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Assessing Earnings Quality of Greek Public Hospitals

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Abstract

Purpose: This paper examines the factors that affect the Net Income of Greek public hospitals for the period 2015-2018. The main objective is to explore whether there is evidence for accounting principles violation. **Methodology:** A representative sample of 107 public hospitals which accounts almost the 85% of the total, is chosen to construct a dataset that contains information about the type of hospital, the number of hospitalized patients and other variables that are taken from the financial statements. Furthermore, this study adopts the OLS method in order to draw relative conclusions. **Findings:** We conclude that differences in the applied accounting policies from the Greek Public Hospitals significantly affect their Net Income. Specifically, we observe that hospitals who apply a more conservative receivables accounting do not seem to be significantly affected by the government policies, while hospitals apply less conservative accounting policies significantly affected by government policies. **Originality:** This study is the first one to examine the effect of the government decision to grant Greek Public Hospitals in 2016 on their earnings. Furthermore, as accounting data is publicly available relatively recently (2011) accounting research regarding Greek Public Hospitals is scarce.

Keywords

Earnings, Financial Statement, Public Hospitals, Conservatism Hospitals

JEL Classification

M41, L32, M42, M48, L31

1. Introduction

In 2015, 127 public hospitals operate in Greece which are under the supervision of YPE. YPE or DYPE are regional health authorities responsible for planning, supervising and controlling the operation of all public health services providers. DYPE are formal administrative units for hospital control and coordination without having a say in any major operating issue (Curtis & Roupas, 2009). There are seven YPE in Greece which operate according to Greek law 3527/2007 and under the supervision of ministry of health.

In 2003 the Presidential Decree 146/2003, obliges Greek public hospitals to apply accrual basis accounting and publish financial statements. Previously, cash-based accounting is the applied accounting system of public hospitals. However, despite the mandatory effect of the Presidential Decree in 2003, public hospitals never seized to apply cash accounting in parallel. They use cash accounting mainly to monitor the annual budget per category of expenses and earnings.

Furthermore, the Greek law 3599/2007 in article 27 dictates that the Greek public hospitals must additionally prepare financial statements according to IFRS. Moreover, the annual financial statements of Greek public hospitals are mandatory subject to external audit. Finally, the financial statements along with audit report are uploaded in web platform Diavgia and sometimes on the website of each hospital. Unfortunately, the most hospitals published financial statements which have prepared according to Presidential Decree (P.D) 146/2003 and not according to IFRS. This renders comparison of Greek hospital institution with its peers abroad impossible.

In our study we examine how differences in accounting policies may affect earnings quality of Greek Public Hospitals. We use two subsamples of our total sample, a distinction based on the amount of allowances for bad receivables or special reserves or contribution of shareholders. Additionally, we use the year of 2016 as our benchmark because government in 2016 publishes a legal decision in which public hospitals receive grants in order to write off of their account receivables. The receivables which will be reversed concern those from National Insurance Institute. If the total balance from the above reserves is greater than the amount granted to a specific hospital, then this hospital is categorized within the more conservative hospital. On the contrary, if the total balance from the relative reserve is less than the amount granted to a specific hospital, then this hospital is categorized within the less conservative hospital. We conclude that hospitals' earnings within the more conservative sample do not seem to be affected by the write offs of the reserves, which could be explained by consistency of the recorded provisions by the hospitals. Conversely, hospitals' earnings within the less conservative sample seem to be affected by the write offs of the reserves.

2. Literature Review

The literature on economics, accounting and financial reporting of Greek public

hospitals is limited. The reason why this is the case is that, their financial and operational data has become accessible to the public recently, after the creation of web platforms Diavgia and Esynet. Nevertheless, there are researchers that employ other methods like questionnaires to collect data and draw conclusions.

Stamatiadis (2009) in his research uses a questionnaire, sent via email and fax to 132 financial directors of Greek public hospitals. Eventually, out of 132 questionnaires, 54 are answered forming a response rate of 41% that covers all the regions of Greece. His survey focuses on the advantages and disadvantages of accrual accounting that derives from accrual accounting system implementation in the Greek Public Sector. According to the results, a vital role in the limited adaption to the accrual-based accounting system plays the scarce financial resources and the lack of the personnel's education.

In the same vein Eriotis et al. (2011) examine the actual adoption and implementation of accrual and cost accounting practices in Greek public hospitals. A questionnaire sent to the CFO's of 132 public hospitals and a linear regression model employed in order to examine the explanatory and implementation factors of the accounting reform adoption level. The total response rate of 71.21% indicates that the level of accounting reform adoption in public hospitals is realized only to a limited extent. Finally, another finding from the same survey is that, the public hospitals have implementation difficulties. These difficulties derive from lack of organizational, technological and human resources in complying with the regulatory requirements.

Ballas and Tsoukas (2004) in their survey argue that the political contingencies, combined with the non-modern trends in the Greek political system, lead to the underdevelopment of accounting and the associated form of measurement in Greek National Health System.

Curtis and Roupas (2009) believe that due to the lack of appropriate financial data on Greek public hospitals, the supervising bodies and the economic units under scrutiny are not able to monitor their economic performance effectively. They attribute the lack of appropriate financial data to the fact that double entry accounting has not yet fully adopted by the public hospitals. In addition, they support that double entry accounting is essential for reporting and monitoring acceptable financial performance. Financial ratios help directors to be informed about the risks of their companies and form the best possible decision to mitigate the negative effects of the company (Gonidakis et al., 2020).

Xenos et al. (2017) in their survey examine the efficiency and productivity of Greek public hospitals during the period of Greek economic crisis in 2009-2012. They use anon-parametric Malmquist analysis to calculate the efficiency and the productivity growth of Greek hospitals. The results show that between 2009 and 2012, on average, hospitals show productivity growth, indicated by the variations in Malmquist Productivity Indicator. Nevertheless, the productivity increase of the hospitals is due to technological changes and not of efficient ones. As far as

the efficiency growth is concerned, hospitals should reduce their capacity in order to achieve high efficiency rates.

Fragkiadakis et al. (2016) in their research focus on the assessment of public hospitals in Greece from the perspective of managerial efficiency, while they seek to assess the ability of the hospitals to utilize the available human, technical, and economic resources in order to produce services in the most efficient and effective way. Data development analysis is employed in their survey because it enables the assessment of productivity and efficiency of organizational units. Moreover, the sample of 87 public general hospitals operating in the Greek health system during the period 2005 to 2009, shows that that the Greek hospitals are characterized by economies of scale but not economies of scope.

Furthermore, when it comes to studies that refer to nonprofit hospitals in other countries are concerned, Hoerger (1991) finds that nonprofit hospitals reduce the fluctuation of reported earnings as they try to manage the level of earnings in order to satisfy the budget constraint. This means that managers can increase or decrease discretionary spending near the year's end in order to achieve the desirable profit. Eldenburg et al. (2011) conclude that the hospitals implement accounting adjustments to prevent big positive net incomes.

Ballantine et al. (2008) in their research about UK public sector NHS Hospital Trusts, conclude that accrual management make possible reported earning manipulation to reach a desirable level of profit. Chang and Tuckman (1990) who study nonprofit organizations in USA, conclude also to similar findings. Another study, Tan (2011) points out that nonprofit hospitals managers use discretionary accruals to meet earnings target. According to Leone and Van Horn (2005) non-profit hospitals do not consider profit as a priority, contrary to the stakeholders who value the hospitals' performance.

Li and Liu (2019) in their study employ a sample from Taiwan for the period from 2013 to 2017. Their goal is to examine whether the country's hospitals have revenue and how they manage it. The research focuses on the costs and profits of the hospitals and to what level these appeared as normal and logical, relative to other countries' hospitals. Governance disclosures in Taiwan hospitals are not mandatory which results in ineffective governance mechanisms. This scheme allows managers to manage the profits of hospitals based on their discretion, without ensuring proper operation and effectiveness of them. According to Huang and Liu (2011), a big number of hospitals in Taiwan have profits that sometimes exceed those from other sectors.

In our study, we employ Net Income and receivables accounting in order to examine how the differences in accounting policies affect earnings quality. In order to examine this hypothesis, we use two subsamples of our total sample. The distinction is based on the amount of allowances for bad receivables or special reserves or contribution of shareholders. Additionally, we use the year of 2016 as our benchmark because government in 2016 publishes a legal decision in

which public hospitals receive grants in order to write off of their account receivables. The receivables which will be reversed concern those from National Insurance Institute. If the total balance from the above reserves is greater than the amount granted to a specific hospital, then this hospital is categorized within the more conservative hospital. On the contrary, if the total balance from the relative reserve is less than the amount granted to a specific hospital, then this hospital is categorized within the less conservative hospital. We expect that hospitals' earnings within the more conservative sample to not be affected by the write offs of the reserves, while hospitals' earnings within the less conservative sample to be affected by the write offs of the reserves.

Therefore, the hypothesis is formed:

H: *Differences in accounting policies affect Net earnings of Greek Public Hospitals.*

3. Research Methodology

3.1. Data Collection and Sample

The sample of the study consists of Greek public hospitals during 2015-2018. We employ the aforementioned period due to the availability of published data regarding the operating activity of hospitals in the web site of Ministry of Health.

Out of the initial sample of 127 Greek public hospitals which operate in 2018, we conclude to 107. We exclude hospitals that publish financial statements according to IFRS as outliers due to their limited adoption. Moreover, we exclude hospitals that do not publish financial statements during the period 2015-2018 and hospitals that operate under distinct legal framework (Papageorgiou hospital and Onasseio hospital) compared with the majority of public hospitals. Finally, we exclude hospital for special diseases in Thessaloniki that do not provide medical services.

Accounting data collected from the web platform Diavgia. Particularly Diaygia, is a public accessible database which has founded in 2010 and contains every decision of the Greek state. It assures transparency and accountability of public administration.

For these 107 hospitals during the period 2015-2018, 341 balance sheets collected and 32 hospitals publish 15 consolidated financial statements, while 19 balance sheets are not available. Those 19 hospitals have been excluded from the final sample.

3.2. Division of Sample

The purpose of this study is to use a sample of 107 hospitals in order to investigate possible factors that influence the Net Income of Greek public hospitals. The initial sample is divided in order to examine how the Net Income of hospitals is influenced relative to the level of accounting conservatism that they apply. To divide the sample, is taken into consideration an accounting event. Particularly, on 11 July of 2016 Health Minister publishes (FEK issue B 2137/11.7.2016)

a decision (number 47295) which states that the Greek public hospitals are obliged to write off of their accounts, receivables from National Insurance Institute, equal to the specific grants which have received from the state.

This study examines the balance sheets of fiscal year 2017 and sums up the balances of the contra accounts "Allowance for bad receivables", "Special reserve account" and "Contribution of Shareholders". If this figure is equal or higher than the amount which is granted to the hospital from the state during the period 2015-2017 then, it is categorized in the sample with more conservative hospitals. On the other hand, if this figure is lower than the granted amount then the hospital is categorized in the sample with less conservative hospitals. After the separation, the first sample, with more conservative hospitals consists of 51 hospitals and 182 observations and second sample with less conservative hospitals consists of 56 hospitals and 159 observations.

This research sums up these three accounts because, according to notes of balance sheet, many hospitals record part or all the amount of specific grants which have received from the state the period 2015-2017. In many cases the notes of balance sheet are not published and consequently it is assumed that these accounts are used for the same purpose. Moreover, we do not take into consideration Special reserve accounts that clearly refer to other purposes. The same applies to Special reserve accounts with stable amount during the period of investigation because probably they serve other purposes.

It is observed that the amounts recorded in specific reserve account or Contribution of Shareholders do not influence the annual earnings because they are not included in Income Statement. As far as the account "Allowance for bad receivables" is concerned, it is a commonly used account which increases through the provisions that recorded in the P&L statement and decreases the net income of the year. Consequently, it is observed that some hospitals record specific grants which receive from the state this period as revenues and at the same time record equal or less provision for bad receivables.

3.3. Dependent Variable

The dependent variable is represented by Net Income of Greek public hospitals as a result of the P&L statement. Table 1 depicts the template of P&L statement as defined by presidential decree 146/2003. P&L statement is annually published by the hospitals.

According to Table 1, Net Income is the sum of the operating profit (or loss) plus the extraordinary and non-operating profit (or loss). It is obvious that defers from the P&L Statement prepared according to IFRS.

3.4. Independent Variables

Our model, implements 10 independent variables. Operation profit, Earnings of Previous Years, Expenses of Previous Years and Provisions, are independent variables as presented in the P&L statement (Table 1). Another independent variable

Table 1. P&L statement template according to Greek legislation (P.D 146/2003).

P&L Statement
(+) Sales Revenue
(−) Cost of Sales
Gross Profit or Loss
(+) Other Operating Income
(−) Administrative Expenses
(−) Research and Development Expenses
(−) Marketing Expenses
(+) Earnings from Investments in Assets and Securities
(+) Profits from Selling Investments in Assets and Securities
(+) Interest Income & Related Income
(−) Expenses and Losses from Selling Securities
(−) Provision for Losses from Investments in Securities
(−) Interest Expense & Related Expenses
Operating Profit or Loss
(+) Extraordinary and Non-Operating Revenues
(+) Extraordinary Profit
(+) Earnings that Belongs to Previous Years
(+) Profit from Previous Years Provisions
(−) Extraordinary and Non-Operating Expenses
(−) Extraordinary Losses
(−) Expenses that Belongs to Previous Years
(−) Provision for Extraordinary Dangers
(−) Depreciation of Assets minus the Amount of Depreciation of Asset that is not included in Operating Expenses
Extraordinary and Non-Operating Profit or Loss
Net Income

is the number of hospitalized patients per year. These figures are published in web site of Ministry of Health. The write-off is dummy variable for this model and represents the year 2016. The last four independent variables are also dummy variables which represent the type of hospital (university hospital, specific hospital, cancer hospital, psychiatric hospital).

3.5. Model Specification

To examine which factors influence the Net Income of Greek public hospitals, a regression model:

1) Net income model:

$$\text{Net Income}_{it} = \alpha_i + \beta_1 \text{Operating Profit}_{i,t} + \beta_2 \text{Earnings of Previous Years}_{i,t}$$
$$+ \beta_3 \text{Expenses of Previous Years}_{i,t} + \beta_4 \text{Provision of year}_{i,t}$$
$$+ \beta_5 \text{Number of Hospitalized Patients}_{i,t} + \text{Write Off dummy}$$
$$+ \text{Type of Hospital dummy} + \varepsilon_{i,t}$$

The subscripts i and t denote hospitals and year respectively, α is the constant term, β_1 to β_5 are slopes to be estimated and ε is the error term of model.

The method, which is used for the panel analysis is the OLS method (Ordinary Least Squares). The method of OLS requires taking each vertical distance from the point to the line of regression, squaring it and then, minimizing the total sum of the areas of squares (least squares). The statistical software that we use is the Stata.

4. Data Findings and Results

4.1. All Hospitals Sample

The "All hospitals" sample contains all 107 hospitals for the period 2015-2018. The results from the 341 observations analysis presented in Table 2.

Firstly, p-value indicates the reliability of explanatory variables to predict the dependent variable. As it is set to 95% confidence interval, we need a p-value lower than 0.05 (5%). In this case the p-value (Prob > F) = 0.0000 so, there is a statistically significant relationship between dependent and independent variables.

The adjusted R-squared is 0.6057 which means that the 60.57% of the variance of dependent variable, is explained by independent variables or the model explains 60.57% of the variance in Net Income. The adjusted R-squared adjusts R-squared by the number of cases and number of variables.

Table 2. Regression results—all hospitals.

	SS	df	MS		Number of obs	341
Model	1.7162e+16	10	1.7162e+15		F(10, 330)	53.24
Residual	1.0639e+16	330	3.2238e+13		Prob > F	0.0000
Total	2.7801e+16	340	8.1767e+13		R-squared	0.6173
					Adj R-squared	0.6057
Net_income	Coef.	Std. Err.	t	$P > |t|$	[95% Conf. Interval]	
Operatingp	0.3759177	0.0269091	13.97	0.000*	0.3229826	0.4288528
Earningspr	1.177773	0.0823611	14.30	0.000*	1.015754	1.339792
Expensespr	−0.6860423	0.0642321	−10.68	0.000*	−0.8123983	−0.5596863
Provisionspl	−0.4190231	0.0770082	−5.44	0.000*	−0.5705121	−0.2675341
Patients	−14.67299	22.64467	−0.65	0.517	−59.2191	29.87312
Writeoff	−2,162,137	710062.9	−3.04	0.003*	−3,558,958	−765316.8
Special	−871688.5	2,184,736	−0.40	0.690	−5,169,454	3,426,077
Cancer	1,178,871	1,638,658	0.72	0.472	−2,044,662	4,402,403
University	2,714,318	1,476,064	1.84	0.067	−189362.9	5,617,999
Psychiatric	−3,021,645	2,046,162	−1.48	0.141	−7,046,811	1,003,522
_Cons	1,482,497	519,992	2.85	0.005*	459580.2	2,505,415

*Significance at 5% level.

The Durbin Watson statistic, which tests for autocorrelation in the residuals, is 1.438 for this model. The Durbin Watson statistic is always between 0 and 4 and the desirable number that indicates no autocorrelation is about 2. Numbers from 0 to 2 indicate positive autocorrelation and numbers between 2 and 4 indicate negative autocorrelation. Results between 1.5 and 2.5 are considered relatively normal. The figure for this model is close to the normal range.

Moreover, we calculate the Variance Inflation Factor (VIF) and present the results in Table 3. The VIF measures the extent of multicollinearity within the model. Multicollinearity reduces the predictive power of the model. Indication for significant multicollinearity issue exists when VIF be high which means over 5. In this model the numbers of VIF are around 2, so there is no indication for significant multicollinearity.

According to the p-value, the statistically significant variables ($\alpha = 0.05$) ofthis model are operating profit, earnings of previous years, expenses of previous years, provision of the year and the dummy variable write off. The variable, number of hospitalized patients, and the dummy variables about the type of hospital are not considered statistical significant.

It looks strange the fact that the number of hospitalized patients are not significant variable, while variables likeearnings and expenses of previous years re statistically significant. If the amounts in these accounts are high, then maybe the accrual principle is violated.

In the following table (Table 4) we present the correlation coefficients between the variables using Spearman's correlation coefficient.

We observe a remarkably high coefficient between Net Income and earnings of previous years. In addition, the difference in coefficients between earnings of previous years and expenses of previous years may indicate violation of matching principle. In general, we observe a correlation between the studied variables.

Table 3. VIF—all hospitals.

Variable	VIF	1/VIF
Operatingp	1.98	0.504475
Earningspr	1.62	0.616073
Expensespr	1.51	0.662057
Provisionspl	1.47	0.680671
Patients	1.45	0.691564
Writeoff	1.38	0.723767
Special	1.27	0.787312
Cancer	1.04	0.958410
University	1.02	0.985109
Psychiatric	1.01	0.985626
Mean VIF	1.38	

Table 4. Correlation coefficients between the variables—all hospitals.

	Net inc	Ope.Pr	Ear.Pr	Exp.Pr	Provis	Patient	Wr-off	Special	Cancer	Univer	Psych
Net inc	1.000										
Ope.Pr	0.489	1.000									
Ear.Prv	0.501	0.178	1.000								
Ex.Prv	0.005	0.301	0.475	1.000							
Provis	−0.035	0.299	−0.004	−0.006	1.000						
Patient	0.352	0.433	0.400	0.249	0.219	1.000					
Wr-off	−0.042	0.148	0.052	0.145	−0.041	0.041	1.000				
Special	−0.063	−0.053	−0.060	−0.026	−0.027	−0.110	0.006	1.000			
Cancer	−0.040	0.087	−0.050	−0.025	0.421	0.170	−0.008	−0.032	1.000		
Univer	0.375	0.298	0.292	0.079	−0.013	0.568	0.026	−0.041	−0.063	1.000	
Psych	−0.128	−0.095	−0.054	−0.012	−0.025	−0.068	−0.005	−0.022	−0.034	−0.044	1.000

4.2. More Conservatism Hospitals Sample

In this section we present the results for the sample "More Conservatism Hospitals" which consists of the data of 51 Greek public hospitals that record equal or higher amounts in contra accounts than the received grants during 2015-2017 (Table 5).

To begin with, the p-value (Prob > F) = 0.0000, therefore a statistically significant relationship between dependent and independent variables is observed.

The adjusted R-squared is 0.9717. This means, that the 97.17% of the variance of the dependent variable is explained by independent variables or that the model explains 97.17% of the variance in Net Income. The number of R-squared in this model is much higher compared to the model of the "All Data" sample. This may be the result of the applied accounting policies (included the conservatism), which leads these hospitals to more stable and predictable profits.

The Durbin Watson statistic which test for autocorrelation in the residuals from a regression analysis, is 1.811 for this model. This figure is near to the desirable number and indicates no autocorrelation.

Moreover, we calculate the Variance Inflation Factor (VIF) and the results presented at Table 6. In this model the numbers of VIF are between 1 and 2, so there is no indication for significant multicollinearity.

According to the p-value approach (a = 5%), the statistical significant variables for this model are operating profit, earnings of previous years, expenses of previous years, provision of the year, the number of hospitalized patients and the dummy variable which represent psychiatric hospitals. The dummies variables, write off, university hospital, specific hospital, cancer hospital, are not considered statistical significant.

The results seem to reinforce the assumption that as the hospitals of this sample apply more conservative accounting, their Net Income is not influenced from

Table 5. Regression results—more conservatism hospitals.

Source	SS	df	MS		Number of obs	182
Model	1.9710e+15	10	1.9710e+14		F(10, 330)	622.67
Residual	5.4129e+13	171	3.1654e+11		Prob > F	0.0000
Total	2.0252e+15	181	1.1189e+13		R-squared	0.9733
					Adj R-squared	0.9717

Net_income	Coef.	Std. Err.	t	P > |t|	[95% Conf. Interval]	
Operatingp	0.9750126	0.0153888	63.36	0.000*	0.9446362	1.005389
Earningspr	0.9928959	0.03486	28.48	0.000*	0.9240845	1.061707
Expensespr	−0.9778227	0.0864951	−11.30	0.000*	−1.148558	−0.8070872
Provisionspl	−0.9339711	0.0355233	−26.29	0.000*	−1.004092	−0.8638505
Patients	7.160747	3.388655	2.11	0.036*	0.4717646	13.84973
Writeoff	167153.8	96544.62	1.73	0.085	−23418.95	357726.4
Special	157399.9	288424.4	0.55	0.586	−411930.8	726730.6
Cancer	292370.4	292137.1	1.00	0.318	−284,289	869029.8
University	−293785.7	342859.4	−0.86	0.393	−970567.5	3,822,996
Psychiatric	1,076,499	311175.4	3.46	0.001*	462259.2	1,690,739
_Cons	43636.79	68571.09	0.64	0.525	−91,718	178991.6

*Significance at 5% level.

Table 6. VIF—more conservatism hospitals.

Variable	VIF	1/VIF
Operatingp	1.68	0.594209
Earningspr	1.45	0.688322
Expensespr	1.43	0.701435
Provisionspl	1.39	0.718480
Patients	1.31	0.765493
Writeoff	1.20	0.835629
Special	1.08	0.928339
Cancer	1.05	0.948092
University	1.03	0.972658
Psychiatric	1.03	0.974128
Mean VIF	1.26	

the writing off receivables. In addition, the high R-squared could possibly be an indication of more stable amount of profits during the years 2015-2018.

The following table presents the correlation coefficients between the variables, using Spearman's correlation coefficient.

From the data of Table 7 we obtain remarkably high coefficient between

Table 7. Correlation coefficients between the variables—more conservatism hospitals.

	Net inc	Ope.Pr	Ear.Pr	Exp.Pr	Provis	Patient	Wr-off	Special	Cancer	Univer	Psych
Net inc	1.000										
Ope.Pr	0.856	1.000									
Ear.Prv	0.198	−0.139	1.000								
Ex.Prv	−0.194	−0.137	0.249	1.000							
Provis	−0.189	0.093	0.168	0.072	1.000						
Patient	0.024	−0.060	0.441	0.460	0.175	1.000					
Wr-off	0.140	0.121	−0.039	−0.015	−0.051	0.021	1.000				
Special	−0.073	−0.077	−0.065	−0.070	−0.041	−0.097	−0.002	1.000			
Cancer	−0.077	−0.071	0.090	0.148	0.117	0.143	−0.002	−0.022	1.000		
Univer	0.289	0.236	0.337	0.204	0.126	0.426	−0.002	−0.022	−0.022	1.000	
Psych	−0.324	−0.358	−0.061	0.053	−0.004	0.008	−0.002	−0.022	−0.022	−0.022	1.000

Net Income and operating income. It is reasonable these amounts to be highly correlated, as the public hospitals have no other activity except from the provision of health services.

4.3. Less Conservatism Hospitals Sample

Finally, in this section we present the results for the sample "Less Conservatism Hospitals" which includes the data of 56 Greek public hospitals that record less amounts in contra accounts than the received grants during 2015-2018 (Table 8).

To begin with, the *p*-value (Prob > F) = 0.0000, therefore a statistically significant relationship between dependent and independent variables is observed.

The adjusted R-squared is 0.5574. This means that the 55.74% of the variance of dependent variable, is explained by independent variables or that the model explains 55.74% of the variance in Net Income. The number of R-squared in this model is significantly lower than this of the model with more conservatism Hospitals. This may be the results of the applied accounting policies (included conservatism), which leads these hospitals to have more volatility in their profits.

The Durbin Watson statistic which test for autocorrelation in the residuals is 1.341 which indicates positive autocorrelation.

The Variance Inflation Factor (VIF) results are presented at Table 9. The VIF values are between 1 and 2.65, therefore there is no indication for significant multicollinearity.

According to the *p*-value approach, the statistical significant variables for this model are operating profit, earnings of previous years, expenses of previous years, provision of the year, and the dummy variable write off. The dummy variables about the type of hospital are not considered statistically significant variables. Notstatistically significant variable is also the number of hospitalized patients.

Table 8. Regression results—less conservatism hospitals.

Source	SS	df	MS		Number of obs	159
Model	1.2766e+16	10	1.2766e+15		F(10, 330)	20.90
Residual	9.0391e+15	148	6.1075e+13		Prob > F	0.0000
Total	2.1805e+16	158	1.3800e+14		R-squared	0.5855
					Adj R-squared	0.5574

Net_income	Coef.	Std. Err.	t	$P > |t|$	[95% Conf. Interval]	
Operatingp	0.3395564	0.0419277	8.10	0.000*	0.2567022	0.4224107
Earningspr	1.1343	0.1236377	9.17	0.000*	0.8899771	1.378624
Expensespr	−0.6388749	0.090181	−7.08	0.000*	−0.8170835	−0.4606663
Provisionspl	−0.423331	0.1124811	−3.76	0.000*	−0.6456075	−0.2010545
Patients	70.639922	47.9373	0.16	0.874	−87.09005	102.3699
Writeoff	−5,373,243	1,447,262	−3.71	0.000*	−8,233,209	−2,513,277
Special	−763022.8	4,604,966	−0.17	0.869	−9,863,000	8,336,954
Cancer	1,156,995	2,772,967	0.42	0.677	−4,322,728	6,636,717
University	1,996,650	2,431,485	0.82	0.413	−2,808,263	6,801,562
Psychiatric	−2,829,006	4,008,104	−0.71	0.481	−107e+07	5,091,498
_Cons	3,066,225	1,147,409	2.67	0.008*	798804.7	5,333,646

*Significance at 5% level.

Table 9. VIF—less conservatism hospitals.

Variable	VIF	1/VIF
Operatingp	2.65	0.377132
Earningspr	1.83	0.544971
Expensespr	1.61	0.619415
Provisionspl	1.53	0.652154
Patients	1.47	0.678307
Writeoff	1.47	0.682224
Special	1.40	0.715932
Cancer	1.09	0.916253
University	1.03	0.974968
Psychiatric	1.02	0.978501
Mean VIF	1.51	

The results seem to reinforce the assumption that hospitals of this sample apply less conservative accounting than the hospitals of the sample "More Conservatism Hospitals", as their Net Income is influenced from the writing off receivables.

In the following table we present the correlation coefficients between the va-

riables, using Spearman's correlation coefficient.

From the data of Table 10, is remarkable the significantly lower coefficient between Net Income and operating income than this of sample "More Conservatism Hospitals". It is reasonable these amounts to be highly correlated, as the public hospitals have no other activity except from the provision of health services.

4.4. Accruals & Matching Principle Violation

The fact that the earnings and the expenses of previous years are statistically significant, leads to a deeper research. For the 78 observations that represent almost 23% of the total sample, the balance of account "earnings" of previous years is higher than 10% of the balance of the account "sales". Regarding the balance of the account "expenses of previous years", only 15 observations have higher than 10% of the balance of the account "Cost of sales". These findings could be an indication for accrual principle violation. Furthermore, because the earnings of previous years and expenses of previous years are not equal either as amounts or as percentages of the accounts (sales and cost of sales), this is an indication of matching principle violation (**Appendix A** and **Appendix B**).

5. Conclusions and Recommendations

5.1. Conclusions of the Study Findings

This study examines the factors that affect the Net Income of Greek Public Hospitals in the period 2015-2018. Published financial statements are used to extract the financial data, while data for the number of hospitalized patients are taken from the published statistical data of Ministry of health. As a result, a panel dataset consists of 341 observations is created. The sample consists of 107 hospitals and represents almost 85% of the total number of hospitals in Greece.

Table 10. Correlation coefficients between the variables—less conservatism hospitals.

	Net inc	Ope.Pr	Ear.Pr	Exp.Pr	Provis	Patient	Wr-off	Special	Cancer	Univer	Psych
Net inc	1.000										
Ope.Pr	0.393	1.000									
Ear.Prv	0.455	0.092	1.000								
Ex.Prv	−0.051	0.278	0.468	1.000							
Provis	−0.086	0.281	−0.057	−0.026	1.000						
Patient	0.381	0.511	0.377	0.260	0.228	1.000					
Wr-off	−0.127	0.198	0.082	0.210	−0.055	0.051	1.000				
Special	−0.077	−0.065	−0.076	−0.032	−0.031	−0.127	0.017	1.000			
Cancer	−0.102	0.064	−0.126	−0.057	0.475	0.148	−0.017	−0.039	1.000		
Univer	0.332	0.254	0.236	0.048	−0.059	0.611	0.037	−0.055	−0.114	1.000	
Psych	−0.113	−0.085	−0.073	−0.023	−0.037	−0.140	−0.009	−0.022	−0.045	−0.064	1.000

The findings show that the hospital types (university hospital, specialized hospital, cancer hospital, psychiatric hospital) do not influence the Net Income. Similarly, the number of hospitalized patients is not statistically significant variable for the linear regression model. On the other hand, the operating profit, the provisions, the write off of account receivables, the earnings and expenses of previous years are statistically significant variables for the model and influence the Net income.

The fact that the earnings and the expenses of previous years are statistically significant, leads to a deeper research. We find that for 78 observations that represent almost 23% of the total sample, the amount in account earnings of previous years is higher than 10% of the account sales. Regarding the expenses of previous years, only 15 observations contain amounts higher than 10% of Cost of sales. These findings are considered as an indication for accrual principle violation. Furthermore, because of the fact that the earnings and expenses of previous years are not equal, either as amounts or percentages, to the accounts sales and Cost of sales, it could indicate violation of matching principle.

According to the decision taken by the Greek Health Minister, all Greek Public Hospitals must write off of their accounts, called "receivables from National Insurance Organization (EOPYY)" an amount equal to the specific grants that they receive from the state during the years 2015-2017. The financial statements reveal that these amounts are of paramount importance, since they correspond to 73% of their total sales, on average, for the period 2015-2017. Taking into consideration this decision and the balance sheets for the fiscal year 2017, we examine which hospitals record in contra accounts an amount equal or greater than the specific grants that they received during the period 2015-2017. However, since most of the hospitals do not publish notes regarding the balance sheets neither details regarding the criteria used to calculate the amounts in contra account, there is a limitation in this research. We find that 51 out of 107 hospitals record in contra accounts an amount equal or greater than the specific grants they received in 31-12-2017, while the rest 56 hospitals record an amount smaller compared to what they received. Assuming that all these hospitals were informed about the decision, it is concluded that 56 hospitals violate the conservatism principle.

To examine how a more/less conservative accounting affects the Net Income, we divide the initial sample into two subsamples. The first sample includes 51 hospitals that seem to apply more conservative accounting and the second sample includes 56 hospitals that seem to apply less conservative accounting. We employ two linear regression models, in order verify this hypothesis. The first sample of hospitals is not influenced by writing off receivables taken place in 2016. Probably, these hospitals either record the appropriate amounts as provision for bad receivables or create a kind of contra account which reduces the amount of that year that write off takes place. Furthermore, the Net Income of these hospitals is influenced by the number of hospitalized patients, a result that

verifies our expectations.

In contrast, hospitals that belong to the second sample are significantly influenced by the write off of receivables in 2016. The coefficient of the dummy variable "write off" takes the value of "−5373243.00", it is statistically significant and strongly supports this argument. Additionally, the Net Income of these hospitals is not influenced by the number of hospitalized patients. One possible explanation is that because the amounts of specific grants are recorded as revenues and the write off of receivables are recorded as losses, there is a cancelation between these two and thus the correlation between net income and operating activity disappears.

Furthermore, using these two samples, we investigate the amounts recorded in the account called "other operating revenue". We conclude that for the first sample the average percentage of "other operating revenue" [(other operating revenues—received grants for salaries from the state)/sales] is almost 12% and for the second sample the figure is almost 60%. These indicators reinforce the assumption that the hospitals belong to the second sample, record grants as revenues. The specific operations of the public hospitals, makes impossible the comparison between the amount in the account called "other operating profits" with the amount in the account "sales" and leads to a difference which is irrationally high.

In fact, these specific grants operate like a cash payment from the state to Public Hospitals for the receivables of National Insurance Organization of Greece. As a result, these receivables obviously are recorded as revenue in the fiscal year that occurred. Consequently, the recording of specific grants as revenue, means that these amounts recorded twice as revenue.

Taking into consideration all the above and the fact that different accounting policies have been applied, we conclude that possibly the financial data such as the Net Income and the Operating Profit of Greek public hospitals, are not comparable with each other.

5.2. Recommendations for Future Research

Even though our study achieves its purpose, we recognize potential limitations. To begin with, sample size could be extended in order to provide much clearer conclusions. Moreover, factors that are related with the governance of the public hospitals have not been taken into consideration due to the fact that relative data is still not available. Therefore, future studies could implement such factors.

Our study on the earnings of Greek public hospitals leads to important observations. Firstly, the ministry of health should provide instructions in order for all the hospitals to apply the same accounting policies.

The same homogenous principle should be applied for the additional notes provided by Public Hospitals. Particularly, among the financial statements that prepare the public hospitals in Greece they disclose the **Appendix** which is relevant to Notes of IFRS. Unfortunately, only few hospitals publish the **Appendix**

which includes useful notes about the financial statements.

The Greek law 3599/2007 in article 27 defines that Greek public hospitals, must prepare their financial statements according to IFRS. Our study concludes that only a few hospitals publish financial statements according to IFRS. The overwhelming majority publish their financial statements according to Greek legislation. We cannot be sure whether hospitals prepare financial statements according IFRS and do not publish them or they don't prepare IFRS complied statements at all. Nevertheless, we believe that the financial statements according to IFRS should be published because are comparable with the financial statements of other hospitals (public or private) or institutes either domestic or abroad. Finally, the financial statements according to IFRS, contain data that is not provided according to Greek Law (for instance cash flow statement).

In 2011 a web platform established by the name *Esynet* for all the public hospitals of Greece to import, their financial and operating numbers. Recently, this platform has changed name and called *BI-Forms* while maintaining its initial purpose and philosophy. The *Bi-Forms* contains almost 20 tables where the hospitals import their data. Unfortunately, a part of this data is widely available. It is our firm belief that this data should be free to the public as it refers to public organizations funded mostly by tax payers' money. Moreover, this data will be very useful for researchers who could study and compare differences between IFRS and Greek reporting framework of Greek public hospitals.

Further research could integrate data like mortality rates, readmission rate, employees/patient rate to financial data which could ultimately lead to improvements to hospital operations. Moreover, as audit report from the external auditor is published, it could be used in order to detect possible weaknesses of hospitals about their operation and the reliability of financial statements data.

Disclaimer

The views and opinions expressed in this paper are those of the authors and do not reflect their respective institutions.

Data Availability Statement

Data are not publicly available due to ethical reasons, though the data may be made available on request from the corresponding author.

Conflicts of Interest

No conflict of interest exists in the submission of this manuscript.

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Websites

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Appendix A

Significant amounts in account "Earnings of previous years"

Hospital_Id	Year	Earnigs Of Previous Years	Sales	Earnings Of Previous Years/sales
127	2015	49196.20	466267.71	10.55%
116	2018	6503619.59	61189950.71	10.63%
28	2015	610353.15	5566918.71	10.96%
24	2015	1650964.46	13889851.55	11.89%
29	2018	482639.56	3883771.69	12.43%
217	2017	3460421.60	27563185.37	12.55%
49	2016	1797300.09	14148982.43	12.70%
612	2016	1115391.17	8611769.46	12.95%
214	2017	496110.75	3670492.48	13.52%
635	2016	3340263.13	23930248.24	13.96%
611	2017	787647.76	5482043.53	14.37%
121	2015	8938003.09	60613399.00	14.75%
73	2017	1791796.07	12078023.53	14.84%
632	2015	1577434.21	10320104.08	15.29%
319	2016	3161781.67	20352172.22	15.54%
219	2018	7942478.42	48408081.38	16.41%
415	2018	6029847.93	35965370.81	16.77%
628	2018	7933109.60	47276069.81	16.78%
410	2017	3257923.32	19178980.06	16.99%
417	2018	2015257.54	11677071.39	17.26%
59	2015	2463961.33	13961848.28	17.65%
210	2015	1339087.83	7282810.66	18.39%
629	2017	10336095.63	55498772.62	18.62%
68	2015	3158751.35	16795192.22	18.81%
65	2018	903930.83	4634713.34	19.50%
23	2016	5198509.04	26202085.92	19.84%
314	2018	786291.33	3924529.97	20.04%
318	2017	3658263.13	18059989.61	20.26%
512	2017	268035.95	1301989.83	20.59%
223	2016	6187642.96	29352864.30	21.08%
68	2016	4372149.89	20415360.11	21.42%
710	2018	2283030.71	10458055.71	21.83%
625	2018	587261.78	2668019.38	22.01%

Continued

213	2015	80339.65	362793.23	22.14%
78	2017	11368549.64	50677018.77	22.43%
411	2017	1715106.29	7354893.85	23.32%
69	2015	3124312.93	13283278.97	23.52%
628	2017	11336531.52	47306001.16	23.96%
73	2015	2299174.38	9578873.67	24.00%
420	2017	11507573.75	47869002.81	24.04%
629	2016	14563612.00	60054611.93	24.25%
614	2017	180785.41	730948.22	24.73%
636	2018	2595219.34	10388798.81	24.98%
321	2017	4897612.32	19550313.28	25.05%
317	2017	4164399.44	15801764.68	26.35%
314	2017	1095596.16	4045149.59	27.08%
419	2016	2674996.31	9770959.92	27.38%
319	2017	5332029.81	18743010.71	28.45%
219	2015	19189957.13	65429593.00	29.33%
72	2018	10167163.95	34408080.98	29.55%
215	2015	1149560.39	3602961.93	31.91%
69	2016	4673559.74	14055865.54	33.25%
210	2017	2293749.25	6892732.16	33.28%
131	2018	6608533.38	19633105.98	33.66%
322	2016	20988922.15	60765505.47	34.54%
322	2017	20009432.07	56664039.26	35.31%
415	2015	11072546.27	30728203.18	36.03%
76	2015	175911.81	482760.16	36.44%
514	2017	22280494.48	59652585.70	37.35%
511	2018	376176.55	981446.85	38.33%
68	2018	5828437.20	14500473.82	40.19%
21	2016	8498200.83	19371583.28	43.87%
28	2017	2109119.36	4514251.50	46.72%
415	2016	14956168.19	31263585.60	47.84%
220	2015	2396564.17	4949425.95	48.42%
415	2017	16519502.72	33360446.31	49.52%
632	2018	5223087.19	10402378.94	50.21%
28	2018	2100431.04	3857852.39	54.45%
411	2016	4405114.06	6786738.28	64.91%
633	2015	6482898.77	7328827.69	88.46%

Continued

633	2018	7691556.65	8397235.00	91.60%
212	2018	1163475.28	1263621.91	92.07%
710	2017	11076434.89	10649895.33	104.01%
69	2018	9138493.00	7612145.61	120.05%
633	2017	15029683.36	6897063.80	217.91%
624	2018	1440250.50	631276.62	228.15%
710	2016	15850746.31	4343180.16	364.96%
633	2016	7638065.84	1318422.18	579.33%

Appendix B

T Significant amounts in account "Expenses of previous years"

Hospital_Id	Year	Expenses Of Previous Years	GOGS	Expenses Of Previous Years/GOGS
121	2015	10500508.23	103696426.47	10.13%
219	2017	9545259.80	84241599.74	11.33%
212	2015	726088.70	5689319.13	12.76%
219	2016	13089432.94	98651964.69	13.27%
67	2017	1339516.01	10064368.72	13.31%
121	2018	11231250.50	78732983.66	14.26%
633	2017	1151178.71	7597961.51	15.15%
633	2018	1085929.62	6799652.87	15.97%
220	2015	2599745.68	14721689.20	17.66%
219	2015	19104038.29	106548779.39	17.93%
28	2018	1839523.50	7688087.27	23.93%
67	2016	3605338.10	10957468.02	32.90%
34	2016	3541651.16	8402345.33	42.15%
322	2016	91001257.57	108897697.04	83.57%
633	2016	17984362.69	8130165.96	221.21%