship between women's representation and performance ([Sabharwal, 2014](#); [Opstrup and Villadsen, 2015](#); [Elwood and Garcia-Lacalle, 2015](#); [Silvera and Clark, 2019](#); [Cuadrado-Ballesteros *et al.*, 2021](#)), though some studies fail to support this claim or provide conflicting results depending on the contingent situation ([Darmadi, 2013](#)). With a few exceptions (e.g. [Park, 2013](#)), the majority of these studies concentrate on the representation of women within the top management or leadership positions of an administration ([Park, 2021](#)), not considering the impact that gender diversity in other employees' categories may have on organizational performance.

Although several studies have stressed the importance of women's representation in the public sector, the relationship between gender and performance in the health sector has remained largely unexplored, despite the sector's extraordinary importance in terms of public expenditure. Studies that deal with gender in healthcare are orientated toward the measurement of the so-called gender gap and the identification of its determinants ([Lanz, 2008](#); [Mastracci, 2017](#); [Vanderbroeck and Wasserfallen, 2017](#); [El Arnaout *et al.*, 2019](#); [Mathad *et al.*, 2019](#)). [Lantz's \(2008\)](#) review of the literature on gender in health focused on the top management of hospitals and showed that, although the majority of employees were female, there were wide gender gaps in the top positions. [Ellwood and Garcia-Lacalle \(2015\)](#), who studied NHS foundation trusts, discovered that a higher presence of women in the executive and non-executive positions was related to significant reductions in negative social outcomes, though they did not find significant differences either in financial returns or service quality.

According to [Silvera and Clark \(2019\)](#), female CEOs improve the interpersonal care experience more quickly than male CEOs.

Gender analysis at the middle management (health and administrative professionals) and staff level (nurses and other employees) in health organisations is lacking, though [Arena et al. \(2021\)](#) focused on the influence of gender in the adoption of new technologies at the top and middle management levels.

2.2 Performance in healthcare

Several management scholars have studied performance in the healthcare sector. They generally agree that performance is a multi-dimensional construct ([Aidemark, 2001](#); [Chang, 2007](#); [Catuogno et al., 2017](#); [Nuti et al., 2018](#); [Cheon et al., 2019](#)). It has been measured at the health system level ([Murray and Frenk, 1999](#); [Chang, 2007](#); [Noto et al., 2019](#)), at the organisational level ([Aidemark, 2001](#); [McCracken et al., 2001](#); [Cheon et al., 2019](#); [Kim et al., 2020](#)) and the intra-organisational level ([Andersen, 2009](#); [Macinati and Rizzo, 2016](#)). At the organisational level, the concept of performance is closely related to the institutional mission and the ability to fulfil it ([McCracken et al., 2001](#); [Noto et al., 2021](#)). Hospitals play a key role in every health system, delivering inpatient and outpatient care to people who need it; as such, their performance is usually assessed through the quality of care provided, their processes, and their financial sustainability ([Donabedian, 1966](#); [Porter, 2010](#); [Barnes et al., 2018](#); [Cheon et al., 2019](#); [Noto et al., 2021](#)).

One of the focuses of the present study is financial performance, partly because this is inevitably affected by other performance dimensions ([McCracken et al., 2001](#); [Barnes et al., 2018](#); [Cafagna et al., 2018](#)). According to multiple studies, in healthcare organizations, the top management has a key but limited influence on the economic results since the consumption of resources is mainly linked to clinical decisions ([Grossman, 1983](#); [Brook, 2011](#); [Kaplan et al., 2014](#)). As such, financial performance can be considered global since it is either directly or indirectly influenced by choices made by every person working in the organisation – for example, when physicians opt for one treatment over another, the decision affects the consumption of resources and thus overall expenditure. This is not always the case when other performance dimensions are considered, such as quality of care – e.g. the quality of a certain specialist treatment is exclusively attributable to the performance of those people involved in the delivery of that service and not to other professionals and employees. Moreover, financial results are easily comparable between organisations that may have different organisational structures, and that may operate in different governance settings (such as regional health systems).

Studies in public and healthcare management have widely investigated the concept and measurement of performance. However, many issues remain to be addressed regarding the relationship between public management variables and organisational performance ([Boyne, 2003](#); [Boyne and Walker, 2005](#); [Peters et al., 2017](#)). From the analysis of the previously reported literature on gender diversity, it emerges the need to continue exploring its role as a performance determinant in healthcare public organisations ([Wegge et al., 2008](#)).

2.3 Hypothesis development

The literature review revealed that there is a research gap concerning the relationship between gender and organizational performance in the healthcare sector and in particular, in considering women's representation at the different levels of the organisation, that is, including all professional categories, from the top management to the lower staff. Given this, and in recognition of the theory that considers gender to be a potential driver to foster organisational performance, the present study aimed to explore the relationship between women's representativeness and financial performance at every organizational level.

As previously recalled, the influence of women's representation in top management on organizational performance has been widely explored by the literature (Manner, 2010; Park, 2013; Ostrup and Villadsen, 2015; Cuadrado-Ballesteros *et al.*, 2021). A positive relationship between women's representation and performance is supported by the interpretation according to which women perform better in terms of transformational leadership, a style that involves higher degrees of team involvement and effectively rewards individuals for their performance (Galletta *et al.*, 2022). Additionally, men tend to lead more autocratically and are more likely to be laissez-faire leaders, a counterproductive leadership style. Women tend to be better communicators and to have higher emotional intelligence and low levels of aggression, a role model that is associated with superior leadership skills (Naciti, 2019).

According to the literature, greater gender diversity brings a competitive advantage to modern organizations, which face extraordinary challenges in an economy that awards unprecedented knowledge and expertise (Kakabadse *et al.*, 2015; Russen *et al.*, 2021). Women make up more than half of the human capital pool. Organizations that fail to fully leverage and tap into more than half of the pool risk being left far behind. Furthermore, organizations with women in the decision-making processes have greater understanding and engagement with their stakeholders (Grosser, 2009; Glass *et al.*, 2016), e.g. patients, caregivers, families, suppliers, etc.

Due to the above considerations, the first hypothesis of this study is:

H1. A higher percentage of women in top management has a positive impact on hospitals' performance.

As highlighted in the previous sub-section, hospital performance largely depends on the clinical decision undertaken by heads of departments and professionals. The choices of treating someone, or to adopt a treatment instead of another certainly have an impact on the quality of care, but also on the consumption of resources and thus on efficiency and, indirectly, on solvency.

As such, the second hypothesis this research tests is the following:

H2. A higher percentage of women in health and non-health professionals categories has a positive impact on hospital performance.

In hospitals, the adequate use of resources is also determined at lower organizational levels. In fact, the administration of pharmaceutical products and other non-complex services are provided by the health staff. The non-health staff is involved in tasks such as purchases, accounting, ICTs and other administrative and technical processes.

In light of the above argument, the third hypothesis of this research is:

H3. A higher percentage of women in health and non-health staff categories has a positive impact on hospital performance.

3. Research design

3.1 Sample and data collection

The Italian National Health System is a regional-based system which provides universal coverage for comprehensive and essential health services (France *et al.*, 2005). It is mainly funded through national and regional taxes supplemented by co-payments for pharmaceuticals, outpatient and inpatient care. Regional authorities receive funds from the central government based on their population adjusted by age factors. Regional authorities provide health services (France *et al.*, 2005; Noto *et al.*, 2020) through: (1) Local Health Authorities (LHAs), geographically based organisations financed by capitation, which

deliver public health and primary care directly as well as secondary and specialist care through directly managed facilities, or by purchasing services from public hospital institutions or private accredited providers; (2) autonomous hospitals focused on acute care and financed by service tariffs; and (3) private not accredited providers financed by service tariffs.

In order to develop the analysis, we collected data on the gender composition and financial performance of 63 Italian autonomous public hospitals – over a total number of 72 public hospitals operating in the national territory, i.e. the 87.5% of the hospital population has been analysed - for the period 2012 to 2018. This period has been selected because in 2012 the financial report structure had been reformed and thus data of the previous period are not comparable; 2018 is the most recent year in which data on hospital personnel were found available. The only hospitals omitted were those for which data were missing from the public dataset.

As previously mentioned, Italian autonomous public hospitals are healthcare organisations whose mission is to deliver healthcare treatment (inpatient and outpatient) at the point of need. They are financed through service tariffs paid by the LHAs in charge of the population’s health in specific geographical areas. [Table 1](#) shows the variables used in this study.

Variables	Measure	Source
<i>Dependent variables</i>		
Liquidity index (LI)	Ratio between short-term assets and short-term liabilities	Italian Public Administration Open Data (Banca dati della Pubblica Amministrazione)
Return on Sales (ROS)	Ratio between operating income and revenues	Italian Public Administration Open Data (Banca dati della Pubblica Amministrazione)
<i>Independent variable</i>		
Top management (C1)	Ratio between women covering top management positions and top management positions	Personnel count (Italian Ministry of Finance)
Non-health professionals (C2)	Ratio between non-health professional women and non-health professionals	Personnel count (Italian Ministry of Finance)
Health professionals (C3)	Ratio between health professional women and health professionals	Personnel count (Italian Ministry of Finance)
Non-health staff (C4)	Ratio between non-health staff women and non-health staff	Personnel count (Italian Ministry of Finance)
Health staff (C5)	Ratio between health staff women and health staff	Personnel count (Italian Ministry of Finance)
<i>Control variables</i>		
Dimension (SIZE)	Number of hospital beds	Open data, Ministry of health
Personnel cost (HUMEXP)	Percentage of personnel cost over production costs	Italian Public Administration Open Data (Banca dati della Pubblica Amministrazione)
Financial cost (FC)	Percentage of financial cost over production costs	Italian Public Administration Open Data (Banca dati della Pubblica Amministrazione)
Age (AGE)	Percentage of employees under 50 years old	Personnel count (Italian Ministry of Finance)

Table 1.
Description of variables

3.1.1 Dependent variables. As a dependent variable to measure financial performance, the authors selected the liquidity index (LI) and the return on sales (ROS). These were computed using the financial reports available through the Open Data of the Italian Public Administration. The LI measures the ability of an organisation to pay its short-term debts through liquidity and other short-term assets. This indicator is particularly suitable for measuring and benchmarking the financial performance of public healthcare organisations (McCracken *et al.*, 2001; Cinquini *et al.*, 2005; Nuti *et al.*, 2013; Bem *et al.*, 2014; Barnes *et al.*, 2018). ROS is an indicator usually aimed at measuring the profitability of sales. However, in the case of public hospitals, it also represents an efficiency measure since it shows the capacity of organisations to provide services that use resources below their tariffs fixed at the national level (McCracken *et al.*, 2001; Barresi, 2004; Cinquini *et al.*, 2005). This makes it an appropriate means of measuring the financial performance of public hospitals that cannot be easily evaluated using traditional profit indicators (Guthrie and English, 1997).

3.1.2 Independent variables. Independent variables were aimed to assess women's representation in each employee category operating in these organisations, which was measured as the percentage of females relative to males in each professional category (Park, 2013). The data were collected through the personnel accounts provided by the Ministry of Finance. The independent variables defined follow the Italian National Health System contractual categories and are the following:

- (1) Top management (C1): the general director, health director, and administrative director (i.e. the three figures representing the top management of Italian healthcare organisations)
- (2) Non-health professionals (C2): administrative managers
- (3) Health professionals (C3): medical doctors, pharmacists, biologists, and so on (who are considered managers at the contractual level)
- (4) Non-health staff (C4): administrative staff (non-managers)
- (5) Health staff (C5): nurses and other health staff (non-managers)

Because C2 and C3 include positions with diverse managerial responsibilities, we explored gender diversity in the different managerial positions within these categories. They were subdivided into three sub-categories according to their degrees of managerial responsibility. These are:

- (1) Complex structure managers (SC): heads of complex organisational units – i.e. semi-autonomous divisions that have their own resources.
- (2) Structure managers (SS): heads of organisational units – i.e. internal sections of complex organisational units.
- (3) Professionals without organisational responsibilities (NO): these are professionals (e.g. medical doctors, pharmacists, biologists, etc.) who, even though being responsible for the clinical activities they perform, do not cover managerial positions in terms of allocation of resources and objective settings.

3.1.3 Control variables. In accordance with the previous literature, the authors also considered four control variables. Control variables were included to account for a set of hospital characteristics that may change with time. Time-invariant variables — such as the type of autonomous hospital and regional health system — cannot be taken into account using fixed-effects models. Therefore, the control variables used were personnel cost (HUMEXP), cost of debt (CD), number of beds (SIZE), and employees' ages (AGE). The first (HUMEXP) was

designed to represent the mix of production factors used by the hospitals. In particular, it accounts for the weight of personnel costs over total production costs. The second (CD) compares the cost of debts with the total production costs; it was designed to show how the organisations' financial structure impacted financial performance. The third (SIZE) measures the number of hospital beds available for each organisation. The fourth (AGE) measures the percentage of employees under 50. Finally, the authors considered the influence of fixed effects and controlled for time dummy variables. Adding this set of variables helps to overcome the potential problem of omitted variables.

3.2 Descriptive statistics

Tables 2 and 3 present the descriptive statistics and the correlation between the variables employed, respectively. In Table 2, the result of the descriptive statistics analysis shows that the highest mean value with respect to the position of women belonged to C5 (70%), followed by C4 (56%). Women at the top level (C1) present the lowest percentage (21%).

Table 3 shows the pairwise correlation coefficient between the dependent, independent, and control variables. The absolute values of the coefficients range between 0.59 and 0.01, indicating no evidence of serious multicollinearity. To verify whether there was multicollinearity among the variables considered, the variance inflation factor (VIF) was performed. The VIF is the measure of how much the variance of a coefficient increases compared with what its value would be if the variable were not related to the other variables: a variable creates multicollinearity problems when it has a VIF greater than 10. Table 3 indicates that multicollinearity was not an issue in the present study because the VIF values are all less than 10 and the model's mean VIF is 1.69.

3.3 Model

When data contains both cross-sectional and time-series aspects, panel data analysis is the most efficient technique to utilize.

We have data that is pooled throughout time and space since the same cross-sectional unit is polled over time. Some of our independent variables can be determined simultaneously with the dependent variable. Some of our independent variables can be determined while the dependent variable is being determined. In this situation, we have a problem with simultaneity. As a result, we need to employ an econometric model that can handle endogeneity and unobserved fixed effects linked with each organization in order to cope with

Variable	Mean	Std.Dev	Min	Max
ROS	-0.0064243	0.100553	-0.55291	0.101189
LI	1.38603	0.772888	0	5.06
C1	0.213719	0.229393	0	1
C2	0.434973	0.199756	0	1
C3	0.452628	0.102784	0	0.857143
C4	0.559057	0.175257	0	0.833333
C5	0.695490	0.137332	0	0.934132
SS	0.300698	0.190336	0	1
SC	0.337037	0.388033	0	1
NO	0.639735	0.272009	0	1
HUMEXP	0.417251	0.111547	0.006435	0.615738
FC	0.0039969	0.0071319	0	0.0448118
SIZE	0.685481	0.416292	0.078	2.331
AGE	0.665753	0.131779	0	1

Table 2.
Descriptive statistics

	VIF	ROS	LI	C1	C2	C3	C4	C5	HUMEXP	CD	SIZE	AGE
ROS		1										
LI		0.3138*	1									
C1	1.01	-0.0120	0.0585	1								
C2	1.13	-0.0473	0.0295	0.0527	1							
C3	1.49	-0.0436	0.0232	0.0129	0.1987*	1						
C4	2.59	0.0529	0.0375	0.0280	0.2960*	0.4988*	1					
C5	3.61	0.0794	0.0442	0.0454	0.3010*	0.4242*	0.7414*	1				
HUMEXP	1.14	0.0131	-0.0583	0.0978*	-0.0038	-0.1552*	-0.0539	0.1110*	1			
FC	1.35	-0.3461*	-0.2904*	-0.0220	-0.0964	-0.1280*	0.2662*	-0.4353*	-0.0728	1		
SIZE	1.06	-0.0125	0.2914*	0.0263	0.0131	-0.1237	-0.1504*	-0.0839	0.0955	-0.0905	1	
AGE	1.82	-0.0420	-0.0989*	0.0300	0.2059*	0.3994*	0.4138*	0.5981*	0.1806*	-0.0936*	-0.0194	1
Mean VIF	1.69											

Note(s): * Significant at the 0.05 level

Table 3.
Variance Inflation
Factor (VIF) and
Pairwise correlation
matrix

these difficulties. We can get around this issue by using pooled OLS estimates, however, they yield biased and inconsistent estimators when the unobserved effect is linked with the independent variable. The fixed effects (within) estimator (Brüderl and Ludwig, 2015) can combat this econometric issue.

Furthermore, we applied the Hausman test to determine the appropriate estimator between fixed and random effects.

Therefore, to investigate the relationship between the two performance indicators (i.e. ROS and LI) and the proportion of females working in each category, we estimated the following panel data models with fixed effects (see Equations 1 and 2). Adopting panel regression, it was possible to analyse data over a long period – for 7 consecutive years in our case. The fixed effects model focuses on the elimination of the intercept α_i , constant over time, as it contains unobservable values, and which would therefore be considered an integral part of the model error. These values could be correlated with the explanatory variables, resulting in a biased estimate. Including fixed effects allows one to account for healthcare organisation characteristics that do not vary over time. Therefore, a fixed effects model takes into account both heteroskedasticity and autocorrelation issues (Wooldridge, 2005).

In addition, we used clustered heteroscedasticity standard errors to account for the serial correlation of the dependent variables for each healthcare organisation. Clustered standard errors are generally recommended when analysing panel data, where each unit is observed over time.

$$\begin{aligned} \text{ROS}_{it} = & \alpha_i + \beta_1 \text{W_C1}_{it} + \beta_2 \text{W_C2}_{it} + \beta_3 \text{W_C3}_{it} + \beta_4 \text{W_C4}_{it} + \beta_5 \text{W_C5}_{it} + \beta_6 \text{SIZE}_{it} \\ & + \beta_7 \text{CD}_{it} + \beta_8 \text{AGE}_{it} + \beta_9 \text{HUMEXP}_{it} + \delta_t + \varepsilon_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} \text{LI}_{it} = & \alpha_i + \beta_1 \text{W_C1}_{it} + \beta_2 \text{W_C2}_{it} + \beta_3 \text{W_C3}_{it} + \beta_4 \text{W_C4}_{it} + \beta_5 \text{W_C5}_{it} + \beta_6 \text{SIZE}_{it} \\ & + \beta_7 \text{CD}_{it} + \beta_8 \text{AGE}_{it} + \beta_9 \text{HUMEXP}_{it} + \delta_t + \varepsilon_{it} \end{aligned} \quad (2)$$

Equation (1) considers the financial performance of healthcare organisations with return on sales (ROS) as the dependent variable; $\beta_1 - \beta_5$ represent the independent variables used in the hypothesis test; $\beta_6 - \beta_9$ are the control variables; δ_t is a year dummy; and α_i is an organisation's specific fixed effect. Instead, equation (2) considers LI as a dependent variable.

4. Results

Using panel data regressions, we analysed the data over 7 years (2012–2018). Table 4 shows the panel data regressions. Model 1 reports the coefficients using C1, C2, C3, C4, and C5 as independent variables and ROS as the dependent variable. The main results highlight a positive and significant relationship between the percentage of women and ROS in category C3 (health professionals).

By contrast, we noted a negative and statistically significant relationship in category C5 (Health staff). In model 2 we use LI as the dependent variable; the results show a positive and statistically significant relationship with category C1 (Top management) and a negative relationship with category C5. These results support our H1 and H2 according to which there is a positive relationship between a higher percentage of women in top management, in health and non-health professionals. The first argument is based on the premise that male and female directors are not the same. Women may provide new views to decision-making or improve the efficacy of organization leadership since they have had various experiences and gained distinct talents (Naciti *et al.*, 2021b).

Conversely, the negative relation of C5 leads us to reject H3 on the positive relationship between the percentage of women in health and non-health staff categories and

	Model (1) ROS	Model (2) LI	Model (3) ROS	Model (4) LI
C1	-0.0115 (0.392)	0.261* (0.018)		
C2	-0.0188 (0.148)	0.333 (0.219)		
C3	0.165*** (0.000)	-0.0474 (0.826)		
C4	0.00333 (0.948)	-0.0888 (0.790)		
C5	-0.282* (0.043)	-4.846* (0.044)		
HUMEXP	0.0118 (0.396)	-0.186* (0.013)	0.0129** (0.009)	-0.174 (0.079)
SIZE	0.0315 (0.422)	-0.332 (0.528)	0.0225 (0.450)	-0.471 (0.462)
FC	0.00431 (0.944)	-0.836 (0.212)	-0.0156 (0.819)	-1.071 (0.269)
AGE	-0.0221 (0.368)	0.0784 (0.805)	0.198*** (0.000)	0.0101 (0.977)
SS			0.0344* (0.017)	-0.188 (0.242)
SC			0.000140 (0.984)	-0.0867 (0.204)
NO			-0.0273* (0.025)	-0.235* (0.046)
_cons	0.118 (0.161)	4.820** (0.006)	-0.135*** (0.000)	2.261* (0.045)
N	441	441	441	441
adj. R ²	0.104	0.325	0.129	0.305
Fixed effects	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes

Note(s): Clustered heteroscedasticity standard errors at the hospital level account for serial correlation in parentheses

p-values in parentheses

p* < 0.05, *p* < 0.01, ****p* < 0.001

Table 4.
Panel data analysis

performance. This last result leads us to support what stated by [Soare et al. \(2022\)](#) that a diverse workforce performs better. Therefore, considering the high percentage of women in this category, this negative influence could be given by a gender imbalance to the detriment of men.

Moreover, [Table 4](#) shows Models 3 and 4 with the subcategories SC, SS, and NO. The results show a positive association between SS and ROS and a negative association between NO and ROS. Regarding LI, the coefficients suggest a negative relationship with NO.

4.1 Robustness test

To test the robustness of the study's findings, additional analyses were conducted ([Table 5](#)). First, the interactions between the categories (from C1 to C5) and the number of beds (SIZE) were considered. The estimated main effect suggests that there is a positive and significant estimate on the interaction between SIZE and C3 on ROS (Model 3) and a negative and significant estimate at the health staff level (C5) in Column 5 (Model 3), confirming the previous results in [Table 4](#). Model 4 reports the coefficients of estimation concerning LI. The estimated coefficients show a positive relationship between C1 and LI and a negative relationship between C5 and LI. The results led us to confirm the results of the main analysis that accept [H1](#) and [H2](#) and reject [H3](#), suggesting that the proportion of women in top and middle management have a more positive relationship with larger facilities than smaller facilities.

We recognise that our findings may be subject to endogeneity concerns regarding selection bias and reverse causality between the variables. Considering lagged variables mitigates the likelihood of endogeneity ([Galletta et al., 2021](#)). Panel data allow researchers to deal with the endogeneity problem by using previous values of possible endogenous variables to build instruments. Lagged variables are effective instruments because they are correlated with the potential endogenous variable and have a low correlation with the dependent variable. This approach is similar to and consistent with the generalised method of

	Model (5) ROS	Model (6) IL	Model (7) ROS	Model (8) IL
C1#Beds	-0.0137 (0.377)	0.292* (0.034)		
C2#Beds	-0.0212 (0.466)	0.286 (0.389)		
C3#Beds	0.305** (0.002)	0.436 (0.777)		
C4#Beds	0.00487 (0.926)	-0.108 (0.859)		
C5#Beds	-0.602** (0.005)	-5.209* (0.014)		
L.C1			-0.00211 (0.926)	0.374* (0.027)
L.C2			0.00808 (0.336)	0.606* (0.031)
L.C3			0.0915* (0.018)	0.166 (0.597)
L.C4			-0.0205 (0.352)	2.075*** (0.000)
L.C5			-0.314* (0.016)	-3.198 (0.215)
FC	0.0103 (0.569)	-0.182 (0.105)	0.0206 (0.487)	-0.203* (0.037)
SIZE			0.0591* (0.011)	-0.870 (0.143)
HUMEXP	0.00280 (0.981)	2.631 (0.065)	-0.0962 (0.288)	-6.014*** (0.000)
AGE	-0.0195 (0.572)	-0.632 (0.479)	0.171* (0.028)	0.520 (0.099)
_cons	-0.00816 (0.789)	2.247* (0.036)	0.0566 (0.173)	4.953** (0.006)
N	441	441	378	378
adj. R ²	0.195	0.310	0.155	0.223
Fixed effects	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes

Note(s): Clustered heteroscedasticity standard errors at the hospital level account for serial correlation in parentheses

p-values in parentheses

* *p* < 0.05, ** *p* < 0.01, *** *p* < 0.001

Table 5.
Robustness test

moments (GMM) technique (Arellano and Bond, 1991), which deals with endogeneity problems in a dynamic setting by introducing high-order temporal lags as instruments (Wooldridge, 2008). We did not have sufficient observations to apply this econometric approach to our study. Therefore, we added the independent variables lagged with respect to ROS and LI to check the effect in the previous year of gender diversity in our sample (Models 7 and 8). The results confirm that the performance indicators were influenced by past values, and show that ROS and LI at time *t* were influenced by the past women’s representation in C1, C2, C3, and C4, assuming that the performance of hospitals at time “*t*” is affected by the past gender composition, which could play a role in enhancing the performance indicators at time *t* + 1.

5. Discussion and conclusion

The present study aimed to explore the link between women’s representation and performance in healthcare organisations by focusing on financial performance as measured using two indicators computed through the analysis of Italian autonomous public hospitals’ financial reports between 2012 and 2018.

The analysis revealed that women’s representation varied according to the professional category. Those in which gender gaps were most evident are top management (C1) — which was 22% female — and health staff (C5), which was 70% female. In the non-health staff category (C4), the gender gap was smaller (56% female). The categories of non-health professionals (C2) and health professionals (C3) were more balanced. Females accounted for 43 and 45%, respectively – but a more significant gap occurred in the first years of the analysis. However, within these two categories, gaps emerged in managerial responsibilities. Amongst those professionals with managerial responsibilities (SC and SS), females only represented 34 and 33%, respectively. Conversely, 64% of professionals with no managerial

responsibilities (NO) - e.g. medical doctors non-responsible for resource allocations - were women.

Our analysis produced interesting results. Our first hypothesis (H1) - i.e. the positive relationship between the percentage of women and performance in top management - was confirmed by the results obtained. In fact, for the top management category (C1), we found a positive relationship between financial performance (LI) and a higher percentage of females. This result, consistently with previous studies in other public sectors (Park, 2021), confirms that public organizations - and in our case public hospitals - with a higher women's representation in top management teams report better financial performance. This can be explained by the different management styles and, in particular, by the more prudent approach in financial management (Cuadrado-Ballesteros *et al.*, 2021). It is important to point out that this category is indeed largely responsible for decisions impacting LI, such as collection and payment times and indebtedness.

For what concerns our second hypothesis, we found a positive relationship between performance efficiency (ROS) and the percentage of females in the C3 category (health professionals). This result is important for two main reasons. First, health professionals operating in hospitals have a strong influence on efficiency, since their clinical decisions (e.g. whether to use one kind of treatment instead of another) impact resource consumption and ultimately costs. This evidence was partially reinforced by the relationship between gender and performance in the sub-categories SC, SS, and NO for health and non-health professionals. The results confirmed a positive relationship between ROS and the percentage of females in the SS sub-category (in which females account for 30% of the total). Interestingly, the results obtained with the NO sub-category, though significant, highlight a negative relationship between both ROS and LI performance and the percentage of females. However, given that in this sub-category women are over-represented (i.e. 64% of total employees are women) these results mean that a lower percentage of women than average - that in this case means a better gender-balanced situation - is associated with better performance. Overall, this indicates that reducing segregation - which means achieving better gender diversity - would be desirable.

A similar situation emerged with the results of the health staff (C5) category, where there was a negative relationship between women's representation and financial performance (both indicators). Even though the result does not confirm our third hypothesis, it is evident that given that females represent 70% of employees in C5, this result means that hospitals with a percentage of females lower than the 70% (and thus more diverse in the genders' representation) report better performance. Such a result suggests that policies should be implemented to achieve greater gender diversity also in non-leader professional groups.

The reason why this category (which has limited organizational responsibilities) may influence financial performance is twofold. On the one hand, it could be related to the fact that clinical decisions taken by health staff have a significant impact on the consumption of resources in hospitals - and thus on efficiency; on the other hand, a better gender balance across the organization (including lower staff) is the result of welfare and gender-based policies - i.e. a "less gendered" organization (Mastracci and Bowman, 2015) - which improve organizational climate and then performance.

The study makes both theoretical and practical contributions. First of all, the results obtained outline that women's representation analyses should consider the cases in which this gender is over-represented (such as in the categories NO and C5 of our study). We believe that this is an important issue that needs to be properly tackled by future research. While measuring women's representation can be supportive when focusing on small teams and groups or when analysing strongly unbalanced contexts; gender studies in large organisations may benefit from the adoption of a gender diversity approach. In these cases, it may be useful the adoption of diversity measures, such as the Blau index (Pitts, 2005;

Ostrup and Villadsen, 2015). The results show indeed that gender diversity is related to financial performance in healthcare organisations.

The study can be considered original for two main reasons. First, of all, it is one of the first studies focusing on the relationship between women's representation and performance in the public healthcare sector. Second, it assesses and measures the link between gender and performance at every level of professional and employment category, not just top management, which was the case in previous studies. This allowed us to examine scenarios in which males are underrepresented, a topic that has been given little attention hitherto. As such, this research aims at opening the discussion on all-level-employees' gender diversity and its relationship with organizational performance in public management.

The practical implications of the study relate to the need to develop and implement policies and tools to empower under-represented genders, allowing them to contribute fully to the mission of the organisations in which they operate. Gender equality plans and gender budgets offer the possibility of pursuing this aim (Steccolini, 2019; Addabbo *et al.*, 2020; Polzer *et al.*, 2021).

The study has some limitations. First, it focuses on hospitals operating in different regional health systems that may have different health policies and cultures. Their awareness of gender issues may also vary. Therefore, it would be interesting to further explore this topic through qualitative investigations aimed at fostering the comprehension of the relationship between gender diversity and performance. Second, it focuses exclusively on the hospital setting; although we can expect that the results obtained would be confirmed in other contexts, future researchers could investigate whether similar results pertain to organisations operating in different care settings or other areas of the public sector. Finally, although financial performance represents the global performance of hospitals, it would be interesting to examine its relationship with other performance dimensions, such as the quality of care, accessibility and patient satisfaction.

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